

ENQUIRIES: IAN HARRIS  
PROJECT NO: 29522-SYD-C

25 July 2016

James Brooks  
Engine Room Venture Management  
Level 12, 280 George Street,  
Sydney, NSW 2000

Attention: James

**RE: 20-22 MACQUARIE STREET, PARRAMATTA– FLOOD IMPACT STATEMENT**

Introduction

This report has been prepared to address the flood impact associated with the property at 20 Macquarie Street, Parramatta. Wood & Grieve Engineers have been engaged by Engine Room Venture Management to assess the flood impacts on the development and impacts of the development on existing flood extents.

Existing Site Characteristics

Address: 20-22 Macquarie Street, Parramatta  
Real Property Address: Lot 1, DP501663 & Lot 1, DP503651  
Total Site Area: 1,294m<sup>2</sup>

As can be seen in the site location aerial photo (on the next page), the site is bounded by Macquarie Street to the south, Marsden Street to the west and commercial properties to the north and east.

The existing site consists of an existing commercial property across the entire development with existing ground floor level which varies between RL9.74 and RL8.88m AHD.

The existing topography of the streets around the site fall south along Marsden Street and west along Macquarie Street

There is existing stormwater drainage infrastructure in both Marsden Street and Macquarie Street with a number of kerb inlet pits located at the Marsden-Macquarie intersection.

**To us, it's more than just work**

Level 6, Building B, 207 Pacific Highway, St Leonards NSW 2065  
Phone +61 2 8484 7000 Fax +61 2 8484 7100 Email [sydney@wge.com.au](mailto:sydney@wge.com.au) [www.wge.com.au](http://www.wge.com.au)  
Wood & Grieve Engineers Limited ACN 137 999 609 trading as Wood & Grieve Engineers ABN 97 137 999 609  
Albany • Brisbane • Busselton • Melbourne • Perth • Sydney

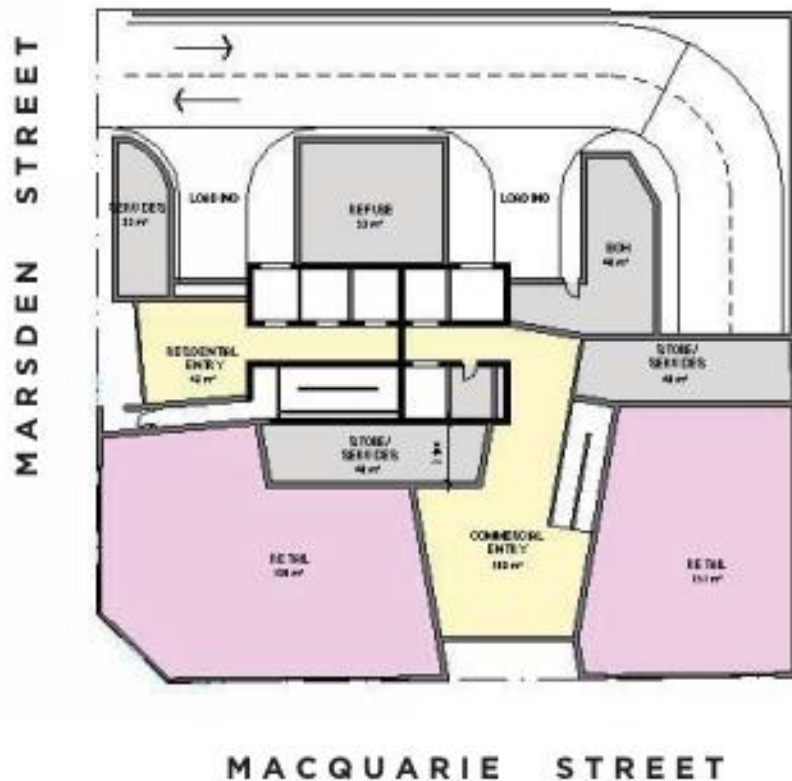


**Figure 1: Site Location Aerial (Source: Nearmaps)**

### Proposed Development

The propose development will consist of a 36 storey mixed use tower with 5 levels of basement car parking.

An extract of the proposed ground floor layout is shown in Figure 2 below.



**Figure 2: Proposed Ground Floor Layout**

#### Existing Flooding

When considering a new development it is important to assess the impact of existing flooding on the proposed development and also the impact of the proposed development on existing or potential flooding both upstream and downstream of the development.

