Contamination, Ecological and Flood Report

Liverpool Civic Place

AWE200116

Prepared for
Built Development Group Pty Ltd

29 November 2019

Cardno

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1 Introduction

This Contamination, Ecological and Flood Report is submitted to Liverpool City Council (Council) in support of a Development Application (DA) for site preparation and early works at 52 Scott Street, Liverpool (the site) also known as the Liverpool Civic Place site. Specifically, the DA seeks approval for:

- Demolition of all existing structures and site improvements; and
- Bulk earth works to a depth of RL 10.35 including shoring through the use of piles.

The proposal relates to the broader Liverpool Civic Place site redevelopment plan which is detailed within the Concept DA (DA/485/2019) submitted to Council on 17 September 2019. Specifically, the Concept Proposal seeks approval for various uses within proposed building envelopes, including:

- A building envelope with a maximum height of RL 43.45 for the purpose of an information and education facility (public library) use;
- A building envelope with a maximum height of RL 84.25 for the purpose of a public administration building use, and either (or a combination of) commercial premises or child-care centre uses;
- A building envelope with a maximum height of RL 118.85 which will accommodate either (or a combination of) commercial premises, educational establishments, tourist and visitor accommodation or boarding house (student accommodation) uses;
- A landscaping and public domain concept including the provision of a public through-site link running north to south through the site, connecting Scott Street to the north through to Terminus Street to the south; and
- A building envelope for a three-level shared basement car park across the entire site to accommodate parking for all future uses (approximately 413 spaces, to be determined as part of future detailed DAs) and accommodating a public car park to be owned by Council.

The detailed design of the Liverpool Civic Place will be subject of separate Stage 2 DA(s). The benefits of this approach would allow the expedited local assessment and determination of an application for these additional ‘early works’, which are key to ensuring the development can be delivered in a timely manner.

Figure 1-1 Indicative photomontage of the concept proposal (Source: FJMT)

1.2 Purpose of this report

Built Development Group Pty Ltd (Built) has commissioned Cardno (NSW/ACT) Pty Ltd (Cardno) to prepare a Contamination, Ecological and Flood Report. The purpose of this report is to:

- Review existing contamination investigations relevant to the site, provide an assessment of the early works and determine if additional works are required;
- Undertake an ecological assessment to determine the potential direct and indirect impacts of the early works on terrestrial flora and fauna. The assessment addresses State and Commonwealth-listed conservation matters that have potential to occur at the site;
- Review existing flood information and provide flood advice for the early works; and
- Provide recommendations and further studies required to avoid, minimise and/or mitigate potential impacts from the proposed development.

This Contamination, Ecological and Flood Report will support the Statement of Environmental Effects (SEE) and Development Application (DA) for the earl works for the Liverpool Civic Place project.

2 Site Analysis

2.1 Site Location and Context

The Liverpool Civic Place site is located at 52 Scott Street and 306-310 Macquarie Street, Liverpool within the Liverpool City Council Local Government Area. However, the site to which the proposed early works will occur, does not include the site at 306-310 Macquarie Street.

The site is located approximately 300m south west of Liverpool Railway Station and is also in the vicinity of a number of regionally significant land uses and features including Liverpool Hospital, Westfield Liverpool, Western Sydney University Liverpool Campus, the Georges River and Biggie Park public open space as illustrated at **Figure 2-1** below.

