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TRAFFIC IMPACT ASSESSMENT
PLANNING PROPOSAL
MIXED USE DEVELOPMENT
197 CHURCH STREET & 89 MARSDEN STREET
PARRAMATTA

Ref: 15-013-2

MARCH 2015

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1. INTRODUCTION

This Practice has been engaged by Holdmark to prepare a traffic impact assessment associated with a Planning Proposal for a mixed use development located on land providing frontages to Church Street, Macquarie Street and Marsden Street, Parramatta.

The Proposal seeks to amend Parramatta City Centre LEP 2009 to allow for the development of a mixed use building with a maximum height of 250m and a floor space ratio of up to 15.3:1. The mixed use development is to comprise approximately 5,000m^2 of retail floor space, 2,500m^2 of office floor space, 2,500m^2 of medical suites and 560 residential apartments. The development is proposed to be serviced by a series of basement parking accessed via Macquarie Street with all site egress proposed to Marsden Street. No vehicular access to / from Church Street is proposed.

This report assesses and documents likely transportation, traffic and parking impacts resulting from the Planning Proposal and recommends, where appropriate, treatments to ameliorate such impacts. In this regard, this assessment focuses on the following issues:

- Describes the site and provides details of the Planning Proposal;
- Existing road network conditions within the vicinity of the site including traffic volumes and general traffic safety;
- Identify vehicular traffic likely to be generated by the Planning Proposal;
- Compares the traffic generating capability of the Proposal with a LEP compliant development scheme and one which is accords with current endorsed strategic planning for the city centre;
- Assess the ability of the surrounding road network to accommodate the traffic generating potential of the Proposal; and
- Assess the cumulative traffic implications of the Proposal together with other known Planning Proposals within the immediate vicinity in terms of road network capacity.

Reference has been made in this report to the following documents:

- The Roads & Maritime Services' *Guide to Traffic Generating Developments* and *Technical Direction TDT 2013/04a*;
- Parramatta City Council's *Parramatta Development Control Plan 2011* (DCP 2011);
- Parramatta City Council's *Parramatta City Centre Local Environmental Plan 2007* (LEP 2007);

- Parramatta City Council's *Parramatta City Centre Car Parking Strategy*;
- Parramatta City Council's *Parramatta Economic Development Strategy 2011 – 2016*;
- Parramatta City Council's *Parramatta City Centre Integrated Transport Plan 2009/10 – 2014/15*;
- Architectus' *Draft Parramatta City Centre Planning Framework Study*;
- Traffix's *Parramatta Square Traffic & Pedestrian Access Strategy*; and
- The Australian Standard for *Parking Facilities Part 1: Off-Street Car Parking* (AS2890.1-2004), *Part 2: Off-Street Commercial Vehicle Facilities* (AS2890.2-2002) and *Part 6: Off-Street Parking for People with Disabilities* (AS2890.6-2009).

The report should be read in conjunction with the architectural plans prepared by Robertson + Marks.

2. SITE DETAILS

2.1 Site Location

The site is located on the western side of Church Street and provides frontages to Macquarie Street and Marsden Street, Parramatta. The site location is shown overleaf by **Figure 1** within a local context, being an extract of UBD's *Australian City Streets – Version 4*.

2.2 Site Description

The site provides a street address of 197 Church Street and 89 Marsden Street, Parramatta and comprises the following allotments:

- Lot 1 DP 710335; and
- Lot 1 DP 233150.

Collectively, the allotments form an irregularly shaped parcel of land providing approximate frontages of 52m, 55m and 26m to Church Street, Macquarie Street and Marsden Street, respectively. The total site area is in the order of 4,300m^2.

2.3 Existing Use

Existing development on the site comprises a two storey heritage listed building that is currently used for retail and office purposes, containing 6,600m^2 retail floor area and 3,300m^2 office floor area. Vehicular access / egress is currently provided via Marsden Street only, servicing in the order of 20 on-site parking spaces and a heavy vehicle servicing area.

2.4 Surrounding Uses

The following land-uses surround the site:

- A seven storey commercial building adjoins the site at the corner of Macquarie Street and Marsden Street;
- Two storey retail premises are located to the east on the opposite side of Church Street;
- Church Street Mall, comprising public open spaces and a number of heritage items including St John's Cathedral is located to the south on the opposite side of Macquarie Street; and
- A mix of single multi-storey commercial buildings occupy land to the north fronting both Church Street and Marsden Street.

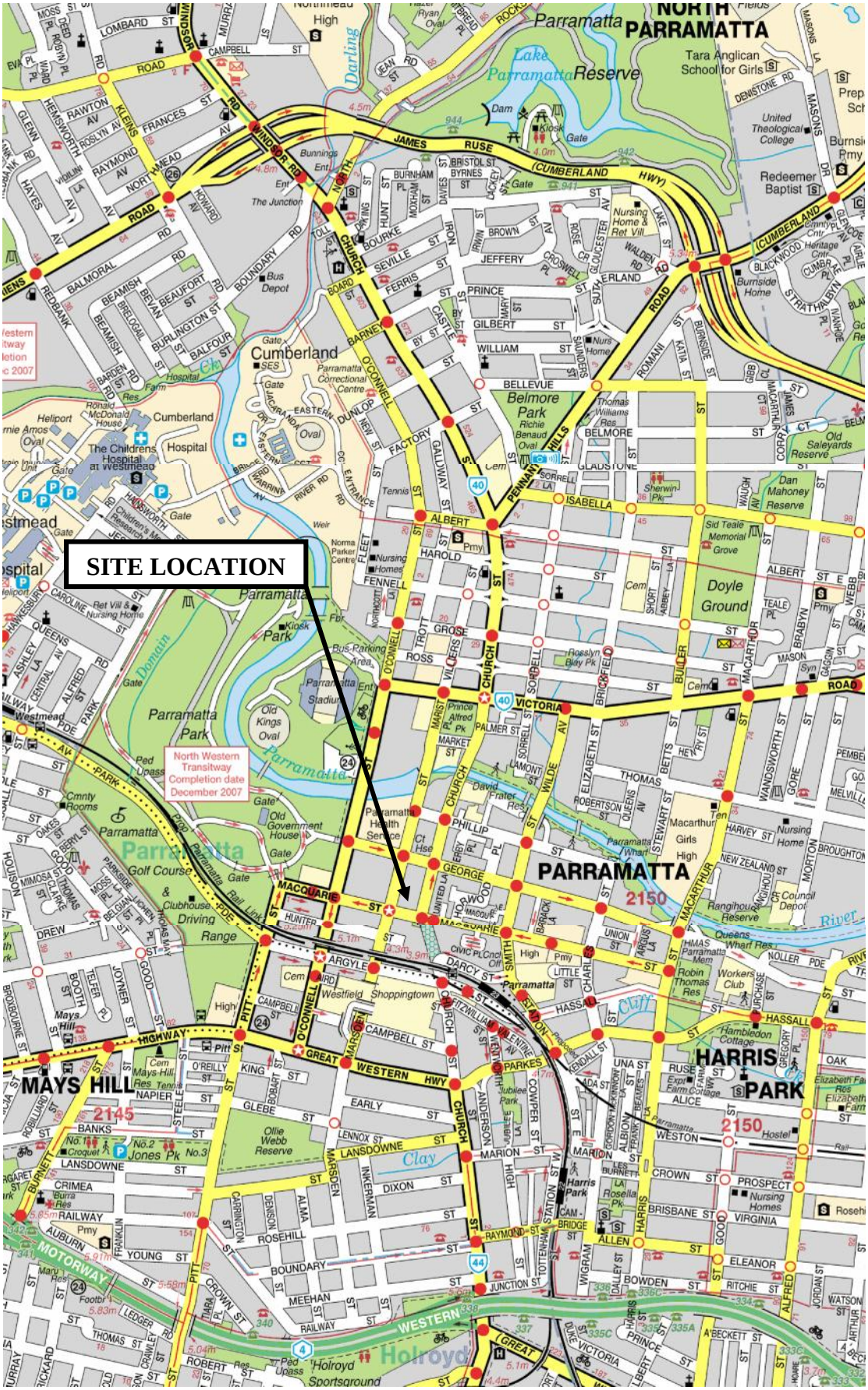


FIGURE 1 – SITE LOCATION WITHIN A LOCAL CONTEXT

3. STRATEGIC CONTEXT

A number of strategic planning documents at both State and Local Government level have been prepared to guide land use and transport decision for the Parramatta central business district. A brief description of these documents and their core principles are outlined below.

3.1 A Plan for Growing Sydney

'A Plan for Growing Sydney' was finalised in December 2014 by the NSW Department of Planning and Environment and is the current metropolitan strategy for the Sydney region (hereafter referred to as the 'Metropolitan Strategy'). The State Government's overarching vision is for Sydney to be:

1) A competitive economy with world-class services and transport;

2) A city of housing choice with homes that meet our needs and lifestyles;

3) A great place to live with communities that are strong, healthy and well connected; and

4) A sustainable and resilient city that protects the natural environment and has a balanced approach to the use of land and resources.

To achieve these goals, a number of directions and action areas have been formulated. Those particularly relevant to the nature of the subject proposal and its location are detailed below.

Goal 1: A Competitive economy with world-class services and transport

Direction 1.2: Grow Greater Parramatta - Sydney's Second CBD

Direction 1.2 recognises the role of Greater Parramatta as Sydney's western CBD of metropolitan significance, and seeks to grow that significance. The core elements for growing Greater Parramatta include:

- Integrating the precincts within Greater Parramatta and connecting the centre to the wider community and other centres through the proposed Parramatta light rail;

- Continue to grow the commercial core as the central focus of business activity; and

- Encouraging growth across a range of employment types.

Direction 1.7: Grow strategic centres – providing more jobs closer to home

Direction 1.7 acknowledges the importance of Sydney's 'strategic centres', being *"areas of intense, mixed economic and social activity that are built around the transport network and feature major public investment in services such as hospitals*

and education and sports facilities". The Metropolitan Strategy reinforces Greater Parramatta as a Strategic Centre.

Goal 2: Sydney's Housing Choices

The Metropolitan Strategy recognizes the need to accelerate housing supply to meet a growing population. The Strategy forecasts that some 664,000 new homes will be required over the next 20 years to accommodate an anticipated increase in population of 1.6 million people through metropolitan Sydney, with about 900,000 of this increase expected to reside in Western Sydney.

Direction 2.1: Accelerate housing supply across Sydney

Direction 2.1, in particular Action 2.1.1, suggests that the goal of increasing housing supply and addressing housing affordability and choice requires government to, among other things, target locations which deliver homes closer to jobs. The Strategy suggests that the most suitable areas for significant urban renewal are those best connect to employment and include areas:

- In and around centres that are close to jobs and are serviced by public transport services that are frequent and capable of moving large number of people; and

- In and around 'strategic centres'.

Goal 3: Sydney's Great Place to Live

Goal 3 advocates Sydney as a great place to live by creating places that are vibrant, well connected with an interesting street life and improved public domain. The strategy suggests that liveability will be Sydney's competitive advantage, developing thriving centres and investment.

