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LEAMAC & CORONATION

Moore Point Precinct Review Study Part 1: Contamination, Acid Sulfate Soils & Remedial Strategy

Newbridge & Bridges Roads, Liverpool, NSW

E22882.E09_Rev1
9 April 2020

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Part 1: Contamination, Acid Sulfate Soils & Remedial Strategy

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Revision	Details	Date	Amended By
A	Initial Draft	12 December 2019	-
B	Advanced Draft (Sec 7 in progress)	9 March 2020	N. Kontos
C	Final Draft (minor updates)	11 March 2020	N. Kontos
0	Original	6 April 2020	N. Kontos
1	Added Executive Summary	9 April 2020	N. Kontos

Table of Contents

Schedule of Figures

Schedule of Tables

Appendices

Executive Summary

This report has been prepared by EI Australia Pty Ltd (EI) on behalf of Leamac and Coronation to review contamination, acid-sulfate soils and precinct remediation options in relation to a Planning Proposal at Moore Point, Liverpool (the site).

The site is located east of Liverpool CBD on the opposite side of the Georges River and north of Newbridge Road. It provides a site area of 38.5 hectares (approx.) and is currently developed with industrial uses. There is nothing contained within this report to preclude rezoning.

The site is situated within Liverpool Collaboration Area's Georges River North precinct and is subject to the priorities and actions of the Liverpool Place Strategy (Strategy), which was released by the Greater Sydney Commission (GSC) in December 2018. Refer to the figure below:

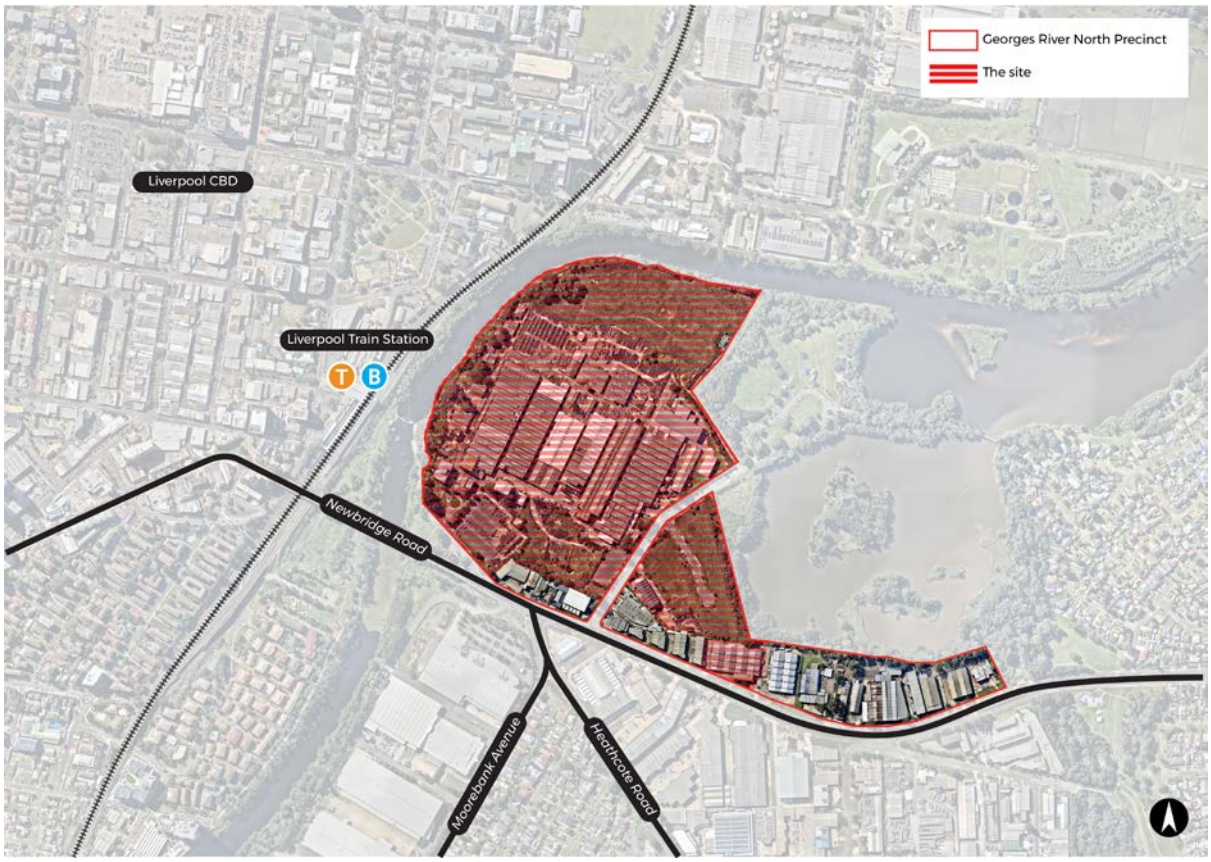


***Figure ES-1** – Site aerial (Source: Nearmap modified by Mecone)*

The Strategy states that by 2036 Liverpool will be a rejuvenated river city, offering diverse and growing residential and employment opportunities. Major health, education and retail precincts, and a mixture of open spaces and parklands alongside the Georges River, will create a rich mix of jobs and workplaces, public spaces, shops and entertainment.

Under the Strategy the site is identified as 'mixed use', which comprises:

> *'a mixture of commercial, retail, residential and community uses that provide sustainable employment, that is complementary to, and not in competition with, the commercial core'*

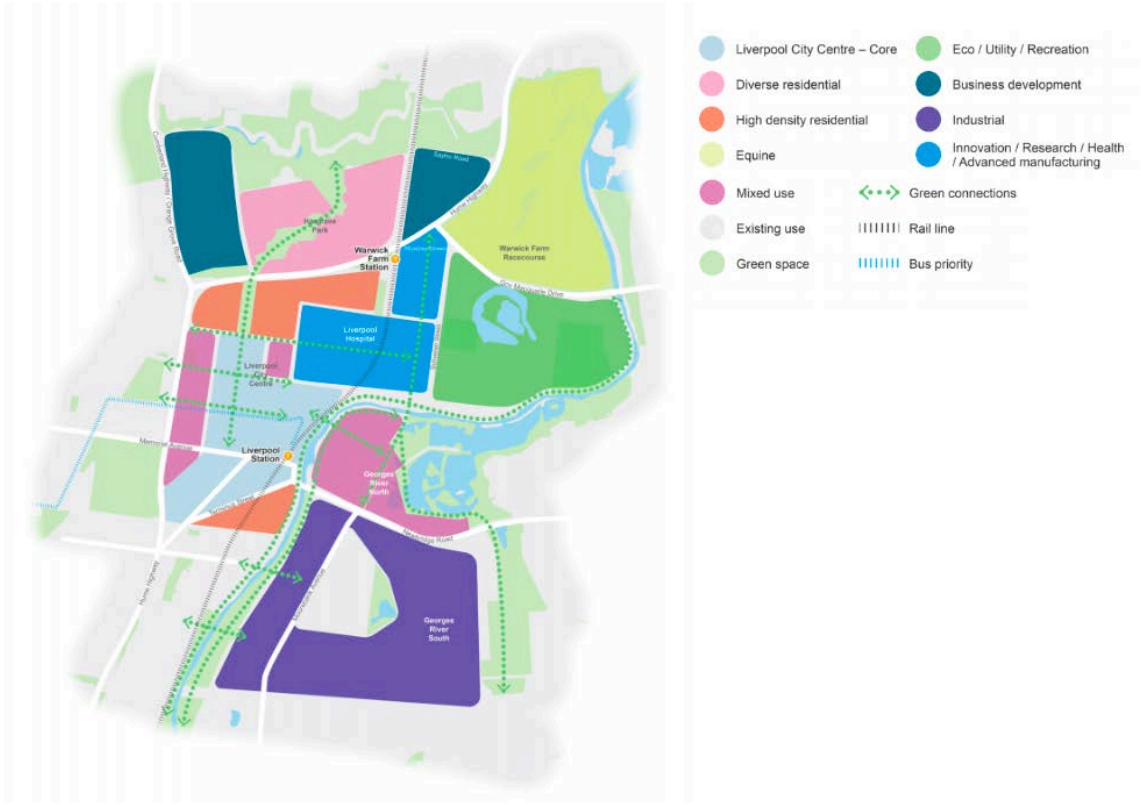


***Figure ES-2** – A Place Strategy for Liverpool (Source: Liverpool Collaboration Area Place Strategy 2018)*

The 2019 Annual report summary for Liverpool Collaboration Area highlighted key steps commenced and completed to address the imperatives acknowledged in the Strategy to accelerate the delivery of the Collaboration Area. These included:

- Engagement with TfNSW to prepare the Liverpool Place-based Integrated Transport Strategy and accelerated investment; and
- Flood studies and flooplain risk management plan completed by Liverpool City Council.

The land uses reflected in the Strategy are reinforced in Liverpool City Council's Local Strategic Planning Statement (LSPS), which identifies the site for investigation as residential/mixed use to support the CBD and Innovation Precinct in tandem with linking open space and green corridors.

The LSPS provides the following short to medium term action (12-24 months) specific to the Georges River North precinct:

> *Action 11.2 – Investigate amendments to LEP to rezone River precinct north of Newbridge Road (Moore Point) as a mixed-use zone to support the Liverpool CBD and Innovation Precinct, with an extensive open space system and cross-river linkages (short to medium term)*

The Planning Proposal involves the creation of a mixed use precinct, providing new homes, jobs and open space adjoining the Georges River and connecting to Liverpool CBD. Key features of the proposal include:

- Adaptive re-use of existing heritage;
- Foreshore embellishments and new open spaces;
- Educational and cultural facilities;
- Connections to Liverpool CBD and Train Station; and
- Transport, intersection and collector road improvements.

The Planning Proposal aligns with the priorities of Government and the implementation phase of the Place Strategy by facilitating the transformation of the Collaboration Area with new jobs, infrastructure, green spaces and housing. The Planning Proposal responds to The Pulse of Greater Sydney's performance indicators, which sit under the following key themes:

Infrastructure and Collaboration

The Planning Proposal will facilitate additional jobs, education and housing in close proximity to Liverpool CBD and Train Station. The proposal will support additional medium and long-term housing supply in Liverpool CBD through diverse and new housing products. The proposal supports the continual expansion and growth of Liverpool Innovation precinct and nearby health infrastructure, with potential to provide complementary uses near Liverpool Hospital and educational and cultural facilities on the site.

Productivity

The Planning Proposal supports the growth of the thirty-minute city, ensuring Liverpool emerges as a premier CBD in the Western City. The proposal provides capacity for new transport infrastructure on the site, road and intersection upgrades and locating density near major transport infrastructure (Liverpool Train Station and Badgery's Creek Aerotropolis). The proposal encourages additional business activity and investment in Liverpool by providing new commercial uses that will complement Liverpool CBD.

Liveability

The Planning Proposal significantly improves upon the existing use of the site by creating walkable places for people to live work and play. This includes foreshore embellishments to the Georges River, improved connections across the Georges River and adaptive re-use of existing heritage items. These measures will contribute to Sydney's Green Grid, improve access to services in Liverpool CBD and establish a community that celebrates identity and place.

Sustainability

The Planning Proposal addresses the urban heat island effect by significantly increasing the quantum of green space on the site for active and passive recreational use. The proposal will provide new parks and green connections to surrounding open spaces including Haigh Park, which will contribute to the urban tree canopy of the area.

Overall, the Planning Proposal represents a clear and consistent strategic line of site with the priorities of government. It meets the performance indicators, priorities and objectives expressed in the District Plan, Place Strategy, LSPS and The Pulse of Greater Sydney.

Nothing contained in the body of this report/assessment would preclude the Planning Proposal from rezoning and gazettal for residential/mixed use purposes.

Review of Contamination, Acid-Sulfate Soils and Remedial Strategy

The purpose of this review was to provide an appreciation of how existing site contamination might affect potential land use changes and the study objective was to identify known and potentially contaminated areas that could impact on future beneficial land uses.

A secondary objective was to identify necessary data gap closure investigations, to inform feasible remediation strategies for making impacted areas suitable for the proposed land uses.

A precinct contamination summary was developed, with an outline of remedial options in the form of a remediation concept strategy and recommendations for site-specific remediation action plans, which are informed by the existing environmental data set and the proposed data gap closure investigation findings.

1. Introduction

1.1 Background and Purpose

Leamac & Coronation Property Group engaged EI Australia Pty Ltd (EI) to conduct a review study for the industrial area to be identified as the Moore Point Precinct (the precinct), which was formerly known as the Liverpool Waterfront.

With a total approximate area of 38.5 hectares, the precinct is located within a portion of the Liverpool Collaboration Area, identified as Georges River North (Area 10). It is bound by Georges River to the north and west, Newbridge Road to the south and the recreational area comprising Haigh Park, Lake Moore and associated islands to the east, as shown in the precinct locality map presented as **Figure 1-1**.

Part 1 of the Moore Point Precinct Review Study (the Study) involved a review of available land contamination and acid sulfate soil data, followed by a review of potential remedial options, with indicative costs to make the land suitable for a range of land uses. Part 2 presents a Preliminary Acid Sulfate Soil Management Plan for the precinct, and is reported under a separate cover.

The purpose of this Part 1 review was to provide high level information to the New South Wales Department of Planning & Environment (the Department), to inform the development of a Precinct Land Use and Infrastructure Strategy.

1.2 Study Purpose and Objectives

The purpose of this study was to provide an appreciation of how existing site contamination might affect potential land use changes that may be brought about by the envisaged Precinct Land Use and Infrastructure Strategy. The key objective, therefore, was to identify areas within the precinct that are contaminated, or are potentially subject to contamination to an extent that could impact on future beneficial land uses.

For areas identified as contaminated or potentially contaminated, a secondary objective was to consider remedial options and data gap closure investigations where necessary, to enable a feasible remediation strategy to be developed, with the aim of making impacted areas suitable for the proposed land uses.

1.3 Scope of Works

To achieve the Study objectives, the following scope of works was implemented:

a) Review of publically available data and previous environmental investigation reports, provided to EI, for individual sites within the precinct;

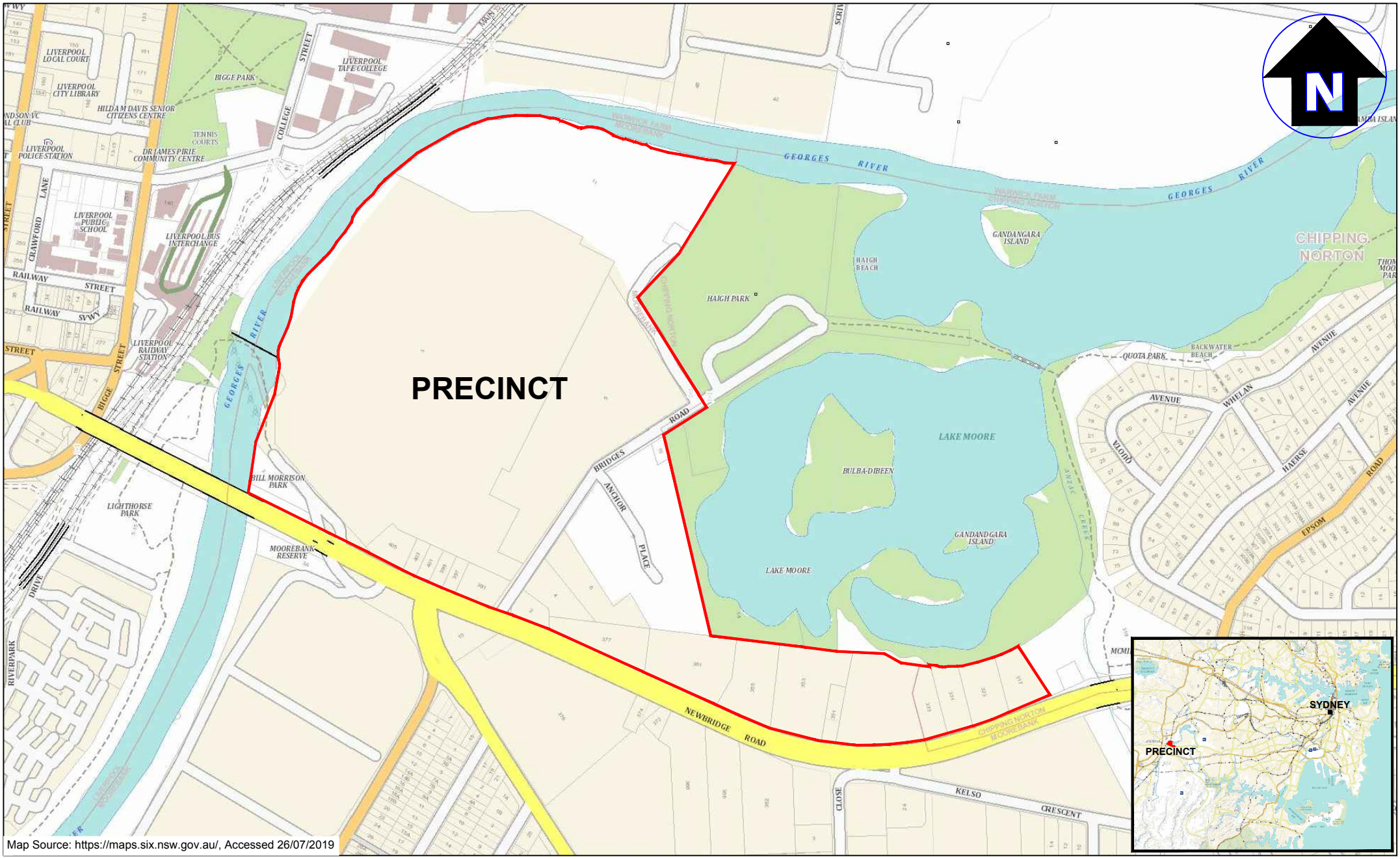
b) Development of a preliminary conceptual site model, with an appreciation of known and potential contamination sources, exposure pathways and potential receptors;

c) Identification of gaps in the existing environmental data set, which are recommended for closure by further investigations for site characterisation and to inform remedial planning;

d) Review of remedial options and methodologies, and the development of strategies to remediate contaminated areas, making them suitable for commercial and residential uses;

e) Preparation of a contingent remedial action procedure outline to be applied for any new contamination, that may be discovered during data gap closure investigations; and

f) Budget estimates and indicative timeframes for completion of the recommended works, provided under a separate cover.



Map Source: https://maps.six.nsw.gov.au/, Accessed 26/07/2019

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Approved:	N.K.
Date:	02-08-19
Scale:	Not To Scale

LAC JV Pty Ltd

Moore Point Precinct Review Study

Part 1: Contamination, Acid-Sulfate Soils and Remedial Strategy

Newbridge & Bridges Roads, Liverpool NSW

Precinct Locality Map

Figure: 1-1

Project: E22882.E09

1.4 Report Structure

The structure of this report is as follows:

- Description of the Moore Point Precinct study area, including its current land zoning and proposed uses, based on the Draft Masterplan for the precinct (**Section 2**);
- A review of the environmental setting in terms of topography, drainage, geology, soils, acid sulphate soil, groundwater conditions, landfilling and reclamation (**Section 3**);
- An appraisal of potential contamination based on Precinct history and previous environmental investigation reports, aerial photographs, searches of government-maintained public databases, including records of past and present underground petroleum storage systems (**Section 4**);
- Development of a preliminary conceptual site model for the precinct as a whole (**Section 5**);
- The identification of gaps in the precinct characterisation data set, which require closure to properly inform remedial action planning (**Section 6**); and
- Review remediation and management options for the areas of known contamination and outline a feasible remedial strategy, including a contingent remedial action procedure for new areas found to be impacted during data gap closure investigations (**Section 7**).
- Broad cost estimates for implementation of the data gap closure and site remedial strategy will be provided under a separate letter report.

1.5 Methodology

The Study involved a desktop review (Task 1), review of previous reports to identify potential / specific contamination (Tasks 2 and 3), identification of data gaps and closure requirements (Task 4) and potential remedial/management options with indicative cost estimates (Task 5). The methodology for these tasks was as follows:

1.5.1 Task 1 – Desktop Review

- Review of current land use maps of the precinct sourced from the Liverpool Local Environmental Plan 2008;
- Review of Liverpool City Council's *Draft Local Strategic Planning Statement – A Land Use Vision to 205*0 to gain an appreciation on envisaged land use changes within the precinct;
- Identifying current land uses, including current occupiers across the precinct via a 'virtual drive-by' assessment and use of cadastral map boundaries and aerial photographic imagery;
- Review of the precinct's environmental setting, based on topographic, geological and soil maps, and publically available groundwater bore records;
- Review the contaminated land public registers maintained by the NSW EPA, to identify sites recognised by the EPA as potentially contaminated under Section 60 of the Contaminated Land Management Act 1997 and/or subject to regulatory notices; and
- Searches for archived SafeWork NSW records relating to the storage of dangerous goods, in particular underground petroleum storage systems.

1.5.2 Task 2 – Review of Previous Reports

A number of individual sites within the precinct have been subject to previous environmental investigations. There are other sites however, which have not yet been assessed. This task involved a review of available site environmental investigation reports to determine what are currently known to be the potential sources, nature, degree and extent of contamination.

1.5.3 Task 3 – Preliminary Conceptual Site Model

Task 1and 2 findings were used to develop a Preliminary Conceptual Site Model (CSM) for the precinct, with the aim of summarising the sources, pathways and receptors for the contaminants of potential concern. The following factors were considered in developing the model:

- Former site use and potential contaminating activities;
- The types of chemicals likely to have been used onsite;
- Local geological and hydrogeological conditions;
- Potential land filling and land reclamation works; and
- Current site conditions as could be observed from the street frontage.

1.5.4 Task 4 – Data Gap Closure Requirements

The Preliminary CSM identified data gaps in the existing site characterisation data set. Data gap closure was deemed necessary for the purpose of properly informing any future environmental remediation works within the precinct. A summary outline of recommended data gap closure investigations was developed to be implemented in areas of the precinct where the site characterisation data set is currently limited.

1.5.5 Task 5 – Remediation/Management Options and Cost Estimation

A significant portion of the precinct area was considered as having a medium to high risk of being contaminated to some extent. Some form of remediation and management may therefore be required in localised areas on specific sites prior to redevelopment. Task 5 involved an overview of available remediation and management options for medium and high risk sites within the precinct, including a contingent remedial action procedure for new impacted areas that may be discovered by the data gap closure investigations.

1.6 Regulatory Framework and Information Sources

The sources of regulatory information for the Study are listed in **Table 1-1**.

Table 1-1 Sources of Information

Attribute	Source
Street names and locations	http://maps.six.nsw.gov.au (NSW Dept. Finance and Spatial Services Information eXchange), i.e. Spatial Services
Lot and Deposited Plan (DP)	http://maps.six.nsw.gov.au (Spatial Services digital cadastral database)
Property boundaries	http://maps.six.nsw.gov.au (Spatial Services digital cadastral database)
Aerial photo image (used in report figures)	http://maps.six.nsw.gov.au (current as at July 2019)
Historical aerial photographs	1930, 1943 - NSW Land and Property Information, hard copies of aerial photographs; 1965, 1991, 2002 - Nearmap Ltd
Current land use zoning map	Liverpool Local Environmental Plan 2008 (current version 22 March 2019)
Structure Plan and Proposed Land Uses	Liverpool City Council's Local Strategic Planning Statement: Structure plan map (pages 20-21) and Liverpool city centre and surrounding area inset map (page 22)
EPA Register of Notices issued under the CLM Act	http://www.epa.nsw.gov.au/prclmapp/searchregister.aspx, NSW EPA website, search performed on 12 July 2019
EPA Register of contaminated sites notified to the EPA under Section 60 of the CLM Act	http://www.epa.nsw.gov.au/clm/publiclist.htm, NSW EPA website, 12 July 2019

Attribute	Source
EPA Register of sites holding Environment Protection Licences	http://www.epa.nsw.gov.au/prpoeoapp/, NSW EPA website, 12 July 2019
Topography	http://maps.six.nsw.gov.au (current as at July 2019)
Geology	Sydney 9130 (1:100,000 scale) Geological Sheet, NSW Dept. of Mineral Resources, 1983
Soils	Sydney Soil Landscape Series Sheet 9130 (1:100,000 scale), Soil Conservation Service of New South Wales, undated
Acid Sulfate Soils	NSW Dept. of Land and Waste Conservation, (1:25,000 scale) Acid Sulfate Soils Risk Map, Edn. 2, Liverpool; and Liverpool Local Environmental Plan 2008, Acid Sulfate Soil Map, Sheets ASS-011, ASS-012 (1:5,000 scale) and ASS014 (1:20,000 scale)
Current site use	Google street view (July 2019)

The following guidelines and legislation were also referred to in completing the Study:

- *State Environmental Planning Policy (SEPP) 55 - Remediation of Land*;
- EPA (1995) *Sampling Design Guidelines*;
- EPA (2014a) *Waste Classification Guidelines*;
- EPA *Resource Recovery Orders* and *Resource Recovery Exemptions* (as listed at http://www.epa.nsw.gov.au/wasteregulation/orders-exemptions.htm);
- *Protection of the Environment (Underground Petroleum Storage System) Regulation 2008*;
- EPA (2017) *Contaminated Land Guidelines for the NSW Site Auditor Scheme*;
- NEPC (2013) *National Environment Protection (Assessment of Site Contamination) Measure 1999 – 2013 Amendment*; and
- OEH (2011) *Guidelines for Consultants Reporting on Contaminated Sites*.

2. Precinct Planning Information

2.1 Study Area and Land Parcel Identification

The Moore Point Precinct covers an area of approximately 38.5 hectares and is bound by Georges River to the north and west, Newbridge Road to the south, and a recreational area comprising Haigh Park, Lake Moore and the islands of Bulba-Dibeen and Gandandgara to the east. It comprises 26 separate land parcels, for which the Lot and Deposited Plan (DP) details are listed in the inset shown on **Figure 2-1**.

2.2 Current Land Use Zoning

In accordance with the Liverpool Local Environmental Plan 2008 (LEP), the current land use zoning for the various parts of the precinct is illustrated on **Figure 2-2**. The precinct currently comprises two land use zones as follows:

2.2.1 Zone RE1 Public Recreation

The triangular land parcel covering approximately 0.95 hectare in the southwest corner of the precinct, is currently zoned *RE1 Public Recreation*. For the purposes of this study, this area is identified as land parcel "Y" and comprises Bill Morrison Park, Haig Avenue and the northern edge of Newbridge Road to approximately 200m east of Georges River.

The key objectives of the *RE1* zone are:

- To enable land to be used for public open space or recreational purposes;
- To provide a range of recreational settings and activities and compatible land uses;
- To protect and enhance the natural environment for recreational purposes;
- To provide equitable distribution of public open space to meet the needs of residents; and
- To ensure the suitable preservation and maintenance of environmentally significant, or environmentally sensitive land.

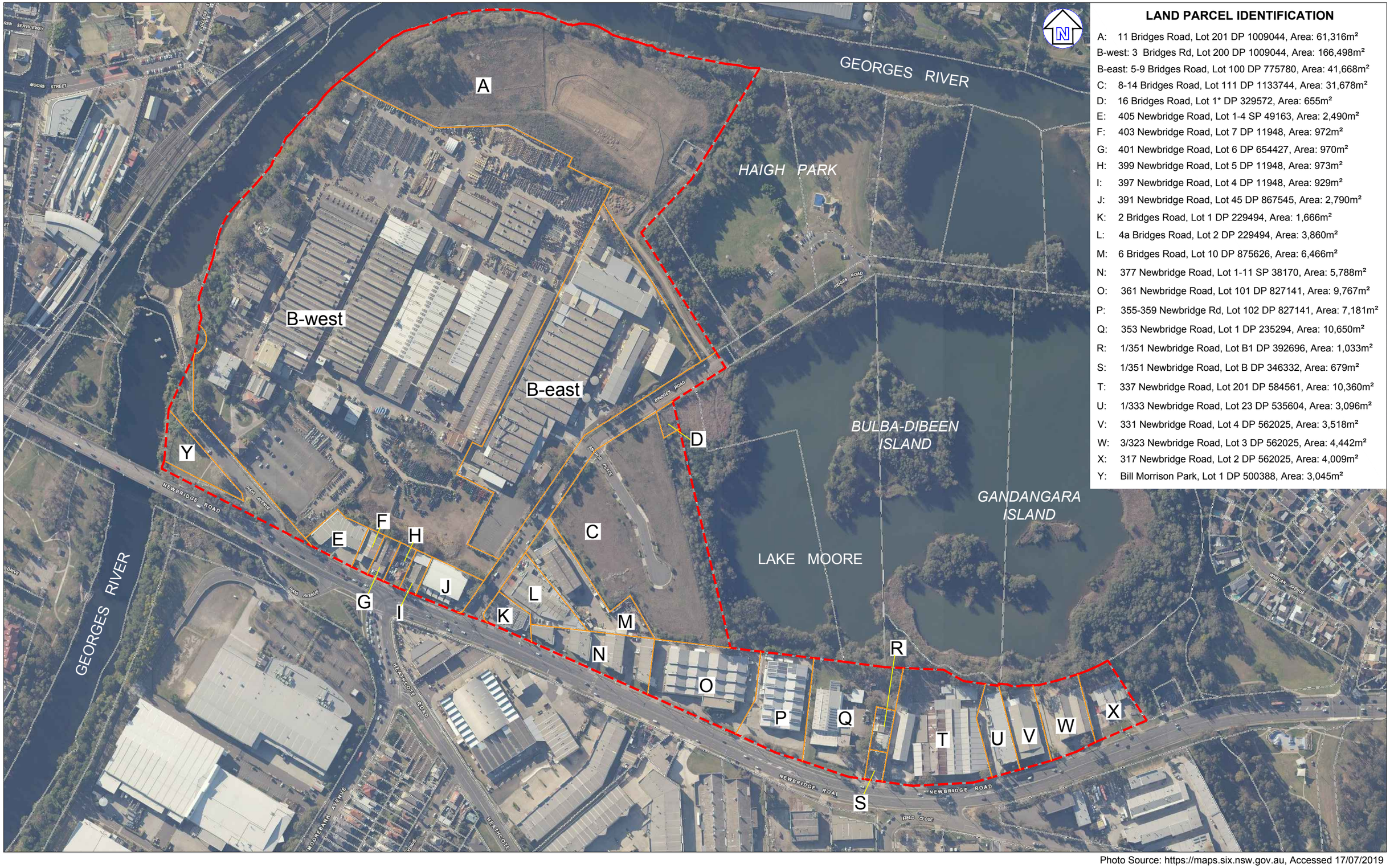
Development permitted with consent in *RE1* zoned land includes, but is not limited to, entertainment facilities, marinas, mooring pens, indoor and outdoor recreation facilities.

2.2.2 Zone IN2 Light Industrial

The remaining 39.05 hectares (approximate) of the precinct are zoned *IN2 Light Industrial*, the objectives of which are:

- To provide a wide range of light industrial, warehouse and related land uses;
- To encourage employment opportunities and to support the viability of centres;
- To minimise any adverse effect of industry on other land uses;
- To enable other land uses that provide facilities or services to meet the day to day needs of workers in the area;
- To support and protect industrial land for industrial uses; and
- To allow other land uses that are compatible with industry and that can buffer heavy industrial zones while not detracting from centres of activity.

Development permitted with consent in *IN2* zoned land includes, but is not limited to, boat building and repair facilities, industrial training facilities, light industries, liquid fuel depots, service stations, timber yards, transport and truck depots, vehicle body repair workshops and warehouse or distribution centres.