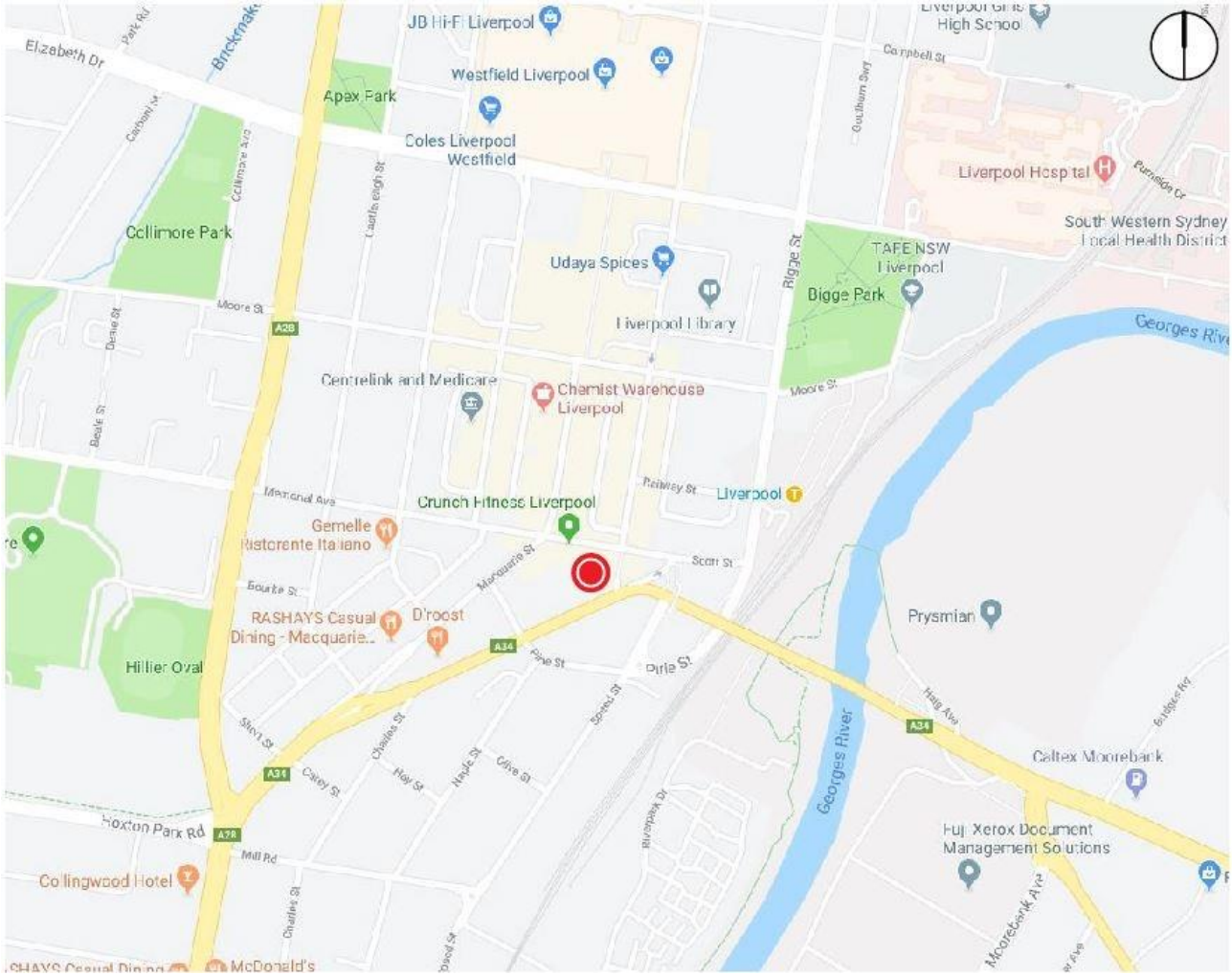

Figure 2-1 Site location (*Source: Google Maps and Ethos Urban*)

2.2 Site Description

This site is irregular in shape and is comprised of 11 lots, legally described below:

- Lot 1 in DP 514817;
- Lot 2 in DP 229979;
- Lot 17 in DP 81842;
- Lot 3 in DP 229979;
- Lot 11 in DP 522284;
- Lot 100 in DP 877435;
- Lot 12 in DP 657056;
- Lot 1 in DP 507070;
- Lot 22 in DP 441010;
- Lot 23 in DP 441010; and
- Lot 1 in DP 229979.

The site has a total area of 7190.4m2 and has three primary road frontages including a primary frontage to Scott Street (98m frontage) to the north, George Lane (40m frontage) to the east and Terminus Street (115m frontage) to the south. An aerial photo of the site is shown in **Figure 2-2** below.

A Site Survey has been prepared and this illustrates that the site slopes to north with a fall of approximately 3.5m from its Terminus Street frontage (RL 25.95) to its Scott Street frontage (RL 22.74). The site is largely free of vegetation, with scattered grass cover present within the eastern vacant lots and street trees lining the Terminus Street boundary.

The site is largely occupied by a two-storey commercial building with a large frontage to Scott Street (**Figure 2-3** and **Figure 2-4**). The commercial building is provided with an above ground car parking structure at the rear with a frontage to Terminus Street (**Figure 2-5**). The eastern portion of the site is occupied by a two storey retail building (**Figure 2-6**) with an adjoining car park at the rear (**Figure 2-7**). The two existing buildings are divided by a central vacant lot.

Figure 2-2 Site aerial (*Source: Near Maps and Ethos Urban*)

Figure 2-3 Commercial building occupying the site as viewed from Scott Street (north east)

Figure 2-4 Commercial building occupying the site as viewed from Scott Street (north west)

Figure 2-5 Above ground car parking structure as viewed from Terminus Street (south east)

Figure 2-6 Commercial building occupying the site as viewed from Scott Street (north east)

Figure 2-7 Rear car park of the commercial building as viewed from Terminus Street (south east)

2.2.1 Access and Connectivity

2.2.1.1 Vehicular Access and Parking

The site has three street frontages, with Scott Street and Terminus Street being the primary street frontages. Scott Street functions as a collector road connecting Memorial Avenue through to Bigge Street and is aligned in an east-west direction. Scott Street is a two-way, two lane road within a 12m wide carriageway with no vehicle access points to the site. Terminus Street is a classified RMS road including a two-way, two lane road within a 13m carriageway. Site access is currently provided by two left in/left out vehicle access points off Terminus Street (**Figure 2-8** and **Figure 2-9**).

Figure 2-8 Existing development from the south

Figure 2-9 Existing development from the south east

2.2.1.2 Pedestrian Access

Scott Street, Terminus Street and Macquarie Street are well-established pedestrian routes, with Liverpool Railway Station and the Liverpool retail precinct to the north being major generators of footfall traffic around the site. The site's eastern boundary fronts the George Street pedestrian access way which links Scott Street to Terminus Street.

2.2.2 Heritage

The subject site does not contain a heritage item nor is it located in a heritage conservation area. The broader Liverpool Civic Place site (Lot 201 DP 1224084, 306-310 Macquarie Street) contains a heritage item, being the Memorial School of Arts building (I99). No site preparation or early works are proposed on this lot. The site is in the vicinity of several heritage items identified within the Liverpool LEP 2008. Notable amongst these heritage items includes:

- I89 – Plan of Town of Liverpool (Early town centre street layout – Hoddle 1827);
- I91 – Commercial Building (formerly Rural bank and State bank);
- I92 – Boer War Memorial, including memorial to Private A.E Smith;
- I93 – Macquarie Monument;
- I94 – Row of 3 palm trees; and
- I109 – Liverpool Fire Station.

2.3 Surrounding Development

The Liverpool CBD is a growing strategic centre within Greater Western Sydney, comprising a true mixed use character. The Liverpool CBD is currently presented with opportunities for renewal and urban transformation which reflects the precinct's strategic positioning between Parramatta as Sydney's Central CBD and the future Badgerys Creek Aerotropolis. The site's immediate surrounding context is outlined below.

2.3.1 North

Development to the north of the site, on the opposite side of Scott Street, includes retail and commercial buildings of two to three storeys, primarily containing retail and commercial uses (**Figure 2-10**). To the north east, the street block contains higher density commercial and service apartment uses (**Figure 2-11**). Further north, this development transitions into the Liverpool civic and retail centre bound by Macquarie Street (**Figure 2-12**) and George Street (**Figure 2-13**).

