Your ref 187 Thomas St
Our ref 270416

File ref 270416-RPT-002[2]

Peter Jones
Development Manager
Level 20, 20 Bond Street
Sydney NSW 2000, Australia

ARUP

Level 5
151 Clarence Street
Sydney NSW 2000
Australia

t +61 2 9320 9320
d +61 2 9320 9688

Duncan.Crook@arup.com
www.arup.com

13 March 2020

Dear Peter,

187 Thomas Street Planning Proposal - Option 5E – Civil Engineering Services

Introduction

Arup have been engaged by Greaton Development to undertake a civil engineering desktop study assessment, to inform Planning Proposal of the redevelopment at 187 Thomas Street, Sydney New South Wales. This assessment is only to inform the current Reference Scheme. The current building comprises a 15-storey office building, inclusive of two basement levels. A detailed project description for the proposed structure is included below.

The purpose of this report is to identify and discuss flood affectation risk, existing site levels, major stormwater drainage assets near the site and the implications of the change of land use in the context of the development proposal.

The advice is based on a desktop review of the following information:

- *Darling Harbour Catchment Floodplain Risk Management Plan, Final Report*, September 2016, WMAwater
- *Darling Harbour Catchment Floodplain Risk Management Study, Final Report*, September 2016, WMAwater
- *Darling Harbour Catchment Flood Study, Final Report,* October 2014, BMT WBM
- *Interim Floodplain Management Policy*, May 2014, City of Sydney Council
- *Sydney Local Environmental Plan*, 2012 (City of Sydney Council)
- *Sydney Development Control Plan*, 2012 (City of Sydney Council).

As the new building design is currently at a planning proposal design stage, the advice contained within this report is intended to be high-level and suitable for a range of applications.

Reference Scheme Project Description

The proposal seeks to amend planning controls applying to the Site to allow a future development that will comprise an integrated community and destination for the innovation and technology sectors in the form of a vertical innovation village with an overall maximum height of 49 storeys (RL 209.80) and approximate commercial GFA of 51,700m^2.

Within a hybrid tower the concept will deliver approximately 51,700m^2 of GFA to a maximum height of RL 207. As illustrated in the reference scheme the hybrid tower will comprise flexible interconnected floorplates of approximately: 1000m^2 on the ground level; 1,700m^2 within the podium; 610 - 760m^2 within the void tower; 1,200m^2 within the low- and high-rise tower; and 900m^2 GFA within the sky rise tower thereby catering to the full range of enterprises within the sector.

Key components of the reference scheme for the hybrid tower include:

- Innovation tech hub (approximately 8,600m^2 GFA) within the basement, podium and void tower with lobby off Valentine Street including:
- tech workshop with shared equipment, facilities and services (including education, business support, programming, safety management and training)
- co-working space for the innovation industries that utilise provided technology and equipment, that changes in space and floor plate design to accommodate growing businesses, and
- terrace on Level 4 of the Void Tower providing an indoor / outdoor workspace
- facilities and services shared with the tech hotel.
- Commercial office space (approximately 33,100m^2 GFA) for the corporate tech sector within the low- and high-rise tower with lobby off Quay Street
- 4-star Tech Hotel (approximately 9,800m^2 GFA / 234 keys with 26 rooms per floor) within the sky rise tower with sky lobby, pool and bar with drop off and lobby off Thomas Street
- Meeting, forum, gym, pool, hospitality and other spaces integrated throughout the building and shared (and co-managed) between the innovation hub, commercial tenancies and tech hotel
- A retail offering of approximately 220m^2 GFA, including food and beverage which will be located on the ground level
- Upgraded (and widened) through site connection connecting Thomas Street to the west with George Street to the east via an activated retail arcade connection
- Redeveloped public space on Thomas, Quay and Valentine Street including an expanded pedestrian plaza at the corner of Thomas and Quay Streets and widening of the Valentine Street footpath
- Integration with the proposed Quay Street public domain works to accommodate increased pedestrian movement from existing and future pedestrian connections to various modes of transport, and
- Five (5) basement levels beneath the building with access off Thomas Street in the north west of the site.

The proposed basement levels will provide:

- Reduced car park provision totalling 79 car parking spaces (including 23 small car spaces,2 car share spaces and 1 electric charging station) *(Note: maximum parking allowed 107 spaces however reduced provision proposed as transport demand strategy. 86 spaces currently provided on site)*
- 14 motorbike parking spaces
- 382 bicycle parking spaces for staff and visitors as well as end of trip (EoT) facilities
- Hotel back of house areas
- loading dock and waste storage room, and
- plant and equipment areas.

It should be noted that while the reference scheme represents one design for the proposed hybrid tower, the project will be subject to a full competitive design process in accordance with the requirements of Sydney LEP 2012.

Project Location

Figure 1- Site Plan *(source: NSW Spatial Services and Arup)*

The Site compromises one property at Lot 100, Plan DP804958. The site has frontages to Thomas Street to the North, Quay Street to the West and Valentine Street to the South. The existing ground levels for the property indicate the lowest level of approximately RL: 8 m AHD North-East of the property and the highest ground level of approximately RL: 12 m AHD South-East of the property (refer to the Site Elevation Plan in **Figure 2**). Vehicle access to the current development site is via Thomas Street.

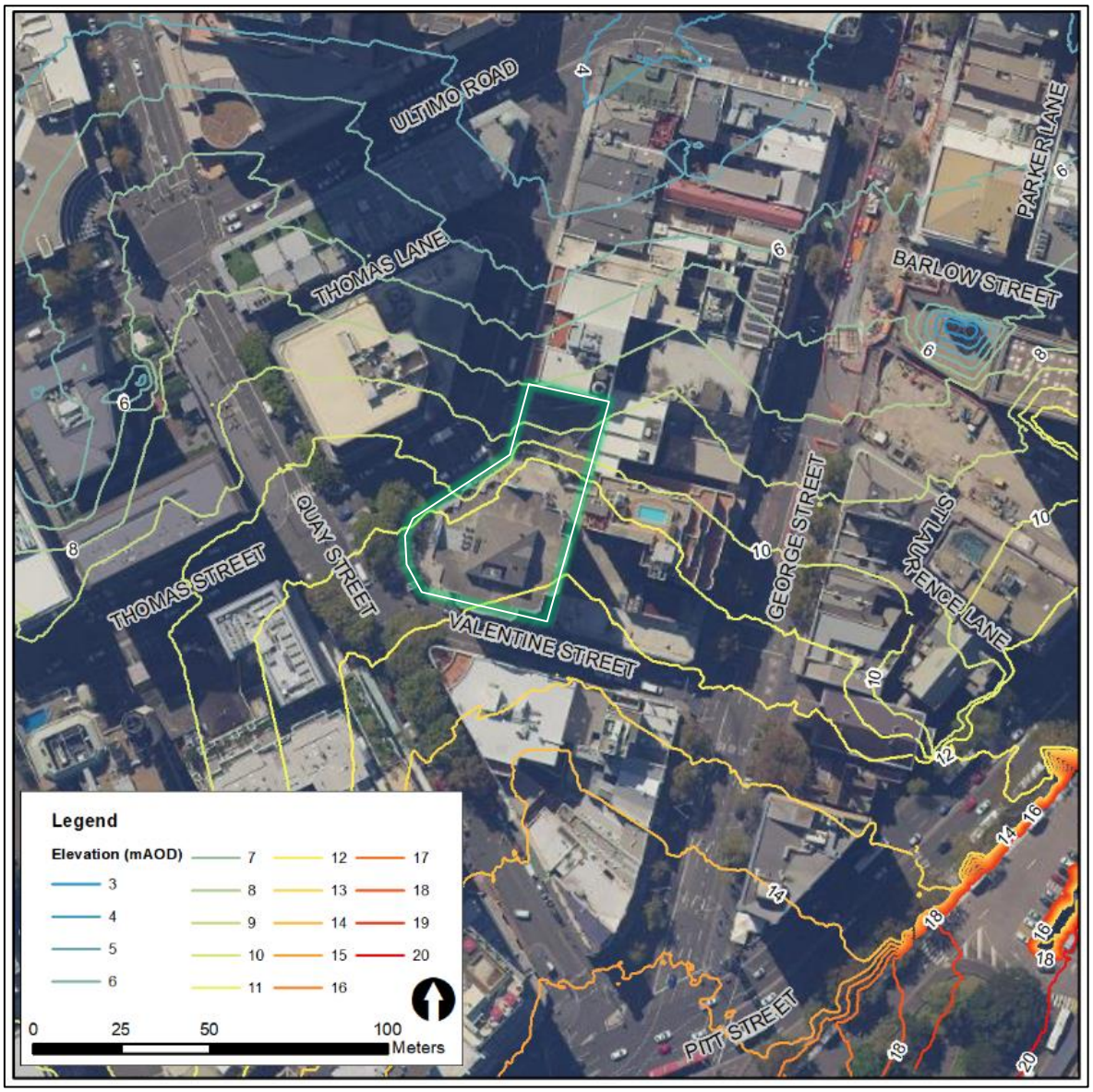


Figure 2 - Site Elevation Plan *(source: NSW Spatial Services and Arup)*

Development Overview

There are preliminary architectural proposals for the redevelopment of the site to construct a new mixed-use tower comprising of the following (refer to the Site Plan in **Figure 1**):

- Basement levels which will include shuttle and hotel lifts, 79 car parking spots per level (subject to design finalisation) and loading dock.
- Ground floor
- Podium levels
- Commercial use levels
- Hotel use levels

The site is currently zoned as Zone B8 Metropolitan Centre (refer to **Figure 3** for details, which is taken from the Sydney Local Environmental Plan 2012, **Appendix C**).

