LEADING

ITEM NUMBER	14.5
SUBJECT	Epping Town Centre Traffic Study and other Epping Planning Review Matters
REFERENCE	F2017/00210 - D06202874
REPORT OF	Snr Project Officer
PREVIOUS ITEMS	11.3 - Epping Planning Review - Completion of Stage 1 and Commencement of Stage 2 - Council - 14 Aug 2017 6:00pm 12.5 - Update on Epping Planning Review and Related Matters - Council - 12 Feb 2018 6.30pm 13.4 - Outcomes of Public Exhibition - Draft Amendments to Hornsby Development Control Plan 2013 - Tree and Vegetation Preservation - Council - 26 Feb 2018 6.30pm

Note: This report was deferred from the 28 May 2018 and 25 June Council Meetings.

PURPOSE:

This report details the progress of the Epping Town Centre Traffic Study and updates Council on the implications for the findings of the Epping Planning Review, as well as several related planning matters relevant to the Epping Town Centre.

RECOMMENDATION

(a) **That** Council note this update on the Epping Planning Review and related matters.

(b) **That** Council exhibits the Epping Town Centre Traffic Study and supporting documentation to enable comment from major stakeholders in accordance with the consultation plan described in the body of this report.

(c) **That** despite recommendation (b) above, that Council adopts the position that it does not support any:

i. Planning proposal or preliminary planning proposal that applies to sites situated within the Epping Planning Review Study Area which seek to deliver extra housing in addition to what can be achieved under the current planning controls, unless the planning proposal is seeking to address a planning issue identified in Council's Epping Planning Review process related to heritage interface controls, commercial floor space or resolving open space issues at Forest Park..

ii. Development applications seeking an increase in residential density via clause 4.6 of the *PLEP 2011*

and that Council write to the Department of Planning and Environment (DP&E) advising them of this position.

(d) **That** in relation to the Austino Planning Proposal that Council write to the DP&E to:-

i. Object to the Planning Proposal in its current form and density proceeding; and

ii. Request that Council be re-instated as the RPA so that Council can pursue a Planning Proposal that would retain the current controls that apply to the site with the exception of the former Bowling Club portion of the site which would be rezoned from RE1 Public Recreation to R4 High Density Residential with a maximum Height of Building control of 17.5m and FSR of 1.5:1.

(e) That should Council be re-instated as the RPA (on the basis that it will pursue a Planning Proposal as per (d)(ii) above) Council officers be authorized to commence discussions with the Austino PP applicant about the form of the Planning Proposal and whether there are any opportunities for some contribution to additional open space as part of the Planning Proposal. The outcome of these discussions should be reported to Council.

(f) **That** Council write to the Minster for Planning and the Greater Sydney Commission and request the State Significant Development currently being progressed for 240-244 Beecroft Road be placed on hold until:

i. the supplementary work on a new road link has been completed; and

ii. that the relevant approval authority agrees to the provision of commercial floor space equivalent to a 1:1 FSR.

(g) **That** a further report is brought to Council on the options for the Rawson Street carpark site as a site for future civic space and community facilities and analysis on whether any EOI process should be commenced to seek partners to redevelop the site and realise the FSR available on the site.

(h) **That** a further report is brought to Council on the outcome of the consultation on the Epping Town Centre Traffic Study and the results of the supplementary traffic analysis discussed in this report on:-

i. Reopening of the former M2 bus tunnel link; and

ii. A new east west road link through 240-244 Beecroft Road

(i) **That** a Planning Proposal including all necessary background studies and analysis be prepared to progress the recommended LEP amendments detailed in this report relating to:-

i. Rosebank Avenue HCA, Precinct;

ii. 1, 3, 3A, 5, 7, and 7A Norfolk Road and 25 Pembroke Street;

iii. Essex Street HCA Precinct;

iv. Rose Street Precinct; and

v. Rockleigh Park Precinct;

and that the Planning Proposal and associated material be reported to Council for endorsement before it is forwarded to the Department of Planning and Environment seeking any Gateway Determination for the planning proposal.

(j) **Further, that** a Planning Proposal including all necessary background studies and analysis be prepared to progress the recommended LEP amendments detailed in this report relating to new controls to require the provision of commercial floor space in the centre and that the Planning Proposal and associated material be reported to Council for endorsement before it is forwarded to the Department of Planning and Environment seeking any Gateway Determination for the planning proposal.

BACKGROUND

1. This report is a progression of a Council report deferred from the 12 February 2018 Council meeting (Item 12.5) provided at **Attachment 1**. This report also relates to a Council assessment of the Austino planning proposal.

2. As noted above, Item 12.5 from the 12 February 2018 Council meeting which sought to provide an update on the status of the Epping Planning Review and associated matters was deferred. It resolved as follows:

   That *consideration of this matter be deferred for the following reasons:*

   1. *Consultation with Ward Councillors.*
   2. *That Council write to the Department of Planning seeking clarification around the decision of 1 December 2017 to appoint the Sydney Central Planning Panel as the relevant Planning Authority, meaning that Council no longer has relevant planning Authority Status for this proposal. Council is seeking this clarification particularly around the fact that the Department of Planning and Environment will be referring the outcome of the Traffic Study to make their determination which is the reason for our Council delaying a recommendation to the Council.*
   3. *Upon receipt of the valuation for the former Epping Bowling Club site, the formal valuation be the subject of a Briefing to Ward Councillors and any other interested Councillors prior to the Austino Planning Proposal or any update on the Epping Planning Review being reported back to Council.*

3. In response to the resolution of 12 February 2018:

   a. A Workshop was held with Councillors on 16 February 2018 so that the applicants of two preliminary planning proposals – Oakstand consortium and Lyon Group – could present their respective preliminary planning proposals. These preliminary planning proposals are detailed later in this report.

   b. A Councillor briefing session was held with Ward Councillors on Wednesday, 28th March 2018 which provided an update on the Epping Planning review including the draft findings on the Epping Town Centre Traffic Study and valuation report on 725 Blaxland Road.

   c. A meeting was held with the Member for Epping, Damien Tudehope on Thursday, 29th March 2018 which also provided an update on the Epping Planning review and included a discussion on the draft findings on the Epping Town Centre Traffic Study and valuation report on 725 Blaxland Road.

4. Consistent with resolution 2 above, on 1 March 2018, Council Officers wrote to the Department of Planning and Environment (DP&E) seeking clarification on the removal of the relevant planning authority role from City of Parramatta council. The DP&E’s response is attached to this report at **Attachment 2**.

OVERVIEW OF EPPING PLANNING REVIEW AND STRUCTURE OF THIS REPORT

5. The Epping Planning Review (EPR) was initiated as a review of planning controls for the Epping Town Centre and immediate surrounds (refer to the area delineated orange in the figure below) to address the issues of land use conflicts. These conflicts were raised by the Epping Community following from the DP&E's Priority Precinct process which increased the density controls in March 2014. The EPR Study Area is shown in Figure 1.

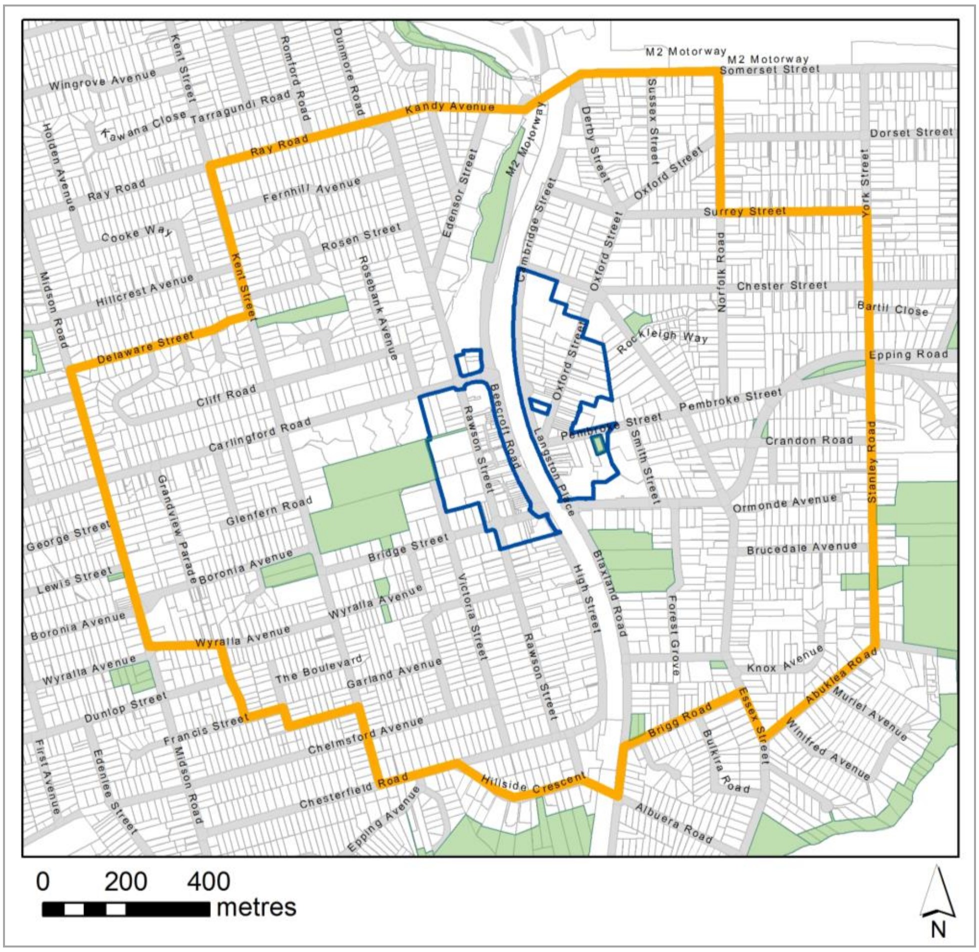

Figure 1 - Epping Planning Review study area showing the town centre and immediate surrounds

6. The EPR has also followed the Council boundary changes occurring in May 2016 under which the Epping Town Centre came to be entirely contained within the City of Parramatta (having previously been split between Parramatta City and Hornsby Shire Councils).

7. One objective of the EPR has been to create a unified planning framework for the Epping Town Centre and its immediate surrounds, including one set of LEP and DCP controls, a unified development contributions framework and one public domain plan. Council has already developed a single development contributions framework for the Epping Town Centre and Council's formal LGA-wide Harmonization Process will have a role in bringing some further consistency to the planning controls.

8. The EPR has two stages. The first stage has involved undertaking technical studies and community consultation to inform planning control amendments to resolve land use conflicts or issues. The last remaining element of this stage is

the completion of traffic analysis and the major element of this is the Epping Town Centre Traffic Study.

9. The **Epping Town Centre Traffic Study** (ETCTS) is the key component of this report, as its findings have major implications for the Epping Town Centre in the short to mid-term. The implications of the ETCTS are also discussed with regards to:
   a. Updates on the status of **LEP and DCP amendments** affecting land within the Town Centre with a small section of the report discussing the release of the final **Central City District Plan** in March 2018 and relationship with the EPR.
   b. the State Significant Development proposal affecting NSW Government owned land at **240-244 Beecroft Road, Epping**.
   c. The **Austino Planning Proposal** and **Preliminary planning proposals** affecting land within the Town Centre.
10. This report makes recommendations on:
    a. the **interface areas** at Rosebank Avenue, Rockleigh Park, Pembroke Street/Norfolk Rd, Essex Street and the Rose Street Precinct;
    b. **commercial floorspace** within the centre; and
    c. potential **social infrastructure** provision on the Rawson Street Car Parking site.

RELATED PLANNING POLICY MATTERS

11. A series of recent policy amendments (LEP, DCP and development contributions plans) are complete which apply to land within the EPR study area and relate to:
    a. Housekeeping Amendment to Hornsby LEP 2013 recently coming into effect.
    b. Fast Tracked Amendments to Parramatta DCP 2011 involving footpath widening recently coming into effect.
    c. Amendment to Hornsby DCP 2013 - Tree Preservation and associated matters raised by Council in its resolution from the 26 February 2018 Council meeting pertaining to tree removal in Forest Park and the potential impact of Austino planning proposal on trees in the north of Forest Park are detailed in **Attachment 3** to this report.
    d. Section 94 and 94A Developer Contributions Plans applying to the EPR area recently coming into effect.
12. These matters are further detailed in **Attachment 3**.

Greater Sydney Region Plan and Central City District Plan

13. In March 2018, the Greater Sydney Commission (GSC) released the final *Central City District Plan* (CCDP) and its metro-wide level plan *Greater Sydney Region Plan - A Metropolis of Three Cities.*
14. In both plans, Epping is identified as a ‘Strategic Centre’ for 2036. However, in the earlier iterations of the District Plan and Metro Plan, Epping was identified as a “Town Centre” or “Local Centre”. Thus the role of the Epping Town Centre has been elevated to a higher-order centre without any corresponding dialogue or justification. Also, the ‘Strategic Centre’ category is still not clearly defined in

the Final Plans. The change has also occurred ahead of completion of the Epping Town Centre Traffic Study.

15. The CCDP establishes dwelling targets for the five year period from 2016 to 2021 for the Parramatta LGA and jobs targets for lower and higher scenarios for 2036 for Epping, specifically. In the context of the Epping Planning Review and recent development forecast, these are discussed below:

    a. With regards to **dwelling targets** for that period, the CCDP sees 21,650 additional dwellings for the 2016-2021 period for the Parramatta LGA. Analysis contained in this report on recent dwelling growth within the Epping Town Centre demonstrates that recent growth patterns mean this centre can meet a substantial proportion of this target.

    b. With regards to the **jobs targets**, the Epping Town Centre is identified as a Strategic Centre for 2036 with a jobs target of 1,900 additional jobs (2036 <u>baseline</u>) to 2,400 additional job (2036 <u>higher target</u>). These are on top of the 5,100 jobs that the CCDP sees as the baseline for 2016. Further discussion about the provision of commercial floorspace is provided further in this report.

16. Furthermore, a series of actions (both direct or indirect) across a number of the CCDP's Planning Priorities apply to the Epping Town Centre and largely involve collaboration with the DP&E and GSC.

EPPING PLANNING REVIEW - STAGE 1

17. The major elements of Stage 1 of the EPR were spelled out in the 12 February 2018 report (Item 12.5) which noted that Stage 1 of the Epping Planning Review was largely completed with the exception of a Final Traffic Study. This was precluded by a report of Council at its meeting on 14 August 2017 which reported the Discussion Paper and its supporting technical studies.

18. An **Interim Traffic Modelling Report** (dated June 2017) was prepared by EMM for the purposes of the Epping Planning Review Discussion Paper which was exhibited in June/July 2017. The Interim Report formed preliminary analysis in order to consult the Epping community on traffic and access in and around the Town Centre.

19. At the 14 August 2017 Council meeting, Council endorsed a suite of principles to guide Stage 2 of the Epping Planning Review. The issues discussed in this report directly affect many of the principles.

Epping Planning Review Steering Group

20. To ensure delivery of the Epping Planning Review, in February 2017, Council established the Epping Planning Review State Agency Steering Group which has representation from the Greater Sydney Commission, the Department of Planning and Environment, Transport for NSW and Roads and Maritime Services.

21. The Steering Group is also consistent with the Central City District Plan where:

    Parramatta City Council is leading the review of planning controls and the Commission is collaborating with Council and other State agencies to address social infrastructure, traffic, heritage and commercial land issues (p.21).

22. Given the recommendations within this report, the role of the Steering Group in providing further direction on the Epping Planning Review process is paramount.

BACKGROUND TO EPPING TOWN CENTRE TRAFFIC STUDY

23. The principal traffic study underpinning the existing planning controls which is now outdated is the **Halcrow Study** of 2011 commissioned by Hornsby Council, the then Parramatta City Council and the DP&E prior to the Priority Precinct process formally commencing. The Epping Town Centre Traffic Study (ETCTS) replaces this analysis.

24. The Halcrow Study tested the short term and long term land use scenarios:

    a. The short term (2016) land use scenario was based on a forecast of additional 900 dwellings and additional 3,000sqm of retail uses; and

    b. The long term (2026) land use forecast a further 2,100 dwellings and another 3,000sqm of retail uses.

25. In total, this tested the impact of 3,000 additional dwellings and 6,000sqm of additional retail within the Town Centre by 2026. As is discussed further in this report, the Halcrow assumptions on residential land use have substantially underestimated the development trends.

EMM's Interim Traffic Study (2017)

26. The preliminary analysis carried out by EMM in 2017 as part of the Interim Traffic Modelling report for the purposes of the EPR Discussion Paper allowed discussion of the issues as part of the Discussion Paper process. Specifically, the preliminary study identified the following key issues:

    a. The east west Carlingford Road/Epping Road and north south Beecroft Road/Blaxland Road are sub-regional routes that converge at the Town Centre mixing with local traffic.

    b. Approximately 89% of trips that cross the bridge are through traffic trips where the origin and destination of the trip is outside the Epping Town Centre.

    c. The through trips are a significant barrier to improving the traffic flow around the Epping Town Centre. (Note: Centres are usually structured in a way that separates local traffic from through-traffic, but the Epping Town Centre is not).

    d. The widening of the rail bridge will not be a "game changer" given the time it will take motorists to cross the bridge. In other words, the expansion of the bridge will be an improvement, but will not be a *significant* improvement in providing relief to congestion.

    e. Traffic routes and intersections are currently operating at over-saturated traffic levels for both the morning and afternoon peak hour, and the increased intersection traffic delays are already displacing some of the previous regional through traffic movements away from the Epping Town centre to other parallel traffic routes such as the M2 Motorway for east-west traffic and Midson Road for north-south traffic.

Local road upgrades

27. The Roads and Maritime Services' (RMS) program of main road improvements within the town centre have been factored into the ETCTS. They are:

    a. Widening of Epping Road from two lanes to three lanes involving:

        i. Removal of the right turn movement from Langston Place into Epping Road,

ii. Removal of the right turn movement from Epping Road into Smith Street and Forest Gove;

iii. New dedicated right turn lanes from Essex Street into Epping Road; and

iv. New traffic light controlled pedestrian crossing for Epping Road and Essex Street.

b. Upgrading the Beecroft Road and Carlingford Road intersection in Epping involving:

i. New traffic light controlled pedestrian crossing for Carlingford and Beecroft Roads;

ii. Additional right-turn lane from Beecroft Road into Carlingford Road; and

iii. New pedestrian path to link with the exiting path to Epping Station.

28. A critical factor is that the traffic modelling undertaken since 2011 all factor in a widening of the rail bridge carriageway on Epping Road to accommodate an additional westbound lane. In a letter from the DP&E to Council dated 7 November 2017, it notes that “Transport for NSW is investigating several options for widening this overpass and the Council would be informed of the results when the investigation concludes” but the letter did not provide a timeframe. Since the receipt of the letter, Council Officers have not been provided with an update.

Dwelling forecasts since 2011 and actual dwelling growth

29. In order to understand the significance of the findings from the ETCTS (covered in the next section), it is important to understand recent (actual) and anticipated dwelling growth in the context of the growth predicted by the DP&E as part of the former Epping Priority Precinct process completed in March 2014. This must be understood so that infrastructure providers (Council and the State government) can ensure the delivery of appropriate infrastructure at the right time.

Dwelling forecasts

30. During the progression of the DP&E’s Priority Precinct process, dwelling growth forecasts were reviewed from **3,000 additional dwellings** for 2026 in the Halcrow Study to **3,750 additional dwellings** for the year 2036 as per the Department of Planning and Environment’s (DP&E’s) *Finalisation Report* (November 2013). However, shortly after the City of Parramatta commenced the EPR process, in early 2017, the DP&E revised its forecast figure of 3,750 additional dwellings to **5,500 additional dwellings** by 2036 and set a maximum dwelling yield of **10,000 additional dwellings** at a 100% take up rate.

Actual dwelling growth

31. The Epping Planning Review Discussion Paper (June 2017) noted that Council Officers had reviewed recent development applications and approvals to track actual growth against the dwelling forecasts undertaken by the DP&E and/or during the Priority Precinct process. This reviewed all of the pre-lodgments, DAs under assessment and determined (both under construction and not yet under construction) that have occurred since March 2014 when the new Priority Precinct controls came into effect and found that **4,735 additional dwellings** could be delivered in the short to mid term (assumed to be as early as 2023), if

all DAs are constructed and fully occupied in that time. This equates to an additional **10,890 people** within the centre assuming a household size of 2.3 persons per household (Source: Council's Social Outcomes Unit).

32. Then again, for the purpose of this Council report, on 19 April 2018, Council Officers tracked this figure to **5,553 additional dwellings** by 2023. This is made up of 3,940 approved dwellings and 1,613 dwellings under assessment. Again, applying an occupancy rate of 2.3 persons per household, this means an additional **12,771 people** in the town centre by 2023. With no signs of the Town Centre's residential market slowing down, Council Officers conclude that within 4 years of the new planning framework being in place, the DP&E's revised 5,550 additional dwelling target for 2036 is well on its way to being met well before 2036.

What does this growth mean?

33. The tracked growth is well above what was forecast and planned for by the DP&E during the Priority Precinct process. In effect, the 2036 revised forecast of last year by the DP&E (of 5,500 dwellings) will already effectively be met within 4 years of the new planning controls if the development detailed in existing approvals and applications are realised.

34. The rate of this growth has significant implications for the amenity and function of the centre including infrastructure provision in the short and mid-terms. For example:
    a. The widening of the rail bridge carriageway on Epping Road to accommodate an additional westbound lane is yet to be delivered by the State Government.
    b. Education infrastructure such as schools managed by the Department of Education (public schools) as well as private schools will be under more pressure.
    c. The significant loss of commercial floorspace spelled out in the SGS *Commercial Floorspace Study* and the *Epping Planning Review Discussion Paper* exhibited in mid 2017 means the future amenity and function of Epping as a centre is at stake.
    d. The provision of local infrastructure (libraries, community facilities, open space and recreational facilities) is under pressure to be enhanced and improved.

Conclusions

35. Comparing the Town Centre's growth with the CCDP's dwelling targets for the Parramatta local government area (LGA) for the 2016-2021 period which is (21,650 dwellings), the 5,553 additional dwellings represents a substantial proportion of the dwelling target although some of that growth has occurred post March 2014.

36. In addition to the tracked dwelling growth since March 2014, there is substantial interest from developers and land owners within and around the town centre seeking an increase in residential yield above what the current controls allow via a planning proposal process.

37. Council must ensure that the amenity of the centre as well as the long term social, environmental and economic aspirations of the Epping community are not undermined. Both the Greater Sydney Commission and the DP&E have a critical role in this.

EPPING TOWN CENTRE TRAFFIC STUDY

38. Council Officers commissioned EMM Planning and Environmental Consultancy in March 2017 to revise the traffic analysis work done as part of the DP&E's Precinct Planning process.

39. The Epping Town Centre Traffic Study (ETCTS) effectively replaces the 2011 Halcrow Study which formed the basis for the current planning controls within the Town Centre. It also replaces other applicant-prepared traffic analysis from 2015. A copy of the ETCTS is provided at **Attachments 4 and 5** (Attachment 4 comprises the Traffic Report and Attachment 5 comprises the Appendices).

The EMM Epping Town Centre model

40. The traffic model was developed by Transport Modelling for EMM. The base model report was completed in December 2017 and forwarded to the RMS for authorisation which was received in February 2018. In its response, RMS stated that the consultant's 2017 base model is suitable for traffic assignment analysis (traffic distribution) for the assessment of any future proposals within the study area.

41. The ETCTS models the co-ordinated operation of a chain of linked intersections. It does this for four existing and future traffic network model and land use scenarios which are:
    a. Existing actual peak hour intersection traffic volumes which were surveyed in March 2017;
    b. Modelled base case 2017 intersection traffic volumes from the EMME model;
    c. Modelled +5,000 dwellings growth scenario intersection traffic volumes from 2026; and
    d. Modelled +10,000 dwellings growth scenario intersection traffic volumes from 2026.

42. To develop a base year for the network traffic model, in March 2017 the following peak hour surveys, travel time surveys and traffic queue length observations were undertaken:
    a. Peak hourly intersection turning movements at 17 intersections;
    b. Morning/afternoon peak hour travel time surveys across the full study area;
    c. Morning/afternoon peak hour maximum traffic queues for traffic signal operations on Beecroft Road, Carlingford, Epping and Blaxland Roads.

43. The model then tests two future residential growth scenarios in the study area as follows:
    a. A 2026 land use scenario tests 5,000 additional dwellings
    b. A 2036 land use scenario tests 10,000 additional dwellings.

    These scenarios are additional dwellings realized after the new DP&E planning controls came into effect in March 2014.

44. The ETCTS also includes preliminary analysis of two local road network options:
    a. The reopening of the former M2 bus tunnel link to Epping Station as a one way westbound link with left turn egress only at Beecroft Road and

b. A new east west road link connecting between Ray Road and Beecroft Road, through the NSW Government site at 240-244 Beecroft Road on the western side of Beecroft Road.

45. These two road network options are only explored in a preliminary sense for the 2026 and 2036 future traffic network models. This seeks to determine the potential future extent of the likely road network traffic delay benefits for locally based traffic accessing the major road network at Epping. Refer to Sections 7.3 and 7.4 of the ETCTS provided at **Attachment 4**.

ETCTS Findings

46. The broad findings from the ETCTS are summarized below.

Findings from Survey Counts

47. For the **March 2017** surveyed morning and afternoon peak hour traffic conditions the findings are as follows:

    a. Up to four of the six key intersections on the four major traffic routes (via Beecroft Road, Blaxland Road, Carlingford Road and Epping Road) are operating at over saturated (level of service F) traffic conditions respectively with an average 5 minute waiting time.

    b. During the morning peak period the combined eastbound and southbound traffic queues on Carlingford Road and Beecroft Road can reach a combined total length of approximate 1.5 km.

    c. The most widespread traffic queuing effects on all areas of the road network are considered to occur at approximately 8:40 am and 5:40pm, consistent with the Sydney regional major road traffic conditions.

    d. The increasing road traffic congestion occurring in the Town Centre area, is adversely affecting both the regional through traffic movements and local traffic accessibility to the major road network.

Future years of 2026 and 2036

48. The findings of the +5,000 and +10,000 dwellings growth scenario intersection traffic volumes for the 2026 and 2036 are as follows:

    a. Future peak hour traffic conditions continue to worsen even when the full programs of the identified RMS and Council road improvements have been implemented.

    b. In the road networks, five to six of the assessed intersections will have traffic conditions operating at oversaturated (level of service F) during both the morning and afternoon traffic peak periods. As an example, in 2026, the Carlingford Road/Beecroft Road intersection has an average delay which equates to 70.5 minutes (morning peak) and 23.5 minutes (afternoon peak). In 2036, this increases to 77 minutes (morning peak) and improves to 10.5 mins in the afternoon peak.

    c. In 2036, over 3,300 vehicles cannot enter the network.

49. The average intersection delays are predicted to improve by 2036 from the 2026 base scenario as a result of Council proposed road improvements which are anticipated to be implemented during this period. However, the most crucial intersection – Beecroft Road – actually experiences a higher average delay in 2036 than for the 2026 case (p.41).

50. The ETCTS also finds that *the afternoon performance of the network for the base 2036 is such that it is unlikely that there will be any spare capacity for additional vehicles* (p.41).

Additional westbound lane on Epping Bridge

51. The additional westbound lane on Epping Bridge would primarily benefit the afternoon peak hour westbound regional traffic movements travelling through the Town Centre. However, if the bridge were to operate with future tidal flow traffic conditions such as four lanes eastbound during the morning peak periods with two lanes westbound and three lanes in each direction during the afternoon peak periods, this future improvement could provide significant travel flow benefits during both these peak periods.

Additional road network options

52. The findings from preliminary testing of two additional road network options, are as follows:

    a. **Reopening of the former M2 bus tunnel link:** the envisaged number of vehicles that would use the tunnel would result in equivalent peak hourly traffic reductions for certain southbound right turning traffic and westbound traffic movements. These "*would probably have significant network traffic benefits in terms of reducing the future peak hourly intersection traffic delays at these intersections"* (ETCTS, p.45).

    b. **A new east west road link through 240-244 Beecroft Road:** the envisaged number of vehicles that would use the through link would result in equivalent peak hourly traffic reductions for the other traffic movements using the Carlingford Road intersections with Beecroft Road or Ray Road and Rawson Street which "*could have significant network traffic benefits in terms of reducing the future peak hourly intersection traffic delays at these intersections"* (ETCTS, p.45).

53. However, further SIDRA intersection analysis is required of the above two road network options, this analysis is currently underway.

Implications

54. The findings from the ETCTS has major land use and infrastructure implications for town centre and surrounds. Therefore, Council Officers see that the role of the ETCTS is to:

    a. Inform planning policy affecting the Study Area particularly in relation to:

        i. Certain proposals seeking an increase in residential yield; and

        ii. State Significant Development applications.

    b. Provide a basis for Council to take to the DP&E, GSC and the Minister for Planning seeking support for:

        i. a position on residential development that indicates that any growth in residential development should only be permitted to resolve planning issues in Epping rather than just to permit additional residential development above what can be achieved under the current controls; and

        ii. a coordinated approach to infrastructure delivery consistent with actions within the CCDP.

c. Inform changes to the principles adopted by Council on 14 August 2017 that relate to:

i. Heritage interface;

ii. Commercial floorpsace; and

iii. Open space and community infrastructure.

Consultation

55. The ETCTS and any associated traffic analysis as part of the overall ETCTS brief should be placed on exhibition so that the major stakeholders (such as RMS, Transport for NSW (TfNSW), DP&E, GSC, landowners and the wider community) have an opportunity to comment on the documentation. Consultation will occur via:

a. Formal invitation to State agencies represented on the EPR Steering Group which are RMS, TfNSW, DP&E and GSC.

b. Formal invitation to major land owners formally seeking density residential density uplift such as Austino, Oakstand and Lyon Group.

c. Notification e-newsletter to the 440 residents and businesses registered on the EPR project mailout database. This will include local residents and business as well as planning consultants acting for Epping landowners.

d. A public notice in the *Northern District Times.*

56. The ETCTS and associated supporting material will be made available on the EPR project website.

IMPACT OF ETCTS ON STATE SIGNIFICANT DEVELOPMENT AT 240-244 BEECROFT ROAD

57. The State government owned site at 240-244 Beecroft Road (refer to Figure 2) once used for the Sydney Metro Northwest project is subject of a State Significant Development (SSD) application.

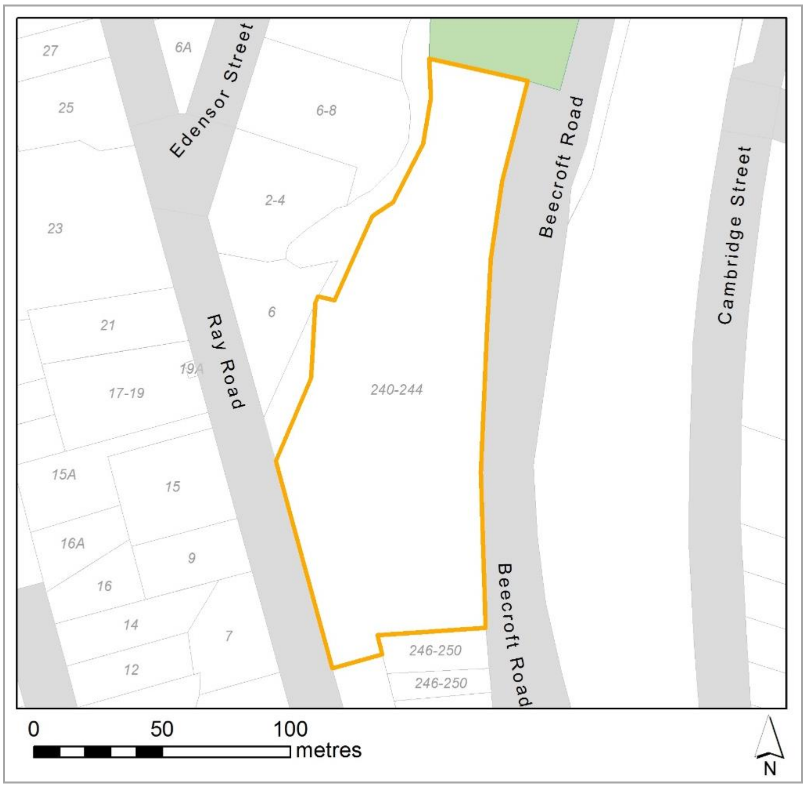

Figure 2 - State government owned land at 240-244 Beecroft Road, Epping

58. The background to his SSD application up to January 2018 is contained within the deferred Council report of 12 February 2018 (**Attachment 1**). However, the role of the site in the future development of the Town Centre is key in two ways: from both land use and traffic/access perspectives.

Land Use issue

59. The SSD application applies to 10,120sqm of the 13,342sqm total site area and proposes 39,000sqm of GFA (450 residential units) and 15 storeys which equates to a 3.8:1 FSR. Of that, the SSC proposes 2,000sqm of commercial FSR which equates to 0.2:1 *to be located at ground level on Road (could be general store, childcare, gymnasiun, café, small offices).*

60. The Commercial Floorspace Study by SGS prepared for the purposes of the EPR Discussion Paper saw that there has been a loss of commercial floorspace estimated at about 63%. Further internal analysis undertaken by Council Officers in early February 2018 has identified that that approximately **8,200sqm retail** and **35,200sqm office** floorspace needs to be "replaced" within the Town Centre. Given its scale, this site plays an important role.

61. From a planning perspective, the SSD process presents Council with an opportunity to negotiate an outcome because:

    a. The site's current zoning (R4 High Density Residential) does not require any commercial floorspace however, a ***neighbourhood shop*** use (max. 100sqm) is permissible within the zone.

    b. The site's previous zone (B4 Mixed Use) would still have allowed the commercial office building on that site to be demolished and replaced with a building that had retail and commercial at lower levels and residential on higher levels. Returning the site to its previous zoning would not require the owner to replace the previous commercial floor space that historically existed on that site.

    c. The timeframe around the SSD process is much faster, than a rezoning process; in the latter, Council can seek a higher amount of commercial floorspace on the site, but this would take some time. The SSD can approve commercial floorspace even it if is not permitted in the zone so there is a mechanism for addressing the floorspace in a timely manner if agreement can be reached.

62. Therefore, a 1:1 FSR (10,120sqm) for commercial uses is a balanced negotiating position that maximises the chances that commercial can be achieved on the site and contribute to Epping's role as a Strategic Centre as identified in the CCDP.

Local Traffic/Access issue

63. Also, as already noted in this report, a road link through the SSD site is being tested to determine whether it can alleviate some of the traffic pressure at the intersections of Carlingford Road with Ray Road and Beecroft Road. Preliminary testing shows it can take of some pressure of peak hour traffic. However, more detailed analysis is progressing with a supplementary report due shortly which will form supplementary analysis to the ETCTS.

Recommendations

64. Council Officers therefore recommend:

a. That Council not support the application until:

   i. A 1:1 FSR of commercial land uses can be delivered on the site; and

   ii. A supplementary report on an east west through link is completed.

b. That Council write to the Minister seeking that he not support the proposal until the two criteria listed in a. immediately above are achieved.

IMPACT OF ETCTS ON AUSTINO PLANNING PROPOSAL

Introduction

65. Council Officers were intending to undertake a detailed assessment of the Austino PP. However, on account of:

    a. The Town Centre having effectively reached the DP&E's revised 2036 dwelling target; and

    b. the findings from the ETCTS;

    Council Officers consider that a detailed assessment of this proposal is no longer required. Instead the assessment method emphasises the significance of the findings of the ETCTS and recognises the critical importance of the RMS and JRPP's comments on traffic matters at the earlier stages of the planning proposal (discussed in the "Traffic" sub-section, below). In short, the traffic impacts associated with the faster than anticipated dwelling growth is the guiding principle informing the outcome of this proposal.

Background

66. The Austino Property Group are the applicant for a Planning Proposal affecting land at 2-18 Epping Road, 2-4 Forest Grove and 725 Blaxland Road (the latter site being the former bowling club site – refer to Figure 3).

Figure 3 - Land affected by the Austino Planning Proposal denoted in solid red line (from applicant's Urban Design Report)

67. The planning proposal – resubmitted to the DP&E in January 2018 seeks to:

    a. Reconfigure the existing R4 and RE1 zones resulting in no net loss of open space;

b. Increase the building heights over the reconfigured R4 zone from 26.5 metres to a maximum of 65.5 metres along with 5 other building heights; and

c. Increase the density on the site from an equivalent 2.1:1 to a combination of 7.5:1, 4.6:1, and 1.75:1.

68. The above proposed changes seek to deliver a predominantly residential development comprising two towers on Blaxland Road with smaller towers on Epping Road accommodating estimated 794* units. (Note this calculation relies on Council's standard practice of applying an efficiency unit rate of 85sqm per unit whereby the applicant relies on a rate of 100sqm). Under the current controls (ie R4 zoning, maximum height of 26.5 metres) on the sites fronting Epping Road), the Austino landholdings would realise a total of approximately 308 units according to Council Officer analysis.

69. A VPA dated 4 December 2015 accompanies the planning proposal which proposes a public urban plaza through the proposed development providing a pedestrian connection between Epping Road and Forest Park, with an area equivalent to the area of land currently zoned RE1 Public Recreation (6,665sqm), so there will be no net loss in open space. However, much of the area proposed to be zoned public open space contains underground car parking below it which is generally not acceptable to Council.

70. This PP has a complex history. Details of the process and the proposal are provided at **Attachment 6.**

Petition

71. Between February and March 2017, Council Officers received a petition which containing nearly 600 signatures. The petition requested a number of actions including that Council purchase the site at 725 Blaxland Road. Other actions related to concerns on the impacts of the planning proposal on Forest Park in terms of traffic and urban design.

72. The petitions were tabled at the Council meeting held on 13 February 2017 where Council resolved:

That the petition be received and referred to the appropriate Council officer for report.

73. In response to the resolution, the appropriate time for the consideration of the petition was always intended to be undertaken as part of the assessment of the Austino planning proposal. This section in this report forms that assessment.

Traffic Analysis

74. The applicant's Traffic Impact Study prepared by GTA in 2015 tested the traffic impacts of the proposal based on the Halcrow Study's 3,000 additional dwellings for 2026. However, as identified in the Halcrow Study, the 3,000 dwellings for 2026 falls well short of the likely growth of 2025 (5,553 dwellings) based on current and expected development activity.

75. In March 2016 having reviewed the applicant's traffic analysis the RMS wrote to Hornsby Shire Council when it was the RPA noting the following:

Should Council support a recommendation for gateway determination, the exhibited proposal must also ensure that the Transport Impact Assessment traffic includes detailed Network modelling results (ie. phasing, queue lengths/delays for all movements, intersection details) for [six] key intersections for all modelled scenarios.

76. At that time, RMS also noted that *the total Residential Parking requirements being restricted to no greater than the minimum parking rates applicable for a total of 327 apartments* on the entire site (ie. Limited to approximately half the amount being sought under this proposal)*. (Note: it is not clear what assumptions the RMS has relied to determine this number of units. Council's assessment suggests the figure is closer to 308 units).

77. In February 2018, the brief for the Epping Traffic Study was extended so that an impact assessment of the Austino planning proposal on traffic and access around the site could be undertaken. This was decided given the findings from the modelled base case 2017 intersection traffic volumes from EMME software based counts.

78. The Traffic Impact Assessment (TIA) prepared by EMM (provided at **Attachment 6**) concludes that the proposal would generate an additional 768 daily vehicle movements on Forest Grove. It also sees that because the impacts of the 2026 and 2036 additional dwellings on the network are so severe, that the actual intersection performance deterioration due to the Austino development either with or without the planning proposal is relatively small.

79. The ETCTS and recent TIA by EMM updates the Austino TIA because the TIA findings were based on a slightly lower future baseline year 2026 additional dwelling forecast than the forecast which has been used in the ETCTS. That said, the general findings within the EMM TIA are still valid. All the same, with regards to the Austino planning proposal impacts, the ETCTS concludes the:

    …significant intersection performance deterioration from the 2017 base to the 2026 future base traffic situation renders any further traffic generating development in this location unacceptable without further capacity improvements to the locality major road and local road network capacity, in particular at the Epping Road/Blaxland Road intersection, and to a lesser extent at the Epping Road/Essex Street intersection. (p.42)

80. When the (then) Sydney East Joint Regional Planning Panel (JRPP) assessed the planning proposal as part of its initial review, it stated, as one of the seven (7) actions, that:

    The proposal on this site should be part of the current Council traffic review of the whole of Epping Town Centre and the outcomes that review shall inform the final decision on Floor Space Ratio for the site.

81. Because of this, a detailed assessment of the planning proposal is considered unnecessary as the fundamental determinant for deciding whether the Epping Planning Review Study Area can take any more residential development is the ETCTS.

82. It is also worth noting that in March 2014, the zoning and density controls for the parcels fronting Epping Road and Forest Grove were amended enabling higher residential yields as part of the DP&E's Priority Precinct process. With the controls having only been in place for 18 months, the applicant seeks further uplift through this planning proposal process. As noted elsewhere in this report, this planning proposal for additional residential development represents housing development simply to increase housing.

Purchase of 725 Blaxland Road (former bowling club) site

83. Part of the site (the former Bowling Club site) is zoned RE1 Public Recreation. The City of Parramatta became responsible for the Planning Controls that apply

to the subject site when the amalgamation occurred in May 2016. Therefore, the City of Parramatta became the acquisition authority for this public recreation land.

84. However, Hornsby Council did not have a funding strategy to acquire the site at 725 Blaxland Road. When the bowling club site became available for sale (ie the transaction that resulted in the current land owner acquiring it). The then Hornsby Council, had the opportunity to purchase it but made a decision not to yet still retained both the RE1 Public Open Space zoning on the Land Zoning Map, and the “Local Open Space Reservation” on the Land Reservation Acquisition Map, over the site.

85. Currently, there is no City of Parramatta Council funding strategy for its acquisition. The revised Section 7.11 and 7.12 (formerly 94/94A) Contributions Plans for Epping which came into effect in November 2017 does include collection for some open space provision. However, the advice in the Epping Planning Review was that Council would be better served by acquiring open space in different parts of Epping where growth is occurring rather than spending a substantial proportion of any funding available (via Section 94 or from other sources) on this portion of land which adjoins an existing substantial piece of open space. This recognises that spending funds to acquire this site would reduce Council’s capacity to invest in other open space to meet the needs of growth in other parts of Epping as well as other community needs.

86. An initial internal valuation of the site was undertaken in mid 2017. The ERP Discussion Paper concluded that for the reasons described above the purchase of the site did not represent value for money and this position informed the subsequent adopted principle which was that Council not purchase the site and instead:

    That Council should seek to progress the planning proposal with Council as the RPA subject to the Traffic Study being completed before FSRs for the site can be finalised. That Council also negotiate with the developer for the provision of public open space in a way that ensures there is a suitable area of open space which is appropriately sized and located.

87. Council Officers have subsequently commissioned an independent valuation for peer review purposes. The valuations remain Commercial in Confidence and confirms that the purchase of the site by Council is not a viable financial option.

88. With regards to the adopted principle above, Council Officers suggest that the opportunity to negotiate with the landowner to have them provide an equivalent amount of open space has changed because of the result of the ETCTS and is in part depended upon the decision made by the current RPA for the Austino Planning Proposal.

89. As already detailed above in this report the DP&E has chosen to remove the Council as the Relevant Planning Authority (RPA) for the Austino Planning Proposal and so it will need to make the next key decision. If despite the ETCTS the RPA now in place for the Austino PP (ie the Central Sydney Planning Panel) decide to proceed with the Planning Proposal then the Council should seek to enter into further discussions with the applicant and the RPA to seek to achieve some dedication of an equivalent amount of open space at no cost to Council as part of the Planning Proposal. If the DP&E allows the further growth despite the problems with the road network they should also be seeking to broker appropriate open space outcomes to help deal with the growth proposed.

90. However, if the RPA decides not to proceed with the Planning Proposal then Council and the applicant will still need to resolve what will happen to the former bowling club site as it will remain zoned RE1 Public Recreation. Whilst this zoning is retained Council remains the acquisition authority.

91. Council options for the former bowling club site in this case will be:-

    a. To commit to the acquisition by retaining the RE1 zoning. As detailed above this option is not recommended by Council Officers as is not considered to be an efficient use of Council funds.

    b. Alternatively, rezone the site so Council is no longer the acquisition authority. In this case the appropriate zoning would be R4 High Density Residential with a maximum height of 17.5m (which permits 5-6 storeys) (Note the *Hornsby LEP* does not include FSR controls for sites zoned R4 High Density Residential but Council's Urban Designers indicate that this would allow approximately 162 units to be built on this site under the controls that would apply under the Hornsby DCP with an FSR equivalent to 1.5:1).

92. It is acknowledged that allowing the site to be rezoned to allow more residential development will be inconsistent with the ETCTS conclusions but Council has two conflicting issues that need to be managed. Council will need to balance two potential negative impacts:-

    a. the traffic impact

       versus

    b. the sub-optimal financial and open space outcomes if it commits to remaining as the acquisition authority for the former bowling club site.

93. Council Officer consider that rezoning the former bowling club site to R4 High Density Residential with a height of 17.5m and FSR of 1.5:1 is the preferred approach because:-

    a. The density that would be permitted is much less than that proposed in the applicants PP so the traffic impact would be mitigated by comparison.

    b. Council will not be forced to expend resources acquiring the former bowling club site in a location Council Officers consider is not optimal use of available funds.

    c. The building height is consistent with the height applied by the DP&E to transition areas when it put in place the existing planning controls in Epping. It will see a stepping down of permitted height as you move away from Epping Road and down to Forrest Park.

94. It is acknowledged that the density permitted on the former bowling club site is the most significant factor driving its valuation and as the density decreases so will the cost of acquiring the site. If Council and the DP&E accept that a R4 High Density Residential Zoning with a height of 17.5m and FSR of 1.5:1 are the appropriate alternate controls to the current RE1 zoning then it maybe possible to have further discussions with the owner about the implications of this for the redevelopment of the site and the delivery of open space outcomes.

Recommendation

95. That Council object to the Planning Proposal in its current form and density proceeding and request that Council be re-instated as the RPA so that Council

can pursue a Planning Proposal that would retain the current controls that apply to the site with the exception of the Bowling Club portion of the site which would be rezoned from RE1 Public Recreation to R4 High Density Residential with a maximum Height of Building control of 17.5m and FSR of 1.5:1.

IMPACT OF ETCTS ON PRELIMINARY PLANNING PROPOSALS

96. As has been noted during Stage 1 of the Epping Planning Review process, two preliminary planning proposals were lodged with Council in late 2014 which affect land within the town centre (western side). Refer to Figure 4. Both proposals have been on hold on account of the ETCTS being completed as per adopted principles of 14 August 2017. When combined, the preliminary planning proposals seek more than **2,000 dwellings**. This equates to an additional 1,000 dwellings above what can currently be achieved across both sites.

97. Each proposal seeks a partnership with Council to develop their sites in conjunction with the Council car park. Figure 4 below shows both the Oakstand and Lyon Group land holdings as well as Council's land holdings. The details of each proposal are provided in **Attachment 7**.

Figure 4 – Applicant owned land for preliminary planning proposals as well as Council's Rawson Car Park sites

Recommendations

98. Given the current growth rate from tracked DAs and the findings from the ETCTS, Council Officers conclude that in the short to mid term, there is no justification for further residential development simply to increase housing. That said, there is an opportunity for an expression of interest (EOI) process with landowners within the Town Centre to transfer some of the floorspace on Council's car park sites to another land owner/s site/s. The EOI process would, at the minimum, stipulate public benefits around a community hub facility, underground car parking, an east-west connection between community hub and the Epping Rail Station, and the like.

99. The outcome of this approach would mean that there is there no net increase in residential floorspace above what can currently be achieved. Effectively Council would be "trading" off the FSR from the carpark site to other sites to generate

funding to provide community facilities on the site of the current car park. It should be noted that any redevelopment would also include retention of carparking on site as it is recognised that this is critical to the operation of western part of the Epping Town Centre.

100. This process would be the subject of a further Council report before any further action is taken explaining the process and potential outcomes. The alternative is to retain the current carpark site and seek to redevelop it independent of other landowners sites. In this case Council would find it difficult to realise the full FSR that currently applies on the site and at the same time provide a significant piece of civic space within current height limits. The viability of achieving the FSR of 4:1 and community facilities and a civic space on the site as a stand alone redevelopment would also be covered in the report should Council request a further report be provided.

IMPACT OF ETCTS ON AREAS WITH INTERFACE ISSUES

101. With regards to the heritage interface areas at Rosebank Avenue HCA, part of the Essex Street HCA, land parcels and Pembroke Road and Norfolk Street and the Rose Street Precinct, the principles adopted at the 14 August 2017 Council meeting recommend further planning analysis that tests higher residential densities such as ***manor homes*** or 3 storey ***residential flat buildings*** which would replace existing detached dwelling development.

102. The interface issues are a result of land use conflicts occurring as a result of the DP&E's Priority Precinct process and require resolution where possible. It is acknowledged that the ETCTS identifies significant traffic impacts on the EPR study area and increasing densities at interface areas will have an increase on the traffic impacts. However, the interfaces put in place where 5-6 storey building look onto the backyards of sites zoned for single dwelling development and covered by a Heritage Conservation Area designation are unacceptable and need to be addressed in some format. This issue was discussed in detail in the Epping Planning Review documents.

103. A copy of the EPR Discussion Paper and the report considered by the Council on 14 August 2017 have been attached (refer to **Attachments 8 and 9**). The details on each HCA and background on the recommendations for these areas is available in this background material. The report below details just the recommendations made previously and options discussed with Councillors at Ward Councillor Briefings to allow Council to determine whether it should proceed with the previous recommendations.

104. Council officers are of the opinion that if growth is to be permitted which will impact on the road network that it should be to resolve these types of planning problems rather than to just increase density on a site for the sake of additional housing numbers. It is for these reasons that Council Officers recommend that changes to the planning controls proceed despite the findings of the ETCTS.

105. Furthermore, in March this year, the DP&E released its *Low Rise Medium Density Housing Code* which comes into effect in July 2018. This establishes planning controls on some forms of medium density housing and provide further guidance on the recommended outcomes in this section.

Rosebank Avenue HCA

106. With regards to Rosebank Avenue HCA, in the 14 August 2018 Council report, Council Officers recommended:

    a. Removing the HCA notation but keeping heritage items.

b. For the area south of the heritage items: allow 3 storey ***residential flat buildings (RFBs).***

c. For the area north of the heritage items: no change.

d. That the changes occur ahead of completion of ETCTS.

107. Council subsequently resolved that it pursue 2 storey ***manor homes*** along full length of Rosebank Ave but test benefits of 3 storey ***RFBs***.

Recommendation

108. Council Officers recommend proceeding with the original recommendations to remove the HCA notation, enable 3 storey ***RFBs*** south of the heritage items with no change north of the heritage items. Refer to Figure 5.

Figures 5 – Council Officer recommendation for Rosebank Avenue HCA

1, 3, 3A, 5, 7, and 7A Norfolk Road and 25 Pembroke Street

109. With regards to properties at 1, 3, 3A, 5, 7, and 7A Norfolk Road and 25 Pembroke Street, in the 14 August 2018 Council report, Council Officers recommended:

a. Remove HCA notation but keep heritage items.

b. R3 zone of area edged black but limit No.s 7 & 7A Norfolk Rd to ***manor homes*** (current zoning is shown in Figure 6).

c. Enable 3 storey ***RFB*** on No.s 1, 3, 3A and 5 Norfolk Rd and 25 Pembroke St.

d. Changes occur ahead of completion of ETCTS.

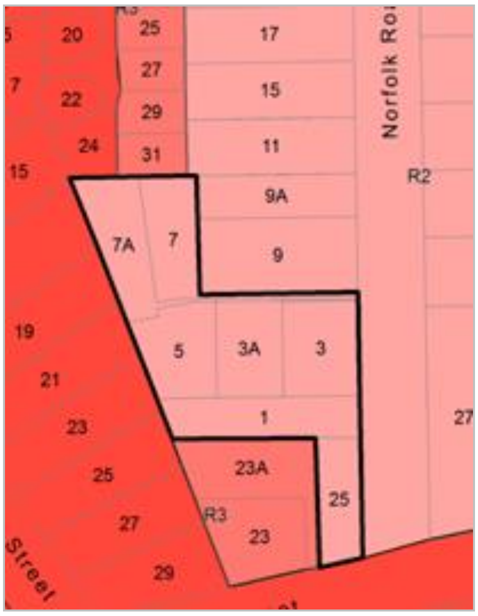

Figure 6 – Current zoning of 1, 3, 3A, 5, 7, and 7A Norfolk Road and 23, 23A and 25 Pembroke Street

110. Council subsequently resolved that it pursue 2 storey ***manor homes*** but test benefits of 3 storey ***residential flat buildings***.

111. At the Ward Councillor Briefings discussed above the option of making no change to the controls in this area was discussed. Should Councillors wish to proceed with this option then Council should resolve to take no further action to change the planning controls for this precinct.

Recommendation

112. To ensure consistency with new Complying Code and subsequent analysis as part of the LEP Harmonisation process, Council Officers propose a new recommendation - **Part 'no change', part RFB:**

    a. No changes to battle-axe blocks at No.s 7 & 7A (ie. maintain controls for ***detached dwellings***) because this conflicts with the DP&E's Complying Code on battle-axe blocks.

    b. Rezone No.s 1, 3, 3A & 5 to R3 zone to enable 3 storey ***RFB*** subject to amalgamation controls being put in place to create 1 super lot.

    c. No.25 Pembroke cannot develop of itself and should retain its existing zoning.

    Refer to the Figure 7.

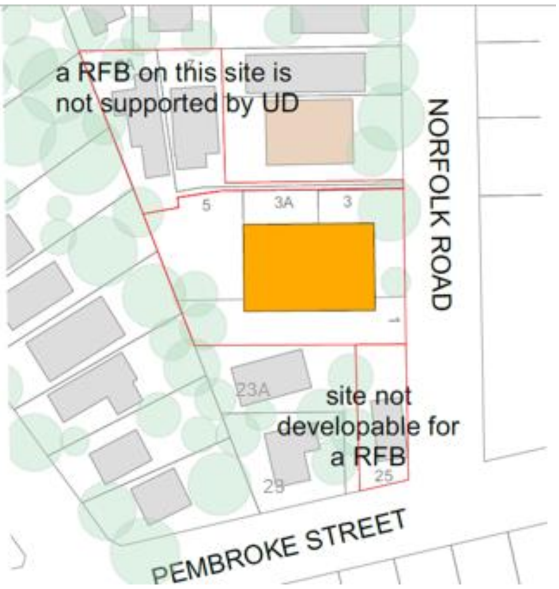

Figure 7 – Council Officer recommendation for 1, 3, 3A, 5, 7, and 7A Norfolk Road and 23, 23A and 25 Pembroke Street

Essex Street HCA

113. With regards to the Essex Street HCA, in the 14 August 2018 Council report, Council Officers recommended:

    a. Remove HCA notation but keep heritage items.

    b. Allow ***manor homes*** on western side between Epping Road and Maida Road only with no change on eastern side.

    c. That the changes occur ahead of completion of ETCTS.

114. The above recommendations were supported by the Council in August 2017.

Recommendation

115. Council Officers recommend maintaining the above recommendations and develop DCP controls that protect larger setbacks to ensure the protection of the tree canopy at rear setbacks.

Rose Street Precinct

116. With regards to the Rose Street Precinct, in the 14 August 2018 Council report, Council Officers recommended:

    a. Allow ***residential flat buildings*** development (R3 zone) with urban design analysis to step down height to Brigg Rd to 2 storeys.

    b. That the changes occur ahead of completion of ETCTS.

117. Council subsequently resolved that it pursue 2 storey ***manor homes*** but test benefits of 3 storey ***residential flat buildings***.

118. At the Ward Councillor Briefing Councillors the issue of the topography of this area and the drainage implications of allowing more density were raised. Council Officers consider that this issue could be investigated as part of the redevelopment options but if Councillors are of the opinion that this should be investigated upfront the recommendation should be amended accordingly.

Recommendation

119. Council Officers recommend allowing ***residential flat buildings*** with associated urban design analysis and DCP controls that enable the stepping down of the building height to 2 storeys at the Brigg Road/Rose Street

frontages and that the four (4) sites fronting Blaxland Road also be included in the precinct. Refer to Figure 8.

Figure 8 – Council Officer recommendation for Rose Street Precinct but include the 4 properties fronting Blaxland Road

Rockleigh Park

120. With regards to the Rockleigh Park, in the 14 August 2018 Council report, Council Officers recommended:

    a. The area zoned R4 (edged with yellow line) be down-zoned to R3 to be consistent with R3 zone boundary to north and east.

    b. That further urban design analysis to determine best height and FSR controls.

121. The above recommendations were supported by the Council.

Recommendation

122. Council Officers recommend reinstate original recommendations. But ensure that ***residential flat buildings*** are prohibited from this area (R3 zone in *HLEP* permits 4 storey RFBs). Refer to Figure 9.

Figure 9 – Council Officer recommendation for Rockleigh Park

IMPACTS OF ETCTS ON COMMERCIAL FLOORSPACE

123. Recent pre-lodgments and development applications within the centre continue to erode the volume of commercial floorspace within the centre as developers

are ‘opting out’ of applying the existing DCP provisions that require delivery of 2, 3 and 4 storey podiums of commercial floorspace in mixed use proposals. This is because of the weak ‘statutory weight’ that DCP controls have over an environmental planning instrument such as a LEP.

124. As discussed in the section entitled “Impact of ETCTS on State Significant Development at 240-244 Beecroft Road”, Council Officers have identified that approximately **8,200sqm of retail floorspace** and **35,200sqm of office floorspace** needs to be “replaced”. To deliver this, Council’s Urban Designers determine that three storey commercial podiums (comprising one floor of retail and two floors of office premises) on remaining sites can deliver the required floorspace.

125. With regards to traffic, the associated traffic impacts from commercial land uses (retail and office premises) may well be greater than those associated with residential development. This is because commercial uses tend to generate a greater number of trips per square metre of floor area. This is another area where Council Officers consider that it may be necessary to allow additional development to resolve a planning issue not related solely to housing delivery. In this case allowing additional density that may detrimentally impact on traffic outcomes should be considered.

126. Given this conflict around the need for more commercial floorspace within the centre to protect its economic viability and amenity, with its associated traffic impacts, a delicate balancing exercise is required that meets the of commercial floorspace needs of the centre whilst acknowledging the potential traffic impacts.

127. In light of the above, Council Officers have identified the following potential options:

    a. **Option 1 – No change:** This option involves no change to the current controls. Because the market favours residential development and the pace of that development recently, this option is highly likely to encourage DAs that deliver only ground floor commercial that will undermine centre’s amenity and economic viability. This has no traffic impact compared to current controls.

    b. **Option 2 – Require minimum level of commercial FSR provision to be provided without amending the maximum FSR or Building Heights:** This option involves increasing the commercial FSR requirements but this occurs at the cost of residential FSR. It means that the heights or densities of buildings will not change, but there will be a higher proportion of commercial floorpsace within any development and less residential than would currently be permitted. In other words, it equates to a net decrease in residential FSR but will improve centre’s amenity and economic viability. This will potentially result in a detrimental impact on the local traffic network.

    c. **Option 3 – Require minimum level of commercial FSR provision to be provided but amend the maximum FSR or Building Heights to seek to retain where possible an FSR for residential equivalent to existing levels** This will mean increases in overall density and building heights but it makes delivery of more commercial (retail/office) uses more viable which will improve the centre’s amenity and economic viability. The detrimental impact on the local traffic network will be greatest with this option.

Recommendation

128. Of the above options, Council Officers recommend **Option 3 - Increase Commercial FSR and density/building heights** because of the strong residential market and the way the planning system operates, if Option 2 was pursued, Council would receive a flood of DAs seeking mixed use development with only the ground floor allocated to commercial uses. These would all have to be considered and potentially approved under the current planning rules and the opportunity to provide the commercial floorspace Epping needs will be lost forever. Without sufficient commercial/retail floorspace the future function and amenity of the Town Centre is significantly impacted.

129. Whilst Option 3 is the Council Officer preference at this point in time this scenario needs to be run through the traffic modelling and if the outcome is unacceptable it may be necessary to fall back to Option 2. A further analysis and report to Council will allow Council to determine which option it will ultimately pursue via a Planning Proposal.

CONCLUSION

130. The reported rate of growth compared to the growth envisaged by the DP&E in 2013 demonstrates the Epping Town Centre has been doing a lot of the “heavy lifting” for dwelling growth and that the impact on infrastructure means that further housing growth for the sake of increasing house supply in Epping is not necessary.

131. This report provides a basis for Council to take to the DP&E, the Minister for Planning and the GSC seeking support for a strategic approach to future planning in Epping where any growth seeks to solve existing planning problems rather than just increasing density for the sole purpose of providing additional housing supply.

NEXT STEPS

132. The next steps are:

    a. Progressing supplementary traffic analysis on new through link through 240-244 Beecroft Rd; and re-opening of former M2 bus tunnel link.

    b. Exhibiting the ETCTS documentation for major stakeholder comment.

    c. Council Officers to arrange EPR Steering Group meeting with State agencies about proposed policy change and revisiting infrastructure delivery.

    d. Council Officers prepare further Council reports that seek to:

        i. Provide advice on provision of community facilities on the Councils Rawson Street Car park land and whether an EOI process should be pursued to enter into partnerships with other landowners.

        ii. Report on the outcome of the consultation on the Epping Town Centre Traffic Study and the results of the supplementary traffic analysis discussed in this report on:-

            1. Reopening of the former M2 bus tunnel link; and

            2. A new east west road link through 240-244 Beecroft Road.

e. Planning Proposal processes inclusive of background and technical study preparation commence on:

   i. The heritage interface areas; and

   ii. The provision of commercial floor space in the centre.

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Sue Weatherley
Director Strategic Outcomes and Development

ATTACHMENTS:

1⇩	ATTACHMENT 1 - Council Report of 12 February 2018	16 Pages
2⇩	ATTACHMENT 2 – April 2018 and November 2017 responses from DPE on RPA matter	3 Pages
3⇩	ATTACHMENT 3 – Related planning policy matters	3 Pages
4⇩	ATTACHMENT 4 - ETCTS Report	51 Pages
5⇩	ATTACHMENT 5 - ETCTS Appendices	192 Pages
6⇩	ATTACHMENT 6 - Austino PP Traffic Impact Assessment undertaken for Council	39 Pages
7⇩	ATTACHMENT 7 - For 28 May 2018 Council Report on EPR - Detail of Planning Proposals	6 Pages
8⇩	ATTACHMENT 8 - EPR Discussion Paper	111 Pages
9⇩	ATTACHMENT 9 - Council Report of 14 August 2017	59 Pages

REFERENCE MATERIAL

LEADING

ITEM NUMBER 11.5

SUBJECT Update on Epping Planning Review and Related Matters

REFERENCE F2017/00210 - D05739808

REPORT OF Project Officer

PURPOSE:

The purpose of this report is to update Council on the Epping Planning Review, as well as several related planning matters relevant to the Epping Town Centre.

RECOMMENDATION

(a) **That** Council note this update on the Epping Planning Review and related matters.

(b) **That,** with regards to the Planning Proposal at 2-18 Epping Road, 2-4 Forest Grove and 725 Blaxland Road, Epping, Council endorse the following principles to be applied when assessing and preparing a future formal submission to the Central City Planning Panel on this matter:

i. No more than 50% of Forest Park should be overshadowed in midwinter between the hours of 10am-2pm.
ii. In the case that there are open space dedications to Council, these should be at grade, contain deep soil zones and should be unencumbered with basement car parking.
iii. The proposal shall step down across the site from Epping Road to Forest Park, both in levels and in scale to demonstrate a respect for the interface between the site and Forest Park.
iv. Building heights should better respond to the surrounding residential zoned land context and respect proximity to Forest Park.
v. Linked residential towers with large floor plates shall be avoided to minimize cumulative bulk and scale impacts.
vi. The design efficiencies of residential Gross Floor Area (GFA) should be based on a Gross Building Area (GBA) x 75%.
vii. A design excellence competition process should be put in place in addition to the site specific DCP.
viii. Any roads/pedestrian links provided through the site should:
  - Provide public address and surveillance;
  - If they relate or link to Forest Park, they should resolve levels and scale along the park interface;
  - Be embellished with paving, bollards, furniture and street lighting; and
  - Be dedicated to Council and delivered via VPA with the relevant public domain guidelines to inform the quality of the finishes.
ix. VPA contribution/effort could also be directed to upgrading existing degraded facilities in the park (amenities, playground equipment, furniture, paving etc).
x. No net loss of public open space.
xi. The proposal should provide a suitable area of public open space which is appropriately sized and located.

xii. The proposal should not be finalized until the Epping Traffic Study is completed.

(c) **That** Council objects to progression of the proposed State Significant Development at 240-244 Beecroft Road until:

i. There is a significant increase in the quantum of commercial floor space provided on this site; and
ii. The Epping Traffic Study is complete.

(d) **Further, that,** following completion of the Epping Traffic Study, a further report to commence Stage 2 of the Epping Planning Review be prepared for Council's consideration.

OVERVIEW OF EPPING PLANNING REVIEW AND STRUCTURE OF THIS REPORT

1. The Epping Planning Review involves undertaking a review of planning for the Epping Town Centre and immediate surrounds. The review follows on from new planning controls introduced in March 2014 through the Department of Planning and Environment's (DPE) Urban Activation Precinct (UAP) Process, as well as Council boundary changes occurring in May 2016 under which Epping Town Centre came to be contained within the City of Parramatta (having previously been split between Parramatta City and Hornsby Shire Councils).

2. The intended outcome of the Epping Planning Review is to create a unified planning framework for the Epping Town Centre and its immediate surrounds, including one set of LEP and DCP controls, a unified development contributions framework and one public domain plan.

3. The Epping Planning Review has two stages. Stage 1 has involved undertaking technical studies and community consultation to inform Stage 2, which will involve preparing the aforementioned unified planning framework.

4. Following two briefings with the Epping Ward Councillors in October 2017 in relation to the Epping Planning Review, it is considered timely to present to Council an update on the Epping Planning Review project, as well as several interrelated planning matters happening concurrently in Epping Town Centre. This includes:

   a. Current development activity in Epping Town Centre;
   b. Regional/District planning matters;
   c. LEP matters;
   d. DCP matters; and
   e. Developer Contributions framework matters.

EPPING PLANNING REVIEW - STAGE 1

5. Stage 1 of the Epping Planning Review involved:

   a. A public launch in mid-December 2016;
   b. Preparation of four technical studies on Heritage, Social Infrastructure, Commercial Floorspace and Traffic (Interim) by consultants;

c. Urban design and planning analysis undertaken by Council;

d. Community consultation in December 2016 and Council Officer attendance at various community events such as Australia Day and Lunar New Year in early 2017 to inform the community of the review being undertaken;

e. Community consultation in March and April 2017 which informed the technical studies and Discussion Paper;

f. Preparation and public exhibition (21 June 2017 – 19 July 2017) of the Epping Planning Review Discussion Paper, informed by the steps described above; and

g. Additional community consultation (workshop series) during public exhibition of the Discussion Paper.

6. Stage 1 of the Epping Planning Review was largely completed (with the exception of a Final Traffic Study, as discussed further in this report) by way of a report to Council at its meeting of 14 August 2017 (Item 11.3). At this meeting, Council endorsed a suite of principles to guide Stage 2 of the Epping Planning Review; the endorsed principles are included at **Attachment 1** and are discussed in more detail in the next section of this report.

7. Council’s full resolution from 14 August 2017 in relation to the Epping Planning Review is included at **Attachment 2** of this report. An update on the action items from this resolution is provided below.

    a. Consistent with part (c)1 of the resolution, the Epping Ward Councillors were briefed on the Epping Planning Review via two briefing sessions held on 17 and 23 October 2017. At these briefing sessions, there was discussion relating to the traffic implications of some of the endorsed principles and additional information being provided regarding this. In response to discussion at these briefing sessions, and to provide further information in relation to traffic and other matters, this update report is provided for Council’s consideration.

    b. Part (c)2 of the resolution requires that a report to Council be prepared to commence Stage 2 of the Epping Planning Review once the Councillors have been briefed. This future report is discussed in further detail in the “Next Steps” section of this report.

    c. Consistent with Part (e) of the resolution, Council wrote to the community thanking them for their feedback and advising them on the outcome of Stage 1 and next steps.

    d. Consistent with Part (f) of the resolution, Council wrote to the Minister for Planning, Greater Sydney Commission, Department of Planning and Environment, Transport for NSW and Roads and Maritime Services to provide an update on the project and next steps.

EPPING PLANNING REVIEW - ENDORSED PRINCIPLES TO GUIDE STAGE 2

8. As discussed above, an extensive suite of principles to guide Stage 2 of the Epping Planning Review were endorsed by Council at its meeting of 14 August 2017. The endorsed principles are included in full at **Attachment 1** of this report, and are summarised in the following subsections. Status updates on actions currently being undertaken are also provided.

Heritage Interface Issues

9. The principles endorse for two (2) of the heritage areas in question (being Rosebank Avenue and certain properties at Norfolk Road/Pembroke Street) and for the Rose Street precinct (located adjacent to the Essex Street Heritage Conservation Area) that facilitating development of 2 storey manor homes be pursued in response to existing heritage interface issues, but that 3 storey residential flat buildings with appropriate DCP controls also be tested through further work. The principles also endorse removal of the Heritage Conservation Area (HCA) notation at Rosebank Avenue and at No.s 1, 3 and 3A Norfolk Road and 25 Pembroke Street.

10. For the Essex Street area, the endorsed principles envision that the HCA notation be removed, that planning controls on the western side of Essex Street be amended to permit redevelopment to 2 storey manor homes, and that planning controls on the eastern side of Essex Street remain unchanged.

11. For Rockleigh Park, the endorsed principles envision that the component of Rockleigh Park zoned R4 be rezoned to the R3 zone, and that further urban design work be undertaken to determine other appropriate controls.

12. For all of the abovementioned areas (excluding Rockleigh Park) the principles state that the recommendations contained in the principles could proceed prior to completion of the Traffic Study, as they seek to urgently deal with existing unintended heritage interface issues.

    <u>Status update:</u> This work has progressed and taken into account the following:

    a. **The need to brief Ward Councillors who have requested further information be provided these options; and**
    b. **It is acknowledged that the principles relating to these heritage precincts endorsed proceeding with these changes ahead of the Traffic Study. However, Council has statutory obligations when preparing any new planning controls to consider the traffic/transport impacts of any proposed changes, therefore, Council is not able to formally advance a Planning Proposal to change these planning controls without consideration of a traffic assessment. Once the Traffic Study is complete, Council may wish to prioritise advancing these amendments based on the further design work that Council officers have undertaken. Council does have the discretion to prioritise these changes ahead of others based on potential traffic impacts, but it must provide an assessment of the traffic implications.**

    The progress on this work has been limited by the need to advance competing priorities for resourcing arising to assist new Councillors upon their election to Council.

13. The principles also endorse recommendations of the Hornsby Heritage Review Stage 6 relating to altering various heritage listings as well as preparation of a Planning Proposal to reflect these recommendations.

Commercial Floor Space

14. The principles endorse further work being undertaken to ensure that minimum 3 storey commercial podiums are delivered on all land zoned B2 (except at 240-244 Beecroft Road, as discussed further in this report), and acknowledge that this work may include investigation through the Traffic Study of additional residential floorspace and height to facilitate delivery of this commercial floorspace. The principles also endorse use of the technical study on commercial floorspace (which informed the Discussion Paper) to be used as an interim assessment measure for future Development Applications until more formal controls are in place.

    Status Update: Council's Land Use Planning officers have been attending DA pre-lodgment meetings with Council's DA assessment officers and applicants in order to advise them of the need to provide appropriate levels of commercial floor space within the town centre in accordance with the Commercial Floorspace Needs Study.

15. The endorsed principles envision rezoning of the site at 240-244 Beecroft back to the B2 Local Centre zone (as was in place prior to DPE changing the zoning to the R4 High Density Residential Zone) to ensure an appropriate commercial floorspace contribution is made. This site is discussed in further detail later in this report. The principles also call for Council Officers to meet with Transport for NSW to discuss opportunities for the Epping rail station site to provide commercial floorspace.

16. The endorsed principles call for investigation of Council-owned sites in relation to both their potential capacity for commercial floorspace and their potential social/community role.

    Status Update: The delivery of commercial floorspace and community facilities on Council-owned sites is still being investigated and Council officers will continue to work to better understand the community needs and commercial opportunities of these sites, as well as work with the proponents of any future Public-Private Partnerships to determine whether the Planning Proposal process can deliver an appropriate development outcome. Regardless, any future development scenarios for Council-owned sites (whether this is Council-led or through a partnership) will need to ensure that the traffic impact is tested as part of the Traffic Study.

Social Infrastructure

17. The endorsed principles call for Council to investigate multiple detailed options to ensure that open space needs in the area are met, and that various other Council planning activities relating to open space consider the community's feedback provided during the Epping Planning Review.

18. With regards to the Austino Planning Proposal, which includes the former bowling club site, the principles endorse progressing the Planning Proposal with Council as the Relevant Planning Authority (RPA), subject to the Traffic Study being completed prior to finalising densities. The principles also state that Council will negotiate with the developer to ensure that a suitable area of open

space is provided. An update on this Planning Proposal is provided elsewhere in this report.

19. The principles state that there will be no net loss of community facility floorspace overall. Providing community infrastructure and civic focal points on both sides of the town centre is endorsed, with a community hub on one side, with adjunct uses on the other. Further feasibility testing should be undertaken to develop options for funding and delivering community facilities.

    Status Update: Council's Social Outcomes unit will do this in conjunction with other relevant business units as part of the annual Operational Plan/Delivery Plan review process; this process would determine prioritisation and budget for future community facilities in Epping.

20. The endorsed principles call for preparation of a master plan for Dence Park in 2018/2019, and that this include a base assumption of an aquatic facility with 50m pool, consideration of multiple options for the Epping Aquatic Leisure Centre, as well as increasing the overall recreation uses of the site and adjoining sensitive bushland.

    Status Update: Council's Place Services Unit has commenced the master plan process, beginning with preparing a brief for consultants.

Public Domain

21. The principles endorse preparation of appropriate DCP controls and a public domain plan that delivers through-block links and wider footpaths.

    Status Update: Please refer to a later section of this report relating to a fast-tracked DCP amendment to provide wider footpaths.

Traffic

22. Several of the endorsed principles relating to traffic provided direction in relation to progressing current development proposals, as follows:
    a. The principles endorse completion of the Traffic Study prior to finalization of proposals seeking development uplift, so that traffic impacts can be properly understood. Furthermore, the principles state that unless innovative solutions or initiatives are found to significantly curb or restrict car ownership/traffic movements, that proposals from parties seeking uplift will not be able to progress. These solutions should be assessed once the Traffic Study is complete.
    b. The principles endorse completion of the Traffic Study prior to finalization of current preliminary Planning Proposals and any future Planning Proposals, and also state that landowners seeking to pursue additional development uplift need to proceed through a formal Planning Proposal process (rather than as part of the Epping Planning Review Process)
    c. With regards to the Austino Planning Proposal, the principles state that Council will seek to retain its RPA status for this proposal on the basis that the proposal cannot be finalized until the traffic study is complete. (Please refer to a later section of the report where the current status of this proposal is discussed in more detail.)

d. The endorsed principles call for a Councillor briefing in relation to the Rawson Street Car Park, in order to progress preliminary Planning Proposals involving this site (refer to later section of this report).

23. The other endorsed principles regarding traffic relate to parking and congestion issues. These principles endorsed the following:

    a. a review of the car parking rates across the relevant Hornsby and Parramatta DCPs in order to determine appropriate lower parking rates, which are to be tested via the Traffic Study.

    b. a further report to Council in relation to amending the Hornsby DCP (which relies on minimum parking rates) to be consistent with the Parramatta DCP (which relies on maximum rates).

    Status update: This DCP amendment process has not commenced due to the potential for the Traffic Study to recommend changes to the parking rates in order to better encourage public transport usage. Changes to Council's parking DCP are subject to completion of the Traffic Study.

    c. to not proceed with a policy of providing an enhanced commuter car parking facility in the town centre.

    d. to further investigate the potential for a resident parking scheme.

    e. introduction of a car share scheme, and the potential for similar schemes to be provided form part of Stage 2 of the Planning Review.

    Status Update: Council installed six (6) car share spaces in the Epping Town Centre between 15-25 November 2017. Further car share policy and implementation options can be considered following completion of the Traffic Study.

    f. that Council trial a "stop/go" traffic controller at the pedestrian crossing of Rawson Street.

    Status Update: Planning for the trial has progressed, and the trial will proceed once school resumes in Term 1 (as it was considered that undertaking the trial during holidays when traffic patterns and pedestrian volumes are different would not provide reliable information upon which to evaluate the trial).

24. As noted above, several of the endorsed principles relate to finalisation of the Traffic Study, as discussed in more detail in the next section of this report.

EPPING PLANNING REVIEW - FINALISATION OF TRAFFIC STUDY

25. The remaining element of Stage 1 of the Epping Planning Review to be completed is the Traffic Study. It is acknowledged that the timelines for the completion of the Traffic Study have been amended to reflect delays in finalising the base traffic network model, which Roads and Maritime Services (RMS) needs to authorize before testing of the land use scenarios identified in the Epping Planning Review are carried out (i.e. Heritage Interface areas, additional commercial FSR, etc.) The major milestones and expected timeframes in relation to finalising the Traffic Study are now as follows:

    a. February 2018: RMS validation of final component of base model.

    b. February 2018: Scenario testing completed.

c. March 2018: Draft Final Traffic Study to Council and RMS for review.

d. April 2018: Final Traffic Study completed.

e. May 2018: Council report on Final Traffic Study with recommendations.

26. As confirmed in the Ward-based Councillor briefing sessions, the Traffic Study must be completed before Council Officers progress any Planning Proposal – whether Applicant-led, site-specific Planning Proposals or a Council-led Planning Proposal to amend controls in the Epping Town Centre (i.e. Stage 2 of the Epping Planning Review). It is acknowledged that the principles relating to heritage precincts endorsed proceeding with some changes ahead of the Traffic Study. However, as noted above, Council has statutory obligations when preparing any new planning controls to consider the traffic/transport impacts of any proposed changes, therefore Council is not able to formally advance a Planning Proposal to change these planning controls without consideration of a traffic assessment. Once the Traffic Study is complete, Council may wish to prioritise advancing these amendments based on the further design work that Council officers have undertaken. Council does have the discretion to prioritise these changes ahead of others based on potential traffic impacts, but it must provide an assessment of the traffic implications.

CURRENT DEVELOPMENT ACTIVITY IN EPPING

27. Simultaneous to the Epping Planning Review project, there has been significant development activity via Planning Proposals (PPs), Development Applications (DAs) and construction of approved DAs underway in Epping Town Centre and surrounds since late 2014. The following subsections provide updates on this activity.

Austino Planning Proposal

28. A Planning Proposal for land at 2-18 Epping Road, 2-4 Forest Grove and 725 Blaxland Road (former bowling club site) was initially lodged with Hornsby Shire Council in 2015, but came to be located within City of Parramatta Council following the May 2016 Council boundary changes. Figure 1 shows the land affected by this PP.

Figure 1: Land affected by the Austino Planning Proposal denoted in solid red line

(from applicant's Urban Design Report)

29. This PP has a complex history, which is summarised as follows:

    a. **December 2015:** The original PP was lodged with Hornsby Shire Council (HSC).

    b. **January 2016:** Parramatta City Council (PCC) was formally invited to prepare a submission which HSC would have regard to in making a decision to support or refuse the application.

    c. **March 2016:** PCC endorsed a submission to HSC (refer **Attachment 3**) which established seven planning principles that this PP should address; these principles are discussed in further detail below.

    d. **April 2016:** HSC refused the PP. The applicant subsequently sought a pre-Gateway review process through DPE.

    e. **May 2016:** Council boundary changes occurred, and the site came to be located in City of Parramatta. DPE also formally notified Council that the applicant had sought a pre-Gateway review.

    f. **November 2016:** DPE wrote to Council to advise that the PP could proceed to Gateway determination "subject to further consideration as indicated in the advice provided by the [Joint Regional Planning] Panel" as part of its pre-Gateway review. This advice included that the proposal "be part of the current Council traffic review of the whole of Epping Town Centre and that the outcomes of that review shall inform the final decision of the Floor Space Ratio for the site".

    g. **December 2016**: In response to letter from DPE, Council wrote to DPE requesting to be the Relevant Planning Authority (RPA) for this PP. This request was on the basis that the Gateway would be issued after the exhibition of the Epping Planning Review Stage 1 materials (Stage 1 had just commenced at that time).

    h. **March 2017**: DPE appointed Council as the RPA on the basis described above.

    i. **June-July 2017**: The Epping Planning Review Discussion Paper and associated technical studies (including interim traffic study) were exhibited for a four-week period.

    j. **August 2017:** Principles to guide Stage 2 of the Epping Planning Review were endorsed by the Administrator.

    k. **September 2017:** Following a request from the applicant, DPE wrote to Council requesting Council to provide its reasoning as to why an alternate RPA should not be appointed, or to advise that it would submit the proposal for Gateway based on the information available at that time.

    l. **October 2017:** Council responded to the above letter, stating its reasoning for remaining the RPA, as summarised below:

        i. RMS's support for the density sought in this PP was only on account of amendments being made to the PP regarding the number of car parking spaces on the site and additional traffic modelling being carried out;

ii. The progression of the PP is dependent on the outcomes of the Epping Traffic Study (consistent with the JRPP's recommendation).

iii. The Epping community expects that traffic matters will be well understood before any decision is made on proposals seeking uplift within and immediately around the town centre.

iv. The issue of precedent that would be created should the RPA role be removed from this planning proposal.

30. On **1 December 2017**, Council received a letter from DPE advising that it had appointed the Sydney Central City Planning Panel as RPA, meaning that Council no longer has RPA status for this proposal. This is not consistent with the endorsed principles discussed in this report, which sought to retain Council's RPA status.

31. DPE has advised Council that it anticipates that any Gateway determination for this proposal would require completion of the Traffic Study and any necessary amendments to the Planning Proposal prior to exhibition.

32. DPE has also advised Council that there will be formal consultation with Council on this Planning Proposal as it proceeds. Therefore, this report seeks Council's endorsement of principles to guide assessment and preparation of a future formal submission on this matter. Council officers have prepared principles for Council's consideration as follows; these principles align with PCC's original submission to HSC on this Planning Proposal (refer **Attachment 3**), as well as relevant principles established through Stage 1 of the Epping Planning Review:

    a. No more than 50% of Forest Park should be overshadowed in midwinter between the hours of 10am-2pm.

    b. In the case that there are open space dedications to Council, these should be at grade, contain deep soil zones and should be unencumbered with basement car parking.

    c. The proposal shall step down across the site from Epping Road to Forest Park, both in levels and in scale to demonstrate a respect for the interface between the site and Forest Park.

    d. Building heights should better respond to the surrounding residential zoned land context and respect proximity to Forest Park.

    e. Linked residential towers with large floor plates shall be avoided to minimize cumulative bulk and scale impacts.

    f. The design efficiencies of residential Gross Floor Area (GFA) should be based on a Gross Building Area (GBA) x 75%.

    g. A design excellence competition process should be put in place in addition to the site specific DCP.

    h. Any roads/pedestrian links provided through the site should:

        i. Provide public address and surveillance;

        ii. If they relate or link to Forest Park, they should resolve levels and scale along the park interface;

iii. Be embellished with paving, bollards, furniture and street lighting; and

iv. Be dedicated to Council and delivered via VPA with the relevant public domain guidelines to inform the quality of the finishes.

i. VPA contribution/effort could also be directed to upgrading existing degraded facilities in the park (amenities, playground equipment, furniture, paving etc).

j. No net loss of public open space.

k. The proposal should provide a suitable area of public open space which is appropriately sized and located.

l. The proposal should not be finalized until the Epping Traffic Study is completed.

33. Council is mindful that applying the above principles is likely to bring a reduction of built form, yield, height and density when compared to the proposal considered by Hornsby Shire Council.

34. Council officers are also progressing a formal valuation of the former Epping Bowling Club site, which forms part of this Planning Proposal.

State Significant Development at 240-244 Beecroft Road

35. There is a large site at 240-244 Beecroft Road which, until recently, was used as a tunneling and works site for the Sydney Metro Northwest project. The endorsed principles call for an appropriate amount of commercial floorspace to be provided as part of redevelopment of this site (whilst retaining current residential floorspace capacity).

Figure 4: UrbanGrowth site at 240-244 Beecroft Road

36. On 27 September 2017, a State Significant Development (SSD) application for a predominantly residential development at this site was lodged with DPE. The application contains an indicative development yield of 450 units.

37. On 9 October 2017, Council endorsed a Lord Mayoral minute outlining Council's objection to the progression of the SSD application until:

    a. "There is a significant increase in the quantum of commercial floors space provided on this site; and

    b. The traffic study currently underway for the Epping Town Centre is complete."

    Council also resolved to write to the Local MP, Minister for Planning and DPE requesting support for Council's position on this matter.

38. On 24 October 2017, Secretary's Environmental Assessment Requirements (SEARs) were issued for this project. Council was given the opportunity to comment on the SEARs, and raised three in-principle issues with the project, summarised as follows:

    a. The Traffic Study is not yet complete, and will likely include a proposal that will make use of part of this site to improve traffic conditions and the public domain. The proposed development of the site could make this impossible to achieve. Furthermore, the potential for confusion arising from the concurrent public release of the Traffic Study and the SSD would be a poor outcome.

    b. Future controls from Stage 1 of the Epping Planning Review would require that this site provide significantly more commercial floor space than is currently proposed in the SSD application.

    c. Council welcomed further discussion with DPE regarding the validity of the SSD pathway for this project.

    Council also provided feedback on the SEARs, requesting that several of these were strengthened to achieve improved outcomes in matters such as social and environmental sustainability, public domain and design excellence. On 8 December 2017, revised SEARs were issued with minor changes.

39. On 1 December 2017, Landcom (the body responsible for the site disposal process) wrote to the Lord Mayor after having conducted a stakeholder engagement with Council, Mr Damien Tudehope MP, the Epping Chamber of Commerce and Epping residents to advise that Landcom will defer the release of the Expressions of Interest (EOI) for the site from early December 2017 to early 2018. The letter advised that this will allow Landcom and Transport for NSW to investigate the possibility of increasing the proposed commercial floorspace on this site from 700sqm to 2,000sqm.

40. As stated previously, the Epping Planning Review Stage 1 principles call for an appropriate amount of commercial floorspace to be provided as part of redevelopment of this site. It is Council officers' view that 2,000sqm is not an appropriate amount, and that additional commercial floor space should be provided. This is based on the following:

    a. the site was previously zoned B2 and had commercial uses on site;

b. the Epping Planning Review Stage 1 principles endorse a minimum 3-storey podium for other land zoned B2 in the Epping Town Centre; and

c. the site area is approximately 13,342sqm, meaning that the proposed 2,000sqm constitutes only about 0.15:1 FSR for commercial uses.

41. It is recommended that Council reiterate its resolution of 9 October 2017 on this matter, specifically, that Council objects to the progression of this SSD application until:

    a. There is a significant increase in the quantum of commercial floor space provided on this site; and

    b. The Epping Traffic Study is complete.

Other planning and development activities in Epping Town Centre

42. Development Applications (DAs) in Epping Town Centre continue to be processed.

43. There are also two preliminary Planning Proposals involving Council-owned sites (inclusive of Council car park) at 51A and 51B Rawson Street. Consistent with the endorsed principles, Council has advised these applicants that current preliminary proposals will not be finalised prior to completion of the Traffic Study.

REGIONAL/DISTRICT PLANNING MATTERS

44. The Greater Sydney Commission (GSC) released new draft Region and District Plans in late 2017 for public consultation. In the draft *Central City District Plan*, Epping is identified as a 'Strategic Centre' for 2036, with a jobs target of 1,900 to 2,400 additional jobs for 2036.

45. Epping was not identified as a higher-order centre in either of the two previous draft subregional/district plans (the draft *West Central Subregion Draft Subregional Strategy 2007* and the draft *West Central District Plan 2016*). These plans identified Epping as a "Town Centre" and "Local Centre", respectively. Thus the role of Epping appears to have been recently elevated from a lower-order to a higher-order centre. However, the 'Strategic Centre' category is not clearly defined in the 2017 draft plans, and no explanation or justification has been provided for this change. The change has also occurred ahead of completion of the Epping Traffic Study, which will guide the centre's capacity for further growth.

46. Council's submission to the GSC on the draft Region and District Plans supported the relevant Action identified in the draft District Plan, which was to "*continue the review of planning controls for Epping in collaboration with State agencies*". Council's submission also offered feedback on the vision expressed for Epping, as summarised in the following points:

    a. Council considers that Epping is less advanced in terms of its development as a strategic centre, and requests stronger guidance from GSC relating to the role of strategic centres (and Epping in particular);

    b. Council notes that the vision for the centre expressed in the draft *District Plan* requires a genuine commitment from State government in all its respective areas of responsibility (including evidence-based policy making, policy implementation, infrastructure investment and governance) to ensure that any expanded role of the centre is a successful one;

c. Council strongly believes that with the support of improved transport, social and recreational infrastructure and public domain investments, the role of Epping as an important business precinct could be heightened; and

d. Any review of the planning controls for Epping must closely involve the community likely to be affected by the outcomes of the review.

47. Council's submission made the following recommendations relating to Epping:

- *That the final plans provide stronger guidance on the role of strategic centres, and Epping in particular.*
- *That the GSC, DPE and UrbanGrowth NSW work with Council to ensure that any review of planning controls for Epping closely involves the community.*

48. Council officers also note that the draft District Plans work to a timeframe of 2036, and the Region Plan presents a vision to 2056. These longer-term timeframes suggest that strategic centres could develop incrementally over the medium- to longer-term. This contrasts with the intense level of development that Epping has experienced in the past few years, and which is forecast for the next few years (as discussed previously in this report).

LEP MATTERS (HORNSBY LEP 2013 – HOUSEKEEPING AMENDMENT)

49. A Housekeeping Amendment to Hornsby LEP 2013 (which was commenced by Hornsby Shire Council prior to council boundary changes in May 2016) was notified on 29 September 2017. This Amendment included some minor changes applying to land in and around Epping Town Centre, as follows:

a. Minor boundary adjustments to the zoning map to align with land parcel boundaries;

b. A change of attribution for the 72m height limit from "AA" to "AA2" (the 72m height remains as is); and

c. Amendment of some minimum lot size requirements at land zoned R3 and R4 (generally around Hazelwood Pl, Essex St, Derby St and Maida Rd) to correspond with previous changes to related planning controls.

This Housekeeping Amendment was administrative in nature, and does not impact the Epping Planning Review.

DCP MATTERS (FAST TRACKED AMENDMENTS TO PARRAMATTA DCP 2011 – PUBLIC DOMAIN)

50. The Epping Planning Review Discussion Paper undertook preliminary analysis identifying the need for amendments for ground floor setbacks in parts of the Town Centre. As part of the suite of principles endorsed on 14 August 2017, Council endorsed the following relevant principle:

That as part of Stage 2 of the Epping Planning Review, that Council prepare appropriate DCP controls and a public domain plan that deliver through-block links and wider footpaths.

51. Since the new planning controls were introduced in March 2014, most DAs in Epping's B4 Mixed Use zone have affected sites on the eastern side of the Town Centre (formerly Hornsby Shire Council area). However, during late 2017, several major land owners on the western side of the Town Centre commenced development proposals (or discussion about potential proposals). Whilst wider footpaths on the eastern side of the Town Centre have largely been delivered through the planning framework and DA processes, widening the footpath on the western side of the Town Centre is now of critical importance in light of significant developer interest and expected increases in pedestrian volumes.

52. The current DCP controls contained within Parramatta DCP 2011 are not considered adequate to deliver the desired outcome of wider footpaths. Council considered a report on this matter on 18 December 2017 which proposed to increase the full building setback from 0m to 1.5m along Beecroft Road (as well as parts of High and Bridge streets). In relation to this matter, Council resolved:

    *(a) **That** the Council resolves the proposed changes to amend the Parramatta DCP 2011 by preparing a public exhibition as outlined in this report.*

    *(c) **That** the CEO be given delegation to authorise the DCP exhibition material prior to proceeding to public exhibition in early 2018.*

    *(d) **Further, that** a report be considered by Council on outcomes of the public exhibition of the DCP amendment.*

53. Exhibition of these amendments commenced on 24 January 2018, and the exhibition outcomes will be reported back to Council in March/April 2018.

DCP MATTERS (AMENDMENTS TO HORNSBY DCP 2013 RELATING TO TREE PRESERVATION)

54. On 10 July 2017, Council resolved to prepare draft amendments to Hornsby DCP 2013 for public exhibition that have the effect of applying the tree preservation controls in Section 5.4 of Parramatta DCP 2011 to land now contained within City of Parramatta which was previously within Hornsby LGA. The draft amendments also update the controls so they are consistent with the new Biodiversity Conservation Act 2016 and State Environmental Planning Policy (vegetation in non-rural areas) 2017. These draft amendments were exhibited from 18 October – 17 November 2017. Council officers are currently preparing a briefing session for Councilors and subsequent report to Council regarding the outcomes of this exhibition; this report is planned for February/March 2018, once a Councillor briefing session has taken place.

DEVELOPER CONTRIBUTIONS MATTERS (NEW CONTRIBUTIONS PLANS RELATING TO EPPING TOWN CENTRE)

55. At its meeting of 13 November 2017 (Item 11.6), Council adopted new Section 94/94A Plans for the area transferred from Hornsby to City of Parramatta as part of council boundary changes in May 2016. These plans were

predominantly required to support infrastructure demand resulting from the growth occurring in Epping Town Centre and will ensure that funds collected within the area now located in City of Parramatta are spent in that area. These plans came into effect on 6 December 2017.

EXPECTED NEXT STEPS

56. Expected timeframes for the individual matters discussed in this report have been provided where possible. It is expected that the outcomes of Council's consideration of a future report to begin Stage 2 of the Epping Planning Review (consistent with part (c)2 of the resolution outlined earlier in this report) will provide more clarity as to the direction for Stage 2 of the Epping Planning Review, as well as other related matters. The timing of this future report depends on the finalisation of the Traffic Study which, as noted previously, is currently expected in May 2018.

CONCLUSION AND RECOMMENDATION

57. As evidenced in this report, there continues to be a significant number of interrelated planning and development matters underway at Epping Town Centre, affecting the formal completion of Stage 1 and commencement of Stage 2 of the Epping Planning Review.

58. It is recommended that Council note the updates on various matters provided in this report and that, following completion of the Traffic Study, a further report to commence Stage 2 of the Epping Planning Review process is prepared for Council's consideration.

Sarah Baker
Project Officer Land Use Planning

Jacky Wilkes
A/Team Leader Land Use Planning

Robert Cologna
A/Service Manager Land Use Planning

Sue Weatherley
Director Strategic Outcomes and Development

Jim Stefan
A/Director City Services

ATTACHMENTS:

1	Endorsed Principles - Stage 1 Epping Planning Review	8 Pages
2	Council resolution - Epping Planning Review - Completion of Stage 1 and Commencement of Stage 2 - 14 August 2017	3 Pages
3	Submission to Hornsby Shire Council - Planning Proposal - Epping and Blaxland Roads, Epping - March 2016	23 Pages

REFERENCE MATERIAL

NSW GOVERNMENT | Planning & Environment

IRF18/1026

Ms Sue Coleman
Interim Chief Executive Officer
City of Parramatta Council
PO Box 32
PARRAMATTA NSW 2124

Attention: Mr Robert Cologna

Dear ~~Ms Coleman~~ Sue

Austino planning proposal (2-18 Epping Road, 2-4 Forest Grove and 725 Blaxland Road, Epping)

I write in response to your letter of 1 March 2018 requesting further clarification of why the Sydney Central City Planning Panel was appointed as the planning proposal authority (PPA) for the above proposal.

As detailed in correspondence from the Department of Planning and Environment in November 2017, careful consideration was given to the proponent's request to grant an alternate PPA. Given the delays and ongoing extensions surrounding the delivery of the Epping traffic report, the change in the local government area, the information submitted by Austino and the outcomes of the meetings between the proponent, Council and the Department, the decision was made to appoint the Panel as the PPA for the planning proposal.

Such a decision is not taken lightly by the Department. However, in this instance, the request was considered to have merit.

A copy of previous correspondence outlining the reasons why an alternate PPA was appointed is enclosed for your reference.

Should you have any further questions in relation to this matter, please contact Ms Ann-Maree Carruthers, Director, Sydney Region West, at the Department on 9274 6270.

Yours sincerely

Marcus Ray
Deputy Secretary
Planning Services
27/04/2018

RECEIVED IN RECORDS
03 MAY 2018
Initials

SCANNED
03 MAY 2018
PCC

Encl: Letters to Council dated 8 September 2017 and 29 November 2017

320 Pitt Street Sydney NSW 2000 | GPO Box 39 Sydney NSW 2001 | planning.nsw.gov.au

NSW GOVERNMENT | Planning & Environment

Mr Greg Dyer
Interim General Manager
City of Parramatta Council
PO Box 32
PARRAMATTA NSW 2124

17/10406-1

Dear Mr ~~Dyer~~ Greg

Austino Property Group (proponent) has requested that an alternate Relevant Planning Authority (RPA) be appointed to progress a proposal which seeks to amend the zones and development controls applying to land at 2–18 Epping Road, 2–4 Forest Grove and 725 Blaxland Road, Epping.

The proponent is concerned that a planning proposal has not been submitted for a Gateway determination despite the Sydney West Joint Regional Planning Panel determining in September 2016 that the proposal should progress. I am also aware that despite the proponent indicating that it is willing to negotiate parking and access requirements for the site, Council resolved on 10 August 2017 to not progress the proposal until a wider traffic study has been completed.

I have carefully reviewed this matter. Given the history of the application, ongoing delays, the information submitted by Austino and the outcomes of the meetings between the proponent, Council and the Department, the request does appear to have merit.

Before I make a decision on the matter, I request that Council provide its reasoning why an alternate RPA should not be appointed or alternatively advise that it will submit the proposal for a Gateway determination based on the information available to date. I request that Council provide a response to this request by 13 October 2017.

I have also requested Catherine Van Laeren, Director of the Sydney Region West office to schedule a meeting to discuss these issues. Mrs Van Laeren can be contacted directly on 9860 1520.

Yours sincerely

Marcus Ray
Deputy Secretary
Planning Services
08/09/2017

320 Pitt Street Sydney NSW 2000 | GPO Box 39 Sydney NSW 2001 | planning.nsw.gov.au

NSW GOVERNMENT | Planning & Environment

Office of the Secretary

17/14234

Mr Greg Dyer
Interim General Manager
City of Parramatta Council
PO Box 32
PARRAMATTA NSW 2124

Dear Mr Dyer

Thank you for your letter of 4 October 2017 regarding Austino's request for an alternate Relevant Planning Authority (RPA) to be appointed for the planning proposal at 2–18 Epping Road, 2–4 Forest Grove and 725 Blaxland Road, Epping (PGR_2016_HORNS_002_00).

I have carefully considered Council's response and I understand Council has met with Department of Planning and Environment staff to discuss the matter. I have now determined that the Sydney Central City Panel will carry out the role of RPA for this proposal.

The Department will coordinate consultation with Council and the proponent to receive an updated planning proposal to be lodged for a Gateway determination as soon as possible. Given the extensive work and community engagement undertaken to date by Council, and the traffic study for the Epping Planning Review nearing completion, it is anticipated that any Gateway determination will require that the proposal not be placed on community consultation until the traffic study is completed and any necessary amendments to the proposal are made.

I note that Council has advised the traffic study is anticipated to be completed in February 2018. The Department is available to work with Council to ensure this timeframe is met.

I have requested Mrs Catherine Van Laeren, Director of Sydney Region West, to assist if you have any further queries. Mrs Van Laeren can be contacted directly on 9860 1520.

Yours sincerely

Secretary
Department of Planning and Environment

29.11.17

320 Pitt Street Sydney NSW 2000 | GPO Box 39 Sydney NSW 2001 | planning.nsw.gov.au

RELATED PLANNING POLICY MATTERS

Attachment 3 to Council Report on Epping Town Centre Traffic Study – 28 May 2018

A series of policy amendments (both LEPs, DCPs and development contributions plans) have been underway or are complete that have an impact on the Epping Town Centre. These matters are summarized in Attachment #).

Hornsby LEP 2013 – Housekeeping Amendment

1. A Housekeeping Amendment to Hornsby LEP 2013 (commenced by Hornsby Shire Council prior to council boundary changes in May 2016) was notified on 29 September 2017. This Amendment included some minor changes applying to land in and around Epping Town Centre, as follows:
    a. Minor boundary adjustments to the zoning map to align with land parcel boundaries;
    b. A change of attribution for the 72m height limit from "AA" to "AA2" (the 72m height control remains as is); and
    c. Amendment of some minimum lot size requirements at land zoned R3 and R4 (generally around Hazelwood Pl, Essex St, Derby St and Maida Rd) to correspond with previous changes to related planning controls.
2. This Housekeeping Amendment was administrative in nature, and does not impact the Epping Planning Review.

Developer Contributions Plans Relating to Epping Town Centre

3. At its meeting of 13 November 2017 (Item 11.6), Council adopted new Section 94/94A Plans for the area transferred from Hornsby to City of Parramatta as part of council boundary changes in May 2016. These plans were predominantly required to support infrastructure demand resulting from the growth occurring in Epping Town Centre and will ensure that funds collected within the area now located in City of Parramatta are spent in that area. These plans came into effect on 6 December 2017.

Fast Tracked Amendments to Parramatta DCP 2011 – Public Domain

4. The Epping Planning Review Discussion Paper undertook preliminary analysis identifying the need for amendments for ground floor setbacks in parts of the Town Centre. As part of the suite of principles endorsed on 14 August 2017, Council endorsed the following relevant principle:

    That as part of Stage 2 of the Epping Planning Review, that Council prepare appropriate DCP controls and a public domain plan that deliver through-block links and wider footpaths.

5. Draft DCP controls were prepared and exhibited between January and February 2018. On 12 March 2018 (Item 13.4) after reporting on the exhibition process, the DCP was adopted by Council. It came into effect on 4 April 2018.

Amendment to Hornsby DCP 2013 - Tree Preservation

6. On 26 February 2018, Council resolved to adopt amendments to Hornsby DCP 2013 that apply the tree preservation controls in Section 5.4 of Parramatta DCP 2011 to land now contained within City of Parramatta which was previously within Hornsby LGA. The draft amendments also update the controls to ensure consistency with the new *Biodiversity Conservation Act 2016* and *State Environmental Planning Policy (Vegetation in non-rural areas) 2017*. Public notices were subsequently placed in local papers in mid March 2018 which brought the DCP amendments into effect.

7. The Council resolution in relation to this item (Item 13.4) request a report be brought back to Council regarding: (1) tree removal in Forest Park; and (2) the impact of the Austino planning proposal on the trees at the northern side of Forest Park. The relevant resolution parts are as follows:

   (h) ***That*** *a report be brought back to Council regarding which trees in Epping Forest Park have been removed by Council staff and any proposed plantings.*

   (i) ***Further, that*** *a report be brought back to Council regarding the potential impact of proposed development to the north of Epping Forest Park on existing trees.*

8. Council Officer's response is provided in the sub-section below.

<u>Tree removal by Council Staff in Forest Park</u>

9. Forest Park is listed as local heritage item under Schedule 5 of the *Hornsby Local Environmental Plan 2013*. This listing identifies significant tree plantings within the park that contribute to its heritage character, including:

   a. 2 x Hoop Pines and 2 x Bunya Pines (c1910/20s);
   b. 1 x Cypress Pine (c1920s);
   c. Canary Island Pines (c1930s);
   d. Crepe Myrtle / Tibouchina / Bottlebrush / New Zealand Christmas Bush eastern border planting (1930s/40s);
   e. Camphor Laurels (c1950s);
   f. Brush Box along northern boundary (c1950s); and
   g. Group of gums including Spotted Gums (c1960s).

10. Council's Parks Services team has commenced restoration of the heritage landscape elements of the garden along the northern boundary of the reserve. This garden contains a number of plant specimens from the original heritage landscaping that have become overgrown in recent years. Large amounts of weeds have recently been removed to uncover these original plantings. The largest and most recent weed removals included three Cocos Palms (*Syagrus romanzoffianum)*.

11. Removal of these trees commenced in early March, with two of the three trees being removed before works were halted due to concerns from members of the local community. These three trees do not contribute to the heritage significance of the park and their removal will allow for additional plantings consistent with the original landscape character of Forest Park.

12. Following the transfer of Forest Park to the City of Parramatta Council in 2016 on account of Council amalgamations, Council has installed a number of plants consistent with the existing heritage plantings, including:

- 15 x Camellia (Propagated from site);
- 3 x Gordonia;
- 10 x Ozmanthus;
- 5 x Rhododendron (Propagated from site);
- 30 x Ctenanthe ‘ Grey star’;
- 20 x Hydrangea;
- 8 x Magnolia ‘Little gem’; and
- 15 x Grevillea.

13. Additional plantings are also scheduled to be undertaken during the current Autumn months. However, this is on hold pending removal of the remaining Cocos Palm to avoid damage to new plants. The additional plantings include:

    - 40 x Philodendrons ‘Xanadu’;
    - 20 x Camellia (Propagated from site);
    - 6 x Magnolia Little gem’;
    - 40 x Gordonia ‘Florida’;
    - 6 x Tibouchina; and
    - 20 x Azalea (Propagated from site).

14. The above information addresses Council’s resolution that “a report be brought back to Council regarding which trees in Epping Forest Park have been removed by Council staff and any proposed plantings.”

<u>Potential impact of proposed (Austino) development to the north of Epping Forest Park</u>

15. The discussion on this planning proposal within the Council report (which this attachment relates to) recommends an alternative option/s for this site. The outcome of this should be explored before an assessment of the proposal is undertaken of the potential impact of proposal on existing trees to the north of Epping Forest Park.

**

Epping Town Centre Traffic Study

Land Use Options Testing

Prepared for Parramatta City Council | 10 May 2018

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Land Use Options Testing

Epping Town Centre Traffic Study

Final

Report J17056RP4 | Prepared for Parramatta City Council | 10 May 2018

Prepared by	**Tim Brooker**	Approved by	**Allan Young**
Position	Associate - Transport Planner	Position	Director
Signature		Signature	
Date	10 May 2018	Date	10 May 2018

Document Control

Version	Date	Prepared by	Reviewed by
V1	10 May 2018	Tim Brooker	Allan Young

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1 Introduction

1.1 Background to land use changes at Epping

A number of economic and transport accessibility factors are currently attracting new urban development (primarily higher density residential development) to be located in the Epping Town Centre and surrounding areas.

Foremost in this regard is the North West Metro project, which the NSW Government has acknowledged by implementing significant local area land use zoning changes at Epping in October 2014, and the concurrent redistribution of the local government area boundaries during 2015 and 2016 which has now brought the entire Epping Town Centre area under the land use planning control of Parramatta City Council (except for some major sites where the NSW Government's-Planning Assessment Panels are involved in the planning assessment).

The continuing strong population growth and transport network changes throughout Sydney and the adjoining outer-urban regions of North Western Sydney, will also have a contributory effect in future years on road traffic conditions throughout the Epping Study area, not just the development occurring adjacent to the "Epping Town Centre" road network which is the primary focus of this report.

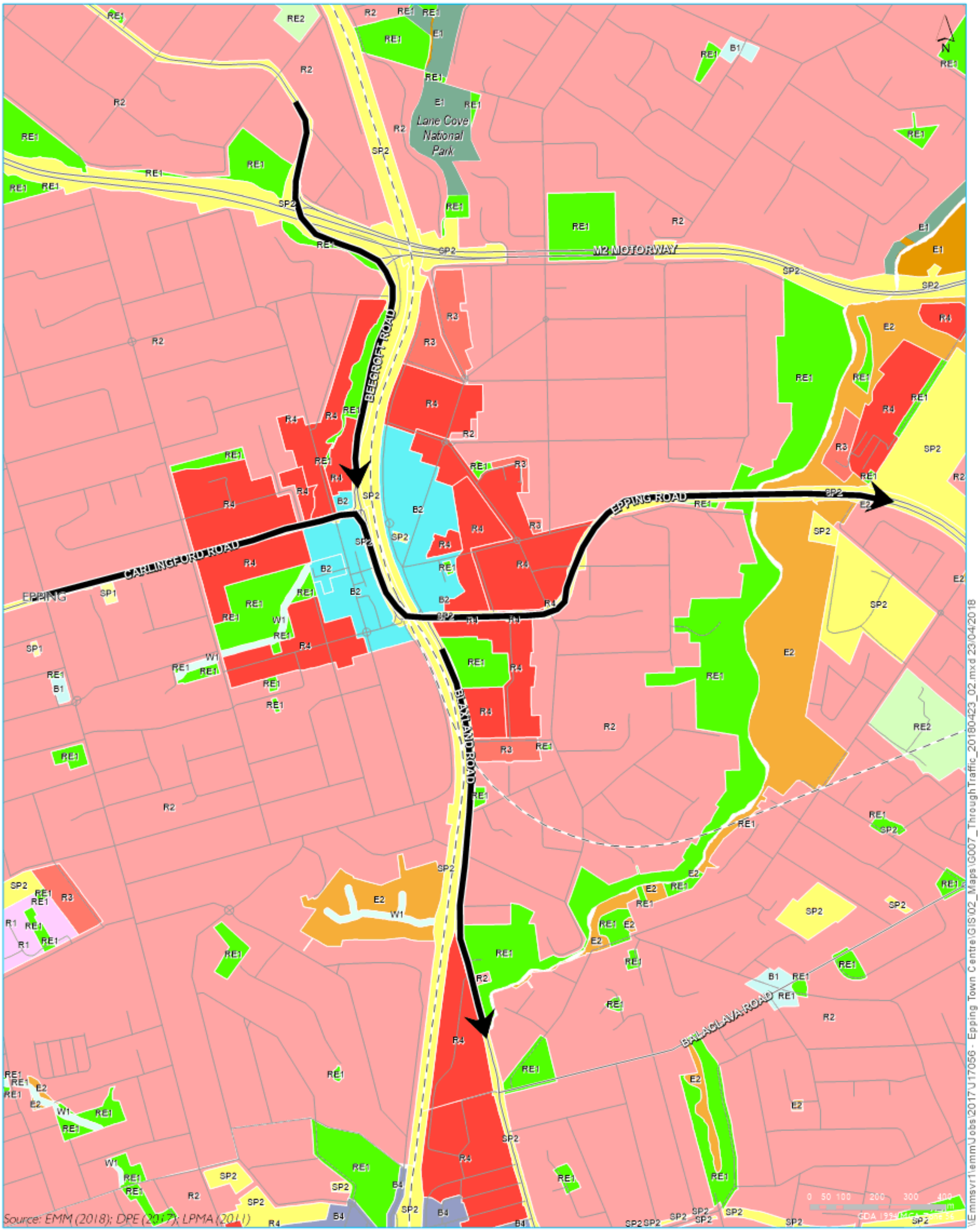
Historically the Town Centre has had a significant employment focus in addition to its retailing and residential development. In recent years, since the new Priority Precinct planning controls were first drafted (from 2011 onwards), the development focus has shifted towards significantly increased residential densities and many proposed residential developments are now potentially displacing the historic employment and retail/commercial uses on key sites within and adjoining the town centre. It is the view of Council that this is not a preferred outcome for the Epping Town Centre where the existing level of retail and commercial development is desired to be at least maintained, to adequately serve the local retail industry and service needs of a growing residential population within and in the vicinity of the Town Centre.

The core commercial and retailing areas of the Town Centre are all within easy walking distance (mostly within 200 m and all generally within 400 m) of the Railway Station at Epping. The primary focus of the existing commercial and retail activity, including the major supermarket (Coles) is currently on the western side of the railway where the three primary retail frontages of Beecroft Road (western side), Rawson Street (eastern side) and Rawson Street (western side) accommodate these businesses. Also, the large Council-owned open air car park, which is located on the western site of Rawson Street, serves as a primary focus for the local vehicular traffic and parking movements which are generated by the Town Centre retail and commercial activity.

1.2 Transport networks

This study has been undertaken as one of a number of related land use planning studies which are critically examining the environmental and other impacts of the potential future urban development at Epping. The Epping study area is strategically located between the Parramatta CBD and Sydney CBD and is well served by regional transport links. These links are described below.

The study area major road network south of the M2 Motorway, which consists of the four major roads, Epping Road, Beecroft Road, Blaxland Road and Carlingford Road, which pass through the Epping Town Centre (refer to Figure 1.1).



KEY

- Through trips
- Rail line
- Main road
- Local road
- NPWS reserve

Zone

- B1 Neighbourhood Centre
- B2 Local Centre
- B4 Mixed Use
- E1 National Parks and Nature Reserves
- E2 Environmental Conservation
- R1 General Residential
- R2 Low Density Residential
- R3 Medium Density Residential
- R4 High Density Residential
- RE1 Public Recreation
- RE2 Private Recreation
- SP1 Special Activities
- SP2 Infrastructure
- W1 Natural Waterways

Major road network at Epping south of the M2 Motorway

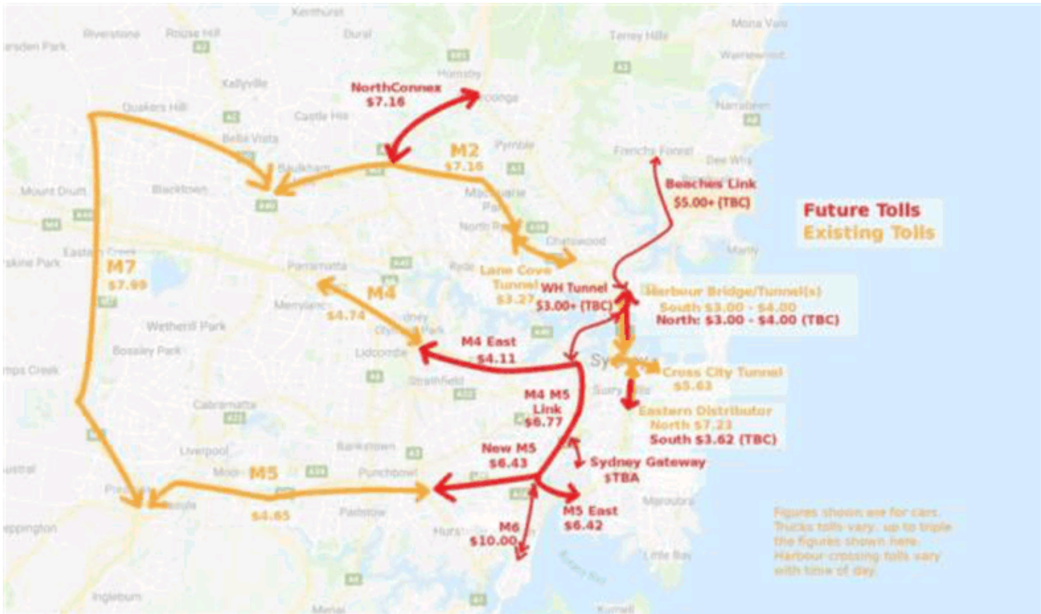
Epping Town Centre traffic study

Figure 1.1

EMM

The M2 Section of the Sydney Orbital Motorway, bypasses the Town Centre in an east-west direction, approximately 800 m north of the core Beecroft Road commercial area. Although the Sydney Motorway Network (including the M2 Motorway) is now heavily congested in the peak travel direction, for extensive periods throughout the normal weekday morning and afternoon traffic peak periods, there are no current plans by RMS for any widening of the M2 Motorway.

The future North-Connex Motorway diversion for the Pennant Hills Road traffic north of Carlingford may potentially provide some future traffic relief to the peak hour traffic congestion on the M2 Motorway. However due to the generally diverging alignments of the two Motorway routes, which is shown on the Sydney Motorway and Tollways map in Figure 1.2, there will be only a limited range of combinations of traffic origins and destinations for which North-Connex can provide a convenient alternative route to the M2, and the new Motorway route is likely to provide only limited future traffic relief to the existing M2 Motorway traffic congestion.



Map Source: Ben Aveling and Ian Bell

Figure 1.2 **Future Sydney orbital motorway and tolled road network**

The Sydney heavy rail and future metro rail networks pass through Epping, which is a major junction station on the Sydney Trains network and major stopping point for Inter City train services on the Sydney to Newcastle and Central Coast line. This provides a high and improving level of rail network accessibility and connectivity for the future residential population and workforce at Epping as is shown by the existing and proposed future train service frequency maps in Figures 1.3, 1.4 and 1.5.

However, although the rail network connectivity is good for the major travel destinations to the north east, north west and south east of Epping, there remains a crucial missing link in the rail network connectivity towards the Parramatta direction in the south west, where the NSW Government's decision in 2005 not to proceed with the previously approved Epping to Parramatta Heavy Rail link, continues to have a significant adverse effect on the public transport connectivity and journey times for public transport travel to and from Epping in the Parramatta direction.

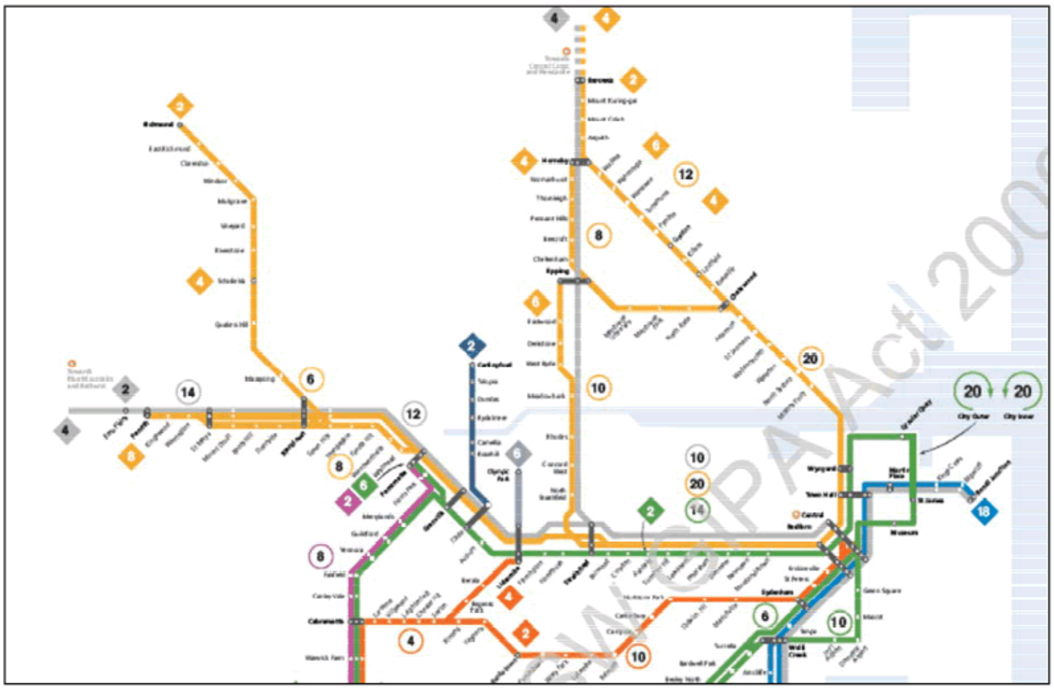


Figure 1.3 Existing Sydney Trains 1 am peak hour train service frequency in 2015

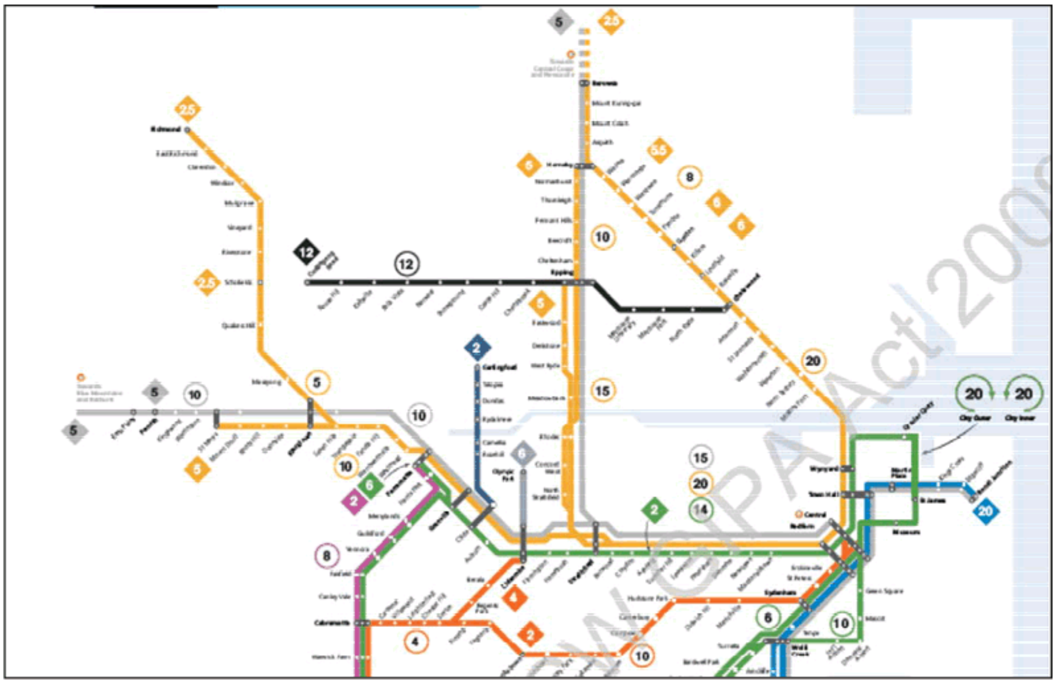


Figure 1.4 Future Sydney Trains 1 hour am peak train service frequency after 2019

The STA (Sydney Buses) local and interregional bus routes network at Epping, which are shown in Figure 1.5, currently service a wide range and frequency of destinations for bus passengers at Epping including longer distance sub-regional connections to Parramatta (routes M54, 546 and 549) and North Sydney or the Sydney CBD (routes 288, 290 and 291).

However even with peak hourly ten minute service frequencies for the buses travelling by these routes, the bus network capacity for peak hourly passenger movements is still only a few hundred passenger per hour, for each route, compared to the likely capacity of between 10,000 to 20,000 passengers per hour which could be achieved by direct metro or heavy rail services travelling to these destinations.

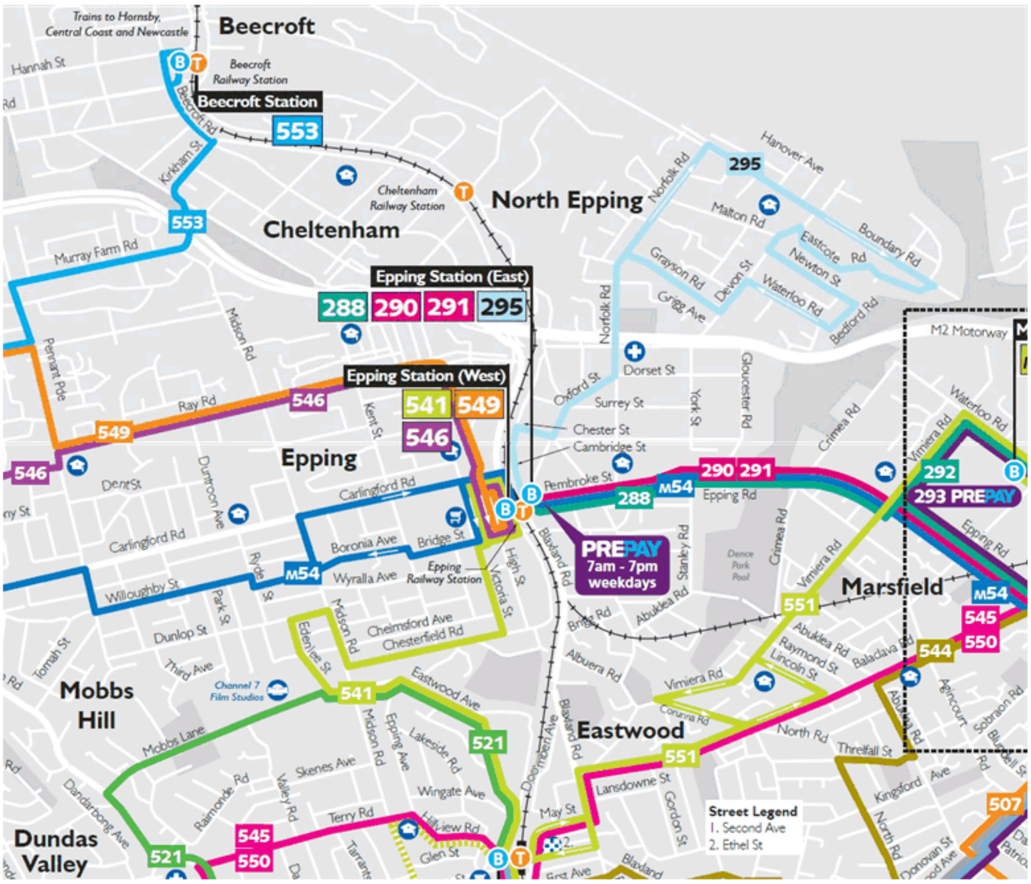


Figure 1.5 Bus routes connecting to the Epping Town Centre and Railway Station

1.3 Project objectives

In a transport modelling context, the two primary aims and objectives of the study are:

to identify the through (regional) traffic volume growth and its effect on the traffic network; and

the quantification of the local area road network impacts from local and through traffic growth.

A range of future land use and road network improvement scenarios are including the core locality residential traffic growth scenarios stemming from the recent zoning changes implemented as an outcome of the Epping Town Centre Urban Activation Precinct (UAP) Study 2014.

This analysis is effectively required to further update the work of the Epping Town Centre Transport Studies by Halcrow and GTA (Halcrow Pacific Pty Ltd, 2011 and GTA Consultants-reviewed by AECOM, 2015) which informed the work of the UAP. The Halcrow Study recommendations for road infrastructure improvements to accommodate the short term future development growth scenario for the Epping Town Centre go some way to accommodate the future traffic needs of longer-term development. However, both these earlier studies were based upon future traffic growth estimates for approximately 3,000 additional dwelling units.