Figure 2-10 Retail and commercial buildings to the north

Figure 2-11 Higher density development to the north east

Figure 2-12 Macquarie Street to the north

Figure 2-13 George Street to the north

2.3.2 East

Development to the east of the site, on the opposite side of the eastern through site link, is a two storey commercial building (**Figure 2-14**). This building is not listed as a heritage significant item. To the east of this building is a larger two storey commercial building (**Figure 2-15**), which extends to the Scott Street and Terminus Street intersection. The Georges River and Liverpool Railway Station are a further 300m from the site and effectively mark the eastern boundary of the Liverpool CBD.

Figure 2-14 Two storey commercial building to the east of the George Street through site link

Figure 2-15 Two storey commercial building at the intersection of Scott and Terminus Street

2.3.3 South

To the south of the site, and on the opposite side of Terminus Street, is the Telstra Exchange building that has a height of approximately four storeys (**Figure 2-16**). As well as this, various retail stores front Terminus Street. Further south of the commercial Terminus Street strip the area transitions to a residential character with a number of four to five storey residential flat buildings (**Figure 2-17**).

Figure 2-16 Telstra Exchange building and adjoining retail tenancies to the south

Figure 2-17 Figure 1: Retail and medium density residential uses fronting Terminus Street to the south

2.3.4 West

Immediately to the west includes the heritage listed Memorial Arts Building and surrounding public domain (**Figure 2-18**). To the rear of this building is a nine-storey mixed use development at 300 Macquarie Street (**Figure 2-19**)**.** The mixed-use building presents a partial blank party wall to the site at the rear (**Figure 2-20**) and contains ground floor retail uses which are set back from the Memorial Arts Building and Macquarie Street. This adjoins a consolidation of low scale automotive service tenancies to the west (**Figure 2-21**).

Figure 2-18 Figure 2: Memorial Arts Building

Figure 2-19 Figure 3: Nine storey mixed use residential building to the west

Figure 2-20 Figure 4: Rear party wall presented to the site

Figure 2-21 Figure 5: Consolidated automotive service tenancies to the west

3 Contamination

3.1 Existing Environment

3.1.1 Preliminary Site Investigation, Proposed Multi-Storey Development, 52 Scott Street, Liverpool, September 2016 (DP, 2016a)

Built Development Group Pty Ltd (Built) commissioned Douglas Partners Pty Ltd (DP) to undertake a Preliminary Site (Contamination) Investigation at 52 Scott Street, Liverpool NSW. The report is dated 6 September 2016 and included investigation of:

- Lots 1, 2 and 3 Deposited Plan 229979;
- Part of Lots 22 and 23 Deposited Plan 441010;
- Lot 17 Deposited Plan 81842; and
- Lot 1 Deposited Plan 507070.

The scope of work undertaken included a site walkover and a review of the available site history, with information obtained from:

- Published maps;
- NSW EPA databases;
- Land titles;
- Section 149 Planning Certificate;
- Council record; and
- Dangerous goods search.

3.1.1.1 Site Description

The site was described as having two-major land uses. The northern section was predominately occupied by a commercial building (NSW Department of Corrections, and a gym), while the southern section was described as an open-air multi-storey carpark with a void created between the Terminus Street side and ground surface. The site slopes from south to north/north west. No evidence of contaminating activities or features were observed.

3.1.1.2 Surrounding Land Use

Land uses around the site are defined as:

- North and east: commercial purposes, with ground level retail. Abutting eastern property was vacant;
- South: commercial properties and Telstra communications exchange building;
- West: Southern section: car service centre / mechanic; and
- West: Northern section: new commercial / residential building.

3.1.1.3 Proposed Site Use

The report described the intended development as a multi-storey commercial building for council offices, public library and community space with a one to two storey basement carpark. Construction of the basement car parking was considered to require excavation of the entire site footprint.

3.1.1.4 Geology and Hydrology

The site is reported as being underlain by Bringelly Shale of the Wianamatta Group, which weathers to residual clays. The site is within an area of no known occurrence of Acid Sulfate Soils. Topography in the area consists of a high point at Terminus Street south of the Site, with a local fall towards the east (Georges River). Groundwater flow is considered to be north-east towards the Georges River.

3.1.1.5 Historical Aerial Photography and Land Titles

Based on DP's review of aerial photography, the site contained residential buildings in the south-western and south-eastern areas in 1943, with additional buildings in the north with unclear use, potentially a fire station.

A large building was constructed in the north western section of the site sometime between 1943 and 1955. Further significant development was undertaken between 1955 and 1970 which resulted in removal of all previous structures, and construction of the likely current buildings; since 1970 the site configuration has essentially remained unchanged.

The review of land titles undertaken lists various commercial uses of the site, with some vacancy and residential use of the southern areas. The most significant being that from 1902 to 1965, Lot 3 Deposited Plan 229979 and Lot 17 Deposited Plan 81842 are listed as a fire station.

3.1.1.6 Conceptual Site Model

Potential sources of contamination identified by DP included uncontrolled filling, existing and former buildings on site, the former fire station, and an adjacent car service centre / mechanical workshop. Potential receptors were considered site users, end users, construction and maintenance workers and adjacent site users in addition to groundwater and terrestrial ecology.

Risk management actions recommended by DP included:

- Assessment of soils to confirm waste classification and removal of all fill material during the proposed development;
- An assessment of groundwater quality, particularly down-gradient of the former fire station and adjacent car service centre / mechanical workshop, and assessment of off-site migration including implementation of remedial measures if soil vapour or groundwater if required; and
- Completion of a hazardous building materials surveys prior to demolition of existing buildings.

DP conclude that subject to the above, the site can be made suitable for the proposed development.

3.1.1.7 Revision

The DP (2016a) report was revised (revision 1) and re-issued dated 10 May 2017 (DP, 2017a), with no material change noted.

3.1.2 Preliminary Groundwater and Waste Classification Assessment, Proposed Multi-Storey Development, 52 Scott Street Liverpool, September 2016 (DP, 2016b)

Built commissioned DP to undertake a Preliminary Groundwater Contamination and Waste Classification Assessment at the site. The investigation included Lot 1 Deposited Plan 514817 (64 Scott Street) which was not included in the DP 2016a assessment.

