

**3 PARRAMATTA SQUARE
PROPOSED PARRAMATTA LIGHT RAIL PROJECT
153 MACQUARIE STREET, PARRAMATTA**
***Assessment of Vehicle Access and
Traffic Implications***

October 2017
(Rev A)

Reference 257/2017

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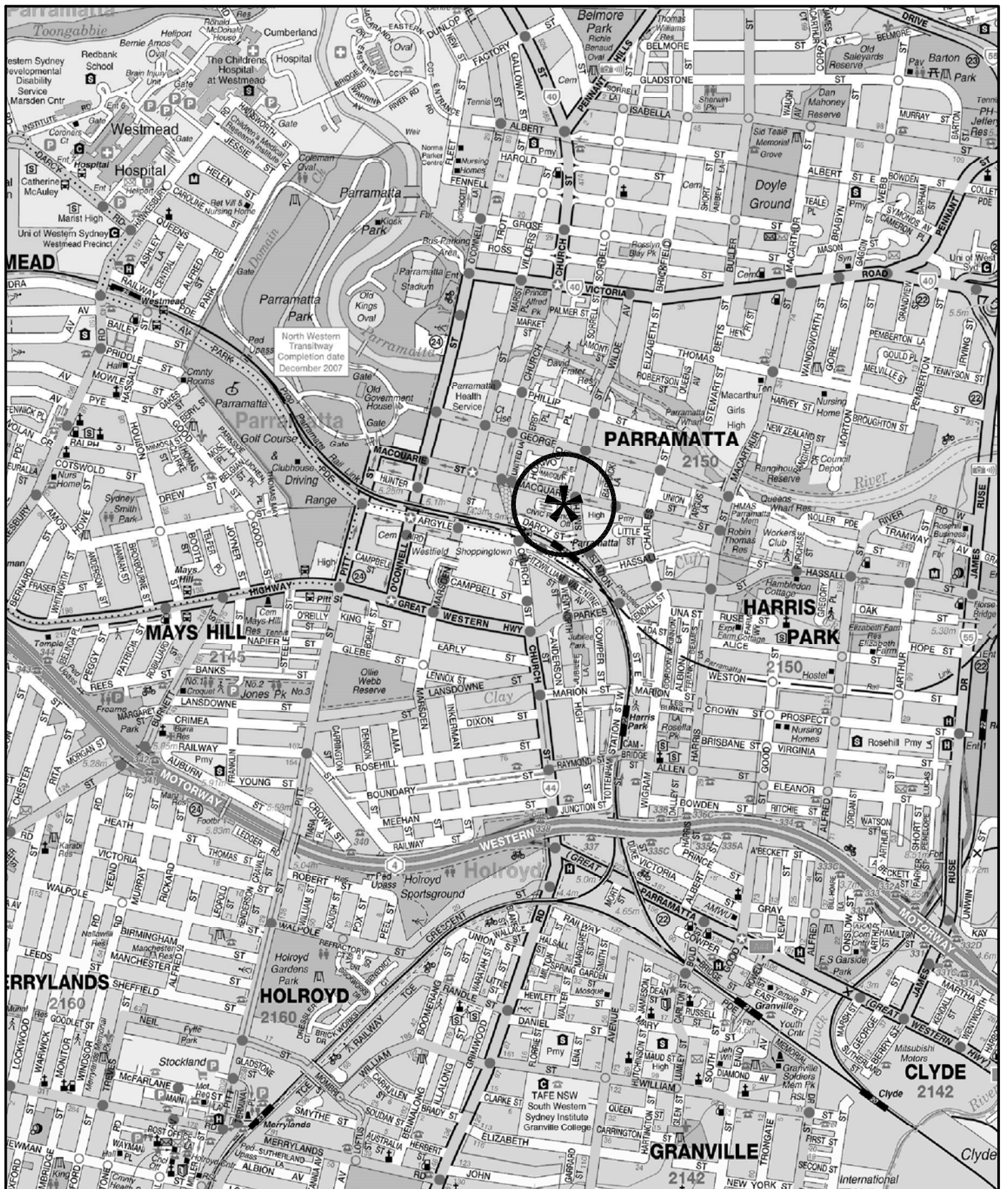
1. INTRODUCTION

This report has been prepared for Walker Corporation to accompany an EIS Submission to City of Parramatta Council (COPC) to provide an assessment of the potential access and traffic implications resultant to the changes proposed for the Parramatta Square access arrangement in light of the recently exhibited Parramatta Light Rail (PLR) study.

It is understood that Walker Corporation lodged a Development Application with COPC for a proposed mixed use development - 3 Parramatta Square (3PS) on land located within the Parramatta Square site in the Parramatta CBD. The 3PS site is located at 153 Macquarie Street and occupies a parcel of land with frontages to Macquarie Street and Civic Place (Figure 1). Primary vehicle access for the 3PS site is to be provided on the Macquarie Street frontage while a secondary access is to be provided at Darcy Street for the 3PS carpark of some 216 spaces within the overall PS super basement of some 1,500 spaces.

The purpose of this report is to:

- ❖ describe the site, its context and the existing circumstances
- ❖ describe the proposed and any surrounding development schemes
- ❖ describe the proposed PLR scheme
- ❖ assess the potential vehicle access implications
- ❖ assess the potential traffic implications



LEGEND



LOCATION

FIG 1

The assessment has regard for the following relevant traffic and transport studies:

- ❖ 3 Parramatta Square Transport Impact Assessment, GTA Consultants, March 2017
- ❖ Parramatta Light Rail Operational Traffic and Transport Technical Assessment Report, GTA Consultants, August 2017
- ❖ 5 Parramatta Square Traffic and Parking Assessment Report, TTPP, August 2017
- ❖ Parramatta Square Traffic and Pedestrian Access Strategy, Traffix, September 2013

2. EXISTING CIRCUMSTANCES

2.1 SITE AND CONTEXT

The PS3 site ([Figure 2](#)) being Lot 1 in DP 863571 occupies a generally rectangular shaped area of some 1,963m² and has frontages to the southern side of Macquarie Street and eastern side of Civic Place. The site forms a part of the broader Parramatta Square large land holding which is generally bounded by Macquarie Street, Church Street/Darcy Street and Smith Street.

The former commercial building on the site has been demolished and the site cleared and established in preparation for the construction of the proposed development 3PS.

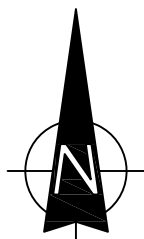
2.2 SURROUNDING LAND USES

The site is situated within the heart of Parramatta Square and benefits from convenient access to government offices, retail and transport services. Notable land uses surrounding the site include:

- ❖ the future Parramatta Town Hall, Council Chambers, library and various office buildings to the south
- ❖ the retail uses along Macquarie Street frontages and Church Street Mall to the west
- ❖ the Parramatta Mission Church and commercial establishments just to the west of Civic Place
- ❖ the Parramatta Interchange (rail and buses) is located some 200 metres to the south east.



LEGEND



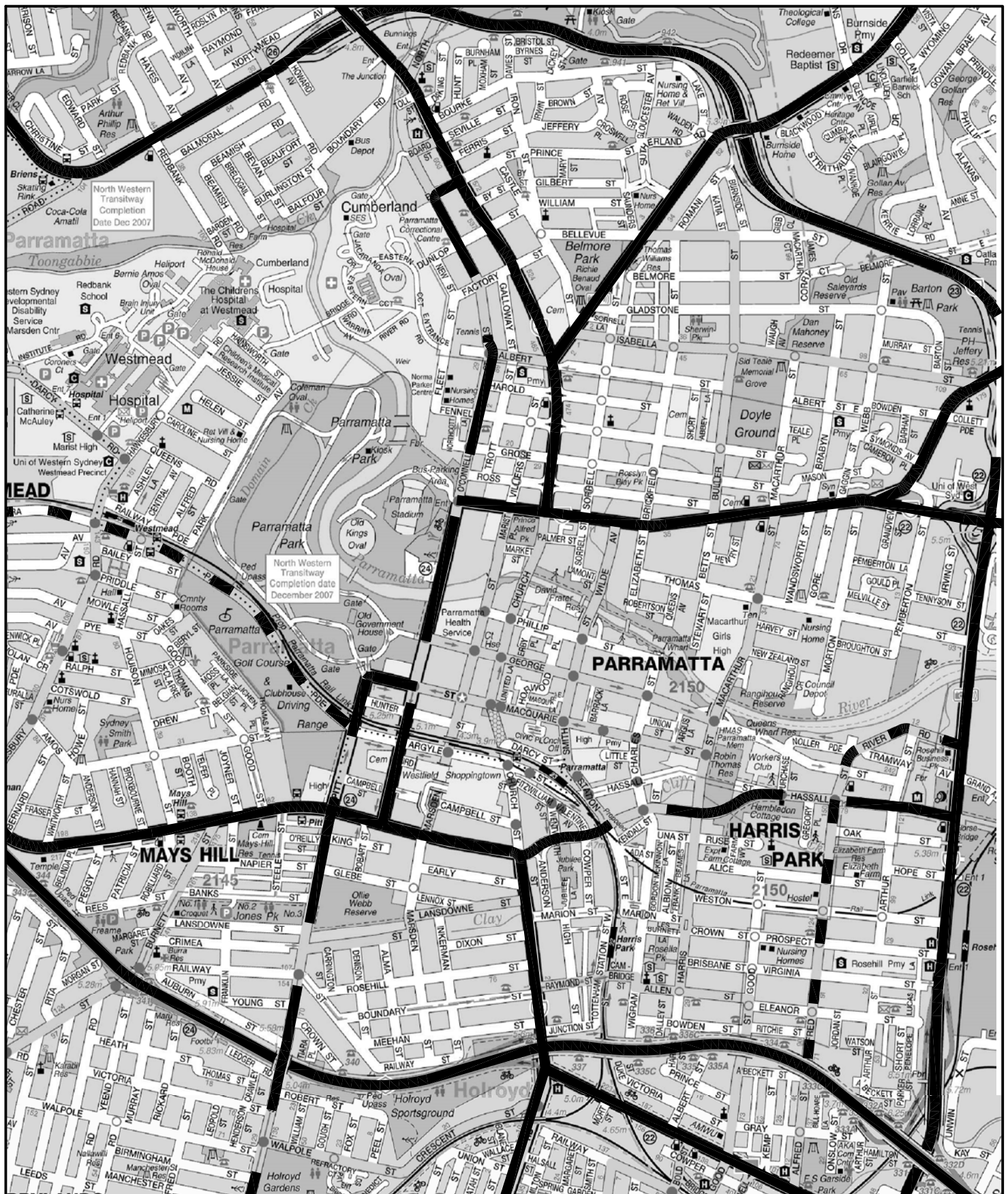
SITE

FIG 2

2.3 EXISTING ROAD NETWORK AND TRAFFIC CONTROL

The existing road network that serves the site and traffic controls that have been implemented are summarised as follows (Figure 3):

- ❖ **Macquarie Street** – a two-lane collector road route which is currently restricted to westerly traffic only between Harris Street and O’Connell Street.
- ❖ **Civic Place** – a former local loop road providing access to the surrounding buildings and carpark. Civic Place is currently closed to public due to construction activities associated with the broader Parramatta Square development.
- ❖ **Darcy Street** – a former local road which was restricted to westerly traffic only connecting between Smith Street, Argyle Street and Church Street in the Parramatta Interchange. Darcy Street is currently closed to public due to construction activities associated with the broader Parramatta Square development.
- ❖ **Smith Street** – a collector road route connecting between Darcy Street at the Interchange and Victoria Road via Wilde Avenue north of the Parramatta River. Bus lanes are provided along Smith Street between Philip Street and the Interchange with signal traffic controls at the intersections with Darcy Street, Macquarie Street and George Street.