Figure 3 - 187 Thomas Street location with respect to current land use *(source: Sydney Local Environmental Plan)*

Flood Assessment

Review of Existing Drainage Infrastructure

There are two Sydney Water owned in-ground drainage networks in the vicinity of the project site (refer to **Figure 4** which is taken from the Sydney Water Asset Map 2020, **Appendix B**) which collect and drain surface water in different directions, generally following the falls in the natural topography. The infrastructure surrounds the site on three sides as follows:

- A DN300 VC circular pipe draining water from at a stormwater maintenance hole near 14 Quay Street extending East to a stormwater maintenance hole below George Street.
- A DN225 VC circular pipe draining water from at a stormwater gully near 14 Quay Street extending North-West to a stormwater maintenance hole below Thomas Street.
- A DN300 VC circular pipe below Thomas Street draining water in a North-Easterly direction to a stormwater maintenance hole below Ultimo Road.

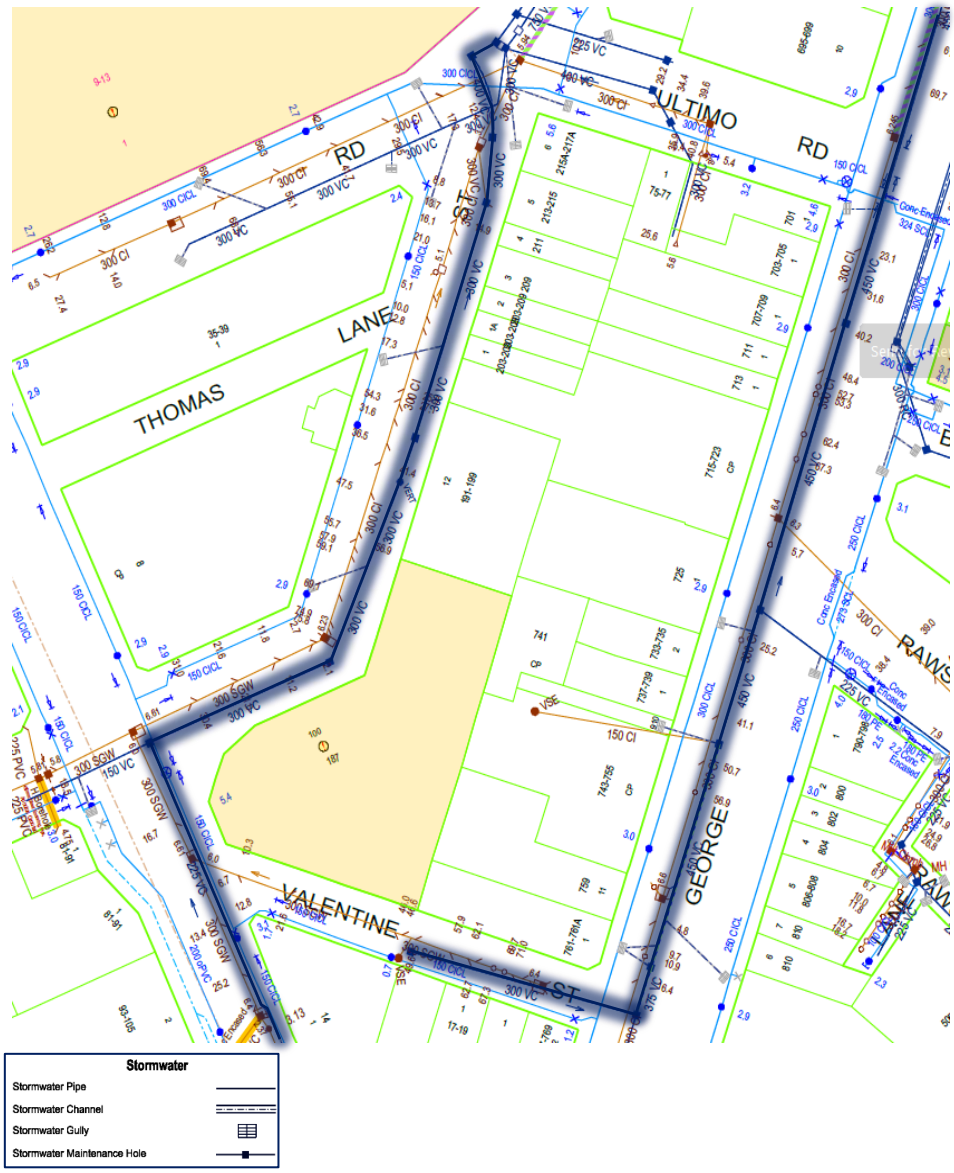


Figure 4 – Existing stormwater infrastructure surrounding 187 Thomas Street *(source: Sydney Water)*

Given there are stormwater drains surrounding the site below all three street frontages there are lots of opportunities for a suitable connection from the proposed development site. It is also likely that existing drainage connections from the existing development could be reused.

The small size and conventional arrangement of the existing drainage infrastructure in the vicinity of the proposed redevelopment, the existing drainage is unlikely to introduce risk or complications to the planning proposal or redevelopment. Our strategy is to mimic the existing drainage regime.

Review of Existing Flood Study

The existing overland flooding characteristics of the Site are documented in the *Darling Harbour Catchment Flood Study, Final Report* (BMT WBM, October 2014). Extracts from this flood study are included in **Appendix D** in support of the discussion below.

A review of the flood maps show that:

- The site is positioned towards the upstream extents of the Darling Harbour catchment, the crest of which is located approximately 1 km to the East of Central Station at Crown Street. (Refer to **Figure 5** for details, taken from the City North Catchment Digital Terrain Model figure, also provided in **Appendix D**).
- As illustrated by the indicative terrain fall arrows, Darling Harbour has a sizeable upstream catchment and receives surface water runoff from Surry Hills and sections of Hyde Park. Eddy Avenue, near Central Railway station function as an overland flow path conveying upstream flows in a north-westerly direction from Foveaux Street and Elizabeth Street before draining towards George Street. From George Street, flows are conveyed through Pyrmont and into the harbour. There are no major overland flow routes directly adjacent to the site.

Figure 5 - 187 Thomas Street location within the Darling Harbour catchment

(source: Darling Harbour Catchment Flood Study)

- In the 1% annual exceedance probability (AEP) storm event, no surface flooding is present in the roads adjacent to the site boundary i.e. on Thomas Street, Quay Street or Valentine Street (refer to **Figure 6** for details, which is taken from the Peak Flood Depth 1% AEP event flooding figure **Appendix D**).

Figure 6 - 187 Thomas Street location with respect to available 1% AEP event flood mapping

(source: Darling Harbour Catchment Floodplain Risk Management Study)

- Likewise, in the probable maximum flood (PMF) event, no surface flooding is present in the roads immediately surrounding the site boundary i.e. on Thomas Street, Quay Street or Valentine Street (refer to **Figure 7** for details, which is taken from the Peak Flood Depth PMF event flooding figure in **Appendix D**).

Figure 7 - 187 Thomas Street location with respect to available PMP event flood mapping

(source: Darling Harbour Catchment Floodplain Risk Management Study)

- As Thomas Street is shown to be flood-free in the 1% AEP and PMF event, no flooding hazard is reported adjacent to the site during both of these events (refer to **Figure 8** and **Figure 9** for details, which is taken from the Flood Hazard 1% AEP and PMF event flooding figure in **Appendix D**).

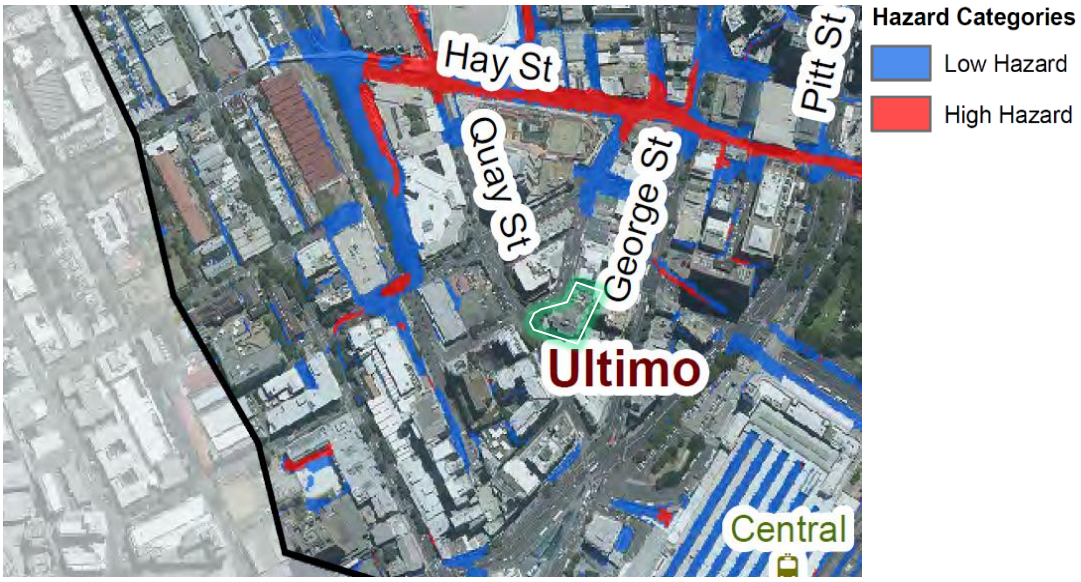


Figure 8 - 187 Thomas Street location with respect to available 1% AEP event flood hazard mapping