The more recent land capability analysis which has been undertaken for this study by Parramatta City Council and EMM has identified the actual future development potential under the new zoning controls is more likely to be approximately 10,000 additional dwellings. Also this growth estimate does not include any additional dwellings proposed as part of planning proposal applications for key sites in the town centre, where several land owners/developers are already requesting further zoning changes which could potentially develop a future total of 2,800 dwellings of which approximately 1,500 dwellings would be in addition to the number of dwellings permitted under current zonings as identified by the land capability assessments which have been undertaken by Parramatta City Council and EMM for this study.

Also, the future land use options which have developed by Parramatta City Council and EMM for assessment in this study are essentially neutral in terms of employment and commercial floorspace development within the Epping Town Centre, which assume no change effectively from the current base year situation. However, it is anticipated that in due course additional town centre development scenarios will be assessed using the Epping Town centre traffic models which have been developed for this study, which also include higher levels of commercial development (and employment) in Epping.

The key objectives of the traffic study process, which have evolved and been refined during the course of the study in numerous discussions with the Council staff, RMS and other key study stakeholders are as follows:

To develop a series of existing and future year (2017, 2026 and 2036) mesoscopic travel demand and traffic flow/queuing models for the full study area road network (including all the existing and proposed major roads and local roads) for the full future 6.30-9.00 am and 3.30-6.00 pm peak traffic flow periods.

To further develop the actual 8.00-9.00 am and 5.00-6.00 pm one hour peak period linked intersection traffic flow and delay (queuing) models for the core traffic model area which is effectively the chain of key intersections along the major traffic route, via Carlingford, Beecroft, Epping and Blaxland Roads. This additional modelling uses the SIDRA 7 Linked intersection model

To accurately calibrate the 2017 peak hourly mesoscopic and traffic flow/queuing models to correctly represent the measured vehicle travel times and traffic queue lengths throughout the Epping Study area, This work has been undertaken in liaison with representatives of RMS. In particular, the calibration and validation of the initial base year 2017 am and pm peak hour study Dynameq traffic models, have been accurately calibrated with regards to:

- Peak hourly intersection turning movements at the key traffic signal intersections;

- Morning and afternoon peak hour travel times across the full study area from west to east and south to north via the identified major road travel paths, and

- Morning and afternoon peak hour maximum traffic queues for each cycle of the traffic signal operations on the Beecroft, Carlingford, Epping and Blaxland Road approaches to the two main traffic signal controlled intersections at the Epping Town centre.

To test the future network congestion and traffic flow implications of a range of future urban development scenarios for the study area, which are broadly consistent with the effects of the priority precinct zoning changes for the study area since 2014, which are effectively

- The future development of approximately 5,000 net additional dwellings from new residential development within the Epping study area, with all the additional dwellings completed and occupied by the year 2026

- The future development of approximately 10,000 net additional dwellings from new residential development within the Epping study area, with all the additional dwellings completed and occupied by the year 2036

1.4 Scope of work

To develop the initial study base year 2017, study area network traffic models, the following peak hour traffic volume surveys, travel time surveys and traffic queue length observations were undertaken.

- Peak hourly intersection turning movements at 17 nominated key intersections on Wednesday ;

- Morning and afternoon peak hour travel time surveys across the full study area major road travel paths, and

- Morning and afternoon peak hour maximum traffic queues for each cycle of the traffic signal operations on the Beecroft, Carlingford, Epping and Blaxland Road approaches to the centre

1.5 Study area

1.5.1 Major roads

Particulars concerning all the major roads in the study area are detailed below:

Beecroft Road – a declared State road under the jurisdiction of the RMS. It is generally a four-lane, two-way road running in a north-south direction between Pennant Hills and Epping. It is signposted with a speed limit of 60 km/hr through Epping. Both sides of Beecroft Road south of the M2 Motorway are clearways during peak hours. It should be noted that RMS has recently completed some widening of Beecroft Road, through and to the north of the Carlingford Road intersection to accommodate one additional southbound right turning lane at the intersection.

Carlingford Road – a declared State road under the jurisdiction of the RMS. It is also generally a four-lane, two-way road running in an east-west direction between Beecroft Road at Epping and Pennant Hills Road at Carlingford. It is signposted with a speed limit of 60 km/hr through the Epping urban area. In the 90 m section of west of Beecroft Road, to the additional town centre intersection with Ray Road and Rawson Street, the traffic queuing is frequently congested and detailed attention is required to be given to the synchronised phasing of the two adjacent sets of traffic signals to optimise the traffic movement through both intersections. Also the right turn movement is not permitted from Carlingford Road to Ray Road in the westbound direction.

Epping Road – a declared State road under the jurisdiction of the RMS. It is also generally a four-lane, two-way road in the Epping study area, although it is wider (generally six lanes) further to the east in the direction of Macquarie Park and Lane Cove. It is signposted with a speed limit of 60 km/hr within the Epping urban area. Both sides of Epping Road are clearways during peak hours and are 'no stopping' at other times. It should be noted that RMS is currently widening Epping Road between Essex Street and Blaxland Road to accommodate an additional westbound lane, and for adding a raised median strip, which will prevent right turning traffic movements in the future at the Epping Road/Smith Street and Epping Road/Forest Grove Road intersections.

Blaxland Road – a declared State road under the jurisdiction of the RMS. It is generally a four-lane, two-way road running in a north-south direction between Epping and Ryde. It is signposted with a speed limit of 60 km/hr. In the 70 m section of Blaxland Road approaching the intersection with Epping Road, a 'no stopping' restriction applies on both sides of the road, and elsewhere on the western side. On most sections, however, kerbside parking is permitted on the eastern side outside of peak hours. At the four way intersection of Blaxland Road with Epping Road and Langston Place to the north, the future RMS intersection improvements will remove the southbound right turn facility from Langston Place into Epping Road-Beecroft Road heading west, which will free up some additional capacity for other traffic movements at the intersection, but will require the existing locally based traffic which is making this movement via Langston Place, to use other traffic detour routes in the future, most probably via the Epping Road/Essex Street intersection.

1.5.2 Intersections

This traffic study has surveyed the existing peak hourly and turning traffic movements at a total of seventeen intersections throughout the study area, which are shown by the summaries of the am and pm peak period one hourly intersection approach traffic volumes in Appendix A.

In addition the RMS has expressed an interest in specifically reviewing the peak hourly intersection approach and turning traffic movements which are predicted by the study at the six key traffic signal controlled intersections along the major traffic route, which are:

West of the railway line at:

- Carlingford Road/Midson Road
- Carlingford Road/Ray Road/Rawson Street
- Carlingford Road/Beecroft Road, and

East of the railway line

- Epping Road/Blaxland Road/Langston Place
- Epping Road/Essex Street
- Epping Road/Pembroke Street

Also shown in Appendix A are the "core network" one hour am and pm peak westbound and eastbound traffic flow volumes along the major traffic route between these intersections, including the calculated mid block traffic flow gains and losses, which represent either:

Additional traffic joining or leaving the major road from intervening local road intersections or property access driveways, or

Greater or fewer number of stored vehicles in the traffic queues along the major road, between the beginning and the end of the relevant peak hour period, or

Possible minor errors in the surveyed intersection turning traffic movements at any intersection

In this study report, the morning and afternoon peak period traffic queuing behaviour along the four major traffic routes approaching Epping has been assessed in detail using the Dynameq traffic queuing model outputs from the year 2017 am and pm peak period base traffic models. A detailed series of traffic queuing outputs for the full study area road network for the overall 2-3 hour am and pm peak traffic periods is presented in Appendix B.

During the morning peak period the combined eastbound and southbound traffic queues on Carlingford Road and Beecroft Road can reach a combined total length of approximately 1.5 km, which is illustrated by Figure 1.6.

The detailed actual Epping town centre peak hour traffic queuing and congestion, is further illustrated by the series of traffic flow and queuing plots in Figures 1.7 to 1.14. Each yellow dot on the maps and figures in Appendix B and Figures 1.7 to 1.15 represents one queued vehicle.

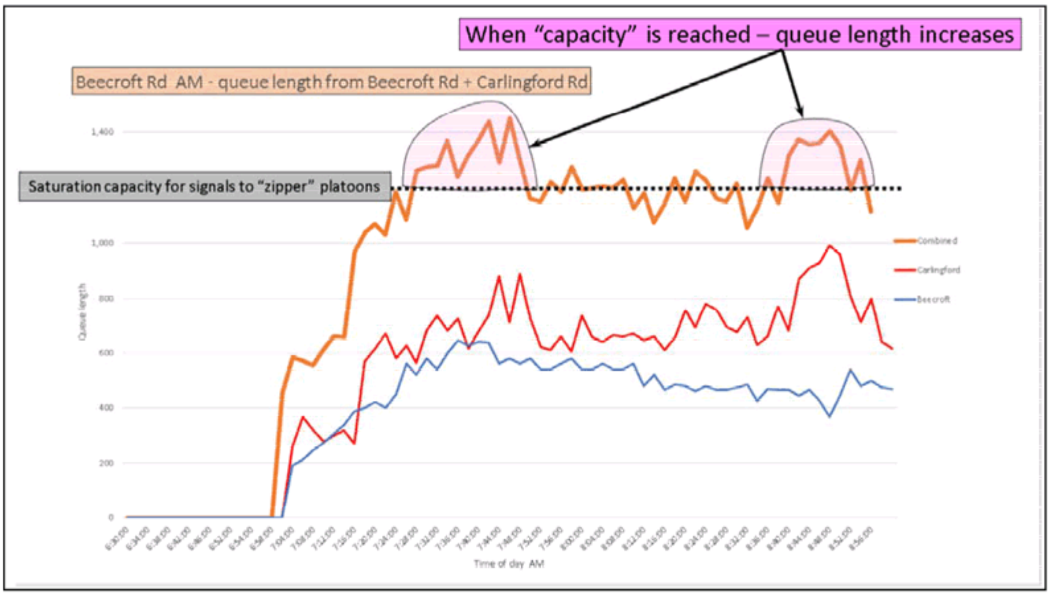


Figure 1.6 **Combined morning peak hour Carlingford Road and Beecroft Road traffic queues**

The peak traffic queue lengths can generally occur at different times of the peak hour in the morning and afternoons on different approach routes and at different intersections, which is also illustrated by the different peak traffic queue times for Carlingford Road and Beecroft Road in Figure 1.6.

There is also a separate focus of significant traffic queuing and congestion in the western part of the study area, centred around the Carlingford Road/Midson Road intersection, which can only be fully understood by referring to the separate series of traffic flow and queuing plots in Appendix B. These plots show the greatest development of traffic queues occurring in this locality between 8.45-8.55 am in the morning and 5.45—5.55pm in the afternoon, which is later than the peak traffic queues near the Epping Town Centre.

For Epping traffic model study area overall, the most widespread traffic queuing effects on all areas of the road network are considered to occur at approximately 8.40 am in the mornings and 5.40 pm in the afternoons, which is consistent with the normal Sydney region major road traffic conditions where the peak traffic volumes are normally between 8.00-9.00 am in the mornings and 5.00—6.00 pm in the afternoons

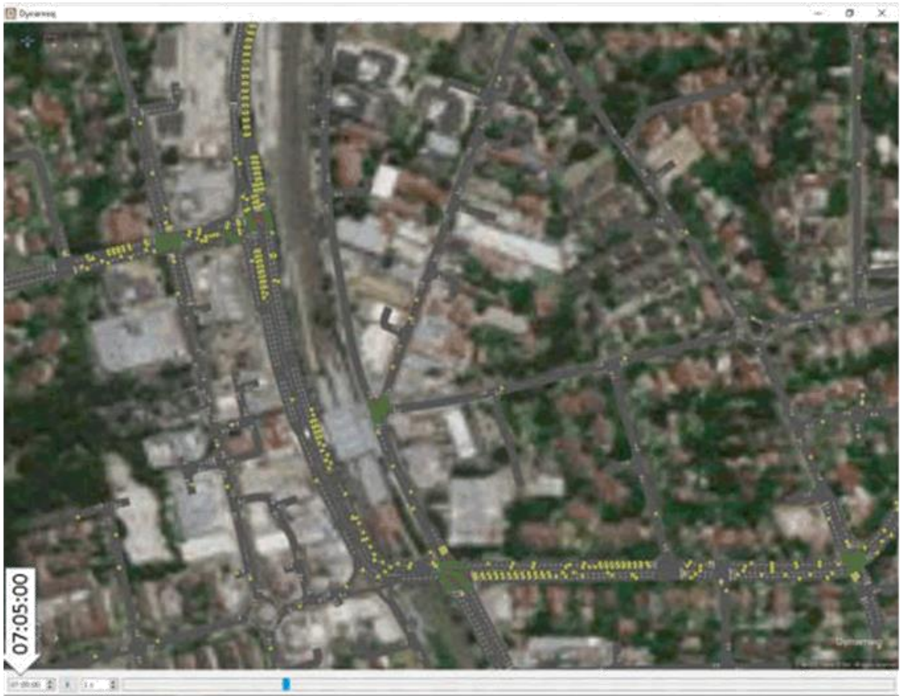


Figure 1.7 Early morning peak hour eastbound traffic queuing at 7.05 am

Figure 1.8 Early morning peak hour eastbound traffic queuing at 7.25 am

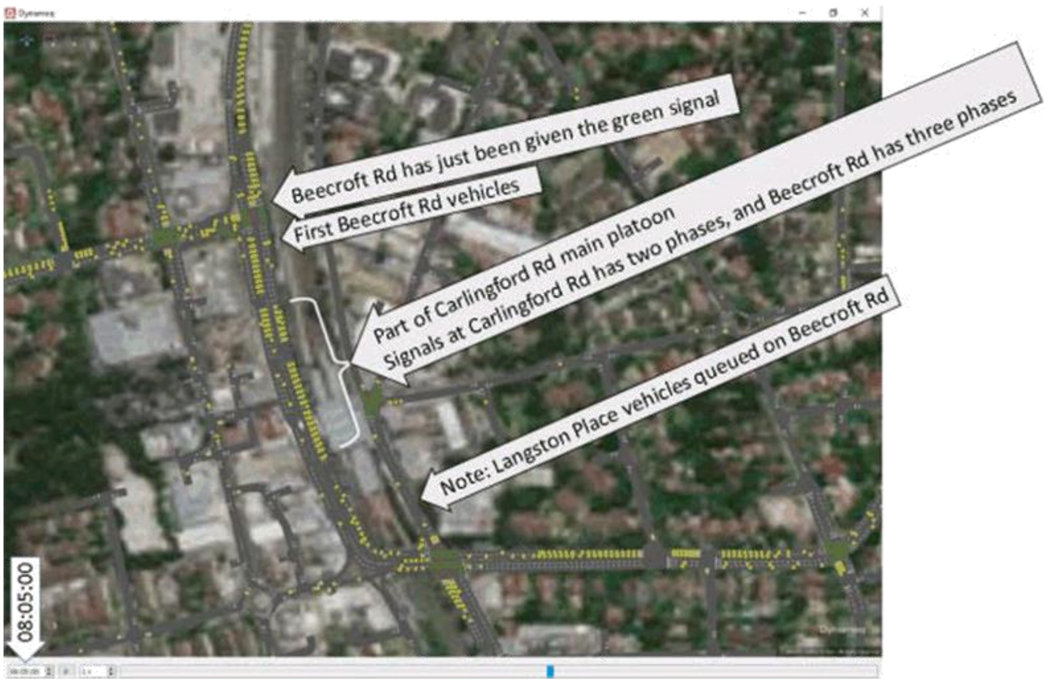


Figure 1.9 Middle morning peak hour eastbound traffic queuing at 8.05 am

Figure 1.10 Middle morning peak hour eastbound traffic queuing at 8.15 am

Figure 1.11 Later morning peak hour eastbound traffic queuing at 8.35 am

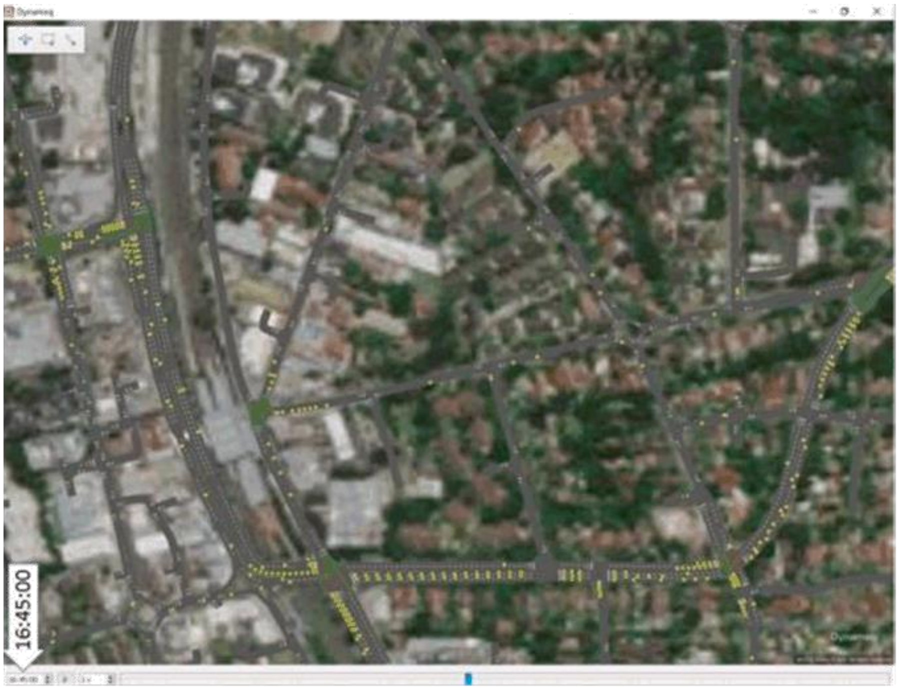


Figure 1.12 Early afternoon peak hour westbound traffic queuing at 4.45 pm

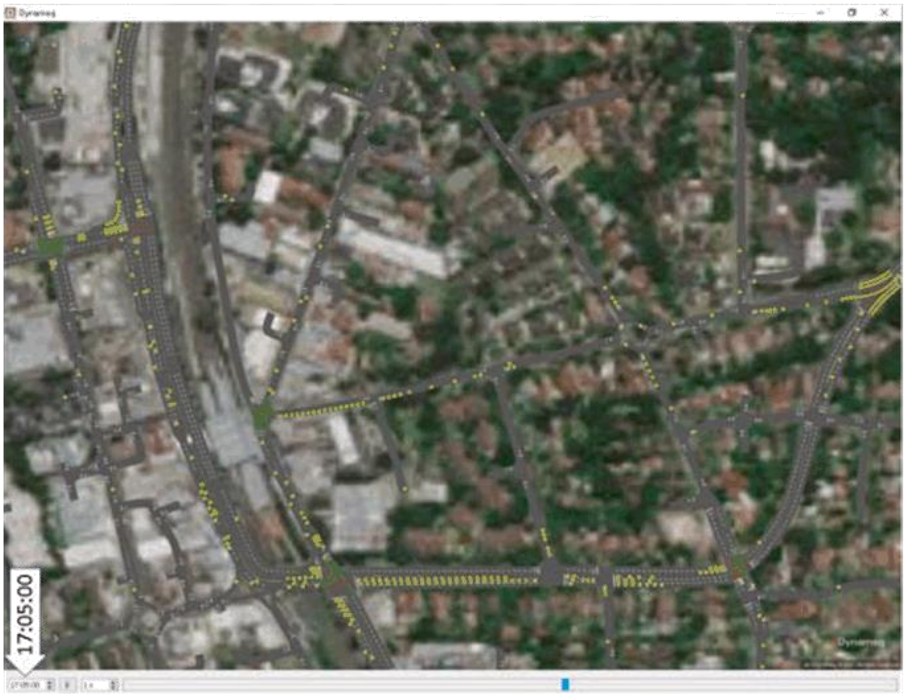


Figure 1.13 Middle afternoon peak hour westbound traffic queuing at 5.05 pm

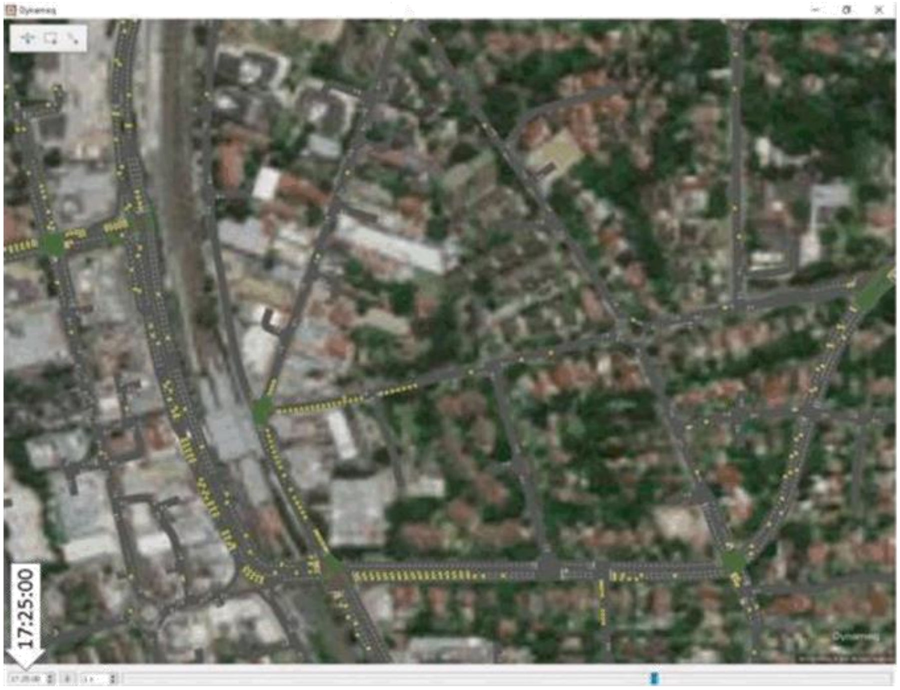


Figure 1.14 Middle afternoon peak hour westbound traffic queuing at 5.25 pm

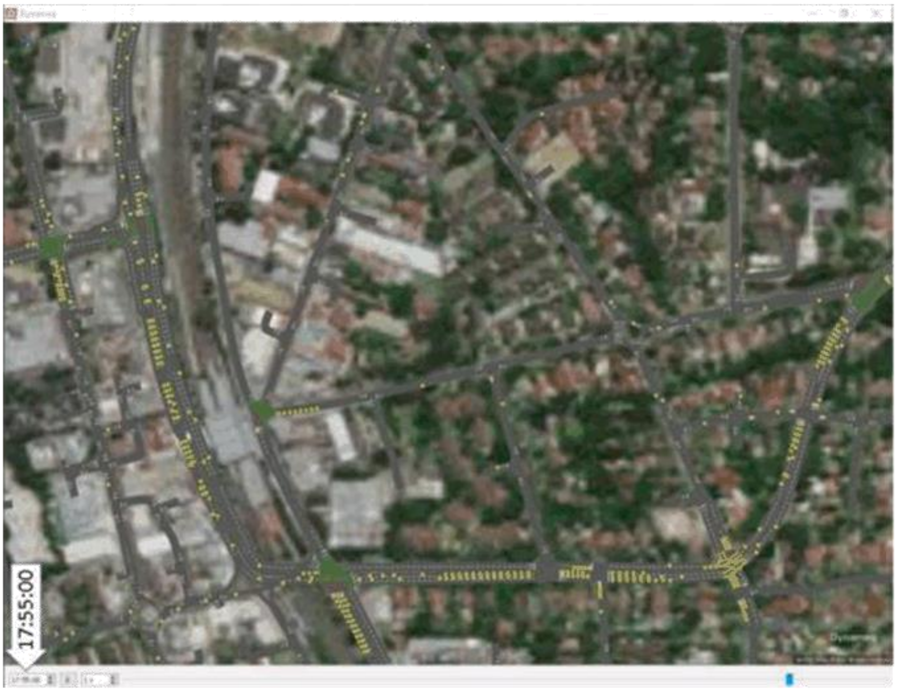


Figure 1.15 Later afternoon peak hour westbound traffic queuing at 5.55 pm

In addition to the Dynameq traffic model queuing analysis, which has been undertaken for the existing base year 2017 am and pm peak traffic models, the existing and future intersection performance and traffic delays at the six key traffic signal controlled intersections of the traffic model "core network" area has been assessed in detail using the SIDRA 7 Linked Intersection model, for the existing 2017 and future year 2026 and 2036 am and pm traffic network models.

For this detailed intersection traffic delay analysis, the unrestrained network travel demand which is determined by the EMME model for the one hour am and pm peak periods, for regional traffic growth, combined with the additional development traffic at Epping, is fed directly into the SIDRA 7 linked intersection model where the SIDRA model responds by applying upstream capacity constraints at each assessed intersection, whereby the peak hourly traffic which is travelling through the intersection is limited according to the actual capacity constraints at the relevant upstream intersections.

1.5.3 Land use patterns

The existing patterns of land use development in the study area, including the current land use zonings, and the sites of recently approved residential developments within and surrounding the Epping Town centre is shown by the map in Figure 1.16, where the identified future development sites are also shown with a red or blue shading.

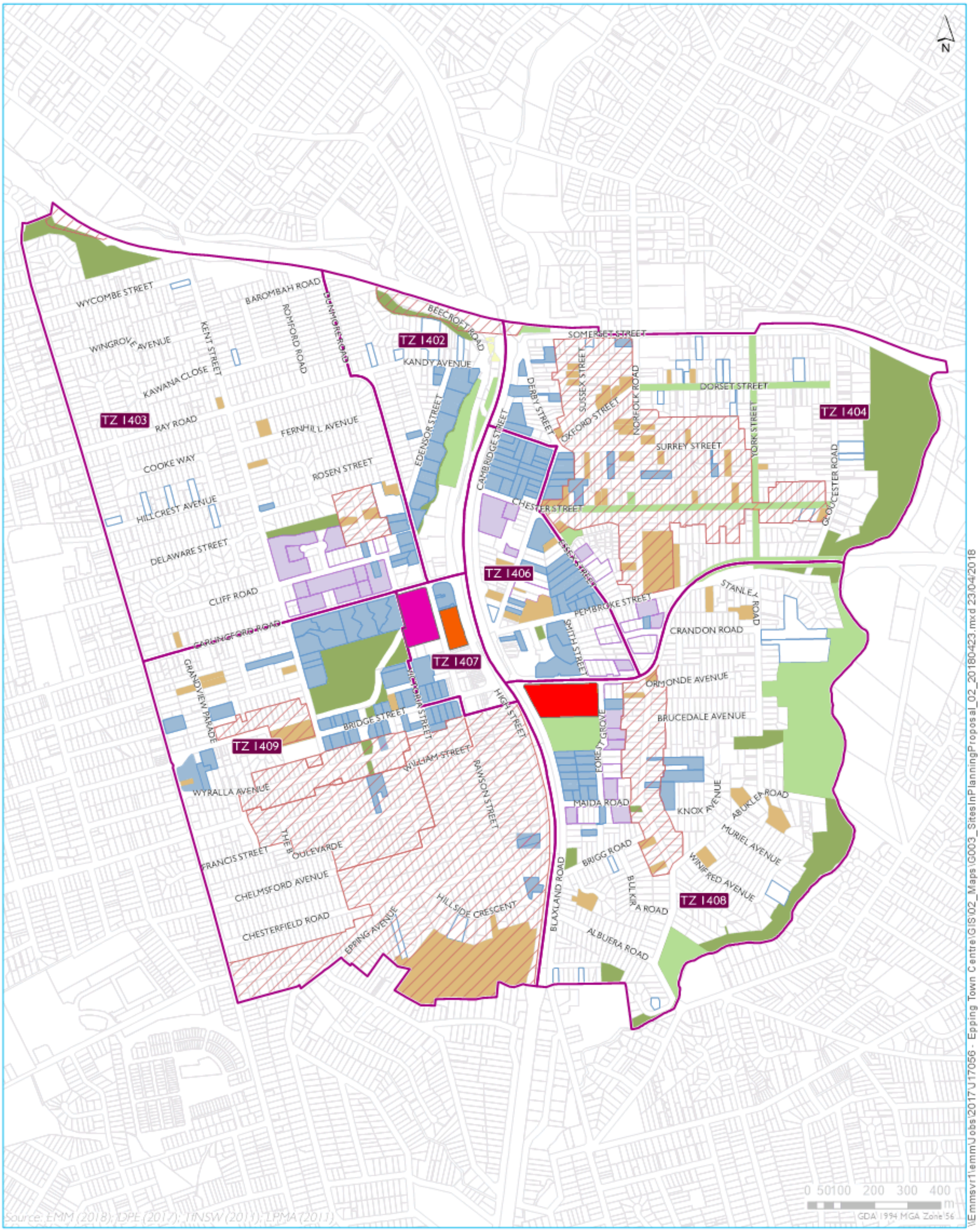
More details of the map which is shown in Figure 1.16 and listings of all the identified development sites and their approved or potential future dwelling numbers in the interim (year 2026) and ultimate (year 2036) future Epping Town Centre land use scenarios are provided in the additional maps and summary tables in Appendix C and Appendix D.

The existing approved developments (as at 19 June 2017) which was defined to be assessed as one of the two core future land use options for the Epping Study area, will effectively result in approximately 5,000 additional dwellings in the study area by 2026 and a further increase to approximately 10,000 additional dwellings in the study area by 2036.

Three further "Planning Proposal" sites, which are either wholly within or adjacent to the Epping town centre commercial areas, and are the subject of known planning proposals to modify the existing zonings and height limits.

These three sites are also shown on the map in Figure 1.17. The requested zoning changes for these three sites, if approved, would permit the construction of a total of approximately 2,800 new dwellings, in comparison to approximately 1,300 new dwellings which would be permitted for these sites currently. This would further increase the potential future Epping study area residential development yield by approximately 1,500 dwellings above the calculated maximum of approximately 10,000 new dwellings, which is forecast to be achieved under the current planning controls.

Figure 1.16 Study area land use analysis and identified development sites



KEY

- BTS Travel zone
- Sites in planning proposal
- Beecroft/Rawson Street site
- Epping Road site
- Rawson Street site
- SILEP heritage
- Conservation Area - General
- Item - General
- Item - Archaeological
- Item - Landscape
- Strata Plan (LPMA 2014)
- Strata title property (Epping Town Centre Urban Activation Precinct Structure Plan 2011)
- DA approved
- DA approved - under construction
- Parks / open space
- Cadastre

Land use analysis and sites with planning proposals

Epping Town Centre traffic study

Figure 1.17

EMM

1.6 Report outline

The structure of this report follows the report guideline table of contents for "Option Testing Report" which has been published by RMS as part of Technical Direction – Traffic Management TTD 2017/001 published on 17 May 2017.

The key details of the study traffic model development have previously been presented in two traffic model calibration reports which were prepared by EMM/Paul van den Bos in July 2017 and December 2017. The additional study traffic model results for the increased study area networks travel demand in 2026 and 2036 and the further detailed SIDRA intersection modelling to calculate future intersection traffic delays, is described in detail in this report under the following chapter headings.

Chapter 2 Land use and network option testing

Chapter 3 Traffic modelling assumption

Chapter 4 Future growth in travel demand

Chapter 5 Base year network operations

Chapter 6 Future Base year network operations

Chapter 7 Future land use and network operation results

Chapter 8 Operational assessment comparison

Chapter 9 Conclusion

2 Option testing conditions

2.1 Regional context

Sydney's future population growth and urban development projections, and now published separately for the three "connected cities" of central, eastern and western Sydney.

Epping is included in the Parramatta LGA which is part of the central city area and which has anticipated future population growth of 550,000 persons over the 20 year future period (from 2016 to 2036). This represents average population growth of 27,500 persons per year over this period.

The anticipated future annual growth demand for new dwellings is a total of 207,500 dwellings, which corresponds to an average growth of 10,375 dwellings per year over the 20 year period.

The forecast range of future housing types for the projected new dwellings is as follows:

60% detached dwellings = 6,225 additional dwellings per year;

15% medium density = 1,556 additional dwellings per year; and

20% apartments = 2,075 additional dwellings per year

Within the Epping town centre study area, the 10,000 additional dwellings which are likely to be constructed over the next 20 years will be either medium density housing or apartments. These additional dwellings will contribute towards meeting the overall "central city" future housing 20 year growth target of 72,625 additional medium density or apartment dwellings which is required (35% of the 207,500 total dwellings required) over the future period from 2016 to 2036.

There has been only moderate recent population growth in the suburb of Epping between the 2011 and 2016 census and the suburb was recently recorded in the 2011 census as having a total of 7,322 existing households, with approximately 31.4% of the working population usually travelling to work by public transport (28.6% by train and 2.8% by bus).This data is summarised in Table 2.1.

The likely future development of an additional 10,000 dwellings at Epping will represent a 137% increase in the number of existing households at Epping, which will have far reaching implications for the range of transport infrastructure and all other community facilities and services which are required to support this level of population growth, in the areas within and around the Epping Town Centre.

Table 2.1 Key demographic indicators for Epping at the 2011 Census

	Epping	**Parramatta LGA**
Number of households	7,322	70,438
Key methods of travel to work	Train – 28.6%	Train – 18.7%
	Bus – 2.8%	Bus – 5.0%
	Car – as driver – 47.7%	Car – as driver – 54.1%
	Car as Passenger – 3.8%	Car as Passenger – 4.2%
	Bicycle – 0.4%	Bicycle – 0.3%
	Walked only – 2.4%	Walked only – 3.6%

The future supporting transport infrastructure which is proposed to be provided by the NSW government at Epping includes both road and public transport network improvements, including the North West metro line to Rouse Hill and the as yet unspecified future radial public transport connection between Parramatta and Epping, shown on the map extract from the central city district plan, in Figure 2.1.

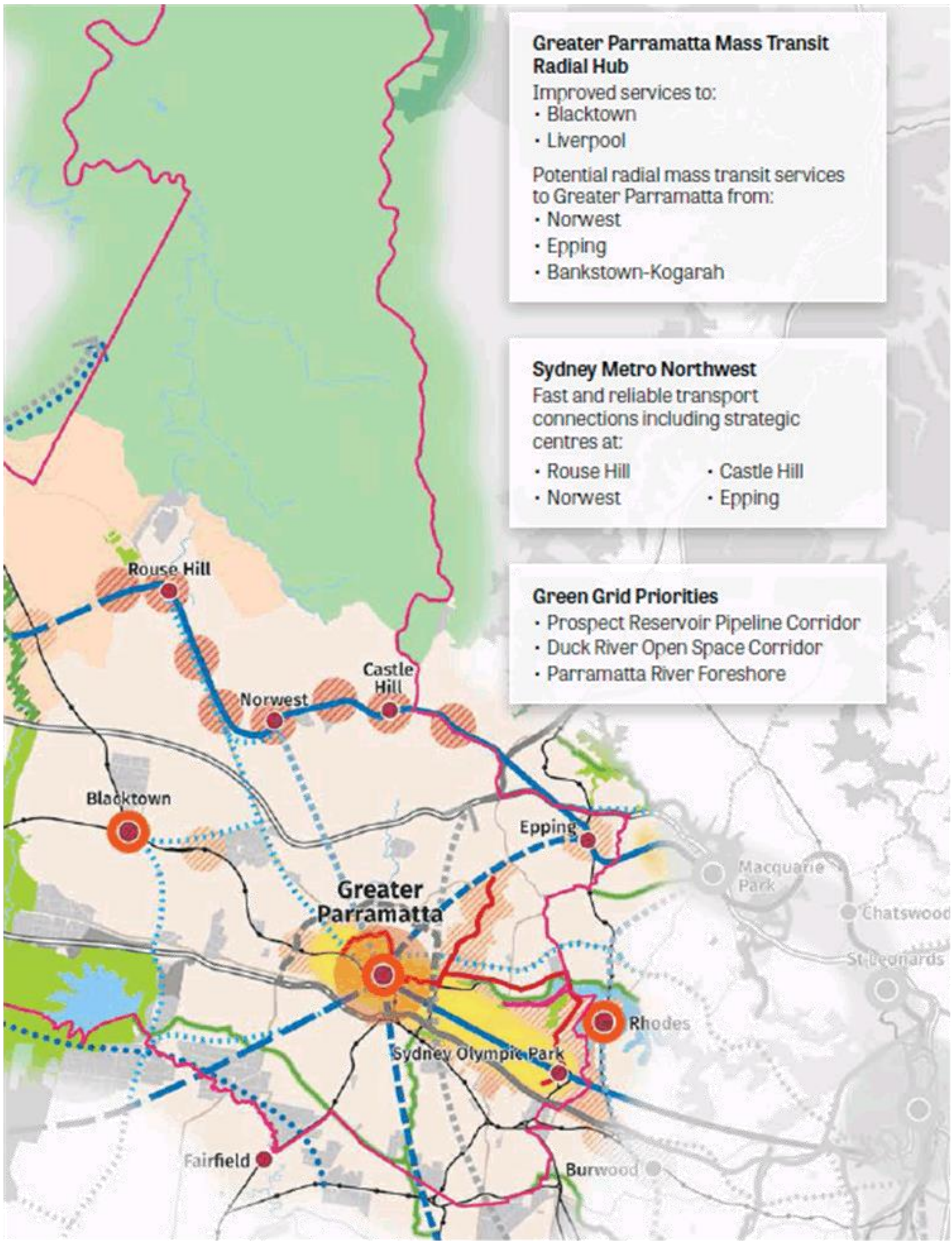


Figure 2.1 **Future public transport connections for Central City including Parramatta-Epping**

2.2 Land use options

Existing land use in the study area comprises of a mix of commercial and residential uses. Existing retail and office activity is concentrated within a 400 m radius of the Epping Train Station. Some residential uses exist in the area, in mixed use buildings with retail on the ground floor. Building heights in this area are generally eight to nine storeys. The Epping Business Park and Cambridge Office park, which are small scale commercial business parks are located on the western and eastern side of the rail line respectively.

There are a number of public and social infrastructure facilities in the area including parks, churches and other community facilities.

Land immediately adjoining the town centre core consists predominately of medium density residential uses including three to four storey apartment buildings. The remaining portion of the Epping town centre study area consists of mostly low density detached buildings with consistent character and built form, in well established areas.

Further details of the identified locations of development sites for 5,000 additional dwellings in the study area by 2026 and a further 5,000 additional dwellings between 2026 and 2036 are shown in Appendix C and Appendix D. The proposed locations of the new dwellings are cross referenced to a fine grain system of new traffic network nodes, which are shown on the study area map in Figure 2.2, which are also cross referenced to the broader TFNSW system of 'TZ' travel zones for network traffic models in Figure 2.3.

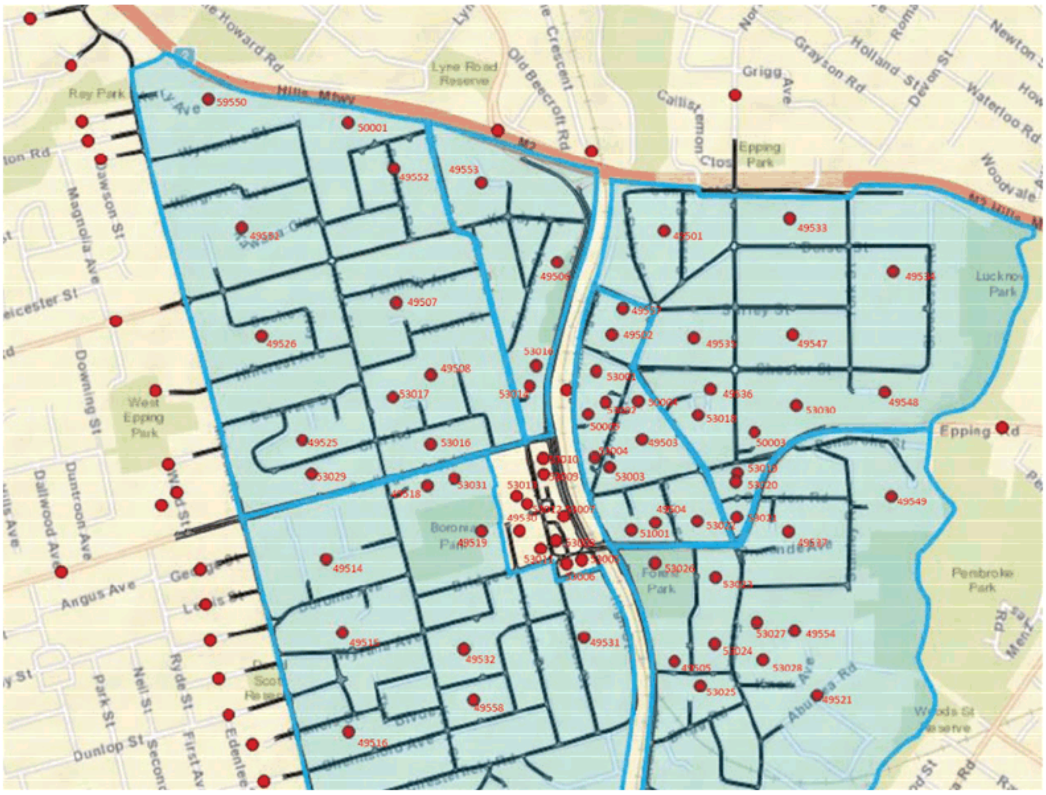
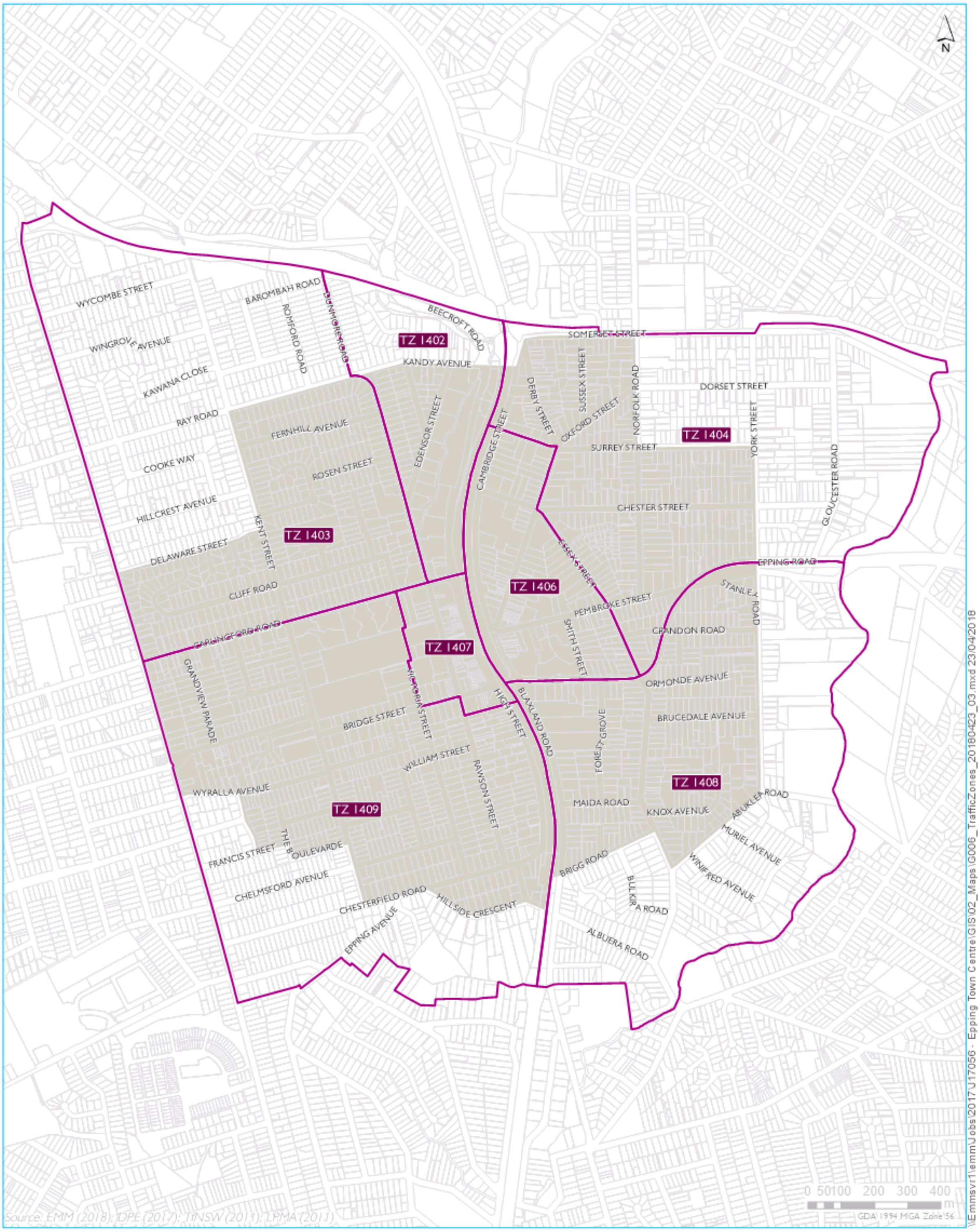


Figure 2.2 Fine grained network of nodes for new residential development at Epping



KEY

BTS Travel zone

Cadastre

Epping precinct boundary

TfNSW land use traffic zones for the study area

Epping Town Centre traffic study

Figure 2.3

The future land use options which have developed by Parramatta City Council and EMM for assessment in this study are essentially neutral in terms of their future employment and commercial floorspace development scenarios within the Epping Town Centre and assume no change effectively from the current base year situation. However, it is anticipated that in due course additional town centre development scenarios will be assessed using the Epping Town centre traffic models which have been developed for this study, which will also include higher levels of commercial development (and employment) in the Epping Town Centre.

One of the additional future planning proposal sites which is shown on Figure 1.17, the Austino site, is located at 2-18 Epping Road, 2-4 Forest Grove Road and 725 Blaxland Road. An additional site specific assessment has also been undertaken for this site to determine the general future road network and intersection delay impacts from allowing additional residential development at this site, above that which is permitted under the current zonings. The preliminary results from this analysis are discussed and presented in Chapter 7 and Appendix M of this report.

2.3 Road network options

The future assumed base levels of road network improvements for the study area are as follows:

- the RMS committed program of main road improvements along the Epping Road to Carlingford Road and Beecroft Road route, through the Epping Town centre, which are linked with the "interim future baseline" year 2026 study area residential development scenario for +5,000 dwellings in the year 2026 network traffic model, and

- a further series of local road network improvements which have been identified by Parramatta City Council, which are assumed to be implemented in addition to the RMS committed program of main road improvements for the "longer term future baseline" year 2036 study area network traffic model with +10,000 dwellings.

A series of maps and other details describing the RMS committed and Council identified future road network improvements are provided in Appendix E and Appendix F of this report.

The Council identified future road network improvements include a total of twelve items of future roadworks, including the previous RMS proposal for one additional traffic lane westbound on the Epping Road bridge which crosses the railway line, which is no longer included in the current RMS committed program of roadworks for the Epping Town Centre (Appendix E) although the previous traffic studies which were undertaken by Halcrow and GTA in 2011 and 2015 both identified this bridge widening was required to accommodate future traffic growth estimates for approximately 3,000 additional dwellings within the Epping Town Centre locality.

In addition a further preliminary analysis of two further road network options has been undetaken:

- the reopening of the former M2 bus tunnel link to Epping Station as a one way westbound link with left turn egress only at Beecroft Road and

- a new East west road link connecting between Ray Road and Beecroft Road, through the NSW Government land which is on the western side of Beecroft Road

where the year 2026 and 2036 future traffic network models have determined the potential future traffic usage and road network traffic delay improvements elsewhere for locally based traffic accessing the major road network at Epping, when these additional road network connections are provided.

The preliminary network traffic analysis results for these additional road network options are presented and discussed in Chapter 7 and Appendix N and Appendix O of this report. The full future traffic analysis details including the SIDRA intersection modelling results for these two options will be reported in a further supplementary report to this report.

3 Assumptions

3.1 Strategic network development

The full details of the Epping Town centre traffic model and study area baseline road network assumptions have been provided in the two previous traffic model calibration reports which were prepared by EMM/Paul van den Bos for review by RMS in July 2017 and December 2017.

The assumed core road network travel speeds for each link in the road network are shown on the map in Figure 3.1, which confirms the maximum (uncongested) travel flow speeds for traffic travelling through and within the study area are effectively:

60 km/hr for the major road (Epping, Beecroft, Carlingford and Blaxland Roads);

50 km/hr for all local roads except for the roads where school zone speed limits apply; and

40 km/hr for the local roads, where school zone speed limits apply.

Figure 3.1 Map of base network travel speeds for each network link

The base year 2017 network traffic modelling assumptions for the combined EMME and Dynameq am and pm peak period and peak hourly traffic models were developed through extensive consultation with the traffic engineering and strategic planning officers at Parramatta City Council and the network traffic modelling and development consultation specialists at RMS. RMS have generally endorsed the base year 2017 network model methodology and assumptions, although the final level of calibration of the detailed core area Dynameq traffic model results do not meet the full RMS microsimulation calibration standard for the core areas of network models, but they do meet the RMS calibration standard for the overall network area. This level of calibration accuracy is considered by the Parramatta City Council planning officers to be adequate for the purposes of the Epping Town Centre study which is primarily a strategic level transport planning study which examines the future road network and traffic capacity implications for the study area from developing either 5,000, 10,000 or possibly an even greater number of additional dwellings over a 10 to 20 year future time horizon.

In this study, the 2017 morning and afternoon peak period vehicle following and queuing behaviour has been extensively investigated for the four major traffic routes approaching Epping using the Dynameq traffic queuing model as a "post processing" for the core unrestrained network travel demand which is calculated using the EMME model. This analysis has been continued using the Dynameq model for the core network travel demand analysis in the EMME model where the real time intersection traffic capacity constraints in the Dynameq model effectively limit the peak hourly volumes of traffic which are able to enter the network, so the core output from the Dynameq traffic model for the 2026 and 2036 future year scenarios is effectively the peak hourly volumes of traffic which are kept waiting and are effectively unable to enter the network.

For intersection analysis outputs for the base year 2017 am and pm peak one hour traffic models, the existing intersection performance and traffic delays at the six key traffic signal controlled intersections of the traffic network model "core area" has been assessed in detail using the SIDRA 7 Linked Intersection model, and this analysis has also been extended to the future year 2026 and 2036 am and pm peak one hour traffic network models. The future year SIDRA 7 Linked intersection model layout for the assessed linked intersections (including the future year road network options assessed) is shown in Figure 3.2 and Figure 3.3 for the future road networks in 2026 and 2036.

The unrestrained network travel demand which is determined by the EMME model for the one hour am and pm peak periods provides the inputs to the SIDRA 7 Linked intersection model to assess the regional traffic growth in 2026 and 2036 in combination with the additional development traffic at Epping.

The EMME model traffic volume outputs for all the linked intersections along the major traffic route, is fed directly into the SIDRA 7 linked intersection model, and the SIDRA model responds by applying upstream capacity constraints at each assessed intersection, whereby the peak hourly traffic which is travelling through both intersections is limited according to the actual capacity constraints at the relevant upstream intersections.

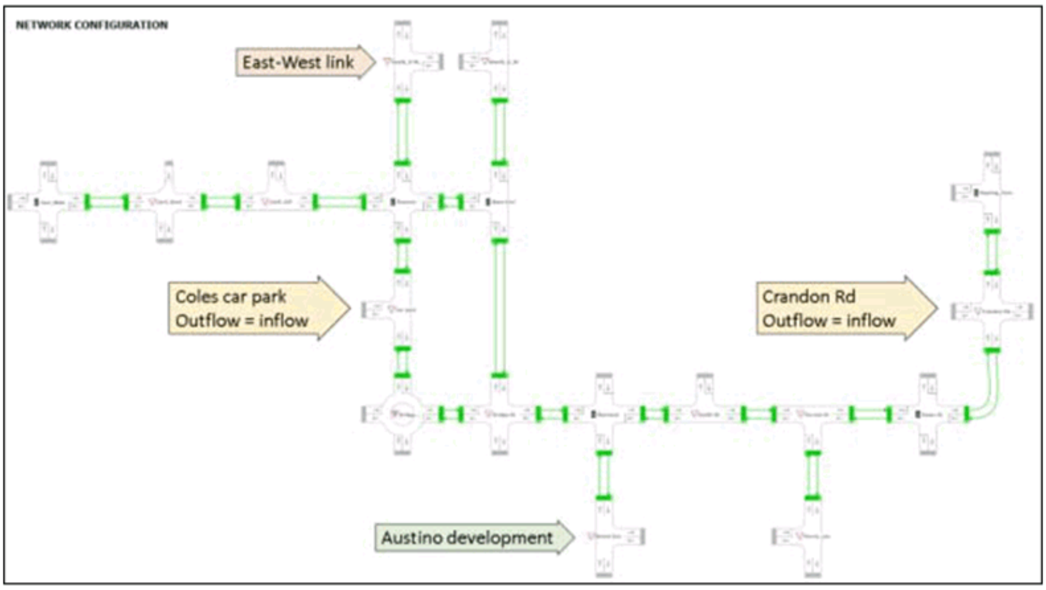


Figure 3.2 Future SIDRA linked intersections assessed in 2026 network model

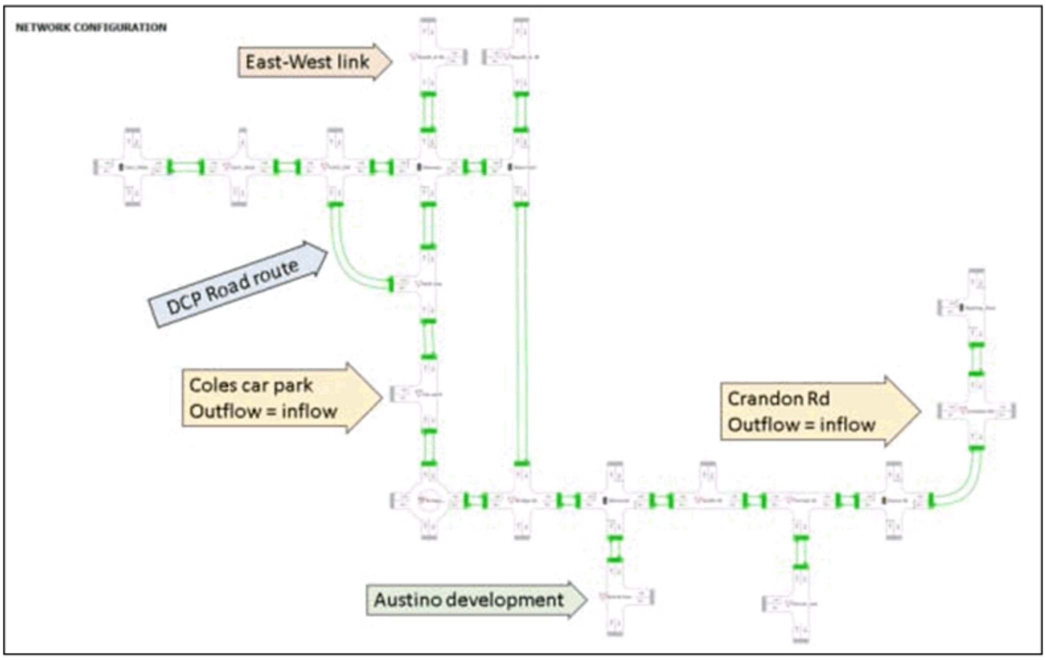


Figure 3.3 Future SIDRA linked intersections assessed in 2036 network model

4 Future year demand

4.1 Dwellings growth

The future dwelling growth scenarios which have been used to develop the future road network traffic demand scenarios for this study have been determined by future land capability analysis by EMM and Parramatta City Council strategic planners and are as follows:

- the future development of approximately 5,000 net additional dwellings from new residential development within the Epping study area, with all the currently approved additional dwellings completed and occupied by the year 2026

- the future development of approximately 10,000 net additional dwellings from new residential development within the Epping study area, with all the additional dwellings completed and occupied by the year 2036

As at 19 April 2018, a total of over 5,500 new dwellings have either been fully approved by Parramatta City Council or the former Hornsby Council (3,940 dwellings) or are in various stages of assessment (1,613 dwellings), since the Epping Town centre land use zoning changes in 2014. The two development scenarios of 5,000 and 10,000 additional dwellings in this study represent effectively the limits of the likely range of realistic minimum and future maximum residential development scenarios for the study area, in the absence of any further zoning changes through planning proposals, which would further increases the maximum residential development yield beyond 10,000 additional dwellings.

4.2 Traffic generation and distribution

For the additional development traffic, the methodology which has been used to calculate traffic generation is based on the distance between a development and the train station. Four concentric zones (see Figure 4.1) were defined based on the distance to the train station, with each zone assigned traffic generation rates corresponding to distances of either (0 - 200, 200 – 400, 400 - 800 or over 800 m to the train station).

The future residential traffic generation rates for zone 1 residential development, within 200 m from the railway station, correspond to the lowest, most recent RMS (year 2013) traffic generation rates for higher density residential development, which are as summarised below:

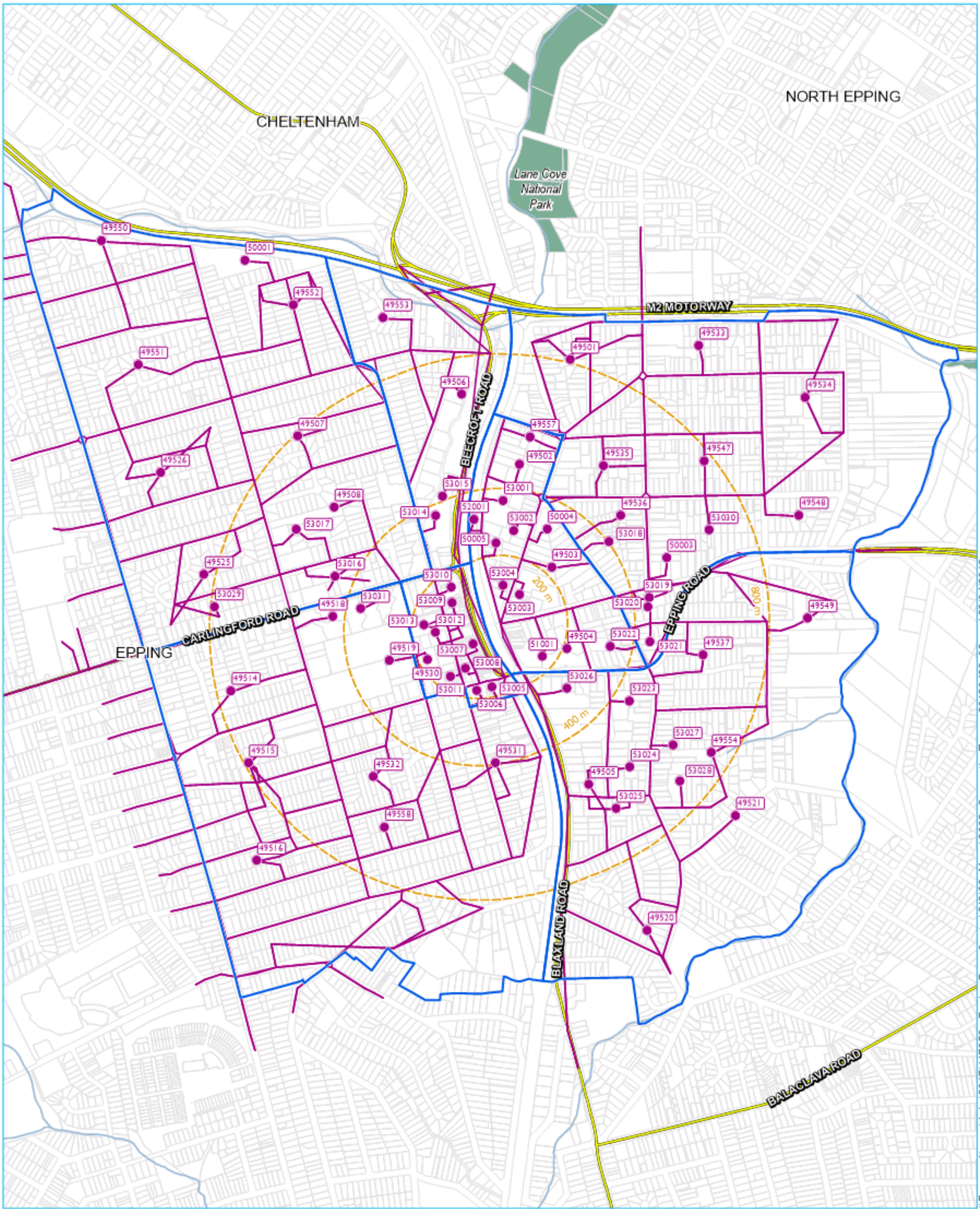
- Morning peak traffic generation: 0.19 vehicles per hour per dwelling; and

- Afternoon peak traffic generation: 0.15 vehicles per hour per dwelling.

The future residential traffic generation rates for zone 2 residential development, between 200 to 400 m from the railway station, correspond to the earlier, RTA/RMS (year 2002) general traffic generation rates for higher density residential development in metropolitan centres, which are:

- Morning and afternoon peak traffic generation: 0.23 vehicles per hour per dwelling;

The future residential traffic generation rates for zone 3 residential development, between 400 to 800 m from the railway station also correspond to the earlier, RTA/RMS (year 2002) traffic generation rates for higher density residential development in metropolitan "sub-regional" centres, which are:



Source: EMM (2018); DFSI (2017); TfNSW (2011)

0 250 500 m
GDA 1994 MGA Zone 56

KEY

- Travel zone
- Access buffers
- Node / zone
- Emme links
- Main road
- Watercourse / drainage line
- Cadastral boundary
- NPWS reserve

Traffic generation zones

Epping Town Centre traffic study

Figure 4.1

EMM

Morning and afternoon peak traffic generation: 0.29 vehicles per hour per dwelling;

The future residential traffic generation rates for zone 4 residential development, over 800 m from the railway station, correspond to the earlier RTA/RMS (year 2002) traffic generation rates for medium density residential development, for which the mid point of the likely range is:

Morning and afternoon peak traffic generation: 0.48 vehicles per hour per dwelling;

4.3 Increased travel demand

The unrestrained growth in the future road network travel demand has been determined using the EMME model for the additional traffic volumes generated by additional residential development, combined with the regional traffic growth (excluding any component which related to the previously assumed Epping Town Centre growth) which was already incorporated in the year 2026 and 2036 versions of the EMME base model.

The overall study area road network plots for the current (year 2017) and the future year 2026 and 2036 baseline (with assumed growth of 5,000 and 10,000 dwellings respectively) are provided in Appendix G, Appendix H and Appendix I of this report. The hourly traffic volumes on each link of the road network are adjusted by + or - up to 50 vehicles, to round to the nearest 100 hourly vehicles, which is an appropriate level of summarisation for network level traffic volume plots of this nature.

A summary of the consequent predicted future growth in the morning and afternoon peak hour traffic volumes on the respective north-south and east-west major road traffic routes through Epping is presented in Table 4.1 and Table 4.2.

Table 4.1 Comparison of future growth in the morning peak hourly traffic volumes 8-9 am

Road	Direction	2017 am peak	2026 am peak	Growth % (from 2017)	2036 am peak	Growth % (from 2017)
Beecroft Rd	Southbound	1,800	2,900	61%	3,000	67%
N/Carlingford Rd	Northbound	900	1,400	56%	1,700	89%
	Combined	**2,700**	**4,300**	**60%**	**4,700**	**74%**
Blaxland Rd	Southbound	900	1,900	111%	2,200	144%
	Northbound	600	1,100	83%	1,100	83%
	Combined	**1,500**	**3,000**	**100%**	**3,300**	**120%**
Carlingford Rd	Eastbound	1,400	1,800	29%	2,100	50%
W/Kent Rd	Westbound	900	1,300	44%	1,500	67%
	Combined	**2,300**	**3,100**	**35%**	**3,600**	**57%**
Epping Rd	Eastbound	2,200	2,300	5%	2,400	9%
E/Blaxland Rd	Westbound	800	1,300	63%	1,600	100%
	Combined	**3,000**	**3,600**	**20%**	**4,000**	**33%**
Epping Rd	Eastbound	2,900	4,000	38%	4,400	52%
at Terrys Creek	Westbound	900	1,000	11%	1,200	33%
	Combined	**3,800**	**5,000**	**32%**	**5,600**	**47%**

The future traffic growth rates from the study EMME network traffic model, which include both through traffic growth and locally based development traffic growth are generally greater on the north-south traffic routes (via Beecroft Road and Blaxland Road) compared to the east west traffic routes (via Carlingford Road and Epping Road).

Table 4.2 Comparison of future growth in the afternoon peak hour traffic volumes 5-6 pm

Road	Direction	2017 pm peak	2026 pm peak	Growth % (from 2017)	2036 pm peak	Growth % (from 2017)
Beecroft Rd	Southbound	900	1,000	11%	1,900	111%
N/Carlingford Rd	Northbound	1,100	2,100	91%	2,200	100%
	Combined	**2,000**	**3,100**	**55%**	**4,100**	**105%**
Blaxland Rd	Southbound	300	1,400	366%	1,600	433%
S/Epping Rd	Northbound	500	1,600	220%	1,700	240%
	Combined	**800**	**3,000**	**275%**	**3,300**	**313%**
Carlingford Rd	Eastbound	700	1,500	114%	1,700	142%
W/Kent Rd	Westbound	1,100	1,700	55%	1,900	73%
	Combined	**1,800**	**3,200**	**78%**	**3,600**	**100%**
Epping Rd	Eastbound	1,000	1,000	0%	1,300	30%
E/Blaxland Rd	Westbound	1,500	2,700	80%	3,200	113%
	Combined	**2,500**	**3,700**	**48%**	**4,500**	**80%**
Epping Rd	Eastbound	1,100	1,400	27%	1,700	55%
at Terrys Creek	Westbound	1,300	2,600	100%	3,100	138%
	Combined	**2,400**	**4,000**	**67%**	**4,800**	**100%**

The overall averages of the range of future traffic volume growth rates from the range of locations considered are much higher for the north-south travel routes, which is probably because there are no direct motorway alternative routes for this travel demand, and the network base traffic volumes are lower (in particular for Blaxland Road) so the future proportional traffic increases are much greater. The predicted proportional traffic increases for the affected major road routes at Epping are:

For the North-South travel routes

- +55 to 60% for Beecroft Road in 2026, 74-105% in 2036
- +100 to 275% for Blaxland Road in 2026, 120-313% in 2036

For the East-West travel routes

- +35 to 78% for Carlingford Road in 2026, 57-100% in 2036
- + 20 to 67% for Epping Road in 2026, 33-100% in 2036

These traffic volume increases illustrate the extent of the additional traffic capacity which is required for the major road network at key intersections in the study area, if the road network is to adequately accommodate (in either 2026 or 2036) the extent of the likely peak hour traffic growth from the combination of the regional through traffic growth and traffic generated by new residential developments in the Epping study area, which includes both the town centre and surrounding residential precincts.

4.4 Vehicles waiting to enter the network

During the morning peak periods for the 2017, 2026 (+5,000 dwellings) and 2036 (+10,000 dwellings) full study area EMME network volumes, the Dynameq model has been used to examine the overall effect of the network capacity constraints at the key intersections, where for the predicted future traffic growth, when the on-road traffic queuing capacity becomes fully occupied, vehicle are kept waiting and unable to enter the traffic model network.

A series of additional Dynameq traffic model output charts and graphs from these model years is also included with the overall EMME one hour peak network travel demand plots in Appendix G, Appendix H and Appendix I of this report.

These additional vehicles waiting, which are unable to enter the Dynameq traffic model network show that the local significance of this factor at Epping does not generally affect the key network model output results for the key intersections in 2017, but does become progressively more significant in 2026 and becomes highly significant in 2036.

A summary of the Dynameq network model "vehicles waiting" plots in Appendix G, Appendix H and Appendix I of this report, is shown in Table 4.3, which illustrates the development of this limiting network capacity factor (which shows effectively the amount of traffic that is able to actually enter the study area Dynameq road network model in either 2017 or the future year 2026 and 2036 networks.

Table 4.3 Summary of key Dynameq traffic model outputs for future year networks

Network Model Year and analysis period	Peak quarter hourly demand for traffic entering the network	Peak quarter hourly vehicles waiting to enter the network	Effect of vehicles waiting on the study area intersection traffic flow results
2017 am peak	2,836 vehicles	7 vehicles	Not significant
2026 am peak	3,320 vehicles	109 vehicles	Marginally significant
2036 am peak	3,442 vehicles	3,273 vehicles	Highly significant

The geographic distribution is also shown in Appendix I for the progressive development of the additional vehicles queued awaiting access to the road network (as defined by the study area road network boundary shown in Figure 2.2) at 7.30, 8.00, 8.15, 8.30 and 8.45 am during the future weekday morning peak hour 2036 analysis. This show the progressive development over the full morning peak period and the range of locations at which additional traffic is not actually able to enter the Dynameq model network. At the peak waiting time, which is 8.45 am, the main locations of the additional waiting vehicles are at:

Beecroft Road, north, 1014 vehicles

Carlingford Road, west, 719 vehicles

Cliff Road. 165 vehicles

Essex Street, north, 144 vehicles

Midson Road, north, 132 vehicles, and

Essex Street, south, 116 vehicles

5 Base network model operational results

5.1 Intersection performance

The performances of the intersections with traffic signals in the immediate vicinity of the site were analysed using a SIDRA-linked intersection model. To the west of the railway line, these included:

Carlingford Road/Midson Road;

Carlingford Road/Rawson Street; and

Carlingford Road/Beecroft Road.

To the east of the railway line, the assessed intersections included:

Epping Road/Blaxland Road;

Epping Road/Essex Street; and

Epping Road/Pembroke Street.

The RMS SIDRA intersection level of service (LoS) vs. delay standards for traffic signal controlled intersections which are specified in the RTA-RMS Guide to Traffic Generating Developments (RTA 2002) are summarised below. In addition to LoS, the existing operation of the intersection is also described in terms of the following factors:

Degree of Saturation (DoS) which is the ratio of the traffic volume to the capacity of the intersection;

the Average Vehicle Delay (AVD) in seconds per vehicle for all traffic movements at the intersection; and

the length of the maximum traffic queue (95th percentile traffic queue) for any traffic movement at the intersection.

Table 5.1 RMS SIDRA intersection level of service and delay standards

Description	LoS (RMS definition)	Average Vehicle Delay (s)
Very Good	A	<14.5
Good	B	14.5 to ≤28.5
Satisfactory	C	28.5 to ≤42.5
Near Capacity	D	42.5 to ≤56.5
At Capacity	E	56.5 to ≤70.5
Over Capacity	F	70.5(1)

In discussions with the Council staff, it has been decided (for the purposes of this study only) that the absolute maximum acceptable intersection delays for under level of service F for the future traffic conditions at any Epping Town Centre intersection should be defined as two complete cycles of the peak hour traffic signals (300 seconds). This is effectively an average 5 minute waiting time at traffic signals.

With this in mind, the peak hour intersection analysis for the 2017 base traffic scenario (for both the modelled case and the actual surveyed case) is presented in Table 5.2 and Table 5.3 with the unacceptable intersection delays which exceed the maximum study intersection delay of 300 seconds, highlighted in yellow:

Table 5.2 Base year 2017 AM intersection performance (surveyed/modelled)

Intersection	Vehicle demand (Veh per Hr) (Survey/Model)	Vehicle throughput (Veh per Hr) (Survey/Model)	Level of Service (Survey/Model)	Average Delay (Seconds) (Survey/Model)	Degree of Saturation (Survey/Model)	Queue length (metres) (Survey/Model)
Carlingford Road / Midson Road	3,251 / 2,787	3,229 / 2,713	F / D	87.3 / 46.0	1.003 / 0.874	301 / 114
Carlingford Road / Rawson Street	2,639 / 2,693	2,617 / 2,623	F / F	304.4 / 210.6	5.771 / 2.401	405 / 223
Carlingford Road / Beecroft Road	4,505 / 4,531	4,334 / 4,402	F / F	153.8 / 255.1	1.244 / 1.540	816 / 816
Epping Road / Blaxland Road	4,545 / 4,601	4,155 / 4,309	C / E	31.1 / 59.3	0.882 / 1.014	132 / 312
Epping Road / Essex Street	3,243 / 3,195	2,972 / 2,959	B / F	26.0 / 277.5	0.888 / 1.380	196 / 196
Epping Road / Pembroke Street	3,343 / 3,341	3,077 / 2,968	F / F	99.5 / 85.3	2.057 / 1.788	492 / 450

Table 5.3 Base year 2017 PM intersection performance (surveyed/modelled)

Intersection	Vehicle demand (Veh per Hr) (Survey/Model)	Vehicle throughput (Veh per Hr) (Survey/Model)	Level of Service (Survey/Model)	Average Delay (Seconds) (Survey/Model)	Degree of Saturation (Survey/Model)	Queue length (metres) (Survey/Model)
Carlingford Road / Midson Road	2,906 / 3,115	2,798 / 3,110	D / E	51.1 / 63.2	0.905 / 0.891	191 / 258
Carlingford Road / Rawson Street	2,496 / 2,365	2,396 / 2,360	F / C	193.8 / 34.1	3.373 / 0.913	378 / 114
Carlingford Road / Beecroft Road	3,991 / 3823	3,830 / 3823	F / D	86.5 / 43.3	1.111 / 1.035	571 / 332
Epping Road / Blaxland Road	4,025 / 4,172	3,823 / 4,171	E / C	66.4 / 42.1	0.997 / 0.891	326 / 326
Epping Road / Essex Street	2,628 / 2,932	2,614 / 2,928	F / B	93.2 / 26.2	1.073 / 0.909	369 / 209
Epping Road / Pembroke Street	2,338 / 2,819	2,322 / 2,816	A / A	13.2 / 8.8	0.631 / 0.537	120 / 103

In Table 5.2, the intersection analysis for the base year 2017 morning peak hour shows some (though generally not significant) variance between the surveyed and the modelled network flows. Most of the intersections considered are over capacity (level of service F).

However, to consider intersections with average delays of up to 300 seconds as acceptable (in the context of this study) only the Rawson Street intersection (as surveyed) exceeds the 300 second average delay threshold. The overall major road network at Epping in 2017 is nevertheless largely at or over capacity for the morning peak hour, which indicates there is very little spare capacity for additional vehicles on the current road network.

In Table 5.3, the intersection analysis for the base year 2017 afternoon peak hour shows some variance between the surveyed and the modelled network flows. Generally, modelled flows are less congested than surveyed flows. Many of the intersections considered (as surveyed) are over capacity (level of service F). In particular, the Rawson Street intersection has an average delay of 193.8 seconds (as surveyed).

However, as the Council study steering group has indicated that it is prepared to consider intersections with average delays of up to 300 seconds as acceptable, when taking this into account, all intersections for the afternoon peak hour have currently acceptable operations.

Overall the major road network at Epping in 2017 also has very little spare capacity for additional vehicles during the afternoon peak hour.

6 Future base year network operational results

6.1 Future base year 2026 network model results

The peak hour intersection analysis for the 2026 future baseline traffic scenario, with the additional traffic growth from 5,000 new dwellings at Epping is presented below In Table 6.1 and Table 6.2:

Table 6.1 Future base year 2026 AM intersection performance

Intersection	Vehicle demand (Veh/Hr)	Vehicle throughput (Veh/Hr)	Level of Service	Average Delay (Seconds)	Degree of Saturation	Queue length (metres)
Carlingford Road / Midson Road	5,305	4,461	F	488.1	1.577	2,119
Carlingford Road / Rawson Street	5,271	3,366	F	1,197.8	13.456	245
Carlingford Road / Beecroft Road	8,342	6,622	F	4,218.7	14.709	816
Epping Road / Blaxland Road	8,116	5,024	F	273.6	1.508	382
Epping Road / Essex Street	5,056	3,104	F	285.5	1.376	897
Epping Road / Pembroke Street	5,289	3,014	F	328.5	2.164	933

Table 6.2 Future base year 2026 PM intersection performance

Intersection	Vehicle demand (Veh/Hr)	Vehicle throughput (Veh/Hr)	Level of Service	Average Delay (Seconds)	Degree of Saturation	Queue length (metres)
Carlingford Road / Midson Road	4,838	3,973	F	234.7	1.232	818
Carlingford Road / Rawson Street	4,369	2,985	F	508.7	3.614	245
Carlingford Road / Beecroft Road	7,301	5,006	F	1,413.2	4.906	816
Epping Road / Blaxland Road	7,437	5,727	F	609.1	2.063	326
Epping Road / Essex Street	4,296	3,132	F	181.7	1.213	505.6
Epping Road / Pembroke Street	4,300	4,055	F	368.7	1.543	2249.8

The intersection analysis of the future base year 2026 scenario for the morning peak hour shows a low level of network performance at all considered intersections. All intersections are over capacity (level of service F). However, the Council has indicated that it is prepared to consider intersections with average delays of up to 300 seconds as acceptable.

Even so, the Midson Road, Rawson Street, Beecroft Road and Pembroke Street intersections all have average delays over this threshold. Most notably, the Beecroft Road intersection has an average delay of 4,219 seconds (or 70.5 minutes).

It should also be noted that the vehicle demand for the intersections considered is consistently higher than actual vehicle throughput – which suggests that there are a number of vehicles that cannot even pass through the network. Overall, the morning performance of the network for the base 2026 scenario is such that it is unlikely that there will be any spare capacity for additional vehicles.

The intersection analysis of the future base year 2026 scenario for the afternoon peak hour shows a similarly low level of network performance at all considered intersections. All intersections are over capacity (level of service F). The Rawson Street, Beecroft Road, Blaxland Road and Pembroke Street intersections all have average delays over 300 seconds.

Again, the Beecroft Road intersection has the highest average delay at 1,413 seconds (or 23.5 minutes) which is highly significant, though not as extreme as for the morning peak. Again, vehicle demand for the intersections considered is consistently higher than actual vehicle throughput. Overall, the afternoon performance of the network for the base 2026 scenario is such that it is unlikely that there will be any spare capacity for additional vehicles.

6.2 Future year 2036 network model results

The Future peak hour intersection analysis for the 2036 future development traffic scenario, for a total of 10,000 new dwellings at Epping is presented below In Table 6.3 and Table 6.4:

Table 6.3 Future base year 2036 AM intersection performance

Intersection	Vehicle demand (Veh/Hr)	Vehicle throughput (Veh/Hr)	Level of Service	Average Delay (Seconds)	Degree of Saturation	Queue length (metres)
Carlingford Road / Midson Road	5,941	4,963	F	1,046.9	2.530	3,064
Carlingford Road / Rawson Street	5,825	2,849	F	174.4	1.191	163
Carlingford Road / Beecroft Road	9,340	6,671	F	4,643.5	15.202	816
Epping Road / Blaxland Road	9,178	5,153	F	291.6	1.527	515
Epping Road / Essex Street	5,747	3,398	F	459.7	1.524	1,228
Epping Road / Pembroke Street	5,898	3,202	F	206.1	1.640	843

The intersection analysis of the future base year 2036 scenario for the morning peak hour shows a low level of network performance at all considered intersections. All intersections are over capacity (level of service F). As mentioned in Section 6.1, the Council has indicated that it is prepared to consider intersections with average delays of up to 300 seconds as acceptable. Even so, the Beecroft Road and Essex Street intersections both have average delays over this threshold.

Most notably, the Beecroft Road intersection has an average delay of 4,644 seconds (or 77 minutes). It should also be noted that the vehicle demand for the intersections considered is consistently higher than actual vehicle throughput – which suggests that there are a number of vehicles that cannot even pass through the network.

Overall, the morning performance of the network for the base 2036 scenario is such that it is unlikely that there will be any spare capacity for additional vehicles. While, broadly, average delays are predicted to improve by 2036 from the 2026 base scenario as a result of the additional Council proposed road improvements which are anticipated to be implemented during this period, the most crucial intersection – Beecroft Road – actually experiences a higher average delay in 2036 than for the 2026 case.

Table 6.4 Future base year 2036 PM intersection performance

Intersection	Vehicle demand (Veh/Hr)	Vehicle throughput (Veh/Hr)	Level of Service	Average Delay (Seconds)	Degree of Saturation	Queue length (metres)
Carlingford Road / Midson Road	5,545	4,398	F	330.0	1.370	1,140
Carlingford Road / Rawson Street	4,834	2,500	C	37.7	0.730	163
Carlingford Road / Beecroft Road	8,322	5,185	F	627.3	2.706	816
Epping Road / Blaxland Road	8,645	5,923	F	602.3	2.061	365
Epping Road / Essex Street	5,176	3,505	F	261.5	1.355	767
Epping Road / Pembroke Street	5,076	4,711	F	525.6	1.799	2,994

The intersection analysis of the future base year 2036 scenario for the afternoon peak hour shows a similarly low level of network performance at all considered intersections. All intersections except Rawson Street are over capacity (level of service F). The Midson Road, Beecroft Road, Blaxland Road and Pembroke Street intersections all have average delays over 300 seconds. Again, the Beecroft Road intersection has the highest average delay at 627 seconds (or 10.5 minutes) which is a significant, though not as extreme delay, as for the morning peak.

Again, vehicle demand for all the intersections considered is consistently higher than the actual vehicle throughput. Overall, the afternoon performance of the network for the base 2036 scenario is such that it is unlikely that there will be any spare capacity for additional vehicles.

7 Future land use and network options examined

7.1 Introduction

This report has primarily only investigated the two future baseline development scenarios for the Epping town centre of +5,000 additional dwellings by the year 2026, and +10,000 additional dwellings by the year 2036.

Further road network investigations by EMM and Paul van Den Bos are ongoing for the additional potential residential development at the Austino site, which is described further in Section 7.2 below and the future road network benefits of two additional local road link connections options for the Epping town centre, which are described further in Sections 7.3 and 7.4 below.

7.2 Land use development scenario option 1: The Austino site

The proposed Austino residential development at 2-18 Epping Road, 2-4 Forest Grove and 725 Blaxland Road may have some impacts on the local road network. A preliminary future traffic network analysis for the site has been undertaken by EMM and was reported previously in a draft Austino Planning Proposal TIA review report which was prepared by EMM in February 2018. The February 2018 Austino site traffic analysis was based on a slightly lower future baseline year 2026 additional dwelling forecast for the Epping Town centre than the forecast which has been used for this report. However the general findings of the EMM TIA review analysis are still generally valid and are summarised here in this report.

The detailed year 2026 SIDRA intersection analysis results for the proposed Austino planning proposal development are included as Appendix M to this report and indicate that the most significant intersection performance deteriorations as a result of the additional potential dwellings for the Austino development would occur at the Epping Road/Essex Street and Epping Road/Blaxland Road intersections. This analysis which is now in the process of being updated by EMM for the latest study area dwellings forecast is presented below in Table 7.1:

Table 7.1 Summary of intersection performance changes due to the Austino proposal

Approach	2017 average delay (seconds) (am/pm)	2017 level of service (am/pm)	2026 base average delay (seconds) (am/pm)	2026 base level of service (am/pm)	2026 (with Austino) average delay (seconds) (am/pm)	2026 (with Austino) level of service (am/pm)
Epping Road/Essex Street intersection						
South approach left turn	66.6 / 91.6	E / F	64.3 / 74.6	E / F	60.3 / 74.6	E / F
South approach through	61.1 / 77.8	E / F	247.0 / 295.2	F / F	294.1 / 282.8	F / F
South approach right turn	66.8 / 82.1	E / F	71.9 / 155.4	F / F	68.2 / 206.6	E / F
East approach left turn	13.7 / 241.6	A / F	44.6 / 247.2	D / F	56.8 / 284.4	E / F
East approach through	8.2 / 236.3	A / F	41.6 / 247.7	C / F	54.9 / 284.9	D / F
East approach right turn	13.7 / 242.0	A / F	Movement removed	Movement removed	Movement removed	Movement removed
North approach left turn	49.0 / 62.7	D / E	37.1 / 289.5	C / F	38.0 / 296.6	C / F
North approach through	53.5 / 57.1	D / E	31.9 / 284.1	C / F	32.5 / 291.1	C / F
North approach right turn	66.0 / 254.3	E / F	292.9 / 297.3	F / F	300.1 / 320.6	F / F

Table 7.1 Summary of intersection performance changes due to the Austino proposal

Approach	2017 average delay (seconds) (am/pm)	2017 level of service (am/pm)	2026 base average delay (seconds) (am/pm)	2026 base level of service (am/pm)	2026 (with Austino) average delay (seconds) (am/pm)	2026 (with Austino) level of service (am/pm)
West approach left turn	23.0 / 22.1	B / B	30.9 / 11.2	C / A	35.2 / 11.2	C / A
West approach through	17.6 / 20.5	B / B	165.3 / 6.5	F / A	190.8 / 6.5	F / A
West approach right turn	23.3 / 33.5	B / C	Movement removed	Movement removed	Movement removed	Movement removed
Epping Road/Blaxland Road intersection						
South approach left turn	17.3 / 74.6	B / F	72.6 / 1060.2	F / F	77.1 / 1118.7	F / F
South approach through	53.8 / 73.6	D / F	695.3 / 1191.6	F / F	701.4 / 1233.9	F / F
East approach left turn	48.8 / 72.8	D / F	38.1 / 35.4	C / C	38.1 / 35.4	C / C
East approach through	43.3 / 67.0	D / E	773.5 / 1325.2	F / F	813.2 / 1313.2	F / F
North approach left turn	58.4 / 98.0	E / F	64.9 / 68.6	E / E	64.4 / 67.5	E / E
North approach through	52.9 / 92.5	D / F	746.8 / 1182.4	F / F	772.0 / 1106.4	F / F
North approach right turn	58.6 / 98.1	E / F	Movement removed	Movement removed	Movement removed	Movement removed
West approach left turn	5.6 / 4.9	A / A	5.6 / 6.2	A / A	5.5 / 6.2	A / A
West approach through	27.3 / 8.6	B / A	13.6 / 11.3	A / A	12.9 / 11.6	A / A
West approach right turn	44.8 / 39.8	D / C	798.4 / 1269.6	F / F	791.8 / 1277.1	F / F

As was concluded by the EMM Austino site planning proposal TIA review report of February 2018, and is further illustrated by the results in Table 7.1, the actual additional intersection performance deterioration due to the Austino development with the planning proposal zoning changes, is relatively small.

However, the significant intersection performance deterioration from the 2017 base to the 2026 future base traffic situation renders any further traffic generating development in this location unacceptable without further capacity improvements to the locality major road and local road network capacity, in particular at the Epping Road/Blaxland Road intersection, and to a lesser extent at the Epping Road/Essex Street intersection.

7.3 Network development scenario option 2: Reopening the bus tunnel link

Further locality major road and local network investigations by EMM and Paul van Den Bos are ongoing for the potential additional local road link connection for the Epping town centre, which could be provided by reopening the former bus tunnel connection which crosses under the railway line to the north of Epping Station, for one way westbound use, primarily by local traffic, with a left turn only movement permitted for the traffic egress at Beecroft Road.

The future road network 2026 and 2036 am and pm peak hour vehicle "difference plots" are shown in Appendix N for the future road networks in 2026 and 2036, either with or without this additional road network connection. The future predicted morning and afternoon traffic volumes which would be using the future bus tunnel (westbound traffic only) would be.

151 vehicles per hour during the 2026 am peak hour;

121 vehicles per hour during the 2026 pm peak hour

234 vehicles per hour during the 2036 am peak hour

192 vehicles per hour during the 2036 pm peak hour

These peak hourly traffic volumes of primarily locally based traffic using the former bus tunnel connection, would result in equivalent peak hourly traffic reductions for the southbound right turning traffic at the Epping Road/Essex Street intersection and the westbound through traffic movement at the Epping Road/Blaxland Road/Langston Place intersection, which would probably have significant network traffic benefits in terms of reducing the future peak hourly intersection traffic delays at these intersections.

The full future year 2026 and 2036 SIDRA intersection analysis has not yet been undertaken for these traffic changes so it is not possible to confirm the exact extent of the future traffic benefits from the additional local traffic connection at Epping via the former bus tunnel. However this analysis is due to be completed soon to confirm this benefit.

7.4 Network development scenario option 3: New Ray Road to Beecroft Road link

This future road network connection is different in principle to the potential former bus tunnel local traffic connection at Epping, which was examined in Section 7.3, in that it is already included in the assumed future 2036 Council recommended road improvements for the Epping Town Centre, which are listed in detail in Appendix F.

The future road network 2026 and 2036 am and pm peak hour vehicle "difference plots" for the road network with and without this east-west link are shown in Appendix O. The future predicted morning and afternoon traffic volumes which would be using the future east-west link road connection are:

246 vehicles per hour during the 2026 am peak hour;

229 vehicles per hour during the 2026 pm peak hour

143 vehicles per hour during the 2036 am peak hour

139 vehicles per hour during the 2036 pm peak hour

These peak hourly traffic volumes of primarily locally based traffic using the proposed east-west link would result in equivalent peak hourly traffic reductions for the other traffic movements using either the Carlingford Road/Beecroft Road or Carlingford Road/Ray Road/Rawson Street intersections, which could have significant network traffic benefits in terms of reducing the future peak hourly intersection traffic delays at these intersections.

The full future year 2026 and 2036 SIDRA intersection analysis has not yet been undertaken for these traffic changes so it is not possible to confirm the exact extent of the future traffic benefits from the additional east west local traffic connection between Ray Road and Rawson Street at Epping. This further analysis is due to be completed soon and will be presented in an additional supplementary report by EMM for more formally assessing the future benefit of these road proposals.

8 Operational assessment comparison

8.1 Future land use options

This report has primarily only investigated the two future baseline development scenarios for the Epping town centre of +5,000 additional dwellings by the year 2026, and +10,000 additional dwellings by the year 2036.

The future intersection delay results from these traffic scenarios show significant and generally unacceptable traffic delays at the key intersections on the major traffic routes through the Epping town centre for east-west and north-south through traffic movements and also for the additional locally generated traffic which will be trying to gain access to the major road network at Epping in these future years.

Further road network investigations of additional road link options for the Epping town centre as identified in Chapter 7, have identified some further potential for additional local road network improvements to improve the future accessibility to the major road network for local traffic. However, until these further investigations are completed, further land rezoning on the key sites within and adjoining the Epping town centre should not be approved until adequate future road network capacity can be identified to accommodate the additional generated traffic demand from these sites.

8.2 Future road network operations

The two primary capacity controlling intersections in the Epping town centre are and will generally remain, the Carlingford Road/Beecroft Road and Epping Road/Blaxland Road intersections. The future operations for these two intersections are summarised below, based on the study SIDRA analysis results which are presented in Chapter 6:

Table 8.1 Summary of two key intersections and their future operations

Intersection	Vehicle demand (Veh/Hr) (am/pm)	Vehicle throughput (Veh/Hr) (am/pm)	Level of Service (am/pm)	Average Delay (Seconds) (am/pm)	Degree of Saturation (am/pm)	Queue length (metres) (am/pm)
Base year 2026						
Carlingford Road / Beecroft Road	8,342 / 7,301	6,622 / 5,006	F / F	4,218.7 / 1,413.2	14.709 / 4.906	816 / 816
Epping Road / Blaxland Road	8,116 / 7,437	5,024 / 5,727	F / F	273.6 / 609.1	1.508 / 2.063	382 / 326
Base year 2036						
Carlingford Road / Beecroft Road	9,340 / 8,322	6,671 / 5,185	F / F	4,643.5 / 627.3	15.202 / 2.706	816 / 816
Epping Road / Blaxland Road	9,178 / 8,645	5,153 / 5,923	F / F	291.6 / 602.3	1.527 / 2.061	515 / 365

As is shown above in Table 8.1, there are some improvements in the average delays in the intersections considered from 2026 to 2036, in particular during the afternoon peak hour at the Carlingford Road/Beecroft Road intersection. These improvements may be attributed to the proposed construction of the east-west link between Ray Road and Beecroft Road and the additional DCP Link Road connection to Carlingford Road on the south side opposite Cliff Road.

However, there is still a large amount of network performance deterioration overall, especially during the morning peak hour. This is primarily due to the fact that the proposed network upgrades will only alleviate local traffic issues, while inter-regional traffic will continue to put pressure on these intersections.

The reopening of the bus tunnel (for westbound traffic only) is not included in the above analysis results and this may lead to some small but significant improvements in future network traffic delays, although primarily only at the Epping Road/Blaxland Road and Epping Road/Essex Street intersections.

9 Conclusion

9.1 Future road network implications for future baseline development

This analysis of the existing (year 2017) traffic situation and two proposed future year residential development scenarios (in 2026 and 2036) for the Epping Town Centre has identified significant levels of predicted future traffic growth that will have significant implications for the future levels of traffic congestion and delays on the major road network, even after considering the currently identified program of road improvements (by both RMS and Parramatta City Council) that have been identified by previous studies to provide additional road traffic capacity to meet the needs of forecast residential development in the Epping area.

The future year 2026 and 2036 land use options which have been assessed by this study are essentially neutral in terms of their employment and commercial floorspace development projections for the Epping Town Centre and assume no change from the current base year situation. However, it is anticipated that in due course additional town centre development scenarios will be further analysed using the Epping Town centre Dynameq and SIDRA traffic models which have been developed for this study, to also assess the future generated traffic impacts of higher levels of commercial development (and employment) in Epping.

The analysis of the key major road intersection delays (assuming the implementation of all the identified RMS and Council road improvements) has been undertaken SIDRA 7 intersection model which models the co-ordinated operation of a chain of linked intersections, for four existing and future traffic network model and land use scenarios, which are:

The existing actual peak hour intersection traffic volumes which were surveyed in March 2017;

The modelled base case 2017 intersection traffic volumes from the EMME model;

The modelled +5,000 dwellings growth scenario intersection traffic volumes from 2026, and

The modelled +10,000 dwellings growth scenario intersection traffic volumes from 2036,

The key findings of the preliminary Dynameq and detailed SIDRA traffic model investigations which have been undertaken for this study are:

Three or four of the six key intersections on the four major traffic routes (via Beecroft Road, Blaxland Road, Carlingford Road and Epping Road) are all operating at over saturated (level of service F) traffic conditions with the March 2017 surveyed morning and afternoon peak hour traffic volumes. The increasing major road traffic congestion which is now occurring in the Epping Town Centre area, is adversely affecting both the regional through traffic movements and the delays for local traffic access to the major road network at Epping.

In the future years of 2026 and 2036, when the increased through and local residential traffic growth is modelled, the future peak hour traffic conditions on the major road network will continue to worsen even when the full programs of the identified RMS and Council road improvements have been implemented. In the assessed future road networks, either five or six of the assessed six intersections will have future traffic conditions operating at oversaturated (level of service F) during both the morning and afternoon traffic peak periods.

The provision of one additional lane westbound on the western side of Epping Bridge will primarily benefit the afternoon peak hour westbound regional traffic movements which are travelling through the Epping Town Centre. However, if the bridge were to operate with future tidal flow traffic conditions such as four lanes eastbound during the morning peak periods with two lanes westbound and three lanes in each direction during the afternoon peak periods, this future improvement could provide significant travel flow benefits during both these peak periods.

9.2 Future Epping area land use development implications

The potential traffic network implications of predicted residential growth in the Epping Town Centre have been reviewed by this report for two different levels of proposed development (either +5,000 or +10,000 additional dwellings) which effectively represent the likely minimum and future maximum residential development scenarios which are likely to occur within the Epping study area:

This future traffic analysis updates the work of the previous Epping Town Centre Transport Studies by Halcrow and GTA (Halcrow Pacific Pty Ltd, 2011 and GTA Consultants, reviewed by AECOM, 2015) which previously identified short term road infrastructure treatments to accommodate Town Centre growth scenarios of up to 3,750 additional dwelling units.

More recent land capability analysis undertaken by City of Parramatta Council informing this traffic study has identified the actual future development potential under the new zoning controls is likely to be in the order of 10,000 additional dwellings. As a result the identified future roadworks programs which have been determined by both the Halcrow and GTA studies for up to 3,750 additional dwellings, are now inadequate and have been reviewed by both Parramatta City Council and RMS.

However the network traffic analysis which has been undertaken for this report has identified that even with all the RMS committed and Council proposed road improvements the future 2036 road network would be inadequate to accommodate the full future predicted traffic demand from approximately 10,000 additional dwellings in the Epping Town Centre and adjoining areas.

References

Epping Town Centre Transport Study Outcomes Report Halcrow Pacific Pty Ltd 2011

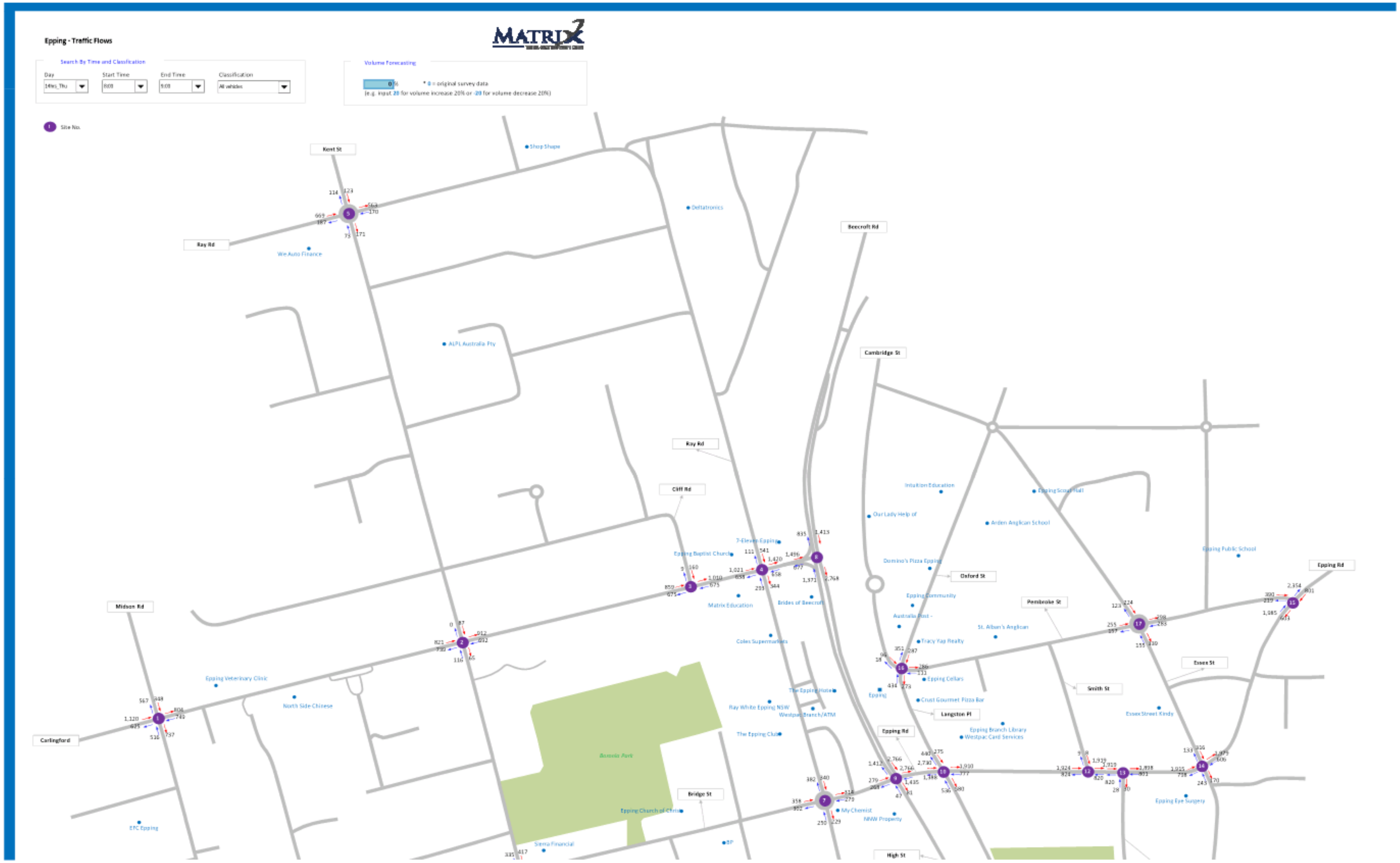
Greater Sydney Commission, Draft Central City District Plan, March 2018

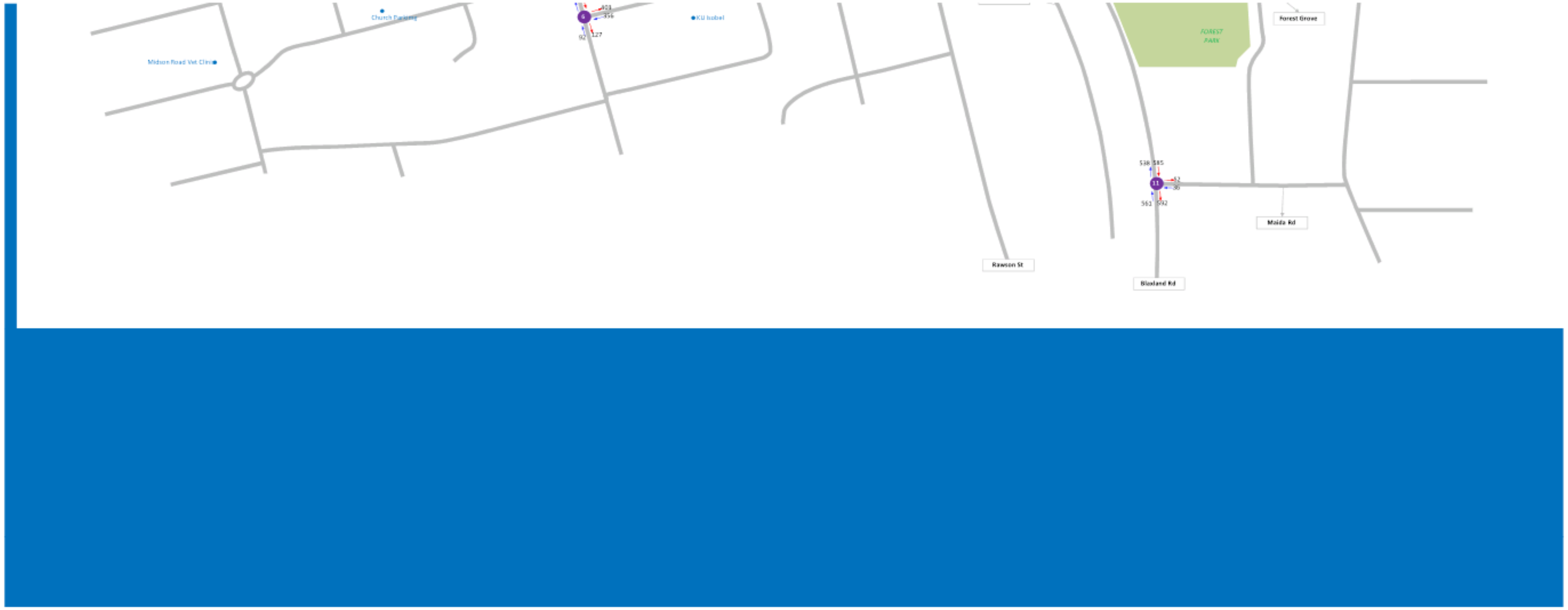
JBA Planning 2011, *Epping Town Centre Study*. Report prepared by JBA Urban Planning Consultants Pty Ltd

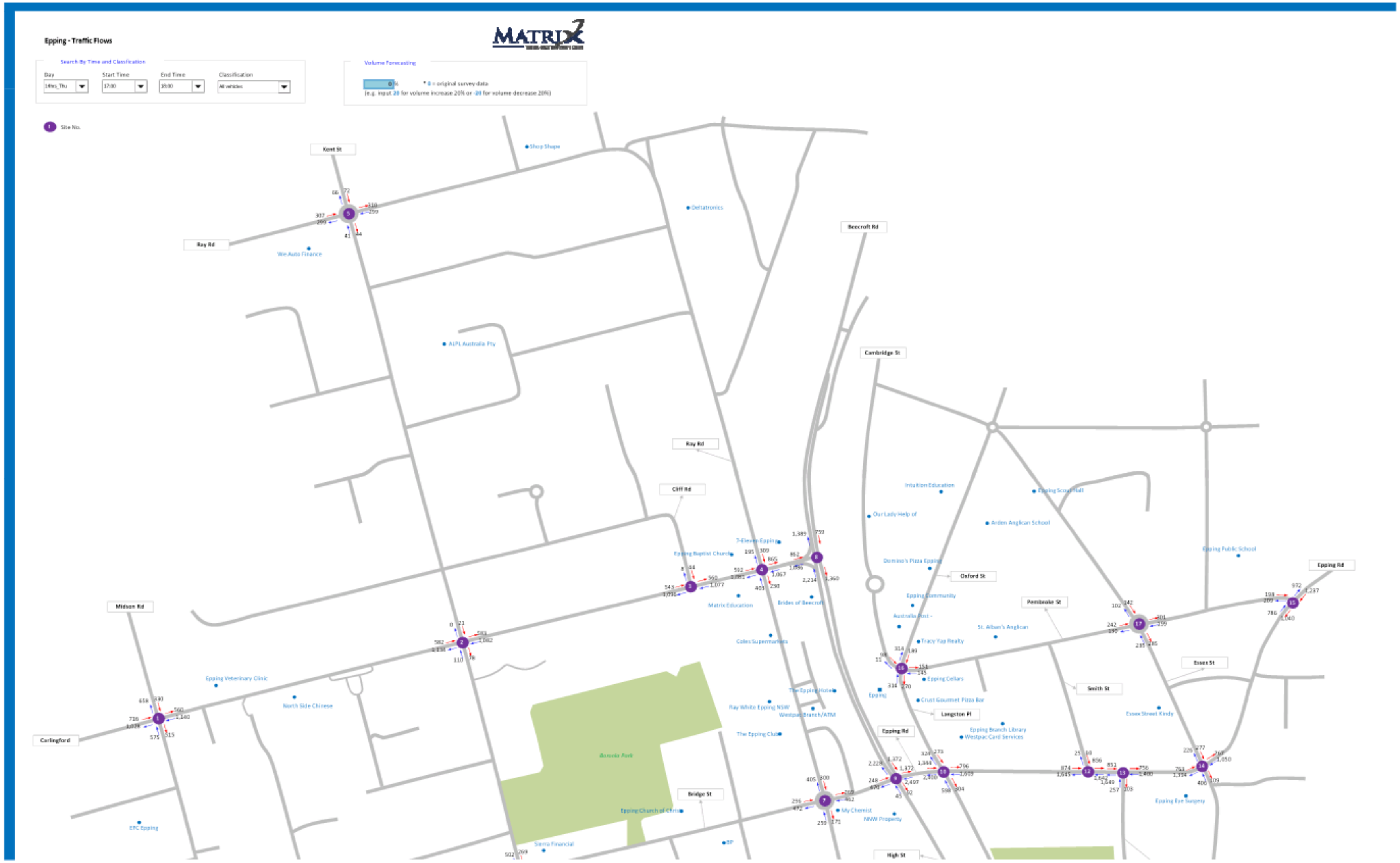
Proposed Epping Town Centre Redevelopment, Rawson Street Epping, Traffic Study by GTA, reviewed by AECOM, November 2015

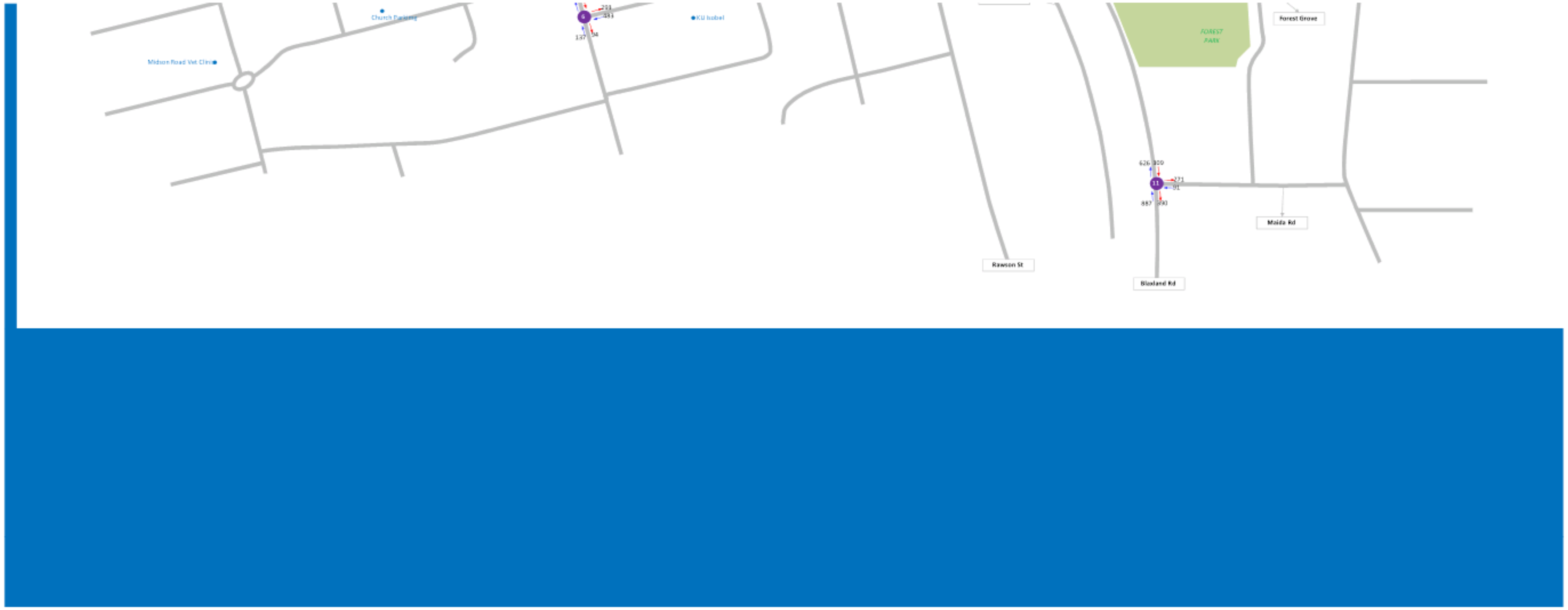
Appendix A

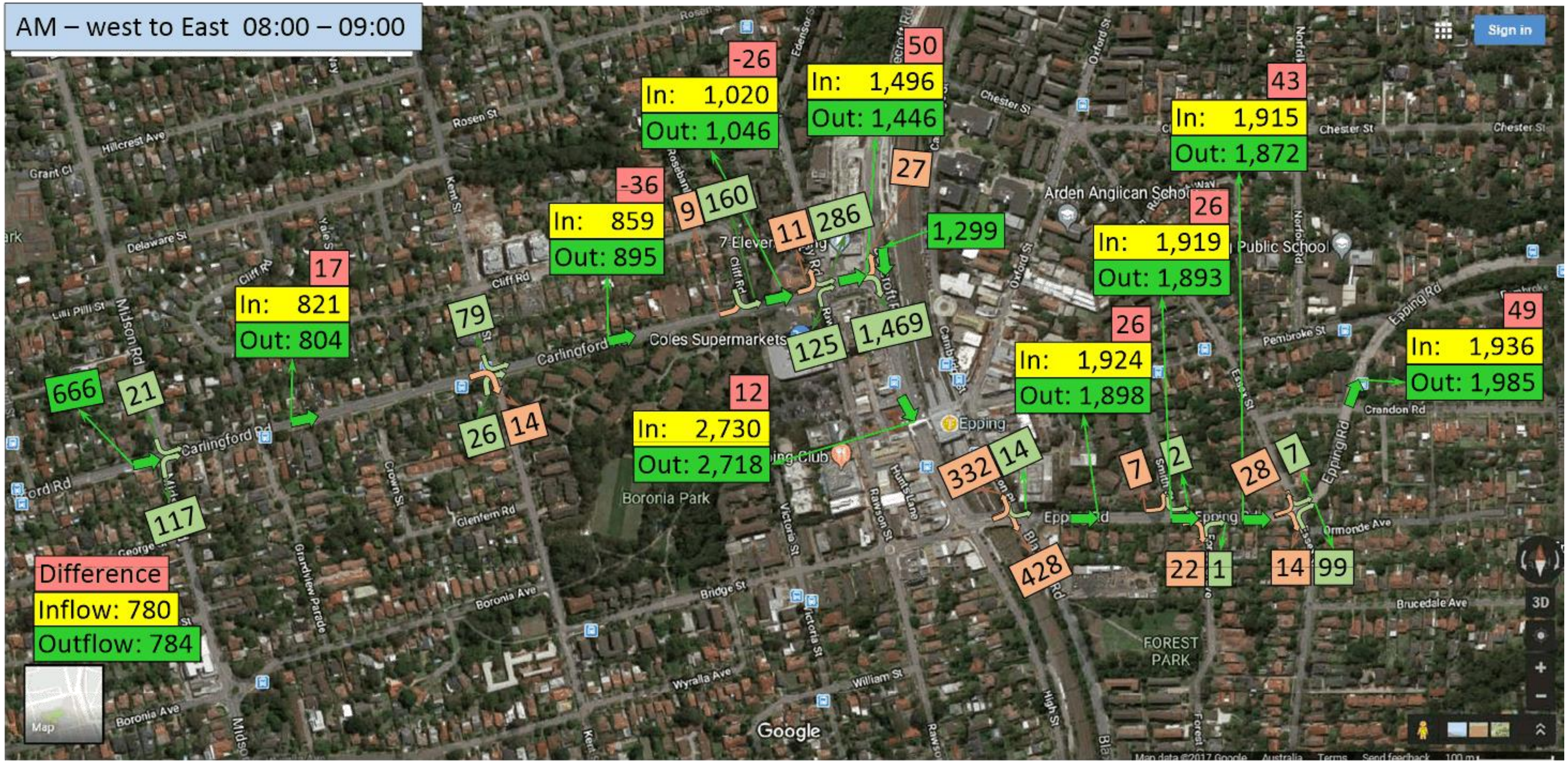
Traffic Survey Volumes


Epping - Traffic Flows
Kent St
Ray Rd
Beecroft Rd
Cambridge St
Cliff Rd
Midson Rd
Carlingford
Oxford St
Pembroke St
Epping Rd
Essex St
Smith St
Langston Pl
Bridge St
High St


Church Parking
KU Isobel
Midson Road Vet Clinic
6
401
356
92
127
FOREST PARK
Forest Grove
538
585
11
62
36
561
592
Maida Rd
Rawson St
Blaxland Rd




Church Parking
KU Isobel
Midson Road Vet Clinic
6
137
34
483
FOREST
PARK
Forest Grove
626
309
271
91
11
887
390
Maida Rd
Rawson St
Blaxland Rd



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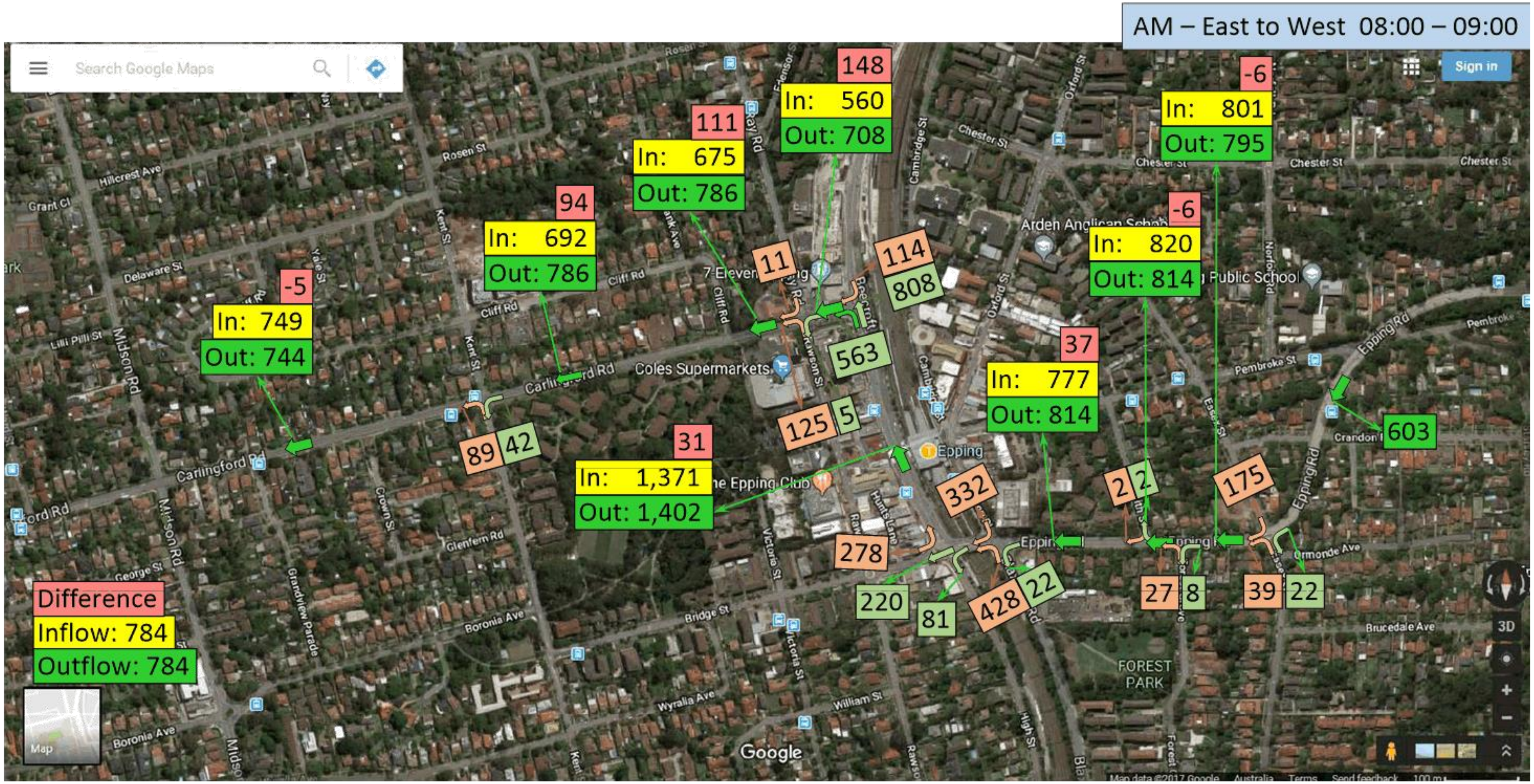
-26
In: 1,020
Out: 1,046
50
In: 1,496
Out: 1,446
43
In: 1,915
Out: 1,872
-36
In: 859
Out: 895
9
160
11
286
27
1,299
26
In: 1,919
Out: 1,893
17
In: 821
Out: 804
79
125
1,469
26
In: 1,924
Out: 1,898
49
In: 1,936
Out: 1,985
666
21
26
14
12
In: 2,730
Out: 2,718
332
14
7
2
28
7
117
428
22
1
14
99
Difference
Inflow: 780
Outflow: 784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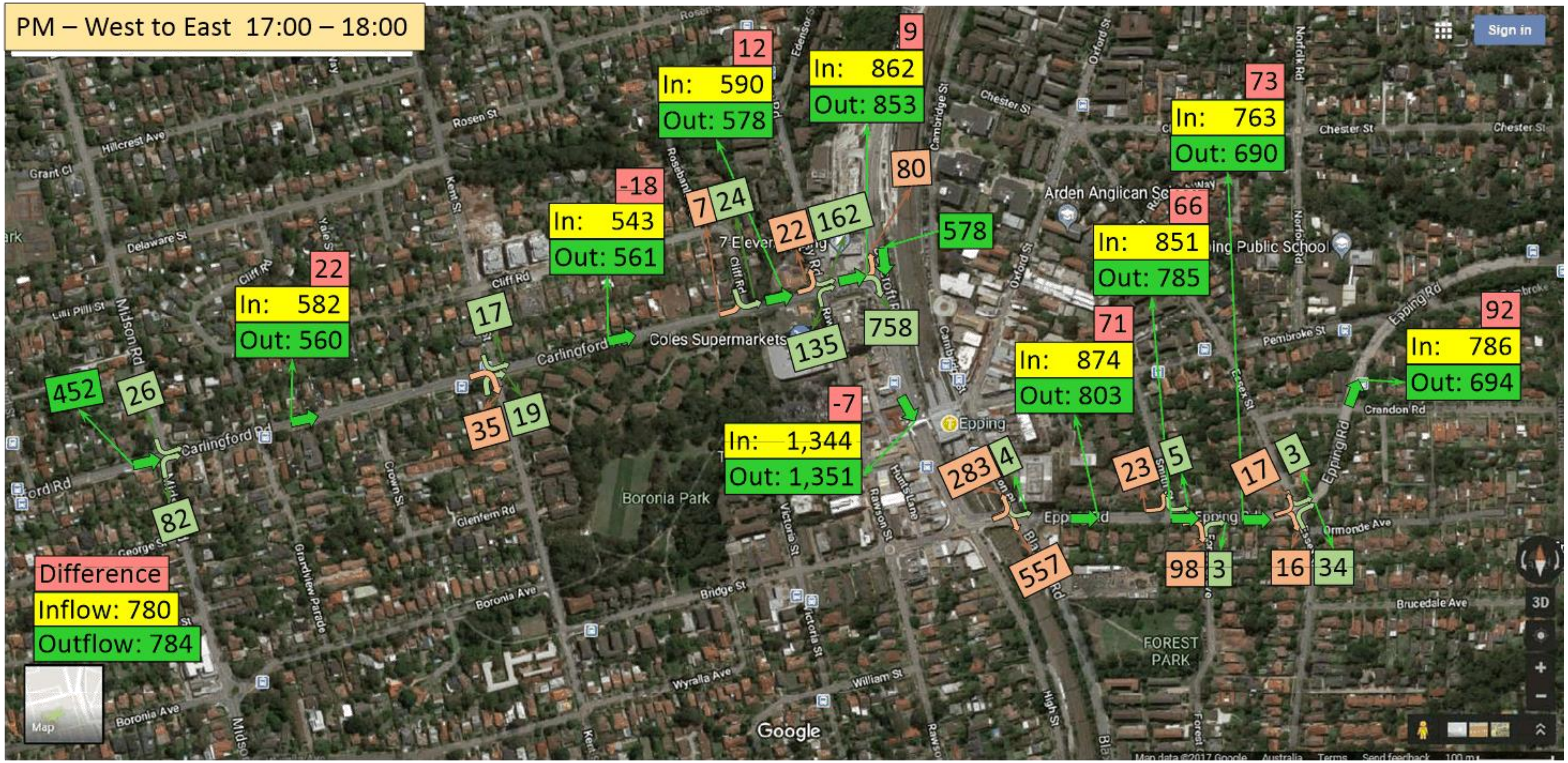
In: 560
Out: 708
111
In: 675
Out: 786
-6
In: 801
Out: 795
94
In: 692
Out: 786
-6
In: 820
Out: 814
-5
In: 749
Out: 744
11
114
808
563
37
In: 777
Out: 814
125
5
89
42
31
In: 1,371
Out: 1,402
603
332
2
2
175
278
220
81
428
22
27
8
39
22
Difference
Inflow: 784
Outflow: 784
Coles Supermarkets
Epping
Carlingford Rd
Epping Rd
FOREST PARK
Google



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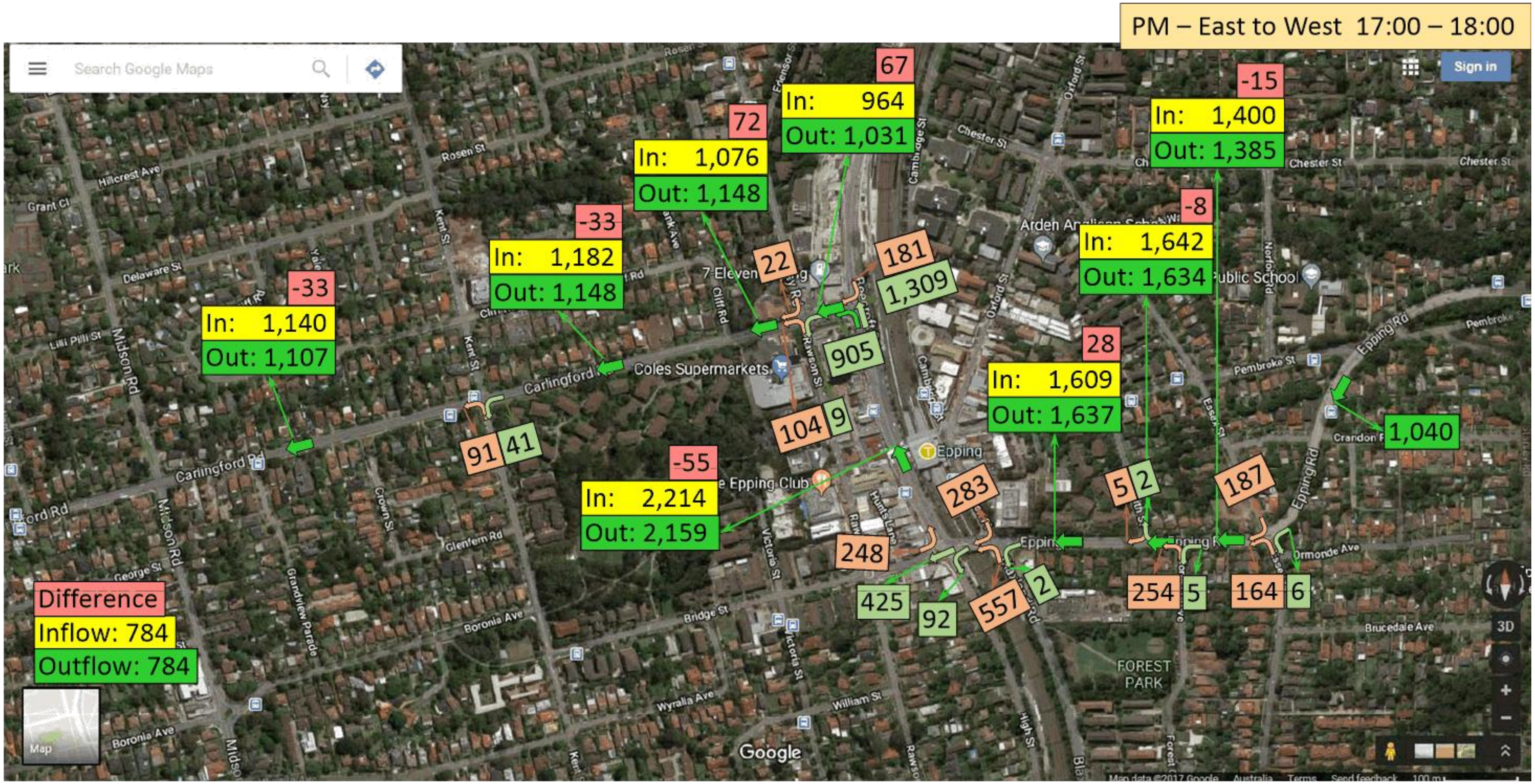
In: 590
Out: 578
9
In: 862
Out: 853
73
In: 763
Out: 690
-18
In: 543
Out: 561
7
24
22
162
80
578
66
In: 851
Out: 785
22
In: 582
Out: 560
17
758
135
71
In: 874
Out: 803
92
In: 786
Out: 694
452
26
35
19
-7
In: 1,344
Out: 1,351
283
4
23
5
17
3
82
557
98
3
16
34
Difference
Inflow: 780
Outflow: 784
Carlingford Rd
Coles Supermarkets
Boronia Park
Epping
Arden Anglican School
Epping Rd
FOREST PARK
Google



