JBS&G 51475 - 103723
L001 (Mooney Mooney & Peat Island Contamination Assessment) Rev 0

29 August 2016

Zoe Trussell
Government Property NSW
Via email: zoe.trussell@property.nsw.gov.au

cc: Daniel Brook
Government Property NSW
Via email: daniel.brook@property.nsw.gov.au

'Commercial in Confidence'

Preliminary Contamination Assessment, Surplus NSW Government Land, Mooney Mooney & Peat Island, NSW

Dear Zoe,

1. Introduction

1.1 Background

JBS&G Australia Pty Ltd (JBS&G) was engaged by Government Property NSW (GPNSW, the client) to prepare an update to a Preliminary Site Investigation (PSI) for surplus NSW Government land at Mooney Mooney & Peat Island, NSW (**Figure 1**, **Attachment 2**). This update to the PSI is required to support a planning proposal for rezoning of the land to facilitate redevelopment for a mixture of residential, community, recreation and employment generating land uses. The Planning Proposal has been prepared by GPNSW following a revision of a previous proposal. GPNSW have asked JBS&G to review the new concept proposal and provide updated recommendations to address the revised land uses and site boundaries, as well as changes to the site subsequent to 2013.

The site, as addressed in the Phase 1 Environmental Site Assessment (JBS 2013), is legally identified as Lots 2, 3 & 4 in Deposit Plan (DP) 239249; Lot 2 in DP 431999; Lot 2 in DP 597504; Lot 21 in DP 836628; Lots 10 & 11 in DP 1157280; Lot 1 in DP 431780; and Lots 1 & 2 in DP 945014. The additional areas included in this investigation are legally identified as Lot 7011 in DP 1057994; Lot 23 in DP 86305; Lots 9, 10 & 11 in DP 863305; and Lot 7302 in DP 1151629.

In 2013 JBS Environmental (now JBS&G) completed a Phase 1 Environmental Site Assessment, otherwise referred to as a PSI, for the site (JBS 2013a[1]). The report identified a number of potential contamination issues in areas of the site that required further investigation. The previous PSI did not give consideration to proposed rezoning, which was not made available at the time. Additionally, the site boundaries have been updated since the previous investigation, now incorporating additional land as shown in **Figure 2** (**Attachment 2**).

It is noted that the revised concept plan also includes areas without Lot and DP numbers, including the grounds of the Hawkesbury River Ambulance Station situated to the west of the Pacific

[1] Phase 1 Environmental Site Assessment, Peat Island, Mooney Mooney, NSW (Rev 0), completed by JBS Environmental for Government Property, 42532-553028, February 2013 (JBS 2013)

Motorway and immediately to the north-east of Deerubbun Reserve; and an elongated area situated east of the Pacific Motorway and west of the Pacific Highway, in the southern half of site.

The site currently comprises land zoned SP2 (Hospital, Educational and Water Storage), RE1 Public Recreation, W2 Recreational Waterways, and unzoned land.

The Zoning Plan provided to JBS&G and to be submitted as part of the planning proposal for the site includes the following zones: B2 Neighbourhood Centre, R1 General Residential, R2 Low Density Residential, RE1 Public Recreation, RE2 Private Recreation, E1 National Parks and Nature Reserves, SP2 Infrastructure and SP3 Tourist. The Concept Plan for the site show the following land uses:

- Community facilities including construction of a local neighbourhood centre;
- 268 residences including residential lots, townhouses and apartments;
- Public car parking areas;
- Hotel/Accommodation, including new and existing buildings on Peat Island;
- Marina with wet berths, dry stacking facility and adjoining car parking area;
- Emergency services facilities to be relocated within the site;
- RMS facilities to be relocated within the site;
- Vehicle access and parking facilities;
- Landscaping and open spaces including a foreshore walkway and multiple public parks; and
- Areas of National Park.

Copies of the Mooney Mooney Zoning Plan and Concept Plan are included in **Attachment 3**.

1.2 Objectives

The objective of this updated PSI is to identify the current potential contamination constraints at the site in the context of the proposed rezoned land uses and updated site boundaries. The assessment takes into consideration the findings of JBS (2013) and any subsequent significant changes identified at the site.

This investigation has been developed in accordance with guidelines made or approved by the NSW Environment Protection Authority (EPA) and relevant Australian Standards.