(source: Darling Harbour Catchment Floodplain Risk Management Study)

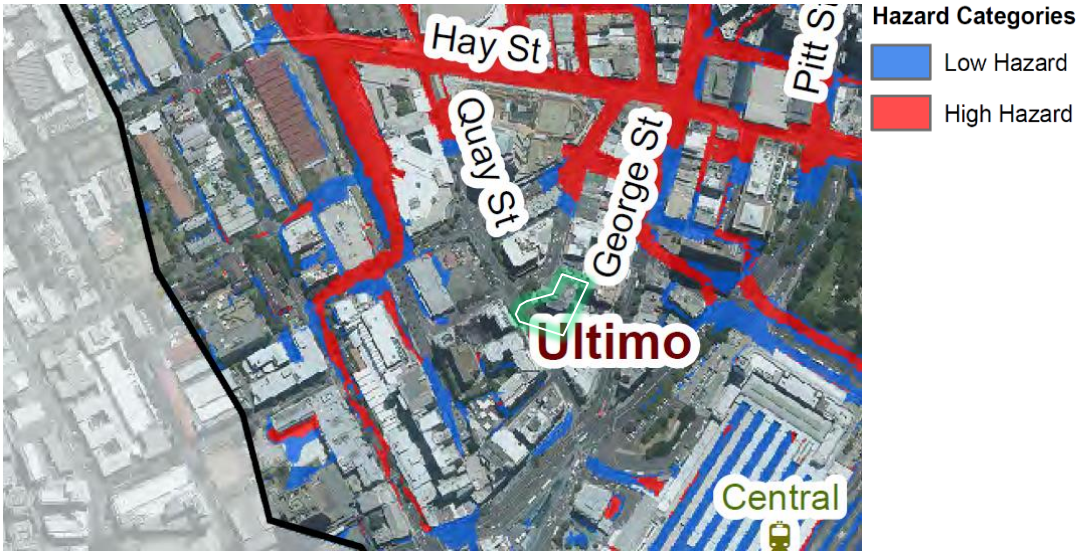


Figure 9 - 187 Thomas Street location with respect to available PMP event flood mapping

(source: Darling Harbour Catchment Floodplain Risk Management Study)

Based on the results outlined from the Darling Harbour catchment flood study, the site is outside of areas prone to flooding and therefore there is minimal risk of flood affectation for the proposed change of land use and redevelopment.

Future discussions with City of Sydney (CoS) Council may be necessary to confirm the accuracy and currency of this information to verify the results of the Arup preliminary assessment are still applicable to the site at the time of development application.

We recommend that Greaton Development obtain of a flooding certificate from CoS Council to confirm that the flood planning levels (FPLs) for this site to inform the architectural design of finished floor levels.

Flooding Design Criteria

Flood planning levels (FPLs) for the site are dictated by the City of Sydney *Interim Floodplain Management Policy*. The FPL are important as they affect the minimum building floor levels and/or building entrance threshold levels so as to mitigate the risk of flood water entering the proposed building. For below-ground basement parking, the FPL refers to the minimum level at each access point, including ventilation ducts, windows, light wells, lift shaft openings, risers and stairwells.

Details of these levels for mixed use developments are included in **Table 1**.

Table 1 - Flood Planning Level Requirements for a site located within a B4 Mixed Use zone *(source: City of Sydney Interim Floodplain Management Policy)*

Development	Flood Planning Level (FPL)
Industrial or commercial, business subject to mainstream or local drainage flooding	Merits based approach with a minimum of the 1% AEP flood level
Industrial or commercial, retail floor levels subject to mainstream or local drainage flooding	Merits based approach with a minimum of the 1% AEP flood level. Must demonstrate a reasonable balance between flood protection and urban design outcomes for street level activation.
Below-ground car park outside floodplain*	0.3 m above the surrounding surface
Below-ground car park subject to mainstream or local drainage flooding	1% AEP flood level + 0.5 m or the PMF (whichever is the higher)

* The criteria for below ground car park includes any intended use for spaces located below the surrounding surface levels e.g. car parking, retail, commercial uses etc.

Additional criteria only apply to other development types including critical facilities, schools, childcare facilities and housing for older people and people with disabilities.

Based on the PDF architectural Option 5E drawings dated 27th February 2020 (refer to **Appendix A**) it has been assumed that these facilities will not be included in the future development and have therefore not been contemplated within this assessment.

Development Flood Compliance

Based on the FPL requirements set out in **Table 1**, and that the proposed redevelopment site is outside the floodplain, only the requirement for below-ground carpark entrances to be raised 0.3m above the surrounding surface levels is applicable to this site.

The redevelopment proposes the same basement entrance location as the existing building (refer to **Figure 10** for details, which is taken from the PDF architectural Option 5E – ground floor drawing in **Appendix A**). If the existing basement entrance is proposed to be retained, the levels should be checked for compliance.

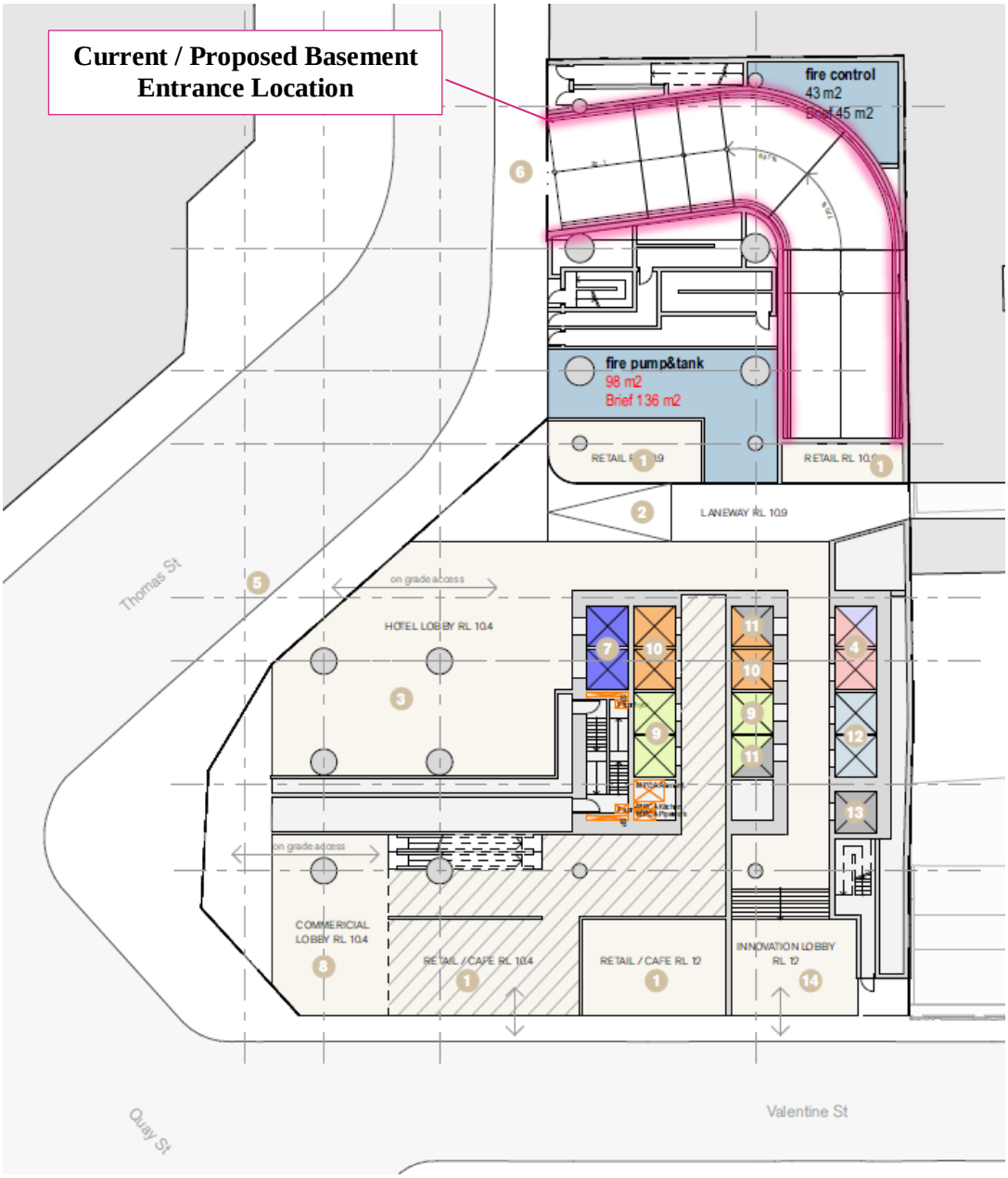


Figure 10 – Current and proposed location of basement entrance

(Source: Greaton Development Pty Ltd)

The advice above assumes that the existing ground levels along the Valentine Street, Quay Street and Thomas Street frontages will be maintained as existing and not adjusted as part of the proposed redevelopment. However, if there are changes to the existing ground levels, or any additional proposed basement entrances added elsewhere, this might increase the risk of flooding on the site, and therefore modifications will be required to comply with the City of City Council Interim Floodplain Policy.