LEGEND

- ARTERIAL
- SUB-ARTERIAL
- COLLECTOR



ROAD NETWORK

FIG 3

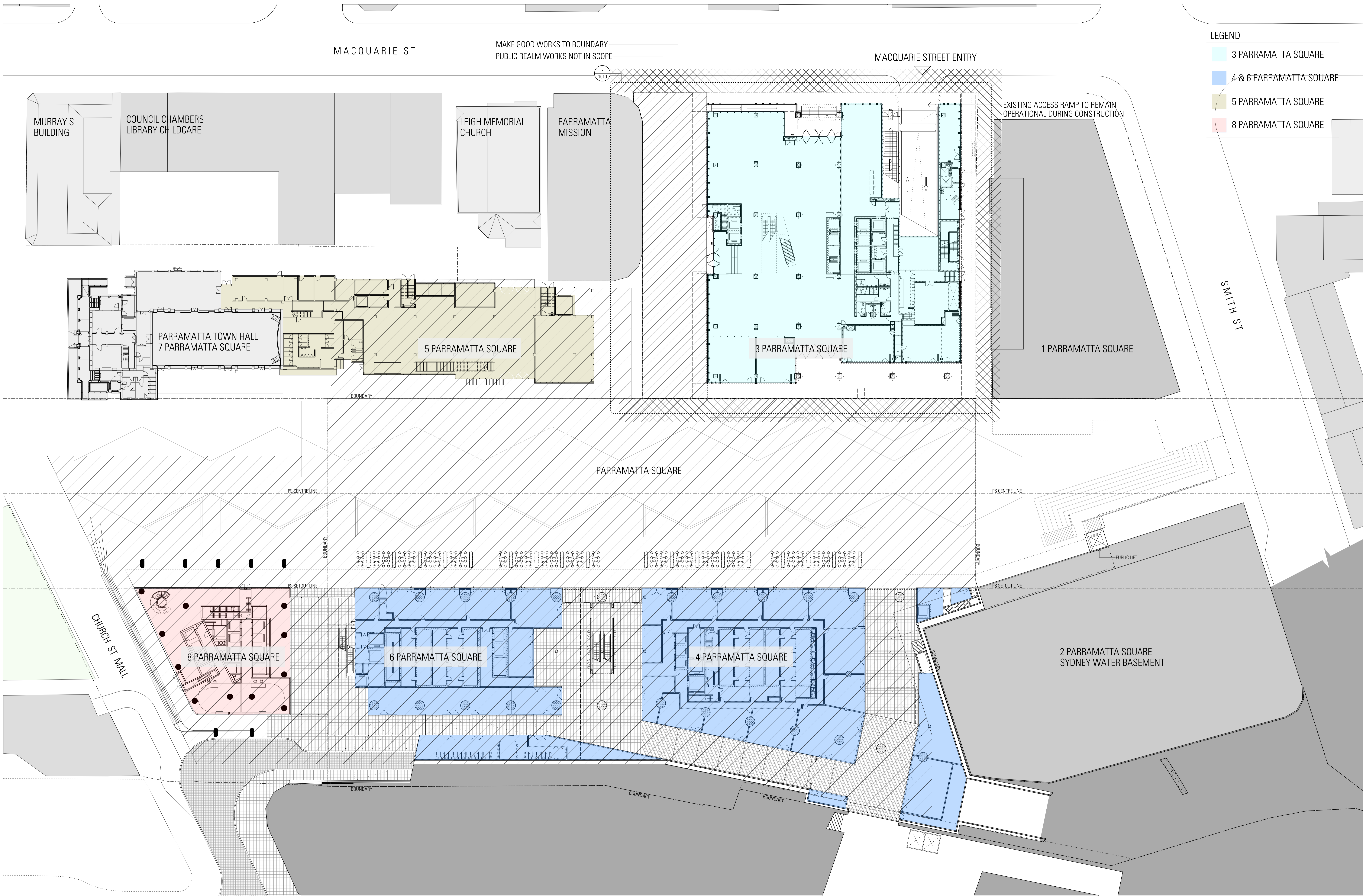
3. PARRAMATTA SQUARE

3.1 PARRAMATTA SQUARE DEVELOPMENT

Parramatta Square is one of the largest urban renewal initiatives in Australia and is set to transform the Parramatta's core into a highly accessible and vibrant mixed use centre that is built on the renewed transport interchange, integrating the needs of residents, employees, commuters and visitors. The Parramatta Square land holding is comprised of 8 key developments ([details overleaf](#)) being:

- ❖ **1PS** – the new Western Sydney University campus
- ❖ **2PS** – the Sydney Water head office
- ❖ **3PS** – a 17-storey mixed use tower involving ground level retail and upper level commercial uses of some 46,000m² with a car parking provision of 216 spaces
- ❖ **4 and 6 PS** - a dual mixed use tower development involving a total retail and commercial floor space of some 128,000m² with a car parking provision of 756 spaces
- ❖ **5PS** – a 6-storey Council community and civic building of some 4,344m² accommodating retail/café, library, community uses, Council chambers as well as other ancillary uses
- ❖ **8PS** – a mixed use tower involving some 700 apartment dwellings with hotel accommodating and ground level retail

Car parking for the above development schemes are to be comprised of an interconnected 'super basement' of some 1,500 car parking spaces with vehicle accesses provided at Macquarie Street and Darcy Street. The super basement scheme proposes that both the vehicle accesses will provide for both ingress and egress movements.



LEGEND

- 3 PARRAMATTA SQUARE
- 4 & 6 PARRAMATTA SQUARE
- 5 PARRAMATTA SQUARE
- 8 PARRAMATTA SQUARE

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T01	MH	MH	Issued For Tender

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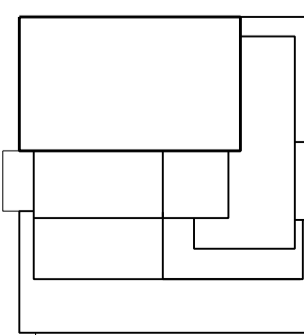
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Key Plan



Scale / North Point

1:300 @ B1

0 3 6 9 15M

General Notes
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Drawing Title
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GROUND

Project Number
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Drawing Number
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25/07/2017

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3.2 3 PARRAMATTA SQUARE

The proposed 3PS scheme involves the development of:

	GFA
Retail (Ground level)	1,979m ²
Lobby/Office (Level 1)	2,122m ²
Offices (Levels 2-15)	39,780m ²
Office/Roof top terrace (Level 16)	2,057m ²
Total	45,938m²

A total of 216 parking spaces will be provided in 3 levels of basement with primary vehicle access to be provided on the Macquarie Street frontage while a secondary access is to be provided at Darcy Street within the overall PS super basement of some 1,500 spaces ([Appendix A](#)). Because of the different staging for the multiple PS sites it is understood that the Macquarie Street access ramp and crossover has already been constructed ([see aerial image dated 22 August 2017 overleaf](#)) while the 3PS site cleared and established in preparation for the imminent construction process.

Details of the proposed development are provided in the architectural drawings prepared by JPW Architects which accompany the Development Application and are reproduced in part in [Appendix A](#).



4. PARRAMATTA LIGHT RAIL

4.1 PARRAMATTA LIGHT RAIL SCHEME SCHEME

Parramatta Light Rail (PLR) is one of the NSW Government's major infrastructure projects which is intended to be delivered in 2 stages. Stage 1 will connect Westmead to Carlingford via Parramatta CBD and spans 12 km in length. An Environmental Impact Assessment of the Stage 1 scheme is recently published and currently being exhibited. With the Stage 1 scheme the following road/traffic control changes are to be implemented on the site's surrounding road network:

- ❖ **Macquarie Street** – to be converted from the existing westerly traffic flow to easterly only with 2 tracks. The signal intersection with Smith Street will be modified to prohibit southbound right turn movement from Smith Street to Macquarie Street
- ❖ **Civic Place** – to be established as a north-south link pedestrian plaza with access for emergency vehicles only
- ❖ **Darcy Street** – to be reconfigured to incorporate a two-way and two-lane access at the west leg while retaining westerly traffic flow (single lane) to the adjacent sites
- ❖ **Smith Street** – to be generally retained.

The Stage 2 scheme, though yet to be finalised, is anticipated to connect between Rosehill and Strathfield via the Sydney Olympic Park. A Final Business Case for Stage 2 is currently underway and is expected to be completed in 2018, with investment decision and details on timing of construction to follow.

Details of the most recently published PLR route map and proposed stations are provided on the extracts reproduced in part in [Appendix B](#).

4.2 MACQUARIE STREET CONCEPT

The Stage 1 PLR route involves 2 tracks along Macquarie Street with a 45 metre long platform and stop (Parramatta Square Station) at the 3PS site frontage. The exhibited scheme proposes that the Macquarie Street access to the PS super basement be restricted to egress only with traffic signal control. Because of this proposed change the site will lose its Macquarie Street ingress to the basement, potentially reducing the site's inbound capacity by some 50%.

The PLR scheme also proposes that the future Macquarie Street be restricted to eastbound traffic movements only. Details of the indicative PS Station and the envisaged Macquarie Street/Smith Street intersection layout are provided in the PLR report¹ and reproduced [overleaf](#).

¹ Parramatta Light Rail Operational Traffic and Transport Technical Assessment Report, GTA Consultants, August 2017



5.5.4.3 Parramatta Square stop

The Parramatta Square stop would be located on Macquarie Street, between Horwood Place and Smith Street. The location of the Parramatta Square stop is under further design consideration in consultation with City of Parramatta Council to ensure efficient integration with the surrounding development and connections via the civic link. Parramatta Square stop would generally service the southern and eastern part of the Parramatta CBD, including Arthur Phillip High School to the east and Westfield Parramatta to the south. The stop would allow for interchange with existing train services at Parramatta train station (via the proposed future Civic Link, refer to Figure 5.16) and bus routes along Smith Street and Argyle Street.