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67
In: 964
Out: 1,031
72
In: 1,076
Out: 1,148
-33
In: 1,182
Out: 1,148
-33
In: 1,140
Out: 1,107
-15
In: 1,400
Out: 1,385
-8
In: 1,642
Out: 1,634
28
In: 1,609
Out: 1,637
-55
In: 2,214
Out: 2,159
22
181
1,309
905
104
9
91
41
283
248
425
92
557
2
5
2
187
254
5
164
6
1,040
Difference
Inflow: 784
Outflow: 784

Appendix B

Traffic Queuing Outputs


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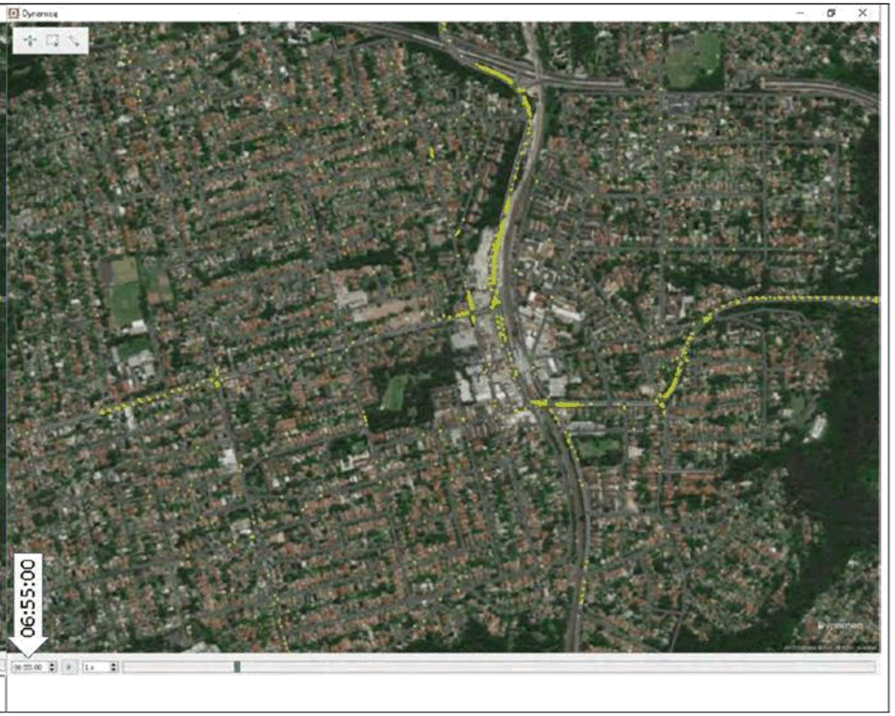
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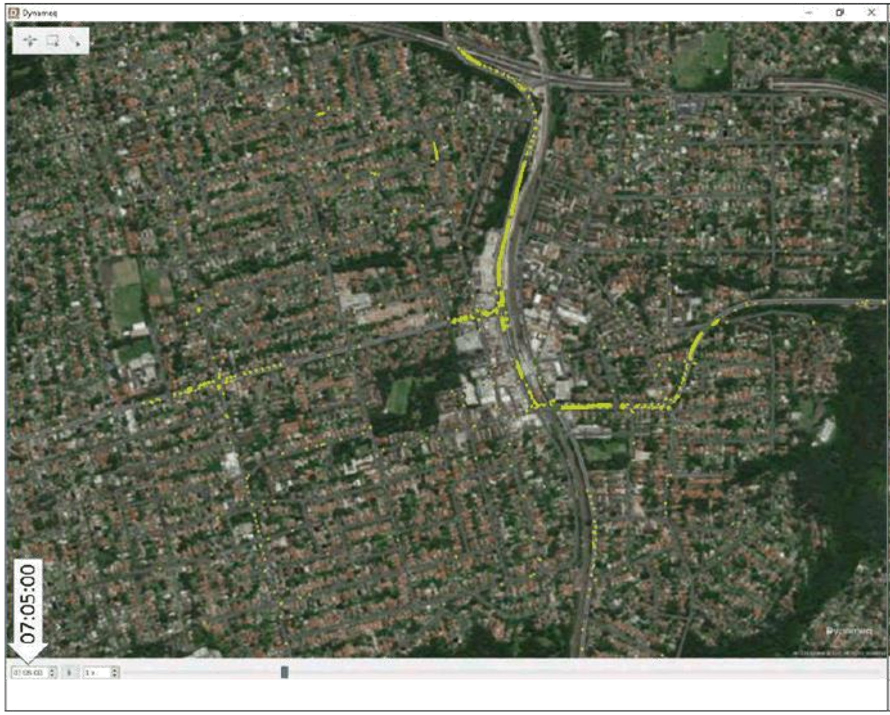
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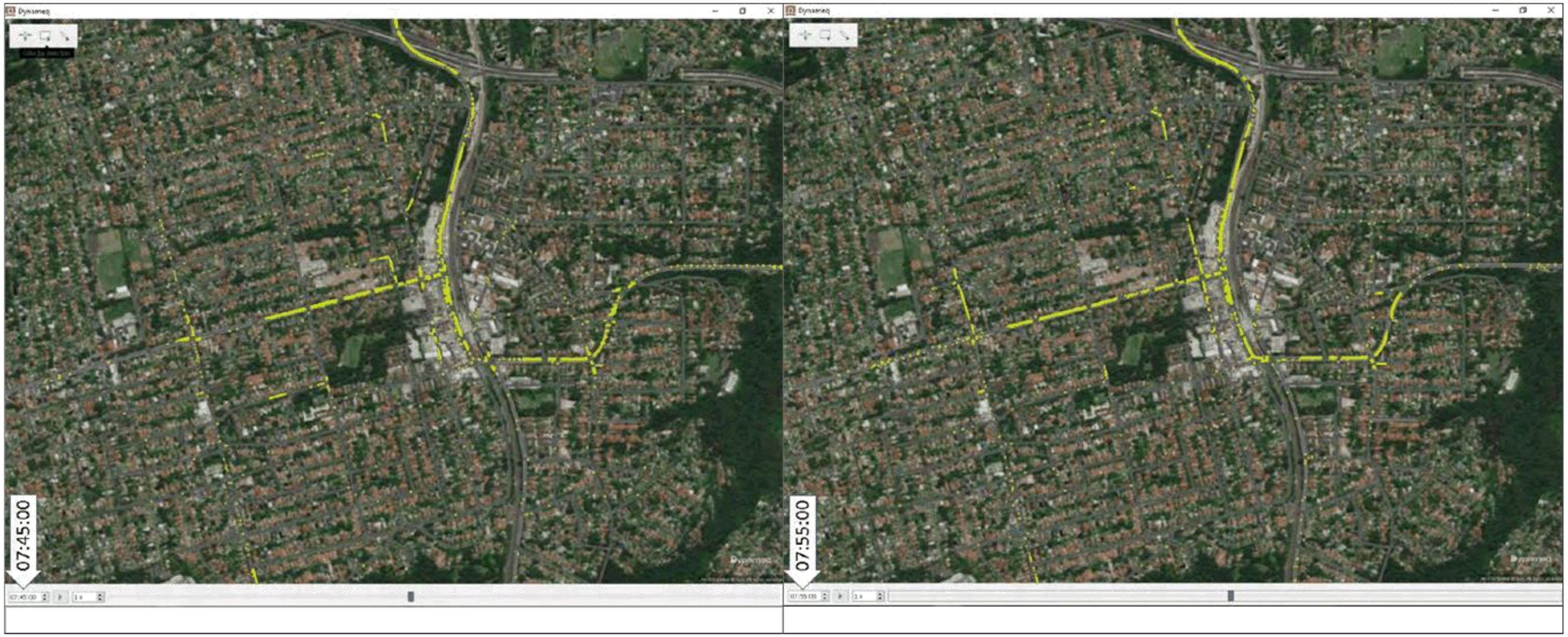
Dynameq
07:15:00


07:25:00


07:35:00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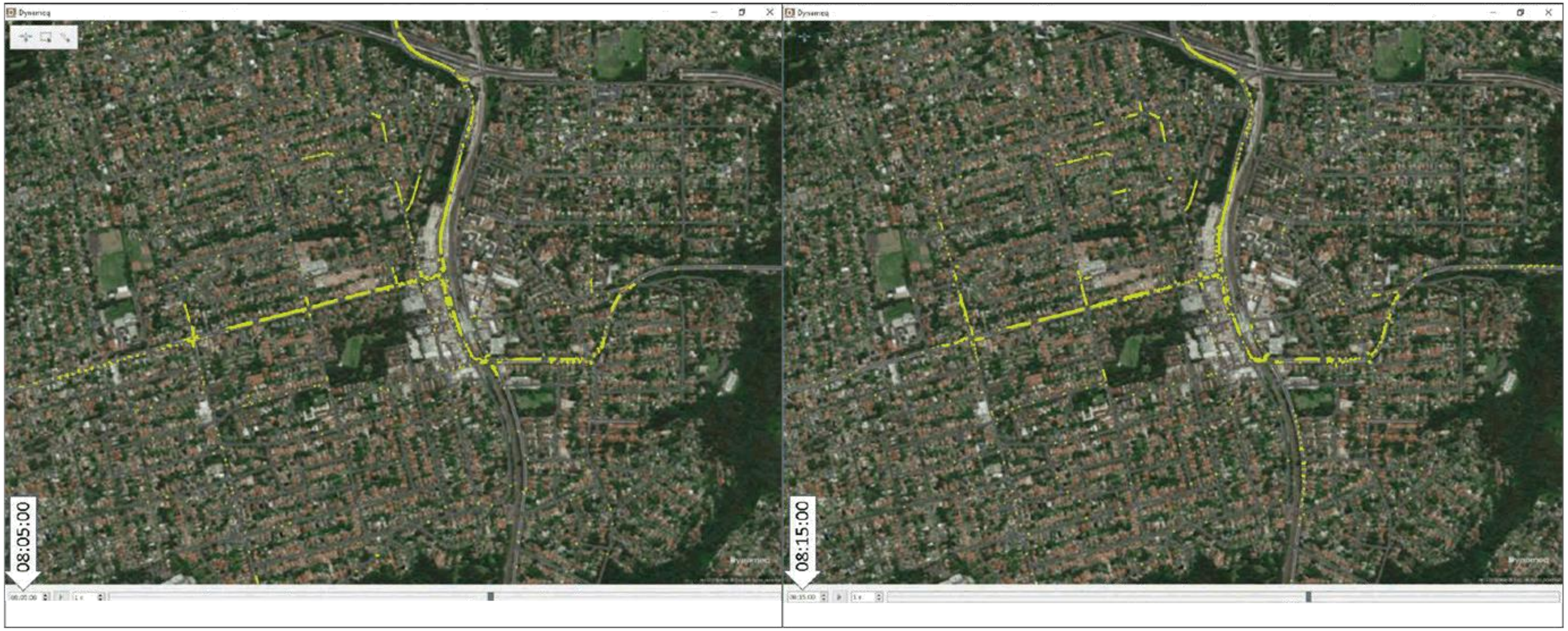
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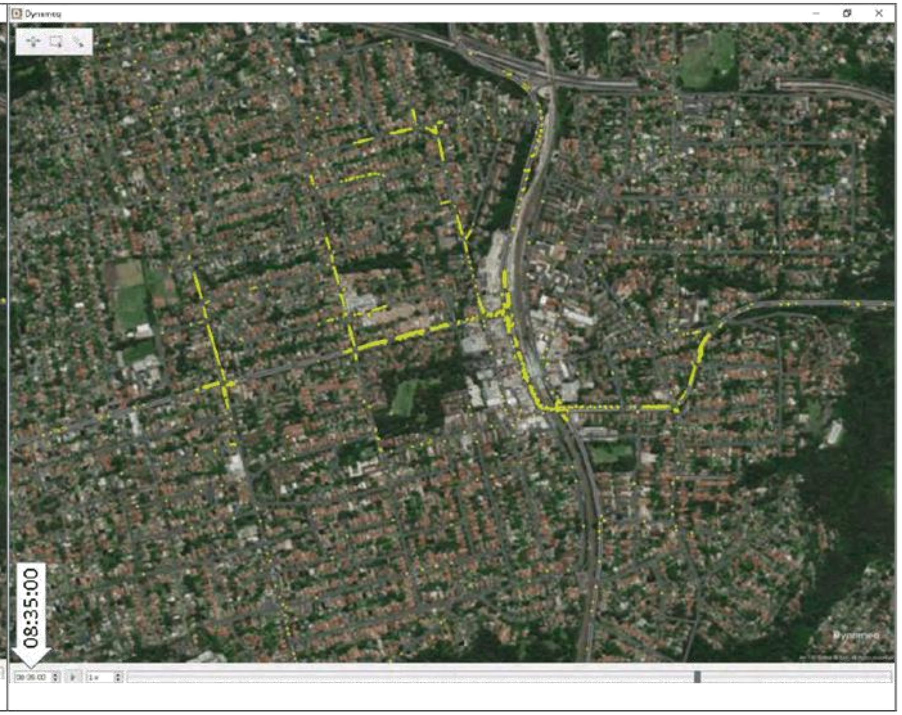
08:15:00


Dynameq
08:25:00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08:35:00


Dynameq
08:45:00
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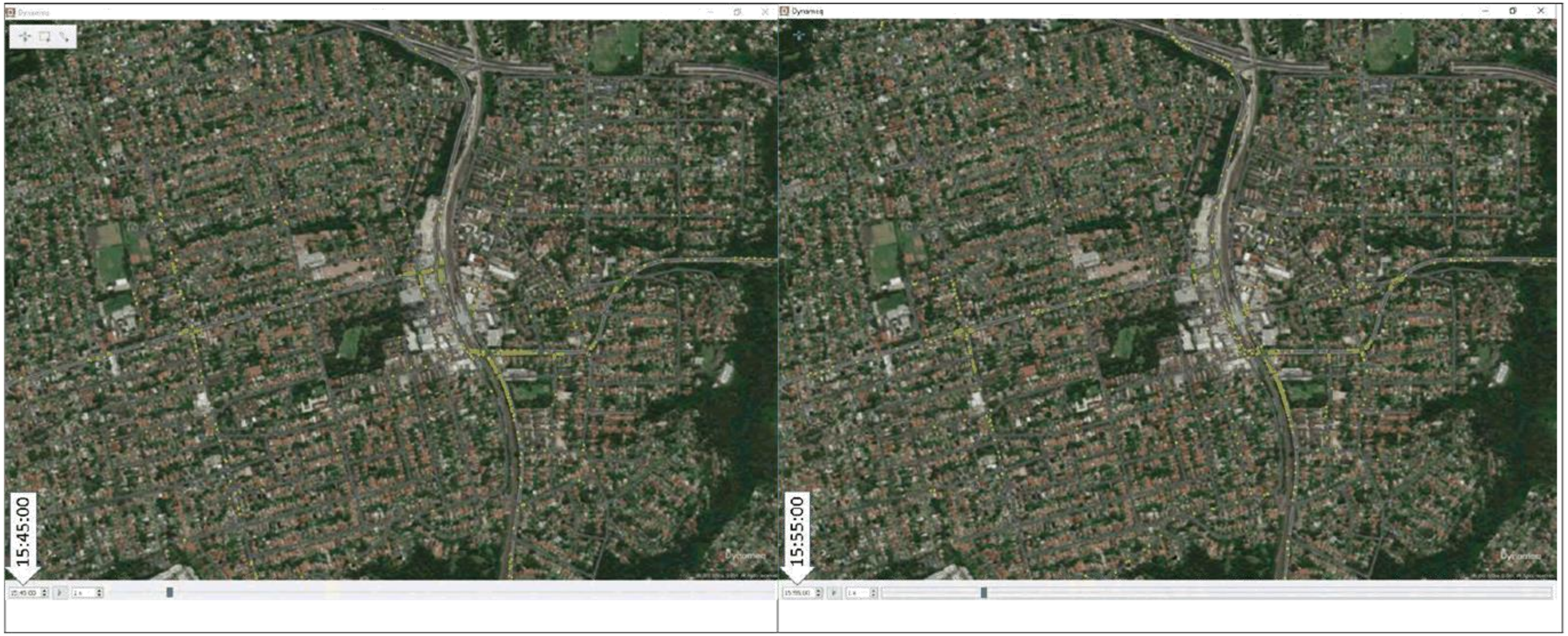
08:55:00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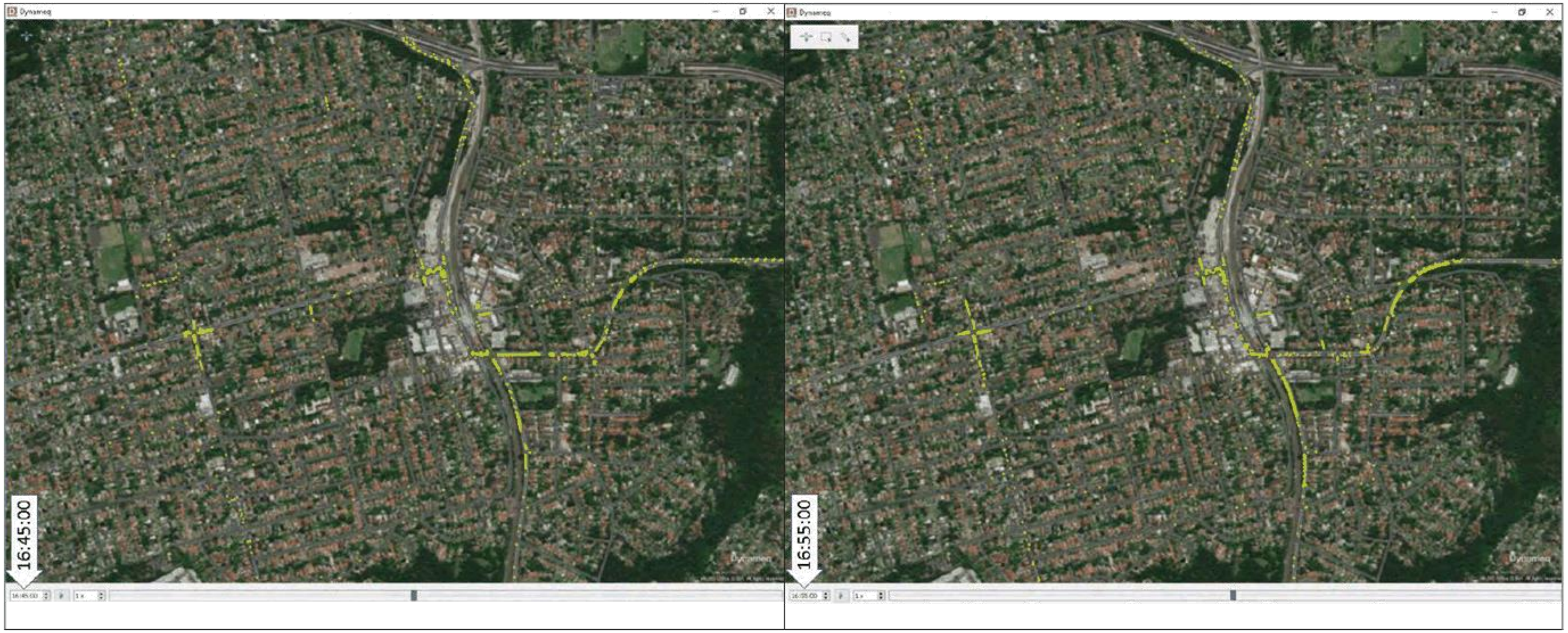
16:05:00


16:15:00


16:25:00
16:35:00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16:45:00
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Dynameq
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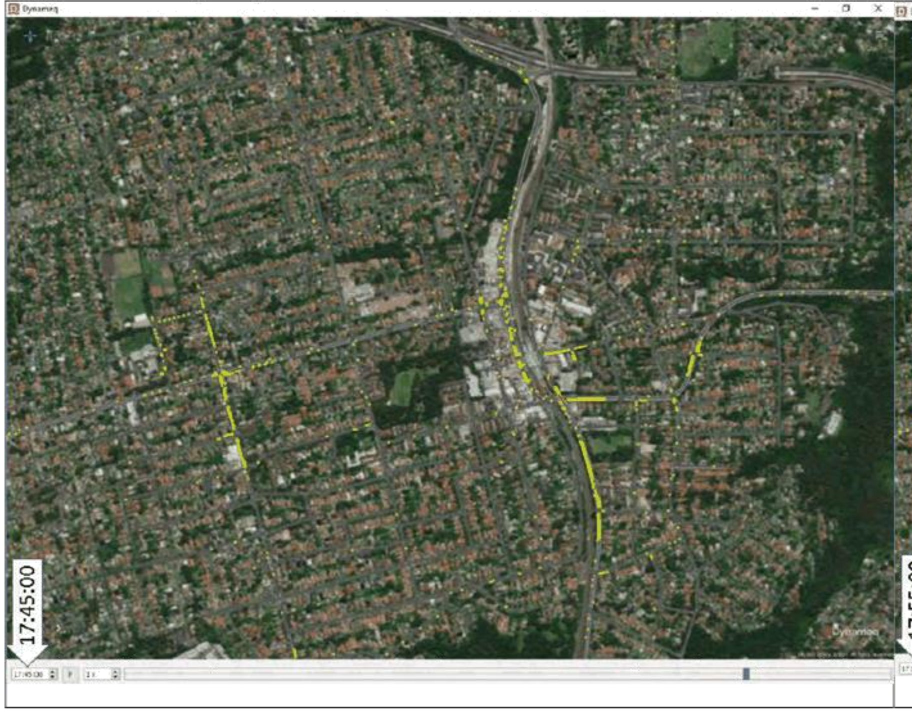
17:35:00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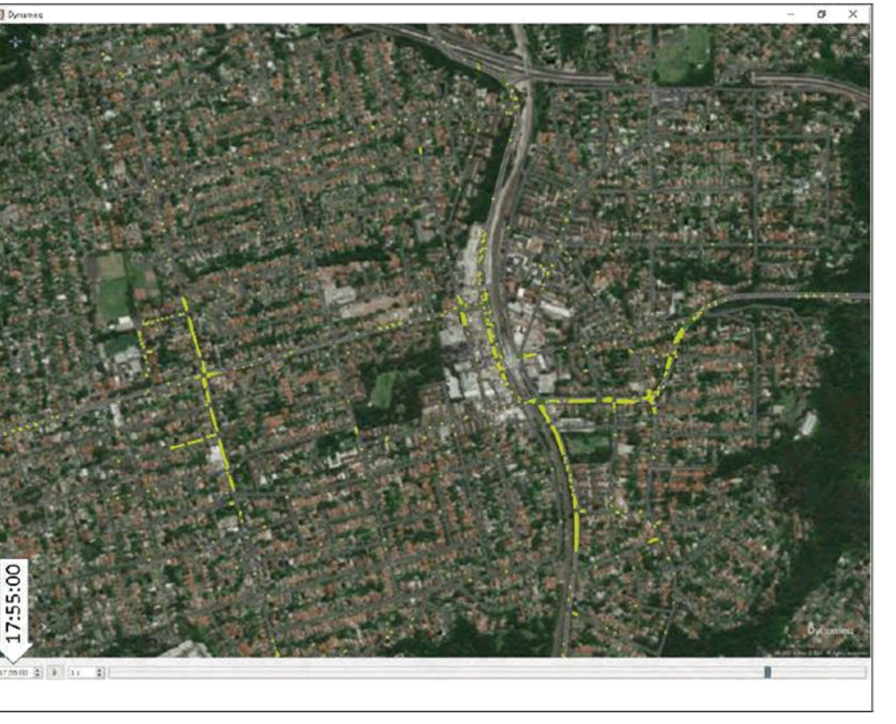
Dynameq
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Appendix C

5,000 dwellings growth location

KEY

- Travel zone boundary
- Under construction
- DA approved
- Under assessment
- Not determined
- Preliminary lodgement
- Heritage conservation area
- B2 zone - potential development
- R4 zone - potential development
- R3 zone - potential development
- Epping Town Centre
- Heritage
- Preliminary lodgement

Epping - Current and potential development - North-west

Epping Town Centre traffic study

Figure C.1

EMM

KEY

- Travel zone boundary
- Under construction
- DA approved
- Under assessment
- Not determined
- Preliminary lodgement
- Heritage conservation area
- B2 zone - potential development
- R4 zone - potential development
- R3 zone - potential development
- Epping Town Centre
- Heritage
- Preliminary lodgement

Epping - Current and potential development - North-east

Epping Town Centre traffic study

Figure C.2

KEY

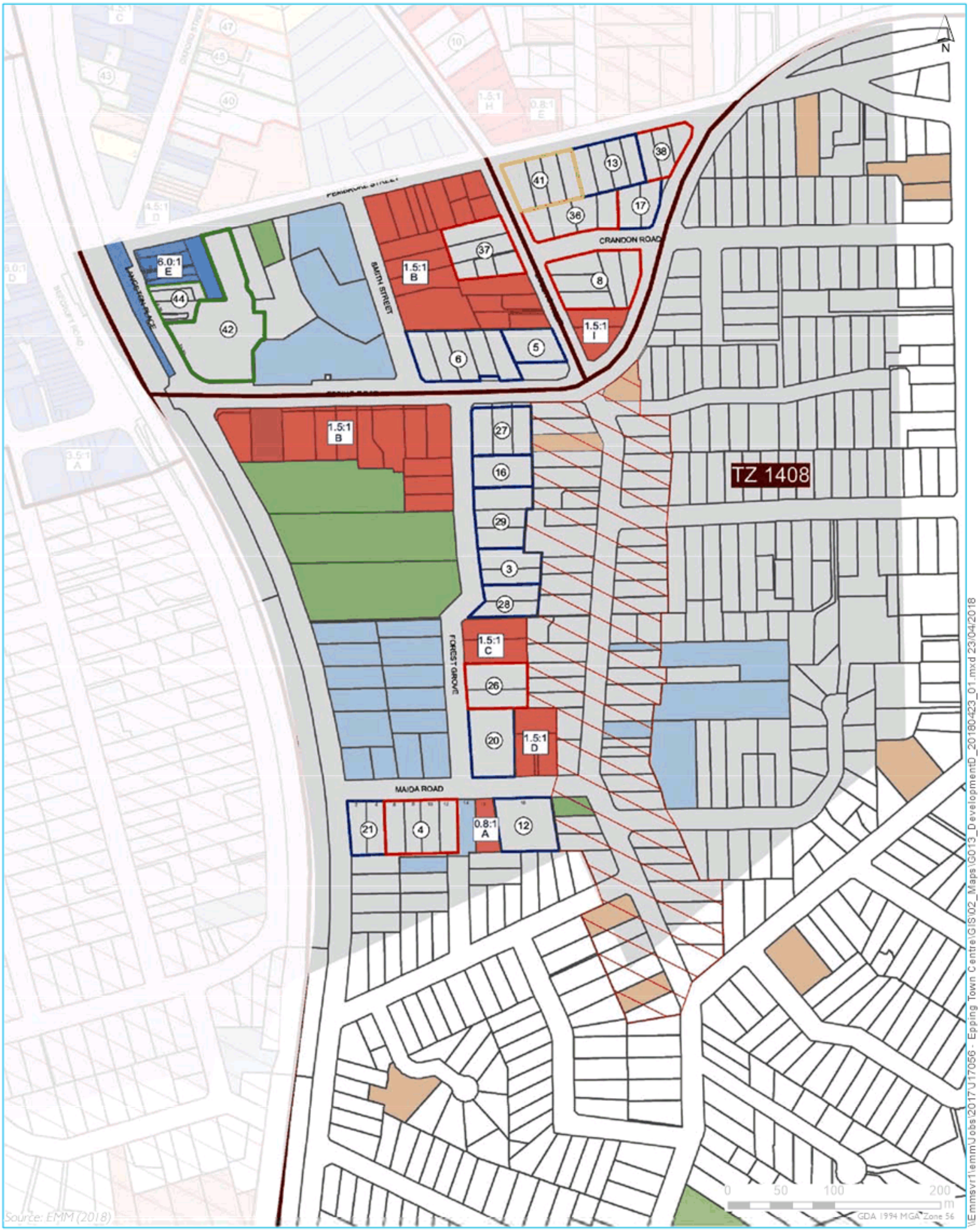
Travel zone boundary	Heritage conservation area	Epping Town Centre
Under construction	B2 zone - potential development	Heritage
DA approved	R4 zone - potential development	Preliminary lodgement
Under assessment	R3 zone - potential development	
Not determined		
Preliminary lodgement		

Epping - Current and potential development - South-west

Epping Town Centre traffic study

Figure C.3

EMM



KEY

- Travel zone boundary
- Under construction
- DA approved
- Under assessment
- Not determined
- Preliminary lodgement
- Heritage conservation area
- B2 zone - potential development
- R4 zone - potential development
- R3 zone - potential development
- Epping Town Centre
- Heritage
- Preliminary lodgement

Epping - Current and potential development - South-east

Epping Town Centre traffic study

Figure C.4

EMM

DA Approved/DA Approved and Under Construction

Travel Zone	Figure Reference	Node	Radius Sector	Units	
1403	1	53016	3	88	
	2			39	
	9			36	
	11			141	
	14			33	
	22			78	
	23			77	
	32			40	
	34			130	
	49			39	
	15	49508	3	35	
	30			99	
	31			0	(refused)
	39			133	
	18	53017	3	256	
	25			38	
				1262	**Total Units**
1404	7	53018	3	32	
	10			76	
	8	53021	3	87	
	13			52	
	17			30	
	36			63	
	38			40	
	41			66	
	24	49501	4	12	
				458	**Total Units**
1406	19	53001	2	119	
	35			501	
	48			222	
	33	53002	2	54	
	46			295	
	43	50005	2	83	
	40	53003	1	254	
	42	51001	1	464	
	44			104	
	5	53022	2	30	
	6			90	
	37			64	
	45	49503	2	200	
	47			179	
				2659	**Total Units**
1407	50	53007	1	147	
				147	**Total Units**
1408	3	53023	3	37	
	16			36	
	27			57	
	28			37	
	29			70	
	20	53024	3	55	
	26			55	
	4	53025	3	60	
	12			36	
	21			27	
				470	**Total Units**
				4996	**Grand Total**

Appendix D

10,000 dwellings growth location

		Location of Identified Future Potential Developments			
Travel Zone	Node	Figure Reference	Radius Sector	Units	
1402	49505				
	49553				
	53014	B	2	159	
	53015	A	3	265	
				424	**Total Units**
1403	49507				
	49508	B	3	52	
	49525				
	49526				
	49550				
	49551				
	49552				
	50001				
	53016	A	3	33	
	53017	C	3	94	
	53029				
				179	**Total Units**
1404	49501	A	4	34	
	49533				
	49534				
	49535	B	3	109	
	49536	C	3	56	
	49547	D	3	38	
	49548				
	50003	F	3	33	
	53018	G	3	81	
	53019	E	3	14	
	53020	H	3	72	
	53021	I	3	31	
	53030				
				468	**Total Units**
1406	49502				
	49503				
	49504				
	49557				
	50004				
	50005	C	2	581	
	51001	E	1	204	
	53001	A	2	113	
	53002				
	53003	D	1	56	
	53004				
	53022	B	2	251	
				1205	**Total Units**
1407	49530	C	1	756	
	53005	A	1	215	
	53006				
	53007	D	1	1007	
	53008				
	53009				
	53010				
	53011				
	53012				
	53013	B	1	450	
				2428	**Total Units**
1408	49505				
	49520				
	49521				
	49537				
	49549				
	49554				
	53023				
	53024	D	3	45	
	53025	A	3	10	
	53026	B	2	234	
	53027	C	3	44	
	53028				
				333	**Total Units**
1409	49514				
	49515	C	3	13	
	49516				
	49518	B	3	15	
	49519	A	2	7	
	49531				
	49532	D	3	10	
	49558				
	53031	E	2	11	
				56	**Total Units**
				5093	**Grand Total**

Appendix E

RMS Road Improvements

Epping Intersection Improvements
Frequently asked questions

Overall project

What are the Epping Town Centre improvements?

Epping Town Centre is one of eight precincts covered under the NSW Government's Urban Activation Precincts Program.

The Roads and Maritime Services is delivering the Epping Town Centre project, which includes:

- Project 1: upgrading the Beecroft Road and Carlingford Road intersection
- Project 2: widening the southern side of Epping Road by about 3.7 metres between Essex Street and Blaxland Road, to provide an additional westbound lane.

Project 1 is due to be completed in early 2018 and includes:

- widening Beecroft Road on the eastern side of the intersection
- providing an additional right turn lane from Beecroft Road southbound into Carlingford Road
- providing a third southbound lane on Beecroft Road north of Carlingford Road
- upgrading the left turn slip lane from Carlingford Road onto Beecroft Road
- providing a new traffic light pedestrian crossing on the western side of the intersection
- building a 90 metre long retaining wall on the eastern side of Beecroft Road next to the rail corridor
- vegetation removal
- upgrading traffic islands and traffic control signals
- adjusting property and utility services.

Project 2 started in mid-2017 and is due to be completed in mid-2018. The work includes:

- widening the southern side of Epping Road by about 3.7 metres between Essex Street and Blaxland Road to provide an additional westbound lane. The additional westbound lane would function as a dedicated left turn lane into Blaxland Road
- upgrading the Epping Road and Essex Street intersection including:
  - widening the north-eastern side of the intersection to provide an additional right turn lane onto Epping Road westbound. This would provide two marked right turn lanes and an unmarked shared left turn/through lane
  - providing new traffic light pedestrian crossings and pram ramps on all four approaches to the intersection
- building a raised central median about 340 metres long on Epping Road between Essex Street and Blaxland Road
- building a raised median about 20 metres long on Essex Street north of Epping Road intersection

- removal of right turns into and out of Forest Grove and Smith Streets
- removal of the right turn from Langston Place onto Epping Road westbound
- removal of the right turn from Epping Road into Essex Street in both directions
- providing a left turn lane from Essex Street onto Epping Road westbound.

What are the key benefits of the project?

The Epping Town Centre project aims to:

- improve traffic flow and road safety
- improve pedestrian access
- help reduce traffic delays and congestion.

What work has been done on Project 2 so far, and what work is to be completed?

We have surveyed the site, carried out demolition work, started our utility relocation work and set up the site compound. Work to be done includes:

- widening Epping Road westbound between Essex Street and Blaxland Road
- improving the intersection at Epping Road and Essex Street
- installing or improving dedicated turning lanes
- asphalting
- road marking.

Questions about the work schedule/construction (hours, noise, schedule)

What will your work schedule involve?

Our typical day working hours will be between **7am** and **6pm** from **Monday** to **Friday**, and **8am** to **1pm** on **Saturdays.** Our typical night time working hours will be between **9pm** and **6am.**

These work hours would be ongoing for four months.

From time to time we may need to work additional hours, including Sundays. The community will be notified if we work outside of these hours.

What is the work schedule?

The expected work schedule is outlined below:

Activity	Timing	Time of the day most construction will happen	Noise Level
Water main relocations	February and March 2018	Mainly days, some night shifts needed	Less Noisy
Electrical relocations	February to April 2018	Mainly days, some night shifts needed	Less Noisy
Telstra relocations	February to April 2018	Mainly days, some night shifts needed	Less Noisy
Optus and NBN relocations	February to April 2018	Mainly days, some night shifts needed	Less Noisy
Jemena relocations	February to April 2018	Mainly days, some night shifts needed	Less Noisy

Building the new road pavement and traffic signals	March to June 2018	Day and night Shifts	Noisier activities
Improvements open to traffic	July 2018		
Building the new median kerb and road furnishing including landscaping and footpaths	July and Aug 18	Mainly Night shift	Less Noisy

What is construction noise?

Most construction noise is typically caused by open-air construction activities and vehicles. Noise impacts depend on the source of the noise, the proximity to the receiver and the existing levels of background noise at the property.

Additionally, construction noise changes with different construction activities and as work progresses.

During the project we will be using equipment including, but not limited to:

- day work: excavators, vacuum trucks, bobcats, jackhammers, tipping trucks, concrete trucks, delivery vehicles, rollers
- night work before midnight: excavators, jackhammers, vacuum trucks, bobcats, concrete saws, rollers, concrete removers, lighting towers
- night work after midnight: asphalt pavers, vacuum trucks, bob cats, excavators, road profiling machines, tipping trucks, rollers, trailers and trucks, bobcats, lighting towers.

It's important to note that people may have varying reactions and sensitivities to noise.

What do you mean when you say X decibels above background?

Decibel is the unit we use to measure noise. When measuring construction noise, we start by monitoring the existing noise to understand what the normal noise levels are for an area. This is referred to as 'background noise levels'. We do this for daytime, evening and night time periods as each of those times typically have different background noise levels.

We then consider the decibel levels of individual and groups of machinery being used in order to determine what the noise increase will be due to the project work. Given that the machines being used for a construction project are generally noisier than cars, traffic or other noise sources, the construction noise typically exceeds the background noise levels.

How much the construction noise exceeds the background noise level determines the level of construction noise you hear and the annoyance you may experience. A noise increase of around 10 decibels at your house will usually be noticeable, a 20 decibel increase will be clearly audible and a greater than 20 or 30 decibel increase will be moderately to highly intrusive..

The noise impact from our work and your eligibility for relocation will be determined by the level of noise above the background noise (decibels above background) your residence is predicted to experience. See below for more information about relocations.

For an understanding of construction noise please ask the project team for a copy of the 'Construction Noise' infographic.

What will I be seeing and hearing?

The things you will see and hear will depend on where you live. Typically, you will see workers:

- digging up the road and footpath to move services

- removing waste from the site
- building the road.

What do you consider 'noisy' and 'less noisy' work?

Noisy work is work considered to have high noise levels and potentially annoying aspects, including high or low frequencies (such as a saw-cutter or circular saw), tonal noises or repetitive noises (such as jack-hammering).
Less noisy work is generally considered to have lower noise levels, a consistent noise source (such as a generator or lighting tower), or equipment that produces similar noise to that of the surrounding noise environment (such as cars or trucks). You may still be able to hear this work, however we try to carry out less noisy work after 12am to minimise sleep disturbance.

How do you predict construction noise levels?

Construction noise is considered during project planning and development. We carry out noise monitoring to help us understand the existing background noise levels. We then assess these levels against the noise generated by the types of equipment we are planning to use to understand the potential impacts.

Will I hear construction work every night you are working?

Construction work will not be carried out across the entire length of the project during every night shift. Work will generally be confined to a limited area of the project each night and will often move along the project site from night to night. This will mean that the level of noise you hear may not be the same each night, depending on where the work and your house are located.

Most of the night work will be around the major intersections of Essex Street and Blaxland Road, so there will be more night shifts around those areas than along the rest of the project.

Why does the work need to be completed using such an intensive schedule?

The road upgrade will improve traffic flow and tackle congestion around Epping Town Centre.

Completing work at night will minimise traffic disruption and enable us to complete the project before the Epping to Chatswood rail line is upgraded to Sydney Metro standards in late 2018. While the rail line is being upgraded, buses will replace trains for around seven months as part of the Temporary Transport Plan.

What mitigation measures are in place to reduce noise at my house?

Roads and Maritime is exploring a number of options to mitigate noise on this project. These include:

- installing temporary noise barriers on the construction fencing
- using lighting towers that are powered by solar power, rather than generators
- using smaller or less noisy machinery whenever possible.

Relocation

Am I eligible for relocation?

Our noise monitoring has determined that relocation is may be warranted for homes within the area indicated in the map below:

- offer of permanent relocation will be for people predicted to experience a greater than 30 decibel noise may be available
- week by week offers of relocation (based on modelling of forecast activities) for people predicted to experience an increase between 20 and 30 decibels may be available.

If we are speaking to you, it is likely that you are eligible for relocation. Please contact DM Roads' Communication and Stakeholder Engagement team on 1800 332 660 for more information.

How do you determine who is offered relocation?

Offers of relocation are made based on expected noise impacts to residents, which is determined using noise modelling software. Noise impacts can differ from property to property, depending on the closeness to the source, the type of work, if you can see the work, or if there is a barrier or structure between you and the work. The noise modelling software factors all of this in to the predicted noise impacts.

I am eligible for relocation, but it is unrealistic for me to move. What can you do for me?

If you would prefer not to move but are impacted by noise from the work, please contact the DM Roads Communication and Stakeholder Engagement team on 1800 332 660. We will arrange to visit your property and investigate whether any temporary onsite noise reduction options can be put in place.

Will I still be eligible for relocation later if I don't accept it now?

Yes, the offer for relocation will remain open while this phase of work is ongoing. Please contact the DM Roads Communication and Stakeholder Engagement team on 1800 332 660 to let us know if you would like to be relocated. We will do our best to find suitable accommodation for you as quickly as possible, however please be aware that we are unlikely to be able to relocate you immediately.

Can my pets be relocated with me?

If you have a pet, please let the DM Roads Communication and Stakeholder Engagement team know when they approach you to discuss relocation. We will do our best to arrange for relocation to a pet friendly property.

Where would I be relocated to?

A number of relocation venues are available to you in serviced apartments around Sydney. Please speak to the project team about the best option for you.

I live in a house; will you relocate me to another house?

Relocation is being offered in serviced apartments. We can offer access to one, two and three bedroom apartments in various locations across Sydney.

Will the relocation you offer include a kitchen and laundry?

Yes, the proposed relocation would include a kitchen or kitchenette and laundry.

We just moved in. Why weren't we told about this before we moved?

Work on Project 2 started in mid-2017 and has been delayed due to challenges related to utility relocation designs. Additionally, as part of the Sydney Metro Northwest rail link project, the Epping to Chatswood rail line will need to be closed for updating. The railway line will be closed for about seven months from mid-2018 with trains to be replaced with bus services. Our road upgrade work will help facilitate traffic management during this transition.

The intensive night works schedule is required to ensure that Epping Town Centre improvement works are completed on time so that traffic impacts associated with the additional bus services are minimised.

What do I do if I feel like my business will lose trade because of this work schedule?

Roads and Maritime must carefully balance the need to provide a road network that facilitates smooth traffic movements for road users while accommodating the needs of the local community.

If you believe the work has caused you financial hardship, you can make a claim by sending your contact details, details of the claim, proof of ownership, occupation and details of your claim to:

Liability Claims Team
Transport Shared Services
PO Box 6464
Silverwater, NSW 1811

Review of Environmental Factors display

How do I make a submission?

We have placed an update to the Review of Environmental Factors on display at the following locations:

Epping Library, Chambers Court (off Pembroke Street), Epping

Christian Chinese Community Service Centre, 41 Essex Street, Epping

The update is available for viewing between 8.30am and 5.00pm from Monday to Friday, and can also be viewed at:

rms.nsw.gov.au/eppingstage2.

If you would like to make a submission, it must reach us by **5pm** on **Tuesday 3 April 2018.**

Your submission should include:

- your name and address
- a statement on whether you support or object to the project
- the reasons why you support or object to the project.

Your submission should be marked DM Roads, Epping Town Centre Project 2:

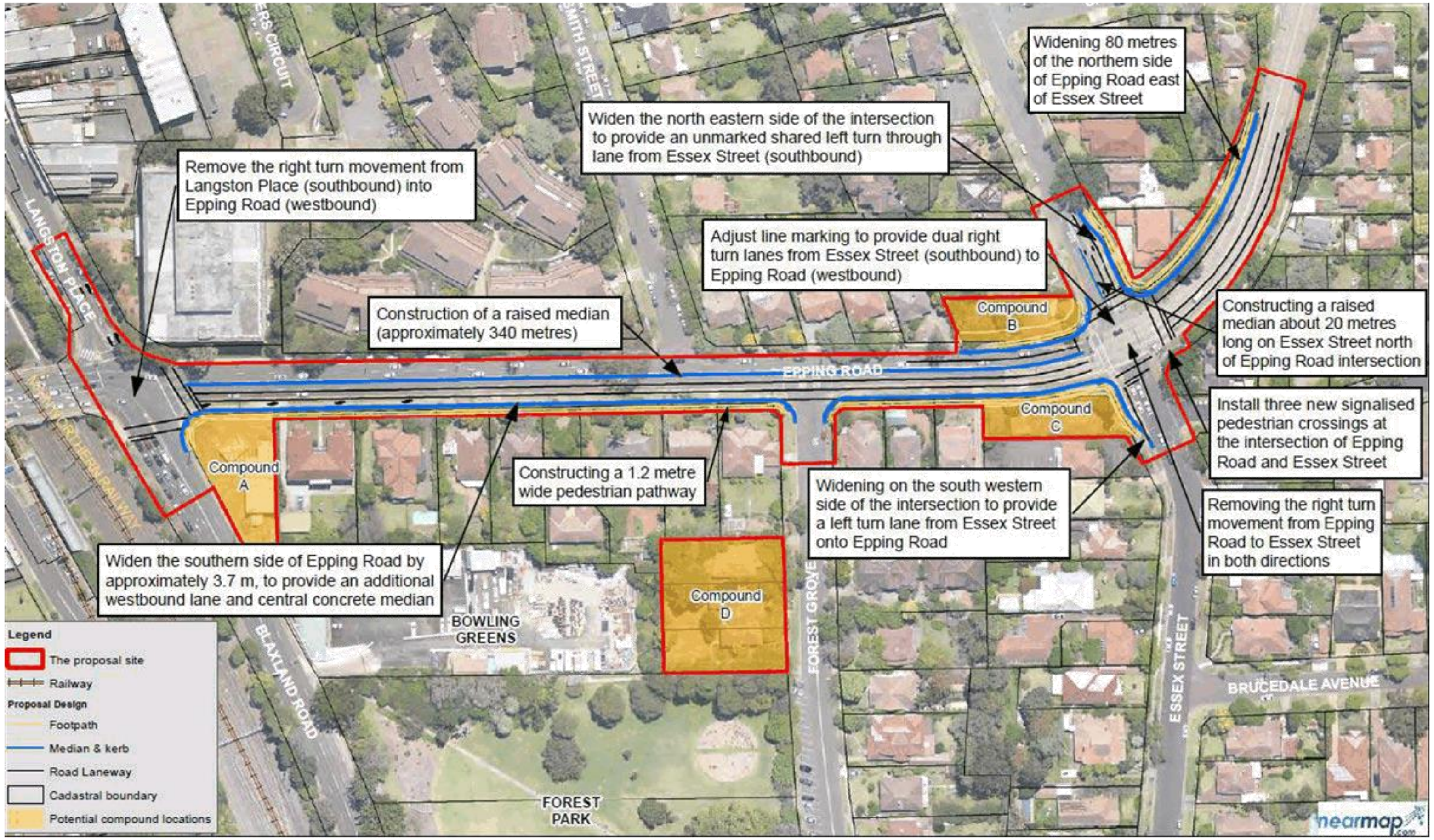
- posted to PO Box 6465, North Ryde NSW 2113
- emailed to nsw_projects@dmroads.com.au

Your submission can be as simple as a one page letter or it can be longer.

Some tips:

- remember, this consultation is solely about the work schedule, we will not consider submissions about the proposal.
- clearly identify the issue and location you want us to know about
- include relevant contact details; name, address, email, fax, telephone
- identify points you want to make
- use headings, sub-headings or main points
- state your position or view at the beginning and explain how it relates to our assessment
- provide background if it would help to explain your concern or issue
- state whether you agree, disagree or you are just stating important things that should be considered
- use one point per paragraph or dot points for each new idea or point
- use headings that highlight your point of view
- summarise the main points
- avoid long sentences.

If you need more information about writing a submission, please phone our community information line on 1800 332 660 or email nsw_projects@dmroads.com.au.


Widening 80 metres of the northern side of Epping Road east of Essex Street
Widen the north eastern side of the intersection to provide an unmarked shared left turn through lane from Essex Street (southbound)
Remove the right turn movement from Langston Place (southbound) into Epping Road (westbound)
Adjust line marking to provide dual right turn lanes from Essex Street (southbound) to Epping Road (westbound)
Construction of a raised median (approximately 340 metres)
Constructing a raised median about 20 metres long on Essex Street north of Epping Road intersection
Install three new signalised pedestrian crossings at the intersection of Epping Road and Essex Street
Constructing a 1.2 metre wide pedestrian pathway
Widening on the south western side of the intersection to provide a left turn lane from Essex Street onto Epping Road
Removing the right turn movement from Epping Road to Essex Street in both directions
Widen the southern side of Epping Road by approximately 3.7 m, to provide an additional westbound lane and central concrete median
Compound A
Compound B
Compound C
Compound D
EPPING ROAD
LANGSTON PLACE
ESSEX STREET
FOREST GROVE
BLAXLAND ROAD
BRUCEDALE AVENUE
BOWLING GREENS
FOREST PARK
Legend
The proposal site
Railway
Proposal Design
Footpath
Median & kerb
Road Laneway
Cadastral boundary
Potential compound locations
nearmap

Appendix F

Council Road Improvements

J17056RP4

Supporting text for Local Road Improvements Maps (at D05725714 & D05725987)

- **Rosebank Avenue**: (1) Extend Rosebank Avenue north to connect with Rosen Street. (2) Widen Rosebank Avenue bridge.

- **Kent Street/Cliff Rd intersection** – install a round-a-bout.

- **Local road through site at 240-244 Rosebank Avenue** – create a new local road through this site connecting Ray Road to Beecroft Road. Left in and left out only where it connects with Beecroft Road. (**Note:** this is consistent with the 'Public Domain' section of the EPR Discussion Paper).

- **Ray Road/Rawson Street intersection** – install barrier on Carlingford Road to restrict movements to left-in/left-out of both Ray Road and Rawson Street.

- **DCP Road** – new road from Rawson Street connecting at Carlingford Road opposite Cliff Road.

- **Cliff Road/DCP road intersection** – (1) Left in/Left out from Cliff Road/DCP road. (2) Straight ahead movement from Cliff Road/DCP road. (3) Right out from Cliff Road/DCP road. (4) Right in to Cliff Road/DCP road (outside of peak, only). (5) Pedestrian bridge on western side of Cliff Road/DCP road intersection.

- **Carlingford Road/Beecroft Road intersection** – Widening of Beecroft Road to 3 lanes. If not, then tidal flow: 3 lanes northbound at peak pm.

- **Widen rail bridge, westbound lane** – westbound lane addition.

- **Epping Road** – Set a Level of Service for motorists exiting from the east side of Epping, north of Epping Road so that motorists do not wait for more than 2 cycles of the traffic signals to get onto, or south of, Epping Road. RMS would need to manage the traffic signals to ensure that this level of service is met.

On account of the first Ward Councillor briefing session held on 17 October, the following sub-option shall also be tested (read in conjunction with D05725987):

- **One way south-bound down Rawson Street** between Carlingford Road and Bridge Street.

- Replace DCP Road Route with New road that connects through Council car park site with Victoria Street cul-de-sac.

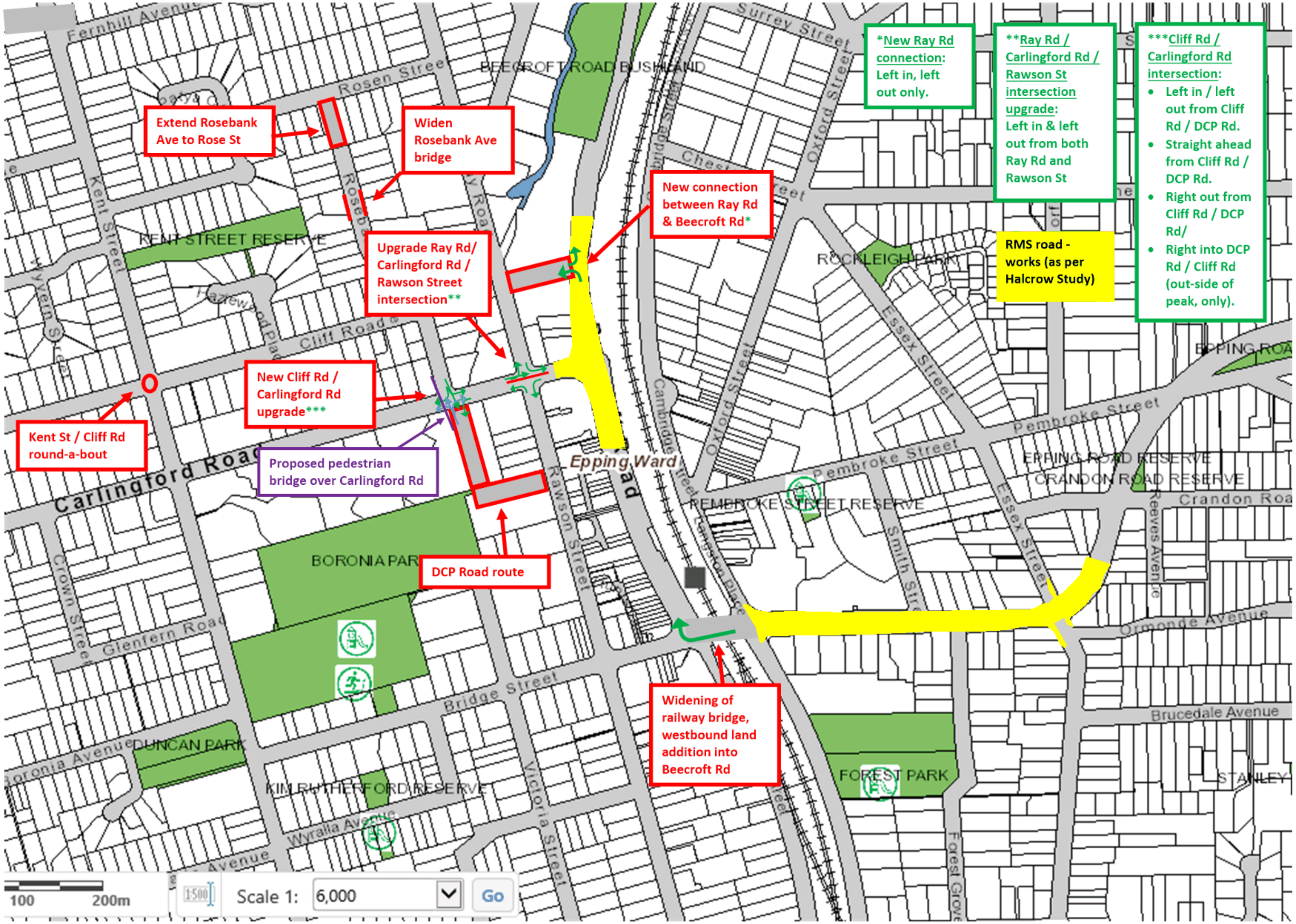
- **Signalisation of Kent/Carlingford Road intersection**.

*

D05624869 (F2017/00210)

LOCAL ROAD IMPROVEMENTS – EPPING TOWN CENTRE TRAFFIC STUDY (Map 1 of 2)

(D05725714)



Note: this must be read in conjunction with supporting text at D05624869, and Summary Table at D05582338 and Maps 2 of 2 at D05725987.

LOCAL ROAD IMPROVEMENTS – EPPING TOWN CENTRE TRAFFIC STUDY - Road upgrades as proposed by Councillors) (Map 2 of 2)

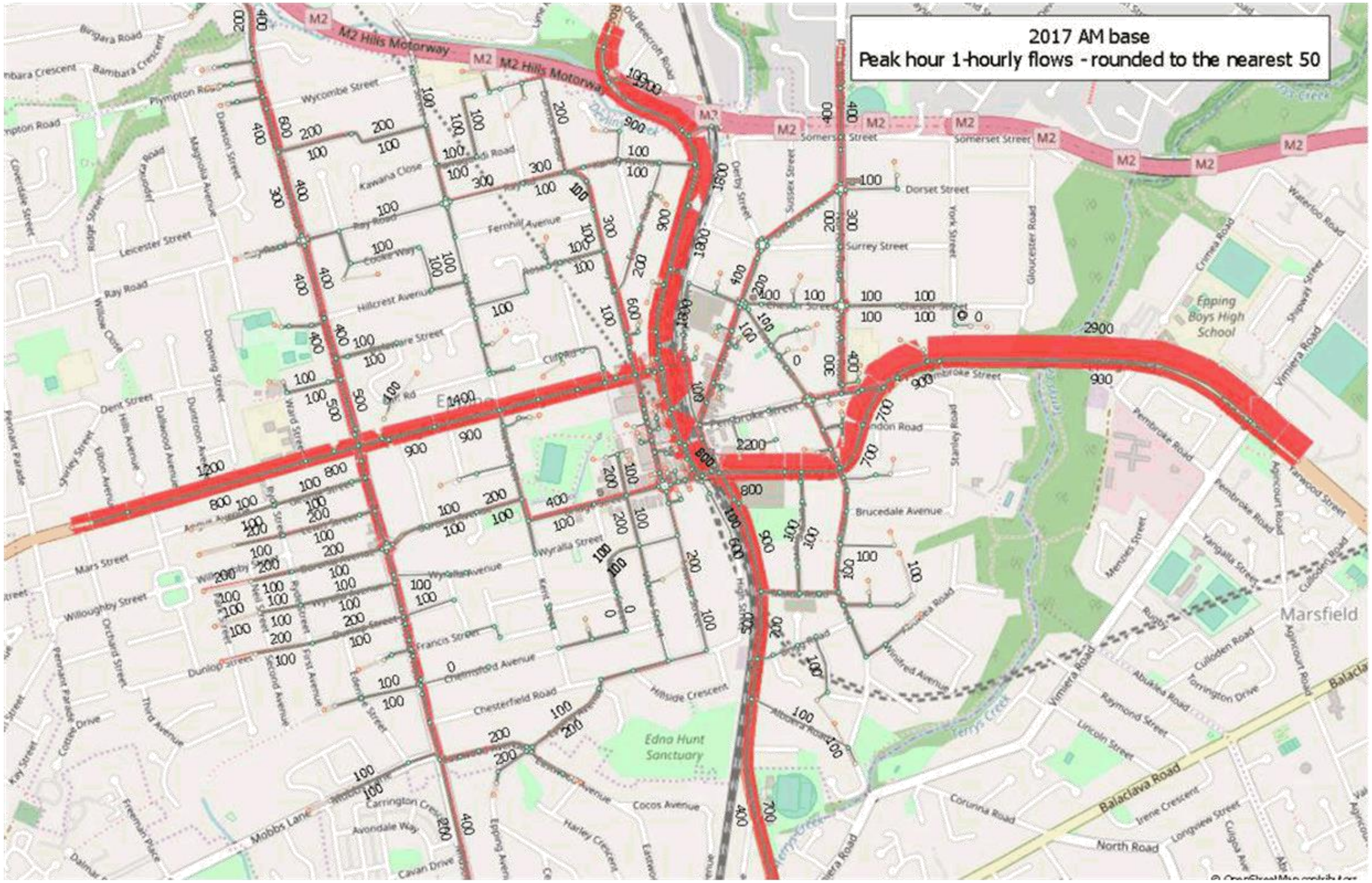
(D05725987)

Note: this must be read in conjunction with supporting text at D05624869, and Summary Table at D05582338 and Maps 1 of 2 at D05725714.

Appendix G

2017 Network Volumes

J17056RP4


2017 AM base
Peak hour 1-hourly flows - rounded to the nearest 50


2017 PM base
Peak hour 1-hourly flows - rounded to the nearest 50
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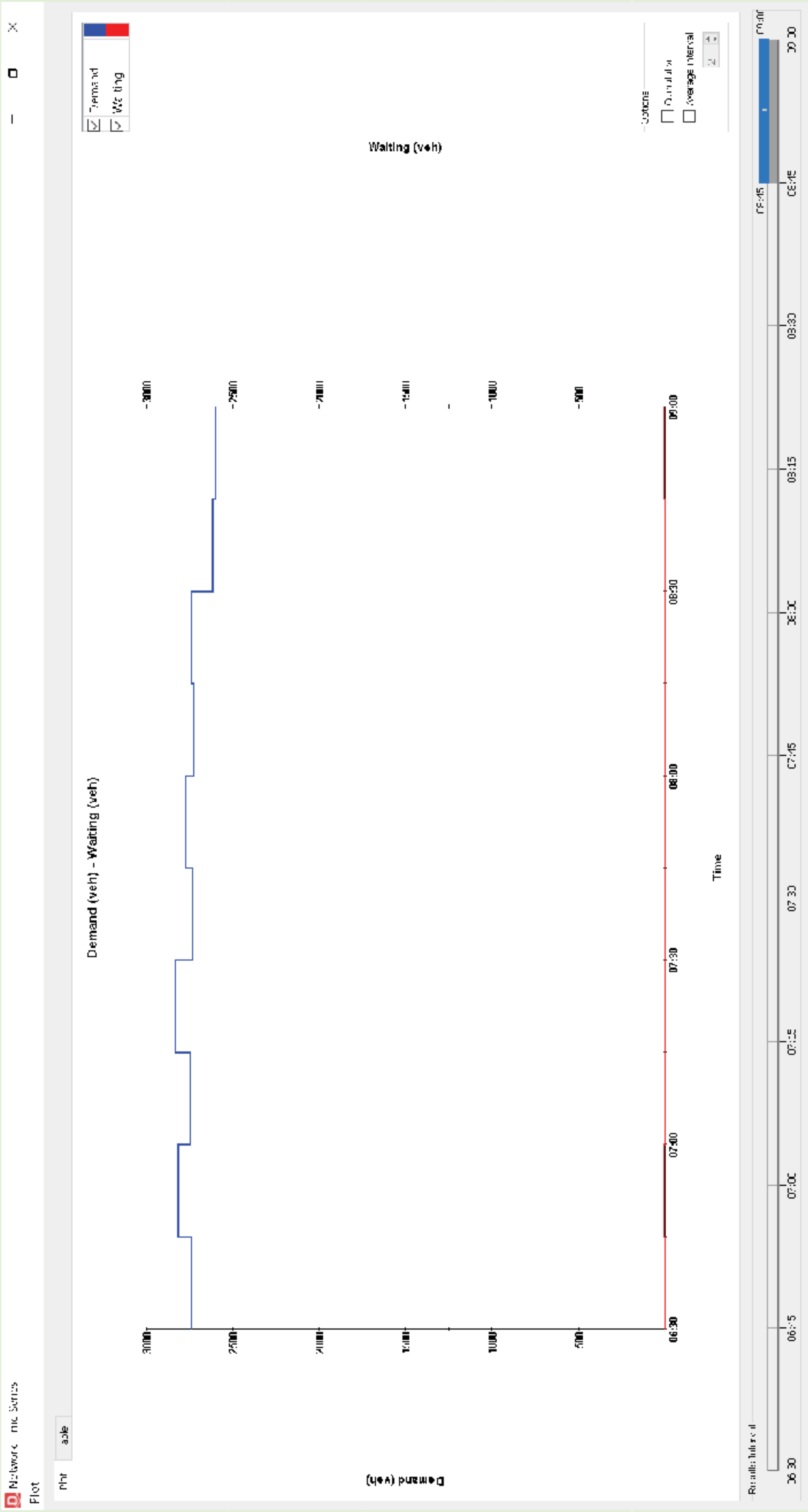

Demand (veh) - Waiting (veh)
Demand (veh)
Waiting (veh)
Time
Demand
Waiting
06:30
07:00
07:30
08:00
08:30
09:00

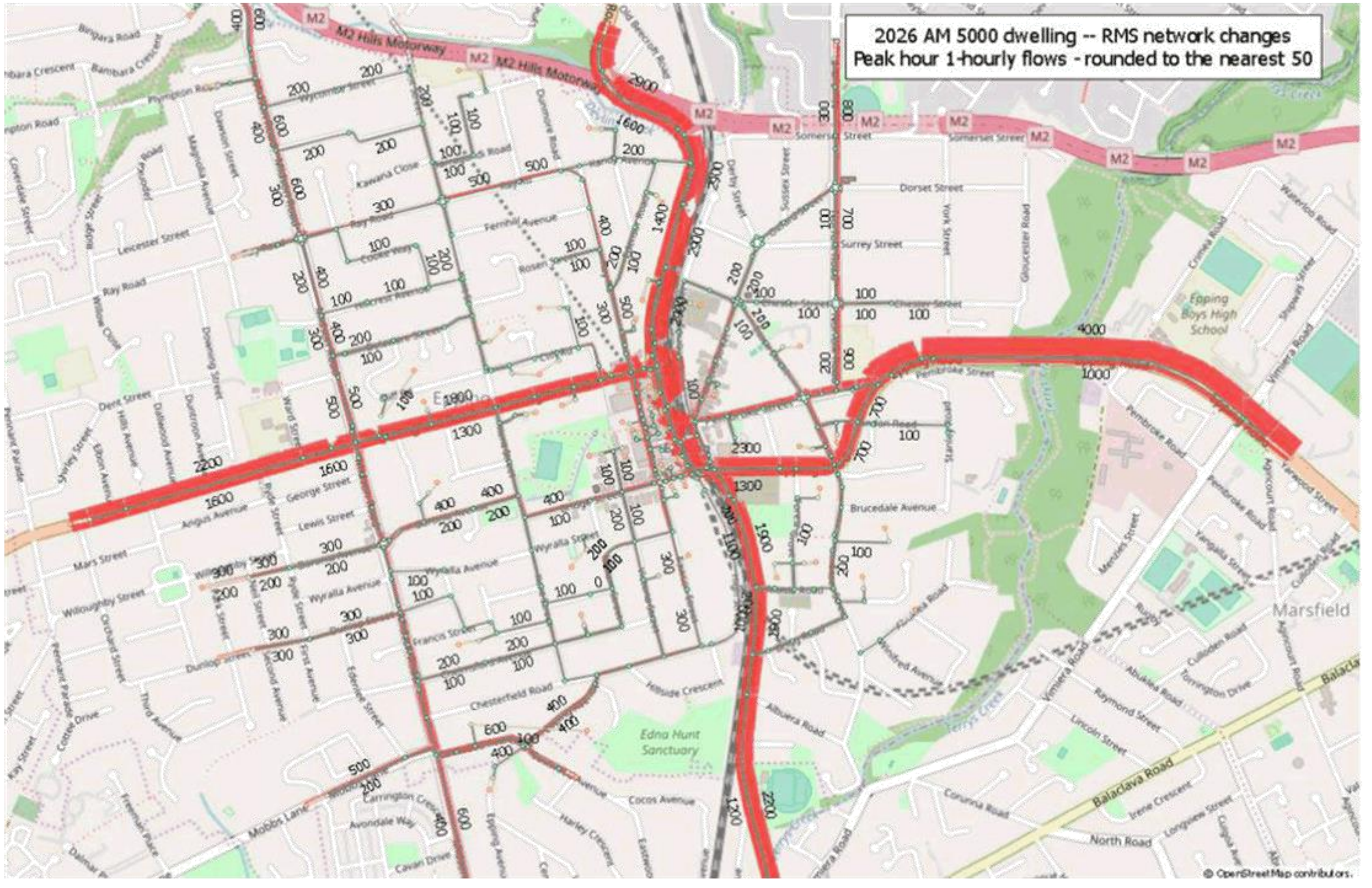
2017 am

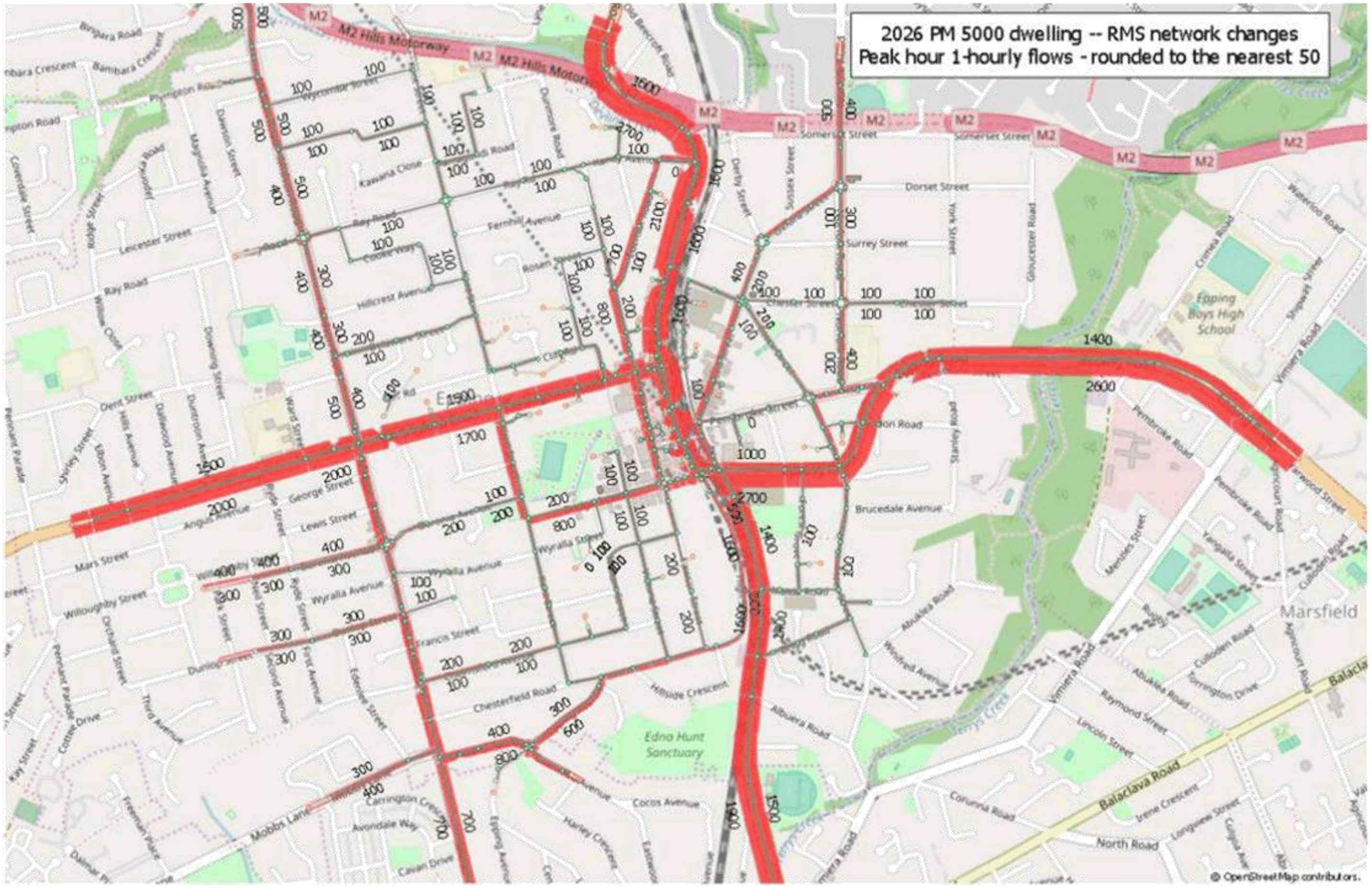
*	project:	Epping_dynameq_small									
*	scenario:	net_2017_base									
*	DTA:	am_2017									
*	vehicle	classes:	Default								
*	CREATED	Tue	24	Apr	4:03:31	2018					
*	result	6:30:00	6:45:00	7:00:00	7:15:00	7:30:00	7:45:00	8:00:00	8:15:00	8:30:00	8:45:00
Demand		2739	2817	2748	2836	2734	2776	2723	2738	2614	2601
In	Count	2737	2812	2754	2835	2736	2775	2723	2739	2612	2598
Out	Count	1972	2685	2668	2816	2647	2706	2839	2798	2693	2646
Waiting		2	7	1	2	0	1	1	0	2	5
Travelling		765	892	978	997	1086	1155	1039	980	899	851
Density		4	7	8	8	9	9	9	8	7	7
VHT		137	214	239	246	270	282	279	266	233	213
VHT-Total		137	214	239	247	270	282	279	266	234	213
VHT-Virtual		0	0	0	0	0	0	0	1	1	0
VHD		43	101	124	126	155	166	157	147	119	101
VHD-Total		43	101	124	127	156	167	157	147	120	101
VKT		5,161	6,225	6,373	6,644	6,341	6,387	6,694	6,519	6,229	6,105
Speed		37.8	29.1	26.7	27.0	23.5	22.6	24.0	24.5	26.7	28.7

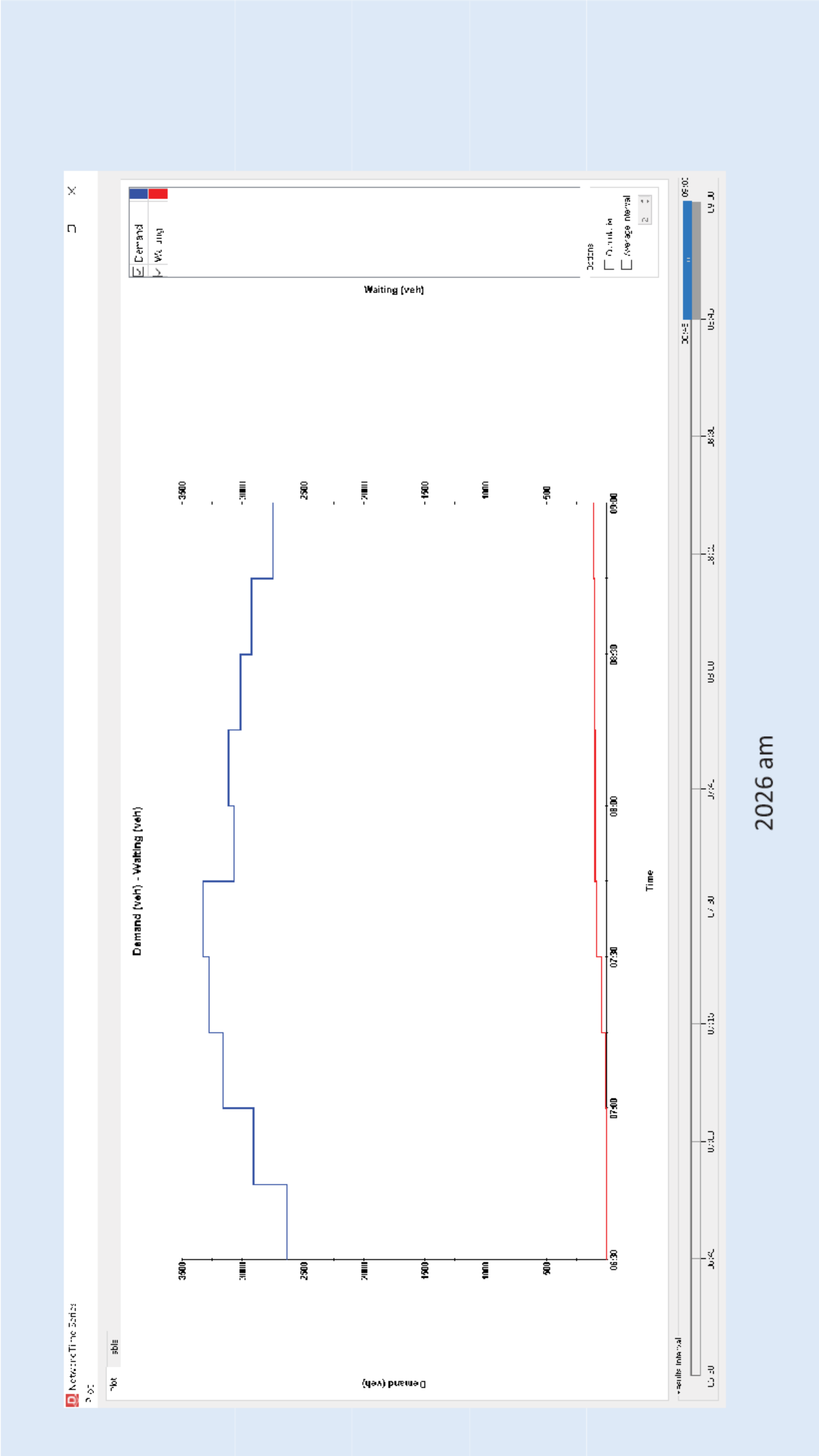
2017 am

Appendix H

2026 Network Volumes


2026 AM 5000 dwelling -- RMS network changes
Peak hour 1-hourly flows - rounded to the nearest 50
© OpenStreetMap contributors.


2026 PM 5000 dwelling -- RMS network changes
Peak hour 1-hourly flows - rounded to the nearest 50
© OpenStreetMap contributors.


Demand (veh) - Waiting (veh)
Demand (veh)
Waiting (veh)
Time
Demand
06:30
07:00
07:30
08:00
08:30
09:00
3500
2500
1500
1000
500
2026 am

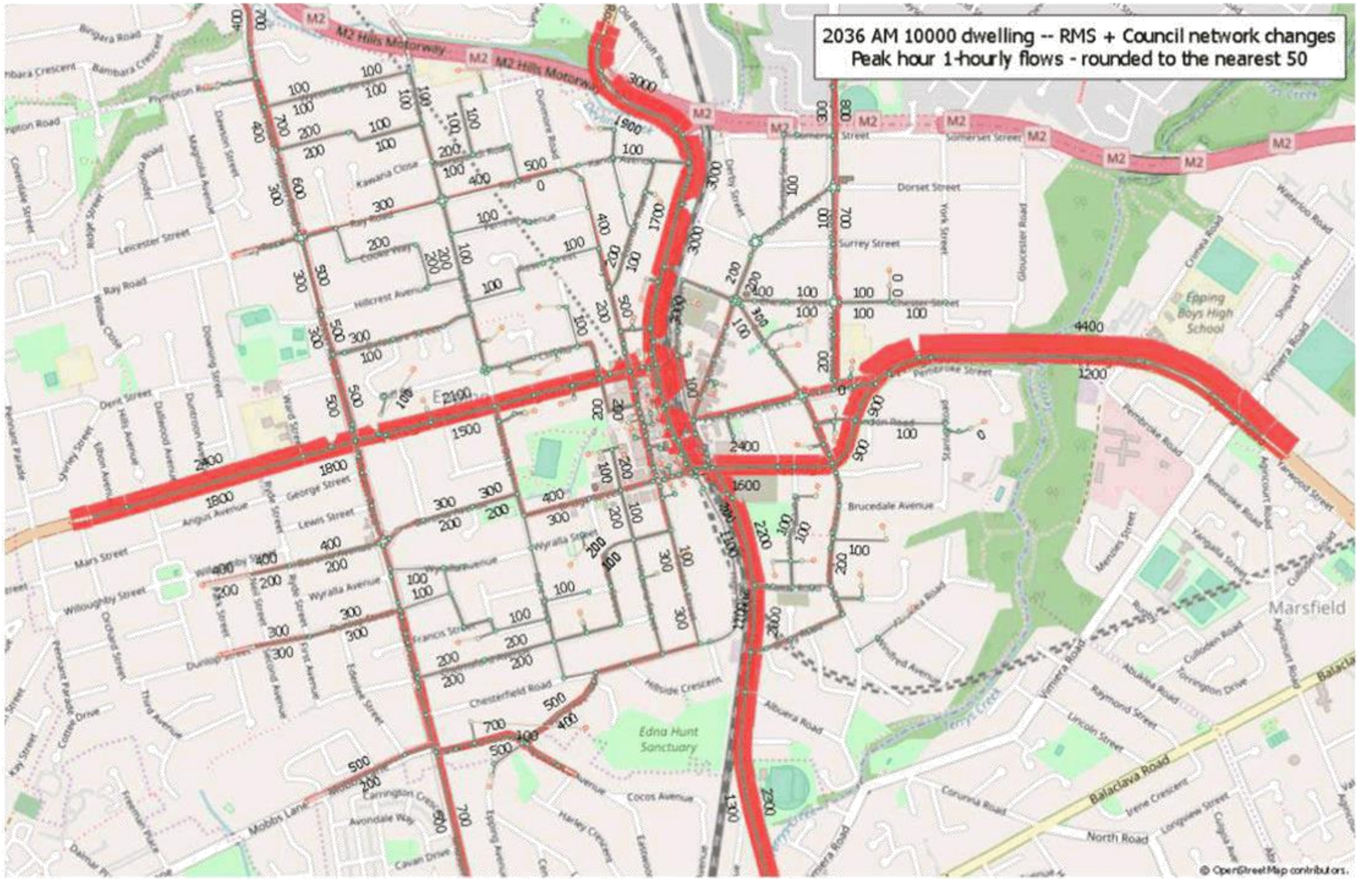
*	project:	Epping_dynameq_small									
*	scenario:	net_2026_RMS									
*	DTA:	am_2026_4000									
*	vehicle	classes:	Default								
*	CREATED	Tue	24	Apr	4:07:51	2018					
*	result	6:30:00	6:45:00	7:00:00	7:15:00	7:30:00	7:45:00	8:00:00	8:15:00	8:30:00	8:45:00
Demand		2,634	2,907	3,162	3,274	3,320	3,069	3,113	3,015	2,924	2,751
In	Count	2,634	2,906	3,155	3,239	3,280	3,053	3,112	3,010	2,927	2,744
Out	Count	2,128	2,690	3,209	3,104	3,371	3,164	3,111	2,981	2,933	2,744
Waiting		0	1	8	43	83	99	100	105	102	109
Travelling		506	722	668	803	712	601	602	631	625	625
Density		3.4	4.8	5.8	5.9	6.0	5.0	5.0	5.0	5.0	4.9
VHT		109	152	183	186	190	159	159	157	159	154
VHT-Total		109	152	183	192	206	182	183	183	185	178
VHT-Virtual		0	0	1	6	16	23	24	26	26	25
VHD		12	34	48	50	44	28	29	31	35	39
VHD-Total		12	34	48	56	60	51	54	56	61	63
VKT		5,428	6,606	7,527	7,600	8,143	7,254	7,151	6,962	6,889	6,333
Speed		49.9	43.5	41.2	40.8	42.8	45.7	44.9	44.4	43.3	41.3

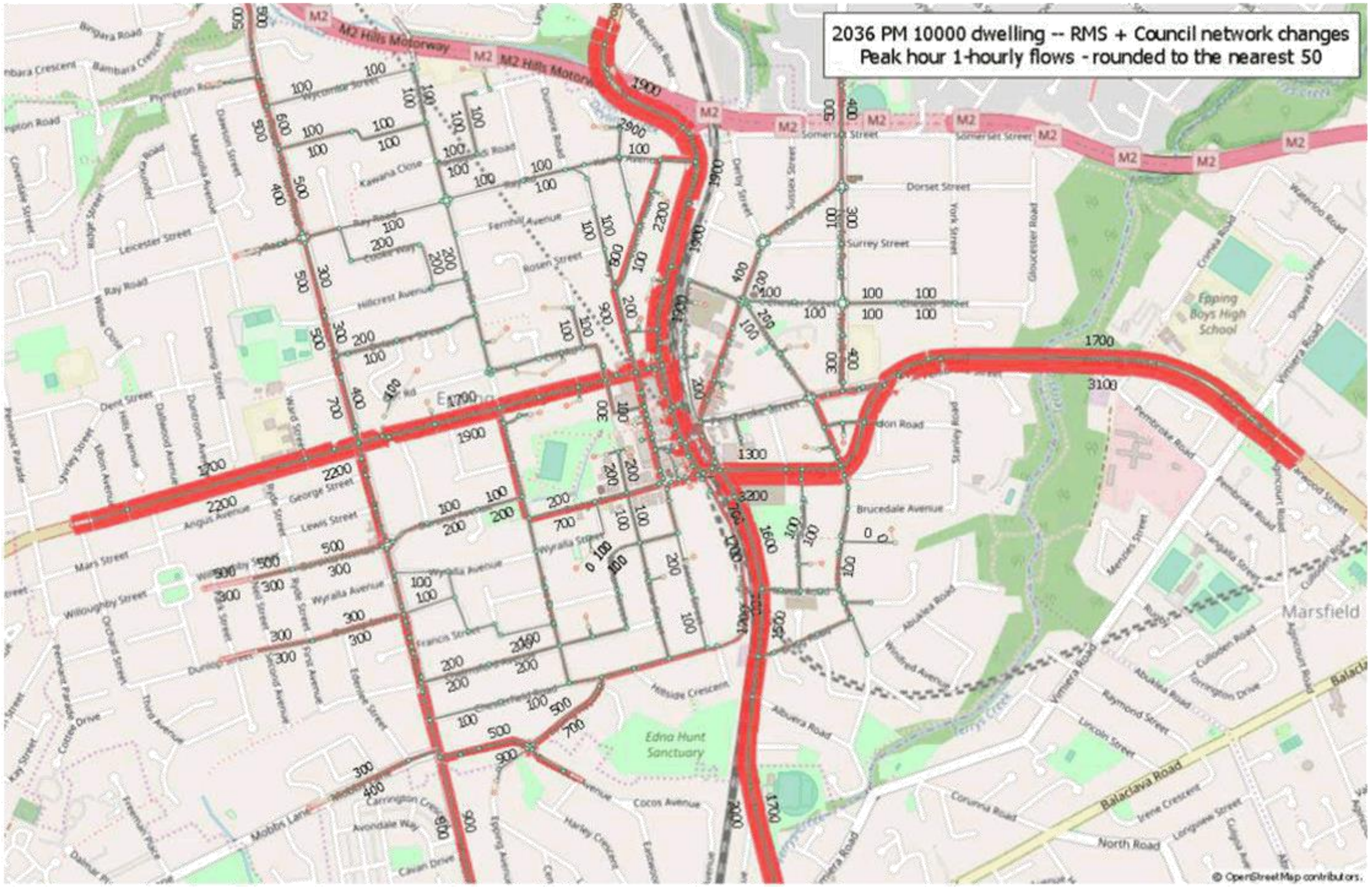
2026 am

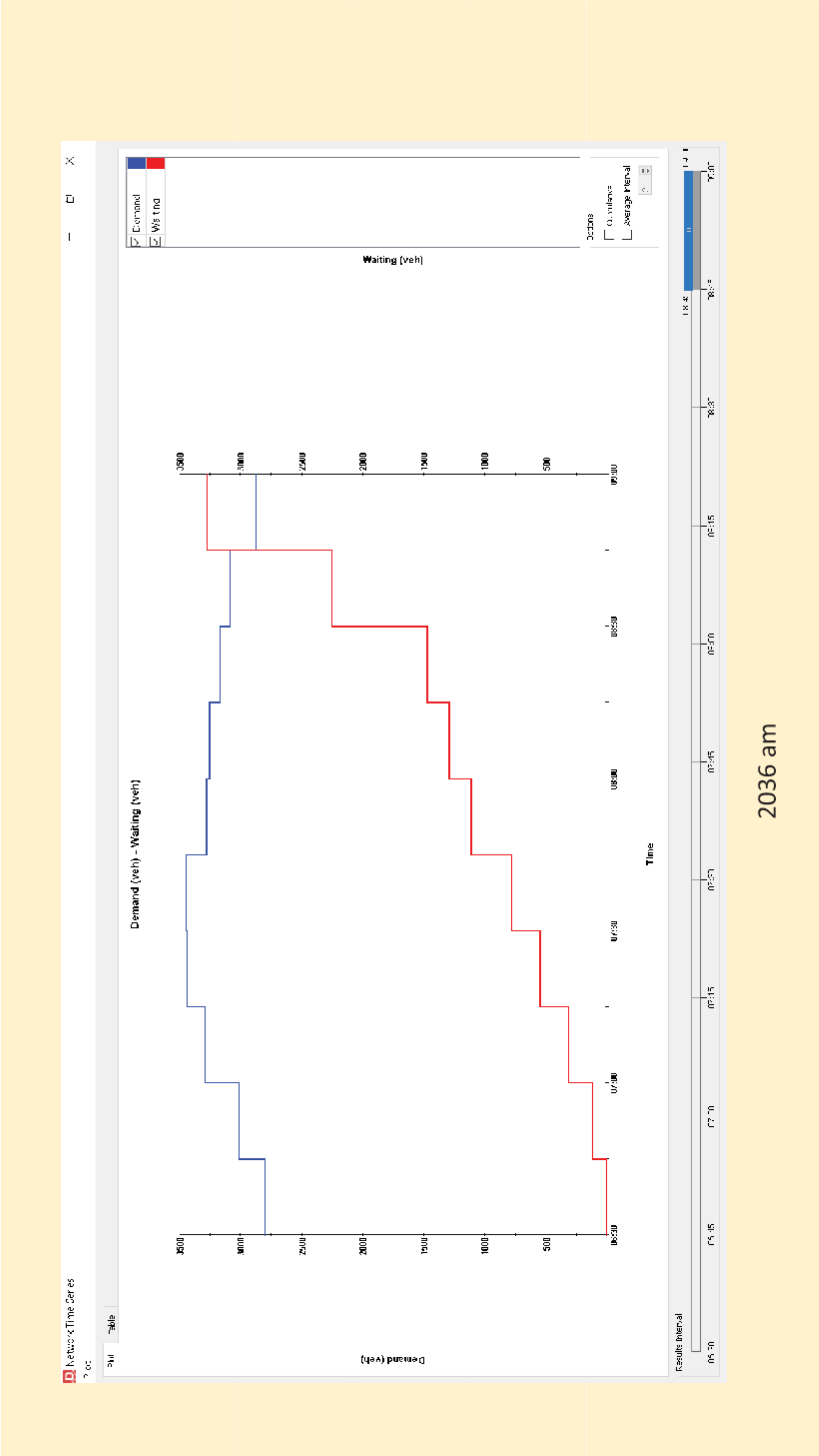
Appendix I

2036 Network Volumes

J17056RP4

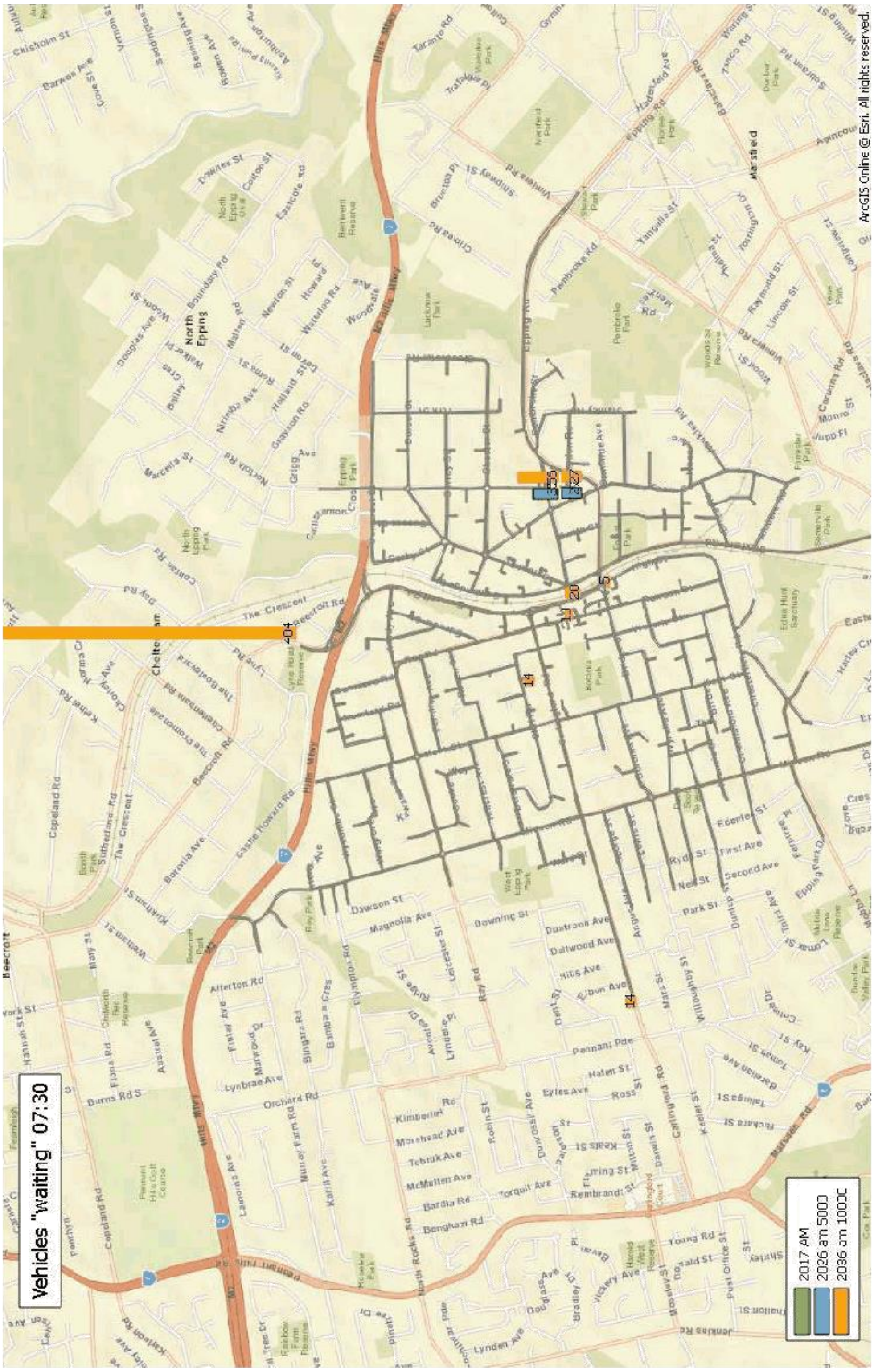

2036 AM 10000 dwelling -- RMS + Council network changes
Peak hour 1-hourly flows - rounded to the nearest 50

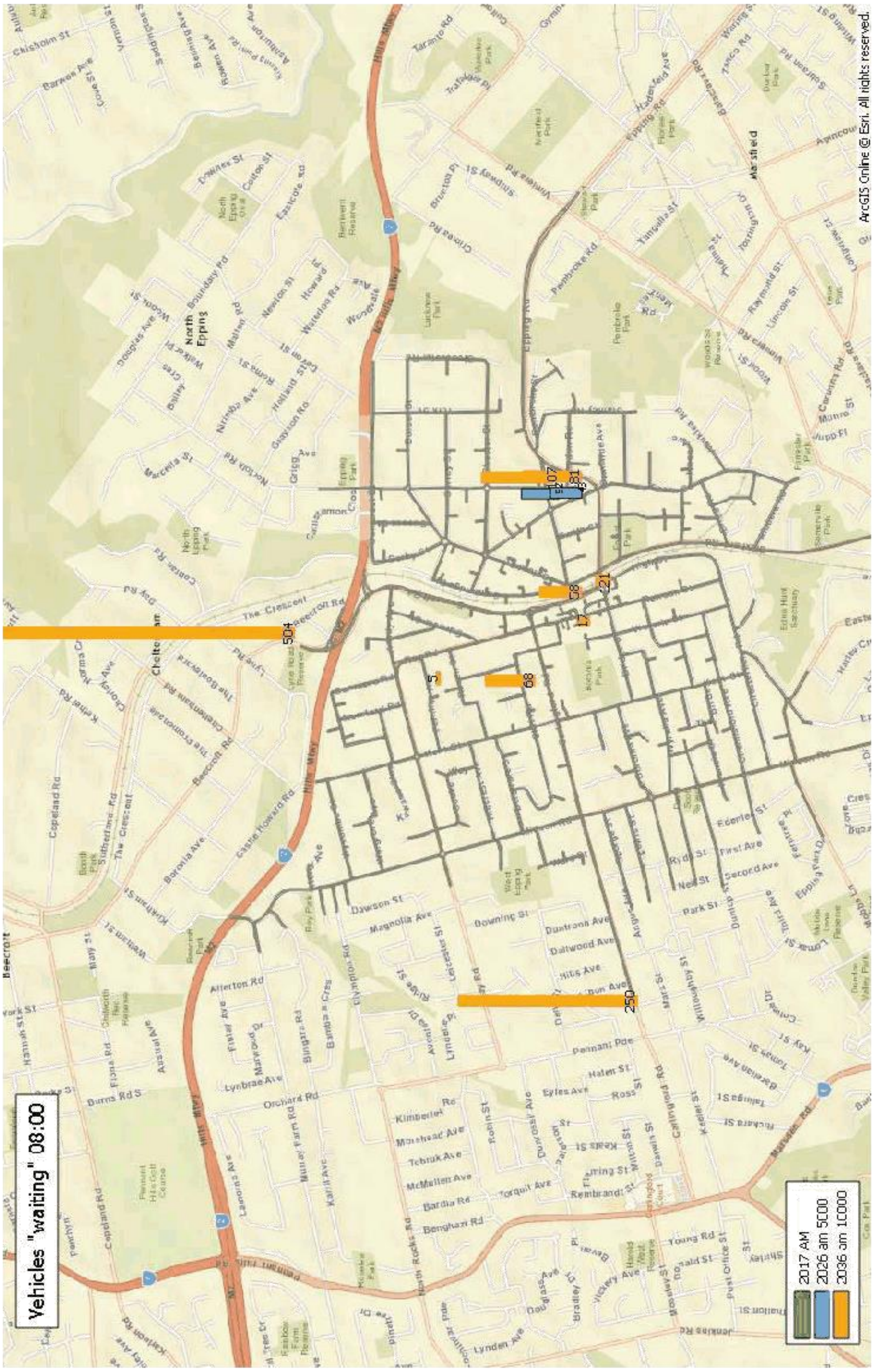

2036 PM 10000 dwelling -- RMS + Council network changes
Peak hour 1-hourly flows - rounded to the nearest 50
© OpenStreetMap contributors.


Demand (veh) - Waiting (veh)
Demand (veh)
Waiting (veh)
Time
2036 am

*	project:	Epping_dynameq_small									
*	scenario:	net_2036_RMS_Council									
*	DTA:	am_2036_10000									
*	vehicle	classes:	Default								
*	CREATED	Tue	24	Apr	4:15:26	2018					
*	result	6:30:00	6:45:00	7:00:00	7:15:00	7:30:00	7:45:00	8:00:00	8:15:00	8:30:00	8:45:00
Demand		2,796	3,008	3,292	3,439	3,442	3,279	3,252	3,171	3,091	2,873
In	Count	2,795	2,889	3,094	3,206	3,209	2,953	3,071	2,989	2,314	1,850
Out	Count	1,908	2,510	2,801	2,824	2,764	2,657	2,828	2,554	1,429	1,373
Waiting		1	120	318	551	784	1,110	1,291	1,473	2,250	3,273
Travelling		887	1,266	1,559	1,941	2,386	2,682	2,925	3,360	4,245	4,722
Density		4.8	8.6	11.5	13.4	15.4	19.6	20.9	21.1	18.4	27.0
VHT		152	273	364	427	489	624	665	671	584	858
VHT-Total		152	281	419	534	647	873	964	1,019	1,029	1,552
VHT-Virtual		0	9	55	107	158	249	299	348	445	694
VHD		62	165	244	302	370	503	542	556	521	801
VHD-Total		62	173	299	409	528	752	840	904	966	1,495
VKT		4,996	5,973	6,589	6,854	6,586	6,734	6,793	6,350	3,374	3,090
Speed		32.9	21.9	18.1	16.1	13.5	10.8	10.2	9.5	5.8	3.6

2036 am


Vehicles "waiting" 07:30
2017 AM
ArcGIS Online © Esri. All rights reserved.


Vehicles "waiting" 08:00
2017 AM
2026 am 5000
2036 am 10000
107
81
25
68
21
17
504
5
68
250
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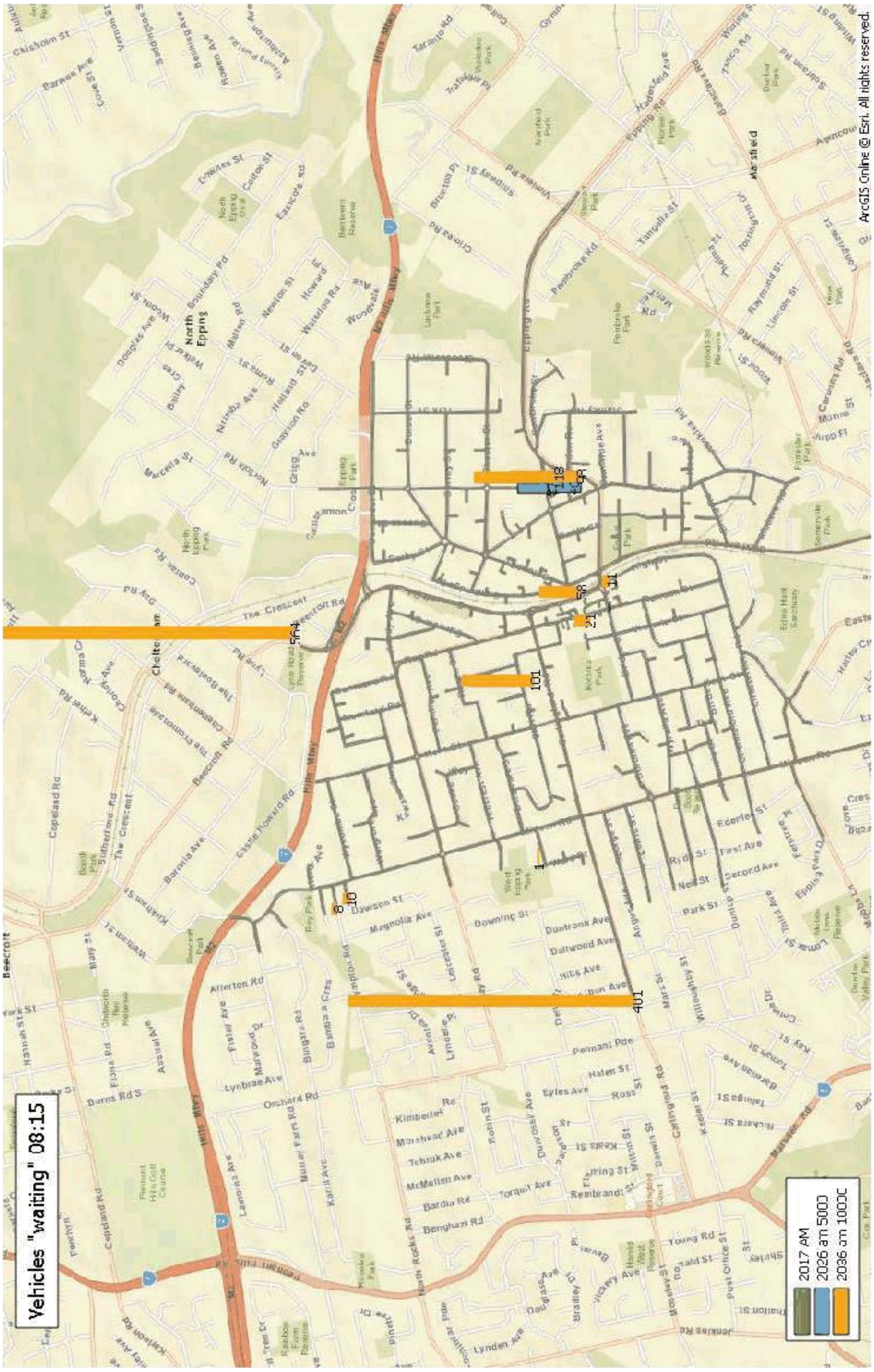
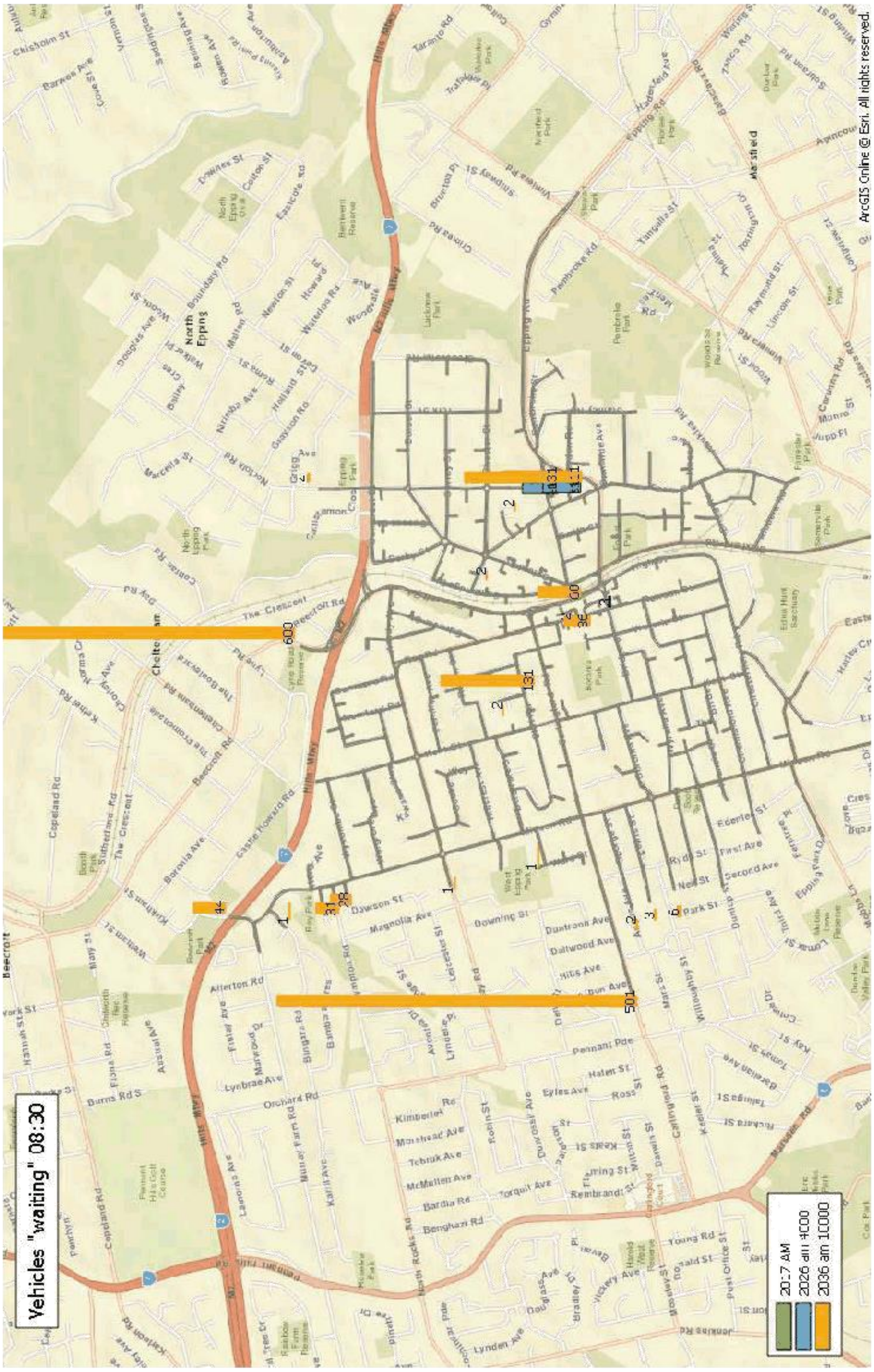
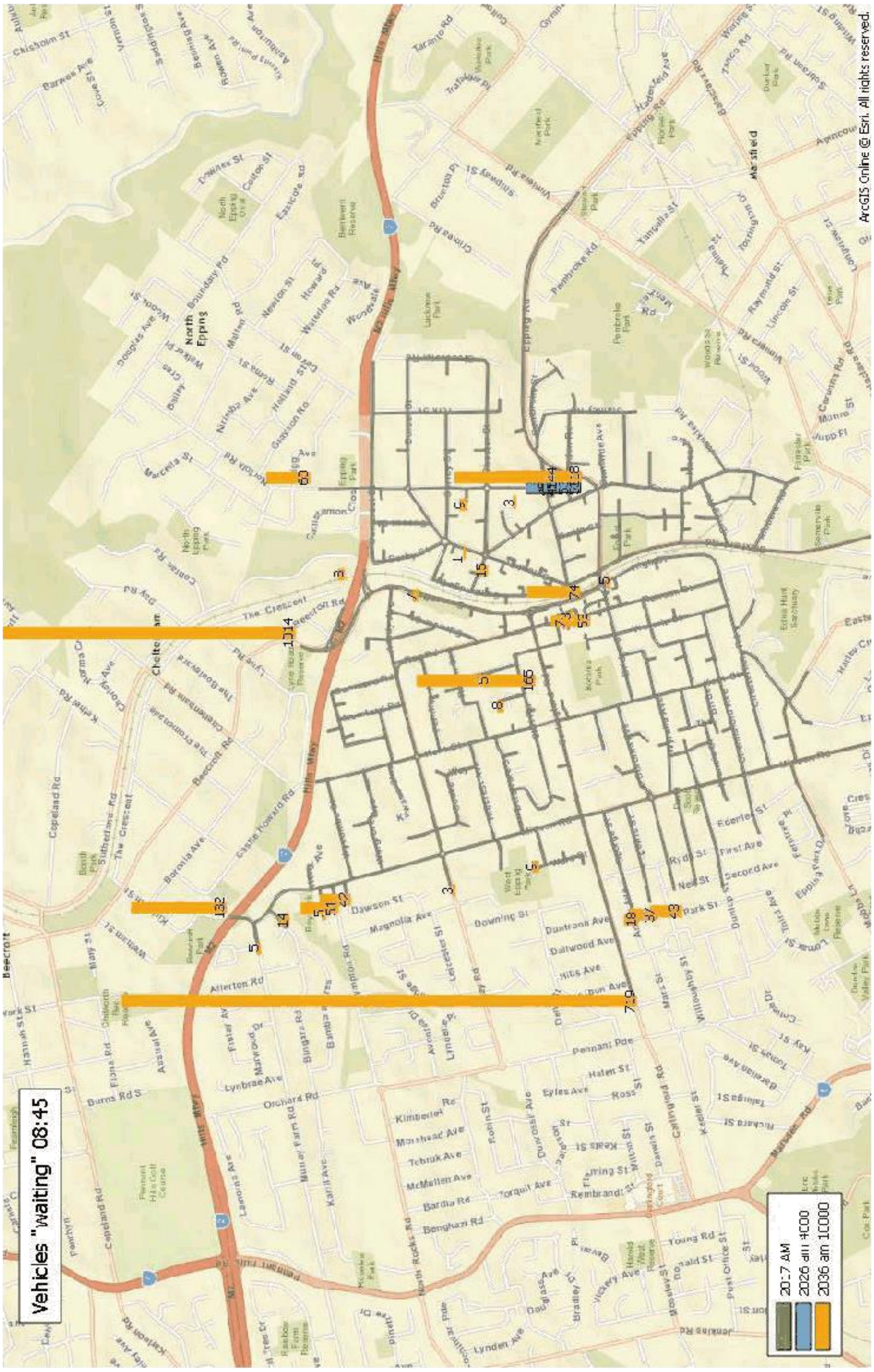

Vehicles "waiting" 08:15
2017 AM
2026 am 5000
2036 am 1000C
ArcGIS Online © Esri. All rights reserved.


Vehicles "waiting" 08:30
2017 AM
2026 am 4000
2036 am 10000
ArcGIS Online © Esri. All rights reserved.