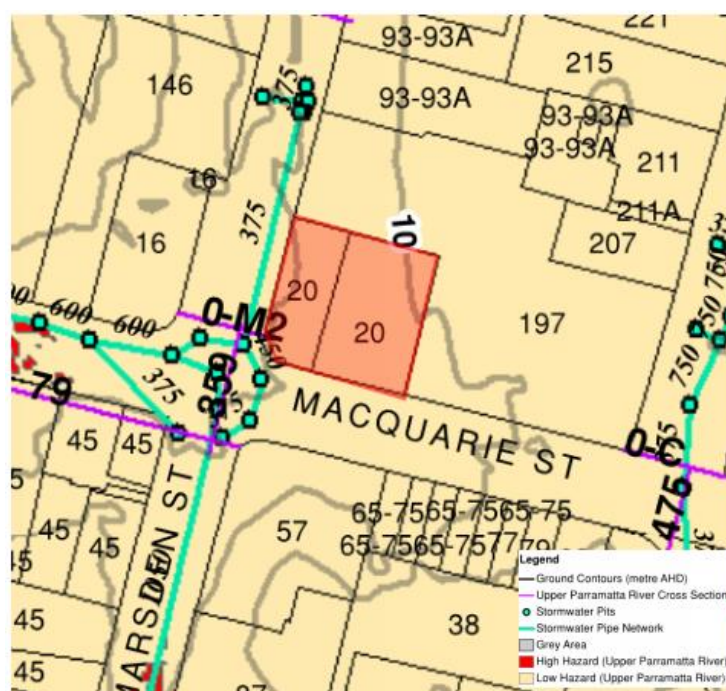
WGE have applied, on behalf of the client, to Parramatta City Council for the flood information relevant to the site. Council have confirmed that the site is impacted by mainstream flooding. This information has been included in this report and has been used to discuss the flood impacts affecting the site and mitigation measures to be incorporated into the future development.

The flood information provided by Parramatta City Council has been summarised in the tab below.

| Flood Event ARI (Years) | Flood Level (m AHD) | Lowest Site Level (m AHD) | Flood Depth (m) |
|-------------------------|---------------------|---------------------------|-----------------|
| 20                      | 9.13                | 8.88                      | 0.25            |
| 100                     | 9.22                |                           | 0.34            |
| PMF                     | 12.9                |                           | 4.02            |

**Table 1: Flood Levels Impacting Site (Source: Parramatta City Council)**

Mapping provided by Parramatta City Council confirms that the site is located within a Low Hydraulic Hazard area as can be seen in the extract below.



**Figure 3: Site Hydraulic Hazard Map (Source: Parramatta City Council)**

### Council Requirements

Referring to Parramatta City Council's DCP 2011 Part 2 in regards to flood plain mitigation measures the following measures are relevant to the site assuming the land use is commercial on the ground floor the floor impacted by flood).

#### **Floor Level**

- Habitable floor levels to be equal to or greater than the 100 year ARI flood level plus freeboard. Freeboard being 500mm;
- A restriction is to be placed on the title of the land, pursuant to S.88B of the Conveyancing Act, where the lowest habitable floor area is elevated more than 1.5m above finished ground level, confirming that the subfloor space is not to be enclosed.

#### **Flood Affection**

- A Civil Engineers report is required to certify at lodgement of the development application, that the development will not increase flood affection elsewhere, having regard to: (i) loss of flood

storage; (ii) changes in flood levels, flows and velocities caused by alterations to flood flows; and (iii) the cumulative impact of multiple potential developments in the vicinity.

- The impact of the development on flooding elsewhere to be considered having regard to the three factors listed in consideration above.

#### **Car Parking & Driveway Access**

- The minimum surface level of open spaces or carports shall be as high as practical, but no lower than 0.1m below the 100 year ARI flood level. In the case of garages, the minimum surface level shall be as high as practical, but no lower than the 100 year ARI flood level.
- Garages capable of accommodating more than 3 motor vehicles on land zones for urban purposes, or enclosed car parking, must be protected from inundation by floods equal to or greater than the 100 year ARI flood. Ramp levels to be no lower than 0.5m above the 100 year ARI flood level.
- The level of the driveway providing access between the road and parking spaces shall be no lower than 0.2m below the 100 year ARI flood level.
- Enclosed car parking and car parking areas accommodating more than 3 vehicles, with a floor below the 100 year ARI flood level, shall have adequate warning systems, signage, exits and evacuation routes.