1.3 Scope of Works

The following scope of work was completed to provide a current preliminary contamination assessment of the site:

- review the previous JBS (2013) PSI report, with consideration of the proposed rezoned land use;
- obtainment and review of historical/background information for the period since 2013, including:
    - post-2013 satellite imagery, to identify any significant changes across the site;
    - current records of pollution/contamination notices/incidents as held by EPA;
    - environmental or geotechnical reports prepared for the site since 2013, as may be available;
    - updated groundwater licence records; and

- preparation of a letter report providing advice on the current potential contamination status of the site within the context of the rezoned land use and with reference to the previous 2013 PSI findings, determining the need for further investigation, and establishing a timeframe for any further investigation

This letter together with the previous PSI meets the requirements of the DUAP/EPA (1998) SEPP 55 Planning Guideline requirements for a Preliminary Site Investigation (PSI) report.

2. Previous investigations

The following investigations relate to the site:

Phase 1 Environmental Site Assessment, JBS Environmental (February, 2013)

JBS Environmental (now JBS&G) prepared a Phase 1 Environmental Site Assessment, otherwise referred to as a PSI, for the site (JBS 2013). The report identified a number of potential contamination issues in areas of the site that required further investigation, including three suspected underground storage tanks (USTs) beneath a concrete forecourt, part of an underground petroleum storage system (UPSS). The previous PSI did not give consideration to proposed rezoning, which was not made available at the time.

UPSS contamination Assessment, Noel Arnold (September, 2013)

An UPSS contamination assessment was completed by Noel Arnold and Associates (Noel Arnold, 2013[2]) for a former service station at the site, located at Lot 3, DP 239249, Pacific Highway, Mooney Mooney, NSW. The investigation identified two USTs by ground penetrating radar. The assessment was limited to the UPSS area. Hydrocarbon odours were noted in the soils around the USTs and near the former service station building. No hydrocarbon impacts were reported in soil or groundwater samples. Additionally, ACM fragments were reported at the ground surface within the service station premises.

The report recommended the preparation and implementation of a remedial action plan (RAP) including additional investigations of other UPSS components (fuel lines, bowsers), followed by appropriate validation. An additional recommendation was a survey of asbestos in surface gravels and soils of the site to assess the extent of asbestos remediation required, and a soil vapour risk assessment based on NEPC (2013)[3] to be carried out during remediation validation.

It is noted that JBS&G received communications from GPNSW in February 2014 specifying that remediation work at the former service station would not be proceeding at that point in time.

3. Environmental Conditions

Information from JBS (2013) regarding surrounding land use, geology, hydrology, hydrogeology, salinity potential and acid sulphate soils have been updated to address the additional areas included in the assessment , as well as any changes to the remainder of the site since issuance of the previous report (JBS 2013). Relevant information regarding current environmental conditions at the site is provided below.

[2] UPSS Contamination Assessment, Lot 3, DP 239249, Pacific Highway, Mooney Mooney, NSW, submitted by Noel Arnold & Associates to Government Property, J119655:C107943, September 2013 (Noel Arnold, 2013)

3.1 Topography

A review was undertaken of available online topographic maps with consideration of the additional investigation areas, details of these areas are provided below.

- The area currently occupied by Deerubbun Reserve lies at an elevation of 20 – 40m AHD, with the highest point approximately in the centre, sloping down in all four compass directions.
- Mooney Mooney Point lies between 0-5 m AHD and is approximately level.

Topography of the remainder of site, including land adjacent the Pacific Highway and Pacific Motorway, is consistent with the general conditions detailed in JBS (2013).

3.2 Geology

A review of both the regional 1:100 000 Sydney geological map, sheet series 9130 (1983) and the regional soils map (SSC, 1983) was undertaken to address the additional investigation areas. These areas were found to be underlain by the same geological groups and soil groups identified in JBS (2013), described below.

The site comprises Triassic interbedded laminite, shale, and quartz to lithic quartz sandstone from the Narrabeen Group, and generally moderately deep to deep yellow podzolic soils on sandstone crests.

3.3 Hydrology

Hydrological conditions across the site appear unchanged from the time of the previous report (JBS 2013). The site is surrounded by the Hawkesbury River, which is the closest surface water body to the site, being 200 m or less from the site boundary and rainfall is anticipated to flow into the Hawkesbury River via stormwater infrastructure and surface water run-off. The additional investigation areas are subject to similar hydrological conditions to the remainder of the site.