Direction 3.1: Revitalise existing suburbs

The following extract from the Metropolitan Strategy distils the principles of Direction 3.1:

> *"A city which makes it easy for residents to get to jobs, services and recreation is a more attractive place to live. By putting more housing in or near centres on the public transport network, residents can take advantage of the shops, cinemas, cafes, restaurants, and health and education services that are already available".*

3.2 Long Term Transport Masterplan

The Long Term Transport Master Plan for NSW identifies current challenges facing the NSW transport system and identifies planned actions to address those challenges in an overarching strategy for which subsequent detailed transport plans are to be based.

It includes actions including the WestConnex project, pinch point and corridors programs and also identifies the following specific projects relevant to Parramatta in the short term:

- Bus priority enhancements within 30 minutes travel time of Parramatta;
- Major upgrade of the Parramatta Interchange;
- Collaboration with Parramatta City Council on city centre improvements and light rail. This includes upgrade of congested bus corridors into Parramatta CBD that align with possible future light rail routes to promote the use of public transport services along these routes; and
- Improved connections developed for Parramatta cycleways, including new cycle routes along the northern side of Parramatta River and within Parramatta Park.

Detailed Modal Delivery Plans will also be prepared to compliment the Long Term Transport MasterPlan, including specific plans for walking, cycling, ferry, light rail, bus, road and rail travel modes which are expected to expand on the goals and actions included in the Master Plan.

3.3 Parramatta Economic Development Strategy 2011-2016

The Parramatta Economic Development Strategy 2011-2016 (the 'Economic Development Strategy') was adopted by Council in November, 2011 and was prepared in response to the employment goals contained in the metropolitan strategy current at the time. The prevailing strategy established a goal for the creation of 280,000 net additional jobs in Western Sydney by 2036, including 27,000 jobs in the Parramatta CBD and 7000 in Westmead.

The Economic Development Strategy establishes 6 priority areas to achieve the employment creation targets, broken down into 20 strategies. These are summarised below:

Priority Area	**Strategies**
A. Identity	A1. Establishing a competitive identity A2. Broadening the city's media profile A3. Holding an annual business forum and broadening engagement activity
B. Business	B4. Helping build sectoral specialisations in 4 primary employment precincts B5. Attracting new firms to Parramatta B6. Building capacity for innovation B7. Supporting small business and start ups
C. Labour	C8. Raising skill levels and aligning them to the needs of industry C9. Attracting and retaining talent C10. Ensuring diversity for employment C.11 Addressing unemployment

D. Property	D12. Activating the CBD property market D13. Planning for three specialist employment precincts D14. Attracting capital to Parramatta
E. Amenity	E15. Improving safety E16. Activating lanes, retail precincts and riverbank E17. Growing the leisure/tourism product offering
F. Infrastructure	F18. Improving transport infrastructure F19. Improving internet speeds and connectivity F20. Strengthening professional networks and partnerships

3.5 Parramatta City Centre Integrated Transport Plan

The final report of the Parramatta City Centre Integrated Transport Plan 2009/10-2014/15 was released in May 2010 (hereafter referred to as the 'ITP'). The ITP acknowledges that the employment and population targets set by metropolitan strategies for the Parramatta City Centre will generate significant additional travel demand thereto, and that this growth needs to be carefully managed. The ITP suggests that the key issue for the Parramatta City Centre is moving away from the reliance on car use towards more sustainable transport of walking, cycling and public transport.

To achieve the change in travel behavior, the ITP articulates a range of tools, both soft and hard options, to limit increases in traffic congestion and reduce the impact of travel on the environment. A summary of the strategy plan is provided below.

Environment	
E1	Continued Land Use Planning techniques to create developments that encourage and support sustainable use
E2	Increase transport efficiency through the continued support of car sharing
E3	Support environmentally sustainable vehicles
Travel Behaviour Change	
TB1	Consider appointing an officer to promote sustainable transport
TB2	Develop a Council travel plan to show leadership and corporate social responsibility
TB3	Offer the walking school bus program to all primary schools within the LGA
Walking	
W1	Prepare a pedestrian access and amenity plan
W2	Investigate a pedestrian and cycle amenity zone
W3	Investigate providing information kiosks to display information covering tourism, public transport, shopping, dining and community events

Cycling	
C1	Implement cycle routes to the city centre
C2	Provide more cycle parking
C3	Lobby to provide cycle centres at public transport nodes and integrated ticketing or free travel for cycles
C4	Investigate a city centre cycle centre
Integrated Transport	
I1	Lobby for a Sydney integrated transport authority to coordinate public transport services
Bus	
B1	Lobby for cross-city bus services
B2	Lobby to use CCTV cameras to enforce bus priority measures
B3	Lobby to improve bus stop facilities
B4	Establish a bus stop access program
Rail	
R1	Lobby to construct the Parramatta to Epping rail link, prepare a feasibility study for the Parramatta to Castle Hill link and restore the Cumberland line services
R2	Lobby to construct the West metro from Sydney to Parramatta
R3	Lobby for improved rail services and station facilities
Ferry	
F1	Lobby for a commuter ferry services between inner west and Parramatta
Taxis	
T1	Establish secure taxi ranks
Motorcycles	
M1	Increase parking spaces and remove on-street parking fees
Road Network	
RN1	Investigate a city ring road
RN2	Investigate a regional ring road
Car Parking	
CP1	Investigate relocation of long-stay commuter parking from the city centre to the periphery
CP2	Market the Fennel Street car park as park & ride

3.6 Parramatta City Centre Car Parking Strategy

The Parramatta City Centre Car Parking Strategy (the 'Car Parking Strategy') was finalised in September 2011 and was prepared in response to the Parramatta City Centre Integrated Transport Plan referred to above. The report establishes the strategies for better utilising and managing the existing car parking facilities within the Parramatta City Centre. Overtime, the Car Parking Strategy seeks to relocate all-day parking to the periphery of the city centre so as to allow employment and residential growth without impact from traffic congestion.

A number of recommendations are foreshadowed in the Car Parking Strategy, as summarised below:

1) *Continue the on-street fee and stay strategy (highest fee and shortest stay in the centre and cheapest fee and longest stay on the edge);*

2) *Continue to manage on-street parking demand on the city edges;*

3) *Modify the length of on-street parking stay in the city centre to increase the supply of short stay spaces;*

4) *Review the 1/4P free on-street parking scheme in the medium term;*

5) *Prepare a Parking Meter Renewal Plan;*

6) *Equalise the parking fee across Council's car parks;*

7) *Improve short stay parking in Council's multi storey car parks;*

8) *Update the car parking information on Council's website;*

9) *Provide car park directional signage to all public car parks;*

10) *Improve vehicle and pedestrian accessibility to Council's multi storey car parks;*

11) *Improve pedestrian amenity (internal) and visual (external) of Council's multi storey car parks;*

12) *Review the planning controls for the provision of public short stay car parking; and*

13) *Prepare Council Car Park Redevelopment Plan (build new car parks on Macquarie Street and Fennell Street sites and close a number of existing car parks.*

3.7 Draft Parramatta City Centre Planning Framework

Council, at its meeting of 8 September, 2014, considered a report on the Draft Parramatta City Centre Planning Framework Study (the 'Draft Planning Framework') and the Draft Parramatta CBD Planning Framework: Economic Analysis (the 'Economic Analysis'). The recommendation of that report, which we understand was adopted by Council, was to publicly exhibit both documents to seek community feedback.

We understand that the Planning Framework, prepared by Architectus, was in response to Council's desire to develop the Parramatta City Centre into a city of world class standard. The key recommendations of the Draft Planning Framework are summarised below, as identified in the 8 September, 2014 Council report:

City Centre Boundary	
1	A revised Parramatta City Centre boundary
Primary Built Form Controls	
2	Potential for new development to increase to a FSR of 10:1 for the main central area of the City Centre, with 6:1 and 3:1 in transitional areas.
3	Sun access controls are to be applied.
4	No specific maximum building height is provided
5	Any uplift in controls allowing taller building forms only applies to sites of a minimum of 1000m^2
Land Use Mix	
6	An expanded commercial core is proposed
7	Residential uses are permitted in the commercial core where prescribed preconditions are met
8	Controls designed to encourage employment uses should be targeted to high-yielding employment uses and not all commercial uses
9	Minimum non-residential FSR requirements are proposed of 1.0:1 for all sites in the mixed use zone of the City Centre.
10	Non-residential FSR exceeding the minimum requirements above should be exempt from the overall maximum FSR for mixed use zones.
Value Uplift Sharing	
11	Existing FSR controls to remain in place. The additional higher FSR controls can only be achieved by 'sharing' the value of the uplift.
12	The above operates for residential uses only, not employment uses
13	System to operate in addition to the existing S.94A contributions.
Tower Slenderness	
14	The floorplate Gross Building Area of residential towers should be limited to prescribed maximums
Design Excellence	
15	An additional 15% FSR provided to proposals which demonstrate design excellence through a nominated architect
16	A principle be included in the Framework which allows the maximum floor space ratio to be achieved on lots less than 1000m^2 where design excellence is achieved
Section 94A Contributions	
17	An additional S94A Levy of 1.5% (total 4.5%) be provided in the City Centre for recreational purposes

Significantly, the Draft Planning Framework proposes a revised and expanded boundary of the city centre, primarily to the north, with expansion also to the north east and south west. In addition, a FSR of 10:1 has been adopted in the Draft Planning Framework for the land that is the subject of this report.

4. DESCRITPION OF PROPOSAL

4.1 Built Form

The Proposal involves the demolition of existing site structures (subject to selection of appropriate strategies to manage heritage items) and the construction of a mixed use development within the subject site comprising the following approximate yields:

- 5,000m^2 of retail floor space;
- 2,500m^2 of office floor space;
- 2,500m^2 of medical suites; and
- 560 residential apartments (whereby 10% will form one bedroom dwellings, 80% two bedroom dwellings and 10% three bedroom dwellings).

It is to be noted that the development yields outlined above are preliminary and conceptual to assist with assessing traffic implications. This assessment actually assesses a slightly increased development yield to that stated above (see Section 6.1 of this report) in order to create an absolute worst case scenario. The final configuration of the building will be the subject of detailed design after the Planning Proposal process.

The above development components are proposed to be contained within a 73 storey building whereby the retail and commercial floor space is to be contained within the first eight storeys with 65 storeys of residential apartments above.

The development is to be serviced by nine basement levels of parking and servicing areas containing approximately:

- 600 resident parking spaces; and
- 300 visitor, retail, office and medical parking spaces.

Vehicular access between the adjoining road network and the site is to be provided via Macquarie Street whilst egress from the site is proposed to Marsden Street. No vehicular access between the site and Church Street is proposed.