The objective of the investigation was to:

- Assess the potential for on-site groundwater quality to be impacted from potential sources of contamination identified during the DP (2016a) investigation; and
- Provide a preliminary waste classification of soils to be removed.

The scope undertaken included installation of groundwater monitoring wells and the collection of representative soil samples.

3.1.2.1 Sampling locations and rationale

Due to limited access to soils at the site, a ‘preliminary’ waste classification, using samples from seven locations (as opposed to the minimum; 15 locations required by the NSW EPA *Sampling Design Guidelines 1995*) was undertaken. Overall, nine boreholes or hand auger locations were advanced to the top of rock, or hand augers to refusal. Depths ranged from 0.35 metres below ground level (mBGL) to 1.1mBGL.

Two wells were installed targeting the areas of concern, with Well 1 targeting the mechanic to the south-west of the site to a depth of 11.7mBGL, and Well 2 targeting the former fire station in the north eastern corner to a depth of 14mBGL.

3.1.2.2 Field Observations

Groundwater was not observed during augering or rock coring works. Consequently, the groundwater monitoring wells were screened over the entire depth of the rock coring works.

Soils encountered generally consisted of asphalt pavement, followed by subgrade and fill including silty clay, clayey sand and sandy gravel including traces of glass and brick fragments to depths of 1.0mBGL. Fill

material was underlain by natural clays and gravel followed by weathered shale, and stronger laminate at greater depths.

3.1.2.3 Groundwater Results

The majority of groundwater contaminants in both monitoring wells were below the laboratory limit of reporting (LOR) and hence adopted NEPC (2013) Groundwater Investigation Levels (GILs) for fresh water. Elevated concentrations of arsenic and nickel were detected in Well 2, however were below the adopted GILs when re-sampled.

Low levels of Per- and Polyfluorinated compounds (PFAS) were detected in Well 2. In addition, chloroform and bromodichloromethane were detected which were attributed to introduced drilling water.

3.1.2.4 Soil Results

DP (2016b) reports that all soil and rock results meet the criteria for provisional classification as General Solid Waste (non-putrescible). In addition, natural soils and rock are provisionally classified as Virgin Excavated Natural Material (VENM).

3.1.2.5 Conclusions and Recommendations

DP (2016b) concluded that:

- Groundwater did not represent a significant risk either on or off-site;
- Waste classification of soils will be required prior to off-site disposal;
- Low concentrations of PFAS, chloroform and bromodichloromethane were reported in groundwater; and
- Groundwater quality and treatment options require assessment prior to off-site disposal during dewatering options.

3.1.2.6 Revision

The DP (2016b) report was revised (revision 1) and re-issued dated 10 May 2017 (DP, 2017b), with no material change noted.

3.1.3 Report on Preliminary Site Investigation – Proposed Multi-Storey Development – 52 Scott Street, Liverpool, April 2019 (DP, 2019)

Built commissioned DP to update the Preliminary Site Investigation (DP, 2017a), due to further acquisition and inclusion of lots on the eastern portion of the site for inclusion in the development. The report was issued on 15 April 2019.

The additional lots include:

- Lot 100 Deposited Plan 877435 (added 2019);
- Lot 12 Deposited Plan 657056 (added 2019);
- Lot 11 Deposited Plan 522284 (added 2019); and,
- Lots 1 and 2 Deposited Plan 1146671 (added 2019).

DP (2019) undertook sampling of an additional five test pits and two test bores, within the vacant lot and carpark adjacent to the eastern site boundary. Asbestos in the form of Asbestos Containing Material (ACM) was observed in two locations at 0.4m and 0.7m.

3.1.3.1 Soil Analytical Results

The reported concentrations contaminants of concern in soils were below the adopted assessment criteria in all samples analysed, however asbestos was detected in one soil where asbestos had previously been observed. Cardno notes that the analysis undertaken was for the presence / absence of asbestos rather than weight / weight in soil.

3.1.3.2 Groundwater Analytical Results

The reported groundwater sampling results were from the DP (2017b) report, with the exception of monitoring Well 2 which was resampled. The analytical results for the groundwater sampled during this investigation were similar to the results from the DP (2016b) report. DP (2019) attributed elevated concentrations of dissolved metals to represent typical background concentrations in an urban environment.

3.1.3.3 Conclusions and Recommendations

DP (2019) concluded that remediation of soils was not required, with the exception of areas of fill containing asbestos, however they did note that building rubble had been identified in fill, and as such there was potential for additional asbestos to be encountered.

With regards to groundwater, DP (2019) concluded that there had been no significant impact on groundwater quality from current or previous site use, however there was low levels of anthropogenic contaminants such as PFAS which required assessment prior to offsite disposal of water.

DP (2019) recommend a Remediation Action Plan and/or Asbestos Management Plan to inform appropriate management of asbestos contaminated soils, an unexpected finds protocol, additional waste classification sampling, and a hazardous materials survey are undertaken.

3.1.4 Geotechnical and Environmental Investigation Report, 29 August 2019 (Golder 2019)

Golder Associates Pty Ltd (Golder) was engaged by Built to undertake a geotechnical and environmental investigation for the proposed mixed-use development at the site.

Golder noted that there had been some adjustment to the proposed site boundary since the DP (2017a/b) assessments, with the inclusion of an additional building to the east. The site now extended to George Lane on the eastern boundary. The site area was subsequently increased to 7,325m^2. The proposed development was listed as a public library, hotel and commercial building that included a 3-level basement carpark to an RL of 11mAHD.

Over the period 8th July to 26 July 2019 Golder undertook the following geotechnical and environmental investigation at the site:

- Advancement of eight boreholes to 15mBGL and three hand augers into fill material from;
- Monitored four groundwater wells including the two DP (2017b) wells; and
- Collected, rock and groundwater samples for laboratory analysis.

3.1.5 Ground Conditions

Fill material observed across the site was generally shallow with a maximum depth of 1.4m and generally was described as clay with gravels and sand. The fill material was underlain by residual clay and rock with the description being consistent with the DP (2017b) investigation.