As discussed previously, further interrogation of the flood model may be required to confirm more accurate flood depths within Thomas Street, Quay Street and Valentine Street.

Water-Sensitive Urban Design (WSUD)

Water Sensitive Urban Design (WSUD) aims to minimise the impacts of developments on the quantity and quality of stormwater runoff, to decrease flooding risk and reduce the effects of water bourn pollution on receiving waterways. This an important consideration during an urban development's planning and design process to satisfy the ecological and sustainable outcomes as required by the City of Sydney.

The water quality targets associated with major redevelopments as recommended by the City of Sydney are presented in **Table 2**. The proposed development is likely to be required to satisfy these targets to support the proposed change in land use.

Table 2 - Development Water Quality Targets for Redevelopment *(source: City of Sydney Decentralised Water Master Plan WSUD & Stormwater Infrastructure Report)*

Water Quality Parameters	**Pollutant Reduction Targets** **% reduction of baseline pollutant load of development site**
Total Suspended Solids (TSS)	85
Total Phosphorus (TP)	65
Total Nitrogen (TN)	45
Gross Pollutants	90 (>5 mm)

The redevelopment presents new opportunities to incorporate WSUD into the civil engineering design. Subject to ongoing design development, these opportunities could include some of the following:

- Capture and reuse of roof runoff to reduce the overall potable water demand of the development;
- Water quality treatment of site runoff via gross pollutant traps or proprietary filtration applications prior to discharge into the City of Sydney drainage network;
- Provision of additional flood storage volume via the inclusion of on-site detention to improve downstream flooding.

The inclusion of WSUDs infrastructure can provide sustainable outcomes and should be considered further at later stages of design development.

Conclusions & Further Work

This technical memo presents the Arup investigation of the existing site conditions at 187 Thomas Street site in consideration of the planning proposal. We have also reviewed some preliminary architectural proposals for the future redevelopment of the site and reviewed the civil engineering implications.

This investigation has identified the following key considerations:

- The City of Sydney Council, Darling Harbour Catchment Flood Study flood study shows no flooding greater than 100 mm in depth adjacent to the site, even during the most extreme flood event. The site is therefore outside the floodplain.
- For these reasons, Arup considers the principles outlined in this planning proposal are suitable from the perspective of flood risk.
- Likewise, early consideration of the preliminary redevelopment proposals suggest that the City of Sydney flooding planning requirements can be satisfied.
- The existing Sydney Water owned drainage infrastructure surrounding the site is available for future stormwater connections from the site
- The planning proposal identifies opportunities to incorporate Water Sensitive Urban Drainage (WSUD) features as part of future design development. These may also be required to comply with the City of Sydney pollutant reduction targets.

Arup has also identified that further work will be required as redevelopment proposals advance including the following items:

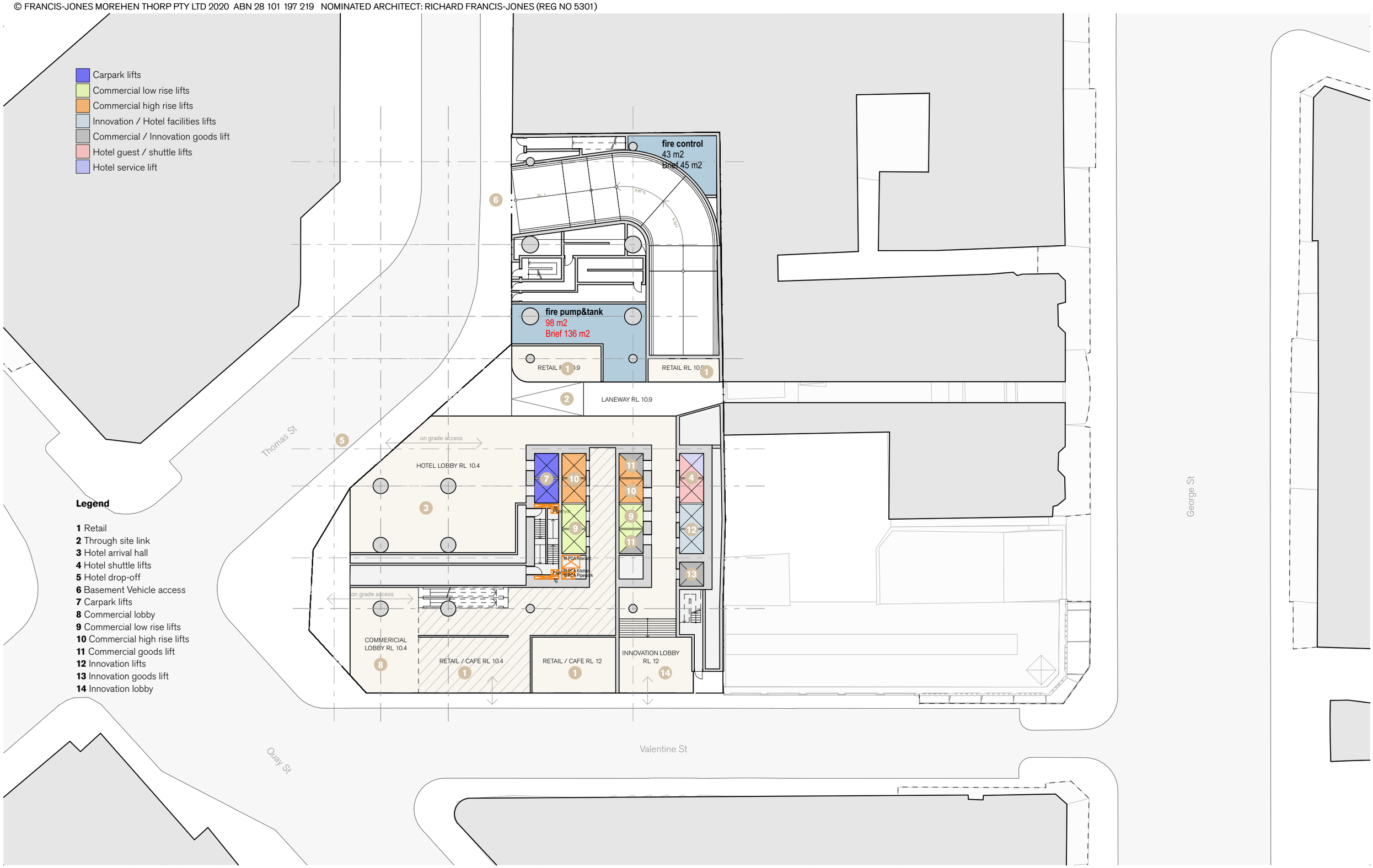
- The design of the future tower and specifically finished floor levels will require consideration of the City of Sydney (CoS) Council Flood Planning Levels (FPLs).
- We recommend that Greaton Development obtain of a flooding certificate from CoS Council to confirm that the flood planning levels (FPLs) for this site to inform the architectural design of finished floor levels.
- Future discussions with City of Sydney Council are recommended to confirm the accuracy and currency of the flood risk information reviewed as part of this assessment at the time of any future development application.
- Drainage connections and any associated modifications of the existing Sydney Water owned stormwater drainage are likely to require consultation and approval from Sydney Water. Early discussions are recommended as the timeframes for approvals can be long and may involve assessment of the condition of the existing infrastructure.
- The specification and assessment of the performance of WSUD features is likely to be required to support any future development application. This is to demonstrate compliance with the City of Sydney pollutant reduction targets.

Yours sincerely

Duncan Crook
Associate
Civil Engineer
NSW & ACT Transport

Appendix A

Architectural Drawings



Legend

1 Retail
2 Through site link
3 Hotel arrival hall
4 Hotel shuttle lifts
5 Hotel drop-off
6 Basement Vehicle access
7 Carpark lifts
8 Commercial lobby
9 Commercial low rise lifts
10 Commercial high rise lifts
11 Commercial goods lift
12 Innovation lifts
13 Innovation goods lift
14 Innovation lobby

fjmt

Ground Floor

GREATON - 187 Thomas St

0 4 10 20m

1:400 @ A3

27/2/20

For Information

fjmt-1006

Appendix B

Sydney Water Asset Map

A3

DBYD Address:
187 Thomas Street
Haymarket NSW 2000

DBYD Job No: 18909186

DBYD Sequence No: 94077554

SYDNEY WATER CORPORATION

Scale: 1:1500

Date of Production: 23/01/2020

Plan 1 of 1

N

0m 9m 18m 27m 36m

Appendix C

City of Sydney Land Zoning Map

Sydney Local Environmental Plan 2012

Land Zoning Map - Sheet LZN_015

Zone

- B1 Neighbourhood Centre
- B2 Local Centre
- B3 Commercial Core
- B4 Mixed Use
- B5 Business Development
- B6 Enterprise Corridor
- B7 Business Park
- B8 Metropolitan Centre
- IN1 General Industrial
- IN2 Light Industrial
- R1 General Residential
- R2 Low Density Residential
- RE1 Public Recreation
- SP1 Special Activities
- SP2 Infrastructure
- CW SREP 26 City West
- DH Darling Harbour Development Plan No.1
- GAHP Sydney LEP (Glebe Affordable Housing Project) 2011
- GS1 South Sydney LEP 1998 and City of Sydney Planning Scheme Ordinance
- GS2 South Sydney LEP 1998 and South Sydney LEP 114
- HP Sydney LEP (Harold Park) 2011
- MD SEPP Major Development 2005
- MPS SEPP 47 Moore Park Showground
- SCRA Sydney Cove Redevelopment Authority Scheme
- SHC SREP Sydney Harbour Catchment 2005
- SLEP Sydney LEP 2005
- SS South Sydney LEP 1998
- WB SREP 16 Walsh Bay
- UL Unzoned Land