5. EXISTING TRANSPORT CONDITIONS

5.1 Surrounding Road Network

It is usual to classify roads according to road hierarchy in order to determine their functional role within the road network. Changes to traffic flows on the roads can then be assessed within the context of the road hierarchy. Roads are classified according to the role they fulfil and the volume of traffic they should appropriately carry. In this regard, the Roads & Maritime Services has set down the following guidelines for the functional classification of roads:

- **Arterial Road** – typically a main road carrying over 15,000 vehicles per day and fulfilling a role as a major inter-regional link (over 1,500 vehicles per peak hour);

- **Sub-Arterial Road** – defined as secondary inter-regional links, typically carrying volumes between 5,000 and 20,000 vehicles per day (500 to 2,000 vehicles per peak hour);

- **Collector Road** – provides a link between local roads and regional roads, typically carrying between 2,000 and 10,000 vehicles per day (250 to 1,000 vehicles per peak hour). At volumes greater than 5,000 vehicles per day, residential amenity begins to decline noticeably; and

- **Local Road** – provides access to individual allotments, carrying low volumes, typically less than 2,000 vehicles per day (250 vehicles per peak hour).

Peak hour volumes on most roads are typically eight to twelve percent of the daily volumes. In accordance with the above, the roads in the vicinity of the subject site are therefore described below:

- **Macquarie Street** performs a local collector function, providing a one-way westbound traffic function through the city centre from Harris Street in the east to O'Connell Street in the west. In the vicinity of the subject site it provides an 11m wide carriageway providing two marked through westbound traffic lanes in conjunction with parallel parking along both kerb alignments. Traffic flow is governed by a sign posted speed limit of 50km/h.

  Macquarie Street, to the west of O'Connell Street, provides a one-way eastbound traffic function, linking and forming part of the State Road routes of Pitt Street and O'Connell Street.

  Macquarie Street, in the vicinity of the site, intersects with Church Street, Marsden Street and O'Connell Street under traffic signal control, and also provides a mid-block signalised pedestrian crossing to the east of Church Street.

- **Church Street** performs a local access function between Macquarie Street and George Street, providing a single lane of northbound traffic, between the signalised intersections. Church Street, to the north of George Street, provides

a two-way collector road function on approach to Victoria Road, with which it intersects with under signalised traffic control. Traffic flow is governed by a sign posted speed limit of 40km/h.

Church Street, to the north of Victoria Road, performs a State Road traffic function, linking with Windsor Road and Cumberland Highway at Northmead.

- **Marsden Street** performs an important north-south collector road function within the context of the Parramatta city centre, linking Great Western Highway in the south with Victoria Road in the north (via Marist Place). Marsden Street, in the vicinity of the subject site, provides one through southbound travel lane and two northbound travel lanes and intersects with Macquarie Street and George Street under traffic signal control. Traffic flow is governed by a sign posted speed limit of 50km/h.

- **O'Connell Street** performs an arterial function under the care and control of the Roads & Maritime Services, between Great Western Highway in the south and Albert Street to the north. It provides a two-way State Road function between Victoria Road and Macquarie Street, intersecting with both under traffic signal control. Traffic flow is governed by a sign posted speed limit of 60km/h.

  O'Connell Street, to the south of Macquarie Street, provides a one-way southbound traffic function towards Great Western Highway, with which it intersecting under traffic signal control.

- **George Street** provides a local collector function, providing a one-way eastbound traffic function through the Parramatta city centre from O'Connell Street in the west to Harris Street / Macarthur Street in the east. In the vicinity of the subject site it provides a 13m wide carriageway providing two marked through eastbound traffic lanes in conjunction with parallel parking along both kerb alignments. Traffic flow is governed by a sign posted speed limit of 50km/h.

  George Street intersects with O'Connell Street, Marsden Street and Church Street under traffic signal control in immediate vicinity of the site.

  George Street, to the east of Harris Street / Macarthur Street, provides a local access function, linking with Arthur Street.

5.2 Traffic Volumes

This Practice has commissioned weekday morning and evening peak period and weekend midday peak period traffic surveys in the immediate vicinity surrounding the subject site in order to obtain an accurate indication of existing traffic conditions. Traffic surveys were undertaken between 7.00am – 9.00am and 4.00pm – 6.00pm on Friday the 30th and Saturday the 31st of January 2015 at the following intersections:

- Macquarie Street and Church Street;

- Macquarie Street and Marsden Street;
- Macquarie Street and O'Connell Street;
- George Street and O'Connell Street;
- George Street and Marsden Street; and
- George Street and Church Street.

Figures 2 and **3** (in the following pages) illustrate the surveyed peak hour traffic flows at the subject intersections, whilst more detailed summaries are available upon request. There are net gains and losses between intersections associated with private development access locations, parking / unparking manoeuvres as well as slightly differing survey peak hour periods.

Figures 2 and **3** indicates the following:

- Macquarie Street accommodates westbound traffic demands of approximately 300 – 550 vehicles per hour during weekday and weekend peaks hours past the site;
- Church Street accommodates northbound traffic demands of between 50 – 150 per hour during weekday and weekend peaks past the site;
- Marsden Street accommodates two directional traffic demands of approximately 1,000 – 1,200 vehicles per hour during weekday and weekend peak hours past the site;
- O'Connell Street accommodates two directional traffic demands of approximately 2,000 – 3,000 vehicles per hour during weekday and weekend peak hours; and
- George Street accommodates eastbound traffic demands of 350 – 700 vehicles per hour during weekday and weekend peak hours.

FIGURE 2
EXISTING WEEKDAY PEAK HOUR TRAFFIC VOLUMES
PARRAMATTA CITY CENTRE

Legend: AM Peak Hour (7.45am – 8.45am) / PM Peak Hour (4.15pm – 5.15pm)

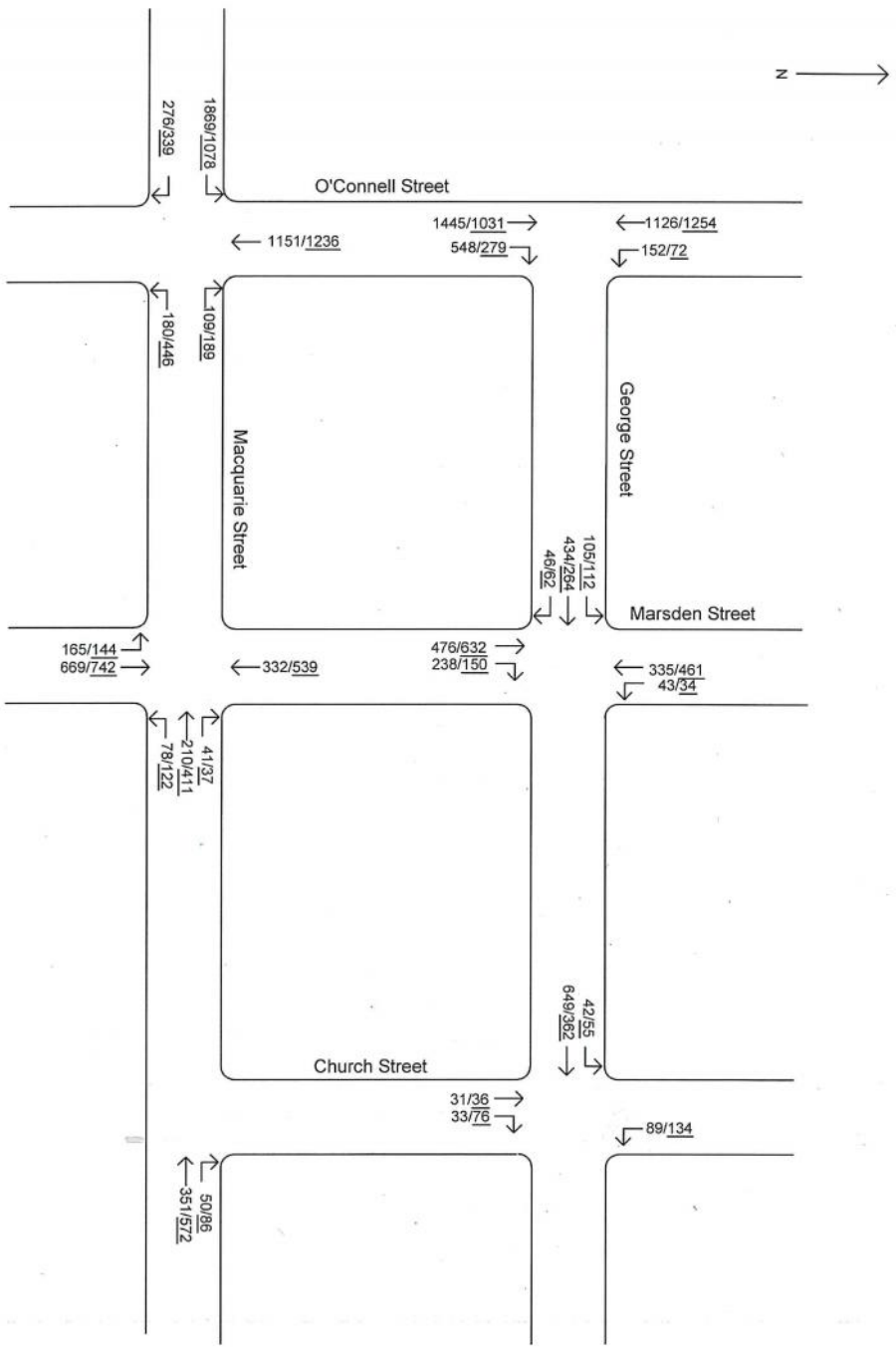
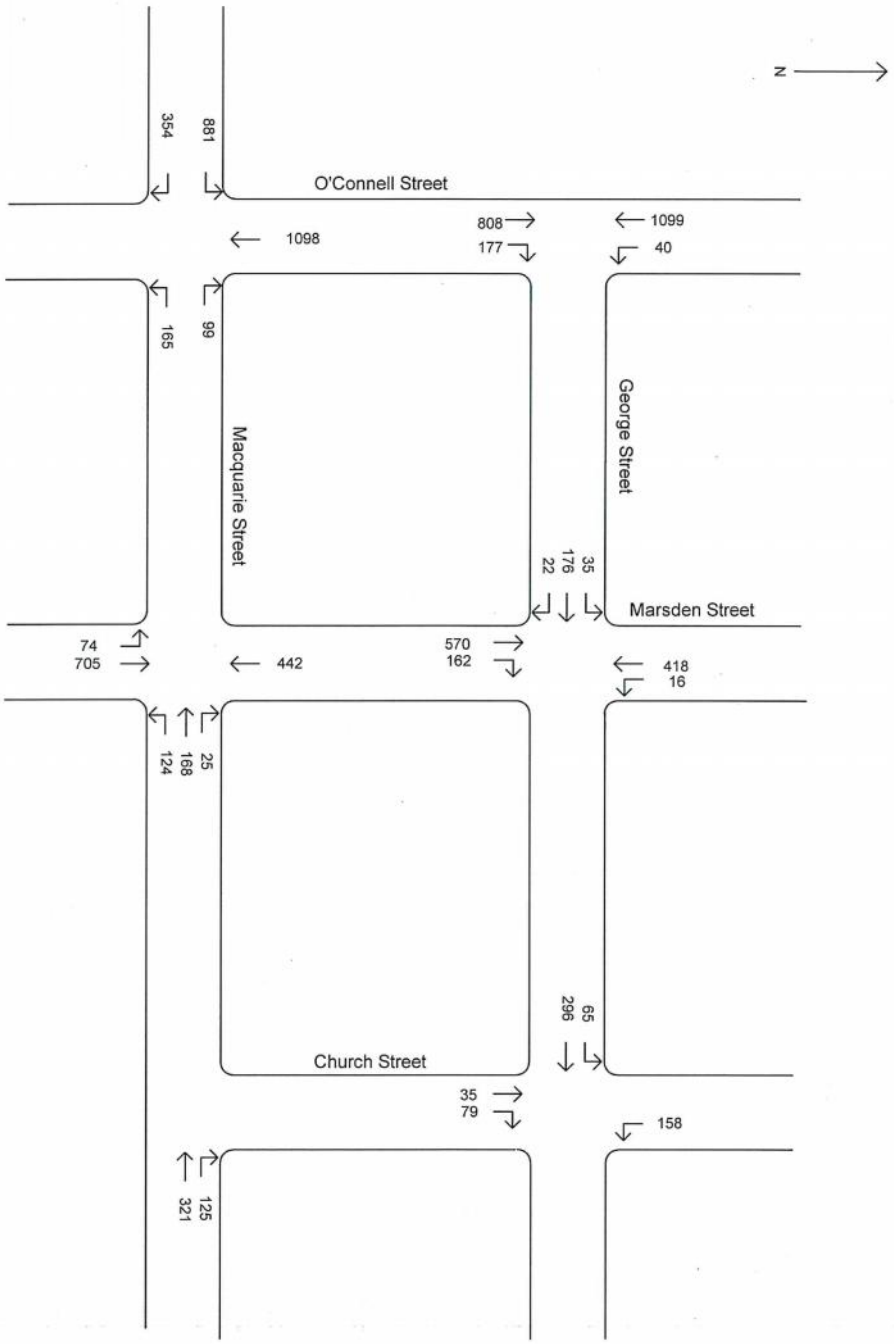