3.4 Hydrogeology

A search was completed of the NSW Office of Water groundwater database on 8 April 2016 for current information regarding wells within a 1.5 km radius of the proposed site. A total of three wells were identified within the search area, with search results provided in **Attachment 4**. All three wells were installed more recently than 2013, however data for these wells could not be accessed due to a website error. A second search of the database was completed on 28 July 2016, with results provided in **Attachment 4.** No additional wells were identified and no data was available for the three previously identified wells.

As discussed in JBS (2013), groundwater is anticipated to be underlying the site within the interbedded sandstones. Groundwater in areas close to Mooney Mooney Creek or the Hawkesbury River is anticipated to be tidally influenced and to undergo partial mixing with these surface water bodies.

Groundwater flow direction is anticipated to be to the south west and east towards Hawkesbury River, based on the local topography either side of the central ridgeline.

3.5 Acid Sulfate Soils

The acid sulfate soil risk status remains unchanged from the JBS (2013) review of the Cowan 1:25 000 Acid Sulfate Soil Risk Map Sheets 9130-N45, which indicated that the site is located within an area which has a “Disturbed terrain which may include filled areas, which often occur during reclamation for low lying swamps for urban development’. Based on the geography and geology it is possible ASS will be present in sites proximal to the river, as indicated in the Section 149 certificate for the site (discussed in **Section 4.3**).

4. Site History

4.1 Aerial Photographs

Satellite images originally obtained by JBS (2013) were reviewed with consideration to the additional investigation areas. Aerial photographs are provided in **Attachment 5.**

Observations are provided below regarding historical conditions and significant changes within the additional investigation areas:

1947 The area currently occupied by Deerubbun Reserve and the Hawkesbury River Ambulance Station is primarily cleared, with 3 residences visible. A band of trees exists at the southern extent of this area, close to the bank of the Hawkesbury River. An elongated structure, possibly a ferry wharf, extends south from the terminus of Peats Ferry Road into the section of river currently occupied by Mooney Mooney Point. The area in the southern portion of the site between the Pacific Highway and Motorways (in their current positions) appears to be partially occupied by a mangrove swamp with the exception of the south-eastern tip of land where clearing and some structures are visible.

1955 The additional investigation areas in the southern portion of the site are out of frame. The remaining additional investigation areas appear unchanged from the 1947 image.

1964 The area currently occupied by Deerubbun Reserve and the Hawkesbury River Ambulance Station has had structures demolished. Additionally, evidence of construction of the Pacific Motorway and rerouting of the Pacific Highway can be seen, with extensive earthworks visible, particularly associated with the construction of Motorway off-ramps. The Motorway eastern off-ramp passes through a large area of the mangrove swamp identified in the 1947 imagery, indicating the area was extensively filled.

1978 Roadworks discussed in the 1964 imagery appear complete. The area now occupied by Mooney Mooney Point appears to have undergone significant sedimentation and/or filling. This area now appears to be low lying and sparsely vegetated. In the north western portion of the site vegetation has been established along the borders of the Pacific Motorway.

1986 The southern portion of Deerubbun reserve appears more vegetated than in earlier imagery. The land between the Motorway and Highway appears grassed. A structure is visible within what is now the grounds of the Hawkesbury River Ambulance Station.

1994 The additional investigation areas appear mostly unchanged with the exceptions of the area which is now Mooney Mooney Point, which appears disturbed, potentially with informal roads and tracks.

2005 A carpark has been established within Mooney Mooney Point. Deerubbun reserve is more vegetated than in previous imagery.

Satellite imagery from 2015, provided in **Attachment 5,** was obtained and reviewed to establish changes across the site from 2005 onwards. The following significant changes were observed:

- Additional structures visible on the grounds of the Hawkesbury River Ambulance Station;
- Construction of rest stop facilities to the east of the Pacific Motorway near the centre of the site;
- Roadside areas adjacent the Pacific Highway and Pacific Motorway generally more vegetated;
- Construction of rock walls for river bank stabilisation at the southern edge of Mooney Mooney Point.
- Evidence of demolition works at the former service station adjacent Pacific Highway.

4.2 EPA Records

A search was undertaken of the public register maintained by the NSW EPA under the Protection of the Environment Operations (POEO) Act 1997, and results are included in **Attachment 6**.