#### **Evacuation**

- Applicant is to demonstrate the development is consistent with any relevant flood evacuation strategy or similar plan.

#### **Flood Impact Assessment**

##### **Flood Storage**

Through assessment of the existing site survey and visual inspection of the site it can be confirmed that currently the ground floor levels of the development have been located above the 100 year flood level with FFL's varying between RL9.74 and RL9.24m AHD. As such there is no existing opportunity for flood storage on the existing site.

Any proposed future development of the site will also keep the ground floor level above the 100 year flood level meaning that there will be no change to the flood storage provided on site and hence no adverse impacts on flooding due to loss of flood storage.

##### **Changes to Flood Flow**

The site is currently development over its entirety. The proposed development will also adopt this form and as such the development of the site will not adversely impact the flood flows as they pass the site.

##### **Cumulative Impacts**

The site is located with the Parramatta CBD and the existing catchment is almost fully developed. The existing flood conditions are based on a fully developed catchment. This development or the

development of other sites within the catchment will not adversely impact the cumulative flooding through the area.

### **Mitigation Measures**

The following flood mitigation measures shall be adopted on the development to prevent adverse flood impacts.

- All habitable floor levels, including commercial/retail will be set at a minimum level of RL9.72m AHD;
- Access to basement car parking will be designed to achieve a freeboard level of RL9.72m AHD prior to falling into the basement car parking area. The existing road level adjacent to the proposed basement ramp is RL8.83m AHD. This means there would need to be a 900mm rise on the ramp to achieve the required freeboard which will not be achievable. It therefore is proposed that a flood gate will be provided across the basement access ramp which will rise during a flood event to provide the freeboard. The flood gate will be designed to rise to RL9.72m AHD during a flood event providing 500mm freeboard above the 100 year flood level.
- Warning signs will be provided within the car parking areas to indicate that the development is within a flood area;
- A flood evacuation plan will be prepared for the development to clearly identify the strategy for evacuation during a flood and will clearly identify the safe path of escape from flood waters.

By incorporating these mitigation measures the development will reduce the risk of damage or injury due to flooding to the satisfaction of Parramatta City Councils Development Control Plan.

We trust that this information is sufficient for your purposes, however should you have any queries in regards to this report please feel free to contact the undersigned.

Yours faithfully



**Ian Harris**  
for **Wood & Grieve Engineers**

cc attached

- existing survey
- proposed development
- Council's Flood Mapping



CITY OF PARRAMATTA

Our Reference: FL/29/2016  
Contact: Peter Sirianni  
Telephone: 02 9806 8250  
Fax: 02 9806 8191

Mr Ian Harris  
Wood & Grieve Engineers  
207 Pacific Highway  
ST LEONDARDS NSW 2065

20 April 2016

**FLOOD ENQUIRY APPLICATION**  
2015 / 2016

**Property Details**

|                                                                                                                                                                                     |                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>Address</b>                                                                                                                                                                      | 20 Macquarie Street, PARRAMATTA NSW 2150 |
| <i>This form applies for up to three adjoining sites relating to the same development. A separate Flood Enquiry form and fee will be required for more than 3 or separate lots.</i> |                                          |

**Delivery Preference**

|                              |
|------------------------------|
| EMAIL: ian.harris@wge.com.au |
|------------------------------|

**Reason for Enquiry**

|  |  |
|--|--|
|  |  |
|--|--|

**Property Type**

**\*\* GST not applicable from 1 July 2013\*\***

|                                                                                                                    |          |
|--------------------------------------------------------------------------------------------------------------------|----------|
| Commercial (includes other residential such as dual occupancies, multi-unit housing and residential flat building) | \$452.50 |
|--------------------------------------------------------------------------------------------------------------------|----------|

**Disclaimer:** Flood levels and flood extent lines are based on current information held by Council. Council does not accept responsibility for the accuracy of this information. Any pipe sizes and location of pits and pipe lines should be confirmed by site investigation.

The flood levels shown on the back of this form are only an approximate guide and have been derived using the current computer simulated model.

The information provided in this document is presented in good faith to assist the public in understanding Council's drainage requirements that apply within the Parramatta Local Government Area. It is the responsibility of each individual using this information to undertake their own checks and confirm this information prior to its use.

Parramatta City Council, its agents and employees are not liable (whether by reason of negligence, lack of care or otherwise) to any person for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation, statement, or advice referred to above.