LAND PARCEL IDENTIFICATION

A: 11 Bridges Road, Lot 201 DP 1009044, Area: 61,316m²
B-west: 3 Bridges Rd, Lot 200 DP 1009044, Area: 166,498m²
B-east: 5-9 Bridges Road, Lot 100 DP 775780, Area: 41,668m²
C: 8-14 Bridges Road, Lot 111 DP 1133744, Area: 31,678m²
D: 16 Bridges Road, Lot 1* DP 329572, Area: 655m²
E: 405 Newbridge Road, Lot 1-4 SP 49163, Area: 2,490m²
F: 403 Newbridge Road, Lot 7 DP 11948, Area: 972m²
G: 401 Newbridge Road, Lot 6 DP 654427, Area: 970m²
H: 399 Newbridge Road, Lot 5 DP 11948, Area: 973m²
I: 397 Newbridge Road, Lot 4 DP 11948, Area: 929m²
J: 391 Newbridge Road, Lot 45 DP 867545, Area: 2,790m²
K: 2 Bridges Road, Lot 1 DP 229494, Area: 1,666m²
L: 4a Bridges Road, Lot 2 DP 229494, Area: 3,860m²
M: 6 Bridges Road, Lot 10 DP 875626, Area: 6,466m²
N: 377 Newbridge Road, Lot 1-11 SP 38170, Area: 5,788m²
O: 361 Newbridge Road, Lot 101 DP 827141, Area: 9,767m²
P: 355-359 Newbridge Rd, Lot 102 DP 827141, Area: 7,181m²
Q: 353 Newbridge Road, Lot 1 DP 235294, Area: 10,650m²
R: 1/351 Newbridge Road, Lot B1 DP 392696, Area: 1,033m²
S: 1/351 Newbridge Road, Lot B DP 346332, Area: 679m²
T: 337 Newbridge Road, Lot 201 DP 584561, Area: 10,360m²
U: 1/333 Newbridge Road, Lot 23 DP 535604, Area: 3,096m²
V: 331 Newbridge Road, Lot 4 DP 562025, Area: 3,518m²
W: 3/323 Newbridge Road, Lot 3 DP 562025, Area: 4,442m²
X: 317 Newbridge Road, Lot 2 DP 562025, Area: 4,009m²
Y: Bill Morrison Park, Lot 1 DP 500388, Area: 3,045m²

Photo Source: https://maps.six.nsw.gov.au, Accessed 17/07/2019

LEGEND
- Approximate precinct boundary
- Approximate lot boundaries

0 50 100 150 200 250
Approx. Scale (m)

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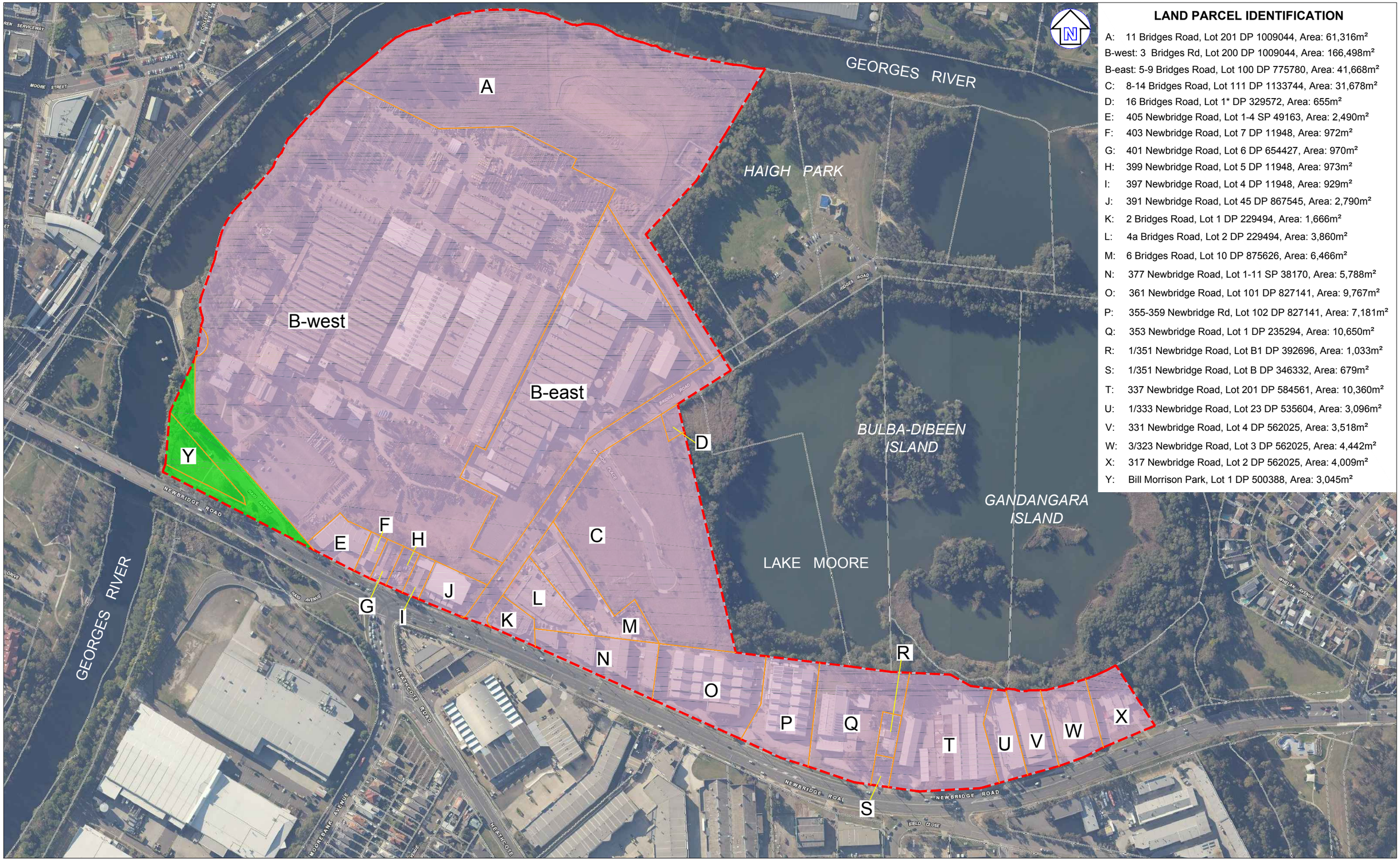
Moore Point Precinct Review Study
Part 1: Contamination, Acid-Sulfate Soils and Remedial Strategy
Newbridge & Bridges Roads, Liverpool NSW

Land Parcel Identification

Figure: 2-1

Project: E22882.E09



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X: 317 Newbridge Road, Lot 2 DP 562025, Area: 4,009m²
Y: Bill Morrison Park, Lot 1 DP 500388, Area: 3,045m²

Land Zoning information is obtained from Liverpool Local Environmental Plan 2008 - Current version for 22 March 2019 to date (accessed 17 July 2019)

Photo Source: https://maps.six.nsw.gov.au, Accessed 17/07/2019

LEGEND

- Approximate precinct boundary
- Approximate lot boundaries
- IN2: Light Industrial zone
- RE1: Public Recreation zone

0 50 100 150 200 250
Approx. Scale (m)

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Newbridge & Bridges Roads, Liverpool NSW

Current Land Use Zoning

Figure: 2-2

Project: E22882.E09

2.2.3 Current Land Uses

A virtual drive-by was conducted across the front of each land parcel within the precinct using Google Street View (dated April 2016). Observations in relation to land uses and site activities at that time are summarised in **Table 2-1**.

Table 2-1 Current land use based on street view imagery (April 2016)

Site ID [1]	Site Address	Business name	Description	Land use type
A	11 Bridges Road	Unused site	Viewing access unavailable due to private gate at driveway entrance	Vacant land
B-west	3 Bridges Road	Prysmian	Cable spools in outdoor storage area, carpark adjacent to Haigh Avenue, multiple factory buildings	Industrial
B-east	5-9 Bridges Road	Joyce Foam Products	Multiple factory buildings	Industrial
C	8-14 Bridges Road	Unused site	Vegetated with grass and weeds, trees located around site perimeter	Vacant land
D	16 Bridges Road	Unused site	Vegetated with grass, weeds and small trees, green Colourbond ® fence at west and north boundaries	Vacant land
E	405 Newbridge Rd	Total Tools, Bells Carpet Court	Concrete-paved site with two retail tenants, and front carpark	Commercial
F	403 Newbridge Rd	MPE – Mura's Plastic Extrusions	2-storey office/factory building with concrete driveway, carpark and lawn	Commercial
G	401 Newbridge Rd	Gearbox Solutions	2-storey, mechanical workshop, concrete driveway and carpark	Commercial/ Industrial
H	399 Newbridge Rd	Residence	1-storey, weatherboard residence with double garage, used for car parking	Residential/ Commercial
I	397 Newbridge Rd	Pioneer DJ, Showtime	Show production audio, lighting, rigging, staging retailer	Commercial
J	391 Newbridge Rd	Pay Less and Carwash Cafe	Self-storage business, Auto washing and detailing business	Commercial/ Industrial
K	2 Bridges Rd	Caltex	Petrol service station with 8 bowser pumps	Commercial/ Industrial
L	4a Bridges Rd	Andrews Smash Repairs Pty Ltd	Auto body repairs workshop	Commercial/ Industrial
M	6 Bridges Rd	Jordbellows International P/L	Manufacturer of metal expansion joints	Industrial
N	377 Newbridge Rd	Various, incl. Allstaff Australia	Four industrial buildings, 10 separate commercial light industrial units	Commercial/ Industrial
O	361 Newbridge Rd	ICON Furniture	Factory building used for the manufacture and wholesale of furniture	Commercial/ Industrial
P	355-359 Newbridge Rd	Seafood Warehouse & Taitung Food	Asian grocery retail and food products supplier	Commercial
Q	353 Newbridge Rd	Diesel Drive	Hino diesel engines and auto parts supplier, bitumen and concrete	Commercial
R, S	351 Newbridge Rd	Big O Tyres	Auto tyres retailer/fitter (Note: parcel R may be separate use at rear, uncertain)	Commercial

Site ID [1]	Site Address	Business name	Description	Land use type
T	337 Newbridge Rd	Wilson & Gilkes P/L	Precision metal products manufacturing and audio visual products	Commercial/ Industrial
U	333-335 Newbridge Rd	Various	Commercial units: include bathroom supplies, carpet, tiles, dance/drama studio, gymnasium and offices	Commercial
V	331 Newbridge Rd	Studio Bagno, Kings Academy	Martial arts academy and yoga centre	Commercial
W	323 Newbridge Rd	Carpet Warehouse	Business liquidation warehouse and Carpet supplier	Commercial
X	317 Newbridge Rd	Carasel Towbars	Towbars and trailers workshop	Commercial
Y	Corner reserve	Bill Morrison Park	Public open space, trees and grass	Recreational

Note: (1) Lot and DP numbers for individual land parcels are shown in **Figure 2-1**.

2.3 Proposed Land Uses

Liverpool City Council's (Council's) Local Strategic Planning Statement has identified the Moore Point Precinct as an area where residential / mixed use is envisaged to support the Liverpool central business district and provide scope for innovation in land use integration.

Based on a Council Workshop presentation by SJB Urban (Architects, Planners, Urban and Interior Designers) on 24 July 2019, the draft Moore Point Masterplan encompasses six main areas of mixed land use zones as follows:

- *Vibrant Public Riverfront* adjacent to Georges River to the west;
- *Passive River and Parkfront* adjacent to Georges River to the north;
- A centrally located *Formal Grid Core and East to West Parkway*;
- An area reserved for *Education and Mixed Use* adjacent to Lake Moore at centre east;
- *Lakefront Mixed Use* adjacent to Lake Moore at south east; and
- *Newbridge Road Edge* mixed use at centre south.

Selected figures showing the preliminary masterplan concept (Ref. SJB Urban, 2019), are presented in **Appendix A.**

3. Environmental Setting

3.1 Topography and Drainage

With ground surface elevations generally between 7 and 9 metres relative to Australian Height Datum (m AHD), the topography across the precinct is generally level, grading to lower elevations with increasing proximity to the Georges River. Ground elevation at the western edge of Lake Moore is approximately 2m AHD.

A relatively steep embankment occurs at the northern boundary on parcel A (11 Bridges Rd, see **Figure 2-1**) and along the western boundary on parcel B-west (3 Bridges Rd), which continues to the river's edge.

Stormwater drainage is expected to flow in a direction that is consistent with ground surface topography, either to the municipal stormwater system or to Lake Moore, via existing storm water pit and pipe drainage systems.

3.2 Geology

The shallow soil profile is characterised by an upper layer of fill, which generally varies between 2m and 4m in thickness, but can be up to 7.5m deep in the northern part of the precinct, in the western part of land parcel A (Ref. S&G, 2007). The fill layer comprises reworked natural clay, sand, crushed shale and sandstone in the middle to northern parts of the precinct. Previous intrusive investigations on land parcels A, C and D have also identified anthropogenic inclusions of timber, concrete rubble, ash, rubber, metal, foam and organic matter.

Natural soils are dominated by Tertiary to Quaternary-aged, fluvial sediments, which consist of quartz sand, silty sand, silty clay, clay and silt associated with Georges River alluvium.

The alluvium is underlain by Mid-Triassic Wianamatta Group bedrock materials, which may comprise shale, carbonaceous claystone, laminite and lithic sandstone of the Bringelly Shale, but are more likely characterised by the black to dark-grey shale and laminite of the Ashfield Shale, east of Georges River. Shale was encountered at approximately 16m below ground level (m bgl) in an industrial water supply bore drilled at 391 Newbridge Road (land parcel J) close to the corner of Newbridge and Bridges Roads (details for this and other bores in the vicinity of the precinct are summarised in **Section 3.5.2**).

3.3 Soils and Soil Landscape

The Penrith 1:100,000 Scale Soil Landscape Sheet 9030 (Ref. NSW Soil Conservation Service, undated) shows most of the soils within the precinct west of Lake Moore as the Blacktown (bt) residual soil landscape. The "*bt* " landscape consists of gently undulating rises on Wianamatta Group shales. This soil landscape also exhibits local relief to 30m, slopes typically less than 5%, with broad, rounded crests and ridges.

Blacktown landscape topsoils are shallow (<100 mm) to moderately deep (50 – 150 mm) and are described as *hardsetting mottled texture contrast soils*, *red and brown podzolic soils on crests*, *grading to yellow podzolic soils on lower slopes and in drainage lines*. This area is also characterised as comprising moderately reactive, high plasticity sub soil, with low soil fertility and poor soil drainage.

The soil landscape in the south-eastern part of the precinct, to the south of Lake Moore, is characterised as the Ricmetalsond (ri) fluvial soil landscape. The "*ri* " landscape in this area consists of Quaternary terraces of Georges River and is relatively flat and level, with slopes of less than 1%. Splays and levees provide local relief of less than 3m.

Ricmetalsond landscape soils are poorly structured, orange to red clay loams, clays and sands. Texture may increase with depth and ironstone nodules may be present. Plastic clays occur in drainage lines. Krasnozems, red earths and red podzolic soils occur on terrace surfaces, with earthy sands on terrace edges.

3.4 Acid Sulfate Soils (ASS)

The extent of ASS in the precinct was interpreted from two sources as follows:

- The Liverpool Acid Sulfate Soil Risk Map Series, Edition 2, Sheet 9030S2 at 1:25,000 scale, produced by the former Department of Land and Water Conservation (DLWC, 1997), shown for the precinct area on Map A in **Figure 3-1**; and
- The Acid Sulfate Soil Map Sheets ASS-011 and ASS-012 (at 1:5,000 scale) and Sheet ASS-014 (at 1:20,000 scale), produced by Council as part of the *Liverpool Local Environment Plan 2008*, which are shown for the precinct area on Map B in **Figure 3-1**.

3.4.1 Department of Land and Water Conservation 1997 – ASS Risk Map

According to the DLWC *Liverpool Acid Sulfate Soil Risk Map* the precinct lies within the following two class descriptions, as illustrated on Map A in **Figure 3-1**:

- *No Known Occurrence* - meaning acid sulfate soils are not known or expected to occur. Environmental risk is stated as: “land management activities are not likely to be affected by ASS materials”. The majority of the precinct, including the southern parts of the land parcels located to the south of Lake Moore, falls into this ASS map class description.
- *Ep1* – meaning low alluvial and estuarine plains, with high probability of ASS occurrence within 1m of the ground surface. The typical landform is low alluvial plains, estuarine sandplains, estuarine swamps and supratidal flats. The environmental risk is stated as: “severe environmental risk if acid sulfate soil materials are disturbed by activities such as shallow drainage, excavation or clearing”. This ASS class is limited to the land parcels C, D and M, and the northern portions of parcels N, O, P, Q, T, U, V, W and X.

Although not within the precinct boundary, the Lake Moore sediments are mapped as *Em* - estuarine bottom sediments below water level, with severe environmental risk if disturbed by activities such as dredging.

3.4.2 Liverpool Local Environmental Plan 2008 - ASS Maps

According to the *Liverpool LEP Acid Sulfate Soil Maps* the precinct lies within the following two ASS class descriptions, as illustrated on Map B in **Figure 3-1**:

Class 5 – Works within 500 m of adjacent Class 1, 2, 3 or 4 land that is below 5 m AHD, assuming that redevelopment will include footings and basement construction works, which are likely to require site dewatering, lowering the water table 1m AHD on adjacent Class 1, 2, 3 or 4 land. The majority of the precinct, including the southern parts of the land parcels located to the south of Lake Moore, is covered under the ASS map Class 5 description.

Class 3 – Works more than 1 metre below the natural ground surface, and works which are likely to lower the water table more than 1 metre below the natural ground surface. ASS map Class 3 is limited to the land parcels C, D and M, and the northern portions of parcels N, O, P, Q, T, U, V, W and X.

MAP A Legend

Map Class Description	Depth to Acid sulfate Soil Materials		Environmental Risk
High Probability High probability of occurence of acid sulfate soil materials within the soil profile. The environment of deposition has been suitable for the formation of acid sulfate soil materials. Acid sulfate soil materials are widespread or sporadic and may be buried by alluvium or windblown sediments.	Em Below water level	Bottom Sediments.	Severe environmental risk if bottom sediments are disturbed by activities such as dredging.
	Ep0	At or near the ground surface.	Severe environmental risk if acid sulfate soil materials are disturbed by activities such as shallow drainage, excavation or clearing.
	Ep1	Within 1 metre of the ground surface.	Severe environmental risk if acid sulfate soil materials are disturbed by activities such as shallow drainage, excavation or clearing.
		Between 1 and 3 metres below the ground surface.	Environmental risk if acid sulfate soil materials are disturbed by activities such as deep excavation for pipelines, dams or deep drains.
		Greater than 3 metres below the ground surface.*	Environmental risk if acid sulfate soil materials are disturbed by activities such as deep excavations, -e.g., large structure foundations or deep dams.
Low Probability Low probability of occurence of acid sulfate soil materials within the soil profile. The environment of deposition has generally not been suitable for the formation of acid sulfate soil materials. Soil materials are often Pleistocene in age. Acid sulfate soil materials, if present, are sporadic and may be buried by alluvium or windblown sediments.	Below water level	Bottom sediments.	The majority of these landforms are not expected to contain acid sulfate soil materials. Therefore, land management is generally not affected by acid sulfate soils. However, highly localized occurrences may be found, especially near boundaries with environments with a high probability of occurrence. Disturbance of these soil materials will result in an environmental risk that will vary with elevation and depth of disturbance.
		At or near the ground surface.	
		Within 1 metre of the ground surface.	
		Between 1 and 3 metres below the ground surface.	
	Ap4	Greater than 3 metres below the ground surface.*	
No Known Occurrence Acid sulfate soils are not known or expected to occur in these environments.		No known occurrences of acid sulfate soil materials.	Land management activities not likely to be affected by acid sulfate soil materials.
Disturbed Terrain	X4	Disturbed terrain (above 4m elevation) may include filled areas, which often occur during reclamation of low lying swamps for urban development. Other disturbed terrain includes areas which have been mined or dredged, or have undergone heavy ground disturbance through general urban development or construction of dams or levees. Soil investigations are required to assess these areas for acid sulfate potential.	

*Deep occurrences of acid sulfate soil materials not able to be confirmed by field inspection and sampling.

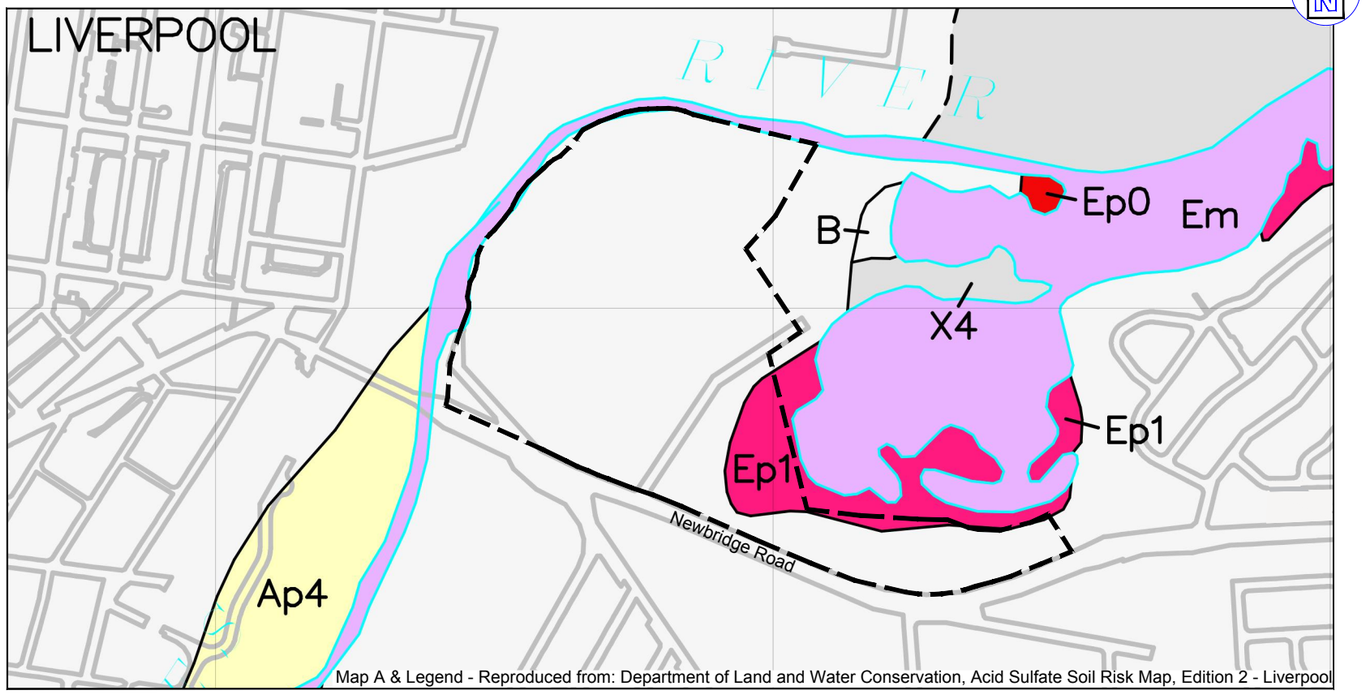
MAP B Legend

Colour Legend	Class of Land	Works
1	Class 1	Any works.
2	Class 2	Works below the natural ground surface. Works by which the watertable is likely to be lowered.
3	Class 3	Works more than 1m below natural ground surface. Works by which the watertable is likely to be lowered more than 1m below natural ground surface.
4	Class 4	Works more than 2m below natural ground surface. Works by which the watertable is likely to be lowered more than 2m below natural ground surface.
5	Class 5	Works within 500m of adjacent Class 1, 2, 3 or 4 land that is below 5m AHD by which the water table is likely to be lowered 1m AHD on adjacent Class 1, 2, 3 or 4 land.

Cadastre

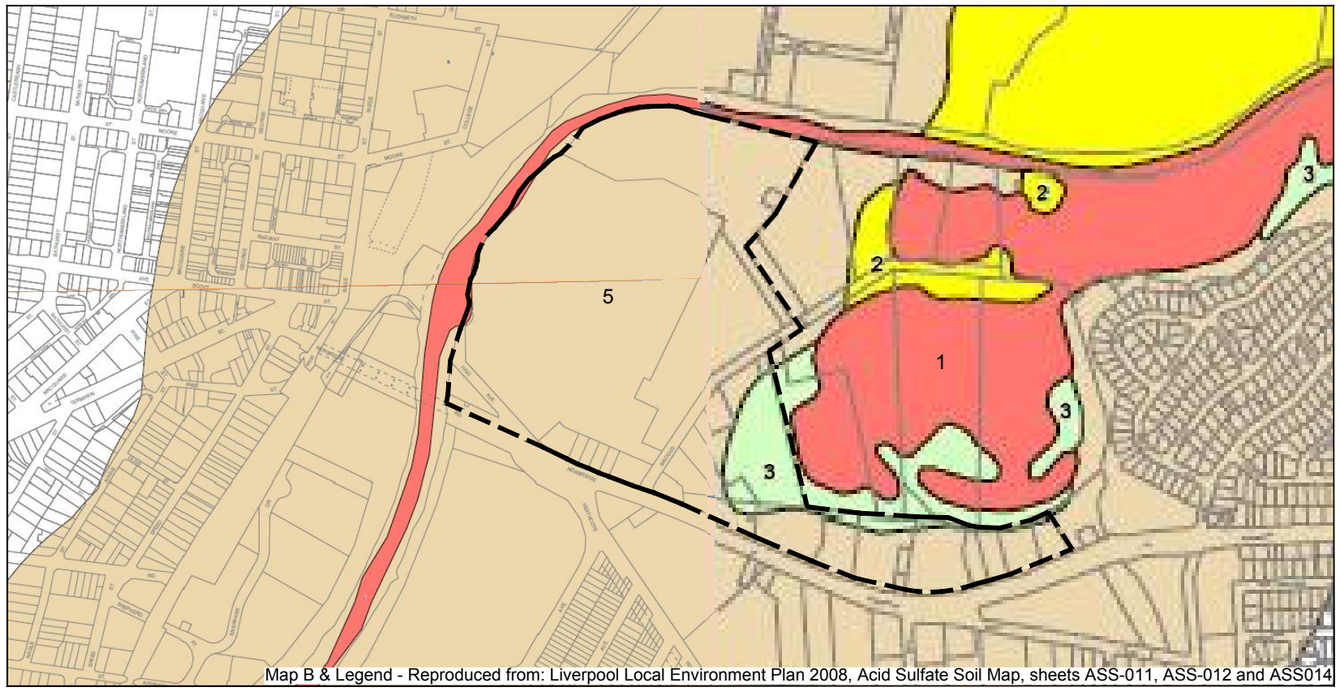
Cadastre 15/8/2008 © Dept of Lands

MAP A



Map A & Legend - Reproduced from: Department of Land and Water Conservation, Acid Sulfate Soil Risk Map, Edition 2 - Liverpool

MAP B



Map B & Legend - Reproduced from: Liverpool Local Environment Plan 2008, Acid Sulfate Soil Map, sheets ASS-011, ASS-012 and ASS014

LEGEND

Approximate precinct boundary

0 50 250 500 1000
Approx. Scale (m)

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	M.G.
Approved:	N.K.
Date:	02-08-19

LAC JV Pty Ltd
Moore Point Precinct Review Study
Part 1: Contamination, Acid-Sulfate Soils and Remedial Strategy
Newbridge & Bridges Roads, Liverpool NSW

Acid Sulfate Soil Maps

Figure: 3-1

Project: E22882.E09

Clause 7.7 of the LEP includes the following sub-clauses, which may be relevant to the envisaged Precinct redevelopment plan:

(1) The objective of this clause is to ensure that development does not disturb, expose or drain acid sulfate soils and cause environmental damage.

Development consent is required for the carrying out of works described in the Table to this subclause [shown in **Table 3-1**] *on land shown on the* ASS Map *as being of the class specified for those works.*

Table 3-1 Acid sulfate soil land classes and works requiring development consent

Class of land	Works
1	*Any works.*
2	*Works below the natural ground surface.* *Works by which the watertable is likely to be lowered.*
3	*Works more than 1 metre below the natural ground surface.* *Works by which the watertable is likely to be lowered more than 1 metre below the natural ground surface.*
4	*Works more than 2 metres below the natural ground surface.* *Works by which the watertable is likely to be lowered more than 2 metres below the natural ground surface.*
5	*Works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum by which the watertable is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.*

*Note: This table is to be used with reference to Map B on **Figure 3-1**.*

(2) Development consent must not be granted under this clause for the carrying out of works unless:

a) an ASSs management plan has been prepared for the proposed works in accordance with the Acid Sulfate Soils Manual *and has been provided to the consent authority, and*

b) a copy of the plan and a copy of the development application have been provided to the Director-General of the Department of Environment and Climate Change and the consent authority has considered any comments of the Director-General made within 21 days after those copies were provided to the Director-General.

(4) Development consent is not required under this clause for the carrying out of works if:

a) a preliminary assessment of the proposed works prepared in accordance with the Acid Sulfate Soils Manual *indicates that an ASSs management plan need not be carried out for the works, and*

b) the preliminary assessment has been provided to the consent authority and the consent authority has confirmed the assessment by notice in writing to the person proposing to carry out the works.

(5) Also, development consent is not required under this clause for the carrying out of any of the following works by a public authority (including ancillary work such as excavation, construction of access ways or the supply of power):

a) emergency work, being the repair or replacement of the works of the public authority required to be carried out urgently because the works have been damaged, have ceased to function or pose a risk to the environment or to public health and safety,

b) routine management work, being the periodic inspection, cleaning, repair or replacement of the works of the public authority (other than work that involves the disturbance of more than 1 tonne of soil),

c) minor work, being work that costs less than $20,000 (other than drainage work).

(6) Development consent is not required under this clause to carry out any works unless:

a) the works involve the disturbance of more than 1 tonne of soil, such as occurs in carrying out agriculture, the construction or maintenance of drains, extractive industries, dredging, the construction of artificial water bodies (including canals, dams and detention basins) or foundations or flood mitigation works, or

b) the works are likely to lower the watertable.

3.4.3 Assessment of ASS Risk

Based on the Liverpool LEP and DLWC ASS Risk Maps, it was concluded that there is a high probability of actual and/or potential ASS within the following parts of the precinct:

- The central and southern parts of land parcel C (8-14 Bridges Road);
- The southern part of land parcel D (16 Bridges Road);
- The south-eastern part of land parcel M (6 Bridges Road);
- The north-eastern part of land parcel N (2 Newbridge Road); and
- The northern part of land parcels O, P, Q, T, U, V, W and X, which are the sites at 361, 355-359, 353, 337, 1/333, 331, 3/323 and 317 Newbridge Road, respectively).

With reference to LEP Clause 7.7, Sub-clause 6 it is assumed that Precinct redevelopment will include disturbance of more than 1 tonne of soil and/or lowering of the water table for the construction of footings and basements. Such works would therefore trigger the need for development consent and an Acid Sulphate Soil Management Plan (ASSMP). This requirement has been addressed through the preparation of a Preliminary ASSMP, which forms the Part 2 report for this study, as mentioned in **Section 1.1**.

EI is not aware of any previous field investigations for ASSs on any parcel within the precinct. The lack of field investigation data in regards to ASS is considered to be a data gap. The need for characterisation of ASS conditions in high risk areas by targeted investigations is discussed in **Section 6**.

3.5 Groundwater

3.5.1 Regional Aquifer

Groundwater flows through the shallow alluvial sands and silty/clayey sands, which form the aquifer system beneath the precinct. These materials have been encountered during previous drilling investigations at between 6 to 10m bgl. The alluvial aquifer is considered to be a complex distribution of lower permeability clayey and silty sands, which interfinger with more hydraulically conductive sand and gravel lenses. This is demonstrated in the existing industrial water supply bore GW102641, located at the corner of Bridges and Newbridge Roads, which has been installed to screen gravel between depths of 14.2 and 16.1m bgl, as discussed in **Section 3.5.2**.

Previous groundwater investigations conducted in the northern part of the site (Ref. S&G, 2007) have indicated groundwater levels in the alluvium ranging between 5.8 and 9.8m bgl, with interpreted groundwater flow towards Georges River, with an estimated hydraulic gradient of between 0.1 and 0.2 m/m.

Although deeper groundwater is known to occur within the underlying fractured bedrock, which was encountered at approximately 16 m bgl close to the southern boundary of the precinct, the Ashfield Shale is not considered a viable aquifer resource due to its characteristically low hydraulic conductivity and the naturally saline groundwater moving through it.

3.5.2 Groundwater Use

An online search of registered groundwater bores was conducted by EI on the 6 August 2019 through the NSW Office of Water (Ref. https://realtimedata.waternsw.com.au/water.stm). A total of nineteen (19) registered bores were identified within approximately 200m of the precinct centre. A summary of registered bores is presented in **Table 3-2**. A bore location plan and information sourced from the archived WaterNSW bore work summary forms are attached in **Appendix B**.

Table 3-2 Summary of registered water bores within 200m of the precinct boundary

Bore No.	Date Drilled	Drilled Depth (m)	SWL*/Salinity/Yield	Water-bearing unit	Bore Purpose
GW024497	01/10/1965	3.00	-	-	Waste Disposal
GW025907	01/04/1996	2.40			Waste Disposal
GW028330	01/11/1966	6.40	1.80 m / - / -	-	Waste Disposal
GW029192	01/11/1968	2.40	-	-	Waste Disposal
GW029194	01/11/1968	2.40	-	-	Waste Disposal
GW029195	01/11/1968	2.40	-	-	Waste Disposal
GW029196	01/11/1968	2.40	-	-	Waste Disposal
GW029197	01/11/1968	2.40	-	-	Waste Disposal
GW058697	01/07/1984	19.20	8.5 m / - / 0.13	Sand	Groundwater exploration
GW058698	01/07/1984	19.50	-	-	Groundwater exploration
GW102641	01/01/1998	16.70	5.13 m / - / 0.2	Gravel	Industrial
GW113068	10/07/2003	10.0	-	-	Monitoring Bore
GW113069	10/07/2003	10.0	-	-	Monitoring Bore
GW113070	10/07/2003	10.0	-	-	Monitoring Bore
GW113071	10/07/2003	10.0	-	-	Monitoring Bore
GW113072	11/07/2003	9.50	-	-	Monitoring Bore
GW113073	11/07/2003	10.0	-	-	Monitoring Bore
GW113074	11/07/2003	10.0	-	-	Monitoring Bore
GW113075	11/07/2003	9.5	-	-	Monitoring Bore

Notes: - Data not recorded; * SWL - Standing water level measured in m bgl; Salinity – units unspecified; Yield – well yield measured in L/s (litres per second).

Nine of the registered bores are located within the precinct area, comprising a low-yielding, industrial water supply bore (identified as bore GW102641) installed in 1998 on land parcel J (391 Newbridge Rd), and eight environmental monitoring bores (GW113068 to GW113075) installed in 2003 within land parcel A (11 Bridges Rd), in the northern part of the precinct.