3.1.6 Soil Analytical Results

Golder reported that concentrations of contaminants of concern in soil samples were below the criteria for commercial / industrial land use, however asbestos was identified in one sample. Cardno notes that the sample analysis was for presence / absence of asbestos, rather than quantitative weight / weight analysis.

3.1.7 Groundwater Investigation

Groundwater levels were reported as approximately 17mAHD within three monitoring wells, with one monitoring wells reporting a groundwater level of 15mAHD. The lower water level was attributed to the monitoring well being screened within a fracture zone distinct from the other wells.

Groundwater analytical results showed exceedances of nitrate, dissolved copper, dissolved zinc above the ANZECC guidelines for protection of aquatic ecosystems. In addition, Perfluorooctanesulfonic Acid (PFOS) was detected above the adopted criteria for protection of aquatic ecosystems in one monitoring wells. Low levels of various hydrocarbons were detected in a separate well.

3.1.8 Waste Classification

Golder concluded that from their testing, that the majority of the fill can be indicatively classified as General Solid Waste, with the area containing asbestos classified as Special Waste. Golder identified that the presence of hydrocarbons in groundwater may impact the classification of rock in the surrounding area as VENM.

3.1.9 Recommendations

Golder concluded that gross contamination warranting further investigations was not identified. However, Golder recommends additional groundwater monitoring is undertaken to investigate the presence of hydrocarbons, and the distribution of PFAS contaminants. In addition, further waste classification sampling is required to meet sampling density guidance for the volume of soil indicated.

3.2 Assessment and Recommendations

From the information above, Cardno concludes:

- The site has been in use for commercial purposes and a portion of the site as a fire station historically between 1902 and 1965;
- Shallow fill material is present across the site, with an area identified as containing asbestos. Other contaminants are generally below the adopted criteria for commercial / industrial use;
- Groundwater at the site contains heavy metals and nutrients generally consistent with an urbanised landscape;
- PFAS concentrations were detected in one monitoring well above the criteria for protection of aquatic ecosystems (Georges River), potentially associated with the use of the site as a fire station. PFAS was not detected in soils, or in the adjacent monitoring well in the 2019 monitoring round;
- Low levels of hydrocarbons have been detected, potentially associated with the mechanic business adjacent;
- The proposed development will involve excavation of the entire footprint of the site, boundary to boundary, and to RL +10.35, below the groundwater table;
- The excavation will remove all fill including asbestos impacted material, and any likely source of PFAS at the site.
- Groundwater management will likely be required, including potential treatment depending on discharge requirements.

Based on the above, Cardno provides the following comments and recommendations:

- The proposed excavation for the development will likely remove any potential risk to human health or the environment, pending further investigations;
- Undertake the additional groundwater sampling as indicated by Golder (2019) to further investigate hydrocarbon and PFAS concentrations and distribution, including reporting and incorporation of any findings; and
- Develop an Excavation Management Plan, incorporating actions including (but not limited to);
  - The functions of an Asbestos Management Plan, to enable the safe removal and management of asbestos impacted fill, including requirements for the validation of removal;
  - An Unexpected Finds Protocol, to enable management of any further identified contamination;
  - Waste classification sampling requirements, in line with EPA endorsed guidelines, to characterise spoil for off-site disposal; and
  - Management and/or treatment and disposal measures if required for groundwater during development.

4 Ecology

4.1 Existing Environment

The site was assessed with a desktop review and a field inspection that was undertaken on 13 November 2019 by a suitably qualified ecologist. The desktop review identified the following potential ecological constraints and opportunities:

- The BioNet Atlas search results indicated that at least 42 threatened species and 24 threatened ecological communities (TECs) listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and/or Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) have been recorded within 5km of the Subject Site (**Appendix A**);
- The Protected Matters Search Tool (PMST) results indicated that the following Matters of National Environmental Significance (MNES) have been recorded within 5km of the site, at least 44 threatened species, 6 TECs and 15 migratory listed under the EPBC Act (**Appendix B**);
- No area is mapped under the Coastal Management *State Environmental Planning Policy (Coastal management) 2018* within or near the site;
- No areas of high biodiversity value are mapped within the site, however, sections of the Georges River approximately 200m to the west are mapped as having high biodiversity value; and
- A review of the local vegetation mapping (OEH, 2016), no area is mapped as native vegetation with the Subject Site, however, sections of the Georges River approximately 200m to the west are mapped as having native vegetation.

A field assessment was undertaken of the site and the area immediately surrounding on 13 November 2019 by a suitably qualified ecologist. No threatened species or TEC listed under the BC Act and/or EPBC Act was detected within or in close proximity to the site.

The site was highly disturbed/modified and was predominantly covered by built structures including brick buildings, carparks, and paved sidewalks and alleyways. All vegetation detected was restricted to planted exotic street trees and other garden plants, and mowed lawn dominated by numerous weed species including *Pennisetum clandestinum* (Kikuyu Grass), *Plantago lanceolata* (Ribwort), *Lactuca serriola* (Prickly Lettuce), *Verbena bonariensis* (Purpletop), *Taraxacum officinale* (Dandelion), *Bidens pilosa* (Cobbler's Pegs), *Capsella bursa-pastoris* (Shepherds Purse), *Sonchus oleraceus* (Common Sow-thistle), *Amaranthus viridis* (Green Amaranth), *Paspalidium distans* and *Conyza* sp. (A Fleabane). No native vegetation is considered to be present.

Fauna species detected included a pair of Rainbow Lorikeet (*Trichoglossus haematodus*) flying over-head. In addition, a colony of at least 10–20 Australian White Ibis (*Threskiornis molucca*) were observed nesting within the three *Phoenix canariensis* (Canary Island Date Palm) trees growing in the road centre median of Macquarie Street. Several Ibis chicks were heard calling and an Australian Raven (*Corvus coronoides*) was observed attacking the nests. Also, a deceased introduced Black Rat (*Rattus ruttus*) was observed on a sidewalk.