**Refer to back of this form for level information issued**



## CITY OF PARRAMATTA

### Flood Enquiry Information Issued *(To be completed by Council Officer)*

#### Mainstream Flooding

|                                                                                                                                                                                                                                |                                                                                            |                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| Is this property affected by mainstream flooding?<br><b>20 Macquarie Street, Parramatta</b>                                                                                                                                    |                                                                                            | <input checked="" type="checkbox"/> Yes<br><input type="checkbox"/> No |
| <b>Flood Levels</b>                                                                                                                                                                                                            | Closest Cross Sections: <i>(Please refer to Flood Study):</i><br><b>Refer to Flood Map</b> |                                                                        |
| <input checked="" type="checkbox"/> 1:20 year ARI                                                                                                                                                                              | <b>RL 9.13</b> m AHD                                                                       | <b>Comments:</b><br><br><b>See Note on Flood / Hazard Map</b>          |
| <input checked="" type="checkbox"/> 1:100 Year ARI                                                                                                                                                                             | <b>RL 9.22</b> m AHD                                                                       |                                                                        |
| <input checked="" type="checkbox"/> PMF                                                                                                                                                                                        | <b>RL 12.9</b> m AHD                                                                       |                                                                        |
| <input checked="" type="checkbox"/> Refer to flood maps provided for detailed flood levels.                                                                                                                                    |                                                                                            |                                                                        |
| The above flood level information is obtained from the following flood study report:<br><b>1. Upper Parramatta River Flood Study – Draft 8 (UPRCT)</b><br><b>2. Parramatta Drainage, 1990 (Sinclair Knight &amp; Partners)</b> |                                                                                            |                                                                        |

Note: Flood inundation can be verified by detail survey to AHD undertaken by a Registered Surveyor.

#### Local Flooding

|                                                                                                                                                                                                                                               |                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| Is the property located within a Hatched Grey Area?<br><i>Properties located within a <b>Hatched Grey Area</b> are subjected to flooding from the local catchment.</i>                                                                        | <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No |
| Is the property located within a Grey Area?<br><i>Properties located within a <b>Grey Area</b> are subjected to additional site drainage controls to manage flooding in the local catchment.</i>                                              | <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No |
| Is the property likely to be affected by overland stormwater run-off from the local catchment?<br><b>Note:</b> No site inspection conducted for this assessment. Based solely on the information supplied for this flood enquiry application. | <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No |
| <b>Note:</b> You are required to contact Council's Development Service Engineer for any details and requirements relating to development that is affected by local flooding.                                                                  |                                                                        |