The remaining ten bores were located outside the precinct boundary. These comprised eight shallow bores (maximum depth 6.4m bgl) registered for waste disposal uses, and two deeper bores (GW058697 and GW058698), completed to around 19m depth, located to the north of Georges River, which were registered for ground water exploration purposes.

Based on the inferred groundwater flow direction towards Georges River and Lake Moore (as described in **Section 3.5.1**), the industrial water supply bore (GW102641) at 391 Newbridge Road, is located up hydraulic gradient in relation to potential contamination sources that may have resulted from historical industrial operations within the precinct. The potential risk of exposure to contaminated groundwater pumped from this bore is therefore considered to be low.

In view of the above findings and the fact that a reticulated water supply is available in the area, it is unlikely that groundwater extraction for beneficial domestic use will be taking place within the precinct, or the surrounding areas.

3.6 Landfilling

The northern and eastern parts of the precinct have been reported as having been subject to periods of landfilling for the purpose of raising the level of the land to reduce the risk of inundation from Georges River and Lake Moore during major storm events. Previous intrusive investigations have encountered fill materials either as widespread filling, as is the case across most of the area within land parcels A, C and D, or as localised areas where industrial waste has been buried in parts of land parcels B-west and B-east.

The presence of fill has been documented for previously investigated areas, as follows:

- Parcel A (11 Bridges Road) was described as having received filling between the late 1940s until the 1990's (Ref. S&G, 2007) for site relevelling purposes. The fill was described to have predominantly included inert wastes from adjacent sites and excess soils from large commercial and residential developments within the Liverpool area.
- Parcel B-west (3 Bridges Road) has been documented as having localised areas of ash fill on the western boundary, with asbestos in soil described as boiler lagging and fibro-cement fragments (Ref. URS, 2000). Limited fill has been identified in other parts of this site; however, up to six buried drums were been found from trenching investigations in the area described as "north of Factory 8", located in the central-north part of this land parcel. Drum contents were not assessed, but were suspected to comprise isocyanate chemicals. It is not known if these drums were subsequently removed from the site.
- Parcels C and D (8-16 Bridges Road) were described by DP (2015) as having been filled to form a platform to raise this site around 2m to 4m above the surrounding areas to the north, south and west, and approximately 5m to 6m above Lake Moore to the east, with embankments formed to meet the surrounding land. Site inspection observations identified silty clay surficial fill, with sandstone and shale inclusions. Sporadic fragments suspected to be asbestos-containing materials (ACM) were also documented on the ground surface.

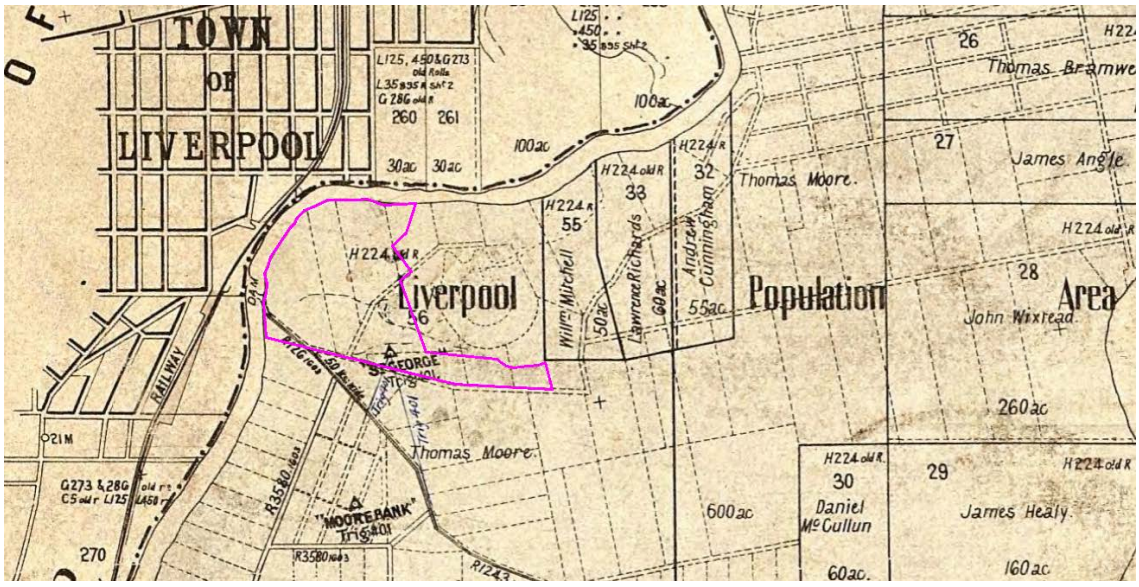
4. Contamination Appraisal

4.1 History of Moore Point

Moore Point Precinct forms the northern part of the suburb of Moorebank. The locality was named after the first British settler in the area, Thomas Moore, who arrived from England in 1792 and was appointed by Governor Macquarie to build the new town of Liverpool after it was proclaimed in 1810.

A historical land titles search performed for land parcel B-west as part of a Phase 1 environmental assessment by Woodward-Clyde (Ref. WC, 1999) found that the site was part of an original land grant to Thomas Moore. The land was consolidated and subdivided between 1918 and 1925, and subsequently relinquished as separate lots for a mixture of residential and market garden uses. This was consistent with circa-1900 maps of the area which indicated that the precinct was an amalgamation of rural paddocks and cultivated areas, as indicated by the 1899 Parish of Holsworthy Map, presented with the precinct area outlined in **Figure 4-1**.

Figure 4-1 Historic Map of Moore Point Precinct Area (circa 1899)



Various lots within the area were progressively acquired by private corporations from the time of World War II, which marked the commencement of industrial development within the area. Additional historical information, derived from aerial photographs sourced from NSW Land and Property Information and Google Earth, is provided in **Appendix C**.

4.2 Available Environmental Reports

Land parcel locations and identification details are listed in **Figure 2-1**. At the time of this review environmental reports were not available for the land parcels E to L, N and P to Y. The following environmental reports provided pertinent information in regards to site contamination, for the remaining parts of the precinct:

Area A (11 Bridges Road)

- Soil & Groundwater Consulting (2007) *Environmental Site Assessment – Phase 1 and 2, Metal Manufacturers Site, 11 Bridges Road, Moorebank, New South Wales,* Doc Ref: SG071485 RP01 Revision 1, 14 December 2007;

- The Planning Group NSW Pty Ltd (2013) *Statement of Environmental Effects, Proposed Industrial Warehouse Building, 11 Bridges Road, Moorebank, Lot 201 DP 1009044*, Report to Proactive Property (NSW) Pty Ltd, Doc Ref: 213.0176, 15 October 2013;
- JK Geotechnics (2013) *Geotechnical Investigation for Proposed Warehouse Development at 11 Bridges Road, Moorebank, NSW,* Report to Proactive Property (NSW) Pty Ltd, Doc Ref: 27021Zrpt, 2 December 2013; and
- Landpac Technologies Pty Ltd (2014) *Report Impact Compaction Trial, 11 Bridges Road, Moorebank NSW*, Report to Unit Process Consulting, Doc Ref: R1000-01 Issue A, 30 October 2014.

Area B (B-West: 3 Bridges Road / B-East: 5-9 Bridges Road)

- AGC Woodward-Clyde Pty Ltd (1999) *Phase 1 Environmental Due Diligence*, *1 Heathcote Road, Liverpool NSW*, Doc Ref: A8602126\0001, 8 January 1999;
- URS Australia Pty Ltd (2000a) *Draft Phase 2 Environmental Site Assessment of Pirelli Cables Australia Ltd, 1 Heathcote Road, Liverpool NSW*, Doc Ref: A8602126\0003, August 1999;
- URS Australia Pty Ltd (2000b) *Letter Report: Additional Phase 2 Investigation – 1 Heathcote Road Liverpool*, Doc Ref: 41897\005\L010, 5 September 2000;
- Responsive Environmental Solutions (2003) *Phase Separated Hydrocarbon Delineation Investigation Final Report, Pirelli Cables, 1 Heathcote Rd, Liverpool NSW*, Doc Ref: 3013RP1, 18 September 2003;
- Responsive Environmental Solutions (2004) *Letter Report: Groundwater Sampling Results, Pirelli Cables Liverpool* (RES Ref: 4016L01, 11 May 2004);
- Responsive Environmental Solutions (2005a) *Product Recovery, 6 Monthly Report Update (January to June 2005), Pirelli Cables, 1 Heathcote Rd, Liverpool NSW* (RES Ref: 14001_RP03, 20 July 2005);
- Responsive Environmental Solutions (2005b) *Letter Report: Groundwater Sampling Results, Pirelli Cables Liverpool* (RES Ref: 5053L01, 8 August 2005);
- MJM Environmental Pty Ltd (2012) *Preliminary Pollution Incident Report and Sampling Plan May 2012, Prysmian Power Cables & Systems Australia - Liverpool* (MJM Ref: BK030412A, 16 May 2012);
- Benbow Environmental (2013) *Environmental Site Assessment Factory 2 Coolant Release, Report for Prysmian Group Liverpool NSW* (BE Ref: 121081_Rep_Final, 30 January 2013);
- Environmental Strategies (2013a) *Supplementary Soil and Groundwater Investigation, Prysmian Power Cables & Systems Australia Pty Ltd* (ES Ref: 10355RP01, 20 June 2013);
- Prysmian Power Cables & Systems Australia Pty Ltd (2013) *Remedial Action Plan for Prysmian Power Cables & Systems Australia Pty Ltd, 1 Heathcote Road, Liverpool NSW 2170, Factory 2 – P1-88 Pit* (Internal Prysmian Report, 28 June 2013);
- Environmental Strategies (2013b) *Letter Report: Hydrocarbon Impacted Soil - Former Leaky In-Ground Pit, Factory 2, Prysmian Power Cables & Systems Australia Pty Ltd, 1 Heathcote Road, Liverpool, NSW* (ES Ref: 10355L01, 8 August 2013);
- Environmental Strategies (2013c) *Groundwater Monitoring Event (September 2013), Prysmian Power Cables & Systems Australia Pty Ltd, 1 Heathcote Road, Liverpool NSW* (ES Ref: 10355aRP01, 6 November 2013);
- Environmental Strategies (2013d) *Environmental Management Plan (EMP), Prysmian Power Cables & Systems Australia Pty Ltd, 1 Heathcote Road, Liverpool NSW* (ES Ref: 10355bRP01, 25 November 2013);

- Zoic Environmental Pty Ltd (2013) *Site Audit Report (SAR) and Site Audit Statement (SAS), Factory 2 Coolant Release, 1 Heathcote Road, Liverpool NSW, Prysmian Power Cables & Systems Australia Pty Ltd* (Zoic Ref: 13080 final, 20 December 2013);
- Environmental Strategies (2014a) *Groundwater Monitoring Event - December 2013, Prysmian Power Cables & Systems Australia Pty Ltd, 1 Heathcote Road, Liverpool NSW* (ES Ref: 10355aRP02, 13 January 2014);
- Environmental Strategies (2014b) *Groundwater Monitoring Event - February 2014, Prysmian Power Cables & Systems Australia Pty Ltd, 1 Heathcote Road, Liverpool NSW* (ES Ref: 10355aRP03, 21 March 2014);
- Environmental Strategies (2015) *Groundwater Monitoring Event - January 2015, Prysmian Power Cables & Systems Australia Pty Ltd, 1 Heathcote Road, Liverpool NSW* (ES Ref: 15001RP01, 11 February 2015);
- EI Australia (2015a) *Preliminary Site Investigation, 5-9 Bridges Road, Moorebank NSW* (EI Ref: E22745 AA_Rev0, 13 November 2015); which reviewed the following GDH Pty Ltd reports:
    - GHD Pty Ltd (2005) *Environmental Site Assessment, 5-9 Bridges Road, Moorebank NSW* (GDH Ref. 2113524/Moorebank_R001, April 2005);
    - GHD Pty Ltd (2006) *Annual Groundwater Monitoring, 5-9 Bridges Road, Moorebank NSW* (GHD Ref. 21\14244, September 2006);
    - GHD Pty Ltd (2010) *Extract from 2010 Groundwater Monitoring, 5-9 Bridges Road, Moorebank NSW* (GHD Ref. 21/20305/167236, February 2011); and
    - GHD Pty Ltd (2014) *December 2013 Groundwater Monitoring Event, Joyce Foam Manufacturing Plant, Moorebank NSW* (GHD Ref. 21/212190/0, January 2014).
- EI Australia (2016a) *Preliminary Site Investigation with Limited Sampling, 3 Bridges Road, Moorebank NSW* , Doc Ref: E22882 AA_Rev0, 30 March 2016;
- EI Australia (2016b) *Acid Sulfate Soil Management Plan, Liverpool Waterfront, 3-11 Bridges Road, Moorebank NSW* (EI Ref: E22882 AC_Rev1, 22 November 2016);
- EI Australia (2016c) *Preliminary Site Investigation, Liverpool Waterfront, 3-11 Bridges Road, Moorebank NSW* (EI Ref: E22882 AD_Rev1, 22 November 2016); and
- EI Australia (2016d) *Geotechnical Assessment Report; 3-11 Bridges Road, Moorebank NSW* (EI Ref: E22882 GA, 13 January 2017).

Areas C + D (8-14 and 16 Bridges Road)

- Douglas Partners Pty Ltd (2015) *Report on Contamination Data Review, Proposed Residential Development, 8-16 Bridges Road, Moorebank, NSW* (DP Project: 76647.00, 2 February 2015).
- Douglas Partners Pty Ltd (2008) *Environmental Management Plan, 8 Bridges Road, Moorebank, NSW* (DP Project: 44823.05, October 2008), Referenced in DP, 2015.

Area M (6 Bridges Road)

- EI Australia (2015b) *Preliminary Site Investigation, 6 Bridges Road, Moorebank NSW* (EI Ref: E22779 AA, 13 November 2015).

Area O (361 Newbridge Road)

- EI Australia (2015c) *Preliminary Site Investigation, 361 Newbridge Road, Liverpool NSW* (EI Ref: E22746 AA, 13 November 2015).

4.3 Review of Previous Contamination Investigations

The summary presented in this section is based on a review of previous environmental reports, which particularly focussed on:

- Site land use history;
- Lithological descriptions and thicknesses of fill and underlying natural soils;
- Groundwater conditions, including depth variations and flow direction;
- Identified chemicals (contaminants) of environmental concern;
- Assessment of analytical data against the human health, ecological, groundwater and waste classification criteria currently endorsed by the NSW EPA;
- The potential degree and extent of contaminated soils, soil vapour and groundwater;
- Waste classification(s) of fill/soils that require offsite disposal; and
- Gaps in the existing site characterisation data set.

4.3.1 Area A (11 Bridges Road)

Soil & Groundwater Consulting (SGC, 2007)

Soil & Groundwater Consulting completed phase 1 and 2 environmental assessments of the Metal Manufacturers Site in 2007, on behalf of Carney's Lawyers. The objectives of the assessment were:

- To identify "contamination issues associated with the past and present site usage, which may significantly impact on future use or development of the site, or pose probable public health and/or environmental risks" (Phase 1 site history component); and
- To collate "sufficient information to characterise any soil or groundwater contamination that may present a risk to human and environmental health and thus impact on future development / use of the site" (Phase 2 soil, groundwater and landfill gas investigation component).

At the time of this assessment, the land was proposed for commercial / industrial use.

Phase 1 Site History Assessment

Area A was part of the river flat adjacent the Georges River, initially used for market gardening prior to the 1940s. Four residences were constructed along the central southern area during this period, although they were demolished in the 1950s. In the late 1940s, filling of the river flat was commenced, to provide a useable landform for the industrial operations immediately south of Area A. The filling and levelling operations intensified between the 1950s and 1970s; thereafter, only minor works were performed until the mid-1990s. The fill materials were predominantly inert industrial wastes from the adjacent manufacturing operation (Area B), along with excess soils from large commercial and residential developments in the Liverpool area.

A chain mesh fenced compound, located in the western part of the area, was used from 1982 to 1990 for administration activities and the storage of construction and electrical servicing equipment. This compound was subsequently used for storage of cable drums and redundant equipment from Area B. Grit blasting of steel fabrications was also conducted in the area for a short period during 1992.

The property was subdivided and made separate from Area B in 2000, after which use of the land ceased and the property remained vacant.

Phase 2 Soil, Groundwater and Landfill Gas Investigations

The phase 1 assessment indicated that fill (comprising industrial waste materials) was present over a large portion of the parcel A area, while various commercial activities had taken place, including market gardening and metal (steel) fabrication. The potential for land contamination was assessed as *high*, which triggered more detailed assessment by way of intrusive soil, groundwater and landfill gas investigations, the findings of which are summarised as follows:

Soils

A total of 56 test pits were constructed across the area (TP1-TP56), to depths of up to 8.2m BGL. Most test pits encountered industrial wastes comprising concrete, timber, wire, metal, bricks, plastics and/or paper cable wrapping materials. At most locations, the fill was mixed with sandy and clayey soils. The depth (layer thickness) of filling was typically 2 to 4m, with a maximum measured layer thickness of 7.5m.

No significant olfactory evidence of contamination was detected during the walkover inspection and test pit works, with only minor earthy type odours identified at some sampling locations. Similar odours were noted in examined natural soils adjacent the Georges River, suggesting they were the result of natural organic materials in the sediments. Results from the in-field screening of headspace samples for volatile organic compounds (VOCs) using a portable photo-ionisation detector (PID) were all less than 2ppm. The low VOC concentrations were consistent with the lack of any significant odours.

Soil samples were laboratory analysed for the contaminants of potential concern (COPC) identified during the Phase 1 assessment and all laboratory results were below the EPA-endorsed acceptance criteria applicable to commercial /industrial sites. A number of exceedances of the adopted ecological investigation levels (EILs) were identified for various metals; however, all average concentrations were below the corresponding thresholds.

Groundwater

Twelve groundwater monitoring wells (GW01 to GW12) were installed and sampled during the investigation, each well was installed to screen the shallow, unconfined aquifer. In addition, three existing up-gradient monitoring wells, located within the adjacent manufacturing operation (Area B), were gauged for groundwater level. Groundwater samples were collected from two of the wells for laboratory analysis.

Inferred groundwater level contours suggested that groundwater flow was from the south toward the Georges River, consistent with regional expectations (i.e. a north / north westerly hydraulic gradient). Field parameters indicated the groundwater was fresh, with electrical conductivity (EC) results typically less than 800 µS/cm, and slightly to moderately acidic (pH: 4.7-6.8).

Laboratory analytical results for the submitted groundwater samples indicated that concentrations of filterable (i.e. dissolved) metals were below the adopted investigation levels applicable to freshwater ecosystem protection, with the exceptions of zinc (all wells) and selenium (three wells). The elevated dissolved selenium concentrations also slightly exceeded the respective primary contact, aquaculture and drinking water criteria, as well as the irrigation and stock watering criteria (two locations). Given that the exceedances were relatively minor, the inferred hydraulic conductivity of the shallow aquifer was low and that there was potential for substantial dilution, risks to the environmental values of the river posed by the identified metals were considered to be low.

All ammonia results exceeded the corresponding primary contact recreational criterion, although they were well below the investigation level applicable to freshwater ecosystem protection. Two nitrate results exceeded the corresponding investigation level applicable to freshwater ecosystem protection; however, both were for wells located near the southern (up-gradient) boundary of the area. Nitrate results in all down-gradient wells and closer to the

Georges River were below this criterion, indicating that nitrate was attenuated within the boundaries of the area and unlikely to pose any significant risk to the river environment.

The concentrations for most remaining COPC were either below the laboratory reporting limits, or below adopted assessment criteria, with the exception of one petroleum hydrocarbon result at GW06, located in the central southern portion. The medium to heavy hydrocarbon fraction was identified at 0.9 mg/L, which exceeded the adopted criterion for oil of 0.6 mg/L. Again, all down gradient wells reported petroleum hydrocarbon results below the laboratory reporting limits; hence, it appeared that the contamination was attenuated prior to migrating off-site.

Landfill Gas

The SGC groundwater monitoring wells were constructed such that their screens intersected the unsaturated material above the watertable, providing an opportunity for any landfill gas to migrate into the well. The wells were subsequently sampled using a landfill gas meter, to extract stagnant air and test the presence of methane, oxygen and carbon dioxide.

All methane results were below the detection limit and it was concluded that no potentially explosive landfill gas occurred within the fill layers. The oxygen and carbon dioxide results indicated that aerobic degradation was occurring, posing a potential risk to subsurface workers in unventilated, confined spaces.

Conclusion

On the basis that no significant soil and groundwater contamination was identified, SGC concluded that the area was suitable for on-going commercial / industrial use.

The scope of this assessment did not include investigation of potential ASS, since “the proposed development is not expected to intersect these deep materials and the development is unlikely to alter their saturation status”. Nevertheless, SGC stated that acid sulfate soils “may exist in the natural soils” and “if potential acid sulphate soils are to be intersected or disturbed by any works, then a management plan should be developed to mitigate and manage any risks to the environment that may arise as a result of these activities”.

The Planning Group NSW Pty Ltd (TPG, 2013)

The Planning Group NSW Pty Ltd produced a Statement of Environmental Effects (SEE) on behalf of Proactive Property (NSW) Pty Ltd in support of a Development Application (DA) to Liverpool City Council for the construction of an industrial warehouse building on 11 Bridges Road. The SEE was prepared in accordance with the provisions under Section 79C of the *Environmental Planning and Assessment Act 1979* and the *Environmental Planning and Assessment Regulation 2000* and provided the following information:

- At the time of SEE preparation Area A was vacant, undeveloped land zoned *IN2 Light Industrial*, under the Liverpool Local Environmental Plan 2008;
- Access to Area A was via an unsealed driveway; and
- The land immediately to the south (5-9 Bridges Road, Area D) was a warehouse complex, occupied by Joyce Foam Products.

Jeffery & Katauskas Pty Ltd (JKG, 2013)

This report presented the results of a geotechnical investigation, commissioned by Mr Richard Shoesmith of Proactive Property (NSW) Pty Ltd for the proposed ‘lightweight’ warehouse development. The purpose of the investigation was to obtain geotechnical information on subsurface conditions, as a basis for preliminary comments and recommendations in relation to the proposed development, including remediation options for the fill, footings, on-grade floor slabs and pavements.

The fieldwork was carried out using a truck-mounted rig on 13 November 2013 and comprised mechanical auger drilling of eight boreholes (BH101 to BH108) to a depth of 7.95m. The following relevant information was derived from these works:

- Area A is a battle-axe, roughly 'kidney' shaped property, approximately 400m long (east to west) by 120m wide (north to south). A 160m long access way extends northwards off Bridges Road.
- The land was gently undulating and was bounded by the southern bank of Georges River.
- The land was undeveloped, with the grass-covered ground surface sloping irregularly downwards to the north. Small trees were scattered around the site, with numerous medium and large trees located near the western end, with dense vegetation along the river foreshore.
- The foreshore was characterised by a batter of variable height. A ramp down to the river was located over the eastern end of the water frontage. The ramp was rock covered and incorporated a geofabric layer. Tension cracks up to 30mm wide were visible at the top edge.
- Fill was encountered in all boreholes, to depths between 1.5m (at bores BH101 and BH104) and 5.5m (at bores BH102 and BH103). The fill was variably compacted and generally comprised silty clay of low and medium plasticity, with bands of gravel and silty sand. Inclusions of gravel, slag, ash, concrete, timber, plastic and rubber were encountered within the fill mass.
- Natural sands were encountered below the fill in all boreholes, continuing to the termination depth at 7.95m BGL. The deposits comprised silty sand, clayey sand and sand, and varied erratically from very loose, loose and medium dense, with very loose sands often at the base of the profile.
- The groundwater level was found at approximately 7m depth in BH101 and BH106. Groundwater was not encountered within the remaining boreholes, except for some localised seepage at a depth of 2.5m, while drilling at location BH105. Water level gauging at the previously installed monitoring wells, showed groundwater levels between 7m and 8m bgl, with an inferred hydraulic gradient falling generally north towards Georges River.

Landpac Technologies Pty Ltd (2014)

This report described the impact compaction trial conducted on site filling materials within Area A. Uncontrolled fill was described to be predominantly silty clay and ranged in depth from 1.5 to 5.5m below the existing ground level.

Monitoring indicated that average compaction settlement on the *in situ* fill area had been reduced to acceptable levels with 40 surface passes using a Landpac, 3-sided Impact Compactor. The soil response monitoring indicated that the sub-grade was relatively uniform at the completion of the impact compaction works, with the exception of two weak areas.

4.3.2 Area B (3 and 5-9 Bridges Road)

Environmental reporting for Area B, also recognised as 1 Heathcote Road and the 'Prysmian Site', dated back to January 1999 and comprised phase 1 and 2 environmental assessments for due diligence purposes. In relation to pollution incidents, the works included a delineation investigation to define the extent of petroleum hydrocarbons impacts, product recovery assessment, groundwater monitoring, supplementary investigations, management planning and an audit statement by an EPA-accredited Site Auditor.

The reports were mostly commissioned by Metal Manufacturers Pty Ltd, Prysmian Power Cables & Systems Australia Pty Ltd and Coronation Property Company Pty Ltd.

The following information was reported for Area B as a whole:

- Area B was progressively built for commercial (industrial) use from the 1940s onwards, upon purchase by Cablemakers Australia Pty Ltd. Prior to that time, it was vacant land or used for farming, with small (possibly residential) structures being present.
- From 1942, Area B was used for the manufacture of electrical (overhead transmission) cables and polyurethane foam products, the latter being conducted by Joyce Australia Pty Ltd (trading as Joyce Foam Products) after 1990, upon purchasing the north eastern portion, referred to as area B-east for the purpose of this report.
- Licensing agreements with the NSW WorkCover Authority (currently SafeWork NSW) had been in place for the storage of dangerous goods on the premises, or at least sections thereof, dating back to 1995. The information included records relating to underground storage tanks (USTs).
- Licensing agreements with the EPA under the Protection of the Environment Operations Act 1999 (POEO Act) applied to identified industrial activities as described separately for the western and eastern parts of Area B, below.
- USTs had been present at several locations across Area B; however, it was understood that all USTs were removed by 2013, including eleven in the 1990s. No validation reports relating to tank and infrastructure removal, or the remediation of former UST areas, were known to be available. The absence of (active) USTs was consistent with the non-inclusion of USTs in the updated 2015 licence with the NSW WorkCover Authority (currently SafeWork NSW).
- Multiple above-ground storage tanks (ASTs) and liquid / solid waste areas were present across Area B.
- Coal fired boilers had been used on the area, although the last was decommissioned in the 1980s.
- Asbestos-containing materials (ACMs) were present within the buildings of Area B, including the roofing, external and internal walls, ceilings and floor coverings, pipe lagging, gaskets and electrical switchboards.

B-west (3 Bridges Road)

- Area B-west was subject to an EPA Environmental Protection Licence No. 818 for the identified industrial activities of '*Metal coating and metal waste generation*' under the POEO Act 1999 (see also **Section 4.4**).
- By the time of the AGC Woodward-Clyde Pty Ltd (AGC-WC, 1999) phase 1 assessment, this part of Area B was being used for the production of copper power cables of varying gauges. The principal operations were as follows:
    - Factory 1: elastomer insulated cable manufacture (dispatch operations at north end);
    - Factory 2: wire drawing operations (tinning line at northern end) this activity has since been discontinued);
    - Factory 3: wire drawing and insulation operations (raw material store at southern end);
    - Factory 4: PVC compounding (continuous batch mixing) and cable insulation;
    - Factory 5: crosslinked polyethylene-insulated cable production and silane mixing;
    - Factory 8: cable testing facility; and
    - Factory 9: use not stated.
- Other activities and facilities on this part of Area B included:
    - An old administration building and newer office building, north of the car park;

  - Engineering services, occupying various buildings west of Factory 1;
  - Scrap recovery buildings/area, north west of Factory 1;
  - Cable storage and despatch, north of Factory 1;
  - Flammable goods storage, south of the Raw Material Store and Factory 3;
  - Rubber compounding building, south of Factory 2; and
  - A drum storage area, north of Factory 5.

- Buried drums were reported north of Factory 8, the contents of which were unknown, but suspected to contain isocyanate.
- Metal- (copper-, lead- and zinc-) impacted filling was identified in the northern portion, within the open, unsealed storage section.
- Filling soils with fragments of ACM and boiler ash was identified in the western portion adjacent to the Georges River. This part of the area had been partly capped by geotextile and revegetated.
- Petroleum hydrocarbons were identified in soil and groundwater south of Factory 4. Well WS01 contained phase separated hydrocarbon (PSH) identified as *diesel*, which may have been associated with a former UST. A hydrocarbon product recovery system was operational from 2003 until at least August 2005.
- Petroleum hydrocarbons were identified in groundwater south-east of Factory 5. Well WS13 contained PSH (diesel), while dissolved hydrocarbons were detected in well WS14, which may have been associated with an up-gradient UST on the adjacent Joyce Australia Pty Ltd property.
- Trichlorofluoromethane (TCFM) was identified in the groundwater from well WS16 on the south-east boundary. TCFM was used by Joyce Australia Pty Ltd as a blowing agent when manufacturing polyurethane foam, with the liquid waste stored in a UST.
- Petroleum hydrocarbon-contaminated soils were identified to a depth of 4.5m in the south-west section of Factory 2. The contamination was due to leakage of approximately 13,000L of hydrocarbon-based, wire drawing coolant / lubricant (identified as WD4100) from the P1-88 Pit; but, was reported as not having impacted groundwater or dispersed laterally beyond the factory perimeter. The impact was managed by an Environmental Management Plan (EMP) developed by Environmental Strategies (ES, 2013d).
- A non-statutory Site Audit conducted by Ms Kylie Lloyd of Zoic Environmental Pty Ltd (NSW EPA-accredited Site Auditor 0302; Zoic, 2013) provided “an independent review of the suitability and appropriateness of environmental works completed in the P1-88 Pit area, within Factory 2” (which had an area of approximately 1120 m^2), as well as a determination on whether this part of Area B was “suitable for ongoing commercial / industrial use”.
- Following review of the reports completed by MJM Environmental Pty Ltd (MJM, 2012), Benbow Environmental (BE, 2013) and Environmental Strategies (ES, 2013a-d), the Site Auditor noted that “contamination exists at the affected part of the site from the WD4100 leak, however is suitable for the proposed land use”. The WD4100 fluid had not impacted local groundwater, but “monitoring and management under a site specific environmental management plan is required”. Subject to the implementation of the EMP, it was concluded in the audit statement that this part of Area B “can be made suitable for commercial / industrial use”.
- Quarterly groundwater monitoring was conducted within the area in 2005/2006, decreasing to biannual monitoring in 2007/2008, with annual groundwater monitoring thereafter. Monitoring results identified the continual presence of TCFM in the south western portion of

the site at monitoring wells DP101, W2, W3 and WS16. A very slow declining trend was reported; however, no evidence of natural attenuation was detected.

- By the time of the EI (2016a) preliminary investigation, the land uses within Area B and surrounding properties were still industrial in nature. 3 Bridges Road (Area B-west) was occupied by five large buildings (Factories 1 to 5), two smaller buildings (Factories 8 and 9), sheds and associated car parking facilities. The inventory of materials included steel and wooden cable reels (mostly in the northern portion), fourteen transformers, a water treatment plant (north-east portion), buried fill with ACMs (along the western boundary) and twenty-one ASTs, which stored plasticisers, extenders and resins; including four silos containing chemicals such as Boresafe HE3490 and Innoplus, which were used in the cable (polyethylene) making operations.
- Fifteen investigative boreholes (BH1 to BH15) were drilled by EI across accessible parts of the area, to a maximum depth of 8.5m bgl. Groundwater monitoring wells were installed in six of these bores (BH1M, BH3M, BH7M, BH10M, BH11M and BH13M).
- Based on the combined borehole logs, the site lithology was generalised as a layer of anthropogenic filling overlying alluvial (estuarine) clays and sands.
- Except for asbestos, laboratory analytical results for identified COPCs in the tested soil samples all complied with the adopted, human health-based investigation / screening levels applicable for residential land use with minimal access to soil. An exceedance for lead above the corresponding investigation level applicable for recreational use was identified for one sample (BH5_0.2-0.3). Metals (predominantly copper, lead and zinc) exceeded adopted ecological investigation levels in fill samples from five boreholes. Asbestos (including free asbestos fibres) was identified in the fill sample BH12_2.9-3.0, collected from the western section, adjacent to the Georges River.
- Laboratory analytical results for COPCs in the tested groundwater samples were as follows:
  - Zinc exceeded the corresponding investigation level at all six (well) locations, the concentrations being similar to those reported by Responsive Environmental Solutions (RES, 2005a/b);
  - Chromium (one well), copper (four wells) and nickel (two wells) exceeded the corresponding investigation levels, although the concentrations were consistent with background conditions for urban (industrial) environments;
  - Elevated concentrations of petroleum hydrocarbons (F2 and F3 TRH fractions) were detected in well BH3M, located in the south eastern, hydraulically up-gradient corner, although they were generally lower than in previous URS (2000) and RES (2003 / 2005) investigations; and
  - TCFM contamination was detected in four monitoring wells (BH3M, BH7M, BH10M and BH11M), with groundwater concentrations at BH7M and BH10M exceeding the corresponding investigation level, suggesting that groundwater movement was causing dispersion of the contamination plume.
- EI (2016a) concluded that widespread contamination was present across this part of Area B and recommended that further investigations be performed “to ascertain the spatial extent of contamination and guide the selection of the most appropriate method for management or remediation in alignment with building footprints, landscaping and roadways of the proposed development”. The recommended investigations, which are described in more detail in **Section 6**, included:
  - Further systematic soil sampling, to delineate contamination and define nominal hotspot diameters, plus determine the quality of site soils and groundwater within areas not previously investigated (e.g. building footprints, post demolition);

- Delineation investigations to define the extent of the metals- (copper-, lead-, zinc-) impacted filling within the northern portion;
- Delineation of the extent of asbestos-impacted filling, particularly in the western section, adjacent to the Georges River;
- Confirmation of the extent and source(s) of the TCFM groundwater contamination;
- Confirmation of the extent and source of the petroleum hydrocarbon groundwater contamination in the south eastern corner; and
- Implementation of a hazardous materials survey for the existing structures.