The search identified the following notices:

- POEO licences were issued for Peat Island Sewage Treatment System on 16 December 2013 (licence number 12035) and 20 March 2007 (licence number 12633).
- A total of 4 s.58 licence variations have occurred pertaining to the surrender of licences at the Peat Island Sewerage Treatment Systems, in 2004 (1034353, 1038198), 2006 (10062002), 2008 (1087970).
- One s.58 licence variation exists for 2014 and pertains to the reissuance of Licence number 12633 for the Peat Island Sewage Treatment System.

A search was completed of the NSW EPA contaminated land public register of notices made under Section 58 of the Contaminated Land Management Act 1997 (CLM Act); and NSW contaminated sites notified to the EPA (under Section 60 of the CLM Act) and results are included in **Attachment 6**. No records relating to the site or nearby properties were identified.

4.3 Council Records

JBS (2013) summarised key aspects of planning certificates provided by Gosford City Council that referred to the Draft Gosford LEP 2009, which has been superseded by Gosford LEP 2014 (**Attachment 7**) which is now in effect. Review of the current LEP indicates:

- Development may be carried out on unzoned land only with development consent.
- Land to which this Plan applies may be subdivided, but only with development consent.
- The demolition of a building or work may be carried out only with development consent.
- Development of roads is permitted with consent in land zoned SP2.
- Development consent is required to carry out development on any land at or below the flood planning level.
- Development consent is required to carry out development on any land below the mean high water mark of any body of water subject to tidal influence (including the bed of any such water).
- No general heritage items or conservation areas identified by Council exist within or near the site.

- The Acid Sulfate Soils Map indicates site includes areas identified by Council as Class 1 and Class 5 acid sulfate soil risk. Land classified as Class 1 requires development consent for any works in this land. Land classified as Class 5 requires development consent for the carrying out of works within 500 m of adjacent Class 1 to 4 ASS land that is below 5 m AHD and by which the water table is likely to be lowered by 1 m AHD on adjacent Class 1 to 4 land. Therefore, an acid sulfate soils management plan is required for the site, in accordance with the Acid Sulfate Soils Manual.
- Exempt developments include recreational facilities, outdoor lighting, short term rental accommodation, solid fuel heaters and temporary events or activities on land owned or managed by Council. These developments may be carried out without the need for development consent under the Local Government Act 1993.

5. Site Condition

A visual inspection of the site was not completed as part of the current investigation, however review of aerial imagery as discussed in **Section 3.1** indicates that changes to the site since 2013 are minimal.

6. Site Characterisation

6.1 Areas of Environmental Concern

Areas of environmental concern (AECs) and contaminants of potential concern (COPCs) have been updated based on the site history review and are shown on **Figure 3**. The AECs and associated COPCs specific to the site remain unchanged from those identified in the JBS (2013) report, with the following additions pertaining to the additional areas of the site:

- Reclaimed land associated with Mooney Mooney Point;
- Reclaimed land associated with rerouting of the Pacific Highway through former mangrove swamp in the south east of the site; and
- Former service station located at Lot 3 DP239249, Pacific Highway, Mooney Mooney, NSW.

The relevant COPCs for the additional AECs include heavy metals, TRHs, PCBs, organic compounds and asbestos within fill materials; and petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAHs) and heavy metals within soil, groundwater and soil vapour at the former service station.

The potentially contaminated material identified as part of the site history review including the JBS (2013) report were fill material, natural soils, surface water and groundwater. Based on review of JBS (2013) and more recent information gathered in respect of the site, JBS&G considers the following.

- fill is a potentially contaminated medium as there are indications of potential historical filling at the site;
- subsurface soils and shallow groundwater are considered to be potentially contaminated media due to the historical presence of ASTs, USTs, and a former petrol station at the site;
- surface water is a potentially contaminated medium due to licensed sewerage discharge identified in EPA notices (see **Section 3.2**) as well as the close proximity of petroleum storage infrastructure to the Hawkesbury River;
- Groundwater at the site is a potentially contaminated medium based on the presence of ASTs, USTs, a former laundry and reclaimed land; and

- There is potential for ASS conditions in reclaimed areas and areas proximal to the Hawkesbury River.

6.2 Potential Migration of Contaminants

The potential for migration at the site remains unchanged from JBS (2013). The site is predominantly vegetated or sealed with bituminous concrete which significantly reduces the potential for windblown contaminants to migrate from the site. The potential for contaminants to migrate via surface water runoff from the site is high, as precipitation onsite is likely to enter the Hawkesbury River via stormwater or directly. There is potential for contaminants to migrate via groundwater due to historical uses of the site (including the USTs, ASTs, former laundry, and potential fill). In the event that significant soil contamination is identified, the potential for groundwater contamination will need to be reassessed.