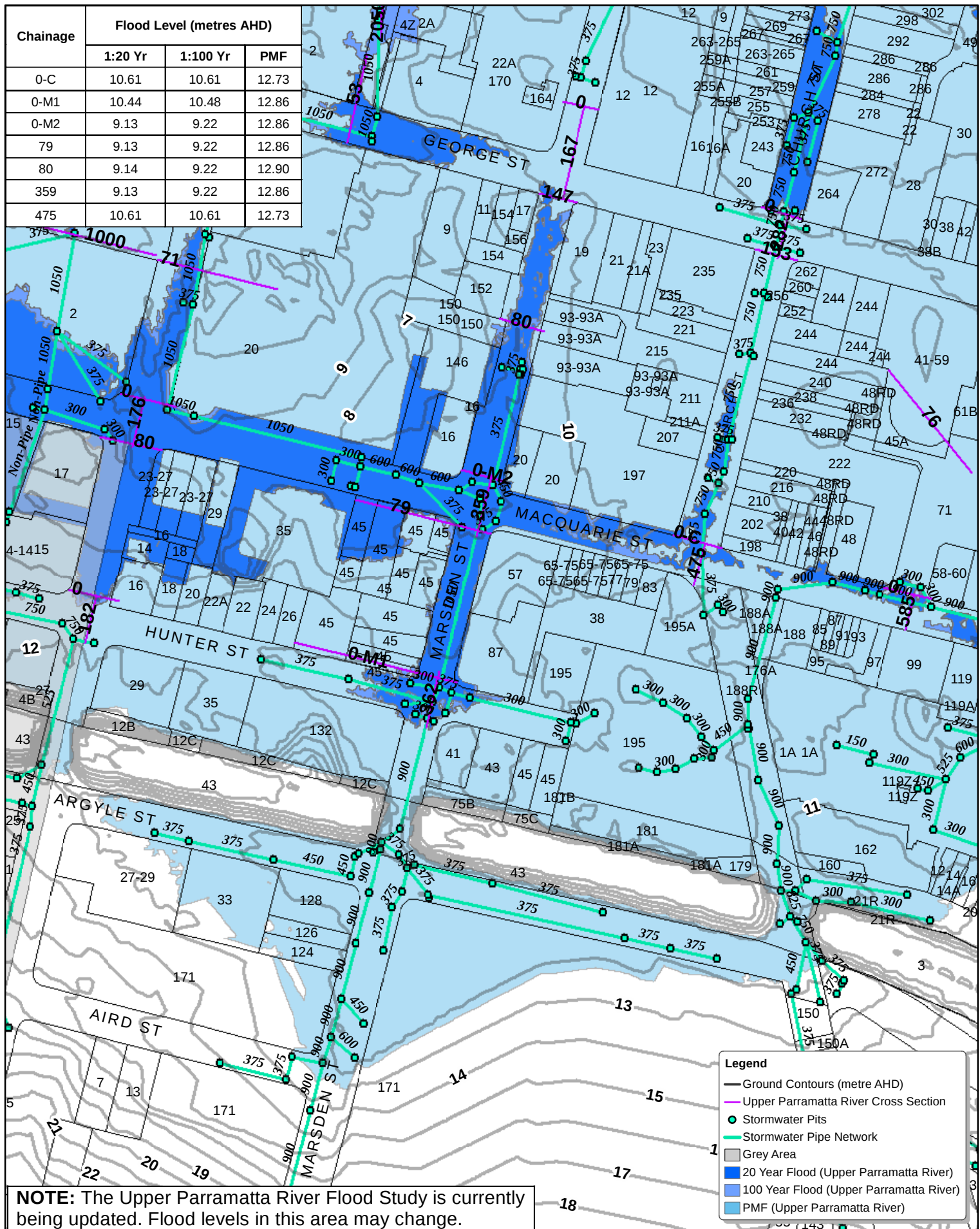
#### Additional Recommended Actions

|                                     |                                                                                                                                                   |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | The Applicant needs to discuss the proposal to re-develop this site with Council's Town Planner and Development Services Engineer.                |
| <input checked="" type="checkbox"/> | The Applicant needs to contact Council's Town Planner and organise a pre-lodgement meeting to discuss any proposal to redevelop this property.    |
| <input checked="" type="checkbox"/> | The Applicant needs to refer to Council's Local Floodplain Risk Management policy for details relating to developing a land affected by flooding. |

#### Definitions: *(As per NSW Floodplain Development Manual dated April 2005)*

- AHD** – a common national surface level datum approximately corresponding to mean sea level.
- ARI** – the long term average number of years between the occurrences of a flood as big as or larger than, the selected event.
- PMF** – is the largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation.
- AEP** – Annual Exceedance Probability is the chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage.

| Chainage | Flood Level (metres AHD) |          |       |
|----------|--------------------------|----------|-------|
|          | 1:20 Yr                  | 1:100 Yr | PMF   |
| 0-C      | 10.61                    | 10.61    | 12.73 |
| 0-M1     | 10.44                    | 10.48    | 12.86 |
| 0-M2     | 9.13                     | 9.22     | 12.86 |
| 79       | 9.13                     | 9.22     | 12.86 |
| 80       | 9.14                     | 9.22     | 12.90 |
| 359      | 9.13                     | 9.22     | 12.86 |
| 475      | 10.61                    | 10.61    | 12.73 |