- EI (2016a) considered that this part of Area B could be made suitable for residential use, provided these recommended investigations were undertaken in accordance with an approved Remediation Action Plan (RAP), which would be developed. All tasks were to be "managed through the development application process in accordance with *State Environmental Planning Policy 55 (SEPP 55) – Remediation of Land*, with the remediation and validation incorporated into conditions of development consent".

B-east (5-9 Bridges Road)

- Area B-east was subject to an EPA Licence No. 3099 for the identified industrial activities of '*Plastic resins production*' under the POEO Act 1999 (see also **Section 4.4**).
- As reported by AGC-WC (1999) factories 6 and 7 were part of the Joyce Australia Pty Ltd operation (i.e. the north eastern portion of Area B), and were used for the manufacture of polyurethane foam products.
- The site was also included on the EPA's contaminated land register and was subject to regulation in accordance with the Contaminated Land Management Act 1999, due to the presence of groundwater TCFM contamination. In accordance with Environmental Protection Licence No. 3099, a Pollution Studies and Reduction Program was in place to address this issue.
- EI (2015a) established that the use of this part of Area B was still industrial in nature, with a warehouse and several smaller buildings occupying the majority of the land. Areas of concern included multiple ASTs, chemical and liquid / solid waste storage areas, a corroded skip-bin and fill material with fragments of ACM at depth.
- Groundwater contaminated by TCFM, sourced from an underground, concrete liquid waste tank located within the south western portion of this area, had migrated to the adjacent western property (i.e. Area B-west, 3 Bridges Road), as noted above. Based on the monitoring conducted by GHD Pty Ltd, only a very slow declining trend was identified, indicating minimal natural attenuation. There was no documented information relating to the removal and validation of the underground concrete liquid waste tank.
- EI (2015a) recommended data gap closure investigations for this part of Area B, which are described in more detail in **Section 6**. These are outlined as follows:
  - Further systematic soil sampling, to delineate contamination and define hotspot diameters, and to characterise site soils and groundwater within areas not previously investigated (e.g. building footprints, post demolition);
  - Confirmation of the extent and source(s) of the TCFM groundwater contamination; and
  - Carrying out a hazardous materials survey for the existing structures.

4.3.3 Areas C and D (8-14, 16 Bridges Road)

Douglas Partners Pty Ltd (DP, 2015)

In 2015, Douglas Partners Pty Ltd (DP) completed a contamination data review (CDR) for the land identified as 8-16 Bridges Road, which comprises Areas C and D of the Moore Point Precinct area. This review was commissioned by Coronation Property Co Pty Ltd, in support of an application to Liverpool City Council for rezoning the land for residential purposes (with limited soil access). The objectives of the CDR were to:

- "Identify data gaps in the current contamination information"; and
- "Recommend requirements for further intrusive investigations", in order to assess the suitability of the land for residential use.

In addition to a walkover inspection of the area, the scope of work involved desktop studies primarily involving records searches and review of previous DP environmental reports dating back to 2002, as well as a related audit report produced by Environ Australia Pty Ltd in 2007.

The following relevant information was derived from the DP (2015) report:

- The area was zoned *IN2 Light Industrial*, under the *Liverpool Local Environmental Plan 2008*.
- Much of the land had been filled, forming a platform that was raised 2m to 4m above the surrounding ground to the north, south and west, and 5m to 6m above Lake Moore to the east. A keystone retaining wall, ranging in height from 0.5m to 5m at its northern end, was aligned along the top of the eastern embankment.
- The ground surface was mainly unsealed, except for an asphaltic concrete internal road connecting to Bridges Road to the west. Parts were grassed, with shrubs and small to medium sized trees on the embankments.
- Surface fill generally comprised silty clay with sandstone and shale inclusions. Anthropogenic materials included brick, cement and asphalt, with an occasional (sporadic) fragment of suspected ACM.
- Multiple stockpiles were present and comprising silty clay fill, asphaltic concrete, road base gravels, concrete and general building rubble. Fragments of suspected ACM were present in the stockpiles.
- Groundwater had been identified in investigation bores at depths of 4m to 12m bgl relative to the top of the fill platform, with levels at the eastern edge "likely to be influenced by fluctuations in the lake water level". The groundwater flow direction was inferred to be "generally south-south-easterly".
- DP identified that the potential contamination issues were:
  - The importation of filling materials from unknown sources; and
  - The application of herbicides and pesticides across the across the site surface.
- Except in relation to asbestos, analytical results for the COPCs in soil and groundwater samples were generally below the adopted human health and ecological investigation levels applicable for residential land use with minimal opportunities for soil access. It was noted; however, that sampling of the "Uncontrolled Refuse Fill" within the southern portion of the area had not been performed, which represented a data gap warranting further investigation.
- The Environ (2007) audit report noted that the land had been "filled over time, including uncontrolled wastes and concrete mixer wash out (slimes) that have been covered by imported silty clay and sandy clay containing some anthropogenic material. There is a risk that asbestos and other contaminants may be encountered in fill material. A UST was previously removed from the site and there is a risk that odorous soil may remain. The

auditor commented that “These risks are addressed in the Environmental Management Plan”, presumably DP (2008) referenced in **Section 4.2**, “that should be implemented during redevelopment and any other subsequent excavation works”.

- DP recommended that further intrusive investigations be conducted for the area, upon completion of a land survey, to determine changes in the depth of fill since the previous works. The proposed data gap closure investigations included:
  - A total of 42 soil sampling locations, with at least one representative fill sample from each being analysed for metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), the monocyclic aromatic hydrocarbons benzene, toluene, ethyl benzene and xylenes (BTEX), total recoverable hydrocarbons (TRHs), polycyclic aromatic hydrocarbons (PAHs), phenols, organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), herbicides and polychlorinated biphenyls (PCBs). At five locations, the sampling was to continue “to the maximum depth of fill”. Five locations were to target the “Uncontrolled Refuse Fill” within the southern portion.
  - A total of 82 asbestos sampling locations, with at least one representative fill sample from each being screened for the presence of ACM (including respirable fibres).
  - The installation of four groundwater monitoring wells, two positioned along the up-gradient boundary (to assess potential on-site migration of contamination from neighbouring sites) and two positioned along the down-gradient boundary (to assess potential off-site migration). The groundwater samples were to be analysed for dissolved metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), VOCs (including BTEX), TRHs and PAHs.

4.3.4 Area M (6 Bridges Road)

In 2015, EI completed a preliminary site investigation (PSI) of the land parcel identified as Area M at 6 Bridges Road. This investigation was commissioned by Coronation Property Co Pty Ltd, in support of an application to Liverpool City Council for rezoning the land for residential purposes, with basement car parking. The investigation objective was to appraise the potential for site contamination on the basis of historical uses, as well as anecdotal and visual evidence of possible pollutant sources. Investigation findings, as reported in EI (2015b) are summarised as follows:

- The property uses had been commercial/industrial in nature since the mid-1960s. Previously to this, it was used for farming and residential purposes.
- Since 1998 the property had been occupied by an engineering firm (Jordbellows Pty Ltd), which manufactured products such as filters, strainers and pressure vessels.
- The land was not subject to regulation by the EPA and was not listed in any of its public registers. A search of the stored chemicals database through SafeWork NSW (formerly WorkCover Authority), did not identify any records relating to the property.
- At the time of the walkover inspection, conducted 10 November 2015, the property consisted of a large metal warehouse, with corrugated fibre cement sheet roofing (likely asbestos-containing), within the north western portion. The remainder included a sealed car-park (adjacent to Bridges Road), an open, concrete/gravel area, a small corrugated metal shed and various equipment / raw material stores.
- Mechanical (hydraulic) punch forming equipment and welding bays were present within the warehouse. A wash bay was present within the western area of the warehouse.
- ASTs were located within the warehouse and on the open, concrete area. Flammable liquid stores including paints, liquefied petroleum gas (LPG) and hydraulic oil drums were located within a bunded section of the warehouse.

- Other equipment and materials, including wooden pallets, dis-used oil drums and metal wastes, were located predominantly in the south (eastern) portion.
- Based on anecdotal evidence provided by a member of Jordbellows Pty Ltd staff:
  - No USTs were present on the property;
  - Jordbellows Pty Ltd had been operating on the property for about 40 years; and
  - Surface runoff pooled in the south eastern part of the site, due to the adjoining land to the north and east having been being built up.
- The conceptual site model identified multiple areas of environmental concern (i.e. potential sources of contamination), including the previous industrial activities, the chemical storage facilities (ASTs and drums), imported filling (for site levelling) and potential burial of ACM from demolished structures.
- EI concluded there was potential for contamination to be present on the land and recommended that a detailed site investigation (DSI) be conducted (including ASS assessment), to characterise site soils and groundwater and provide baseline data for determining any remedial requirements necessary to render the property suitable for the proposed rezoning.

4.3.5 Area O (361 Newbridge Road)

EI also completed a PSI of the land identified as 361 Newbridge Road, which is the land covered under Area O of the proposed Moore Point Precinct area. Similar to Area M, this investigation was also commissioned by Coronation Property Co Pty Ltd, for land rezoning to residential. The following outline summarises the reported PSI findings (Ref. EI, 2015c):

- The property was used for commercial/industrial purposes since 1965. Previous to this, it was used for farming (cropping) and residential purposes.
- Past industrial activities included plastics manufacturing (1970-1990), storage and distribution of food stuffs (1992-1995), tyre re-treading (2002-2007), furniture manufacturing and wholesale (on-going since 2008).
- The land was not subject to regulation by the EPA and was not listed in any of the Authority's public registers.
- A search of stored chemicals records through the NSW WorkCover Authority (currently SafeWork NSW), revealed the presence of an abandoned UST and various aboveground (dangerous goods) storage depots.
- At the time of the walkover inspection, conducted 29 October 2015, the property consisted of a large, brick and metal warehouse. Vegetation was present along the southern boundary and included garden beds and grass. All plants displayed no signs of stress.
- Small piles of plastic, metal and wooden debris were observed in north eastern corner of the property.
- Petroleum hydrocarbon (solvent-like) odours were detected in the south western corner of the warehouse, which was used for painting and varnishing furniture products.
- Three flammable liquid storage cabinets were observed within the south western section of the warehouse. Obvious signs of leakage (spillage/staining) were noted on the surrounding floors. The chemicals included Mirosol 1229 and Mirocat PC 3220/30 (clear satin topcoats).
- LPG bottles were observed inside the south western section of the warehouse.
- Three air compressors were present within the warehouse, two on the eastern side and one on the western side. Localised floor staining was present in their vicinities.

- Evidence of a former UST (now decommissioned) was observed in the south western corner of the property, by way of concreted tank filling points; however, no vents or fuel lines were identified.
- The conceptual site model identified multiple areas of environmental concern (i.e. potential sources of contamination), including the previous industrial activities, the chemical storage facilities (former UST area and flammable liquid cabinets), imported filling (for site levelling) and potential onsite burial of ACM from demolished structures.
- EI concluded that there was potential for contamination to be present on the land and recommended that a detailed site investigation (DSI) be conducted, including an assessment for ASS to characterise site soils and groundwater and to provide baseline data for determining any remedial requirements necessary to render the property suitable for the proposed rezoning.

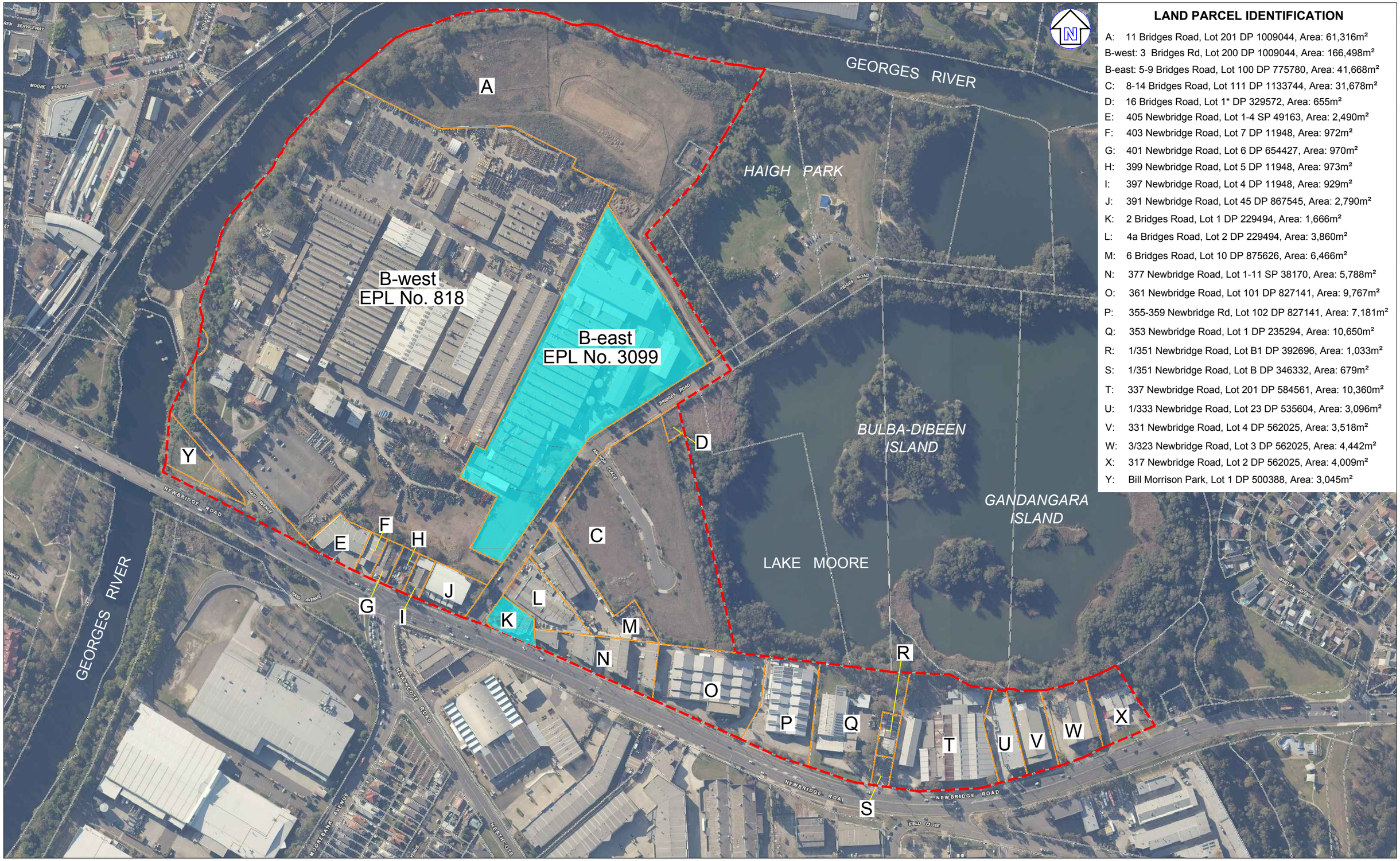
4.4 Environment Protection Licences

A search for Environment Protection Licences (EPLs) under the *Protection of the Environment Operations Act 1997* (the POEO Act) was performed on 15 August 2019 and identified two properties which are currently subject to EPLs. The results of the search are listed in **Table 4-1**, with the site locations highlighted on **Figure 4-2**. A copy of each licence downloaded from the NSW EPA website (https://apps.epa.nsw.gov.au/prpoeoapp/) is presented in **Appendix D**.

It should be noted that Environment Protection Licensing only came into effect in 1997 and did not address activities which ceased prior to 1997. Also, EPLs are required for sites involving industrial operations that are considered to present a greater potential risk of causing contamination, as compared to sites where operations do not include activities requiring an EPL. Potentially contaminating activities however, are also conducted on sites that are not required under the POEO Act to have an EPL. Historical activities which preceded the EPL scheme and landfilling may also be sources of contamination.

Table 4-1 Sites with previous or current Environment Protection Licences

Company name	Site Address (EPL No., Issue date)	Regulated Activities
Joyce Foam Pty Ltd (T/A Joyce Foam Products)	5-9 Bridges Road, Moorebank (Licence No. 3099, 2 Feb 2000) *Area B - east*	Plastic resins production
Prysmian Australia Pty Ltd	1 Heathcote Road, Liverpool; also known as: 3 Bridges Rd, Moorebank (Licence No. 818, 4 Aug 2000) *Area B - west*	Metal coating and metal waste generation



LAND PARCEL IDENTIFICATION

A: 11 Bridges Road, Lot 201 DP 1009044, Area: 61,316m²
B-west: 3 Bridges Rd, Lot 200 DP 1009044, Area: 166,498m²
B-east: 5-9 Bridges Road, Lot 100 DP 775780, Area: 41,668m²
C: 8-14 Bridges Road, Lot 111 DP 1133744, Area: 31,678m²
D: 16 Bridges Road, Lot 1* DP 329572, Area: 655m²
E: 405 Newbridge Road, Lot 1-4 SP 49163, Area: 2,490m²
F: 403 Newbridge Road, Lot 7 DP 11948, Area: 972m²
G: 401 Newbridge Road, Lot 6 DP 654427, Area: 970m²
H: 399 Newbridge Road, Lot 5 DP 11948, Area: 973m²
I: 397 Newbridge Road, Lot 4 DP 11948, Area: 929m²
J: 391 Newbridge Road, Lot 45 DP 867545, Area: 2,790m²
K: 2 Bridges Road, Lot 1 DP 229494, Area: 1,666m²
L: 4a Bridges Road, Lot 2 DP 229494, Area: 3,860m²
M: 6 Bridges Road, Lot 10 DP 875626, Area: 6,466m²
N: 377 Newbridge Road, Lot 1-11 SP 38170, Area: 5,788m²
O: 361 Newbridge Road, Lot 101 DP 827141, Area: 9,767m²
P: 355-359 Newbridge Rd, Lot 102 DP 827141, Area: 7,181m²
Q: 353 Newbridge Road, Lot 1 DP 235294, Area: 10,650m²
R: 1/351 Newbridge Road, Lot B1 DP 392696, Area: 1,033m²
S: 1/351 Newbridge Road, Lot B DP 346332, Area: 679m²
T: 337 Newbridge Road, Lot 201 DP 584561, Area: 10,360m²
U: 1/333 Newbridge Road, Lot 23 DP 535604, Area: 3,096m²
V: 331 Newbridge Road, Lot 4 DP 562025, Area: 3,518m²
W: 3/323 Newbridge Road, Lot 3 DP 562025, Area: 4,442m²
X: 317 Newbridge Road, Lot 2 DP 562025, Area: 4,009m²
Y: Bill Morrison Park, Lot 1 DP 500388, Area: 3,045m²

Photo Source: https://maps.six.nsw.gov.au, Accessed 17/07/2019

LEGEND

- Approximate precinct boundary
- Approximate lot boundaries
- Contaminated sites notified to EPA
- EPL — Sites with current Evironmental Protection Licence under POEO Act

0 50 100 150 200 250
Approx. Scale (m)

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	M.G.
Approved:	N.K.
Date:	02-08-19

LAC JV Pty Ltd
Moore Point Precinct Review Study
Part 1: Contamination, Acid-Sulfate Soils and Remedial Strategy
Newbridge & Bridges Roads, Liverpool NSW

Notified Contaminated Sites & Sites with current EPLs

Figure: 4-2

Project: E22882.E09

4.5 Documented Contaminated Sites

4.5.1 NSW EPA Contaminated Land Notices

An on-line search of the Contaminated Land Public Record of NSW Environment Protection Authority (EPA) Notices was conducted on 5 August 2019. The contaminated land public record is a searchable database of:

- Orders made under Part 3 of the Contaminated Land Management Act 1997 (CLM Act);
- Approved voluntary management proposals under the CLM Act that have not been fully carried out and where the approval of the EPA has not been revoked;
- Site Audit Statements provided to the EPA under Section 53B of the CLM Act that relate to significantly contaminated land;
- Where practicable, copies of any documentation formerly required to be part of the public record; and
- Actions taken by the EPA under Sections 35 and 36 of the Environmentally Hazardous Chemicals Act 1985.

The search confirmed that the NSW suburb of Moorebank, NSW, including properties within 500m of the precinct, were not subject to any regulatory notices issued by the NSW EPA or the Office of Environment and Heritage (OEH).

4.5.2 Contaminated Sites Notified to the EPA

A search through the List of NSW Contaminated Sites notified to the EPA under Section 60 of the CLM Act 1997 was conducted on 15 August 2019. This list was last updated by the EPA on 1 August 2019 and includes properties on which contamination has been identified, and which are at various stages of the assessment and remediation process.

This search confirmed two properties within the suburb of Moorebank NSW were on the notified sites list (**Table 4-2**). These parcels are highlighted on **Figure 4-2**. It was also noted that the list of notified sites did not include any property located within 500m of the precinct.

Table 4-2 Summary of EPA Notified Sites in the vicinity of the precinct

Address	Site Occupier / Activity Type	Management Classification
2 Bridges Road, Moorebank	Caltex Service Station Moorebank / Service Station	Regulation under CLM Act not required
5-9 Bridges Road, Moorebank	Joyce Foam Products / Chemical Industry	Regulation under CLM Act not required

4.6 SafeWork NSW Searches for Underground Storage Tanks

Searches of SafeWork NSW (formerly WorkCover NSW) records relating to the storage of hazardous substances were conducted during the previous investigations. These searches identified the presence of underground storage tanks (UST) on land parcels B-west, B-east, C and O, some of which are believed to have been decommissioned and/or removed. In addition, 2 Bridges Road (land parcel K) has been in operation as a Caltex petrol service station for some time, which also is expected to have USTs.

As not all parcels within the precinct have undergone environmental assessment to date, it is possible that USTs also exist, or have previously existed, in other areas. A thorough review of underground petroleum storage systems (UPSS) within the precinct is warranted and is part of the recommended data gap closure works.

4.7 Summary of Known and Potential Contaminating Activities

The precinct has a history of passive and cultivated rural use during the 1800s and early 1900s. Mixed industrial development commenced in the early 1940s and expanded between the 1940s and 1970s, spreading to all remaining parts of the precinct. Based on current land uses for sites that have not been previously investigated (**Section 2.2.3**), and reported historical operations for previously investigated sites (**Section 4.3**), a summary of potentially contaminating land use activities is provided in **Table 4-3**.

Table 4-3 Potentially Contaminating Activities (Past and Present)

Parcel ID / Address	Business name(s) or site use	Historical operations and Potentially contaminating activities
Area A / 11 Bridges Rd	Undeveloped site	• Market gardening pre-1940s involved chemical spraying using herbicides and pesticides. • Widespread filling and site relevelling between the late 1940s - 1970s. Fill materials comprised inert waste sourced from land parcels B-west and B-east, as well as surplus natural soils excavated from developments in the Liverpool area. • Metal sheet fabrication. • Storage of construction and electrical equipment, cable drums and redundant machinery (1982 - 1990). • Grit blasting conducted during 1992. SGS reported that site wide investigations found no evidence of significant contamination, Ref. SGC, 2007 (**Section 4.3.1**)
Area B-west / 3 Bridges Rd	Cablemakers Australia Pty Ltd, Metal Manufacturers Pty Ltd, Prysmian Power Cables & Systems Australia Pty Ltd, Coronation Property Company Pty Ltd	• Farming up to 1940s with potential chemical spraying using herbicides and pesticides. • AGC-WC, 1999 reported a number of activities in relation to electrical cables manufacturing, as detailed in **Section 4.3.2**: - Factory 1: elastomer insulated cable manufacture; - Factories 2: wire drawing operations, petroleum-impacted soils were found at 4.5mBGL in southwest part of factory, due to UST leak of wire drawing coolant/lubricant, Environmental Management Plan (EMP) in place (ES, 2013d), Site Audit found that the site can be made suitable for commercial/industrial uses by implementing the EMP; - South of Factory 2: rubber compounding building; - Factory 3: flammable goods storage & wire drawing; - South of the Raw Material Store: flammable goods storage; - Factory 4: PVC compounding; - South of Factory 4: petroleum-impacted soil and groundwater, with phase-separated hydrocarbons (PSH) related to diesel leak from former UST, Petroleum product recovery was conducted by RES between 2003 and August 2005 - Factory 5: polyethylene-insulated cable production and silane mixing; - Southeast of Factory 5: petroleum-impacted groundwater, with PSH related to diesel leak from former UST; - North of Factory 5: Drum storage area; - Factory 9 (formerly Factory 6): use not reported - Factory 8 (formerly Factory 7): cable testing; - North of factory 8: Buried drums, suspected to contain isocyanate; - South of Raw Material Store & Factory 3: flammable goods storage; - Northern unsealed storage area: copper, lead and zinc impacted filling was reported; - Western area adjacent to Georges River: ACM and boiler ash in filling; and - TCFM was found in groundwater close to the eastern boundary with Area B-east.
Area B-east / 5-9 Bridges Rd	Cablemakers Australia Pty Ltd, Joyce Australia Pty Ltd	• Farming up to 1940s with potential chemical spraying using herbicides and pesticides. • AGC-WC, 1999 reported a number of activities in relation to electrical cables manufacturing by Joyce Australia Pty Ltd after

Parcel ID / Address	Business name(s) or site use	Historical operations and Potentially contaminating activities
Area B-east / 5-9 Bridges Rd (continued)		1990, as detailed in **Section 4.3.2**: - Polyurethane foam products manufacture; - Groundwater TCFM contamination was identified, which resulted in the site becoming regulated as described in **Section 4.5.2**; - Multiple ASTs; - A liquid waste UST close to the southeast corner, believed to be the source of the groundwater TCFM contamination; - Chemical dispensing, reacting and storage areas; - Building structures and/or roofing were observed to include ACM; and - ACM fragments found in fill soils at depth.
Area C / 8-14 Bridges Rd and Area D / 16 Bridges Rd	Unused sites	• Farming up to 1940s with potential chemical spraying using herbicides and pesticides. • Sand mining operations were conducted on the site followed by land relevelling from the late 1940s to 1970s. Fill materials included uncontrolled wastes from unknown sources and concrete mixer wash out (slimes). Fill materials may contain asbestos and other contamination. • The following potentially contaminating activities and observations of contamination were reported by DP (2015), as described in **Section 4.3.3**: - A sporadic ACM fragment was identified in the surface fill; - Multiple soil stockpiles were previously located onsite, with suspected ACM fragments contained within. - A concrete batching plant was located in the western portion (sometime between 1970 and 1990). - Residual hydrocarbons and odorous soils may exist in site soils in the vicinity of a former UST.
Area E / 405 Newbridge Rd	Total Tools, Bells Carpet Court	• Farming up to 1940s with potential chemical spraying using herbicides and pesticides.
Area F / 403 Newbridge Rd	MPE – Mura's Plastic Extrusions	• Farming up to 1940s with potential chemical spraying using herbicides and pesticides. • Plastic extrusion manufacturing indicates potential storage and use of a range of chemicals, such as: - Resins: i.e. the raw polymer material; - Fillers: e.g. calcium carbonate, natural or synthetic silica, carbon black, graphite; - Plasticisers: e.g. phthalates, adipates, phosphate, polyester; - Additives: hardeners, catalysts, stabilizers containing phenol or amines, blowing agents, lubricants, dyes, fungicides, bactericides and solvents.
Area G / 401 Newbridge Rd	Gearbox Solutions	• Farming up to 1940s with potential chemical spraying using herbicides and pesticides. • In addition to oil-based hydraulic fluids used in vehicle hoists, mechanical workshops, typically involve the handling of: - Asbestos: found in hood liners, brakes, clutches and engine gaskets; - Antiknock agents: e.g. Methylcyclopentadienyl manganese tricarbonyl (MMT); - Lead dusts and fumes; - Solvents: e.g. degreasers; and - Waste Oil: phenols and PAHs.
Area H / 399 Newbridge Rd	Private Residence	• Farming up to 1940s with potential chemical spraying using herbicides and pesticides.
Area I / 397 Newbridge Rd	Pioneer DJ, Showtime	• Farming up to 1940s with potential chemical spraying using herbicides and pesticides.
Area J / 391 Newbridge Rd	Pay Less and Carwash Cafe	• Farming up to 1940s with potential chemical spraying using herbicides and pesticides. • Contaminants associated with vehicle auto-wash facilities include:

Parcel ID / Address	Business name(s) or site use	Historical operations and Potentially contaminating activities
Area J / 391 Newbridge Rd (continued)		- Cleaning agents, detergents and their by-products; - Engine coolant; - Oil, grease and other lubricants; and - Petroleum based products.
Area K / 2 Bridges Rd	Caltex service station	• Farming up to 1940s with potential chemical spraying using herbicides and pesticides. • Underground petroleum storage systems (UPSS), including USTs, fuel pumps, fuel delivery lines; • Contaminants associated with service station operations typically include: - Petroleum Hydrocarbons and BTEX ; - PAHs, Phenols and Lead.
Area L / 4a Bridges Rd	Andrews Smash Repairs	• Farming up to 1940s with potential chemical spraying using herbicides and pesticides. • Contaminants that have been identified for this site in a PSI report by EI (2015), based on historical operations as a smash repair business, include: - Petroleum Hydrocarbons and BTEX ; - PAHs, Phenols and Lead; - Oil and grease; and - Paints and cleaning solvents used in relation to spray booth activities.
Area M / 6 Bridges Rd	Jordbellows Pty Ltd	• Farming up to 1960s with potential chemical spraying using herbicides and pesticides. • Subsequent operations involved the manufacture of filters, strainers and pressure vessels, with use of the following potential chemicals: - Metals (particularly associated with welding, metal fabrication activities and metal wastes produced); - TRH, BTEX and solvents in flammable liquids storage; - PAHs, Phenols and Lead. - Oil-based hydraulic fluids; - Oil and grease; - Paints and cleaning solvents used in spray booth operations. • ACM in fibre cement warehouse building. • Numerous ASTs and flammable liquid stores present. • Anecdotal evidence indicated the absence of UPSS in this area.
Area N / 377 Newbridge Rd	Versaquip, Allstaff Australia, Century Picture Framing, Creative Trophies, Scope Signs, Pedders Suspensions, Workscene	• Farming up to 1960s with potential chemical spraying using herbicides and pesticides. • Various light industrial uses, on separate industrial units. • It is unknown if previous contaminating practices were conducted onsite, however current uses appear to pose a low risk of site contamination.
Area O / 361 Newbridge Rd	ICON Furniture Pty Ltd	• Farming up to 1965 with potential chemical spraying using herbicides and pesticides. • Imported filling was used for site relevelling; • Potential onsite burial of demolished structures indicated potential for ACM in fill; • Operational history included manufacture of plastics (1970-1990), storage and distribution of food stuffs (1992-1995), tyre re-treading (2002-2007) and furniture manufacturing and wholesale (on-going since 2008). • Evidence of decommissioned UST (i.e. filling points) was identified in the south western corner of the site. Vents and fuel lines were absent. • Various flammable liquid stores present. • Solvent and petroleum hydrocarbon odours were detected in the vicinity of three flammable liquid storage cabinets in the southwest corner of the warehouse.

Parcel ID / Address	Business name(s) or site use	Historical operations and Potentially contaminating activities
		• Floor staining indicated leakage and spillage of furniture stains. • Air compressors indicated that spaying of paint, stain and other furniture finishing had been taking place. Data gap closure investigations were recommended by DP (2015), which are described in **Section 6**.
Area P / 355-359 Newbridge Rd	Seafood Warehouse & Taitung Food	• Farming up to 1965 with potential chemical spraying using herbicides and pesticides. • Redeveloped for warehousing thereafter.
Area Q / 353 Newbridge Rd	Diesel Drive	• Farming with cultivation up to 1960s with potential chemical spraying using herbicides and pesticides; and • Redeveloped for warehousing of auto parts thereafter.
Area R / 1/351 Newbridge Rd	Big O Tyres	• Farming with cultivation up to 1960s with potential chemical spraying using herbicides and pesticides; and • Auto tyres retailer/fitter business, which use the following range of chemicals: - Rubber adhesives or vulcanising cements, rubber cleaners, tyre sealants, chemical accelerators (to speed up drying), tyre mounting paste, tyre (carbon) black; and - Hydraulic hoists that may leak hydraulic (oil) fluids.
Area S / 2/351 Newbridge Rd	Big O Tyres	
Area T / 337 Newbridge Rd	Wilson & Gilkes P/L	• Farming with cultivation up to 1960s with potential chemical spraying using herbicides and pesticides; and • Manufacturing of precision metal products including: laser cutting, bending, CNC punching, welding and powder coating.
Area U / 1/333 Newbridge Rd	Various	• Farming with cultivation up to 1960s with potential chemical spraying using herbicides and pesticides; and • Non-contaminating activities related to commercial uses: including retail of bathroom supplies, carpet, tiles, dance/drama studio, gymnasium and offices.
Area V / 1/333 Newbridge Rd	Studio Bagno, Kings Academy	• Farming with cultivation up to 1960s with potential chemical spraying using herbicides and pesticides; and • Non-contaminating activities: Martial arts academy and yoga centre.
Area W / 3/323 Newbridge Rd	Carpet Warehouse	• Farming with cultivation up to 1960s with potential chemical spraying using herbicides and pesticides; and • Business liquidation warehouse and Carpet supplier.
Area X / 317 Newbridge Rd	Carasel Towbars	• Farming with cultivation up to 1960s with potential chemical spraying using herbicides and pesticides; and • Towbars and trailers workshop.
Area Y / SW Corner Reserve	Bill Morrison Park	• Farming with cultivation up to 1960s with potential chemical spraying using herbicides and pesticides; thereafter • Public, open green space, trees and grass.