7. Conclusions and Recommendations

Based on the relevant information reported by JBS (2013) and results of the current assessment, and the limitations in **Attachment 1**, JBS&G conclude the following:

- There is potential for contamination of the site to have occurred based on past and current site usage, however historical use of the areas in question was not intensive, and there were no indications of gross or widespread impacts that would require management or impede development of the site; and
- The site can be made suitable for all of the proposed land uses, subject to the recommendations below.

The following recommendations are made:

- Prior to redevelopment at the site, Intrusive sampling targeting identified AECs applicable to the site should be undertaken to provide an adequate assessment of potential soil contamination and confirm the findings of the preliminary investigation.

Should you require clarification, please contact the undersigned on 02 8245 0300 or by email mbennett@jbsg.com.au.

Yours sincerely:

Lindsey Blecher
Environmental Consultant
JBS&G Australia Pty Ltd

Reviewed/Approved by:

Matthew Bennet
Principal Contaminated Land
JBS&G Australia Pty Ltd

Attachments

1) Limitations
2) Figures
3) Mooney Mooney Zoning Plan and Concept Plan
4) Groundwater Bores
5) Aerial Photographs
6) EPA Records
7) Gosford Local Environmental Plan 2014

Attachment 1 – Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by JBS&G, and should not be relied upon by other parties, who should make their own enquires.

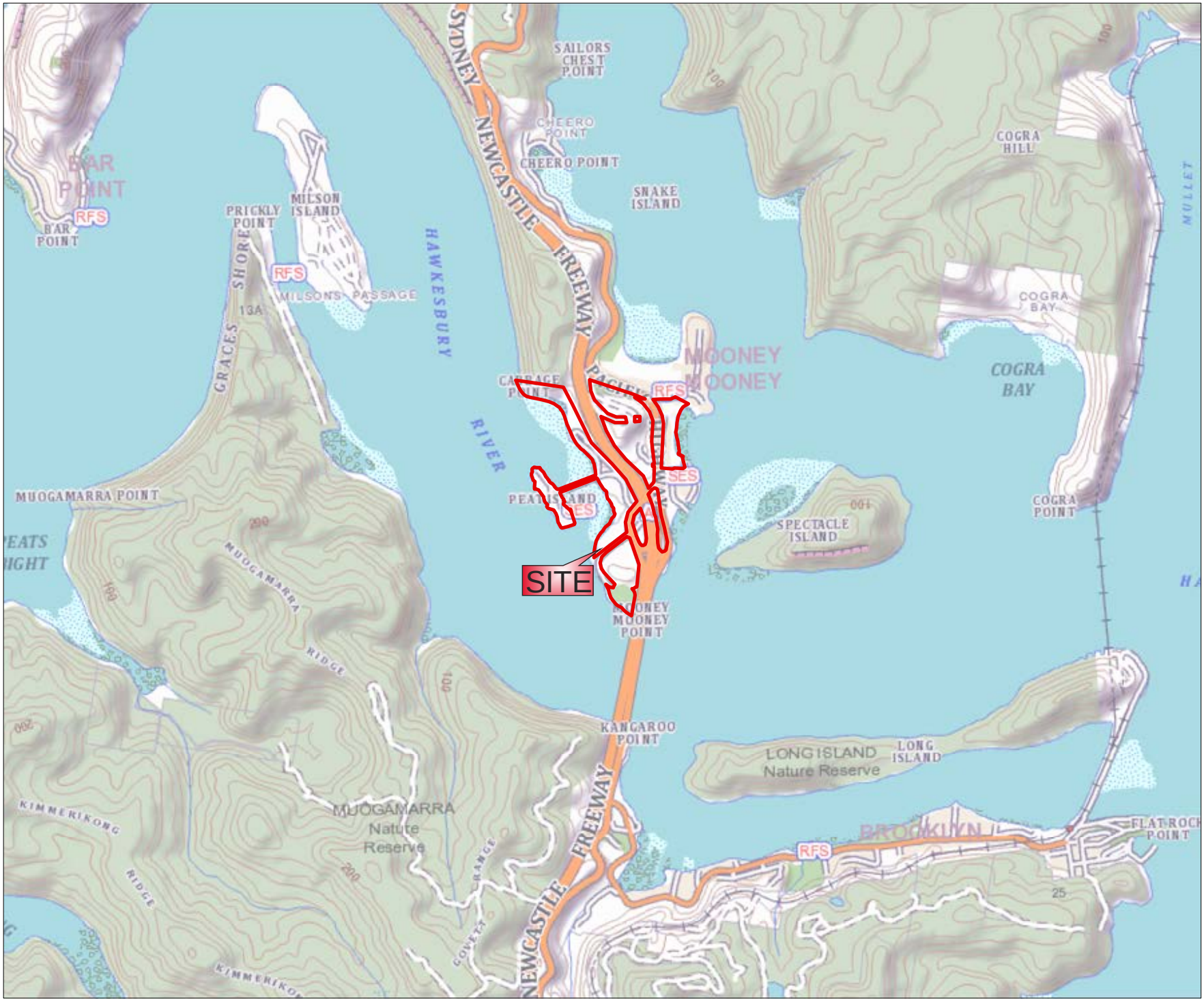
Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements.