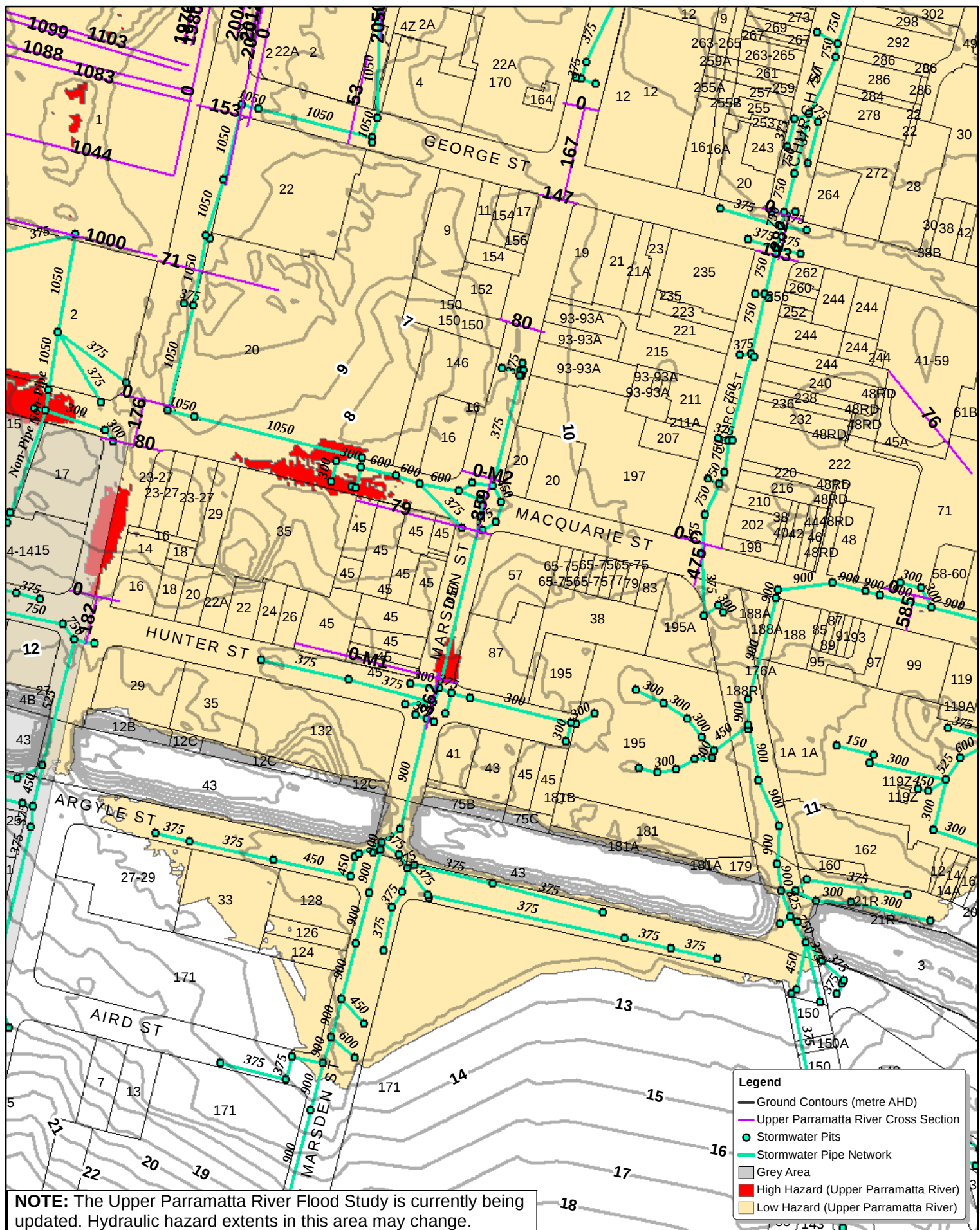


Printed  
19/04/2016

## Parramatta City Council Flood Map

N  
1:2,500

**DISCLAIMER:** Flood levels and flood extent lines are based on current information held by Council. Council does not accept responsibility for the accuracy of this Information. Any pipe sizes and location of pits and pipe lines should be confirmed by site investigation. The flood levels provided are only an approximate guide and have been derived using the current computer simulated model. The information provided on this document is presented in good faith. It is the responsibility of each individual using this information to undertake their own checks and confirm this information prior to its use. Parramatta City Council, its agents and employees are not liable (whether by reason of negligence, lack of care or otherwise) to any person for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation, statement, or advice referred to above.