5. Preliminary Conceptual Site Model

Considering the findings of the desktop assessment, described in **Sections 2** to **4** of this report, a high-level preliminary conceptual site model (CSM) was developed for the precinct as a whole to assess plausible pollutant linkages between potential contamination sources and potential receptors.

CSMs are typically developed on a site-specific basis in accordance with *Schedule B2 – Guideline on Site Characterisation* of the National Environment Protection (Assessment of Site Contamination) Measure 1999 (2013 Amendment). As the available contamination reports do not address all areas of the precinct, this CSM incorporates only known impacted areas and potential contamination sources, as summarised in **Table 4-3** (**Section 4.7**).

This CSM was used to identify data gaps in the existing environmental data set, which will require closure as part of future site characterisation investigations. It informs the data gap closure investigations described in **Section 6** and budgeted in **Section 8.1**.

5.1 Subsurface Conditions

As indicated in **Section 3.2**, the typical soil profile consists of an upper layer of sandy fill that is between 2m and 4m in thickness, becoming thicker close to the Georges River foreshore area. Underlying the fill layer are natural soils comprising sands, silts and clays associated with Georges River alluvium. The alluvium is in turn underlain by shale, carbonaceous claystone, laminite and lithic sandstone, which form the regional bedrock materials.

5.2 Potential Contamination Sources

Based on the reviewed site history information and the findings documented in the available environmental reports for selected sites, potential contamination sources for the precinct are summarised as follows:

- Imported fill soils of largely unknown origins used as backfill for relevelling various parts of the precinct. Fill materials included ash fill, asbestos in soil, asbestos in fibrous-cement sheet fragments and boiler lagging (Area B-west), and in some cases uncontrolled wastes, asbestos-containing material (ACM) fragments and concrete washer slimes, particularly within Areas C and D.
- Previous farming, market gardening and cultivation activities, which typically involved the application of chemicals for weed and pest control, fertilisers and petroleum hydrocarbon products used to power and maintain motorised farming equipment.
- The use and handling of paints and other chemicals, including volatile organic compounds (VOCs), during historical and current industrial activities involving manufacturing, chemical reacting, dispensing, treatment and the production of liquid wastes.
- TCFM, leaked from an underground, concrete liquid waste tank located within the south western portion of Area B-east, which was reported to have migrated westwards to the adjacent property Area B-west at 3 Bridges Road;
- Multiple underground and above ground storage of petroleum fuels (i.e. UPSS and ASTs), particularly within areas B-west, B-east, M and O, some of which are still in use and/or remain in partially decommissioned condition;
- Deeper, natural soils and groundwater containing residual impacts from leaked hydrocarbons and other chemicals, representing potential secondary sources of contamination;

- Hazardous building materials (past and present structures), including ACM and lead-based paints; and
- Asbestos impacted site soils.

5.3 Chemicals of Potential Concern

Based on currently available information, the chemicals of potential concern (COPCs) for the precinct are considered to be:

- **In Soil** – metals, petroleum hydrocarbons (TRH), polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), including the monocyclic aromatic hydrocarbons benzene, toluene, ethylbenzene and xylenes (BTEX), chlorinated VOCs (CVOCs, including *trichlofluororomethane* - TCFM), organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), herbicides, polychlorinated biphenyls (PCBs), phenols, per- and poly-fluoroalkyl substances (PFAS) and asbestos.
- **In Soil Vapour** – VOCs including light-chain TRHs, BTEX, CVOCs and the semi-volatile PAH compound *naphthalene*, particularly in areas where VOCs are present in soil and/or groundwater.
- **In Groundwater** – metals, TRHs, PAHs, VOCs, CVOCs and PFAS.

5.4 Potential Sources, Exposure Pathways and Receptors

Potential contamination sources, exposure pathways and potential human and environmental receptors that are considered relevant for the precinct are summarised in **Table 5-1**. Also shown in this table is a qualitative assessment of the potential risks posed when complete exposure pathways exist between contamination sources and potential receptors.

Table 5-1 Preliminary Conceptual Site Model for Previously Investigated Sites

Precinct Area	Potential Sources	Potential Contaminants	Media	Potential Receptors	Migration & Exposure Pathways	Potential Risk of Complete Exposure Pathway
A / 11 Bridges Rd	Fill containing slag and ash, sand-blasting activities and application of herbicides and pesticides during historical cultivation activities	metals, PAHs, OCPs, OPPs, herbicides, PCBs and asbestos	Soil and groundwater	Georges River; Site Workers during construction; and Future site users and maintenance workers	Seepage into site soils and groundwater, Dermal contact, ingestion	*Low risk (during and post development)* Previous, detailed intrusive investigations of soil, soil gas and groundwater did not identify evidence of significant contamination.
B-west / 3 Bridges Road and B-east / 5-9 Bridges Road	Filling, industrial operations involving past contaminating activities including UPSS, ASTs, deep soil impacts with spilled chemicals, buried, hazardous materials and hazardous materials in building structures	metals, TRHs, PAHs, VOCs, OCPs, OPPs, herbicides, PCBs, phenols, PFAS and asbestos	Soil Groundwater Soil Vapour	Georges River; Site Workers during demolition and construction; and Future site users and maintenance workers	Seepage into site soils & groundwater Dermal contact, Ingestion and inhalation	*Medium to High Risk (during redevelopment)* Previous investigations have identified existing sources and evidence of contamination at concentrations exceeding health-based and ecological assessment criteria. *Low risk (post remediation)* The site can be made suitable for more sensitive land uses through appropriate remedial action.
C / 8-14 Bridges Rd and D / 16 Bridges Rd	Uncontrolled filling, former UPSS and associated, residual hydrocarbon impacts, application of herbicides and pesticides during historical cultivation activities (Note: soil and groundwater data gaps reported for southern areas in DP, 2015)	metals, TRHs, PAHs, VOCs, OCPs, OPPs, herbicides, PCBs, asbestos	Soil Groundwater Soil Vapour	Lake Moore; Site Workers during demolition and construction; and Future site users and maintenance workers	Seepage into site soils & groundwater Dermal contact, Ingestion and inhalation	*Low to Medium Risk (during redevelopment)* Previous investigations have identified existing asbestos containing material fragments in site fill soils and petroleum odours from impacted soils close to a former underground tank. These and other impacts that may be identified during data gap closure investigations may be remediated to achieve site suitability for sensitive land uses.
M / 6 Bridges Road	Application of herbicides and pesticides during historical cultivation activities, filling, industrial activities	metals, TRHs, PAHs, VOCs, OCPs, OPPs, herbicides, PCBs, phenols, PFAS, asbestos	Soil Groundwater Soil Vapour	Lake Moore; Site Workers during demolition and construction; and Future site users and maintenance workers	Seepage into site soils & groundwater Dermal contact, Ingestion and inhalation	*Medium to High Risk (during redevelopment)* A preliminary site investigation identified the potential for onsite contamination and recommended a detailed investigation to characterise site environmental conditions.

Precinct Area	Potential Sources	Potential Contaminants	Media	Potential Receptors	Migration & Exposure Pathways	Potential Risk of Complete Exposure Pathway
	including chemical and flammable liquids storage (ASTs, paints, hydraulic oil drums), buried hazardous building materials, including ACM.					
O / 361 Newbridge Road	Application of herbicides and pesticides during historical cultivation activities, filling, industrial activities including chemical and flammable liquids storage (UST, ASTs, paints, hydraulic oil drums), buried hazardous building materials, including ACM.	metals, TRHs, PAHs, VOCs, OCPs, OPPs, herbicides, PCBs, phenols, PFAS, asbestos	Soil Groundwater Soil Vapour	Lake Moore; Site Workers during demolition and construction; and Future site users and maintenance workers	Seepage into site soils & groundwater Dermal contact, Ingestion and inhalation	*Medium to High Risk (during redevelopment)* A preliminary site investigation identified the potential for onsite contamination and recommended a detailed investigation to characterise site environmental conditions.

Note: Land parcels E-J, K, L, N and P-Y had not yet been investigated at the time of preparation of this report. The need for data gap closure investigations is discussed in **Section 6**.

6. Data Gap Closure Requirements

Based on the Preliminary CSM described in **Section 5**, the following data gaps have been identified in the existing environmental data set. Of particular relevance is the need to establish the environmental condition of land parcels that have not yet been investigated, or have been investigated to a limited extent.

6.1 Recommended Data Gap Closure for Previously Investigated Areas

6.1.1 Area A (11 Bridges Road)

The SGC (2007) investigation established that no significant, widespread soil and groundwater contamination was present within Area A, and that it was suitable for on-going commercial and industrial use. Since completion of that investigation, the land has remained undeveloped and vacant; however, the following data gap closure tasks are considered relevant for site redevelopment purposes:

- Review of the existing soil and groundwater data against the current environmental criteria, including the health-based investigation levels provided in the NEPC 2013 and the ANZG 2018 (in relation to water quality) applicable for the relevant land uses that are envisaged for the area.
- To confirm if previously reported groundwater impacts at monitoring well GW06 (SGC, 2007) are still present or attenuating, a groundwater monitoring event (GME) incorporating existing monitoring wells is recommended. The GME should include groundwater level gauging and sampling at all existing monitoring wells that are found to be functioning, to include groundwater level gauging, sampling, field testing and laboratory analysis for metals, total recoverable hydrocarbons, BTEX, PAHs, phenols and VOCs.
- To enable appropriate offsite disposal or offsite reuse of site soils, if required, an assessment of soil data against current EPA waste classification guidelines, for landfill disposal, or VENM / Excavated Natural Material (ENM) guidelines, in the case that offsite reuse is considered. Additional soil sampling and analysis may be required to obtain leachability data to enable proper waste classification, in accordance with current NSW EPA waste guidelines.

6.1.2 Area B (3 and 5-9 Bridges Road)

The previous investigations determined that widespread contamination was present across Area B (east and west areas), with both soils and groundwater being impacted. Based on the information reviewed the following recommended environmental data gap closure tasks are identified:

- Detailed review of the existing soil and groundwater data against NEPC 2013 and ANZG 2018 criteria applicable for the proposed site-specific land uses and potential groundwater receptors.
- Conduct a hazardous materials survey for existing building structures.
- Undertake a detailed inspection of the ground surface, referring to previous layout and sampling plans to establish the locations of the former USTs and any existing groundwater monitoring wells. The underground tank survey will be guided by use of ground penetrating radar (GPR). Existing monitoring wells should be gauged (tested) to establish well condition (i.e. whether each well is functional).

- Further intrusive investigations to increase sampling coverage for site characterisation and to delineate the extent of previously reported contamination and to identify contaminant source(s). The investigations should include:
  - Test pitting at target locations suspected as being contaminated (i.e. close to UST areas, north of Factory 8, the northern, unsealed storage area and the western area adjacent to Georges River), with fill/soil sampling and laboratory testing as required;
  - Systematic soil sampling of previously reported impacted locations, to delineate the vertical and lateral extent of contamination and to define hotspot dimensions (e.g. the petroleum hydrocarbon-impacted soils to 4.5m BGL in the south west section of Factory 2);
  - Systematic soil sampling in the vicinity of ASTs and liquid / solid waste storage areas;
  - Systematic soil sampling within areas not previously investigated (e.g. the building footprints, post demolition);
  - Delineation and identification of the source of petroleum hydrocarbon-impacted groundwater contamination in the south eastern corner of Area B west, close to former monitoring well BH3M; and
  - Delineation and identification of the source(s) of the TCFM groundwater contamination.
- The analytical program for the data gap closure investigations should include field-based screening of soil headspace samples for VOCs, as well as laboratory testing of selected, representative soil and groundwater samples for metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), VOCs (including BTEX and VCHs), TRHs, PAHs, phenols, OCPs, OPPs, herbicides, PCBs and polyfluoroalkyl substances (PFAS).
- Perform soil vapour assessment in areas where VOCs (including TRH F1 and BTEX) and chlorinated VOCs are detected.
- Waste classification(s) of fill/soils that require off-site disposal, including leachability assessment (for metals, PAHs and other relevant chemicals).
- VENM / Excavated Natural Material (ENM) assessments, where deeper bulk excavation into natural soils is proposed, and offsite reuse of natural materials is being considered.
- Should data gap closure investigations indicate groundwater contamination is still present and/or elevated VOCs are confirmed, a human health and ecological risk assessment (HHERA) should be conducted to define if the contamination poses risks to potential off-site receptors. HHERA findings would inform a remedial action plan (RAP) aimed at reducing risks to acceptable levels.
- Collate all available environmental data, including that produced by the data gap closure works and develop a RAP for the area. The proposed (preferred) remedial strategy may incorporate a combination of method(s) as discussed in **Section 7**.

6.1.3 Areas C and D (8-14 Bridges Road and 16 Bridges Road)

The DP (2015) investigation established that, except in relation to asbestos, the soils and groundwater of Areas C and D were generally suitable for residential land use (with minimal opportunities for soil access). A possible exception to this was the “Uncontrolled Refuse Fill” within the southern portion of Area C, since sampling had not been performed there.

Since completion of the 2015 investigation, the land has remained undeveloped and vacant, apart from the asphaltic concrete internal road. The recommended environmental tasks for data gap closure prior to redevelopment are therefore:

- Access to previous survey data is not confirmed.
- Undertake further intrusive investigations, to broaden the assessment and delineate the vertical and lateral extent of asbestos contamination. The investigations should include:
  - A minimum of 42 soil sampling locations is recommended, with at least one representative fill sample from each being analysed for metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), VOCs (including BTEX and VCHs), TRHs, PAHs, phenols, OCPs, OPPs, herbicides, PCBs and PFAS. At five locations, the sampling is to continue to the maximum depth of fill. Five locations are to target the "Uncontrolled Refuse Fill" within the southern portion.
  - A minimum of 82 asbestos sampling locations is recommended, with at least one representative fill sample from each being screened for the presence of ACM (including respirable fibres).
  - The installation of four groundwater monitoring wells, two positioned along the up-gradient boundary (to assess potential onsite contaminant migration from neighbouring sites) and two positioned along the down-gradient boundary (to assess potential off-site migration). The bores should be sufficiently deep, to intercept (capture) the concrete slurries and all uncontrolled fill for characterisation analysis. Groundwater samples are to be analysed for dissolved metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), VOCs (including BTEX and VCHs), TRHs, PAHs and PFAS.
  - Laboratory analytical results to be interpreted against relevant criteria recommended under NEPC (2013) for the envisaged land uses in relation to soil data, and the NEPC 2013/ANZG 2018 criteria in relation to groundwater data.
- Assessment for the presence (depth and lateral extent) of ASS.
- Waste classification(s) of fill/soils that require off-site disposal, including leachability assessment (for metals, PAHs and other relevant chemicals).
- Collate all the investigative information and develop a site-specific RAP. The proposed (preferred) remedial strategy may incorporate a combination of method(s) for contamination clean-up and containment (management), making reference to the existing EMP.

6.1.4 Area M (6 Bridges Road)

The EI (2015b) investigation concluded there was potential for contamination to be present on the land covered under Area M, and identified the following data gap closure investigation requirements:

- Undertake a hazardous materials survey for the existing structures and engage licensed Hazmat contractors to manage the safe, offsite removal of identified hazardous materials.
- Undertake intrusive investigations (post building demolition), to increase sampling coverage for site characterisation and delineate the extent of any identified contamination. The investigations should include:
  - A combination of systematic (grid-based) and targeted soil sampling across the entire area. A minimum of 17 soil sampling locations are recommended, with at least one representative fill sample from each sampling location being analysed for metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), VOCs (including BTEX and VCHs), TRHs, PAHs, phenols, OCPs, OPPs, herbicides, PCBs and PFAS. At all locations the fill layer should be penetrated to establish the depth of fill across Area M.

  - A minimum of 34 asbestos sampling locations (to comply with NSW EPA guidelines), with at least one representative fill sample from each being screened for the presence of ACM (including respirable fibres).
  - The installation of four groundwater monitoring wells, two positioned along the up-gradient boundary (to assess potential on-site migration of contamination from neighbouring sites) and two positioned along the down-gradient boundary (to assess potential off-site migration). Groundwater samples are to be analysed for dissolved metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), VOCs (including BTEX and VCHs), TRHs, PAHs and PFAS.
  - Data assessment against NEPC (2013) and ANZG 2018 criteria applicable for the proposed site-specific land uses and potential groundwater receptors.
- Waste classification(s) of fill/soils that require off-site disposal, including leachability assessment (for metals, PAHs and other relevant chemicals).
- VENM / Excavated Natural Material (ENM) assessments, where deeper bulk excavation into natural soils is proposed, and offsite reuse of natural materials is being considered.
- Collate all available environmental data, including that produced by the data gap closure works and develop a RAP for the area. The proposed (preferred) remedial strategy may incorporate a combination of method(s) as discussed in **Section 7**.

6.1.5 Area O (361 Newbridge Road)

The EI (2015c) investigation concluded there was potential for contamination to be present on the land, with the following data gap closure investigation requirements:

- Undertake a hazardous materials survey for the existing structure.
- Undertake intrusive investigations (post building demolition), to broaden the assessment and delineate the extent of any identified contamination. Data gap closure investigations should include:
  - Systematic (grid-based) and targeted soil sampling across the entire area. A minimum of 21 soil sampling locations is recommended, with at least one representative fill sample from each being analysed for metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), VOCs (including BTEX and VCHs), TRHs, PAHs, phenols, OCPs, OPPs, herbicides, PCBs and PFAS. At all locations, the sampling is to continue to natural soils in order to define the maximum depth of fill across the site.
  - A minimum of 42 asbestos sampling locations, with at least one representative fill sample from each being screened for the presence of ACM (including respirable fibres).
  - The installation of four groundwater monitoring wells, two positioned along the up-gradient boundary (to assess potential on-site migration of contamination from neighbouring sites) and two positioned along the down-gradient boundary (to assess potential off-site migration). Groundwater samples are to be analysed for dissolved metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), VOCs (including BTEX and chlorinated VOCs), TRH, PAH and PFAS.
  - Soil and VOC results to be interpreted against relevant criteria recommended under NEPC (2013) for the envisaged land uses, and the NEPC 2013/ANZG 2018 criteria in relation to groundwater data.
- Waste classification(s) of fill/soils that require off-site disposal, including leachability assessment (for metals, PAHs and other relevant chemicals).

- Collate all available environmental data, including that produced by the data gap closure works and develop a RAP for the area. The proposed (preferred) remedial strategy may incorporate a combination of method(s) as discussed in **Section 7**.

6.2 Recommended Investigations for Other Areas

6.2.1 Areas Requiring Stage 1 & 2 Environmental Site Assessment

The following parts of the Moore Point precinct require a Stage 1 Preliminary Site Investigation (PSI) and a Stage 2 Detailed Site Investigation (DSI), as described under the NSW EPA (2019) *Contaminated Land Guidelines – Consultants reporting on contaminated land*.

With the exception of the Caltex Service Station at Area K, which is known to be a regulated site (as described in **Section 4.5.2**), the rest of these areas are yet to be investigated for the assessment of site contamination and are grouped as follows:

Group 1 Areas

Areas E to J – cover a total area of 0.89 hectares and are located on the north side of Newbridge Road (west of Bridges Road), identified in **Figure 2** as:

Area E	405 Newbridge Road	Lots 1-4 in SP 49163
Area F	403 Newbridge Road	Lot 7 in DP 11948
Area G	401 Newbridge Road	Lot 6 in DP 654427
Area H	399 Newbridge Road	Lot 5 in DP 11948
Area I	397 Newbridge Road	Lot 4 in DP 11948
Area J	391 Newbridge Road	Lot 45 in DP 867545

Group 2 Areas

Areas K, L and N – cover a total area of 1.14 hectares and are located on the north side of Newbridge Road (east of Bridges Road), identified in **Figure 2** as:

Area K	2 Bridges Road	Lot 1 in DP 229494
Area L	4A Bridges Road	Lot 2 in DP 229494
Area N	377 Newbridge Road	Lots 1-11 in SP 38170

Group 3 Areas

Areas P to X – cover a total area of 5.20 hectares and are located on the north side of Newbridge Road (southeast part of the precinct), identified in **Figure 2** as:

Area P	355-359 Newbridge Road	Lot 102 in DP 827141
Area Q	353 Newbridge Road	Lot 1 in DP 235294
Area R	1/351 Newbridge Road	Lot B1 in DP 392696
Area S	1/351 Newbridge Road	Lot B in DP 3234332
Area T	337 Newbridge Road	Lot 201 in DP 584561
Area U	1/333 Newbridge Road	Lot 32 in DP 535604
Area V	331 Newbridge Road	Lot 4 in DP 562025
Area W	3/323 Newbridge Road	Lot 3 in DP 562025
Area X	317 Newbridge Road	Lot 2 in DP 562025

Group 4 Area

Area Y – is Bill Morrison Park, covering a total area of 0.3 hectares, located on the north side of Newbridge Road (southwest corner of the precinct), identified in **Figure 2** as:

Area Y	Bill Morrison Park	Lot 1 in DP 500388

6.2.2 Recommended DSI Activities

In addition to standard requirements for Stage 1 PSI and Stage 2 DSI works, the following additional tasks should be included on a group by group basis:

Group 1 – DSI Inclusions for Areas E to J

- A hazardous materials survey for the existing structures on each of the properties.
- Intrusive investigations (post building demolition), to include:
  - Mixed systematic (grid-based) and targeted soil sampling across the entire area. A minimum of 20 soil sampling locations is recommended, with at least one representative fill sample from each being analysed for metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), VOCs (including BTEX and VCHs), TRHs, PAHs, phenols, OCPs, OPPs, herbicides, PCBs and PFAS. At all locations, the sampling is to continue to the maximum depth of fill.
  - A minimum of 40 asbestos sampling locations, with at least one representative fill sample from each being screened for the presence of ACM (including respirable fibres).
  - The installation of four groundwater monitoring wells, positioned along the length of the combined area (to assess potential on- and off- site migration of contamination). Groundwater samples are to be analysed for dissolved metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), VOCs (including BTEX and VCHs), TRHs, PAHs and PFAS.
  - Data assessment against relevant criteria for the proposed land uses.
- Waste classification(s) of fill/soils that may require off-site disposal, including leachability assessment (for metals, PAHs and other relevant chemicals).

Group 2 – DSI Inclusions for Areas K, L and N

- A hazardous materials survey for the existing structures on each of the properties.
- As Area K (2 Bridges Road), is a Caltex service station and is a regulated site, previous investigations are expected to have been conducted previously on this property. A *freedom of information* search should be conducted through the EPA to access copies of previous investigation reports for Area K, to establish the current contamination and/or remediation status of this site.
- Intrusive investigations for Areas L and N (post building demolition), to include:
  - Mixed systematic (grid-based) and targeted soil sampling across the entire area. A minimum of 23 soil sampling locations is recommended, with at least one representative fill sample from each being analysed for metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), VOCs (including BTEX and VCHs), TRHs, PAHs, phenols, OCPs, OPPs, herbicides, PCBs and PFAS. At all locations, the sampling is to continue to the maximum depth of fill.
  - A minimum of 46 asbestos sampling locations, with at least one representative fill sample from each being screened for the presence of ACM (including respirable fibres).

  - The installation of four groundwater monitoring wells, two positioned along the up-gradient boundary (to assess potential on-site migration of contamination from neighbouring sites) and two positioned along the down-gradient boundary (to assess potential off-site migration). Groundwater samples are to be analysed for dissolved metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), VOCs (including BTEX and VCHs), TRHs, PAHs and PFAS.
  - Additional investigations on the service station site at Area K may be required, subject to the data that is made accessible via the EPA freedom of information search.
  - Data assessment against relevant criteria for the proposed land uses.
- Waste classification(s) of fill/soils that may require off-site disposal, including leachability assessment (for metals, PAHs and other relevant chemicals).

Group 3 – DSI Inclusions for Areas P to X

- A hazardous materials survey for the existing structures on each of the properties.
- Intrusive investigations for Areas P to X (post building demolition), to include:
  - Mixed systematic (grid-based) and targeted soil sampling across the entire area. A minimum of 57 soil sampling locations is recommended, with at least one representative fill sample from each being analysed for metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), VOCs (including BTEX and VCHs), TRHs, PAHs, phenols, OCPs, OPPs, herbicides, PCBs and PFAS. At all locations, the sampling is to continue to the maximum depth of fill.
  - A minimum of 114 asbestos sampling locations, with at least one representative fill sample from each being screened for the presence of ACM (including respirable fibres).
  - The installation of eight groundwater monitoring wells, positioned along the length of the combined area (to assess potential on- and off- site migration of contamination). Groundwater samples are to be analysed for dissolved metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), VOCs (including BTEX and VCHs), TRHs, PAHs and PFAS.
  - Data assessment against relevant criteria for the proposed land uses.
- Waste classification(s) of fill/soils that may require off-site disposal, including leachability assessment (for metals, PAHs and other relevant chemicals).

Group 4 – DSI Inclusions for Area Y (Morrison Park)

- Intrusive investigations for Area Y, to include:
  - Systematic (grid-based) soil sampling across the entire area. A minimum of 9 soil sampling locations is recommended, with at least one representative fill sample from each being analysed for metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRH, BTEX, PAH, phenols, OCPs, OPPs, PCBs and PFAS. At all locations, the sampling is to continue to the maximum depth of fill.
  - A minimum of 18 asbestos sampling locations, with at least one representative fill sample from each being screened for the presence of ACM (including respirable fibres).
  - Data assessment against relevant criteria for the proposed land use.
- Waste classification(s) of fill/soils is only required if offsite disposal of excavated materials is envisaged.

Should the Stage 1 PSIs identify the potential for site contamination, a Stage 2 DSI involving intrusive investigations should be conducted to determine if contamination is present in site soils or groundwater. In the case that the Stage 2 DSI identifies soil vapours impacted with VOCs, then soil vapour investigations should also be conducted to determine the degree and extent of the soil vapour contamination. For sites where significant soil vapour contamination is identified, a vapour intrusion risk assessment will also be required to determine the level of risk posed to future site users.

The environmental data produced by the DSI for each Group area should be used to develop a RAP for that area. The proposed (preferred) remedial strategy may incorporate a combination of method(s) as discussed in **Section 7**.

6.3 Site Characterisation in Relation to Acid Sulfate Soils

Based on the desktop assessment of ASS Risk in **Section 3.4**, there is a high probability of actual ASS (AASS) and/or potential ASS (PASS) within land parcels C, D, M, N, O, P, Q, T, U, V, W and X (shown in **Figures 2** and **3**).

The above listed land parcels should be investigated to assess for the presence of AASS or PASS. As a minimum, these investigations should include:

- A site inspection should be conducted to visually assess the ground topography, geomorphology, hydrology and dominant vegetation (if any);
- A site-wide intrusive investigation of shallow soils by manual auger method to characterise soil type and soil profile;
- Deeper investigations should be conducted soil and groundwater sampling and analysis where ground disturbance is expected, or at grid-based locations across the site in the case that the proposed development concept is uncertain; and
- Analysis of soil and groundwater indicators in accordance with the NSW ASSMAC (1998) Acid Sulfate Soils Assessment Guidelines, to confirm the distribution of AASS/PASS.

The results of this assessment will provide site-specific information for the final ASSMP.

7. Remediation and Management Options

7.1 Remediation Objective and Goals

The objective of site remediation is to render the impacted areas suitable for the proposed, site-specific land uses. Based on the preliminary masterplan concept (**Appendix A**), rezoning to more sensitive land uses is expected for various parts of the precinct. It is understood that these will include high density residential, recreational, commercial and industrial zones, with roads and communal (public) open spaces.

The review of environmental data for the purposes of this assessment has not identified contaminant levels that would not be able to be remediated using currently available technologies. The findings of this assessment therefore would not preclude the Planning Proposal from rezoning and gazettal for residential/mixed use purposes.

The feasibility of various remedial options and the final remedial strategy adopted for each area will depend on a number of factors, including:

a) Site characterisation findings based on previous investigation results and the results produced from the data gap closure investigations, to complete the environmental data set;

b) The final configuration of land uses across the precinct area;

c) Development acceptance of a long-term Environmental Management Plan (LTEMP), associated environmental monitoring requirements and potential annotations to the land titles, in the case that contaminated materials are retained beneath development footprint areas;

d) Council acceptance of contaminated materials being transferred to Council-owned roadway alignments, where they can be safely buried between the water table and the road construction layers, clear of underground services, maintenance pits and road verge tree planting areas; and

e) Council acceptance of contaminated materials being transferred to physical containment cells located at depth within Council-owned deep soil areas, such as may be present in various parts of the redeveloped precinct, clear of underground services, maintenance pits and road verge tree roots.

Adequate site characterisation, Item (a), should make it possible to understand the nature, degree and extent of the contamination. This is an essential prerequisite for developing detailed, site-specific RAP documents to guide the remedial action.

A clear understanding of the site constraints outlined in Items (b) to (e), is also necessary to inform decisions on suitable management options for impacted materials that can be accommodated onsite.

Since items (a) to (e) are not yet thoroughly known, the remediation concept strategy outlined in **Section 7.4** is preliminary in nature and provides a process to enable the preparation of indicative remedial cost estimates (under a separate cover). It is intended that this information will assist stakeholders in assessing the feasibility of future land uses and precinct development options. The proposed strategy is therefore presented with the understanding that it will be refined, as more specific information regarding the development masterplan and relevant constraints become known. It is also considered appropriate for data gap closure works to take place at the development application stage.

A key preference for the final remedial strategy will be avoidance of annotations to title for commercial and residential units. In view of these guiding terms, the site remediation strategy must achieve the following goals:

- To minimise the amount of excavated fill material that is assigned for landfill disposal;
- To maximise the amount of excavated fill material that is reused on-site, isolating residual, impacted materials to unoccupied areas (i.e. beneath roads, open space parkland or designated containment cells); and
- To ensure that the site is remediated in a safe and acceptable manner, to a condition that is consistent with the intended land uses.

The strategy must be consistent with the requirements of the NEPC (2013) *National Environment Protection (Assessment of Site Contamination) Measure 1999 (Amendment 2013)*, as well as other relevant EPA-endorsed guidelines and the principles of ecologically sustainable development.

7.2 Environmental Setting and Contamination Risk

As described in **Section 3**, the Precinct environment is characterised by low gradients, a fill layer comprising mainly reworked natural soils with some anthropogenic materials, sediments comprising sand, silt and clay associated with Georges River; overlying relatively impermeable shale, claystone and sandstone bedrock. The fill material and more permeable sediments, with shallow groundwater (between 6 m and 10 m in depth), create an environment where contaminants may infiltrate the ground and then migrate downwards and laterally through the more permeable sand and gravel lenses. The fill material which has been placed across the historically lower areas of the Precinct presents a potential source of contamination. The presence of potential acid sulphate soils (as identified in **Section 3.4.3**) would require management during excavation works to prevent generation of acid forming conditions.

The waters of Lake Moore and Georges River represent potential receptors for contamination migrating via soil erosion, stormwater and groundwater. The presence of underground services and storm water drainage systems may also act as preferential pathways for contaminants to move towards the lake and the river environments.

7.3 Precinct Contamination Summary

Based on a review of the available information, including potentially contaminating activities described in **Section 4.7**, known land use impacts appear to be mainly associated with the historical operations on the largest land parcels in the precinct and some smaller sites, summarised as follows:

- Areas A, C and D - widespread filling for site relevelling purposes;
- Area C was also reported to have received uncontrolled waste from unknown sources, with previous identification of ACM fragments in fill and stockpiles at multiple onsite locations;
- Area B:
  - Area B-west and Area B-east were subject to chemical spills and leaks from the handling and storage of hazardous substances (including metals, petroleum hydrocarbons, chlorinated solvents, TCFM and asbestos);
  - Area B-west was also subject to burial of industrial waste, including asbestos waste and disused chemical drums, in;

  - Area B-west, south of Factory, 4 diesel-type phase separated hydrocarbons (PSH), were previously reported on groundwater at former monitoring well WS01 and remedial product recovery works were reported by RES (1999), however it is assumed that further remedial action may be needed in regards to PSH;
  - Area B-west, southeast of Factory 5, at former monitoring wells WS13 and WS14, diesel-type PSH and dissolved petroleum hydrocarbons were previously reported for groundwater located in Area B-west, this was thought to be a result of onsite migration from an up-gradient UST on Area B-east, as reported by AGC-WC (1999);
- Area K - Petroleum hydrocarbon and VOC impacts associated with service station operations at the Caltex Service Station;
- Area F - plastics extrusion factory, which stores and handles a range of chemicals, including resins, plasticisers, phenols and solvents;
- Areas G, J, L, R and S - mechanical workshops, tyre repair, car wash, and smash repair businesses handling a range of chemicals, including: metals, automotive fluids, PFAS, oil, grease, paints, resins, plasticisers, phenols and degreasing solvents; and
- Area O - furniture manufacturing facility, with a disused UST and other potentially contaminating operations including flammable liquids storage, painting and staining of furniture and the onsite burial of ACM in site fill.