No sampling and laboratory analyses were undertaken as part of the investigations described herein. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the site conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review the report in the context of the additional information.

Attachment 2 – Figures



Legend:

Approximate Site Boundary

JBS&G

Job No: 51475	
Client: Government Property NSW	
Version: L001	Date: 26-Aug-2016
Drawn By: SE	Checked By: LB

Scale 1:30,000

0 400 800

metres

Coor. Sys. GDA 1994 MGA Zone 56

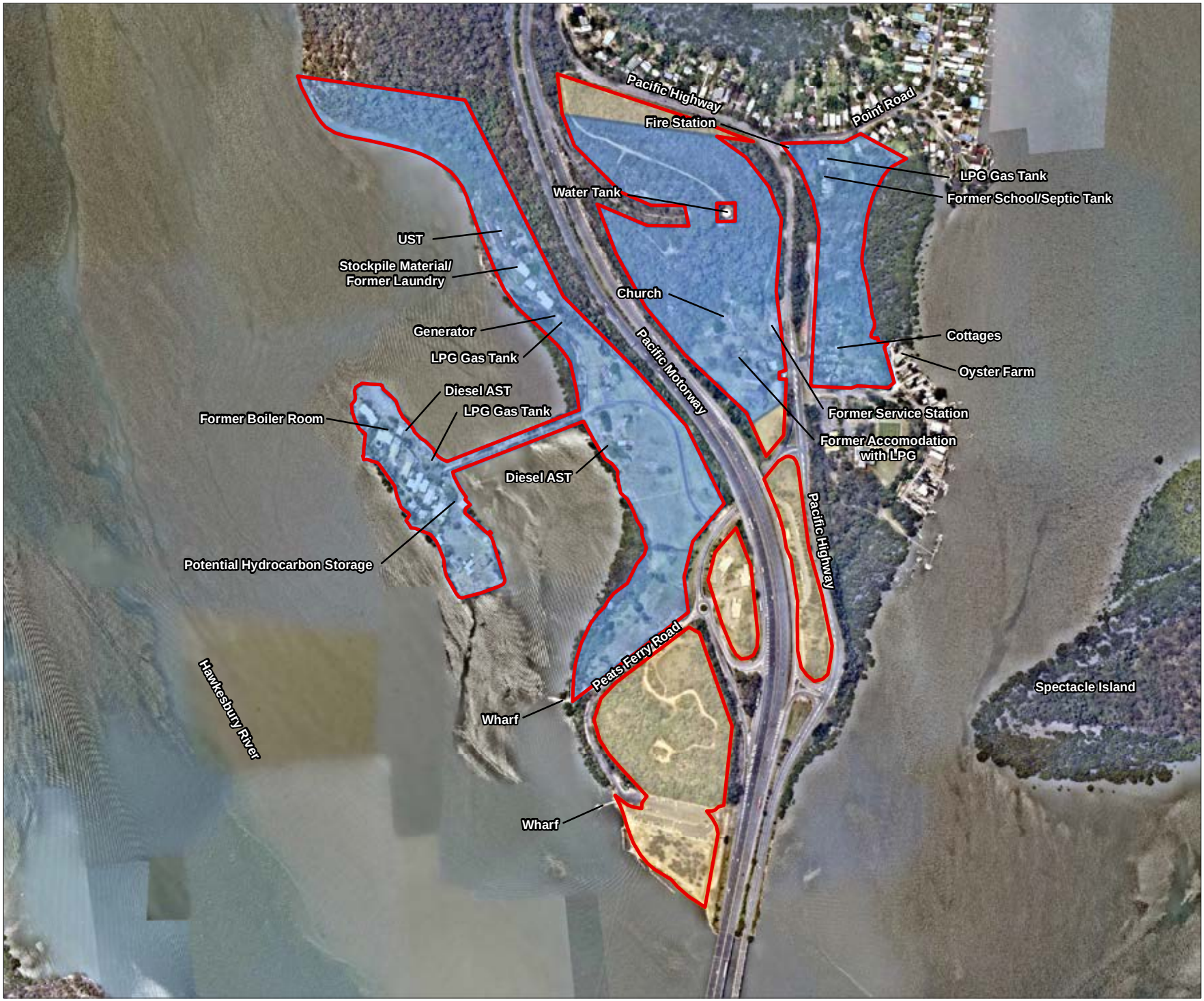
Mooney Mooney and Peat Island, NSW

SITE LOCATION

FIGURE 1

File Name: 51475_01

Reference: SIX Maps www.maps.six.nsw.gov.au, accessed 22-01-2013



Legend:

- Approximate Site Boundary
- Extent of Previous Investigation
- Additional Investigation Area