Similar to the arrangement of the Eat Street stop, the current design of the Parramatta Square stop would consist of two side platforms that tie into the light rail and pedestrian zone between Horwood Place and Smith Street. A pedestrian crossing would be provided at the western end of the platform with an additional pedestrian crossing of the car park access driveway.

An indicative section for the Parramatta Square stop is shown in Figure 5.15 with an indicative plan shown in Figure 5.16.

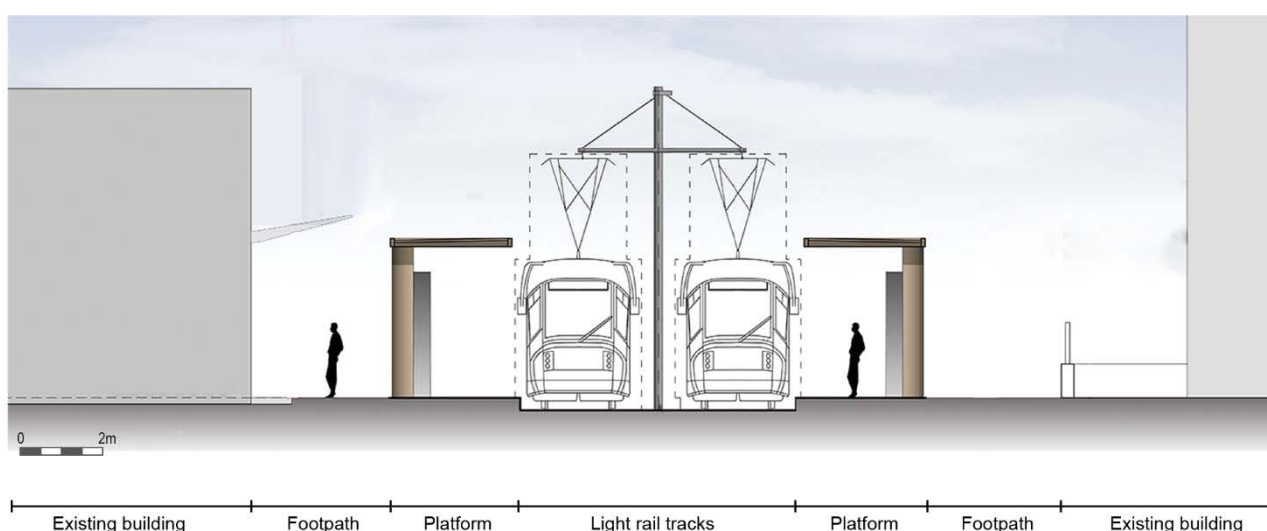
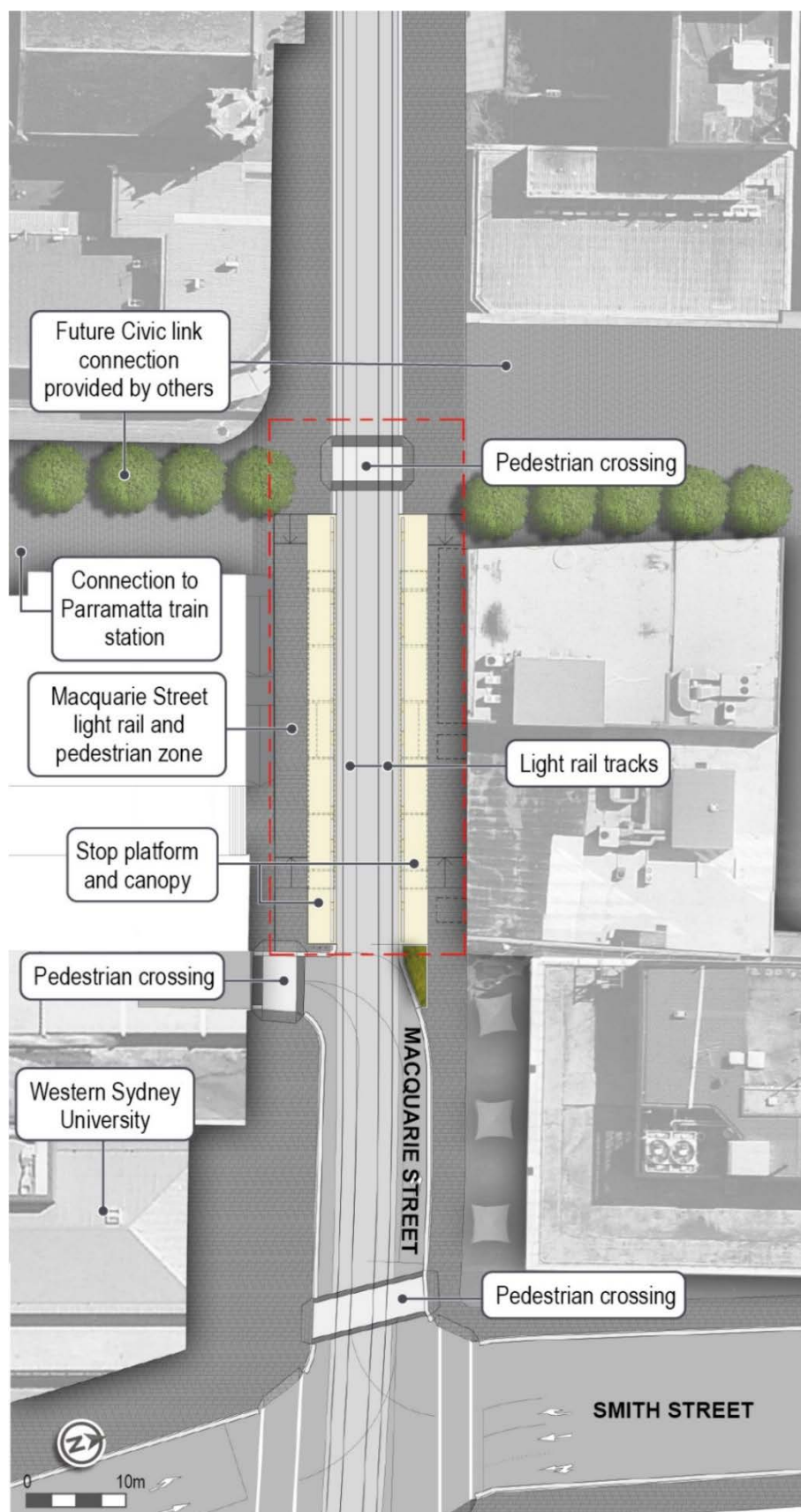


Figure 5.15 Indicative section – Parramatta Square stop



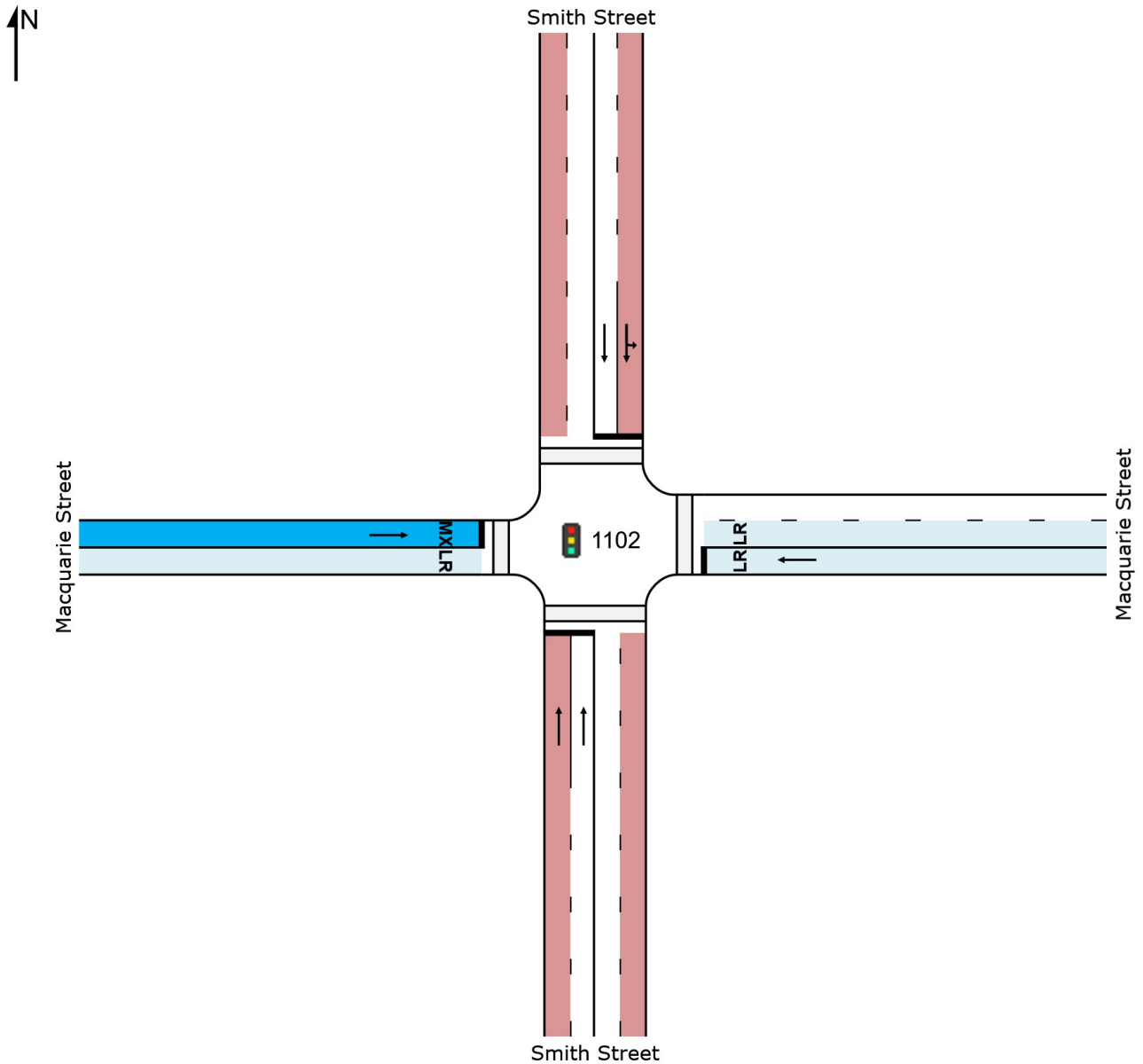
Note: Indicative design shown. Subject to detailed design.

Figure 5.16 Indicative plan – Parramatta Square stop

SITE LAYOUT

 **Site: 1102 [3000_30_Macquarie-Smith_2026PLR_AM]**

Macquarie Street/ Smith Street, Parramatta
Signals - Fixed Time Isolated



5. ASSESSMENT OF VEHICLE ACCESS IMPLICATIONS

5.1 PROPOSED DEVELOPMENT ACCESS AND TRAFFIC

Vehicle access for the super basement serving the broader PS development will be reliant on the ramps provided at Macquarie Street and Darcy Street. It is proposed that these ramps will each have separate ingress and egress lanes catering for two-way traffic flows.