In addition to the above, all areas of the precinct were identified from the historical aerial photograph review (see **Appendix C**) to have been used for market gardening and crop cultivation in the early- to mid-1900s, indicating the potential for organochlorine pesticide impacts in site soils.

7.4 Remediation Concept Strategy

7.4.1 Remediation of Hazardous Building Materials

The remediation of hazardous building materials (HBM) requires identification followed by removal and off-site disposal in accordance with the following guidelines:

- Safe Work Australia (2011) *National Code of Practice How to Manage and Control Asbestos in the Workplace*;
- Safe Work Australia (2011) *National Code of Practice How to Safely Remove Asbestos*;
- National Occupational Health and Safety Commission: 2002 (2005) *Code of Practice for the Safe Removal of Asbestos 2nd Edition*;
- National Occupational Health and Safety Commission: 2018 (2005) *Code of Practice for the Management and Control of Asbestos in Workplaces*;
- Environmental Health Committee, Department of Health and Ageing (2005) *Management of Asbestos In The Non-Occupational Environment;* and
- WorkCover Authority of New South Wales (2008) *Working with Asbestos: Guide*.

7.4.2 Remedial Options for Contaminated Soils and Soil Vapour

In consideration of the previously reported findings, as well as the proposed mixed uses for the land, a combination of the following remedial options may be implemented to achieve the remediation objective:

- **Excavation and Onsite Encapsulation** – involving excavation of impacted soils from bulk excavations that are intended for the construction of basement car parking facilities, followed by onsite reuse to the extent possible (within engineered containment cells). Onsite containment of contaminated soils by way of capping and/or encapsulation within low permeability cells or other appropriately designed barrier system, where subsurface or above-ground storage areas are available. Contaminated materials that are retained onsite will need to be managed under a site-specific LTEMP, which will include periodic groundwater monitoring to confirm that offsite contaminant migration is not occurring. Should offsite migration be detected, then contingent groundwater remediation measures will also need to be implemented.
- **Excavation and Offsite Disposal** – involving excavation of impacted soils from bulk excavations followed by offsite disposal of surplus impacted soils to licensed waste landfill;
- **In-situ Soil Vapour Extraction –** coarse grained soils impacted with VOCs (including chlorinated VOCs, light fraction petroleum hydrocarbons and BTEX), may be treated in-situ by extracting soil vapour under vacuum, via horizontal vent pipes installed in trenches throughout the impacted area. The contamination is drawn out of the soil as vapour and liquid, which are collected for appropriate onsite treatment and/or offsite recycling.
- **Ex-situ Bioremediation with Soil Vapour Extraction –** coarse grained soils impacted with VOCs (including chlorinated VOCs, light fraction petroleum hydrocarbons and BTEX), may be treated ex-situ by extracting soil vapour under vacuum, via horizontal vent pipes installed in bio-piles (covered stockpiles) created from the excavation of impacted soils. The contamination is drawn out of the soil bio-piles as vapour and liquid, which are collected for appropriate onsite treatment and/or offsite recycling.

7.4.3 Remedial Options for Contaminated Groundwater

The preferred order for the remediation and management of contaminated groundwater as recommended under the EPA (2007) Groundwater Contamination Guidelines is outlined as:

1. Clean-up so that the natural background water quality is restored;
2. Clean-up to protect the environmental, human and ecological health; and
3. Clean-up to the extent practicable.

Based on the existing environmental data set, the following remedial options may be implemented to address groundwater contamination issues:

In-situ Groundwater Treatment

- Bio-remediation: Addition of oxygen and nutrient compounds to accelerate the natural process of organic compound decay within the environment.
- Chemical oxidation: Addition of chemical compounds to oxidise the contaminants in groundwater into compounds that are less harmful to the environment.
- Air Sparging and Vapour Extraction: Air is forced through the contaminated groundwater system to volatilise organic contaminants. The air is then extracted and captured for treatment leaving reduced contaminant concentrations within the sub-strata.

Ex-situ Groundwater Treatment

- Washing: Groundwater is stripped of contaminants via a leaching process, with the concentrated contaminated liquid product retained for disposal or additional treatment.
- Bioremediation: Groundwater is pumped into an above ground tank and treated with inorganic nutrients. Oxygen is introduced in to the tank by sparging, and hydrocarbons are broken down by naturally occurring bacteria.
- Pumping with Offsite Treatment: Contaminated groundwater is extracted, collected and transported to an approved/licensed treatment facility. There it is treated to remove and/or stabilise the contaminants, then returned to the subject site for re-injection into the aquifer, or transported to an alternative facility for disposal.

Groundwater Management and Monitoring

Measures to manage groundwater contamination may include:

- Notifying appropriate government agencies, owners of subsurface facilities and any other appropriate parties of the presence of groundwater contamination;
- Plume containment;
- Monitored natural attenuation;
- Implementing management or contingency plans to reduce risks; and
- Restricting groundwater use in and down gradient of the contaminated plume.

7.5 Recommendations

Once the results of data gap closure investigations are available, the remedial strategy may be refined.

A detailed, site-specific remedial action plan is required for each site, before the commencement of site remediation.

The site specific-RAP must include an Unexpected Finds Protocol to provide guidance on addressing unexpected contamination that may be identified during the course of site redevelopment.

8. Concluding Remarks

This assessment did not identify any evidence to preclude the Planning Proposal from rezoning and gazettal for residential/mixed use purposes.

It is also considered appropriate for data gap closure investigation works to take place at the development application stage.

9. References

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WC (1999) *Phase 1 Environmental Due-diligence Investigation, 1 Heathcote Road, Liverpool, NSW*, prepared for Allen Allen & Hemsley acting for Pirelli Cables, by Woodward-Clyde, Report A8602126 R001-B, 8 January 1999.

Abbreviations

ACM	Asbestos-containing materials
AHD	Australian Height Datum
ANZG	Australian and New Zealand Guidelines
AASS	Actual acid sulfate soils
ASS	Acid sulfate soils
AST	Above-ground storage tank
B(a)P	Benzo(a)Pyrene (a PAH compound), - B(a)P TEQ Toxicity Equivalent Quotient
BH	Borehole
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
Council	Liverpool City Council (in NSW)
CDR	Contamination data review
CLM Act	Contaminated Land Management Act 1997
COPCs	Contaminants (or Chemicals) of Potential Concern
Council	Liverpool City Council
CSM	Conceptual Site Model
DA	Development Application
DEC	Department of Environment and Conservation, NSW (see OEH)
DECC	Department of Environment and Climate Change, NSW (see OEH)
DECCW	Department of Environment, Climate Change and Water, NSW (see OEH)
DLWC	Dept. of Land & Water Conservation (now Water NSW and NSW Land & Property Information)
DP	Deposited Plan
DSI	Detailed Site Investigation
EI	EI Australia
EC	Electrical Conductivity
EPA	Environment Protection Authority NSW
EPL	Environment Protection Licence
EMP	Environmental Management Plan
ENM	Excavated natural material
F1	TRH $C_6 – C_{10}$ less the sum of BTEX concentrations (Ref. NEPM 2013, Schedule B1)
F2	TRH $>C_{10} – C_{16}$ less the concentration of naphthalene (Ref. NEPM 2013, Schedule B1)
GIL	Groundwater Investigation Level
GME	Groundwater Monitoring Event
GPR	Ground penetrating radar (a non-intrusive investigation technique)
HIL	Health-based Investigation Level
HSL	Health-based Screening Level
km	Kilometres
LNAPL	Light, non-aqueous phase liquid (also referred to as PSH)
DNAPL	Dense, non-aqueous phase liquid
EIL	Ecological Investigation Level
ESL	Ecological Screening Level
m	Metres
m AHD	Metres Australian Height Datum
m bgl	Metres Below Ground Level (units for depth)
mg/m^3	Milligrams per cubic metre (units of concentration in air)
mg/L	Milligrams per litre (units of concentration in water)
µg/L	Micrograms per litre (units of concentration in water)
µS/cm	Micro Siemen per centimetre (units of electrical conductivity)
LAC JV P/L	More Point Land Owner Group and/or Leamac & Coronation Property, for the purposes of this report
LEP	Local Environmental Plan
LPG	Liquefied petroleum gas
MW	Monitoring well
NATA	National Association of Testing Authorities, Australia
NEPC	National Environmental Protection Council
NSW	New South Wales
OEH	Office of Environment and Heritage, NSW (formerly DEC, DECC, DECCW)
OCP	Organochlorine pesticides

OPP	Organophosphate pesticides
PAHs	Polycyclic Aromatic Hydrocarbons
PASS	Potential acid sulfate soils
PFAS	Poly- and Per-fluoro alkyl substances (used in fire-fighting foams and various industrial processes)
pH	Measure of the acidity or basicity of an aqueous solution
PCB	Polychlorinated biphenyls
PSH	Phase-separated hydrocarbons (also referred to as LNAPL)
POEO Act	Protection of the Environment Operations Act 1997
PQL	Practical Quantitation Limit (limit of detection for respective laboratory instruments)
QA/QC	Quality Assurance / Quality Control
RAP	Remediation Action Plan
Ref	Reference
SEPP	State Environmental Planning Policy
SWL	Standing Water Level
TCLP	Toxicity Characteristics Leaching Procedure
TCFM	Trichlorofluoromethane (used as a blowing agent in the manufacture of polyurethane foam)
TDS	Total dissolved solids (a measure of water salinity)
TPH	Total Petroleum Hydrocarbons (superseded term equivalent to TRH)
TRH	Total Recoverable Hydrocarbons (non-specific analysis of organic compounds)
UCL	Upper Confidence Limit of the mean
USEPA	United States Environmental Protection Agency
UPSS	Underground Petroleum Storage System (including: USTs, fuel pumps, fuel delivery lines, etc.)
UST	Underground Storage Tank
VENM	Virgin excavated natural material
VCH	Volatile Chlorinated Hydrocarbons (also referred to as CVOCs – chlorinated VOCs, or VHC)
VHC	Alternative acronym for VCH
VOCs	Volatile Organic Compounds (specific organic compounds which are volatile)

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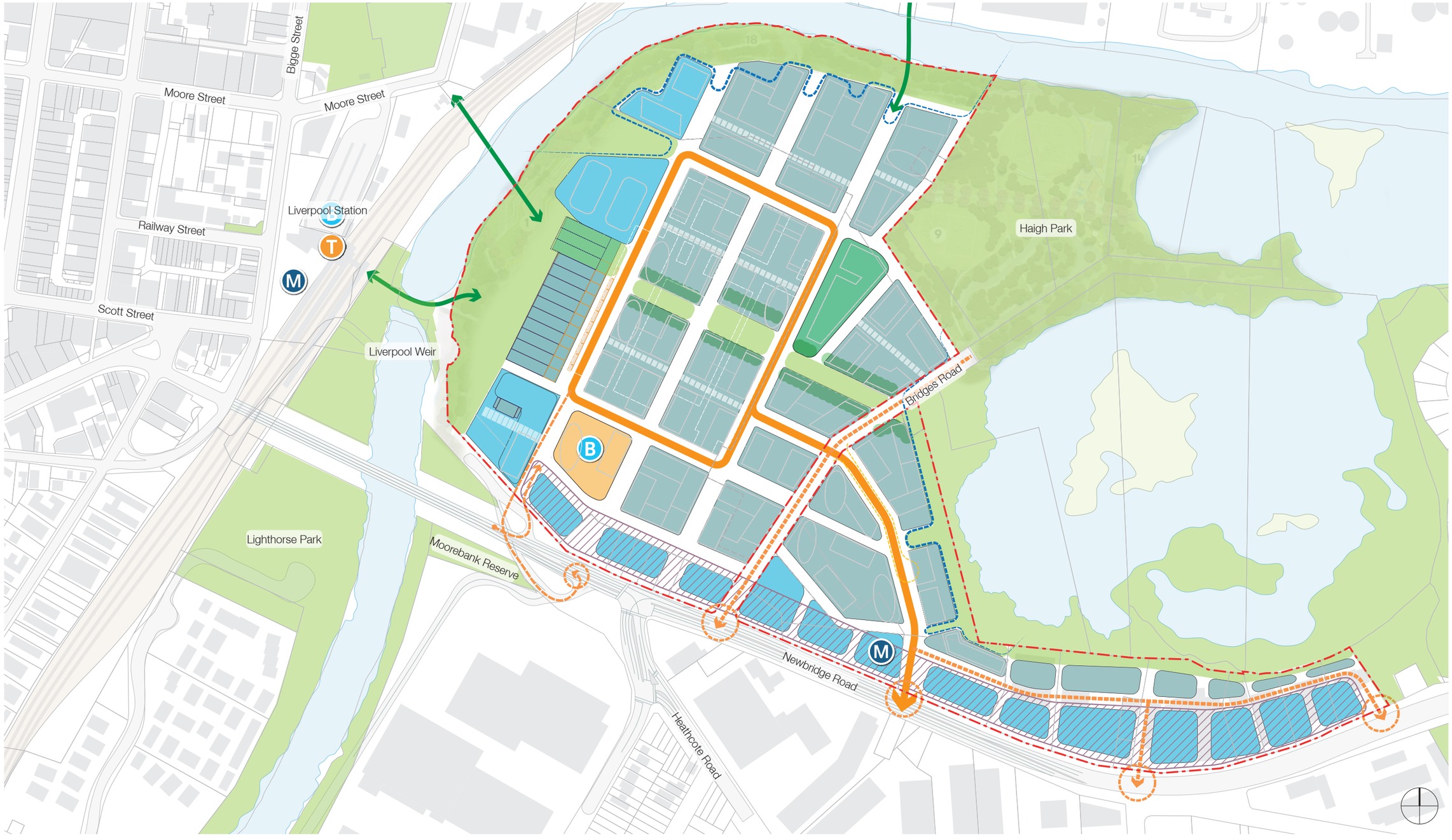
Appendix A – Preliminary Masterplan Concept

Concept Masterplan



Character areas

Open spaces and public domain

Appendix B – Groundwater Bore Search

All Groundwater Site Details

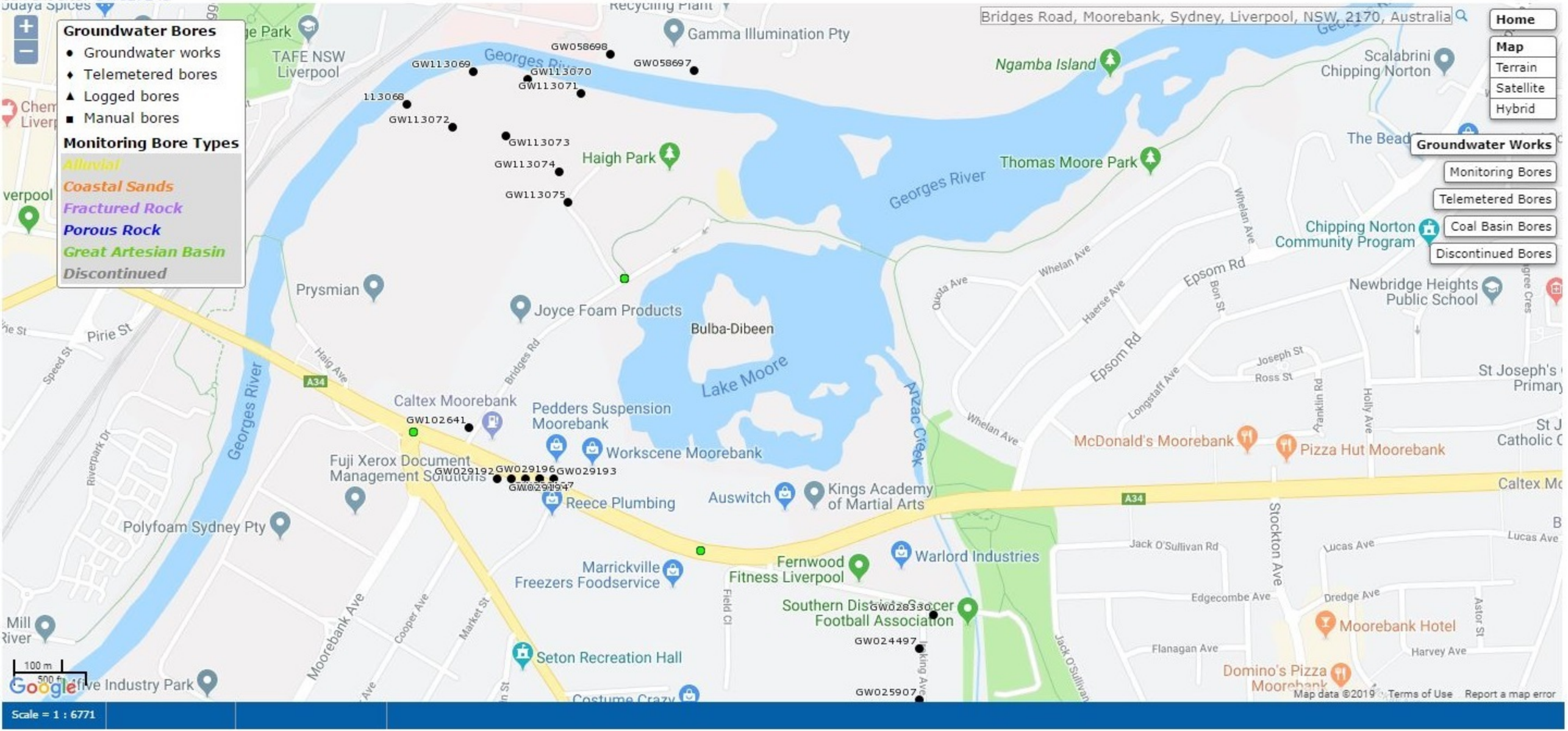
All Groundwater Map

bookmark this page

All data times are Eastern Standard Time

Map | Info

current site: GW027249



Scale = 1 : 6771

WaterNSW
Work Summary

GW024497

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): WASTE DISPOSAL

Work Type: Bore
Work Status:
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date: 01/10/1965
Final Depth: 3.00 m
Drilled Depth: 3.00 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	HOLSWORTHY	56
Licensed:			

Region: 10 - Sydney South Coast
River Basin: 213 - SYDNEY COAST - GEORGES RIVER
Area/District:
CMA Map: 9030-2S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)
Northing: 6243502.000
Easting: 309703.000
Latitude: 33°55'54.3"S
Longitude: 150°56'28.2"E

GS Map: -
MGA Zone: 56
Coordinate Source: GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Opening	Perforations	-100.00	0.00	381		1	SL: 50.8mm
1	1	Casing	Concrete Cylnder	0.00	0.00	381			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.30	0.30	Topsoil	Topsoil	
0.30	1.21	0.91	Clay	Clay	
1.21	2.43	1.22	Loam Sandy	Loam	
2.43	3.04	0.61	Sand	Sand	

Remarks

13/08/1980: LOT 4 IRAKING AVE MOOREBANK
23/09/2011: Slot Length and Width adjusted due to data entry errors with advice from Madhwan Keshwan. GDS Data Cleanup project 2011.

***** End of GW024497 *****

WaterNSW
Work Summary

GW025907

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): WASTE DISPOSAL

Work Type: Well
Work Status:
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date: 01/04/1966
Final Depth: 2.40 m
Drilled Depth: 2.40 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	HOLSWORTHY	56
Licensed:			

Region: 10 - Sydney South Coast
River Basin: 213 - SYDNEY COAST - GEORGES RIVER
Area/District:
CMA Map: 9030-2S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)
Northing: 6243409.000
Easting: 309705.000
Latitude: 33°55'57.3"S
Longitude: 150°56'28.2"E

GS Map: -
MGA Zone: 56
Coordinate Source: GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Opening	Perforations	-100.00	0.00	381		1	
1	1	Casing	Asbestos Cement	0.00	0.00	381			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.91	0.91	Clay	Clay	
0.91	1.52	0.61	Loam Sandy	Loam	
1.52	2.43	0.91	Sand	Sand	

Remarks

13/08/1980: LOT 9 IRAKING AVE MOOREBANK

***** End of GW025907 *****

WaterNSW
Work Summary

GW028330

Licence:
Licence Status:
Authorised Purpose(s):
Intended Purpose(s): WASTE DISPOSAL

Work Type: Well
Work Status:
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date: 01/01/1966
Final Depth: 6.40 m
Drilled Depth: 6.40 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	HOLSWORTHY	L2 (56)
Licensed:			

Region: 10 - Sydney South Coast
River Basin: 213 - SYDNEY COAST - GEORGES RIVER
Area/District:
CMA Map: 9030-2S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)
Northing: 6243564.000
Easting: 309728.000
Latitude: 33°55'52.3"S
Longitude: 150°56'29.2"E

GS Map: -
MGA Zone: 56
Coordinate Source: GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Backfill	Backfill	0.00	6.40	609			
1	1	Casing	Asbestos Cement	0.00	6.40	609			

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
5.40	5.40	0.00	Unconsolidated	1.80					

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments

0.00	5.48	5.48	Driller	(Unknown)	
5.48	6.40	0.92	Sand Nominal Water Supply	Sand	

Remarks

13/08/1980: LOT 2 EPSOM RD MOOREBANK

***** End of GW028330 *****

WaterNSW
Work Summary

GW029192

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): WASTE DISPOSAL

Work Type: Well
Work Status:
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date: 01/11/1968
Final Depth: 2.40 m
Drilled Depth: 2.40 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	HOLSWORTHY	56
Licensed:			

Region: 10 - Sydney South Coast
River Basin: 213 - SYDNEY COAST - GEORGES RIVER
Area/District:
CMA Map: 9030-2S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)
Northing: 6243794.000
Easting: 308927.000
Latitude: 33°55'44.3"S
Longitude: 150°55'58.2"E

GS Map: -
MGA Zone: 56
Coordinate Source: GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Concrete Cylnder	0.00	2.40	914			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	2.43	2.43	Loam Sandy	Loam	

Remarks

13/08/1980: NEWBRIDGE RD MOOREBANK

***** End of GW029192 *****

WaterNSW
Work Summary

GW029194

Licence:
Licence Status:
Authorised Purpose(s):
Intended Purpose(s): WASTE DISPOSAL

Work Type: Well
Work Status:
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date: 01/11/1968
Final Depth: 2.40 m
Drilled Depth: 2.40 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	HOLSWORTHY	56
Licensed:			

Region: 10 - Sydney South Coast
River Basin: 213 - SYDNEY COAST - GEORGES RIVER
Area/District:
CMA Map: 9030-2S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)
Northing: 6243796.000
Easting: 309004.000
Latitude: 33°55'44.3"S
Longitude: 150°56'01.2"E

GS Map: -
MGA Zone: 56
Coordinate Source: GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Concrete Cylnder	0.00	0.00	914			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	2.43	2.43	Loam Sandy	Loam	

Remarks

13/08/1980: NEWBRIDGE RD MOOREBANK

***** End of GW029194 *****

WaterNSW
Work Summary

GW029195

Licence:
Licence Status:
Authorised Purpose(s):
Intended Purpose(s): WASTE DISPOSAL

Work Type: Well
Work Status:
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date: 01/11/1968
Final Depth: 2.40 m
Drilled Depth: 2.40 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	HOLSWORTHY	56
Licensed:			

Region: 10 - Sydney South Coast
River Basin: 213 - SYDNEY COAST - GEORGES RIVER
Area/District:
CMA Map: 9030-2S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)
Northing: 6243796.000
Easting: 309004.000
Latitude: 33°55'44.3"S
Longitude: 150°56'01.2"E

GS Map: -
MGA Zone: 56
Coordinate Source: GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Concrete Cylnder	0.00	0.00	914			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	2.43	2.43	Loam Sandy	Loam	

Remarks

13/08/1980: NEWBRIDGE RD MOOREBANK

***** End of GW029195 *****

WaterNSW
Work Summary

GW029196

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): WASTE DISPOSAL

Work Type: Well
Work Status:
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date: 01/11/1968
Final Depth: 2.40 m
Drilled Depth: 2.40 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	HOLSWORTHY	56
Licensed:			

Region: 10 - Sydney South Coast
River Basin: 213 - SYDNEY COAST - GEORGES RIVER
Area/District:
CMA Map: 9030-2S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)
Northing: 6243795.000
Easting: 308978.000
Latitude: 33°55'44.3"S
Longitude: 150°56'00.2"E

GS Map: -
MGA Zone: 56
Coordinate Source: GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Concrete Cylnder	0.00	0.00	914			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	2.43	2.43	Loam Sandy	Loam	

Remarks

13/08/1980: NEWBRIDGE RD MOOREBANK

***** End of GW029196 *****

WaterNSW
Work Summary

GW029197

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): WASTE DISPOSAL

Work Type: Well
Work Status:
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date: 01/11/1968
Final Depth: 2.40 m
Drilled Depth: 2.40 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	HOLSWORTHY	56
Licensed:			

Region: 10 - Sydney South Coast
River Basin: 213 - SYDNEY COAST - GEORGES RIVER
Area/District:
CMA Map: 9030-2S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)
Northing: 6243795.000
Easting: 308952.000
Latitude: 33°55'44.3"S
Longitude: 150°55'59.2"E

GS Map: -
MGA Zone: 56
Coordinate Source: GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Concrete Cylnder	0.00	0.00	914			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	2.43	2.43	Loam Sandy	Loam	

Remarks

13/08/1980: NEWBRIDGE ROAD MOOREBANK

***** End of GW029197 *****

WaterNSW
Work Summary

GW058697

Licence:
Licence Status:
Authorised Purpose(s):
Intended Purpose(s): G/WATER XPLORE

Work Type: Bore
Work Status: Test Hole
Construct.Method: Cable Tool
Owner Type: Private

Commenced Date:
Completion Date: 01/07/1984
Final Depth: 19.20 m
Drilled Depth: 19.20 m

Contractor Name: (None)
Driller: Roy Max Barrett
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	ST LUKE	260
Licensed:			

Region: 10 - Sydney South Coast
River Basin: 213 - SYDNEY COAST - GEORGES RIVER
Area/District:
CMA Map: 9030-2S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)
Northing: 6244541.000
Easting: 309271.000
Latitude: 33°55'20.3"S
Longitude: 150°56'12.2"E

GS Map: -
MGA Zone: 56
Coordinate Source: GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Opening	Screen	0.00	0.00	150		1	Stainless Steel, A: 0.90mm
1	1	Casing	Threaded Steel	0.00	9.00	150			

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
8.50	14.00	5.50	Unconsolidated	8.50		0.13			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments

0.00	5.00	5.00	Clay Stiff	Clay	
5.00	6.00	1.00	Sand Soft Silty	Sand	
6.00	8.00	2.00	Sand Coarse Silty, Wood Charcoal	Sand	
8.00	14.00	6.00	Sand Grey Silty Coarse Water Supply	Sand	
14.00	16.00	2.00	Clay Grey Silty, Some Coarse Sand	Clay	
16.00	18.30	2.30	Clay Grey Silty	Clay	
18.30	19.20	0.90	Slate Clayey	Slate	

***** End of GW058697 *****

WaterNSW
Work Summary

GW058698

Licence:
Licence Status:
Authorised Purpose(s):
Intended Purpose(s): G/WATER XPLORE

Work Type: Bore
Work Status: Test Hole
Construct.Method: Cable Tool
Owner Type: Private

Commenced Date:
Completion Date: 01/07/1984
Final Depth: 19.50 m
Drilled Depth: 19.50 m

Contractor Name: (None)
Driller: Roy Max Barrett
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	ST LUKE	260
Licensed:			

Region: 10 - Sydney South Coast
River Basin: 213 - SYDNEY COAST - GEORGES RIVER
Area/District:
CMA Map: 9030-2S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)
Northing: 6244568.000
Easting: 309117.000
Latitude: 33°55'19.3"S
Longitude: 150°56'06.2"E

GS Map: -
MGA Zone: 56
Coordinate Source: GD.,ACC.MAP

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	11.50	11.50	Clay Black Grey	Clay	
11.50	12.00	0.50	Clay Coarse Sandy Gravel	Clay	
12.00	19.00	7.00	Clay Grey Sandy	Clay	
19.00	19.50	0.50	Shale	Shale	

***** End of GW058698 *****

WaterNSW
Work Summary

GW102641

Licence:
Licence Status:
Authorised Purpose(s):
Intended Purpose(s): INDUSTRIAL

Work Type: Bore
Work Status:
Construct.Method: Rotary
Owner Type:

Commenced Date:
Completion Date: 01/01/1998
Final Depth: 16.50 m
Drilled Depth: 16.70 m

Contractor Name: PANORAMA DRILLING COMPANY
Driller: Ronald John Lee
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	HOLSWORTHY	45 867545
Licensed:			

Region: 10 - Sydney South Coast
River Basin: - Unknown
Area/District:
CMA Map:
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6243885.000
Easting: 308873.000
Latitude: 33°55'41.3"S
Longitude: 150°55'56.2"E

GS Map: -
MGA Zone: 56
Coordinate Source: Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	16.70	225			Rotary Air/Mud
1		Annulus	Waterworn/Rounded	0.00	16.70				Graded, Q:0.300m3
1	1	Casing	Pvc Class 9	-0.50	13.50	140			Seated on Bottom, Screwed
1	1	Opening	Screen	13.50	16.50	140		0	Steel, Screwed, A: 1.00mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
14.20	16.10	1.90	Unknown	5.13		0.20			420.00

Drillers Log

From	To	Thickness	Drillers Description	Geological Material	Comments

(m)	(m)	(m)			
0.00	2.00	2.00	BROWN LT. CLAY	Invalid Code	
2.00	3.40	1.40	CLAY RED AND BROWN	Clay	
3.40	10.50	7.10	SILT LT. BROWN AND FINE SAND	Silt	
10.50	14.20	3.70	SILT CLAYING BROWN YELLOW	Silt	
14.20	16.10	1.90	GRAVELS	Gravel	
16.10	16.70	0.60	SHALE	Shale	

***** End of GW102641 *****

WaterNSW
Work Summary

GW113068

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): MONITORING BORE

Work Type: Bore
Work Status: Equipped
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date: 10/07/2003
Final Depth: 10.00 m
Drilled Depth: 10.00 m

Contractor Name: Macquarie Drilling
Driller: Unkown Unknown
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	HOLSWORTHY	201//1009044
Licensed:			

Region: 10 - Sydney South Coast
River Basin: - Unknown
Area/District:
CMA Map:
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6244469.000
Easting: 308749.000
Latitude: 33°55'22.3"S
Longitude: 150°55'51.8"E

GS Map: -
MGA Zone: 56
Coordinate Source: Unknown

Remarks

29/07/2014: Nat Carling, 29-July-2014; Added status, drill method, depth & work name, updated work type.

***** End of GW113068 *****

WaterNSW
Work Summary

GW113069

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): MONITORING BORE

Work Type: Bore
Work Status: Equipped
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date: 10/07/2003
Final Depth: 10.00 m
Drilled Depth: 10.00 m

Contractor Name: Macquarie Drilling
Driller: Unkown Unknown
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	HOLSWORTHY	201//1009044
Licensed:			

Region: 10 - Sydney South Coast
River Basin: - Unknown
Area/District:
CMA Map:
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6244531.000
Easting: 308869.000
Latitude: 33°55'20.4"S
Longitude: 150°55'56.5"E

GS Map: -
MGA Zone: 56
Coordinate Source: Unknown

Remarks

29/07/2014: Nat Carling, 29-July-2014; Added status, drill method, depth & work name, updated work type.

***** End of GW113069 *****

WaterNSW
Work Summary

GW113070

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): MONITORING BORE

Work Type: Bore
Work Status: Equipped
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date: 10/07/2003
Final Depth: 10.00 m
Drilled Depth: 10.00 m

Contractor Name: Macquarie Drilling
Driller: Unkown Unknown
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	HOLSWORTHY	201//1009044
Licensed:			

Region: 10 - Sydney South Coast
River Basin: - Unknown
Area/District:
CMA Map:
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6244520.000
Easting: 308968.000
Latitude: 33°55'20.8"S
Longitude: 150°56'00.4"E

GS Map: -
MGA Zone: 56
Coordinate Source: Unknown

Remarks

29/07/2014: Nat Carling, 29-July-2014; Added status, drill method, depth & work name, updated work type.

***** End of GW113070 *****

WaterNSW
Work Summary

GW113071

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): MONITORING BORE

Work Type: Bore
Work Status: Equipped
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date: 10/07/2003
Final Depth: 10.00 m
Drilled Depth: 10.00 m

Contractor Name: Macquarie Drilling
Driller: Unkown Unknown
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	HOLSWORTHY	201//1009044
Licensed:			

Region: 10 - Sydney South Coast
River Basin: - Unknown
Area/District:
CMA Map:
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6244495.000
Easting: 309065.000
Latitude: 33°55'21.7"S
Longitude: 150°56'04.1"E

GS Map: -
MGA Zone: 56
Coordinate Source: Unknown

Remarks

29/07/2014: Nat Carling, 29-July-2014; Added status, drill method, depth & work name, updated work type.