Vehicles "waiting" 08:45
2017 AM
2026 am 4000
2036 am 10000
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Appendix J

2017 SIDRA Results

MOVEMENT SUMMARY

Site: Bridge St [Bridge St]

Network: 2017_netwo [2017_am_base_survey]

Beecroft Rd - Hight St Bridge St
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: High St													
1	L2	49	0.0	49	0.0	0.042	0.9	LOS A	0.2	1.4	0.33	0.17	49.1
Approach		49	0.0	49	0.0	0.042	0.9	NA	0.2	1.4	0.33	0.17	49.1
East: Bridge													
4	L2	85	0.0	85	0.0	0.605	0.0	LOS A	0.0	0.0	0.00	0.00	55.0
5	T1	232	0.0	232	0.0	0.605	0.0	LOS A	0.0	0.0	0.00	0.00	50.3
6	R2	1194	0.0	1194	0.0	0.605	0.1	LOS A	0.0	0.0	0.00	0.00	51.9
Approach		1511	0.0	1511	0.0	0.605	0.1	NA	0.0	0.0	0.00	0.00	52.2
North: Beecroft Rd													
7	L2	2912	0.0	2531	0.0	0.521	0.1	LOS A	30.2	211.5	0.00	0.00	59.8
Approach		2912	0.0	2531 N1	0.0	0.521	0.1	NA	30.2	211.5	0.00	0.00	59.8
West: Bridge St													
10	L2	293	0.0	290	0.0	0.896	29.5	LOS C	7.5	52.5	0.73	1.43	8.9
Approach		293	0.0	290 N1	0.0	0.896	29.5	LOS C	7.5	52.5	0.73	1.43	8.9
All Vehicles		4764	0.0	4381 N1	0.0	0.896	2.0	NA	30.2	211.5	0.05	0.10	51.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option is selected.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 156.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Monday, 23 April 2018 11:15:43 AM
Project: C:\Epping_SIDRA\Epping_2017_am_survey.sip7

MOVEMENT SUMMARY

Site: Beec-Carl [Beecroft-Carlingford]

Network: 2017_netwo [2017_am_base_survey]

Beecroft Rd - Carlingford Rd
Signals - Fixed Time Coordinated Cycle Time = 180 seconds (Network Cycle Time - Program)
Common Control Group: carl [Carlingford Rd]

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Beecroft Rd													
1	L2	593	0.0	592	0.0	0.207	7.0	LOS A	4.3	30.4	0.09	0.56	45.9
2	T1	851	0.0	849	0.0	1.244	306.1	LOS F	76.8	537.4	1.00	1.78	3.9
Approach		1443	0.0	1441 N1	0.0	1.244	183.3	LOS F	76.8	537.4	0.63	1.28	6.3
North: Beecroft Rd													
8	T1	1367	0.0	1367	0.0	1.180	247.1	LOS F	116.6	816.0	1.00	1.66	6.5
9	R2	120	0.0	120	0.0	1.224	305.9	LOS F	21.5	150.2	1.00	1.37	5.3
Approach		1487	0.0	1487	0.0	1.224	251.9	LOS F	116.6	816.0	1.00	1.64	6.4
West: Carlingford Rd													
10	L2	28	0.0	25	0.0	0.019	9.4	LOS A	0.4	2.8	0.21	0.58	22.4
12	R2	1546	0.0	1381	0.0	0.629	20.0	LOS B	16.3	114.2	0.44	0.71	12.9
Approach		1575	0.0	1406 N1	0.0	0.629	19.8	LOS B	16.3	114.2	0.44	0.71	13.0
All Vehicles		4505	0.0	4334 N1	0.0	1.244	153.8	LOS F	116.6	816.0	0.69	1.22	6.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 156.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Monday, 23 April 2018 11:15:43 AM
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MOVEMENT SUMMARY

Site: BridgeRaws [BridgeSt_RawsonSt]

Network: 2017_netwo [2017_am_base_survey]

BridgeSt_RawsonSt
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Rawson St													
1	L2	15	0.0	15	0.0	0.276	5.8	LOS A	1.5	10.7	0.55	0.66	49.1
2	T1	104	0.0	104	0.0	0.276	6.1	LOS A	1.5	10.7	0.55	0.66	46.9
3	R2	139	0.0	139	0.0	0.276	10.7	LOS A	1.5	10.7	0.55	0.66	46.9
Approach		258	0.0	258	0.0	0.276	8.5	LOS A	1.5	10.7	0.55	0.66	47.1
East: Bridge St													
4	L2	64	0.0	64	0.0	0.279	5.5	LOS A	1.7	12.2	0.52	0.59	48.9
5	T1	146	0.0	146	0.0	0.279	5.8	LOS A	1.7	12.2	0.52	0.59	44.5
6	R2	75	0.0	75	0.0	0.279	10.4	LOS A	1.7	12.2	0.52	0.59	30.5
Approach		285	0.0	285	0.0	0.279	6.9	LOS A	1.7	12.2	0.52	0.59	44.1
North: Rawson St													
7	L2	45	0.0	42	0.0	0.280	5.6	LOS A	1.5	10.2	0.41	0.62	44.0
8	T1	143	0.0	134	0.0	0.280	5.8	LOS A	1.5	10.2	0.41	0.62	52.7
9	R2	135	0.0	126	0.0	0.280	10.5	LOS A	1.5	10.2	0.41	0.62	49.4
Approach		323	0.0	302 N1	0.0	0.280	7.7	LOS A	1.5	10.2	0.41	0.62	50.7
West: Bridge St													
10	L2	197	0.0	197	0.0	0.401	5.8	LOS A	2.2	15.6	0.57	0.63	39.3
11	T1	138	0.0	138	0.0	0.401	6.0	LOS A	2.2	15.6	0.57	0.63	39.3
12	R2	28	0.0	28	0.0	0.401	10.7	LOS A	2.2	15.6	0.57	0.63	52.4
Approach		363	0.0	363	0.0	0.401	6.3	LOS A	2.2	15.6	0.57	0.63	41.6
All Vehicles		1229	0.0	1208 N1	0.0	0.401	7.3	LOS A	2.2	15.6	0.51	0.63	46.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 156.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Carlf_Clif [CarlingfordRd_CliffRd]

Network: 2017_netwo [2017_am_base_survey]

CarlingfordRd_CliffRd
Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Carlingford Rd													
5	T1	711	0.0	687	0.0	0.176	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		711	0.0	687[N1]	0.0	0.176	0.0	NA	0.0	0.0	0.00	0.00	60.0
North: RoadName													
7	L2	168	0.0	168	0.0	0.402	8.8	LOS A	0.9	6.4	0.49	0.80	46.8
9	R2	1	0.0	1	0.0	0.010	37.7	LOS C	0.0	0.2	0.90	0.96	27.0
Approach		169	0.0	169	0.0	0.402	8.9	LOS A	0.9	6.4	0.49	0.81	46.6
West: Carlingford Rd													
10	L2	9	0.0	9	0.0	0.232	5.6	LOS A	18.8	131.5	0.00	0.01	57.9
11	T1	895	0.0	895	0.0	0.232	0.0	LOS A	26.4	185.0	0.00	0.01	59.8
Approach		904	0.0	904	0.0	0.232	0.1	NA	26.4	185.0	0.00	0.01	59.7
All Vehicles		1784	0.0	1761[N1]	0.0	0.402	0.9	NA	26.4	185.0	0.05	0.08	56.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 156.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Carli_Kent [CarlingfordRd_KentSt]

Network: 2017_netwo [2017_am_base_survey]

CarlingfordRd_KentSt
Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Kent St													
1	L2	73	0.0	73	0.0	0.074	6.9	LOS A	0.3	1.9	0.37	0.63	45.4
3	R2	27	0.0	27	0.0	0.380	69.3	LOS E	1.2	8.5	0.95	1.02	14.4
Approach		100	0.0	100	0.0	0.380	24.0	LOS B	1.2	8.5	0.53	0.73	28.6
East: Carlingford Rd													
4	L2	44	0.0	43	0.0	0.183	5.6	LOS A	0.0	0.0	0.00	0.07	56.8
5	T1	684	0.0	667	0.0	0.183	0.0	LOS A	0.0	0.0	0.00	0.03	59.1
Approach		728	0.0	710 N1	0.0	0.183	0.3	NA	0.0	0.0	0.00	0.04	58.8
North: Kent St													
7	L2	83	0.0	83	0.0	0.095	7.7	LOS A	0.4	2.7	0.46	0.67	48.0
Approach		83	0.0	83	0.0	0.095	7.7	LOS A	0.4	2.7	0.46	0.67	48.0
West: Carlingford Rd													
11	T1	849	0.0	849	0.0	0.229	0.2	LOS A	49.3	345.4	0.04	0.01	59.2
12	R2	15	0.0	15	0.0	0.229	10.7	LOS A	49.3	345.4	0.08	0.02	57.1
Approach		864	0.0	864	0.0	0.229	0.4	NA	49.3	345.4	0.04	0.01	59.1
All Vehicles		1776	0.0	1757 N1	0.0	0.380	2.1	NA	49.3	345.4	0.07	0.09	55.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 156.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Carl_Mids [CarlingfordRd_MidsonRd]

Network: 2017_netwo [2017_am_base_survey]

CarlingfordRd_MidsonRd
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Midson Rd													
1	L2	58	0.0	58	0.0	0.965	104.4	LOS F	25.0	175.1	1.00	1.14	19.5
2	T1	362	0.0	362	0.0	0.965	99.0	LOS F	25.0	175.1	1.00	1.13	19.7
3	R2	123	0.0	123	0.0	0.965	104.7	LOS F	24.7	173.2	1.00	1.13	9.5
Approach		543	0.0	543	0.0	0.965	100.8	LOS F	25.0	175.1	1.00	1.13	17.7
East: RoadName													
4	L2	58	0.0	56	0.0	0.969	104.2	LOS F	30.1	210.5	1.00	1.16	18.6
5	T1	566	0.0	551	0.0	0.969	98.8	LOS F	30.1	210.5	1.00	1.15	22.0
6	R2	164	0.0	160	0.0	0.496	66.4	LOS E	10.7	74.7	0.95	0.81	27.4
Approach		788	0.0	767 N1	0.0	0.969	92.4	LOS F	30.1	210.5	0.99	1.08	22.7
North: RoadName													
7	L2	22	0.0	22	0.0	0.778	67.0	LOS E	23.6	165.1	1.00	0.90	20.1
8	T1	311	0.0	311	0.0	0.778	61.5	LOS E	23.6	165.1	1.00	0.90	26.6
9	R2	407	0.0	407	0.0	0.997	116.0	LOS F	40.8	285.8	1.00	1.08	20.5
Approach		740	0.0	740	0.0	0.997	91.6	LOS F	40.8	285.8	1.00	1.00	22.4
West: RoadName													
10	L2	71	0.0	71	0.0	0.772	57.3	LOS E	29.9	209.5	0.98	0.87	31.7
11	T1	701	0.0	701	0.0	0.772	50.8	LOS D	29.9	209.5	0.94	0.84	22.6
12	R2	407	0.0	407	0.0	1.003	120.2	LOS F	43.0	300.7	1.00	1.08	17.2
Approach		1179	0.0	1179	0.0	1.003	75.1	LOS F	43.0	300.7	0.96	0.93	20.4
All Vehicles		3251	0.0	3229 N1	0.0	1.003	87.3	LOS F	43.0	300.7	0.98	1.01	21.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 156.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	61.8	LOS F	0.2	0.2	0.91	0.91
P2	East Full Crossing	53	58.2	LOS E	0.2	0.2	0.88	0.88
P3	North Full Crossing	53	45.7	LOS E	0.2	0.2	0.78	0.78
P4	West Full Crossing	53	68.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		211	58.5	LOS E			0.88	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

MOVEMENT SUMMARY

Site: Rawson [Carlingford Rd - Ray St - Rawson St]

Network: 2017_netwo [2017_am_base_survey]

Carlingford Rd - Ray St - Rawson St
Signals - Fixed Time Coordinated Cycle Time = 180 seconds (Network Cycle Time - Program)
Common Control Group: carl [Carlingford Rd]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Rawson St													
1	L2	77	0.0	77	0.0	0.524	52.8	LOS D	11.4	79.5	0.79	0.71	17.7
2	T1	100	0.0	100	0.0	0.524	47.2	LOS D	11.4	79.5	0.79	0.71	17.7
3	R2	132	0.0	132	0.0	5.771	4328.6	LOS F	57.9	405.3	1.00	1.79	0.3
Approach		308	0.0	308	0.0	5.771	1875.1	LOS F	57.9	405.3	0.88	1.17	0.6
East: Carlingford Rd													
4	L2	103	0.0	100	0.0	0.287	21.3	LOS B	11.1	77.9	0.42	0.47	13.4
5	T1	584	0.0	566	0.0	0.287	19.2	LOS B	16.3	114.2	0.54	0.52	12.4
Approach		687	0.0	666 N1	0.0	0.287	19.5	LOS B	16.3	114.2	0.53	0.51	12.6
North: Ray St													
7	L2	301	0.0	301	0.0	1.249	325.4	LOS F	23.3	163.2	1.00	1.40	1.2
8	T1	258	0.0	258	0.0	1.083	188.4	LOS F	23.3	163.2	1.00	1.37	2.1
9	R2	11	0.0	11	0.0	1.083	193.9	LOS F	23.3	163.2	1.00	1.37	2.1
Approach		569	0.0	569	0.0	1.249	260.9	LOS F	23.3	163.2	1.00	1.39	1.5
West: Carlingford Rd													
10	L2	12	0.0	12	0.0	0.897	58.9	LOS E	23.3	163.2	0.94	0.98	6.9
11	T1	1062	0.0	1062	0.0	0.897	52.9	LOS D	23.3	163.2	0.94	0.98	7.0
Approach		1074	0.0	1074	0.0	0.897	53.0	LOS D	23.3	163.2	0.94	0.98	7.0
All Vehicles		2639	0.0	2617 N1	0.0	5.771	304.4	LOS F	57.9	405.3	0.84	0.97	1.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 156.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Blaxland [Epping_Blaxland]

Network: 2017_netwo [2017_am_base_survey]

New Site
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Practical Cycle Time)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Blaxland Rd													
1	L2	451	0.0	451	0.0	0.369	17.8	LOS B	5.0	34.7	0.75	0.77	18.8
2	T1	114	0.0	114	0.0	0.860	53.8	LOS D	5.8	40.4	1.00	0.97	15.2
Approach		564	0.0	564	0.0	0.860	25.1	LOS B	5.8	40.4	0.80	0.81	17.3
East: Epping Rd													
4	L2	12	0.0	12	0.0	0.821	44.9	LOS D	18.8	131.5	1.00	0.97	15.0
5	T1	806	0.0	806	0.0	0.821	39.4	LOS C	18.8	131.7	1.00	0.97	15.0
Approach		818	0.0	818	0.0	0.821	39.5	LOS C	18.8	131.7	1.00	0.97	15.0
North: Landston Place													
7	L2	15	0.0	15	0.0	0.867	58.4	LOS E	7.4	51.6	1.00	0.99	9.8
8	T1	71	0.0	71	0.0	0.867	52.9	LOS D	7.4	51.6	1.00	0.99	9.8
9	R2	204	0.0	204	0.0	0.867	58.6	LOS E	7.4	51.6	1.00	0.99	9.5
Approach		289	0.0	289	0.0	0.867	57.2	LOS E	7.4	51.6	1.00	0.99	9.6
West: Bridge St													
10	L2	349	0.0	302	0.0	0.245	5.6	LOS A	2.1	14.4	0.25	0.62	41.5
11	T1	1996	0.0	1725	0.0	0.882	24.7	LOS B	14.0	97.9	0.80	0.86	9.8
12	R2	528	0.0	457	0.0	0.881	48.2	LOS D	14.0	97.9	1.00	1.07	5.3
Approach		2874	0.0	2483 N1	0.0	0.882	26.7	LOS B	14.0	97.9	0.77	0.87	10.9
All Vehicles		4545	0.0	4155 N1	0.0	0.882	31.1	LOS C	18.8	131.7	0.84	0.89	12.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 156.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Essex St [Essex St]

Network: 2017_netwo [2017_am_base_survey]

Epping Essex St
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Practical Cycle Time)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Essex St													
1	L2	41	0.0	41	0.0	0.843	62.5	LOS E	7.1	49.5	1.00	0.95	6.4
2	T1	111	0.0	111	0.0	0.843	57.0	LOS E	7.1	49.5	1.00	0.95	12.0
3	R2	104	0.0	104	0.0	0.843	62.7	LOS E	6.9	48.4	1.00	0.95	6.1
Approach		256	0.0	256	0.0	0.843	60.2	LOS E	7.1	49.5	1.00	0.95	8.8
East: Epping Rd													
4	L2	23	0.0	23	0.0	0.325	13.6	LOS A	5.5	38.4	0.62	0.55	41.5
5	T1	615	0.0	615	0.0	0.325	8.1	LOS A	5.5	38.4	0.62	0.54	41.8
6	R2	1	0.0	1	0.0	0.325	13.6	LOS A	5.4	37.9	0.62	0.53	43.9
Approach		639	0.0	639	0.0	0.325	8.3	LOS A	5.5	38.4	0.62	0.54	41.7
North: Essex St													
7	L2	7	0.0	7	0.0	0.195	44.5	LOS D	2.7	19.1	0.90	0.69	14.8
8	T1	141	0.0	141	0.0	0.840	45.9	LOS D	14.3	99.9	0.96	0.86	16.9
9	R2	184	0.0	184	0.0	0.840	56.2	LOS D	14.3	99.9	1.00	0.97	11.5
Approach		333	0.0	333	0.0	0.840	51.6	LOS D	14.3	99.9	0.98	0.91	13.9
West: Epping Rd													
10	L2	29	0.0	26	0.0	0.888	27.9	LOS B	28.0	195.8	0.97	0.97	23.9
11	T1	1972	0.0	1707	0.0	0.888	22.5	LOS B	28.0	195.8	0.97	0.97	15.9
12	R2	15	0.0	13	0.0	0.888	28.2	LOS B	28.0	195.8	0.97	0.97	21.5
Approach		2016	0.0	1745 N1	0.0	0.888	22.6	LOS B	28.0	195.8	0.97	0.97	16.1
All Vehicles		3243	0.0	2972 N1	0.0	0.888	26.0	LOS B	28.0	195.8	0.90	0.87	18.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 156.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Forrest Gr [Forrest Grove] **Network: 2017_netwo [2017_am_base_survey]**

Epping Rd Forrest Grove
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Forrest Grove													
1	L2	28	0.0	28	0.0	0.031	7.4	LOS A	0.1	0.9	0.42	0.61	29.1
3	R2	1	0.0	1	0.0	0.271	518.5	LOS F	0.3	2.3	0.99	1.00	0.8
Approach		29	0.0	29	0.0	0.271	25.6	LOS B	0.3	2.3	0.44	0.63	12.8
East: Epping Rd													
4	L2	8	0.0	8	0.0	0.216	5.5	LOS A	0.0	0.0	0.00	0.01	59.1
5	T1	835	0.0	835	0.0	0.216	0.0	LOS A	0.0	0.0	0.00	0.01	59.5
Approach		843	0.0	843	0.0	0.216	0.1	NA	0.0	0.0	0.00	0.01	59.5
West: Epping Rd													
11	T1	1997	0.0	1727	0.0	0.458	0.2	LOS A	2.6	18.2	0.04	0.01	54.6
12	R2	23	0.0	20	0.0	0.458	11.8	LOS A	2.6	18.2	0.07	0.01	49.9
Approach		2020	0.0	1747 N1	0.0	0.458	0.4	NA	2.6	18.2	0.04	0.01	54.5
All Vehicles		2893	0.0	2619 N1	0.0	0.458	0.6	NA	2.6	18.2	0.03	0.01	54.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 156.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Eppimg_Pem [EppingRd_PembrokeSt] **Network: 2017_netwo [2017_am_base_survey]**

EppingRd_PembrokeSt
Signals - Fixed Time Coordinated Cycle Time = 180 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Epping Rd													
1	L2	22	0.0	19	0.0	0.565	10.8	LOS A	25.1	175.4	0.35	0.34	49.5
2	T1	2067	0.0	1804	0.0	0.565	5.2	LOS A	25.1	175.6	0.35	0.34	54.1
Approach		2089	0.0	1824[N1]	0.0	0.565	5.3	LOS A	25.1	175.6	0.35	0.34	54.1
North: Epping Rd													
8	T1	635	0.0	635	0.0	0.197	3.3	LOS A	5.5	38.7	0.22	0.19	54.2
9	R2	208	0.0	208	0.0	2.057	1089.8	LOS F	70.3	491.8	1.00	2.08	2.4
Approach		843	0.0	843	0.0	2.057	271.9	LOS F	70.3	491.8	0.41	0.66	6.6
West: Pembroke St													
10	L2	411	0.0	411	0.0	1.047	164.0	LOS F	25.8	180.3	1.00	1.10	12.7
Approach		411	0.0	411	0.0	1.047	164.0	LOS F	25.8	180.3	1.00	1.10	12.7
All Vehicles		3343	0.0	3077[N1]	0.0	2.057	99.5	LOS F	70.3	491.8	0.46	0.53	18.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 156.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Average Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	83.3	LOS F	0.3	0.3	0.96	0.96
P3	North Full Crossing	53	84.3	LOS F	0.3	0.3	0.97	0.97
P4	West Full Crossing	53	4.5	LOS A	0.1	0.1	0.22	0.22
All Pedestrians		158	57.4	LOS E			0.72	0.72

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: Smith St [Smith St]

Network: 2017_netwo [2017_am_base_survey]

Epping Rd - Smith St

Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Epping Rd													
5	T1	861	0.0	861	0.0	0.226	0.4	LOS A	0.3	2.3	0.02	0.00	53.6
6	R2	2	0.0	2	0.0	0.226	30.8	LOS C	0.3	2.3	0.04	0.00	51.2
Approach		863	0.0	863	0.0	0.226	0.5	NA	0.3	2.3	0.02	0.00	53.6
North: Smith St													
7	L2	2	0.0	2	0.0	0.005	11.1	LOS A	0.0	0.1	0.62	0.68	31.9
9	R2	6	0.0	6	0.0	0.494	391.0	LOS F	1.3	9.0	0.99	1.02	1.9
Approach		8	0.0	8	0.0	0.494	296.0	LOS F	1.3	9.0	0.90	0.93	2.5
West: Epping Rd													
10	L2	7	0.0	6	0.0	0.452	5.6	LOS A	45.7	320.2	0.00	0.00	56.0
11	T1	2018	0.0	1758	0.0	0.452	0.0	LOS A	45.7	320.2	0.00	0.00	59.8
Approach		2025	0.0	1764 N1	0.0	0.452	0.0	NA	45.7	320.2	0.00	0.00	59.7
All Vehicles		2897	0.0	2636 N1	0.0	0.494	1.1	NA	45.7	320.2	0.01	0.00	53.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 156.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: Bridge St [Bridge St]

Network: 2017_netwo [2017_pm_base_survey]

Beecroft Rd - Hight St Bridge St
Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: High St													
1	L2	47	0.0	47	0.0	0.048	1.9	LOS A	0.2	1.5	0.45	0.29	48.4
Approach		47	0.0	47	0.0	0.048	1.9	NA	0.2	1.5	0.45	0.29	48.4
East: Bridge													
4	L2	97	0.0	90	0.0	0.650	0.0	LOS A	2.6	18.1	0.00	0.00	54.3
5	T1	447	0.0	414	0.0	0.650	0.0	LOS A	2.6	18.1	0.00	0.00	47.7
6	R2	2084	0.0	1929	0.0	0.650	0.1	LOS A	14.0	97.9	0.00	0.00	52.6
Approach		2628	0.0	2433 N1	0.0	0.650	0.1	NA	14.0	97.9	0.00	0.00	52.1
North: Beecroft Rd													
7	L2	1444	0.0	1411	0.0	0.290	0.0	LOS A	13.8	96.4	0.00	0.00	59.9
Approach		1444	0.0	1411 N1	0.0	0.290	0.0	NA	13.8	96.4	0.00	0.00	59.9
West: Bridge St													
10	L2	261	0.0	258	0.0	0.776	15.6	LOS B	4.2	29.2	0.68	1.02	13.4
Approach		261	0.0	258 N1	0.0	0.776	15.6	LOS B	4.2	29.2	0.68	1.02	13.4
All Vehicles		4381	0.0	4149 N1	0.0	0.776	1.0	NA	14.0	97.9	0.05	0.07	51.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option is selected.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 197.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Beec-Carl [Beecroft-Carlingford]

Network: 2017_netwo [2017_pm_base_survey]

Beecroft Rd - Carlingford Rd
Signals - Fixed Time Coordinated Cycle Time = 180 seconds (Network Cycle Time - Program)
Common Control Group: carl [Carlingford Rd]

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Beecroft Rd													
1	L2	953	0.0	889	0.0	0.387	8.0	LOS A	19.1	133.4	0.10	0.57	44.4
2	T1	1378	0.0	1285	0.0	1.111	191.7	LOS F	81.6	571.2	1.00	1.49	6.1
Approach		2331	0.0	2174 N1	0.0	1.111	116.6	LOS F	81.6	571.2	0.63	1.11	9.4
North: Beecroft Rd													
8	T1	608	0.0	608	0.0	0.267	19.3	LOS B	12.8	89.6	0.53	0.46	37.0
9	R2	191	0.0	191	0.0	1.097	207.5	LOS F	28.2	197.7	1.00	1.23	7.6
Approach		799	0.0	799	0.0	1.097	64.2	LOS E	28.2	197.7	0.64	0.64	19.3
West: Carlingford Rd													
10	L2	84	0.0	84	0.0	0.083	17.8	LOS B	2.2	15.3	0.34	0.63	14.4
12	R2	777	0.0	773	0.0	0.639	32.5	LOS C	16.3	114.2	0.62	0.75	8.7
Approach		861	0.0	857 N1	0.0	0.639	31.1	LOS C	16.3	114.2	0.59	0.74	9.0
All Vehicles		3991	0.0	3830 N1	0.0	1.111	86.5	LOS F	81.6	571.2	0.63	0.93	11.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 197.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Smith St [Smith St]

Network: 2017_netwo [2017_pm_base_survey]

Epping Rd - Smith St

Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Epping Rd													
5	T1	1726	0.0	1556	0.0	0.401	0.0	LOS A	11.7	81.6	0.00	0.00	59.2
6	R2	2	0.0	2	0.0	0.401	13.4	LOS A	11.7	81.6	0.01	0.00	53.8
Approach		1728	0.0	1558 N1	0.0	0.401	0.1	NA	11.7	81.6	0.00	0.00	59.2
North: Smith St													
7	L2	5	0.0	5	0.0	0.006	7.4	LOS A	0.0	0.1	0.43	0.59	37.9
9	R2	5	0.0	5	0.0	1.041	824.0	LOS F	1.7	11.6	1.00	1.10	0.9
Approach		11	0.0	11	0.0	1.041	415.7	LOS F	1.7	11.6	0.71	0.84	1.7
West: Epping Rd													
10	L2	24	0.0	24	0.0	0.231	5.5	LOS A	0.0	0.0	0.00	0.03	55.5
11	T1	896	0.0	878	0.0	0.231	0.0	LOS A	0.0	0.0	0.00	0.02	59.3
Approach		920	0.0	901 N1	0.0	0.231	0.2	NA	0.0	0.0	0.00	0.02	59.1
All Vehicles		2659	0.0	2470 N1	0.0	1.041	1.9	NA	11.7	81.6	0.01	0.01	47.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 197.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: BridgeRaws [BridgeSt_RawsonSt]

Network: 2017_netwo [2017_pm_base_survey]

BridgeSt_RawsonSt
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Rawson St													
1	L2	40	0.0	40	0.0	0.299	7.2	LOS A	2.0	13.8	0.69	0.75	48.4
2	T1	111	0.0	111	0.0	0.299	7.4	LOS A	2.0	13.8	0.69	0.75	46.1
3	R2	116	0.0	116	0.0	0.299	12.0	LOS A	2.0	13.8	0.69	0.75	46.1
Approach		266	0.0	266	0.0	0.299	9.4	LOS A	2.0	13.8	0.69	0.75	46.5
East: Bridge St													
4	L2	52	0.0	48	0.0	0.390	5.5	LOS A	2.9	20.3	0.54	0.59	48.7
5	T1	308	0.0	288	0.0	0.390	5.7	LOS A	2.9	20.3	0.54	0.59	44.2
6	R2	125	0.0	117	0.0	0.390	10.3	LOS A	2.9	20.3	0.54	0.59	30.4
Approach		485	0.0	453 N1	0.0	0.390	6.9	LOS A	2.9	20.3	0.54	0.59	42.9
North: Rawson St													
7	L2	63	0.0	61	0.0	0.253	5.2	LOS A	1.3	9.1	0.39	0.61	44.2
8	T1	97	0.0	94	0.0	0.253	5.4	LOS A	1.3	9.1	0.39	0.61	52.8
9	R2	137	0.0	132	0.0	0.253	10.1	LOS A	1.3	9.1	0.39	0.61	49.6
Approach		297	0.0	287 N1	0.0	0.253	7.5	LOS A	1.3	9.1	0.39	0.61	50.2
West: Bridge St													
10	L2	172	0.0	172	0.0	0.290	5.8	LOS A	1.8	12.8	0.57	0.63	39.3
11	T1	103	0.0	103	0.0	0.290	6.1	LOS A	1.8	12.8	0.57	0.63	39.3
12	R2	25	0.0	25	0.0	0.290	10.7	LOS A	1.8	12.8	0.57	0.63	52.4
Approach		300	0.0	300	0.0	0.290	6.3	LOS A	1.8	12.8	0.57	0.63	41.7
All Vehicles		1348	0.0	1306 N1	0.0	0.390	7.4	LOS A	2.9	20.3	0.54	0.64	45.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 197.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Carlf_Clif [CarlingfordRd_CliffRd] **Network: 2017_netwo [2017_pm_base_survey]**

CarlingfordRd_CliffRd
Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Carlingford Rd													
5	T1	1133	0.0	1042	0.0	0.267	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1133	0.0	1042 N1	0.0	0.267	0.0	NA	0.0	0.0	0.00	0.00	59.9
North: RoadName													
7	L2	25	0.0	25	0.0	0.050	6.7	LOS A	0.1	0.6	0.34	0.60	49.0
9	R2	21	0.0	21	0.0	0.160	33.6	LOS C	0.5	3.5	0.90	0.96	28.8
Approach		46	0.0	46	0.0	0.160	18.9	LOS B	0.5	3.5	0.59	0.76	37.1
West: Carlingford Rd													
10	L2	7	0.0	7	0.0	0.147	5.5	LOS A	6.9	48.5	0.00	0.02	57.9
11	T1	564	0.0	564	0.0	0.147	0.0	LOS A	7.5	52.2	0.00	0.01	59.8
Approach		572	0.0	572	0.0	0.147	0.1	NA	7.5	52.2	0.00	0.01	59.7
All Vehicles		1751	0.0	1660 N1	0.0	0.267	0.6	NA	7.5	52.2	0.02	0.02	57.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 197.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Carli_Kent [CarlingfordRd_KentSt]

Network: 2017_netwo [2017_pm_base_survey]

CarlingfordRd_KentSt
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Kent St													
1	L2	96	0.0	96	0.0	0.120	8.1	LOS A	0.4	3.0	0.48	0.72	43.9
3	R2	19	0.0	19	0.0	0.294	70.5	LOS F	0.9	6.3	0.95	1.00	14.2
Approach		115	0.0	115	0.0	0.294	18.4	LOS B	0.9	6.3	0.56	0.77	32.6
East: Carlingford Rd													
4	L2	43	0.0	39	0.0	0.267	5.6	LOS A	0.0	0.0	0.00	0.05	57.1
5	T1	1096	0.0	1001	0.0	0.267	0.0	LOS A	0.0	0.0	0.00	0.02	59.4
Approach		1139	0.0	1040 N1	0.0	0.267	0.2	NA	0.0	0.0	0.00	0.02	59.2
North: Kent St													
7	L2	2	0.0	2	0.0	0.002	7.0	LOS A	0.0	0.1	0.39	0.54	48.7
Approach		2	0.0	2	0.0	0.002	7.0	LOS A	0.0	0.1	0.39	0.54	48.7
West: Carlingford Rd													
11	T1	576	0.0	576	0.0	0.192	1.4	LOS A	31.6	220.9	0.15	0.04	56.0
12	R2	37	0.0	37	0.0	0.192	14.7	LOS B	31.6	220.9	0.42	0.12	52.1
Approach		613	0.0	613	0.0	0.192	2.2	NA	31.6	220.9	0.17	0.05	55.5
All Vehicles		1868	0.0	1770 N1	0.0	0.294	2.1	NA	31.6	220.9	0.09	0.08	55.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 197.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Carl_Mids [CarlingfordRd_MidsonRd]

Network: 2017_netwo [2017_pm_base_survey]

CarlingfordRd_MidsonRd
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Midson Rd													
1	L2	89	0.0	89	0.0	0.875	58.7	LOS E	16.7	116.9	1.00	1.02	27.9
2	T1	429	0.0	429	0.0	0.875	53.1	LOS D	16.7	116.9	1.00	1.02	28.4
3	R2	86	0.0	86	0.0	0.875	58.7	LOS E	16.7	116.9	1.00	1.02	15.6
Approach		605	0.0	605	0.0	0.875	54.7	LOS D	16.7	116.9	1.00	1.02	27.0
East: RoadName													
4	L2	55	0.0	50	0.0	0.905	57.8	LOS E	27.3	190.9	1.00	1.09	27.3
5	T1	935	0.0	850	0.0	0.905	52.2	LOS D	27.3	190.9	1.00	1.09	31.3
6	R2	211	0.0	191	0.0	0.382	37.8	LOS C	7.7	53.7	0.86	0.79	35.5
Approach		1200	0.0	1092 N1	0.0	0.905	49.9	LOS D	27.3	190.9	0.97	1.03	31.8
North: RoadName													
7	L2	27	0.0	27	0.0	0.601	49.6	LOS D	8.2	57.4	0.98	0.80	24.6
8	T1	262	0.0	262	0.0	0.601	44.1	LOS D	8.2	57.4	0.98	0.80	31.2
9	R2	58	0.0	58	0.0	0.601	49.7	LOS D	8.1	57.0	0.98	0.80	33.8
Approach		347	0.0	347	0.0	0.601	45.5	LOS D	8.2	57.4	0.98	0.80	31.3
West: RoadName													
10	L2	53	0.0	53	0.0	0.851	57.6	LOS E	14.1	99.0	1.00	0.99	31.6
11	T1	476	0.0	476	0.0	0.851	52.0	LOS D	14.3	99.9	1.00	0.99	22.3
12	R2	225	0.0	225	0.0	0.758	52.6	LOS D	11.3	79.1	1.00	0.88	28.4
Approach		754	0.0	754	0.0	0.851	52.6	LOS D	14.3	99.9	1.00	0.96	25.2
All Vehicles		2906	0.0	2798 N1	0.0	0.905	51.1	LOS D	27.3	190.9	0.99	0.98	29.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 197.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	36.2	LOS D	0.1	0.1	0.85	0.85
P2	East Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94
P3	North Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94
P4	West Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		211	42.3	LOS E			0.92	0.92

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

MOVEMENT SUMMARY

Site: Rawson [Carlingford Rd - Ray St - Rawson St]

Network: 2017_netwo [2017_pm_base_survey]

Carlingford Rd - Ray St - Rawson St
Signals - Fixed Time Coordinated Cycle Time = 180 seconds (Network Cycle Time - Program)
Common Control Group: carl [Carlingford Rd]

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Rawson St													
1	L2	109	0.0	107	0.0	0.590	25.0	LOS B	11.7	81.7	0.53	0.56	29.4
2	T1	173	0.0	168	0.0	0.590	19.5	LOS B	11.7	81.7	0.53	0.56	29.4
3	R2	142	0.0	139	0.0	3.373	2190.4	LOS F	54.0	378.1	1.00	1.96	0.5
Approach		424	0.0	414 N1	0.0	3.373	748.1	LOS F	54.0	378.1	0.69	1.03	1.6
East: Carlingford Rd													
4	L2	108	0.0	100	0.0	0.754	59.5	LOS E	16.3	114.2	0.92	0.83	5.1
5	T1	1005	0.0	925	0.0	0.754	54.8	LOS D	16.3	114.2	0.95	0.85	5.2
Approach		1114	0.0	1024 N1	0.0	0.754	55.2	LOS D	16.3	114.2	0.94	0.85	5.2
North: Ray St													
7	L2	171	0.0	170	0.0	0.456	26.3	LOS B	9.0	63.3	0.56	0.70	12.9
8	T1	132	0.0	132	0.0	1.236	241.0	LOS F	23.3	163.2	0.90	1.25	1.6
9	R2	35	0.0	35	0.0	1.236	311.0	LOS F	23.3	163.2	1.00	1.41	1.3
Approach		337	0.0	337	0.0	1.236	139.5	LOS F	23.3	163.2	0.74	0.99	2.7
West: Carlingford Rd													
10	L2	23	0.0	23	0.0	0.895	87.2	LOS F	23.3	163.2	1.00	1.05	4.7
11	T1	598	0.0	598	0.0	0.895	82.0	LOS F	23.3	163.2	1.00	1.06	4.7
Approach		621	0.0	621	0.0	0.895	82.2	LOS F	23.3	163.2	1.00	1.06	4.7
All Vehicles		2496	0.0	2396 N1	0.0	3.373	193.8	LOS F	54.0	378.1	0.89	0.95	2.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 197.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Blaxland [Epping_Blaxland]

Network: 2017_netwo [2017_pm_base_survey]

New Site
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Blaxland Rd													
1	L2	586	0.0	586	0.0	0.903	82.2	LOS F	20.0	140.0	1.00	1.11	5.4
2	T1	43	0.0	43	0.0	0.635	83.2	LOS F	3.4	23.7	1.00	0.78	10.8
Approach		629	0.0	629	0.0	0.903	82.2	LOS F	20.0	140.0	1.00	1.08	5.8
East: Epping Rd													
4	L2	2	0.0	2	0.0	0.989	83.9	LOS F	46.6	326.4	1.00	1.16	8.6
5	T1	1692	0.0	1521	0.0	0.989	85.6	LOS F	46.6	326.4	1.00	1.20	8.0
Approach		1694	0.0	1523 N1	0.0	0.989	85.6	LOS F	46.6	326.4	1.00	1.20	8.0
North: Landston Place													
7	L2	4	0.0	4	0.0	0.962	105.5	LOS F	17.4	121.5	1.00	1.08	5.7
8	T1	35	0.0	35	0.0	0.962	100.0	LOS F	17.4	121.5	1.00	1.08	5.7
9	R2	248	0.0	248	0.0	0.962	109.7	LOS F	17.4	121.5	1.00	1.08	5.4
Approach		287	0.0	287	0.0	0.962	108.5	LOS F	17.4	121.5	1.00	1.08	5.5
West: Bridge St													
10	L2	298	0.0	291	0.0	0.215	4.9	LOS A	1.6	11.1	0.13	0.58	42.9
11	T1	834	0.0	815	0.0	0.358	7.3	LOS A	12.2	85.1	0.38	0.33	23.8
12	R2	283	0.0	277	0.0	0.997	119.6	LOS F	14.0	97.9	1.00	1.21	2.3
Approach		1415	0.0	1384 N1	0.0	0.997	29.3	LOS C	14.0	97.9	0.45	0.56	11.3
All Vehicles		4025	0.0	3823 N1	0.0	0.997	66.4	LOS E	46.6	326.4	0.80	0.94	7.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 197.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Essex St [Essex St]

Network: 2017_netwo [2017_pm_base_survey]

Epping Essex St
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles														
Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Essex St													
1	L2	173	0.0	173	0.0	1.073	175.9	LOS F	21.6	151.1	1.00	1.23	2.2
2	T1	219	0.0	219	0.0	1.064	156.3	LOS F	30.0	209.9	1.00	1.34	5.0
3	R2	36	0.0	36	0.0	1.064	161.9	LOS F	30.0	209.9	1.00	1.34	2.5
Approach		427	0.0	427	0.0	1.073	164.7	LOS F	30.0	209.9	1.00	1.29	3.7
East: Epping Rd													
4	L2	6	0.0	6	0.0	1.034	116.9	LOS F	44.9	314.6	1.00	1.29	9.3
5	T1	1098	0.0	1098	0.0	1.034	108.5	LOS F	52.7	369.2	1.00	1.29	7.6
6	R2	1	0.0	1	0.0	1.034	111.7	LOS F	52.7	369.2	1.00	1.30	10.3
Approach		1105	0.0	1105	0.0	1.034	108.5	LOS F	52.7	369.2	1.00	1.29	7.6
North: Essex St													
7	L2	3	0.0	3	0.0	0.246	63.2	LOS E	5.3	36.8	0.91	0.71	11.0
8	T1	92	0.0	92	0.0	1.062	70.8	LOS F	25.1	175.6	0.92	0.78	12.5
9	R2	197	0.0	197	0.0	1.062	165.1	LOS F	25.1	175.6	1.00	1.22	4.3
Approach		292	0.0	292	0.0	1.062	134.4	LOS F	25.1	175.6	0.97	1.07	5.9
West: Epping Rd													
10	L2	18	0.0	18	0.0	0.513	19.5	LOS B	12.4	86.7	0.73	0.65	30.2
11	T1	768	0.0	754	0.0	0.513	17.6	LOS B	12.4	86.7	0.78	0.68	18.9
12	R2	18	0.0	18	0.0	0.513	29.3	LOS C	10.1	70.7	0.87	0.74	20.8
Approach		804	0.0	790 N1	0.0	0.513	17.9	LOS B	12.4	86.7	0.78	0.68	19.3
All Vehicles		2628	0.0	2614 N1	0.0	1.073	93.2	LOS F	52.7	369.2	0.93	1.08	7.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 197.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Monday, 23 April 2018 1:33:26 PM
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MOVEMENT SUMMARY

Site: Eppimg_Pem [EppingRd_PembrokeSt] **Network: 2017_netwo [2017_pm_base_survey]**

EppingRd_PembrokeSt
Signals - Fixed Time Coordinated Cycle Time = 180 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Epping Rd													
1	L2	13	0.0	12	0.0	0.251	9.0	LOS A	7.5	52.3	0.23	0.22	51.6
2	T1	815	0.0	799	0.0	0.251	3.5	LOS A	7.5	52.3	0.23	0.22	55.9
Approach		827	0.0	811 N1	0.0	0.251	3.6	LOS A	7.5	52.3	0.23	0.22	55.8
North: Epping Rd													
8	T1	1095	0.0	1095	0.0	0.631	5.9	LOS A	17.2	120.2	0.39	0.37	50.3
9	R2	207	0.0	207	0.0	0.434	12.4	LOS A	6.0	41.8	0.35	0.69	45.7
Approach		1302	0.0	1302	0.0	0.631	6.9	LOS A	17.2	120.2	0.39	0.42	49.3
West: Pembroke St													
10	L2	208	0.0	208	0.0	0.532	89.1	LOS F	8.8	61.8	0.99	0.79	20.0
Approach		208	0.0	208	0.0	0.532	89.1	LOS F	8.8	61.8	0.99	0.79	20.0
All Vehicles		2338	0.0	2322 N1	0.0	0.631	13.2	LOS A	17.2	120.2	0.39	0.38	44.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 197.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	83.3	LOS F	0.3	0.3	0.96	0.96
P3	North Full Crossing	53	84.3	LOS F	0.3	0.3	0.97	0.97
P4	West Full Crossing	53	4.5	LOS A	0.1	0.1	0.22	0.22
All Pedestrians		158	57.4	LOS E			0.72	0.72

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Organisation: TRANSPORT MODELLING | Processed: Monday, 23 April 2018 1:33:26 PM
Project: C:\Epping_SIDRA\Epping_2017_pm_survey.sip7

MOVEMENT SUMMARY

Site: Forrest Gr [Forrest Grove] **Network: 2017_netwo [2017_pm_base_survey]**

Epping Rd Forrest Grove
Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Forrest Grove													
1	L2	267	0.0	267	0.0	0.731	17.4	LOS B	3.7	26.2	0.64	1.12	17.1
3	R2	3	0.0	3	0.0	0.059	69.7	LOS E	0.2	1.2	0.95	0.98	5.3
Approach		271	0.0	271	0.0	0.731	18.0	LOS B	3.7	26.2	0.64	1.12	16.7
East: Epping Rd													
4	L2	5	0.0	5	0.0	0.331	5.5	LOS A	28.0	195.8	0.00	0.00	59.6
5	T1	1468	0.0	1287	0.0	0.331	0.0	LOS A	28.0	195.8	0.00	0.00	59.8
Approach		1474	0.0	1292 N1	0.0	0.331	0.0	NA	28.0	195.8	0.00	0.00	59.8
West: Epping Rd													
11	T1	793	0.0	777	0.0	0.314	1.8	LOS A	86.4	604.8	0.16	0.08	37.6
12	R2	103	0.0	101	0.0	0.314	14.2	LOS A	86.4	604.8	0.73	0.36	15.9
Approach		896	0.0	879 N1	0.0	0.314	3.2	NA	86.4	604.8	0.22	0.11	32.4
All Vehicles		2640	0.0	2441 N1	0.0	0.731	3.2	NA	86.4	604.8	0.15	0.16	40.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 197.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Monday, 23 April 2018 1:33:26 PM
Project: C:\Epping_SIDRA\Epping_2017_pm_survey.sip7

MOVEMENT SUMMARY

Site: Bridge St [Bridge St]

Network: 2017_netwo [2017_am_base_modelled]

Beecroft Rd - Hight St Bridge St
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: High St													
1	L2	32	0.0	32	0.0	0.027	1.0	LOS A	0.1	0.9	0.33	0.16	49.1
Approach		32	0.0	32	0.0	0.027	1.0	NA	0.1	0.9	0.33	0.16	49.1
East: Bridge													
4	L2	173	0.0	172	0.0	0.397	0.0	LOS A	2.4	17.1	0.00	0.00	53.7
5	T1	244	0.0	244	0.0	0.397	0.0	LOS A	2.4	17.1	0.00	0.00	44.3
6	R2	1072	0.0	1069	0.0	0.397	0.0	LOS A	4.2	29.7	0.00	0.00	52.2
Approach		1488	0.0	1484 N1	0.0	0.397	0.0	NA	4.2	29.7	0.00	0.00	51.8
North: Beecroft Rd													
7	L2	2908	0.0	2601	0.0	0.535	0.1	LOS A	40.8	285.9	0.00	0.00	59.8
Approach		2908	0.0	2601 N1	0.0	0.535	0.1	NA	40.8	285.9	0.00	0.00	59.8
West: Bridge St													
10	L2	266	0.0	246	0.0	0.488	2.8	LOS A	1.7	11.6	0.44	0.37	25.5
Approach		266	0.0	246 N1	0.0	0.488	2.8	LOS A	1.7	11.6	0.44	0.37	25.5
All Vehicles		4695	0.0	4362 N1	0.0	0.535	0.2	NA	40.8	285.9	0.03	0.02	56.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option is selected.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 340.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: Beec-Carl [Beecroft-Carlingford]

Network: 2017_netwo [2017_am_base_modelled]

Beecroft Rd - Carlingford Rd
Signals - Fixed Time Coordinated Cycle Time = 180 seconds (Network Cycle Time - Program)
Common Control Group: carl [Carlingford Rd]

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Beecroft Rd													
1	L2	482	0.0	474	0.0	0.191	7.5	LOS A	3.5	24.7	0.09	0.56	45.2
2	T1	856	0.0	841	0.0	1.540	558.9	LOS F	81.6	571.2	1.00	2.19	2.2
Approach		1338	0.0	1315 N1	0.0	1.540	360.2	LOS F	81.6	571.2	0.67	1.60	3.4
North: Beecroft Rd													
8	T1	1467	0.0	1467	0.0	1.292	340.6	LOS F	116.6	816.0	1.00	1.93	4.8
9	R2	226	0.0	226	0.0	1.513	547.7	LOS F	54.2	379.7	1.00	1.68	3.1
Approach		1694	0.0	1694	0.0	1.513	368.3	LOS F	116.6	816.0	1.00	1.90	4.5
West: Carlingford Rd													
10	L2	58	0.0	54	0.0	0.038	8.2	LOS A	0.7	5.2	0.19	0.59	24.3
12	R2	1441	0.0	1340	0.0	0.639	18.9	LOS B	16.3	114.2	0.39	0.69	13.5
Approach		1499	0.0	1394 N1	0.0	0.639	18.5	LOS B	16.3	114.2	0.39	0.69	13.7
All Vehicles		4531	0.0	4402 N1	0.0	1.540	255.1	LOS F	116.6	816.0	0.71	1.43	4.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 340.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Monday, 23 April 2018 12:51:24 PM
Project: C:\Epping_SIDRA\Epping_2017_am_modelled.sip7

MOVEMENT SUMMARY

Site: BridgeRaws [BridgeSt_RawsonSt]

Network: 2017_netwo [2017_am_base_modelled]

BridgeSt_RawsonSt
Roundabout

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Rawson St													
1	L2	12	0.0	12	0.0	0.160	5.2	LOS A	0.9	6.3	0.44	0.57	50.3
2	T1	113	0.0	113	0.0	0.160	5.4	LOS A	0.9	6.3	0.44	0.57	48.4
3	R2	56	0.0	56	0.0	0.160	10.1	LOS A	0.9	6.3	0.44	0.57	48.4
Approach		180	0.0	180	0.0	0.160	6.9	LOS A	0.9	6.3	0.44	0.57	48.6
East: Bridge St													
4	L2	27	0.0	27	0.0	0.183	4.6	LOS A	1.1	7.9	0.33	0.56	48.7
5	T1	76	0.0	76	0.0	0.183	4.8	LOS A	1.1	7.9	0.33	0.56	44.2
6	R2	128	0.0	128	0.0	0.183	9.5	LOS A	1.1	7.9	0.33	0.56	30.7
Approach		232	0.0	231 N1	0.0	0.183	7.4	LOS A	1.1	7.9	0.33	0.56	40.1
North: Rawson St													
7	L2	55	0.0	34	0.0	0.124	4.5	LOS A	0.6	3.9	0.24	0.54	45.6
8	T1	93	0.0	58	0.0	0.124	4.8	LOS A	0.6	3.9	0.24	0.54	53.6
9	R2	97	0.0	61	0.0	0.124	9.4	LOS A	0.6	3.9	0.24	0.54	50.7
Approach		244	0.0	153 N1	0.0	0.124	6.5	LOS A	0.6	3.9	0.24	0.54	51.4
West: Bridge St													
10	L2	123	0.0	123	0.0	0.190	5.4	LOS A	1.1	7.4	0.48	0.59	40.0
11	T1	58	0.0	58	0.0	0.190	5.6	LOS A	1.1	7.4	0.48	0.59	40.0
12	R2	26	0.0	26	0.0	0.190	10.3	LOS A	1.1	7.4	0.48	0.59	52.7
Approach		207	0.0	207	0.0	0.190	6.1	LOS A	1.1	7.4	0.48	0.59	43.4
All Vehicles		863	0.0	771 N1	0.0	0.190	6.7	LOS A	1.1	7.9	0.38	0.57	46.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 340.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Carlf_Clif [CarlingfordRd_CliffRd] **Network: 2017_netwo [2017_am_base_modelled]**

CarlingfordRd_CliffRd
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Carlingford Rd													
5	T1	844	0.0	776	0.0	0.199	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		844	0.0	776 N1	0.0	0.199	0.0	NA	0.0	0.0	0.00	0.00	60.0
North: RoadName													
7	L2	116	0.0	116	0.0	0.287	8.3	LOS A	0.6	3.9	0.49	0.77	47.3
9	R2	47	0.0	47	0.0	0.598	79.7	LOS F	2.1	14.8	0.97	1.07	16.8
Approach		163	0.0	163	0.0	0.598	29.0	LOS C	2.1	14.8	0.63	0.86	31.0
West: Carlingford Rd													
10	L2	23	0.0	23	0.0	0.255	5.6	LOS A	17.3	121.4	0.00	0.03	57.8
11	T1	972	0.0	972	0.0	0.255	0.0	LOS A	31.2	218.4	0.00	0.01	59.6
Approach		995	0.0	995	0.0	0.255	0.1	NA	31.2	218.4	0.00	0.01	59.5
All Vehicles		2002	0.0	1934 N1	0.0	0.598	2.5	NA	31.2	218.4	0.05	0.08	52.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 340.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Monday, 23 April 2018 12:51:24 PM
Project: C:\Epping_SIDRA\Epping_2017_am_modelled.sip7

MOVEMENT SUMMARY

Site: Carli_Kent [CarlingfordRd_KentSt]

Network: 2017_netwo [2017_am_base_modelled]

CarlingfordRd_KentSt
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Kent St													
1	L2	72	0.0	72	0.0	0.076	7.1	LOS A	0.3	1.9	0.40	0.64	45.2
3	R2	27	0.0	27	0.0	0.570	122.6	LOS F	1.8	12.9	0.98	1.05	9.1
Approach		99	0.0	99	0.0	0.570	39.1	LOS C	1.8	12.9	0.56	0.76	21.6
East: Carlingford Rd													
4	L2	60	0.0	54	0.0	0.207	5.6	LOS A	0.0	0.0	0.00	0.08	56.7
5	T1	832	0.0	751	0.0	0.207	0.0	LOS A	0.0	0.0	0.00	0.04	59.0
Approach		892	0.0	805 N1	0.0	0.207	0.4	NA	0.0	0.0	0.00	0.04	58.7
North: Kent St													
7	L2	31	0.0	31	0.0	0.041	8.6	LOS A	0.2	1.1	0.52	0.69	46.9
Approach		31	0.0	31	0.0	0.041	8.6	LOS A	0.2	1.1	0.52	0.69	46.9
West: Carlingford Rd													
11	T1	937	0.0	937	0.0	0.306	1.1	LOS A	55.1	385.6	0.15	0.05	56.5
12	R2	77	0.0	77	0.0	0.306	12.2	LOS A	55.1	385.6	0.41	0.14	53.0
Approach		1014	0.0	1014	0.0	0.306	1.9	NA	55.1	385.6	0.17	0.06	56.0
All Vehicles		2035	0.0	1948 N1	0.0	0.570	3.3	NA	55.1	385.6	0.12	0.10	53.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 340.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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Project: C:\Epping_SIDRA\Epping_2017_am_modelled.sip7

MOVEMENT SUMMARY

Site: Carl_Mids [CarlingfordRd_MidsonRd]

Network: 2017_netwo [2017_am_base_modelled]

CarlingfordRd_MidsonRd
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Practical Cycle Time)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Midson Rd													
1	L2	53	0.0	53	0.0	0.874	54.3	LOS D	15.1	105.7	1.00	1.03	29.3
2	T1	299	0.0	299	0.0	0.874	48.8	LOS D	15.1	105.7	1.00	1.03	29.6
3	R2	240	0.0	240	0.0	0.874	54.5	LOS D	14.7	102.7	1.00	1.01	15.8
Approach		592	0.0	592	0.0	0.874	51.6	LOS D	15.1	105.7	1.00	1.02	25.0
East: RoadName													
4	L2	39	0.0	36	0.0	0.835	48.8	LOS D	16.2	113.6	1.00	0.98	30.0
5	T1	708	0.0	650	0.0	0.835	43.2	LOS D	16.3	114.1	1.00	0.98	34.1
6	R2	156	0.0	143	0.0	0.365	38.9	LOS C	5.5	38.3	0.90	0.78	35.1
Approach		903	0.0	829 N1	0.0	0.835	42.7	LOS D	16.3	114.1	0.98	0.95	34.1
North: RoadName													
7	L2	158	0.0	158	0.0	0.655	46.0	LOS D	8.3	57.9	0.99	0.84	24.4
8	T1	208	0.0	208	0.0	0.655	40.4	LOS C	8.6	59.9	0.99	0.83	32.5
9	R2	22	0.0	22	0.0	0.655	45.9	LOS D	8.6	59.9	0.99	0.83	35.4
Approach		388	0.0	388	0.0	0.655	43.0	LOS D	8.6	59.9	0.99	0.83	29.8
West: RoadName													
10	L2	17	0.0	17	0.0	0.857	51.9	LOS D	15.4	108.0	1.00	1.01	33.5
11	T1	614	0.0	614	0.0	0.857	46.3	LOS D	15.5	108.2	1.00	1.01	24.0
12	R2	274	0.0	274	0.0	0.780	47.2	LOS D	12.5	87.4	1.00	0.90	30.0
Approach		904	0.0	904	0.0	0.857	46.7	LOS D	15.5	108.2	1.00	0.98	26.3
All Vehicles		2787	0.0	2713 N1	0.0	0.874	46.0	LOS D	16.3	114.1	0.99	0.96	29.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 340.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Average Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	38.4	LOS D	0.1	0.1	0.92	0.92
P2	East Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
P3	North Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
P4	West Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
All Pedestrians		211	39.1	LOS D			0.93	0.93

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

MOVEMENT SUMMARY

Site: Rawson [Carlingford Rd - Ray St - Rawson St]

Network: 2017_netwo [2017_am_base_modelled]

Carlingford Rd - Ray St - Rawson St
Signals - Fixed Time Coordinated Cycle Time = 180 seconds (Network Cycle Time - Program)
Common Control Group: carl [Carlingford Rd]

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Rawson St													
1	L2	125	0.0	125	0.0	0.480	50.7	LOS D	11.6	81.3	0.78	0.74	17.9
2	T1	112	0.0	111	0.0	2.401	639.0	LOS F	31.9	223.1	0.88	1.20	1.8
3	R2	42	0.0	42	0.0	2.401	1319.4	LOS F	31.9	223.1	1.00	1.72	0.9
Approach		279	0.0	279	0.0	2.401	477.5	LOS F	31.9	223.1	0.85	1.07	2.4
East: Carlingford Rd													
4	L2	3	0.0	3	0.0	0.281	23.3	LOS B	13.0	91.2	0.51	0.45	13.1
5	T1	705	0.0	636	0.0	0.281	21.7	LOS B	16.3	114.2	0.60	0.53	11.6
Approach		708	0.0	639 N1	0.0	0.281	21.7	LOS B	16.3	114.2	0.60	0.53	11.6
North: Ray St													
7	L2	380	0.0	380	0.0	1.408	459.6	LOS F	23.3	163.2	1.00	1.57	0.9
8	T1	223	0.0	223	0.0	1.721	721.4	LOS F	23.3	163.2	1.00	2.01	0.5
9	R2	14	0.0	14	0.0	1.721	726.9	LOS F	23.3	163.2	1.00	2.01	0.5
Approach		617	0.0	617	0.0	1.721	560.2	LOS F	23.3	163.2	1.00	1.74	0.7
West: Carlingford Rd													
10	L2	11	0.0	11	0.0	0.900	62.1	LOS E	23.3	163.2	0.95	1.00	6.6
11	T1	1078	0.0	1078	0.0	0.900	55.0	LOS D	23.3	163.2	0.95	0.99	6.8
Approach		1088	0.0	1088	0.0	0.900	55.0	LOS D	23.3	163.2	0.95	0.99	6.8
All Vehicles		2693	0.0	2623 N1	0.0	2.401	210.6	LOS F	31.9	223.1	0.87	1.06	2.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 340.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Blaxland [Epping_Blaxland]

Network: 2017_netwo [2017_am_base_modelled]

New Site
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Blaxland Rd													
1	L2	471	0.0	471	0.0	0.401	32.0	LOS C	8.8	61.5	0.78	0.82	12.2
2	T1	91	0.0	91	0.0	0.998	118.0	LOS F	8.7	61.2	1.00	1.08	8.0
Approach		561	0.0	561	0.0	0.998	45.9	LOS D	8.8	61.5	0.82	0.87	10.5
East: Epping Rd													
4	L2	1	0.0	1	0.0	1.008	124.7	LOS F	44.5	311.7	1.00	1.31	6.0
5	T1	802	0.0	798	0.0	1.008	119.5	LOS F	44.5	311.7	1.00	1.31	5.9
Approach		803	0.0	799 N1	0.0	1.008	119.5	LOS F	44.5	311.7	1.00	1.31	5.9
North: Landston Place													
7	L2	23	0.0	23	0.0	0.983	118.1	LOS F	17.8	124.9	1.00	1.16	5.2
8	T1	88	0.0	88	0.0	0.983	112.5	LOS F	17.8	124.9	1.00	1.16	5.2
9	R2	217	0.0	217	0.0	0.983	120.7	LOS F	17.8	124.9	1.00	1.13	5.0
Approach		328	0.0	328	0.0	0.983	118.3	LOS F	17.8	124.9	1.00	1.14	5.1
West: Bridge St													
10	L2	328	0.0	296	0.0	0.225	5.3	LOS A	2.3	16.4	0.17	0.59	42.1
11	T1	1980	0.0	1784	0.0	0.838	16.4	LOS B	14.0	97.9	0.70	0.66	13.6
12	R2	600	0.0	541	0.0	1.014	119.8	LOS F	14.0	97.9	1.00	1.26	2.3
Approach		2908	0.0	2621 N1	0.0	1.014	36.5	LOS C	14.0	97.9	0.70	0.78	8.3
All Vehicles		4601	0.0	4309 N1	0.0	1.014	59.3	LOS E	44.5	311.7	0.80	0.92	7.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 340.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: Essex St [Essex St]

Network: 2017_netwo [2017_am_base_modelled]

Epping Essex St
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Essex St													
1	L2	51	0.0	51	0.0	0.528	75.5	LOS F	7.6	53.4	0.99	0.79	5.3
2	T1	57	0.0	57	0.0	0.528	70.0	LOS E	7.6	53.4	0.99	0.79	10.3
3	R2	128	0.0	128	0.0	1.295	350.2	LOS F	23.1	161.7	1.00	1.52	1.1
Approach		236	0.0	236	0.0	1.295	223.8	LOS F	23.1	161.7	1.00	1.19	2.2
East: Epping Rd													
4	L2	20	0.0	20	0.0	0.324	11.3	LOS A	7.4	51.8	0.45	0.41	39.1
5	T1	731	0.0	731	0.0	0.324	7.9	LOS A	7.6	53.5	0.52	0.46	33.6
6	R2	5	0.0	5	0.0	0.324	16.0	LOS B	7.6	53.5	0.59	0.52	36.0
Approach		756	0.0	756	0.0	0.324	8.1	LOS A	7.6	53.5	0.52	0.46	33.8
North: Essex St													
7	L2	7	0.0	7	0.0	0.297	80.9	LOS F	2.3	15.8	0.99	0.72	6.4
8	T1	109	0.0	109	0.0	1.282	273.5	LOS F	28.0	196.1	1.00	1.38	3.0
9	R2	77	0.0	77	0.0	1.282	333.0	LOS F	28.0	196.1	1.00	1.56	1.5
Approach		194	0.0	194	0.0	1.282	289.8	LOS F	28.0	196.1	1.00	1.43	2.4
West: Epping Rd													
10	L2	24	0.0	21	0.0	1.380	403.2	LOS F	28.0	195.8	1.00	2.21	2.3
11	T1	1972	0.0	1740	0.0	1.380	398.0	LOS F	28.0	195.8	1.00	2.21	1.2
12	R2	14	0.0	12	0.0	1.380	403.9	LOS F	28.0	195.8	1.00	2.21	2.0
Approach		2009	0.0	1774 N1	0.0	1.380	398.1	LOS F	28.0	195.8	1.00	2.21	1.2
All Vehicles		3195	0.0	2959 N1	0.0	1.380	277.5	LOS F	28.0	196.1	0.88	1.63	1.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 340.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Forrest Gr [Forrest Grove]

Network: 2017_netwo [2017_am_base_modelled]

Epping Rd Forrest Grove
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Forrest Grove													
1	L2	20	0.0	20	0.0	0.021	7.0	LOS A	0.1	0.6	0.38	0.59	29.6
3	R2	37	0.0	37	0.0	12.071	10234.3	LOS F	35.1	246.0	1.00	1.37	0.0
Approach		57	0.0	57	0.0	12.071	6635.8	LOS F	35.1	246.0	0.78	1.09	0.1
East: Epping Rd													
4	L2	77	0.0	76	0.0	0.220	5.5	LOS A	0.0	0.0	0.00	0.11	53.3
5	T1	781	0.0	778	0.0	0.220	0.0	LOS A	0.0	0.0	0.00	0.05	56.8
Approach		858	0.0	854 N1	0.0	0.220	0.5	NA	0.0	0.0	0.00	0.05	56.5
West: Epping Rd													
11	T1	1973	0.0	1784	0.0	0.473	0.3	LOS A	11.7	81.6	0.04	0.01	54.2
12	R2	22	0.0	20	0.0	0.473	12.6	LOS A	11.7	81.6	0.08	0.01	49.3
Approach		1995	0.0	1804 N1	0.0	0.473	0.4	NA	11.7	81.6	0.04	0.01	54.2
All Vehicles		2909	0.0	2715 N1	0.0	12.071	139.4	NA	35.1	246.0	0.04	0.04	2.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 340.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Eppimg_Pem [EppingRd_PembrokeSt] **Network: 2017_netwo [2017_am_base_modelled]**

EppingRd_PembrokeSt
Signals - Fixed Time Coordinated Cycle Time = 180 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Epping Rd													
1	L2	64	0.0	53	0.0	0.538	10.6	LOS A	22.8	159.9	0.34	0.34	46.1
2	T1	2043	0.0	1681	0.0	0.538	5.0	LOS A	22.9	160.3	0.34	0.33	53.0
Approach		2107	0.0	1734 N1	0.0	0.538	5.2	LOS A	22.9	160.3	0.34	0.33	52.8
North: Epping Rd													
8	T1	615	0.0	615	0.0	0.190	3.3	LOS A	5.3	37.2	0.22	0.19	54.2
9	R2	208	0.0	208	0.0	1.788	839.3	LOS F	64.3	450.0	1.00	1.94	3.0
Approach		823	0.0	823	0.0	1.788	215.0	LOS F	64.3	450.0	0.42	0.64	8.2
West: Pembroke St													
10	L2	411	0.0	411	0.0	1.047	164.0	LOS F	25.8	180.3	1.00	1.10	12.7
Approach		411	0.0	411	0.0	1.047	164.0	LOS F	25.8	180.3	1.00	1.10	12.7
All Vehicles		3341	0.0	2968 N1	0.0	1.788	85.3	LOS F	64.3	450.0	0.45	0.52	18.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 340.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	83.3	LOS F	0.3	0.3	0.96	0.96
P3	North Full Crossing	53	84.3	LOS F	0.3	0.3	0.97	0.97
P4	West Full Crossing	53	4.5	LOS A	0.1	0.1	0.22	0.22
All Pedestrians		158	57.4	LOS E			0.72	0.72

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: Smith St [Smith St] **Network: 2017_netwo [2017_am_base_modelled]**

Epping Rd - Smith St

Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Epping Rd													
5	T1	801	0.0	797	0.0	0.299	0.3	LOS A	0.2	1.4	0.01	0.00	55.5
6	R2	1	0.0	1	0.0	0.299	34.0	LOS C	0.2	1.4	0.02	0.00	52.2
Approach		802	0.0	798 N1	0.0	0.299	0.3	NA	0.2	1.4	0.01	0.00	55.5
North: Smith St													
7	L2	2	0.0	2	0.0	0.008	11.1	LOS A	0.0	0.1	0.63	0.71	31.9
9	R2	6	0.0	6	0.0	0.737	537.5	LOS F	1.4	9.8	0.99	1.04	1.4
Approach		8	0.0	8	0.0	0.737	405.9	LOS F	1.4	9.8	0.90	0.95	1.8
West: Epping Rd													
10	L2	21	0.0	19	0.0	0.457	5.6	LOS A	32.9	230.3	0.00	0.01	55.8
11	T1	1982	0.0	1764	0.0	0.457	0.0	LOS A	36.0	251.7	0.00	0.01	59.6
Approach		2003	0.0	1782 N1	0.0	0.457	0.1	NA	36.0	251.7	0.00	0.01	59.5
All Vehicles		2814	0.0	2589 N1	0.0	0.737	1.5	NA	36.0	251.7	0.01	0.01	52.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 340.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Monday, 23 April 2018 12:51:24 PM
Project: C:\Epping_SIDRA\Epping_2017_am_modelled.sip7

MOVEMENT SUMMARY

Site: Beec-Carl [Beecroft-Carlingford]

Network: 2017_netwo [2017_pm_base_modelled]

Beecroft Rd - Carlingford Rd
Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network Cycle Time - Program)
Common Control Group: carl [Carlingford Rd]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Beecroft Rd													
1	L2	963	0.0	963	0.0	0.425	7.2	LOS A	11.1	77.6	0.12	0.57	45.7
2	T1	1203	0.0	1203	0.0	1.028	98.0	LOS F	47.4	331.5	1.00	1.52	11.0
Approach		2166	0.0	2166	0.0	1.028	57.6	LOS E	47.4	331.5	0.61	1.10	16.7
North: Beecroft Rd													
8	T1	628	0.0	628	0.0	0.290	11.3	LOS A	7.2	50.6	0.57	0.49	44.1
9	R2	149	0.0	149	0.0	1.035	118.6	LOS F	12.1	84.5	1.00	1.33	12.3
Approach		778	0.0	778	0.0	1.035	31.9	LOS C	12.1	84.5	0.65	0.65	29.5
West: Carlingford Rd													
10	L2	102	0.0	102	0.0	0.106	12.5	LOS A	1.5	10.7	0.41	0.65	18.5
12	R2	777	0.0	777	0.0	0.713	18.8	LOS B	11.3	79.4	0.62	0.75	13.6
Approach		879	0.0	879	0.0	0.713	18.1	LOS B	11.3	79.4	0.59	0.73	14.0
All Vehicles		3823	0.0	3823	0.0	1.035	43.3	LOS D	47.4	331.5	0.61	0.92	19.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 5.0 %
Number of Iterations: 30 (maximum specified: 30)

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MOVEMENT SUMMARY

Site: BridgeRaws [BridgeSt_RawsonSt] **Network: 2017_netwo [2017_pm_base_modelled]**

BridgeSt_RawsonSt
Roundabout

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
Movement Performance - Vehicles													
South: Rawson St													
1	L2	26	0.0	26	0.0	0.209	6.0	LOS A	1.2	8.6	0.56	0.67	49.2
2	T1	85	0.0	85	0.0	0.209	6.3	LOS A	1.2	8.6	0.56	0.67	47.1
3	R2	99	0.0	99	0.0	0.209	10.9	LOS A	1.2	8.6	0.56	0.67	47.1
Approach		211	0.0	211	0.0	0.209	8.4	LOS A	1.2	8.6	0.56	0.67	47.4
East: Bridge St													
4	L2	9	0.0	9	0.0	0.271	4.8	LOS A	1.7	12.0	0.38	0.54	49.3
5	T1	223	0.0	223	0.0	0.271	5.0	LOS A	1.7	12.0	0.38	0.54	45.1
6	R2	107	0.0	107	0.0	0.271	9.6	LOS A	1.7	12.0	0.38	0.54	31.7
Approach		340	0.0	340	0.0	0.271	6.4	LOS A	1.7	12.0	0.38	0.54	42.6
North: Rawson St													
7	L2	39	0.0	39	0.0	0.150	4.7	LOS A	0.8	5.3	0.32	0.55	45.1
8	T1	74	0.0	74	0.0	0.150	4.9	LOS A	0.8	5.3	0.32	0.55	53.4
9	R2	67	0.0	67	0.0	0.150	9.6	LOS A	0.8	5.3	0.32	0.55	50.3
Approach		180	0.0	180	0.0	0.150	6.6	LOS A	0.8	5.3	0.32	0.55	51.2
West: Bridge St													
10	L2	86	0.0	86	0.0	0.144	5.3	LOS A	0.8	5.6	0.47	0.58	40.0
11	T1	48	0.0	48	0.0	0.144	5.5	LOS A	0.8	5.6	0.47	0.58	40.0
12	R2	22	0.0	22	0.0	0.144	10.2	LOS A	0.8	5.6	0.47	0.58	52.7
Approach		157	0.0	157	0.0	0.144	6.1	LOS A	0.8	5.6	0.47	0.58	43.6
All Vehicles		887	0.0	887	0.0	0.271	6.9	LOS A	1.7	12.0	0.43	0.58	46.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 5.0 %
Number of Iterations: 30 (maximum specified: 30)

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MOVEMENT SUMMARY

Site: Carlf_Clif [CarlingfordRd_CliffRd]

Network: 2017_netwo [2017_pm_base_modelled]

CarlingfordRd_CliffRd
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Carlingford Rd													
5	T1	1173	0.0	1168	0.0	0.299	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1173	0.0	1168 N1	0.0	0.299	0.0	NA	0.0	0.0	0.00	0.00	59.9
North: RoadName													
7	L2	2	0.0	2	0.0	0.002	6.6	LOS A	0.0	0.1	0.34	0.54	49.0
9	R2	21	0.0	21	0.0	0.237	50.9	LOS D	0.7	5.2	0.94	0.99	22.7
Approach		23	0.0	23	0.0	0.237	46.9	LOS D	0.7	5.2	0.88	0.95	23.9
West: Carlingford Rd													
10	L2	72	0.0	72	0.0	0.187	5.6	LOS A	0.0	0.0	0.00	0.12	56.9
11	T1	653	0.0	653	0.0	0.187	0.0	LOS A	0.0	0.0	0.00	0.05	58.6
Approach		724	0.0	724	0.0	0.187	0.6	NA	0.0	0.0	0.00	0.06	58.3
All Vehicles		1920	0.0	1915 N1	0.0	0.299	0.8	NA	0.7	5.2	0.01	0.03	56.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 5.0 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Carli_Kent [CarlingfordRd_KentSt] **Network: 2017_netwo [2017_pm_base_modelled]**

CarlingfordRd_KentSt
Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Kent St													
1	L2	61	0.0	61	0.0	0.081	8.4	LOS A	0.3	2.0	0.50	0.73	43.4
3	R2	1	0.0	1	0.0	0.029	98.0	LOS F	0.1	0.6	0.96	0.98	11.0
Approach		62	0.0	62	0.0	0.081	9.9	LOS A	0.3	2.0	0.51	0.73	41.4
East: Carlingford Rd													
4	L2	64	0.0	64	0.0	0.305	5.6	LOS A	0.0	0.0	0.00	0.06	56.9
5	T1	1128	0.0	1124	0.0	0.305	0.0	LOS A	0.0	0.0	0.00	0.03	59.2
Approach		1193	0.0	1188 N1	0.0	0.305	0.3	NA	0.0	0.0	0.00	0.03	58.9
North: Kent St													
7	L2	2	0.0	2	0.0	0.002	7.6	LOS A	0.0	0.1	0.45	0.56	48.2
Approach		2	0.0	2	0.0	0.002	7.6	LOS A	0.0	0.1	0.45	0.56	48.2
West: Carlingford Rd													
11	T1	720	0.0	720	0.0	0.246	2.0	LOS A	1.6	11.0	0.16	0.04	54.8
12	R2	40	0.0	40	0.0	0.246	18.4	LOS B	1.6	11.0	0.49	0.12	50.2
Approach		760	0.0	760	0.0	0.246	2.9	NA	1.6	11.0	0.18	0.04	54.4
All Vehicles		2017	0.0	2012 N1	0.0	0.305	1.6	NA	1.6	11.0	0.08	0.06	56.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 5.0 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Carl_Mids [CarlingfordRd_MidsonRd]

Network: 2017_netwo [2017_pm_base_modelled]

CarlingfordRd_MidsonRd
Signals - Fixed Time Isolated Cycle Time = 130 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Midson Rd													
1	L2	140	0.0	140	0.0	0.890	70.3	LOS E	26.8	187.6	1.00	1.02	25.1
2	T1	415	0.0	415	0.0	0.890	64.8	LOS E	26.8	187.6	1.00	1.01	25.3
3	R2	202	0.0	202	0.0	0.890	70.4	LOS E	26.6	186.2	1.00	1.00	13.2
Approach		757	0.0	757	0.0	0.890	67.3	LOS E	26.8	187.6	1.00	1.01	22.7
East: RoadName													
4	L2	40	0.0	40	0.0	0.891	63.1	LOS E	36.9	258.0	1.00	1.02	25.9
5	T1	934	0.0	930	0.0	0.891	57.3	LOS E	36.9	258.0	0.98	1.01	30.0
6	R2	216	0.0	215	0.0	0.376	43.3	LOS D	10.6	74.4	0.83	0.80	33.6
Approach		1189	0.0	1185 N1	0.0	0.891	54.9	LOS D	36.9	258.0	0.95	0.97	30.4
North: RoadName													
7	L2	91	0.0	91	0.0	0.883	76.7	LOS F	15.6	109.4	1.00	1.00	17.8
8	T1	282	0.0	282	0.0	0.883	71.2	LOS F	15.7	109.9	1.00	1.00	24.1
9	R2	69	0.0	69	0.0	0.883	76.7	LOS F	15.7	109.9	1.00	1.00	27.1
Approach		442	0.0	442	0.0	0.883	73.2	LOS F	15.7	109.9	1.00	1.00	23.5
West: RoadName													
10	L2	16	0.0	16	0.0	0.853	71.4	LOS F	17.4	121.9	1.00	0.97	28.4
11	T1	488	0.0	488	0.0	0.853	65.8	LOS E	17.4	121.9	1.00	0.97	19.2
12	R2	222	0.0	222	0.0	0.777	66.7	LOS E	14.4	100.7	1.00	0.88	25.0
Approach		726	0.0	726	0.0	0.853	66.2	LOS E	17.4	121.9	1.00	0.94	21.4
All Vehicles		3115	0.0	3110 N1	0.0	0.891	63.2	LOS E	36.9	258.0	0.98	0.98	25.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 5.0 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	40.1	LOS E	0.2	0.2	0.79	0.79
P2	East Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	57.4	LOS E	0.2	0.2	0.94	0.94
P4	West Full Crossing	53	51.9	LOS E	0.2	0.2	0.89	0.89
All Pedestrians		211	52.2	LOS E			0.89	0.89

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

MOVEMENT SUMMARY

Site: Rawson [Carlingford Rd - Ray St - Rawson St] **Network: 2017_netwo [2017_pm_base_modelled]**

Carlingford Rd - Ray St - Rawson St
Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network Cycle Time - Program)
Common Control Group: carl [Carlingford Rd]

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Rawson St													
1	L2	65	0.0	65	0.0	0.070	15.3	LOS B	1.3	9.1	0.49	0.68	34.5
2	T1	149	0.0	149	0.0	0.272	12.3	LOS A	5.1	35.8	0.58	0.57	35.9
3	R2	64	0.0	64	0.0	0.272	17.9	LOS B	5.1	35.8	0.58	0.57	35.9
Approach		279	0.0	279	0.0	0.272	14.3	LOS A	5.1	35.8	0.56	0.59	35.5
East: Carlingford Rd													
4	L2	22	0.0	22	0.0	0.913	52.5	LOS D	16.3	114.2	1.00	1.12	5.9
5	T1	1089	0.0	1085	0.0	0.913	47.8	LOS D	16.3	114.2	1.00	1.12	5.9
Approach		1112	0.0	1107 N1	0.0	0.913	47.9	LOS D	16.3	114.2	1.00	1.12	5.9
North: Ray St													
7	L2	193	0.0	193	0.0	0.223	16.4	LOS B	4.3	29.9	0.54	0.72	17.8
8	T1	109	0.0	109	0.0	0.130	10.7	LOS A	2.7	18.8	0.52	0.46	22.7
9	R2	17	0.0	17	0.0	0.130	16.2	LOS B	2.7	18.8	0.52	0.46	22.7
Approach		319	0.0	319	0.0	0.223	14.4	LOS A	4.3	29.9	0.53	0.62	19.5
West: Carlingford Rd													
10	L2	33	0.0	33	0.0	0.585	34.1	LOS C	11.3	79.1	0.90	0.77	11.6
11	T1	623	0.0	623	0.0	0.585	28.5	LOS B	13.3	92.8	0.90	0.77	11.7
Approach		656	0.0	656	0.0	0.585	28.7	LOS C	13.3	92.8	0.90	0.77	11.7
All Vehicles		2365	0.0	2360 N1	0.0	0.913	34.1	LOS C	16.3	114.2	0.86	0.89	11.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 5.0 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Blaxland [Epping_Blaxland]

Network: 2017_netwo [2017_pm_base_modelled]

New Site
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Blaxland Rd													
1	L2	553	0.0	553	0.0	0.824	69.7	LOS E	16.4	114.5	1.00	1.04	6.3
2	T1	60	0.0	60	0.0	0.882	90.8	LOS F	5.0	35.0	1.00	0.92	10.0
Approach		613	0.0	613	0.0	0.882	71.8	LOS F	16.4	114.5	1.00	1.03	6.8
East: Epping Rd													
4	L2	1	0.0	1	0.0	0.891	45.5	LOS D	46.6	326.4	0.97	0.94	14.9
5	T1	1806	0.0	1806	0.0	0.891	39.9	LOS C	46.6	326.4	0.97	0.94	14.9
Approach		1807	0.0	1807	0.0	0.891	39.9	LOS C	46.6	326.4	0.97	0.94	14.9
North: Landston Place													
7	L2	39	0.0	39	0.0	0.867	86.8	LOS F	13.9	97.1	1.00	0.96	6.7
8	T1	37	0.0	37	0.0	0.867	81.2	LOS F	13.9	97.1	1.00	0.96	6.7
9	R2	269	0.0	269	0.0	0.867	86.9	LOS F	13.9	97.1	1.00	0.94	6.7
Approach		345	0.0	345	0.0	0.867	86.3	LOS F	13.9	97.1	1.00	0.95	6.7
West: Bridge St													
10	L2	244	0.0	244	0.0	0.182	5.1	LOS A	1.6	11.0	0.14	0.58	42.6
11	T1	905	0.0	905	0.0	0.394	7.5	LOS A	13.9	97.3	0.39	0.35	23.3
12	R2	257	0.0	257	0.0	0.889	83.4	LOS F	14.0	97.9	1.00	1.02	3.2
Approach		1406	0.0	1406	0.0	0.889	21.0	LOS B	14.0	97.9	0.46	0.51	14.1
All Vehicles		4172	0.0	4171 N1	0.0	0.891	42.1	LOS C	46.6	326.4	0.81	0.81	11.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 5.0 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Bridge St [Bridge St]

Network: 2017_netwo [2017_pm_base_modelled]

Beecroft Rd - Hight St Bridge St
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: High St													
1	L2	31	0.0	31	0.0	0.028	1.4	LOS A	0.1	0.9	0.40	0.22	48.7
Approach		31	0.0	31	0.0	0.028	1.4	NA	0.1	0.9	0.40	0.22	48.7
East: Bridge													
4	L2	251	0.0	251	0.0	0.704	0.1	LOS A	0.0	0.0	0.00	0.00	54.1
5	T1	334	0.0	334	0.0	0.704	0.1	LOS A	0.0	0.0	0.00	0.00	46.8
6	R2	2045	0.0	2045	0.0	0.704	0.1	LOS A	0.0	0.0	0.00	0.00	52.4
Approach		2629	0.0	2629	0.0	0.704	0.1	NA	0.0	0.0	0.00	0.00	52.3
North: Beecroft Rd													
7	L2	1405	0.0	1405	0.0	0.289	0.0	LOS A	7.0	49.1	0.00	0.00	59.9
Approach		1405	0.0	1405	0.0	0.289	0.0	NA	7.0	49.1	0.00	0.00	59.9
West: Bridge St													
10	L2	120	0.0	120	0.0	0.184	4.8	LOS A	0.8	5.7	0.62	0.58	22.4
Approach		120	0.0	120	0.0	0.184	4.8	LOS A	0.8	5.7	0.62	0.58	22.4
All Vehicles		4185	0.0	4185	0.0	0.704	0.2	NA	7.0	49.1	0.02	0.02	54.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option is selected.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 5.0 %
Number of Iterations: 30 (maximum specified: 30)

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MOVEMENT SUMMARY

Site: Essex St [Essex St]

Network: 2017_netwo [2017_pm_base_modelled]

Epping Essex St
Signals - Fixed Time Isolated Cycle Time = 130 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Essex St													
1	L2	43	0.0	43	0.0	0.559	66.2	LOS E	6.7	47.1	0.99	0.79	6.0
2	T1	65	0.0	65	0.0	0.559	60.6	LOS E	6.7	47.1	0.99	0.79	11.4
3	R2	195	0.0	195	0.0	0.909	81.9	LOS F	14.3	100.1	1.00	0.98	4.7
Approach		303	0.0	303	0.0	0.909	75.1	LOS F	14.3	100.1	1.00	0.91	6.2
East: Epping Rd													
4	L2	11	0.0	11	0.0	0.879	26.1	LOS B	29.8	208.6	0.90	0.89	31.1
5	T1	1548	0.0	1548	0.0	0.879	21.0	LOS B	29.8	208.6	0.90	0.89	28.4
6	R2	4	0.0	4	0.0	0.879	27.0	LOS B	29.3	205.1	0.90	0.90	32.2
Approach		1563	0.0	1563	0.0	0.879	21.1	LOS B	29.8	208.6	0.90	0.89	28.5
North: Essex St													
7	L2	8	0.0	8	0.0	0.206	68.3	LOS E	1.9	13.2	0.97	0.71	10.1
8	T1	67	0.0	67	0.0	0.890	73.1	LOS F	7.9	55.0	0.99	0.90	12.0
9	R2	62	0.0	62	0.0	0.890	83.7	LOS F	7.9	55.0	1.00	0.99	8.2
Approach		138	0.0	138	0.0	0.890	77.5	LOS F	7.9	55.0	0.99	0.92	10.2
West: Epping Rd													
10	L2	65	0.0	65	0.0	0.503	12.9	LOS A	11.7	81.8	0.59	0.55	37.5
11	T1	827	0.0	824	0.0	0.503	10.6	LOS A	11.7	81.8	0.66	0.60	25.3
12	R2	35	0.0	35	0.0	0.503	22.5	LOS B	8.7	60.8	0.81	0.70	24.7
Approach		927	0.0	924 [N1]	0.0	0.503	11.2	LOS A	11.7	81.8	0.66	0.60	26.4
All Vehicles		2932	0.0	2928 [N1]	0.0	0.909	26.2	LOS B	29.8	208.6	0.84	0.81	21.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 5.0 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Monday, 23 April 2018 2:46:36 PM
Project: C:\Epping_SIDRA\Epping_2017_pm_modelled.sip7

MOVEMENT SUMMARY

Site: Forrest Gr [Forrest Grove]

Network: 2017_netwo [2017_pm_base_modelled]

Epping Rd Forrest Grove
Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Forrest Grove													
1	L2	168	0.0	168	0.0	0.576	15.9	LOS B	1.8	12.9	0.66	0.99	18.3
3	R2	23	0.0	23	0.0	1.195	562.6	LOS F	6.1	42.6	1.00	1.28	0.7
Approach		192	0.0	192	0.0	1.195	82.0	LOS F	6.1	42.6	0.70	1.03	4.5
East: Epping Rd													
4	L2	19	0.0	19	0.0	0.424	5.5	LOS A	3.6	25.4	0.00	0.01	58.9
5	T1	1635	0.0	1635	0.0	0.424	0.0	LOS A	4.3	30.4	0.00	0.01	59.4
Approach		1654	0.0	1654	0.0	0.424	0.1	NA	4.3	30.4	0.00	0.01	59.4
West: Epping Rd													
11	T1	904	0.0	904	0.0	0.343	3.4	LOS A	41.0	287.2	0.18	0.05	29.5
12	R2	57	0.0	57	0.0	0.343	23.3	LOS B	41.0	287.2	0.71	0.18	12.1
Approach		961	0.0	961	0.0	0.343	4.6	NA	41.0	287.2	0.22	0.06	27.2
All Vehicles		2806	0.0	2806	0.0	1.195	7.2	NA	41.0	287.2	0.12	0.09	27.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 5.0 %
Number of Iterations: 30 (maximum specified: 30)

MOVEMENT SUMMARY

Site: Eppimg_Pem [EppingRd_PembrokeSt]

Network: 2017_netwo [2017_pm_base_modelled]

EppingRd_PembrokeSt
Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Epping Rd													
1	L2	161	0.0	161	0.0	0.373	11.0	LOS A	8.7	60.7	0.42	0.49	47.4
2	T1	869	0.0	867	0.0	0.373	5.4	LOS A	8.8	61.6	0.42	0.42	53.3
Approach		1031	0.0	1027 N1	0.0	0.373	6.3	LOS A	8.8	61.6	0.42	0.43	52.6
North: Epping Rd													
8	T1	1471	0.0	1471	0.0	0.530	6.4	LOS A	14.8	103.4	0.50	0.46	49.7
9	R2	175	0.0	175	0.0	0.537	16.9	LOS B	4.6	32.5	0.62	0.76	42.5
Approach		1645	0.0	1645	0.0	0.537	7.5	LOS A	14.8	103.4	0.51	0.49	48.5
West: Pembroke St													
10	L2	143	0.0	143	0.0	0.248	42.5	LOS D	2.8	19.9	0.92	0.75	30.4
Approach		143	0.0	143	0.0	0.248	42.5	LOS D	2.8	19.9	0.92	0.75	30.4
All Vehicles		2819	0.0	2816 N1	0.0	0.537	8.8	LOS A	14.8	103.4	0.50	0.48	48.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 5.0 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
P3	North Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
P4	West Full Crossing	53	6.8	LOS A	0.1	0.1	0.39	0.39
All Pedestrians		158	28.5	LOS C			0.75	0.75

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: C:\Epping_SIDRA\Epping_2017_pm_modelled.sip7

MOVEMENT SUMMARY

Site: Smith St [Smith St]

Network: 2017_netwo [2017_pm_base_modelled]

Epping Rd - Smith St

Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Epping Rd													
5	T1	1804	0.0	1804	0.0	0.464	0.0	LOS A	11.7	81.6	0.00	0.00	59.5
6	R2	1	0.0	1	0.0	0.464	15.3	LOS B	11.7	81.6	0.01	0.00	53.9
Approach		1805	0.0	1805	0.0	0.464	0.0	NA	11.7	81.6	0.00	0.00	59.5
North: Smith St													
7	L2	19	0.0	19	0.0	0.023	7.7	LOS A	0.1	0.6	0.45	0.64	37.3
9	R2	2	0.0	2	0.0	1.132	1732.1	LOS F	1.5	10.7	1.00	1.05	0.4
Approach		21	0.0	21	0.0	1.132	180.1	LOS F	1.5	10.7	0.51	0.68	3.8
West: Epping Rd													
10	L2	2	0.0	2	0.0	0.242	5.5	LOS A	0.0	0.0	0.00	0.00	56.0
11	T1	942	0.0	942	0.0	0.242	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		944	0.0	944	0.0	0.242	0.0	NA	0.0	0.0	0.00	0.00	59.9
All Vehicles		2771	0.0	2771	0.0	1.132	1.4	NA	11.7	81.6	0.01	0.01	49.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 5.0 %
Number of Iterations: 30 (maximum specified: 30)

Appendix K

2026 SIDRA Results

J17056RP4

MOVEMENT SUMMARY

Site: Beec-Carl [Beecroft-Carlingford] **Network: 2017_netwo [2026_am_rms]**

Beecroft Rd - Carlingford Rd
Signals - Fixed Time Coordinated Cycle Time = 180 seconds (Network Cycle Time - Program)
Common Control Group: carl [Carlingford Rd]

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Beecroft Rd													
1	L2	702	0.0	544	0.0	0.171	6.1	LOS A	2.6	18.1	0.06	0.55	47.3
2	T1	1343	0.0	1041	0.0	8.897	7142.1	LOS F	81.6	571.2	1.00	2.48	0.2
Approach		2045	0.0	1585 N1	0.0	8.897	4692.4	LOS F	81.6	571.2	0.68	1.81	0.3
North: Beecroft Rd													
8	T1	2157	0.0	2157	0.0	5.686	4267.0	LOS F	116.6	816.0	1.00	3.38	0.4
9	R2	911	0.0	911	0.0	14.709	12387.9	LOS F	116.6	816.0	1.00	2.62	0.1
Approach		3067	0.0	3067	0.0	14.709	6677.6	LOS F	116.6	816.0	1.00	3.16	0.3
West: Carlingford Rd													
10	L2	265	0.0	162	0.0	0.097	4.8	LOS A	0.6	3.9	0.06	0.55	30.7
12	R2	2964	0.0	1808	0.0	0.837	8.9	LOS A	14.0	97.9	0.31	0.67	21.3
Approach		3229	0.0	1970 N1	0.0	0.837	8.6	LOS A	14.0	97.9	0.29	0.66	21.8
All Vehicles		8342	0.0	6622 N1	0.0	14.709	4218.7	LOS F	116.6	816.0	0.71	2.09	0.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 442.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Thursday, 19 April 2018 5:35:24 PM
Project: C:\Epping_SIDRA\Epping_2026_am_RMS.sip7

MOVEMENT SUMMARY

Site: Bridge St [Bridge St]

Network: 2017_netwo [2026_am_rms]

Beecroft Rd - Hight St Bridge St
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: High St													
1	L2	14	0.0	14	0.0	0.011	0.8	LOS A	0.1	0.4	0.30	0.12	49.3
Approach		14	0.0	14	0.0	0.011	0.8	NA	0.1	0.4	0.30	0.12	49.3
East: Bridge													
4	L2	223	0.0	167	0.0	0.440	0.0	LOS A	21.3	149.1	0.00	0.00	54.2
5	T1	272	0.0	203	0.0	0.440	0.0	LOS A	21.3	149.1	0.00	0.00	46.7
6	R2	1702	0.0	1274	0.0	0.440	0.0	LOS A	21.3	149.1	0.00	0.00	52.4
Approach		2197	0.0	1644 N1	0.0	0.440	0.0	NA	21.3	149.1	0.00	0.00	52.4
North: Beecroft Rd													
7	L2	5121	0.0	2235	0.0	0.460	0.1	LOS A	81.6	571.2	0.00	0.00	59.8
Approach		5121	0.0	2235 N1	0.0	0.460	0.1	NA	81.6	571.2	0.00	0.00	59.8
West: Bridge St													
10	L2	322	0.0	280	0.0	0.625	6.3	LOS A	2.9	20.3	0.54	0.61	20.5
Approach		322	0.0	280 N1	0.0	0.625	6.3	LOS A	2.9	20.3	0.54	0.61	20.5
All Vehicles		7654	0.0	4172 N1	0.0	0.625	0.5	NA	81.6	571.2	0.04	0.04	55.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option is selected.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 442.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Thursday, 19 April 2018 5:35:24 PM
Project: C:\Epping_SIDRA\Epping_2026_am_RMS.sip7

MOVEMENT SUMMARY

Site: BridgeRaws [BridgeSt_RawsonSt]

Network: 2017_netwo [2026_am_rms]

BridgeSt_RawsonSt
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Rawson St													
1	L2	2	0.0	2	0.0	0.611	5.2	LOS A	2.7	19.0	0.48	0.62	49.5
2	T1	253	0.0	253	0.0	0.611	5.4	LOS A	2.7	19.0	0.48	0.62	47.5
3	R2	234	0.0	234	0.0	0.611	10.1	LOS A	2.7	19.0	0.48	0.62	47.5
Approach		488	0.0	488	0.0	0.611	7.6	LOS A	2.7	19.0	0.48	0.62	47.5
East: Bridge St													
4	L2	19	0.0	15	0.0	0.211	4.2	LOS A	0.8	5.8	0.22	0.52	49.7
5	T1	131	0.0	100	0.0	0.211	4.4	LOS A	0.8	5.8	0.22	0.52	45.8
6	R2	116	0.0	89	0.0	0.211	9.0	LOS A	0.8	5.8	0.22	0.52	32.5
Approach		265	0.0	203 N1	0.0	0.211	6.4	LOS A	0.8	5.8	0.22	0.52	42.5
North: Rawson St													
7	L2	96	0.0	41	0.0	0.087	5.4	LOS A	0.5	3.2	0.48	0.59	39.2
8	T1	66	0.0	28	0.0	0.087	5.7	LOS A	0.5	3.2	0.48	0.59	52.2
9	R2	55	0.0	23	0.0	0.087	10.3	LOS A	0.5	3.2	0.48	0.59	47.8
Approach		217	0.0	92 N1	0.0	0.087	6.7	LOS A	0.5	3.2	0.48	0.59	47.4
West: Bridge St													
10	L2	174	0.0	174	0.0	0.522	8.7	LOS A	2.3	16.4	0.72	0.83	35.7
11	T1	84	0.0	84	0.0	0.522	8.9	LOS A	2.3	16.4	0.72	0.83	35.7
12	R2	16	0.0	16	0.0	0.522	13.5	LOS A	2.3	16.4	0.72	0.83	50.3
Approach		274	0.0	274	0.0	0.522	9.0	LOS A	2.3	16.4	0.72	0.83	37.6
All Vehicles		1244	0.0	1057 N1	0.0	0.611	7.7	LOS A	2.7	19.0	0.49	0.66	44.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 442.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Thursday, 19 April 2018 5:35:24 PM
Project: C:\Epping_SIDRA\Epping_2026_am_RMS.sip7

MOVEMENT SUMMARY

Site: Carlf_Clif [CarlingfordRd_CliffRd]

Network: 2017_netwo [2026_am_rms]

CarlingfordRd_CliffRd
Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Carlingford Rd													
5	T1	1292	0.0	492	0.0	0.126	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1292	0.0	492 N1	0.0	0.126	0.0	NA	0.0	0.0	0.00	0.00	60.0
North: RoadName													
7	L2	91	0.0	91	0.0	0.510	19.1	LOS B	1.0	7.1	0.79	0.99	37.1
9	R2	155	0.0	155	0.0	25.789	22456.3	LOS F	152.2	1065.6	1.00	1.38	0.1
Approach		245	0.0	245	0.0	25.789	14174.8	LOS F	152.2	1065.6	0.92	1.24	0.1
West: Carlingford Rd													
10	L2	64	0.0	45	0.0	0.521	5.6	LOS A	79.3	554.9	0.00	0.03	57.7
11	T1	2842	0.0	1984	0.0	0.521	0.1	LOS A	79.3	554.9	0.00	0.01	59.5
Approach		2906	0.0	2029 N1	0.0	0.521	0.2	NA	79.3	554.9	0.00	0.01	59.4
All Vehicles		4443	0.0	2766 N1	0.0	25.789	1257.2	NA	152.2	1065.6	0.08	0.12	0.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 442.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Carli_Kent [CarlingfordRd_KentSt] **Network: 2017_netwo [2026_am_rms]**

CarlingfordRd_KentSt
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Kent St													
1	L2	121	0.0	121	0.0	0.111	6.5	LOS A	0.4	2.9	0.31	0.59	45.8
3	R2	57	0.0	57	0.0	18.947	16359.5	LOS F	55.4	388.1	1.00	1.37	0.1
Approach		178	0.0	178	0.0	18.947	5231.7	LOS F	55.4	388.1	0.53	0.84	0.2
East: Carlingford Rd													
4	L2	147	0.0	53	0.0	0.139	5.5	LOS A	0.0	0.0	0.00	0.12	56.3
5	T1	1337	0.0	485	0.0	0.139	0.0	LOS A	0.0	0.0	0.00	0.05	58.6
Approach		1484	0.0	538 N1	0.0	0.139	0.6	NA	0.0	0.0	0.00	0.06	58.2
North: Kent St													
7	L2	197	0.0	197	0.0	1.250	264.9	LOS F	28.8	201.3	1.00	4.20	6.2
Approach		197	0.0	197	0.0	1.250	264.9	LOS F	28.8	201.3	1.00	4.20	6.2
West: Carlingford Rd													
11	T1	2642	0.0	1836	0.0	0.572	1.0	LOS A	52.2	365.3	0.16	0.06	56.6
12	R2	236	0.0	164	0.0	0.572	11.4	LOS A	52.2	365.3	0.40	0.15	53.6
Approach		2878	0.0	1999 N1	0.0	0.572	1.9	NA	52.2	365.3	0.18	0.07	56.1
All Vehicles		4737	0.0	2912 N1	0.0	18.947	338.9	NA	55.4	388.1	0.22	0.39	4.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 442.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Carl_Mids [CarlingfordRd_MidsonRd]

Network: 2017_netwo [2026_am_rms]

CarlingfordRd_MidsonRd
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Midson Rd													
1	L2	221	0.0	221	0.0	1.007	122.0	LOS F	37.5	262.7	1.00	1.17	17.2
2	T1	147	0.0	147	0.0	1.007	116.5	LOS F	37.5	262.7	1.00	1.17	17.4
3	R2	445	0.0	445	0.0	1.563	575.5	LOS F	102.5	717.6	1.00	1.88	1.9
Approach		814	0.0	814	0.0	1.563	369.2	LOS F	102.5	717.6	1.00	1.56	4.7
East: RoadName													
4	L2	58	0.0	24	0.0	1.406	437.3	LOS F	58.0	406.0	1.00	1.95	5.4
5	T1	1327	0.0	559	0.0	1.406	431.7	LOS F	58.2	407.2	1.00	1.95	6.7
6	R2	74	0.0	31	0.0	0.157	72.0	LOS F	2.1	14.7	0.94	0.73	26.2
Approach		1459	0.0	614 N1	0.0	1.406	413.8	LOS F	58.2	407.2	1.00	1.89	7.0
North: RoadName													
7	L2	222	0.0	222	0.0	1.458	482.5	LOS F	69.2	484.3	1.00	1.98	3.5
8	T1	321	0.0	321	0.0	1.458	476.8	LOS F	70.2	491.5	1.00	2.05	5.3
9	R2	122	0.0	122	0.0	1.458	482.4	LOS F	70.2	491.5	1.00	2.09	6.5
Approach		665	0.0	665	0.0	1.458	479.7	LOS F	70.2	491.5	1.00	2.03	5.0
West: RoadName													
10	L2	53	0.0	53	0.0	1.577	582.2	LOS F	302.7	2119.0	1.00	2.74	5.6
11	T1	2194	0.0	2194	0.0	1.577	578.4	LOS F	302.7	2119.0	1.00	2.75	3.0
12	R2	121	0.0	121	0.0	0.155	34.0	LOS C	5.4	37.7	0.66	0.74	34.7
Approach		2367	0.0	2367	0.0	1.577	550.7	LOS F	302.7	2119.0	0.98	2.65	3.3
All Vehicles		5305	0.0	4461 N1	0.0	1.577	488.1	LOS F	302.7	2119.0	0.99	2.25	4.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 442.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	32.7	LOS D	0.1	0.1	0.66	0.66
P4	West Full Crossing	53	61.8	LOS F	0.2	0.2	0.91	0.91
All Pedestrians		211	58.3	LOS E			0.87	0.87

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

MOVEMENT SUMMARY

Site: Rawson [Carlingford Rd - Ray St - Rawson St]

Network: 2017_netwo [2026_am_rms]

Carlingford Rd - Ray St - Rawson St
Signals - Fixed Time Coordinated Cycle Time = 180 seconds (Network Cycle Time - Program)
Common Control Group: carl [Carlingford Rd]

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Rawson St													
1	L2	48	0.0	46	0.0	2.033	997.3	LOS F	35.0	244.8	1.00	2.14	0.6
2	T1	207	0.0	197	0.0	2.033	991.7	LOS F	35.0	244.8	1.00	2.14	0.6
3	R2	286	0.0	272	0.0	13.456	11247.2	LOS F	35.0	244.8	1.00	1.89	0.1
Approach		542	0.0	515 N1	0.0	13.456	6408.7	LOS F	35.0	244.8	1.00	2.01	0.1
East: Carlingford Rd													
4	L2	420	0.0	157	0.0	0.188	6.7	LOS A	3.8	26.8	0.16	0.40	29.8
5	T1	1192	0.0	445	0.0	0.188	3.3	LOS A	6.7	46.8	0.24	0.29	31.8
Approach		1612	0.0	602 N1	0.0	0.188	4.2	LOS A	6.7	46.8	0.22	0.32	31.3
North: Ray St													
7	L2	57	0.0	57	0.0	0.722	97.1	LOS F	7.3	50.9	1.00	0.86	4.1
8	T1	77	0.0	77	0.0	1.958	675.9	LOS F	23.3	163.2	1.00	1.44	0.6
9	R2	51	0.0	50	0.0	1.958	926.2	LOS F	23.3	163.2	1.00	1.68	0.4
Approach		184	0.0	184	0.0	1.958	566.0	LOS F	23.3	163.2	1.00	1.33	0.7
West: Carlingford Rd													
10	L2	46	0.0	33	0.0	1.261	307.1	LOS F	23.3	163.2	1.00	1.90	1.3
11	T1	2886	0.0	2032	0.0	1.261	301.7	LOS F	23.3	163.2	1.00	1.91	1.3
Approach		2933	0.0	2064 N1	0.0	1.261	301.8	LOS F	23.3	163.2	1.00	1.91	1.3
All Vehicles		5271	0.0	3366 N1	0.0	13.456	1197.8	LOS F	35.0	244.8	0.86	1.61	0.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 442.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Blaxland [Epping_Blaxland]

Network: 2017_netwo [2026_am_rms]

New Site
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Blaxland Rd													
1	L2	891	0.0	891	0.0	0.787	44.6	LOS D	20.6	144.2	0.96	0.96	9.3
2	T1	271	0.0	271	0.0	1.492	506.8	LOS F	28.0	195.8	1.00	2.02	2.0
Approach		1161	0.0	1161	0.0	1.492	152.3	LOS F	28.0	195.8	0.97	1.20	3.7
East: Epping Rd													
4	L2	2	0.0	2	0.0	0.002	34.2	LOS C	0.1	0.5	0.62	0.61	16.5
5	T1	1327	0.0	1146	0.0	1.493	512.9	LOS F	46.6	326.4	1.00	2.51	1.5
Approach		1329	0.0	1147 N1	0.0	1.493	512.2	LOS F	46.6	326.4	1.00	2.51	1.5
North: Landston Place													
7	L2	1	0.0	1	0.0	1.495	514.0	LOS F	54.3	380.1	1.00	1.98	1.2
8	T1	503	0.0	503	0.0	1.495	508.4	LOS F	54.5	381.7	1.00	1.98	1.2
Approach		504	0.0	504	0.0	1.495	508.4	LOS F	54.5	381.7	1.00	1.98	1.2
West: Bridge St													
10	L2	348	0.0	150	0.0	0.122	6.5	LOS A	1.8	12.7	0.22	0.60	39.8
11	T1	3298	0.0	1424	0.0	0.634	12.9	LOS A	14.0	97.9	0.57	0.52	16.2
12	R2	1475	0.0	637	0.0	1.508	524.9	LOS F	14.0	97.9	1.00	2.47	0.5
Approach		5121	0.0	2211 N1	0.0	1.508	159.9	LOS F	14.0	97.9	0.67	1.09	1.9
All Vehicles		8116	0.0	5024 N1	0.0	1.508	273.6	LOS F	54.5	381.7	0.85	1.53	1.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 442.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Essex St [Essex St]

Network: 2017_netwo [2026_am_rms]

Epping Essex St
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Essex St													
1	L2	21	0.0	21	0.0	0.113	72.6	LOS F	1.4	10.0	0.94	0.71	5.2
2	T1	44	0.0	44	0.0	0.227	68.1	LOS E	3.0	21.2	0.96	0.72	10.8
3	R2	252	0.0	252	0.0	1.370	406.8	LOS F	48.3	338.0	1.00	1.59	1.0
Approach		317	0.0	317	0.0	1.370	337.3	LOS F	48.3	338.0	0.99	1.41	1.3
East: Epping Rd													
4	L2	31	0.0	29	0.0	0.875	56.6	LOS E	26.1	183.0	1.00	0.98	14.0
5	T1	817	0.0	788	0.0	0.875	51.0	LOS D	26.2	183.5	1.00	0.98	10.2
Approach		847	0.0	817 N1	0.0	0.875	51.2	LOS D	26.2	183.5	1.00	0.98	10.4
North: Essex St													
7	L2	24	0.0	24	0.0	0.026	25.3	LOS B	0.9	6.1	0.53	0.67	20.3
8	T1	53	0.0	53	0.0	0.054	20.1	LOS B	1.9	13.4	0.54	0.42	29.3
9	R2	623	0.0	623	0.0	1.376	415.5	LOS F	128.2	897.4	1.00	1.68	1.8
Approach		700	0.0	700	0.0	1.376	372.3	LOS F	128.2	897.4	0.95	1.55	2.0
West: Epping Rd													
10	L2	108	0.0	43	0.0	1.359	380.8	LOS F	28.0	195.8	1.00	2.05	2.3
11	T1	3083	0.0	1227	0.0	1.359	375.3	LOS F	28.0	195.8	1.00	2.05	1.2
Approach		3192	0.0	1270 N1	0.0	1.359	375.5	LOS F	28.0	195.8	1.00	2.05	1.2
All Vehicles		5056	0.0	3104 N1	0.0	1.376	285.5	LOS F	128.2	897.4	0.99	1.59	2.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 442.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Forrest Gr [Forrest Grove] **Network: 2017_netwo [2026_am_rms]**

Epping Rd Forrest Grove
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Forrest Grove													
1	L2	39	0.0	39	0.0	0.048	8.3	LOS A	0.2	1.4	0.50	0.65	27.4
Approach		39	0.0	39	0.0	0.048	8.3	LOS A	0.2	1.4	0.50	0.65	27.4
East: Epping Rd													
4	L2	174	0.0	149	0.0	0.080	5.5	LOS A	0.0	0.0	0.00	0.58	35.7
5	T1	1276	0.0	1098	0.0	0.282	0.0	LOS A	28.0	195.8	0.00	0.00	59.9
Approach		1449	0.0	1247 N1	0.0	0.282	0.7	NA	28.0	195.8	0.00	0.07	55.3
West: Epping Rd													
11	T1	3192	0.0	1334	0.0	0.342	0.0	LOS A	11.7	81.6	0.00	0.00	59.9
Approach		3192	0.0	1334 N1	0.0	0.342	0.0	NA	11.7	81.6	0.00	0.00	59.9
All Vehicles		4680	0.0	2620 N1	0.0	0.342	0.4	NA	28.0	195.8	0.01	0.04	55.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 442.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Thursday, 19 April 2018 5:35:24 PM
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MOVEMENT SUMMARY

Site: Eppimg_Pem [EppingRd_PembrokeSt] **Network: 2017_netwo [2026_am_rms]**

EppingRd_PembrokeSt
Signals - Fixed Time Coordinated Cycle Time = 180 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Epping Rd													
1	L2	8	0.0	3	0.0	0.349	9.4	LOS A	11.5	80.8	0.26	0.24	48.2
2	T1	3392	0.0	1122	0.0	0.349	3.9	LOS A	11.5	80.8	0.26	0.24	54.5
Approach		3400	0.0	1125 N1	0.0	0.349	3.9	LOS A	11.5	80.8	0.26	0.24	54.5
North: Epping Rd													
8	T1	742	0.0	742	0.0	0.230	3.4	LOS A	6.7	46.8	0.23	0.20	54.0
9	R2	299	0.0	299	0.0	1.006	137.4	LOS F	44.6	312.2	1.00	1.16	14.7
Approach		1041	0.0	1041	0.0	1.006	41.9	LOS C	44.6	312.2	0.45	0.48	27.1
West: Pembroke St													
10	L2	848	0.0	848	0.0	2.164	1110.7	LOS F	133.3	933.1	1.00	2.00	2.3
Approach		848	0.0	848	0.0	2.164	1110.7	LOS F	133.3	933.1	1.00	2.00	2.3
All Vehicles		5289	0.0	3014 N1	0.0	2.164	328.5	LOS F	133.3	933.1	0.54	0.82	6.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 442.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	83.3	LOS F	0.3	0.3	0.96	0.96
P3	North Full Crossing	53	84.3	LOS F	0.3	0.3	0.97	0.97
P4	West Full Crossing	53	4.5	LOS A	0.1	0.1	0.22	0.22
All Pedestrians		158	57.4	LOS E			0.72	0.72

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Organisation: TRANSPORT MODELLING | Processed: Thursday, 19 April 2018 5:35:24 PM
Project: C:\Epping_SIDRA\Epping_2026_am_RMS.sip7

MOVEMENT SUMMARY

Site: Smith St [Smith St]

Network: 2017_netwo [2026_am_rms]

Epping Rd - Smith St

Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Epping Rd													
5	T1	1327	0.0	1162	0.0	0.199	0.0	LOS A	11.7	81.6	0.00	0.00	60.0
Approach		1327	0.0	1162 [N1]	0.0	0.199	0.0	NA	11.7	81.6	0.00	0.00	60.0
North: Smith St													
7	L2	13	0.0	13	0.0	0.037	9.0	LOS A	0.1	0.5	0.53	0.71	35.1
Approach		13	0.0	13	0.0	0.037	9.0	LOS A	0.1	0.5	0.53	0.71	35.1
West: Epping Rd													
10	L2	120	0.0	51	0.0	0.358	5.6	LOS A	46.6	326.4	0.00	0.04	55.2
11	T1	3179	0.0	1342	0.0	0.358	0.0	LOS A	46.6	326.4	0.00	0.02	59.0
Approach		3299	0.0	1392 [N1]	0.0	0.358	0.2	NA	46.6	326.4	0.00	0.02	58.7
All Vehicles		4639	0.0	2567 [N1]	0.0	0.358	0.2	NA	46.6	326.4	0.00	0.02	58.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 442.5 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Thursday, 19 April 2018 5:35:24 PM
Project: C:\Epping_SIDRA\Epping_2026_am_RMS.sip7

MOVEMENT SUMMARY

Site: Bridge St [Bridge St]

Network: 2017_netwo [2026_pm_rms]

Beecroft Rd - Hight St Bridge St
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: High St													
1	L2	48	0.0	48	0.0	0.041	1.0	LOS A	0.2	1.4	0.34	0.17	49.0
Approach		48	0.0	48	0.0	0.041	1.0	NA	0.2	1.4	0.34	0.17	49.0
East: Bridge													
4	L2	313	0.0	152	0.0	0.539	0.0	LOS A	21.3	149.1	0.00	0.00	54.4
5	T1	501	0.0	243	0.0	0.539	0.0	LOS A	21.3	149.1	0.00	0.00	48.0
6	R2	3339	0.0	1620	0.0	0.539	0.0	LOS A	21.3	149.1	0.00	0.00	52.6
Approach		4153	0.0	2015 N1	0.0	0.539	0.0	NA	21.3	149.1	0.00	0.00	52.6
North: Beecroft Rd													
7	L2	2568	0.0	1899	0.0	0.391	0.0	LOS A	81.6	571.2	0.00	0.00	59.9
Approach		2568	0.0	1899 N1	0.0	0.391	0.0	NA	81.6	571.2	0.00	0.00	59.9
West: Bridge St													
10	L2	365	0.0	337	0.0	0.891	23.9	LOS B	8.5	59.6	0.67	1.34	10.3
Approach		365	0.0	337 N1	0.0	0.891	23.9	LOS B	8.5	59.6	0.67	1.34	10.3
All Vehicles		7135	0.0	4299 N1	0.0	0.891	1.9	NA	81.6	571.2	0.06	0.11	50.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option is selected.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 134.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Thursday, 19 April 2018 6:02:28 PM
Project: C:\Epping_SIDRA\Epping_2026_pm_RMS.sip7

MOVEMENT SUMMARY

Site: Beec-Carl [Beecroft-Carlingford]

Network: 2017_netwo [2026_pm_rms]

Beecroft Rd - Carlingford Rd
Signals - Fixed Time Coordinated Cycle Time = 180 seconds (Network Cycle Time - Program)
Common Control Group: carl [Carlingford Rd]

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Beecroft Rd													
1	L2	1377	0.0	727	0.0	0.310	6.9	LOS A	9.8	68.8	0.08	0.56	46.0
2	T1	2327	0.0	1229	0.0	4.849	3507.6	LOS F	81.6	571.2	1.00	2.90	0.4
Approach		3704	0.0	1956 N1	0.0	4.849	2206.4	LOS F	81.6	571.2	0.66	2.03	0.6
North: Beecroft Rd													
8	T1	1136	0.0	1136	0.0	1.658	662.3	LOS F	116.6	816.0	1.00	2.46	2.6
9	R2	557	0.0	557	0.0	4.906	3581.8	LOS F	116.6	816.0	1.00	2.64	0.5
Approach		1693	0.0	1693	0.0	4.906	1622.8	LOS F	116.6	816.0	1.00	2.52	1.1
West: Carlingford Rd													
10	L2	472	0.0	336	0.0	0.214	4.9	LOS A	1.0	7.0	0.05	0.55	30.5
12	R2	1433	0.0	1021	0.0	0.560	9.1	LOS A	8.0	55.7	0.19	0.61	21.0
Approach		1904	0.0	1357 N1	0.0	0.560	8.0	LOS A	8.0	55.7	0.15	0.60	22.8
All Vehicles		7301	0.0	5006 N1	0.0	4.906	1413.2	LOS F	116.6	816.0	0.64	1.81	0.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 134.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Thursday, 19 April 2018 6:02:28 PM
Project: C:\Epping_SIDRA\Epping_2026_pm_RMS.sip7

MOVEMENT SUMMARY

Site: BridgeRaws [BridgeSt_RawsonSt]

Network: 2017_netwo [2026_pm_rms]

BridgeSt_RawsonSt
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Rawson St													
1	L2	3	0.0	3	0.0	0.727	8.5	LOS A	4.6	32.0	0.62	0.79	47.5
2	T1	280	0.0	280	0.0	0.727	8.7	LOS A	4.6	32.0	0.62	0.79	45.0
3	R2	231	0.0	231	0.0	0.727	13.4	LOS A	4.6	32.0	0.62	0.79	45.0
Approach		514	0.0	514	0.0	0.727	10.8	LOS A	4.6	32.0	0.62	0.79	45.0
East: Bridge St													
4	L2	21	0.0	11	0.0	0.277	4.4	LOS A	1.3	9.1	0.31	0.51	49.8
5	T1	360	0.0	191	0.0	0.277	4.6	LOS A	1.3	9.1	0.31	0.51	46.0
6	R2	154	0.0	82	0.0	0.277	9.2	LOS A	1.3	9.1	0.31	0.51	32.6
Approach		535	0.0	284 N1	0.0	0.277	5.9	LOS A	1.3	9.1	0.31	0.51	43.8
North: Rawson St													
7	L2	75	0.0	44	0.0	0.136	5.4	LOS A	0.8	5.3	0.49	0.60	38.8
8	T1	94	0.0	56	0.0	0.136	5.6	LOS A	0.8	5.3	0.49	0.60	51.9
9	R2	75	0.0	44	0.0	0.136	10.3	LOS A	0.8	5.3	0.49	0.60	47.3
Approach		243	0.0	145 N1	0.0	0.136	7.0	LOS A	0.8	5.3	0.49	0.60	48.2
West: Bridge St													
10	L2	100	0.0	100	0.0	0.341	7.3	LOS A	1.4	9.7	0.71	0.75	37.8
11	T1	75	0.0	75	0.0	0.341	7.5	LOS A	1.4	9.7	0.71	0.75	37.8
12	R2	6	0.0	6	0.0	0.341	12.2	LOS A	1.4	9.7	0.71	0.75	51.5
Approach		181	0.0	181	0.0	0.341	7.6	LOS A	1.4	9.7	0.71	0.75	38.8
All Vehicles		1473	0.0	1123 N1	0.0	0.727	8.6	LOS A	4.6	32.0	0.54	0.69	44.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 134.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Thursday, 19 April 2018 6:02:28 PM
Project: C:\Epping_SIDRA\Epping_2026_pm_RMS.sip7

MOVEMENT SUMMARY

Site: Carlf_Clif [CarlingfordRd_CliffRd]

Network: 2017_netwo [2026_pm_rms]

CarlingfordRd_CliffRd
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Carlingford Rd													
5	T1	1860	0.0	963	0.0	0.247	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1860	0.0	963 N1	0.0	0.247	0.0	NA	0.0	0.0	0.00	0.00	59.9
North: RoadName													
7	L2	49	0.0	49	0.0	0.135	8.5	LOS A	0.2	1.6	0.50	0.76	47.1
9	R2	101	0.0	101	0.0	3.553	2390.5	LOS F	55.0	384.8	1.00	2.26	0.7
Approach		151	0.0	151	0.0	3.553	1607.6	LOS F	55.0	384.8	0.84	1.76	1.1
West: Carlingford Rd													
10	L2	127	0.0	104	0.0	0.336	5.6	LOS A	31.7	221.9	0.00	0.10	57.1
11	T1	1467	0.0	1200	0.0	0.336	0.0	LOS A	31.7	221.9	0.00	0.04	58.8
Approach		1595	0.0	1304 N1	0.0	0.336	0.5	NA	31.7	221.9	0.00	0.05	58.5
All Vehicles		3605	0.0	2418 N1	0.0	3.553	100.4	NA	55.0	384.8	0.05	0.14	8.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 134.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Thursday, 19 April 2018 6:02:28 PM
Project: C:\Epping_SIDRA\Epping_2026_pm_RMS.sip7

MOVEMENT SUMMARY

Site: Carli_Kent [CarlingfordRd_KentSt] **Network: 2017_netwo [2026_pm_rms]**

CarlingfordRd_KentSt
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Kent St													
1	L2	107	0.0	107	0.0	0.168	7.5	LOS A	0.4	3.1	0.44	0.70	44.6
3	R2	63	0.0	63	0.0	6.771	5382.9	LOS F	50.2	351.5	1.00	1.51	0.2
Approach		171	0.0	171	0.0	6.771	1998.4	LOS F	50.2	351.5	0.65	1.00	0.6
East: Carlingford Rd													
4	L2	165	0.0	84	0.0	0.330	5.6	LOS A	0.0	0.0	0.00	0.10	56.4
5	T1	1785	0.0	907	0.0	0.330	0.0	LOS A	0.0	0.0	0.00	0.05	58.7
Approach		1951	0.0	991 N1	0.0	0.330	0.5	NA	0.0	0.0	0.00	0.05	58.4
North: Kent St													
7	L2	42	0.0	42	0.0	0.090	12.3	LOS A	0.3	2.3	0.67	0.86	43.0
Approach		42	0.0	42	0.0	0.090	12.3	LOS A	0.3	2.3	0.67	0.86	43.0
West: Carlingford Rd													
11	T1	1538	0.0	1293	0.0	0.465	2.1	LOS A	53.4	373.7	0.20	0.07	54.4
12	R2	141	0.0	119	0.0	0.465	16.7	LOS B	52.9	370.3	0.66	0.22	48.9
Approach		1679	0.0	1412 N1	0.0	0.465	3.3	NA	53.4	373.7	0.24	0.08	53.6
All Vehicles		3842	0.0	2615 N1	0.0	6.771	132.5	NA	53.4	373.7	0.18	0.14	9.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 134.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Thursday, 19 April 2018 6:02:28 PM
Project: C:\Epping_SIDRA\Epping_2026_pm_RMS.sip7

MOVEMENT SUMMARY

Site: Carl_Mids [CarlingfordRd_MidsonRd]

Network: 2017_netwo [2026_pm_rms]

CarlingfordRd_MidsonRd
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Midson Rd													
1	L2	255	0.0	255	0.0	1.219	277.6	LOS F	73.4	514.1	1.00	1.65	8.7
2	T1	374	0.0	374	0.0	1.219	272.1	LOS F	73.4	514.1	1.00	1.64	8.8
3	R2	295	0.0	295	0.0	1.219	277.7	LOS F	73.1	512.0	1.00	1.62	3.7
Approach		923	0.0	923	0.0	1.219	275.4	LOS F	73.4	514.1	1.00	1.64	7.2
East: RoadName													
4	L2	36	0.0	19	0.0	1.232	288.5	LOS F	80.4	562.7	1.00	1.90	8.0
5	T1	1735	0.0	942	0.0	1.232	283.2	LOS F	80.4	562.7	1.00	1.89	9.8
6	R2	121	0.0	66	0.0	0.171	58.0	LOS E	3.9	27.6	0.86	0.75	29.4
Approach		1892	0.0	1027 N1	0.0	1.232	268.9	LOS F	80.4	562.7	0.99	1.81	10.2
North: RoadName													
7	L2	92	0.0	92	0.0	0.953	101.8	LOS F	19.5	136.2	1.00	1.10	14.4
8	T1	228	0.0	228	0.0	0.953	96.3	LOS F	19.5	136.2	1.00	1.10	19.9
9	R2	116	0.0	116	0.0	0.953	101.9	LOS F	19.4	135.6	1.00	1.10	22.7
Approach		436	0.0	436	0.0	0.953	99.0	LOS F	19.5	136.2	1.00	1.10	19.7
West: RoadName													
10	L2	81	0.0	81	0.0	1.211	267.0	LOS F	116.9	818.0	1.00	1.85	10.9
11	T1	1231	0.0	1231	0.0	1.211	263.1	LOS F	116.9	818.0	1.00	1.87	6.1
12	R2	276	0.0	276	0.0	0.578	49.9	LOS D	16.1	113.0	0.86	0.81	29.2
Approach		1587	0.0	1587	0.0	1.211	226.2	LOS F	116.9	818.0	0.98	1.69	7.9
All Vehicles		4838	0.0	3973 N1	0.0	1.232	234.7	LOS F	116.9	818.0	0.99	1.64	9.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 134.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	57.3	LOS E	0.2	0.2	0.88	0.88
P2	East Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	44.2	LOS E	0.2	0.2	0.77	0.77
P4	West Full Crossing	53	60.9	LOS F	0.2	0.2	0.90	0.90
All Pedestrians		211	57.9	LOS E			0.88	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

MOVEMENT SUMMARY

Site: Rawson [Carlingford Rd - Ray St - Rawson St]

Network: 2017_netwo [2026_pm_rms]

Carlingford Rd - Ray St - Rawson St
Signals - Fixed Time Coordinated Cycle Time = 180 seconds (Network Cycle Time - Program)
Common Control Group: carl [Carlingford Rd]

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Rawson St													
1	L2	129	0.0	117	0.0	1.018	164.5	LOS F	15.3	107.1	1.00	1.10	3.4
2	T1	262	0.0	238	0.0	3.614	2419.1	LOS F	35.0	244.8	1.00	2.96	0.2
3	R2	376	0.0	341	0.0	3.614	2424.6	LOS F	35.0	244.8	1.00	2.96	0.2
Approach		767	0.0	696 N1	0.0	3.614	2041.4	LOS F	35.0	244.8	1.00	2.64	0.3
East: Carlingford Rd													
4	L2	267	0.0	123	0.0	0.325	14.6	LOS B	14.0	97.9	0.40	0.46	17.1
5	T1	1666	0.0	765	0.0	0.325	12.9	LOS A	14.0	97.9	0.51	0.50	15.3
Approach		1934	0.0	888 N1	0.0	0.325	13.1	LOS A	14.0	97.9	0.49	0.49	15.5
North: Ray St													
7	L2	48	0.0	48	0.0	0.313	68.1	LOS E	6.4	44.8	0.88	0.75	5.8
8	T1	39	0.0	39	0.0	0.313	62.6	LOS E	6.4	44.8	0.88	0.75	5.8
9	R2	63	0.0	63	0.0	1.432	471.3	LOS F	13.9	97.4	1.00	1.30	0.8
Approach		151	0.0	150 N1	0.0	1.432	235.8	LOS F	13.9	97.4	0.93	0.98	1.6
West: Carlingford Rd													
10	L2	38	0.0	31	0.0	0.899	46.2	LOS D	23.3	163.2	0.88	0.91	8.7
11	T1	1480	0.0	1220	0.0	0.899	41.1	LOS C	23.3	163.2	0.88	0.91	8.7
Approach		1518	0.0	1251 N1	0.0	0.899	41.2	LOS C	23.3	163.2	0.88	0.91	8.7
All Vehicles		4369	0.0	2985 N1	0.0	3.614	508.7	LOS F	35.0	244.8	0.80	1.19	0.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 134.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Blaxland [Epping_Blaxland] **Network: 2017_netwo [2026_pm_rms]**

New Site
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Blaxland Rd													
1	L2	1304	0.0	1304	0.0	1.092	144.0	LOS F	28.0	195.8	1.00	1.22	2.6
2	T1	388	0.0	388	0.0	2.016	966.4	LOS F	28.0	195.8	1.00	2.61	1.1
Approach		1693	0.0	1693	0.0	2.016	332.7	LOS F	28.0	195.8	1.00	1.54	1.7
East: Epping Rd													
4	L2	12	0.0	7	0.0	0.009	31.9	LOS C	0.3	2.0	0.60	0.64	17.3
5	T1	2849	0.0	1690	0.0	2.063	1022.3	LOS F	46.6	326.4	1.00	3.37	0.7
Approach		2861	0.0	1697 N1	0.0	2.063	1018.3	LOS F	46.6	326.4	1.00	3.36	0.7
North: Landston Place													
7	L2	2	0.0	2	0.0	2.018	970.7	LOS F	45.1	315.7	1.00	2.00	0.6
8	T1	313	0.0	313	0.0	2.018	965.1	LOS F	45.1	316.0	1.00	2.00	0.6
Approach		315	0.0	315	0.0	2.018	965.2	LOS F	45.1	316.0	1.00	2.00	0.6
West: Bridge St													
10	L2	404	0.0	318	0.0	0.260	7.0	LOS A	4.5	31.7	0.25	0.62	39.0
11	T1	1021	0.0	804	0.0	0.360	7.6	LOS A	12.4	87.0	0.38	0.34	23.1
12	R2	1143	0.0	900	0.0	2.025	982.9	LOS F	14.0	97.9	1.00	3.18	0.3
Approach		2568	0.0	2022 N1	0.0	2.025	441.6	LOS F	14.0	97.9	0.64	1.65	0.8
All Vehicles		7437	0.0	5727 N1	0.0	2.063	609.1	LOS F	46.6	326.4	0.87	2.14	0.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 134.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Essex St [Essex St]

Network: 2017_netwo [2026_pm_rms]

Epping Essex St
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Essex St													
1	L2	13	0.0	13	0.0	0.093	77.0	LOS F	0.9	6.2	0.96	0.69	5.0
2	T1	61	0.0	61	0.0	0.427	74.2	LOS F	4.4	31.0	1.00	0.76	10.1
3	R2	165	0.0	165	0.0	1.213	275.8	LOS F	25.6	179.3	1.00	1.38	1.4
Approach		239	0.0	239	0.0	1.213	213.8	LOS F	25.6	179.3	1.00	1.18	2.3
East: Epping Rd													
4	L2	54	0.0	35	0.0	1.194	237.7	LOS F	36.1	253.0	1.00	1.73	3.6
5	T1	2500	0.0	1609	0.0	1.194	232.1	LOS F	36.1	253.0	1.00	1.74	2.4
Approach		2554	0.0	1643 N1	0.0	1.194	232.3	LOS F	36.1	253.0	1.00	1.74	2.4
North: Essex St													
7	L2	21	0.0	21	0.0	0.027	32.8	LOS C	0.9	6.2	0.62	0.68	17.0
8	T1	20	0.0	20	0.0	0.025	27.2	LOS B	0.8	5.9	0.62	0.45	24.8
9	R2	449	0.0	449	0.0	1.185	255.0	LOS F	72.2	505.6	1.00	1.41	2.8
Approach		491	0.0	491	0.0	1.185	236.2	LOS F	72.2	505.6	0.97	1.34	3.1
West: Epping Rd													
10	L2	51	0.0	38	0.0	0.552	32.3	LOS C	16.9	118.0	0.86	0.75	21.4
11	T1	962	0.0	722	0.0	0.552	26.8	LOS B	16.9	118.6	0.86	0.74	14.2
Approach		1013	0.0	759 N1	0.0	0.552	27.1	LOS B	16.9	118.6	0.86	0.74	14.6
All Vehicles		4296	0.0	3132 N1	0.0	1.213	181.7	LOS F	72.2	505.6	0.96	1.39	3.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 134.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Thursday, 19 April 2018 6:02:28 PM
Project: C:\Epping_SIDRA\Epping_2026_pm_RMS.sip7

MOVEMENT SUMMARY

Site: Forrest Gr [Forrest Grove]

Network: 2017_netwo [2026_pm_rms]

Epping Rd Forrest Grove
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Forrest Grove													
1	L2	24	0.0	24	0.0	0.042	10.8	LOS A	0.2	1.2	0.61	0.74	23.5
Approach		24	0.0	24	0.0	0.042	10.8	LOS A	0.2	1.2	0.61	0.74	23.5
East: Epping Rd													
4	L2	137	0.0	80	0.0	0.043	5.5	LOS A	0.0	0.0	0.00	0.58	35.7
5	T1	2824	0.0	1660	0.0	0.426	0.0	LOS A	28.0	195.8	0.00	0.00	59.9
Approach		2961	0.0	1740 N1	0.0	0.426	0.3	NA	28.0	195.8	0.00	0.03	58.0
West: Epping Rd													
11	T1	1013	0.0	820	0.0	0.218	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1013	0.0	820 N1	0.0	0.218	0.0	NA	0.0	0.0	0.00	0.00	60.0
All Vehicles		3998	0.0	2584 N1	0.0	0.426	0.3	NA	28.0	195.8	0.01	0.02	57.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 134.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Thursday, 19 April 2018 6:02:28 PM
Project: C:\Epping_SIDRA\Epping_2026_pm_RMS.sip7

MOVEMENT SUMMARY

Site: Eppimg_Pem [EppingRd_PembrokeSt]

Network: 2017_netwo [2026_pm_rms]

EppingRd_PembrokeSt
Signals - Fixed Time Coordinated Cycle Time = 180 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Epping Rd													
1	L2	34	0.0	26	0.0	0.266	9.1	LOS A	8.0	56.0	0.24	0.24	48.3
2	T1	1067	0.0	830	0.0	0.266	3.6	LOS A	8.0	56.2	0.24	0.23	54.7
Approach		1101	0.0	857 N1	0.0	0.266	3.7	LOS A	8.0	56.2	0.24	0.23	54.6
North: Epping Rd													
8	T1	2491	0.0	2491	0.0	1.543	557.5	LOS F	321.4	2249.8	1.00	2.47	3.1
9	R2	264	0.0	264	0.0	0.588	14.0	LOS A	9.3	65.4	0.43	0.72	44.6
Approach		2755	0.0	2755	0.0	1.543	505.4	LOS F	321.4	2249.8	0.95	2.30	3.6
West: Pembroke St													
10	L2	444	0.0	444	0.0	1.133	225.0	LOS F	33.2	232.1	1.00	1.20	9.6
Approach		444	0.0	444	0.0	1.133	225.0	LOS F	33.2	232.1	1.00	1.20	9.6
All Vehicles		4300	0.0	4055 N1	0.0	1.543	368.7	LOS F	321.4	2249.8	0.80	1.74	5.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 134.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Average Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	83.3	LOS F	0.3	0.3	0.96	0.96
P3	North Full Crossing	53	84.3	LOS F	0.3	0.3	0.97	0.97
P4	West Full Crossing	53	4.5	LOS A	0.1	0.1	0.22	0.22
All Pedestrians		158	57.4	LOS E			0.72	0.72

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Organisation: TRANSPORT MODELLING | Processed: Thursday, 19 April 2018 6:02:28 PM
Project: C:\Epping_SIDRA\Epping_2026_pm_RMS.sip7

MOVEMENT SUMMARY

Site: Smith St [Smith St]

Network: 2017_netwo [2026_pm_rms]

Epping Rd - Smith St

Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Epping Rd													
5	T1	2849	0.0	1685	0.0	0.288	0.0	LOS A	11.7	81.6	0.00	0.00	59.9
Approach		2849	0.0	1685 N1	0.0	0.288	0.0	NA	11.7	81.6	0.00	0.00	59.9
North: Smith St													
7	L2	17	0.0	17	0.0	0.019	7.3	LOS A	0.1	0.5	0.42	0.61	38.0
Approach		17	0.0	17	0.0	0.019	7.3	LOS A	0.1	0.5	0.42	0.61	38.0
West: Epping Rd													
10	L2	7	0.0	6	0.0	0.212	5.5	LOS A	0.0	0.0	0.00	0.01	55.9
11	T1	1015	0.0	821	0.0	0.212	0.0	LOS A	0.0	0.0	0.00	0.00	59.8
Approach		1022	0.0	826 N1	0.0	0.212	0.0	NA	0.0	0.0	0.00	0.00	59.7
All Vehicles		3888	0.0	2529 N1	0.0	0.288	0.1	NA	11.7	81.6	0.00	0.01	59.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 134.8 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Thursday, 19 April 2018 6:02:28 PM
Project: C:\Epping_SIDRA\Epping_2026_pm_RMS.sip7

Appendix L

2036 SIDRA Results

MOVEMENT SUMMARY

Site: Carl_Mids [CarlingfordRd_MidsonRd]

Network: 2017_netwo [Epping_2036_am_RMS_Council]

CarlingfordRd_MidsonRd
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Midson Rd													
1	L2	248	0.0	248	0.0	1.106	186.7	LOS F	59.7	417.6	1.00	1.41	12.2
2	T1	214	0.0	214	0.0	1.106	181.2	LOS F	59.7	417.6	1.00	1.41	12.3
3	R2	485	0.0	485	0.0	2.095	1050.1	LOS F	144.2	1009.6	1.00	2.30	1.0
Approach		947	0.0	947	0.0	2.095	627.7	LOS F	144.2	1009.6	1.00	1.86	3.0
East: RoadName													
4	L2	72	0.0	30	0.0	1.590	596.2	LOS F	76.3	534.4	1.00	2.22	4.1
5	T1	1525	0.0	630	0.0	1.590	590.7	LOS F	76.6	536.2	1.00	2.22	5.1
6	R2	69	0.0	29	0.0	0.145	71.9	LOS F	1.9	13.5	0.94	0.72	26.3
Approach		1666	0.0	688 N1	0.0	1.590	569.3	LOS F	76.6	536.2	1.00	2.15	5.2
North: RoadName													
7	L2	253	0.0	253	0.0	1.972	935.1	LOS F	90.3	632.1	1.00	2.39	1.9
8	T1	400	0.0	400	0.0	1.972	927.4	LOS F	128.0	895.9	1.00	2.65	2.9
9	R2	122	0.0	122	0.0	1.972	932.5	LOS F	128.0	895.9	1.00	2.71	3.6
Approach		775	0.0	775	0.0	1.972	930.7	LOS F	128.0	895.9	1.00	2.58	2.7
West: RoadName													
10	L2	65	0.0	65	0.0	2.530	1444.8	LOS F	437.6	3063.5	1.00	3.84	2.4
11	T1	2353	0.0	2353	0.0	2.530	1440.6	LOS F	437.6	3063.5	1.00	3.83	1.2
12	R2	135	0.0	135	0.0	0.184	37.0	LOS C	6.3	44.3	0.69	0.75	33.5
Approach		2553	0.0	2553	0.0	2.530	1366.6	LOS F	437.6	3063.5	0.98	3.67	1.4
All Vehicles		5941	0.0	4963 N1	0.0	2.530	1046.9	LOS F	437.6	3063.5	0.99	2.94	2.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 146.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	35.4	LOS D	0.2	0.2	0.69	0.69
P4	West Full Crossing	53	58.2	LOS E	0.2	0.2	0.88	0.88
All Pedestrians		211	58.0	LOS E			0.87	0.87

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

MOVEMENT SUMMARY

Site: Beec-Carl [Beecroft-Carlingford]

Network: 2017_netwo [Epping_2036_am_RMS_Council]

Beecroft Rd - Carlingford Rd
Signals - Fixed Time Coordinated Cycle Time = 180 seconds (Network Cycle Time - Program)
Common Control Group: carl [Carlingford Rd]

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Beecroft Rd													
1	L2	832	0.0	595	0.0	0.187	6.2	LOS A	2.9	20.1	0.06	0.55	47.3
2	T1	1627	0.0	1165	0.0	9.956	8097.3	LOS F	81.6	571.2	1.00	2.50	0.2
Approach		2459	0.0	1760 N1	0.0	9.956	5361.0	LOS F	81.6	571.2	0.68	1.84	0.2
North: Beecroft Rd													
8	T1	2183	0.0	2183	0.0	5.752	4327.4	LOS F	116.6	816.0	1.00	3.39	0.4
9	R2	941	0.0	941	0.0	15.202	12832.7	LOS F	116.6	816.0	1.00	2.63	0.1
Approach		3124	0.0	3124	0.0	15.202	6889.3	LOS F	116.6	816.0	1.00	3.16	0.3
West: Carlingford Rd													
10	L2	335	0.0	159	0.0	0.095	4.7	LOS A	0.4	3.0	0.05	0.55	30.9
12	R2	3422	0.0	1627	0.0	0.756	9.3	LOS A	14.0	97.9	0.33	0.67	20.6
Approach		3757	0.0	1786 N1	0.0	0.756	8.9	LOS A	14.0	97.9	0.30	0.66	21.3
All Vehicles		9340	0.0	6671 N1	0.0	15.202	4643.5	LOS F	116.6	816.0	0.73	2.14	0.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 146.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Friday, 20 April 2018 8:21:28 AM
Project: C:\Epping_SIDRA\Epping_2036_am_RMS_Council.sip7

MOVEMENT SUMMARY

Site: BridgeRaws [BridgeSt_RawsonSt]

Network: 2017_netwo [Epping_2036_am_RMS_Council]