Cadastre

Cadastre 26/09/2012 © City of Sydney

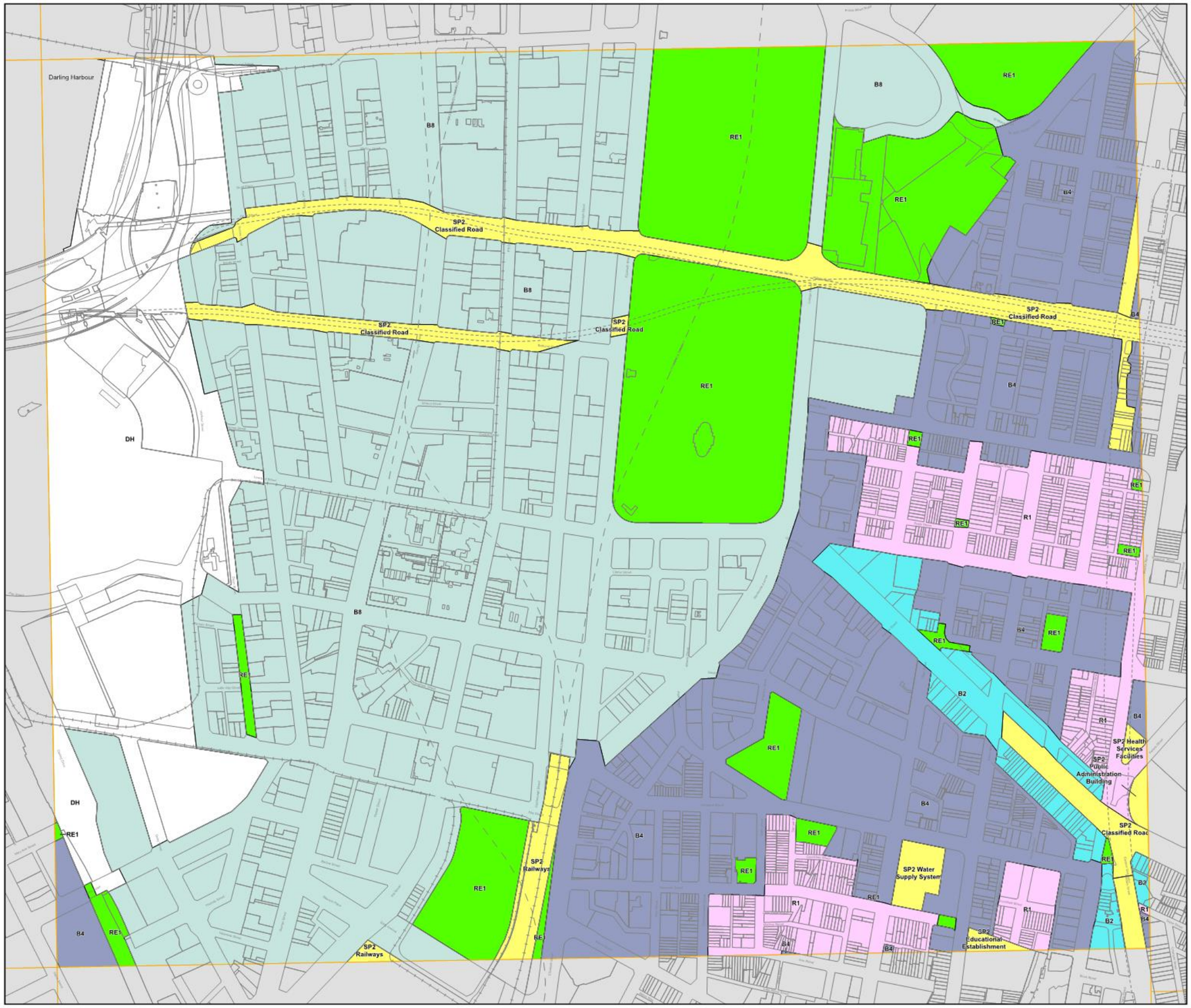
N

0 200 m

Scale: 1:5,000 @ A3

Projection: GDA 1994 Zone 56

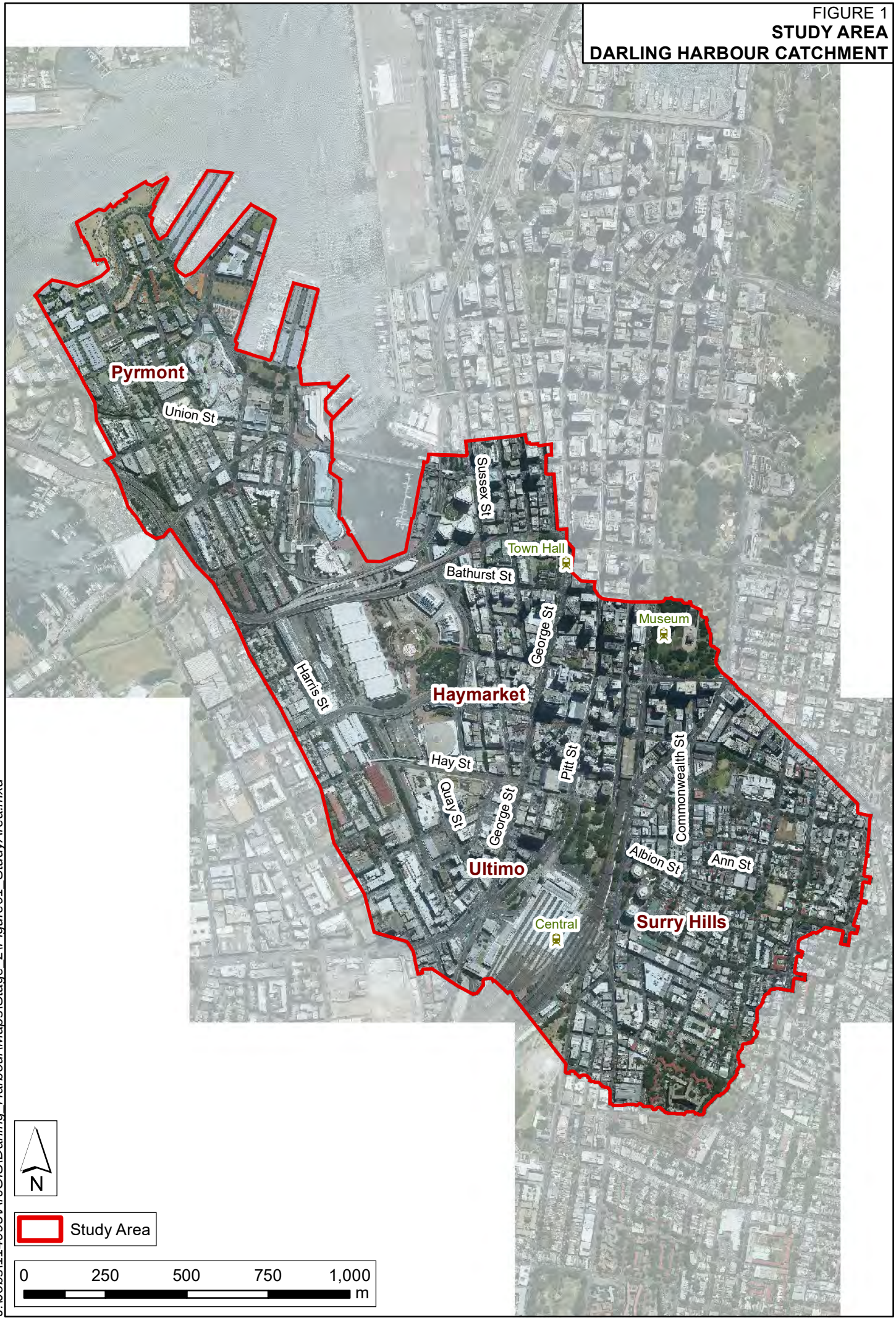
Map identification number: 7200_COM_LZN_015_005_20120926