***** End of GW113071 *****

WaterNSW
Work Summary

GW113072

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): MONITORING BORE

Work Type: Bore
Work Status: Equipped
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date: 11/07/2003
Final Depth: 9.50 m
Drilled Depth: 9.50 m

Contractor Name: Macquarie Drilling
Driller: Unkown Unknown
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	HOLSWORTHY	201//1009044
Licensed:			

Region: 10 - Sydney South Coast
River Basin: - Unknown
Area/District:
CMA Map:
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6244429.000
Easting: 308832.000
Latitude: 33°55'23.7"S
Longitude: 150°55'55.0"E

GS Map: -
MGA Zone: 56
Coordinate Source: Unknown

Remarks

29/07/2014: Nat Carling, 29-July-2014; Added status, drill method, depth & work name, updated work type.

***** End of GW113072 *****

WaterNSW
Work Summary

GW113073

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): MONITORING BORE

Work Type: Bore
Work Status: Equipped
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date: 11/07/2003
Final Depth: 10.00 m
Drilled Depth: 10.00 m

Contractor Name: Macquarie Drilling
Driller: Unkown Unknown
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	HOLSWORTHY	201//1009044
Licensed:			

Region: 10 - Sydney South Coast
River Basin: - Unknown
Area/District:
CMA Map:
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6244416.000
Easting: 308929.000
Latitude: 33°55'24.2"S
Longitude: 150°55'58.8"E

GS Map: -
MGA Zone: 56
Coordinate Source: Unknown

Remarks

29/07/2014: Nat Carling, 29-July-2014; Added status, drill method, depth & work name, updated work type.

***** End of GW113073 *****

WaterNSW
Work Summary

GW113074

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): MONITORING BORE

Work Type: Bore
Work Status: Equipped
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date: 11/07/2003
Final Depth: 10.00 m
Drilled Depth: 10.00 m

Contractor Name: Macquarie Drilling
Driller: Unkown Unknown
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	HOLSWORTHY	201//1009044
Licensed:			

Region: 10 - Sydney South Coast
River Basin: - Unknown
Area/District:
CMA Map:
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6244353.000
Easting: 309029.000
Latitude: 33°55'26.3"S
Longitude: 150°56'02.6"E

GS Map: -
MGA Zone: 56
Coordinate Source: Unknown

Remarks

29/07/2014: Nat Carling, 29-July-2014; Added status, drill method, depth & work name, updated work type.

***** End of GW113074 *****

WaterNSW
Work Summary

GW113075

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): MONITORING BORE

Work Type: Bore
Work Status: Equipped
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date: 11/07/2003
Final Depth: 9.50 m
Drilled Depth: 9.50 m

Contractor Name: Macquarie Drilling
Driller: Unkown Unknown
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	HOLSWORTHY	201//1009044
Licensed:			

Region: 10 - Sydney South Coast
River Basin: - Unknown
Area/District:
CMA Map:
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6244297.000
Easting: 309045.000
Latitude: 33°55'28.1"S
Longitude: 150°56'03.2"E

GS Map: -
MGA Zone: 56
Coordinate Source: Unknown

Remarks

29/07/2014: Nat Carling, 29-July-2014; Added status, drill method, depth & work name, updated work type.

***** End of GW113075 *****

Appendix C – Historic Aerial Photography

Historic Aerial Photography Review

Aerial photographs of the precinct were sourced from NSW Land and Property Information (formerly NSW Department of Lands), or from alternative databases (such as Google Earth). These provided an appreciation of the historical development and changes of land use across the precinct area. Land use observations and comments for each of the aerial photographs reviewed are summarised in **Table C-1**. Where the land use activity has been documented by previous studies (**Section 4.2**), reference to the corresponding information source is made.

Table C-1 Historical aerial photo review

Photo year	Aerial photograph details	Historical land use description	Land use category
1930	*Survey:* Sydney NSW 3429, Run 24, Photo 797; *Photo date:* 10-2-1930; *Source:* Commonwealth of Aust., see **Figure C-1**	***Within the precinct:*** Although photo image resolution was low in quality, the whole of the precinct area appeared to be rural land with most parts showing evidence of cultivation, with occasional structures believed to be farm sheds and/or residences. Four residences were located in the southern part of parcel A. Two buildings were present in the southwest corner of the site (land [1] parcel Y) over present day Bill Morrison Park. Cleared, grazing land, with sparse trees was present over all or most of the smaller land parcels D, C, P, Q, R, S, T, U, the northern and western parts of parcel A. Bridges Rd. terminated at Haigh Park. The western end of Newbridge Road joined Heathcote Road, which extended over what is now Haigh Avenue, in the southwest corner of the precinct. A former road was also present running from Heathcote Road to the south through the centre of parcel B-west and terminating at parcel A.	Rural: passive, cultivated and sparse residential
		Surrounding Properties: An oxbow lake feature was located 150m east of parcels C and D and adjacent to the northern boundary of parcels T to X, over the eastern part of current day Lake Moore, which was fed by ANZAC Creek located 70 to 90m east of parcel X. Other off-Precinct areas south of Georges River were passive or cultivated rural land, with the exception of the land to the south of Heathcote and Newbridge Roads, and close to Georges River, which was partly covered by regular structures, indicating more intensive farming operations (e.g. dairy or poultry farming). A railway corridor was apparent to the west and north of Georges River, with the early Liverpool train station on eastern edge of Liverpool Town visible to the west of the rail line.	Rural and town development
1943	*Survey:* SKM Sydney 1943; *Photo date:* not specified; *Source:* Sinclair Knight Merz., see **Figure C-2**	***Within the precinct:*** The 1943 photo showed cultivated areas had been extended, with some lots remaining as passive rural grazing land. Roadways appeared unchanged. Major changes were as follows: ▪ A topographic depression, which appeared to be inundated with water, was obvious in the south east part of parcel B-west, immediately north of	Rural: passive, cultivated and sparse residential

Photo year	Aerial photograph details	Historical land use description	Land use category
		parcels E, F, G, H and I; ▪ Earthworks, believed to be associated with sand mining operations (DP, 2015), were evident on the eastern parts of land parcel C, with partially flooded excavated areas almost reaching the eastern Precinct boundary at this location; and ▪ A factory structure measuring approximately 50m by 160m was constructed over the western part of parcel B-west, approximately 70-100m from the east bank of Georges River, with a number of other associated structures resembling separate commercial/industrial buildings also present in the vicinity. This parcel had been acquired by Cable Makers Australia Pty Ltd and was used for a range of processes in the manufacture of electrical cables, overhead transmission cables and polyurethane foam (WC, 1999 and AECOM, 2015). ▪ WC also recorded that during the 1940s the northern part of parcel B-west began to be used for onsite waste scrap disposal. ***Surrounding Properties:*** The island within the oxbow lake feature (over present day Bulba-Dibeen Island), east of the precinct showed evidence of cultivation, as did the surrounding land. Commercial/industrial buildings had been constructed on the land adjacent to Georges River and to the south of Heathcote and Newbridge Roads. This was understood to be a Department of Defence facility, specifically, the No. 3 Sub-base of the 5th Ordnance Depot during World War II, believed to be used for storage of clothing, artillery, armament parts and firearms, military vehicles, technical equipment, inflammables (paints, acids, oils, turps) and tallow drums. Also on this site were the Australian Women's Army Barracks, truck storage facilities, pallet manufacturing and workshops (Ref. AECOM, 2015). A residential estate had been developed south of Newbridge Road and east of Morebank Avenue.	Commercial and industrial Industrial Rural, with surface water features Industrial Low-density residential
1965	*Survey:* Cumberland NSW 5228, Run 23, Photo 1404; *Photo date:* 29-8-1965; *Source:* NSW Dept. of Lands, see **Figure C-3**	***Within the precinct:*** Rural land uses within the precinct had been diminished to parcels A, the northern part of B-east, D, K to P and R to X. Parcel C still appeared disturbed due to sand mining works, with flooding of excavations. Other changes were as follows: ▪ The factory building on the western part of parcel B-west on the 1943 aerial photo had been extended eastwards over previously cultivated land, with the construction of additional industrial buildings over parcel B-east (Joyce Foam Pty Ltd, foam manufacturer), to Bridges Rd. ▪ A summary of historical operations reported by WC (1999) indicated that extensions between 1940 and 1967 included an administration	Industrial and passive rural

Photo year	Aerial photograph details	Historical land use description	Land use category
		building, coal-fired boiler, incinerator building, mould shop, flammable liquids store, mixing shed and carbon black store. ▪ Earthworks and filling were noted in parcel A and the northwest corner of parcel B-west close to Georges River. The fill comprised inert industrial waste from land parcels B-west and B-east, with some originating from commercial development sites in Liverpool (Ref. S&G, 2007). ▪ A new road appeared to the north of the factory extension connecting Bridges Road to the western part of parcel B-west. ▪ Small to medium sized structures had been constructed on parcels E to J on Newbridge Road. ▪ A commercial / industrial building with approximate dimensions 20m x 50m had been constructed south of Lake Moore, over previously cultivated land within parcel Q. ***Surrounding Properties:*** The land to the east of the precinct, north and west of the oxbow lake, as well as the southern part of the island within the lake, had undergone significant sand mining and appeared flooded. South of Newbridge Road, a factory building measuring approximately 70m x 80m had been constructed over former cultivated land between Heathcote and Newbridge Roads. Some of the factory buildings close to Georges River had been extended eastwards almost to Moorebank Avenue. Light Horse Bridge crossing the Georges River on Newbridge Road was constructed and increased development of Liverpool town was evident.	Mainly industrial and commercial, with surface water features and some low-density residential
1970	*Survey:* Cumberland NSW; *Photo date:* 7-7-1970; *Source:* NSW Dept. of Lands, see **Figure C-4**	***Within the precinct:*** Additional industrial development occurred across the precinct as follows: ▪ The existing factory buildings in land parcels B-west and B-east had been extended northwards to the southern boundary of parcel A. ▪ WC (1999) noted that three underground storage tanks (USTs) containing petrol and diesel were installed near Factory No. 9. A PCB compound was being produced in Factory No. 4 where cables were manufactured. ▪ Land parcel A had some small structures constructed in the western part, with motor vehicles (heavy and light) parked or moving across the site. ▪ New industrial buildings had been constructed on land parcels K, L, M, O, Q and T on Newbridge Road. Parcels U to X appeared to be prepared for development. The building on parcel K was believed to have been a petrol service station. ▪ The EI (2015b) Phase 1 Preliminary Site Investigation (PSI) reported that parcel M was used for the manufacture of filters, strainers and	Industrial / commercial

Photo year	Aerial photograph details	Historical land use description	Land use category
		pressure vessels. Asbestos-cement sheeting was on the warehouse building. Other potential contamination sources on land parcel M included above ground storage tanks inside the warehouse, flammable liquids storage including paints, hydraulic oil and LPG. ▪ The EI (2015c) PSI reported that parcel O was used for the manufacture of plastics, food storage and distribution, tyre re-treading and furniture manufacture and wholesaling. The site inspection revealed a decommissioned UST and a number of dangerous goods storage depots. Other changes were as follows: ▪ The sand-mined, eastern part of Parcel C was still flooded. ▪ A new access road connecting Bridges Road to the eastern part of parcel A had been constructed. ***Surrounding Properties:*** The land to the east appeared to be inundated with flood waters, with the exception of the central island and access roadways. Additional factory buildings were evident to the south of Newbridge Road, opposite land parcels O and P. Otherwise no significant change to off-site properties was evident.	Industrial and commercial, with surface water features and some low-density residential
1991	*Survey:* Sydney NSW 4028, Run 12, Photo 197; *Photo date:* 13-8-1991; *Source:* NSW Dept. of Lands, see **Figure C-5**	***Within the precinct:*** Additional industrial development occurred across the precinct as follows: ▪ Extensions to the existing factory buildings to the north and south of land parcel B-west and to the north of parcel B-east; and ▪ New industrial buildings or extensions to existing buildings had been constructed on land parcels N, P and R to X. The sand-mined, eastern part of Parcel C was only partially flooded, probably indicating that some filling of this site had commenced to raise its level above that of Lake Moore to the east. An industrial operation was taking place on the western part of parcel C, corresponding with historical information regarding a concrete batching plant in this area. ***Surrounding Properties:*** Sand mining operations east of the precinct appeared to have ceased and the shape of Lake Moore with islands was formed generally as per the present day layout of this surface water feature. New industrial developments were evident on the land south of Newbridge Road, opposite land parcels V to X, and on properties located north of Georges River. All other off-Precinct properties remained mostly unchanged.	Industrial Industrial and commercial, with surface water features and some low-density residential
2002	*Survey:* Penrith NSW 4724 (M2302), Run 12, Photo 53; *Photo date:* 16-3-2002; *Source:* NSW	***Within the precinct:*** Photo resolution was poor; however, it was evident that only minimal changes occurred across the precinct. These included:	Industrial

Photo year	Aerial photograph details	Historical land use description	Land use category
	Dept. of Lands, see **Figure C-6**	▪ Extensions to the existing factory buildings in the northwest corner of land parcel B-west; and ▪ Filling operations were in progress across the sand mined portion of parcel C. ***Surrounding Properties:*** New industrial developments evident on the land south of Newbridge Road, opposite land parcels O and P. Haigh Park to the east of parcel A appeared to have been filled and rehabilitated. All other off-Precinct properties remained mostly unchanged.	Industrial and commercial, with surface water features and some low-density residential
2009	*Survey:* not specified; *Photo date:* 14-11-09; *Source:* nearmap.com.au; *Accessed:* 02-8-2019, see **Figure C-7**	***Within the precinct:*** The industrial activities appeared unchanged from previous historical aerial photographs, with the following exceptions: ▪ Outdoor industrial storage areas were evident to the north and south of factory buildings within the land parcels B-west and Q, as well as other parcels located on Newbridge Road; ▪ Above-ground storage tanks were also visible in between factory buildings on parcel B-east; and ▪ Stockpiled materials (possibly soil) were visible in the southern and central parts of Parcel A. ***Surrounding Properties:*** Former industrial buildings in the area adjacent to the Georges River appeared to have been extended and modernised. All other off-Precinct properties remained mostly unchanged.	Industrial Industrial and commercial, with surface water features and some low-density residential

Notes: [1] Land parcels A to X are current designations used to identify the separate sites making up the precinct and are identified on **Figure 2-1 (**, which showed an aerial view of the site in 2019.

Photo Source: Commonwealth of Australia, SYDNEY SURVEY, NSW Survey 3429, Run 24, Photo 797, 10-2-1930

LEGEND

Approximate precinct boundary

0 50 100 150 200 250

Approx. Scale (m)

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	M.G.
Approved:	N.K.
Date:	02-08-19

LAC JV Pty Ltd
Moore Point Precinct Review Study
Part 1: Contamination, Acid-Sulfate Soils and Remedial Strategy
Newbridge & Bridges Roads, Liverpool NSW

Aerial Photograph - 1930

Figure: C-1

Project: E22882.E09

Photo Source: https://maps.six.nsw.gov.au, SKM SYDNEY 1943.

LEGEND

Approximate precinct boundary

0 50 100 150 200 250

Approx. Scale (m)

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	M.G.
Approved:	N.K.
Date:	02-08-19

LAC JV Pty Ltd

Moore Point Precinct Review Study

Part 1: Contamination, Acid-Sulfate Soils and Remedial Strategy

Newbridge & Bridges Roads, Liverpool NSW

Aerial Photograph - 1943

Figure: C-2

Project: E22882.E09

Photo Source: NSW Lands Department, Cumberland, NSW Survey 5228, Run 23, Photo 1404, 29-8-65

LEGEND

Approximate precinct boundary

0 50 100 150 200 250

Approx. Scale (m)

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	M.G.
Approved:	N.K.
Date:	02-08-19

LAC JV Pty Ltd
Moore Point Precinct Review Study
Part 1: Contamination, Acid-Sulfate Soils and Remedial Strategy
Newbridge & Bridges Roads, Liverpool NSW

Aerial Photograph - 1965

Figure: C-3

Project: E22882.E09

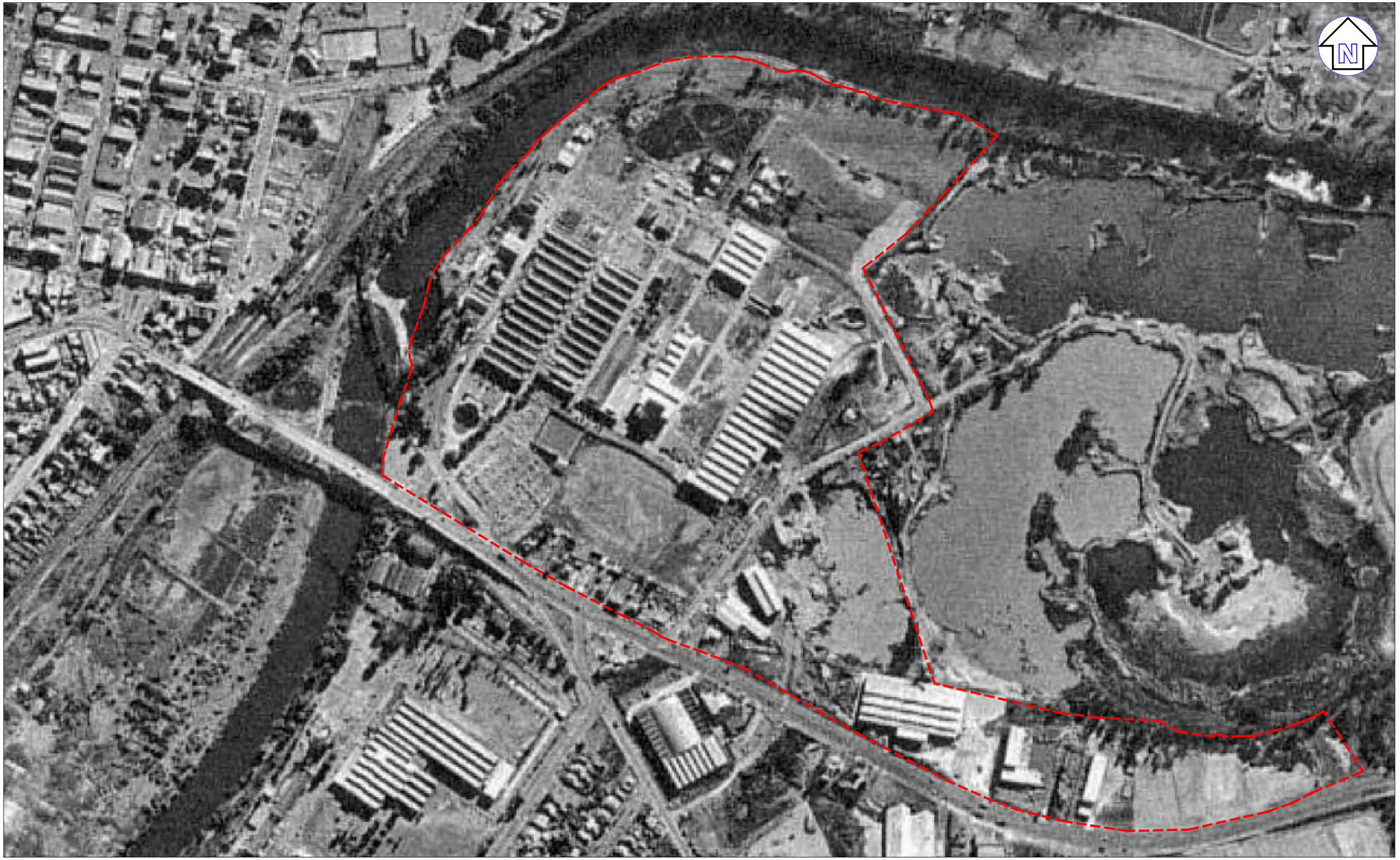


Photo Source: NSW Lands Department, Cumberland, NSW Survey 5195, Photo 1908, 07-07-1970

LEGEND

Approximate precinct boundary

0 50 100 150 200 250

Approx. Scale (m)

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	M.G.
Approved:	N.K.
Date:	02-08-19

LAC JV Pty Ltd
Moore Point Precinct Review Study
Part 1: Contamination, Acid-Sulfate Soils and Remedial Strategy
Newbridge & Bridges Roads, Liverpool NSW

Aerial Photograph - 1970

Figure: C-4

Project: E22882.E09

Photo Source: NSW Lands Department, SYDNEY, NSW Survey 4028, Run 12, Photo 197, 13-8-91

LEGEND

Approximate precinct boundary

0 50 100 150 200 250

Approx. Scale (m)

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	M.G.
Approved:	N.K.
Date:	02-08-19

LAC JV Pty Ltd
Moore Point Precinct Review Study
Part 1: Contamination, Acid-Sulfate Soils and Remedial Strategy
Newbridge & Bridges Roads, Liverpool NSW

Aerial Photograph - 1991

Figure: C-5

Project: E22882.E09

Photo Source: NSW Lands Department, PENRITH, NSW Survey 4724 (M2302), Run 12, Photo 53, 16-3-02

LEGEND

Approximate precinct boundary

0 50 100 150 200 250

Approx. Scale (m)

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	M.G.
Approved:	N.K.
Date:	02-08-19

LAC JV Pty Ltd
Moore Point Precinct Review Study
Part 1: Contamination, Acid-Sulfate Soils and Remedial Strategy
Newbridge & Bridges Roads, Liverpool NSW

Aerial Photograph - 2002

Figure: C-6

Project: E22882.E09

Photo Source: https://www.nearmap.com.au/, Image dated 14/11/2009, Accessed on 02/08/2019

LEGEND

Approximate precinct boundary

0 50 100 150 200 250

Approx. Scale (m)

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	M.G.
Approved:	N.K.
Date:	02-08-19

LAC JV Pty Ltd
Moore Point Precinct Review Study
Part 1: Contamination, Acid-Sulfate Soils and Remedial Strategy
Newbridge & Bridges Roads, Liverpool NSW

Aerial Photograph - 2009

Figure: C-7

Project: E22882.E09

Appendix D – Environment Protection Licences

Licence summary

Search Again Return to Previous Page

Summary Licence No: 818

View this licence (PDF document 121 kb)

Licence holder: PRYSMIAN AUSTRALIA PTY LTD
Premises: PRYSMIAN AUSTRALIA PTY LIMITED
1 HEATHCOTE ROAD, LIVERPOOL, NSW, 2170
LGA: LIVERPOOL **Catchment:** Sydney Coast & Georges River
Administrative fee: $2,128.00
Licence status: Issued
Activity type: Metal coating
Metal waste generation
Licence review: Complete date 06 Apr 2016
Complete date 13 Apr 2011
Complete date 06 Apr 2006
Complete date 15 Mar 2005
Complete date 21 Jun 2002
Due date 06 Apr 2021
Pollution incident management plan: Last tested 04 Feb 2019
Current Environmental Risk Level: Level 1

Applications

Number	Application type	Current status	Date received
141780	s.55 Licence Transfer	Approved	21 Feb 2003

Notices

Number	Issue date	Notice type
1046598	22 Jun 2005	s.58 Licence Variation
1057336	07 Apr 2006	s.58 Licence Variation
1072072	10 Apr 2007	s.58 Licence Variation
1076668	09 Aug 2007	s.58 Licence Variation
1096521	16 Jan 2009	s.58 Licence Variation
1511943	29 Aug 2014	s.58 Licence Variation
1538225	02 May 2016	s.58 Licence Variation
1565149	28 May 2018	Penalty Notice

Pollution studies and reduction programs

Title	Program type	Start date	Complete date	
Remediation and monitoring of contaminated areas	Mixed	30 Apr 2013		Conditions

Annual Returns

Start date	End date	Date received	Non-compliance	LBL data
31-Dec-2017	30-Dec-2018	21-Feb-2019	yes	Not available
31-Dec-2016	30-Dec-2017	04-Jul-2018	yes	Not available
31-Dec-2015	30-Dec-2016	25-Jan-2017	No	Not available
31-Dec-2014	30-Dec-2015	29-Feb-2016	No	Not available
31-Dec-2013	30-Dec-2014	26-Feb-2015	No	Not available
31-Dec-2012	30-Dec-2013	13-Feb-2014	No	Not available
31-Dec-2011	30-Dec-2012	27-Feb-2013	yes	Not available
31-Dec-2010	30-Dec-2011	25-Jan-2012	No	Not available
31-Dec-2009	30-Dec-2010	22-Feb-2011	No	Not available
31-Dec-2008	30-Dec-2009	03-Mar-2010	No	Not available
31-Dec-2007	30-Dec-2008	03-Mar-2009	No	Not available
31-Dec-2006	30-Dec-2007	19-Feb-2008	yes	Not available
31-Dec-2005	30-Dec-2006	29-Jan-2007	yes	Not available
31-Dec-2004	30-Dec-2005	24-Jan-2006	yes	Not available
31-Dec-2003	30-Dec-2004	24-Feb-2005	yes	Not available
31-Dec-2002	30-Dec-2003	16-Jan-2004	No	Not available
31-Dec-2001	30-Dec-2002	14-Feb-2003	No	Not available
31-Dec-2000	30-Dec-2001	14-May-2002	No	Not available
31-Dec-1999	30-Dec-2000			

Complete annual return via eConnect

For business and industry

For local government

Contact us

- 131 555 (tel:131555)
- info@epa.nsw.gov.au (mailto:info@epa.nsw.gov.au)
- EPA Office Locations (https://www.epa.nsw.gov.au/about-us/contact-us/locations)

Environment Protection Licence

Licence - 818

Licence Details	
Number:	818
Anniversary Date:	31-December

Licensee
PRYSMIAN AUSTRALIA PTY LTD
LOCKED BAG 7042
LIVERPOOL BC NSW 1871

Premises
PRYSMIAN AUSTRALIA PTY LIMITED
1 HEATHCOTE ROAD
LIVERPOOL NSW 2170

Scheduled Activity
Metallurgical activities

Fee Based Activity	Scale
Metal coating	0-100000 T annual capacity to coat metal
Metal waste generation	> 100 T annual volume of waste generated or stored

Region
Metropolitan - Sydney Industry
Level 13, 10 Valentine Ave PARRAMATTA NSW 2150
Phone: (02) 9995 5000
Fax: (02) 9995 6900
PO Box 668 PARRAMATTA
NSW 2124

Environment Protection Licence

Licence - 818

Environment Protection Licence

Licence - 818

Environment Protection Licence

Licence - 818

Information about this licence

Dictionary

A definition of terms used in the licence can be found in the dictionary at the end of this licence.

Responsibilities of licensee

Separate to the requirements of this licence, general obligations of licensees are set out in the Protection of the Environment Operations Act 1997 ("the Act") and the Regulations made under the Act. These include obligations to:

- ensure persons associated with you comply with this licence, as set out in section 64 of the Act;
- control the pollution of waters and the pollution of air (see for example sections 120 - 132 of the Act);
- report incidents causing or threatening material environmental harm to the environment, as set out in Part 5.7 of the Act.

Variation of licence conditions

The licence holder can apply to vary the conditions of this licence. An application form for this purpose is available from the EPA.

The EPA may also vary the conditions of the licence at any time by written notice without an application being made.

Where a licence has been granted in relation to development which was assessed under the Environmental Planning and Assessment Act 1979 in accordance with the procedures applying to integrated development, the EPA may not impose conditions which are inconsistent with the development consent conditions until the licence is first reviewed under Part 3.6 of the Act.

Duration of licence

This licence will remain in force until the licence is surrendered by the licence holder or until it is suspended or revoked by the EPA or the Minister. A licence may only be surrendered with the written approval of the EPA.

Licence review

The Act requires that the EPA review your licence at least every 5 years after the issue of the licence, as set out in Part 3.6 and Schedule 5 of the Act. You will receive advance notice of the licence review.

Fees and annual return to be sent to the EPA

For each licence fee period you must pay:

- an administrative fee; and
- a load-based fee (if applicable).

Environment Protection Licence

The EPA publication “A Guide to Licensing” contains information about how to calculate your licence fees. The licence requires that an Annual Return, comprising a Statement of Compliance and a summary of any monitoring required by the licence (including the recording of complaints), be submitted to the EPA. The Annual Return must be submitted within 60 days after the end of each reporting period. See condition R1 regarding the Annual Return reporting requirements.

Usually the licence fee period is the same as the reporting period.

Transfer of licence

The licence holder can apply to transfer the licence to another person. An application form for this purpose is available from the EPA.

Public register and access to monitoring data

Part 9.5 of the Act requires the EPA to keep a public register of details and decisions of the EPA in relation to, for example:

- licence applications;
- licence conditions and variations;
- statements of compliance;
- load based licensing information; and
- load reduction agreements.

Under s320 of the Act application can be made to the EPA for access to monitoring data which has been submitted to the EPA by licensees.

This licence is issued to:

PRYSMIAN AUSTRALIA PTY LTD
LOCKED BAG 7042
LIVERPOOL BC NSW 1871

subject to the conditions which follow.

Environment Protection Licence

Licence - 818

1 Administrative Conditions

A1 What the licence authorises and regulates

A1.1 This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, fee-based activity classification and the scale of the operation.

Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition.

Scheduled Activity	Fee Based Activity	Scale
Metallurgical activities	Metal coating	0 - 100000 T annual capacity to coat metal
Metallurgical activities	Metal waste generation	> 100 T annual volume of waste generated or stored

A2 Premises or plant to which this licence applies

A2.1 The licence applies to the following premises:

Premises Details
PRYSMIAN AUSTRALIA PTY LIMITED
1 HEATHCOTE ROAD
LIVERPOOL
NSW 2170
LOT 200 DP 1009044

A3 Other activities

A3.1 This licence applies to all other activities carried on at the premises, including:

Ancillary Activity
Chemical storage

A4 Information supplied to the EPA

A4.1 Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence.

In this condition the reference to "the licence application" includes a reference to:
a) the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998;

and
b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.

2 Limit Conditions

L1 Pollution of waters

L1.1 Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.

L2 Waste

L2.1 The licensee must not cause, permit or allow any waste to be received at the premises, except the wastes expressly referred to in the column titled “Waste” and meeting the definition, if any, in the column titled “Description” in the table below.
Any waste received at the premises must only be used for the activities referred to in relation to that waste in the column titled “Activity” in the table below.
Any waste received at the premises is subject to those limits or conditions, if any, referred to in relation to that waste contained in the column titled “Other Limits” in the table below.
This condition does not limit any other conditions in this licence.

Code	Waste	Description	Activity	Other Limits
NA	General or Specific exempted waste	Waste that meets all the conditions of a resource recovery exemption under Clause 92 of the Protection of the Environment Operations (Waste) Regulation 2014	As specified in each particular resource recovery exemption	NA
NA	Waste	Any waste received on site that is below licensing thresholds in Schedule 1 of the POEO Act, as in force from time to time	-	NA

L3 Potentially offensive odour

L3.1 No condition of this licence identifies a potentially offensive odour for the purposes of Section 129 of the Protection of the Environment Operations Act 1997.

L3.2 The licensee must not cause or permit the emission of offensive odour beyond the boundary of the premises.

Note: Section 129 of the Protection of the Environment Operations Act 1997, provides that the licensee must not cause or permit the emission of any offensive odour from the premises but provides a defence if the emission is identified in the relevant environment protection licence as a potentially offensive odour and the odour was emitted in accordance with the conditions of a licence directed at minimising odour.

3 Operating Conditions

O1 Activities must be carried out in a competent manner

O1.1 Licensed activities must be carried out in a competent manner.
This includes:
a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and
b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.

O2 Maintenance of plant and equipment

O2.1 All plant and equipment installed at the premises or used in connection with the licensed activity:
a) must be maintained in a proper and efficient condition; and
b) must be operated in a proper and efficient manner.

O3 Processes and management

O3.1 The licensee must ensure that any any liquid and/or non liquid generated and/or stored at the premises is assessed and classified in accordance with the EPA Waste Classification Guidelines as in force from time to time.

O3.2 The licensee must ensure that waste identified for recycling is stored separately from other waste.

4 Monitoring and Recording Conditions

M1 Monitoring records

M1.1 The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.

M1.2 All records required to be kept by this licence must be:
a) in a legible form, or in a form that can readily be reduced to a legible form;
b) kept for at least 4 years after the monitoring or event to which they relate took place; and
c) produced in a legible form to any authorised officer of the EPA who asks to see them.

M1.3 The following records must be kept in respect of any samples required to be collected for the purposes of

this licence:
a) the date(s) on which the sample was taken;
b) the time(s) at which the sample was collected;
c) the point at which the sample was taken; and
d) the name of the person who collected the sample.

M2 Recording of pollution complaints

M2.1 The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.

M2.2 The record must include details of the following:
a) the date and time of the complaint;
b) the method by which the complaint was made;
c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
d) the nature of the complaint;
e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and
f) if no action was taken by the licensee, the reasons why no action was taken.

M2.3 The record of a complaint must be kept for at least 4 years after the complaint was made.

M2.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M3 Telephone complaints line

M3.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.

M3.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.

M3.3 The preceding two conditions do not apply until 3 months after: the date of the issue of this licence.