FIGURE 3
EXISTING WEEKEND (SATURDAY) MIDDAY PEAK HOUR (11.30AM – 12.30PM) TRAFFIC VOLUMES
PARRAMATTA CITY CENTRE



5.3 Existing Intersection Operation

In order to estimate the existing peak efficiency of the adjoining road network, a SIDRA computer intersection analysis has been undertaken. SIDRA is a computerised traffic arrangement program which, when volume and geometrical configurations of an intersection are imputed, provides an objective assessment of the operation efficiency under varying types of control (i.e. signs, signal and roundabouts). Key indicators of SIDRA include level of service where results are placed on a continuum from A to F, with A providing the greatest intersection efficiency and therefore being the most desirable by the Roads and Maritime Services.

SIDRA uses detailed analytical traffic models coupled with an iterative approximation method to provide estimates of the abovementioned key indicators of capacity and performance statistics. Other key indicators provided by SIDRA are average vehicle delay, the number of stops per hour and the degree of saturation. Degree of saturation is the ratio of the arrival rate of vehicles to the capacity of the approach. Degree of saturation is a useful and professionally accepted measure of intersection performance.

SIDRA provides analysis of the operating conditions that can be compared to the performance criteria set out in **Table 1** below (being the RMS NSW method of calculation of Level of Service).

TABLE 1
LEVELS OF SERVICE CRITERIA FOR INTERSECTION
SIGNALISED INTERSECTIONS

Level of Service	Average Delay per Vehicle (secs/veh)	Expected Delay
A	Less than 14	Little or no delay
B	15 to 28	Minimal delay and spare capacity
C	29 to 42	Satisfactory delays with spare capacity
D	43 to 56	Satisfactory but near capacity
E	57 to 70	At capacity, incidents will cause excessive delays
F	> 70	Extreme delay, unsatisfactory

The existing conditions have been modelled utilising the peak hour traffic volumes presented within **Figures 2** and **3**. **Table 2** overleaf provides a summary of the SIDRA output data whilst full details are available upon request.

TABLE 2 SIDRA OUTPUT – PEAK HOUR INTERSECTION PERFORMANCE			
	Weekday Peaks		Weekend
	AM Peak	PM Peak	Midday Peak
MACQUARIE STREET & CHURCH STREET			
Average Vehicle Delay (sec/veh)	12.1	10.7	14.4
Degree of Saturation	0.21	0.31	0.25
Level of Service	A	A	A
MACQUARIE STREET & MARSDEN STREET			
Average Vehicle Delay (sec/veh)	12.9	15.4	12.3
Degree of Saturation	0.35	0.49	0.36
Level of Service	A	B	A
MACQUARIE STREET & O'CONNELL STREET			
Average Vehicle Delay (sec/veh)	16.7	25.6	17.3
Degree of Saturation	0.68	0.54	0.36
Level of Service	B	B	B
GEORGE STREET & CHURCH STREET			
Average Vehicle Delay (sec/veh)	25.7	31.8	32.5
Degree of Saturation	0.49	0.43	0.42
Level of Service	B	C	C
GEORGE STREET & MARSDEN STREET			
Average Vehicle Delay (sec/veh)	19.7	16.5	13.7
Degree of Saturation	0.47	0.49	0.44
Level of Service	B	B	A
GEORGE STREET & O'CONNELL STREET			
Average Vehicle Delay (sec/veh)	32.3	23.5	20.0
Degree of Saturation	0.82	0.68	0.55
Level of Service	C	B	B

Table 2 indicates the following:

- The Macquarie Street intersections with Church Street, Marsden Street and O'Connell Street provide a level of service 'A/B' during all peak periods, representing good operation with spare capacity;

- The George Street intersections with O'Connell Street and Church Street provide a level of service 'B/C' during all peak periods, representing good to satisfactory operation with spare capacity; and

- The intersection of George Street and Marsden Street provides a level of service 'A/B' during all peak periods, representing good operation with spare capacity.

Further to the above presented surveyed intersections, assessment of a number of intersections to the east and south-east of the subject site has recently been undertaken by Traffix on behalf of Parramatta City Council and reported upon within the *Parramatta Square Traffic & Pedestrian Access Strategy*. This assessment included weekday commuter peak period analysis on the intersection of Macquarie Street and

Smith Street, presenting that the existing peak operation level of service of the intersection is 'D', representing satisfactory operation but near capacity.

The slightly reduced operational performance experienced at the intersection of Macquarie Street and Smith Street, in comparison to other intersections within the city centre, is understood from discussions with Roads & Maritime Services officers to be a result of an exclusive pedestrian phase at the intersection. This phase, whilst improving the level of safety for pedestrians at the intersection, reduces the amount of green time available for vehicular traffic, thereby resulting in a reduced level of operational performance. It is however noted that the existing level of service is considered to be satisfactory and is largely commensurate with the intersection of two important city centre collector roads.

5.4 Public Transport & Non Car Travel

State Government metropolitan planning has, for many years, promoted Parramatta as Sydney's secondary commercial hub. An array of business activities are now located in the Parramatta city centre providing significant employment opportunities to Western Sydney residents. Land use and transport policy have been integrated, encouraging new commercial activities in an area where public transport services are intended to be the principal form of travel. In recent years, Parramatta Station has been upgraded and the bus interchange expanded, in the interest of achieving a greater proportion of journeys-to-work outside of the private vehicle.

5.4.1 Train

The site is located approximately 300m walking distance to the north-west of Parramatta Railway Station. Parramatta station is served by North Shore, Western, Cumberland and Blue Mountains Lines. There are good connecting services to Parramatta provided by the South Line (at Granville) and Northern Line (at Strathfield) as follows:

- The North Shore & Western Line connects Berowra, via Sydney to Emu Plains with a branch to Richmond;
- The Cumberland Line provides direct services from South Western Sydney (Liverpool) to Western Sydney (Blacktown) via Parramatta;
- The Blue Mountains Line service connects Lithgow and the Blue Mountains to Sydney offering fast services between Penrith, Blacktown, Parramatta, Granville, Strathfield and Sydney;
- The South Line service connects Macarthur to Sydney;
- The Carlingford branch line connects Carlingford to Clyde, where there are limited connections on the Western Line to Parramatta; and
- CountryLink provides two long distance rail services via Parramatta: a daily service to Dubbo via Orange and a weekly service to Broken Hill via Orange.

The *Parramatta City Centre Integrated Transport Plan* states that Parramatta railway station accommodates nearly 10,000 passengers during the morning peak.

5.4.2 Bus

The *Parramatta City* Centre *Integrated Transport Plan* states that Parramatta city centre is serviced by approximately 40 bus routes provided by six bus operators (Veolia, Hopkinsons, Westbus, Hillsbus, Sydney Buses and Western Sydney Buses).

The Parramatta Transport Interchange integrates the bus and rail stations. All bus services (with a few minor exceptions) terminate at the interchange.
The Liverpool to Parramatta T-way was opened in 2003 and the North West T-way opened in March 2007. The North-West T-way comprises two sections: Parramatta to Rouse Hill and Blacktown to Parklea.

In 2008, Council started "the Loop" free city bus service. The Loop bus connects significant destinations and integrates with bus services as all services terminate at the interchange. The loop operates a one-way service on a 10 minute frequency with the closest stop located within Macquarie Street to the east of O'Connell Street.

5.4.3 Ferry

The subject site is located approximately 650m to the south-west of Parramatta Ferry Wharf. The wharf accommodates ferry services between Parramatta and Circular Quay along the Parramatta River and Sydney Harbour. Ferry services provide a 60 minute frequency during commuter peaks, business hours and on weekends.

5.4.4 Bicycle

The following are nominated on road bicycle routes to the north of the site:

- George Street to the west of Church Street;
- Church Street between George Street and Palmer Street; and
- Sorrell Street to the south of Palmer Street.

These routes provide connectivity to off-road cycle routes through Parramatta Park to the west and along the northern foreshore of the Parramatta River to the east.

The following are nominated on road bicycle routes to the north of the site:

- O'Connell Street between Grose Street and Fennell Street;
- Fennell Street to the west of O'Connell Street; and
- Reef Street.

These routes provide connectivity to off-road cycle routes through Parramatta Park to the west and Cumberland Hospital to the north.

5.4.5 Potential Future Public Transport

It is understood that the NSW Government, is currently investigating the provision of a light rail service linking with Parramatta. In this regard, four potential routes have been shortlisted as follows:

- Parramatta to Macquarie Park via Carlingford;
- Parramatta to Castle Hill via Old Northern Road;
- Parramatta to Bankstown; and
- Parramatta to Sydney Olympic Park and Strathfield / Burwood.

The NSW Government has not yet made any final decisions about the exact route or stop locations and will be consulting with key stakeholders during the detailed study phase of the project.