The 3PS traffic assessment undertaken by GTA Consultants considered the broader Parramatta Square development and projected the following peak hour traffic generation at the super basement (prior to PLR proposed changes):

	In	Out	Total
AM Peak	629 vtp ²	224 vtp	853 vtp
PM Peak	172 vtp	474 vtp	645 vtp

The GTA report when assessing the overall impact on the surrounding intersections adopted the following traffic distribution (Figure 3):

	Inbound	Outbound
Macquarie Street	40%	35%
	AM – 252 vtp	AM – 78 vtp
	PM – 69 vtp	PM – 166 vtp
Darcy Street	60%	65%
	AM – 377 vtp	AM – 146 vtp
	PM – 103 vtp	PM – 308 vtp

Based on the above the traffic distribution in the surrounding road network is shown in [Figure 4](#).

² Vehicle Trips per Hour

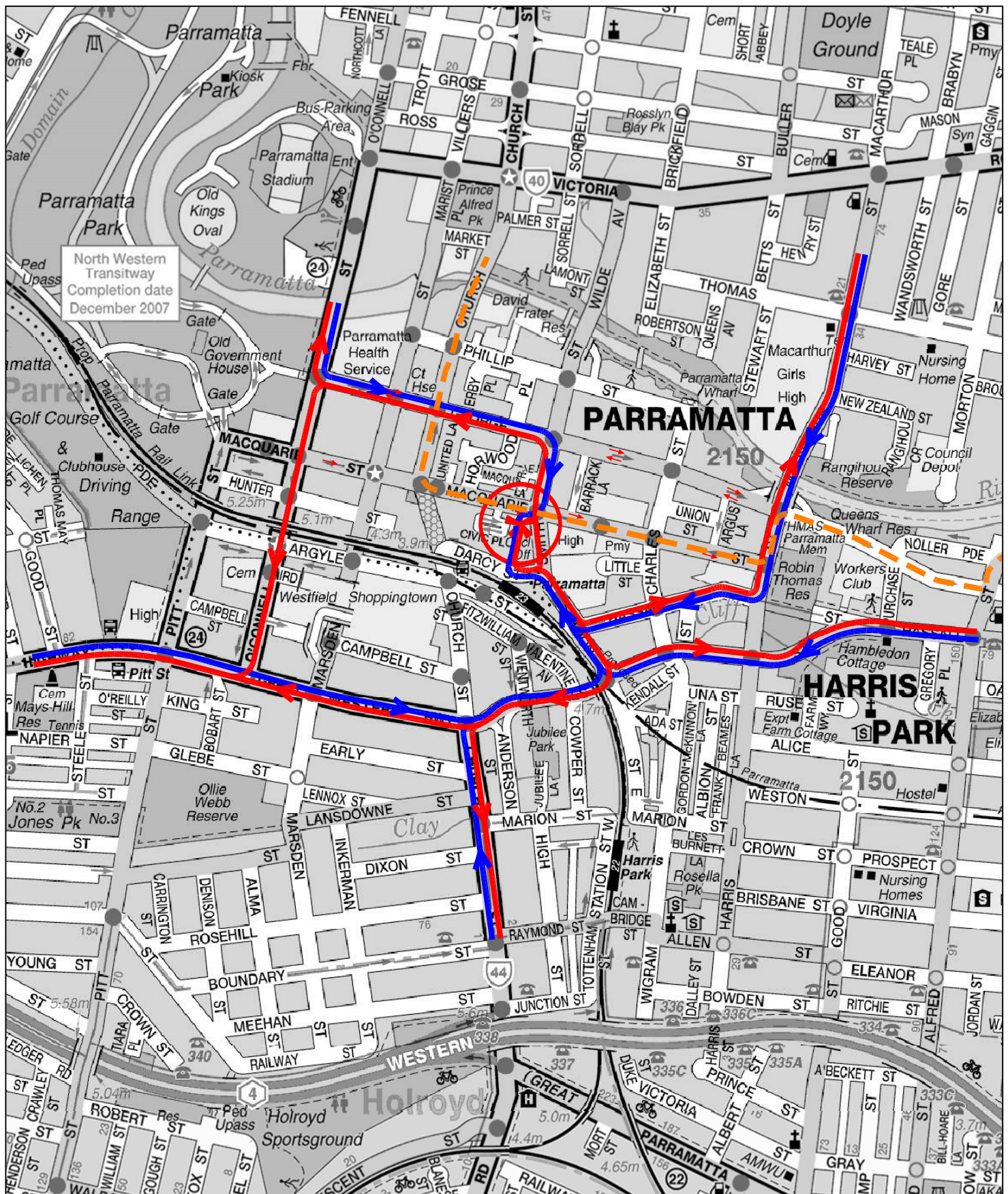


FIG 4

5.2 IMPLICATIONS OF THE PLR SCHEME

Because it is proposed for the Macquarie Street access to be converted to a signalised exit only arrangement, the overall access capacity for the super basement will now be reduced to a single point of entry only at the Darcy Street ramp while there will be 2 points of egress from Darcy Street and Macquarie Street.

With the proposed restriction this would result in 100% of inbound movements (some 629 vtpm AM and 172 vtpm PM) being required to access the super basement by the Darcy Street ramp (Figure 5).

The impact of the redistricted inbound traffic on the external road network will be most critical during the AM peak and this is modelled using the SIDRA intersection modelling program. For the purpose of this assessment the design parameters and traffic volumes will be based on the 4 and 6PS traffic assessment by GTA Consultants. The model results are provided in Appendix C and accompanied by a guide to interpreting SIDRA results.

	LOS ³	AVD ⁴	Smith Street RT Queue ⁵
AM + PS Dev ⁶	B	19.0s	60.1m
+ PLR redistribution	D	51.7s	299.7m

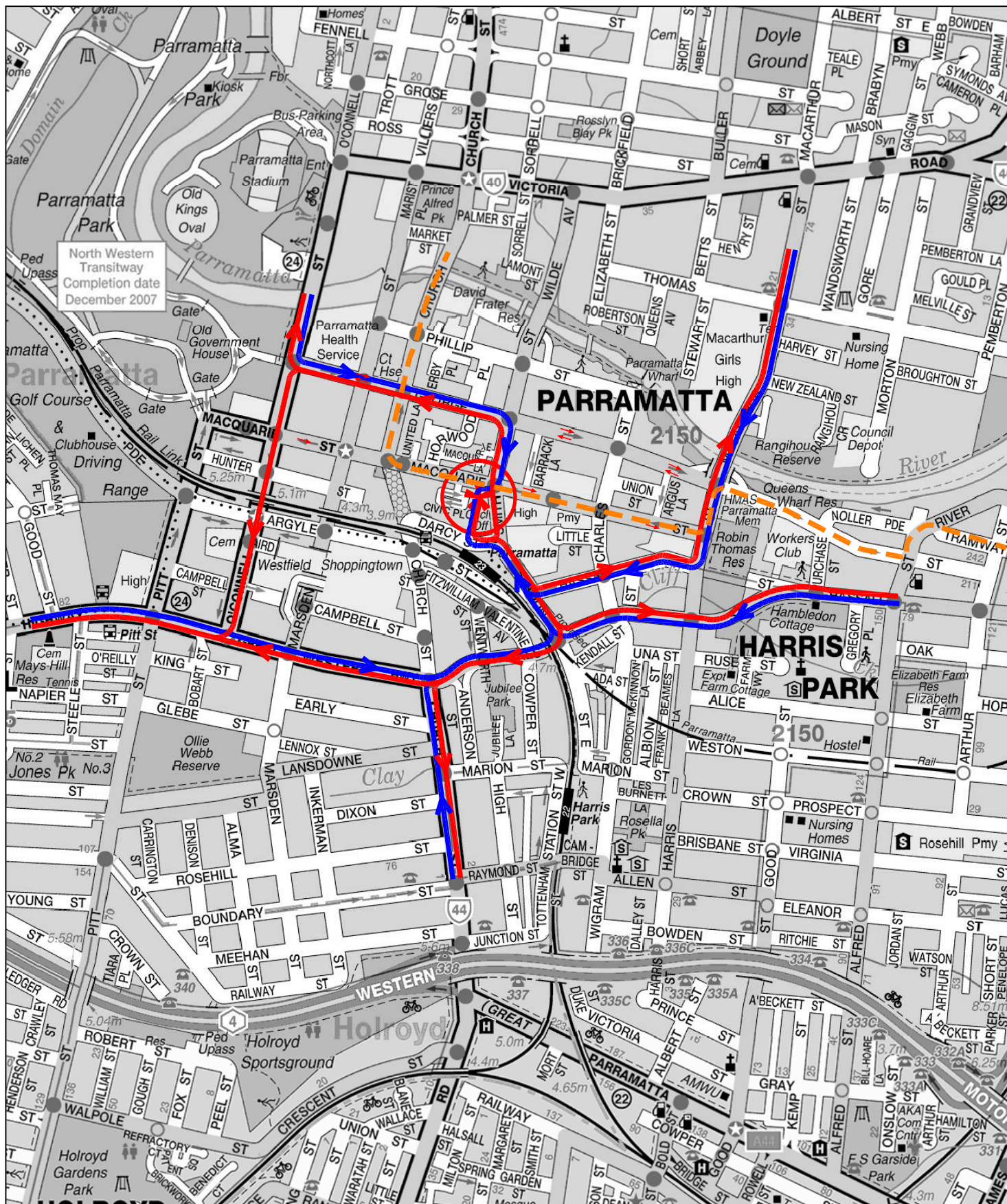
When the Macquarie Street inbound movements are diverted to Smith Street the intersection level of service falls from B to D and more importantly the Smith Street right turn bay of some 65 metres will be overflowed with 95th percentile queue of some 300 metres essentially extending past Macquarie Street to near the Smith Street/George Street intersection. The excessive right turn queue also reflects in a level of service of F as opposed to the B as assessed for the PS scheme before the proposed PLR changes.