5 Reporting Conditions

R1 Annual return documents

R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:
1. a Statement of Compliance,
2. a Monitoring and Complaints Summary,
3. a Statement of Compliance - Licence Conditions,
4. a Statement of Compliance - Load based Fee,

5. a Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan,
6. a Statement of Compliance - Requirement to Publish Pollution Monitoring Data,
7. a Statement of Compliance - Environmental Management Systems and Practices; and
8. a Statement of Compliance - Environmental Improvement Works.

At the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.

R1.2 An Annual Return must be prepared in respect of each reporting period, except as provided below.

R1.3 Where this licence is transferred from the licensee to a new licensee:
a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and
b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.

R1.4 Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on:
a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or
b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.

R1.5 The Annual Return for the reporting period must be supplied to the EPA by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').

R1.6 The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.

R1.7 Within the Annual Return, the Statements of Compliance must be certified and the Monitoring and Complaints Summary must be signed by:
a) the licence holder; or
b) by a person approved in writing by the EPA to sign on behalf of the licence holder.

Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period.

Note: An application to transfer a licence must be made in the approved form for this purpose.

R2 Notification of environmental harm

R2.1 Notifications must be made by telephoning the Environment Line service on 131 555.

R2.2 The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.

Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening

material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.

R3 Written report

R3.1 Where an authorised officer of the EPA suspects on reasonable grounds that:
a) where this licence applies to premises, an event has occurred at the premises; or
b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence,
and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.

R3.2 The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.

R3.3 The request may require a report which includes any or all of the following information:
a) the cause, time and duration of the event;
b) the type, volume and concentration of every pollutant discharged as a result of the event;
c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event;
d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort;
e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants;
f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and
g) any other relevant matters.

R3.4 The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.

6 General Conditions

G1 Copy of licence kept at the premises or plant

G1.1 A copy of this licence must be kept at the premises to which the licence applies.

G1.2 The licence must be produced to any authorised officer of the EPA who asks to see it.

G1.3 The licence must be available for inspection by any employee or agent of the licensee working at the premises.

Environment Protection Licence

7 Special Conditions

E1 Environmental Management Plan

E1.1 The licensee must implement the "*Environmental Management Plan Coolant Leak Area - Factory 2, 1 Heathcote Road, Liverpool NSW, 25 November 2013*" audited by Zoic Environmental Pty Ltd (Site Audit Statement ref. KJL090, 23rd December 2013).

E1.2 The licensee must engage a suitably qualified environmental consultant to sample all five monitoring wells installed around the in-ground tank as depicted in Figure 3, Appendix A of the Environmental Management Plan (EMP) referred to in Condition E1.1. From the date of this Notice onwards, groundwater monitoring is to be undertaken on an annual basis in accordance with the *8.1 Groundwater Sampling Methodology* and analysed in conjunction with *Table 8-3 Groundwater Assessment Criteria* of the EMP.

E1.3 Within one month of receiving the annual groundwater sampling report, the licensee must submit the report to the EPA's Manager Sydney Industry by email to metro.regulation@epa.nsw.gov.au.
The report must address the requirements of *Section 8.2 Groundwater Analytical Program* as described in the EMP.

E1.4 If at any time, any of the target contaminants exceed the assessment criteria defined in Table 8.3 *Groundwater Assessment Criteria* of the EMP, the licensee must implement contingency options including but not limited to:
a) further assessment and management by a suitably qualified environmental consultant;
b) the adoption and implementation of a suitable remediation technique; and
c) notification of any groundwater contaminant exceedances to a NSW EPA-accredited site auditor.

E1.5 Provided that the NSW EPA, in consultation with the licensee, agree that no further groundwater monitoring is required, the licensee must provide the following:
a) a site audit report prepared by a NSW EPA accredited site auditor that can verify that there is no further risk to the underlying ground water; and
b) a site auditor's statement prepared by an accredited site auditor in accordance with the approved site audit form. The report and statement must comply with the EPA's publication Guidelines for the NSW Site Auditor Scheme. The site audit report and site audit statement must be submitted to the Manager Sydney Industry by email to metro.regulation@epa.nsw.gov.au within six months of its preparation.

Environment Protection Licence

Licence - 818

Dictionary

General Dictionary

3DGM [in relation to a concentration limit]	Means the three day geometric mean, which is calculated by multiplying the results of the analysis of three samples collected on consecutive days and then taking the cubed root of that amount. Where one or more of the samples is zero or below the detection limit for the analysis, then 1 or the detection limit respectively should be used in place of those samples
Act	Means the Protection of the Environment Operations Act 1997
activity	Means a scheduled or non-scheduled activity within the meaning of the Protection of the Environment Operations Act 1997
actual load	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
AM	Together with a number, means an ambient air monitoring method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.
AMG	Australian Map Grid
anniversary date	The anniversary date is the anniversary each year of the date of issue of the licence. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
annual return	Is defined in R1.1
Approved Methods Publication	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
assessable pollutants	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
BOD	Means biochemical oxygen demand
CEM	Together with a number, means a continuous emission monitoring method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.
COD	Means chemical oxygen demand
composite sample	Unless otherwise specifically approved in writing by the EPA, a sample consisting of 24 individual samples collected at hourly intervals and each having an equivalent volume.
cond.	Means conductivity
environment	Has the same meaning as in the Protection of the Environment Operations Act 1997
environment protection legislation	Has the same meaning as in the Protection of the Environment Administration Act 1991
EPA	Means Environment Protection Authority of New South Wales.
fee-based activity classification	Means the numbered short descriptions in Schedule 1 of the Protection of the Environment Operations (General) Regulation 2009.
general solid waste (non-putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997

Environment Protection Licence

Licence - 818

flow weighted composite sample	Means a sample whose composites are sized in proportion to the flow at each composites time of collection.
general solid waste (putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environmen t Operations Act 1997
grab sample	Means a single sample taken at a point at a single time
hazardous waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
licensee	Means the licence holder describe d at the front of this licence
load calculation protocol	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
local authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
material harm	Has the same meaning as in section 147 Protection of the Environment Operations Act 1997
MBAS	Means methylene blue active substances
Minister	Means the Minister administering the Protection of the Environment Operations Act 1997
mobile plant	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
motor vehicle	Has the same meaning as in the Protection of the Environment Operations Act 1997
O&G	Means oil and grease
percentile [in relation to a concentration limit of a sample]	Means that percentage [eg.50%] of the number of samples taken that must meet the concentration limit specified in the licence for that pollutant over a specified period of time. In this licence, the specified period of time is the Reporting Period unless otherwise stated in this licence.
plant	Includes all plant within the meaning of the Protection of the Environment Operations Act 1997 as well as motor vehicles.
pollution of waters [or water pollution]	Has the same meaning as in the Protection of the Environment Operations Act 1997
premises	Means the premises described in condition A2.1
public authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
regional office	Means the relevant EPA office referred to in the Contacting the EPA document accompanying this licence
reporting period	For the purposes of this licence, the reporting period means the period of 12 months after the issue of the licence, and each subsequent period of 12 mo nths. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
restricted solid waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
scheduled activity	Means an activity listed in Schedule 1 of the Protection of the Environment Operations Act 1997
special waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
TM	Together with a number, means a test method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.

Environment Protection Licence

Licence - 818

TSP	Means total suspended particles
TSS	Means total suspended solids
Type 1 substance	Means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements
Type 2 substance	Means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements
utilisation area	Means any area shown as a utilisation area on a map submitted with the application for this licence
waste	Has the same meaning as in the Protection of the Environment Operations Act 1997
waste type	Means liquid, restricted solid waste, general solid waste (putrescible), general solid waste (non - putrescible), special waste or hazardous waste

Ms Nadia Kanhoush

Environment Protection Authority

(By Delegation)

Date of this edition: 04-August-2000

Environment Protection Licence

Licence - 818

End Notes

1	Licence varied by Admin corrections to archived record, issued on 02-Dec-2002, which came into effect on 02-Dec-2002.
2	Licence transferred through application 141780, approved on 04-Mar-2003, which came into effect on 01-Jul-2001.
3	Licence varied by notice 1046598, issued on 22-Jun-2005, which came into effect on 24-Jun-2005.
4	Licence varied by notice 1057336, issued on 27-Apr-2006, which came into effect on 27-Apr-2006.
5	Licence varied by notice 1072072, issued on 10-Apr-2007, which came into effect on 10-Apr-2007.
6	Licence varied by notice 1076668, issued on 09-Aug-2007, which came into effect on 09-Aug-2007.
7	Condition A1.3 Not applicable varied by notice issued on <issue date> which came into effect on <effective date>
8	Licence varied by notice 1096521, issued on 16-Jan-2009, which came into effect on 16-Jan-2009.
9	Licence varied by notice 1511943 issued on 29-Aug-2014
10	Licence varied by notice 1538225 issued on 02-May-2016

Licence summary

Search Again Return to Previous Page

Summary Licence No: 3099

View this licence (PDF document 139 kb)

Licence holder: **JOYCE FOAM PTY LTD**
Trading as: JOYCE FOAM PRODUCTS
Premises: JOYCE FOAM PRODUCTS
5-9 BRIDGES ROAD, MOOREBANK, NSW, 2170
LGA: LIVERPOOL **Catchment:** Sydney Coast & Georges River
Administrative fee: $8,840.00
Licence status: Issued
Activity type: Plastic resins production
Licence review: Complete date 25 Jan 2016
Complete date 25 Jan 2011
Complete date 25 Jan 2006
Complete date 26 Oct 2001
Due date 25 Jan 2021
Pollution incident management plan: Last tested 22 Aug 2018
Current Environmental Risk Level: Level 1

Applications

Number	Application type	Current status	Date received
143769	s.55 Licence Transfer	Approved	27 Oct 2005
1513477	s.58 Licence Variation	Withdrawn	13 Dec 2012

Notices

Number	Issue date	Notice type
1004945	25 Oct 2001	s.58 Licence Variation
1025420	06 Jun 2003	s.58 Licence Variation
1052359	31 Oct 2005	s.58 Licence Variation
1055579	28 Feb 2006	s.58 Licence Variation
1076735	06 Sep 2007	s.58 Licence Variation
1085001	16 May 2008	s.58 Licence Variation
1091163	21 Jul 2009	Load Reduction Agreement
1118608	23 Aug 2010	s.58 Licence Variation
1529545	15 Mar 2016	s.58 Licence Variation
1541996	05 Aug 2016	s.58 Licence Variation
1549859	22 Mar 2017	s.58 Licence Variation
1551743	04 May 2017	s.58 Licence Variation
1556382	10 Jul 2018	s.58 Licence Variation

Pollution studies and reduction programs

Title	Program type	Start date	Complete date	
Feasibility Assessment of Wet Gas Scrubber	Air	05 Aug 2016	03 Oct 2016	Conditions
Curing and Storage Room Stack Verification	Air	04 Aug 2016	03 Oct 2016	Conditions
Confirmation of TDI Emission Levels and Scrubber Optimisation	Air	01 Mar 2017	03 Jul 2017	Conditions

Annual Returns

Start date	End date	Date received	Non-compliance	LBL data
30-Sep-2017	29-Sep-2018	06-Dec-2018	No	view
30-Sep-2016	29-Sep-2017	05-Dec-2017	No	view
30-Sep-2015	29-Sep-2016	02-Dec-2016	No	view
30-Sep-2014	29-Sep-2015	11-Dec-2015	No	view
30-Sep-2013	29-Sep-2014	08-Dec-2014	No	view
30-Sep-2012	29-Sep-2013	02-Dec-2013	yes	view
30-Sep-2011	29-Sep-2012	13-Dec-2012	No	view
30-Sep-2010	29-Sep-2011	14-Dec-2011	No	view
30-Sep-2009	29-Sep-2010	13-Dec-2010	yes	view
30-Sep-2008	29-Sep-2009	11-Dec-2009	yes	view
30-Sep-2007	29-Sep-2008	05-Dec-2008	yes	view
30-Sep-2006	29-Sep-2007	10-Dec-2007	yes	view
30-Sep-2005	29-Sep-2006	11-Dec-2006	yes	view
30-Sep-2004	29-Sep-2005	01-Dec-2005	yes	view
30-Sep-2003	29-Sep-2004	08-Dec-2004	yes	view

For business and industry

For local government

Contact us

30-Sep-2002	29-Sep-2003	28-Nov-2003	yes	view
30-Sep-2001	29-Sep-2002	03-Dec-2002	No	view
30-Sep-2000	29-Sep-2001	26-Mar-2002	No	view
30-Sep-1999	29-Sep-2000	27-Nov-2000	No	view

Environment Protection Licence

Licence - 3099

Licence Details	
Number:	3099
Anniversary Date:	30-September

Licensee

JOYCE FOAM PTY LTD

PMB 7

MOOREBANK NSW 1875

Premises

JOYCE FOAM PRODUCTS

5-9 BRIDGES ROAD

MOOREBANK NSW 2170

Scheduled Activity

Chemical production

Fee Based Activity	Scale
Plastic resins production	> 2000-10000 T annual production capacity

Region

Metropolitan - Sydney Industry

Level 13, 10 Valentine Ave
PARRAMATTA NSW 2150

Phone: (02) 9995 5000

Fax: (02) 9995 6900

PO Box 668

PARRAMATTA NSW 2124

Environment Protection Licence

Licence - 3099

Environment Protection Licence

Licence - 3099

Environment Protection Licence

Licence - 3099

Information about this licence

Dictionary

A definition of terms used in the licence can be found in the dictionary at the end of this licence.

Responsibilities of licensee

Separate to the requirements of this licence, general obligations of licensees are set out in the Protection of the Environment Operations Act 1997 ("the Act") and the Regulations made under the Act. These include obligations to:

- ensure persons associated with you comply with this licence, as set out in section 64 of the Act;
- control the pollution of waters and the pollution of air (see for example sections 120 - 132 of the Act);
- report incidents causing or threatening material environmental harm to the environment, as set out in Part 5.7 of the Act.

Variation of licence conditions

The licence holder can apply to vary the conditions of this licence. An application form for this purpose is available from the EPA.

The EPA may also vary the conditions of the licence at any time by written notice without an application being made.

Where a licence has been granted in relation to development which was assessed under the Environmental Planning and Assessment Act 1979 in accordance with the procedures applying to integrated development, the EPA may not impose conditions which are inconsistent with the development consent conditions until the licence is first reviewed under Part 3.6 of the Act.

Duration of licence

This licence will remain in force until the licence is surrendered by the licence holder or until it is suspended or revoked by the EPA or the Minister. A licence may only be surrendered with the written approval of the EPA.

Licence review

The Act requires that the EPA review your licence at least every 5 years after the issue of the licence, as set out in Part 3.6 and Schedule 5 of the Act. You will receive advance notice of the licence review.

Fees and annual return to be sent to the EPA

For each licence fee period you must pay:

- an administrative fee; and
- a load-based fee (if applicable).

Environment Protection Licence

Licence - 3099

The EPA publication “A Guide to Licensing” contains information about how to calculate your licence fees. The licence requires that an Annual Return, comprising a Statement of Compliance and a summary of any monitoring required by the licence (including the recording of complaints), be submitted to the EPA. The Annual Return must be submitted within 60 days after the end of each reporting period. See condition R1 regarding the Annual Return reporting requirements.

Usually the licence fee period is the same as the reporting period.

Transfer of licence

The licence holder can apply to transfer the licence to another person. An application form for this purpose is available from the EPA.

Public register and access to monitoring data

Part 9.5 of the Act requires the EPA to keep a public register of details and decisions of the EPA in relation to, for example:

- licence applications;
- licence conditions and variations;
- statements of compliance;
- load based licensing information; and
- load reduction agreements.

Under s320 of the Act application can be made to the EPA for access to monitoring data which has been submitted to the EPA by licensees.

This licence is issued to:

JOYCE FOAM PTY LTD
PMB 7
MOOREBANK NSW 1875

subject to the conditions which follow.

Environment Protection Licence

Licence - 3099

1 Administrative Conditions

A1 What the licence authorises and regulates

A1.1 This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, fee-based activity classification and the scale of the operation.

Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition.

Scheduled Activity	Fee Based Activity	Scale
Chemical production	Plastic resins production	> 2000 - 10000 T annual production capacity

A2 Premises or plant to which this licence applies

A2.1 The licence applies to the following premises:

Premises Details
JOYCE FOAM PRODUCTS
5-9 BRIDGES ROAD
MOOREBANK
NSW 2170
LOT 100 DP 775780

A3 Other activities

A3.1 This licence applies to all other activities carried on at the premises, including:

Ancillary Activity
Chemical production - use of toxic substances (commercial use of Toluene diisocyanate (TDI) in foam making)

A4 Information supplied to the EPA

A4.1 Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence.

In this condition the reference to "the licence application" includes a reference to:
a) the applications for any licences (including former pollution control approvals) which this licence

replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998; and
b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.

2 Discharges to Air and Water and Applications to Land

P1 Location of monitoring/discharge points and areas

P1.1 The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.

Air

EPA identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
1	Discharge to air - emissions monitoring	Discharge to air - emissions monitoring	Stack serving the wet gas scrubber outlet located externally on the western wall of the foam production building serving the Henneke and Maxfoam production lines
2	Discharge to air - emissions monitoring	Discharge to air - emissions monitoring	Stack serving the Variable Pressure Foam (VPF) process chamber. The stack discharge point is located on the western wall of the building and follows an activated carbon bed.
3	Discharge to air - emissions monitoring	Discharge to air - emissions monitoring	Stack serving the Variable Pressure Foam (VPF) air lock chamber. The stack discharge point is located on the western wall of the building and follows an activated carbon bed.

3 Limit Conditions

L1 Pollution of waters

L1.1 Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.

L2 Load limits

L2.1 The actual load of an assessable pollutant discharged from the premises during the reporting period must not exceed the load limit specified for the assessable pollutant in the table below.

L2.2 The actual load of an assessable pollutant must be calculated in accordance with the relevant load calculation protocol.

Assessable Pollutant	Load limit (kg)
Benzene (Air)	5.50
Fine Particulates (Air)	250.00
Nitrogen Oxides - Summer (Air)	
Nitrogen Oxides (Air)	0.00
Volatile organic compounds - Summer (Air)	
Volatile organic compounds (Air)	175000.00

Note: An assessable pollutant is a pollutant which affects the licence fee payable for the licence.

L3 Concentration limits

L3.1 For each monitoring/discharge point or utilisation area specified in the table\s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.

L3.2 Air Concentration Limits

POINT 1

Pollutant	Units of measure	100 percentile concentration limit	Reference conditions	Oxygen correction	Averaging period
Toluene 2,4 & 2,6 diisocyanate (TDI) (combined)	milligrams per cubic metre	0.01	Dry, 273K, 101.325 kPa(a)		1 hour
Methylene chloride	milligrams per cubic metre	500	Dry, 273K, 101.325 kPa(a)		1 hour

POINT 2,3

Pollutant	Units of measure	100 percentile concentration limit	Reference conditions	Oxygen correction	Averaging period
Toluene 2,4 & 2,6 diisocyanate (TDI) (combined)	milligrams per cubic metre	0.01	Dry, 273K, 101.325 kPa(a)		1 hour

L3.3 The licensee must not operate any of the foam production lines simultaneously.

L4 Noise limits

L4.1 Noise from the premises must not exceed:
a) An LA10 (15 minute) noise emission criterion of 70 dB(A) 0700 to 2200 Monday to Saturday and 0800 to 2200 Sundays and Public Holidays; and
b) An LA10 (15 minute) noise emission criterion of 65 dB(A) at all other times,
except as expressly provided by this licence.

L4.2 Noise from the premises is to be measured or computed at any point within 1 metre of the boundary of the premise to determine compliance with condition L4.1. A reduction of 5dB(A) must be applied to the relevant limits if the noise is tonal or impulsive in character.

4 Operating Conditions

O1 Activities must be carried out in a competent manner

O1.1 Licensed activities must be carried out in a competent manner.
This includes:
a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and
b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.

O2 Maintenance of plant and equipment

O2.1 All plant and equipment installed at the premises or used in connection with the licensed activity:
a) must be maintained in a proper and efficient condition; and
b) must be operated in a proper and efficient manner.

5 Monitoring and Recording Conditions

M1 Monitoring records

M1.1 The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.

M1.2 All records required to be kept by this licence must be:
a) in a legible form, or in a form that can readily be reduced to a legible form;
b) kept for at least 4 years after the monitoring or event to which they relate took place; and
c) produced in a legible form to any authorised officer of the EPA who asks to see them.

M1.3 The following records must be kept in respect of any samples required to be collected for the purposes of

this licence:
a) the date(s) on which the sample was taken;
b) the time(s) at which the sample was collected;
c) the point at which the sample was taken; and
d) the name of the person who collected the sample.

M2 Requirement to monitor concentration of pollutants discharged

M2.1 For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:

M2.2 Air Monitoring Requirements

POINT 1

Pollutant	Units of measure	Frequency	Sampling Method
Dry gas density	kilograms per cubic metre	Special Frequency 1	TM-23
Methylene chloride	milligrams per cubic metre	Special Frequency 1	TM-34
Moisture	percent	Special Frequency 1	TM-22
Molecular weight of stack gases	grams per gram mole	Special Frequency 1	TM-23
Temperature	Kelvin	Special Frequency 1	TM-2
Velocity	metres per second	Special Frequency 1	TM-2

POINT 1,2,3

Pollutant	Units of measure	Frequency	Sampling Method
Toluene 2,4 & 2,6 diisocyanate (TDI) (combined)	milligrams per cubic metre	Special Frequency 1	TM-34

M2.3 Special Frequency 1 requires monitoring to be undertaken at 6 monthly intervals.

Note: Methylene chloride is stored in bulk at the premises. The licensee advised that it is used as a blowing agent within the Maxfoam and Henneke production lines.

Note: In addition to Condition M2.2, the licensee should conduct a 5-yearly performance review of the activated carbon within the vessels serving the Variable Pressure Foam (VPF) line. This performance review should address:

- the suitability of the maintenance program to ensure that it is effective in detecting actual or potential changes in the environmental and safety performance;
- any procedures for detecting changes to the equipment which could impact on performance, including the effects of moisture and corrosion;
- results of any internal inspections, using video techniques, sampling and analysis the activated carbon where appropriate.

The first review will be due in the 2020 reporting period.

M3 Testing methods - concentration limits

M3.1 Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with:
a) any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or
b) if no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; or
c) if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place.

Note: The *Protection of the Environment Operations (Clean Air) Regulation 2010* requires testing for certain purposes to be conducted in accordance with test methods contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".

M4 Testing methods - load limits

Note: Division 3 of the *Protection of the Environment Operations (General) Regulation 2009* requires that monitoring of actual loads of assessable pollutants listed in L2.2 must be carried out in accordance with the relevant load calculation protocol set out for the fee-based activity classification listed in the Administrative Conditions of this licence.

M5 Recording of pollution complaints

M5.1 The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.

M5.2 The record must include details of the following:
a) the date and time of the complaint;
b) the method by which the complaint was made;
c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
d) the nature of the complaint;
e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the

complainant; and
f) if no action was taken by the licensee, the reasons why no action was taken.

M5.3 The record of a complaint must be kept for at least 4 years after the complaint was made.

M5.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M6 Telephone complaints line

M6.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.

M6.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.

M6.3 The preceding two conditions do not apply until 3 months after: the date of the issue of this licence.

M7 Other monitoring and recording conditions

Wet scrubber liquor tank operating parameters

M7.1 The parameters set out in the table below must be monitored continuously to ensure that the wet gas scrubber is being operated in a proper and efficient manner.

Parameter	Unit of measure	Frequency	Method
pH	pH	Continuous	Probe

Wet scrubber liquor tank operating limits

M7.2 The liquor tank associated with the operation of the wet gas scrubber must be operated to meet the parameter limits specified in the table below:

Parameter	Unit of measure	Lower limit
pH	pH	9.0

M7.3 The licensee must retain a log of all pH measurements made in relation to condition M7.1.

M7.4 The licensee must conduct inspections of the wet scrubbing system at a frequency of at least one inspection per four week period. The outcomes of these inspections must be captured within a service log that includes, but is not limited to, a checklist, a record of service or repair, damper adjustments, pH level, fan current and a description of any dosing chemicals supplied.

Note: The requirement to conduct periodic inspection of the Wet Gas Scrubbing system was derived from the Pollution Study: Feasibility Assessment of Wet Gas Scrubber, October 2016.

6 Reporting Conditions

R1 Annual return documents

R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:

1. a Statement of Compliance,
2. a Monitoring and Complaints Summary,
3. a Statement of Compliance - Licence Conditions,
4. a Statement of Compliance - Load based Fee,
5. a Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan,
6. a Statement of Compliance - Requirement to Publish Pollution Monitoring Data; and
7. a Statement of Compliance - Environmental Management Systems and Practices.

At the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.

R1.2 An Annual Return must be prepared in respect of each reporting period, except as provided below.

R1.3 Where this licence is transferred from the licensee to a new licensee:
a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and
b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.

R1.4 Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on:
a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or
b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.

R1.5 The Annual Return for the reporting period must be supplied to the EPA via eConnect *EPA* or by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').

R1.6 Where the licensee is unable to complete a part of the Annual Return by the due date because the licensee was unable to calculate the actual load of a pollutant due to circumstances beyond the licensee's control, the licensee must notify the EPA in writing as soon as practicable, and in any event not later than the due date. The notification must specify:
a) the assessable pollutants for which the actual load could not be calculated; and
b) the relevant circumstances that were beyond the control of the licensee.

R1.7 The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.

R1.8 Within the Annual Return, the Statements of Compliance must be certified and the Monitoring and Complaints Summary must be signed by:
a) the licence holder; or
b) by a person approved in writing by the EPA to sign on behalf of the licence holder.

Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period.

Note: An application to transfer a licence must be made in the approved form for this purpose.

R2 Notification of environmental harm

R2.1 Notifications must be made by telephoning the Environment Line service on 131 555.

R2.2 The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.

Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.

R3 Written report

R3.1 Where an authorised officer of the EPA suspects on reasonable grounds that:
a) where this licence applies to premises, an event has occurred at the premises; or
b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence,
and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.

R3.2 The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.

R3.3 The request may require a report which includes any or all of the following information:
a) the cause, time and duration of the event;
b) the type, volume and concentration of every pollutant discharged as a result of the event;
c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event;
d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort;
e) action taken by the licensee in relation to the event, including any follow-up contact with any

complainants;
f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and
g) any other relevant matters.

R3.4 The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.

7 General Conditions

G1 Copy of licence kept at the premises or plant

G1.1 A copy of this licence must be kept at the premises to which the licence applies.

G1.2 The licence must be produced to any authorised officer of the EPA who asks to see it.

G1.3 The licence must be available for inspection by any employee or agent of the licensee working at the premises.

G2 Other general conditions

G2.1 **Completed Programs**

Program	Description	Completed Date
Develop emission concentration limits controls.	The objective of this PRP was to develop emission concentration limits and to develop fugitive emissions control; monitor and control air emissions.	01-October-2003
Groundwater Contamination Monitoring Program - discontinued owing to landowner (not licensee) being responsible	The object of the PRP was to implement an ongoing Groundwater Monitoring Program in accordance with a Groundwater Monitoring Plan, prepared by GHD Pty Ltd. Its goal was to determine the extent and concentration of contaminants and in light of the monitoring results, to inform any further actions which may be necessary. The licensee leases the land and the land owner is responsible for ongoing monitoring	09-April-2015
Further investigate the ground level concentration	The objective of this PRP was to further investigate the ground level concentration impacts of VOCs in light of the PRP 1 report findings that informed decisions regarding cleaner production opportunities.	22-February-2007

Environment Protection Licence

Licence - 3099

Air pollutant impact assessment and mitigation	Air pollutant impact assessment and mitigation study to ensure compliance with the EPA's health based impact assessment criteria for toluene di-isocyanate (TDI). To reduce emission of TDI & Methylene Chloride to an acceptable level in order to protect human health.	18-February-2008
Feasibility Assessment of Wet Gas Scrubber	Investigative study to determine the suitability of the wet gas scrubber for the treatment of TDI emissions from the foam making process.	03-October-2016
Curing and Storage Room Stack Verification	verifying the proposed site specific emission limits within the curing and storage rooms	03-October-2016
Confirmation of TDI Emission Levels and Scrubber Optimisation	Dispersion Modelling for Scrubber and VPF line carbon filter to confirm emission limits for TDI	03-July-2017

Environment Protection Licence

Licence - 3099

Dictionary

General Dictionary

3DGM [in relation to a concentration limit]	Means the three day geometric mean, which is calculated by multiplying the results of the analysis of three samples collected on consecutive days and then taking the cubed root of that amount. Where one or more of the samples is zero or below the detection limit for the analysis, then 1 or the detection limit respectively should be used in place of those samples
Act	Means the Protection of the Environment Operations Act 1997
activity	Means a scheduled or non-scheduled activity within the meaning of the Protection of the Environment Operations Act 1997
actual load	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
AM	Together with a number, means an ambient air monitoring method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.
AMG	Australian Map Grid
anniversary date	The anniversary date is the anniversary each year of the date of issue of the licence. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
annual return	Is defined in R1.1
Approved Methods Publication	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
assessable pollutants	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
BOD	Means biochemical oxygen demand
CEM	Together with a number, means a continuous emission monitoring method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.
COD	Means chemical oxygen demand
composite sample	Unless otherwise specifically approved in writing by the EPA, a sample consisting of 24 individual samples collected at hourly intervals and each having an equivalent volume.
cond.	Means conductivity
environment	Has the same meaning as in the Protection of the Environment Operations Act 1997
environment protection legislation	Has the same meaning as in the Protection of the Environment Administration Act 1991
EPA	Means Environment Protection Authority of New South Wales.
fee-based activity classification	Means the numbered short descriptions in Schedule 1 of the Protection of the Environment Operations (General) Regulation 2009.
general solid waste (non-putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997

Environment Protection Licence

Licence - 3099

flow weighted composite sample	Means a sample whose composites are sized in proportion to the flow at each composites time of collection.
general solid waste (putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environmen t Operations Act 1997
grab sample	Means a single sample taken at a point at a single time
hazardous waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
licensee	Means the licence holder described at the front of this licence
load calculation protocol	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
local authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
material harm	Has the same meaning as in section 147 Protection of the Environment Operations Act 1997
MBAS	Means methylene blue active substances
Minister	Means the Minister administering the Protection of the Environment Operations Act 1997
mobile plant	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
motor vehicle	Has the same meaning as in the Protection of the Environment Operations Act 1997
O&G	Means oil and grease
percentile [in relation to a concentration limit of a sample]	Means that percentage [eg.50%] of the number of samples taken that must meet the concentration limit specified in the licence for that pollutant over a specified period of time. In this licence, the specified period of time is the Reporting Period unless otherwise stated in this licence.
plant	Includes all plant within the meaning of the Protection of the Environment Operations Act 1997 as well as motor vehicles.
pollution of waters [or water pollution]	Has the same meaning as in the Protection of the Environment Operations Act 1997
premises	Means the premises described in condition A2.1
public authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
regional office	Means the relevant EPA office referred to in the Contacting the EPA document accompanying this licence
reporting period	For the purposes of this licence, the reporting period means the period of 12 months after the issue of the licence, and each subsequent period of 12 mo nths. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
restricted solid waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
scheduled activity	Means an activity listed in Schedule 1 of the Protection of the Environment Operations Act 1997
special waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
TM	Together with a number, means a test method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.

Environment Protection Licence

Licence - 3099

TSP	Means total suspended particles
TSS	Means total suspended solids
Type 1 substance	Means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements
Type 2 substance	Means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements
utilisation area	Means any area shown as a utilisation area on a map submitted with the application for this licence
waste	Has the same meaning as in the Protection of the Environment Operations Act 1997
waste type	Means liquid, restricted solid waste, general solid waste (putrescible), general solid waste (non - putrescible), special waste or hazardous waste

Mr Tim Gilbert

Environment Protection Authority

(By Delegation)

Date of this edition: 02-February-2000

Environment Protection Licence

Licence - 3099

End Notes

1	Licence varied by notice 1004945, issued on 26-Oct-2001, which came into effect on 31-Oct-2001.
2	Licence varied by notice 1025420, issued on 06-Jun-2003, which came into effect on 01-Jul-2003.
3	Licence varied by notice 1052359, issued on 31-Oct-2005, which came into effect on 25-Nov-2005.
4	Licence transferred through application 143769, approved on 06-Dec-2005, which came into effect on 30-Nov-2005.
5	Licence varied by notice 1055579, issued on 01-Mar-2006, which came into effect on 26-Mar-2006.
6	Licence varied by change to legislation, issued on 05-Jul-2007, which came into effect on 05-Jul-2007.
7	Licence varied by notice 1076735, issued on 06-Sep-2007, which came into effect on 06-Sep-2007.
8	Licence varied by notice 1085001, issued on 16-May-2008, which came into effect on 16-May-2008.
9	Condition A1.3 Not applicable varied by notice issued on <issue date> which came into effect on <effective date>
10	Licence varied by notice 1118608, issued on 23-Aug-2010, which came into effect on 23-Aug-2010.
11	Licence varied by correction to scheduled activity name, issued on 21-Dec-2010, which came into effect on 21-Dec-2010.
12	Licence varied by notice 1529545 issued on 15-Mar-2016
13	Licence varied by notice 1541996 issued on 05-Aug-2016
14	Licence varied by notice 1549859 issued on 22-Mar-2017
15	Licence varied by notice 1551743 issued on 04-May-2017
16	Licence varied by notice 1556382 issued on 10-Jul-2018