The Parramatta to Castle Hill route is likely to involve Church Street, thence connecting with the city centre via Macquarie Street (to the east of Church Street). In this regard, it has not yet been decided whether the section of Church Street adjacent to the site will continue to provide for northbound traffic flow. In any event, it is likely that there will be significant improvements / alterations to pedestrian infrastructure within Church Street to accommodate the light rail route.

In the event that the Parramatta to Castle Hill route does not proceed, it is understood that high-frequency and fast 'Rapid' bus routes will be progressively delivered to connect every regional major centre to Parramatta. Existing bus services will also be progressively upgraded on the shortlisted light rail routes while light rail is investigated.

5.5 Pedestrian Conditions / Infrastructure

Pedestrians are provided with footpaths along both sides of all surrounding streets. In addition, signalised pedestrian crossings are provided over all approaches to the surveyed intersections within the immediate vicinity of the subject site. Church Street Mall provides a pedestrian only connection between Macquarie Street and Darcy Street, linking with the Parramatta Railway Station and bus interchange facility.

Pedestrian demands within the vicinity of the subject site were surveyed during weekday commuter peaks and weekday midday peaks in associated with the previously presented vehicular traffic surveys. In this regard, pedestrian crossing volumes were surveyed at the Macquarie Street and George Street intersections with Church Street, Marsden Street and O'Connell Street in conjunction.

Table 3 overleaf provides a summary of the pedestrian crossing survey results whilst full details are available upon request.

TABLE 3 EXISTING PEAK HOUR PEDESTRIAN VOLUMES PARRAMATTA CITY CENTRE					
	Intersection Approach				
	North	**South**	**East**	**West**	**Total**
MACQUARIE STREET & CHURCH STREET					
Weekday AM Peak	105	-	680	597	1382
Weekday PM Peak	116	-	864	293	1273
Weekend Midday Peak	210	-	900	255	1365
MACQUARIE STREET & MARSDEN STREET					
Weekday AM Peak	492	345	151	139	1127
Weekday PM Peak	324	368	138	113	943
Weekend Midday Peak	107	80	31	27	245
MACQAURIE STREET & O'CONNELL STREET					
Weekday AM Peak	97	81	51	92	321
Weekday PM Peak	142	114	31	137	424
Weekend Midday Peak	36	44	7	35	122
GEORGE STREET & CHURCH STREET					
Weekday AM Peak	62	14	435	201	712
Weekday PM Peak	84	21	539	345	989
Weekend Midday Peak	64	5	518	178	765
GEORGE STREET & MARSDEN STREET					
Weekday AM Peak	116	61	6	169	352
Weekday PM Peak	114	168	74	121	477
Weekend Midday Peak	38	65	29	12	144
GEORGE STREET & O'CONNELL STREET					
Weekday AM Peak	34	22	51	-	107
Weekday PM Peak	50	34	25	-	109
Weekend Midday Peak	21	27	5	-	53

Table 3 indicates that north-south pedestrian movements along Church Street significantly dominate the pedestrian movement profile within the subject vicinity. East-west pedestrian movements along Macquarie Street are also notable during weekday periods.

Pedestrian movements within Marsden Street, O'Connell Street and George Street are reasonably low compared with Church Street, particularly outside of weekday commuter peaks.

5.6 Parking Considerations

5.6.1 On-Street

Time limited metered parking is available within Macquarie Street, Church Street and George Street in the vicinity of the subject site.

Kerb-side parking is prohibited along Marsden Street and O'Connell Street in the immediate vicinity of the site.

5.6.2 Off-Street

The following Council owned public car parking areas are located within the immediate vicinity of the site:

- Horwood Place Car Park 150m to the east of the subject site;
- Erby Place Car Park 300m to the north-east of the subject site; and
- Hunter Street Car Park 300m to the south-west of the subject site.

Further to the above, there are various privately owned and operated car parking areas within the subject vicinity, including Westfield Shopping Centre some 300m to the south of the site.

6. PROJECTED PROPOSAL TRAFFIC GENERATION & IMPACTS

6.1 Development Scenarios Assessed

Section 4.1 of this report presents that the Planning Proposal involves a mixed use development comprising approximately 5,000m^2 of retail floor space, 2,500m^2 of office floor space, 2,500m^2 of medical suites and 560 residential apartments. However, this assessment is based on the slightly increased conceptual and preliminary development yields of 5,140m^2 of retail floor space, 2,570m^2 of office floor space, 2,570m^2 of medical suites and 573 residential apartments, in order to create an absolute worst case scenario. The final configuration of the building will be the subject of detailed design after the Planning Proposal process.

Whilst this report assesses the likely traffic generating capacity of this Proposal and the impacts of such on the surrounding road network, for the purposes of comparison, the following other scenarios have been assessed:

- A LEP compliant development scheme, providing a maximum building height of 36m; and

- A development scheme providing a Floor Space Ratio of 10:1 modelled in the Architectus Planning Framework Study and endorsed by Council.

Table 4 below provides a summary of the various assessment scenarios with respect to potential development yields.

TABLE 4
ASSESSED DEVELOPMENT SCENARIOS
197 CHURCH STREET, PARRAMATTA

	Current Development	**LEP Compliant Development**	**FSR = 10:1**	**Assessed Planning Proposal**
Retail Floor Space	6,600m^2	3,800m^2	4,950m^2	5,140m^2
Office Floor Space	3,300m^2	1,600m^2	2,475m^2	2,570m^2
Medical Floor Space	-	1,600m^2	2,475m^2	2,570m^2
Residential Units	-	91 units	366 units	573 units

The subject Proposal therefore involves a reduction in retail and office floor space and the introduction of medical and residential floor space to the site. Importantly, the Proposal is essentially limited to an increased residential dwelling yield when compared to a development scheme based on a FSR of 10:1 as recommended by the Architectus Planning Framework Study and endorsed by Council.

6.2 Traffic Generation

The Roads & Maritime Services provide the following peak hour traffic generation rates relevant to the subject proposal within its *Guide to Traffic Generating Developments* and *TDT 2013/04*:

Office Floor Space
1.6 AM trips per 100m^2 GFA
1.2 PM trips per 100m^2 GFA
Retail Floor Space
4.0 PM trips per 100m^2 GFA
3.6 Weekend trips per 100m^2 GFA
High Density Residential Building
0.19 AM trips per unit
0.15 PM trips per unit

For the purposes of this assessment, medical suites are projected to generate traffic in a similar manner to office floor space. In this regard, office and medical floor space has been projected to generate primarily (80%) inbound vehicle movements during the weekday morning peak and outbound movements during the weekday evening peaks, associated with the travel to and from of employees. Weekend traffic generation associated with the office and medical floor space is assumed to be negligible.

Retail floor space has been assumed to generate negligible traffic during morning weekday peak periods associated with operational hours largely commencing following the morning commuter peak. Weekday evening and weekend peak traffic generation has been assigned to be evenly distributed between ingress and egress movements.

Traffic generation associated with the residential component is projected to be primarily (80%) outbound during the weekday morning peak and inbound during the weekday evening peak associated with normal journey to and from work movements. Weekend traffic generation associated with the residential component of the development is projected to be evenly distributed between ingress and egress movements. For the purposes of this assessment and in order to generate a worst case scenario, traffic generation during weekend peak periods has been assumed to be equal to that of weekday evening commuter peak periods.

Table 5 overleaf provides a summary of the traffic generating ability of the subject site incorporating the various assessed scenarios.

TABLE 5 TRAFFIC GENERATING CAPACITY SUMMARY TABLE				
	Current Development	**LEP Compliant Development**	**FSR = 10:1 (Architectus)**	**Planning Proposal**
WEEKDAY AM PEAK				
In	42	46	77	88
Out	11	24	72	103
Total	53	70	149	191
WEEKDAY PM PEAK				
In	140	95	155	161
Out	164	109	157	147
Total	304	204	312	308
WEEKEND MIDDAY PEAK				
In	119	75	116	136
Out	119	75	117	136
Total	238	150	233	272

Table 5 indicates the following:

- The Proposal is projected to generate 191 weekday morning peak hour trips, which is:
  - 138 additional trips over and above that capable of being generated by the existing development;
  - 121 additional trips over and above that estimated to be generated by a LEP compliant development; and
  - 42 additional trips over and above that estimated to be generated by a FSR 10:1 development.

- The Proposal is projected to generate 308 weekday evening peak hour trips, which is:
  - 4 additional trips over and above that capable of being generated by the existing development;
  - 104 additional trips over and above that estimated to be generated by a LEP compliant development; and
  - 4 fewer trips than that estimated to be generated by a FSR 10:1 development.

- The Proposal is projected to generate 272 weekend midday peak hour trips, which is:
  - 34 additional trips over and above that capable of being generated by the existing development;
  - 122 additional trips over and above that estimated to be generated by a LEP compliant development; and
  - 39 additional trips over and above that estimated to be generated by a FSR 10:1 development.

The subject proposal is therefore expected to generate comparable traffic during weekday evening peaks and weekend peaks to that currently capable of being generated by the existing site development (whereby less than one additional traffic movement per minute is estimated).

It is however acknowledged that the Proposal is expected to generate up to 138 additional vehicle trips over and above that currently capable of being generated by the existing site development during the weekday morning peak hour. The extent of this additional traffic generating capability is reduced to 42 trips when compared to that capable of being generated by a FSR 10:1 development, as recommended by the Architectus report and supported by Council.

6.3 Trip Assignment

In order to gauge the impact of the altered traffic generation and distribution, an assessment of the likely assignment of traffic is required to be undertaken. This involves distributing the traffic generated by the proposed development along the major approach routes before it dissipates throughout the general road network. **Table 6** provides a summary of the trip distribution applied to the subject site following assessment of journey to work data for Parramatta.

TABLE 6 ADOPTED SITE TRIP DISTRIBUTION	
North	35%
East	25%
South	15%
West	25%
TOTAL	100%

6.4 Projected Traffic Volumes

Figures 4 and **5** overleaf provide an estimation of the projected traffic volumes incorporating the previously presented traffic generation and trip assignment. For the purposes of presenting an absolute worst case scenario, the Proposal has been assigned to generate the full extent of the traffic presented within **Table 5** as new trips. There has been no discounting associated with the traffic generating ability of the existing site development. Further, there has been no discounting associated with the potential for linked and multi-purpose trips between the various Proposal components (or indeed, land-uses within surrounding developments).