³ Level of Service

⁴ Average Delays

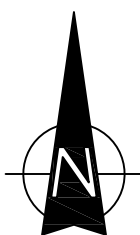
⁵ Queue - 95th percentile Queue Length / RT – Right Turn

⁶ 4 and 6 Parramatta Square Mixed Use Development Transport Impact Assessment, GTA Consultants, June 2016



LEGEND

- PARRAMATTA SQUARE APPROACH ROUTES
- PARRAMATTA SQUARE DEPARTURE ROUTES
- - - PROPOSED PLR ALIGNMENT
- ↔ PLR PROPOSAL CHANGES TO TRAFFIC NETWORK



TRAFFIC DISTRIBUTION (POST PLR)

FIG 5

It is RMS' standard practice to prioritise signal green time allocation for through traffic on major routes (i.e. Smith Street) and as such it is likely that vehicles egressing from the signalised Macquarie Street ramp will be subject to further traffic delays and queues. If it is assumed that some additional 20% of the GTA assessed Macquarie Street outbound trips are diverted to Darcy Street then the redistribution would indicate the following outcome:

	LOS	AVD	Darcy Street Ramp Queue
PM + PS Dev	B	15.0s	126.7m
+ PLR redistribution	C	35.0s	148.7m

Having regard for the above the primary implications and concerns resultant to the proposed changes at the super basement access are:

- ❖ the proportion of traffic generation being serviced by the single lane ingress at the Darcy Street ramp
- ❖ the lack of alternative ingress, in the event that the Darcy Street access is impeded by emergency vehicles and/or broken down vehicles/trucks etc
- ❖ the Smith Street/Darcy Street/Station Avenue intersection level of service which reduces from a LOS B to D in the AM peak and from LOS B to C in the PM peak
- ❖ the Smith Street to Darcy Street southbound right turn bay which will be overflowed with a queue of some 300 metres extending pass Macquarie Street near the Smith Street/George Street intersection further north
- ❖ the inadequacy of the Darcy Street single lane egress with peak queues increased from 127 to 149 metres during the PM Peak

It is apparent under this proposed arrangement that traffic operation at the super basement will be significantly impacted particularly during the AM peak resulting in unacceptable traffic outcome for the broader PS development.

6. POTENTIAL ACCESS ARRANGEMENTS

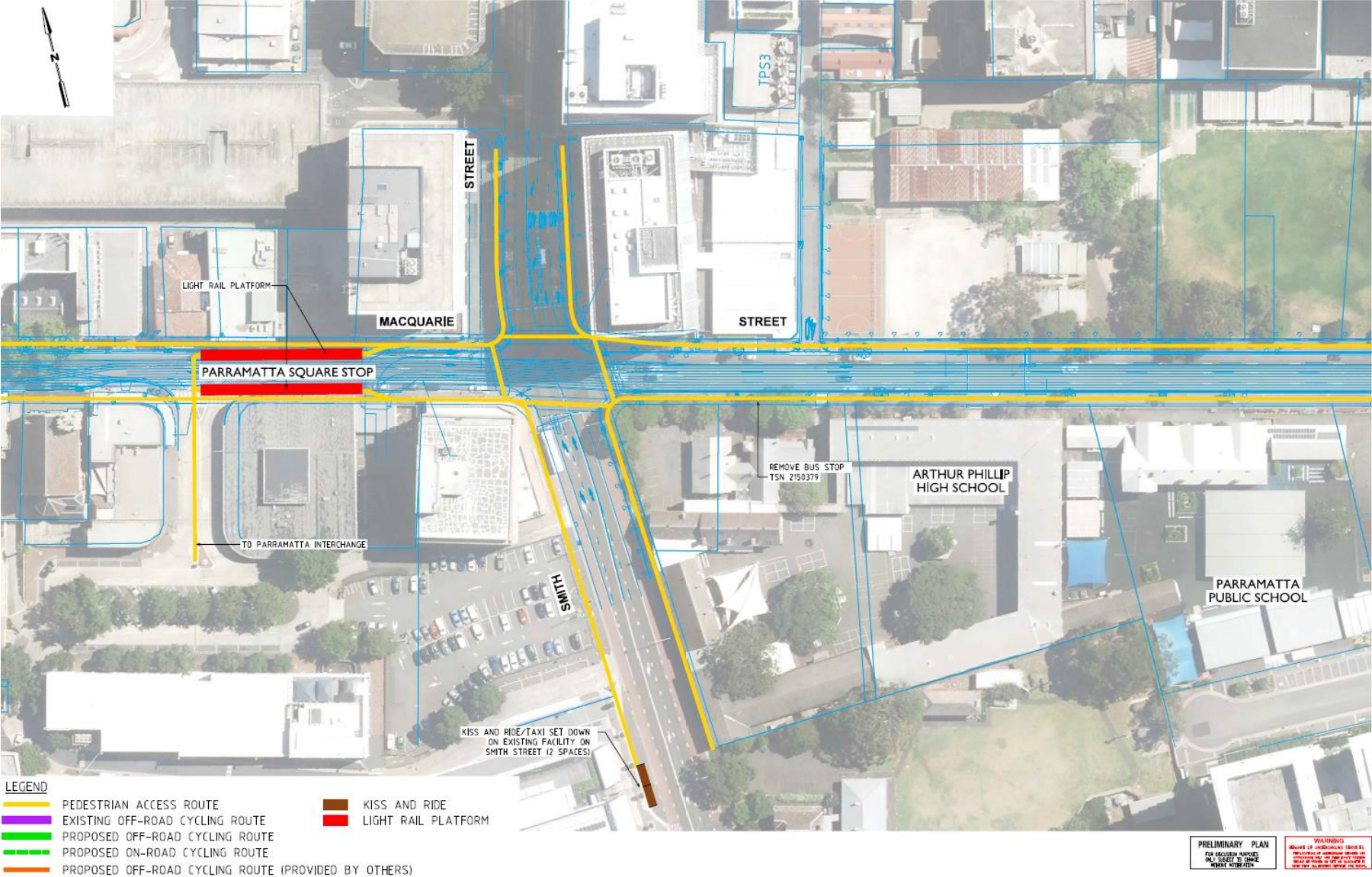
The assessment undertaken in Section 5 of this report confirms that the proposed changes to the super basement's access arrangement would occasion traffic redistributions within the local road network and SIDRA modelling has demonstrated that this would result in unacceptable queuing impact at the intersection of Smith Street, Darcy Street and Station Street. It is also demonstrated that the extended queue length at the Smith Street northern approach would extend pass the Smith Street/Macquarie Street intersection to near the Smith Street/George Street intersection.

It is understood that the COPC is currently conducting an Integrated Transport Study as part of the Parramatta CBD Planning Proposal. It is also understood that the study, which is to be delivered in 2 stages, involves:

- ❖ Stage 1 – a high level and strategic analysis to assess the likely traffic impacts associated with the envisaged increase in residential and commercial developments
- ❖ Stage 2 – a detailed traffic modelling assessment to assess and identify the required road and infrastructure upgrades

Detailed findings of the COPC study is not available at present however the outcome of the traffic assessment presented in this report highlighted the importance of maintaining the envisaged and planned access capacity for the super basement. It is also noteworthy that upon detailed review of the currently exhibited EIS and the PLR Operational Traffic and Transport Technical Assessment Report it is quite apparent that the Parramatta Square Station concept plan ([see overleaf](#)) has in fact made provision to retain the two-way signalised access arrangement at the Macquarie Street ramp. Whilst it is not understood why this option was not pursued further, it is recommended that the superseded access arrangement is investigated further to alleviate the overall traffic impact.

Figure 3.16: Parramatta Square stop access plan



7. CONCLUSION

The proposed PS development which comprises 8 key development sites (including that of the 3PS) will involve an integrated 'super basement' carpark capable of accommodating up to some 1,500 vehicles. The original intended vehicle accesses involve 2 ramps at Macquarie Street and Darcy Street. The Macquarie Street access will have a priority control with a left turn and left out restriction while the Darcy Street access will be incorporated into the Smith Street/Darcy Street/Station Street signal intersection. The traffic, access and parking provisions and implications for the broader PS development have been guided and informed by the multiple traffic and transport assessment which are referenced throughout this report.

The PLR scheme which is currently being exhibited proposes a number of changes to the local traffic network. Of particular relevance for the PS super basement are:

- ❖ the reversal of Macquarie Street traffic flow
- ❖ the removal of Macquarie Street ingress
- ❖ the signal control at the Macquarie Street egress

Having regard for the above the primary concerns for the proposed changes at the super basement access are:

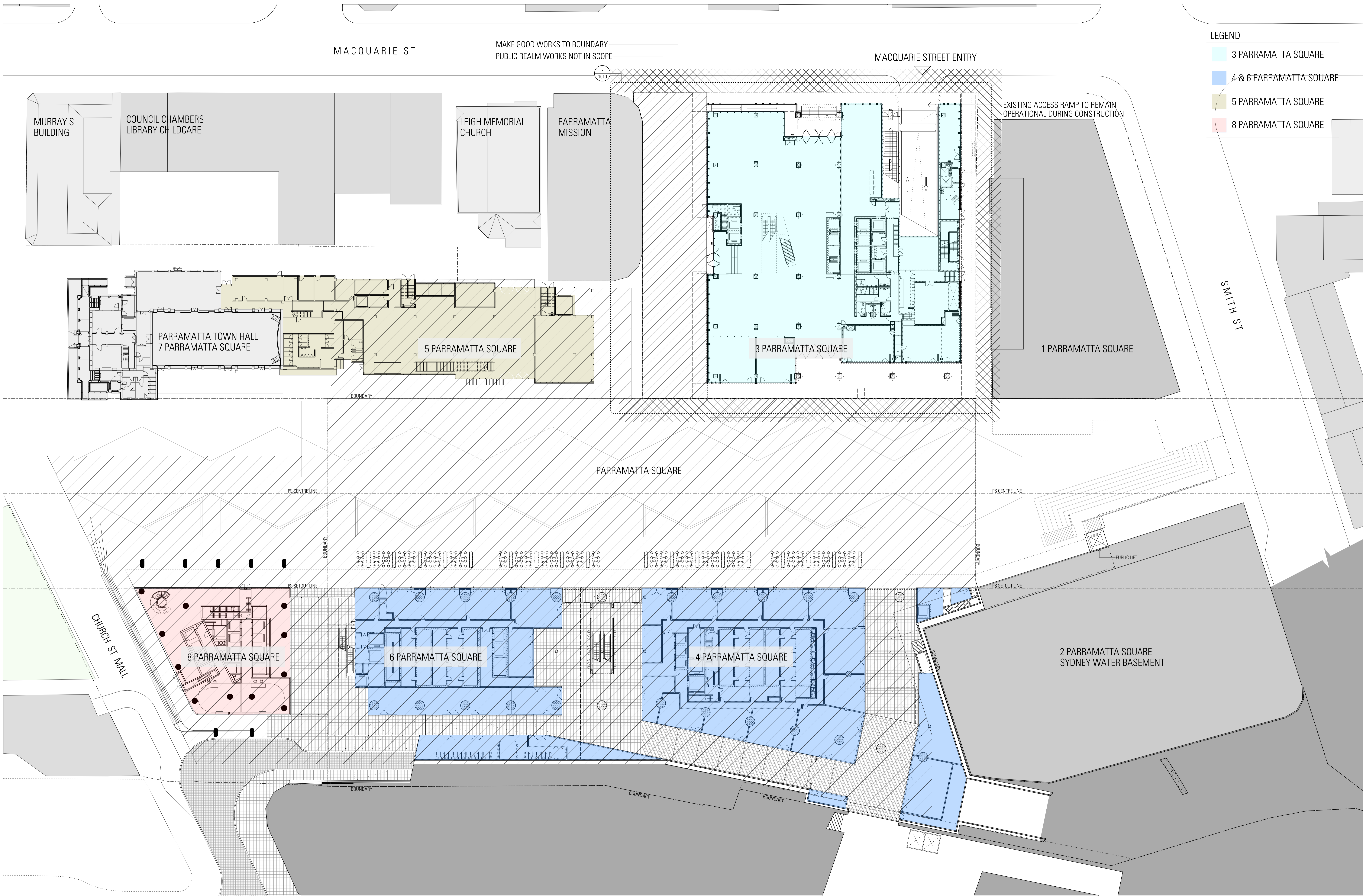
- ❖ the restriction of egress from Macquarie Street
- ❖ the inconvenience for inbound commuters who will need to divert to the Darcy Street access
- ❖ the lack of alternative ingress in the event that the Darcy Street access is to be blocked by broken down vehicles/trucks or emergency vehicles
- ❖ the pressure of diverted traffic to the local traffic network