4.2 Assessment and Recommendations

Due to the past and ongoing disturbance of the site, the lack of native vegetation and any significant habitat feature for potentially occurring threatened species, the site is considered to have no or at least very low ecological value. The Ibis nests that occurs in close proximity to the site are unlikely to be impacted from the proposed works. As such, no threatened species, populations or ecological communities listed under the BC Act and/or EPBC Act would likely be significantly impacted by the proposed project.

Recommendations to avoid and/or mitigate impacts to flora, fauna and their habitat due to the proposed project include:

- All trees to be removed/retained need to be clearly marked to avoid the unnecessary removal of trees that can be retained;
- All construction and development works near retained trees must abide by the *Australian Standard AS 4970-2009 Protection of trees on development sites*;
- All tree trimming is to be in accordance with the *Australian Standard AS4373 Pruning of amenity trees;*

- All machinery should be cleaned of foreign soil and vegetative matter to avoid the spread of *Phytophthora cinnamomi*, pathogenic fungus (Myrtle Rust) and dispersal of seeds of non-native plants;
- Stop-work procedure on the chance encounter of any dispersing wildlife during works should be implemented to avoid death or injury;
- Strict erosion and sediment control measures should be implemented, monitored and maintained to prevent impacts on adjacent areas, particularly following erosion and sediment mobilisation from rain events;
- Implement dust control measures where necessary to protect adjacent retained vegetation and water quality in adjacent waterways and water bodies; and
- Stockpiling of materials should occur within previously disturbed areas and not within driplines or retained vegetation.

5 Flooding

5.1 Existing Environment

Under existing conditions, the site consists predominantly of impervious surfaces (two commercial buildings and associated car parking). There is a small vacant lot separating the two existing buildings.

The site is located at the upstream extent of a small catchment that drains through the Liverpool CBD to the Georges River. Flood behaviour for this catchment was assessed by Liverpool City Council as part of the Liverpool CBD Floodplain Management Study (GHD, 2007). This study found that no lots forming part of the proposed development were flood affected in the 100 year Average Recurrence Interval (ARI) flood event (refer **Figure 5-1**). This finding was also confirmed with Council staff during preparation of the Concept Proposal and documented in the Stormwater Management Plan (WGE, 2019).

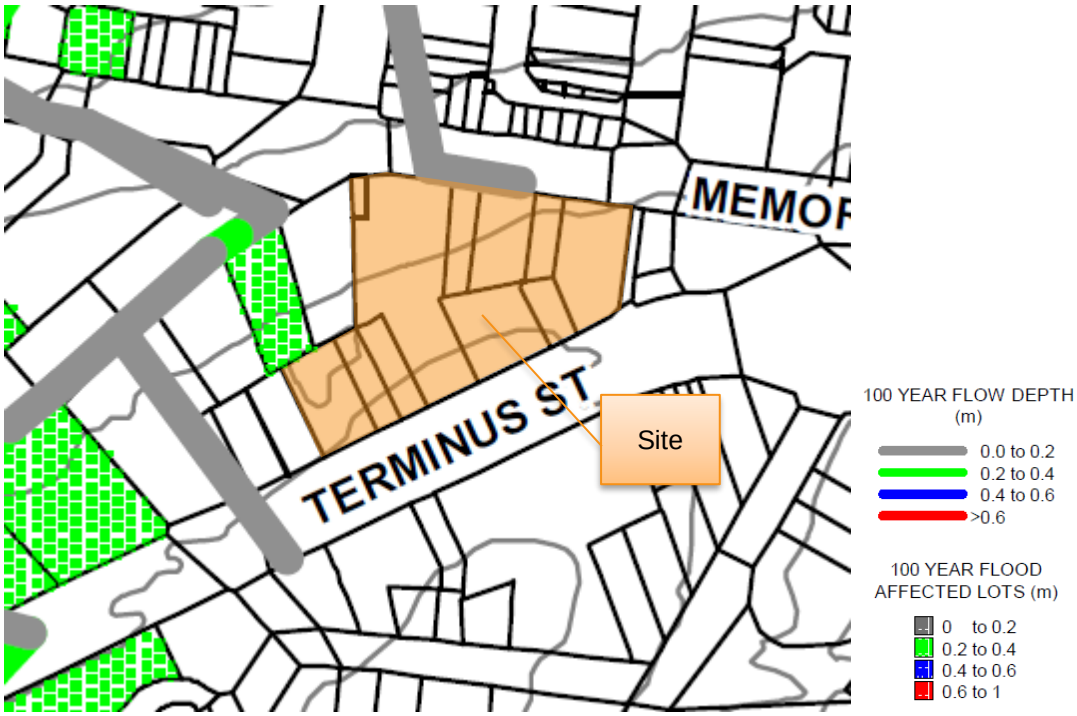

Figure 5-1 Flood affected lots (GHD, 2007)

5.2 Assessment

Given the site is not within the 100 year ARI flood extent, the early works are not expected to be impacted by flooding or have any impact on flood behaviour to adjacent properties. Also, given the site is largely impervious under existing conditions it is not expected the proposed works would increase discharges to the stormwater network, provided catchment areas are generally maintained to existing connection points (assumed to be both Scott Street and Terminus Street).

6 References

DP (2016a) *Preliminary Site (Contamination) Investigation. Proposed Multi-Storey Development, 52 Scott Street, Liverpool*. Prepared by Douglas Partners for Built Development Group Pty Ltd, September 2016.

DP (2016b) *Preliminary Groundwater and Waste Classification Assessment, Proposed Multi-Storey Development, 52 Scott Street Liverpool*. Prepared by Douglas Partners for Built Development Group Pty Ltd, September 2016.

DP (2017a) *Preliminary Site (Contamination) Investigation. Proposed Multi-Storey Development, 52 Scott Street, Liverpool*. Prepared by Douglas Partners for Built Development Group Pty Ltd, May 2017.