BridgeSt_RawsonSt
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Rawson St													
1	L2	2	0.0	2	0.0	0.493	5.8	LOS A	3.4	23.6	0.58	0.68	48.7
2	T1	200	0.0	200	0.0	0.493	6.0	LOS A	3.4	23.6	0.58	0.68	46.5
3	R2	339	0.0	339	0.0	0.493	10.6	LOS A	3.4	23.6	0.58	0.68	46.5
Approach		541	0.0	541	0.0	0.493	8.9	LOS A	3.4	23.6	0.58	0.68	46.5
East: Bridge St													
4	L2	38	0.0	27	0.0	0.206	4.2	LOS A	1.2	8.3	0.23	0.52	49.7
5	T1	185	0.0	132	0.0	0.206	4.4	LOS A	1.2	8.3	0.23	0.52	45.8
6	R2	166	0.0	119	0.0	0.206	9.0	LOS A	1.2	8.3	0.23	0.52	32.5
Approach		389	0.0	278 N1	0.0	0.206	6.3	LOS A	1.2	8.3	0.23	0.52	42.8
North: Rawson St													
7	L2	95	0.0	27	0.0	0.080	6.1	LOS A	0.4	3.1	0.57	0.64	37.9
8	T1	87	0.0	25	0.0	0.080	6.4	LOS A	0.4	3.1	0.57	0.64	51.4
9	R2	82	0.0	23	0.0	0.080	11.0	LOS A	0.4	3.1	0.57	0.64	46.7
Approach		264	0.0	75 N1	0.0	0.080	7.7	LOS A	0.4	3.1	0.57	0.64	47.0
West: Bridge St													
10	L2	211	0.0	211	0.0	0.457	9.0	LOS A	3.2	22.6	0.81	0.86	35.3
11	T1	109	0.0	109	0.0	0.457	9.3	LOS A	3.2	22.6	0.81	0.86	35.3
12	R2	16	0.0	16	0.0	0.457	13.9	LOS A	3.2	22.6	0.81	0.86	50.0
Approach		336	0.0	336	0.0	0.457	9.3	LOS A	3.2	22.6	0.81	0.86	36.8
All Vehicles		1531	0.0	1230 N1	0.0	0.493	8.4	LOS A	3.4	23.6	0.56	0.69	44.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 146.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Bridge St [Bridge St]

Network: 2017_netwo [Epping_2036_am_RMS_Council]

Beecroft Rd - Hight St Bridge St
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: High St													
1	L2	48	0.0	48	0.0	0.042	1.1	LOS A	0.2	1.4	0.36	0.19	48.9
Approach		48	0.0	48	0.0	0.042	1.1	NA	0.2	1.4	0.36	0.19	48.9
East: Bridge													
4	L2	241	0.0	163	0.0	0.476	0.0	LOS A	21.3	149.1	0.00	0.00	54.0
5	T1	400	0.0	270	0.0	0.476	0.0	LOS A	21.3	149.1	0.00	0.00	46.0
6	R2	2002	0.0	1350	0.0	0.476	0.0	LOS A	21.3	149.1	0.00	0.00	52.3
Approach		2643	0.0	1782 N1	0.0	0.476	0.0	NA	21.3	149.1	0.00	0.00	52.1
North: Beecroft Rd													
7	L2	5605	0.0	2023	0.0	0.417	0.1	LOS A	81.6	571.2	0.00	0.00	59.9
Approach		5605	0.0	2023 N1	0.0	0.417	0.1	NA	81.6	571.2	0.00	0.00	59.9
West: Bridge St													
10	L2	457	0.0	400	0.0	0.900	21.2	LOS B	10.6	74.2	0.61	1.19	11.1
Approach		457	0.0	400 N1	0.0	0.900	21.2	LOS B	10.6	74.2	0.61	1.19	11.1
All Vehicles		8754	0.0	4254 N1	0.0	0.900	2.0	NA	81.6	571.2	0.06	0.11	49.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option is selected.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 146.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Carl_Mids [CarlingfordRd_MidsonRd]

Network: 2017_netwo [Epping_2036_am_RMS_Council]

CarlingfordRd_MidsonRd
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Midson Rd													
1	L2	248	0.0	248	0.0	1.106	186.7	LOS F	59.7	417.6	1.00	1.41	12.2
2	T1	214	0.0	214	0.0	1.106	181.2	LOS F	59.7	417.6	1.00	1.41	12.3
3	R2	485	0.0	485	0.0	2.095	1050.1	LOS F	144.2	1009.6	1.00	2.30	1.0
Approach		947	0.0	947	0.0	2.095	627.7	LOS F	144.2	1009.6	1.00	1.86	3.0
East: RoadName													
4	L2	72	0.0	30	0.0	1.590	596.2	LOS F	76.3	534.4	1.00	2.22	4.1
5	T1	1525	0.0	630	0.0	1.590	590.7	LOS F	76.6	536.2	1.00	2.22	5.1
6	R2	69	0.0	29	0.0	0.145	71.9	LOS F	1.9	13.5	0.94	0.72	26.3
Approach		1666	0.0	688 N1	0.0	1.590	569.3	LOS F	76.6	536.2	1.00	2.15	5.2
North: RoadName													
7	L2	253	0.0	253	0.0	1.972	935.1	LOS F	90.3	632.1	1.00	2.39	1.9
8	T1	400	0.0	400	0.0	1.972	927.4	LOS F	128.0	895.9	1.00	2.65	2.9
9	R2	122	0.0	122	0.0	1.972	932.5	LOS F	128.0	895.9	1.00	2.71	3.6
Approach		775	0.0	775	0.0	1.972	930.7	LOS F	128.0	895.9	1.00	2.58	2.7
West: RoadName													
10	L2	65	0.0	65	0.0	2.530	1444.8	LOS F	437.6	3063.5	1.00	3.84	2.4
11	T1	2353	0.0	2353	0.0	2.530	1440.6	LOS F	437.6	3063.5	1.00	3.83	1.2
12	R2	135	0.0	135	0.0	0.184	37.0	LOS C	6.3	44.3	0.69	0.75	33.5
Approach		2553	0.0	2553	0.0	2.530	1366.6	LOS F	437.6	3063.5	0.98	3.67	1.4
All Vehicles		5941	0.0	4963 N1	0.0	2.530	1046.9	LOS F	437.6	3063.5	0.99	2.94	2.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 146.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	35.4	LOS D	0.2	0.2	0.69	0.69
P4	West Full Crossing	53	58.2	LOS E	0.2	0.2	0.88	0.88
All Pedestrians		211	58.0	LOS E			0.87	0.87

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

MOVEMENT SUMMARY

Site: Carlf_Clif [CarlingfordRd_CliffRd]

Network: 2017_netwo [Epping_2036_am_RMS_Council]

CarlingfordRd_CliffRd
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: RoadName													
1	L2	1	0.0	1	0.0	12.944	10918.7	LOS F	74.6	521.9	1.00	1.38	0.1
2	T1	100	0.0	78	0.0	12.944	10956.8	LOS F	74.6	521.9	1.00	1.38	0.2
3	R2	569	0.0	442	0.0	147.415	131839.2	LOS F	74.6	521.9	1.00	1.41	0.0
Approach		671	0.0	521 N1	0.0	147.415	113621.3	LOS F	74.6	521.9	1.00	1.41	0.0
East: Carlingford Rd													
4	L2	1	0.0	0	0.0	0.145	5.5	LOS A	0.0	0.0	0.00	0.00	59.9
5	T1	1417	0.0	566	0.0	0.145	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1418	0.0	566 N1	0.0	0.145	0.0	NA	0.0	0.0	0.00	0.00	59.9
North: RoadName													
7	L2	95	0.0	95	0.0	35.840	31439.8	LOS F	210.2	1471.1	1.00	1.69	0.1
8	T1	114	0.0	114	0.0	35.840	31453.0	LOS F	210.2	1471.1	1.00	1.69	0.1
9	R2	256	0.0	256	0.0	35.840	31458.2	LOS F	210.2	1471.1	1.00	1.44	0.1
Approach		464	0.0	464	0.0	35.840	31453.2	LOS F	210.2	1471.1	1.00	1.55	0.1
West: Carlingford Rd													
10	L2	60	0.0	38	0.0	0.523	5.6	LOS A	79.3	554.9	0.00	0.02	57.7
11	T1	3163	0.0	2000	0.0	0.523	0.1	LOS A	79.3	554.9	0.00	0.01	59.5
Approach		3223	0.0	2038 N1	0.0	0.523	0.2	NA	79.3	554.9	0.00	0.01	59.5
All Vehicles		5776	0.0	3589 N1	0.0	147.415	20552.2	NA	210.2	1471.1	0.27	0.41	0.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 146.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Friday, 20 April 2018 8:21:28 AM
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MOVEMENT SUMMARY

Site: Carli_Kent [CarlingfordRd_KentSt]

Network: 2017_network [Epping_2036_am_RMS_Council]

CarlingfordRd_KentSt
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Kent St													
1	L2	145	0.0	145	0.0	0.178	6.6	LOS A	0.5	3.7	0.34	0.62	45.6
3	R2	80	0.0	80	0.0	26.666	23266.8	LOS F	78.1	546.7	1.00	1.38	0.1
Approach		225	0.0	225	0.0	26.666	8267.3	LOS F	78.1	546.7	0.58	0.89	0.2
East: Carlingford Rd													
4	L2	191	0.0	68	0.0	0.199	5.6	LOS A	0.0	0.0	0.00	0.13	56.1
5	T1	1521	0.0	543	0.0	0.199	0.0	LOS A	0.0	0.0	0.00	0.06	58.5
Approach		1712	0.0	611 N1	0.0	0.199	0.6	NA	0.0	0.0	0.00	0.07	58.0
North: Kent St													
7	L2	263	0.0	263	0.0	1.611	575.3	LOS F	66.5	465.7	1.00	6.81	3.0
Approach		263	0.0	263	0.0	1.611	575.3	LOS F	66.5	465.7	1.00	6.81	3.0
West: Carlingford Rd													
11	T1	2882	0.0	1807	0.0	0.562	1.1	LOS A	59.0	413.2	0.16	0.06	56.4
12	R2	235	0.0	147	0.0	0.562	12.2	LOS A	59.0	413.2	0.42	0.14	53.3
Approach		3117	0.0	1954 N1	0.0	0.562	1.9	NA	59.0	413.2	0.18	0.06	56.0
All Vehicles		5317	0.0	3053 N1	0.0	26.666	660.9	NA	78.1	546.7	0.25	0.71	2.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 146.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Friday, 20 April 2018 8:21:28 AM
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MOVEMENT SUMMARY

Site: Rawson [1Carlingford Rd - Ray St - Rawson St]

Network: 2017_netwo [Epping_2036_am_RMS_Council]

Carlingford Rd - Ray St - Rawson St
Signals - Fixed Time Coordinated Cycle Time = 180 seconds (Network Cycle Time - Program)
Common Control Group: carl [Carlingford Rd]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Rawson St													
1	L2	92	0.0	73	0.0	0.217	87.1	LOS F	3.0	20.9	0.96	0.74	4.4
Approach		92	0.0	73 N1	0.0	0.217	87.1	LOS F	3.0	20.9	0.96	0.74	4.4
East: Carlingford Rd													
4	L2	448	0.0	167	0.0	0.205	6.7	LOS A	4.3	30.2	0.17	0.39	29.8
5	T1	1324	0.0	492	0.0	0.205	3.4	LOS A	7.4	51.9	0.25	0.30	31.7
Approach		1773	0.0	659 N1	0.0	0.205	4.2	LOS A	7.4	51.9	0.23	0.32	31.2
North: Ray St													
7	L2	134	0.0	134	0.0	0.720	98.3	LOS F	6.2	43.4	1.00	0.86	4.0
Approach		134	0.0	134	0.0	0.720	98.3	LOS F	6.2	43.4	1.00	0.86	4.0
West: Carlingford Rd													
10	L2	205	0.0	106	0.0	1.191	243.7	LOS F	23.3	163.2	1.00	1.70	1.7
11	T1	3622	0.0	1877	0.0	1.191	239.0	LOS F	23.3	163.2	1.00	1.72	1.7
Approach		3827	0.0	1984 N1	0.0	1.191	239.2	LOS F	23.3	163.2	1.00	1.72	1.7
All Vehicles		5825	0.0	2849 N1	0.0	1.191	174.4	LOS F	23.3	163.2	0.82	1.33	2.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 146.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Friday, 20 April 2018 8:21:28 AM
Project: C:\Epping_SIDRA\Epping_2036_am_RMS_Council.sip7

MOVEMENT SUMMARY

Site: Blaxland [Epping_Blaxland]

Network: 2017_netwo [Epping_2036_am_RMS_Counc il]

New Site
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Blaxland Rd													
1	L2	979	0.0	979	0.0	0.954	80.5	LOS F	28.0	195.8	1.00	1.11	5.5
2	T1	279	0.0	279	0.0	1.448	468.8	LOS F	28.0	195.8	1.00	1.99	2.1
Approach		1258	0.0	1258	0.0	1.448	166.6	LOS F	28.0	195.8	1.00	1.30	3.4
East: Epping Rd													
4	L2	3	0.0	2	0.0	0.003	33.6	LOS C	0.1	0.7	0.62	0.62	16.7
5	T1	1643	0.0	1181	0.0	1.513	530.7	LOS F	46.6	326.4	1.00	2.56	1.4
Approach		1646	0.0	1183 N1	0.0	1.513	529.7	LOS F	46.6	326.4	1.00	2.56	1.4
North: Landston Place													
7	L2	2	0.0	2	0.0	1.515	531.2	LOS F	73.0	511.1	1.00	2.15	1.2
8	T1	665	0.0	665	0.0	1.515	525.6	LOS F	73.5	514.5	1.00	2.15	1.2
Approach		667	0.0	667	0.0	1.515	525.7	LOS F	73.5	514.5	1.00	2.15	1.2
West: Bridge St													
10	L2	431	0.0	157	0.0	0.128	6.7	LOS A	2.0	13.8	0.23	0.60	39.5
11	T1	3687	0.0	1345	0.0	0.635	15.3	LOS B	14.0	97.9	0.61	0.56	14.3
12	R2	1488	0.0	543	0.0	1.527	541.7	LOS F	14.0	97.9	1.00	2.48	0.5
Approach		5606	0.0	2045 N1	0.0	1.527	154.4	LOS F	14.0	97.9	0.68	1.07	2.0
All Vehicles		9178	0.0	5153 N1	0.0	1.527	291.6	LOS F	73.5	514.5	0.87	1.61	1.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 146.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Friday, 20 April 2018 8:21:28 AM
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MOVEMENT SUMMARY

Site: Essex St [Essex St]

Network: 2017_network [Epping_2036_am_RMS_Council]

Epping Essex St
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Essex St													
1	L2	25	0.0	25	0.0	0.136	72.9	LOS F	1.7	12.0	0.95	0.72	5.2
2	T1	51	0.0	51	0.0	0.259	68.4	LOS E	3.5	24.4	0.96	0.73	10.8
3	R2	262	0.0	262	0.0	1.428	457.0	LOS F	53.4	373.8	1.00	1.65	0.9
Approach		338	0.0	338	0.0	1.428	370.2	LOS F	53.4	373.8	0.99	1.44	1.2
East: Epping Rd													
4	L2	32	0.0	32	0.0	1.398	414.2	LOS F	36.1	253.0	1.00	2.01	2.1
5	T1	1021	0.0	1021	0.0	1.398	408.7	LOS F	36.1	253.0	1.00	2.01	1.4
Approach		1053	0.0	1053	0.0	1.398	408.8	LOS F	36.1	253.0	1.00	2.01	1.4
North: Essex St													
7	L2	42	0.0	42	0.0	0.041	22.0	LOS B	1.4	9.7	0.49	0.67	22.2
8	T1	66	0.0	66	0.0	0.062	16.6	LOS B	2.2	15.4	0.49	0.39	32.1
9	R2	752	0.0	752	0.0	1.521	543.3	LOS F	175.4	1227.6	1.00	1.84	1.4
Approach		860	0.0	860	0.0	1.521	477.2	LOS F	175.4	1227.6	0.94	1.67	1.6
West: Epping Rd													
10	L2	142	0.0	47	0.0	1.524	525.1	LOS F	28.0	195.8	1.00	2.21	1.7
11	T1	3355	0.0	1101	0.0	1.524	519.5	LOS F	28.0	195.8	1.00	2.21	0.9
Approach		3497	0.0	1147 [N1]	0.0	1.524	519.8	LOS F	28.0	195.8	1.00	2.21	0.9
All Vehicles		5747	0.0	3398 [N1]	0.0	1.524	459.7	LOS F	175.4	1227.6	0.98	1.94	1.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 146.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Forrest Gr [Forrest Grove]

Network: 2017_netwo [Epping_2036_am_RMS_Council]

Epping Rd Forrest Grove
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Forrest Grove													
1	L2	44	0.0	44	0.0	0.055	8.4	LOS A	0.2	1.6	0.51	0.66	27.2
Approach		44	0.0	44	0.0	0.055	8.4	LOS A	0.2	1.6	0.51	0.66	27.2
East: Epping Rd													
4	L2	199	0.0	138	0.0	0.075	5.5	LOS A	0.0	0.0	0.00	0.58	35.7
5	T1	1599	0.0	1113	0.0	0.285	0.0	LOS A	28.0	195.8	0.00	0.00	59.9
Approach		1798	0.0	1251 N1	0.0	0.285	0.6	NA	28.0	195.8	0.00	0.06	55.6
West: Epping Rd													
11	T1	3497	0.0	1212	0.0	0.311	0.0	LOS A	11.7	81.6	0.00	0.00	59.9
Approach		3497	0.0	1212 N1	0.0	0.311	0.0	NA	11.7	81.6	0.00	0.00	59.9
All Vehicles		5339	0.0	2508 N1	0.0	0.311	0.5	NA	28.0	195.8	0.01	0.04	55.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 146.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: Eppimg_Pem [EppingRd_PembrokeSt]

Network: 2017_netwo [Epping_2036_am_RMS_Council]

EppingRd_PembrokeSt
Signals - Fixed Time Coordinated Cycle Time = 180 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Epping Rd													
1	L2	9	0.0	3	0.0	0.329	11.8	LOS A	12.6	88.5	0.32	0.29	44.6
2	T1	3684	0.0	995	0.0	0.329	6.2	LOS A	12.6	88.5	0.32	0.29	51.7
Approach		3694	0.0	998 N1	0.0	0.329	6.2	LOS A	12.6	88.5	0.32	0.29	51.7
North: Epping Rd													
8	T1	951	0.0	951	0.0	0.627	9.2	LOS A	17.8	124.8	0.47	0.44	46.2
9	R2	312	0.0	312	0.0	0.962	103.4	LOS F	36.9	258.3	0.90	1.06	18.1
Approach		1262	0.0	1262	0.0	0.962	32.4	LOS C	36.9	258.3	0.58	0.59	30.7
West: Pembroke St													
10	L2	942	0.0	942	0.0	1.640	650.4	LOS F	120.4	842.5	1.00	1.72	3.7
Approach		942	0.0	942	0.0	1.640	650.4	LOS F	120.4	842.5	1.00	1.72	3.7
All Vehicles		5898	0.0	3202 N1	0.0	1.640	206.1	LOS F	120.4	842.5	0.62	0.83	9.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 146.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	74.9	LOS F	0.2	0.2	0.91	0.91
P3	North Full Crossing	53	77.6	LOS F	0.3	0.3	0.93	0.93
P4	West Full Crossing	53	6.7	LOS A	0.1	0.1	0.27	0.27
All Pedestrians		158	53.1	LOS E			0.71	0.71

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: Smith St [Smith St]

Network: 2017_netwo [Epping_2036_am_RMS_Council]

Epping Rd - Smith St

Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Epping Rd													
5	T1	1643	0.0	1180	0.0	0.202	0.0	LOS A	11.7	81.6	0.00	0.00	60.0
Approach		1643	0.0	1180 [N1]	0.0	0.202	0.0	NA	11.7	81.6	0.00	0.00	60.0
North: Smith St													
7	L2	13	0.0	13	0.0	0.035	8.5	LOS A	0.1	0.4	0.51	0.69	35.9
Approach		13	0.0	13	0.0	0.035	8.5	LOS A	0.1	0.4	0.51	0.69	35.9
West: Epping Rd													
10	L2	204	0.0	74	0.0	0.343	5.6	LOS A	46.6	326.4	0.00	0.07	54.7
11	T1	3484	0.0	1260	0.0	0.343	0.0	LOS A	46.6	326.4	0.00	0.03	58.6
Approach		3688	0.0	1334 [N1]	0.0	0.343	0.3	NA	46.6	326.4	0.00	0.03	58.2
All Vehicles		5344	0.0	2526 [N1]	0.0	0.343	0.2	NA	46.6	326.4	0.00	0.02	58.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 146.2 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: Beec-Carl [Beecroft-Carlingford]

Network: 2017_netwo [Epping_2036_pm_RMS_Council]

Beecroft Rd - Carlingford Rd
Signals - Fixed Time Coordinated Cycle Time = 180 seconds (Network Cycle Time - Program)
Common Control Group: carl [Carlingford Rd]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Beecroft Rd													
1	L2	1518	0.0	719	0.0	0.325	9.3	LOS A	11.7	82.2	0.12	0.57	42.7
2	T1	2559	0.0	1213	0.0	2.704	1587.6	LOS F	81.6	571.2	1.00	2.95	0.8
Approach		4077	0.0	1932 N1	0.0	2.704	1000.0	LOS F	81.6	571.2	0.67	2.06	1.3
North: Beecroft Rd													
8	T1	1285	0.0	1285	0.0	1.097	176.4	LOS F	116.6	816.0	1.00	1.43	8.8
9	R2	664	0.0	664	0.0	2.706	1614.2	LOS F	116.6	816.0	1.00	2.32	1.1
Approach		1949	0.0	1949	0.0	2.706	666.3	LOS F	116.6	816.0	1.00	1.73	2.6
West: Carlingford Rd													
10	L2	502	0.0	285	0.0	0.203	5.9	LOS A	2.1	14.6	0.11	0.57	27.4
12	R2	1794	0.0	1019	0.0	0.887	19.8	LOS B	14.0	97.9	0.38	0.71	11.9
Approach		2296	0.0	1304 N1	0.0	0.887	16.8	LOS B	14.0	97.9	0.32	0.68	13.6
All Vehicles		8322	0.0	5185 N1	0.0	2.706	627.3	LOS F	116.6	816.0	0.71	1.59	1.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 140.1 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Friday, 20 April 2018 8:47:34 AM
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MOVEMENT SUMMARY

Site: Bridge St [Bridge St]

Network: 2017_netwo [Epping_2036_pm_RMS_Council]

Beecroft Rd - Hight St Bridge St
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: High St													
1	L2	63	0.0	63	0.0	0.056	1.3	LOS A	0.3	1.9	0.38	0.22	48.8
Approach		63	0.0	63	0.0	0.056	1.3	NA	0.3	1.9	0.38	0.22	48.8
East: Bridge													
4	L2	397	0.0	167	0.0	0.534	0.0	LOS A	21.3	149.1	0.00	0.00	54.1
5	T1	707	0.0	297	0.0	0.534	0.0	LOS A	21.3	149.1	0.00	0.00	46.5
6	R2	3646	0.0	1533	0.0	0.534	0.0	LOS A	21.3	149.1	0.00	0.00	52.4
Approach		4751	0.0	1997 N1	0.0	0.534	0.0	NA	21.3	149.1	0.00	0.00	52.1
North: Beecroft Rd													
7	L2	3079	0.0	2179	0.0	0.449	0.1	LOS A	81.6	571.2	0.00	0.00	59.8
Approach		3079	0.0	2179 N1	0.0	0.449	0.1	NA	81.6	571.2	0.00	0.00	59.8
West: Bridge St													
10	L2	431	0.0	405	0.0	0.986	46.2	LOS D	17.9	125.4	0.66	1.98	6.3
Approach		431	0.0	405 N1	0.0	0.986	46.2	LOS D	17.9	125.4	0.66	1.98	6.3
All Vehicles		8323	0.0	4644 N1	0.0	0.986	4.1	NA	81.6	571.2	0.06	0.18	45.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option is selected.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 140.1 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: BridgeRaws [BridgeSt_RawsonSt]

Network: 2017_netwo [Epping_2036_pm_RMS_Council]

BridgeSt_RawsonSt
Roundabout

Movement Performance - Vehicles														
Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Rawson St													
1	L2	3	0.0	3	0.0	0.716	9.3	LOS A	6.0	41.7	0.71	0.85	46.7
2	T1	296	0.0	296	0.0	0.716	9.5	LOS A	6.0	41.7	0.71	0.85	44.1
3	R2	291	0.0	291	0.0	0.716	14.1	LOS A	6.0	41.7	0.71	0.85	44.1
Approach		589	0.0	589	0.0	0.716	11.8	LOS A	6.0	41.7	0.71	0.85	44.1
East: Bridge St													
4	L2	29	0.0	14	0.0	0.276	4.3	LOS A	1.6	11.3	0.28	0.50	49.9
5	T1	485	0.0	226	0.0	0.276	4.5	LOS A	1.6	11.3	0.28	0.50	46.1
6	R2	226	0.0	106	0.0	0.276	9.1	LOS A	1.6	11.3	0.28	0.50	32.8
Approach		741	0.0	346 N1	0.0	0.276	5.9	LOS A	1.6	11.3	0.28	0.50	43.8
North: Rawson St													
7	L2	42	0.0	16	0.0	0.098	5.7	LOS A	0.5	3.7	0.53	0.63	37.7
8	T1	101	0.0	39	0.0	0.098	5.9	LOS A	0.5	3.7	0.53	0.63	51.2
9	R2	98	0.0	38	0.0	0.098	10.6	LOS A	0.5	3.7	0.53	0.63	46.4
Approach		241	0.0	94 N1	0.0	0.098	7.8	LOS A	0.5	3.7	0.53	0.63	48.2
West: Bridge St													
10	L2	142	0.0	142	0.0	0.411	8.5	LOS A	2.2	15.7	0.81	0.84	36.1
11	T1	87	0.0	87	0.0	0.411	8.8	LOS A	2.2	15.7	0.81	0.84	36.1
12	R2	6	0.0	6	0.0	0.411	13.4	LOS A	2.2	15.7	0.81	0.84	50.6
Approach		236	0.0	236	0.0	0.411	8.8	LOS A	2.2	15.7	0.81	0.84	37.0
All Vehicles		1807	0.0	1265 N1	0.0	0.716	9.3	LOS A	6.0	41.7	0.60	0.74	43.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 140.1 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Friday, 20 April 2018 8:47:34 AM
Project: C:\Epping_SIDRA\Epping_2036_pm_RMS_Council.sip7

MOVEMENT SUMMARY

Site: Carlf_Clif [CarlingfordRd_CliffRd]

Network: 2017_netwo [Epping_2036_pm_RMS_Council]

CarlingfordRd_CliffRd
Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: RoadName													
1	L2	1	0.0	1	0.0	8.209	6552.2	LOS F	74.6	521.9	1.00	1.99	0.1
2	T1	197	0.0	149	0.0	8.209	6574.6	LOS F	74.6	521.9	1.00	1.99	0.4
3	R2	573	0.0	433	0.0	89.297	79526.2	LOS F	74.6	521.9	1.00	1.61	0.0
Approach		771	0.0	583 N1	0.0	89.297	60790.0	LOS F	74.6	521.9	1.00	1.71	0.0
East: Carlingford Rd													
4	L2	1	0.0	0	0.0	0.236	5.5	LOS A	0.0	0.0	0.00	0.00	59.9
5	T1	2004	0.0	921	0.0	0.236	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		2005	0.0	922 N1	0.0	0.236	0.0	NA	0.0	0.0	0.00	0.00	59.9
North: RoadName													
7	L2	56	0.0	56	0.0	15.550	13169.0	LOS F	140.9	986.3	1.00	2.08	0.1
8	T1	65	0.0	65	0.0	15.550	13179.1	LOS F	140.9	986.3	1.00	2.08	0.1
9	R2	192	0.0	192	0.0	15.550	13220.1	LOS F	140.9	986.3	1.00	1.69	0.1
Approach		313	0.0	313	0.0	15.550	13202.4	LOS F	140.9	986.3	1.00	1.84	0.1
West: Carlingford Rd													
10	L2	112	0.0	83	0.0	0.362	5.6	LOS A	34.2	239.1	0.00	0.07	57.3
11	T1	1789	0.0	1326	0.0	0.362	0.0	LOS A	35.0	245.1	0.00	0.03	59.1
Approach		1901	0.0	1409 N1	0.0	0.362	0.4	NA	35.0	245.1	0.00	0.04	58.8
All Vehicles		4989	0.0	3226 N1	0.0	89.297	12263.5	NA	140.9	986.3	0.28	0.50	0.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 140.1 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Friday, 20 April 2018 8:47:34 AM
Project: C:\Epping_SIDRA\Epping_2036_pm_RMS_Council.sip7

MOVEMENT SUMMARY

Site: Carli_Kent [CarlingfordRd_KentSt]

Network: 2017_netwo [Epping_2036_pm_RMS_Council]

CarlingfordRd_KentSt
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Kent St													
1	L2	181	0.0	181	0.0	0.335	7.8	LOS A	0.8	5.9	0.45	0.74	44.3
3	R2	59	0.0	59	0.0	6.961	5568.6	LOS F	48.2	337.2	1.00	1.48	0.2
Approach		240	0.0	240	0.0	6.961	1373.6	LOS F	48.2	337.2	0.59	0.92	0.9
East: Carlingford Rd													
4	L2	191	0.0	83	0.0	0.372	5.6	LOS A	0.0	0.0	0.00	0.11	56.3
5	T1	1994	0.0	864	0.0	0.372	0.1	LOS A	0.0	0.0	0.00	0.05	58.7
Approach		2184	0.0	946 N1	0.0	0.372	0.5	NA	0.0	0.0	0.00	0.05	58.3
North: Kent St													
7	L2	51	0.0	51	0.0	0.115	13.0	LOS A	0.4	2.9	0.70	0.87	42.3
Approach		51	0.0	51	0.0	0.115	13.0	LOS A	0.4	2.9	0.70	0.87	42.3
West: Carlingford Rd													
11	T1	1792	0.0	1349	0.0	0.485	2.0	LOS A	60.7	425.2	0.20	0.07	54.5
12	R2	176	0.0	132	0.0	0.485	16.1	LOS B	60.7	425.2	0.66	0.23	49.1
Approach		1967	0.0	1481 N1	0.0	0.485	3.3	NA	60.7	425.2	0.24	0.08	53.7
All Vehicles		4442	0.0	2718 N1	0.0	6.961	123.5	NA	60.7	425.2	0.20	0.16	10.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 140.1 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Friday, 20 April 2018 8:47:34 AM
Project: C:\Epping_SIDRA\Epping_2036_pm_RMS_Council.sip7

MOVEMENT SUMMARY

Site: Carl_Mids [CarlingfordRd_MidsonRd]

Network: 2017_netwo [Epping_2036_pm_RMS_Counc il]

CarlingfordRd_MidsonRd
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Midson Rd													
1	L2	221	0.0	221	0.0	1.370	405.7	LOS F	101.3	709.0	1.00	2.03	6.3
2	T1	421	0.0	421	0.0	1.370	400.2	LOS F	101.3	709.0	1.00	1.97	6.3
3	R2	396	0.0	396	0.0	1.370	405.9	LOS F	99.6	697.5	1.00	1.82	2.6
Approach		1038	0.0	1038	0.0	1.370	403.6	LOS F	101.3	709.0	1.00	1.93	4.9
East: RoadName													
4	L2	36	0.0	17	0.0	1.329	370.8	LOS F	92.4	646.6	1.00	2.11	6.4
5	T1	1984	0.0	948	0.0	1.329	365.5	LOS F	92.4	646.6	1.00	2.09	7.8
6	R2	177	0.0	84	0.0	0.235	60.6	LOS E	5.2	36.6	0.89	0.77	28.8
Approach		2197	0.0	1050 N1	0.0	1.329	341.1	LOS F	92.4	646.6	0.99	1.98	8.3
North: RoadName													
7	L2	137	0.0	137	0.0	1.075	166.9	LOS F	28.8	201.8	1.00	1.34	9.3
8	T1	262	0.0	262	0.0	1.075	161.3	LOS F	29.1	203.5	1.00	1.34	13.5
9	R2	93	0.0	93	0.0	1.075	166.8	LOS F	29.1	203.5	1.00	1.34	15.9
Approach		492	0.0	492	0.0	1.075	163.9	LOS F	29.1	203.5	1.00	1.34	12.9
West: RoadName													
10	L2	88	0.0	88	0.0	1.347	382.3	LOS F	162.8	1139.8	1.00	2.20	8.1
11	T1	1445	0.0	1445	0.0	1.347	378.1	LOS F	162.8	1139.8	1.00	2.23	4.4
12	R2	285	0.0	285	0.0	0.630	48.4	LOS D	16.4	115.1	0.85	0.81	29.7
Approach		1819	0.0	1819	0.0	1.347	326.6	LOS F	162.8	1139.8	0.98	2.01	5.7
All Vehicles		5545	0.0	4398 N1	0.0	1.370	330.0	LOS F	162.8	1139.8	0.99	1.91	6.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 140.1 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	59.1	LOS E	0.2	0.2	0.89	0.89
P2	East Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	42.7	LOS E	0.2	0.2	0.75	0.75
P4	West Full Crossing	53	60.9	LOS F	0.2	0.2	0.90	0.90
All Pedestrians		211	58.0	LOS E			0.88	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

MOVEMENT SUMMARY

Site: Rawson [1Carlingford Rd - Ray St - Rawson St]

Network: 2017_netwo [Epping_2036_pm_RMS_Council]

Carlingford Rd - Ray St - Rawson St
Signals - Fixed Time Coordinated Cycle Time = 180 seconds (Network Cycle Time - Program)
Common Control Group: carl [Carlingford Rd]

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Rawson St													
1	L2	151	0.0	120	0.0	0.081	35.7	LOS C	3.0	20.8	0.61	0.71	9.8
Approach		151	0.0	120 N1	0.0	0.081	35.7	LOS C	3.0	20.8	0.61	0.71	9.8
East: Carlingford Rd													
4	L2	328	0.0	145	0.0	0.509	37.2	LOS C	14.0	97.9	0.71	0.68	7.1
5	T1	1854	0.0	818	0.0	0.509	36.2	LOS C	14.0	97.9	0.79	0.73	6.7
Approach		2182	0.0	963 N1	0.0	0.509	36.4	LOS C	14.0	97.9	0.78	0.72	6.7
North: Ray St													
7	L2	84	0.0	84	0.0	0.053	35.2	LOS C	2.1	14.9	0.60	0.69	9.9
Approach		84	0.0	84	0.0	0.053	35.2	LOS C	2.1	14.9	0.60	0.69	9.9
West: Carlingford Rd													
10	L2	183	0.0	101	0.0	0.730	44.1	LOS D	23.3	163.2	0.86	0.80	9.0
11	T1	2234	0.0	1232	0.0	0.730	38.5	LOS C	23.3	163.2	0.86	0.79	9.1
Approach		2417	0.0	1333 N1	0.0	0.730	38.9	LOS C	23.3	163.2	0.86	0.79	9.1
All Vehicles		4834	0.0	2500 N1	0.0	0.730	37.7	LOS C	23.3	163.2	0.81	0.76	8.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 140.1 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Friday, 20 April 2018 8:47:34 AM
Project: C:\Epping_SIDRA\Epping_2036_pm_RMS_Council.sip7

MOVEMENT SUMMARY

Site: Blaxland [Epping_Blaxland]

Network: 2017_netwo [Epping_2036_pm_RMS_Counc il]

New Site
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Blaxland Rd													
1	L2	1381	0.0	1381	0.0	1.156	197.5	LOS F	28.0	195.8	1.00	1.33	2.0
2	T1	423	0.0	423	0.0	2.023	973.0	LOS F	28.0	195.8	1.00	2.68	1.1
Approach		1804	0.0	1804	0.0	2.023	379.4	LOS F	28.0	195.8	1.00	1.64	1.5
East: Epping Rd													
4	L2	3	0.0	2	0.0	0.002	32.9	LOS C	0.1	0.4	0.61	0.61	16.9
5	T1	3371	0.0	1636	0.0	2.061	1020.9	LOS F	46.6	326.4	1.00	3.33	0.7
Approach		3374	0.0	1637 N1	0.0	2.061	1019.9	LOS F	46.6	326.4	1.00	3.33	0.7
North: Landston Place													
7	L2	2	0.0	2	0.0	1.863	834.3	LOS F	52.2	365.1	1.00	2.07	0.8
8	T1	385	0.0	385	0.0	1.863	828.8	LOS F	52.2	365.3	1.00	2.07	0.8
Approach		387	0.0	387	0.0	1.863	828.8	LOS F	52.2	365.3	1.00	2.07	0.8
West: Bridge St													
10	L2	481	0.0	327	0.0	0.272	7.5	LOS A	5.1	35.6	0.27	0.62	38.2
11	T1	1320	0.0	897	0.0	0.432	9.6	LOS A	14.0	97.9	0.44	0.39	19.9
12	R2	1279	0.0	869	0.0	2.059	1013.2	LOS F	14.0	97.9	1.00	3.22	0.3
Approach		3080	0.0	2094 N1	0.0	2.059	426.0	LOS F	14.0	97.9	0.65	1.60	0.8
All Vehicles		8645	0.0	5923 N1	0.0	2.061	602.3	LOS F	52.2	365.3	0.87	2.12	0.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 140.1 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: Essex St [Essex St]

Network: 2017_netwo [Epping_2036_pm_RMS_Counc il]

Epping Essex St
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Essex St													
1	L2	18	0.0	18	0.0	0.131	77.4	LOS F	1.3	8.8	0.97	0.70	4.9
2	T1	78	0.0	78	0.0	0.545	75.0	LOS F	5.7	40.0	1.00	0.77	10.0
3	R2	177	0.0	177	0.0	1.298	346.6	LOS F	31.1	217.8	1.00	1.49	1.1
Approach		273	0.0	273	0.0	1.298	251.3	LOS F	31.1	217.8	1.00	1.23	2.0
East: Epping Rd													
4	L2	56	0.0	32	0.0	1.331	357.0	LOS F	36.1	253.0	1.00	2.07	2.5
5	T1	2921	0.0	1662	0.0	1.331	351.5	LOS F	36.1	253.0	1.00	2.08	1.6
Approach		2977	0.0	1694 [N1]	0.0	1.331	351.6	LOS F	36.1	253.0	1.00	2.08	1.6
North: Essex St													
7	L2	26	0.0	26	0.0	0.032	30.5	LOS C	1.1	7.4	0.59	0.68	17.9
8	T1	23	0.0	23	0.0	0.027	24.8	LOS B	0.9	6.5	0.59	0.44	26.2
9	R2	547	0.0	547	0.0	1.355	398.7	LOS F	109.6	767.4	1.00	1.65	1.8
Approach		597	0.0	597	0.0	1.355	367.9	LOS F	109.6	767.4	0.97	1.56	2.0
West: Epping Rd													
10	L2	87	0.0	62	0.0	0.741	40.1	LOS C	24.7	173.2	0.95	0.85	18.2
11	T1	1242	0.0	880	0.0	0.741	34.6	LOS C	24.9	174.3	0.95	0.84	11.6
Approach		1329	0.0	941 [N1]	0.0	0.741	34.9	LOS C	24.9	174.3	0.95	0.84	12.1
All Vehicles		5176	0.0	3505 [N1]	0.0	1.355	261.5	LOS F	109.6	767.4	0.98	1.59	2.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 140.1 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Friday, 20 April 2018 8:47:34 AM
Project: C:\Epping_SIDRA\Epping_2036_pm_RMS_Council.sip7

MOVEMENT SUMMARY

Site: Forrest Gr [Forrest Grove]

Network: 2017_netwo [Epping_2036_pm_RMS_Council]

Epping Rd Forrest Grove
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Forrest Grove													
1	L2	32	0.0	32	0.0	0.053	10.5	LOS A	0.2	1.5	0.60	0.75	23.9
Approach		32	0.0	32	0.0	0.053	10.5	LOS A	0.2	1.5	0.60	0.75	23.9
East: Epping Rd													
4	L2	148	0.0	71	0.0	0.038	5.5	LOS A	0.0	0.0	0.00	0.58	35.7
5	T1	3339	0.0	1602	0.0	0.411	0.0	LOS A	28.0	195.8	0.00	0.00	59.9
Approach		3487	0.0	1673 N1	0.0	0.411	0.2	NA	28.0	195.8	0.00	0.02	58.1
West: Epping Rd													
11	T1	1331	0.0	911	0.0	0.382	0.0	LOS A	0.0	0.0	0.00	0.00	59.8
Approach		1331	0.0	911 N1	0.0	0.382	0.0	NA	0.0	0.0	0.00	0.00	59.8
All Vehicles		4849	0.0	2615 N1	0.0	0.411	0.3	NA	28.0	195.8	0.01	0.02	57.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 140.1 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Friday, 20 April 2018 8:47:34 AM
Project: C:\Epping_SIDRA\Epping_2036_pm_RMS_Council.sip7

MOVEMENT SUMMARY

Site: Eppimg_Pem [EppingRd_PembrokeSt]

Network: 2017_netwo [Epping_2036_pm_RMS_Council]

EppingRd_PembrokeSt
Signals - Fixed Time Coordinated Cycle Time = 180 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Epping Rd													
1	L2	58	0.0	42	0.0	0.311	9.3	LOS A	9.8	68.8	0.25	0.27	47.7
2	T1	1308	0.0	959	0.0	0.311	3.7	LOS A	9.9	69.1	0.25	0.25	54.4
Approach		1366	0.0	1002 N1	0.0	0.311	4.0	LOS A	9.9	69.1	0.25	0.25	54.2
North: Epping Rd													
8	T1	2903	0.0	2903	0.0	1.799	792.4	LOS F	427.7	2994.1	1.00	2.83	2.2
9	R2	338	0.0	338	0.0	1.002	129.7	LOS F	49.3	344.8	1.00	1.15	15.4
Approach		3241	0.0	3241	0.0	1.799	723.3	LOS F	427.7	2994.1	1.00	2.66	2.5
West: Pembroke St													
10	L2	468	0.0	468	0.0	1.195	273.5	LOS F	38.9	272.1	1.00	1.28	8.1
Approach		468	0.0	468	0.0	1.195	273.5	LOS F	38.9	272.1	1.00	1.28	8.1
All Vehicles		5076	0.0	4711 N1	0.0	1.799	525.6	LOS F	427.7	2994.1	0.84	2.01	3.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 140.1 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	83.3	LOS F	0.3	0.3	0.96	0.96
P3	North Full Crossing	53	84.3	LOS F	0.3	0.3	0.97	0.97
P4	West Full Crossing	53	4.5	LOS A	0.1	0.1	0.22	0.22
All Pedestrians		158	57.4	LOS E			0.72	0.72

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: C:\Epping_SIDRA\Epping_2036_pm_RMS_Council.sip7

MOVEMENT SUMMARY

Site: Smith St [Smith St]

Network: 2017_netwo [Epping_2036_pm_RMS_Counc il]

Epping Rd - Smith St

Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Epping Rd													
5	T1	3371	0.0	1634	0.0	0.279	0.0	LOS A	11.7	81.6	0.00	0.00	59.9
Approach		3371	0.0	1634 N1	0.0	0.279	0.0	NA	11.7	81.6	0.00	0.00	59.9
North: Smith St													
7	L2	19	0.0	19	0.0	0.022	7.6	LOS A	0.1	0.6	0.45	0.63	37.4
Approach		19	0.0	19	0.0	0.022	7.6	LOS A	0.1	0.6	0.45	0.63	37.4
West: Epping Rd													
10	L2	9	0.0	7	0.0	0.240	5.5	LOS A	0.0	0.0	0.00	0.01	55.9
11	T1	1314	0.0	930	0.0	0.240	0.0	LOS A	0.0	0.0	0.00	0.00	59.8
Approach		1323	0.0	936 N1	0.0	0.240	0.1	NA	0.0	0.0	0.00	0.00	59.7
All Vehicles		4713	0.0	2589 N1	0.0	0.279	0.1	NA	11.7	81.6	0.00	0.01	59.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 140.1 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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Project: C:\Epping_SIDRA\Epping_2036_pm_RMS_Council.sip7

Appendix M

Austino Site Analysis

J17056RP4

MOVEMENT SUMMARY

Site: Blaxland [Epping_Blaxland]

Network: 2026 netwk [2026_4000_am_network]

New Site
Signals - Fixed Time Isolated   Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Blaxland Rd													
1	L2	891	0.0	891	0.0	0.926	76.2	LOS F	28.0	195.8	1.00	1.11	5.8
2	T1	157	0.0	157	0.0	1.709	695.3	LOS F	28.0	195.8	1.00	1.90	1.5
Approach		1047	0.0	1047	0.0	1.709	168.9	LOS F	28.0	195.8	1.00	1.23	3.2
East: Epping Rd													
4	L2	1	0.0	1	0.0	0.001	38.1	LOS C	0.0	0.3	0.66	0.60	15.2
5	T1	1327	0.0	1231	0.0	1.787	773.5	LOS F	46.6	326.4	1.00	2.89	1.0
Approach		1328	0.0	1232[N1]	0.0	1.787	773.0	LOS F	46.6	326.4	1.00	2.88	1.0
North: Landston Place													
7	L2	15	0.0	15	0.0	0.060	64.9	LOS E	0.9	6.5	0.89	0.70	8.4
8	T1	455	0.0	455	0.0	1.767	746.8	LOS F	117.3	821.4	1.00	2.59	0.8
Approach		469	0.0	469	0.0	1.767	725.4	LOS F	117.3	821.4	1.00	2.53	0.9
West: Bridge St													
10	L2	760	0.0	331	0.0	0.275	5.6	LOS A	3.1	21.5	0.19	0.60	41.5
11	T1	2608	0.0	1136	0.0	0.647	13.6	LOS A	14.0	97.9	0.57	0.52	15.6
12	R2	1753	0.0	763	0.0	1.817	798.4	LOS F	14.0	97.9	1.00	2.95	0.3
Approach		5121	0.0	2229[N1]	0.0	1.817	281.0	LOS F	14.0	97.9	0.66	1.36	1.3
All Vehicles		7966	0.0	4978[N1]	0.0	1.817	421.1	LOS F	117.3	821.4	0.85	1.82	1.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 48.7 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Friday, 16 February 2018 5:06:48 PM
Project: C:\Epping_SIDRA\Development_2026_4000_am_network.sip7

MOVEMENT SUMMARY

Site: Blaxland [Epping_Blaxland]

Network: 2026 nrtwr [2026_4000_pm]

New Site
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Blaxland Rd													
1	L2	1967	0.0	1967	0.0	2.122	1060.2	LOS F	28.0	195.8	1.00	2.25	0.4
2	T1	301	0.0	301	0.0	2.270	1191.6	LOS F	28.0	195.8	1.00	2.50	0.9
Approach		2268	0.0	2268	0.0	2.270	1077.6	LOS F	28.0	195.8	1.00	2.28	0.5
East: Epping Rd													
4	L2	1	0.0	1	0.0	0.001	35.4	LOS C	0.0	0.3	0.63	0.60	16.1
5	T1	2185	0.0	1778	0.0	2.399	1325.2	LOS F	46.6	326.4	1.00	3.56	0.6
Approach		2186	0.0	1779 N1	0.0	2.399	1324.6	LOS F	46.6	326.4	1.00	3.56	0.6
North: Landston Place													
7	L2	7	0.0	7	0.0	0.037	68.6	LOS E	0.5	3.3	0.91	0.67	8.0
8	T1	476	0.0	476	0.0	2.259	1182.4	LOS F	146.3	1023.9	1.00	2.86	0.5
Approach		483	0.0	483	0.0	2.259	1165.4	LOS F	146.3	1023.9	1.00	2.82	0.5
West: Bridge St													
10	L2	421	0.0	328	0.0	0.282	6.2	LOS A	3.9	27.0	0.22	0.61	40.3
11	T1	1004	0.0	783	0.0	0.439	11.3	LOS A	14.0	97.9	0.47	0.42	17.8
12	R2	1143	0.0	891	0.0	2.344	1269.6	LOS F	14.0	97.9	1.00	3.47	0.2
Approach		2568	0.0	2002 N1	0.0	2.344	570.5	LOS F	14.0	97.9	0.67	1.81	0.6
All Vehicles		7506	0.0	6532 N1	0.0	2.399	996.0	LOS F	146.3	1023.9	0.90	2.53	0.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 48.9 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Friday, 16 February 2018 4:47:36 PM
Project: C:\Epping_SIDRA\Development_2026_4000_pm_network.sip7

MOVEMENT SUMMARY

Site: Essex St [Essex St]

Network: 2026 netwk [2026_4000_am_network]

Epping Essex St
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Essex St													
1	L2	21	0.0	21	0.0	0.082	64.3	LOS E	1.3	9.3	0.89	0.71	5.8
2	T1	304	0.0	304	0.0	1.185	247.0	LOS F	45.5	318.8	1.00	1.63	3.3
3	R2	174	0.0	174	0.0	0.678	71.9	LOS F	12.3	86.3	1.00	0.83	10.8
Approach		499	0.0	499	0.0	1.185	178.4	LOS F	45.5	318.8	0.99	1.31	4.5
East: Epping Rd													
4	L2	22	0.0	22	0.0	0.819	44.6	LOS D	28.0	195.9	0.99	0.93	16.9
5	T1	743	0.0	743	0.0	0.819	41.6	LOS C	28.0	195.9	0.98	0.94	12.0
Approach		765	0.0	765	0.0	0.819	41.7	LOS C	28.0	195.9	0.98	0.94	12.2
North: Essex St													
7	L2	6	0.0	6	0.0	0.031	37.4	LOS C	1.0	7.1	0.67	0.55	23.4
8	T1	16	0.0	16	0.0	0.031	31.9	LOS C	1.0	7.1	0.67	0.55	21.8
9	R2	626	0.0	626	0.0	1.223	292.9	LOS F	53.4	374.1	1.00	1.46	2.5
Approach		648	0.0	648	0.0	1.223	284.0	LOS F	53.4	374.1	0.99	1.43	2.6
West: Epping Rd													
10	L2	40	0.0	18	0.0	0.567	30.9	LOS C	14.0	98.2	0.88	0.76	22.3
11	T1	2455	0.0	1080	0.0	1.193	165.3	LOS F	28.0	195.8	0.96	1.41	5.2
Approach		2495	0.0	1097 [N1]	0.0	1.193	163.2	LOS F	28.0	195.8	0.96	1.40	5.3
All Vehicles		4407	0.0	3010 [N1]	0.0	1.223	160.9	LOS F	53.4	374.1	0.98	1.28	4.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 48.7 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Friday, 16 February 2018 5:06:48 PM
Project: C:\Epping_SIDRA\Development_2026_4000_am_network.sip7

MOVEMENT SUMMARY

Site: Essex St [Essex St]

Network: 2026 nrtwr [2026_4000_pm]

Epping Essex St
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Essex St													
1	L2	2	0.0	2	0.0	0.016	74.6	LOS F	0.1	1.0	0.94	0.62	5.1
2	T1	174	0.0	174	0.0	1.243	295.2	LOS F	28.3	198.1	1.00	1.54	2.8
3	R2	141	0.0	141	0.0	1.055	155.4	LOS F	15.8	110.5	1.00	1.16	5.5
Approach		317	0.0	317	0.0	1.243	231.5	LOS F	28.3	198.1	1.00	1.36	3.6
East: Epping Rd													
4	L2	358	0.0	358	0.0	1.250	274.2	LOS F	246.4	1724.9	1.00	1.82	3.2
5	T1	2013	0.0	2013	0.0	1.250	274.7	LOS F	246.4	1724.9	1.00	1.86	2.1
Approach		2371	0.0	2371	0.0	1.250	274.6	LOS F	246.4	1724.9	1.00	1.85	2.2
North: Essex St													
7	L2	20	0.0	20	0.0	1.231	289.5	LOS F	40.7	285.2	1.00	1.64	4.2
8	T1	239	0.0	239	0.0	1.231	284.1	LOS F	40.7	285.2	1.00	1.64	3.6
9	R2	242	0.0	242	0.0	1.231	297.3	LOS F	20.4	142.9	1.00	1.45	2.4
Approach		501	0.0	501	0.0	1.231	290.7	LOS F	40.7	285.2	1.00	1.55	3.0
West: Epping Rd													
10	L2	61	0.0	48	0.0	0.202	11.2	LOS A	3.9	27.4	0.42	0.42	39.4
11	T1	959	0.0	751	0.0	0.426	6.5	LOS A	10.0	70.3	0.49	0.45	43.3
Approach		1020	0.0	798 N1	0.0	0.426	6.8	LOS A	10.0	70.3	0.49	0.44	43.1
All Vehicles		4208	0.0	3987 N1	0.0	1.250	219.6	LOS F	246.4	1724.9	0.90	1.49	3.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 48.9 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Friday, 16 February 2018 4:47:36 PM
Project: C:\Epping_SIDRA\Development_2026_4000_pm_network.sip7

MOVEMENT SUMMARY

Site: Forrest Gr [Forrest Grove]

Network: 2026 netwk [2026_4000_am_network]

Epping Rd Forrest Grove
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Forrest Grove													
1	L2	129	0.0	129	0.0	0.096	7.4	LOS A	0.4	3.1	0.39	0.62	28.5
Approach		129	0.0	129	0.0	0.096	7.4	LOS A	0.4	3.1	0.39	0.62	28.5
East: Epping Rd													
4	L2	194	0.0	178	0.0	0.220	5.5	LOS A	0.0	0.0	0.00	0.25	46.4
5	T1	1197	0.0	1099	0.0	0.220	0.0	LOS A	28.0	195.8	0.00	0.06	56.3
Approach		1391	0.0	1277 N1	0.0	0.220	0.8	NA	28.0	195.8	0.00	0.08	54.7
West: Epping Rd													
11	T1	2494	0.0	1096	0.0	0.281	0.0	LOS A	11.7	81.6	0.00	0.00	59.9
Approach		2494	0.0	1096 N1	0.0	0.281	0.0	NA	11.7	81.6	0.00	0.00	59.9
All Vehicles		4014	0.0	2503 N1	0.0	0.281	0.8	NA	28.0	195.8	0.02	0.07	53.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 48.7 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: Forrest Gr [Forrest Grove]

Network: 2026 nrtwr [2026_4000_pm]

Epping Rd Forrest Grove
Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Forrest Grove													
1	L2	113	0.0	113	0.0	0.107	9.0	LOS A	0.5	3.4	0.51	0.69	26.0
Approach		113	0.0	113	0.0	0.107	9.0	LOS A	0.5	3.4	0.51	0.69	26.0
East: Epping Rd													
4	L2	183	0.0	147	0.0	0.311	5.5	LOS A	0.0	0.0	0.00	0.15	51.3
5	T1	2074	0.0	1665	0.0	0.311	0.0	LOS A	28.0	195.8	0.00	0.04	57.3
Approach		2257	0.0	1812 N1	0.0	0.311	0.5	NA	28.0	195.8	0.00	0.05	56.7
West: Epping Rd													
11	T1	1020	0.0	781	0.0	0.200	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1020	0.0	781 N1	0.0	0.200	0.0	NA	0.0	0.0	0.00	0.00	60.0
All Vehicles		3389	0.0	2706 N1	0.0	0.311	0.7	NA	28.0	195.8	0.02	0.06	54.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 48.9 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Friday, 16 February 2018 4:47:36 PM
Project: C:\Epping_SIDRA\Development_2026_4000_pm_network.sip7

MOVEMENT SUMMARY

Site: Smith St [Smith St]

Network: 2026 netwk [2026_4000_am_network]

Epping Rd - Smoith St

Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: RoadName													
5	T1	1338	0.0	1241	0.0	0.212	0.0	LOS A	11.7	81.6	0.00	0.00	60.0
Approach		1338	0.0	1241 N1	0.0	0.212	0.0	NA	11.7	81.6	0.00	0.00	60.0
North: RoadName													
7	L2	6	0.0	6	0.0	0.006	8.8	LOS A	0.0	0.2	0.51	0.63	35.4
Approach		6	0.0	6	0.0	0.006	8.8	LOS A	0.0	0.2	0.51	0.63	35.4
West: Epping Rd													
10	L2	121	0.0	53	0.0	0.294	5.6	LOS A	0.0	0.0	0.00	0.06	55.0
11	T1	2487	0.0	1090	0.0	0.294	0.0	LOS A	46.6	326.4	0.00	0.03	58.8
Approach		2608	0.0	1144 N1	0.0	0.294	0.3	NA	46.6	326.4	0.00	0.03	58.5
All Vehicles		3953	0.0	2390 N1	0.0	0.294	0.2	NA	46.6	326.4	0.00	0.01	58.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 48.7 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Friday, 16 February 2018 5:06:48 PM
Project: C:\Epping_SIDRA\Development_2026_4000_am_network.sip7

MOVEMENT SUMMARY

Site: Smith St [Smith St]

Network: 2026 nrtwr [2026_4000_pm]

Epping Rd - Smoith St

Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: RoadName													
5	T1	2185	0.0	1777	0.0	0.304	0.0	LOS A	11.7	81.6	0.00	0.00	59.9
Approach		2185	0.0	1777 N1	0.0	0.304	0.0	NA	11.7	81.6	0.00	0.00	59.9
North: RoadName													
7	L2	6	0.0	6	0.0	0.004	7.9	LOS A	0.0	0.1	0.46	0.60	36.8
Approach		6	0.0	6	0.0	0.004	7.9	LOS A	0.0	0.1	0.46	0.60	36.8
West: Epping Rd													
10	L2	8	0.0	6	0.0	0.199	5.5	LOS A	0.0	0.0	0.00	0.01	55.9
11	T1	1003	0.0	771	0.0	0.199	0.0	LOS A	0.0	0.0	0.00	0.00	59.7
Approach		1012	0.0	777 N1	0.0	0.199	0.1	NA	0.0	0.0	0.00	0.00	59.7
All Vehicles		3203	0.0	2561 N1	0.0	0.304	0.0	NA	11.7	81.6	0.00	0.00	59.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 48.9 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Friday, 16 February 2018 4:47:36 PM
Project: C:\Epping_SIDRA\Development_2026_4000_pm_network.sip7

MOVEMENT SUMMARY

Site: Blaxland [Epping_Blaxland]

Network: 2026 netwk [2026_4600_am_network]

New Site
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Blaxland Rd													
1	L2	891	0.0	891	0.0	0.926	77.1	LOS F	28.0	195.8	1.00	1.11	5.7
2	T1	140	0.0	140	0.0	1.716	701.4	LOS F	28.0	195.8	1.00	1.85	1.4
Approach		1031	0.0	1031	0.0	1.716	161.9	LOS F	28.0	195.8	1.00	1.21	3.2
East: Epping Rd													
4	L2	1	0.0	1	0.0	0.001	38.1	LOS C	0.0	0.3	0.66	0.60	15.2
5	T1	1360	0.0	1262	0.0	1.831	813.2	LOS F	46.6	326.4	1.00	2.94	0.9
Approach		1361	0.0	1263 N1	0.0	1.831	812.6	LOS F	46.6	326.4	1.00	2.94	0.9
North: Landston Place													
7	L2	7	0.0	7	0.0	0.030	64.4	LOS E	0.5	3.2	0.88	0.67	8.4
8	T1	462	0.0	462	0.0	1.795	772.0	LOS F	120.9	846.4	1.00	2.62	0.8
Approach		469	0.0	469	0.0	1.795	760.9	LOS F	120.9	846.4	1.00	2.59	0.8
West: Bridge St													
10	L2	783	0.0	340	0.0	0.280	5.5	LOS A	3.0	20.8	0.18	0.60	41.7
11	T1	2556	0.0	1110	0.0	0.628	12.9	LOS A	14.0	97.9	0.55	0.50	16.2
12	R2	1792	0.0	778	0.0	1.809	791.8	LOS F	14.0	97.9	1.00	2.94	0.3
Approach		5131	0.0	2228 N1	0.0	1.809	283.8	LOS F	14.0	97.9	0.65	1.37	1.3
All Vehicles		7992	0.0	4990 N1	0.0	1.831	437.3	LOS F	120.9	846.4	0.84	1.85	1.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.3 %
Number of Iterations: 28 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Saturday, 17 February 2018 1:11:47 PM
Project: C:\Epping_SIDRA\Development_2026_4600_am_network.sip7

MOVEMENT SUMMARY

Site: Blaxland [Epping_Blaxland]

Network: 2026netwrk [2026_4600_pm_network]

New Site
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Blaxland Rd													
1	L2	1991	0.0	1991	0.0	2.187	1118.7	LOS F	28.0	195.8	1.00	2.29	0.4
2	T1	307	0.0	307	0.0	2.318	1233.9	LOS F	28.0	195.8	1.00	2.52	0.8
Approach		2298	0.0	2298	0.0	2.318	1134.1	LOS F	28.0	195.8	1.00	2.32	0.5
East: Epping Rd													
4	L2	1	0.0	1	0.0	0.001	35.4	LOS C	0.0	0.3	0.63	0.60	16.1
5	T1	2185	0.0	1768	0.0	2.386	1313.2	LOS F	46.6	326.4	1.00	3.55	0.6
Approach		2186	0.0	1769 N1	0.0	2.386	1312.6	LOS F	46.6	326.4	1.00	3.55	0.6
North: Landston Place													
7	L2	7	0.0	7	0.0	0.035	67.5	LOS E	0.5	3.3	0.90	0.67	8.1
8	T1	483	0.0	483	0.0	2.173	1106.4	LOS F	145.2	1016.1	1.00	2.84	0.6
Approach		491	0.0	491	0.0	2.173	1090.8	LOS F	145.2	1016.1	1.00	2.81	0.6
West: Bridge St													
10	L2	419	0.0	312	0.0	0.268	6.2	LOS A	3.6	25.4	0.22	0.61	40.4
11	T1	1006	0.0	750	0.0	0.422	11.6	LOS A	14.0	97.9	0.48	0.42	17.5
12	R2	1167	0.0	871	0.0	2.353	1277.1	LOS F	14.0	97.9	1.00	3.48	0.2
Approach		2593	0.0	1933 N1	0.0	2.353	580.5	LOS F	14.0	97.9	0.67	1.83	0.6
All Vehicles		7567	0.0	6491 N1	0.0	2.386	1014.6	LOS F	145.2	1016.1	0.90	2.54	0.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 12.4 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: Essex St [Essex St]

Network: 2026 netwk [2026_4600_am_network]

Epping Essex St
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Essex St													
1	L2	21	0.0	21	0.0	0.070	60.3	LOS E	1.3	8.9	0.86	0.71	6.2
2	T1	377	0.0	377	0.0	1.243	294.1	LOS F	62.2	435.3	1.00	1.82	2.8
3	R2	201	0.0	201	0.0	0.668	68.2	LOS E	13.9	97.5	0.99	0.83	11.3
Approach		599	0.0	599	0.0	1.243	210.0	LOS F	62.2	435.3	0.99	1.45	3.9
East: Epping Rd													
4	L2	22	0.0	22	0.0	0.881	56.8	LOS E	33.0	230.9	1.00	1.02	14.0
5	T1	749	0.0	749	0.0	0.881	54.9	LOS D	33.0	230.9	1.00	1.03	9.6
Approach		772	0.0	772	0.0	0.881	54.9	LOS D	33.0	230.9	1.00	1.03	9.7
North: Essex St													
7	L2	4	0.0	4	0.0	0.029	38.0	LOS C	0.9	6.4	0.67	0.53	23.3
8	T1	16	0.0	16	0.0	0.029	32.5	LOS C	0.9	6.4	0.67	0.53	21.7
9	R2	623	0.0	623	0.0	1.232	300.1	LOS F	53.8	376.3	1.00	1.47	2.4
Approach		643	0.0	643	0.0	1.232	291.8	LOS F	53.8	376.3	0.99	1.44	2.5
West: Epping Rd													
10	L2	39	0.0	17	0.0	0.586	35.2	LOS C	14.6	102.2	0.90	0.79	20.3
11	T1	2394	0.0	1047	0.0	1.235	190.8	LOS F	28.0	195.8	0.97	1.48	4.6
Approach		2433	0.0	1064 N1	0.0	1.235	188.3	LOS F	28.0	195.8	0.97	1.47	4.7
All Vehicles		4446	0.0	3078 N1	0.0	1.243	180.7	LOS F	62.2	435.3	0.99	1.35	4.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.3 %
Number of Iterations: 28 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: Essex St [Essex St]

Network: 2026netwrk [2026_4600_pm_network]

Epping Essex St
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles														
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Essex St													
1	L2	2	0.0	2	0.0	0.016	74.6	LOS F	0.1	1.0	0.94	0.62	5.1
2	T1	172	0.0	172	0.0	1.228	282.8	LOS F	27.3	191.2	1.00	1.51	2.9
3	R2	151	0.0	151	0.0	1.126	206.6	LOS F	19.8	138.9	1.00	1.26	4.2
Approach		324	0.0	324	0.0	1.228	246.1	LOS F	27.3	191.2	1.00	1.39	3.4
East: Epping Rd													
4	L2	374	0.0	374	0.0	1.261	284.4	LOS F	253.1	1771.7	1.00	1.85	3.1
5	T1	2018	0.0	2018	0.0	1.261	284.9	LOS F	253.1	1771.7	1.00	1.89	2.0
Approach		2392	0.0	2392	0.0	1.261	284.8	LOS F	253.1	1771.7	1.00	1.88	2.2
North: Essex St													
7	L2	20	0.0	20	0.0	1.240	296.6	LOS F	41.6	291.1	1.00	1.66	4.1
8	T1	237	0.0	237	0.0	1.240	291.1	LOS F	41.6	291.1	1.00	1.66	3.5
9	R2	249	0.0	249	0.0	1.259	320.6	LOS F	21.4	149.8	1.00	1.48	2.2
Approach		506	0.0	506	0.0	1.259	305.8	LOS F	41.6	291.1	1.00	1.57	2.9
West: Epping Rd													
10	L2	62	0.0	47	0.0	0.195	11.2	LOS A	3.7	26.2	0.42	0.42	39.5
11	T1	959	0.0	721	0.0	0.410	6.5	LOS A	9.5	66.6	0.48	0.44	43.4
Approach		1021	0.0	768 N1	0.0	0.410	6.7	LOS A	9.5	66.6	0.48	0.44	43.2
All Vehicles		4243	0.0	3990 N1	0.0	1.261	230.8	LOS F	253.1	1771.7	0.90	1.52	3.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 12.4 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: Forrest Gr [Forrest Grove]

Network: 2026 netwk [2026_4600_am_network]

Epping Rd Forrest Grove
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Forrest Grove													
1	L2	167	0.0	167	0.0	0.123	7.5	LOS A	0.6	4.1	0.39	0.63	28.4
Approach		167	0.0	167	0.0	0.123	7.5	LOS A	0.6	4.1	0.39	0.63	28.4
East: Epping Rd													
4	L2	201	0.0	184	0.0	0.220	5.5	LOS A	0.0	0.0	0.00	0.26	46.1
5	T1	1193	0.0	1093	0.0	0.220	0.0	LOS A	28.0	195.8	0.00	0.06	56.3
Approach		1394	0.0	1278 N1	0.0	0.220	0.8	NA	28.0	195.8	0.00	0.09	54.5
West: Epping Rd													
11	T1	2433	0.0	1064	0.0	0.273	0.0	LOS A	11.7	81.6	0.00	0.00	59.9
Approach		2433	0.0	1064 N1	0.0	0.273	0.0	NA	11.7	81.6	0.00	0.00	59.9
All Vehicles		3994	0.0	2510 N1	0.0	0.273	0.9	NA	28.0	195.8	0.03	0.09	52.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.3 %
Number of Iterations: 28 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: TRANSPORT MODELLING | Processed: Saturday, 17 February 2018 1:11:47 PM
Project: C:\Epping_SIDRA\Development_2026_4600_am_network.sip7

MOVEMENT SUMMARY

Site: Forrest Gr [Forrest Grove]

Network: 2026netwrk [2026_4600_pm_network]

Epping Rd Forrest Grove
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Forrest Grove													
1	L2	147	0.0	147	0.0	0.135	8.8	LOS A	0.6	4.4	0.50	0.68	26.4
Approach		147	0.0	147	0.0	0.135	8.8	LOS A	0.6	4.4	0.50	0.68	26.4
East: Epping Rd													
4	L2	232	0.0	184	0.0	0.310	5.5	LOS A	0.0	0.0	0.00	0.18	49.4
5	T1	2038	0.0	1619	0.0	0.310	0.0	LOS A	28.0	195.8	0.00	0.05	56.8
Approach		2269	0.0	1803 N1	0.0	0.310	0.6	NA	28.0	195.8	0.00	0.06	56.0
West: Epping Rd													
11	T1	1021	0.0	778	0.0	0.200	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1021	0.0	778 N1	0.0	0.200	0.0	NA	0.0	0.0	0.00	0.00	60.0
All Vehicles		3438	0.0	2729 N1	0.0	0.310	0.9	NA	28.0	195.8	0.03	0.08	53.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 12.4 %
Number of Iterations: 30 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

▽ Site: Smith St [Smith St]

Network: 2026 netwk [2026_4600_am_network]

Epping Rd - Smith St

Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Epping Rd													
5	T1	1360	0.0	1261	0.0	0.216	0.0	LOS A	11.7	81.6	0.00	0.00	60.0
Approach		1360	0.0	1261 N1	0.0	0.216	0.0	NA	11.7	81.6	0.00	0.00	60.0
North: Smith St													
7	L2	8	0.0	8	0.0	0.008	8.6	LOS A	0.0	0.2	0.51	0.64	35.6
Approach		8	0.0	8	0.0	0.008	8.6	LOS A	0.0	0.2	0.51	0.64	35.6
West: Epping Rd													
10	L2	132	0.0	57	0.0	0.286	5.6	LOS A	0.0	0.0	0.00	0.06	54.9
11	T1	2424	0.0	1056	0.0	0.286	0.0	LOS A	46.6	326.4	0.00	0.03	58.7
Approach		2556	0.0	1114 N1	0.0	0.286	0.3	NA	46.6	326.4	0.00	0.03	58.3
All Vehicles		3924	0.0	2383 N1	0.0	0.286	0.2	NA	46.6	326.4	0.00	0.02	58.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.3 %
Number of Iterations: 28 (maximum specified: 30)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: Smith St [Smith St]

Network: 2026netwrk [2026_4600_pm_network]

Epping Rd - Smoith St

Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: RoadName													
5	T1	2185	0.0	1767	0.0	0.302	0.0	LOS A	11.7	81.6	0.00	0.00	59.9
Approach		2185	0.0	1767 N1	0.0	0.302	0.0	NA	11.7	81.6	0.00	0.00	59.9
North: RoadName													
7	L2	17	0.0	17	0.0	0.011	7.9	LOS A	0.0	0.3	0.45	0.62	36.9
Approach		17	0.0	17	0.0	0.011	7.9	LOS A	0.0	0.3	0.45	0.62	36.9
West: Epping Rd													
10	L2	8	0.0	6	0.0	0.195	5.5	LOS A	0.0	0.0	0.00	0.01	55.9
11	T1	1004	0.0	753	0.0	0.195	0.0	LOS A	0.0	0.0	0.00	0.00	59.8
Approach		1013	0.0	759 N1	0.0	0.195	0.1	NA	0.0	0.0	0.00	0.00	59.7
All Vehicles		3215	0.0	2543 N1	0.0	0.302	0.1	NA	11.7	81.6	0.00	0.01	59.3

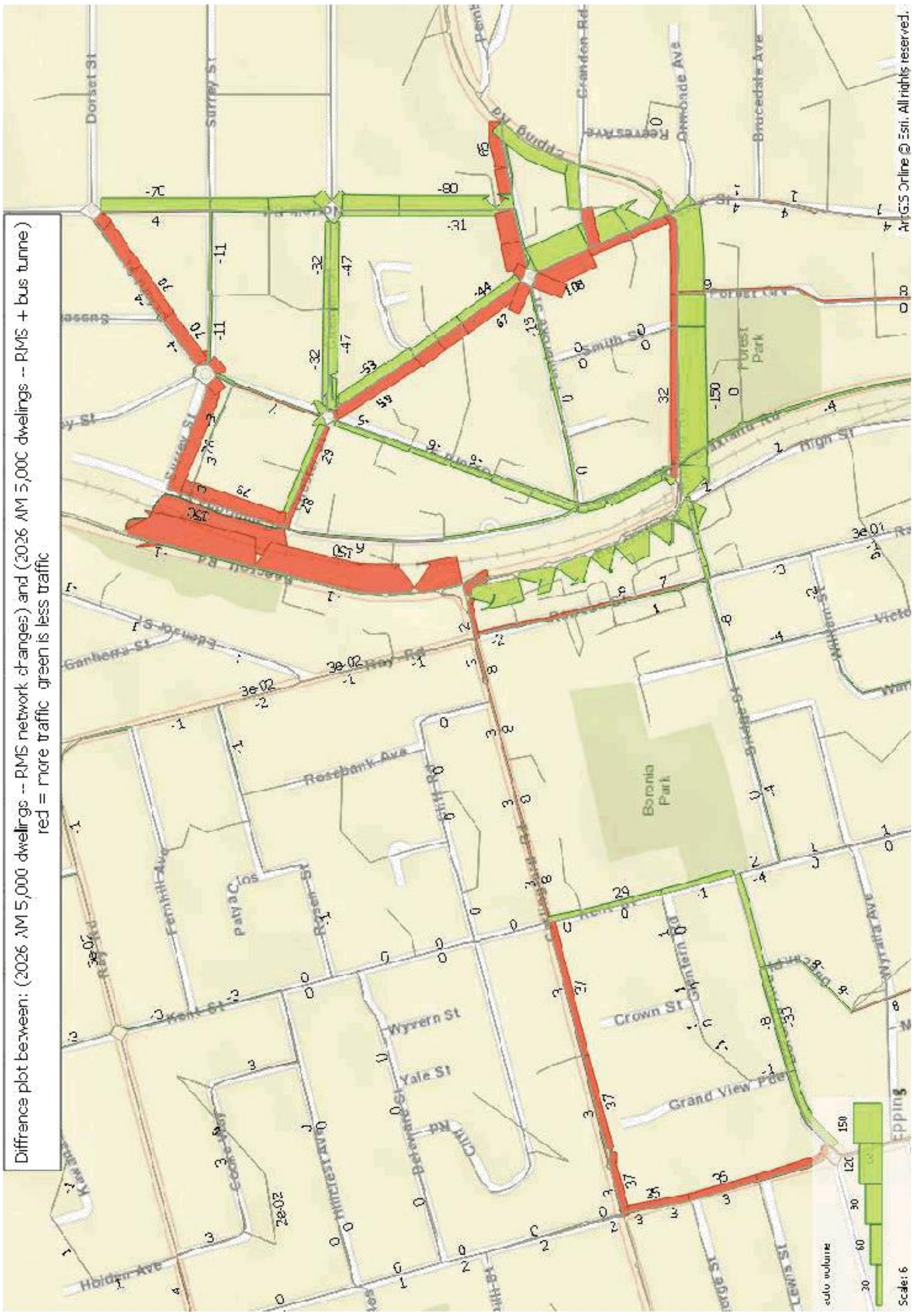
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 12.4 %
Number of Iterations: 30 (maximum specified: 30)

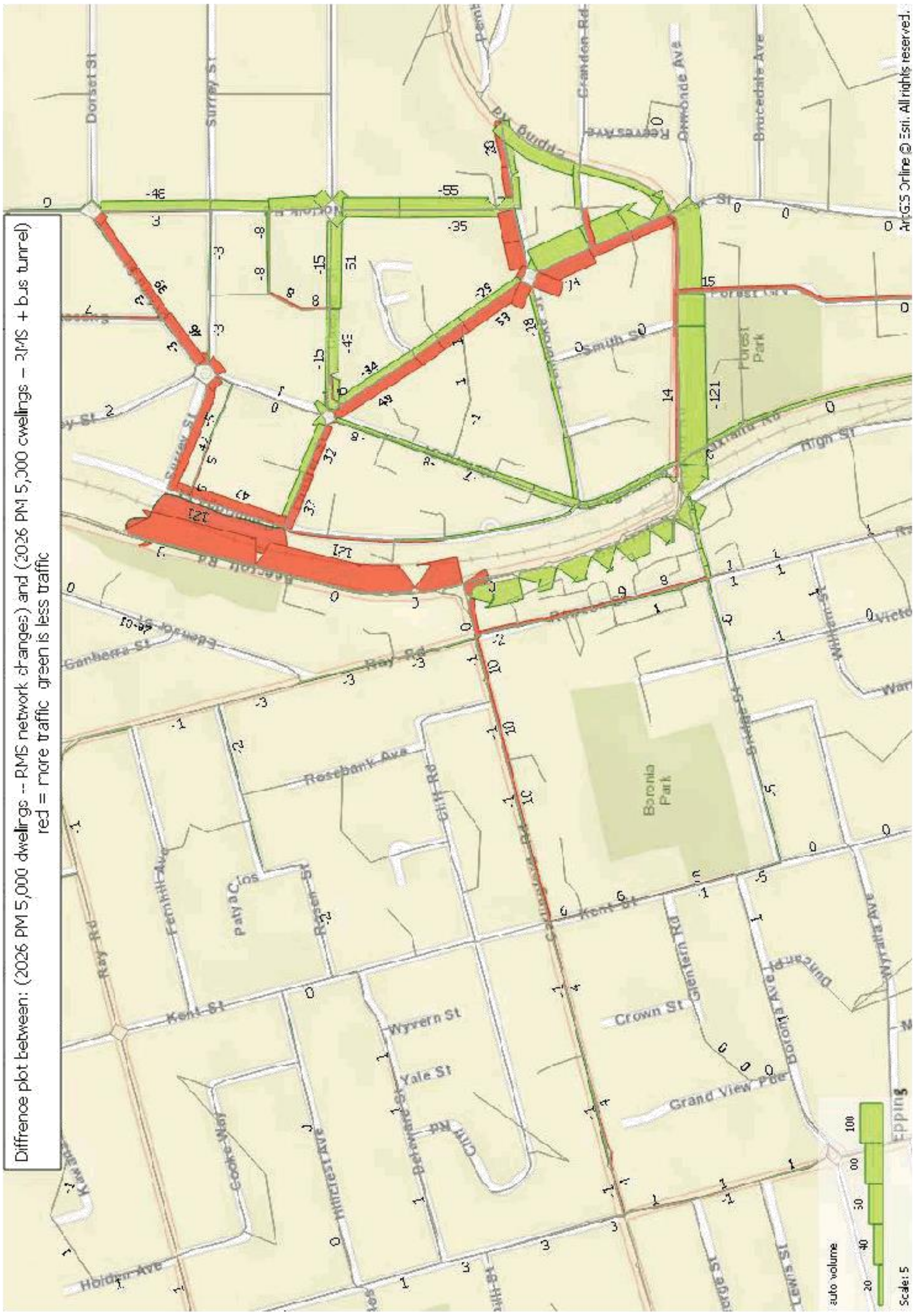
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

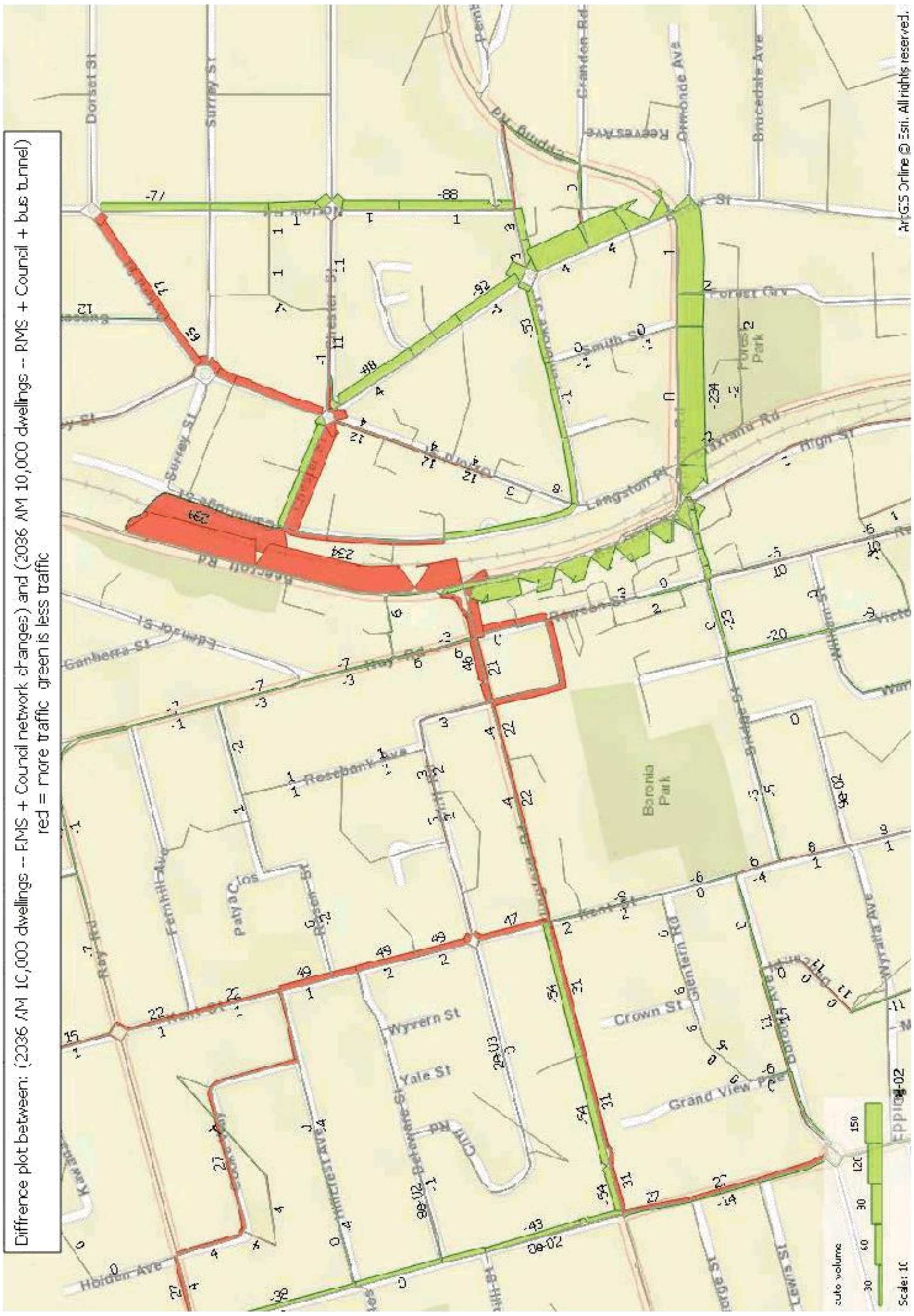
Organisation: TRANSPORT MODELLING | Processed: Friday, 16 February 2018 4:03:43 PM
Project: C:\Epping_SIDRA\Development_2026_4600_pm_network.sip7

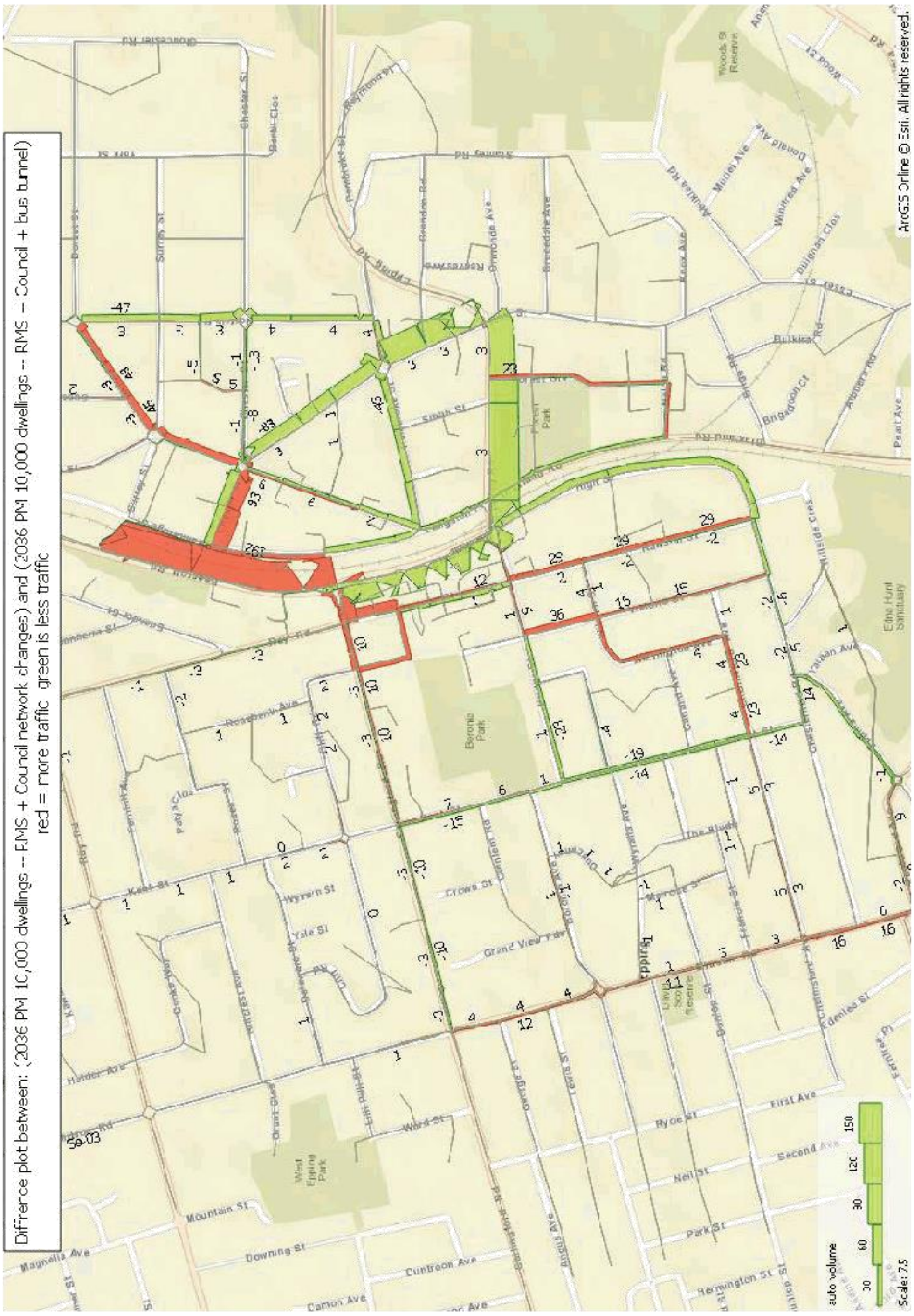
Appendix N

Bus Tunnel Analysis


Diffrence plot between: (2026 AM 5,000 dwellings -- RMS network changes) and (2026 AM 5,000 dwellings -- RMS + bus tunnel)
red = more traffic green is less traffic
ArcGIS Online © Esri. All rights reserved.


Diffrence plot between: (2026 PM 5,000 dwellings -- RMS network changes) and (2026 PM 5,000 dwellings -- RMS + bus tunnel)
red = more traffic green is less traffic
ArcGIS Online © Esri. All rights reserved.
auto volume
Scale: 5

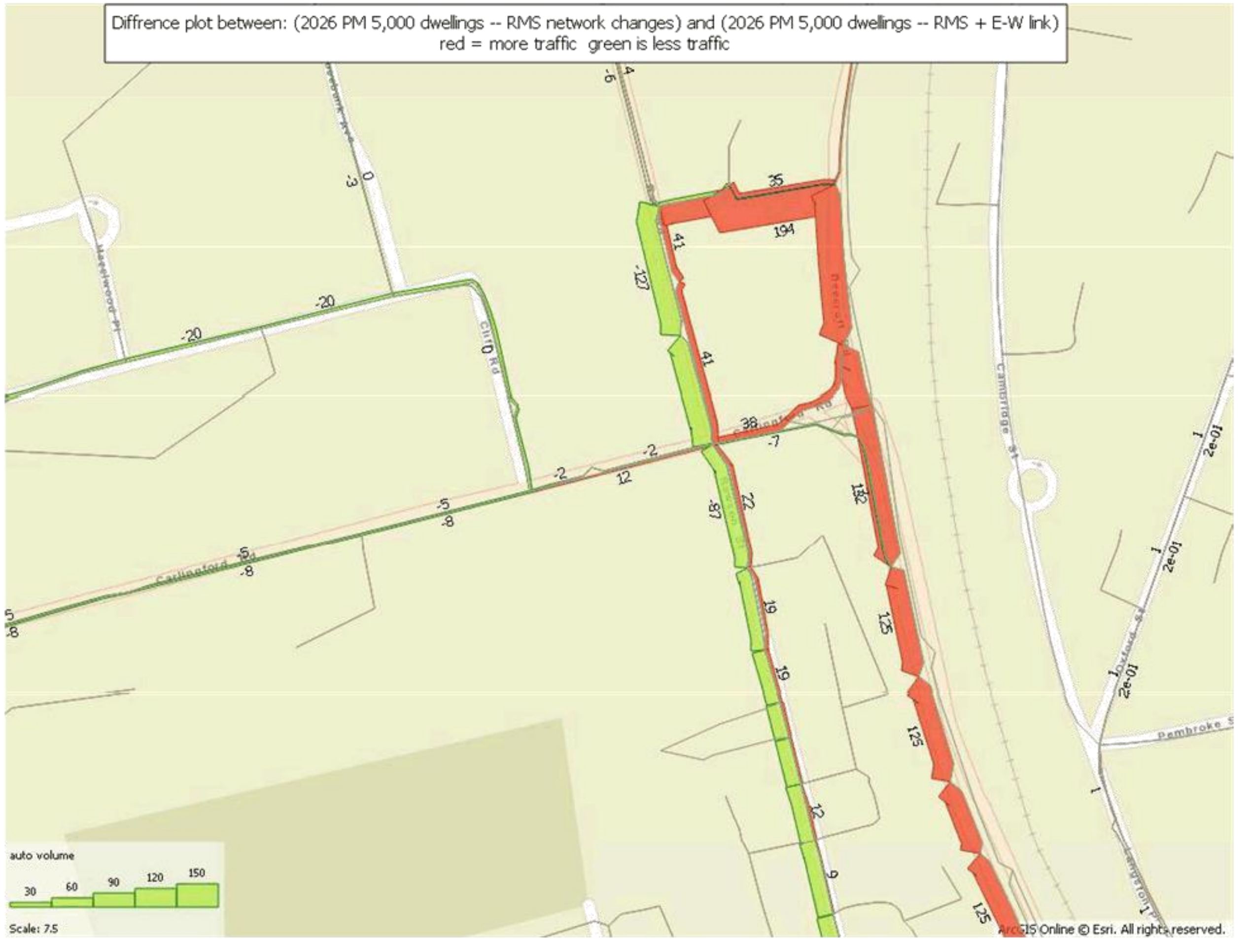

Diffrence plot between: (2036 AM 10,000 dwellings -- RMS + Council network changes) and (2036 AM 10,000 dwellings -- RMS + Council + bus tunnel)
red = more traffic green is less traffic
ArcGIS Online © Esri. All rights reserved.

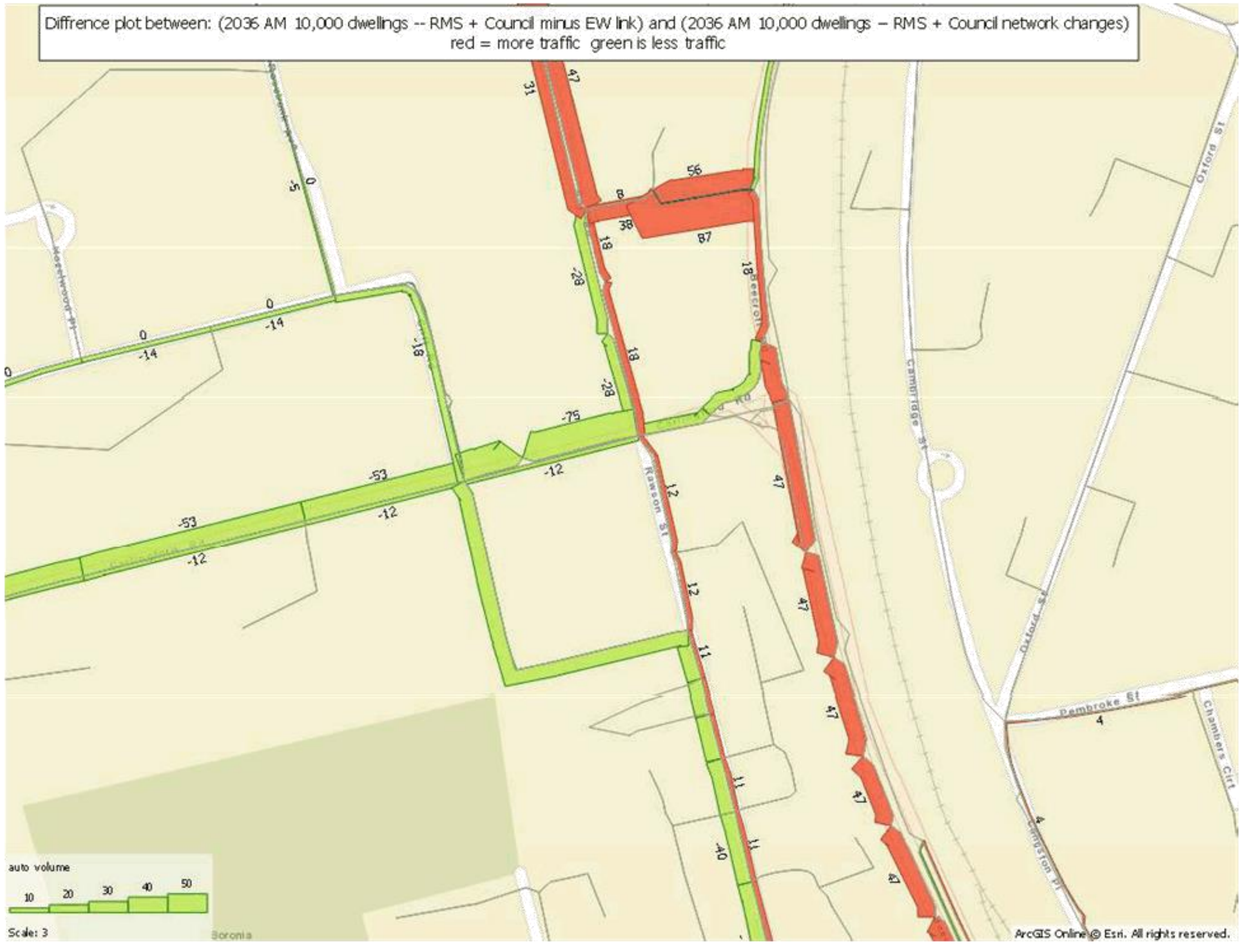

Difference plot between: (2036 PM 10,000 dwellings -- RMS + Council network changes) and (2036 PM 10,000 dwellings -- RMS -- Council + bus tunnel)
red = more traffic green is less traffic
auto volume
30 60 90 120 150
Scale: 7.5
ArcGIS Online © Esri. All rights reserved.

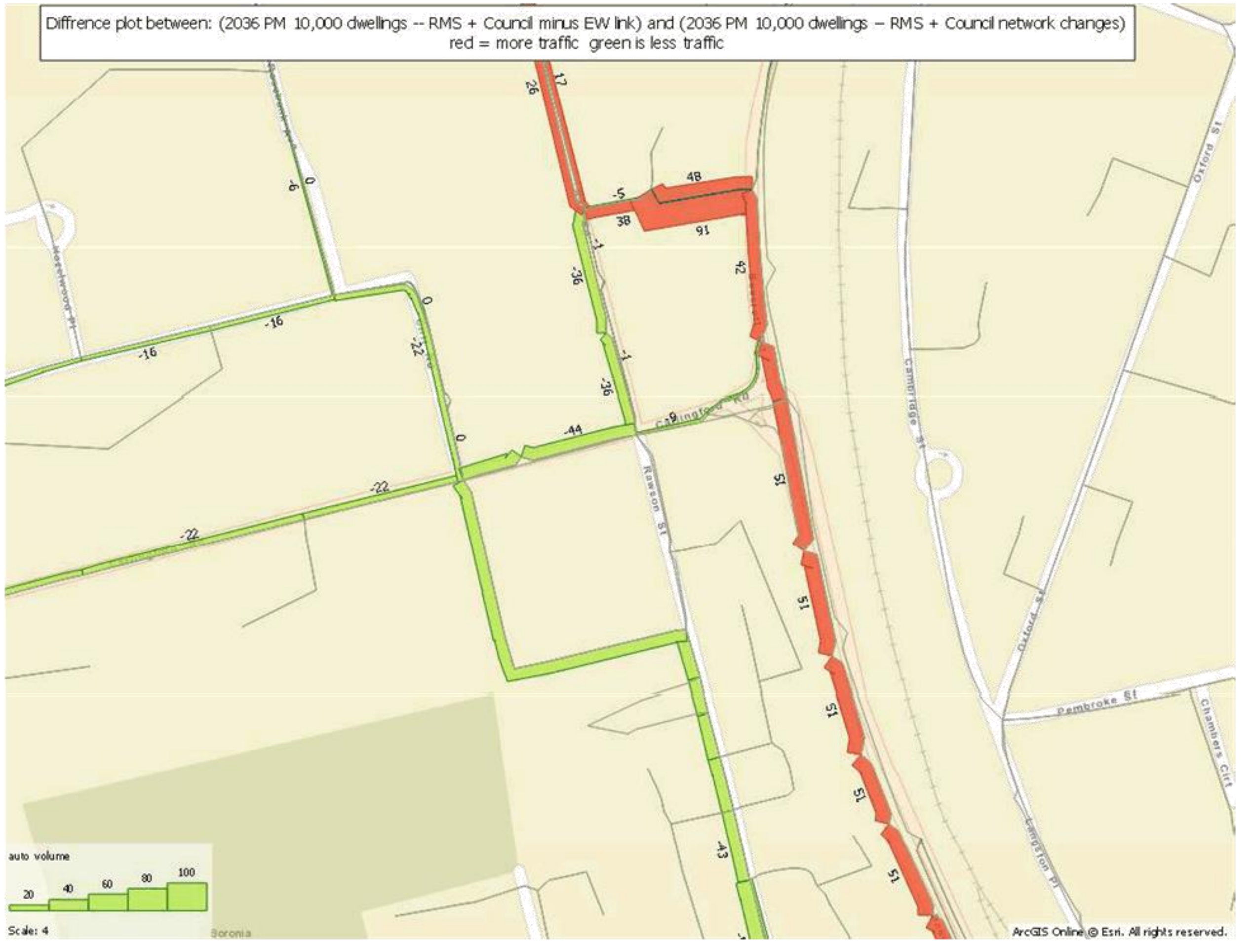
Appendix O

East West Link Analysis


Diffrence plot between: (2026 AM 5,000 dwellings -- RMS network changes) and (2026 AM 5,000 dwellings -- RMS + E-W link)
red = more traffic green is less traffic
auto volume
30
60
90
120
150
Scale: 7.5
ArcGIS Online © Esri. All rights reserved.


Diffrence plot between: (2026 PM 5,000 dwellings -- RMS network changes) and (2026 PM 5,000 dwellings -- RMS + E-W link)
red = more traffic green is less traffic
Cliff Rd
Carlingford Rd
Cambridge St
Pembroke St
auto volume
30
60
90
120
150
Scale: 7.5
ArcGIS Online © Esri. All rights reserved.


Diffrence plot between: (2036 AM 10,000 dwellings -- RMS + Council minus EW link) and (2036 AM 10,000 dwellings – RMS + Council network changes)
red = more traffic green is less traffic
auto volume
10
20
30
40
50
Scale: 3
Rawson St
Cambridge St
Oxford St
Pembroke St
Chambers Cirt
ArcGIS Online © Esri. All rights reserved.



Diffrence plot between: (2036 PM 10,000 dwellings -- RMS + Council minus EW link) and (2036 PM 10,000 dwellings -- RMS + Council network changes)
red = more traffic green is less traffic
auto volume
20
40
60
80
100
Scale: 4
Rawson St
Cambridge St
Oxford St
Pembroke St
Chambers Cirt
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Forest Park Planning Proposal Review

Traffic Impact Assessment Report

Prepared for Parramatta City Council | 23 February 2018

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Forest Park Planning Proposal Review

Final

Report J17056 RPT3 | Prepared for City of Parramatta Council| 23 February 2018

Prepared by	**Dr Tim Brooker**	Approved by	**Allan Young**
Position	Associate – Transport Planner	Position	Planning Service Leader
Signature		Signature	
Date	23 February 2018	Date	23 February 2018

Document Control

Version	Date	Prepared by	Reviewed by
v1	23 February 2018	Tim Brooker	Allan Young

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Figures

1 Introduction

1.1 Overview

This traffic impact assessment report (TIA) has been prepared by EMM Consulting Pty Limited (EMM) for City of Parramatta Council to review the transport and access impacts of potential residential development under the current zoning for approximately 234 dwellings at the Forest Park development plus a proposed zoning uplift for 350 additional dwellings. This would give a future total of 584 additional dwellings in a mixture of one bedroom, two bedroom and three bedroom units to be developed by 2026. In the period up to 2017, Council has currently approved 4,854 additional dwellings to be developed in the Epping town centre. The Forest Park development would raise this to a total of 5,438 dwellings by 2026.

While the site is located within the City of Parramatta local government area (LGA), due to a recent boundary change for local councils, Hornsby Shire Council planning instruments still apply. The development uplift will be greater than the development permitted for the site under the Hornsby Local Environment Plan 2013 (HLEP 2013). These dwellings will be above commercial floor-space (1,384 m^2) which is effectively a replacement activity for existing commercial uses at the site and the commercial component of the Forest Park development is therefore not considered in this report. The addresses which make up the site are: 2-18 Epping Road, 2-4 Forest Grove and 725 Blaxland Road, as shown below in Figure 1.1.

This TIA report considers the impacts of traffic generated by the maximum potential development (approximately 600 dwellings total), and also considers the future base traffic volumes which would be generated as a result of the existing recently approved backlog of new residential developments on sites within and surrounding the Epping town centre, which involves an additional 4,854 dwellings in the Epping town centre by 2026.

A TIA was included in a previous planning proposal for the Forest Park development. This was prepared for Austino Property Group by GTA consultants in December 2015 (GTA 2015). This TIA reviews the information and conclusions of the GTA report and updates these with regard to the most recent changes in the RMS approved road upgrades for the major road network, which are now under construction along Epping Road and the other major traffic routes through the Epping town centre.

Figure 1.1 Site locality

1.2 Details of the development traffic impacts considered

This TIA reviews the likely future effect of the traffic generated by the Forest Park development on weekdays during the main morning and afternoon commuter peak traffic hours on Epping Road, Blaxland Road, Forest Grove, Essex Street and Smith Street, in combination with other development traffic in the locality. The following three scenarios are considered in the analysis of traffic volumes:

- scenario 1 – the current base traffic volumes (using 2017 surveyed traffic flows);
- scenario 2 – the future base traffic volumes for 2026 (considering an additional 4,854 dwellings in the Epping Town Centre); and
- scenario 3 – the future total traffic volumes for 2026 (including the additional 4,854 dwellings plus an extra 584 dwellings at the site, totalling 5,438 dwellings).

This report also reviews the future pedestrian, cycleway and public transport access requirements for the potential 584 dwellings at the Forest Park development by considering:

- the site's pedestrian and cycleway access; and
- the use of the local bus routes and train line as the primary public transport routes serving the area.

2 Existing traffic conditions

2.1 Location

The site (see Figure 1.1 above), known as Forest Park, is located at the addresses: 2-18 Epping Road, 2-4 Forest Grove and 725 Blaxland Road, in the Epping town centre. The site is currently comprised of five properties fronting onto Epping Road, Blaxland Road and Forest Grove: a small block of flats, an automotive workshop, and three small residential dwellings. The remainder of the site has been cleared in preparation for development.

The site is approximately 20,040 m^2 and is currently zoned R4 High Density Residential and RE1 Public Recreation in the HLEP 2013. It is bounded by Epping Road to the north, Forest Grove to the east and Blaxland Road to the west and is located within an easy walking distance of Epping Railway Station (260 m).

2.2 Site access and local road network

The site is directly accessible from Epping Road, Blaxland Road and Forest Grove. Other key roads in the vicinity include Essex Street, Smith Street and Maida Road. Particulars concerning all these roads are detailed below:

- Epping Road – a state declared road under the jurisdiction of the RMS. It is generally a four-lane, two-way road running in an east-west direction between Epping and Lane Cove. It is signposted with a speed limit of 60 km/hr. Both sides of Epping Road are clearways during peak hours and are 'no stopping' at other times. It should be noted that RMS is currently widening Epping Road between Essex Street and Blaxland Road to accommodate an additional westbound lane, and adding a raised median strip.

- Blaxland Road – a state declared road under the jurisdiction of the RMS. It is generally a four-lane, two-way road running in a north-south direction between Epping and Ryde. It is signposted with a speed limit of 60 km/hr. In the 70 m section of Blaxland Road approaching the intersection with Epping Road, a 'no stopping' restriction applies on both sides of the road, and elsewhere on the western side. On most sections, however, kerbside parking is permitted on the eastern side outside of peak hours.

- Forest Grove – a local road under council jurisdiction. It is a two-lane, two-way road running in a north-south direction between Epping Road and Maida Road. It is signposted with a speed limit of 50 km/hr. Both sides of Forest Grove permit unrestricted parking.

- Essex Street – a local street under council jurisdiction. It is a two-lane, two-way street running in a north-south direction. It is signposted with a speed limit of 50 km/hr. Both sides of Essex Street permit unrestricted parking.

- Smith Street – a local street under council jurisdiction. It is a two-lane, two-way street running in a north-south direction between Pembroke Street and Epping Road. It is signposted with a speed limit of 50 km/hr. Both sides of Smith Street permit unrestricted parking.

- Maida Road – a local road under council jurisdiction. It is a two-lane, two-way street running in an east-west direction between Blaxland Road and Essex Street. It is signposted with a speed limit of 50 km/hr. Both sides of Maida Road permit unrestricted parking.

2.3 Traffic volumes

The existing peak hourly traffic volumes (scenario 1) for the local road network were determined by peak hourly intersection counts undertaken in March 2017.

These morning and afternoon peak hour traffic counts are shown below in Table 2.1:

Table 2.1 Traffic volumes on local roads

Road	Morning peak volume	Afternoon peak volume	Average daily volume[1]
Epping Road between Blaxland Road and Smith Street	2,730	2,431	30,966
Epping Road between Smith Street and Forest Grove	2,735	2,463	31,188
Epping Road between Forest Grove and Essex Street	2,700	2,156	29,136
Blaxland Road between Epping Road and Maida Road	1,120	919	12,234
Forest Grove	58	360	2,508
Essex Street between Epping Road and Maida Road	413	515	5,568
Smith Street	17	35	312
Maida Road	88	362	2,700

Notes: 1. Daily average volume is estimated as 12x the average peak traffic volume.

2.4 Existing Intersection Performance

The performances of the following intersections in the immediate vicinity of the site were analysed using a SIDRA-linked intersection model:

- Epping Road/Blaxland Road;
- Epping Road/Smith Street;
- Epping Road/Forest Grove; and
- Epping Road/Essex Street.

The RMS SIDRA intersection level of service (LoS) vs. delay standards for traffic signal controlled intersections which are specified in the RTA-RMS Guide to Traffic Generating Developments (RTA 2002) are summarised below. In addition to LoS, the existing operation of the intersection is also described in terms of the following factors:

- Degree of Saturation (DoS) which is the ratio of the traffic volume to the capacity of the intersection;
- the Average Vehicle Delay (AVD) in seconds per vehicle for all traffic movements at the intersection; and
- the length of the maximum traffic queue (95th percentile traffic queue) for any traffic movement at the intersection.

Description	LoS (RMS definition)	Average Vehicle Delay (s)
Very Good	A	<14.5
Good	B	14.5 to ≤28.5
Satisfactory	C	28.5 to ≤42.5
Near Capacity	D	42.5 to ≤56.5
At Capacity	E	56.5 to ≤70.5
Over Capacity	F	≥70.5

Table 2.2 Epping Road/Blaxland Road intersection - 2017 AM performance

Approach	Average delay (seconds)	Queue length (metres)	Level of service	Degree of saturation
South: Blaxland Road				
Left turn	17.3	33.7	B	0.358
Through	53.8	40.4	D	0.860
East: Epping Road				
Left turn	48.8	138.8	D	0.859
Through	43.3	139.0	D	0.859
North: Langston Place				
Left turn	58.4	51.6	E	0.867
Through	52.9	51.6	D	0.867
Right turn	58.6	51.6	E	0.867
West: Bridge Street				
Left turn	5.6	14.7	A	0.248
Through	27.3	97.9	B	0.895
Right turn	44.8	97.9	D	0.861

The existing Epping Road/Blaxland Road intersection morning operation shows a mixed performance. During the morning peak hour, the eastern and northern approaches have the worst levels of service, with the northern approach largely at capacity (LoS E). This shows that the intersection has a small amount of spare traffic capacity in the morning to accommodate additional peak hour traffic growth from the new residential and other developments in the Epping town centre locality assessed in this report.

Table 2.3 Epping Road/Blaxland Road intersection - 2017 PM performance

Approach	Average delay (seconds)	Queue length (metres)	Level of service	Degree of saturation
South: Blaxland Road				
Left turn	74.6	133.8	F	0.894
Through	73.6	22.1	F	0.402
East: Epping Road				
Left turn	72.8	326.4	F	0.962
Through	67.0	326.4	E	0.962
North: Langston Place				
Left turn	98.0	75.4	F	0.926
Through	92.5	75.4	F	0.926
Right turn	98.1	75.4	F	0.926
West: Bridge Street				
Left turn	4.9	11.9	A	0.243
Through	8.6	97.9	A	0.379
Right turn	39.8	97.9	C	0.832

The existing Epping Road/Blaxland Road intersection afternoon operation shows a low performance. During the afternoon peak hour, the southern, eastern and northern approaches are all generally over-capacity (LoS F). This shows that the intersection has practically no spare traffic capacity in the afternoon to accommodate additional peak hour traffic growth from the new residential and other developments in the Epping town centre locality assessed in this report.

Table 2.4 Epping Road/Smith Street intersection - 2017 AM performance

Approach	Average delay (seconds)	Queue length (metres)	Level of service	Degree of saturation
East: Epping Road				
Through	0.4	2.4	A	0.227
Right turn	31.6	2.4	C	0.227
North: Smith Street				
Left turn	11.2	0.1	A	0.005
Right turn	414.5	9.3	F	0.514
West: Epping Road				
Left turn	5.6	201.3	A	0.456
Through	0.0	201.3	A	0.456

The existing Epping Road/Smith Street intersection morning operation shows a generally satisfactory performance. During the morning peak hour, most approaches are acceptable (Los A-C). The major issue with this intersection is the right turn from Smith Street onto Epping Road. Due to the RMS' intention to add a median strip on Epping Road, this turn will not be permitted in future. Apart from this issue, the intersection has significant spare traffic capacity in the morning to accommodate additional peak hour traffic growth from the new residential and other developments in the Epping town centre locality assessed in this report.

Table 2.5 Epping Road/Smith Street intersection - 2017 PM performance

Approach	Average delay (seconds)	Queue length (metres)	Level of service	Degree of saturation
East: Epping Road				
Through	0.0	81.6	A	0.471
Right turn	11.4	81.6	A	0.471
North: Smith Street				
Left turn	7.3	0.1	A	0.003
Right turn	1957.9	46.9	F	2.560
West: Epping Road				
Left turn	5.5	0.0	A	0.223
Through	0.0	0.0	A	0.223

Similarly to the morning peak, the afternoon peak for the existing Epping Road/Smith Street intersection has significant capacity and a very good LoS (A). Again, the only exception is the right turn from Smith Street which is well over capacity. However this turn will not be permitted in RMS' new plans for Epping Road, where a median strip will prevent right turns.

Table 2.6 Epping Road/Forest Grove intersection - 2017 AM performance

Approach	Average delay (seconds)	Queue length (metres)	Level of service	Degree of saturation
South: Forest Grove				
Left turn	7.4	0.9	A	0.031
Right turn	538.4	2.4	F	0.270
East: Epping Road				
Left turn	5.5	0.0	A	0.216
Through	0.0	0.0	A	0.216
West: Epping Road				
Through	0.8	13.1	A	0.886
Right turn	12.9	13.1	A	0.886

The existing Epping Road/Forest Grove intersection morning operation shows a mixed performance. During the morning peak hour, most approaches have a very good LoS (A). The major issue with this intersection is the right turn from Forest Grove onto Epping Road. Due to the RMS' intention to add a median strip on Epping Road, this turn will not be permitted in future. Apart from this issue, the intersection has significant spare traffic capacity in the morning to accommodate additional peak hour traffic growth from the new residential and other developments in the Epping town centre locality assessed in this report.

Table 2.7 Epping Road/Forest Grove intersection - 2017 PM performance

Approach	Average delay (seconds)	Queue length (metres)	Level of service	Degree of saturation
South: Forest Grove				
Left turn	23.5	34.4	B	0.801
Right turn	87.5	1.5	F	0.076
East: Epping Road				
Left turn	5.5	115.5	A	0.377
Through	0.0	164.0	A	0.377
West: Epping Road				
Through	2.3	18.0	A	0.286
Right turn	16.6	18.0	B	0.286

Similarly to the morning peak, the afternoon peak for the existing Epping Road/Forest Grove intersection has significant capacity and a good LoS (A-B). Again, the only exception is the right turn from Smith Street which is over capacity. However this turn will not be permitted in RMS' new plans for Epping Road, where a median strip will prevent right turns.

Table 2.8 Epping Road/Essex Street intersection - 2017 AM performance

Approach	Average delay (seconds)	Queue length (metres)	Level of service	Degree of saturation
South: Essex Street				
Left turn	66.6	60.9	E	0.841
Through	61.1	60.9	E	0.841
Right turn	66.8	59.3	E	0.841
East: Epping Road				
Left turn	13.7	39.7	A	0.314
Through	8.2	39.7	A	0.314
Right turn	13.7	39.1	A	0.314
North: Essex Street				
Left turn	49.0	21.5	D	0.206
Through	53.5	114.7	D	0.889
Right turn	66.0	114.7	E	0.889
West: Epping Road				
Left turn	23.0	193.1	B	0.859
Through	17.6	193.1	B	0.859
Right turn	23.3	190.5	B	0.859

The existing Epping Road/Essex Street intersection morning operation shows a mixed performance. During this peak hour, the southern and northern approaches have the worst levels of service, with the southern approach at or nearing capacity (LoS D-E). The Epping Road components of the intersection have good levels of service (A-B). This shows that the intersection has some spare traffic capacity to accommodate additional peak hour traffic growth from the new residential and other developments in the Epping town centre locality assessed in this report.

Table 2.9 Epping Road/Essex Street intersection - 2017 PM performance

Approach	Average delay (seconds)	Queue length (metres)	Level of service	Degree of saturation
South: Essex Street				
Left turn	91.6	110.3	F	0.891
Through	77.8	123.7	F	0.891
Right turn	82.1	123.7	F	0.891
East: Epping Road				
Left turn	241.6	544.3	F	1.194
Through	236.3	544.3	F	1.194
Right turn	242.0	534.8	F	1.194
North: Essex Street				
Left turn	62.7	41.9	E	0.270
Through	57.1	41.9	E	0.270
Right turn	254.3	210.9	F	1.178
West: Epping Road				
Left turn	22.1	102.7	B	0.560
Through	20.5	102.7	B	0.560
Right turn	33.5	79.2	C	0.560

The existing Epping Road/Essex Street intersection afternoon operation shows a low performance. During this peak hour, the southern, eastern and northern approaches are at or over capacity (LoS E-F). The western approach has an acceptable LoS (B-C). Overall, the intersection has no spare traffic capacity to accommodate additional peak hour traffic growth from the new residential and other developments in the Epping town centre locality assessed in this report.

2.5 Car parking

As mentioned is Section 2.2, kerbside parking is not permitted on Epping Road, however it is permitted on the eastern side of Blaxland Road outside of peak hours. Unrestricted kerbside parking is permitted on both sides of Essex Street, Forest Grove, Smith Street and Maida Road.

2.6 Pedestrian and cycling access

The vicinity of the site is well suited for pedestrian travel. There are concrete footpaths on both sides of Epping Road and the eastern side of Blaxland Road and Forest Grove. There are also concrete footpaths on the western side of Essex Street and on the northern side of Maida Road. Signalised pedestrian crossings at the Epping Road/Blaxland Road intersection allows for easy and safe crossing of the busier roads in the area.

There is a designated cycle route on Pembroke Street, approximately 200 m north of the site. This is connected to the local cycling network.

2.7 Public transport access and services

The site has good access to a range of public transport options. The T1 North Shore, Northern and Western Line of the Sydney railway network is accessible at Epping station, approximately 260 m from the Forest Park site. The railway provides access to a range of areas throughout the Sydney metropolitan region including Hornsby, Chatswood, North Sydney and the CBD. Intercity services also stop at Epping, including services to the Central Coast and Newcastle.

A number of bus routes operate within a 300 m radius of the site, providing transport to the CBD, Macquarie Park and Parramatta. These services run along Pembroke Street, Beecroft Road and Epping Road. There is a bus stop located along the site's Epping Road frontage.

3 Proposed development

3.1 Currently permitted development

The HLEP 2013 zones the majority of the site as R4 high density residential. Within this zone, residential unit blocks, childcare centres and shop-top housing are permitted with consent. A maximum building height of 26.5 m is permitted where the site fronts on to Epping Road. A maximum building height of 17.5 m is permitted where the site fronts on to Forest Grove.

Under the HLEP 2013, high density residential development on the site may accommodate approximately 327 residential units along with approximately 200 m^2 of non-residential uses.

3.2 Proposed uplift

The planning proposal seeks to develop an uplift of the already existing proposal to incorporate an additional 327 units and 1,184 m^2 of non-residential floor-space. This would bring the total number of proposed units to 584, and a total of 1,384 m^2 of non-residential floor-space.

As yet, the exact mix of unit sizes and the use of the non-residential spaces are undetermined. However, for the purposes of this TIA, an indicative mix of unit sizes has been adopted, following the proportions of the mix quoted in GTA 2015:

- 1-bedroom units – 134;
- 2-bedroom units – 327;
- 3-bedroom units – 123;
- total – 584 units.

It is assumed that the non-residential space would be developed for commercial purposes. These commercial spaces would have a greater rate of traffic generation than the residential spaces but, as noted previously, commercial traffic is not considered in this report's analysis as it is assumed that the current volumes of commercial traffic generated by the site will be similar to those in the future.

4 Traffic impact assessment

4.1 Traffic generation and distribution

The methodology used to calculate traffic generation is based on a development's distance to the train station. Four concentric zones (see Figure 4.1 below) were defined based on the distance to the train station, with each zone assigned traffic generation rates. The Forest Park development is within zone 2 (200 – 400 m to the train station).

The future residential traffic volumes generated by the Forest Park development have been determined as summarised below:

- Morning traffic generation: 107 vehicle movements; and
- Afternoon traffic generation: 54 vehicle movements.

Figure 4.1 Traffic generation zones

4.2 Traffic volumes

The future peak hourly traffic volumes for scenario 2 (+4,854 additional dwellings in the Epping town centre) and scenario 3 (+5,438 additional dwellings in the Epping town centre) are shown below in Table 4.1:

Table 4.1 Future traffic volumes on local roads

Road	Morning peak volume (scen. 2/scen. 3)	Afternoon peak volume (scen. 2/scen. 3)	Average daily volume[1] (scen. 2/scen. 3)
Epping Road between Blaxland Road and Smith Street	3,949 / 3,920	3,197 / 3,198	42,876 / 42,708
Epping Road between Smith Street and Forest Grove	3,826 / 3,793	3,201 / 3,206	42,162 / 41,994
Epping Road between Forest Grove and Essex Street	3,885 / 3,827	3,271 / 3,291	42,936 / 42,708
Blaxland Road between Epping Road and Maida Road	3,257 / 3,286	3,888 / 3,949	42,870 / 43,410
Forest Grove	323 / 368	296 / 379	3,714 / 4,482
Essex Street between Epping Road and Maida Road	537 / 637	914 / 936	8,706 / 9,438
Smith Street	127 / 140	14 / 25	846 / 990

Notes: 1. Daily average volume is estimated as 12x the average peak traffic volume.

As shown above in Table 4.1, in terms of the volume of vehicles on the roads in the vicinity of the site, there is very little difference between scenario 2 and scenario 3. Interestingly, some of the scenario 3 volumes, as calculated by the model, are actually lower than the scenario 2 volumes. The main roads affected by the development will be Blaxland Road, Forest Grove, Essex Street and Smith Street. The increases in daily traffic on Forest Grove are the most significant – an extra 768 daily vehicle movements, approximately, as a result of the development. Overall however, there will be a minimal effect on the traffic volumes of the local network as a result of the Forest Park development.

4.3 Impacts at intersections

The future operating performance of the four intersections considered in this report has been assessed using the SIDRA linked intersection model with a 90 second cycle time for all intersections.

The primary modified feature of the future intersection design is the presence of a median strip along Epping Road adjacent to the site's frontage, and an additional west-bound lane.

The two future traffic generation scenarios (scenarios 2 and 3) for the locality which have been assessed are defined in Section 1.2. Scenario 2 assesses the future adjusted baseline traffic volumes for the locality incorporating the range of other developments totalling +4,854 new dwellings in the Epping town centre. Scenario 3 represents a cumulative analysis of the surrounding developments' traffic generation with the uplifted proposed Forest Park residential development, involving a total of +5,438 new dwellings in the Epping town centre. The future SIDRA intersection output results for the two future traffic generation scenarios considered are included for in Appendices B and C.

4.3.1 Epping Road/Blaxland Road intersection

The intersection analysis results for the Epping Road and Blaxland Road intersection for the two future traffic generation scenarios considered are presented in Table 4.2 and 4.3.

Table 4.2 Epping Road/Blaxland Road intersection - 2026 AM performance

Approach	Average delay (seconds) (scen. 2/scen. 3)	Queue length (metres) (scen. 2/scen. 3)	Level of service (scen. 2/scen. 3)	Degree of saturation (scen. 2/scen. 3)
South: Blaxland Road				
Left turn	76.6 / 77.1	195.8 / 195.8	F / F	0.926 / 0.926
Through	695.3 / 701.2	195.8 / 195.8	F / F	1.709 / 1.716
East: Epping Road				
Left turn	38.1 / 38.1	0.3 / 0.3	C / C	0.001 / 0.001
Through	773.5 / 813.2	326.4 / 326.4	F / F	1.787 / 1.831
North: Langston Place				
Left turn	64.9 / 64.4	6.5 / 3.2	E / E	0.060 / 0.030
Through	746.8 / 772.0	821.4 / 846.4	F / F	1.767 / 1.795
West: Bridge Street				
Left turn	5.6 / 5.5	21.5 / 20.8	A / A	0.275 / 0.280
Through	13.6 / 12.9	97.9 / 97.9	A / A	0.647 / 0.628
Right turn	798.4 / 791.8	97.9 / 97.9	F / F	1.817 / 1.809

The analysis of the future Epping Road/Blaxland Road intersection morning peak operation shows a low level of performance. During the morning peak hour, some lanes in all four approaches are above capacity (LoS F). There is no significant difference between scenario 2 and scenario 3. As such, the proposed development will have only a marginal impact on this intersection. Overall, the intersection has very little spare traffic capacity in the morning to accommodate additional peak hour traffic growth from the new residential and other developments in the Epping town centre locality assessed in this report.

Table 4.3 Epping Road/Blaxland Road intersection - 2026 PM performance

Approach	Average delay (seconds) (scen. 2/scen. 3)	Queue length (metres) (scen. 2/scen. 3)	Level of service (scen. 2/scen. 3)	Degree of saturation (scen. 2/scen. 3)
South: Blaxland Road				
Left turn	1060.2 / 1118.7	195.8 / 195.8	F / F	2.122 / 2.187
Through	1191.6 / 1233.9	195.8 / 195.8	F / F	2.270 / 2.318
East: Epping Road				
Left turn	35.4 / 35.4	0.3 / 0.3	C / C	0.001 / 0.001
Through	1325.2 / 1313.2	326.4 / 326.4	F / F	2.399 / 2.386
North: Langston Place				
Left turn	68.6 / 67.5	3.3 / 3.3	E / E	0.037 / 0.035
Through	1182.4 / 1106.4	1023.9 / 1016.1	F / F	2.259 / 2.173
West: Bridge Street				
Left turn	6.2 / 6.2	27.0 / 25.4	A / A	0.282 / 0.268

Table 4.3 Epping Road/Blaxland Road intersection - 2026 PM performance

Approach	Average delay (seconds) (scen. 2/scen. 3)	Queue length (metres) (scen. 2/scen. 3)	Level of service (scen. 2/scen. 3)	Degree of saturation (scen. 2/scen. 3)
Through	11.3 / 11.6	97.9 / 97.9	A / A	0.439 / 0.422
Right turn	1269.6 / 1277.1	97.9 / 97.9	F / F	2.344 / 2.353

The analysis of the future Epping Road/Blaxland Road intersection afternoon peak operation shows a low level of performance. During the afternoon peak hour, some lanes in all four approaches are above capacity (LoS F). There is no significant difference between scenario 2 and scenario 3. As such, the proposed development will have only a marginal impact on this intersection. Overall, the intersection has very little spare traffic capacity in the afternoon to accommodate additional peak hour traffic growth from the new residential and other developments in the Epping town centre locality assessed in this report.

4.3.2 Epping Road/Smith Street intersection

The intersection analysis results for the Epping Road and Smith Street intersection for the two future traffic generation scenarios considered are presented in Table 4.4 and 4.5.