Appendix D

Darling-Harbour-Catchment-Flood Studies

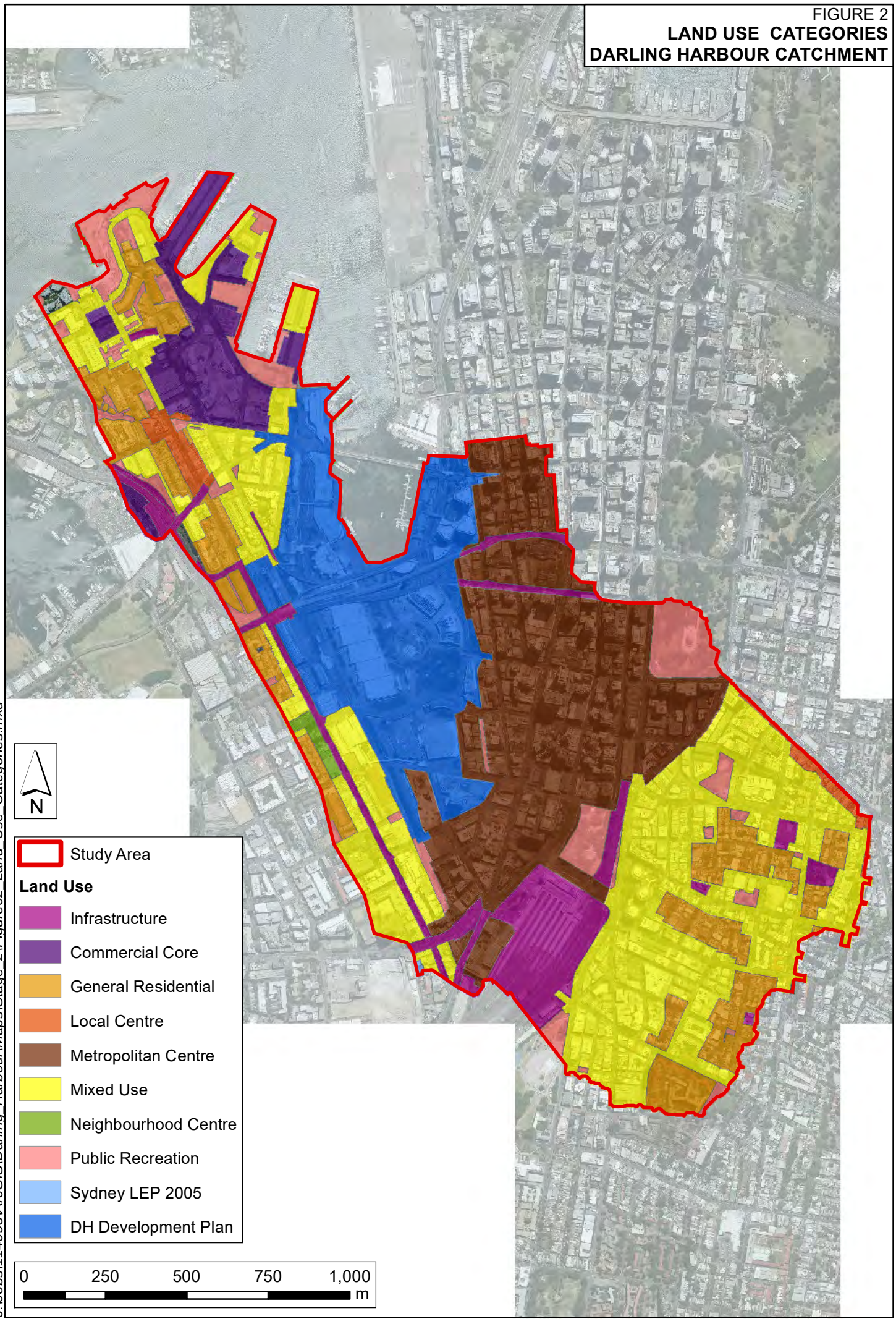
FIGURE 1
STUDY AREA
DARLING HARBOUR CATCHMENT



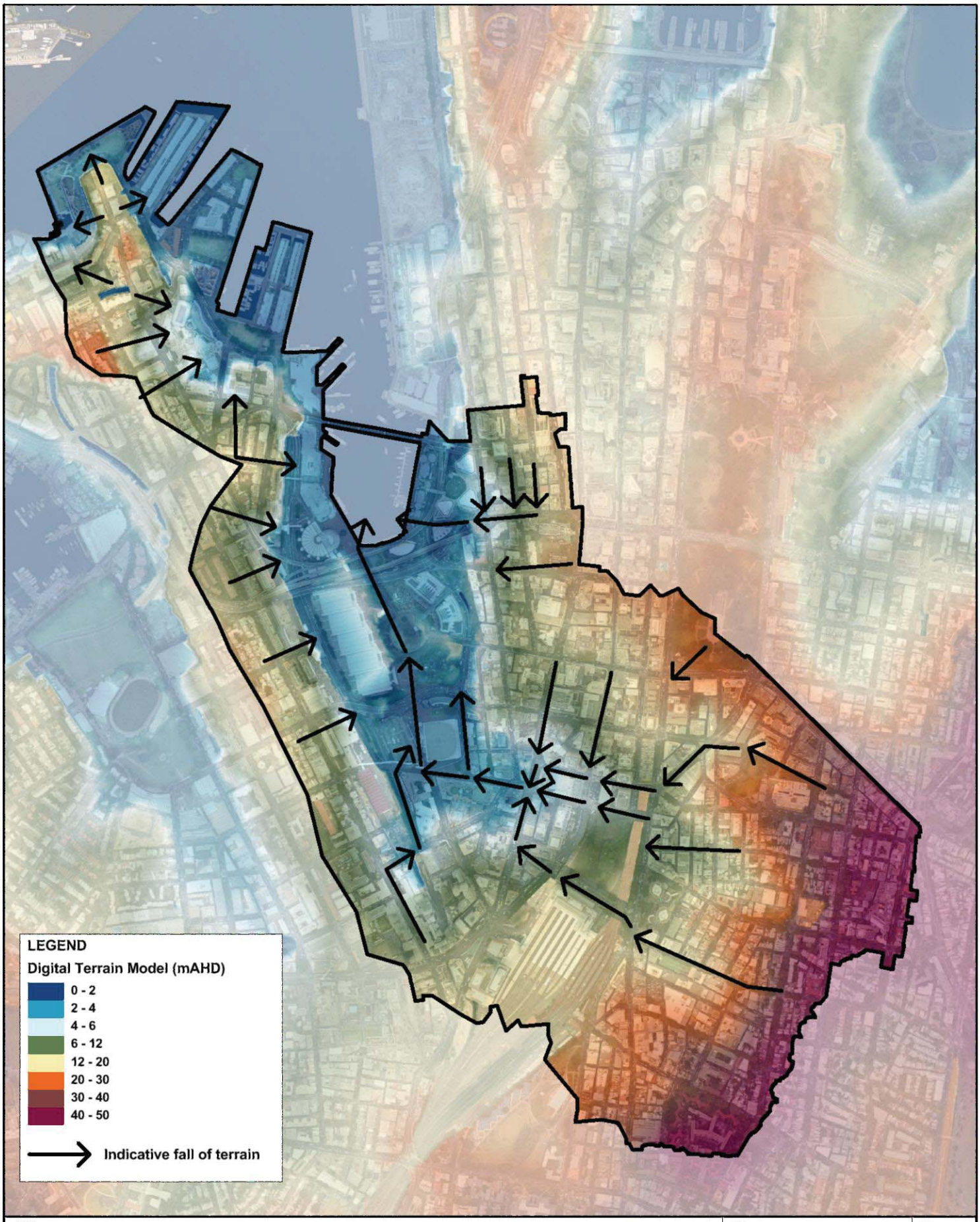
J:\Jobs\114095\ArcGIS\Darling_HarbourMaps\Stage_2\Figure01_StudyArea.mxd

FIGURE 2

LAND USE CATEGORIES
DARLING HARBOUR CATCHMENT



J:\Jobs\114095\ArcGIS\Darling_Harbour\Maps\Stage_2\Figure02_Land_Use_Categories.mxd



Title:

Darling Harbour Catchment Digital Terrain Model

Figure: 2-3

Rev: A

N

0 250 500m

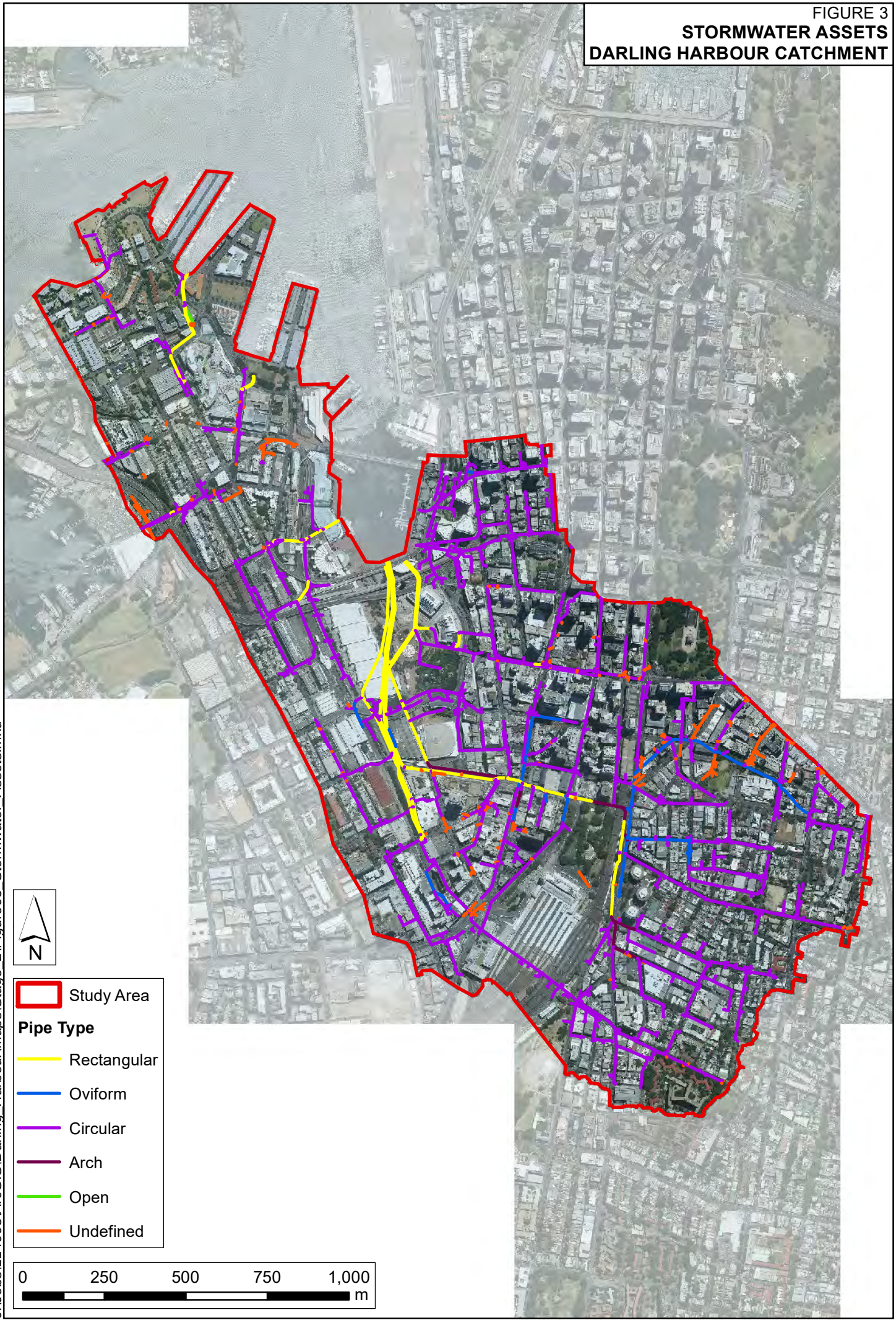
Approx. Scale

BMT WBM

www.bmtwbm.com.au

Filepath : S:\WATER\PROJECTS\S20012 - Water - Darling Harbour Catchment Flood Study\Documents\Figures

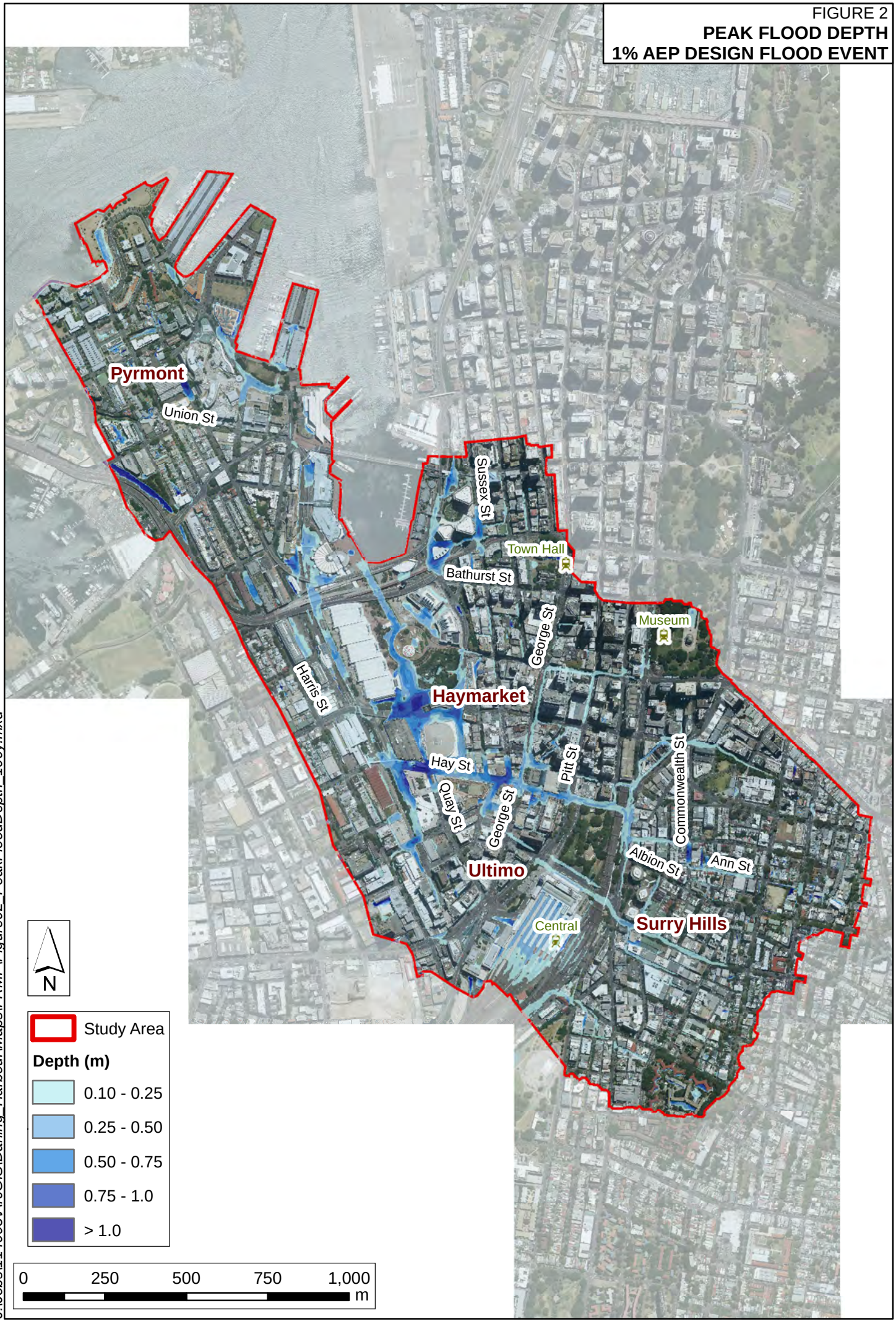
FIGURE 3
STORMWATER ASSETS
DARLING HARBOUR CATCHMENT



J:\Jobs\114095\ArcGIS\Darling_Harbour\Maps\Stage_2\Figure03_Stormwater_Assets.mxd