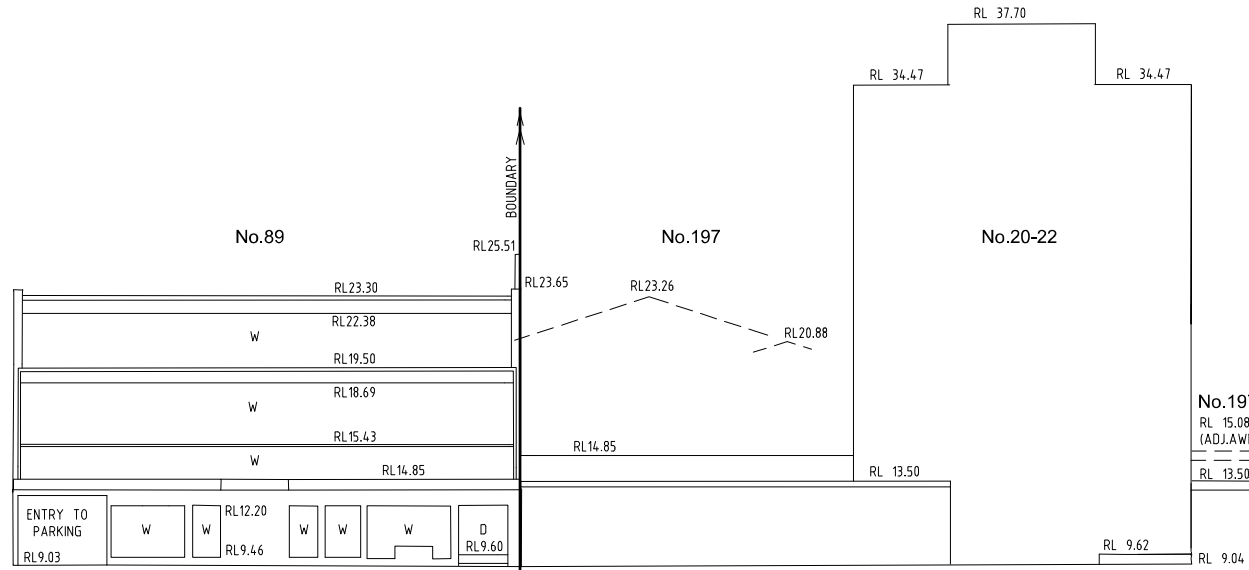


Printed  
19/04/2016

## Parramatta City Council Hydraulic Hazard Map

N  
1:2,500

**DISCLAIMER:** Flood levels and flood extent lines are based on current information held by Council. Council does not accept responsibility for the accuracy of this information. Any pipe sizes and location of pits and pipe lines should be confirmed by site investigation. The flood levels provided are only an approximate guide and have been derived using the current computer simulated model. The information provided on this document is presented in good faith. It is the responsibility of each individual using this information to undertake their own checks and confirm this information prior to its use. Parramatta City Council, its agents and employees are not liable (whether by reason of negligence, lack of care or otherwise) to any person for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation, statement, or advice referred to above.



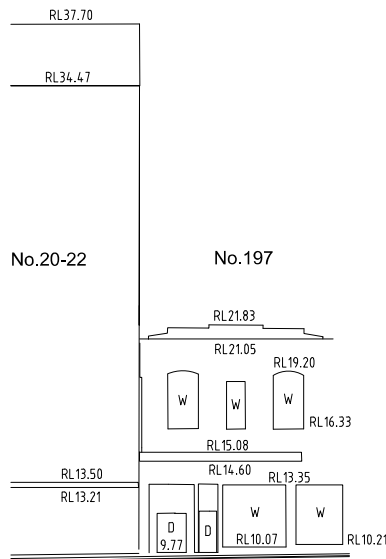
WESTERN ELEVATION -  
MARSDEN STREET FRONTAGE

LEGEND

|                                   |         |
|-----------------------------------|---------|
| BENCH MARK                        | ▲       |
| OPTUS PIT                         | ■ OPTUS |
| COMMS PIT                         | ■ COMM  |
| TELSTRA PIT                       | ■ TEL   |
| ELECTRICITY BOX                   | ■ EL    |
| POWER POLE                        | ● PP    |
| PIT WITH CONCRETE LID             | □ CLID  |
| PIT WITH METAL LID                | □ MLID  |
| TRAFFIC LIGHT                     | ■ TLP   |
| STREET SIGNAL BOX                 | ■ SSBOX |
| ROAD TRAFFIC AUTHORITY            | ■ RTA   |
| PARKING METER                     | ■ PKMT  |
| PHONE BOX                         | □ PHONE |
| STREET SIGN                       | ■ SS    |
| BOLLARD                           | ○ BOL   |
| GRATED INLET PIT                  | ■ GIP   |
| MANHOLE PIT                       | ■ MIP   |
| SEWER MANHOLE                     | ○ SMH   |
| STOP VALVE                        | ■ SV    |
| HYDRANT                           | ■ HYD   |
| WATER LID                         | ◆ W     |
| GAS LID                           | ◆ GAS   |
| VEHICLE CROSSING (VC)             | ■ VC    |
| PRAM CROSSING (PC)                | ■ PC    |
| WINDOW                            | W       |
| DOOR                              | D       |
| HEAD/SILL                         | H/S     |
| GAS (DBYD)                        | G       |
| TELSTRA (DBYD)                    | T       |
| OPTUS                             | OP      |
| OPTICAL FIBRE                     | OF      |
| AAPT                              | A       |
| NATIONAL BROADBAND NETWORK (DBYD) | NBN     |
| WATER (DBYD)                      | W       |
| STORMWATER (DBYD)                 | SW      |
| SEWER (DBYD)                      | S       |
| ELECTRICITY (UGROUND) (DBYD)      | E       |