FIGURE 4
PROJECTED WEEKDAY PEAK HOUR TRAFFIC VOLUMES
INCORPORATING THE SUBJECT PROPOSAL
PARRAMATTA CITY CENTRE

Legend: AM Peak Hour (7.45am – 8.45am) / PM Peak Hour (4.15pm – 5.15pm)

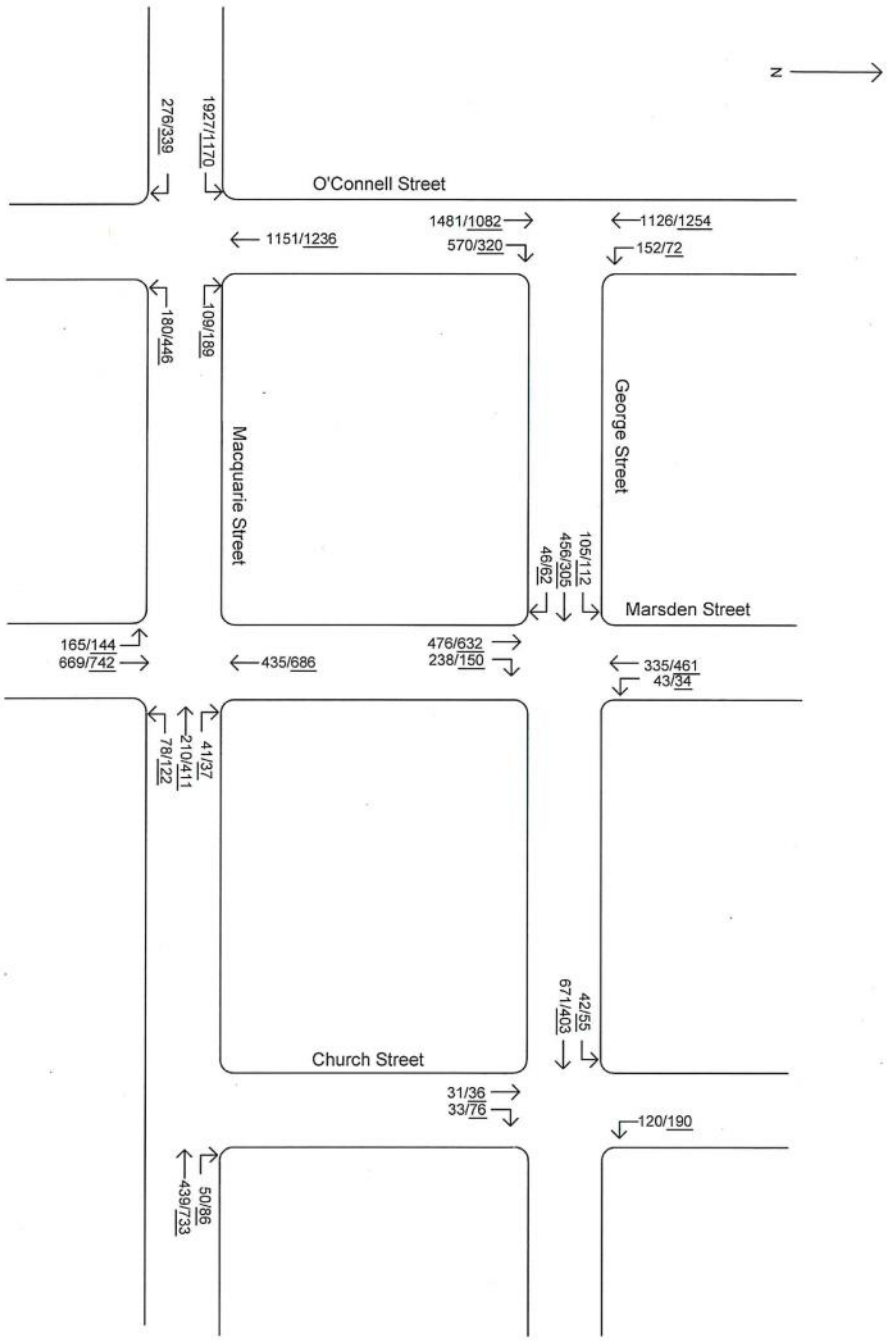
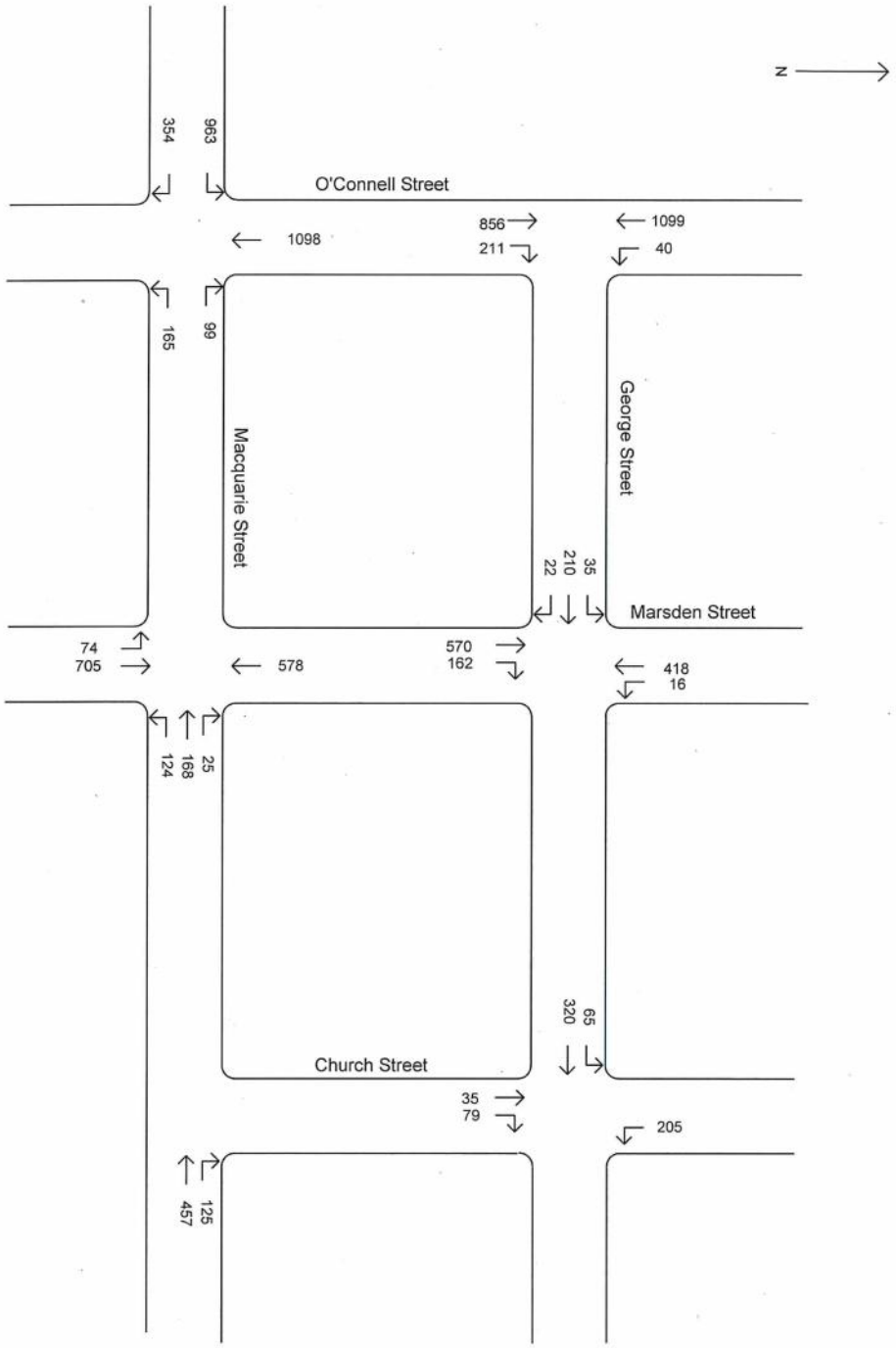


FIGURE 5
PROJECTED WEEKEND (SATURDAY) MIDDAY PEAK HOUR (11.30AM – 12.30PM) TRAFFIC VOLUMES
INCORPORATING THE SUBJECT PROPOSAL
PARRAMATTA CITY CENTRE



6.5 Projected Intersection Performance

Utilising the projected traffic generation characteristics of the proposed development and the abovementioned assumed trip assignment, a number of significant junctions have been modelled in order to estimate that likely impact on traffic safety and efficiency. A summary of the most pertinent results are indicated within **Table 7** overleaf whilst full details are available if required.

TABLE 7
SIDRA OUTPUT – PEAK HOUR INTERSECTION PERFORMANCE

	Existing Conditions			Projected Conditions		
	Weekday		Weekend Midday	Weekday		Weekend Midday
	AM	PM		AM	PM	
MACQUARIE STREET & CHURCH STREET						
Average Vehicle Delay (sec/veh)	12.1	10.7	14.4	10.5	9.9	12.7
Degree of Saturation	0.21	0.31	0.25	0.24	0.37	0.30
Level of Service	A	A	A	A	A	A
MACQUARIE STREET & MARSDEN STREET						
Average Vehicle Delay (sec/veh)	12.9	15.4	12.3	12.7	14.9	11.5
Degree of Saturation	0.35	0.49	0.36	0.36	0.58	0.45
Level of Service	A	B	A	A	B	A
MACQUARIE STREET & O'CONNELL STREET						
Average Vehicle Delay (sec/veh)	16.7	25.6	17.3	16.7	25.6	17.2
Degree of Saturation	0.68	0.54	0.36	0.70	0.54	0.36
Level of Service	B	B	B	B	B	B
GEORGE STREET & CHURCH STREET						
Average Vehicle Delay (sec/veh)	25.7	31.8	32.5	27.5	32.7	32.6
Degree of Saturation	0.49	0.43	0.42	0.55	0.51	0.48
Level of Service	B	C	C	B	C	C
GEORGE STREET & MARSDEN STREET						
Average Vehicle Delay (sec/veh)	19.7	16.5	13.7	19.8	17.1	14.2
Degree of Saturation	0.47	0.49	0.44	0.49	0.50	0.44
Level of Service	B	B	A	B	B	A
GEORGE STREET & O'CONNELL STREET						
Average Vehicle Delay (sec/veh)	32.3	23.5	20.0	33.6	24.7	21.6
Degree of Saturation	0.82	0.68	0.55	0.84	0.70	0.57
Level of Service	C	B	B	C	B	B

Table 7 indicates that the additional traffic to be generated is expected to have minor impacts on the average vehicular delay and degree of saturation of the surveyed intersections, however the existing level of service of all intersections is anticipated to remain unaffected. The Planning Proposal is therefore not projected to result in any unreasonable impacts on the surrounding city centre road network performance.

It is acknowledged that traffic studies undertaken on behalf of Parramatta Council indicate that there is a slightly reduced capacity to accommodate additional traffic to the east of the current study precinct, in particular the intersection of Macquarie Street and Smith Street. This reduced capacity, as corroborated by Roads & Maritime Services officers, is largely a result of the implementation of an exclusive pedestrian phase thereby reducing available cycle time to vehicular traffic. It is however envisaged that the road network to the east is suitably capable of accommodating the altered traffic generating potential of the subject Proposal as was previously demonstrated in the abovementioned study undertaken on behalf of Council.