DP (2016b) *Preliminary Groundwater and Waste Classification Assessment, Proposed Multi-Storey Development, 52 Scott Street Liverpool*. Prepared by Douglas Partners for Built Development Group Pty Ltd, May 2017.

DP (2019) *Preliminary Site Investigation. Proposed Multi-Storey Development, 52 Scott Street, Liverpool*. Prepared by Douglas Partners for Built Development Group Pty Ltd, April 2019

GHD (2007) *Liverpool CBD Floodplain Management Study.* Prepared by GHD Pty Ltd on behalf of Liverpool City Council.

Golder (2019) *Geotechnical and Environmental Investigation Report, Liverpool Civic Place*. Prepared by Golder Associates Pty Ltd on behalf of Built Pty Ltd, 29 August 2019.

OEH (2016) *The Native Vegetation of the Sydney Metropolitan Area. Version 3.1. VIS ID 4489*. NSW Office of Environment and Heritage. https://datasets.seed.nsw.gov.au/dataset/the-native-vegetation-of-the-sydney-metropolitan-area-oeh-2016-vis-id-4489

WGE (2019) *Liverpool Civic Place, Liverpool. Stormwater Management Plan*. Prepared by Wood, Grieve Engineers (WGE) on behalf of Built Pty Ltd, 11 September 2019.

APPENDIX

A

BIONET ATLAS SEARCH RESULTS

Table A1-1. Threatened species listed under the BC Act and/or EPBC Act recorded within 5 km of the Subject Site (BioNet Atlas).

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records
Gastropod					
Camaenidae	*Meridolum corneovirens*	Cumberland Plain Land Snail	E	-	77
Frog					
Hylidae	*Litoria aurea*	Green and Golden Bell Frog	E	V	10
Birds					
Ardeidae	*Ixobrychus flavicollis*	Black Bittern	V	-	1
Accipitridae	*Circus assimilis*	Spotted Harrier	V	-	3
	Haliaeetus leucogaster	White-bellied Sea-Eagle	V	C	14
	Hieraaetus morphnoides	Little Eagle	V	-	7
Falconidae	*Falco subniger*	Black Falcon	V	-	1
Psittacidae	*Glossopsitta pusilla*	Little Lorikeet	V	-	25
	Lathamus discolor	Swift Parrot	E	CE	7
Strigidae	*Ninox connivens*	Barking Owl	V	-	1
	Ninox strenua	Powerful Owl	V	-	7
Meliphagidae	*Anthochaera phrygia*	Regent Honeyeater	CE	CE	4
	Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V	-	3
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella	V	-	14
Artamidae	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V	-	10
Petroicidae	*Petroica boodang*	Scarlet Robin	V	-	1
Mammals					
Phascolarctidae	*Phascolarctos cinereus*	Koala	V	V	65
Burramyidae	*Cercartetus nanus*	Eastern Pygmy-possum	V	-	1
Petauridae	*Petaurus norfolcensis*	Squirrel Glider	V	-	1
Pteropodidae	*Pteropus poliocephalus*	Grey-headed Flying-fox	V	V	224
Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V	-	7
Miniopteridae	*Miniopterus australis*	Little Bent-winged Bat	V	-	7
	Miniopterus orianae oceanensis	Large Bent-winged Bat	V	-	11
Molossidae	*Micronomus norfolkensis*	Eastern Coastal Free-tailed Bat	V	-	17
Vespertilionidae	*Chalinolobus dwyeri*	Large-eared Pied Bat	V	V	1

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records
	Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	9
	Myotis macropus	Southern Myotis	V	-	8
	Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	13
Flora					
Apocynaceae	*Marsdenia viridiflora* subsp. *viridiflora*	*Marsdenia viridiflora* R. Br. subsp. *viridiflora* population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	EP	-	3
Dilleniaceae	*Hibbertia fumana*	-	CE	-	882
	Hibbertia puberula	-	E	-	953
Ericaceae	*Epacris purpurascens* var. *purpurascens*	-	V	-	1
Ericaceae	*Leucopogon exolasius*	Woronora Beard-heath	V	V	2
Fabaceae (Faboideae)	*Pultenaea pedunculata*	Matted Bush-pea	E	-	11
Fabaceae (Mimosoideae)	*Acacia bynoeana*	Bynoe's Wattle	E	V	21
	Acacia pubescens	Downy Wattle	V	V	145
Myrtaceae	*Eucalyptus nicholii*	Narrow-leaved Black Peppermint	V	V	1
Orchidaceae	*Diuris aequalis*	Buttercup Doubletail	E	V	1
	Pterostylis nigricans	Dark Greenhood	V	-	1
Proteaceae	*Grevillea parviflora* subsp. *parviflora*	Small-flower Grevillea	V	V	918
	Persoonia nutans	Nodding Geebung	E	E	264
Thymelaeaceae	*Pimelea spicata*	Spiked Rice-flower	E	E	9

Key: CE = Critically Endangered, E = Endangered, V = Vulnerable, EP = Endangered Population.

Table A1-2. Threatened ecological communities listed under the BC Act and/or EPBC Act that are known, or are predicted, to occur within 5 km of the Subject Site (BioNet Atlas).