JBS&G

Job No: 51475

Client: Government Property NSW

Version: L001	Date: 26-Aug-2016
Drawn By: SE	Checked By: LB

Scale 1:8,500

0 100 200
metres

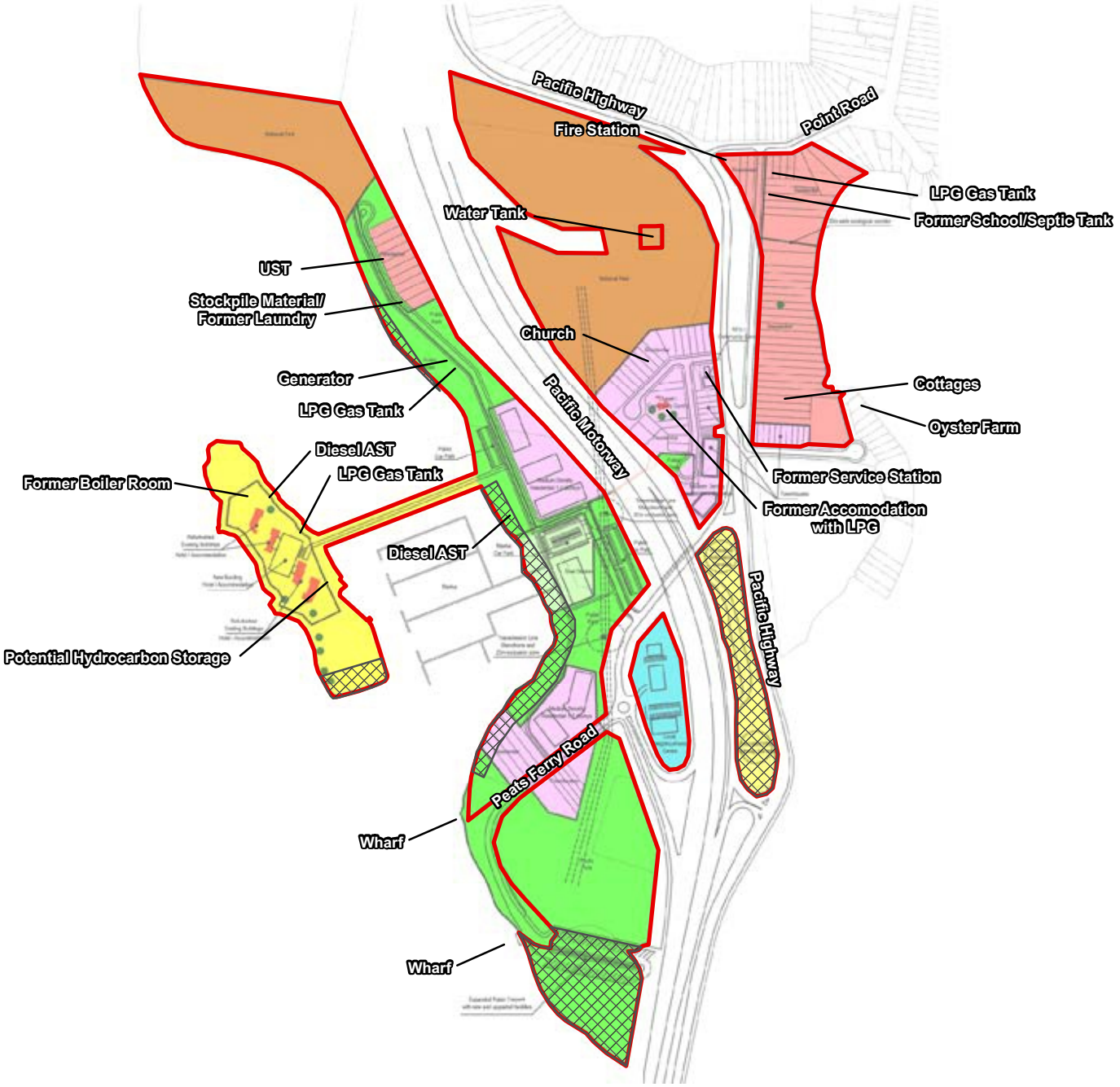
Coor. Sys. GDA 1994 MGA Zone 56

Mooney Mooney and Peat Island, NSW

SITE LAYOUT

FIGURE 2

File Name: 51475_02
Reference: Near Map www.nearmap.com, imagery date 01-12-2015, accessed 08-04-2016



Legend:

- Approximate Site Boundary
- Reclaimed Land
- B2 Neighbourhood Centre
- E1 National Parks and Nature Reserves
- R1 General Residential
- R2 Low Density Residential
- RE1 Public Recreation
- RE2 Private Recreation
- SP2 Infrastructure
- SP3 Infrastructure

JBS&G

Job No: 51475

Client: Government Property NSW

Version: L001	Date: 26-Aug-2016
Drawn By: SE	Checked By: LB

Scale 1:8,500

0 100 200

metres

Coor. Sys. GDA 1994 MGA Zone 56

Mooney Mooney and Peat Island, NSW

SITE ZONING AND AREAS OF CONCERN

FIGURE 3

File Name: 51475_03
Reference: Client Supplied

Attachment 3 – Mooney Mooney Zoning Plan and Concept Plan

National Park
Residential
Public Park
Public Park
National Park
Residential
Residential
30m wide ecological corridor
Residential
RFS / Community Centre
Residential
Chapel / Community Centre
Residential
Public Car Park
Medium Density Residential 1-2 storeys
Public Park
Medium Density Residential 1-3 storeys
Townhouses
Transmission Line Stanchions and 20m exclusion zone