TTPA has reviewed the relevant traffic studies previously undertaken of PS development and assessed the proposed access arrangements and considered the implications of the traffic redistributions. The assessment has established that:

- ❖ the removal of egress opportunity from the Macquarie Street access would require all inbound commuters to use the Darcy Street access
- ❖ the limited right turn bay of 65m from Smith Street to Darcy Street at the Smith Street/Darcy Street intersection will be near capacity (60m) under the original dual ingress arrangement assessed by GTA
- ❖ the Smith Street to Darcy Street inbound right turn queue will extend from 60m to some 300m in the morning peak when the Macquarie Street ingress is closed extending past the Smith Street/Macquarie Street intersection to near the Smith Street/George Street intersection further north
- ❖ the Darcy Street to Smith Street (PS egress) will increase from 127m to 149m in the afternoon peak
- ❖ the Smith Street/Darcy Street intersection level of service will fall from B to D in the morning peak and B to C in the afternoon peak
- ❖ the Macquarie Street ingress will be integral to retaining the envisaged level of service of the surrounding road network
- ❖ the PLR Technical Assessment Report indicated a superseded access arrangement which retains the Macquarie Street two-way access via a signalised arrangement and it is proposed that this option is investigated in detail and a design concept is prepared in consultation with RMS, COPC and the PLR Planning Authority

APPENDIX A

ARCHITECTURAL PLANS



Rev App Cld Revision or reason for issue
T01 MH MH Issued For Tender

Date
02-08-17

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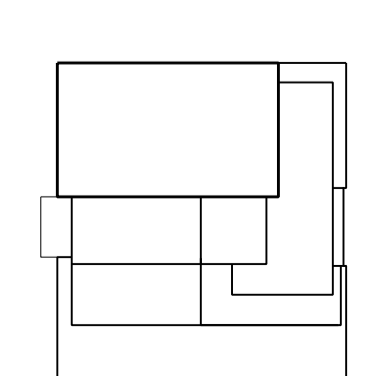
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Vertical Transport
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15 Edmondson Ct, THORNLEIGH
Tel: 02 9875 1383

Key Plan



Scale / North Point

1:300 @ B1

0 3 6 9 15M

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Drawing Title
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GROUND

Project Number
16007

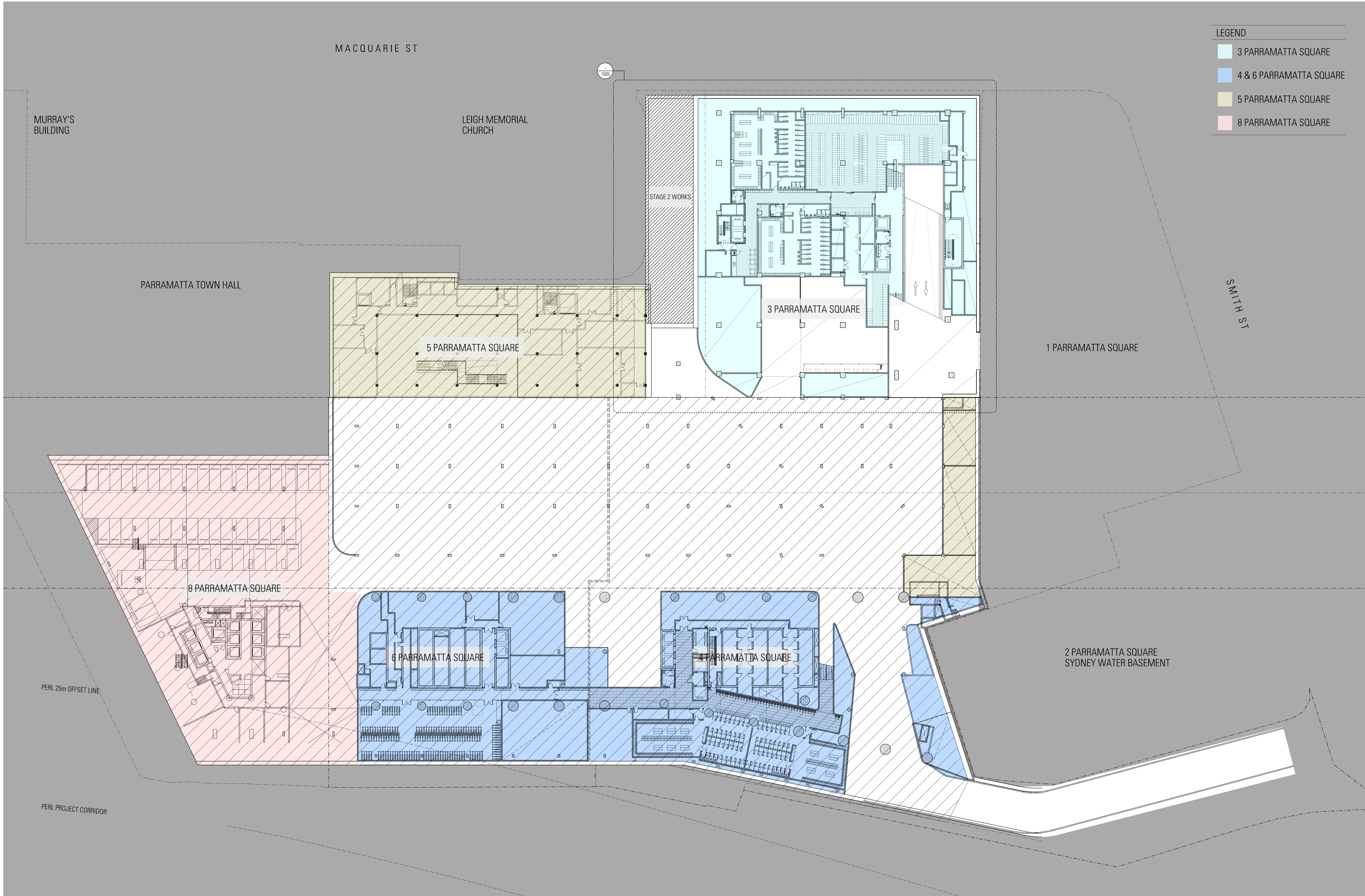
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Revision
T01

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LEGEND

- 3 PARRAMATTA SQUARE
- 4 & 6 PARRAMATTA SQUARE
- 5 PARRAMATTA SQUARE
- 8 PARRAMATTA SQUARE

Rev	App	Cld	Revision or reason for issue	Date
T01	MH	MH	Issued For Tender	02-08-17

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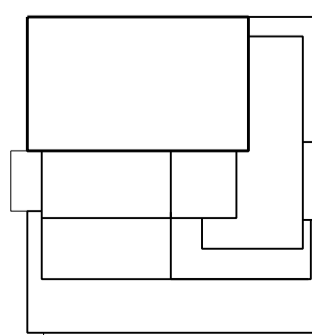
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Key Plan