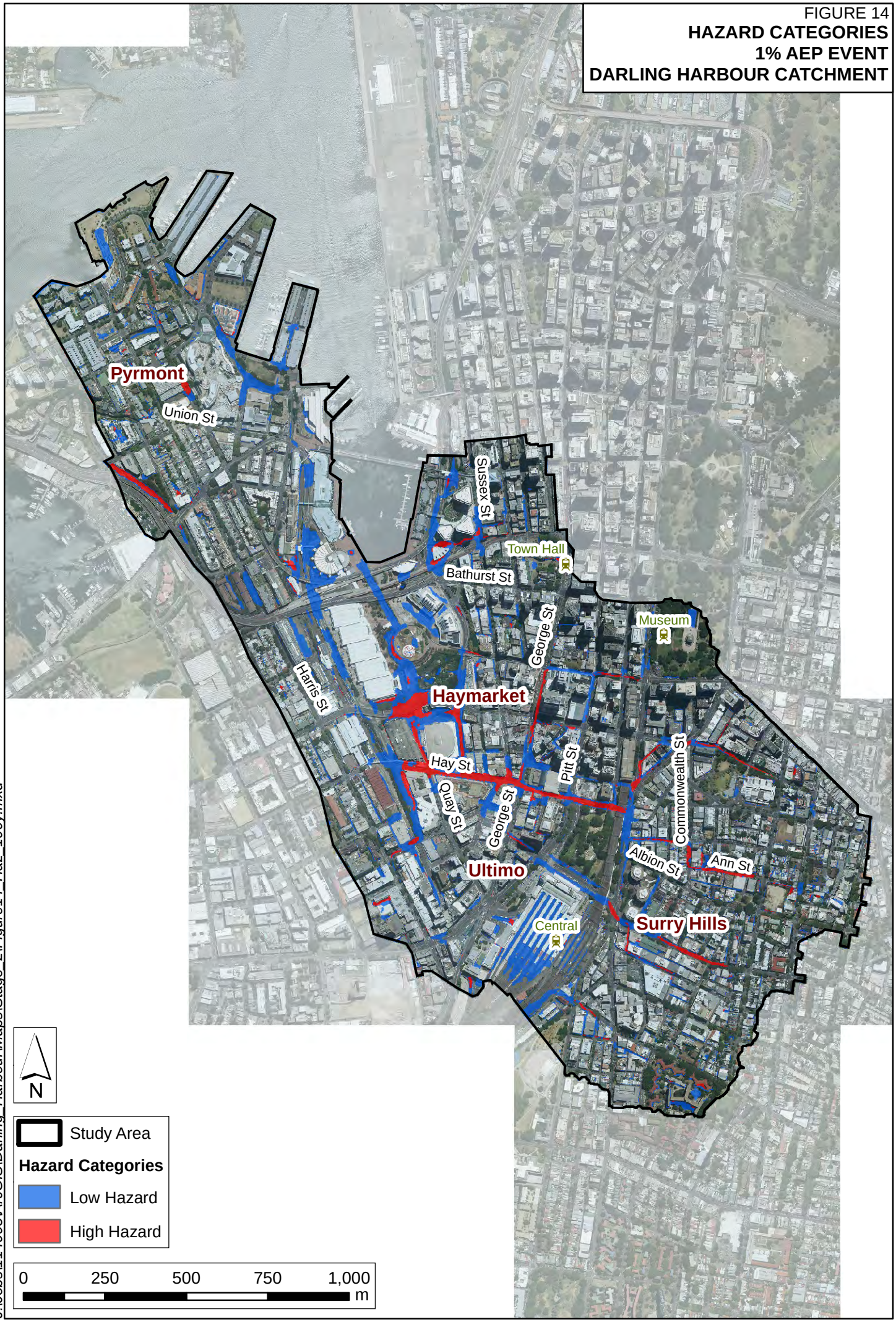
FIGURE 2

PEAK FLOOD DEPTH
1% AEP DESIGN FLOOD EVENT



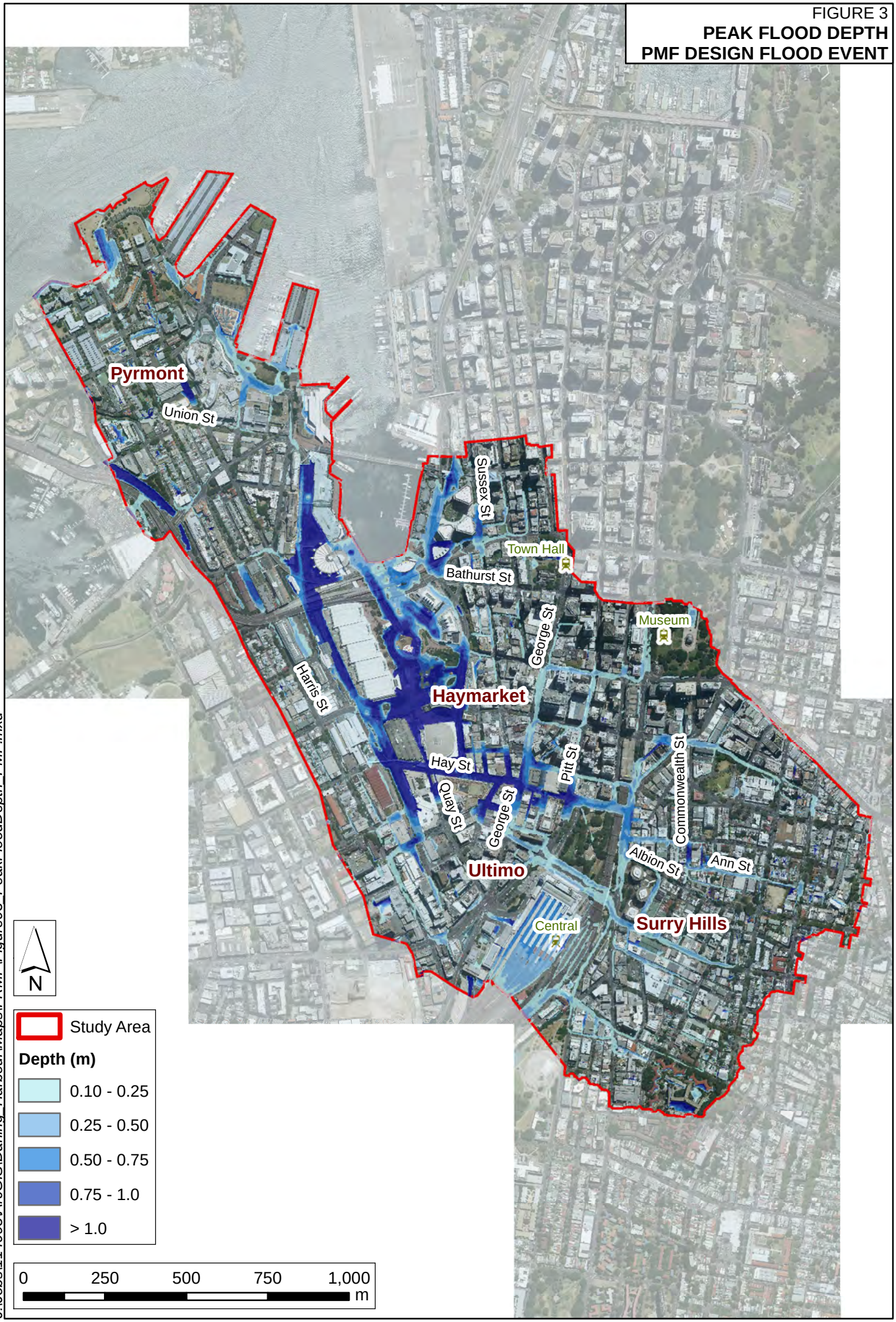
J:\Jobs\114095\ArcGIS\Darling_Harbour\Maps\FRMP\Figure02_PeakFloodDepth_100y.mxd

FIGURE 14
HAZARD CATEGORIES
1% AEP EVENT
DARLING HARBOUR CATCHMENT



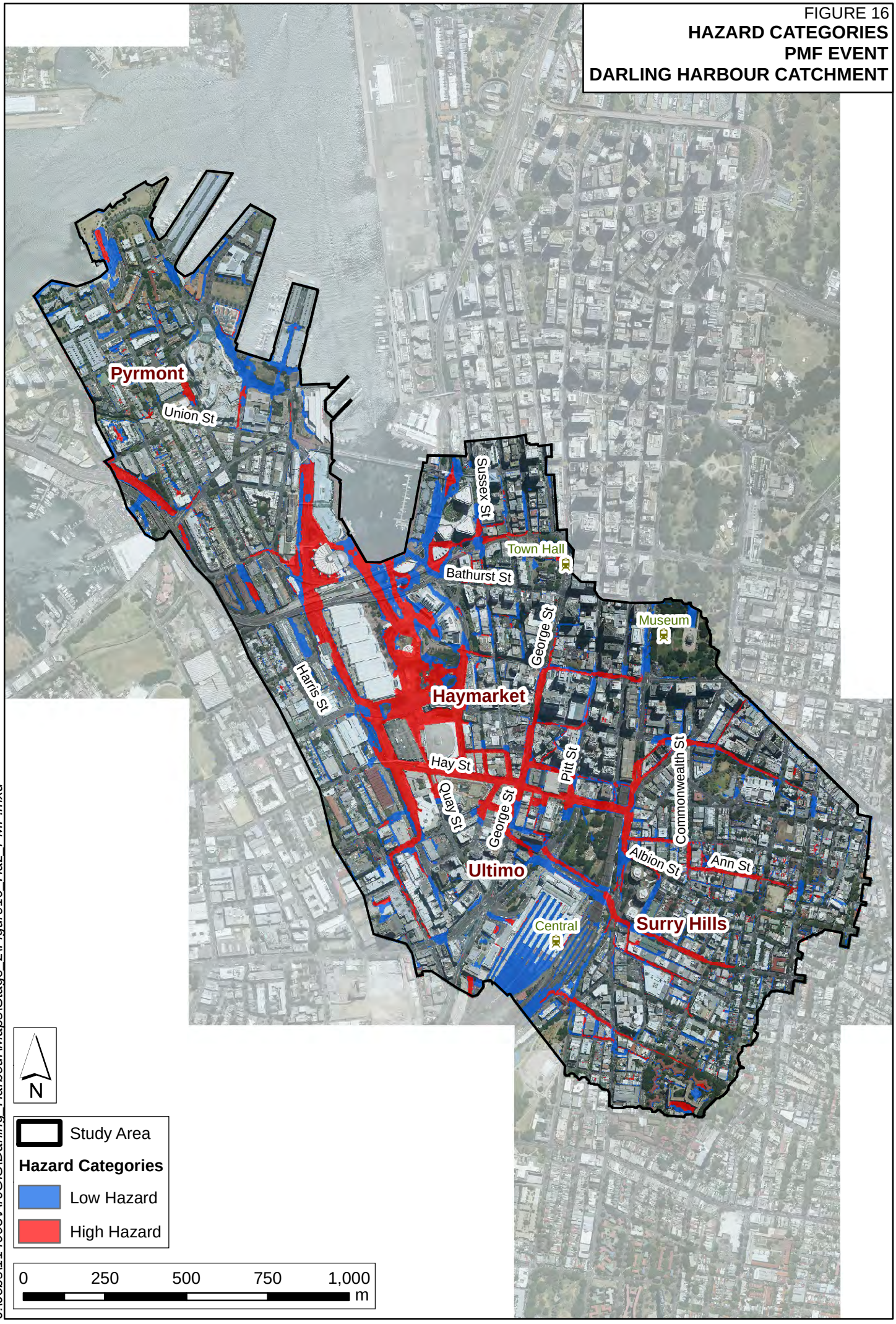
J:\Jobs\114095\ArcGIS\Darling_HarbourMaps\Stage_2\Figure14_Haz_100y.mxd

FIGURE 3
PEAK FLOOD DEPTH
PMF DESIGN FLOOD EVENT



J:\Jobs\114095\ArcGIS\Darling_Harbour\Maps\FRMP\Figure03_PeakFloodDepth_PMF.mxd

FIGURE 16
HAZARD CATEGORIES
PMF EVENT
DARLING HARBOUR CATCHMENT



J:\Jobs\114095\ArcGIS\Darling_HarbourMaps\Stage_2\Figure16_Haz_PMF.mxd