Table 4.4 Epping Road/Smith Street intersection - 2026 AM performance

Approach	Average delay (seconds) (scen. 2/scen. 3)	Queue length (metres) (scen. 2/scen. 3)	Level of service (scen. 2/scen. 3)	Degree of saturation (scen. 2/scen. 3)
East: Epping Road				
Through	0.0 / 0.0	81.6 / 81.6	A / A	0.212 / 0.216
North: Smith Street				
Left turn	8.8 / 8.6	0.2 / 0.2	A / A	0.006 / 0.008
West: Epping Road				
Left turn	5.6 / 5.6	0.0 / 0.0	A / A	0.294 / 0.286
Through	0.0 / 0.0	326.4 / 326.4	A / A	0.294 / 0.286

The analysis of the future Epping Road/Smith Street intersection morning operation shows a very good level of performance. During the morning peak hour, all approaches are very good (LoS A). There are no differences between scenario 2 and scenario 3. As such the proposed development will have only a marginal effect on this intersection. Overall, the intersection has significant spare traffic capacity in the morning to accommodate additional peak hour traffic growth from the new residential and other developments in the Epping town centre locality assessed in this report.

Table 4.5 Epping Road/Smith Street intersection - 2026 PM performance

Approach	Average delay (seconds) (scen. 2/scen. 3)	Queue length (metres) (scen. 2/scen. 3)	Level of service (scen. 2/scen. 3)	Degree of saturation (scen. 2/scen. 3)
East: Epping Road				
Through	0.0 / 0.0	81.6 / 81.6	A / A	0.304 / 0.302
North: Smith Street				
Left turn	7.9 / 7.9	0.1 / 0.3	A / A	0.004 / 0.011
West: Epping Road				
Left turn	5.5 / 5.5	0.0 / 0.0	A / A	0.199 / 0.195
Through	0.0 / 0.0	0.0 / 0.0	A / A	0.199 / 0.195

The analysis of the future Epping Road/Smith Street intersection afternoon operation shows a very good level of performance. During the afternoon peak hour, all approaches are very good (LoS A). There are no significant differences between scenario 2 and scenario 3. As such the proposed development will have only a marginal effect on this intersection. Overall, the intersection has significant spare traffic capacity in the afternoon to accommodate additional peak hour traffic growth from the new residential and other developments in the Epping town centre locality assessed in this report.

4.3.3 Epping Road/Forest Grove intersection

The intersection analysis results for the Epping Road and Forest Grove intersection for the two future traffic generation scenarios considered are presented in Table 4.6 and 4.7.

Table 4.6 Epping Road/Forest Grove intersection - 2026 AM performance

Approach	Average delay (seconds) (scen. 2/scen. 3)	Queue length (metres) (scen. 2/scen. 3)	Level of service (scen. 2/scen. 3)	Degree of saturation (scen. 2/scen. 3)
South: Forest Grove				
Left turn	7.4 / 7.5	3.1 / 4.1	A / A	0.096 / 0.123
East: Epping Road				
Left turn	5.5 / 5.5	0.0 / 0.0	A / A	0.220 / 0.220
Through	0.0 / 0.0	195.8 / 195.8	A / A	0.220 / 0.220
West: Epping Road				
Through	0.0 / 0.0	81.6 / 81.6	A / A	0.281 / 0.273

The analysis of the future Epping Road/Forest Grove intersection morning operation shows a very good level of performance. During the morning peak hour, all approaches are very good (LoS A). There are no significant differences between scenario 2 and scenario 3. As such the proposed development will have only a marginal effect on this intersection. Overall, the intersection has significant spare traffic capacity in the morning to accommodate additional peak hour traffic growth from the new residential and other developments in the Epping town centre locality assessed in this report.

Table 4.7 Epping Road/Forest Grove intersection - 2026 PM performance

Approach	Average delay (seconds) (scen. 2/scen. 3)	Queue length (metres) (scen. 2/scen. 3)	Level of service (scen. 2/scen. 3)	Degree of saturation (scen. 2/scen. 3)
South: Forest Grove				
Left turn	9.0 / 8.8	3.4 / 4.4	A / A	0.107 / 0.135
East: Epping Road				
Left turn	5.5 / 5.5	0.0 / 0.0	A / A	0.311 / 0.310
Through	0.0 / 0.0	195.8 / 195.8	A / A	0.311 / 0.310
West: Epping Road				
Through	0.0 / 0.0	0.0 / 0.0	A / A	0.200 / 0.200

The analysis of the future Epping Road/Forest Grove intersection afternoon operation shows a very good level of performance. During the afternoon peak hour, all approaches are very good (LoS A). There are no significant differences between scenario 2 and scenario 3. As such the proposed development will have only a marginal effect on this intersection. Overall, the intersection has significant spare traffic capacity in the afternoon to accommodate additional peak hour traffic growth from the new residential and other developments in the Epping town centre locality assessed in this report.

4.3.4 Epping Road/Essex Street intersection

The intersection analysis results for the Epping Road and Essex Street intersection for the two future traffic generation scenarios considered are presented in Table 4.8 and 4.9.

Table 4.8 Epping Road/Essex Street intersection - 2026 AM performance

Approach	Average delay (seconds) (scen. 2/scen. 3)	Queue length (metres) (scen. 2/scen. 3)	Level of service (scen. 2/scen. 3)	Degree of saturation (scen. 2/scen. 3)
South: Essex Street				
Left turn	64.3 / 60.3	9.3 / 8.9	E / E	0.082 / 0.070
Through	247.0 / 294.1	318.8 / 435.3	F / F	1.185 / 1.243
Right turn	71.9 / 68.2	86.3 / 97.5	F / E	0.678 / 0.668
East: Epping Road				
Left turn	44.6 / 56.8	195.9 / 230.9	D / E	0.819 / 0.881
Through	41.6 / 54.9	195.9 / 230.9	C / D	0.819 / 0.881
North: Essex Street				
Left turn	37.4 / 38.0	7.1 / 6.4	C / C	0.031 / 0.029
Through	31.9 / 32.5	7.1 / 6.4	C / C	0.031 / 0.029
Right turn	292.9 / 300.1	374.1 / 376.3	F / F	1.223 / 1.232
West: Epping Road				
Left turn	30.9 / 35.2	98.2 / 102.2	C / C	0.567 / 0.586
Through	165.3 / 190.8	195.8 / 195.8	F / F	1.193 / 1.235

The analysis of the future Epping Road/Essex Street intersection morning operation shows a low level of performance. During this peak hour, the southern, northern and western approaches have the worst levels of service, each with lanes over capacity (LoS F). The main effect of the proposed development is on the eastern approach of Epping Road, which reaches capacity (LoS E) for the left turn, and approaches capacity (LoS D) as a result of the extra 600 units. Overall, the intersection has limited spare traffic capacity to accommodate additional peak hour traffic growth from the new residential and other developments in the Epping town centre locality assessed in this report.

Table 4.9 Epping Road/Essex Street intersection - 2026 PM performance

Approach	Average delay (seconds) (scen. 2/scen. 3)	Queue length (metres) (scen. 2/scen. 3)	Level of service (scen. 2/scen. 3)	Degree of saturation (scen. 2/scen. 3)
South: Essex Street				
Left turn	74.6 / 74.6	1.0 / 1.0	F / F	0.016 / 0.016
Through	295.2 / 282.8	198.1 / 191.2	F / F	1.243 / 1.228
Right turn	155.4 / 206.6	110.5 / 138.9	F / F	1.055 / 1.126
East: Epping Road				
Left turn	274.2 / 284.4	1724.9 / 1771.7	F / F	1.250 / 1.261
Through	274.2 / 284.9	1724.9 / 1771.7	F / F	1.250 / 1.261
North: Essex Street				
Left turn	289.5 / 296.6	285.2 / 291.1	F / F	1.231 / 1.240
Through	284.1 / 291.1	285.2 / 291.1	F / F	1.231 / 1.240
Right turn	297.3 / 320.6	142.9 / 149.8	F / F	1.231 / 1.259
West: Epping Road				
Left turn	11.2 / 11.2	27.4 / 26.2	A / A	0.202 / 0.195
Through	6.5 / 6.5	70.3 / 66.6	A / A	0.426 / 0.410

The analysis of the future Epping Road/Essex Street intersection afternoon operation shows a low level of performance. During this peak hour, the southern, eastern and northern approaches are fully over capacity (LoS F). The proposed development has a small effect on the expected situation. Only the western approach has a very good LoS (A). Overall, the intersection has no spare traffic capacity to accommodate additional peak hour traffic growth from the new residential and other developments in the Epping town centre locality assessed in this report.

Overall, the worst affected approaches are the north and south approaches to Epping Road at the Blaxland Road and Essex Street intersections. This is clearly shown in the Table 4.10 below, comparing average delay times across the three scenarios:

Table 4.10 Summary of significant average delay deteriorations

Approach	Scenario 1 (AM/PM)	Scenario 2 (AM/PM)	Scenario 3 (AM/PM)
Epping Road/Blaxland Road intersection			
Northern approach left turn	49.0 / 62.7	37.4 / 289.5	38.0 / 296.6
Northern approach through	53.5 / 57.1	31.9 / 284.1	32.5 / 291.1
Northern approach right turn	66.0 / 254.3	292.9 / 297.3	300.1 / 320.6
Southern approach left turn	66.6 / 91.6	64.3 / 74.6	60.3 / 74.6
Southern approach through	61.1 / 77.8	247.0 / 295.2	294.1 / 282.8
Southern approach right turn	66.8 / 82.1	71.9 / 155.4	68.2 / 206.6
Epping Road/Essex Street intersection			
Northern approach left turn	58.4 / 98.0	64.9 / 68.6	64.4 / 67.5
Northern approach through	52.9 / 92.5	746.8 / 1182.4	772.0 / 1106.4
Southern approach left turn	17.3 / 74.6	76.6 / 1060.2	77.1 / 1118.7
Southern approach through	53.8 / 73.6	695.3 / 1191.6	701.2 / 1233.9

As such, while the effect of the development is generally small, as at other intersections, the year 2026 base conditions are such that no further development is advisable in the site locality without further improvements to the local traffic access to Epping Road.

4.4 Car parking

4.4.1 Council parking requirements

The HDCP 2013 gives parking rates for various types of development. A breakdown of the parking required based on the HDCP 2013 guidelines is provided below in Table 4.11:

Table 4.11 Analysis of council parking requirements

Use	Units/floor area	Minimum parking rate[1]	Minimum parking requirement
1-bedroom units	134	0.75 space per dwelling	100.5
2-bedroom units	327	1.0 space per dwelling	327
3-bedroom units	123	1.5 spaces per dwelling	184.5
Visitors		1.0 space per 7 dwellings	83.4
Residential subtotal			**695**
Commercial	1,384 m^2	1 space per 29 m^2	47.7
Total			**743**

Notes: 1. Minimum parking rates according to the Hornsby development control plan 2013.

The HDCP 2013 guidelines require a minimum of 695 residential car parking spaces and 48 commercial car parking spaces. Specific requirements for accessible care parking for high density residential developments include a minimum of one accessible car space for each proposed accessible unit and a minimum of 10 percent of all units to be provided with an accessible car space. This entails that at least 58 of the 695 residential car spaces be accessible car parking spaces. Furthermore HDCP 2013 requires that at least one car share (eg GoGet, Greenshare, Flexicar) space should be provided for residential developments containing 50 or more dwellings. Any further requirements, relating to loading or service vehicle bays for example, will be assessed in the detailed development application.

4.4.2 RMS parking requirements

The SEPP 65 amendment states that a development application cannot be refused on car parking grounds

> "if the car parking for the building be equal to, or greater than, the recommended minimum amount of car parking specified in Part 3J of the Apartment Design Guide".

Part 3J of the Apartment Design Guide states:

> "For development ... on sites that are within 800 metres of a railway station ... the minimum car parking requirement for residents and visitors is set out in the Guide to Traffic Generating Developments, or in the car parking requirement prescribed by the relevant council, whichever is less."

The site is located approximately 260 m from Epping railway station. The parking requirements relevant to the proposed development prescribed in the *Guide to Traffic Generating Developments* (2002) are analysed below in Table 4.12.

Table 4.12 Analysis of RMS parking requirements

Use	Units/floor area	Minimum parking rate[1]	Minimum parking requirement
1-bedroom units	134	0.6 space per dwelling	80.4
2-bedroom units	327	0.9 space per dwelling	294.3
3-bedroom units	123	1.4 spaces per dwelling	172.2
Visitors		0.2 space per dwelling	116.8
Commercial	1,384 m^2	1 space per 29 m^2	47.7
Total			**711**

Notes: 1. Minimum parking rates according to the Guide to Traffic Generating Developments (2002), except for commercial floor-space which continues to follow council requirements.

Based on the SEPP 65 amendment and Part 3J of the Apartment Design Guide, it is permissible for the development to supply a minimum of 711 parking spaces rather than 743 as per the council requirements.

The preliminary design of the proposed development accommodates the required 711 car parking spaces.

4.5 Pedestrian, cycling and motorcycling requirements

Pedestrian access for the site is very good, with concrete paved footpaths, safe crossings and easy access to Epping train station provided (as discussed in Sections 2.6 and 2.7).

The HDCP 2013 requires the following cycling and motorcycling provisions in high density residential developments:

- Bicycle parking is required at a rate of one space per five units for residents, one space per 10 units for visitors and one space per 600 m^2 of commercial floor area. This entails 117 spaces for residents, 58 spaces for visitors and two spaces for commercial uses – a total of 177 spaces.

- Motorcycle parking is required at a rate of 1 space per 50 car parking spaces provided. This entails a minimum of 14 spaces.

The preliminary design of the proposed development accommodates the required 177 bicycle spaces and 14 motorcycle spaces.

4.6 Public transport services

The existing bus and rail transport services discussed in Section 2.7 will provide adequate public transport accessibility for the proposed residential development. This is reflected in the more recent (but lower) 2013 traffic generation rates in the addendum to *Traffic Generating Developments (2002)* which are now recommended by RMS for use with higher density residential developments in more urbanised areas.

5 Summary and conclusions

This traffic impact assessment report has analysed the traffic impacts of the proposed residential development (including uplift) known as Forest Park. The analysis has considered the surrounding approved projects in the locality, to be fully developed by 2026.

The analysis was carried out with reference to three development scenarios:

- Scenario 1 – the 2017 base-load traffic in the vicinity of the site.
- Scenario 2 – the 2026 base-load traffic, generated by the additional 4,854 dwellings currently approved to be developed within the Epping town centre.
- Scenario 3 – as above, plus the traffic generated by the uplifted proposed Forest Park residential development (total of +5,438 dwellings).

With reference to these scenarios, this report includes:

- a detailed intersection traffic analysis of the four relevant intersections in the vicinity of the site;
- a cumulative analysis of the traffic volumes on the relevant roads;

This report also includes an assessment of the local public transport and pedestrian/cycleway access routes.

5.1 Site access and local network changes

The proposed vehicle access for the Forest Park residential development will be via Epping Road and Forest Grove. Significant other roads in the vicinity of the site include Blaxland Road, Essex Street, Smith Street and Maida Road. The RMS plans to carry out some road upgrades in the Epping town centre: most significantly for the site, the addition of a raised median strip on Epping Road. This will restrict right turns onto Epping Road from Forest Grove and Smith Street. Further, an additional west-bound lane on Epping Road along the site's frontage will be constructed.

5.2 Assessment of impacts on peak and daily traffic volumes

There will be significant increases in traffic volumes on the local network from the 2017 levels to the 2026 base-load levels. However, there will be a relatively small effect on 2026 volumes as a result of the Forest Park development. The most significant of these will be on Forest Grove, which will experience an additional 768 daily vehicle movements, approximately, as a result of the development. This was expected in that Forest Grove will be a primary access road to the development.

5.3 Assessment of traffic impacts on intersections

5.3.1 Existing intersection operations

The existing (2017) operations for the following intersections were assessed using SIDRA:

- Epping Road/Blaxland Road;

- Epping Road/Smith Street;
- Epping Road/Forest Grove; and
- Epping Road/Essex Street.

The existing operation of the Epping Road/Blaxland Road intersection is poor, with the northern approach at capacity (LoS E) during the morning peak hour. All approaches except for the western approach are over capacity (LoS F) during the afternoon peak hour.

The existing operations of the Epping Road/Smith Street and Epping Road/Forest Grove intersections are generally good. The level of service for all approaches is acceptable (LoS A-C) at both intersections for the morning and afternoon peak. The only exception is that the right turn from both Smith Street and Forest Grove is permanently over capacity (LoS F) due to the difficulty of turning right into Epping Road at an unsignalised intersection. However, RMS road upgrades will not permit these right turns in the near future.

The existing operation of the Epping Road/Essex Street is poor, with the northern and southern approaches at or near capacity (LoS D-E) during the morning peak hour. Furthermore, during the afternoon peak hour, all approaches except for the western approach are at or over capacity (LoS E-F).

5.3.2 Future intersection operations

The same four intersections were assessed again using SIDRA with consideration of scenario 2 (+4,854 new dwellings in the Epping town centre) and scenario 3 (+5,438 new dwellings plus Forest Park development) as cumulative traffic impacts on the local network. The road upgrades planned by RMS were incorporated into the predictive model used in this analysis.

The future operation of the Epping Road/Blaxland Road intersection is poor for both future scenarios, with the northern, southern and eastern approaches generally at or near capacity (LoS E-F) during the morning and afternoon peak hours. The differences between scenario 2 and scenario 3 are marginal and thus the effect of the Forest Park development on this intersection will not be significant.

The future operations of the Epping Road/Smith Street and Epping Road/Forest Grove intersections are very good for both future scenarios. The level of service for all approaches is acceptable (LoS A) at both intersections for the morning and afternoon peak. The differences between the two future scenarios are marginal and thus Forest Park's effect on these intersections will not be significant.

The future operation of the Epping Road/Essex Street is poor for both future scenarios. During the morning peak hour, all approaches exhibit a mixture of levels of service (LoS C-F), with these oscillating between scenarios 2 and 3. The net difference between the two scenarios is, however, minimal. During the evening peak hour, all approaches except the western approach are over capacity (LoS F) for both future scenarios with no practical difference between the scenarios. Overall, the effect of the Forest Park development on this intersection will not be significant.

While, in general, the development only has a minor effect on the traffic conditions at intersections, the increases in average vehicle delays (as shown in Table 4.10) from scenario 1 to scenario 2 are such that further development in the Epping town centre is unacceptable without further improvements to the local traffic access to Epping Road.

5.4 Assessment of car parking

Kerbside parking is currently permitted on various roads in the vicinity of the site including the eastern side of Blaxland Road (outside peak hours) and both sides of Essex Street, Forest Grove, Smith Street and Maida Road.

Based on a parking analysis (Section 4.4), a minimum of 711 car parking spaces will be required. These are accommodated in the preliminary design for the development.

5.5 Assessment of pedestrian and cycling access needs

The site is well placed for pedestrian and cycling access. Concrete footpaths are on at least one side of all the surrounding roads. A designated cycle route on Pembroke Street, 200 m north of the site is easily accessible.

A minimum of 177 bicycle and 14 motorcycle spaces are required by the HDCP 2013. These are accommodated in the preliminary design for the development.

5.6 Assessment of public transport access

Multiple public transport options are available. The T1 North Shore, Northern and Western Line of the Sydney railway network is accessible at Epping station, 260 m away on foot. Furthermore, several bus routes operate within a 300 m radius of the site – including a bus stop at the site's Epping Road frontage. Thus, public transport from the site to a range of areas throughout the Sydney metropolitan region is available. The existing public transport network will be sufficient for the needs of the Forest Park development.

References

GTA Consultants (2015), *Forest Park, Epping Planning Proposal Traffic Impact Assessment*, report prepared for Austino Property Group, December 2015.

Roads and Traffic Authority (2002), *Guide to Traffic Generating Developments.*

Appendix A

Scenario 1 Intersection SIDRA Analysis Results

Appendix B

Scenario 2 Intersection SIDRA Analysis Results

Appendix C

Scenario 3 Intersection SIDRA Analysis Results

J17056 RPT3

SUMMARY OF PLANINNG PROPOSALS & PRELIMINARY PLANNING PROPOSALS –
Attachment 7 to Council report on the Epping Town Centre Traffic Study - 28 May 2018

AUSTINO PLANNING PROPOSAL

Introduction

1. A Planning Proposal for land at 2-18 Epping Road, 2-4 Forest Grove and 725 Blaxland Road (former bowling club site) was lodged with Hornsby Shire Council in 2015, but came to be located within City of Parramatta Council following the May 2016 Council boundary changes. Figure 1 below shows the land affected by this PP. The applicant is the Austino Property Group.

Figure 1 - Land affected by the Austino Planning Proposal denoted in solid red line (from applicant's Urban Design Report)

2. The proposal seeks a predominantly residential development comprising two towers on Blaxland Road with smaller towers on Epping Road accommodating estimated 794* units. (Note this calculation by Council Officers relies on Council's standard practice of applying an efficiency unit rate of 85sqm per unit whereby the applicant's 678 units figure relies on a rate of 100sqm).
3. This PP has a complex history, which is summarised as follows:
   a. **December 2015:** Original PP was lodged with Hornsby Shire Council (HSC).
   b. **January 2016:** the then Parramatta City Council (PCC) was formally invited to comment on the applicant's Planning Proposal and on 14 March 2016, resolved to adopt a submission on the matter which requested further analysis against 9 principles identified in Council's submission.
   c. **April 2016:** On 13 April 2016, Hornsby Shire Council resolved not to support the proposal (just prior to the Council amalgamation on 12 May 2016). In response to Hornsby Shire Council's resolution, the applicant

lodged a Pre-Gateway Review with the Department in late April 2016. This placed the handling of the Planning Proposal in the hands of the Department.

d. **March 2016:** the then PCC endorsed a submission to HSC (refer **Attachment 3**) which established seven planning principles that this PP should address; these principles are discussed in further detail below.

e. **April 2016:** HSC refused the PP. The applicant subsequently sought a pre-Gateway review process through DPE.

f. **May 2016:** Council boundary changes occurred, and the site came to be located within the new entity of the City of Parramatta. DPE also formally notified Council that the applicant had sought a pre-Gateway review.

g. **September 2016:** As part of the Pre-Gateway review process, the Joint Regional Planning Panel (JRPP) considered the proposal in September 2016 and recommended a range of issues be considered before the proposal is submitted for a Gateway Determination.

h. **November 2016:** DPE wrote to Council:

    i. To advise that the PP could proceed to Gateway determination "subject to further consideration as indicated in the advice provided by the [Joint Regional Planning] Panel" as part of its pre-Gateway review. This advice included that the proposal "be part of the current Council traffic review of the whole of Epping Town Centre and that the outcomes of that review shall inform the final decision of the Floor Space Ratio for the site".

    ii. Seeking whether Council would elect to be the Relevant Planning Authority (RPA). This would enable City of Parramatta Council to have more influence over the process. Council accepted the RPA role on the condition that the Gateway Determination is issued after the exhibition of the Discussion Paper and supporting technical studies, so that this information and community views can be taken into account.

i. **December 2016**: In response to November 2016 letter from DPE, Council wrote to DPE requesting to be the RPA. This request was on the basis that the Gateway would be issued after the exhibition of the Epping Planning Review Stage 1 materials (Stage 1 had just commenced at that time).

j. **March 2017**: DPE appointed Council as the RPA on the basis described above.

k. **June-July 2017**: The Epping Planning Review Discussion Paper and associated technical studies (including interim traffic study) were exhibited for a four-week period.

l. **August 2017:** Principles to guide Stage 2 of the Epping Planning Review were endorsed by the Administrator.

m. **September 2017:** Following a request from the applicant, DPE wrote to Council requesting Council to provide its reasoning as to why an alternate RPA should not be appointed, or to advise that it would submit the proposal for Gateway based on the information available at that time.

n. **October 2017:** Council responded to the above letter, stating its reasoning for remaining as the RPA, as summarised here:
    i. RMS's support for the density sought in this PP was only on account of amendments being made to the PP regarding the number of car parking spaces on the site and additional traffic modelling being carried out;
    ii. The progression of the PP is dependent on the outcomes of the Epping Traffic Study (consistent with the JRPP's recommendation).
    iii. The Epping community expects that traffic matters will be well understood before any decision is made on proposals seeking uplift within and immediately around the town centre.
    iv. The issue of precedent that would be created should the RPA role be removed from this planning proposal.
o. On **1 December 2017**, Council received a letter from DPE advising that it had appointed the Sydney Central City Planning Panel as RPA, meaning that Council no longer has RPA status for this proposal. This is not consistent with the endorsed principles discussed in this report, which sought to retain Council's RPA status. The DPE has advised Council:
    v. that it anticipates that any Gateway determination for this proposal would require completion of the Traffic Study and any necessary amendments to the Planning Proposal prior to exhibition.
    vi. that there will be formal consultation with Council on this Planning Proposal as it proceeds.
p. **12 February 2018:** A Council report (Item 12.3) which sought to provide an update on the status of the Epping Planning Review and associated matters was deferred from the 12 February 2018 Council Meeting. One of the resolutions was:

    That Council write to the Department of Planning seeking clarification around the decision of 1 December 2017 to appoint the Sydney Central Planning Panel as the relevant Planning Authority, meaning that Council no longer has relevant planning Authority Status for this proposal. Council is seeking this clarification particularly around the fact that the Department of Planning and Environment will be referring the outcome of the Traffic Study to make their determination which is the reason for our Council delaying a recommendation to the Council.
q. **1 March 2018:** Consistent with the resolution on 12 February 2018, Council Officers wrote to the DPE on 1 March 2018. Council Officers have received verbal confirmation that a response from the DPE's Secretary is due shortly which will reiterate the position in its letter of 1 December 2018. At the time the Council report was being prepared, a

response from the DPE had not been provided. Therefore, a copy of that letter is attached to the Council Report.

r. **28 March 2018:** Consistent with a resolution from the 12 February 2018 Council meeting (Item 12.5) requesting Ward Councillors be briefed, a Councillor briefing session was held on Wednesday, 28 March 2018 with the Epping Ward Councillors.

s. **29 March 2018:** A meeting was held with the Local Member for Epping, Damien Tudehope MP with RMS and TfNSW and the Lord Mayor and Council Officers on 2 March 2018

t. **April 2018:** An independent valuation of the former Epping Bowling Club site (725 Blaxland Road, Epping) was completed.

u. **April 2018:** EMM complete two Traffic Analyses reports:

   i. Austino Traffic Impact Assessment (TIA) based on the 5,000 dwelling figures for the 2016 scenario.

   ii. The ETCTS which includes a section on the Austion PP (refer to Section 7.1) revises in a minor way, the figures in the their Austino TIA.

4. The assessment of the planning proposal as a result of the findings from the ETCTS and rate of dwelling growth within the Town Centre since March 2014 is provided within the Council report which this attachment relates to.

PRELIMINARY PLANNING PROPOSALS

5. As noted within the Epping Planning Review Discussion Paper and follow up Council Report on Stage 1 of the Epping Planning Review (of August 2018), two preliminary planning proposals have been lodged with Council affecting land within the town centre. As well, the seek a partnership with Council to develop their sites in conjunction with the Council car park. These preliminary planning proposals have been on hold on account of the ETCTS being completed as per the adopted principles of August last year.

Oakstand Consortium

6. A preliminary planning proposal received in of November 2014 by the Oakstand Group applies to land at 53 and 61 Rawson Street, Epping. Figure 2 shows the sites' consistent with that proposal.

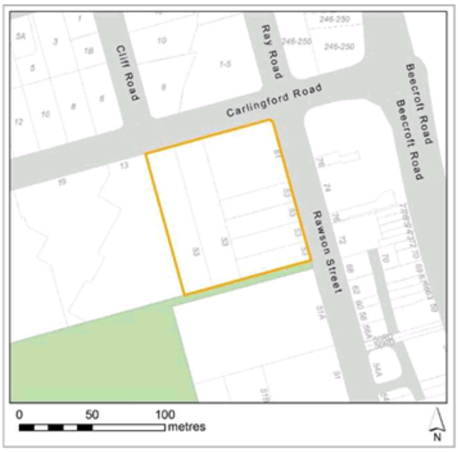

Figure 2 - Oakstand site (53 & 61 Rawson Street, Epping)

7. The proposal seeks a partnership with Council to develop their site in conjunction with the Council car park. It seeks to amend planning controls to increase height and density achievable on these sites to enable:

    a. **674 units** over its site at 53 and 61 Rawson Street; and

    b. **520 units** over the Council car park site.

8. The total dwelling figure of this proposal equates to **1194 dwellings** It also proposes rezoning the entire site from B2 to B4 zoning, which would likely reduce the amount of commercial uses at the site. Whilst the proposal does currently propose 10,000sqm of retail and 4,923sqm of other non-residential uses, the risk that Council needs to consider is that introducing the proposed B4 zone could result in the site being redeveloped entirely for residential flat buildings with no commercial uses on the site, unless controls are put in place to mandate a minimum provision of commercial floor space.

9. The proposed public benefit elements included in this proposal include a range of traffic upgrades, creation of a new 3,430sqm town square, a new civic memorial, activation of Boronia Park, amenity improvements to Rawson Street, through-site links, and 200 underground Council car parking spaces.

10. More recently (ie. since the report to Council in August 2018 last year covering Stage 1 of the Epping Planning Review), the consortium now intends to expand their sites of interest to include the Epping Club, though no revised preliminary planning proposal has been submitted to Council as yet.

Lyon Group (59-77 Beecroft Road and Masonic Hall Site at 49 Rawson Street)

11. A preliminary proposal by the Winton and Lyon Groups applies to land at 59-77 Beecroft Road, Epping as well as the Masonic Hall located at 49 Rawson Street, adjacent to Council's car park site at 51A Rawson Street, Epping (refer to Figure 3).

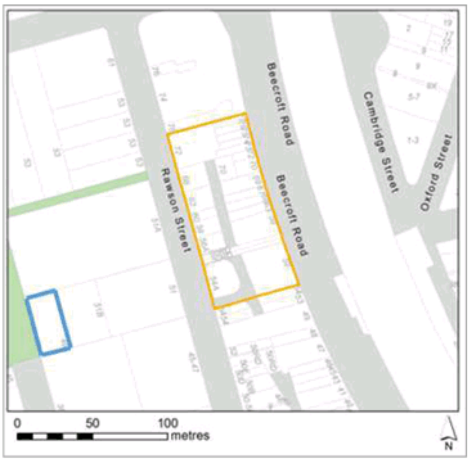

Figure 3 - Lyon group site – 59-77 Beecroft Road (orange outline) and Masonic Hall Site (blue outline), Epping

12. The preliminary proposal seeks a partnership with Council to develop their site in conjunction with the Council car park. It seeks to amend the planning controls to increase building height and density controls achievable at this site to enable:
    a. **700** units over its site at 59-77 Beecroft Road; and
    b. **200** units over the Council car park sites and the Masonic Hall site (49 Rawson Street).
13. The total dwelling figure of this proposal equates to **900 dwellings**. This proposal also includes retail and commercial uses, as well as proposed public benefits including 2,000sqm of community facilities and infrastructure, a civic plaza area of over 3,700sqm which will create a "green spine" from east to west through the site, and improved pedestrian connectivity between Boronia Park and the Epping transport interchange. These elements are proposed to be delivered via a voluntary planning agreement.

CONCULSION

14. Under the current controls, the planning (or preliminary planning) proposals applying to the three land holdings would deliver approximately 1,500 dwellings. If realized as currently proposed, the three planning proposals would deliver a total of 2,100 dwellings within the Town Centre which equates to an **additional 1,300 dwellings** above what can currently be achieved. This is on top of the **5,553 dwellings** which are being delivered via development applications and approvals.

***

Epping Planning Review

Discussion Paper

June 2017

How do I make a submission?

This Discussion Paper is being exhibited from Wednesday, 21 June 2017 to Wednesday, 19 July 2017. You can make a submission during this time.

Please quote reference no. **F2017/000210** in your submission.

SUBMISSIONS CAN BE POSTED TO:
Epping Planning Review
City of Parramatta Council
PO Box 32
PARRAMATTA NSW 2150

SUBMISSIONS CAN BE EMAILED TO:
placeservices@cityofparramatta.nsw.gov.au

YOU CAN ALSO CALL US:
If you have accessibility concerns, please contact the National Relay Service on http://relayservice.gov.au/ and provide them with the City of Parramatta number you want to call.

WHAT HAPPENS TO MY SUBMISSION?
All submissions will be carefully considered by senior staff and reported to Council in August 2017, prior to commencing Stage 2. Letters of acknowledgment will be provided for written submissions.

WHAT IS ON EXHIBITION?
The Discussion Paper is being exhibited in conjunction with the following supporting information:

1. **Technical Studies:**
   a. Heritage Review (prepared by City Plan Services).
   b. Commercial Floorspace Study (prepared by SGS Economics & Planning).
   c. Social Infrastructure Study (prepared by Council's Social Outcomes team).
   d. Interim Traffic Modelling Report (prepared by EMM).
2. **Phase 1 Consultation Report** (prepared by Straight Talk).

Table of Contents

1.0 INTRODUCTION

1.1 Background

Due to the introduction of new planning controls in 2014 coupled with a strong housing market, the Epping Town Centre is experiencing unprecedented levels of redevelopment and change, particularly on its northern and eastern sides. This redevelopment impacts residents significantly, particularly with regards to view impacts, reduction in tree canopy, parking and traffic, and construction noise.

New development is changing the amount of commercial floor space available within the Epping Town Centre, creating uncertainty for existing businesses who want to remain in the centre. This is not an ideal outcome for current and future residents.

New development is also increasing the centre's residential population. At the current rate of development, approximately 10,000 new residents will move into the centre in the next five to seven years. This new population will rely on the commercial and community offerings of the Epping Town Centre, putting pressure on existing infrastructure. While the train station is a major asset and the North West Metro Line will be installed in the first half of 2019, access into, out of and through the centre for private vehicles continues to be an issue.

These changes are impacting on local residents, who see the character of their local area changing rapidly. Some of these impacts are temporary – like construction traffic and noise – while others will be more permanent. The positive elements of density, such as economic diversity and infrastructure investment, are not occurring at the same rate as the redevelopment.

On 12 May 2016, the council amalgamations process saw the Epping Town Centre fall entirely within the jurisdiction of the new City of Parramatta. This presents an opportunity to address these pressing issues and plan for the function of the centre over the next 20 years.

1.2 Strategic context

The most recent strategic planning document with implications for Epping is the Greater Sydney Commission's *Draft West Central District Plan* (Draft District Plan). The Draft District Plan was published in late 2016, and adopts a timeframe of 2016-2036 for planning for the West Central District. The Draft District Plan makes numerous references to the Epping Town Centre:

- *Examples of significant concurrent investment in growth and renewal opportunities include…the renewal and revitalisation of Epping Town Centre* (pg.31)
- *In the West Central District, Epping and Merrylands are examples of local centres that, with the right planning and investment, could read their potential as emerging commercial and retail nodes* (pg.48).
- The Draft District Plan recognises that the Epping Town Centre Priority Precinct is forecast to deliver up to 3,750 dwellings in the next 5 years after its rezoning in March 2014 (pg.93), although this figure has since been revised to 5,500 dwellings.

- City of Parramatta will *progress the delivery of Epping Town Centre urban renewal with the Greater Sydney Commission and Department of Planning and Environment* (pg.99).

The Draft District Plan identifies two distinct centre hierarchies: Local Centres and Strategic Centres (as detailed in the Department's *A Plan for Growing Sydney).* Epping is identified as a Local Centre as per the comments above; however, the Local Centre category is somewhat ambiguous with 30 to 40 local centres identified within the West Central District. Aside from the points above, there is very little about what the Epping Town Centre might become in 2036 in this document.

Please refer to Appendix 1 for a more detailed discussion of Epping's role within the metropolitan strategic planning framework.

1.3 Purpose of the Discussion Paper

This Discussion Paper is the major milestone for Stage 1 of the Epping Planning Review. The purpose of the Discussion Paper is to:

- explain the background and context around the need to undertake the Epping Planning Review;
- propose appropriate options, recommendations, and suggest principles for adoption, taking into consideration both technical study findings and community opinion; and
- invite comment on the Discussion Paper so the community can assist Council to develop new planning controls for the Epping Town Centre and immediate surrounds.

1.4 Study area

Figure 1 illustrates the extent of the study area for the Epping Planning Review. Despite the boundaries in Figure 1, Epping residents utilise community facilities situated outside the study area; these social infrastructure assets have been considered as part of the Epping Planning Review project.

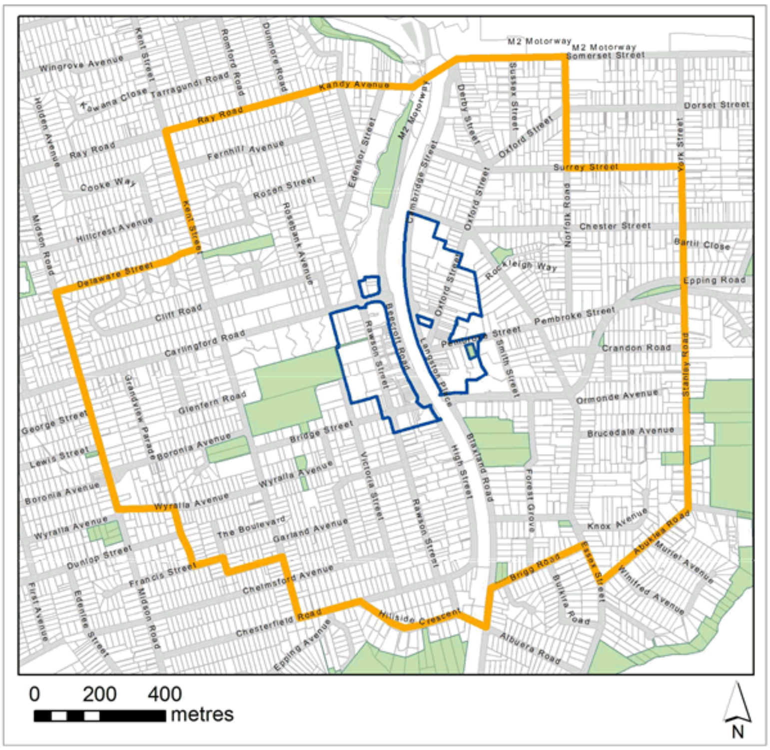

Figure 1 Epping Planning Review study area showing the town centre and immediate surrounds

1.5 Structure of the Discussion Paper

This Discussion Paper is structured as follows:

- **Chapter 2 Background**
  This chapter explains some background including the NSW Department of Planning's (the Department) Priority Precinct process and the new planning controls of March 2014.
- **Chapter 3 Why is the Epping Planning Review needed?**
  This chapter explains why the Epping Planning Review is being undertaken by the City of Parramatta.
- **Chapter 4 What is the Epping Planning Review?**
  This chapter details what the Epping Planning Review involves.
- **Chapter 5 Community Engagement**
  This chapter summarises the community consultation undertaken since the public forum (held on 14 December 2016) to the present, including the Phase 1 community workshops held in May 2017.
- **Chapter 6 Introduction to the Technical Studies**
  This chapter introduces the technical studies and supporting analyses which have informed this Discussion Paper.
- **Chapter 7 Heritage Review**

This chapter presents the findings from the heritage review (prepared by City Plan), summarises findings from the Phase 1 community workshops, and presents options and recommendations that seek to resolve the tensions between the technical findings and community opinion.

- **Chapter 8 Commercial Floorspace Study**
  This chapter presents the findings from the Commercial Floorspace Study (prepared by SGS Economics), summarises the findings from the Phase 1 community workshops, and presents options and recommendations to resolve issues around how commercial land uses will evolve in this centre over the next 20 years.
- **Chapter 9 Social Infrastructure Study**
  This chapter presents the findings from the Social Infrastructure Study (prepared by Council's Social Outcomes team), summarises the findings from the Phase 1 community workshops, and presents options and recommendations to resolve social infrastructure capacity issues over the next 20 years.
- **Chapter 10 Public Domain Analysis**
  This chapter acknowledges public domain issues that emerged from the technical studies and from the Phase 1 community workshops, and presents urban design recommendations for the public domain.
- **Chapter 11 Traffic and Land Use Options Study**
  This chapter presents interim findings from the traffic and land use technical study, acknowledges feedback on traffic and land use issues that emerged from the Phase 1 community workshops, and presents guiding principles for further consultation.
- **Chapter 12 How to Make a Submission and Next Steps**
  This chapter explains what the next steps are in the Epping Planning Review project including what happens after the exhibition of the Discussion Paper.

1.6 Supporting information

The following supporting information is being exhibited with this Discussion Paper:

- Heritage Review (prepared by City Plan Services).
- Commercial Floorspace Study (prepared by SGS Economics & Planning).
- Social Infrastructure Study (prepared by Council's Social Outcomes team).
- Interim Traffic Modelling Report (prepared by EMM).
- Phase 1 Community Consultation Report (prepared by Straight Talk).

2.0 BACKGROUND

2.1 Epping Priority Precinct

In 2011, the former Hornsby Shire and Parramatta City Councils jointly prepared the *Epping Town Centre Study* in order to explore the potential for more dwellings and jobs around the Epping train station. The study was funded by the NSW Department of Planning and Environment's (the Department) Planning Reform Fund.

The *Epping Town Centre Study* was exhibited in late 2011. As a means of implementing this study, Hornsby Shire Council nominated the precinct as a Priority Precinct. This was endorsed by the NSW Government in October 2012, and meant that the State Government took full carriage of the planning process from that point.

As part of the Priority Precinct process, studies addressing urban design, traffic and economic feasibility were undertaken. These studies informed new planning controls for the town centre which concentrated growth close to the railway station. These controls came into effect in March 2014.

2.2 March 2014 planning controls

The new planning controls which came into effect in March 2014 are detailed in Appendix 2. In summary:

- For the former Hornsby Shire Council (north and eastern) portion of the town centre and surrounds, the B2 Local Centre and R4 High Density Residential zones were expanded with their respective building height and density controls increased. Also, three new Heritage Conservation Areas were created (Rosebank Avenue, East Epping and Essex Street).
- For the former Parramatta City Council (western) portion of the town centre and surrounds, the B2 Local Centre zone became the uniform zone with accompanying height and floor space ratio controls increased. There were no changes to the surrounding R2 Low Density and R4 High Density zones, including no height and density changes, and no changes to nearby Heritage Conservation Areas.

The March 2014 planning controls enabled development of up to 10,000 dwellings if all sites were to be developed to their total capacity. Whilst this is the theoretical capacity, it is unlikely that all sites would be developed to their maximum capacity, so the theoretical capacity is unlikely to be reached.

Initial Department of Planning projections suggested that 3,750 dwellings would be achieved within 5 years (assuming a 37.5% take-up rate of the 10,000 dwellings). However, the Department has recently revised this figure, indicating that 5,550 dwellings will be achieved within 5 years (a 55% take-up rate of the 10,000 dwellings). This revised figure may still be an underestimate as recent analysis undertaken by Council suggests that the take-up rate for redevelopment sites in Epping has been unprecedented. If applications continue to be lodged at the rate they have been since the new controls came into force, it may be that more than 5,550 dwellings will be achieved in this timeframe.

3.0 WHY IS THE EPPING PLANNING REVIEW NEEDED?

A number of factors have led the City of Parramatta to undertake the Epping Planning Review. These factors are explained in this chapter.

3.1 Council amalgamations

Council amalgamations in May 2016 saw the Epping Town Centre and immediate surrounds fall wholly within a new jurisdiction - the City of Parramatta Council.

Prior to this, the Epping Town Centre had been split between the former Parramatta City Council (PCC) to the west and the former Hornsby Shire Council to the north and east. This historic dual structure resulted in a complex planning control framework currently in place for the centre, including:

- two local environmental plans (*Parramatta Local Environmental Plan 2011* and *Hornsby Local Environmental Plan 2013*);
- two development control plans (*Parramatta Development Control Plan 2011* and *Hornsby Development Control Plan 2013*);
- three development contributions plans with different contributions rates across each development type (a Section 94A plan applying to the former PCC area, and a Section 94 plan and Section 94A Plan applying to the former Hornsby Shire area); and
- one public domain plan for the former Hornsby Shire Council area, with no corresponding public domain plan for the former PCC side.

The amalgamation between the former PCC and Hornsby Shire councils did not change or unify any planning controls, so an exercise of bringing all of the controls into a single framework is required to deliver consistency. (As an example, one difference is that *Hornsby LEP 2013* does not contain floor space ratio controls in residential zones, while *Parramatta LEP 2011* includes floor space ratio controls in these zones.) The objective of this exercise will be one LEP, one DCP, one development contributions plan, and one public domain plan applying to the entire town centre and immediate surrounds. These planning policy documents will also be informed by traffic and transport management analysis and Council's Social Infrastructure Strategy, which are being prepared in conjunction with this Discussion Paper and will continue to evolve in parallel with the planning policies described above.

3.2 Developer interest

The level of interest from landowners within the Epping Town Centre and immediate surrounds is one factor driving the Epping Planning Review. This interest is evident in Development Applications, Planning Proposals (requests for rezoning and/or density changes) and preliminary discussions regarding undertaking a Planning Pproposal process.

Assuming that the Development Applications currently under construction, approved, under assessment or at a pre-lodgement stage are all constructed and fully occupied, they are expected to deliver **4,735 units (10,890 people** assuming a household size of 2.3 persons). This indicates a very rapid delivery of the Department's projected 5,500 dwellings over the next five years. If this rate of development activity continues, it is expected that more than 5,500 dwellings would be delivered in this centre. This unprecedented pace of redevelopment presents challenges for Council and the State government in delivering the required infrastructure to accompany that population growth.

In addition to the Development Application activity, there is also a lodged Planning Proposal, two preliminary Planning Proposals, and two additional sites where landowners have expressed an interest in a Planning Proposal process.

Current Development Application and Planning Proposal activity in Epping is discussed in further detail at **Appendix 3**.

3.3 Poor built form transition – Epping Town Centre north and east

The new planning controls which came into effect in March 2014 rezoned some R2 Low Density Residential zoned land located to the north and east of the town centre to R4 High Density Residential. These changes resulted in:

- portions of the newly identified Rosebank Avenue and Essex Street HCAs (zoned R2) abutting land zoned R4 where the R4 sites were permitted a building height of 17.5 metres (5 storeys), and
- residential blocks of R2 zoned land located in the vicinity of Rose Street and Rockleigh Streets abutting land zoned R4 where the R4 sites were permitted a building height of 17.5 metres (5 storeys).

Redevelopment in these areas where there is an interface between R2 and R4 zones across a property boundary has resulted in new 5 storey residential flat buildings directly overlooking low-density residential properties located within Heritage Conservation Areas.

In order to better understand these interface issues, Council commissioned a Heritage Review and undertook its own analysis to assess these interface and other heritage matters raised by the Epping community since 2014. The findings are discussed in Chapter 7.

3.4 Loss of commercial floor space

In 2011, the Epping Town Centre had 4,512 jobs with 55,000sqm of office floor space and 13,000sqm of retail floor space. However, since 2014, new development within the B2 Local Centre zone has reduced the amount of office floor space. Developers are replacing existing large scale office towers and small scale (2 and 3 storey) office development with ***shop top housing***.

> ***Shop top housing*** means development comprising apartments located above ground floor retail or business premises.

This trend is occurring despite the Hornsby DCP controls requiring non-residential uses on the first two to three floors of development in the B2 Local Centre zone. Parramatta's DCP controls are worded to allow a developer to provide "up to" 4 storeys of commercial development, but only for development on Beecroft Road. This wording leaves the choice of how many storeys between 1 and 4 in the hands of the developer and does not mandate a minimum floor area. This poor application of the planning controls needs to be better understood.

The Department's position on the reduction of commercial floor space is that, based on market analysis, demand for commercial floor space is expected to reduce as other centres such as Macquarie Park and Norwest Business park become more attractive. However, the City of Parramatta does not accept this view.

In order to understand whether the loss of floor space is a positive trend, and to understand other commercial land use elements that may create a more successful town centre, Council commissioned SGS Economics to undertake a Commercial Floorspace Study. This is discussed in Chapter 8.

3.5 Social infrastructure

With unprecedented population growth occurring within the town centre and immediate surrounds, an understanding of the pressures on local infrastructure is urgently required. In 2016, Council commissioned consultants to undertake analyses of both open space and recreational facilities across the entire City of Parramatta. Council's Social Outcomes team has subsequently prepared the *Epping Social Infrastructure Study* which excises the Epping content from both analyses to create an infrastructure analysis for the Epping suburb. This analysis identifies Epping's existing social infrastructure, the potential infrastructure shortfalls arising from growth, and methods to address these shortfalls; it is discussed in Chapter 9.

3.5.1 Funding infrastructure

Following the Department's Priority Precinct process, Parramatta and Hornsby Shire Councils each received $2.5 million from the NSW Government's Precinct Support Scheme to fund improvements to Boronia Park, West Epping Park, and other public domain assets.

The Hornsby and Parramatta development contribution frameworks have not yet been aligned into a single City of Parramatta framework. Currently, developers within the former Parramatta City Council area pay 1% of the cost of development for purposes of funding local road upgrades, open space and community facilities. In the former Hornsby Shire Council area, the Hornsby Shire Council Section 94 Plan currently collects around $10,000 to $20,000 for each new apartment for a range of local road upgrades, open space and community facilities (including an upgrade to Epping Library and new Epping Community Centre) and for other infrastructure identified in the Hornsby plan.

The increase in population will place additional pressure on infrastructure within the town centre. As such, the current development contributions framework requires review. To this end, Council is preparing a new draft Development Contributions Plan to address these issues. Before this plan can be implemented there will need to be further consultation and negotiation with Hornsby Council prior to it coming into force.

3.6 Traffic and access

The planning controls of 2014 focus new development within walking distance of Epping Railway Station and commercial town centre core. Providing higher density development in a town centre with excellent public transport connections encourages more efficient use of public transport services while also encouraging new residents and workers to walk between shops and services.

However, Epping also experiences significant traffic congestion and this was a consistent theme raised by community during the public exhibition of the Urban Activation Precinct and subsequent community consultation carried out as part of the broader Epping Planning Review. There are significant concerns from the community around the impacts of the additional residential densities permitted under the 2014 planning controls given the additional population envisaged and the subsequent impacts on an already congested and constrained road network. There is also increasing developer pressure to increase residential densities (through Planning Proposals) beyond that permitted under the existing planning framework.

The purpose of the Epping Traffic Study is to provide an evidence-based approach to the assessment of existing and future traffic conditions under different development scenarios for the Epping Town Centre and surrounds, including potential infrastructure improvements.

3.6.1 Road infrastructure

The Epping Town Centre is located approximately 25 km north west of the Sydney CBD and 10km north east of the Parramatta CBD. The Epping Town Centre is located south of the Beecroft Road exit off the M2 Motorway. The Road network consists of several major roads, which serve as part of the regional network, including Beecroft Road, Ray Road, Carlingford Road, Bridge Street and High Street on the western and on the eastern side, Epping Road, Oxford Street and Blaxland Road. A number of these major roads including Beecroft Road, Carlingford Road, Blaxland Road and Epping Roads are owned and managed by the State Government (Roads and Maritime Services or RMS). Figure 2 illustrates some of the major roads through the town centre.

Figure 2 Road network map

Traffic congestion in peak hours is a significant issue in the town centre. Vehicle queues typically extend for significant distances in peak periods along Carlingford Road, Beecroft Road and Epping Road as people try to access, or more typically pass through, the town centre. In particular, there is a high volume of through traffic in the Epping Town Centre with 89% of all AM and PM peak traffic on the Rail Bridge having the origins and destinations of their trips outside the Epping Town Centre and surrounds (Halcrow 2011). This has flow on effects for local streets such as Rawson Street and Langston Place

Traffic and transport impacts were considered as part of the UAP process for Epping and was informed by a Transport Study prepared by Halcrow in 2011 for Hornsby Shire Council, former Parramatta City Council and NSW Department of Planning. The Study recommend a series of works to assist with managing traffic congestion in the Epping Town Centre.

The NSW Government Housing Acceleration Fund has since allocated funding for three intersection upgrades (Carlingford Road/Beecroft Road, Essex Street/Epping Road, and Epping Road/Blaxland Road) and widening of Epping Road to address the performance of intersections, travel times, congestion, pedestrian facilities and road safety. Construction of the Carlingford Road/Beecroft Road intersection started in late April 2016, with work expected to be completed by September 2017. The other traffic works will start on Monday 12 June 2017 and take 15 months to complete. The work will include the widening of Epping Road westbound between Essex Street and Blaxland Road and upgrading of the Epping Road and Essex Street intersection.

The proposed railway bridge widening is supported by the RMS, however further work still needs to be carried out to determine its feasibility due to current engineering constraints and funding implications.

3.6.2 Railway infrastructure

Epping train station is located on the T1 North Shore, Northern and Western Line with regular services to Central via Chatswood and Strathfield, Hornsby and Central Coast. Train services will improve with the introduction of the Sydney Metro Norwest project (scheduled for completion in 2019) and will further improve accessibility into Epping, particularly from the north west of Sydney (refer to Figure 3). Sydney Metro Northwest is an integrated transport initiative from Rouse Hill through to Chatswood. It will integrate directly with the existing Epping to Chatswood railway corridor to allow the new trains to operate a distance of 36km between Rouse Hill and Chatswood. In peak hours, it is expected that there will be a train at least every 4 minutes/15 trains per hour and they will run in both directions between Epping and Chatswood during the peak – almost four times the number of trains currently running in the peak times.

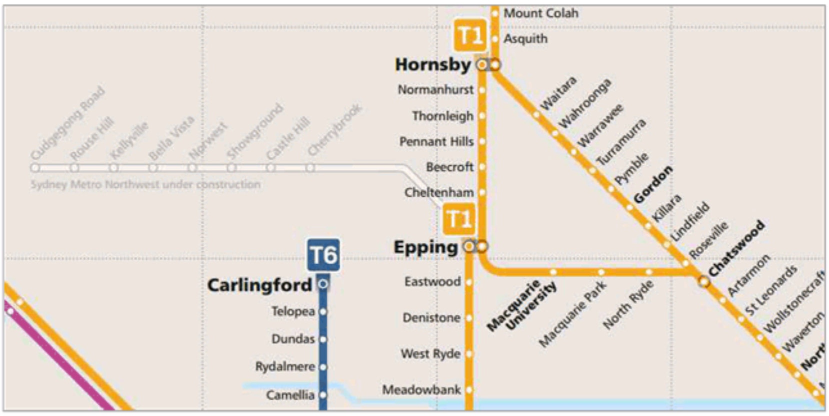

Figure 3 Chatswood to Epping and North West Metro lines (extract: Sydney Trains network map)

As part of converting the existing suburban line between Epping and Chatswood to accommodate the new Metro Service, upgrades will be needed to reconfigure existing stations (such as Epping) to include new cabling, power and signalling systems and platform screen doors to enable Metro integration.

From late 2018, buses will replace trains for around seven months between Epping and Chatswood whilst the line is converted to metro operations.

3.6.3 Buses

Epping is currently well served by buses with bus terminals located on both sides of the train station. Most of the buses that traverse Epping also feed passengers to and from the station with the exception of those services that now remain on the M2 Motorway since the widening work was carried out on the M2 Motorway.

Epping residents have access to a range of regular bus services travelling to both the Sydney CBD and Parramatta CBD. Bus routes also service other employment, education and shopping precincts such as Macquarie Park, Macquarie University and Chatswood as well as services to Carlingford and Eastwood local centres.

4.0 WHAT IS THE EPPING PLANNING REVIEW?

The Epping Planning Review project is identified in Council's *Operational Plan 2016/2017* under Action 2.4 "Review of Epping Town Centre Planning Controls". Council's current draft *Operational Plan 2017/2018* sees Council continuing to work with stakeholders on key precincts such as Epping. The *Draft West Central District Plan* also foresees that Council will progress the delivery of the Epping Town Centre urban renewal with the Greater Sydney Commission and the Department of Planning and Environment (pg.99).

The Epping Planning Review project involves two stages which are summarised in the sections below.

4.1 Stage 1 of the Epping Planning Review

Commencing in December 2016, the Epping Planning Review was launched via a public forum at the Epping Arts Centre (14 December 2016). Stage 1 involves the preparation of technical studies, community consultation, and the preparation of a Discussion Paper for public comment. Figure 4 below illustrates the structure and various components of Stage 1 of the Epping Planning Review.

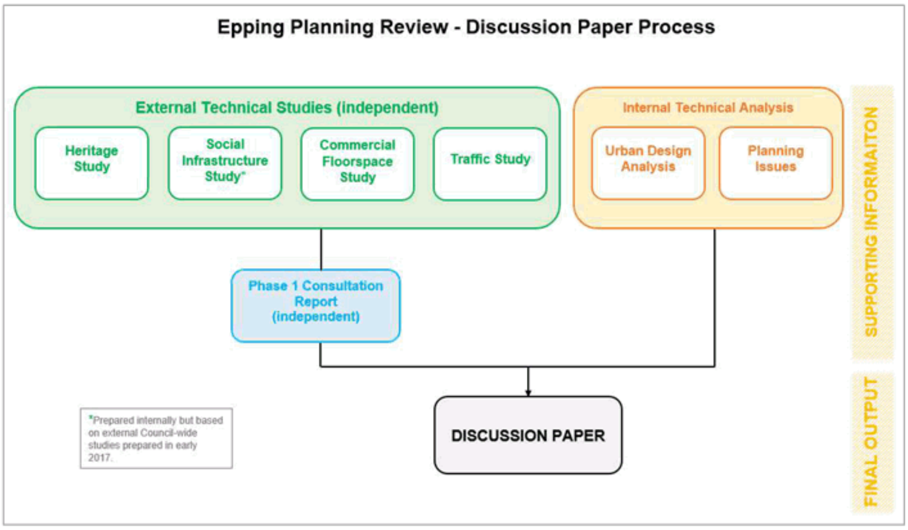

Figure 4 Process structure for Stage 1 of the Epping Planning Review

4.2 Stage 2 of the Epping Planning Review

Commencing in 2018, and relying on principles determined in Stage 1, Stage 2 will involve preparing a single set of planning controls for the town centre and immediate surrounds; this will include a new LEP, DCP, development contributions plan and public domain plan.

4.3 Stage agency buy-in

To ensure delivery of the Epping Planning Review, Council has established the Epping Planning Review State Agency Steering Group which has representation from the

Greater Sydney Commission, the Department of Planning and Environment, Transport for NSW and Roads and Maritime Services.

4.4 What the Epping Planning Review will not be addressing

The scope of the Epping Planning Review is limited to better managing the impacts of new development generated from planning controls that came into effect in March 2014 and allowing Council to assess other proposals for growth in the town centre. It is also intended to allow Council to progress decisions made by Hornsby Shire Council on specific heritage matters when it governed part of the Epping suburb.

The Epping Planning Review does **not** review the appropriateness of the 2014 planning controls (i.e. to reduce densities that were introduced in the planning controls of 2014 across the centre and surrounds).

5.0 COMMUNITY ENGAGEMENT

Council has undertaken targeted engagement on the Epping Planning Review since its inception in December 2016. The aim has been to provide high-quality and extensive community engagement, and to build capacity and understanding of planning concepts within the community. Consultation with a broad range of stakeholders has extended the project's reach to all cross sections of the community, including:

- Epping suburb residents,
- local businesses and their employees,
- local community organisations,
- State and local political representatives, and
- Epping visitors.

This chapter details the key engagement activities which have occurred to date.

5.1 Public forum (December 2016)

The Epping Planning Review commenced with a public forum held on 14 December 2016. Over 300 residents attended, along with State member for Epping, Damien Tudehope, West Central District Commissioner of the Greater Sydney Commission, Ed Blakely, and City of Parramatta Council's Administrator, Amanda Chadwick. During the forum, residents provided feedback on their concerns for Council's consideration. In early 2017, a summary of feedback from the forum was forwarded to those attendees who provided an email address. A summary of the resident feedback from the public forum is available at Appendix 4.

5.2 Project E-Newsletters

The attendees at the public forum were asked to provide their email address if they wanted be part of the mailing list to receive regular updates about the project and opportunities to participate. The e-newsletter list currently includes close to 400 recipients, and consists primarily of forum attendees.

5.3 Presence at Australia Day and Lunar New Year

Council held an information tent at the 2017 Australia Day event in Parramatta Park and Lunar New Year celebration in North Rocks on 28 January 2017. A total of 36 flyers were given out, including ten flyers in Chinese and one in Korean. Residents were also invited to sign up for email updates.

5.4 Imagine Epping

Council also ran a four-week online engagement campaign focusing on ideas for immediate improvements at Epping. From 3-29 March 2017, the "Imagine Epping" campaign asked residents, visitors and workers to submit their ideas for improving their experience of place and community in Epping. Participants could also vote and comment on ideas submitted on the website. 115 ideas were received via this platform, and included placing historical images of Epping around the town centre, improving traffic, and bringing back the suburb's leafy character in key locations. At the end of the campaign, an interdisciplinary panel of Council staff assessed the submissions. The winning submission was an idea to connect parks with walking routes, supported by landscaping, outdoor exercise equipment and a jogging and walking trail. This will be implemented in 2017/2018.

5.5 Project webpage

A dedicated project webpage was established in February 2017 and by early June 2017 had received 1,075 page views in its first three months of operation. The webpage allows the community to keep up-to-date with the Epping Planning Review, and includes information on the project context and timeline, description of the four technical studies, and downloadable information documents including flyers (English, Korean, Chinese) and presentations from Phase 1 community workshops.

5.6 Other correspondence from residents

Since last year's public forum, other correspondence has been received by Council via email, letter or phone call. Some of the matters raised in this correspondence are being addressed through Stage 1 of the Epping Planning Review. Appendix 5 provides a detailed summary of this correspondence, where it related to land use issues covered in this Discussion Paper. Issues raised by the community via this channel have been incorporated in this Discussion Paper where appropriate or responded to separately.

5.7 Community workshops (May 2017)

Prior to the release of the Discussion Paper, a number of community workshops were held in May 2017 to inform the technical studies prepared on heritage, social infrastructure and commercial floor space. The main purpose of the workshops was to discuss and gather information around community values in each of the respective technical areas. Each workshop included presentations from Council and the respective technical consultants, before workshop participants were asked to provide their input through facilitated table work.

The consultation workshops are summarised in Straight Talk's *Epping Town Centre: Phase 1 Community Consultation* which supports the Discussion Paper. Where participants provided preliminary submissions at the workshops, these were forwarded to the respective consultant for consideration in their respective reports.

5.7.1 Heritage Review Workshop

Two Heritage Review Workshops were held with regards to HCAs within the former Hornsby Shire Council area. One workshop was held for landowners within a HCA and the other was a general workshop held for any interested residents; these had 101 participants and 71 participants, respectively. The workshops explored potential land use scenarios and associated impacts in the HCAs. A detailed summary is contained in Straight Talk's *Epping Town Centre: Phase 1 Community Consultation*, and key issues arising are discussed in Chapter 7.

5.7.2 Social Infrastructure Workshop

The community workshop on the Social Infrastructure Study had 91 participants, which included residents and representatives from local interest groups. A detailed summary is contained in Straight Talk's *Epping Town Centre: Phase 1 Community Consultation*, and key issues arising are discussed in Chapter 9.

5.7.3 Commercial Floor Space Workshop

The community workshop on the Commercial Floorspace had 41 participants, which included local residents, business landowners and developers. A detailed summary is contained in Straight Talk's *Epping Town Centre: Phase 1 Community Consultation*, and key issues arising are discussed in Chapter 8.

5.8 Online survey

The workshops were supplemented by two online surveys to reach those who could not attend a workshop. The surveys related to Epping's heritage, social infrastructure, and commercial floor space respectively. The survey was also undertaken in person around Epping Town Centre and the train station during late May.

5.9 Exhibition consultation

Three Information Sessions will be undertaken during the exhibition of the Discussion Paper. The purpose of the workshops will be to further engage with the community on the options and recommendations raised in the Discussion Paper, and will focus on:

- Social infrastructure and commercial floor space
- Heritage
- Traffic

Details of the times and location for the workshops are available on Council's website (https://www.cityofparramatta.nsw.gov.au/about-parramatta/precinct-planning/epping-planning-review) and have been forwarded to Epping Stakeholders in letters notifying them of the release of this Discussion Paper.

5.10 CALD-based consultation

In line with Council's commitment to engagement, the Epping Planning Review sought to engage with Epping's Korean and Chinese communities, these being the largest cultural and linguistically diverse (CALD) communities in the suburb. The CALD-based activities included:

- Epping Planning Review flyer translated into Korean and Chinese; and
- The Imagine Epping campaign received one submission in Korean. Communications and promotions for Imagine Epping were undertaken in Korean and Chinese. The website could also be translated into Chinese, Korean, and Hindi.

During the Discussion Paper exhibition, one workshop each will be conducted in Korean and Chinese. The CALD workshops are being promoted via public notices in local Korean/Chinese newspapers, flyers (in Korean and Chinese) available at the Epping Library, Council's Customer Service Centre, the YMCA and the Epping Baptist Church. Information on these workshops will also be promoted via the Epping Project website, the Your City Your Say contact list and social media presence.

6.0 INTRODUCTION TO THE TECHNICAL STUDIES

As shown in Figure 4 (pg. 16), a series of technical studies were commissioned as part of Stage 1 of the Epping Planning Review. Three of these studies respectively address **heritage**, **commercial floor space** and **social infrastructure** issues. These three studies are being exhibited with this Discussion Paper as supporting information, and are discussed in further detail in Chapters 7, 8 and 9, respectively.

Public domain and planning analysis has also been undertaken by Council officers. This analysis aims to test a range of options responding to the technical study on heritage and community views heard before and during Phase 1 consultations, and to advance recommendations from the commercial floor space and social infrastructure technical studies. These analyses are discussed in the respective chapters of this Discussion Paper, as well as in Chapter 10. It is also noted that additional detailed urban design and planning analysis will need to be undertaken in Stage 2 of the Epping Planning Review to inform centre-wide development standards and progress some of the technical studies' findings.

A study on **traffic and transport** has also been commissioned, but has not yet been completed. However, interim findings from this study have been prepared and are also provided in support of this Discussion Paper. The key issues arising are discussed in Chapter 11 of this Discussion Paper.

The following chapters (7-11) summarise the technical findings from each study, present community feedback, and propose options and recommendations to address various technical issues identified during Stage 1 of the Epping Planning Review. In each chapter a series of questions are posed and feedback is sought on all of those questions to inform Phase 2 of the Epping Planning Review, where policy changes will be drafted prior to further community consultation. The response will also inform Council's position in response to applicant-initiated Planning Proposals that Council is asked to respond to.

7.0 HERITAGE STUDY

Council commissioned City Plan Services to undertake the *Epping Town Centre Heritage Review* (the Heritage Review), which is being exhibited in conjunction with this Discussion Paper, and which:

- Reviews the existing Heritage Conservation Areas (HCAs) incorporating East Epping, Essex Street and Rosebank Avenue located within Epping suburb (which became part of the City of Parramatta as a result of the Council boundary changes in May 2016).
- Investigates concerns raised by various landowners and residents about the value and significance of the HCAs and of properties located within the HCAs which interface with R4 and R3 zoned areas (higher density residential zones).
- Reviews current controls that apply to the areas that have an interface with these HCAs.
- Reviews various properties located within the Study area which are:
    - currently listed as Heritage Items, to advise on whether the listing should be retained,
    - currently located on the edges of the HCAs, to determine whether they should be removed from the HCA, or
    - currently not Heritage listed but were identified by Hornsby Shire Council as sites that could be considered for listing.

The scope of the Heritage Review responded in part to resolutions from Hornsby Shire Council from 8 October 2014 and January 2016 (which was when the eastern part of the Epping Town Centre was located within the former Hornsby Shire Council LGA Boundary) which proposed to undertake a review of various heritage matters.

7.1 Technical findings

The recommendations from the Heritage Review are as follows:

a) **Retain the current boundaries of the Essex Street and Rosebank Avenue HCAs.**
Despite the new R4 redevelopment (in the form of 5 storey residential apartments) flanking a portion of each of the two HCAs, the Heritage Review found that these two HCAs retain the same level of integrity and significance as identified in Hornsby Shire Council's 2013 *Heritage Study*. See Figures 5 and 6 below.

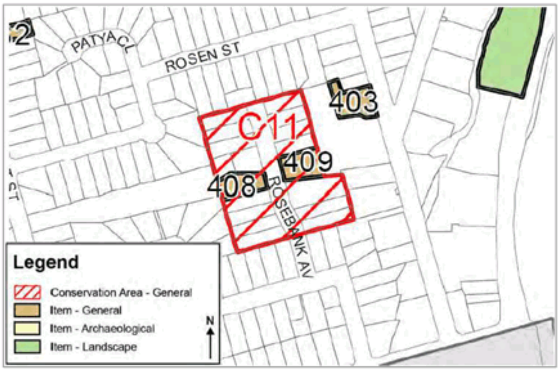

Figure 5 Rosebank Avenue HCA (extract from City Plan Services report, May 2017)

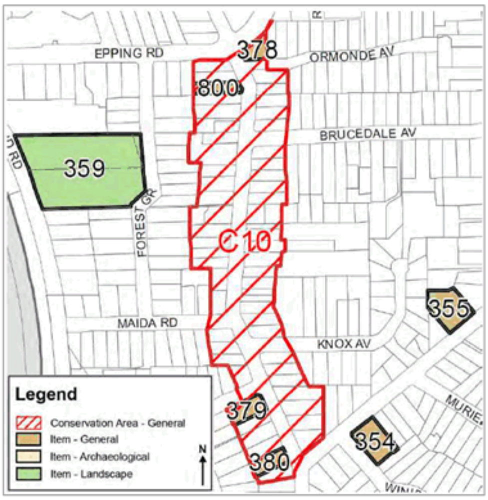

Figure 6 Essex Street HCA (extract from City Plan Services report, May 2017)

The Heritage Review also recommends that where sites in these two HCAs are located directly adjacent to an R4 zoned sites with higher density development, that those sites be permitted to undertake sympathetic 2 storey extensions to the rear of the site as long as they do not reduce the contribution of the dwelling to the HCA, or result in removal of mature trees or reduce the streetscape character.

A further recommendation is made that future planning controls should require archival photographic recordings to be taken of dwellings in the HCA if a substantial change is being made to the dwelling.

b) **Adjust the south-west boundary of the East Epping HCA to remove properties at 25 Pembroke Street and Nos. 1, 3 and 3A Norfolk Road**
The Heritage Review recommends the removal of these properties from the East Epping Heritage Conservation Area because Nos. 1, 3 and 3A Norfolk Road are not in keeping with the Federation and Inter War characteristics of the East Epping HCA, whilst 25 Pembroke Street (a contributory building) will soon be isolated from similar properties of Federation and Inter War periods as a result of rezoning of the southern side of Pembroke Street. Refer to Figure 7 below in point d). Sites discussed in this paragraph are outlined in blue in Figure 7.

c) **Retain individual heritage items requested for removal by property owners at No.3 and 42 Essex Street**
The Heritage Review reassessed the heritage value of these two properties and supports retaining the heritage listing currently in *Hornsby LEP 2013,* because the heritage significance of both properties is still intact.

d) **Rezone removed properties from East Epping Heritage Conservation Area (as per b) above), as well as Nos. 5, 7 and 7A Norfolk Road and identified properties within 'Rockleigh Park' to R3 Medium Density Residential with 12 metre height limit**
The Heritage Review recommends rezoning the removed properties from the East Epping HCA (as recommended in b above), as well as Nos. 5, 7 and 7A Norfolk Road and 'Rockleigh Park' from the R2 Low Density zone to the R3

Medium zone with a 12 metre (4 storey) height limit, so as to provide a smoother transition between the low and high density zones. These lots are shown in Figure 7.

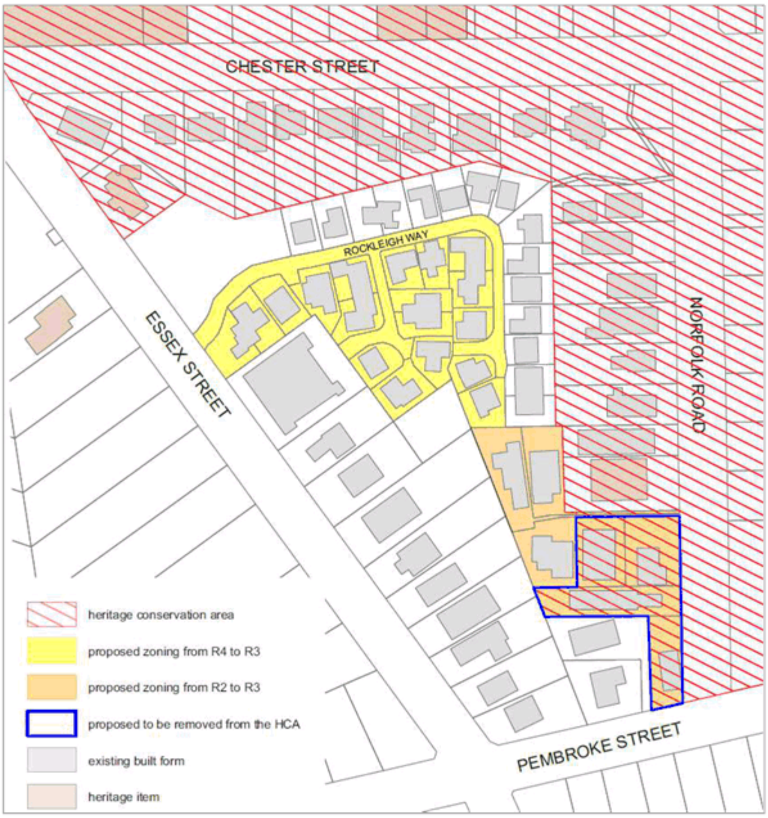

Figure 7 Sites recommended for HCA removal or rezoning at 'Rockleigh Park' and southern East Epping HCA

e) **Amend *Interface Guidelines of the Hornsby DCP (Section 9.4.1)* to improve the transition the R4 High Density development Hornsby DCP**
The Heritage Review recommends increasing the setbacks and areas for deep soil planting on R4 zoned land at the interface with a HCA to help retain landscape character.

f) **Maintain current height limits for the R4 and R3 zones**
The Heritage Review recommends that the 17.5 metre (5 storey) height limit in the R4 zone and 12 metre (4 storey) height limit in the R3 zone be maintained, as they create an appropriate transition in height.

g) **Rezone R2 land to the R3 zone in Rose Street and Briggs Road**
The Heritage Review recommends this rezoning in order to respond to 4 storey residential flat buildings being located immediately to the north and to better transition down to 2 storey development on the southern side of Brigg Road. This area is shown in Figure 8 below.

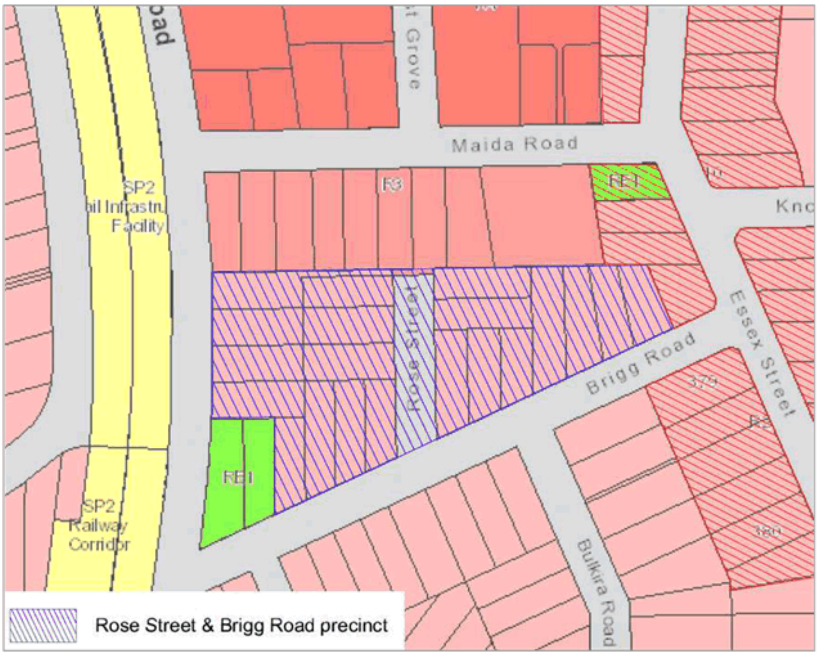

Figure 8 Rose Street and Briggs Road precinct (hashed blue)

h) **Hornsby Heritage Study issues**
In response to a previous Hornsby Shire Council resolution, the Heritage Review makes recommendations related to various sites identified as part of Stage 6 of the Hornsby Shire Council Heritage Study Review. Please refer to Section 13 of the Heritage Review that accompanies this Discussion Paper for detailed discussion of these recommendations.

Options and recommendations where appropriate related to each of these recommendations are discussed further in this chapter.

7.2 Community feedback

Community feedback was sought on the HCAs via two workshops held on 1st and 3rd of May 2017. Information and/or submissions were also provided at, or after, each workshop. During the workshops, participants were asked about what they valued about the neighbourhood, their experiences around development, and concerns around their neighbourhood. The participants were also specifically asked to nominate what Council should take into consideration when reviewing planning controls.

The participants valued Epping's aesthetics, particularly the green and leafy nature of the suburb which was seen to contribute to the feeling that the area is protected and has a good sense of community. The participants also reflected that the low-density buildings are perceived to add space and safety, adding to the family-friendly character of the suburb. Easy access to public transport is also highly valued.

Traffic and parking was perceived to be a major issue. Other concerns included privacy and overshadowing from increased building heights; and increase in traffic, noise and rubbish from over-development.

In regard to planning controls, there were differing views. Some participants believed that building and planning controls need to be stricter, while other participants believed that the development controls should be lifted entirely as the HCAs are already compromised. However, there was agreement that future planning and development should be consistent and appropriate for each section of the local area.

Some landowners within the HCA considered that the impact of a 5 storey apartment building located close to their rear yard was unsatisfactory and that this should be taken into consideration in determining whether their sites should remain in the HCA. They perceived that, even if they were to "sell up" and move to avoid amenity impacts, they would suffer financially as the amenity impact has devalued their property. Other landowners within the HCA's indicated that they valued the characteristics of their street that resulted in the HCA protection and that it should be retained for those reasons. There was no clear spatial pattern to differentiate those for and against retention of the HCA.

7.3 Guiding principles

After considering the technical report and the public consultation the principles and themes identified by Council staff to guide the development of options and recommendations presented in this Discussion Paper are:

- from a technical point of view, the adjoining development does not have sufficient impact on the HCAs to warrant the HCA designation being removed;
- controls should seek to retain the existing character of these areas which are valued by the community (the key characteristic being the relatively low building scale surrounded by spaces for significant landscaping and large trees);
- residents are concerned about the impact of higher density development in terms of traffic, noise, overlooking and overshadowing; and
- residents in interface areas between the R2 HCA sites and R4 apartment building sites suffer from amenity impacts and options to ameliorate these impacts should be considered.

There is no single option presented in this chapter that achieves all these principles; instead, options give differing weights to each of these principles.

7.4 Heritage issues – options, recommendations and questions

This section seeks to reconcile the recommendations a., e., and f. of the Heritage Review, community feedback and further urban design and planning investigations on the impact of alternate development on the character of the area. There are tensions between the technical findings and some community members who would like to see the HCA designations removed (particularly in the Essex and Rosebank precincts). Council officers acknowledge that the amenity of some rear yards within the HCAs has been compromised, so it was considered that other options should at least be canvassed as part of this Discussion Paper process. The amenity issues associated with the interface between the R4 zoned sites and adjoining HCA sites is a planning issue that should also be given some weight. It is also important to note that, whilst a critical component of Council's consideration, heritage matters are not the only consideration in play at Epping.

The heritage options below constitute analysis undertaken by Council officers in response to tensions between the recommendations in the *Heritage Review* and some community feedback received. The options attempt to resolve poor transition in land use from 4 and 5 storey development to 2 storey development which was not appropriately addressed when the new planning controls came into effect in March 2014.

7.4.1 Rosebank Avenue and Essex Street HCA interfaces with R4 zoned land

A total of seven options are presented below for both the Rosebank Avenue and Essex Street heritage conservation area (HCA) interfaces with land zoned R4 High Density residential.

Option 1 – Maintain current HCAs

Option 1 protects and maintains the current Rosebank Avenue and Essex Street HCAs as shown previously in Figures 7 and 8, i.e. this will maintain the status quo. Figure 9 is an indicative diagram which illustrates the retention of the building form in each of the two HCAs (residential flat buildings on the left on adjoining R4 zoned land and single detached dwellings on the right on the R2 zoned and HCA land).

Figure 9 Option 1: Maintain current HCAs

Strengths:

- Consistent with findings from *Heritage Review.* The HCAs remain intact and are protected for current and future generations.
- No additional traffic or parking impacts arising from this area.
- Does not require Council to consult with the NSW Office of Environment and Heritage (OEH), as current HCA is maintained.
- A sensitively designed 2 storey extension to the rear could still be considered by the owner.

Weaknesses:

- Some land owners may feel aggrieved about the loss of amenity at the rear of their properties, and feel they are left with two options: to either stay and endure the decreased amenity, or suffer a financial loss when selling the property to move away.

Guiding principle: That the impact of RFBs at the interface areas of the HCA do not have significant impact on the significance and intactness of the HCA, and that the impact of the apartment building on the amenity of adjoining properties is within acceptable limits. The HCA should be retained.

Option 2 – Landscaping at interface with R2 and R4 zoned land

Option 2 involves a Council-funded/managed tree planting initiative (of appropriate tree species). The tree planting would occur in the rear yards of the land owners to assist in mitigating the visual impact and loss of visual amenity from the 5 storey residential flat building development. This initiative would be managed as part of Council's Heritage Grants Program, but would require a review of the Heritage Grants Guidelines and for Council to allocate additional funding to support this program.

This option is centred around managing the issue of visual impact alone. Figure 10 is an indicative illustration of how tree planting can assist in managing the visual impacts on privacy between the 5 storey residential flat building development (shown at left of the diagram) and largely single storey residential development (shown at right of the diagram). Photographs in Figures 66 and 69 in the *Heritage Review* also illustrate how mature tree planting can mitigate visual impacts.

Figure 10 Option 2: Council-funded/managed tree planting initiative

Strengths:

- Consistent with findings from *Heritage Review*; the HCAs remain intact and are protected for current and future generations.
- The neighbourhood will see an increase in green tree cover and canopy as the trees grow and mature over time which are elements of Epping the community value.
- No additional traffic or parking impacts arising from this area.
- Does not require Council to consult with the NSW Office of Environment and Heritage (OEH).
- A sensitively designed 2 storey extension to the rear could still be considered by the owner.

Weaknesses:

- Regardless of tree species recommended, the trees will take many years to grow to a sufficient height to mitigate the impacts. Therefore, current owners will have to endure ongoing amenity impacts for some time.
- Some land owners may feel aggrieved about the loss of amenity at the rear of their properties, and feel they are left with two options: to either stay and endure the decreased amenity, or suffer a financial loss when selling the property to move away.

Guiding principles: The impact of RFBs at the interface areas of the HCA do not have an adverse impact on the significance and intactness of the HCA and the HCA should therefore be retained. However, the visual and amenity impacts at the rear boundary is recognised with tree planting to be put in place to ameliorate the impact.

Option 3 – Dual Occupancy (addition at the rear)

Option 3 involves permitting a second attached dwelling to the rear of the dwelling resulting in an attached dual occupancy scheme which would not be visible from the street. Technically, this would be similar to a second storey alteration and addition recommended as appropriate by the independent Heritage Review. Figure 11 is an indicative illustration of Option 3 (refer to the orange colouring showing a ground floor extension and additional second floor at the rear).

Figure 11 Option 3: Dual Occupancy (addition at rear)

Strengths:

- Largely consistent with findings from *Heritage Review*; the HCAs remain largely intact and are protected for current and future generations.
- The current land owners who feel aggrieved about the loss of amenity at the rear of their properties are being offered an opportunity to re-develop their sites in a low impact fashion and realise an economic benefit.
- Results in a more efficient use of a large residential block.
- Provides an alternative type of housing stock (***dual occupancy***) with proximity to the Epping Town Centre and public transport.

Weaknesses:

- Requires Council to consult with the NSW Office of Environment and Heritage (OEH) owing to numerous amendments to the *HLEP 2013* regarding zone permissibility and heritage controls.

- Residents of the new dual occupancy development at the rear will still experience amenity issues with the adjoining 5 storey residential flat buildings.
- Likely to involve tress loss at the rear of the site and thus reduce the landscape buffer between the adjoining R4 zoned land and current R2.
- Some increase in traffic and on-street parking associated with additional dwellings.

Guiding principle: The impact of RFBs at the interface areas of the HCA do not have an adverse impact on the significance and intactness of the HCA and the HCA should therefore be retained. However, this option recognises that landowners can economically benefit from minor redevelopment opportunities.

Option 4 – Dual occupancy (side by side) redevelopment

This option involves demolishing the existing detached dwellings on a lot and replacing it with new ***dual occupancy (attached)*** in a side by side pair (i.e. both have street frontage). It would involve removal of the HCA. Figure 12 provides an indicative diagram of Option 4.

Figure 12 Option 4: Dual occupancy (attached) side by side redevelopment

Strengths:

- Represents a sound transition in density from the interface with 5 storey residential flat buildings, to 2 storey medium-density, then 1/2 storey low-density across the street.
- Efficient use of large residential blocks for two households with proximity to the Epping Town Centre.
- Provides an alternative type of housing stock (***dual occupancy***) with proximity to the Epping Town Centre and public transport.
- Introduces a more affordable housing option to that of a detached dwelling on a large lot.
- The current land owners who feel aggrieved about the loss of amenity at the rear of their properties are being offered an opportunity to re-develop their sites in a low impact fashion and realise an economic benefit.
- Trees are retained at the rear of the properties.

Weaknesses:

- Inconsistent with findings from *Heritage Review*, the HCA is not being protected for current and future generations.

- Alters the building form within the streetscape rather than having a predominant, uniform building type.
- Requires Council to consult with the NSW Office of Environment and Heritage (OEH) owing to numerous amendment to the *HLEP 2013* on permissibility and heritage.
- Some increase in traffic and on-street parking associated with additional dwellings.

Guiding principle: That the impact of RFBs at the interface areas of the HCA has such an adverse impact on the amenity of these properties in the HCA that the HCA designation should be removed and that alternate planning controls that still allow for 2 storey development should be introduced.

Option 5 – Town house re-development

This option involves demolishing the existing detached dwellings and replacing them with a town house development. This option requires the amalgamation of two residential sites for this option to occur. It would involve removal of the HCA. Figure 13 provides an indicative diagram of Option 5.

Figure 13 Option 5: Town House redevelopment

Strengths:

- Represents a sound transition in density from the interface with 5 storey residential flat buildings, to 2 storey medium-density, then 1/2 storey low-density across the street.
- More efficient use of large residential blocks for multiple households with proximity to the Epping Town Centre.
- Provides an alternative type of housing stock with proximity to the Epping Town Centre and public transport.
- Introduces a more affordable housing option to that of a detached dwelling on a large lot.
- The current land owners who feel aggrieved about the loss of amenity at the rear of their properties are being offered an opportunity to re-develop their sites in a low impact fashion and realise an economic benefit which is likely to be a higher benefit to that of Options 3 and 4.

Weaknesses:

- Inconsistent with findings from *Heritage Review*, the HCA is not being protected for current and future generations.

- Alters the building form within the streetscape rather than having a predominant, uniform single dwelling building form.
- Requires site amalgamation.
- Likely to add to the traffic and parking pressures on the street.
- Requires Council to consult with the NSW Office of Environment and Heritage (OEH) owing to numerous amendment to the *HLEP 2013* on permissibility and heritage.
- Significant tree removal likely with limited opportunity for deep soil planting.

Guiding principles: That the impact of RFBs at the interface areas of the HCA has such an adverse impact on the amenity of these properties in the HCA that the HCA designation should be removed and that alternate planning controls that still allow for 2 storey development should be introduced.

Option 6 – Manor home re-development

This option involves demolishing an existing detached dwelling and replacing it with a ***manor home***. This option does not require the amalgamation of lots. It would involve removal of the HCA.

Note: a ***manor home*** means a 2 storey building containing 4 dwellings, where:

a) each storey contains 2 dwellings, and

b) each dwelling is on its own lot (being a lot within a strata scheme or community title scheme), and

c) access to each dwelling is provided through a common or individual entry at ground level, but does not include a residential flat building or multi-dwelling housing.

(This definition is contained within *SEPP (Sydney Region Growth Centres) 2006*).

Figure 14 provides an indicative diagram of Option 6.

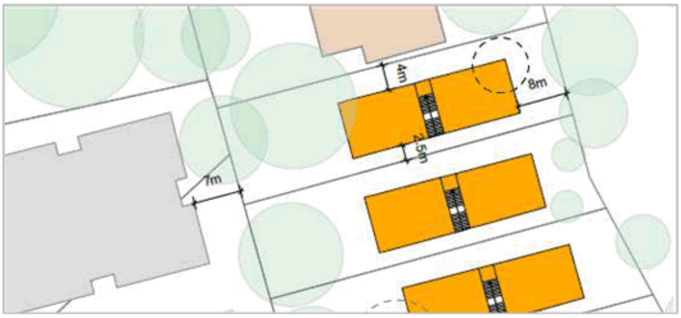

Figure 14 Option 6: Manor Home redevelopment

Strengths:

- Represents a sound transition in density from the interface with 5 storey residential flat buildings, to 2 storey medium-density, then 1/2 storey low-density across the street.
- More efficient use of large residential blocks for four households with proximity to the Epping Town Centre.

- Provides an alternative type of housing stock with proximity to the Epping Town Centre and public transport.
- Introduces a more affordable housing option to that of a detached dwelling on a large lot.
- Does not require site amalgamation.
- The current land owners who feel aggrieved about the loss of amenity at the rear of their properties are being offered an opportunity to re-develop their sites in a low impact fashion and realise an economic benefit which is likely to be a higher benefit to that of Options 3, 4 and 5.

Weaknesses:

- Inconsistent with findings from *Heritage Review;* the HCAs would not be protected for current and future generations.
- Significant change to streetscapes in Rosebank Avenue and Essex Streets in terms of building form and lot sizes.
- Will add to the traffic and parking impacts.
- Requires Council to consult with the NSW Office of Environment and Heritage (OEH) owing to numerous amendments to the *HLEP 2013* regarding permissibility and heritage.
- Significant tree removal likely for rear on-site parking and with limited opportunity for deep soil planting if basement parking not feasible.

Guiding principle: The impact of RFBs at the interface areas of the HCA has such an adverse impact on the amenity of these properties in the HCA that the HCA designation should be removed and that alternate planning controls that allow for 2 storey development should be introduced

Option 7 – 3 storey residential flat building re-development

This option involves demolishing the existing detached dwellings, site amalgamation and construction of 3 storey residential flat development. It would involve removal of the HCA.

It should be noted that in order to deal the issue of transition to adjoining low-density residential areas, the maximum height Council Officers are willing to identify as an option is a 3 storey apartment building. Permitting any 4-5 storey apartments on the western side of Essex Street is not considered appropriate as it would result in unbalanced streetscapes in Essex Street which can only be addressed by extending the higher density zones to the eastern side of Essex Street. This is not considered appropriate or consistent with community sentiment about the character of the area.

In the case of the Rosebank Avenue HCA, a 3 storey apartment building form is considered to be the maximum height that still allows for an appropriate transition, and also an appropriate height to deal with transition to the two heritage items located mid-block in this precinct.

Specifically, this option requires the amalgamation of two residential sites. Figure 15 provides an indicative diagram of Option 7.

Figure 15 Option 7: 3 storey residential flat redevelopment

Strengths:

- Represents a sound transition in density from the interface with 5 storey residential flat buildings, to 3 storey medium-density, then 1 and 2 storey low-density across the street.
- More efficient use of large residential blocks for two households with proximity to the Epping Town Centre.
- Provides an alternative type of housing stock with proximity to the Epping Town Centre and public transport.
- Introduces a more affordable housing option to that of a detached dwelling on a large lot.
- The current land owners who feel aggrieved about the loss of amenity at the rear of their properties are being offered an opportunity to re-develop their sites in a low impact fashion and realise an economic benefit which is likely to be a higher benefit to that of Options 3 to 6.

Weaknesses:

- Inconsistent with findings from *Epping Town Centre (East) Heritage Review;* the HCAs would not be protected for current and future generations.
- There would be significant change to streetscapes in Rosebank Avenue and Essex Streets in terms of building form and lot sizes.
- Likely to have the most noticeable traffic and parking impact on the street.
- Requires Council to consult with the NSW Office of Environment and Heritage (OEH) owing to numerous amendments to the *HLEP 2013*.
- Amalgamation of at least two lots will be required.
- Due to the necessity for basement car parking, this option would need to be tested for economic viability.

Guiding principles: The impact of apartment buildings at the interface areas of the HCA has an adverse impact on the significance and intactness of the HCA and the HCA should therefore be removed; and that transition between the R4 and R2 zones is better addressed; so that landowners can economically benefit from upper scale redevelopment.

Council Officer Recommendation

Council officers recommend that Council investigate 3 of the above options further. These are options are:

- Option 4 – Dual Occupancy (dwellings side by side) development

- Option 5 - Town House development
- Option 6 - Manor Home development.

These options recognize the unacceptable impact of adjoining development on the amenity of dwellings in the HCA, whilst allowing a transition to a built form that is 2 storeys in character and allows sufficient space for planting of significant trees.

Options 1 - Retain Existing Arrangements, 2 - Retain Existing Arrangements plus institute tree planting to screen and 3 - Dual Occupancy to the rear of existing dwellings all allow for the retention of the HCA. However, they do not sufficiently address the failures of previous planning processes (the outcome of which has been dwellings in a HCA have significantly reduced amenity with limited redevelopment options) to allow them to respond to the new adjoining apartment building development.

A sound planning process would have better balanced the desire for density with the impact on the amenity of the adjoining development. The independent Heritage Review recognises the impact of the adjoining apartment developments on the dwellings in the HCA by recommending increased setbacks and deep soil planting zones. However, neither of these options are feasible given that most of the adjoining sites where these measures might be implemented have already been developed or approved for development. Therefore, the setbacks and deep soil planting zones which might have been included as appropriate measures to protect the amenity of adjoining properties are no longer feasible.

Option 7 – 3 storey residential flat building redevelopment is not recommended as the other options provide for a more consistent 2 storey scale and more opportunity for significant tree planting. Both of these aspects are issues that residents indicated they valued in their local area during the consultation.

It is considered that Options 4, 5 and 6 should be further analysed (including financial feasibility) as preferred options for those sites that:

- fall within the Essex Road HCA and are located on the western side of Essex Street between Epping Road and Briggs Street.
- are located within the Rosebank HCA (where it is possible that different options might be applied to different parts of the HCA, i.e. higher density Manor Homes being more appropriate at the southern end and dual occupancy being more appropriate at the northern end).

Consultation Question:

Council is seeking your feedback on the preferred option. Council officers recommend that the options Council should consider further are options 4 - dual occupancy development, 5 - town house development and 6 - Manor Home Development, as these options recognize the impact of adjoining development on the amenity of dwellings in the HCA whilst allowing a transition to a built form that is 2 storey in character as well as sufficient space for planting of significant trees.

7a. What is your preferred option and why?

7.4.2 Zoning issues – interface with the East Epping HCA

Rockleigh Park comprises 36 small subdivided lots which are zoned R4 High Density Residential with a R3 zone edge to the north and east. It contains relatively new detached or attached cottages which front onto a small, narrow laneway system under community title. The average lot size is 280sqm. Figure 16 illustrates the Rockleigh Park area.

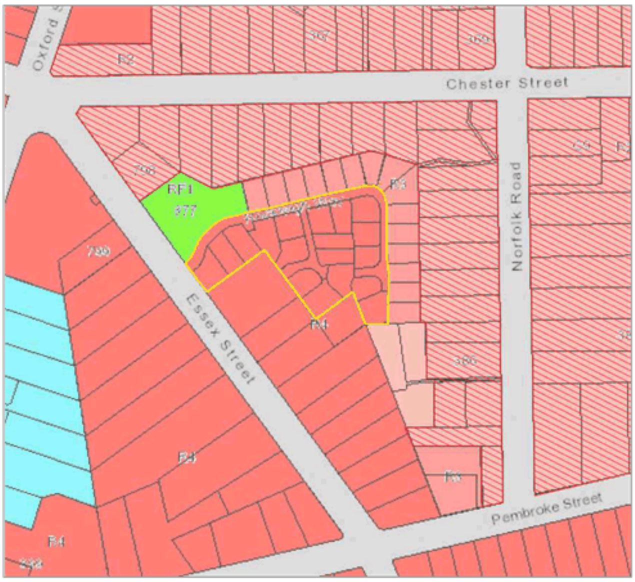

Figure 16 Rockleigh Park area (yellow outline)

The Heritage Review recommends down-zoning the Rockleigh Park parcels from the R4 High Density Residential zone which has a 17.5 metre (5 storey) building height to the R3 Medium Density zone which as a 12 metre (or 4 storey) building height. Council officers have undertaken a preliminary assessment of this recommendation (see following section).

Council officers also saw the need to undertake an assessment of parcels zoned R2 Low Density Residential at 1 to 7A Norfolk Road and 25 Pembroke Street. These parcels are situated south of "Rockleigh Park" and at the Southern end of the East Epping HCA (Refer Figures 17-19). The Heritage Review recommends these be rezoned to the R3 Medium Density Residential zone; Council Officers also present additional options for feedback in the following sections.

Council Officer Recommendations and Options

Rockleigh Park:
Down-zoning the site from the R4 High Density zone to the R3 Medium Density zone, enabling a reduction in the permissible density, is supported. However, to determine the appropriate density controls (height and floor space ratio), it is recommended that Stage 2 of the Epping Planning Review involves the preparation of a master plan to determine the most appropriate outcome. The area shown outlined in yellow in Figure 16 is the area to rezoned from R4 to R3.

Consultation Question:

7b. Do you agree with the above recommendation for Rockleigh Park?

Zoning Options: 1, 3, 3A, 5, 7 and 7A Norfolk Road and 25 Pembroke Road

Option 1 - Recommendation of the Heritage Review

As indicated in Section 7.1, the Heritage Review recommends that the HCA designation be removed from 1, 3, 3A Norfolk Road and 25 Pembroke Street, and that these sites, together with 5, 7 and 7A, be rezoned to Residential R3. This would allow them to be developed for apartment buildings to 4 storeys. It is noted that amalgamation of the lots would be necessary for these sites to be viable for this form of development. Figure 17 illustrates this option. Strengths and weaknesses of this option from Council Officers' point of view are:

Strengths

- Addresses the transition issues for Nos. 1, 5 and 7A Norfolk Road, as these properties have a rear boundary with sites fronting Essex Street which are zoned Residential R4 (and allows the construction of 5 storey apartment building).
- Addresses concerns of these landowners about the impact of the adjoining development on their amenity by allowing them to redevelop.

Weaknesses

- From an urban design viewpoint, Nos. 3A, 5, 7 and 7A have no road frontage. This makes designing apartment buildings that manage amenity impacts problematic in terms of setbacks and building separations, and will result in sub-optimal urban design outcomes.
- Will impact on traffic and parking issues in the street as a result of additional density.

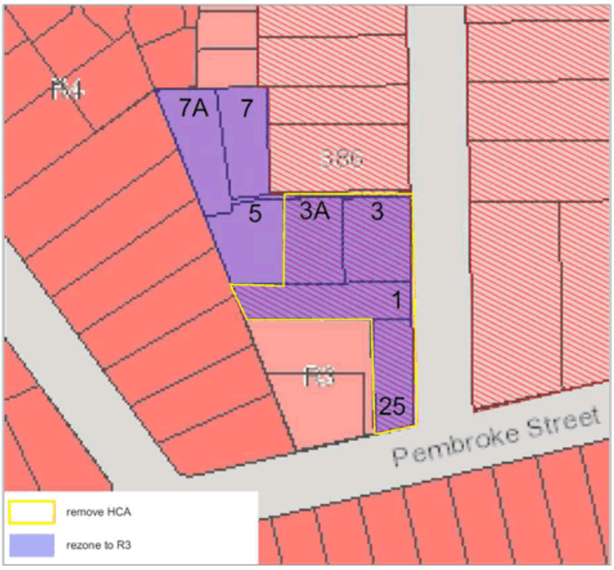

Figure 17 Option 1 – Recommendation of the heritage review

Option 2 - Rezone 1, 3, 3A, 5, 7 and 7A Norfolk Road and 25 Pembroke Street to Residential R3, but restrict development on 3, 3A, 5, 7, and 7A Norfolk Road to a 2 storey Manor Home.

As indicated above, rezoning all of these sites to Residential R3 would allow for a 4 storey development. One option for managing the design issues related to the isolated nature of Nos. 3A, 5, 7, and 7A Norfolk Road (as discussed in the weaknesses for Option 1 above) is to limit the redevelopment of these sites to a 2 storey Manor Home. In this case, there may be scope to introduce different design controls that would potentially produce better built form outcomes than those that would be result from a 4 storey apartment building under SEPP 65. This option would also involve removing the HCA designation from 1, 3, 3A Norfolk Road and 25 Pembroke Street. Figure 18 illustrates this option. Strengths and weaknesses of this options from Council Officers' point of view are:

Strengths

- Allows the owners of Nos. 3, 3A, 5, 7 and 7A Norfolk Road a redevelopment opportunity that they would not be able to achieve under the Residential R2 zoning (noting that it would require amalgamation of these into two development parcels)
- Allows for design options that better manage the transition between the building form on the Residential R4 on the adjoining site.

Weaknesses

- From an urban design perspective, Nos. 3A, 5, 7 and 7A have no road frontage. This makes designing apartment buildings that manage amenity impacts problematic in terms of setbacks and building separations, and will result in sub-optimal urban design outcomes.
- Will impact on traffic and parking issues in the street as a result of additional density, but not as greatly as Option 1 due to the lower density.

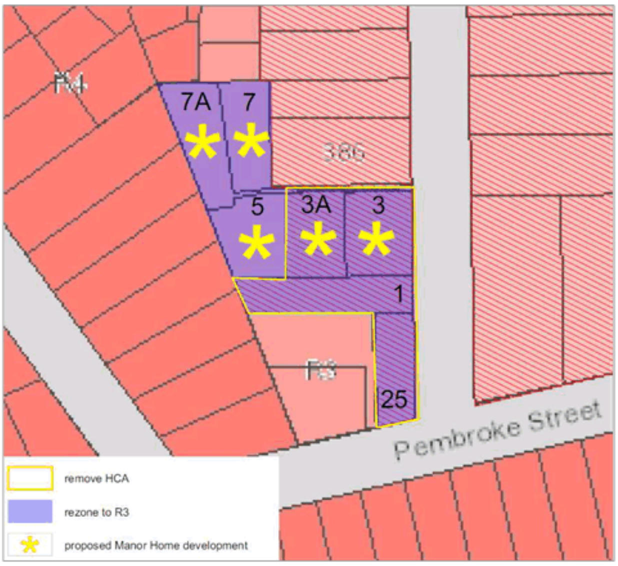

Figure 18 Option 2 involving 1-7A Norfolk Road and 25 Pembroke Street

Option 3 - Allow 1 Norfolk Road and 25 Pembroke Street to be rezoned to Residential R3 and retain Residential R2 zoning on 3, 3A, 5, 7 and 7A Norfolk Road

This option recognises that it may be possible to easily amalgamate 1 Norfolk Road and 25 Pembroke Street with 23 and 23A Pembroke Street (which are already zoned Residential R3) to create a suitably-dimensioned development site where a 4 storey development building can be accommodated with high-quality urban design outcomes. Due to concerns the design outcome from any amalgamation this option would see, Nos. 3, 3A, 5, 7 and 7A Norfolk Road would retain the Residential R2 zone which allows for no increased density. This option would also involve removing the HCA designation from 1, 3, 3A Norfolk Road and 25 Pembroke Street. Figure 19 illustrates this option. Strengths and weaknesses of this options from Council Officers' point of view are:

Strengths

- Addresses concerns about the urban design outcomes of redeveloping Nos. 3A, 5, 7 and 7A, given that they have no road frontage and are surrounded by other residential development sites.

Weaknesses

- Does not address the transition in built form issues of the owners of Nos. 5 and 7A who share a boundary with Residential R4 sites and may be concerned about the potential impact on the amenity of their property.
- Will impact on traffic and parking issues due to the additional density for 1 Norfolk Road and 25 Pembroke Street, but the impact would not be as significant as Options 1 and 2.

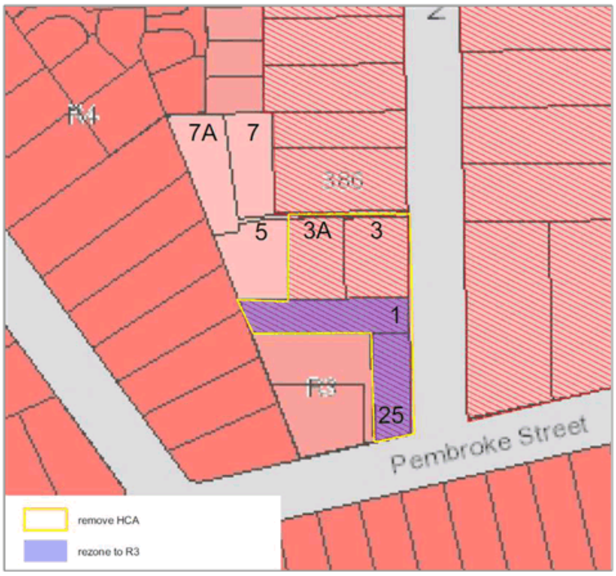

Figure 19 Option 3 involving 1-7A Norfolk Road and 25 Pembroke Street

Consultation Question:

7c. In the case of 1, 3, 3A, 5, 7, and 7A Norfolk Road and 25 Pembroke Street, what is your preferred option and why?

7.4.3 Rose Street precinct

The Rose Street precinct is zoned R2 Low Density Residential and includes properties that have frontage to Blaxland Road (comprising Nos. 705, 707, 709 and 711), Rose Street (comprising Nos. 1 to 5), and Brigg Road, northern side only (comprising Nos. 5-11 and 15-27). It excludes Essex Street properties. This land is zoned R2 Low Density Residential in *HLEP 2013*. Refer to the land shown hashed blue in Figure 20.

Figure 20 Rose Street precinct (land hashed blue)

In 2014, land immediately to the north of the precinct which has frontage to Maida Road was rezoned from the R2 zone to the R3 Medium Density Residential. The R3 zone in *HLEP 2013* permits residential flat buildings and has an accompanying 12m (4 storey) height limit. Recently approved Development Applications are seeing 4 storey residential flat building development realised on these sites.

The Heritage Review reviewed the appropriateness of the R2 Low Density zone over this precinct and has recommended up-zoning to the R3 Medium Density Residential zone. Council officers have reviewed this recommendation and concur with the conclusion, but also sees the need for further analysis to determine the appropriate density (height and FSR) controls.

Council Officer Recommendations

Council officers recommend rezoning this precinct from R2 Low Density to R3 Medium Density, thereby enabling a clear transition from the R4 zone on the northern side of Maida Road, to the R3 zone from the southern side of Maida Road to Brigg Road, and to the existing R2 zone on the southern side of Brigg Road. (Refer to Figure 21).

However, to determine the appropriate detailed controls, it is also recommended that Stage 2 of the Epping Planning Review involves the preparation of a master plan to determine the subdivision pattern, the amalgamation pattern and the appropriate setbacks.

Figure 21 Rose Street precinct interface showing the proposed area to be up-zoned

Consultation Question:

7d. Do you agree with the recommendations for the Rose Street precinct? Please comment.

8.0 COMMERCIAL FLOORSPACE STUDY

Council commissioned SGS Economics and Planning to prepare a Commercial Floorspace Study in order to analyse the loss of commercial floor space occurring within the centre and determine the town centre's potential role and whether specific planning controls need to be in place to meet future demand. The Study is being exhibited as supporting information to this Discussion Paper.

Note: In this chapter "**commercial**" refers to **office**, **retail** and **other non-residential** floor space. When a specific subset of commercial floor space is referred to – i.e. office floorspace – the specific term is used.

8.1 Technical findings

The Commercial Floorspace Study (CFS) identifies that Epping has or will have a number of competitive advantages. First, Epping is expected to have a high rate of growth over the coming decades, which will result in more residents than other suburban centres such as Hornsby, Pymble, and Pennant Hills. Epping is also expected to be competitive with Macquarie Park, as it will have a larger population and a "comparable level of highly educated and professional people to draw on" (pg.57). Epping also ranks well in terms of transport accessibility, exposure for retail spaces and foot traffic.

The CFS also identified two of Epping's competitive weaknesses. The first is poor accessibility to major infrastructure such as hospitals, universities. The second is that Epping lacks the prestige of other nearby centres, such as Macquarie Park, Rhodes and Chatswood.

In light of the above strengths and weaknesses, the CFS details three possible scenarios for the Epping Town Centre:

1. Epping as a **population servicing centre (low scenario)** where office uses service the population of Epping.
2. Epping as a **local centre (medium scenario)** where office uses service the surrounding population (e.g. a 5 to 10 minute catchment).
3. Epping as a **district centre (high scenario)** where office uses service a wider population and attract strategic employment uses (e.g. a 20 to 30 minute catchment).

Note: The Greater Sydney Commission's Draft District Plans define a District Centre as having one or more of the following characteristics:

- the scale of retail activity, generally over 50,000 square metres of floor space
- the presence of health and education facilities that serve the district and the local community
- the level of transport services
- generally between 5,000 to 10,000 jobs.

In terms of the likely future scenario for the Epping Town Centre, the CFS concludes that the low scenario as not a realistic outcome as the Epping Town Centre has the potential to play a more significant role. The CFS therefore recommends that the preferred scenario is somewhere between the local centre (medium) and the district centre (high) scenarios, and can be described as a **sub-district centre (a medium-high scenario)**.

The sub-district centre scenario would meet the forecast demand for **55,616sqm of office floor space** and **13,000sqm of retail floor space** in Epping Town Centre to 2036.

As shown in Table 1 below, the forecast demand is very close to the amount of office and retail floor space located in Epping Town Centre estimated through the 2011 Census data. However, as noted previously in this Discussion Paper, some office and retail floor space has been "lost" to residential uses through current redevelopment.

Type of commercial floor space	Provision 2011 (Census data estimates)	Demand 2036 (forecast in technical study)
Office	55,000sqm	55,616sqm
Retail	12,900sqm	13,000sqm

Table 1 2011 provision and 2036 demand for commercial floor space by type

8.1.1 Retail floor space

The CFS outlines demand for 13,000sqm of retail floor space in Epping Town Centre. It identifies that redevelopment should allow for a greater range of retail premises (i.e. variation in size of premises) to be provided for local shops, more supermarkets, cafes and restaurants, and everyday services such as banks, dry cleaners and hairdressers.

Retail uses should be located on the ground floor as part of any redevelopment, achieve a fine grain at the street level and promote an active street frontage. Figure 22 illustrates the location of these uses within the podium element of a mixed use development within the town centre.

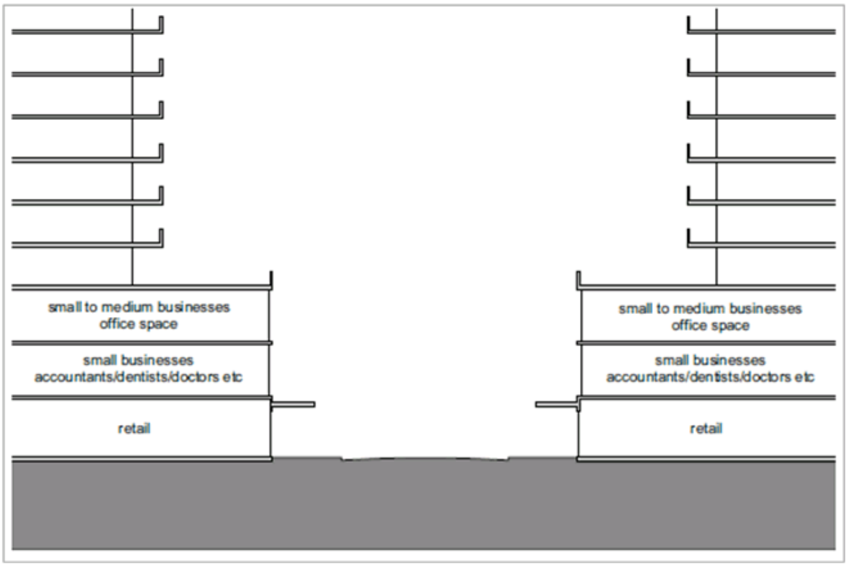

Figure 22 Location of retail and office uses within a 3 storey podium

8.1.2 Office floor space

The CFS outlines demand for 55,616sqm of office floor space in Epping Town centre, and recommends that this comprise the following types of office floor space:

- Small to medium enterprises across a range of industries located above the ground floor.
- Medical services for the local population (residents and workers) located on or above the ground floor.
- Other non-residential uses (such as Educational uses, child care centres and gyms) located on or above the ground floor.

8.1.3 Approaches to deliver the commercial floor space

The study looked at three approaches to addressing the demand for commercial floor space, as follows:

1. **Standalone commercial**: This approach requires office building development only, while prohibiting residential uses. The study generally recommends that this approach not be relied upon, but does identify some potential for large sites.
2. **True mixed-use development**: This approach requires commercial floor space for the first few floors of a mixed-use development. This can be achieved by having a minimum non-residential floor space ratio control.
3. **Development of government-owned sites**: This approach identifies that, where local or state government-owned land could incorporate commercial floor space to support the 30-minute city vision.

> **Note:** The Greater Sydney Commission's Draft District Plans envision a **30-minute city,** in which people can access a wide range of job, services and other opportunities within 30 minutes from their place of residence. The 30-minute city vision will improve the quality of life of Greater Sydney residents and improve accessibility and transport outcomes across the metropolitan area.

8.1.4 Other strategies for delivering commercial floor space

Because the market still favours residential development, the CFS recommends planning policies that would help deliver commercial floor space within the Epping Town Centre. These include:

- Introduce a **minimum non-residential floor space ratio control** on both sides of the town centre. (The report sees this as the most effective measure to maintain commercial floor space.)
- **Maintain residential development** on all B2 zoned land to maintain feasibility of non-residential development.
- Address the above two matters via **stronger planning controls** (LEP/DCP) that deliver podium-style commercial development with residential towers, along with a **prohibition of serviced apartments** in this zone
- **Explore car parking initiatives that reduce private car ownership**. This recognises the current impact that cars are having on the centre and the high level of public transport accessibility.
- With regards to **Government-owned sites**, Council should explore ways to include office, retail and other non-residential floor space which draws

residents to the centre. It proposes that the Ray Road/Beecroft Road sites previously zoned for business purposes (acquired by the State government for the purposes of the Sydney Metro project) be explored in this regard.

8.2 Community feedback

As noted previously, a community workshop focusing on commercial floor space was held on 22 May 2017. Feedback from this forum is summarised as follows:

- People are enthusiastic about the possible future of Epping. They want their town centre to reflect the vibrant, friendly, community which they are familiar with.
- There is a strong sense of community within Epping which is centred on having a retail and business hub which can offer a range of services and activities for the local community to access.
- There is a wide range of services available in the town centre which most participants enjoy using.
- There are some essential uses that do not exist or are not sufficiently provided within the town centre; this forces community members to visit other centres and suburbs. Workshop participants identified that the following broad range of uses which one might expect in a centre like Epping were not sufficiently provided:
  - Fresh food (butchers, greengrocers, etc.); there is only one supermarket
  - Larger format and big brand shops (discount department stores or hardware store)
  - A wide range of clothing retail
  - Medical services (e.g. x-ray services)
- There is little resistance to increasing the amount of space available for new businesses and offices spaces. Many participants wanted Epping to grow and wanted to see development of a new heart for the town centre.
- There is a noticeable lack of professional job opportunities in Epping at present. As such, there were many and varied suggestions around having flexible office or retail spaces, as well as room for business start-up spaces and for larger companies to make Epping their home (i.e. architectural, engineering or building companies).
- Parking and transport are seen as a barrier to those wanting to use Epping as a retail centre.

The community feedback is detailed in full in the Straight Talk Phase 1 Consultation Report which is being exhibited alongside this Discussion Paper.

8.3 Council analysis – commercial floor space issues

Council's analysis of commercial floor space issues, taking into account the findings from both the CFS and community consultation, is summarised in this section.

The Hornsby DCP controls which currently require a 2 to 3 storey podium for commercial uses have been applied weakly. As a result, only 50% of approvals to date are delivering a ground floor non-residential element. The Parramatta DCP controls require "up to" a 4 storey commercial podium for development along Beecroft Road but no retail or commercial on the other B2 Commercial zoned sites. The use of the words "up to" means the applicant can choose the height as long as it is no greater than 4 storeys. Furthermore, under current planning legislation, the role of the DCPs have been weakened relative to their historical role. DCPs now provide a guide, which can be varied as part of the Development Application process. In order to achieve a greater provision of commercial floor space via the DA process, Council would have to strengthen its planning controls to mandate a minimum amount of commercial floor space in the LEP.

The lack of connectivity between the east and west portions of the centre was recorded indirectly in the feedback received at the consultation sessions. One of the options put forward was the desire to see a link between the two sides activated with shops. The suggestion was that a shopping centre linking both sides could be built over the train station. Whilst the achievement of a high-quality activated link is highly desirable, there is still a need to make sure that each side of the railway line is able to achieve a high level of amenity to minimise the distance people have to travel to meet their needs. In addition to a link, it is also desirable that both sides have a retail focus in the form of a supermarket, minimising the distance people have to travel to meet basic needs and providing an economic focal point on each side of the train station.

The ability of the centre to provide large floorplates was analysed. Given the lot sizes and the potential for site amalgamation, there is greater opportunity on the western side of the rail line for larger sites to be redeveloped to provide a variety of premises to support a mix of commercial uses. On the eastern side there are fewer options where amalgamation of multiple sites has already occurred. Council should investigate whether it is feasible to put in place planning controls that promote amalgamation of sites in strategic locations, so that a mix of commercial uses can be achieved on both sides of the rail line.

The rail line at Epping is a significant barrier to mobility; significant east, west, north and south routes of the arterial road network meet in Epping and cross over this barrier at the Epping Rail Overbridge. The preliminary traffic assessment (see Chapter 11) suggests that there is little that can be done to alleviate the arterial road traffic and that increasing private vehicle access into Epping represents a significant challenge for which there is not a feasible and cost-effective solution. The implications of this for commercial activity is that Epping should be a centre where the accessibility focus is on public transport and active transport options like walking and bicycles. This is also consistent with the recommendation in the SGS study which promotes initiatives to minimise private car ownership.

8.4 Guiding principles

The future planning controls for the Epping Town Centre should:

- seek to establish Epping as a Sub District Town Centre with a target of 13,000sqm of retail and 56,000sqm of office floor space by 2036.
- seek to ensure that each development site in Epping approved under any new controls makes a contribution to the retail and office targets in the centre and that consideration be given in preparing planning controls to:
  - ensure that residential is still retained at the maximum feasible level to maximise the feasibility of commercial floor space; and
  - provide an incentive for developers to amalgamate sites as this provides the best opportunity to provide a mix of retail and office floor space in their development.
- seek to ensure that the broadest possible range of retail and a range of small to medium office and service uses are can be accommodated in the Epping Town Centre
- seek to ensure that connectivity between the eastern and western parts of the Epping Town Centre is maximised to provide the broadest range of access for

all future users, whilst still seeking to ensure that key uses (i.e. a supermarket) are easily accessible to provide a high level of access to key services and facilities (minimising the distance anyone needs to travel within the centre to meet their daily needs).

- focus on Epping's relative accessibility advantage which is public transport and active transport, rather than relying on private vehicle transport where there are already constraints. These measures should seek to ensure Epping plays a role in providing residents in the region with a 30-minute city.

8.5 Questions for feedback

Council is seeking your feedback on the following questions and options.

8.5.1 Should Epping seek to evolve into a Sub District Centre with regards to commercial floor space?

Based on the Development Applications already approved, the Epping Town Centre will not achieve the recommended commercial floor space targets without some sort of planning intervention. Without intervention, Epping is likely to operate in the future as a dormitory suburb rather than a sub district centre. At the consultation session, there was general support for retail and office floor space being retained and provided in the Epping Town Centre. To test this premise amongst the broader community, feedback is sought on the following question.

Guiding principle: seek to establish Epping as a Sub District Town Centre with a target of 13,000sqm of retail and 56,000sqm of office floor space by 2036.

Consultation Question:

8a. Should Epping seek to evolve into a Sub District Town Centre with a target of 13,000sqm of retail floor space and 56,000sqm of office floor space?

8.5.2 Options for amending controls to deliver retail and office floor space targets

Council and the CFS identify that, if there is a desire to achieve the commercial floor space targets described above, then minimum non-residential floor space controls must be introduced. In order to have certainty on delivering this floor space, it is recommended that these controls be included in the LEP (as the existing DCP controls have not been an effective mechanism).

The technical study acknowledges that residential development on all B2 zoned land should be maintained in order to maintain the feasibility of non-residential development. This is also consistent with the Council and NSW Government objective of increasing activity around the Epping public transport hub.

Urban design analysis suggests that sites within the B2 zone (assuming a 60% take-up rate) would need to provide 3 storeys of commercial floor space in order to achieve the 2036 targets.

On the eastern side of the rail line, the current DCP controls requires 2 storeys on the majority of sites (with a small number of sites near the station required to provide 3 storeys). In this case, new controls would require an increase in the commercial floor space provided on site.

On the western side the land between Beecroft Road and Rawson Street, there is no clearly enforceable requirement to provide a commercial podium beyond retail at the ground floor. In this case, requiring 3 storeys of commercial across all these B2 zoned sites will give a net increase in the total amount of commercial floor space.

The way that Council implements any new controls will play an important role in the centre's viability and the delivery of commercial floor space.

Option 1 – Retain existing floor space controls and replace existing residential floor space with commercial floor space targets

When reformulating the planning controls, Council could retain existing FSR controls and introduce minimum requirements for non-residential floor space as well. This means that the development would reduce the amount of future residential floor space (the number of apartments that can be achieved) to accommodate the minimum non-residential floor space.

This would also potentially change the height controls, though it is not possible to say how these will change without site-specific testing. However, it is possible that the height controls would need to be maintained or increased because the floor to ceiling height for commercial storeys are higher than for residential storeys. In other words, mandating more commercial floor space at lower levels could result in slightly taller tower buildings, especially if a slender tower with a smaller shadow impact (which is a desirable building form) is to be achieved.

Strengths:

- Allows for delivery of commercial floor space targets and seeks to ensure Epping is able to achieve a Sub District Centre role and contribute to this part of Sydney becoming a 30-minute city.
- Delivers on the community's desire for a greater mix of goods services and jobs to be provided in the centre.
- Assist with managing traffic and parking issues by not resulting in a net increase in floor space in the town centre (especially if it is supported by other measures to limit private vehicle ownership for residents living close to the Epping Town Centre and to promote workers arriving at work via public transport).

Weaknesses:

- Reduces the number of residential units that can be achieved close to Epping Station, which was a key objective of the Epping UAP process; this may not be supported by the Department of Planning.
- Unlikely to be supported by landowners as it makes redevelopment less financially attractive (commercial floor space is much less valuable in the current market).
- Potentially encourages a "rush" of Development Applications under the current controls to avoid future planning controls that would limit residential units achievable.

Guiding principle:

- seek to establish Epping as a Sub District Town Centre with a target of 13,000sqm of retail and 56,000sqm of office floor space by 2036.

- seek to ensure that each development site in Epping approved under any new controls makes a contribution to the retail and office targets in the centre and that consideration be given in preparing planning controls to:
  - ensure that residential is still retained at the maximum feasible level to maximise the feasibility of commercial floor space; and
  - provide an incentive for developers to amalgamate sites as this provides the best opportunity to provide a mix of retail and office floor space in their development.

Consultation Question:

8b. Should Epping evolve as a Sub District Centre achieving the commercial floor space targets without any increase in Net Floor Space on Business B2 zoned sites?

Option 2 – Allow additional floor space on B2 Business zoned sites to allow for the commercial floor space targets to be achieved.

There are a number of sites where there would need to be more commercial floor space than envisaged under the existing DCP controls in order to meet the targets. In these instances, if the amount of floor space permitted was increased to accommodate the additional commercial floor space, then there would be no net loss in residential development permitted on these sites. The impact of this is that the height of the buildings would need to increase to accommodate the additional floor space.

Strengths:

- Allows for delivery of commercial floor space targets and seeks to ensure the Epping is able to achieve a Sub District Centre role and contribute to this part of Sydney becoming a 30-minute city.
- Delivers on community's desire for a greater mix of goods services and jobs to be provided in the centre.
- Has less impact on housing targets, and is more likely to be supported by the Department of Planning.
- More likely to be supported by landowners as the impact on financial returns associated with any redevelopment are significantly lower than Option 1.

Weaknesses:

- Will make managing traffic and parking issues more difficult by allowing a net increase in floor space in the town centre. This could potentially be offset if it is supported by other measures to limit private vehicle ownership for residents living close to the Epping Town Centre and to promote workers arriving at work via public transport. However, these measures would need to be even more strictly applied compared to Option 1.
- Allows for taller buildings with greater shadow and potential visual impacts compared to those permitted under existing controls.

Guiding principle:

- seek to establish Epping as a Sub District Town Centre with a target of 13,000sqm of retail and 56,000sqm of office floor space by 2036.
- seek to ensure that each development site in Epping approved under any new controls makes a contribution to the retail and office targets in the centre and that consideration be given in preparing planning controls to:

- ensure that residential is still retained at the maximum feasible level to maximise the feasibility of commercial floor space; and
- provide an incentive for developers to amalgamate sites as this provides the best opportunity to provide a mix of retail and office floor space in their development.

Consultation Question:

8c. Should Epping evolve as a Sub District Centre achieving the commercial floor space targets by allowing for an increase in density permitted so the commercial can be delivered with no loss of residential floor space capacity?

8.5.3 Role of Government-owned sites

The technical study has identified a role where Government-owned sites could be used as part of a deliberate strategy to support the Government's 30-minute city strategy by:

- Providing commercial floor space to offset the loss when other sites are developed; and
- Providing floor space to allow businesses that are displaced when their existing building is being redeveloped to relocate within the centres.

This section below discusses the Government-owned Sites that have been identified as opportunities to make a contribution to the 30-minute city strategy.