Scale / North Point

1:300 @ B1

0 3 6 9 15M

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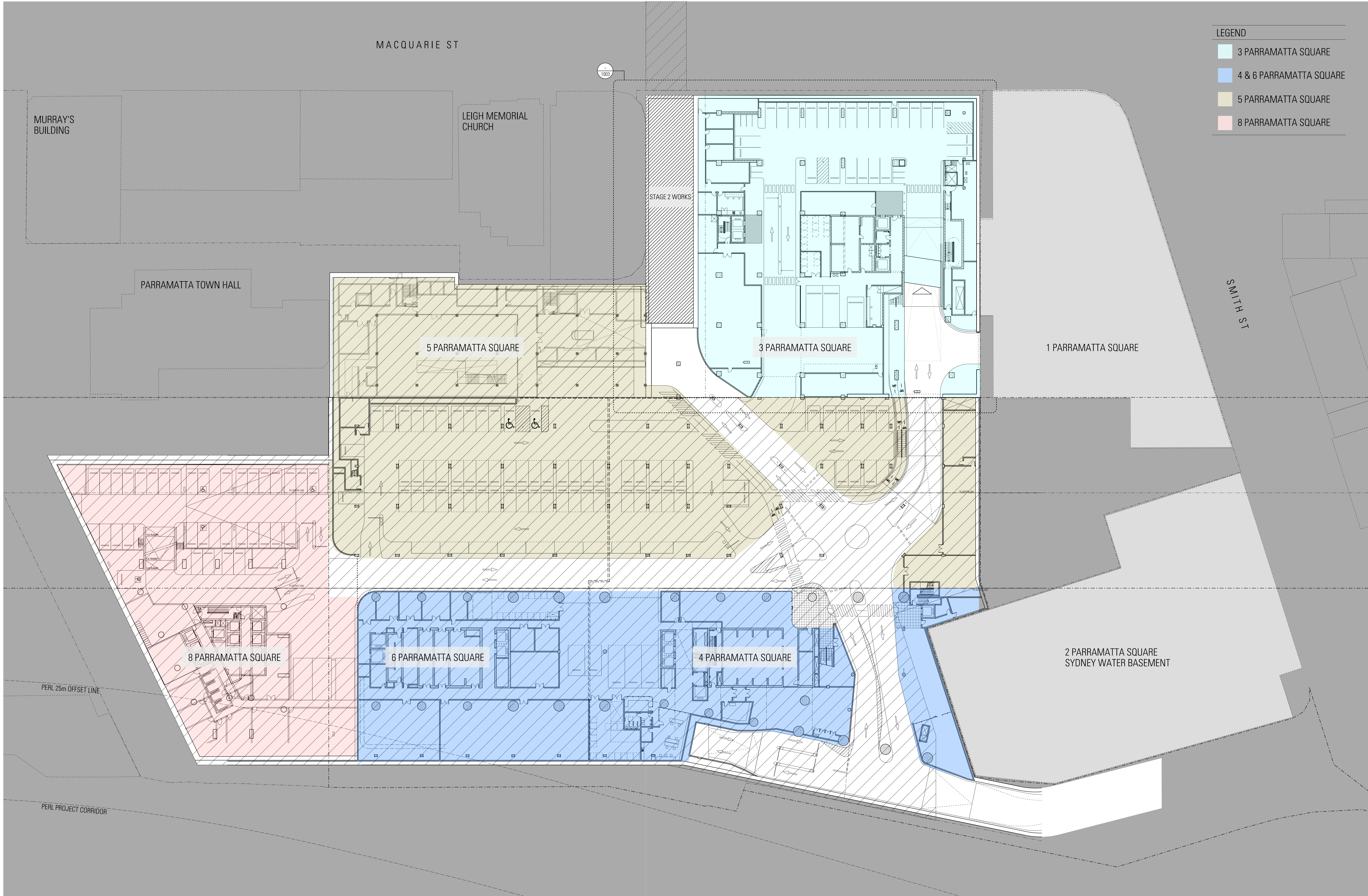
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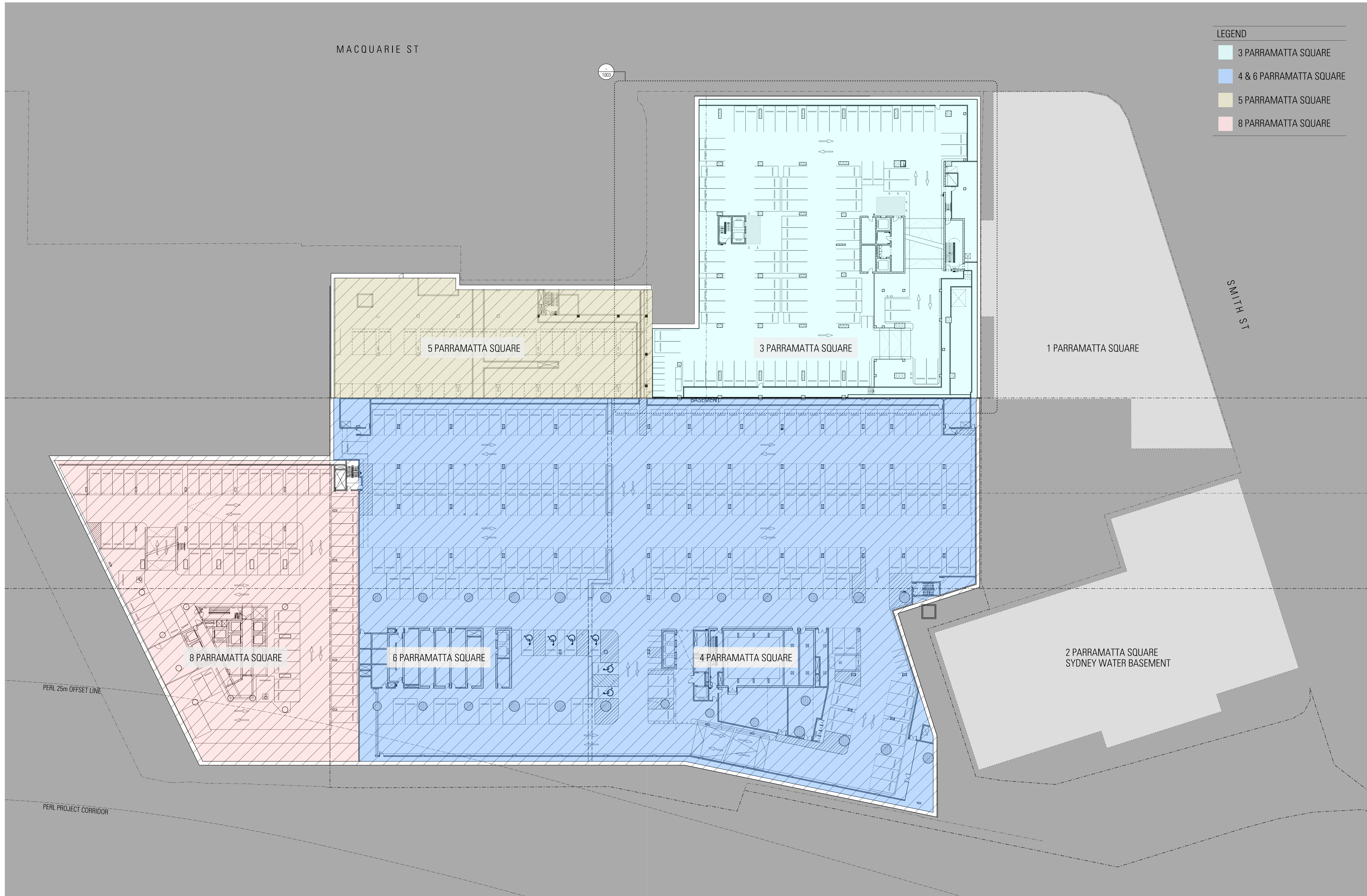
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Drawing Number
A-3-0505

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Revision
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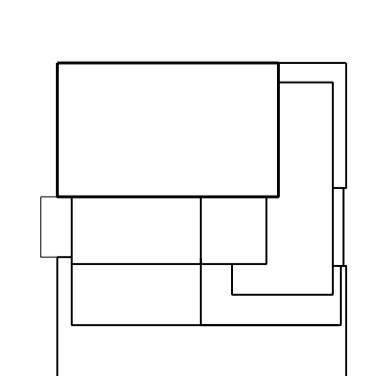
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15 Edmondson CL THORNLEIGH
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Key Plan



Scale / North Point
1:300 @ B1
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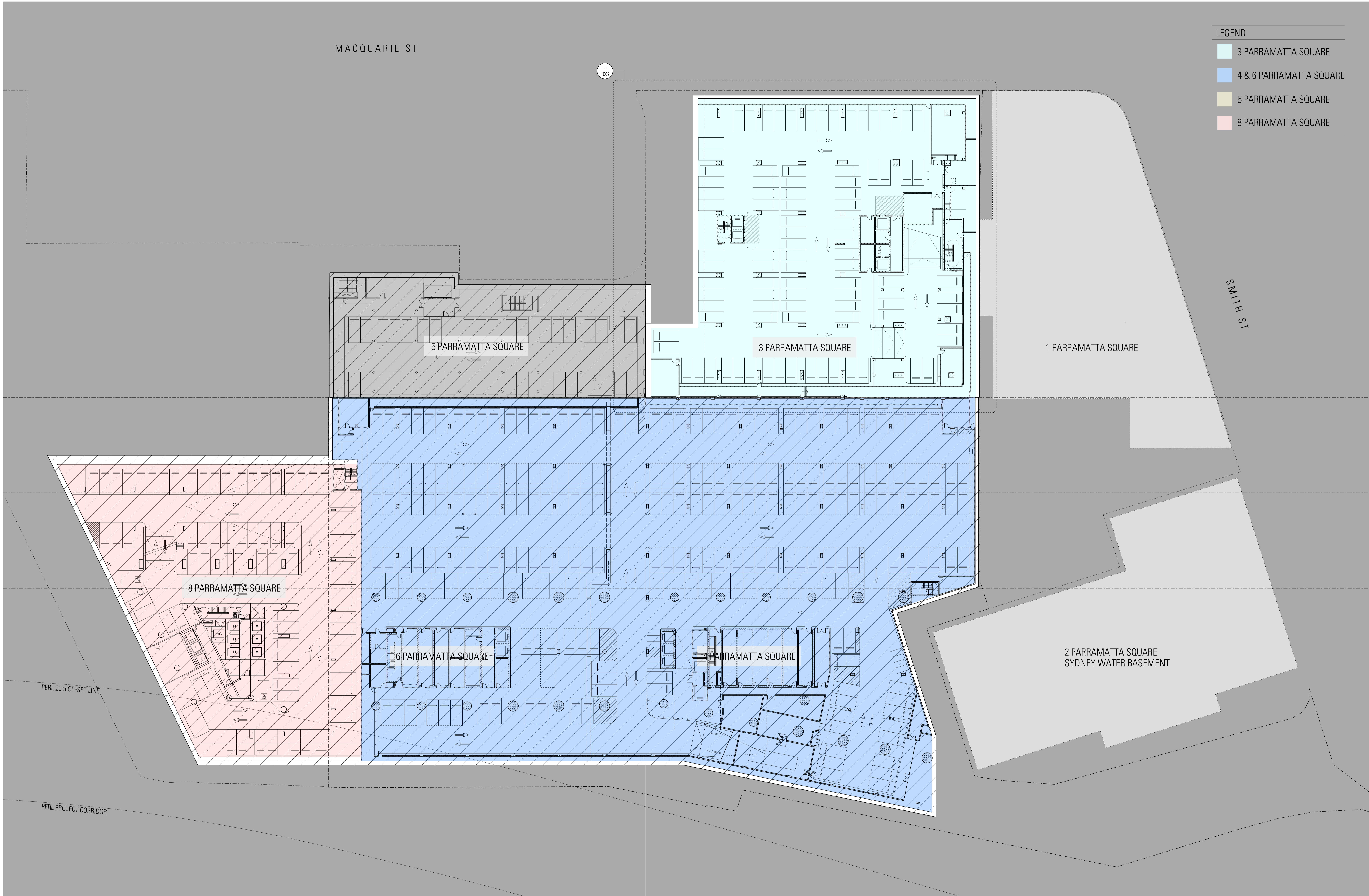


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BASEMENT LEVEL 02
Project Number
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Drawing Number
A-3-0503
Documentation Stage
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Revision
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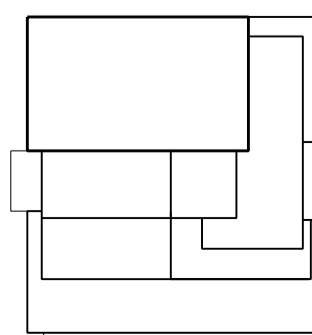
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Key Plan