Refurbished Existing Buildings Hotel / Accommodation
Marina Car Park
Public Car Park
Relocated Ambulance Services
New Building Hotel / Accommodation
Marina
Boat Stacker
Public Park
Refurbished Existing Buildings Hotel / Accommodation
Transmission Line Stanchions and 20m exclusion zone
Medium Density Residential 1-3 storeys
Local Neighbourhood Centre
Relocated RMS Highway Services
Residential
Townhouses
Public Park
Expanded Public Carpark with new and upgraded facilities

LEGEND

- Site Boundary
- B2 Neighbourhood Centre
- E1 National Parks and Nature Reserves
- R1 General Residential
- R2 Low Density Residential
- RE1 Public Recreation
- RE2 Private Recreation
- SP2 Infrastructure
- SP3 Tourist

urbis
Sydney
Tower 2, Level 23, Darling Park
201 Sussex Street, Sydney NSW 2000
t 02 8233 9900
Urbis Pty Ltd ABN 50 105 256 228

Mooney Mooney

Zoning Plan

Scale 1:4,000 @ A3

0 10 50 100 200m

PROJECT NO: ND1515
DATE: 22.08.16
DRAWING NO: PP05
REV: F

LEGEND

- Site Boundary
- Foreshore Walk
- Pedestrian Connection

Sydney
Tower 2, Level 23, Darling Park
201 Sussex Street, Sydney NSW 2000
t 02 8233 9900
Urbis Pty Ltd ABN 50 105 256 228

Mooney Mooney

Concept Plan

Scale 1:4,000 @ A3

0 10 50 100 200m

PROJECT NO: ND1515
DATE: 22.08.16
DRAWING NO: PP04
REV: F

Attachment 4 – Groundwater Bores

All Groundwater

All Groundwater Map

bookmark this page

All data times are Eastern Standard Time

Map | Info

current site: GW203051