Site 1 – State Government Owned Site at 240 – 244 Beecroft Road, Epping

This site (see Figure 23) has previously accommodated a commercial office development. The site was acquired by the State Government and has been used as a works site for the North West Metro Project.

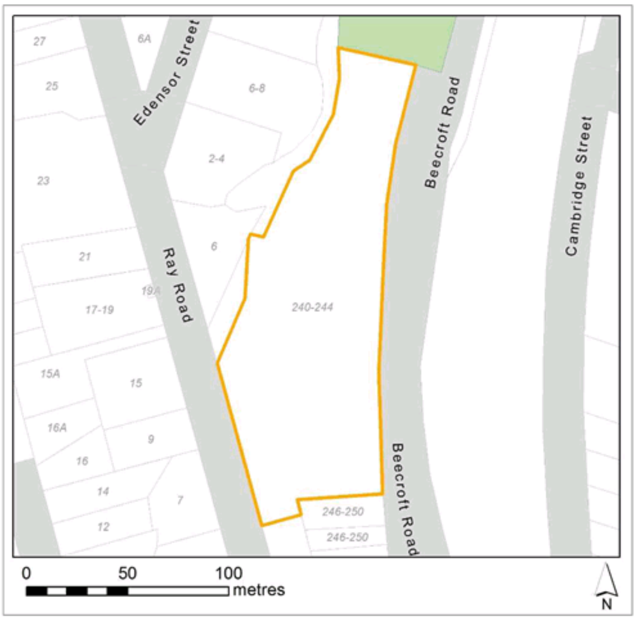

Figure 23 State government owned land at 240-244 Beecroft Road, Epping

As part of the 2014 Planning Controls coming into force, this site was rezoned to R4 High Density Residential with a maximum height of 48m. Once the construction of the Sydney Metro is completed and the site is no longer required for a works site, it is expected that it will be redeveloped in accordance with the existing zoning for largely residential purposes. The R4 zone allows for shop top housing and neighbourhood shops on the ground floor but would not permit any retail or commercial development above the ground floor.

As indicated above, the commercial floor space targets can be achieved in the existing B2 zone with a 60% take-up rate without any commercial floor space being developed on this site. If the zoning of this site changed to permit more commercial floor space, and this was taken up, it would be possible to reduce the retail commercial requirement on other sites. One advantage of encouraging commercial development on this site is that the size of the site would allow for larger floorplates than could be achieved on most sites in the B2 zone.

The technical study recommends that Council should explore ways that this site might be used for non-residential uses. Options for this site include:

- **Option 1a** - Retain the existing zoning.
- **Option 1b** - Rezone the site and allow a mix of retail and office on the site (similar to what is being considered in Section 8.5.2).
- **Option 1c** - Amend the planning controls to require commercial development and prohibit residential development.

The more commercial floor space that could be accommodated on this site, the less pressure there would be to maximise commercial floor space on B2 zoned sites closer to the station. However, unless the height of building also increases, Option 1b and 1c will result in a reduction in housing close to the Epping Station which is inconsistent with the Epping UAP objectives put forward by the State Government.

Guiding principle:

- seek to establish Epping as a Sub District Town Centre with a target of 13,000sqm of retail and 56,000sqm of office floor space by 2036.
- seek to ensure that each development site in Epping approved under any new controls makes a contribution to the retail and office targets in the centre and that consideration be given in preparing planning controls to:
  - ensure that residential is still retained at the maximum feasible level to maximise the feasibility of commercial floor space; and
  - provide an incentive for developers to amalgamate sites as this provides the best opportunity to provide a mix of retail and office floor space in their development.

Consultation Question:

8d. What contribution should 240-244 Beecroft Road make to the provision of commercial floor space in Epping?

Site 2 – Epping Station Site

As part of the consultation a number of stakeholders put forward a proposal for a development over the top of the Epping Station. The perceived advantages of the proposal included:

- The opportunity to provide a high-quality activated link between the east and west side of the Town Centre; and
- The opportunity to provide commercial floor space to support the town centre

The critical conversation for this site is with the relevant Government transport agencies who may have a position on what can feasibly be constructed over the rail line/station.

Guiding principle:

- seek to establish Epping as a Sub District Town Centre with a target of 13,000sqm of retail and 56,000sqm of office floor space by 2036.
- seek to ensure that each development site in Epping approved under any new controls makes a contribution to the retail and office targets in the centre and that consideration be given in preparing planning controls to:
  - ensure that residential is still retained at the maximum feasible level to maximise the feasibility of commercial floor space; and
  - provide an incentive for developers to amalgamate sites as this provides the best opportunity to provide a mix of retail and office floor space in their development.
- seek to ensure that connectivity between the eastern and western parts of the Epping Town Centre is maximised to provide the broadest range of access for all future users, whilst still seeking to ensure that key uses (i.e. a supermarket) are easily accessible to provide a high level of access to key services and facilities (minimising the distance anyone needs to travel within the centre to meet their daily needs).

Consultation Question:

8e. What contribution should the Epping Station Site make improving connectivity and provision of commercial floor space?

Site 3 – Council Car Park site – Rawson Road Epping

The Council carpark site located in Rawson Street (see Figure 24) represents an opportunity to utilise Council-owned land to benefit the community (as identified in Appendix 3). Council has already been approached by adjoining developers seeking to enter into an agreement with Council to include this land in a redevelopment that would see car parking provided underground and the site developed above ground with a mix of community open space, commercial facilities and residential development (see Appendix 3 for further discussion).

Figure 24 Council car park sites at 51A and 51B Rawson Street, Epping

The role that this site can play as a potential location for a community hub incorporating a civic space and potential community hub facility incorporating a mix of community uses is discussed further in Chapter 9. Consequently, it is recommended that this site not be identified as a site where significant commercial or retail floor space should be contemplated. If redeveloped, this site will more likely play a role ensuring that there is sufficient social infrastructure provided in the town centre.

Site 4 – Current Epping Library site – Chamber Court Epping

The existing Epping Library Site (see Figure 25) was previously identified by Hornsby Shire Council as a potential redevelopment site. Hornsby Shire Council had previously undertaken an Expression of Interest (EOI) process that sought a partner to redevelop a site with a view to the site being redeveloped with residential uses and a new library facility located on the lower levels. A partnership approach was proposed with the objective of delivering a new library funded by the developer.

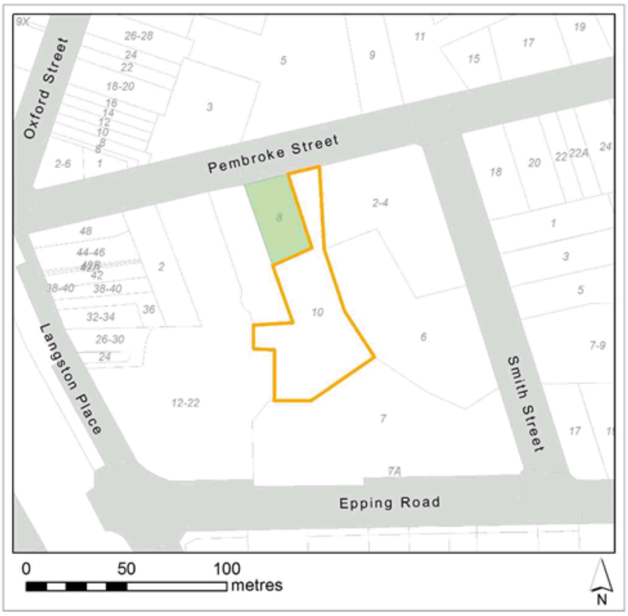

Figure 25 Epping Library site, Pembroke Street, Epping

The role this site could play in the provision of community open space and community facilities is discussed in more detail in Chapter 9. As part of that development, Council could consider what contribution the site should make to the provision of commercial floor space in the Town Centre.

Council could also require the site to provide for three levels of commercial floor space (equivalent to adjoining site), but use the lower levels for a community facility and/or office space that might accommodate Non-Government Organisations (NGOs) and other community service providers (instead of commercial floor space that would be leased in the open market).

Alternatively, Council could seek to make a greater contribution by providing more levels of office space than adjoining equivalent sites that could then be leased to both NGO/Community Service Providers and private tenants depending on demand and the funding model required.

Guiding principles:

- seek to establish Epping as a Sub District Town Centre with a target of 13,000sqm of retail and 56,000sqm of office floor space by 2036.
- seek to ensure that each development site in Epping approved under any new controls makes a contribution to the retail and office targets in the centre and that consideration be given in preparing planning controls to:
  - ensure that residential is still retained at the maximum feasible level to maximise the feasibility of commercial floor space; and
  - provide an incentive for developers to amalgamate sites as this provides the best opportunity to provide a mix of retail and office floor space in their development.

Consultation Questions:

8f. Should the Epping Library and Council car park sites play a role in providing for commercial floor space in the centre?

8g. Should the floor space allocated to community uses and commercial floor spaces be equivalent to or greater than the levels required on adjoining equivalent sites?

8.5.4 Delivering the right mix of retail uses in Epping Town Centre

Issue 1 – Delivering a Supermarket on the Eastern Side of Epping Town Centre

One issue that will impact on the liveability of Epping Town Centre will future residents' and workers' ability to access daily needs in a convenient manner. To this end, there would ideally there will be a supermarket provided on both sides of the rail line. Supermarkets tend to be an anchor use that then encourage other smaller and medium enterprises to locate nearby, providing a wider range of local uses for daily needs. A supermarket already operates on the west side of the centre but there is no supermarket on the eastern side.

Ultimately the planning system cannot mandate the operation of any business. The planning controls allocate floor space areas and set in place planning controls that seek to create an environment for the business community to operate these types of businesses. Council cannot guarantee a supermarket be provided, but it can put in place planning controls that promote or incentivise desirable outcomes and apply economic development initiatives to attract a supermarket tenant.

Supermarkets require large floorplates. On the eastern side of Epping Town Centre, the existing lot pattern with multiple small shops requires significant lot amalgamation to occur to get an appropriate site. Having considered the pattern of Development Applications already in place and the possible locations for a supermarket, there remains one key site identified by Council Officers as ideal for a supermarket to service the eastern side of the Town Centre. The landholding (see Figure 26) consists of 7 sites – 38-48 Langston Place and 2 Pembroke Street – which together have a site area of approximately 2,900sqm.

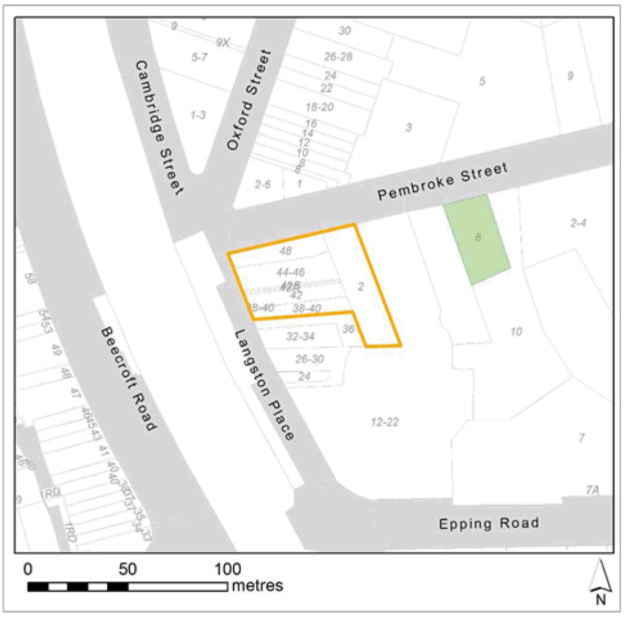

Figure 26 Potential supermarket site – Eastern side of Epping Town Centre

This site is located directly opposite the station and is considered the ideal site for a supermarket to service the eastern side of the Epping Town Centre, if supported by community and the market. However, the amalgamation of all of these sites to achieve a supermarket floorplate cannot be mandated by Council. Instead it may be possible to provide these landowners with an incentive to amalgamate these sites by providing them with additional floor space and height in any new planning controls to provide a financial incentive for amalgamation and the delivery of a supermarket.

Guiding principle:

- seek to ensure that the broadest possible range of retail and a range of small to medium office and service uses are can be accommodated in the Epping Town Centre.
- seek to ensure that connectivity between the eastern and western parts of the Epping Town Centre is maximised to provide the broadest range of access for all future users, whilst still seeking to ensure that key uses (i.e. a supermarket) are easily accessible to provide a high level of access to key services and facilities (minimising the distance anyone needs to travel within the centre to meet their daily needs).

Consultation Question:

8h. Should Council seek to actively encourage a supermarket site on the eastern side of the Epping Town Centre by providing floor space and height bonuses to incentivise the site amalgamation necessary to achieve a supermarket?

Issue 2 - Ensuring Delivery of Large Floorplate Retail Options on the Western Side of the Rail Line

As discussed in Appendix 3, Council has two Preliminary Planning Proposals seeking to increase FSR and height on sites on the western side of the Epping Town Centre. The two sites are shown in Figures 27 and 28 below.

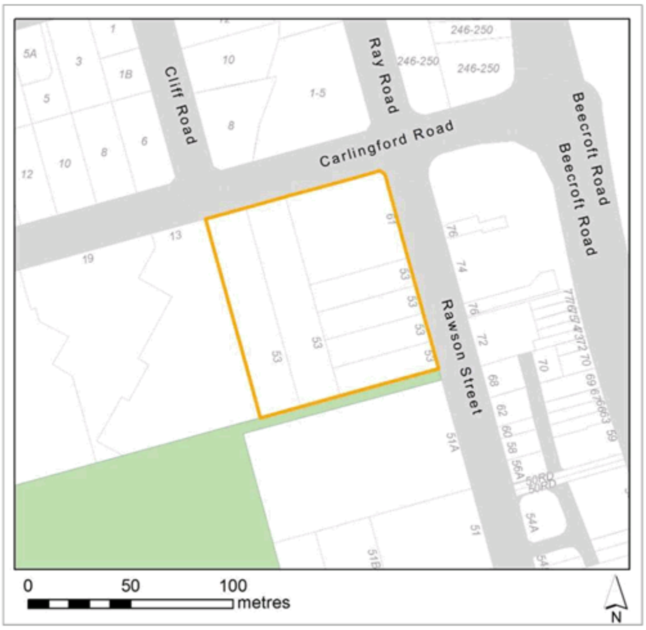

Figure 27 Potential large floorplate supermarket site – Western side of Epping Town Centre, 53 & 61 Rawson Street, Epping

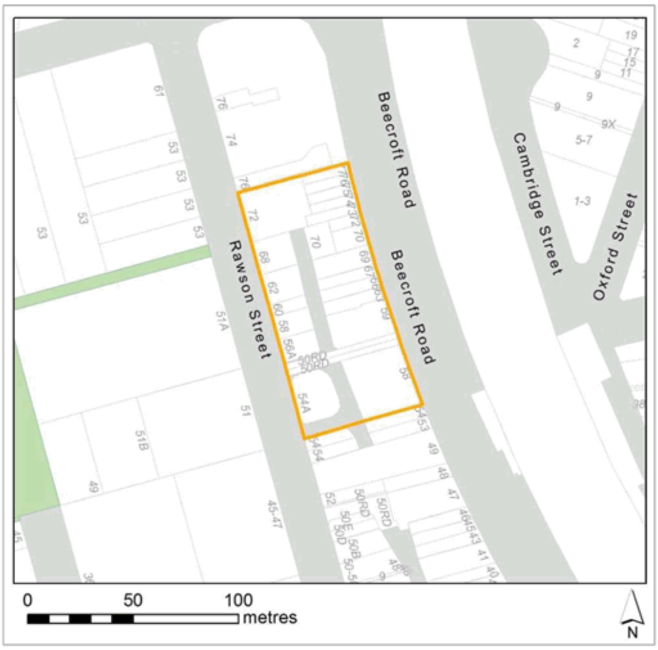

Figure 28 Potential large floorplate supermarket site – Western side of Epping Town Centre, 59 & 77 Beecroft Street, Epping

In both the proposals submitted there are large floorplate shops provided for in the lower levels.

In order to achieve a role for Epping as a sub district centre, it is critical that these sites provide commercial levels in a podium and that larger floorplate shops are retained within it. The DCP currently requires up to a 4 storey podium be provided for the Beecroft Road Site. However, the current planning controls do not contain any provisions that require the applicants to retain large floorplate outlets. There are also no controls that require a supermarket site be retained for the site on the western corner of Rawson Road and Carlingford Road

It is recommended that Council strengthen its DCP controls to specify that large floorplate retail should be provided. However, this sort of control has traditionally not been specified in a DCP and instead it has been left to the market to determine the mix of retail shop sites on a development in Parramatta LGA.

The circumstances for these sites are different to those discussed above in relation to providing a supermarket in the east. These sites have effectively already been amalgamated so there is no incentive required to promote amalgamation.

However, in both cases the applicants via their preliminary Planning Proposals are seeking additional density on these sites over and above what is permitted under the current controls. There are various other issues, particularly traffic management and urban design considerations that need to be considered before any decision about whether these sites will be able to be developed at higher densities.

However, a position Council could take is that any additional density on these sites (subject to Council being satisfied it is satisfactory from a traffic and urban design point of view) would be conditional upon large floorplate shops being provided.

Guiding principles:

- seek to ensure that the broadest possible range of retail and a range of small to medium office and service uses are can be accommodated in the Epping Town Centre.
- seek to ensure that connectivity between the eastern and western parts of the Epping Town Centre is maximised to provide the broadest range of access for all future users, whilst still seeking to ensure that key uses (i.e. a supermarket) are easily accessible to provide a high level of access to key services and facilities (minimising the distance anyone needs to travel within the centre to meet their daily needs).

Consultation Question:

8i. Should Council consider floor space incentives on this site to seek to ensure larger floorplate retail shops on these sites?

9 SOCIAL INFRASTRUCTURE STUDY

Following council boundary changes in 2016, Council commissioned Suter Planners and Elton Consulting to prepare studies of Council's social infrastructure across the City of Parramatta Local Government Area. The analysis relevant to the Epping suburb has been extracted and presented in the *Epping Social Infrastructure Study*. This is being exhibited as supporting information to this Discussion Paper.

Section 10.1 summarises the technical findings from the Epping Social Infrastructure Study while Section 10.2 summarises the community feedback from the Phase 1 workshops that took place in May 2017. Section 10.3 specifically addresses open space provision, which is a key issue for consideration. Section 10.4 then develops a set of guiding principles that inform the recommendations made in Section 10.5.

The role of this Discussion Paper is to identify principles that will guide future decision making. Any future decisions on provision of any social infrastructure will be guided by the outcome of this Discussion Paper process, but will also need to be informed by project feasibility and financial analysis prior to Council making any decisions on exactly how and where social infrastructure changes are pursued in the future.

9.1 Technical findings

The *Epping Social Infrastructure Study* (the Study) makes recommendations on each Council-owned social infrastructure facility; these are summarised in the following sections. Section 10.1.1 deals with Community Facilities, Section 10.1.2 deals with Open Space, and Section 10.1.3 deals with other Indoor and Outdoor Facilities.

The Study notes that the following types of social infrastructure were not audited as part of the study:

- school facilities used by the community;
- facilities owned and/or operated by other Councils that are outside City of Parramatta borders, but are likely to be used by Parramatta residents; and
- facilities not owned by Council, but used by the community for meetings and functions, such as churches and YMCA venues.

However, these types of social infrastructure were included when considering options for future provision of social infrastructure.

Important note on benchmarking of social infrastructure (continues on next page)

The Study relies on population benchmarking as a basis to compare and understand the provision of social infrastructure across various geographical areas in the Parramatta LGA. Benchmarking compares the amount of floor space available of various types of social infrastructure (e.g. library floor space and community meeting rooms) per 1,000 residents. This process can then be applied to identify current gaps in provision, as well predicting future needs to adequately service a local catchment as the population fluctuates.

While benchmarking is useful and widely used by government as an analysis tool, the Study is clear to point out that it is only one factor that should be considered as:

- It does not assess the useability or quality of the floor space being provided, so is therefore not a useful tool to assess the suitability of the space provided to meet the specific needs of the local community.
- It does not take into account the different ways that different communities live. For instance, the needs of residents living in high-density environments are different to those living in suburban settings, and provision of social infrastructure may need to change accordingly.
- It does not assess the practical elements that affect the way we plan for social infrastructure. For example, large parcels of land for additional sports fields are often not available in an urban or infill environment.
- Other approaches, such as using school grounds for org sport on weekends may create better outcomes for the community, rather than Council acquiring additional land to expand its sporting facilities assets. In other words, considering community needs within their own context is critical.

There are other factors that Council must consider when providing social infrastructure. Different areas of the City have different levels of provision when benchmarked. Council will need to prioritise available funding to make improvements to local social infrastructure. Whilst Section 94 developer contributions will assist in funding infrastructure, they will not cover the full cost of the infrastructure upgrades required; therefore, funding from other sources will need to be factored in when assessing the feasibility of delivering new social infrastructure.

9.1.1 Community facilities

The table below lists the Council-owned community facilities in Epping.

Facility	Address	GFA (sqm)	Zoning	Management
Epping Community Centre (School of Arts)	9 Oxford Street, Epping	1,157	B2 Local Centre	Unstaffed, Council management
Epping Library	1 Chambers Court, Epping	550	B2 Local Centre	Council management
Epping Leisure and Learning Centre	1 Chambers Court, Epping	389	B2 Local Centre	Council management
Epping Creative Centre	26 Stanley Road, Epping	460	RE1 Public recreation	Managed by NGO tenant – subsidised lease
West Epping Community Centre	15 Ward Street, Epping	622	RE1 Public recreation	Unstaffed, Council management
B. Parker Memorial Guide Hall	1-3 Briggs Road, Epping	190	RE1 Public recreation	Managed by NGO tenant (Girl Guides Association NSW) – exclusive lease

Table 2 Council-owned community facilities within the Epping suburb

The Study identified the following strengths and weaknesses with regard to community facilities in the Epping suburb:

Strengths:

- The community facilities generally benefit from good access to public transport, especially those close to the Town Centre, including Epping Community Centre and Epping Library.

- The community facilities generally benefit from good integration with other services and facilities.
- Benchmarking indicates that the current population of Epping (24,530 residents) is currently well-serviced with community space when compared with other parts of the Parramatta LGA. Epping has the highest community facility provision in the LGA (116sqm per 1,000 people in Epping, compared with 61sqm per 1,000 people across the LGA).
- On the assumption that the population of Epping increases to 37,271 residents in 2036, benchmarking indicates Epping will only have a very small shortfall in community facility floor space to service a larger population (81sqm per 1,000 residents) even if no new facilities are provided.

Weaknesses:

- In many cases, existing community facilities are not adequately staffed and have limited programming available, making much of the space unusable to the community and underutilised.
- The quality of the floor space across many of the community facilities is poor.
- The current dispersed "branch network" of community centres in and around the centre reinforces their underutilisation and poor useability. A best practice model that enables Council to efficiently resource, staff and program to meet the needs of local residents would be a large, flexible multipurpose community facility.
- Inadequate parking creates barriers to use, especially for facilities that do not benefit from public transport connectivity (e.g. West Epping Community Centre).
- Some community facilities lack visual prominence. Facilities such as the Epping Creative Centre and West Epping Community Centre lack good access. More prominence could provide increased value for the community.
- Epping Leisure and Learning Centre is in relatively poor condition, provides limited access, and is significantly underutilised.
- B. Parker Memorial Hall and Epping Creative Centre have limited access.
- Library floor space is unlikely to be inadequate to meet community needs by 2036 – see discussion in following paragraphs.

Epping Library

The Study identifies library space as Epping's most significant shortfall in the area of community facilities (refer to site at Figure 25). It does not meet the existing needs of the community in its current form. The current facility provides approximately 550sqm of library space, and requires an additional minimum of 1,000sqm to meet current needs using the benchmarking approach. Specifically, it was identified that there is a particular lack of space for the library to offer lifelong learning programs, and to provide adequate seating and study areas. It was also found that some events (such as Storytime) are often oversubscribed. Demand for library floor space and the services provided are forecast to continue to increase in line with population projections.

To service the needs of Epping residents to 2036, the Study identifies that 1,000sqm of additional floor space is required. However, some floor space efficiencies could be gained by co-locating the library with other community facilities using a multi-functional community hub model. Potential options on how Council might meet the needs of Epping residents, including through a community hub model, are further explored later in this chapter.

9.1.2 Open Space - sports fields and recreation parks

The study identified a total of 16 open space reserves and parks within the Epping suburb. They range from major sports fields, including the recently upgraded West Epping Park and Boronia Park, through to smaller passive outdoor recreation spaces such as Discovery Park and Kim Rutherford Reserve. This section summarises the findings of the Study with regards to sports fields and recreation parks, as well as the recreation facilities available within these settings (e.g. picnic areas, play spaces and exercise stations).

Strengths:

- The Epping suburb has adequate provision of outdoor recreation facilities for unstructured recreation (such as paths, play spaces, exercise equipment, and youth-oriented facilities) to meet the needs of the expected population at 2036.
- Epping Town Centre and suburbs benefit from a significant provision of natural areas, and a number of good-quality larger parks.
- Access to sports fields and parks by public transport is an overall strength, though this varies depending on proximity to the Town Centre.

Weaknesses:

- Many of the open space areas in Epping are not universally accessible, particularly at Dence Park and the Epping Aquatic and Leisure Centre, as access grades (the slope of the path) are not consistent with current building code requirements for universal accessibility.
- Open space provision is low for the current population (24,530 residents), with a particular lack of sports fields for organised activities. This shortage will only be exacerbated by growth in Epping. Specifically, additional open space will be required to provide for additional tennis and netball courts, as well as fields appropriately sized to allow for organised sport including rugby league, touch football and soccer.
- There are limited walkable connections between recreation facilities and spaces.
- While *generally* there are adequate recreation facilities to meet the needs of Epping residents to 2036, the Study identifies that by 2036 there will be some shortages in specific facilities like in playgrounds, youth skate and bike facilities, and dog parks. The study also identified that the diversity and quality of these facilities was generally lacking, particularly for older children and young adults.

Other observations:

Council officers also make the following observations regarding sports fields and recreation parks:

- By upgrading parks and open spaces, there is an opportunity to enhance the quality and function of the public spaces adjoining parks and sports fields. An example of this is the interface between future redevelopment in Epping Town Centre with Boronia Park, where redevelopment of surrounding sites offers the opportunity to improve the interface with the park.
- There is potential to increase the value and useability of smaller parks.

9.1.3 Aquatic and indoor recreational facilities

Aquatic and indoor recreational facilities are:

- The YMCA sports centre at West Epping Park (the only indoor recreation facility within the Epping suburb)
- Epping Aquatic and Recreation Centre provides a 50m outdoor pool with a smaller kids play pool at Dence Park.

The Study identified the following strengths and weaknesses with regard to aquatic and indoor recreational facilities in the Epping suburb:

Strengths:

- The YMCA Sports Centre has been recently upgraded and provides good quality facilities, including multi-use courts (with 4 badminton courts), separate gymnastics arena, multipurpose program rooms and a fitness centre. The Centre provides the flexible space model Council envisages for the area.
- The study indicates current flexible indoor court provision could be adequate to meet the needs of the expected population at 2036.

Weaknesses:

- The YMCA lacks car parking and connection with other West Epping sports facilities.
- Epping Aquatic and Recreation Centre is ageing and not close to the majority of expected population growth.
- There are limited walkable connections between recreation facilities and spaces.

9.1.4 Epping Town Centre Civic Focal Point

Epping Town Centre lacks a clear focal point for civic activity, with community facilities being dispersed across the centre and suburb. Epping Town Centre should have a focal point consistent with its strategic importance and size.

9.1.5 Social infrastructure needs analysis

The following is a summary of the needs identified in the analysis above:

- Library:
  - An additional minimum of 1,000sqm is required to meet current needs – i.e. a facility of approximately 1,500sqm.
  - To meet the needs of the future population at 2036, benchmarking indicates a library facility of about 2,000sqm. Efficiencies could be gained by co-locating the library with other community facilities in a multi-functional community hub (a best practice model).

- Community space:
  - There is only a small shortfall of community space across Epping anticipated for 2036. However, the configuration of the existing centres makes staffing and programming difficult. This limits the accessibility and usability of these facilities.
  - Current provision and programming of existing community facilities does not reflect best practice, and could be better provided through a larger flexible multi-purpose community space based on a community hub model.
  - The spread of community centre functions across a number of smaller locations is likely to confuse some residents.

  - Epping Leisure and Learning Centre is in relatively poor condition and hence appears to be significantly underutilised.

- Open Space:
  - There is a need to address the provision of open space and its quality and usability to respond to increasing population pressure.

9.1.6 Recommendations of the Social Infrastructure Study

The Study makes the following recommendations across **community facilities and open space and recreation**:

- Improve Council's centralised bookings system
- Identify opportunities for greater utilisation by the community of all of Council's assets, including a review of Council's leases and licenses.
- Seek to include non – Council spaces for hire in Epping in Council's centralised booking system
- Seek to develop formal partnerships with organisation and groups in Epping and the wider catchment to increase community access to existing facilities

The Study makes the following recommendations in relation to **community facilities**:

- In the short term seek to convert the Epping Leisure and Learning Centre into an expanded multipurpose space for Epping Library to address some of the current shortfall in library space.
- In the longer term, review Epping Creative Centre design and uses as part of a master planning process for the entire Dence Park area to increase recreation and leisure uses on the site.
- With a medium to longer term view work now to identify opportunities to deliver a new community hub in Epping of 3,500 square metres.
- Seek to facilitate delivery of affordable rental housing in Epping.
- Seek to promote and work with developers and other stakeholders to realise increased provision of quality long day care.
- Seek opportunities to increase provision of low cost leasable office space for not for profit community service providers.

The Study makes the following recommendations in relation to **open space and recreation**:

- Work with councils bordering City of Parramatta LGA to understand the capacity of sports fields and recreation facilities close by to Epping to cater for Epping residents.
- In the medium to longer term, upgrade existing larger parks to establish them as major recreation destinations.
- Upgrade:
  - existing smaller parks within Epping to establish them as high quality recreation and open spaces.
  - existing sports fields within Epping to increase the community value of existing facilities.
  - existing sports facilities that are located nearby Epping to support the needs of Epping residents.
- Assess the condition and capacity of the Epping Aquatic and Leisure Centre to address local aquatic needs longer term and options for development of

alternate or enhanced aquatic offerings including water play and indoor facilities.
- Maximise appropriate use of Epping's natural assets by creating quality recreational settings linked to natural areas.
- Pursue land acquisition to increase open space recreation parks and plazas.

9.2 Community feedback

9.2.1 Social infrastructure workshop

The community workshop on social infrastructure in Epping was held on 15 May 2017 and focused on open space and 'bricks and mortar' facilities. A total of 91 participants attended the workshop.

Participants were asked to consider the strengths and weakness of the local parks and indoor and outdoor recreation facilities and how to increase their accessibility and usage, as well as to provide direction on the future of the Epping pool. Feedback on other social infrastructure, including infrastructure not in Council ownership (e.g. childcare, affordable rental housing, youth facilities, over 55's facilities) was also covered.

Other feedback received at the workshop included:

- Local facilities are well-known and residents are mostly satisfied with the range of services available to them.
- Operation and maintenance is important (e.g. contactable administration, good lighting and proper signage).
- There was a view that creating mixed-use spaces which cater to many different types of people could enhance usage (e.g. sports fields with picnic areas, local parks with adult facilities or multipurpose indoor recreation).
- Epping Pool is a beloved community asset. Developing different types of activities on-site such as improving gym facilities or incorporating a café may make it more appealing to use, bringing in more money for its maintenance.
- Participants believe that future infrastructure planning needs to 'enable liveable town centres' as an overarching principle.

9.2.2 Other community consultation and feedback

In addition to social infrastructure workshop that was part of the Epping Planning Review, Council undertook extensive community engagement across the whole City of Parramatta area throughout 2016. Through these processes, the Epping community told Council that:

- Epping has a great sense of community, and residents value the village feel of the suburb, which is "at a distance" to busier and denser suburbs. Residents feel a sense of belonging and connection to their neighbours.
- Residents value the "family feel" of the Epping area, which they see reflected in the preservation of family-oriented homes, as well as community-oriented facilities that cater to group activities and children.
- Residents value local parks and open space.
- Residents value public transport connections, but want to see improvements to traffic, transport and parking, with congestion recognised as a growing problem.

- Residents want to see the impacts of growth effectively managed, and are concerned by the perception of "overdevelopment" in the area.

9.3 Council assessment of key issue – open space

A key issue emerging from the previous sections is **the viability of applying strict benchmarks to open space provision**. Community feedback and the technical assessment both highlighted concerns about the need for additional open space to service the growing population.

Having considered the outcome of the technical assessment and the community feedback, Council officers have analysed this issue further to develop guiding principles. The key question is: how can Council respond and what would be the impact of that response?

There are practical issues that need to be considered before Council determines the appropriate strategy. Hypothetically, a strict application of the benchmark would require 56 additional hectares of open space within the Epping suburb, raising the following issues:

- **Character impacts:** The Epping suburb is 680Ha in area the town. It would not be possible to insert 56Ha of additional open space into this established urban area without significantly impacting on the suburb's predominantly low-density residential character.
- **Displacement of the community:** acquisition of 56ha of land which is close to the Epping Town Centre would require acquisition of a significant number of private homes.
- **Land Costs:** land values in this area are such that acquisition of 56Ha of land is not a feasible financial option for Council.
- **Flow-on density changes:** If 56Ha of land was rezoned to open space, densities on these sites would be very low (effectively zero). In order to maintain dwelling target numbers, densities on sites *not* zoned for open space would need to increase significantly to compensate. This would dramatically change the character of Epping.

In summary, to simply apply the benchmark in this established area would be inappropriate and impractical. This means that Council must consider what is the next best alternative. The key information to take away from the benchmarking exercise is that more open space is required and that the open space opportunities for residents need to be addressed via a series of strategies rather than simply meeting the numerical benchmark. Consideration also needs to be given to services and facilities that meet the community's needs, but which are not owned by Council or are located in adjoining Local Government Areas.

9.4 Guiding principles

After considering the technical report and the public consultation, the principles and key themes identified by Council staff which guide the development of options and recommendations included in this Discussion Paper are:

- Council should investigate a series of options to ensure that all its open space needs are met for the growing Epping population.

- A move toward a multi-function community hub model will deliver a best practice response for the residents of Epping in relation to community facilities by:
  - Allowing Council to co-ordinate staffing and programming resources efficiently to the benefit of the local community;
  - Encouraging diverse users;
  - Having a sufficient size and scale to have flexible and multipurpose spaces that respond and adapt as the needs of the community change; and
  - Being prominently located to encourage use and promote the role these facilities play in serving identified social and community needs (ideally on a main street with ground floor street frontages).
- Investment in upgrading of facilities needs to be prioritised in locations that are accessible both in terms of public transport, and are capable of achieving universal access requirements.
- There needs to be a balance between the needs of diverse communities, including young people and the elderly and frail.
- Facilities also need to balance family and non-family needs, as well providing options for people of diverse cultural backgrounds and preferences (active, passive open space; range of facilities – Barbeque, playground, fishing and other scout things and the like).
- By upgrading parks and open spaces, there is an opportunity to enhance the quality and function of the public spaces adjoining parks and sports fields.
- A civic space integrated with other community facilities and services should be provided in Epping Town Centre to provide a focal point for civic activity.

Given the range of role and function of social infrastructure in the local community, there are a number of options that are available to Council to provide the facilities, spaces and services to meet the needs of Epping residents now and to 2036. This is presented in the next section.

9.5 Questions for feedback

This section seeks to reconcile the recommendations of the Study with community feedback. In moving towards a best practice model of social infrastructure delivery, there will inevitably be tensions between the technical findings of the Study, the views of community members who have strong interests in particular community facilities, and the recommendations of Council officers which aim to deliver the best outcome for the community.

The issues presented in this section arise from a synthesis of the Study findings and the community feedback received during the consultation process. Feedback from the community is sought on policy areas to:

- help resolve potential inconsistency or conflict between the study and consultation findings;
- help resolve potential inconsistency or conflict between different parts of the Epping community; or
- assist Council to prioritise different options available to improve community facility and open space provision in the area.

Feedback in these areas will assist Council to develop strategies that balance the technical findings and community sentiment.

9.5.1 Issues regarding improving open space provision in Epping to 2036

Issue 1 - Assessing where new land should be acquired for open space

The strategic acquisition of land to increase the size of existing open space will be considered but the recommendation is that Council look at opportunities to expand the size of existing parks. In short, strategic purchases to create new parks would be a secondary consideration. This strategy is considered the most feasible approach to improving the role open space will have for all Epping residents. For instance, concentrating on a single new park will see a significant contribution to those within the catchment of the new park, but little impact elsewhere.

Also, expanding existing parks is considered to be a process where open space improvements can be realised in a shorter time period for reasons discussed in the next section. It is easier to acquire one or two sites to expand a park than it is to acquire multiple properties to create a new park.

Guiding principle: Council should investigate a series of options to ensure that all its open space needs are met for the growing Epping population.

Consultation Question:

9a. Do you support an approach of expanding existing parks in and around Epping ahead of the creation of a new park in the area around Epping Town Centre?

Issue 2 – Acquisition of former bowling club site

As discussed in further detail in Appendix 3, there is a Planning Proposal for a land holding between Epping Road and Forest Park (referred to as the Austino Planning Proposal). The site the subject of that Planning Proposal contains the former Epping Bowling Club site (725 Blaxland Road) which is currently zoned RE1 Public Recreation zone and owned by Austino. Figure 29 shows the former bowling club site and its location within Austino's overall land-holding.

Figure 29 Land affected by the Austino Planning Proposal (from applicant's Urban Design Report)

Council is the acquisition authority and could acquire the land subject to funding being available to finance the acquisition. The owner of the site is seeking to amend the planning controls for their land and as part of the proposal they are intending to dedicate an equivalent amount of open space to Council.

In carrying out the original assessment of the Planning Proposal, Hornsby Shire Council did not have a funding strategy to acquire 725 Blaxland Road and had concluded that the purchase of the site for the purpose of expanding Forest Park is unlikely to represent value for money when compared with alternative open space options within the locality (Hornsby Shire Council, 13 April 2016, Item 8). Given that the site was not formally purchased by the former Hornsby Shire Council, the site is currently not available to the community despite RE1 Public Recreation zoning. The applicant is therefore seeking to provide public open space as part of their redevelopment of the site, albeit in a different spatial structure than would have been achieved if Council had purchased the site subject to additional residential density being supported.

The trade-off that the community is being asked to consider in response to this Discussion Paper is whether it is willing to continue considering this trade-off as part of the Planning Proposal process or whether it should purchase the Open Space zoned land separately from the process, recognising that this would reduce Council's capacity to invest in other community needs.

It should be noted when providing this feedback that it will assist Council in assessing the Planning Proposal but:

- this trade-off is not the only consideration in the assessment of the Planning Proposal. The other impacts of the additional density must also be considered;
- even if Council was to purchase the bowling club site the applicant would still be able to pursue an application to increase density of the remainder of the site;
- feedback has been received from some local residents indicating the Planning Proposal should not be supported;
- the Sydney West Central Planning Panel have considered the matter and determined that it should at least be considered by Council. The Panel has the power to alter Council's future decisions on this Planning Proposal is they consider it appropriate.

The purpose of this section of the Discussion Paper is to test the community position on this trade-off so Council can decide whether it will seek funding to acquire the existing open space zone land or continue to consider the applicant's proposal. Council's decision will impact significantly on how the Planning Proposal progresses. In this regard advantages and disadvantages of accepting additional density in return for open space without Council having to formally purchase it include:

Advantages

- This option has the least financial impact for Council and the community. At this point in time, there is no designated funding for the acquisition of this site. The Section 94 Contributions Plan for Epping does not collect any funds for acquisition of this site. The more general revenue funding that Council has to allocate to purchase this site, the less funding available for other infrastructure in Epping.

Disadvantages

- There will be impacts associated with the additional density the scale of which will depend on the scale of the additional density permitted proposal.

Guiding principle: Council should investigate a series of options to ensure that all its open space needs are met for the growing Epping population.

Consultation Question:

9b. Should Council purchase the Bowling Club site separate from the current Planning Proposal process or continue to consider the Planning Proposal option that it be provided to Council subject to additional density being permitted on the existing landowners site?

Issue 3 – Process for acquiring open space

Land in Epping is expensive and existing parks generally adjoin residential properties, which means any future expansion of existing parks or fields would require Council to acquire private residential properties. The potential acquisition of private residences would need to be undertaken very sensitively, considering the impact that this could have on the occupants/owners of the land. Despite this, Council will continue to investigate options for acquisition of land where it will improve existing open space. This may also involve the purchase of land outside of the immediate Epping area, but is accessible by residents from the Epping area.

Council will, as part of future phases of the planning process initiated by the preparation of this Discussion Paper, commence the feasibility analysis for identifying potential residential sites that could be acquired to expand existing parks. Consultation with land owners will precede any rezoning because in most instances they will comprise of private homes. It will be necessary to explain to the occupants/owners the impacts on their property value, their ability to sell their site and the ability to stay on the site.

Once the properties are zoned Council can legally acquire the properties via **compulsory acquisition** or via **negotiated agreement**. Traditionally Council has been reluctant to compulsorily acquire properties as this forces people out of their homes. Instead a process of negotiation at a time when the current owner is happy to consider moving is preferred. The disadvantage of this approach is that it can take many years for a piece of open space to be acquired, delaying the provision of additional open space. Using negotiated acquisition can take more time, but this process is more sensitive to impacts on the owners of those sites.

Feedback is required from the community on the importance of delivering open space acquisition in the short to medium term to determine which approach Council should take.

Guiding principle: Council should investigate a series of options to ensure that all its open space needs are met for the growing Epping population.

Consultation Question:

9c. Do you support Council pursing a process where acquisition of land for open space is done on the basis of negotiated acquisition rather than compulsory acquisition?

Issue 4 – Utilising existing land more effectively

There are a number of factors that determine the level of intensity of use a local park or sports field can accommodate to ensure it can be used by the community without degrading. Two key factors are the amount (or type) of landscaping on the site, and the level of maintenance required.

As an example, re-configuring landscaping in existing parks could enable more active uses (including both unstructured play and organised sporting activities) while also accommodating for the needs of residents who want to use parks to passively enjoy the outdoors.

Another option could be to provide a different surface treatment to playgrounds and sporting fields to accommodate a higher level of use, such as the use of synthetic sporting surfaces.

Guiding principle: Council should investigate a series of options to ensure that all its open space needs are met for the growing Epping population.

Consultation Question:

9d. Are you supportive of Council investing in improved landscaping and equipment in parks and sporting field, including investigating synthetic surfaces for sporting fields to cater for more intensive use?

Issue 5 – Establishing partnerships to make better use of existing facilities

Large institutional landowners, including government and non-government schools, provide opportunities for Council to facilitate partnerships with local community organisations (such as amateur sports clubs) to make better use of existing facilities for the local community. In the case of schools, many children within the Epping community use their school's open space areas during the week, but are unable to use the same fields on the weekend in organised sporting activities by non-school groups. The way in which schools are fenced off, and the way landscaping is used to prevent access is important to ensure the safety and supervision of students during school days, however there is an opportunity to consider the flexible use of schools' sporting fields.

Council considered a report on 13 June 2017 where it resolved to enter into a memorandum of understanding (MOU) with the Department of Education (DOE). The associated Investigation Program identifies seven action areas that together form the basis of Council's initial work with DOE:

- Increase community access to sports fields.
- Establish formal arrangements between DOE and Council to continue use of Carlingford High School sports fields.

- Increase community access to school halls and related facilities.
- Increase community access to library facilities.
- Proactive joint planning for the growth of Telopea and the shared use of school facilities and community assets.
- Proactive joint planning and preparation to support the opening of Wentworth Point Public School.
- Proactive joint planning of a primary school in the Carter Street Precinct.

Feedback is sought from the community on how this MOU should be pursued in the Epping area.

Guiding principle: Council should investigate a series of options to ensure that all its open space needs are met for the growing Epping population.

Consultation Question:

9e. Which schools should Council pursue in the Epping area to progress the MOU between Council and the Department of Education to improve the availability of sporting fields?

9.5.2 Location of potential future Civic Focal Point

In order to meet the needs of a larger population living in a higher density environment by 2036, the Study recommends the provision of a 3,500sqm multi-purpose facility based on the Community Facility Hub model (involving library and community facility floor space). This could include the co-location of an expanded library offering, as well community meeting rooms, study areas, community programming facilities and the like.

Investigating the delivery of such a facility is consistent with the guiding principles *"to effectively deliver community programming and services"*, *"investment in upgrading of facilities … prioritised in locations that are accessible both in terms of public transport and universal accessibility"* and *"to make our community facilities relevant and valued resources … they need to be clustered/co-located to encourage a diversity of users"*.

Ideally, the Community Facility Hub would be co-located with the Civic Space (i.e. plaza) that has been identified elsewhere in this Discussion Paper as required in the Epping Town Centre. This Community Facility Hub would be provided in integrated manner as a Civic Focal Point (comprising both the facilities hub and an urban plaza) for the centre. The options investigated below consider where a Civic Focal Point could be delivered.

Important Note:
Different terms are used in this section to describe and differentiate options for civic facilities as follows:

Community Facility Hub: A facility incorporating a library and community facility floor space.

Civic Space: A public urban plaza.

Civic Focal Point: A location combining both of the above elements.

Option 1 – Rawson Street Council car park site

The advantages and disadvantages of locating a Civic Focal Point on this site are discussed below together with some options for how this might be delivered on this site. The key reason for choosing this site is that it is already in Council's ownership.

Council currently owns the car park site along with an adjoining site at 51A and 51B Rawson Street (refer to Figure 24). The site currently plays a key role in providing car parking for this part of the Epping Town Centre. This option is put forward on the basis that the site will continue to play a role as a car park with parking transferred into a basement.

The strengths and weaknesses of this site as the location for a hub are detailed below.

Strengths:

- The site has a 55m primary street frontage to both Rawson Street and Boronia Park, which could allow Council to achieve one of the recommendations of the study which is to provide prominent visual exposure to a valued community asset (Boronia Park).
- The site is large enough to potentially provide for an integrated Civic Focal Point that meets both community facility requirements and a contiguous civic space with a good interface with Boronia Park thereby providing integration of 3 key civic assets.
- The site is more physically separated from sensitive land uses such as lower density residential development.
- There is an opportunity to enhance the quality and function of Boronia Park (including treatments of the edges), as well as the public domain along Rawson Street and a potential future town square.
- The proposed pedestrian network in the current DCP indicates an intent to create/improve upon pedestrian links between the station and residential zoned land to the west so the site would expect to have significant pedestrian traffic activating it and assisting with the visual exposure of the site.
- This site would be served by excellent public transport connectivity.
- Locating the Civic Focal Point here would strengthen the role of the town centre.

Weaknesses:

- The site is less accessible to residents/ workers located on the eastern side of the rail line.
- The development permitted under the planning controls for the site immediately to the north (containing the Coles supermarket) will mean that providing a Civic Space with a high level of solar access would be a challenge.

Option 2 – Epping Library site

The Epping Library site at 10 Pembroke Street also contains a Council carpark whilst Pembroke Reserve at 8 Pembroke Street adjoins the library site (refer to

Figure 23). Option 2 would see the park formalised into more of a civic space rather than its current role of a traditional park.

Chapter 10 of this Discussion Paper shows a future potential through link that is being considered for the street block that contains the current Epping library site. The comments on the strengths and weaknesses have had some regard to the impact of that proposal on the suitability of the site.

Strengths:
- The site is large enough to potentially provide for an integrated Civic Focal Point that meets the requirements for community facilities and for the conversion of the adjoining park into a more formalised Civic Space but the site is smaller than the Rawson Street Car park site.
- The site has good access for residents on the eastern side of the rail line.
- If the potential proposed new road network discussed in Chapter 10 can be delivered the road/pedestrian linkages are proposed to be improved which will improve pedestrian activity in this vicinity.

Weaknesses:
- The road network proposed for this street block will provide more road frontage but will split the site in two separating the civic space from the facilities building.
- The Library site is located mid street block and despite the creation of the new streets would have poorer visual prominence and exposure compared to the other option.
- In terms of its location, relative to existing and pedestrian pathways which are important for giving the hub prominence and activating any civic space the pedestrian desire lines that cross this site are weaker than the other option.
- Converting Pembroke Reserve into a more formalised Civic Space would result in loss of its existing local park functions diminishing the availability of local open space on the eastern side of the rail line.
- The site has poorer access for residents on the western side of the rail line.

Option 3 – Two Civic Focal Points with a range of services

This option would see the sites in Options 1 and 2 each turned into Civic Focal Points with a Community Facility Hub and Civic Space enabling Council to provide different community facilities on both sides of the rail line (for instance, a library facility on one side and a community centre on the other). It is worth noting that this option could have been realised if the Council amalgamation had not occurred in 2016. Given the severance issue with the town centre with the railway line, there is no reason why the Epping Town Centre cannot have more than one Civic Focal Point, with each activated with different community facilities.

Strengths:
- It retains a presence for community facilities on both sides of the rail line so residents have easy access to a civic space and some community facilities on their side of the rail station.
- It strengthens the role of each side of the town centre.

Weaknesses:

- This option is not consistent with the recommendations of the Consultant Study, which recommends consolidating community facilities into a single site (this consolidation provides the chance to share spaces and create efficiencies and ongoing operation costs, rather than having to staff and run programs over two separate sites).
- It does not create a single Civic Focal Point for the Epping Town Centre
- There is significant additional cost in creating two Civic Focal Points.
- There would be a loss of open space on the eastern side if Pembroke Reserve is converted into a more formalised civic space.

Council Officer Recommendation

Of the three options for the location of potential future Civic Focal Point/s, Council officers consider the Rawson Street Car Park site (presented as Option 1) to be the preferred option for a single Civic Focal Point, as the site is better able to accommodate a Community Facility Hub and Civic Space in way that can be integrated into the broader pedestrian network and town centre. This option does not result in the loss of any existing community facility given that the public car park can be located underground below the new Community Facilities Hub whereas the Epping Library Site and Pembroke park would result in the loss of local open space if Pembroke park was converted into a more formalised Civic Space.

Guiding principles:

- A move toward a multi-function community hub model will deliver a best practice response for the residents of Epping in relation to community facilities by:
  - Allowing Council to co-ordinate staffing and programming resources efficiently to the benefit of the local community;
  - Encouraging diverse users;
  - Having a sufficient size and scale to have flexible and multipurpose spaces that respond and adapt as the needs of the community change; and
  - Being prominently located to encourage use and promote the role these facilities play in serving identified social and community needs (ideally on a main street with ground floor street frontages).
- Investment in upgrading of facilities needs to be prioritised in locations that are accessible both in terms of public transport, and are capable of achieving universal access requirements.
- A civic space integrated with other community facilities and services should be provided in Epping Town Centre to provide a focal point for civic activity.

Consultation Questions:

9f. Where is your preferred location for a Civic Focal Point incorporating a Community Facilities Hub and some form of Civic Space?

9g. Why is this your preferred location?

9.5.3 Options for funding and delivering a potential future Civic Focal Point

Community feedback is required on the mechanisms that might be used to develop a Civic Focal Point regardless of the site. The Study suggests that one method to assist funding of a new central facility would be potentially to sell off some of the dispersed sites that currently accommodate these facilities to fund the new facility.

Another option is for Council to enter into partnerships with developers to realise the development potential of sites it currently owns to fund the provision of community facilities.

There is precedent in this regard. Prior to the Council boundary changes of May 2016, Hornsby Shire Council had commenced an expression of interest (EOI) process that sought partners interested in working with the Council to redevelop the library site for a mixed use development that would have seen residential units constructed above the library site to assist with the funding of the new facility. This process had not been completed when the boundary changes that unified the Epping Town Centre within the new City of Parramatta LGA occurred. The EOI has been placed on hold until this strategic planning review can be completed.

There are also similar mechanisms being proposed involving the Rawson Street car park site. As discussed in Appendix 3, two preliminary Planning Proposals have been lodged with Council which both put forward the proposition that the Rawson car park site might be included in a broader redevelopment with adjoining sites. Both of these development proposals incorporate some civic space and community facilities and are discussed in more detail in Appendix 3.

This Discussion Paper is not seeking feedback on the particular details of these preliminary proposals. The proposals if they proceed will require further negotiation and resolution with selected partners to confirm exactly what is being delivered with further public consultation required in some form before final decisions are made. The question that is being posed in this Discussion Paper is: should Council consider entering into partnerships with adjoining landowners to assist with funding community infrastructure in Epping Town Centre?

There are three options for Council, which are discussed below.

Option 1 – Selling land that becomes surplus to requirements if a single Civic Focal Point is built

As indicated above, all Council-owned sites located within the town centre have some development potential for which Council could realise value by selling the site for redevelopment. In Chapter 8 the role of Council's sites in providing for commercial floor space was discussed. Council could seek to sell any number of sites it currently owns to provide funding for delivery of the community infrastructure discussed in this section.

The purpose of selling sites would not be to reduce the level of services. Instead, the strategy would be to provide improved services in a more efficient way on a consolidated site.

Guiding principles:

- A move toward a multi-function community hub model will deliver a best practice response for the residents of Epping in relation to community facilities by:
  - Allowing Council to co-ordinate staffing and programming resources efficiently to the benefit of the local community;
  - Encouraging diverse users;
  - Having a sufficient size and scale to have flexible and multipurpose spaces that respond and adapt as the needs of the community change; and
  - Being prominently located to encourage use and promote the role these facilities play in serving identified social and community needs (ideally on a main street with ground floor street frontages).
- Investment in upgrading of facilities needs to be prioritised in locations that are accessible both in terms of public transport, and are capable of achieving universal access requirements.
- A civic space integrated with other community facilities and services should be provided in Epping Town Centre to provide a focal point for civic activity.

Consultation Question:

9h. Would you support existing community facilities sites being sold to assist with funding a new consolidated single community hub to provide a higher quality community facility somewhere else within the Epping Town Centre?

Option 2 – Maximise the development potential of sites to assist with funding a Civic Focal Point

One option for funding the provision of Community Infrastructure is for Council to realise the value of land holdings in a way that provides the community with a financial return that can be used to assist with funding the new Civic Focal Point. In relation to both the options being considered for a new Civic Focal Point there is a history of these sites being considered for redevelopment in ways that would allow for new facilities to be delivered as part of the process.

The Expression of Interest (EOI) process that Hornsby Shire Council undertook before the Local Government Boundary changes that saw Epping included in the City of Parramatta is an example. The intention of the EOI was to find a partner so that together Council and the development partner could develop the site with a building incorporating the library on lower levels and residential development on higher level. If it had gone ahead the residential development would have effectively funded the new library component.

Another option is discussed in Appendix 3 where two Preliminary Planning Proposals are detailed that both seek to include the Rawson Street Carpark in the redevelopments. Both of the Preliminary Planning Proposals envisage Council's Rawson Street Carpark site being included in redevelopment processes with the benefits to the community/Council being the car parking being retained in a basement plus the delivery of other community infrastructure.

The redevelopment of Council owned sites in partnership with other partners can deliver significant community benefits that will allow the delivery of community infrastructure in a more financially sustainable manner. The Discussion Paper seeks feedback on whether the community is comfortable with this approach.

Guiding principles:

- A move toward a multi-function community hub model will deliver a best practice response for the residents of Epping in relation to community facilities by:
    - Allowing Council to co-ordinate staffing and programming resources efficiently to the benefit of the local community;
    - Encouraging diverse users;
    - Having a sufficient size and scale to have flexible and multipurpose spaces that respond and adapt as the needs of the community change; and
    - Being prominently located to encourage use and promote the role these facilities play in serving identified social and community needs (ideally on a main street with ground floor street frontages).
- Investment in upgrading of facilities needs to be prioritised in locations that are accessible both in terms of public transport, and are capable of achieving universal access requirements.
- A civic space integrated with other community facilities and services should be provided in Epping Town Centre to provide a focal point for civic activity.

Consultation Question:

9i. Should Council seek to develop Council-owned sites to maximise the funding available to deliver a new Civic Focal Point?

Option 3 – Allowing additional density to secure a new Civic Focal Point

The two preliminary Planning Proposals, discussed in Appendix 3, for sites adjoining the Rawson Street Carpark Site both propose an increase in the overall density permitted on their site and both proposals seek to underground the carpark, and provide community facilities and a civic space.

Again the community is being asked to consider a trade-off between timely provision of community facilities against additional density being permitted in the town centre. This is similar to the trade-off discussed earlier in the Chapter related to the acquisition of the Bowling Club site as open space.

In this case, feedback is sought from the community on whether the community benefit that might be generated in terms of funding for a Community Focal Point should be given any weight in the process of determining whether additional density should be permitted in or around the centre.

Guiding principles:

- A move toward a multi-function community hub model will deliver a best practice response for the residents of Epping in relation to community facilities by:
    - Allowing Council to co-ordinate staffing and programming resources efficiently to the benefit of the local community;
    - Encouraging diverse users;

    - Having a sufficient size and scale to have flexible and multipurpose spaces that respond and adapt as the needs of the community change; and
    - Being prominently located to encourage use and promote the role these facilities play in serving identified social and community needs (ideally on a main street with ground floor street frontages).
- Investment in upgrading of facilities needs to be prioritised in locations that are accessible both in terms of public transport, and are capable of achieving universal access requirements.
- A civic space integrated with other community facilities and services should be provided in Epping Town Centre to provide a focal point for civic activity.

Consultation Question:

9j. Are you willing to accept further increases in density in the town centre if it would assist with funding a new Civic Focal Point?

9.5.4 Dence Park - Epping Aquatic Centre

Through the community consultation process, it was clear to Council that Epping Aquatic and Leisure Centre is a beloved community asset to sections of the Epping Community. However, despite this impassioned position, usage levels of this facility have been in decline over the longer term.

The technical report acknowledges that the facility is aging and has accessibility issues which means it does not meet modern day standards for this type of facility. At the time the pool was the responsibility of Hornsby Shire Council, reports to council considered the option of closing down the centre.

As part of the development of a community facilities strategy, Council will need to determine what role the Epping Aquatic centre might play within the new City of Parramatta entity. For instance, should the centre be redeveloped or modernised as an aquatic centre, or put to an alternate community use.

The strengths and weaknesses of the site are detailed below.

Strengths
- Council owns the land.
- Council will open the pool for October 2017 summer.

Weaknesses
- The Aquatic Centre is aging and needs significant upgrading
- It lacks visual prominence.
- It is in a bushfire-prone site.
- Is not heated and is underutilised.
- The topography of the site makes modernising the site a relatively expensive exercise.

Council is seeking feedback from the community on what it considers is the appropriate future community and social use for this site.

Guiding principles:
- Council should investigate a series of options to ensure that all its open space needs are met for the growing Epping population.

- Investment in upgrading of facilities needs to be prioritised in locations that are accessible both in terms of public transport, and are capable of achieving universal access requirements.

Consultation Question:

9k. What should be the future use of the Dence Park Aquatic Site?

10.0 PUBLIC DOMAIN ANALYSIS

The intense growth within the Epping Town Centre presents Council with the opportunity to review aspects of the centre's public domain, identify opportunities for improvements and present these to the community for discussion. This will also assist Council in advising Development Application and Planning Proposal applicants until new planning controls can be formulated. Council officers have identified that the areas requiring immediate attention are pedestrian connections and footpath widths.

10.1 Community feedback

While there has not been a community workshop held specifically on urban design issues, numerous urban design themes have been consistently raised throughout the consultation process to date. Some recent feedback received at the workshop pertaining to the way the centre will redevelop over time included:

- **Pedestrian connections:** The view emerged in all workshops that pedestrian connections should be:
  - created or improved either between or through blocks;
  - improved between different land uses and attractors (i.e. the centre and open space areas);
  - created at mid-block where block lengths were long; and
  - improved to form linkages from one side of the centre to the other.
- **A vibrant centre:** Participants are enthusiastic about the possible future of Epping. They want their town centre to reflect the vibrant, friendly, community which they are familiar with (from the commercial floor space workshop).
- **Enable liveability:** The community believe that future infrastructure planning needs to "enable liveable town centres" as an overarching principle (from the Social Infrastructure Workshop held on 15 May 2017).

The recommendations in this chapter seek comment on proposed amendments to the design controls to improve the public domain in Epping Town Centre.

10.2 Guiding Principles

After considering the outstanding public domain design matters and the broad public consultation feedback, the guiding principles identified by Council staff are:

- to provide a well-connected town centre with footpaths, laneways and arcades that maximise the walkability of the town centre, and
- to make sure that the design of footpaths, laneways and arcades provides for high quality urban environments that feel safe and attractive for pedestrians.

10.3 Through-block connections, streets, laneways and arcades, and shareways

In urban precincts, the greater the density the greater the requirement for high quality streets and **fine-grain** street blocks. This is because streets and laneways provide access and address to buildings, as well as choices in how pedestrians and cars move through a precinct.

> **Fine grain** means a network of small or detailed streetscapes which take into consideration street type hierarchies, physical links and movement between locations, and transport modes.

Streets and laneways also expand retail opportunities because they increase the range of rental possibilities.

Whilst streets, laneways and arcades are shown in current DCP and public domain controls, these are out of date and require review.

Below are objectives and design controls to inform new through-block links for the Epping Town Centre. Through-block links can be provided in the form of laneways, arcades or shareways. Shareways are spaces that are shared by vehicles and pedestrians, where vehicle speeds are low (around 10km per hour) and where pedestrians have right of way.

Proposed pedestrian links proposing laneways, arcades and shareways are illustrated in Figure 30. It is intended that these would be included in the future consolidated Development Control Plan for the town centre. The feedback sought from the community in this Discussion Paper is whether those proposed are appropriate and whether any additional connections should be considered.

Objectives

All Through-Block Connections

- Optimise choice and connectivity
- Create fine grain street blocks
- Provide addresses and frontages for buildings
- Provide an edge for public parks and spaces.

Pedestrian Laneways

- Provide ease of access and convenience between two locations.
- Pedestrian laneways are well designed.

Arcades

- Provide ease of access, convenience and protection from inclement weather between two nearby destinations.
- Pedestrian arcades are well designed.

Design controls

All Through-Block Connections

- Connections must increase the permeability of the overall street block in a logical way that reflects desire lines.
- Connections must have clear straight sight lines through the link.
- Connections must align with other streets, laneways and arcades where possible.
- Connections must provide links to public transport, streets and open spaces.
- Connections must create an edge for public open spaces.
- Connections must be generous, well-lit and fit for purpose.
- Connections must display signage at street entries indicating public accessibility and the street to which the through site link connects.

Laneways

- Pedestrian laneways must be a minimum width of 3m clear of all obstructions.
- Pedestrian laneways must be open to the air and to be publicly accessible at all times.
- Pedestrian laneways at ground level ideally would be dedicated to Council

Arcades

- Arcades must be a minimum width of 5m clear of all obstructions (including columns, stairs, escalators).
- Arcades must provide public access at all business trading times and be available to allow access 18 hours a day seven days a week even if some of the businesses are not operating
- Arcades must be at least 2 storeys high.
- Arcades where practical, have access to natural light for at least 50% of their length.
- Arcades must incorporate clear glazed entry doors comprising at least 50% of the entrance where the arcade is air conditioned.

Shareways

- Shareways be a minimum width of 6.5m clear of all obstructions.
- Shareways be open to the air and to be publicly accessible at all times.
- Shareways be built on the ground (without car parking underground).
- Shareways be dedicated to Council.
- Shareways meet RMS Standards

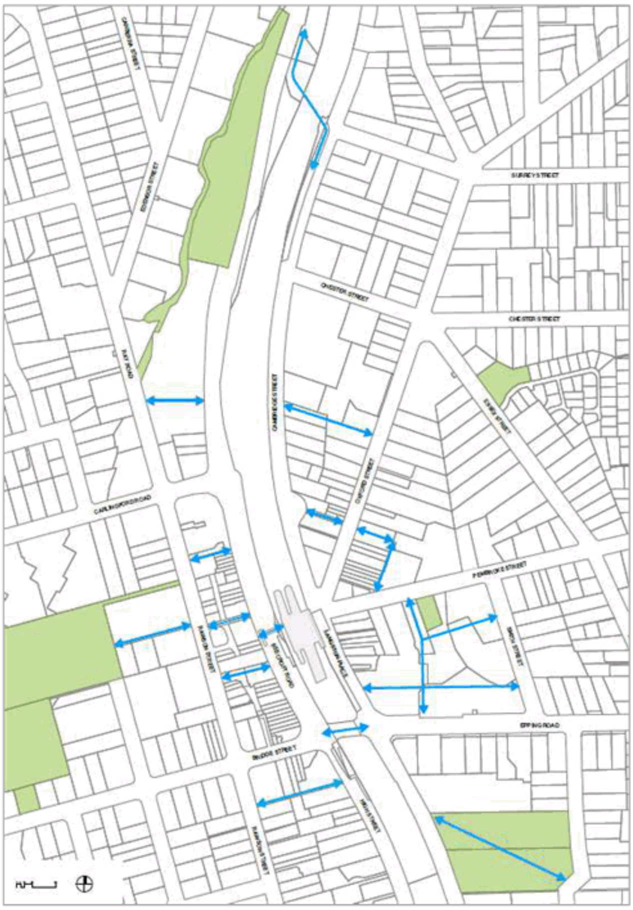

Figure 30 Existing and proposed through-block connections

Guiding principles:
After considering the outstanding public domain design matters and the broad public consultation feedback, the guiding principles identified by Council staff are:

- to provide a well-connected town centre with footpaths, laneways and arcades that maximise the walkability of the town centre, and
- to make sure that the design of footpaths, laneways and arcades provides for high quality urban environments that feel safe and attractive for pedestrians.

Consultation Question:

10a. Are there any other through site links outside of those that are already proposed in Figure 30 that should be considered by Council?

10.4 Wider footpaths

To provide more capacity for pedestrians, allow space for tree planting and street furniture that add to the amenity of the footpath changes could be made to the DCP controls that apply to sites in Epping. Figure 31 below illustrates the proposed setback for lower levels of the future buildings within the Epping Town Centre. This setback would apply to the lower levels of the building known as the podium.

Objectives:

- Increase the width of the existing footpath to provide generous footpaths and clear passage ways for pedestrians particularly to major destinations
- Enable light and sun to the street
- Reduce impacts from overshadowing
- Increase the width of the footpath so that it relates to the taller buildings
- Enable tree planting and awnings
- Enable outdoor dining and other street activities.

Design controls:

- Buildings be setback from street boundaries as indicated in Figure 29
- The footway interface, where the footway is being widened, must:
  - Provide a seamless level connection with the existing footpath
  - Be paved as per Council's Public Domain Guidelines
  - Be built on the ground (without car parking under)
  - Be dedicated to Council.

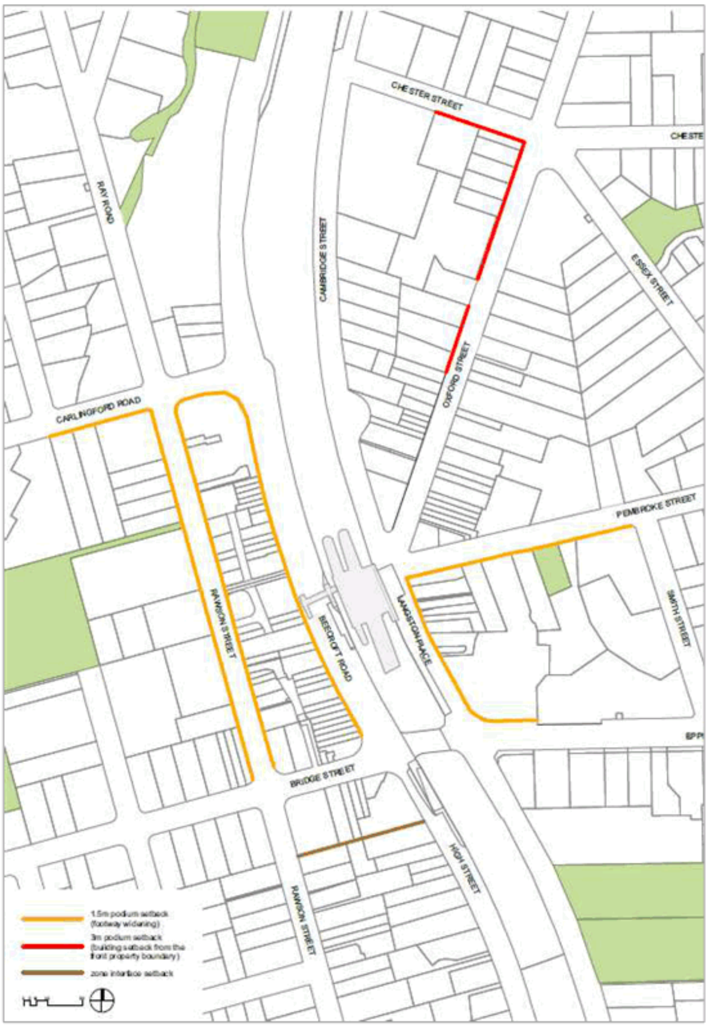

Figure 31 Proposed ground floor setbacks

Guiding principles:

After considering the outstanding public domain design matters and the broad public consultation feedback, the guiding principles identified by Council staff are:

- to provide a well-connected town centre with footpaths, laneways and arcades that maximise the walkability of the town centre, and
- to make sure that the design of footpaths, laneways and arcades provides for high quality urban environments that feel safe and attractive for pedestrians

Consultation Question:

10b. Do you think the new ground floor setbacks proposed in Figure 31 for Epping Town Centre are appropriate?

11.0 TRAFFIC AND LAND USE OPTIONS STUDY

11.1 Background

Council commissioned EMM Consulting to prepare a Traffic and Land Use Options Study (the Traffic Study) to provide an evidence-based approach to the assessment of existing and future traffic conditions with different development scenarios for the Epping Town Centre and surrounds, including potential infrastructure improvements.

A traffic study was carried out previously by Halcrow in 2011 on behalf of Hornsby Shire Council, the former Parramatta City Council and the Department of Planning as part of the proposed new planning controls implemented by the Department of Planning in 2014. This report recommended a series of works to address traffic issues. These works were detailed earlier in this report in Section 3.6.1.

It is noted that the Halcrow report was based on a long-term development scenario of 3,000 additional dwellings up to 2026. As noted previously, current Development Application activity indicates delivery of 4,735 residential units over the next few years. Work undertaken by Council suggests there is an ultimate capacity for 10,000 dwellings under the planning controls currently in place.

11.2 Development pressures

Appendix 3 describes three separate Planning Proposals or preliminary Planning Proposals which propose additional density in Epping Town Centre on top of the current controls. The preliminary Planning Proposals for the two sites with frontage to Rawson Street were accompanied by a Joint Traffic Study that has recommended additional traffic works (supplementary to works identified by Halcrow) that impact primarily on the western side of Epping. These works include:

- Provision of three eastbound lanes along Carlingford Road between Rawson Street/Ray Road and Beecroft Road;
- Provision of an additional (third) northbound through lane at the Carlingford Road/Beecroft Road intersection;
- Application of a double-cycle signal phasing at the Carlingford Road/Beecroft Road intersection;
- Provision of a new left-turn slip lane from Rawson Street into Carlingford Rd (part of the Oakstand site); and
- Victoria Street extension between Carlingford Road and Bridge Street.

A Planning Proposal for the site known as the Austino Site located on the eastern side of Epping (at the corner of Blaxland Road and Epping Road) is also described in Appendix 3. It should be noted that this proposal was previously considered by Hornsby Shire Council prior to the eastern part of Epping becoming part of the City of Parramatta. As part of the report considered by Hornsby Shire Council, the Roads and Maritime Service (RMS) raised concerns about the significant peak hour delays and queues in the locality, but ultimately raised no objection to the additional density on this site, subject to a number of amendments to the proposal (including the number of car parking spaces on site being capped to the number currently permitted on the site under the existing controls and additional traffic modelling being carried out prior to exhibition).

11.3 Draft technical findings

Council has engaged EMM Consulting to identify the traffic and transport network planning implications of different potential changes to the Epping Planning Controls.

There are scenarios detailed in previous sections of this Discussion paper which talk about the option to change planning controls, which would potentially increase the density of development in Epping by:

- Allowing bonus floor space as an incentive to have commercial floor space constructed
- Allowing bonus floor space to incentivise provision of large floor plate shops and retail
- Changing planning controls in existing HCA areas which may increase the density of development

A traffic model is being prepared and it will be used to assess the land use and road network improvement options that Council deems appropriate after considering this Discussion Paper.

In a transport modelling context, the objectives of the study are:

- To identify the through (regional) traffic volumes and their effect on the traffic network, and
- The quantification of the local area road network impacts from local and through traffic growth.

Once these are completed the land use scenarios Council may seek to pursue as a result of the exhibition of the Discussion Paper will be modelled using the following traffic models.

11.3.1 Traffic models

The **Sydney Traffic Model (STM)** belongs to the RMS and provides details of the morning and afternoon peak hour regional traffic movements travelling through the Epping area via RMS roads including Carlingford Road, Beecroft Road, Blaxland Road, and Epping Road.

The **Epping Town Centre Local Network Model (LNM)** on the other hand is currently being built for this project by the consultant team. The LNM (sometimes also referred to as the base model) provides a much finer grain level of analysis and includes details of local trips within the local traffic network (validated by traffic counts and surveys to validate journey times) as well as factoring regional routes identified in the STM so that Council has a detailed picture of the current traffic conditions in Epping. Once a base model is built and calibrated, this model can be manipulated to test various land use scenarios and the impact this will have on the traffic network. This model also has the capability to test and model the impacts of various traffic improvements/ infrastructure within Epping under a range of land use or development scenarios to determine the efficiency of potential infrastructure improvements. The development and calibration of the base model/LNM is often the most time consuming aspect of traffic modelling, however this approach is considered to be the most comprehensive approach for evaluating the impacts of various development scenarios within an existing network.

Due to the short timeframe between the engagement of EMM Consulting to carry out the Epping Traffic Study and the release of the EPR Discussion Paper, the base model is in the process of being finalised. Once the model is completed, the RMS will validate this base model before testing of the land use scenarios can occur.

In order to inform the Guiding Principles and Options detailed later in this report EMM Consulting have been asked to prepare an *Interim Traffic Modelling Report 2017* based on:

- the modelling carried out to date using the STM Model (note the Epping Traffic Model);
- local intersection based analysis (such as SIDRA analysis or similar tools); and
- their experience of the potential issues given the preliminary findings and data available to date.

11.3.2 Preliminary advice

The purpose of the preliminary analysis carried out as part of the Interim Traffic Modelling report is to provide an indicator of the issues and options available to allow discussion of these issues as part of the Discussion Paper process.

The preliminary advice received is that regardless of what land use density options or road work improvements are put in place there is little scope for significant improvements to the way the road network operates in the Epping Town Centre without new and additional policies to reduce car usage and shift more trips that currently come through the centre by car onto public transport modes.

The consideration of options for managing local traffic considered to date concludes that:

- Preliminary findings suggest the widening of the rail bridge will not be a "game changer" given the time it will take motorists to cross the bridge – the expansion of the bridge will be an improvement, but will not be a *significant* improvement in providing relief to congestion, and the benefit will only be felt in one direction (westbound). However, the addition of an additional lane could open up more options for the operation of the bridge to manage morning and evening peak traffic through changes to tidal flow conditions. This type of tidal flow arrangement would potentially enable a single lane of additional traffic capacity at the bridge to provide additional peak hour capacity for both the morning peak hour eastbound and the afternoon peak hour westbound traffic flows.
- Putting in place a ring road requiring traffic to 'go around the block' (Bridge Street, Kent Street, Carlingford Road prior to continuing north along Beecroft Rd), will potentially increase travel times and distances, and that through trippers may seek to take a shorter path - i.e. "rat run" via Rawson Road.
- The proposed Victoria Street link to Carlingford Road will provide an additional north-south link between Carlingford Road and Bridge Street for local trips. However, the modelling carried out to date is not sensitive enough to model the impact of this connection and its impacts on local traffic. This will need to be modelled through the LNM as part of the final Traffic Study.

Even improvements already underway or proposed in the Halcrow Report will not result in significant long term sustained improvements to the way traffic flows through or within the Epping Town Centre. The reason for this lies primarily in the fact that two major arterial road routes converge at the Epping Bridge. The east west Carlingford Road/Epping Road and north south Beecroft Road/Blaxland Road routes converge at the Epping bridge. This is the reason that 89% of trips that cross the bridge are through traffic trips where the origin and destination of the trip is outside the Epping Town Centre.

These traffic routes and intersections are currently operating at over-saturated traffic levels for both the morning and afternoon peak hour. It is considered that the increased intersection traffic delays are already displacing some of the previous regional through traffic movements away from the Epping Town centre to other parallel traffic routes such as the M2 Motorway for east-west traffic and Midson Road for north-south traffic. While there may be some improvements that could be made to improve capacity to Epping Bridge and the adjacent group of intersections, it is likely that this improved capacity will be taken up by the currently displaced through traffic.

The through trips are a significant barrier to improving the traffic flow around the Epping Town centre for the following reasons:

- Any improvement to the intersection will be primarily to the benefit of the through traffic rather than local traffic.
- If intersection management is changed to make access from local streets onto the arterial roads easier, it will cause significant delays and even further queuing on the arterial road network.
- There are no other feasible points where these routes can cross the Rail line in the vicinity of Epping to alleviate the pressure that through traffic places on the Epping Town Centre
- If a technical solution was found to improve the flow of traffic through Epping, then it is likely that more people would make a choice to avoid M2 tolls and go through Epping as the congestion at Epping is one of the factors that makes the choice to take the M2 more appealing (see above).

11.4 Community feedback

Unlike the Heritage Study, Social Infrastructure Needs Study and Commercial Floor Space Needs Study community consultation workshops carried out previously, there has been no pre-exhibition consultation workshop carried out specifically for Traffic. The timing of those community workshops meant that the results of the interim work relating to Traffic were still too preliminary to be of value to the community at that early stage. Accordingly, a traffic workshop has since been organised for the 12 July 2017 to discuss the findings of the work carried out to date and to allow the community to ask questions in order to inform their submission.

Notwithstanding the above, traffic congestion and access issues have been a consistent theme raised as part of the other pre exhibition workshops including written correspondence received throughout the preparation of this Discussion Paper (refer to Appendices 4 and 5 for further discussion). Common concerns are:

- The level of density proposed in Epping will only exacerbate already significant levels of congestion and that the densities proposed should never have been permitted;

- It is difficult to access service and facilities for those outside the walking catchment of Epping because of traffic congestion and lack of parking;
- The community feel that the failure to upgrade the Epping Bridge (which was a recommendation of the Halcrow report and a proposed work to support the UAP density) is unacceptable because the development is occurring but the infrastructure improvements are not being delivered;
- A number of stakeholders suggested that Council should either provide or lobby the State Government to provide commuter parking near the Epping Station. The argument put forward by proponents is that this would clear surrounding streets of commuter parking and improve access to local shops for local people.
- One of the issues raised during the consultation was a proposal for a crossing guard to regulate the pedestrian flow on the pedestrian crossing in Rawson Street to potentially improve traffic flow.

11.5 Epping's role in managing Sydney's transport issues

Given the high level of public transport access available in the Epping Town Centre it will have to make a significant contribution to help manage Sydney's Transport issues. The key recommendation to come out of the preliminary transport analysis to date is that traffic congestion can be managed but it is likely to continue to increase in Epping unless broader policies are put in place to encourage public transport usage instead of private vehicle trips.

Given the access to public transport in Epping its most important transport role is to make sure that as many people as possible are encouraged to take public transport rather than use their car. This is the principle that underpinned the additional density being proposed around Epping as part of the UAP and is one of the reasons why additional density remains a feasible option in this discussion paper despite the traffic congestion issues.

The RMS and Department of Transport are key partners in setting the policy frameworks that seek to manage the balance between increasing density around any train station whilst maintaining the amenity of the area for existing and future residents who live around that train station. This balance needs to recognise that if density is not focused on public transport nodes like Epping that general traffic congestion across Sydney becomes even more difficult to manage.

In order to continue to manage congestion existing and future public transport nodes must be used as efficiently as possible and so places like Epping have to evolve into places where the first choice made by residents is public transport or active transport options (walking or cycling) ahead of using the private motor vehicle.

Previous chapters of this discussion paper have noted the desire for Epping to become a more vibrant place where locals can access all the services and facilities they need. Proposals in the commercial floor space chapter to improve access to services and facilities measures in the Urban Design chapter to make Epping easier to walk around are all part of the evolution of Epping into a transit oriented centre. The consultant who provided advice on the future retail and office floor space needs of the centre felt the need to make a recommendation on parking recognising that transport related policy issues would impact on the success of Epping as a town centre.

Part of that evolution is looking at other transport policy options that take into consideration the findings of the traffic model being prepared to best manage local congestion but to more strongly driven by policies that:

- Discourage car ownership and usage
- Promote public transport and

The guiding principles discussed in the next chapter seek to put forward options that enable Epping to evolve in this way.

11.6 Interim guiding principles

The interim guiding principles for traffic considerations at Epping are:

- Advocate for road network improvements acknowledging that these measures are not the sustainable answer to reducing traffic congestion but are an important tool to mitigate traffic congestion.
- Do not support any additional uplift within the Epping Town Centre above and beyond current UAP densities until Council has the opportunity complete the Epping Traffic Model so any measures that help to best mitigate congestion can be best understood.
- Review car parking policies to ensure that they are calibrated to:
  - Minimise local car ownership
  - Decrease motor vehicle use (or alternatively promote active and public transport options) through and within Epping

11.7 Questions for feedback

11.7.1 Proposals for additional uplift

Given the above interim findings, Council recommend adoption of the principle that Council does not support any additional density (via Planning Proposals) within the Epping Town Centre above and beyond that which the current planning controls permit until the impact of such densities can be modelled through the completion of the Epping Traffic Study and until car parking and other policies are resolved to ensure the impact of the density is clearly and transparently understood.

Given that the Austino Planning Proposal discussed in detail in Appendix 3 has been subject of consideration by the Sydney West Central Planning Panel Council would also have to request that the State Government defer any progress on this Planning Proposal until the Epping Traffic Study is complete.

Guiding principles:
Do not support any additional uplift within the Epping Town Centre above and beyond current UAP densities until Council has the opportunity complete the Epping Traffic Model so any measures that help to best manage congestion can be best understood

Consultation Question:

11a. Should Council delay the processing of current and future Planning Proposals within the Epping Town Centre and surrounds until the Traffic Study is completed?

11.7.2 Car parking rates review

Car parking rates across on both sides of the Epping Town Centre are currently inconsistent. The Hornsby DCP contains minimum car parking rates while the Parramatta City DCP has maximum rates. These rates should be made consistent and a maximum rate should be applied so that development provides less car parking to discourage local car ownership and use.

As well as ensuring the parking rates are consistent it is also proposed that they be reviewed (and potentially further reduced) to further encourage residents to use public transport and other active transport modes.

Guiding principles:
Review car parking policies to ensure that they are calibrated to:

- Minimise local car ownership
- Decrease motor vehicle use (or alternatively promote active and public transport options) through and within Epping

Consultation Question:

11b. Should Council consider further reducing car parking rates as a means of reducing traffic within the Epping Town Centre and encourage public transport usage?

11.7.3 Commuter parking

A number of stakeholders suggested that Council should either provide or lobby the State Government to provide commuter parking near the Epping Station. The argument put forward by proponents is that this would clear surrounding streets of commuter parking and improve access to local shops for local people.

Commuter parking at train stations is a complex issue that depends very much on local context. It is acknowledged that allowing people to drive to stations to use public transport is decreasing the length of vehicle trips and increasing the length of public transport trips which is to be encouraged. However, the provision of commuter car parks can have other unintended impacts unless it is implemented sensitively and in appropriate locations. Council Officers and the consultants undertaking the traffic modelling exercise do not consider that Epping is an appropriate location for a commuter parking station for the following reasons:

- It will attract additional trips into the Epping Town Centre for the sole purpose of utilising the car park which will have a further detrimental impact on local traffic conditions and increase traffic congestion.
- It will encourage local employees to drive to the centre rather than arrive via public transport due to the increase access to day long parking options.
- Experience in other centres suggests that the availability of day long parking encourages more commuters to make the choice to drive to the station because of the increased likelihood they can find a park within reasonable walking distance to the station. So parking availability on local streets is not improved.
- An integrated transport system would see people take the bus from close to their home to the station to continue their public transport journey. This is most efficient and effective if regular bus services are feasible. The more commuter parking is provided the greater the negative impact on the

feasibility of running regular bus services especially given the number of buses that provide access to Epping.

Council Officers consider that commuter parking stations do play an important role in promoting public transport but do not consider that Epping is an appropriate location for a commuter parking station.

Guiding principles:
Review car parking policies to ensure that they are calibrated to:

- Minimise local car ownership
- Decrease motor vehicle use (or alternatively promote active and public transport options) through and within Epping

Consultation Question:

11c. Is there a suitable site for which Council should lobby the State Government to have a commuter parking station provided near Epping Station?

11.7.4 Policies to manage local parking and access to private motor vehicles

Option 1 – Resident or controlled parking schemes

A commonly expressed concern when any proposal is put forward to decrease parking rates on site is that residents will still own a car they will just park in local streets. Should Council consider introducing maximum rates or reducing car parking rates below the "maximum rates" identified in the PDCP2011 in order to influence mode shift, it is considered that additional measures could also be investigated to discourage residents purchasing into new high density development do not end up parking in local residential streets.

A rollout of restricted/time limited parking zones within residential streets adjacent higher density development could be investigated along with a resident parking scheme to enable existing residents within lower density residential zones up to a 3 storey apartment building to have the opportunity to apply for a permit to enable residents and their visitors to continue to have on-street parking albeit in limited and controlled manner. Such an initiative would also discourage commuters from parking within local streets close to Epping Station and depending on the nature of the restricted parking roll out, may encourage commuters to catch a bus to the Epping Station.

Notwithstanding the above, there are also a number of limitations and resourcing issues associated with any rollout of a resident car parking scheme. These issues include:

- Impacts on existing commuters and workers who currently park in local streets and walk into the centre who could be displaced.
- Setting a precedent that may then apply in future to other railway stations on the Northern and North Shore railway lines, further reducing commuter parking.
- Permit parking schemes can be difficult to manage in the transition areas on the edge of resident permit parking zones, as it transfers parking impacts to

areas immediately outside the permit parking precinct, including areas that would otherwise be unaffected by on-street parking issues.
- Affecting visitors to residents within the restricted areas.
- This scheme would require the consent of the RMS who monitor and can override any proposals that may impact on the availability of commuter parking.
- Any such scheme would be resource-intensive to implement and administer for both Council (who have to administer and enforce the system) and residents as they need to go through the process of obtaining and retaining permit. Accordingly, any such scheme would need to be appropriately resourced to ensure effective rollout and enforcement, particularly if it was seen as a precedent that saw it rolled out in other areas. Enforcement in particular can be problematic as the residential component means enforcement will be required at night.
- The perception of equity (or rather inequity) where Council would need to make a decision on who is and who is not entitled to a parking permit including the number of permits to be allocated. For example, residents on the fringes of the high density areas who have parking on-site, depending on the criteria, may not be deemed eligible for a permit and they may perceive this to be fair unfair as they are an original resident. The process for determining how the system operates can be very controversial.

Guiding principles:

Review car parking policies to ensure that they are calibrated to:
- Minimise local car ownership
- Decrease motor vehicle use (or alternatively promote active and public transport options) through and within Epping

Consultation Question:

11d. Would you support the introduction of a Resident Parking Scheme where owners of new units would not be permitted to park on local streets as a way to discourage car ownership and manage parking on local streets?

Option 2 – Car sharing schemes

Car sharing enables more sustainable travel habits by making more efficient use of a parking space either on street or within a private development. A single car share vehicle can replace up to 12 private vehicles that would otherwise compete for local parking (source: *www.cityofsydney.nsw.gov.au/live/residents/car-sharing*). Car share schemes provide flexibility to residents or businesses who either do not own a car, cannot justify car ownership given close proximity to public transport or lack a parking space. Resident and businesses can book a car online when they need one and pick it up from a car share space.

Car share users are charged by time and distance, at a rate set by each operator (e.g. GoGET, Hertz24/7). Costs associated with fuel, vehicle maintenance and insurance are usually included in the operator's hire fees. Car share spaces can be located on street with the agreement of Council or within development for larger scale developments.

At the 13 June Council Meeting, Council considered a report on the Minutes of the Parramatta Traffic Committee held on the 25 May 2017. Council resolved the following in relation to the recommendation to provide car share spaces on Council streets in Epping:

> *"2. That, in regards to six (6) car share spaces in Epping, Council notes that car share may be an important element of creating a less private car dependant town centre, and that car share arrangements be considered as part of the current traffic and land use study for Epping. No further action be taken on car share spaces in Epping until this study is complete."*

In accordance with the above resolution, car share arrangements will be considered as part of the Epping Traffic Study and will also consider feedback received from the community during this process on this issue.

Guiding principles:
Review car parking policies to ensure that they are calibrated to:

- Minimise local car ownership
- Decrease motor vehicle use (or alternatively promote active and public transport options) through and within Epping

Consultation Question:

11e. Do you support car sharing schemes as measures to decrease vehicle ownership and the potential impacts of decreasing parking rates for sites within walking distance of Epping Station?

11.7.5 Policies to manage local traffic congestion

An issue raised during a previous consultation event at Epping indicated that there is concern over the amount of traffic backing up on Rawson Street near the pedestrian crossing in front of Council's car park. During peak time the traffic backs up with a constant stream of people on the crossing, and associated safety issues are a concern.

In order to address the above, Council could implement a "Stop/Go" traffic controller on the crossing during peak times to control pedestrians (similar to a School zone crossing). A minimum shift is 4 hours and 2 people would be required. It is estimated that this would cost up to $100,000 per year inclusive of all on costs.

Guiding principles: Advocate for road network improvements acknowledging that these measure are not the sustainable answer to reducing traffic congestion but an important tool to best manage traffic congestion.

Consultation Question:

11f. Do you think Council should employ crossing attendants during peak conflict periods at the Rawson Street pedestrian crossing to manage the flow of pedestrians and vehicles to best manage congestion in Rawson Street?

12.0 HOW TO MAKE A SUBMISSION AND NEXT STEPS

12.1 Future Epping

The Discussion Paper and background reports that were prepared to inform this Discussion Paper all make suggestions about how Epping should evolve into a centre that provides the highest possible quality of life for existing and future residents of Epping.

The "Future Epping" envisaged in this Discussion Paper is an Epping that:

- operates as a sub-regional centre that provides for local jobs in businesses that meet all day to day needs of the Epping community with a high quality public domain incorporating safe and interesting streets and pedestrian connections;
- balances recognition of Epping's heritage and the impact of new development on the owners/occupants of developments within the Heritage conservation areas;
- provides for improved quality community facilities and open space and recreation opportunities for the local community than those currently available; and
- seeks to maximise the role Epping will play in managing Sydney's congestion problems by focusing on maximising public transport and active transport options whilst best managing local traffic congestion.

The Discussion Paper sets out how the evolution could occur but there are policy decisions to be made and potential trade-offs between further growth and provision of community facilities that will impact on how the evolution to a Future Epping will proceed. To help inform these decisions this Discussion Paper asks a series of questions around different policy themes and Council is seeking feedback on these Questions from the local community and other stakeholders.

12.2 How can I make a submission?

SUBMISSIONS CAN BE POSTED TO:
Epping Planning Review (F2017/000210)
City of Parramatta Council
PO Box 32
PARRAMATTA NSW 2150

SUBMISSIONS CAN BE EMAILED TO:
placeservices@cityofparramatta.nsw.gov.au

YOU CAN ALSO CALL US:
Lily Wang, Place Manager – 9806 5347
Jacky Wilkes, Senior Project Officer – 9806 5496

If you have accessibility concerns, please contact the National Relay Service on http://relayservice.gov.au/ and provide them with the City of Parramatta number you want to call.

In preparing your submission, please quote the number of any questions from this Discussion Paper to which you respond (e.g. 9a).

WHAT HAPPENS TO MY SUBMISSION?
All submissions will be carefully considered by senior staff and reported to Council in August 2017, prior to commencing Stage 2. Letters of acknowledgment will be provided for written submissions.

12.3 What are the next steps?

Following exhibition of the Discussion Paper, the expected next steps for the Epping Planning Review are as follows:

1. **14 August Council Meeting:** Council to consider the responses received as part of the Discussion Paper process to allow the Administrator to adopt some guiding principles and directions that will guide development of Stage 2 of the Epping Planning Review.

2. **Late 2017 - early 2018:** A Draft Planning Proposal accompanied by a Draft Development Control Plan and Developer Contributions Framework which will incorporate changes to the existing Planning Controls consistent with the guiding principles will be prepared for consideration by Council. If these are endorsed by Council, the following process will be pursued:

    a. The Draft Planning Proposal will be forwarded to the Department of Planning who need to endorse the potential new changes;
    b. Once endorsement from the Department of Planning is received the Draft Planning Proposal, Development Control Plan and Developer Contribution Framework will be placed on public exhibition to allow the Epping community to provide further comment on the detail of the proposed changes to the planning controls; and
    c. The results of this further consultation will be reported to Council and if the new controls are endorsed by Council the new planning controls would come into force once the Draft Planning Proposal changes are legally finalised and a notice indicating they have been finalised is published in the Government Gazette.

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Appendix 1 – Strategic context

This appendix discusses in more detail the role of the Epping Town Centre within the Sydney metropolitan context across the various metro-wide and sub-regional level plans over recent years.

Draft West Central District Plan (2016)

The Greater Sydney Commission's *Draft West Central District Plan* (Draft District Plan) is the draft subregional strategic planning document for the West Central District to 2036. The Draft District Plan makes numerous references to the Epping Town Centre:

- *Examples of significant concurrent investment in growth and renewal opportunities include…the renewal and revitalisation of Epping Town Centre* (pg.31)
- *In the West Central District, Epping and Merrylands are examples of local centres that, with the right planning and investment, could read their potential as emerging commercial and retail nodes* (pg.48).
- The Draft District Plan recognises that the Epping Town Centre Priority Precinct is forecast to deliver up to 3,750 dwellings in the next 5 years after its rezoning in March 2014 (pg.93), although this figure has since been revised to 5,500 dwellings. (As discussed elsewhere in this Discussion Paper 4,735 of these units are anticipated to be delivered in the next 5 to 7 years.)
- City of Parramatta will *progress the delivery of Epping Town Centre urban renewal with the Greater Sydney Commission and Department of Planning and Environment* (pg.99).

The Draft District Plan identifies two distinct centre hierarchies: Local Centres and Strategic Centres (as detailed in the Department's *A Plan for Growing Sydney).* Epping is identified as a Local Centre as per the comments above; however, the Local Centre category is somewhat ambiguous with 30 to 40 local centres identified within the West Central District. Aside from the points above, there is very little about what the Epping Town Centre might become in 2036 in this document.

Towards our Greater Sydney 2056 (2016)

This short 16-page document prepared by the Greater Sydney Commission in November 2016 constitutes a draft amendment which updates the 2014 *A Plan for Growing Sydney* released by the Department in 2014 (and discussed below).

One of priorities expressed within this document is the concept of a 30-minute city, which aims to increase the range of jobs, services and other opportunities for people to access within 30 minutes from their place of residence. The 30-minute city concept and Epping's opportunity to fulfil this role is detailed in the Commercial Floorspace Study which supports this Discussion Paper and is discussed further in Chapter 8.

A Plan for Growing Sydney (2014)

The Department's *A Plan for Growing Sydney* is the principle vision for the Greater Sydney to the year 2031 with four principle goals to deliver new housing and employment across Sydney.

A Plan for Growing Sydney identifies the Epping Town Centre as one of ten Priority Precincts – a process which was initiated by Hornsby Shire Council and finalised in March 2014 when new planning controls came into effect. The Epping Town Centre is also identified as part of the North West Rail Link corridor (now referred to as Sydney Metro North West), which focuses on increased housing, economic activity, social infrastructure and accessibility to Sydney's Global Economic Corridor.

West Central Subregion Draft Subregional Strategy (2007)

Prepared in December 2007, the West Central Subregion Draft Subregional Strategy (WCDSS) establishes a clear centres hierarchy, and identifies Epping as one of eight Town Centres within the West Central Subregion. Town centres are defined in the WCDSS as having "one or two supermarkets, community facilities, medical centres, schools, etc. containing between 4,500 – 9,500 dwellings" (pg.61).

The WCDSS sees the eight Town Centres as important subregional anchors of retail, services and community facilities which service catchments of two or three surrounding suburbs (pg.60). This strategy presented a clear vision for the centre and its role within the West Central Subregion. However, since the release of the WCDSS in 2007, the Department has not released a centres hierarchy at the local centre level. Instead, it has focused on the higher order centres (Strategic Centres, GPOP, etc.).

Appendix 2 - Explanation of changes to planning controls that came into effect in March 2014

Changes to the planning controls that came into effect in March 2014 as part of the Department's Priority Precinct process are detailed below.

For the former **Hornsby Shire Council (eastern) portion** of the town centre and surrounds:

- Land zoned B2 Local Centre was slightly expanded and accompanied by substantial increases in building heights from 12 and 16 metres (3 to 4 storeys) to 48 and 72 metres (12 and 22 storeys) and floor space ratio (FSR) controls (from 0.5:1, 1:1 and 2:1 to 4.5:1 and 6:1).
- Land zoned R2 Low Density Residential was substantially rezoned to R4 High Density Residential, with a small portion rezoned to R3 Medium Density. The new R4 zone was accompanied by increases in the height controls from 8.5 and 12 metres (2 and 3 storeys) to 12, 17.5 and 26.5 metres 12 (3, 5 and 8 storeys).
- Three new Heritage Conservation Areas were created (Rosebank Avenue, East Epping and Essex Street).

For the former **Parramatta City Council (western) portion** of the town centre and surrounds:

- The Council-owned car park site was rezoned from SP2 Infrastructure to B2 Local Centre, and its accompanying height controls increased from no height control to 48 metres (12 storeys) and FSR controls increased from no FSR to 4.5:1.
- There were no other changes to the area of land zoned B2 Local Centre, however, in existing B2 Local Centre zones applying to the town centre, the height controls increased from 11, 18, 21, 25, 28 and 40 metres (2 to 11 storeys) to 18, 48 and 72 metres (5 to 22 storeys) and FSR controls increased from 0.8, 2:1, 3:1. 3.5:1 and 6:1 to 1.7:1, 4.5:1 and 6:1.
- There were no changes to the surrounding R2 Low Density zones, including no height and density changes.
- There were no changes to the area, height or density controls of R4 High Density Residential zones, with the exception of the R4 zone applying to a small frontage of land on Bridge Street. Its height controls increased from 11, 18 and 25 metres (2, 5 and 7 storeys) to 18 and 48 metres (5 and 12 storeys) and its density controls increased from 0.8:1 and 2:1 to 1.7:1 and 4.5:1 to 4.5:1 and 6:1.
- No changes occurred to nearby Heritage Conservation Areas.

*

Appendix 3 – Development Application and Planning Proposal activity in Epping

Development Applications

Since March 2014 when the new planning controls came into effect, a number of Development Applications (DAs) have been lodged, either with Hornsby Shire Council (prior to the amalgamations on 12 May 2016) or with the City of Parramatta Council (since 12 May 2016). As at 19 June 2017, Development Application activity is summarised as follows:

- **Pre-lodgements:** two pre-lodgement DAs are proposed to deliver **621 units**.
- **Under assessment:** four DAs currently under assessment propose to deliver **917 units**.
- **Approved but not under construction:** 11 approved DAs which are not yet under construction will deliver **879 units.**
- **Under Construction:** 28 developments that are under construction will deliver **2,318 units.**

Assuming these DAs are all constructed and fully occupied, they are expected to deliver **4,735 units** (**10,890 people** assuming a household size of 2.3 persons).

The current Development Application activity indicates a very rapid delivery of Department's projected 5,500 dwellings over the next five years. If this rate of development activity were to continue, it is expected that more than the 5,500 dwellings would be delivered in this centre.

Exponential growth and change: This forecasted dwelling/population growth indicates that growth is actually occurring more rapidly than in forecast scenarios undertaken by the Department and by id.Forecast (which Council typically relies on). This unprecedented pace of redevelopment presents challenges for Council and the State government in delivering the required infrastructure to accompany that population growth.

Planning Proposals

Austino Planning Proposal

Austino Property Group has lodged a Planning Proposal for land at 2-18 Epping Road, 2-4 Forest Road and 725 Blaxland Road, Epping (refer to Figure 32). This Planning Proposal seeks to increase height and density controls. Planning controls for this site were only recently amended in March 2014 as part of the Department's Priority Precinct process, at which time they changed from predominantly R2 Low Density Residential zoning and an 8.5 metre height control, to predominantly R4 High Density Residential zoning and a 26.5 metres height control. The RE1 Public Open Space zone over the former bowling club site was not altered.

Figure 32 Land affected by the Austino Planning Proposal (from applicant's Urban Design Report)

The Planning Proposal seeks to:

- reconfigure the R4 and RE1 zones across the site to enable an open space connection from the Epping Town Centre and the site;
- increase the building height over the reconfigured R4 zone from 26.5 metres to 72 metres (22 storeys), 65 metres (20 storeys), 58 metres (18 storeys) and 17.5 metres (5 storeys) with a small portion of the site to retain the 26.5 metres (8 storeys) building height;
- increase the density on the site to realise a predominantly residential development comprising two towers on Blaxland Road, accommodating estimated 654* units (please refer to box at end of this section for further discussion of this estimate); and
- deliver a public urban plaza through the proposed development providing a pedestrian connection between Epping Road and Forest Park, with an area equivalent to the area of land currently zoned RE1 Public Recreation (6,665sqm), so there will be no net loss in open space.

In January 2016, PCC was invited to comment on the applicant's Planning Proposal and on 14 March 2016, resolved to adopt a submission on the matter which requested further analysis against 9 principles identified in Council's submission. On 13 April 2016, Hornsby Shire Council resolved not to support the proposal (just prior to the Council amalgamation on 12 May 2016).

In response to Hornsby Shire Council's resolution, the applicant lodged a Pre-Gateway Review with the Department in late April 2016. This placed the handling of the Planning Proposal in the hands of the Department. As part of the Pre-Gateway review process, the Joint Regional Planning Panel (JRPP) considered the proposal in September 2016 and recommended a range of issues be considered before the proposal is submitted for a Gateway Determination.

With regards to the Epping Planning Review process, the relevant issues related to this Planning Proposal are:

- The proposal being subject to Council's traffic review for the Epping Town Centre to inform the final floor space ratio;
- Clarification of public benefits and heights of buildings, and addressing overshadowing of Forest Park; and
- No retail being permitted.

In November 2016, the Department wrote to City of Parramatta seeking whether Council would elect to be the Relevant Planning Authority (RPA). This would enable City of Parramatta Council to have more influence over the process. Council accepted the RPA role on the condition that the Gateway Determination is issued after the exhibition of the Discussion Paper and supporting technical studies, so that this information and community views can be taken into account.

What additional dwelling growth would the Austino proposal bring to the Epping Town Centre?

The current controls would result in the site delivering **630 dwellings**.

Council officers estimate that the applicant's request for uplift would result in an additional **129 dwellings** (total **759 dwellings**).

***The reason for the difference between Council officers' estimate of 759 dwellings and the applicant's estimate of 654 dwellings is that Council officers' analysis is based on 85sqm/unit size.**

Preliminary Planning Proposals

This section discusses two preliminary Planning Proposals which have been lodged with Council with regards to Council's car park sites at 51A and/or 51B Rawson Street (see Figure 33). Both of these preliminary Planning Proposals are on hold until two things occur: first, that feedback from the Discussion Paper has been reported to Council, and second, that the Traffic Study prepared by EMM has been finalised.

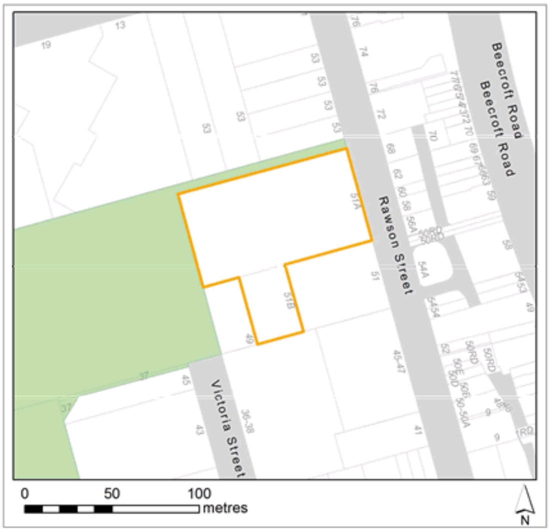

Figure 33 Council Car Park Sites – 51A and 51B Rawson Street, Epping

Both of the applicants' sites (discussed further below), as well as Council's car park site, received height and density increases as part of the new planning controls introduced in March 2014. The Council car park site was rezoned from SP2 zone to the B2 Local Centre zone when the new controls came into effect.

Important Note: While both preliminary schemes propose redevelopment of Council's car park site, Council has made no decision regarding redevelopment. Council's decision is that it will wait for the completion of Stage 1 of the Epping Planning Review before making any decision on the car park site. This has been communicated to both applicants.

Preliminary Proposal affecting 53 and 61 Rawson Street

A preliminary proposal by the Oakstand Group applies to land at 53 and 61 Rawson Street, Epping (refer to Figure 34).

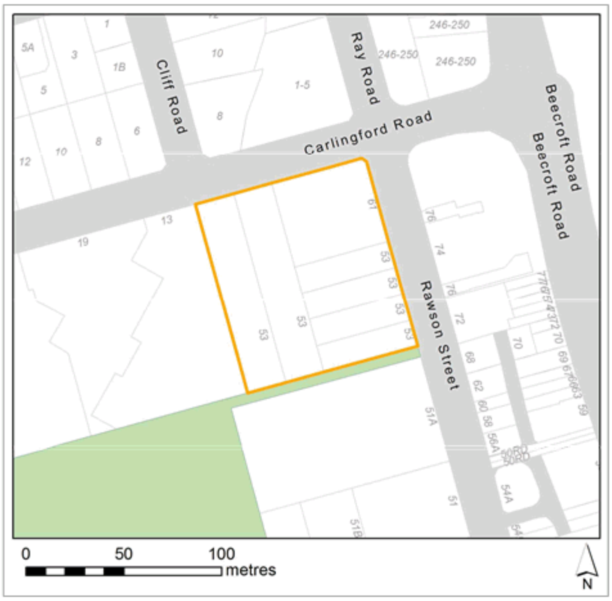

Figure 34 Oakstand site – 53 & 61 Rawson Street, Epping

The preliminary proposal seeks a partnership with Council to develop their site in conjunction with the Council car park. It seeks to amend planning controls to increase height and density achievable on these sites to enable:

- **674 units** over its site at 53 and 61 Rawson Street; and
- **520 units** over the Council car park site

It also proposes rezoning the entire site from B2 to B4 zoning, which would likely reduce the amount of commercial uses at the site. Whilst the proposal does currently propose 10,000sqm of retail and 4,923sqm of other non-residential uses, the risk that Council needs to consider is that introducing the proposed B4 zone could result in the site being redeveloped entirely for residential flat buildings with no commercial uses on the site, unless controls are put in place to mandate a minimum provision of commercial floor space.

The proposed public benefit elements included in this proposal include a range of traffic upgrades, creation of a new 3,430sqm town square, a new civic memorial, activation of Boronia Park, amenity improvements to Rawson Street, through-site links, and 200 underground Council car parking spaces.

What additional dwelling growth would the Oakstand proposal bring to the Epping Town Centre?

The current controls would result in the site delivering approximately **272 dwellings.** The applicant's proposal for uplift would result in an additional **922 dwellings** (total **1,194 dwellings**).

Preliminary Proposal affecting 59-77 Beecroft Road and Masonic Hall Site (49 Rawson Street)

A preliminary proposal by the Winton and Lyon Groups applies to land at 59-77 Beecroft Road, Epping (refer to Figure 35).

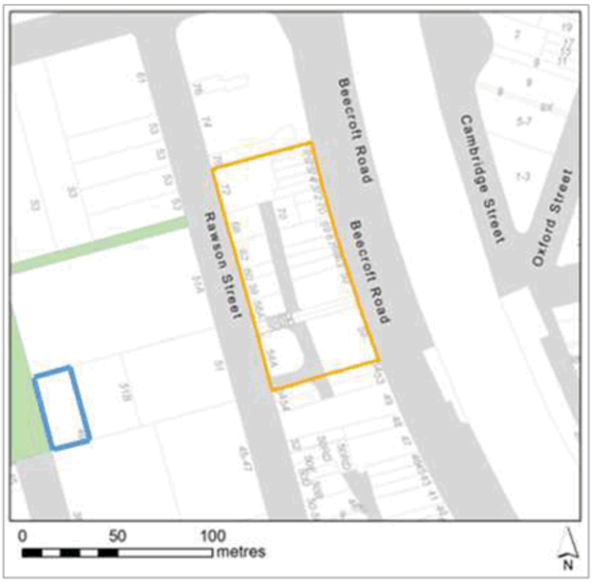

Figure 35 Winton/Lyon groups site – 59-77 Beecroft Road (orange outline) and Masonic Hall Site (blue outline), Epping

The preliminary proposal seeks a partnership with Council to develop their site in conjunction with the Council car park. It seeks to amend the planning controls to increase building height and density controls achievable at this site to enable:

- **700 units** over its site at 59-77 Beecroft Road; and
- **200 units** over the Council car park sites and the Masonic Hall site (49 Rawson Street).

This proposal also includes retail and commercial uses, as well as proposed public benefits including 2,000sqm of community facilities and infrastructure, a civic plaza area of over 3,700sqm which will create a "green spine" from east to west through the site, and improved pedestrian connectivity between Boronia Park and the Epping transport interchange.

What additional dwelling growth would the Winton/Lyon groups proposal bring to the Epping Town Centre?

The current controls would result in the site delivering approximately **317 dwellings**.
The applicant's proposal for uplift would result in an additional **584 dwellings** (total **901 dwellings**).

Other land owner interest

The owners of two additional large sites in the vicinity of Ray and Beecroft Roads have also expressed interest in redevelopment to Council. Whilst details are not yet known, this suggests that landowners continue to perceive development opportunities in the centre.

Appendix 4 - Summary of feedback from public forum

[This Appendix is provided in a separate attachment]

Appendix 5 – Summary of feedback pertaining to land use issues received after the public forum

[This Appendix is provided in a separate attachment]

LEADING

ITEM NUMBER	11.3
SUBJECT	Epping Planning Review - Completion of Stage 1 and Commencement of Stage 2
REFERENCE	F2017/00210 - D05111630
REPORT OF	Snr Project Officer

PURPOSE:

The purpose of this report is twofold: to detail the feedback received from submissions on the Epping Planning Review Discussion Paper exhibited from 21 June and 19 July 2017; and to recommend principles to guide Stage 2 of the Epping Planning Review.

RECOMMENDATION

(a) **That** Council receive and note the submissions made on the Epping Planning Review Discussion Paper.

(b) **That** the recommended principles, as identified within this report and contained within **Attachment 6** be endorsed for the purposes of guiding Stage 2 of the Epping Planning Review.

(c) **That** Council Officers:

1 Brief the incoming Councillors on the Epping Planning Review process to date including the endorsed principles to confirm the future planning direction for Epping as part of progressing Stage 2 of the project, and

2 That following the above briefing, a further report be submitted to Council recommending the commencement of Stage 2 of the Epping Planning Review which will involve preparing new planning controls including:

2.1 A planning proposal to amend both the *PLEP 2011* and *HLEP 2013*

2.2 A development control plan amendment to amend PDCP 2011 and HDCP 2013

2.3 Amendments to relevant Contributions Plans and public domain plans where relevant.

(d) **That** the recommendations contained within **Attachment 5** detailing the outcomes of the Stage 6 Heritage Review be endorsed.

(e) **That** Council write to the community thanking them for their feedback and advising them on the outcome of Stage 1 Review and next steps

(f) **Further, that** Council write to the Minister for Planning, Greater Sydney Commission, Department of Planning and Environment, Transport for NSW and the Roads and Maritime Services to provide an update on the project and outline of next steps.

BACKGROUND

1. In March 2014, new planning controls for the Epping Town Centre and surrounds came into effect as a result of the Department of Planning and Environment's (DPE) Priority Precinct process. This process resulted in increased building heights and density controls within Epping Town Centre and surrounds which at the time was split between the former Parramatta City Council (western side of the train line) and former Hornsby Shire Council (eastern side of the train line). This process also saw the creation of three new Heritage Conservation Areas (on the former Hornsby Council side) – Rosebank Avenue, East Epping and Essex Street HCA.
2. On 12 May 2016, Council amalgamations saw the Epping Town Centre and immediate surrounds fall wholly within a new jurisdiction - the City of Parramatta Council. Prior to this, the Epping Town Centre had been split between the former Parramatta City Council (PCC) to the west and the former Hornsby Shire Council to the north and east. This historic dual structure has resulted in a complex planning control framework comprising of:
    a. two local environmental plans (*Parramatta Local Environmental Plan 2011* and *Hornsby Local Environmental Plan 2013*);
    b. two development control plans (*Parramatta Development Control Plan 2011* and *Hornsby Development Control Plan 2013*);
    c. three development contributions plans with different contributions rates across each development type (a Section 94A plan applying to the former PCC area, and a Section 94 plan and Section 94A Plan applying to the former Hornsby Shire area); and
    d. one public domain plan for the former Hornsby Shire Council area and public domain guidelines for the former PCC side.
3. The amalgamation has not changed or unified the planning controls, thus an exercise of bringing all of the controls into a single framework is required to deliver consistency. The objective of unifying the controls is to have one LEP, one DCP, one development contributions plan and one public domain plan applying to the entire town centre and immediate surrounds.
4. The Epping Planning Review project is identified in Council's *Operational Plan 2016/2017* under Action 2.4 "Review of Epping Town Centre Planning Controls". The Action involves undertaking a review of the planning for the Epping Town Centre, in conjunction with the Department of Planning and Environment (DP&E). Council's *Operational Plan 2017/2018* sees Council continuing to work with stakeholders on key precincts such as Epping. The *Draft West Central District Plan* also foresees that Council will progress the delivery of the Epping Town Centre urban renewal with the Greater Sydney Commission and the DP&E to ensure that the centre is considered as an integrated whole.
5. The study area for the Epping Planning Review is based on the DP&E's Urban Activation Precinct boundary and is illustrated in **Figure 1**. However, in the case of social infrastructure, the study boundary extends beyond the boundary in **Figure 1** so as to incorporate all the social infrastructure that Epping Town Centre residents rely on, which generally, is the Epping suburb.

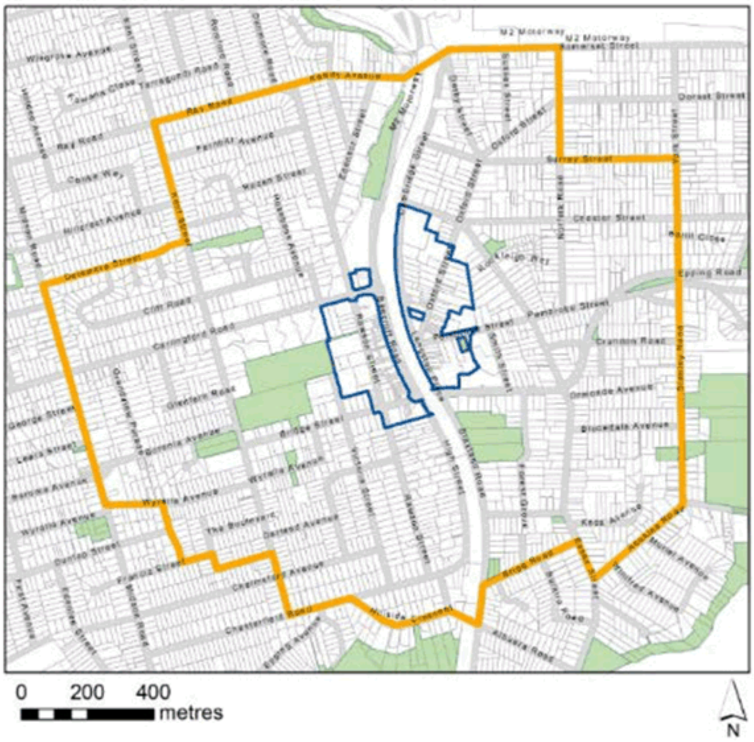

Figure 1 - Epping Planning Review Study area

6. The Epping Planning Review project involves two stages, the scope of which has been to address the unintended consequences of the planning control amendments brought into effect in March 2014 as well as allowing Council to manage current (formal and preliminary) Planning Proposals seeking growth within the Town Centre. It is also intended to allow the City of Parramatta Council to progress resolutions made by the former Hornsby Shire Council on specific heritage matters. Stage 1 of the Epping Planning Review has involved:

    a. A public launch in mid December 2016.

    b. Preparation of technical studies on Heritage, Social Infrastructure, Commercial Floorspace and Traffic (Interim) by consultants as well urban design and planning analysis which was undertaken by Council.

    c. Pre-Phase 1 Community Consultation commencing in December 2016; this consultation is summarised in Chapter 5.0 Community Engagement of the Discussion Paper (**Attachment 1**) and involved Council Officer attendance at various community events such as the Australia Day and Lunar New Year to inform the community of the review being undertaken.

    d. Phase 1 Community Consultation involved consultations that informed the technical studies and Discussion Paper and was undertaken in conjunction with Straight Talk who were engaged to facilitate the consultation events. The feedback received from the Phase 1 consultations was contained in Straight Talk's Phase 1 Community Consultation report which formed part of the supporting information to the Discussion Paper in **Attachment 1**.

    e. The preparation of the Epping Planning Review Discussion Paper (informed by points b, c and d, above) for public exhibition.

f. Phase 2 Community Consultation carried out during the public exhibition of the Discussion Paper with a series of Community Workshop Sessions.

7. **Figure 2** below illustrates the major structural components of Stage 1 of the Epping Planning Review.

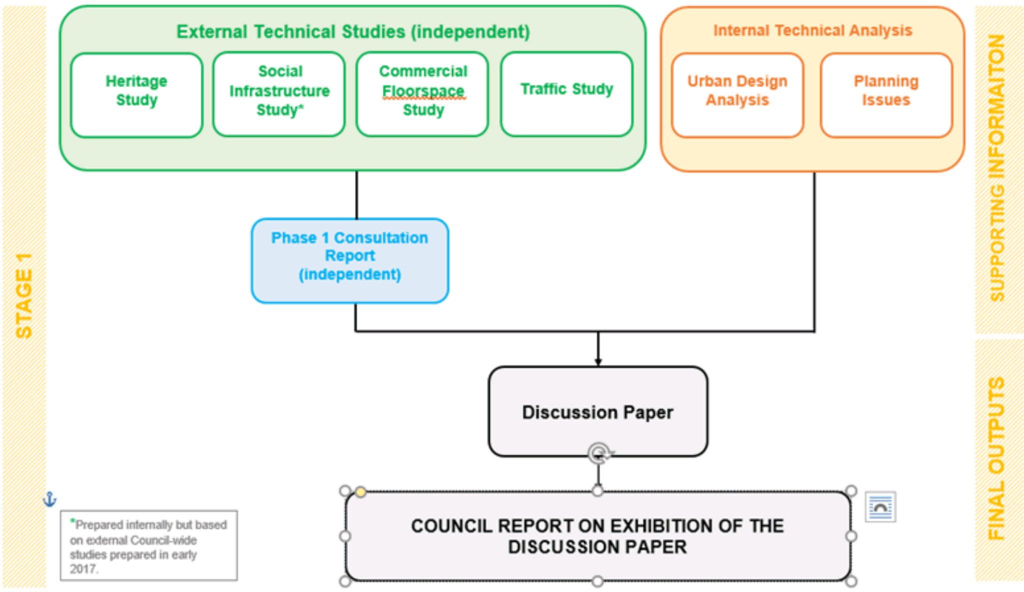

Figure 2 - Stage 1 of the Epping Planning Review

8. This Council report constitutes the last major milestone of Stage 1 of the Epping Planning Review and reports on the feedback received from the Phase 2 community consultations and Discussion Paper exhibition process.

9. Stage 2 of the Epping Planning Review will involve implementing changes to planning controls (zoning, heights, FSRs) and unifying the planning controls to create a single set of controls for the town centre. This means amending the *Parramatta LEP (PLEP) 2011* and the *Hornsby LEP (HLEP) 2013*, Parramatta DCP and Hornsby DCP, and relevant development contributions plans and public domain plans to create a single set of planning controls.

10. It is noted that the principles determined in Stage 1 also impact on other policy areas of Council (outside of the changes to planning controls covered in Stage 2) and that the findings and analysis carried out to date will be used to inform further work on these areas (ie. social infrastructure) as part of a separate process.

PUBLIC EXHIBITION OF DISCUSSION PAPER

11. The Epping Planning Review Discussion Paper **(Attachment 1)** and supporting studies were publicly exhibited from Wednesday, 21 June to Wednesday, 19 July 2016.

12. The Discussion Paper contained 32 questions, of which:

    a. 4 questions addressed heritage interface issues;

    b. 9 questions addressed commercial floorspace issues;

c. 11 questions addressed social infrastructure issues;

d. 2 questions addressed public domain issues; and

e. 6 questions addressed traffic and transport issues.

13. The context around the questions are detailed in the Discussion Paper.

14. Council has specifically sought responses to the questions to help guide the future direction of Stage 2 of the Epping Planning Review. As such this report focuses on the community feedback raised in relation to the questions.

15. It must also be noted that comments/feedback were also provided outside of the questions and this is also discussed in this report.

Phase 2 Community Engagement

16. Phase 2 community engagement involved a series of Community Workshop sessions which presented the findings of the technical studies and Discussion Paper. Feedback was also sought on the options and the questions.

17. Over 750 participant entries were recorded across all engagement activities, which incorporated:

    a. Three evening sessions held on:

        i. Social Infrastructure and commercial floor space (3 July 2017),

        ii. Heritage (5 July 2017), and

        iii. Traffic (12 July 2017).

    These were held at the St Albans Anglican Church Main Hall in the Epping Town Centre.

    b. Two evening sessions for Epping's two largest culturally and linguistically diverse (CALD) communities:

        i. A session for the Chinese community was held on 10 July 2017,

        ii. A session for the Korean community was held on 17 July 2017.

    These were held at the Epping Creative Centre.

18. All sessions were facilitated by Straight Talk, a consultancy commissioned to independently facilitate and record the feedback from each session.

19. These Phase 2 consultations are summarised in the *Epping Town Centre Review: Phase two – Exhibition period consultation* (provided at **Attachment 2**).

Site visits

20. Three site visits were undertaken by Council Officers and the Administrator at the request of residents who raised concerns about the impacts of current development in their areas. Site visits were undertaken at the following locations:

    a. Rosebank Avenue.

    b. Eastern side of Essex Street, within the Essex Street HCA.

    c. Norfolk Street in the vicinity of Pembroke Street.

21. The purpose of the site visits was to listen to the concerns raised by residents with regard to the findings of the Discussion Paper and assist them in informing their submission.

Developer Consultation

22. On 30 June 2017, Council Officers hosted an Information Session for the applicants of the Austino Planning Proposal (adjacent to Forest Park) and the two Preliminary planning proposals at Rawson Street and Beecroft Road.

23. The purpose of this consultation was to provide an update to the applicants on the status of the Epping Planning Review project, in order to enable them to prepare a submission.

PROJECT STEERING GROUP

24. To ensure State agency engagement on the recommendations of the Epping Planning Review process, at the commencement of the project, Council established the Epping Planning Review State Agency Steering Group.

25. The Steering Group comprises representation from the Greater Sydney Commission, the Department of Planning and Environment, Transport for NSW and Roads and Maritime Services and staff of City of Parramatta.

26. To date, the Steering Group has met on three occasions to discuss issues relating to the review as well as oversee the progress of the Discussion Paper.

COMMUNITY FEEDBACK - INTRODUCTION

Submissions

27. Council received over 300 individual pieces of correspondence in response to the exhibition. Within this correspondence, there were several submitters that made multi-part submissions, as well as a few submissions made on behalf of small groups of residents. These factors meant that the total number of submitters was over 260.

28. The submissions varied broadly in scope in terms of their response to the 32 questions posed in the Discussion Paper. The majority of submissions (about 90%) directly answered questions posed in the Discussion Paper. Of these, about one third of submitters focused on one question, about one third of submitters discussed 2-5 questions, and about one third addressed 6 or more questions. About 12% of submitters addressed 20 or more questions.

29. **Figure 3** below demonstrates the frequency of response to the 32 questions.

30. As demonstrated in **Figure 3** there was a high level of response to each of the questions posed (minimum 24 responses; maximum 131 responses). The average number of responses to each question was 50, for a total of over 1,600 individual answers across all of the questions. The four questions attracting the highest frequency of responses were 9b (relating to the purchase of the former Bowling Club site), 9k (relating to future use of the Dence Park Aquatic Centre), 9a (relating to expanding parks ahead of creating new parks), and 11a (relating to delaying processing of planning proposals until the Traffic Study is complete); each of these four questions received over 100 responses.