Scale / North Point

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0 3 6 9 15M

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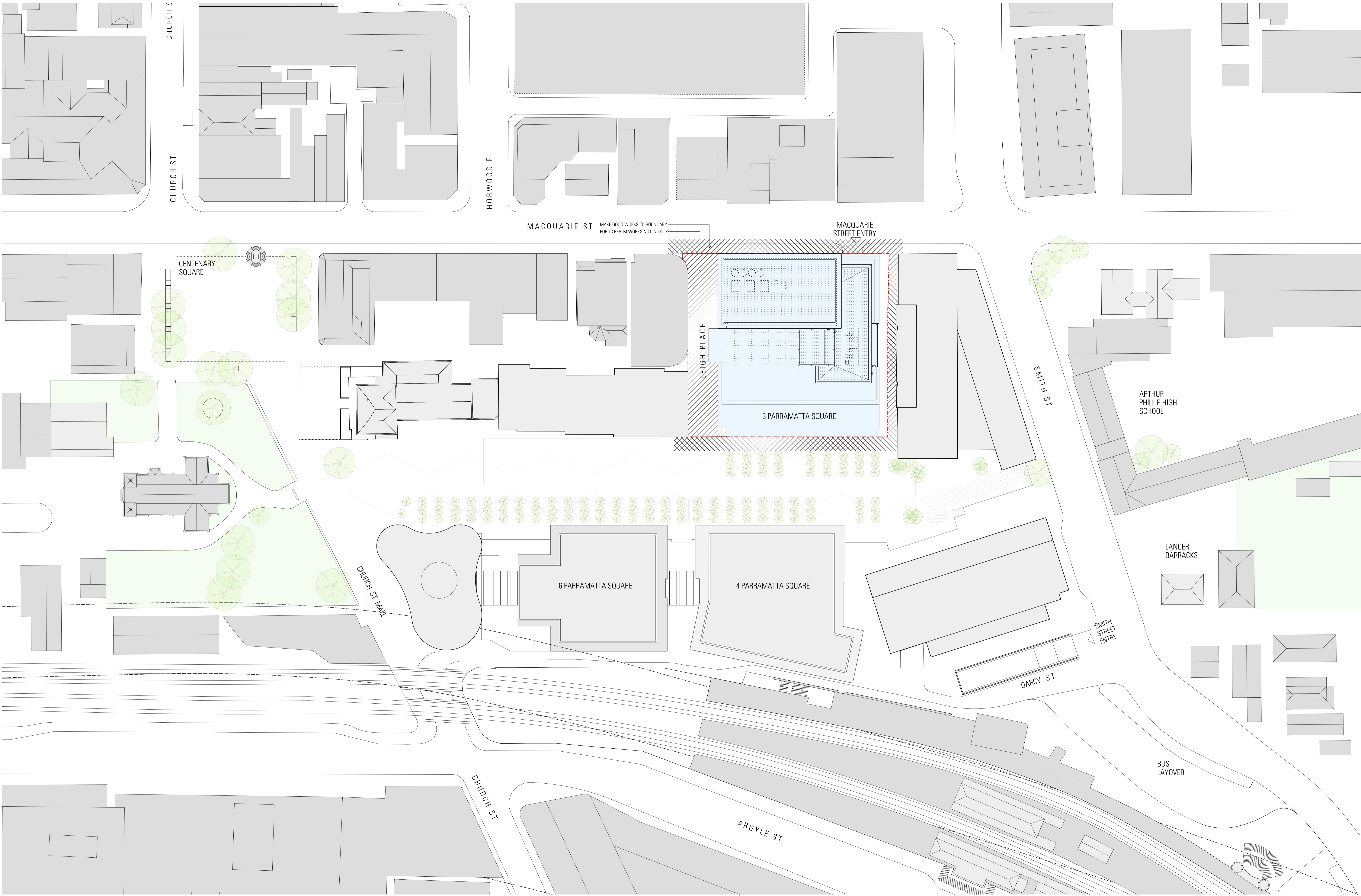
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BASEMENT LEVEL 03

Project Number
16007
Drawing Number
A-3-0502

Documentation Stage
TENDER
Revision
T01

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APPENDIX B

PARRAMATTA LIGHT RAIL DETAILS



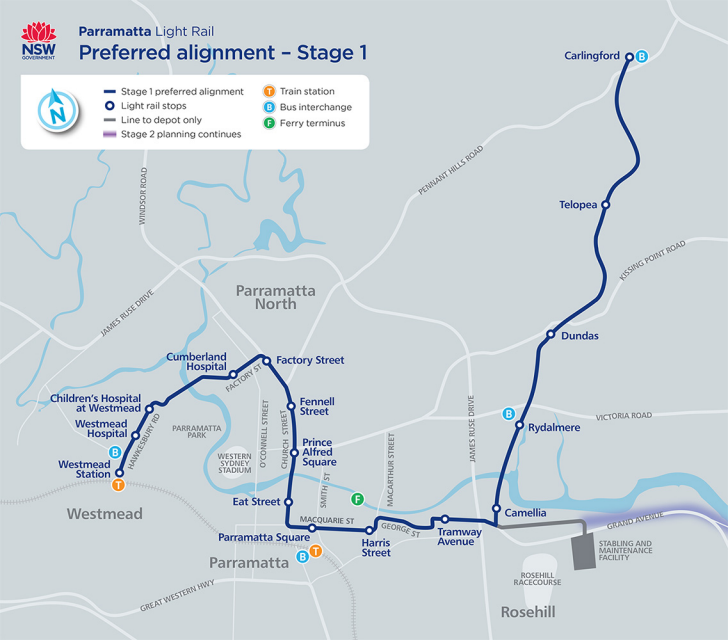


Parramatta Light Rail

Preferred alignment - Stage 1



- Stage 1 preferred alignment
- Light rail stops
- Line to depot only
- Stage 2 planning continues
- Train station
- Bus interchange
- Ferry terminus



APPENDIX C

SIDRA MODEL RESULTS

Criteria for Interpreting Results of SIDRA Analysis

1. Level of Service (LOS)

LOS	Traffic Signals and Roundabouts	Give Way and Stop Signs
'A'	Good	Good
'B'	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
'C'	Satisfactory	Satisfactory but accident study required
'D'	Operating near capacity	Near capacity and Accident Study required
'E'	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode
'F'	Unsatisfactory and requires additional capacity	Unsatisfactory and requires other control mode

2. Average Vehicle Delay (AVD)

The AVD provides a measure of the operational performance of an intersection as indicated on the table below, which relates AVD to LOS. The AVD's listed in the table should be taken as a guide only as longer delays could be tolerated in some locations (ie inner city conditions) and on some roads (ie minor side street intersecting with a major arterial route).

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabouts	Give Way and Stop Signs
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode

3. Degree of Saturation (DS)

The DS is another measure of the operational performance of individual intersections.

For intersections controlled by **traffic signals**¹ both queue length and delay increase rapidly as DS approaches 1, and it is usual to attempt to keep DS to less than 0.9. Values of DS in the order of 0.7 generally represent satisfactory intersection operation. When DS exceeds 0.9 queues can be anticipated.

For intersections controlled by a **roundabout or GIVE WAY or STOP signs**, satisfactory intersection operation is indicated by a DS of 0.8 or less.

¹ the values of DS for intersections under traffic signal control are only valid for cycle length of 120 secs

MOVEMENT SUMMARY

 **Site: 101 [SMITH STREET/DARCY ST AM PEAK PLR]**

Signals - Fixed Time Isolated Cycle Time = 110 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m		per veh	km/h
South: STATION ST											
1	L2	383	1.4	0.783	35.2	LOS D	14.5	114.4	0.96	0.96	37.6
2	T1	411	17.9	0.783	43.4	LOS D	18.7	135.6	0.99	0.92	28.5
Approach		794	9.9	0.783	39.2	LOS D	18.7	135.6	0.98	0.94	33.2
North: SMITH ST											
8	T1	356	18.1	0.242	9.8	LOS A	6.9	48.1	0.47	0.40	48.2
9	R2	483	5.2	1.005	101.7	LOS F	41.0	299.7	1.00	1.14	16.6
Approach		839	10.7	1.005	62.7	LOS E	41.0	299.7	0.78	0.82	23.0
West: DARCY ST ACCESS											
10	L2	102	0.0	0.543	49.7	LOS D	9.0	66.1	0.95	0.81	26.2
12	R2	79	14.1	0.543	49.9	LOS D	9.0	66.1	0.95	0.81	32.3
Approach		181	6.1	0.543	49.8	LOS D	9.0	66.1	0.95	0.81	29.2
SouthWest: BUS INTERCHANGE EXIT											
30b	L3	8	100.0	0.698	71.3	LOS E	2.3	30.1	1.00	0.85	27.0
30a	L1	3	100.0	0.698	69.2	LOS E	2.3	30.1	1.00	0.85	20.8
32b	R3	26	100.0	0.698	71.0	LOS E	2.3	30.1	1.00	0.85	26.8
Approach		38	100.0	0.698	70.9	LOS E	2.3	30.1	1.00	0.85	26.4
All Vehicles		1852	11.7	1.005	51.7	LOS D	41.0	299.7	0.88	0.87	27.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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 (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate		
		ped/h	sec		Pedestrian ped	Distance m	per ped		
P3	North Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95	
P4	West Full Crossing	53	37.7	LOS D	0.1	0.1	0.83	0.83	
P8	SouthWest Full Crossing	53	1.8	LOS A	0.0	0.0	0.18	0.18	
All Pedestrians		158	29.6	LOS C			0.65	0.65	

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.

MOVEMENT SUMMARY

 **Site: 101 [SMITH STREET/DARCY ST PM PEAK PLR]**

Signals - Fixed Time Isolated Cycle Time = 110 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		veh	m		per veh	km/h
South: STATION ST											
1	L2	147	1.4	0.488	26.1	LOS C	6.3	56.1	0.89	0.77	42.0
2	T1	358	17.9	0.663	38.3	LOS D	14.5	101.7	0.95	0.81	30.6
Approach		505	13.1	0.663	34.4	LOS C	14.5	101.7	0.93	0.80	34.0
North: SMITH ST											
8	T1	381	18.1	0.375	22.5	LOS C	11.3	79.2	0.71	0.61	38.4
9	R2	164	5.2	0.630	54.9	LOS D	8.6	62.9	0.99	0.82	24.6
Approach		545	14.2	0.630	32.3	LOS C	11.3	79.2	0.80	0.67	32.9
West: DARCY ST ACCESS											
10	L2	259	0.0	0.671	36.0	LOS D	20.2	148.7	0.89	0.85	30.9
12	R2	194	14.1	0.671	36.1	LOS D	20.2	148.7	0.89	0.85	36.8
Approach		453	6.0	0.671	36.0	LOS D	20.2	148.7	0.89	0.85	33.8
SouthWest: BUS INTERCHANGE EXIT											
30b	L3	4	100.0	0.605	69.9	LOS E	2.0	25.5	1.00	0.80	27.3
30a	L1	1	100.0	0.605	67.8	LOS E	2.0	25.5	1.00	0.80	21.0
32b	R3	27	100.0	0.605	69.6	LOS E	2.0	25.5	1.00	0.80	27.0
Approach		33	100.0	0.605	69.5	LOS E	2.0	25.5	1.00	0.80	26.9
All Vehicles		1536	13.3	0.671	35.0	LOS C	20.2	148.7	0.87	0.77	33.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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 (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Back of Queue Distance	Prop. Queued	Effective Stop Rate	
		ped/h	sec		ped	m		per ped	
P3	North Full Crossing	53	32.1	LOS D	0.1	0.1	0.77	0.77	
P4	West Full Crossing	53	38.6	LOS D	0.1	0.1	0.84	0.84	
P8	SouthWest Full Crossing	53	1.8	LOS A	0.0	0.0	0.18	0.18	
All Pedestrians		158	24.2	LOS C			0.60	0.60	

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.