Ecological Community Name	BC Act	EPBC Act	Records
Agnes Banks Woodland in the Sydney Basin Bioregion - BC Act *Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion* - EPBC Act	CE	E	Known
Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions	E	-	Known
Blue Gum High Forest in the Sydney Basin Bioregion - BC Act *Blue Gum High Forest of the Sydney Basin Bioregion* - EPBC Act	CE	CE	Known
Blue Mountains Shale Cap Forest in the Sydney Basin Bioregion - BC Act *Southern Highlands Shale Forest and Woodland in the Sydney Basin Bioregion* - EPBC Act	E	CE	Known
Castlereagh Scribbly Gum Woodland in the Sydney Basin Bioregion - BC Act *Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion* - EPBC Act	V	E	Known
Castlereagh Swamp Woodland Community	E		Known
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions - BC Act *Subtropical and Temperate Coastal Saltmarsh* - EPBC Act	E	V	Predicted
Coastal Upland Swamp in the Sydney Basin Bioregion - BC Act *Coastal Upland Swamps in the Sydney Basin Bioregion* - EPBC Act	E	E	Known
Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion - BC Act *Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion* - EPBC Act	E	CE	Known
Cumberland Plain Woodland in the Sydney Basin Bioregion - BC Act *Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest* - EPBC Act	CE	CE	Known
Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	-	Known
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions - BC Act *Littoral Rainforest and Coastal Vine Thickets of Eastern Australia* - EPBC Act	E	CE	Predicted
Moist Shale Woodland in the Sydney Basin Bioregion - BC Act *Western Sydney Dry Rainforest and Moist Woodland on Shale* - EPBC Act	E	CE	Known
O'Hares Creek Shale Forest	E	-	Known
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	-	Known
Shale Gravel Transition Forest in the Sydney Basin Bioregion - BC Act *Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest* - EPBC Act	E	CE	Known
Shale Sandstone Transition Forest in the Sydney Basin Bioregion - BC Act *Shale Sandstone Transition Forest of the Sydney Basin Bioregion* - EPBC Act	CE	CE	Known

Ecological Community Name	BC Act	EPBC Act	Records
Southern Sydney sheltered forest on transitional sandstone soils in the Sydney Basin Bioregion	E	-	Known
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions - BC Act *Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community* - EPBC Act	E	E	Known
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	-	Known
Sydney Freshwater Wetlands in the Sydney Basin Bioregion	E	-	Known
Sydney Turpentine-Ironbark Forest - BC Act *Turpentine-Ironbark Forest of the Sydney Basin Bioregion* - EPBC Act	CE	CE	Known
Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions	E	-	Known
Western Sydney Dry Rainforest in the Sydney Basin Bioregion - BC Act *Western Sydney Dry Rainforest and Moist Woodland on Shale* - EPBC Act	E	CE	Known

Key: CE = Critically Endangered, E = Endangered, V = Vulnerable.

APPENDIX B

PMST SEARCH RESULTS

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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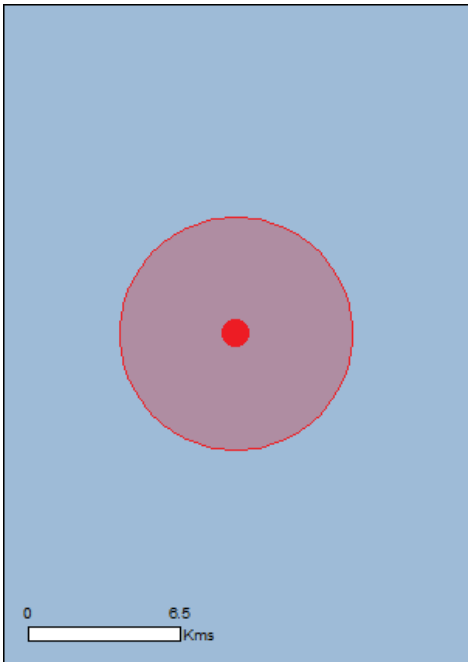

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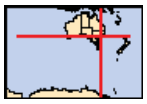

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	44
Listed Migratory Species:	15

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	10
Commonwealth Heritage Places:	None
Listed Marine Species:	24
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	49
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	Endangered	Community likely to occur within area
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	Critically Endangered	Community likely to occur within area
Shale Sandstone Transition Forest of the Sydney Basin Bioregion	Critically Endangered	Community may occur within area
Western Sydney Dry Rainforest and Moist Woodland on Shale	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat may occur within area
Fish		
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat known to occur within area
Frogs		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat may occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog [1828]	Vulnerable	Species or species habitat may occur within area
Insects		
Synemon plana Golden Sun Moth [25234]	Critically Endangered	Species or species habitat likely to occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat likely to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Plants		
Acacia bynoeana Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat may occur within area
Acacia pubescens Downy Wattle, Hairy Stemmed Wattle [18800]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
Allocasuarina glareicola [21932]	Endangered	Species or species habitat likely to occur within area
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat may occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Genoplesium baueri Yellow Gnat-orchid [7528]	Endangered	Species or species habitat likely to occur within area
Grevillea parviflora subsp. parviflora Small-flower Grevillea [64910]	Vulnerable	Species or species habitat known to occur within area
Leucopogon exolasius Woronora Beard-heath [14251]	Vulnerable	Species or species habitat likely to occur within area
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat may occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat likely to occur within area
Persoonia hirsuta Hairy Geebung, Hairy Persoonia [19006]	Endangered	Species or species habitat likely to occur within area
Persoonia nutans Nodding Geebung [18119]	Endangered	Species or species habitat known to occur within area
Pimelea curviflora var. curviflora [4182]	Vulnerable	Species or species habitat may occur within area
Pimelea spicata Spiked Rice-flower [20834]	Endangered	Species or species habitat known to occur within area
Pomaderris brunnea Rufous Pomaderris [16845]	Vulnerable	Species or species habitat likely to occur within area
Pterostylis gibbosa Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area
Pterostylis saxicola Sydney Plains Greenhood [64537]	Endangered	Species or species habitat likely to occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat likely to occur within area
Thelymitra kangaloonica Kangaloon Sun Orchid [81861]	Critically Endangered	Species or species habitat may occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Reptiles		

Name	Status	Type of Presence
Hoplocephalus bungaroides Broad-headed Snake [1182]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Australian Telecommunications Corporation
Commonwealth Land - Defence Housing Authority
Commonwealth Land - Defence Service Homes Corporation
Commonwealth Land - Director of War Service Homes
Commonwealth Land - Telstra Corporation Limited
Defence - MOOREBANK AREA INC SME
Defence - Suite 8, Library Plaza
Defence - WET BRIDGING SITE - CASULA

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species

Name	Threatened	Type of Presence
		habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat may occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Leacock	NSW

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Carduelis chloris European Greenfinch [404]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red		Species or species habitat likely to occur

Name	Status	Type of Presence
Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-33.92542 150.92343

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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