7. CUMULATIVE ASSESSMENT OF TRAFFIC IMPACTS

7.1 Other Development Scenarios Assessed

Parramatta City Council has advised that there are two sites in the immediate vicinity of the subject site for which concept proposals are currently being formulated for redevelopment as follows:

- 20 – 22 Macquarie Street, immediately adjoining the site to the south-west and providing frontages to the north-eastern corner of the junction of Macquarie Street and Marsden Street; and

- 220 – 222 Church Street and 48 Macquarie Street, located to the east of the site on the opposite side of Church Street but also providing a substantial frontage to Macquarie Street.

It is understood that 20 – 22 Macquarie Street provides a site area of 1,294m^2 and currently accommodates a mixed commercial development providing approximately 3,870m^2 office floor space and 1,294m^2 retail floor space.

It is further understood that 220 – 222 Church Street and 48 Macquarie Street provides a site area of 4,144m^2, accommodating a similar mixed use commercial development providing approximately 4,740m^2 office floor space and 4,140m^2 retail floor space.

Indicative development yield scenarios for these sites have been formulated by Robertson + Marks, based on a FSR of 10:1 as recommended by the Architectus Planning Framework Study and endorsed by Council, the results of which are contained within **Table 8** for reference.

TABLE 8
ASSESSED DEVELOPMENT SCENARIO FOR NEARBY SITES

	20 – 22 Macquarie Street		**220 – 222 Church Street & 48 Macquarie Street**	
	Existing	**Future**	**Existing**	**Future**
Retail Floor Space	1,294m^2	1,200m^2	4,140m^2	4,350m^2
Office Floor Space	3,870m^2	1,200m^2	4,740m^2	4,350m^2
Medical Floor Space	-	-	-	-
Residential Units	-	131	-	414

The potential redevelopment of the assessed sites is therefore largely expected to involve a reduction in commercial floor space and the introduction of residential development yield.

7.2 Traffic Generation

The traffic generating potential of the assessed surrounding development sites has been investigated in a similar manner to that which was applied to the subject Proposal in Section 6. **Table 9** below provides a summary of the existing and proposed traffic generating capacity of the nearby sites.

TABLE 9
TRAFFIC GENERATING CAPACITY SUMMARY TABLE
NEARBY DEVELOPMENT SITES

	20 – 22 Macquarie Street		**220 – 222 Church Street & 48 Macquarie Street**	
	Current Development	**FSR 10:1 Scheme**	**Current Development**	**FSR 10:1 Scheme**
WEEKDAY AM PEAK				
In	50	20	61	72
Out	12	24	15	77
Total	62	44	76	149
WEEKDAY PM PEAK				
In	35	43	95	147
Out	63	39	130	141
Total	98	82	233	288
WEEKEND MIDDAY PEAK				
In	23	32	75	109
Out	23	32	75	109
Total	46	64	150	218

Table 9 indicates the following:

- The traffic generating potential of 20 22 Macquarie Street is similar incorporating the current development scheme and a scheme with a FSR of 10:1; and

- The traffic generating potential of 220 – 222 Church Street and 48 Macquarie Street is likely to increase by approximately 40% incorporating a redevelopment FSR 10:1 scheme.

7.3 Trip Assignment and Projected Traffic Volumes

In order to undertake a cumulative assessment of the ability of the surrounding road network to accommodate the altered traffic generating characteristics of the nearby potential redevelopment sites, the previously assessed indicative traffic generation has been assigned to various routes within the city centre. This assignment has incorporated the following assumptions:

- The redevelopment of 20 – 22 Macquarie Street is to be serviced by a single ingress driveway within Macquarie Street and a single egress driveway within Marsden Street facilitating left out only movements (in a similar manner to the subject Proposal);

- The redevelopment of 220 – 220 Church Street and 48 Macquarie Street is to be serviced by a single combined ingress / egress driveway connecting with Macquarie Street;

- Traffic to and from the redevelopment sites has been assigned in accordance with the trip assignment presented within **Table 6**;

- For the purposes of presenting an absolute worst case scenario, the redevelopment sites have been assigned to generate the full extent of the traffic presented within **Table 9** as new trips;

- There has been no discounting associated with the traffic generating ability of the existing site developments; and

- There has been no discounting associated with the potential for linked and multi-purpose trips between the various redevelopment site components (or indeed, land-uses within surrounding developments).

Figures 6 and **7** overleaf provide an estimation of the projected cumulative traffic volumes incorporating the subject Proposal and the additional traffic generating potential of the two other assessed nearby redevelopment sites.

FIGURE 6
PROJECTED WEEKDAY PEAK HOUR TRAFFIC VOLUMES
INCORPORATING THE SUBJECT PROPOSAL & OTHER ASSESSED REDEVELOPMENT SITES
PARRAMATTA CITY CENTRE

Legend: AM Peak Hour (7.45am – 8.45am) / PM Peak Hour (4.15pm – 5.15pm)

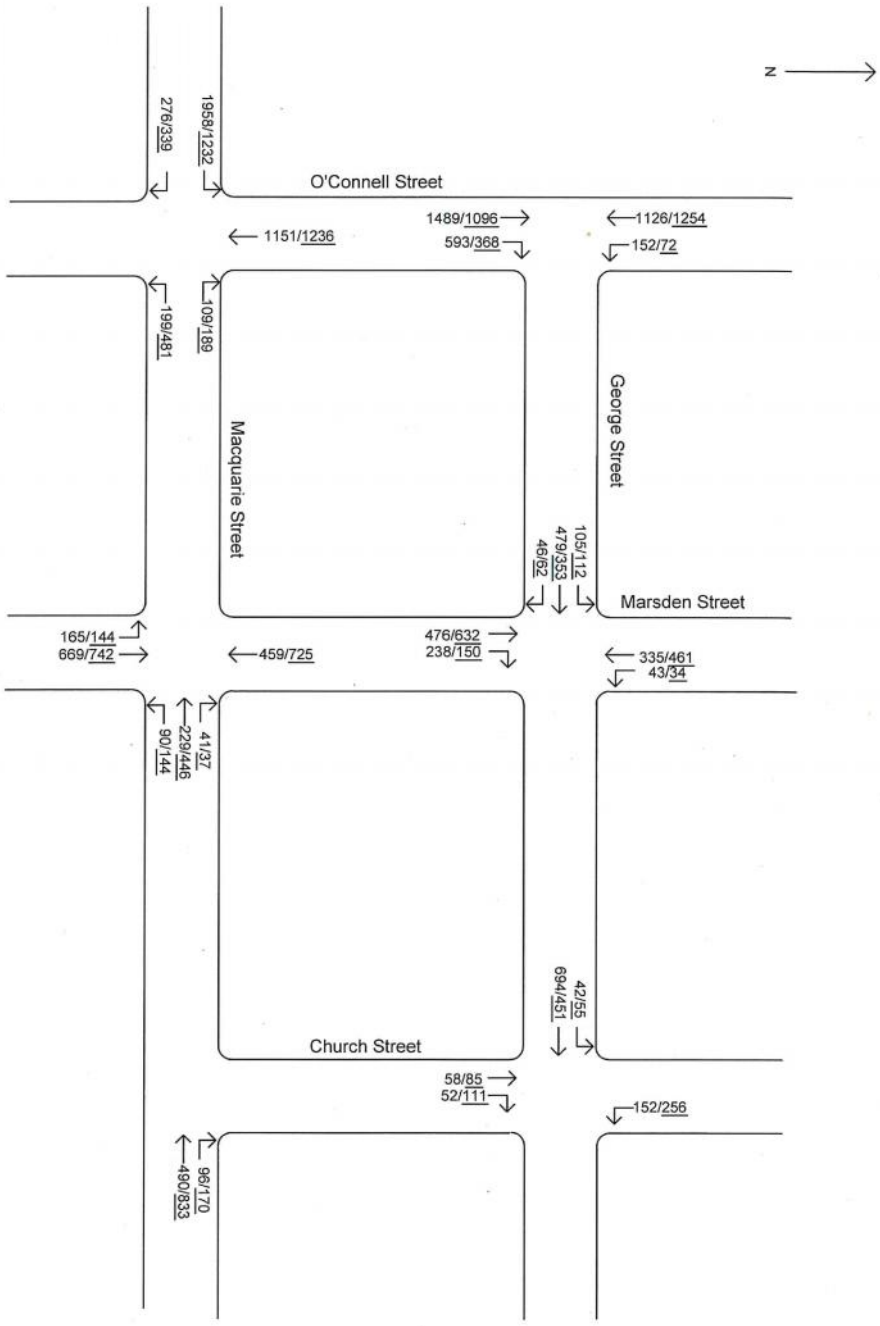
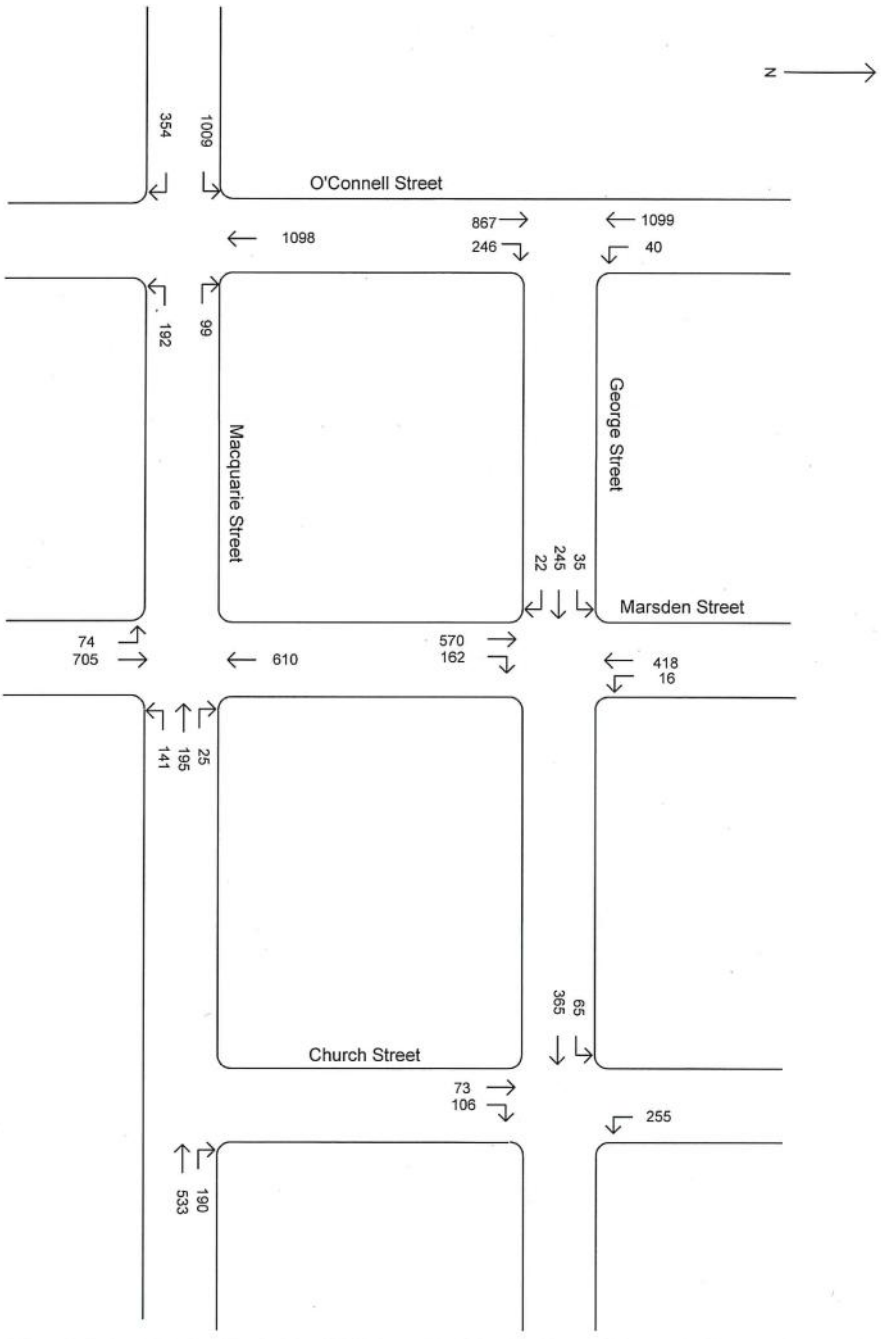