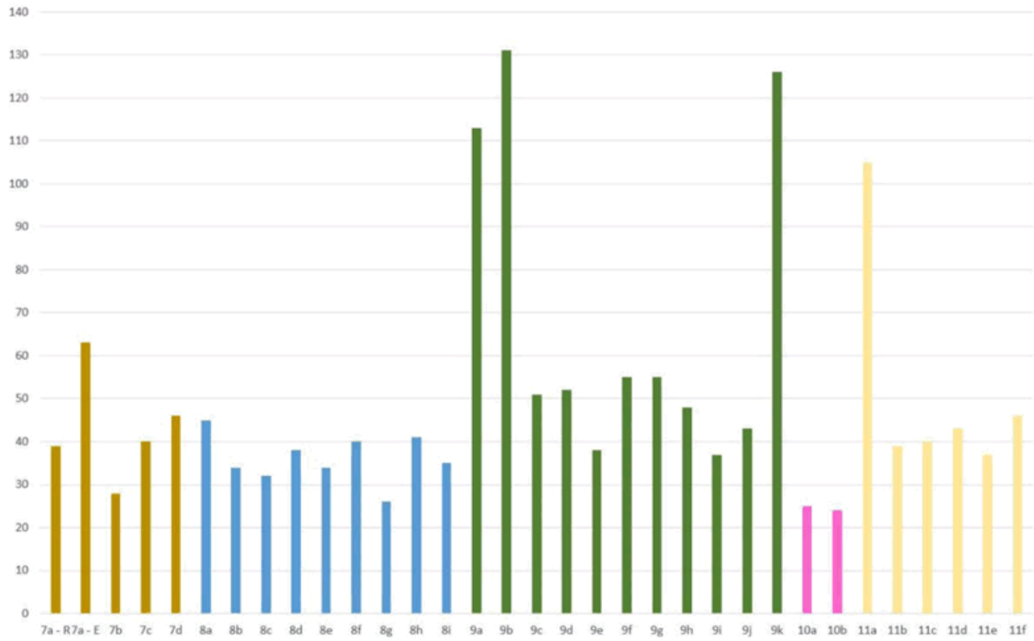

Figure 3 - Graph showing responses to the questions

31. **Attachment 3** provides a detailed summary of the submissions received in response to each question, and further sections of this report respond to this analysis on a question-by-question basis. Many respondents provided commentary outside of the questions posed, but which still broadly related to the five themes in the Discussion Paper (Heritage, Commercial Floor Space, Social Infrastructure, Public Domain and Traffic/Transport). This commentary is also summarised in **Attachment 3** on a thematic basis. Analysis of this feedback is also considered within this report.

32. Many respondents provided commentary outside of the questions and themes of the Discussion Paper. Council officers' analysis of this commentary is detailed in **Attachment 4** (General Comments). Analysis of this feedback is also considered within this report.

Community Workshop Sessions

33. The Community Workshop sessions (discussed above in 'Phase 2 Community Engagement') were a major element of the Phase 2 Community Engagement process and have been summarised in Straight Talk's *Epping Town Centre Review: Phase two – Exhibition period consultation* which forms **Attachment 2** to this report.

34. Generally, there are strong similarities with the feedback from the community submission process. However, any differences in views between submissions and feedback received directly from the community workshop sessions are explained in each of the chapter sections below.

HERITAGE CHAPTER

35. Chapter 7.0 of the Discussion Paper responds to the recommendations made within City Plan Services' *Epping Town Centre (East) Heritage Review* ("Heritage Review") as well as feedback received from residents during the Phase 1 consultations held in May this year.

36. The sub-sections below summarise the responses to the Discussion Paper's four questions (ie. 7a, 7b, 7c and 7d) which pertain to Rosebank Avenue and Essex Street Heritage Conservation Areas (HCAs), Rockleigh Way, certain properties at Norfolk Road and Pembroke Street and the Rose Street Precinct.

Rosebank Avenue HCA

37. Until March 2014, the Rosebank Avenue area and surrounds were zoned R2 Low Density Residential Zone. However, new planning controls which came into effect in March 2014 by way of the Department of Planning and Environment's (DP&E's) Urban Activation Precinct process introduced the Rosebank Avenue HCA and introduced the R4 High Density Residential Zone to its south eastern, southern and eastern borders. The R4 High Density Residential Zone currently permits 5 storey residential flat buildings.

38. The Rosebank HCA and surrounding land zonings in *HLEP 2013* are illustrated in **Figure 4**, below.

Figure 4 - Rosebank Avenue HCA (hashed) and current zoning

39. Two heritage items are situated midpoint within the HCA, at No.s 9 and 10 Rosebank Avenue (refer to **Figure 5** below). These two sites mark the midpoint on either side of the HCA.

40. The street runs in a north/south direction with most properties fronting the street in an east or west direction. These lots are relatively large. However, No.23 Rosebank Avenue is the only property that fronts the street in a north/south direction. This lot is also much smaller in size and is flanked by larger lots that have frontage to Rosen Street. It therefore, has limited redevelopment opportunity on its own.

41. The Heritage Review assessed the heritage value of the HCA and has recommended the retention of the Rosebank Avenue HCA. However, this study only looks at the heritage factors and does not address the land use conflicts occurring at the interface at the rear of some of the properties within the Rosebank Avenue HCA.

42. A strong residential market has seen many of the R4 zoned sites be redeveloped for 5 storey residential flat buildings. This has created a conflict in land use that sees 5 storey residential flat buildings overlooking single and two

storey low density residential development which is significantly impacting on the privacy and amenity of the Rosebank Avenue residents, particularly those at No.s 1-7, and 2-8 Rosebank Avenue.

43. Section 7.4.1 of the Discussion Paper presents 7 options to resolve interface issues at the Rosebank Avenue HCA (as well as the Essex Street HCA which is discussed in the section below). The options range from "Maintain the HCA" to presenting an option that would permit "3 storey residential flat building" redevelopment and involve the removal of the HCA notation in the *HLEP 2013*.

44. Council Officers recommend three options (Options 4, 5 and 6) for the Rosebank Avenue HCA all of which involve:

    a. Removal of the HCA affectation in *HLEP 2013*; and

    b. Planning controls that permit demolition of the existing housing and two storey redevelopment comprising: (1) Dual Occupancy (side by side); (2) Town Houses; or (3) Manor home, (with the exception of the two heritage items).

45. With the adjacent creek (zoned RE1 Public Open Space) and the two heritage items sitting midway in the precinct, the Discussion Paper noted that further analysis be undertaken to assess how *different options that might be applied to different parts of the HCA* due to the fact that the interface issues primarily affect the couthern properties in Rosebank Avenue.

46. The standard question 7a. asks: *What is your preferred option and why?*

Community Feedback

47. Feedback from the community on Rosebank Avenue received via the community information sessions and via submissions was divided.

48. Some residents within Rosebank Avenue want to see the same planning controls that enable 5 storey residential development applied to their sites so they can maximise their economic benefit in the same way their neighbours have to the south and south east (refer to **Figure 5** below showing the extent of the HCA and street numbers).

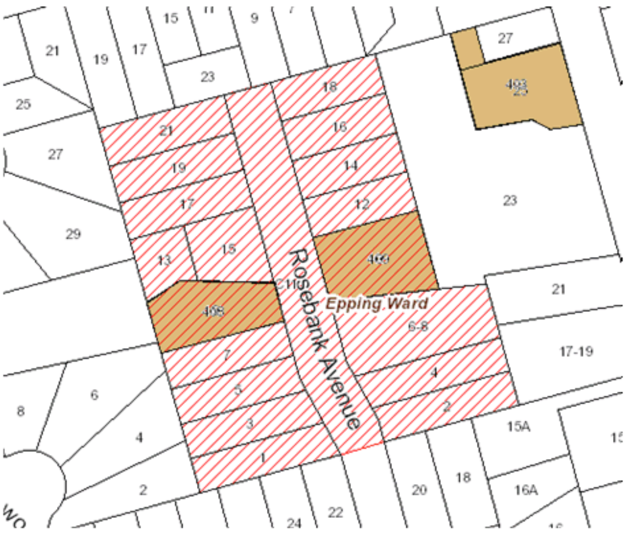

Figure 5 - Rosebank Avenue HCA and heritage items with street numbers

49. Views received via submissions and Community Workshop sessions from some residents who reside outside the HCA see the removal of the HCA and allowance for redevelopment as further degradation of local character. Many are unsympathetic to the residents experiencing the interface issues. Some view that the new R4 zone has been in place for over 3 and a half years and affected residents could have either sold up to a more tolerant resident who "knew what they were buying". Some hold the view that affected residents could have planted trees at the time the new controls came into effect to help mitigate the amenity and privacy impacts. There is also a perception from these respondents that the affected residents who see redevelopment as a resolution to the interface issues do not care about the impacts it will have on the residents who choose to stay or who are less affected by the new development.

50. With regards the heritage items at No.s 9 and 10 Rosebank Avenue, the predominant response from respondents was that the heritage items should be removed if the HCA notation is recommended for removal on the basis that the heritage items are just as affected as the properties at the sourthern portion of the precinct. They see that these properties also have visual proximity to the interface issues and this devalues the significance of the heritage items. There was also a contrary view – that the preference is for Options 1 ("Maintain the HCA") or Option 2 ("Landscaping at interface") across the precinct but notes that in the instance the HCA is recommended for removal, then the entire precinct should enable 5 storey residential flat buildings.

Conclusions and recommendations

51. The scope of the Stage 1 analysis and recommendations has been to address the unintended impacts resulting from the new planning controls introduced by the State Government in March 2014.

52. Having considered the feedback from the Phase 2 consultations, Council Officers **conclude**:

   a. That Council Officers accept that there are severe interface issues occurring (or, in some cases, are yet to occur) to the southern half of the precinct; specifically, the properties at No.s 1, 3, 5 and 7 as well as 2, 4 and 6-8 are likely experience the same impacts as the remaining adjoining R4 zoned land is redeveloped over time.

   b. That a heritage item (such as the two at No.s 9 and 10 Rosebank Avenue), as opposed to a property with just a HCA notation over it, has a much more significant role in terms of heritage conservation and protection. The importance of a heritage item relies less on the surrounding character and more so on its own individual historical attributes. As such, it is not uncommon for heritage items to sit amongst development that is of a different typology.

   c. The RE1 zoned land to the west comprising the eastern edge of Kent Street Park – along with the two heritage items - also forms a 'break' and mid point within the Rosebank Avenue Precinct.

   d. Council Officers see that the interface issues are less significant at the rear of No.s 12 to 18 Rosebank Avenue, despite the R4 zoning on the adjoining large site to the east at No.23 Ray Road. Constructed in early 2011, the development on this site incorporates 2.5 and 3 storey town house development which faces the properties at No.s 12 to 18 Rosebank Avenue. These townhouses shield the 4 storey residential flat building development that fronts Ray Road. Since 2011, tree plantings now shield views to this development from Rosebank Avenue.

e. Similarly, Council Officers determine that there are no interface issues occurring (or anticipated to occur) at the rear of the sites at No.s 13 to 21 Rosebank Avenue. This also includes No.23 Rosebank Avenue. These sites do not adjoin any R4 zoned land. As noted above, the property at No.23 is isolated, smaller in size than the other Rosebank Avenue parcels and has little chance of being redeveloped and given it is surrounded by the R2 zoned properties which have frontage to Rosen Street. Therefore, the current R2 zone is not considered to be inappropriate against the R2 zoned land which has a two storey height limit.

f. That any change to the planning controls needs to be sensitive and sympathetic to the existing heritage items at No.s 9 and 10 Rosebank Avenue.

g. That the removal of the HCA notation will not have any impact on the heritage significance of the two heritage items situated at No.s 9 and 10 Rosebank Avenue (refer to **Figure 5**) as these properties are recognised for their significance as stand-alone sites.

h. That the basis for any changes to the planning controls is to place as little pressure as possible on local traffic.

53. Council Officers therefore, **recommend the following principles**:

a. In the case of properties situated at No.s 1, 3, 5 and 7 as well as 2, 4 and 6-8 Rosebank Avenue:

i. That Option 7 – 3 storey residential flat building redevelopment be permissible; and

ii. That further urban design work identify appropriate building height, density (FSR) controls, building setback and amalgamation controls so as to ensure an appropriate transition from 3 storeys to 2 storeys towards the heritage item sites to the north. This analysis will inform new DCP controls.

These recommended controls:

- enable owners to achieve economic benefit from a higher density solution.
- represent a sound transition in density from the 5 storey residential flat building to a single storey heritage item.

b. That the Rosebank Avenue HCA notation in *HLEP 2013* (labelled "C11") be removed entirely.

c. That the existing heritage items at No.s 9 and 10 Rosebank Avenue remain listed in the LEP Heritage Schedule as heritage items.

d. In the case of the properties situated north of the heritage items comprising No.s 13 to 21 Rosebank Aveune (western side) and 12 to 18 Rosebank Avenue (eastern side) and of No.23 Rosebank Avenue, that there be no change to the LEP planning controls.

e. That in the case of the entire Rosebank Avenue area, that the relevant DCP controls be amended accordingly, including any amendments to

Section 9.3.14 'Rosebank Avenue (Epping) Heritage Conservation Area' section of the Hornsby DCP'.

f. That despite the increase in residential density proposed, that the above recommendations could proceed ahead of the completion of the Traffic study as they seek to urgently deal with the unintended impacts arising from the new planning controls implemented in 2014 relating to land use interface issues. Furthermore, the potential increase in dwelling numbers resulting from this recommendation is likely to be minimal when compared against the traffic impacts arising from proposals detailed later in this report.

Essex Street HCA

54. Until March 2014, land situated on the eastern side of Forest Grove - which directly adjoins land on the western side of Essex Street between Epping Road and Maida Road - was zoned R2 Low Density Residential. However, new planning controls which came into effect in March 2014 via the DP&E's Urban Activation Precinct process introduced the R4 zone. The R4 High Density Residential zone permits 5 storey residential flat buildings.

55. The Essex Street HCA and surrounding land zonings in *HLEP 2013* are illustrated in **Figure 6**, below.

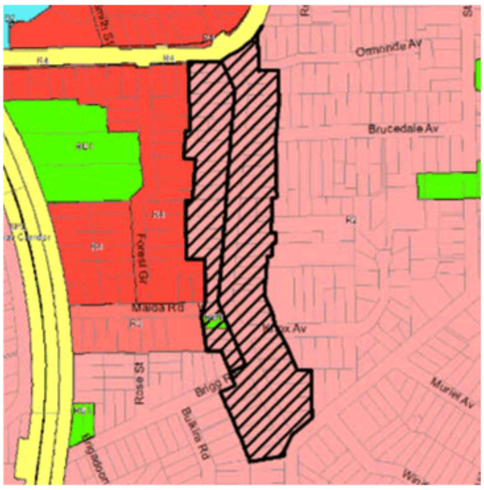

Figure 6 - Essex Street HCA (hashed) and current zoning

56. Four heritage items are situated within the Essex Street HCA - at No.s 42, 47, 76 and 84 Essex Street (refer to **Figure 7** below).

57. The Heritage Review assessed the heritage value of the HCA and has recommended retention of the Essex Street HCA. However, this study only looks at the heritage factors and does not address the land use conflicts occurring on the west side of the HCA between Epping Road and Maida Road.

58. A strong residential market has seen most of the R4 zoned sites (between Epping and Maida Roads) flanking the western side of Essex Street be redeveloped (or have existing approvals) for 5 storey residential flat buildings. This has created a conflict in land uses that sees 5 storey residential flat buildings overlooking single and two storey low density residential which is significantly impacting on the privacy and amenity of the Essex Street residents on the western side of Epping and Maida Road.

59. Section 7.4.1 of the Discussion Paper presents 7 options to resolve interface issues at the Rosebank Avenue HCA (as well as the Essex Street HCA which is discussed in the section below). The options range from "Maintain the HCA" to "3 storey residential flat building" redevelopment.

60. Council Officers recommend three options (Options 4, 5 and 6) for the Rosebank Avenue HCA all of which involve:

    a. Removal of the HCA notation in *HLEP 2013*; and

    b. Introduction of new planning controls that permit two storey redevelopment comprising: (1) Dual Occupancy (side by side); (2) Town Houses; or (3) Manor home (with the exception of heritage items).

61. The standard question, 7a., asks: *What is your preferred option and why?*

Community Feedback

62. Feedback from the community on the Essex Street HCA received via the community information sessions and via submissions is divided.

63. For residents residing on the western side of Essex Street, situated within the HCA, the responses were as follows:

    a. 75% of residents either supported the Council Officer recommendation or Option 7 ("3 Storey Residential Flat Building").

    b. 25% of residents supported Option 1 ("No Change").

64. The predominant view from residents on the eastern side of Essex Street within the HCA also support the removal of the HCA notation to enable redevelopment that enables a transition to the adjoining R4 zone. Views from the eastern side of Essex Street held the strong view that if there was any change to the building form on the western side of the street, that the same type of development should permissible on the eastern side of the street.

65. Views of residents that reside outside the HCA see the removal of the HCA and allowance for redevelopment as further degradation of local character. Furthermore these views have strong similarities with those of the residents situated outside the Rosebank Avenue HCA, in that:

    a. Some residents are not sympathetic to the residents experiencing the interface issues:

        i. Some view that affected residents could have addressed interface issues early by tree planting at the time the new controls came into effect to help mitigate the amenity and privacy impacts

        ii. Some view that affected residents could have either sold up and moved out by selling to a more tolerant resident who "knew what they were buying" and appreciates what special character is left.

        iii. Some have the perception that the affected residents who are fed up and want to sell to maximise their economic benefit do not care about the impacts it will have on the residents who choose to stay or who are less affected by the new development.

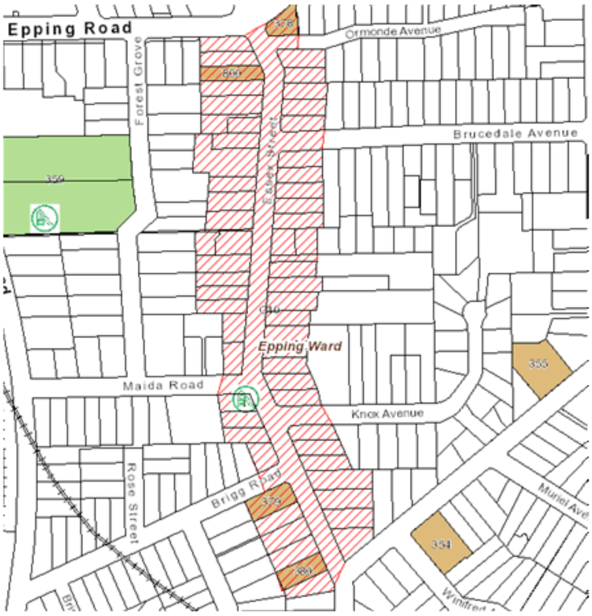

Figure 7 - Essex Street HCA and heritage items in HLEP 2013

Conclusions and recommendations

66. The scope of the Stage 1 analysis and recommendations has been to address the unintended impacts resulting from the new planning controls that came into effect by the State Government in March 2014.

67. Having considered the feedback from the Phase 2 consultations, Council Officers **conclude**:

    a. That there are significant interface issues that properties are experiencing on the western side of Essex Street HCA; specifically, those situated between Epping Road and No.86 Essex Street.

    b. That there are no interface issues being experienced on the eastern side of the Essex Street HCA despite the numerous views of the residents residing on the eastern side. The role of the Essex Street road reserve is critical in establishing a demarcation between land uses. The road reserve which is approximately 21 metres wide when measured between the front boundaries of the western and eastern side of the street acts as a clear demarcation for any change in land use and becomes the ideal “line in the sand”. If Council was to enable redevelopment uplift of the eastern side of Essex, this only pushes and extends the interface issue further east.

    c. Essex Street stretches from Oxford Street in the north to Abuklea Road in the south with the Essex Street HCA section occupying a little more than 25% of its full length. Therefore, any recommendations to change the eastern side of Essex Street within the HCA section is likely to result in the Essex Street residents situated outside of the HCA that own land zoned R2 Low Density Residential to also seek uplift because the rezoning of the eastern side will establish a precedent.

    d. Terry’s Creek forms a natural geographical boundary rather than a boundary for land use change. Relying on Terry’s Creek as a land use boundary would introduce a significant number of dwellings which would not only have significant traffic implications but also result in significant additional land being up-zoned further away from the station.

e. Of the 3 recommended re-development options within the Discussion Paper (which were: Option 4 Dual Occupancy (side by side), Option 5 Town house re-development and Option 6 Manor home, that Council Officers recommend Option 6 Manor home because this option:

   i. Represents a sound transition in density from the 5 storey residential flat building to 2 a storey medium-density, to the 1 to 2 storey low density across the street. It means that no change to the existing height control is required.

   ii. Does not require site amalgamation so that owners will be able to independently develop their sites if they wish.

f. That if there is a recommendation that enables redevelopment of the western side of Essex Street between Epping and Maida Roads, that there is no heritage benefit in keeping the Essex Street HCA notation.

g. The removal of the HCA notation will not have any impact on the heritage significance of the four heritage items situated at No.s 42, 47, 76 and 84 Essex Street (refer to **Figure 7**) as these properties are recognised for their significance as stand-alone sites.

68. Council Officers therefore, **recommend the following principles**:

a. That the Essex Street HCA notation in *HLEP 2013* (labelled “C10”) be removed in full.

b. That the existing heritage items at No.s 42, 47, 76 and 84 Essex Street remain listed in the LEP Heritage Schedule as heritage items.

c. That the planning controls for the properties on the western side of the Essex Street HCA area be amended to permit re-development that involves demolition of the existing housing (with the exception of heritage items) to enable development of two storey manor home development, between Epping Road and Maida Road.

d. That the planning controls for the properties on the eastern side of the Essex Street HCA area remain unchanged and not be amended.

e. That further urban design be undertaken to determine the appropriate density, setbacks and other building envelope and controls to guide the development of new manor home development. This analysis will inform new development control plan (DCP) controls including any amendments to Section 9.3.13 ‘Essex Street (Epping) Heritage Conservation Area of the Hornsby DCP’.

f. That despite the increase in residential density proposed, that the above recommendations could proceed ahead of the completion of the Traffic study as they seek to urgently deal with the unintended impacts arising from the new planning controls implemented in 2014 relating to land use interface issues. Furthermore, the potential increase in dwelling numbers resulting from this recommendation is likely to be minimal when compared against the traffic impacts arising from proposals detailed later in this report.

Rockleigh Park

69. The Rockleigh Park precinct comprises 33 small subdivided lots that come off a small, narrow laneway system. The area is predominantly zoned R4 high

Density Residential (shown edged yellow in **Figure 8** below) with an R3 Medium Density Residential zoned strip edging the north and eastern boundaries. The subject site currently contains medium density housing.

70. Until March 2014, the 36 parcels that make up Rockleigh Park were zoned R2 Low Density Residential Zone. However, new planning controls which came into effect in March 2014 via the DP&E's Urban Activation Precinct process introduced the R4 zone to the 18 parcels central within Rockleigh Park. The R4 High Density Residential zone permits 5 storey residential flat buildings. No sites have been redeveloped in accordance with the new zone on account of constraints around community title and the small street network.

71. The precinct's proximity to the R4 zoned land at Essex Street to the south and the East Epping HCA to the north (shown hashed red) are illustrated in **Figure 8**.

72. The Heritage Review commissioned by Council recommends down-zoning the parcels zoned R4 (which has a 17.5 metre or 5 storey building height) to R3 Medium Density Residential zone (which has a 12 metre or 4 storey building height) to better reflect existing development.

Figure 8 - Rockleigh Way (area edged in yellow and with a R3 zoned strip)

73. The Discussion Paper recommends supporting the R3 zone and that further urban design analysis to identify the appropriate amalgamation, height and density controls be carried out.

74. The proposed downzoning to the R3 zone better reflects the current use – small single and two storey cottages, some of which are attached, on a small, narrow laneway system.

75. The standard question at the end of this section (Question 7b) asks*: Do you agree with the recommendation for Rockleigh Park?*

Community Feedback

76. Community feedback from residents on this issue showed strong support for the down zoning of the site from the R4 zone to the R3 zone.

77. Respondents also said that the proposed R3 zone:

    a. Would more appropriately deal with the transition between higher and lower density areas; and

    b. Should be supported by a master planning process so that appropriate heights and density controls can be put in place.

Conclusions and recommendations

78. The scope of the Stage 1 analysis and recommendations has been to address the unintended impacts resulting from the new planning controls that came into effect by the State Government in March 2014.

79. Having considered the feedback from the Phase 2 consultations, Council Officers **conclude**:

    a. With 18 lots zoned R4 and 15 lots zoned R3 all of which rely on the same small road network for access which falls under a community title, it is highly unlikely that these sites will be purchased by a developer for redevelopment.

    b. The recommended downzoning better reflects the current use – small single and two storey cottages, some of which are attached, on a small, narrow laneway system.

    c. The proposed R3 Medium Density Residential zone is consistent with the Rockleigh Park properties that form its northern and eastern boundaries.

    d. That redevelopment of Rockleigh Park for 5 storey residential flat building development would reflect further and unnecessary encroachment of inappropriate high density development up against low density development.

    e. That the recommendation within the Discussion Paper to down-zone the R4 zone to the R3 zone still stands.

80. Council Officers therefore, **recommend the following principles**:

    a. That the component of Rockleigh Park currently zoned R4 be rezoned to the R3 zone so that the entire 33 parcels fall under a single (R3) zone consistent with the recommendations with the Heritage Review and Discussion Paper.

    b. That further urban design analysis be undertaken across all of Rockleigh Park to determine the best building height and density (FSR) controls including amalgamation patterns should the site be amalgamated in the future. This analysis will also inform DCP controls.

1, 3, 3A, 5, 7, and 7A Norfolk Road and 25 Pembroke Street

81. The parcels at 1, 3, 3A, 5, 7, and 7A Norfolk Road and 25 Pembroke Street are all currently zoned R2 Low Density Residential with the properties at No.s 1, 3 and 3A Norfolk Road and 25 Pembroke Street located within the most southern section of the East Epping HCA (refer to **Figures 9 and 10**, below)

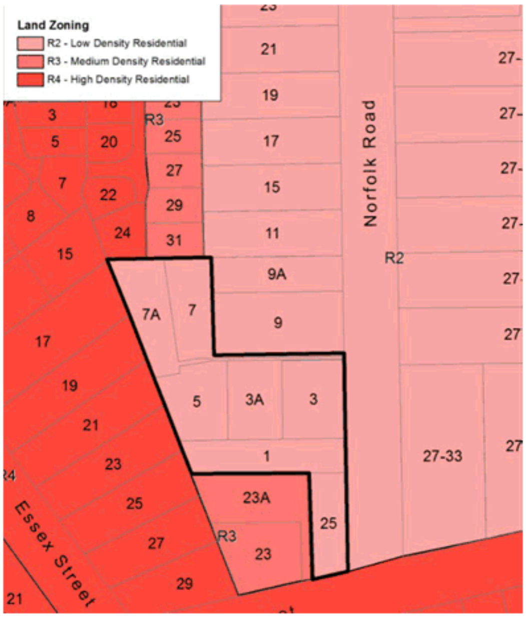

Figure 9 - Norfolk Road and Pembroke Street properties – land zonings as per HLEP 2013

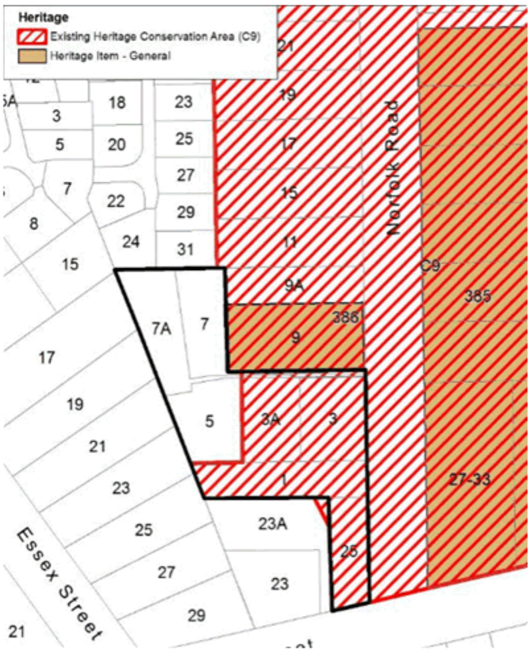

Figure 10 - Norfolk Road and Pembroke Street properties – HCA affectation and adjoining heritage item at 9 Norfolk Road HLEP 2013

82. Three parcels which do not have street frontage – No.s 5, 7 and 7A Norfolk Road are sandwiched between the HCA properties and a heritage item at No.9 Norfolk Road to the east and R4 zoned land which has a 5 storey height limit to the west. These sites are occupied by large houses which take up much of their respective sites.

83. Land to the south at 23 and 23A Pembroke Road has a R3 Medium Density Residential zoning and is also occupied by large dwelling houses that occupy much of their land parcel.

84. Until March 2014, the R4 zone to the west of this area did not exist. However, new planning controls which came into effect in March 2014 via the DP&E's Urban Activation Precinct process rezoned the R2 Low Density Residential land to the R4 High Density Residential zone which permits 5 storey residential flat buildings.

85. The Heritage Review commissioned by Council recommends:

    a. The removal of the East Epping HCA notation (labelled "C9" in *HLEP 2013*) over the properties at No.s 1, 3 and 3A Norfolk Road and 25 Pembroke Street; and

    b. Rezone No.s 1, 3 and 3A Norfolk Road and 25 Pembroke Street as well as No. 5, 7 and 7A to the R3 zone so all parcels share the same zoning and also, match the zoning to the south.

86. Since 2014, when the adjacent R4 zone came into effect, there has been no redevelopment of land in this vicinity however, it is noted that a strong residential market could drive redevelopment in the future.

87. To resolve any forthcoming interface issues at No.s 1, 3, 3A, 5, 7, and 7A Norfolk Road and 25 Pembroke Street, Section 7.4.2 of the Discussion Paper presented three options and sought feedback. The three options are as follows:

    a. Option 1 is as per the Heritage Review's recommendation (described above).

    b. Option 2 is to both:

        i. Remove the East Epping HCA notation (labelled "C9" in *HLEP 2013*) over the properties at No.s 1, 3 and 3A Norfolk Road and 25 Pembroke Street, and

        ii. Rezone all of the seven parcels to the R3 zone, but restrict development on No.s 3, 3A, 5, 7 and 7A Norfolk Road to a 2 storey manor home and encouraging No.s 1 Norfolk Road and 25 Pembroke Street to amalgamate with No.s 23 and 23A Pembroke Street to redevelopment into a town house scheme.

    c. Option 3 is to:

        i. Remove the East Epping HCA notation (labelled "C9" in *HLEP 2013*) over the properties at No.s 1, 3 and 3A Norfolk Road and 25 Pembroke Street, and

        ii. Retain the R2 zone on No.s 3, 3A, 5, 7 and 7A Norfolk Road, and

        iii. Allow No.1 Norfolk Road and 25 Pembroke Street to be rezoned to the R3 zone.

88. The standard question at the end of this section (Question 7c) asks: *…what is your preferred option and why?".*

Community Feedback

89. Feedback from the community via the community information sessions and submissions is divided.

90. Responses from the owners of No.s 1, 3, 3A, 5, 7, and 7A Norfolk Road and 25 Pembroke Street, included a coordinated group response which was included in some of the households' submissions. These indicated unanimous support

for Option 1 (remove HCA and rezone to R3). Key reasons for supporting this option were:

a. That there is a desire to resolve future interface issues with the anticipated R4 development yet to occur on the adjoining R4 land.

b. That the option could encourage amalgamated development sites large enough to support "high-quality integrated development" with adequate transition to adjacent low-rise areas and the Heritage Item at 9 Norfolk Road.

c. To encourage housing within walkable access to the school and town centre.

d. That Option 2 (manor home) was not preferred as it was seen as an undesirable and less integrated approach than larger site amalgamation along with the potential problems with strata-titled developments sharing one driveway (i.e. access, construction, utilities) was also raised although it should be noted that the manor home recommendation involves amalgamated sites.

e. That Option 3 was considered as an uncoordinated approach to zoning that could result in small, piecemeal development. An alternative for R4 zoning was also raised by some.

91. Feedback from two adjoining owners, including the owner of the adjoining heritage property at No. 9 Norfolk Road have preference for Option 3 as this is seen as a more appropriate building form response since the sites at No.s 3A, 5, 7 and 7A Norfolk Street have no street address.

92. Feedback from other residents were varied:

a. some seeing Option 2 as preferable,

b. others as Option 3 as preferable, with

c. others feeling that only limited redevelopment was acceptable (low density to be replaced with low density).

93. Other residents cited the local neighbourhood shop building which is attached to the dwelling at No. 25 Pembroke Street as a valued and historically important building in this area. However, despite the Heritage Study's identification of the site as a 'contributory item', it also recommends removal of the East Epping HCA notation over the site.

Conclusions and recommendations

94. The scope of the Stage 1 analysis and recommendations has been to address the unintended impacts resulting from the new planning controls that came into effect by the State Government in March 2014.

95. Having considered the feedback from the Phase 2 consultations, Council Officers **conclude**:

a. That any response needs to be sensitive to the heritage item at No.9 Norfolk Road.

b. The narrowness of the lots at No.25 Pembroke Street and No.1 Norfolk Street lend themselves to amalgamating with No.s 23 and 23A given their location.

c. That the R4 High Density Residential zone to the west and R3 Medium Density Residential zone to the south have the strong potential to result in interface issues which need to be managed.

96. Council Officers therefore, **recommend the following principles**:

   a. That option 2 from the Discussion Paper be applied, which involves:

      i. Removing the East Epping HCA notation (labelled "C9" in *HLEP 2013*) over the properties at No.s 1, 3 and 3A Norfolk Road and 25 Pembroke Street, and

      ii. Rezoning all of the seven parcels to the R3 zone*, but:

         1. Limit re-development on No.s 7 and 7A Norfolk Road to a 2 storey manor home.

         2. Enable re-development on No.s 1, 3 and 3A, 5 Norfolk Road and 25 Pembroke Street to realise residential flat building (no more than 3 storeys in height) however, undertake urban design analysis to determine:

            - appropriate height, density and amalgamation controls including the controls affecting No.s 23 and 23A Pembroke Street; and
            - appropriate setback controls from the heritage item at No. 9 Norfolk Street; and
            - that this analysis informs DCP controls including any amendments to section 9.3.12 'East Epping Heritage Conservation Area'.

Note: this may result in a different zone depending on the methodology utilized in the harmonization of the planning controls.

   b. That despite the increase in residential density proposed, that the above recommendations could proceed ahead of the completion of the Traffic study as they seek to urgently deal with the unintended impacts arising from the new planning controls implemented in 2014 relating to land use interface issues. Furthermore, the potential increase in dwelling numbers resulting from this recommendation is likely to be minimal when compared against the traffic impacts arising from proposals detailed later in this report.

Rose Street precinct

97. The Rose Street Precinct is flanked by properties zoned R3 Medium Density Residential (which front Maida Road), Blaxland Road to the west, the Essex Street HCA properties to the east and Brigg Road to the south. It excludes the Essex Street properties and a pocket park in the north east corner with Maida Road and Essex Street. Refer to **Figure 11** below.

98. Until March 2014, land situated on the southern side Maida Road was zoned R2 Low Density Residential Zone. However, new planning controls which came into effect in March 2014 via the DP&E's Urban Activation Precinct process introduced the R3 zone to Maida Road. The R3 zone permits 4 storey residential flat buildings.

Figure 11 - Rose Street Precinct (area hashed blue)

99. The land that is zoned R3 is being redeveloped into 4 storey residential flat buildings. Also the topography slopes (downwards) to the south increasing the impact of the height of new development.

100. The Heritage Review assessed the appropriateness of the R2 zone with regards to the adjoining Essex Street HCA and concluded that the Rose Street precinct be upzoned to the R3 zone on a land use basis.

101. With regards to land outside the precinct (as per **Figure 11**, above) it should be noted that as per the recommendations for Essex Street, the HCA notation to the east of the precinct is recommended for removal.

102. As at mid July 2017, over two-thirds of the strip of R3 zoned land fronting Maida Road has either been developed as 4 storey residential flat buildings or is under construction for the same.

103. There is potentially an opportunity for Council to pursue an acquisition process to purchase sites for community/public open space in the vicinity of Rotary Park given the findings from the *Epping Social Infrastructure Study* which supported the Discussion Paper.

104. The Discussion Paper supports the recommendation within the Heritage Study - which is to zone the precinct R3 zone - but also recommends that further master planning work be undertaken to determine the appropriate height and density controls so as to ensure a clear transition to the R2 zoned land on the southern side of Brigg Road.

105. The Discussion Paper seeks feedback on the recommendation (Question 7d) which asks: *Do you agree with the recommendation for the Rose Street Precinct?*

Community Feedback

106. Council received a total of 45 submissions on this issue. Feedback from the community is divided. Responses from 19 respondents support the Discussion Paper's recommendation to up-zone the precinct. This is largely because those residing within the Rose Street precinct feel they have lost significant amenity with the introduction of the 4 storey residential flat building development occurring to the north. The views of residents outside the precinct (26 respondents) do not support the recommendation for up-zoning as they feel

that it will only extend pressure to upzone land further south. Some respondents have the view that the four storey interface is insignificant. (Refer to a summary of the submissions at **Attachment 3**).

107. The above views were also reflected at the Community Information Sessions (refer to Straight Talk's *Epping Town Centre Review - Phase Two - Exhibition period consultation* at **Attachment 2**).

Conclusions/Recommendations

108. The scope of the Stage 1 analysis and recommendations has been to address the unintended impacts resulting from the new planning controls that came into effect by the State Government in March 2014.

109. Having considered the feedback from the Phase 2 consultations, Council Officers **conclude**:

    a. That the interface issues that are occurring to the north of the precinct require a land use planning response to manage these interface issues.

    b. That the recommended R3 Medium Density zone in the Heritage Review and the Discussion Paper generally represents a sound transition to the R2 zone on the southern side of Briggs Road providing that master planning is undertaken for this precinct.

110. Council Officers therefore, **recommend the following principles**:

    a. That the land be rezoned to the R3 zone*; and

    b. That further urban design analysis/master planning process is needed to:

        i. Determine how development from the north needs to step down to a building height of 2 storeys at the Brigg Road frontage to transition to development across the road. Transition should also be considered towards the eastern end of the site to ensure future massing appropriately responds to the low density residential development fronting Essex Street.

        ii. Determine an appropriate amalgamation pattern, building height, density and setback controls as well as provision of communal and public open space

        iii. That this analysis inform DCP controls.

Note: this may result in a different zone depending on the methodology utilized in the harmonization of the planning controls. But the intended built form outcome will remain the same.

    c. That despite the increase in residential density proposed, that the above recommendations could proceed ahead of the completion of the Traffic study as they seek to urgently deal with the unintended impacts arising from the new planning controls implemented in 2014 relating to land use interface issues. Furthermore, the potential increase in dwelling numbers resulting from this recommendation is likely to be minimal when compared against the traffic impacts arising from proposals detailed later in this report.

Hornsby Heritage Review Stage 6

111. Section 7.1 within the Heritage Chapter of the Discussion Paper responds to a previous Hornsby Shire Council resolution pertaining to certain heritage matters in Epping.

112. Identified as part of 'Stage 6' of the Hornsby Shire Council Heritage Study Review, the Heritage Study prepared by City Plan Services reviewed these matters and made a number of recommendations. These matters and recommendations are detailed in **Attachment 5** and are also detailed in the consolidated list of recommendations contained in **Attachment 6**.

COMMERCIAL FLOORSPACE CHAPTER

113. As noted in the Discussion Paper, in 2011 the Epping Town Centre had 4,512 jobs with 55,000sqm of office floor space and 13,000sqm of retail floor space. However, since 2014, new development within the B2 Local Centre zone has reduced the amount of office floor space. Developers are replacing existing large scale office towers and small scale (2 and 3 storey) office development with shop top housing.

114. This trend is occurring despite the Hornsby DCP controls requiring non-residential uses on the first two to three floors of development in the B2 Local Centre zone. Parramatta's DCP controls require applicant's to provide "up to" 4 storeys of commercial development, but only for development on Beecroft Road.

Note: Commercial floorpsace is floorspace utilised for retail, office or business premises.

115. The Department's position on the reduction of commercial floor space is that, based on market analysis, demand for commercial floor space is expected to reduce as other centres such as Macquarie Park and Norwest Business Park become more attractive. City of Parramatta commenced a review and in response commissioned SGS Economics and Planning to understand whether the loss of floor space is a positive trend, and to understand other commercial land use elements that may create a more successful town centre.

116. Chapter 8.0 of the Discussion Paper responds to the recommendations made within SGS Economics and Planning *Epping Town Centre Commercial Floorspace Study* ("Floorspace Study") as well as feedback received from residents during the Phase 1 consultations held in May this year.

117. The sub-sections below summarise the responses to the Discussion Paper's nine questions which pertain to:
    a. Epping Town Centre's role as a Sub-District Centre;
    b. The role of Government owned sites; and
    c. The mix of retail uses.

Epping as a Sub District Town Centre in 2036

118. One of the concepts considered in the Floorspace Study is the State Government's **30-minute city** where people can access a wide range of job, services and other opportunities within 30 minutes from their place of residence.

119. Sections 8.5.1 and 8.5.2 within the Discussion Paper comprises three questions (8a to 8c) which seek feedback on the future role of the Epping Town Centre to the year 2036.

Community Feedback

120. With regards to question 8a: *Should Epping evolve as a Sub District Centre with a target of achieving the commercial floor space targets without any increase in Net Floor Space on Business B2 zoned sites?* The community's responses are highly supportive of the role of the centre having a significant component of commercial floorspace. The most common view is that there needs to be more variety in retail and more night time activity.

121. With regards to questions 8b and 8c, these ask if Epping should evolve as a Sub District Centre:

    a. Without any increase in net floorspace (8b) noting that additional commercial floorspace provision would be provided at the expense of residential development; or

    b. By allowing an increase in net floorspace (8c) to recognise the need for increased provision of commercial floorspace.

122. Responses were as follows:

    a. Despite residents generally recognising the need for additional commercial floorpsace, residents generally consider that this additional floorpsace should be contained within the current height and density controls.

    b. Developers believe that an incentive – such as mandating a minimum commercial floorspace - needs to ensure that there is no net loss of potential residential floorspace and is an essential mechanism to ensure the delivery of the amount of commercial floorspace to deliver a sub-district centre.

Conclusions and recommendations

123. The scope of the Stage 1 analysis and recommendations has been to address the unintended impacts resulting from the new planning controls that came into effect by the State Government in March 2014.

124. Having considered the feedback from the Phase 2 consultations, Council Officers **conclude** the following:

    a. That Epping Town Centre should aim to be a Sub-District Centre in 2036 (ie. 13,000sqm of retail floorspace and 55,000sqm of other commercial floorspace) as per the *Epping Commercial Floorspace Study* prepared by SGS Economics and Planning.

    b. The urban design analysis demonstrates that a 3 storey podium is required on remaining developable sites within the town centre to achieve the target identified in the Study.

    c. In order for the Epping Town Centre to become a vibrant commercial centre, additional floorspace which enables higher rates of office and retail floor space is needed.

    d. Such controls need to be mandated and therefore, should be in the LEP not the just the DCP.

    e. That the traffic implications of increased commercial floorspace provision and associated increase in residential floorspace (should this be supported) be tested as part of the traffic study.

125. Council Officers **recommend the following principles**:

a. That further analysis be undertaken to determine the best LEP mechanism that mandates for a minimum amount of commercial floorspace within suitable locations that delivers a minimum 3 storey podium of commercial floorspace in the LEP and that this apply to all land zoned B2 without having the need to expand the B2 zone (except in the case of the site at 240-244 Beecroft Road – see below).

b. That any additional residential floorspace and height be investigated and analysed through the Traffic Study to partially recognise the proposed requirement to provide increased commercial floorspace.

c. That the SGS Economics and Planning's *Epping Commercial Floorspace Study* and Section 8.5.2 of the Epping Planning Review Discussion Paper which demonstrates that there is demand for additional retail and commercial floor space in Epping be used to inform the assessment of future development applications until more formal planning controls are in place.

Role of Government owned Sites

126. As noted in the Discussion Paper, the *Epping Commercial Floorspace Study* has identified a role where Government-owned sites could be used as part of a deliberate strategy to support the Government's 30-minute city strategy by:

a. Providing commercial floor space to offset the loss when other sites are developed; and

b. Providing floor space to allow businesses that are displaced when their existing building is being redeveloped to relocate within the centre.

127. The section below discusses the Government-owned sites that have been identified as opportunities to contribute to the 30-minute city strategy.

State Government owned sites

128. Part of Section 8.5.3 of the Discussion Paper proposes two State Government owned sites within the town centre at the following addresses to provide commercial floorspace:

a. 240-244 Beecroft Road, Epping (see **Figure 12** below); and

b. Epping Railway Station Site (see **Figure 13** below).

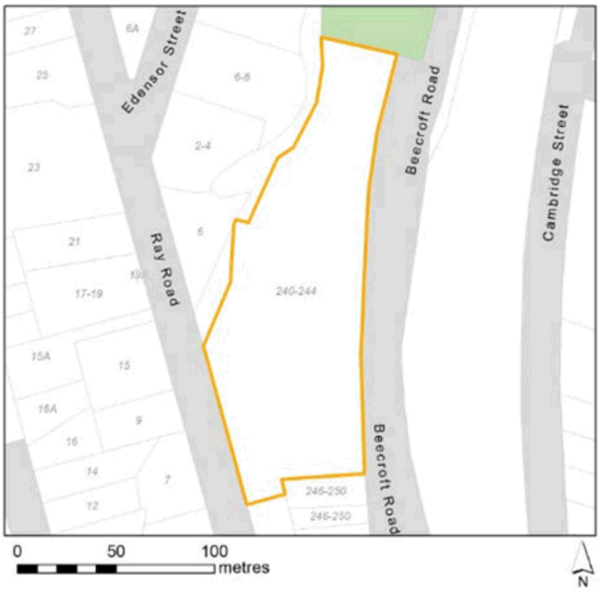

Figure 12 - UrbanGrowth NSW site – 240-244 Beecroft Road, Epping

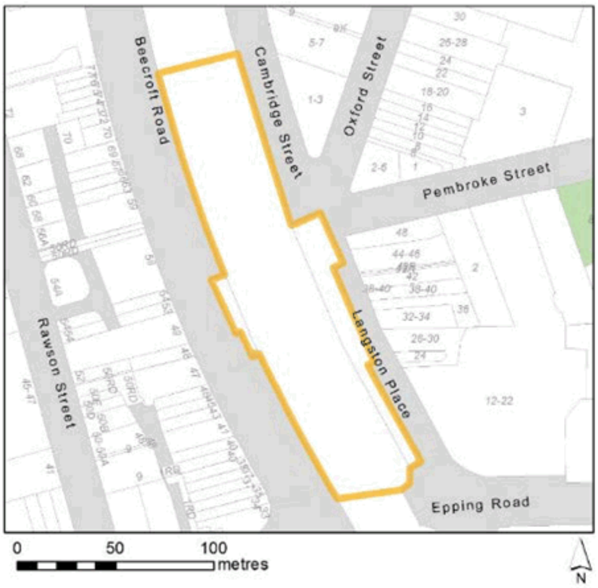

Figure 13 - Epping Railway Station site

129. The questions for each site (8e, 8f and 8g) asks the community *what contribution should each site make to the provision of commercial floor space in Epping*?

Community Feedback

130. A total of 40 responses were received on this question.

131. Community feedback received on the UrbanGrowth site at 240-244 Beecroft Road, Epping was:

   a. 19 submissions supported commercial and/or retail uses at the site, though some of these preferred commercial only, while more preferred a mix of non-residential uses.

b. Some respondents saw the site as having potential to provide commuter parking or a bus interchange.

c. Some respondents, including the land owner were of the view that the R4 High Density Residential zone was appropriate; reasons offered in support of this view included its proximity to the station and that there are other more suitable and feasible large commercial sites nearby. The landowner, a State Government agency, also questioned the need for large-scale floorplates in the town centre and at this site specifically.

132. Community feedback received on the Railway Station Site was as follows:

a. There was a high level of agreement that it could make a strong contribution to connectivity and civic space. The existing pedestrian connections through the station site were generally seen as inadequate, unattractive and inaccessible, and viewed redevelopment as a potential way to address some of these issues.

b. While there was a high level of support for use of this site for public open space and to improve public connectivity, there was less support for associated development due to concerns such as perceived overdevelopment and potential impacts on views and overshadowing.

c. While some submissions acknowledged that partnering with a developer might be necessary to realise development at this site, in general, only a low level of development was seen as acceptable – with many not accepting any level of development at all.

d. Many submissions acknowledged the technical complexity of such an undertaking, due to interface with the rail line.

Refer to a summary of the submissions at **Attachment 3.**

133. The above views were also reflected in the Community Workshop Sessions (refer to the *Epping Town Centre Review: Phase two – Exhibition period consultation* **Attachment 2**).

Conclusions and recommendations

134. The scope of the Stage 1 analysis and recommendations has been to address the unintended impacts resulting from the new planning controls that came into effect by the State Government in March 2014.

135. Having considered the feedback from the Phase 2 consultations, Council Officers **conclude**:

a. The State Government site situated at 240-244 Beecroft Road had previously been zoned B2 zone up to March 2014 when the State Government rezoned the land to residential. The amount of commercial floorspace that the site could deliver under the current controls would be tokenistic given its current R4 zone which only permits shop top housing and neighbourhood shops.

b. Large floorplate commercial is an important part of making a town centre commercially vibrant and diverse. The centre's poor offering of large floorplate commercial is identified as a disadvantage in the SGS Economics and Planning *Commercial Floorspace Study*.

c. There is limited opportunity for large floorplate commercial floorspace within the town centre.

d. The State Government sites:

i. Are large in scale (particularly the Beecroft Road site) and can make a unique offering by providing large floorplate commercial as found by the *Floorspace Study*.

ii. Can make a contribution to commercial floorspace as per the urban design analysis which recommends three storey podium of commercial development.

Each State Government site could be individually assessed for an appropriate level and type of commercial floorspace.

136. Council Officers therefore, **recommend the following principles**:

a. With regards to the site at 240-244 Beecroft Road, that:

i. That Council amends the planning controls (as discussed above) to rezone the site back to the B2 zone to ensure an appropriate contribution is made towards commercial floorspace whilst retaining current residential floorspace capacity. This may include concentrating these uses at the southern end of the site.

ii. That Council meet with UrbanGrowth NSW to discuss this proposed amendment.

b. With regards to the Epping Railway Station site, that Council Officers meet with Transport for NSW to discuss the opportunities for the site to deliver commercial development.

c. That the traffic impacts of both options need to be properly understood before finalising any changes to the planning controls.

Local Government owned sites

137. Part of Section 8.5.3 of the Discussion Paper considers two Council owned sites within the town centre at:

a. Council Car Park site at Rawson Street (see **Figure 14**); and

b. Epping Library Site (see **Figure 15**).

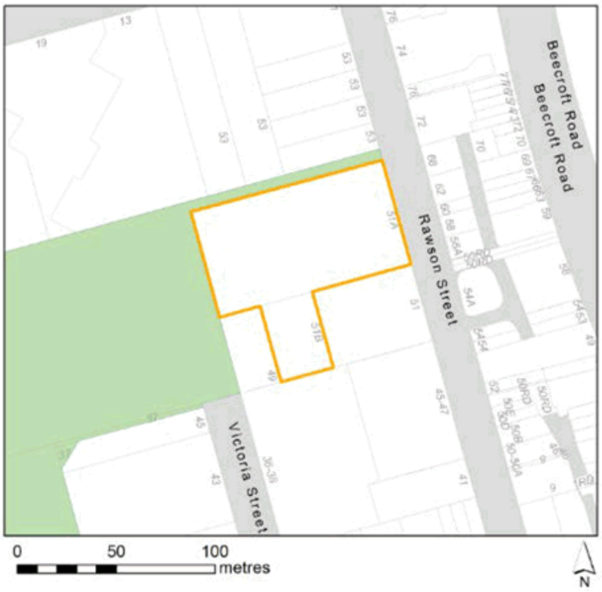

Figure 14 - Council Car Park landholding – 51A and 51B Rawson Street, Epping

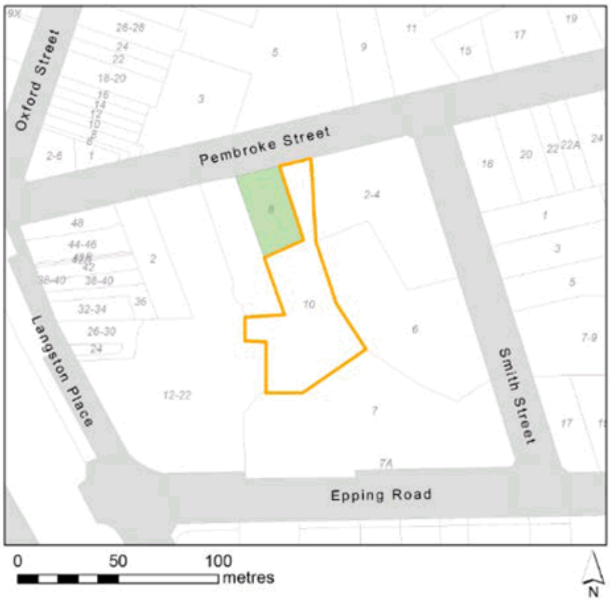

Figure 15 - Epping Library Site

138. Council has been approached by two developers to enter into an agreement to redevelop the Rawson Street car park.

139. The Epping Library site was previously identified by Hornsby Shire Council as a potential redevelopment site. Through an EOI process initiated by Hornsby Shire Council, it sought to redevelop the site with a view to being redeveloped with residential uses and a new library facility located on the lower storeys.

140. With regards to the Rawson Street car park site, the Discussion Paper recommended that the site not be identified as a site where significant commercial or retail floor space should be contemplated. If redeveloped, this site will more likely play a role ensuring that there is sufficient social infrastructure provided in the town centre.

141. The two questions – one for each site – asked:

    a. *8f. Should the Epping Library and Council car park sites play a role in providing for commercial floor space in the centre?*

    b. *8g. Should the floor space allocated to community uses and commercial floor spaces be equivalent to or greater than the levels required on adjoining equivalent sites?*

Community Feedback

142. A total of 38 responses were received on this question.

143. Community feedback received on the Rawson Street Car Park site was as follows:

    a. The predominant view was that respondents felt that the car park site should not be redeveloped to include commercial floor space. Instead an open space/plaza was preferred, in conjunction with linkages to nearby Boronia Park and underground parking.

    b. There were strong views that this site should be retained for public use only.

c. Some respondents (9) were positive about or at least willing to consider some commercial development here, some with provisos such that community facilities were maintained/increased, that height was limited, that access to Boronia Park was maintained, that such development might not be feasible given demand for commercial floor space, and that any such decision would require additional community consultation and careful consideration.

d. Refer to **Attachments 2 and 3** for a summary of the Community Workshop Session and submissions feedback.

144. Community feedback received on the Epping Library Site was as follows:

a. Views on the library site were more evenly-mixed. While 13 respondents were supportive or at least willing to consider such a proposal, 16 submissions were not supportive.

b. As with the car park, there was a frequent view that maintaining an exclusive public use on this site was important. Amongst those willing to consider a possible redevelopment, there were again provisos, such as prioritisation of community space over commercial, making space for NGOs, only with limited height potential, only with a master planning exercise, and only if community facilities were maintained or expanded.

Refer to a summary of the submissions at **Attachment 3.**

145. The above views were also reflected in the Community Workshop Sessions (refer to the *Epping Town Centre Review: Phase two – Exhibition period consultation* **Attachment 2**).

Conclusions and recommendations

146. These two Council assets are explored in more detail in the Social Infrastructure section of this Council report

147. Having considered the feedback from the Phase 2 consultations, Council Officers **conclude** in the Social Infrastructure section of this Council report:

a. Council Officers note and support the community's preference for Council to use its current assets at Rawson St and Chambers Court (Epping Library) for community uses.

b. Refer also to the Social Infrastructure section of this Council report where this asset is discussed in more detail including recommended principles.

148. Council Officers therefore, **recommend the principles**:

a. From the 'Local of Potential Civic Focal Point' section in the Social Infrastructure Chapter session of this report be applied here; and

b. That investigation take place on the potential for commercial uses on both sites and that occur in conjunction with the analysis on these sites' social/community role.

Delivering a supermarket on the eastern side of the Town Centre

149. As noted in Section 8.5.4 of the Discussion Paper, one of the issues that will impact on the future liveability of Epping Town Centre will be future residents' and workers' ability to access their daily food retail needs in a convenient manner.

150. The Discussion Paper explains that ideally there should be a supermarket provided on both sides of the rail line as supermarkets tend to be an anchor use that encourage other smaller and medium enterprises to locate nearby, providing a wider range of local uses for daily needs. A supermarket (Coles) already operates on the west side of the centre but there is no supermarket on the eastern side.

151. As the Discussion Paper explains, the planning system cannot mandate the location and operation of any business. The planning controls allocate floor space ratios and set in place planning controls that seek to create an environment for the business community to operate these types of businesses. Council cannot guarantee a supermarket would be provided, but it can put in place planning controls that promote or incentivise desirable outcomes and apply economic development initiatives to attract a supermarket tenant.

152. Supermarkets require large floorplates. On the eastern side of the Epping Town Centre, the existing lot pattern with multiple small shops requires significant lot amalgamation to occur to achieve an appropriate site. Having considered the pattern of Development Applications already in place and the possible locations for a supermarket, the Discussion Paper presents one site as ideal for a supermarket to service the eastern side of the Town Centre. The landholding (see **Figure 16**) consists of 7 sites – 38-48 Langston Place and 2 Pembroke Street – which together have a site area of approximately 2,900sqm.

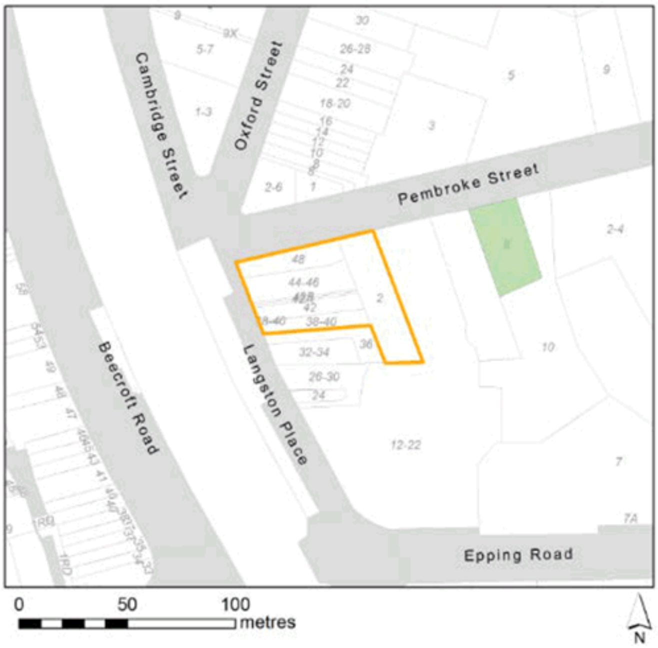

Figure 16 - Site identified within the Discussion Paper as a potential supermarket site on eastern side of Epping Town Centre

153. The question in the Discussion Paper, standard question 8h, asked *Should Council seek to actively encourage a supermarket site on the eastern side of the Epping Town Centre by providing floor space and height bonuses to incentivise the site amalgamation necessary to achieve a supermarket?*

Community Feedback

154. Specific feedback with regards to the eastern side was as follows:

a. Most respondents were positive about a supermarket on the eastern side of the rail line. There was a perception that additional residential development on the eastern side would necessitate this. As noted above, many submissions did not wish to accept height increases to incentivise this use.

b. Some alternative locations were suggested besides the one raised in the Discussion Paper, such as church and library sites on the eastern side, or at the end of Chester Street where traffic is less of an issue.

c. Few felt that supermarket options on the western side and/or nearby centres was sufficient, and that an additional supermarket was not needed on the eastern side.

155. Specific feedback with regards to the western side was as follows:

a. There were more mixed views about additional or new supermarkets, and this seemed to be affected by the fact that there is already a supermarket on the western side.

b. Most respondents did not support planning incentives to deliver a supermarket.

c. Some respondents saw supermarkets as a secondary consideration on the western side, instead considering smaller shops, services and other commercial floor space as more important.

d. Some respondents suggested that DCP controls be drafted to support delivery of a supermarket, rather than incentives.

Conclusions and recommendations

156. Having considered the feedback from the Phase 2 consultations, Council Officers **conclude and recommend the following principle**:

a. That the requirement for 3 storey commercial podium (as discussed, above) would provide additional floorpsace for commercial and retail uses that could assist in potentially delivering a supermarket on the eastern side.

Other Large Floorplate Retail Options

157. As noted in Section 8.5.4 of the Discussion Paper, Council has two Preliminary Planning Proposals seeking to increase FSR and height on sites on the western side of the Epping Town Centre. In both the proposals submitted there are large floorplate shops provided for in the lower levels. (Refer to **Figures 17 and 18**).

158. In order to achieve a role for Epping as a sub district centre, it is critical that these sites provide commercial levels in a podium and that larger floorplate shops are retained within it. The DCP currently requires up to a 4 storey podium be provided for the Beecroft Road Site (see **Figure 18**). However, the current planning controls do not contain any provisions that require the applicants to retain large floorplate outlets. There are also no controls that require a supermarket site be retained for the site on the western corner of Rawson Road and Carlingford Road

159. This type of landuse/planning control has traditionally not been specified in a DCP and instead it has been left to the market to determine the mix of retail shop sites in a development. However, it is recommended that Council strengthen its DCP controls to specify that large floorplate retail should be provided.

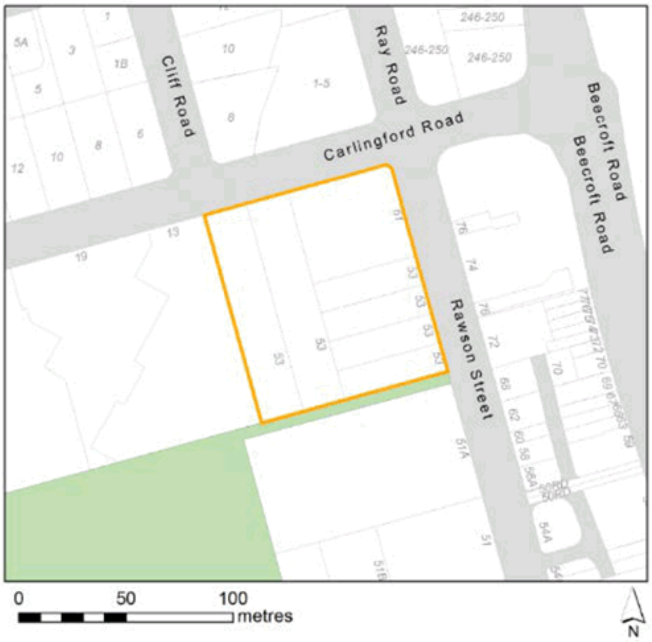

Figure 17 - Oakstand land holding

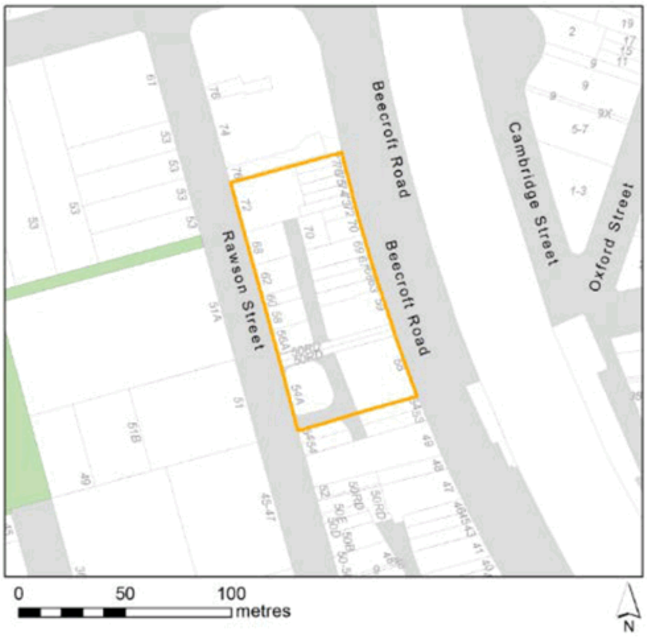

Figure 18 - Beecroft Road land holding

160. The circumstances for these sites are different to those discussed above in relation to providing a supermarket in the east. These sites have effectively already been amalgamated so there is no incentive required to promote amalgamation.

161. However, in both cases the applicants via their Preliminary Planning Proposals are seeking additional density on these sites over and above what is permitted under the current controls. There are various other issues, particularly traffic management and urban design, that need to be considered before any decision about whether these sites will be able to be developed at higher densities.

162. However, a position Council could take is that any additional density on these sites (subject to Council being satisfied it is satisfactory from a traffic and urban design point of view) would be conditional upon large floorplate shops being provided.

163. The Discussion Paper question (8i) asked: *Should Council consider floor space incentives to seek to ensure larger floorplate retail shops on these sites?*

Community Feedback

164. There was a common, though not unanimous, view that more retail options are required across Epping. However, amongst the respondents who discussed incentives, most did not want Council to consider incentives to encourage amalgamation of large floorplates.

Conclusions and recommendations

165. These two sites are subject to another standard question (11a) in the report that asks if further consideration of the Planning Proposals (including the Austino planning Proposal) be deferred until the Traffic Study is complete so the traffic implications are fully understood (see on Traffic Chapter, below).

166. Council Officers therefore, **recommend the following principle**:

    a. That the consideration of large floorplate controls be deferred until the preliminary planning proposals can be progressed. See also recommendations in Traffic Chapter, below.

SOCIAL INFRASTRUCTURE CHAPTER

167. Chapter 9.0 Social Infrastructure comes from technical work initially prepared for Council by Suter Planners and Elton Consulting on Council's social infrastructure across the City of Parramatta local government area. The analysis relevant to the Epping suburb was extracted and presented in the *Epping Social Infrastructure Study* prepared by Council which supported the exhibition of the Discussion Paper.

168. The role of the Chapter 9.0 Social Infrastructure is to identify principles that will guide future decision making on the provision of social infrastructure. The outcomes are via feedback received on the questions.

169. The Discussion Paper recognises that the process will also need to be informed by project feasibility and financial analysis prior to Council making any decisions on exactly how and where social infrastructure changes are pursued in the future.

170. The Discussion Paper looks at the areas requiring attention in Epping:

    a. Improving access to open space
    b. Location of potential future Civic Focal Point
    c. Methods for funding and delivering a potential future Civic Focal Point
    d. Dence Park - Epping Aquatic and Leisure Centre.

    These are summarised below.

Improving open space provision in Epping to 2036

171. Section 9.5.1 of the Discussion Paper discusses three issues that seek to improve open space provision to meet the Epping community's needs by 2036. These are outlined and addressed below.

Assessing where new land should be acquired for open space

172. The Discussion Paper's recommended principle is that Council look at opportunities to expand the size of existing parks over and above creating new parks. The Discussion Paper's standard question (9a.) asks: *Do you support an approach of expanding existing parks in and around Epping ahead of the creation of a new park in the area around the Epping Town Centre?*

Community Feedback

173. Feedback from both the submissions and Phase 2 Community Workshops shows very strong community support for expanding open space opportunities in Epping, though it is noted that not all submissions appeared to view this question as a choice between expanding existing parks versus creating a new park. (A more detailed summary of feedback to this question is contained in **Attachments 2 and 3)**.

Conclusions and recommendations

174. Having considered the feedback from the Phase 2 consultations, Council Officers **conclude**:

    a. The community's strong support for expanding access to open space is noted.

    b. Community sentiment reflects the directions outlined for open space (parks) in Council's draft Social Infrastructure Strategy (SIS), which is to be publicly exhibited between August – September 2017, and is expected to be finalised by the end of 2017. In relation to parks, the draft Strategy suggests no net loss of current parks and outdoor recreation space provision in the City of Parramatta LGA, to increase the utilisation and hours of use of Council's exiting parks through improvements to quality and design, diversity of offer, enhanced pedestrian, cycle, public transport connections and or parking facilities, and further to seek to increase provision of open space for parks and outdoor recreation.

175. Council Officers therefore, **recommend the following principles**:

    a. That Council should investigate a series of detailed options to ensure that all its open space needs are met for the growing Epping population.

    b. That community feedback on expanding access to open space parks in Epping be considered as an information input to inform finalisation of Council's Social Infrastructure Strategy and the preparation of an Organised Sporting Asset Assessment Report (OSAAR) which is currently being drafted.

Acquisition of former bowling club site (725 Blaxland Road)

176. The Discussion Paper explains that a Planning Proposal by Austino Property Group applies (in part) to the former Epping Bowling Club site situated at 725 Blaxland Road (refer to **Figure 19** below). The site is currently zoned RE1 Public Recreation zone and identified for acquisition on the Land Reservation Map in *HLEP 2013*.

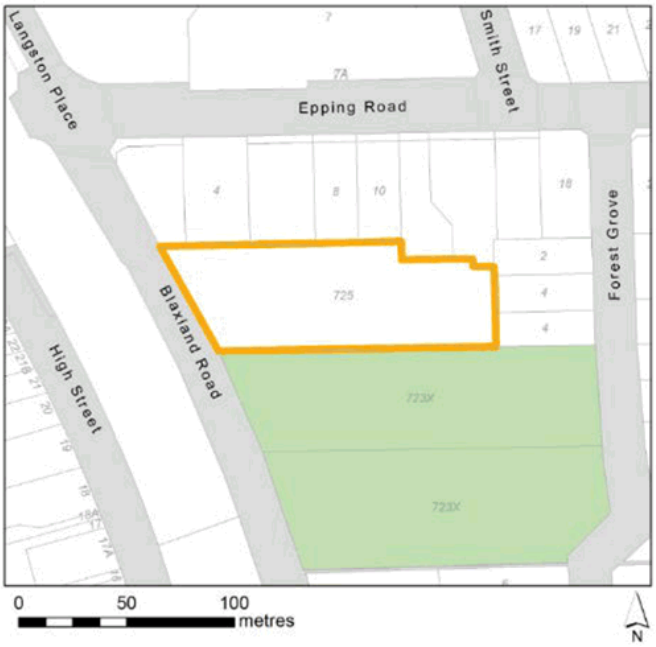

Figure 19 - Former bowling club site – 725 Blaxland Road, Epping

177. Despite this, the Hornsby Council concluded in April 2016 that the purchase of the site for the purpose of expanding Forest Park *is unlikely to represent value for money when compared with alternative open space options within the locality.*

178. The applicant's planning proposal is currently proceeding through the Department of Planning and Environment's Pre-Gateway Review process. In November 2016, Council nominated to be the relevant planning authority (RPA) in order to have influence over the outcome. It did so on the condition that the Gateway Determination is issued after the exhibition of the Discussion Paper and technical studies. However, because the Traffic Study is not yet complete, Council is reluctant to determine the planning proposal until the proponent's proposed density has been tested within the traffic model. Regardless, at any point, the Minister for Planning can withdraw Council's status as the RPA and take full control of the planning proposal process and progress it in a way that may not fully address Council's or the community's concerns.

179. The Discussion Paper's standard question (9b.) asks: *Should Council purchase the former Bowling Club site separate from the current Planning Proposal process or continue to consider the Planning Proposal option that it be provided to Council subject to additional density being permitted on the existing landowners site?*

Community Feedback

180. Feedback from both the submissions and Phase 2 Community Workshops shows very strong community support in favour of purchasing the Bowling Club and for Council to not progress the Planning Proposal. (A more detailed summary of feedback to this question is contained in **Attachments 2 and 3)**.

Conclusions and recommendations

181. Having considered the feedback from the Phase 2 consultations along with Council's analysis, Council Officers **conclude**:

a. Council's Property officers have since undertaken an indicative assessment of the valuation of the site and determine that its value is cost prohibitive. The analysis further finds that Council would achieve better value for money by purchasing individual residential R2 zoned properties elsewhere near the town centre for a new park. Indicative costing of this alternate approach is provided within the *Draft Former Hornsby Council/Epping Town Centre Development Contributions Plans* which are scheduled to be exhibited from August to September 2017.

b. That should the planning proposal progress, that Council negotiate with the developer for the provision of public open space appropriately located and sized on the site.

182. Council Officers **recommend the following principle**:

a. That Council should seek to progress the planning proposal with Council as the RPA subject to the Traffic Study being completed before FSRs for the site can be finalised. That Council also negotiate with the developer for the provision of public open space in a way that ensures there is a suitable area of open space which is appropriately sized and located.

Note: Refer also to the response to question 11a pertaining to *Consideration of Planning Proposals/Preliminary Planning Proposals*.

Process for acquiring open space

183. As noted within the Discussion Paper, Council will, as part of future phases of the planning process (initiated via the Discussion Paper) commence the feasibility analysis for identifying potential residential sites that could be acquired to expand existing parks. Consultation with land owners will precede any rezoning because in most instances they will be single detached homes. It will be necessary to explain to the occupants/owners the impacts on their property value, their ability to sell their site and the ability to stay on the site.

184. The Discussion Paper's question (9c.) asks: *Do you support Council pursuing a process where acquisition of land for open space is done on the basis of negotiated acquisition rather than compulsory acquisition?*

Community Feedback

185. With regards to the submissions received, there were mixed responses. Whilst respondents generally supported negotiated acquisition over compulsory acquisition, many other respondents expressed:

a. support for compulsory acquisition in limited circumstances only;

b. negotiated acquisition for private homes but compulsory at development sites;

c. support for any option which would increase open space; and

d. strict opposition to compulsory acquisition.

A more detailed summary of feedback to this question is contained in **Attachment 3**.

186. With regards to the Phase 2 Community Workshop, the predominant response supported negotiated acquisition with a few respondents not supporting the idea. (A more detailed summary of feedback to this question is contained in

Straight Talk's *Epping Town Centre Review: Phase two – Exhibition period consultation* report at **Attachment 2)**.

Conclusions and recommendations

187. Having considered the feedback from the Phase 2 consultations, Council Officers **conclude**:

    a. Council has prepared a Council wide draft *Social Infrastructure Strategy* (SIS) which is scheduled for exhibition from August to September 2017. The draft SIS: *identifies and assesses existing social infrastructure provision in City of Parramatta LGA. It identifies contemporary challenges we have for realising quality social infrastructure, and finally key opportunities and directions by asset type (including open space) and for City of Parramatta's 13 high growth areas (which includes Epping). This draft Strategy applies to our unique and diverse neighbourhoods as well as our CBD.*

    b. Council is also preparing an *Organised Sporting Asset Assessment Report* (OSAAR). The OSAAR will further assist Council to understand the specific challenges and opportunities that existing with each of our sports fields and determine the priority actions to take to increase provision and utilisation of our sports field open space. This will include sports fields in the suburb of Epping.

    c. The Discussion Paper process which constitutes Stage 1 of the Epping Planning Review aligns with the approaches being undertaken for the draft SIS and OSAAR, both of which are about increasing access to green open space.

188. Council Officers therefore, **recommend the following principle**:

    a. That the findings, analysis and feedback from Stage 1 of the Epping Planning Review process relating to the process for acquiring open space be considered as part of the preparation of the final SIS and OSAAR projects

<u>Utilising existing land more effectively</u>

189. The Discussion Paper explains that there are a number of factors that determine the level of intensity of use of a local park or sports field, to ensure it can be used by the community without being degraded. Two key factors are the amount (or type) of landscaping on the site, and the level of maintenance required. The Discussion Paper provides two examples:

    a. re-configuring landscaping in existing parks could enable more active uses (including both unstructured play and organised sporting activities) while also accommodating for the needs of residents who want to use parks to passively enjoy the outdoors.

    b. provide a different surface treatment to playgrounds and sporting fields to accommodate a higher level of use, such as the use of synthetic sporting surfaces.

190. The Discussion Paper's question (9d.) asks: *Are you supportive of Council investing in improved landscaping and equipment in parks and sporting fields, including investigating synthetic surfaces for sporting fields to cater for more intensive use?*

Community Feedback

191. Feedback from both the submissions and Phase 2 Community Workshops revealed there was unanimous community support for improving landscaping, equipment and parks in Epping. There were mixed views on synthetic surfaces, with some accepting and some against their use. The community urged a site-by-site consideration of parks with additional consultation to make future decisions about improvements to parks and sports fields. (A more detailed summary of feedback to this question is contained in **Attachments 2 and 3**).

Conclusions and recommendations

192. Having considered the feedback from the Phase 2 consultations, Council Officers **conclude**:

    a. Council Officers recognise that the community of Epping support the upgrade and increased utilisation of parks and sports fields. Council Officers also acknowledge that there is mixed opinion for synthetic sports fields.

    b. The sports fields in the suburb of Epping must be analysed and planned within the context of the overall sports field network in the CoP LGA.

    c. Council has prepared a draft SIS which is scheduled for exhibition from August to September 2017. Work has also commenced on an LGA wide detailed organised sporting asset assessment (ie. the OSAAR).

    d. As part of the above documents Council will consider the use of synthetics and other options to increase utilisation and access to sports fields, as well as upgrades to parks within Epping.

193. Having considered the feedback from the Phase 2 consultations, Council Officers **recommend the following principle**:

    a. That the responses provided as part of the Phase 2 consultation process for the Epping Planning review relating to landscaping and synthetic surfaces for parks will inform the finalisation of the Social Infrastructure Strategy and Organised Sporting Asset Assessment Report. The intention is to finalise the SIS by the end of 2017.

Establishing partnerships to make better use of existing facilities

194. Large institutional landowners, including government and non-government schools, provide opportunities for Council to facilitate partnerships with local community organisations (such as amateur sports clubs) to make better use of existing facilities for the local community. In the case of schools, many children within the Epping community use their schools' open space areas during the week, but are unable to use the same fields on the weekend in organised sporting activities by non-school groups. The way in which schools are fenced off, and the way landscaping is used to prevent access is important to ensure the safety and supervision of students during school days, however there is an opportunity to consider further community use of schools' sporting fields.

195. Council considered a report on 13 June 2017 where it resolved to enter into a Memorandum of Understanding (MOU) with the NSW Department of Education (DOE). The associated Investigation Program identifies seven action areas that together form the basis of Council's initial work with DOE:

    a. Increase community access to sports fields.

    b. Establish formal arrangements between DOE and Council to continue use of Carlingford High School sports fields.

c. Increase community access to school halls and related facilities.

d. Increase community access to library facilities.

e. Proactive joint planning for the growth of Telopea and the shared use of school facilities and community assets.

f. Proactive joint planning and preparation to support the opening of Wentworth Point Public School.

g. Proactive joint planning of a primary school in the Carter Street Precinct.

196. The Discussion Paper sought feedback on how this MOU should be pursued in the Epping area through question 9e. *Which schools should Council pursue in the Epping area to progress the MOU between Council and the Department of Education to improve the availability of sporting fields?*

Community Feedback

197. The community's views from both submissions and the Phase 2 Community Workshops were as follows:

a. There is broad support for use of school facilities.

b. Some respondents query some of the detail about which schools and which facilities.

A more detailed summary of feedback to this question is contained in **Attachment 3**.

Conclusions and recommendations

198. Having considered the feedback from the Phase 2 consultations, Council Officers **conclude**:

a. That there is broad support for Council to work with schools to increase community use of school assets.

b. Council is commencing implementation and this includes investigating the suitability of individual schools and assets for community use.

c. Initial actions will focus on analysing the suitability of sports fields on specific school sites.

199. Council Officers therefore, **recommend the following principle:**

a. That the detailed community feedback provided as part of the Phase 2 community engagement process for the Epping Planning Review inform the implementation of the MOU with the DOE.

Location of potential future Civic Focal Point

200. Section 9.5.2 of the Discussion Paper defines a **Civic Focal Point** as comprising:

a. A library and community facility floor space; and

b. A public urban plaza.

201. The Discussion Paper (and *Epping Social Infrastructure Study* which supports the Discussion Paper) identifies:

a. That to meet the needs of a larger population living in a higher density environment by 2036, the Study recommends the provision of a 3,500sqm multi-purpose facility based on the Community Hub model (involving library and community facility floor space). This could include the co-location of an expanded library offering, as well as community meeting rooms, study areas, community programming facilities and the like.

b. That the 550sqm Epping library facility requires an additional minimum 1,000sqm to meet current population needs.

202. The Discussion Paper subsequently proposes three options for a civic focal point within the Epping Town Centre:

a. Rawson Street car park site (refer to **Figure 14**);

b. Epping Library site (refer to **Figure 15**); or

c. Two civic focal points each with a range of services.

203. The Discussion Paper then presents the Council Officer recommendation which is for Option 1 – Rawson Street Car Park site *as the site is better able to accommodate a Community Facility Hub and Civic Space in a way that can be integrated into the broader pedestrian network and town centre. ...[it] does not result in the loss of any existing community facility given that the public car park can be located underground below the new Community Facility Hub whereas the Epping Library Site and Pembroke Park would result in the loss of local open space if Pembroke Park was converted into a more formalised Civic Space.*

204. The city-wide Draft Social Infrastructure Strategy which is scheduled to be exhibited from August to September 2017, identifies the need to locate and plan for a civic focal point within the Epping Town Centre.

205. The Discussion Paper asked three questions relating to a Civic Focal Point:

a. Questions 9f. and 9g. asked: *Where is your preferred location for a Civic Focal Point incorporating a Community Facilities Hub and some form of Civic Space?* and *Why is this your preferred location?*

b. Question 9h. asked*: Would you support existing community facilities sites being sold to assist with funding a new consolidated single community hub to provide a higher quality community facility somewhere else within the Epping Town Centre?*

c. Question 9i. asked*: Should Council seek to develop Council-owned sites to maximise the funding available to deliver a new Civic Focal Point?*

The responses to the above questions pertaining to a Civic Focal Point are consolidated below.

Options for funding and delivering a potential future Civic Focal Point

206. Section 9.5.3 of the Discussion Paper proposes three options for funding and delivering a potential future Civic Focal Point:

a. Selling land that becomes surplus to requirements if a single Civic Focal Point is built;

b. Maximise the development potential of sites to assist with funding a Civic Focal Point; or

c. Allowing additional density to secure a new Civic Focal Point.

These are discussed below.

<u>Selling land that becomes surplus to requirements if a single Civic Focal Point is built</u>

207. As noted within the Discussion Paper, all Council-owned sites located within the town centre have some development potential for which Council could realise value by selling the site for redevelopment. Council could seek to sell any number of sites it currently owns to provide funding for delivery of the community infrastructure discussed in this section.

208. The purpose of selling sites would not be to reduce the level of services. Instead, the strategy would be to provide improved services in a more efficient way on a consolidated site.

Maximise the development potential of sites to assist with funding a Civic Focal Point

209. As noted within the Discussion Paper, one option for funding the provision of Community Infrastructure is for Council to realise the value of land holdings in a way that provides the community with a financial return that can be used to assist with funding the new Civic Focal Point (the EOI process that Hornsby Shire Council undertook before the Local Government boundary changes that saw Epping included in the City of Parramatta is an example which involved the Council finding a partner to develop a site). Another avenue can be through a planning proposal process involving Council owned land. Two Preliminary Planning Proposal examples were provided in the Discussion Paper.

210. The redevelopment of Council owned land in partnership with other partners can deliver significant community benefits that will allow the delivery of community infrastructure in a more financially sustainable manner. The Discussion Paper seeks feedback on whether the community is comfortable with this approach.

211. The Discussion Paper's question (9i.) asks*: Should Council seek to develop Council-owned sites to maximise the funding available to deliver a new Civic Focal Point?*

Allowing additional density to secure a new Civic Focal Point

212. The Discussion Paper notes two Preliminary Planning Proposals, for sites adjoining the Rawson Street Carpark Site. Both propose an increase in the overall density permitted on their site and both proposals seek to underground the carpark, and provide community facilities and a civic space.

213. The Discussion Paper's question 9j. which asks the community to consider a trade-off between timely provision of community facilities against additional density being permitted in the town centre, was: *Are you willing to accept further increases in density in the town centre if it would assist with funding a new Civic Focal Point?*

Community Feedback

214. Community feedback received from the submission process and Phase 2 Community Workshops on questions 9f, 9g and 9h pertaining to a Civic Focal Point indicated mixed views:

    a. The most common response was a preference for two sites (and of these, most expressed support for the Rawson Street Car Park and Library sites). The key reasons for this included a preference for having different sites for different uses and a perception of "fairness" across both sides of the rail line.

    b. Of those who preferred a single site, the most common response was the Rawson Street Car Park site. The main advantages for this site were seen to be access, site size, parking and proximity to Boronia Park.

c. There was proportionately more support for Council seeking to develop Council-owned sites, than for selling existing community facilities or accepting further increases in density from the Phase 2 Community Workshops. This feedback was more supportive of such redevelopment models of Council-owned sites.

215. Refer to Straight Talk's *Epping Town Centre Review: Phase two – Exhibition period consultation* report at **Attachment 2**.a more detailed summary of feedback at **Attachment 3**.

Conclusions and recommendations

216. Having considered the feedback from the Phase 2 consultations and submissions, Council Officers **conclude**:

a. Council Officers note and support the community's preference for community facilities on both sides of the railway line.

b. Council Officers note and support the community's preference for Council to use its current assets at Rawson St and Chambers Court (Epping Library) for community uses.

c. Council officers note that there was no clear preference over the three options. However most support was given to the "developing council owned sites" option.

217. Council Officers therefore, **recommend the following principles**:

a. That Council utilise its assets at Rawson Street car park and Chambers Court to provide community infrastructure and civic focal points on both sides of the town centre.

b. That Council seek to develop a community hub (defined above) but on one of the sites and other adjunct uses for the other site.

c. That there be no net loss of community facility floor space overall in Epping.

d. That Council seek to increase the utilisation of all of Council's current assets in Epping for the broader community.

e. That further feasibility testing of Council owned land assets should be undertaken (including additional community consultation) to develop options - including a Community Hub (defined in the Discussion Paper as *a facility incorporating a library and community facility floor space*) and public urban plaza - and potential funding mechanisms for community facilities in Epping.

Dence Park – Epping Aquatic and Leisure Centre

218. Council's *Social Infrastructure Study* identifies that the Dence Park – Epping Aquatic and Leisure Centre is aging and has accessibility issues which means it does not meet current standards for this type of facility. Hornsby Shire Council considered the option of closing the centre at the time the pool was its responsibility.

219. Section 9.5.4 of the Discussion Paper acknowledges that as part of the development of a community facilities strategy, Council will need to determine what role the Epping Aquatic and Leisure Centre might play. For instance, should the centre be redeveloped or modernised as an aquatic centre, or put to an alternate community use.

220. Through the Phase 1 community consultation process, it was clear the facility is a beloved community asset to sections of the Epping community. However, despite this impassioned position, usage levels of this facility have been in decline over the longer term, except in the last year where usage levels had actually increased since City of Parramatta took ownership.

221. The Discussion Paper noted the strengths and the weakness of the site. The strengths are that Council owns the land and that Council will open the pool for the October 2017 summer season. The weaknesses of the site are that:

    a. The Centre is aging, needs significant upgrading, and is at risk of significant infrastructure failure

    b. It lacks visual prominence,

    c. It is in a bushfire-prone site,

    d. Is underutilized, and

    e. The topography of the site makes modernising the site a relatively expensive exercise and impacts on its accessibility.

222. Adjoining bushland along Terrys Creek is a key wildlife corridor (confirmed in recent bushland fauna surveys).

223. The Discussion Paper's question (9k) asks: *What should be the future use of the Dence Park Aquatic Site?*

Community Feedback

224. The feedback from both the submissions and Phase 2 Community Workshops showed there was very strong community support to retain Dence Park for public and recreational uses. There was also strong community support to retain the swimming pool, and perhaps increase/improve it in some capacity with an expanded indoor fitness centre or similar uses. Furthermore, many respondents highlighted the environmental conservation value of the bushland and the need for its retention along with carefully selected passive recreational uses.

Conclusions and recommendations

225. Having considered the feedback from the Phase 2 consultations, Council Officers **conclude**:

    a. Council's Draft SIS which is being exhibited from August to September 2017 draws attention to the LGA-wide issues pertaining to the overall aquatic infrastructure/network.

    b. Adjoining bushland along Terrys Creek requires protection and there needs to be a restriction on the expansion of Dence Park aquatic facility.

226. Council Officers therefore, **recommend the following principles**:

    a. The feedback obtained from the Phase 2 consultation process be considered and integrated into the exhibition process for the Draft SIS.

    b. A master plan process be undertaken for the entire Dence Park site, giving consideration to the future options for aquatic and other water related activities for the Epping Aquatic and Leisure Centre, as well as increasing the overall recreation uses of the site and adjoining sensitive bushland.

PUBLIC DOMAIN CHAPTER

227. The intense growth within the Epping Town Centre has presented Council with the opportunity to review aspects of the centre's public domain, identify opportunities for improvements and present these to the community for discussion. The feedback and direction will also assist Council in advising Development Application and Planning Proposal applicants until new planning controls can be formulated. The areas requiring immediate attention are pedestrian connections and footpath widths.

228. Numerous urban design themes have been consistently raised throughout the consultation process on:

    a. Pedestrian connections - That pedestrian connections should be:

        i. created or improved either between or through blocks;

        ii. improved between different land uses and attractors (i.e. the centre and open space areas);

        iii. created at mid-block where block lengths were long; and

        iv. improved to form linkages from one side of the centre to the other.

    b. A vibrant centre – The community are enthusiastic about the possible future of Epping. They want their town centre to reflect the vibrant, friendly, community which they are familiar with.

    c. Enable liveability - The community see that future infrastructure planning needs to "enable liveable town centres" as an overarching principle.

229. The Discussion Paper subsequently presented two public domain issues:

    a. Through-block connections, streets, laneways and arcades and shareways; and

    b. Wider footpaths (which pertain to building setbacks).

230. The Discussion Paper asked two questions each were supported by a diagram:

    a. 10a. *Are there any other through site links outside of those that are already proposed in Figure 30 that should be considered by Council?* and

    b. 10b. *Do you think the new ground floor setbacks proposed in Figure 31 for Epping Town Centre are appropriate?*

Community Feedback

231. Community feedback (from 23 submissions) received on the through-block connections indicated the following:

    a. Some submissions broadly reflected that any and all links should be encouraged, in order to improve safe and pleasant access across the town centre.

    b. Many submissions also identified specific existing links that they wished to see reflected in the map.

    c. Some submissions proposed:

        - extensions to existing links, and/or
        - where a new link could be created.

232. Community feedback (from 21 submissions) received on wider footpaths said the following:

    a. The majority of submissions were supportive of the new ground floor setbacks proposed in the discussion paper.

    b. Some submissions noted that having setbacks which are consistent are important, and noted that the desired setbacks are not being achieved consistently through current controls (particular concern about current redevelopment at 35 Oxford Street).

    c. Some respondents felt that setbacks should be further increased (for example, on Oxford Street, Epping Road and Beecroft Road); justifications included that increased setbacks might provide space for larger trees, and that footpaths will continue to get busier in the town centre as Epping grows and that this could present safety and accessibility risks – particularly to those with limited mobility. Trees were seen in some submissions as being important to Epping's character, as well as having shading, cooling and aesthetics benefits.

    d. Some respondents also asked Council to consider cycling movement through Epping, as increasing bicycle trips could improve traffic issues.

    e. A couple of respondents were not supportive, as it was felt that the current setback situation is adequate.

    f. One developer was also not supportive of the proposed setbacks and instead proposed that setbacks be flexible in order to accommodate large retail/commercial floorplates at podium levels, should be determined at a master planning stage, and that having tightly controlled setbacks might not achieve the best outcome in all cases.

233. Refer to **Attachment 3** for a summary of the submission responses. Also, Public Domain matters were not covered by the Community Workshop Sessions.

Conclusions and recommendations

234. Having considered the feedback from the Phase 2 consultations, Council Officers **conclude**:

    a. There are a number of opportunities to improve the public domain in terms of delivering through-block links and wider footpaths.

    b. The best mechanism for delivering public domain initiatives is via new DCP controls (where appropriate) and a revised public domain plan.

235. Council Officers therefore, **recommend the following principles**:

    a. That as part of Stage 2 of the Epping Planning Review, that Council prepare appropriate DCP controls and a public domain plan that deliver through-block links and wider footpaths.

TRAFFIC CHAPTER

236. As noted on the Discussion Paper, Council has commissioned EMM Consulting to prepare a Traffic and Land Use Options Study (Traffic Study) to provide an evidence-based approach to the assessment of existing and future traffic conditions with different development scenarios for the Epping Town Centre and surrounds, including potential infrastructure improvements.

237. The Traffic Study builds on traffic study work which was carried out previously by Halcrow in 2011 on behalf of Hornsby Shire Council, the former Parramatta City Council and the Department of Planning and Environment as part of the proposed new planning controls implemented by the Department of Planning and Environment in 2014.

238. There are significant concerns from the community around the impacts of the additional residential densities permitted under the 2014 planning controls given the additional population envisaged and the subsequent impacts on an already congested and constrained road network. There is also increasing developer pressure to increase residential densities (through Planning Proposals) beyond that permitted under the existing planning framework.

239. EMM prepared *an Interim Traffic Modelling Report* which was exhibited as supporting information to the Discussion Paper. It included preliminary analysis to provide an indicator of the issues and options available to allow discussion of these issues as part of the exhibition process.

240. The preliminary advice concludes that regardless of what land use density options or road work improvements are put in place there is little scope for significant improvements to the way the road network operates in the Epping Town Centre without new and additional policies to reduce car usage and shift more trips that currently come through the centre by car onto public transport modes.

241. This chapter of the Discussion Paper presented six questions that play a role in developing the scenarios for the purposes of the traffic model exercise.

Consideration of Planning Proposals/Preliminary Planning Proposals

242. The Discussion Paper explains the level of developer interest in the Epping Town Centre with three planning proposal under assessment and other land owners also expressing a desire to seek uplift.

243. The standard question (11a) asks: *Should Council delay the processing of current and future Planning Proposals within the Epping Town Centre and surrounds until the Traffic Study is completed?*

Community Feedback

244. This matter received a total of 103 submissions - the most received for any standard question.

245. The predominant view (94 submissions) is overwhelmingly in favour of delaying the progression of any planning proposal including existing planning proposal, preliminary planning proposals and future planning proposals.

246. The majority of submissions to this question also raised concerns about existing traffic congestion in Epping (particularly around the Town Centre). Specific matters raised included:

    a. Residential growth has already outpaced the original traffic review carried out by Hornsby Council.

    b. There is a need to address traffic flows in and out of North Epping before further major developments are started.

    c. The volume of traffic has already increased markedly over the past decade and this is significantly detracting from the amenity of the Town Centre, with current levels of congestion only likely to worsen.

d. A workable traffic solution for existing problems needs to be developed by Council and the RMS before any future Planning Proposals should be considered.

247. There was a broad view that further traffic analysis is required, and commentary on the Traffic Study was offered. Many submissions suggested that any additional impact from Planning Proposals (both current and future) needs to be carefully studied and understood, and that Council should not delay pending traffic studies.

248. A few submissions mentioned that the quality of the recommendations in the Traffic Study will depend on the quality of the assumptions made during the modelling performed. It was suggested that the Traffic Study should be peer reviewed and made available for public comment prior to finalisation. One submission recommended that the Traffic Study should assess usage and movement patterns in areas such as Cliff Road.

249. A total of 16 respondents specifically recommended that the Austino Planning Proposal be placed on hold until the Traffic Study is finalised, citing concerns about the level of density and the impact on local area traffic. In contrast, a developer submission from Austino strongly disagreed that current planning proposals be delayed until the traffic study is completed; this submission stated that this is currently the only major site in Epping that has been determined to have strategic merit by the NSW Department of Planning and Environment, the JRPP, and has been supported on traffic grounds by the RMS.

250. Some community responses sought to also delay development applications. However, under the *Environmental Planning and Assessment Act 1979* this is not legally possible. This position has been reinforced by Council's Administrator at the public launch of the Epping Planning Review in December 2016 as well as at subsequent community consultation sessions.

251. The above views were also expressed at the Community Workshop Sessions. Refer to **Attachments 2 and 3** for a summary of the Community Workshop Session and submissions feedback.

Conclusions and recommendations

252. The scope of the Stage 1 analysis and recommendations has been to address the unintended impacts resulting from the new planning controls that came into effect by the State Government in March 2014.

253. The Epping Town Centre currently experiences significant traffic delays during morning and afternoon peaks as a result of the significant amount through traffic as well as increased residential densities resulting from the new planning controls implemented in 2014. Until the traffic impacts of allowing increased development above and beyond current planning controls are properly understood (including the cumulative impact of current and potential planning proposals), any planning proposal should not be finalised.

254. Having considered the feedback from the Phase 2 consultations, Council Officers **conclude**:

a. Council has deferred consideration of a Planning Proposal and two Preliminary Planning Proposal processes on account of the work being undertaken by the Epping Planning Review:

i. The Austino Planning Proposal seeking to deliver an additional **272 dwellings**.

ii. The Oakstand Preliminary Planning Proposal seeking to deliver an additional **922 dwellings***.

iii. The Winten/Lyon Group Preliminary Planning Proposal seeking to deliver an additional **584 dwellings***.

Note: with regards to the two preliminary planning proposals, it is accepted that the dwelling numbers as currently proposed cannot be delivered simultaneously as both proposal seek to develop Council's car park.

b. In addition to the above, Council is aware of at least two other land holders potentially looking to pursue a planning proposal process. Therefore, there is an urgent need to understand the traffic issues prior to advancing proposals that seek development growth above the March 2014 planning controls.

c. The Epping Town Centre has been doing a lot of the "heavy lifting" for the residential growth in this vicinity of Sydney. With the number of planning proposals and precinct planning projects across the LGA before Council, Council does not require any further uplift in Epping for the purpose of meeting its housing targets as expressed in the Greater Sydney Commission's *Draft West Central District Plan*. Also, as has been made clear, the scope of the Epping Planning Review has been to address the failings of the planning system that came into effect in March 2014. As such, additional requests for rezoning (received through the submission process) will not be considered as part of the Epping Planning Review.

d. The pace of change is having a significant impact on the Epping residents. Council should therefore continue to manage any further formal requests for uplift (eg. planning proposal applications) outside of the Epping Planning Review process and be subject to the Epping Traffic Study which is still being completed.

e. The scope of the traffic analysis has been undertaken to better understand the traffic impacts of any growth, not necessarily to enable any further growth within the Town Centre. Therefore, there is no urgency or need for Council to consider individual requests for uplift as part of the Epping Planning Review process. Instead, that applicant's seeking uplift should do this via a formal planning proposal process.

f. There is some urgency in bringing about the planning control changes to address the unintended impacts associated with the new planning controls that came into effect in March 2014 as soon as possible. The inclusion of other landowner sites within the Stage 2 process will only cause further delay to this process.

255. Council Officers therefore, **recommend the following principles:**

a. That Council continue to manage and progress the current planning proposal (Austino) given the potential risk of not being the Relevant Planning Authority (ie. the State Government becoming the Relevant Planning Authority). As mentioned previously, this is to ensure that Council's and the community's concerns and issues are addressed (eg. open space – refer to 'Acquisition of former bowling club site (725 Blaxland Road)' in Social Infrastructure section (ie. Response to question 9b). However, should the proposal proceed to Gateway Determination, that Council request that a condition be placed on the

Gateway to ensure that the proposed FSRs for the site cannot be finalised until the Traffic Study is completed.

b. That following the Local Government elections in September 2017, the new Councillors be consulted and briefed on the progress of the Epping Planning Review and the community feedback received with regards to the future of the Rawson Street Car Park. This will enable Council officers to engage with the applicants of the 2 Preliminary Planning Proposals (Winten Lyon and Oakstand) to allow these proposals to be further considered.

c. That other landowners seeking to pursue development uplift will need to pursue this via a formal planning proposal process and not through the Epping Planning Review process.

d. That the Traffic Study must be completed to ensure that the traffic impacts of proposals seeking development uplift (with the exception of those changes proposed to deal with the unintended impacts of the previous UAP planning process) within Epping can be properly understood prior to any proposal being finalised. Furthermore, unless innovative solutions or initiatives that significantly curb or restrict car ownership/movements are incorporated as part of the development, that proposals seeking uplift will not be able to progress or be further considered given current traffic issues in Epping. Notwithstanding the above, any proposed parking/vehicle management solutions need to be assessed via the Traffic Study in order to determine its impact on the wider road network.

Car Parking Rates

256. Section 11.7.2 of the Discussion Paper explains the inconsistency between the parking rates between the Hornsby and Parramatta DCPs and the need to make them consistent. The Discussion Paper notes that parking rates should be reviewed and potentially further reduced to encourage residents to use public transport and other active transport modes.

257. The objectives around reducing car parking rates in DCPs is to minimise local car ownership and decrease private motor vehicle use.

258. The Discussion Paper's question (11b.) asks: *Should Council consider further reducing car parking rates as a means to reducing traffic within the Epping Town Centre and encourage public transport usage?*

Community Feedback

259. Community views (from a total of 38 respondents) were mixed with just over half of submissions not supporting this approach to reducing traffic.

260. Respondents that were not supportive (22) were of the view that reduced availability of car parking spaces will result in more on-street parking. Several believed that the current parking rates were reasonable and should not be changed. Some were sceptical on whether this would actually work in terms of reducing car ownership, and felt a more effective approach to reducing congestion would be to limit development instead.

261. Respondents that were supportive (11) generally took the view that the number of cars on the roads need to be reduced, with some supporting any measure to reduce the traffic load on Epping. Some submissions which were broadly supportive did note that reduced rates would be more appropriate for residential uses than for retail and service providers.

262. Many submissions were of the opinion that owning a car is necessary and that people cannot rely on public transport. These submissions mentioned that the new residents will need cars to move families around to libraries, school, after school activities, pick up from the station etc.

Conclusions and recommendations

263. The scope of the Stage 1 analysis and recommendations has been to address the unintended impacts resulting from the new planning controls that came into effect by the State Government in March 2014.

264. Having considered the feedback from the Phase 2 consultations, Council Officers **conclude**:

   a. That given the results of the interim traffic findings, reducing car parking rates is an important planning and traffic mechanism that can contribute towards the reduction of local car ownership and alternatively promote active and public transport options through and within Epping.

265. Council Officers therefore, **recommend the following principles**:

   a. The car parking rates across the Hornsby and Parramatta DCPs be reviewed to determine appropriate lower parking rates.

   b. That any proposed lower parking rate be tested as part of the traffic modelling in the Epping Traffic Study before changes are finalised.

   c. That further to points a. and b. above, an interim step towards reducing parking rates could be to amend Hornsby DCP parking controls (which have minimum parking rates) to be in line with Parramatta DCP parking controls (which have maximum parking rates).

Commuter Parking Station

266. Section 11.7.3 of the Discussion Paper explains that a number of stakeholders suggested that Council should either provide or lobby the State Government to provide commuter parking near the Epping Station. The argument put forward by proponents is that this would clear surrounding streets of commuter parking and improve access to local shops for local people.

267. Commuter parking at train stations is a complex issue that depends very much on local context. It is acknowledged that allowing people to drive to stations to use public transport is decreasing the length of cross-city vehicle trips and increasing the length of public transport trips which is to be encouraged. However, the provision of commuter car parks can have other unintended impacts unless it is implemented sensitively and in appropriate locations.

268. Again, the objectives around the car parking policy for the Epping Town Centre is to minimise local car ownership and decrease private motor vehicle use.

269. The Discussion Paper's question (11c.) asks: *Is there a suitable site for which Council should lobby the State Government to have a commuter parking station provided near Epping Station?*

Community Feedback

270. A total of 38 submissions were received with opinions split on this issue.

271. Across submissions supportive of commuter car parking, there was a view that the current situation where commuters park in local streets was not acceptable, as it affected locals, visitors, and businesses. Providing commuter car parking was seen as potentially increasing residents' usage of the rail line; current bus

service was generally seen as poor, with commuter car parking as a better alternative. However, it was also noted that elderly residents who were unable to drive might still struggle to use transport.

272. The needs of neighbouring suburbs were also considered in some submissions, with the view expressed that North Epping residents need commuter parking as well; Transport for NSW's current investigations of a similar solution at Eastwood was also raised.

273. As noted above, several ideas about commuter car park sites were suggested:

    a. 240-244 Beecroft Road, mainly due to good station access,
    b. Above Epping Train Station,
    c. Above Rawson Street Car Park,
    d. Under current library site,
    e. Older apartment complex near Epping Station, through an acquisition process, and
    f. Inside newly constructed residential towers.

274. Many submissions took a broader view that any site considered should be within walking distance of the town centre and train station, while others were willing to consider sites outside the town centre in combination with shuttle buses to the station.

275. Amongst submissions not supporting commuter car parking, there was a common view that commuter parking would only increase traffic and local car use. Some felt that this would incentivise commuters from other suburbs coming into Epping to park, thereby impacting the road network and taking away parking from local residents. Others felt there was no suitable space in Epping for a commuter parking station, while others felt that a commuter parking station was a lower priority than valuable commercial, retail and residential space. Some felt that a low-cost shuttle bus would be a better alternative.

276. The above views were also expressed at the Community Workshop Sessions. Refer to **Attachments 2 and 3** for a summary of the Community Workshop Session and submissions feedback.

Conclusions and recommendations

277. Having considered the feedback from the Phase 2 consultations on a commuter car parking station in the Epping Town Centre, Council Officers maintain the views expressed in the Discussion Paper and therefore **conclude** the following:

    a. It will attract additional trips into the Epping Town Centre for the sole purpose of utilising the car park which will have a further detrimental impact on local traffic conditions and increase traffic congestion.
    b. It will encourage local employees to drive to the centre rather than arrive via public transport due to the increased access to day long parking options.
    c. Experience in other centres suggests that the availability of day long parking encourages more commuters to make the choice to drive to the station because of the increased likelihood they can find a park. If all spaces within the commuter car park are occupied, drivers will park on the street. So parking availability on local streets is not improved.

d. An integrated transport system would see people take the bus from close to their home to the station to continue their public transport journey. This is most efficient and effective if regular bus services are feasible. The more commuter parking is provided the greater the negative impact on the feasibility of running regular bus services especially given the number of buses that provide access to Epping.

e. Commuter parking stations do play an important role in promoting public transport but do not consider that Epping is an appropriate location for a commuter parking station.

278. Council Officers therefore, **recommend the following principles**:

a. That Council Officers not pursue a policy of providing a commuter car parking facility within the Town Centre.

Policies to manage local parking and access to private motor vehicles

279. Section 11.7.4 of the Discussion Paper proposes two options to discourage residents that purchase into new high density development from parking in local residential streets:

a. Resident or controlled parking schemes; and

b. Car sharing scheme.

280. As Section 11.7.4 of the Discussion Paper noted, a commonly expressed concern when any proposal is put forward to decrease parking rates on site is that residents will still own a car and will park it on local streets. Should Council consider introducing maximum rates or reducing car parking rates below the "maximum rates" identified in the PDCP 2011 in order to influence mode shift, it is considered that additional measures could also be investigated to discourage residents purchasing into new high density development do not end up parking in local residential streets.

<u>Resident or controlled car parking schemes</u>

281. The Discussion Paper notes that a rollout of restricted/time limited parking zones within residential streets adjacent to higher density development could be investigated along with a resident parking scheme to enable existing residents within lower density residential zones up to a 3 storey apartment building to have the opportunity to apply for a permit to enable residents and their visitors to continue to have on-street parking albeit in a limited and controlled manner. Such initiatives also discourage commuters from parking within local streets close to Epping Station and depending on the nature of the restricted parking roll out, can encourage commuters to catch a bus to the Epping Station.

282. The fundamental objectives around introducing a resident or controlled parking scheme is to minimise local car ownership and decrease private motor vehicle use.

283. The Discussion Paper's question (11d.) asks: *Would you support the introduction of a Resident Parking Scheme where owners of new units would not be permitted to park on local streets as a way to discourage car ownership and manage parking on local streets?*

Community Feedback

284. Community views (from a total of 41 respondents) were mixed with more than half of submissions supporting this approach to reducing traffic.

285. Respondents that were supportive generally supported introducing restricted/time parking zones within residential streets adjacent to high density residential development. Others suggested delineating a radius around the station to which the scheme would apply. Others suggested that Council remove “full day” parking in favour of different timed parking options which radiated out from the centre. There was also a specific request for extension of 2-hour parking farther along Oxford Street.

286. Respondents that were not supportive had the following opinions:

    a. Many respondents felt that people would want to own cars, regardless of efforts made by Council to encourage behaviour change.

    b. Some were concerned about how the value of units might be affected with the introduction of a scheme. One was unsure about how this approach could help with reducing car ownership.

287. The above views were also expressed at the Community Workshop Sessions. Refer to **Attachments 2 and 3** for a summary of the Community Workshop Session and submissions feedback.

Conclusions and recommendations

288. The scope of the Stage 1 analysis and recommendations has been to address the unintended impacts resulting from the new planning controls that came into effect by the State Government in March 2014.

289. Having considered the feedback from the Phase 2 consultations, Council Officers **conclude**:

    a. There is strong community support for a residential or controlled parking scheme

290. Council Officers therefore, **recommend the following principle**:

    a. That Council officers carry out further investigation around the potential implementation of a resident parking scheme in Epping in order to minimise local car ownership and decrease private motor vehicle use.

Car sharing scheme

291. As noted within the Discussion Paper, car sharing enables more sustainable travel habits by making more efficient use of a parking space either on street or within a private development. A single car share vehicle can replace up to 12 private vehicles that would otherwise compete for local parking (source: *www.cityofsydney.nsw.gov.au/live/residents/car-sharing*). Car share schemes provide flexibility to residents or businesses who either do not own a car, cannot justify car ownership given close proximity to public transport or lack of a parking space. Resident and businesses can book a car online when they need one and pick it up from a car share space.

292. Furthermore, car share users are charged by time and distance, at a rate set by each operator (e.g. GoGET, Hertz24/7). Costs associated with fuel, vehicle maintenance and insurance are usually included in the operator’s hire fees. Car share spaces can be located on street with the agreement of Council or within larger scale developments.

293. The objectives around introducing a car sharing scheme is to minimise local car ownership and decrease private motor vehicle use.

294. The Discussion Paper’s question (11e.) asks: *Do you support car sharing schemes as measures to decrease vehicle ownership and the potential impacts*

of decreasing parking rates for sites within walking distance of Epping Station? This question sought feedback on reducing the rates of car parking provision in new development in the town centre.

Community Feedback

295. Community views were mixed on this question, with the majority of respondents supporting this approach to reducing traffic. Of those supporting the scheme:

   a. Many respondents offered feedback about providing and locating potential spaces:

      i. Some suggested dedicated spaces be created on both sides of the railway to reduce walking distance for all residents.

      ii. Some proposed a collaborative approach with neighbouring councils as was the idea of working in a network (along with existing car share facilities at Macquarie Park).

   b. Other views saw that car share spaces need to be dedicated for car share only, and that spaces should be included in new developments. One developer noted that they would be willing to include car share spaces in their basement parking allowance.

   c. Some views expressed uncertainty about the effectiveness of car share schemes (even across some of those who were supportive). Some were unsure if it would work effectively in the suburbs, while others were unsure if it would actually reduce car ownership rates.

   d. Some submissions suggested that Council would need to actively promote and make the community aware of alternative transport options like car sharing in order for this approach to have a positive impact.

Conclusions and recommendations

296. The scope of the Stage 1 analysis and recommendations has been to address the unintended impacts resulting from the new planning controls that came into effect by the State Government in March 2014.

297. Having considered the feedback from the Phase 2 consultations, Council Officers **conclude**:

   a. On 13 June 2017, the Parramatta Traffic Committee (PTC) and Traffic Engineering Advisory Group (TEAG) approved a number of car share spaces across the city (Item 1705 A3). However, it excluded a 6 car share parking spaces in Epping because whilst: *Council notes that car share may be an important element of creating a less private car dependent town centre, that car share arrangements be considered as part of the current traffic and land use study for Epping. No further action be taken on car share spaces in Epping until this study is complete.*

   b. The community feedback received on this issue reveals there is overwhelming support by Epping residents.

298. Council Officers therefore, **recommend the following principles**:

   a. That Council introduce a car share scheme in the Epping Town Centre as per the recommendations within the PTC report of 13 June 2017.

   b. That the potential for car share schemes to be provided within a development be further explored and if technically supported, be introduced as new DCP controls as part of Stage 2 of the Epping Planning Review.

Policies to manage local traffic congestion

299. Section 11.7.5 of the Discussion Paper proposes a “Stop/Go” traffic controller to manage pedestrian activity at the pedestrian crossing on Rawson Street adjacent to the Rawson Street car park.

300. The Discussion Paper’s standard question (11f.) asks: *Do you think Council should employ crossing attendants during peak conflict periods at the Rawson Street pedestrian crossing to manage the flow of pedestrians and vehicles to best manage congestion in Rawson Street?*

Community Feedback

301. With 44 submissions, the community was divided on this issue, with an equal number of submissions supporting/not supporting this approach and a small number undecided. The reasons for supporting the proposal were around improving pedestrian safety and managing congestion. The reasons for not supporting the proposal were around skepticism of its success.

302. The above views were also expressed at the Community Workshop Sessions. Refer to **Attachments 2 and 3** for a summary of the Community Workshop Session and submissions feedback.

Conclusions and recommendations

303. Having considered the feedback from the Phase 2 consultations, Council Officers **conclude**:

    a. Council should consider funding a “Stop/Go” traffic controller on the crossing during peak times to control pedestrians, it would cost of up to $10,000 per month inclusive of all on costs.

    b. There are technical legal questions over the enforceability of a “Stop/Go” traffic controller.

    c. The effectiveness of a “Stop/Go” traffic controller is also limited, having to be positioned on one side of the street.

304. Council Officers therefore, **recommend the following principles**:

    a. That Council trial a “Stop/Go” traffic controller at the pedestrian crossing on Rawson Street adjacent to the Rawson Street car park for a period of 2 months and report on the effectiveness of the trial to Council’s PTC and TEAG by the middle of 2018.

COMMUNITY FEEDBACK – GENERAL COMMENTS

305. As has been noted within this report, the scope of the Stage 1 analysis and recommendations has been to address the unintended impacts resulting from the new planning controls that came into effect by the State Government in March 2014.

306. Whilst the purpose of the exhibition was to seek the wider community’s opinion on the Discussion Paper’s questions, other matters were raised that are outside the scope of this phase of the study. A broad summary of the issues raised is provided below:

    a. The predominant theme from submitters are concerns around:

i. Overdevelopment of the Epping Town Centre in terms of what has been built since March 2014, and

ii. Further developer interest in the area by way of planning proposals (either existing, preliminary or future planning proposals).

These concerns largely relate to the associated traffic impacts, construction impacts, tree loss, character loss, heritage loss, parking concerns, visual impacts (regarding inappropriate building heights) and environmental impacts.

307. Some submitters situated outside the town centre core have requested upzonings. Council's response is that the Epping Town Centre has been doing a lot of the "heavy lifting" for the residential growth in this vicinity of Sydney. With the number of planning proposals and precinct planning projects across the LGA before Council, Council does not require any further uplift in Epping for the purpose of meeting its housing targets as expressed in the Greater Sydney Commission's *Draft West Central District Plan*. As has been made clear, the scope of the Epping Planning Review has been to address the failings of the planning system that came into effect in March 2014. As such, additional requests for rezoning (received through the submission process) will not be considered as part of the Epping Planning Review process.

308. A submission table details Council Officers response to general issues raised, is detailed in **Attachment 4.**

RECOMMENDATIONS

309. The recommendations detailed in this report are consolidated and contained in **Attachment 6**.

NEXT STEPS

310. As has been noted, the scope of the Epping Planning Review is limited to better managing the impacts of new development generated from planning controls that came into effect in March 2014 and allowing Council to manage current (formal and preliminary) planning proposals seeking growth in the town centre. It is also intended to allow Council to progress decisions made by Hornsby Shire Council on specific heritage matters when it governed part of the Epping suburb.

311. The recommended principles from Stage 1 also impact on other policy areas of Council which are outside the changes to planning controls to be covered in Stage 2. The findings and analysis carried out to date will be used to inform further work in these areas (ie. social infrastructure) as part of separate processes.

312. Once the new Councillors have been elected, a briefing will be undertaken on the Epping Planning Review process to date, including the endorsed principles, to confirm the future planning direction for Epping as part of progressing Stage 2 of the project.

313. Further discussion with the DP&E will be carried out to determine the appropriate mechanism for which to implement Stage 2 of the Epping Planning Review. For instance whether this can be carried out via a new State Environmental Planning Policy (similar to the previous mechanism which

implemented the March 2014 planning controls) or alternatively, via a Planning Proposal process.

314. The community that have given their time in such a generous way to contribute to this stage of the Review will be thanked and advised of the outcomes. Council will continue to engage with the community through future stages of the review.

FINANCIAL IMPLICATIONS

The only recommended principle that would have an immediate and direct financial implication for Council is the trial of a Stop/Go Controller for 2 months (see **point 304**), which would cost Council $20,000. This would be funded from an existing operational budget.

Jacky Wilkes
Senior Project Officer Land Use

Kevin Kuo
Team Leader Land Use Planning

Sue Weatherley
Director Strategic Outcomes and Development

Sue Coleman
Director City Services

ATTACHMENTS:

1	Attachment 1 - Discussion Paper	111 Pages
2	Attachment 2 - Phase 2 Community Workshop Sessions Report	80 Pages
3	Attachment 3 - Summary of Submissions	45 Pages
4	Attachment 4 - General Comments	21 Pages
5	Attachment 5 - Stage 6 Summary and Recommendations	4 Pages
6	Attachment 6 - Consolidated List of Recommended Principles	8 Pages

REFERENCE MATERIAL

The Amendment was put and lost.

The Motion was put and carried.

NOTE:

Councillor Benjamin Barrak declared a Non-Pecuniary Less Than Significant Interest in this items as he lives in the vicinity of the Oval. He remained in the Meeting during debate and voting of this matter.

EXTENSION OF TIME

RESOLVED (Wearne/Issa)

That as the time has reached 11.05pm, the meeting be extended for 30 minutes to enable consideration of the remaining items on the agenda.

PROCEDURAL MOTION

1449 RESOLVED (Wilson)

That Item 14.5 relating to Epping Town Centre Traffic Study and other Epping Planning Review Matters and Item 14.7 Delegations to the Chief Executive Officer be brought forward in the meeting for consideration.

14.5 SUBJECT Epping Town Centre Traffic Study and other Epping Planning Review Matters

REFERENCE F2017/00210 - D06202874

REPORT OF Snr Project Officer

1450 RESOLVED (Tyrrell/Wearne)

(a) **That** Council note this update on the Epping Planning Review and related matters.

(b1) **That** Council exhibits the Epping Town Centre Traffic Study and supporting documentation (including the further supplementary reports) to enable comment from major stakeholders in accordance with the consultation plan described in the body of this report with a Community Briefing Session to be organised to inform the community about the content of the Traffic Study and allow them to ask questions about its preliminary findings to inform any submissions stakeholders may wish make on the study.

(b2) **That** the exhibition material placed on public exhibition state that Council does not support any extension of Rosebank Avenue to connect with Rosen Street as described in the traffic study and advise the affected landowners of this decision.

(c1) **That** despite recommendation (b1) above, that Council adopts the position that it does not support any:

(i) Planning proposal or preliminary planning proposal that applies to sites situated within the Epping Planning Review Study Area which seek to deliver extra housing in addition to what can be achieved under the current planning controls, unless the planning proposal is seeking to address a planning issue identified in Council's Epping Planning Review process related to:-

- commercial floor space in the Epping Town Centre; or
- the Planning Controls that should apply to Heritage Conservation Areas or areas that interface with High Density Residential zones surrounding Epping Town Centre.

(ii) Development applications seeking an increase in residential density via clause 4.6 of the *PLEP 2011;*

and that Council write to both the Department of Planning and Environment (DP&E) and the Greater Sydney Commission advising them this will remain Council's position until the State Government has provided infrastructure to resolve the through traffic issues with the Epping Town Centre.

(c2) **That** a Planning Proposal including all necessary background studies and analysis be prepared to amend Clause 4.6 of PLEP 2011 so that it cannot be used to seek a FSR greater than that permitted on the Floor Space Ratio Map for sites within the Epping Town Centre.

(d) **That** in relation to the Austino Planning Proposal that Council write to the DP&E to:-

(i) Object to the Planning Proposal proceeding in its current form and density and request that no Planning Proposal proceed for this site. Instead the existing planning controls should be retained with the portion currently zoned RE1 Public Recreation remaining in place along with retaining no Floor Space Ratio or Height of Buildings control notations applying to that portion.

(ii) **That** the Council write to the Minister for Planning seeking that the Minister amends the legislative provisions related to the acquisition of open space land applying the principle that where a developer has purchased land which at the time of purchase is already zoned public open space, they should not benefit from any changes to the value derived from the existing zoning of adjoining land or changes to zoning of adjoining land. And write to the Local Members requesting funding out of the Open Spaces and Greater Sydney Package. To avoid any doubt Council considers that the owner should be entitled to the price they paid (adjusted for

CPI) but no increases in value as a result of changes to the planning controls surrounding the site.

(e) **That** Council write to the Minster for Planning, Landcom and the Greater Sydney Commission and request the State Significant Development currently being progressed for 240-244 Beecroft Road be placed on hold until a workshop can be organised involving Council and Landcom to discuss and seek to resolve the following:-

(i) to establish whether a new road link can be provided through this site linking Beecroft Road and Ray Road; and

(ii) the provision of commercial floor space on the site being provided at a level no less than 1:1 FSR on this site.

(f) **That** a further report is brought to Council on the options for future civic space and community facilities on the following sites:-

(i) the Rawson Street carpark site; and

(ii) the Chalmers Street site (containing the existing Epping Library site and adjoining open space);

including analysis on whether any process should be commenced to realise the FSR available on either of these sites.

(g) **That** in addition to correspondence Council resolved to forward to the State Government regarding the investigation of M2 tolling at the 12 June 2018 Council Meeting (i.e. Item 15.5) the further supplementary reports on:-

(i) Reopening of the former M2 bus tunnel link; and

(ii) A new east west road link through 240-244 Beecroft Road

be forwarded to the relevant transport agencies that manage the former M2 bus link, the RMS and Urban Growth and circulated to Councillors upon receipt and then be placed on public exhibition with the Epping Town Centre Traffic Study with any feedback received on this issues during the consultation to be reported back to Council.

(h) **That** a Planning Proposal including all necessary background studies and analysis be prepared to progress LEP amendments as follows:-

(i) Rockleigh Park Precinct; controls consistent with the recommendations in the body of this report

(ii) In the Norfolk, Pembroke, Essex Street area the planning controls be retained (including the Heritage Conservation Area notation) for 1, 3, 3A, 5, 7, and 7A Norfolk Road 25 Pembroke (ie retain the existing R2 Low Density Residential zoning and the existing Height of Building controls of 8.5m) and instead amend the controls for the following sites as follows:-

- 21, 23, 25, 27 and 29 Essex Street amend the zoning from R4 High Density Residential to R3 Medium Density Residential with maximum height permitted on these sites to be amended from 17.5m to 11m (to allow for apartment building development no greater than 3 storeys on these sites); and

- The height of building control for 23, 23A Pembroke be reduced from 12m to 11m with the existing zoning of Residential R3 Medium Density Residential to be retained for these two sites;

and that the Planning Proposal and associated material be reported to Council for endorsement before it is forwarded to the Department of Planning and Environment seeking any Gateway Determination for the planning proposal.

(i) **That** a Planning Proposal including all necessary background studies and analysis be prepared to progress LEP amendments for 2 - 8 Rosebank Ave and 1 - 7 Rosebank Ave as follows:

(i) Remove the Heritage Conservation Area notation from these sites;

(ii) Rezone the sites from Residential R2 Low Density Residential to R3 Medium Density Residential; and

(iii) Amend the permitted height of building for these sites from 8.5m to 11m (to allow for apartment building development no greater than 3 storeys on these sites).

All other sites in Rosebank Avenue should retain their existing planning controls including the Heritage Conservation Area notation and that the Planning Proposal and associated material shall be reported to Council for endorsement before it is forwarded to the Department of Planning and Environment seeking any Gateway Determination for the planning proposal.

(j) **That** a Planning Proposal and Draft DCP amendments including all necessary background studies and analysis be prepared to progress amendments to these plans for the Essex Street HCA Precinct with the planning controls to be consistent with the following:-

(i) Retention of the existing Heritage Conservation Area for both sides of Essex Street

(ii) Amend the planning controls to allow for detached dual occupancies on the western side of Essex Street between Epping Road and Maida Road (which are the sites that are impacted by proximity to the adjoining 5 storey apartment buildings) in the form where the second dwelling shall be permitted behind the existing dwelling but not in a Duplex form.

(iii) That the Draft DCP that applies to this HCA and surrounding land be reviewed with a view to including: -

- a detailed analysis of significant trees located on the sites on the western side of Essex Street and supporting DCP controls that seek protect those trees; and
- Draft DCP planning controls that require provision to be made for the widening and improvement of the pedestrian link currently located between 58-60 Essex Street linking through to Forest Grove;

and that the Planning Proposal and associated material be reported to Council for endorsement before it is forwarded to the Department of Planning and Environment seeking any Gateway Determination for the planning proposal.

(k) **That** no further action be taken to amend the Planning Controls that apply to the Rose Street Precinct until a drainage analysis detailing the implications of re-development of the Rose Street Precinct Sites is completed and reported to Council.

(l) **That** a Planning Proposal including all necessary background studies and analysis be prepared to progress the recommended LEP amendments detailed in this report relating to new controls to require the provision of commercial floor space in the Town Centre and that the Planning Proposal and associated material be reported to Council for endorsement before it is forwarded to the Department of Planning and Environment seeking any Gateway Determination for the planning proposal.

(m) **That** Council Officers identify potential sites for acquisition for open space purposes in the areas to the north east of the Epping Town Centre. This process should include obtaining valuations for acquisition and the construction of the parks and should also involve discussions with potentially affected landowners. A further report to Council on the outcome of this analysis be reported to Council to allow Council to determine whether it wishes to commence a rezoning process to rezone any sites in this area for open space.

(n) **That** Council write to the Member for Epping seeking their support for funding for the acquisition of open space in the area north east of the Epping town centre as part of the Open Spaces and Greener Sydney package announced in April 2018. The Local Member also be requested to make representations to the relevant Minister to ensure the criteria that needs to be met to obtain grant funding provides flexibility (in terms of timeframe for delivery and the identification of the land to be acquired) so that Council can secure the funding prior to finalizing the rezoning and consultation/ acquisition processes

(o) **Further**, **that** this motion carries the unanimous support of the Ward Councillors being Councillors Tyrrell, Wearne and Davis.

DIVISION The result being:-

AYES: Councillors B Barrak, P Bradley, D Davis, B Dwyer, P Esber, M Garrard, P Han, S Issa, A Jefferies, S Pandey, P Prociv, W Tyrrell, L Wearne, A Wilson and M Zaiter

NOES: Nil

14.7 SUBJECT Delegations to Chief Executive Officer

REFERENCE F2018/01846 - D06203417

REPORT OF Acting Chief Executive Officer. Also Supplementary