NOTES

1. THE BOUNDARIES HAVE NOT BEEN MARKED
2. ALL AREAS AND DIMENSIONS HAVE BEEN COMPILED FROM PLANS MADE AVAILABLE BY THE OFFICE OF LAND & PROPERTY INFORMATION (NSW) AND ARE SUBJECT TO FINAL SURVEY
3. ORIGIN OF LEVELS ON A.H.D. IS TAKEN FROM SSM 51808 R.L. 9.129 (A.H.D.) IN O'CONNELL STREET
4. CONTOUR INTERVAL 0.1 m
5. CONTOURS ARE INDICATIVE ONLY. ONLY SPOT LEVELS SHOULD BE USED FOR CALCULATIONS OF QUANTITIES WITH CAUTION
6. ONLY SPOT LEVELS SHOULD BE USED FOR CALCULATIONS OF QUANTITIES WITH CAUTION
7. KERB LEVELS ARE TO THE TOP OF KERB UNLESS SHOWN OTHERWISE
8. FLOOR LEVELS SHOWN ARE THRESHOLD LEVELS. NO INVESTIGATION OF INTERNAL FLOOR LEVELS HAS BEEN UNDERTAKEN
9. NO INVESTIGATION OF UNDERGROUND SERVICES HAS BEEN MADE. SERVICES HAVE BEEN PLOTTED FROM RELEVANT AUTHORITIES INFORMATION AND HAVE NOT BEEN SURVEYED. ALL RELEVANT AUTHORITIES SHOULD BE NOTIFIED PRIOR TO ANY EXCAVATION ON OR NEAR THE SITE
10. 8/4/7 DENOTES TREE SPREAD OF 8m, TRUNK DIAMETER OF 0.4m & APPROX HEIGHT OF 7m
11. SHOWS APPROXIMATE POSITION OF ROAD LINEMARKING AND IS INDICATIVE ONLY
12. BEARINGS SHOWN ARE MGA (MAP GRID OF AUSTRALIA) ADD APPROX. 1°00' FOR TRUE NORTH



SOUTHERN ELEVATION -  
MACQUARIE STREET FRONTAGE

No.45 MACQUARIE STREET  
(UNDER CONSTRUCTION)

100  
DP 1212216

1  
DP 633257  
No.146  
7 STOREY BUILDING

2  
DP 540744  
No.144  
(No.16 MACQUARIE STREET)  
3 STOREY BUILDING

1  
DP 503651

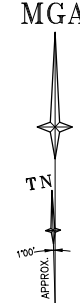
1  
DP 501663

1  
DP 710335  
No.197 CHURCH STREET  
2 STOREY BUILDING

1  
DP 747730

DP 15108

SOUTHERN ELEVATION - No.89



REFER TO NOTES AND LEGEND



|          |          |   |             |           |
|----------|----------|---|-------------|-----------|
| D        | 00/00/00 | - |             | 00        |
| C        | 00/00/00 | - |             | 00        |
| B        | 00/00/00 | - |             | 00        |
| A        | 00/00/00 | - |             | 00        |
| Revision | Date     |   | Description | Reference |

THIS IS THE PLAN REFERRED TO  
IN MY LETTER DATED:  
.....  
Registered Surveyor NSW



Client ENGINE ROOM VENTURE MANAGEMENT PTY LTD  
Drawing title  
PLAN OF DETAIL AND LEVELS OVER LOT 1 DP 501663 &  
LOT 1 DP 503651, No.20-22 MACQUARIE STREET  
PARRAMATTA

|                             |                     |                             |
|-----------------------------|---------------------|-----------------------------|
| datum<br>AHD                | project number<br>- | reference number<br>43494DT |
| site Area<br>1294m²(SURVEY) | scale<br>1:200      | date of survey<br>29/06/16  |
| LGA<br>PARRAMATTA           | SHEET<br>OF 1       | SHEETS<br>1                 |