FIGURE 7
PROJECTED WEEKEND (SATURDAY) MIDDAY PEAK HOUR (11.30AM – 12.30PM) TRAFFIC VOLUMES
INCORPORATING THE SUBJECT PROPOSAL & OTHER ASESED REDEVELOPMENT SITES
PARRAMATTA CITY CENTRE



7.4 Projected Intersection Performance

Utilising the projected traffic generation characteristics of the proposed development and the abovementioned assumed trip assignment, a number of significant junctions have been modelled in order to estimate that likely impact on traffic safety and efficiency. A summary of the most pertinent results are indicated within **Table 10** overleaf whilst full details are available if required.

TABLE 10
SIDRA OUTPUT – PEAK HOUR INTERSECTION PERFORMANCE

	Existing Conditions			Projected Conditions (Cumulative Scenario)		
	Weekday		Weekend Midday	Weekday		Weekend Midday
	AM	PM		AM	PM	
MACQUARIE STREET & CHURCH STREET						
Average Vehicle Delay (sec/veh)	12.1	10.7	14.4	10.1	9.2	11.7
Degree of Saturation	0.21	0.31	0.25	0.27	0.43	0.35
Level of Service	A	A	A	A	A	A
MACQUARIE STREET & MARSDEN STREET						
Average Vehicle Delay (sec/veh)	12.9	15.4	12.3	12.8	15.4	12.3
Degree of Saturation	0.35	0.49	0.36	0.37	0.62	0.48
Level of Service	A	B	A	A	B	A
MACQUARIE STREET & O'CONNELL STREET						
Average Vehicle Delay (sec/veh)	16.7	25.6	17.3	17.0	26.4	17.1
Degree of Saturation	0.68	0.54	0.36	0.71	0.57	0.38
Level of Service	B	B	B	B	B	B
GEORGE STREET & CHURCH STREET						
Average Vehicle Delay (sec/veh)	25.7	31.8	32.5	29.5	35.2	34.3
Degree of Saturation	0.49	0.43	0.42	0.60	0.65	0.60
Level of Service	B	C	C	C	C	C
GEORGE STREET & MARSDEN STREET						
Average Vehicle Delay (sec/veh)	19.7	16.5	13.7	19.9	17.8	14.7
Degree of Saturation	0.47	0.49	0.44	0.49	0.51	0.44
Level of Service	B	B	A	B	B	B
GEORGE STREET & O'CONNELL STREET						
Average Vehicle Delay (sec/veh)	32.3	23.5	20.0	34.7	25.8	23.3
Degree of Saturation	0.82	0.68	0.55	0.86	0.72	0.60
Level of Service	C	B	B	C	B	B

Table 10 indicates that the cumulative additional traffic projected to be generated by the subject Proposal and the other assessed surrounding potential redevelopment sites is expected to have minor impacts on the average vehicular delay and degree of saturation of the surveyed intersections, however the existing level of service of all intersections is anticipated to be between 'A' and 'C', representing satisfactory conditions with spare capacity. The viability of the subject Planning Proposal is therefore not unreasonably impacted by the potential for the redevelopment of other sites in the immediate vicinity.

8. ACCESS CONSIDERATIONS

8.1 Access Strategy

Vehicular access between the surrounding road network and the site is proposed as follows:

- All site ingress is proposed via Macquarie Street via a 6m wide ingress only driveway; and

- All site egress is proposed via Marsden Street via a 7m wide egress only driveway.

Vehicular ingress movements from Macquarie Street are proposed to be restricted to right in movements only by virtue of the one-way westbound traffic function of the frontage road.

Whilst two way traffic is facilitated by Marsden Street, egress movements are proposed to be restricted to left out only in order to reduce delay for exiting traffic and potential conflicts with adjoining public road traffic flow.

It is acknowledged that DCP 2011 prohibits the provision of access driveways servicing new development to / from Macquarie Street (and Church Street). The proposed access strategy, involving the separation of ingress and egress movements, has however been formulated for the following reasons:

- To reduce the width of driveways servicing the site and thereby reduce potential conflicts with pedestrian movements within the city centre location;

- To create clear access and departure routes to and from the site and thereby reduce the potential for a single road to be burdened with all traffic associated with the development; and

- To eliminate any potential conflicts between ingress and egress movements.

The proposed access strategy is considered to result in the least disruption to vehicular and pedestrian movements within the Parramatta city centre and accordingly, is considered to be satisfactory.

8.2 Access Design

In order to undertake an assessment of the proposed access driveway design, reference is made to AS2890.1-2004. These documents provide driveway design specifications based on a number of site and surrounding road network characteristics such as the number and classification of vehicles to be accommodated on-site and the functional order of the frontage roads.

Based on the development accommodating in excess of 600 car parking spaces and the local (non-arterial) nature of the frontages roads, AS2890.1-2004 specifies, at minimum, the site must be serviced by a Category 4 type driveway, comprising a 6m

wide ingress driveway separated by a 6m wide egress driveway by a 1m wide median. The proposed separated ingress and egress driveway arrangement suitably accords with this AS2890.1-2004 requirement and is therefore considered to be satisfactory.

Further to the above, desktop analyses of the proposed site access driveways indicates that vehicles up to Medium Rigid Vehicles (MRVs) are suitably capable of entering and exiting from Macquarie Street and Marsden Street respectively without any unreasonable encroachment on pedestrian footpaths or adjoining / opposing public road travel lanes. In consideration of this and the above discussion, the proposed site access driveway design is considered to be satisfactory.

8.3 Access Safety / Efficiency

The safety associated with site access driveways is largely attributable to the provision of satisfactory sight distance along the frontage road and footpath. The proposed access driveway arrangements are considered to provide for safe site ingress and egress for the following reasons:

- Macquarie Street and Marsden Street provide consistent vertical and horizontal alignments in the immediate vicinity of the subject site resulting in good sight distance provisions to / from the access driveways;

- The Marsden Street egress driveway is proposed to provide a maximum grade of 1 in 20 for the first 6m within the subject site to ensure that exiting motorists are on a reasonably level grade when approaching the public road footpath; and

- No obstructions to visibility are proposed to adjoin the Marsden Street access driveway to ensure that good sight distance is afforded between exiting motorists and pedestrians within the eastern Marsden Street footpath.

Whilst it is acknowledged that both Macquarie Street and Marsden Street accommodate notable traffic demands, particularly during peak periods, motorists are envisaged to be able to enter and exit the subject site with a reasonable level of efficiency for the following reasons:

- Vehicles will enter the site via the Macquarie Street access driveway in an unimpeded fashion;

- Impacts on trailing through Macquarie Street traffic movements will be limited as through vehicles are provided with two through westbound lanes thereby allowing trailing vehicles to overtake decelerating vehicles entering the site;

- Vehicle speeds within the immediate vicinity of the site have been observed to be significantly lower than the sign posted speed limit of 50km/h, commensurate with the city centre location and the proliferation of traffic signal controlled intersections; and

- Vehicles exiting the site will be able to do so in regular and extended gaps in southbound Marsden Street traffic flow, punctuated by the operation of traffic signals at George Street to the north.

In consideration of the above, motorists are envisaged to be capable of entering and exiting the subject site in a safe and efficient manner.

8.4 Alternate Access Strategy

The proposed access strategy is noted to be somewhat flexible in that it is interchangeable with a reversed access condition, whereby ingress be provided as left in movements from Marsden Street and egress provided as a right turn from the site to Macquarie Street.

The implementation of such an access strategy is likely to result in reduced demands on intersections to the east of the site but increased demand on intersections to the west and north-west of the site. The road network performance analysis contained within previous sections of this report, complete with worst case scenario assessments, however indicate that there is sufficient capacity within the road network to the west and north-west of the site to accommodate increased demands.

9. CONCLUSION

This Practice has undertaken an assessment of the potential traffic related impacts resulting from a Planning Proposal seeking to amend Parramatta City Centre LEP 2009 to allow for the development of a mixed use building with a maximum height of 250m and a floor space ratio of up to 15.3:1. Based on the findings of this assessment, the following is now concluded:

- The Proposal comprises approximately 5,000m^2 retail floor space, 2,500m^2 office floor space, 2,500m^2 medical suites and 560 residential apartments;

- The mixed use development is proposed to be serviced by a series of basement parking accessed via Macquarie Street with all site egress proposed via Marsden Street. No vehicular access to / from Church Street is proposed;

- The road network surrounding the subject site currently provides motorists with a reasonable level of service and is capable of accommodating additional demands during peak weekday and weekend periods;

- The subject site is located within walking distance to a myriad of existing and planned future public transport infrastructure and is therefore compliant with recent government strategic policy of locating mixed use developments within close proximity to public transport;

- The development is capable of generating up to approximately 308 peak hour vehicle trips to and from the site;

- Such a traffic generation is reasonably consistent with that which would be generated by a redevelopment of the site incorporating a FSR of 10:1 as recommended by Architectus' Parramatta City Centre Planning Framework Study recently endorsed by Council;

- Notwithstanding the above, in order to generate an absolute worst case scenario, the subject Proposal has been assessed to generate the abovementioned 308 peak hour trips as *new* trips to the city centre;

- Assessment of the traffic generating ability of two other potential development sites in the immediate vicinity of the subject site has also been incorporated;

- The surrounding city centre road network has been assessed to be capable of accommodating the additional traffic projected to be generated by the Proposal and the two other potential redevelopment sites in a safe and efficient manner;

- The site access strategy is considered to facilitate safe and efficient arrangements with respect to local traffic and pedestrian considerations; and

Based on contents of this report and the above conclusions, it is our view that there are no traffic, parking and transport related issues associated with the Planning Proposal which would prevent this Practice from recommending it for approval.