Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Land Capability, Salinity & Contamination Investigation
Volume 3 – Contamination

Riverstone East Precinct
North West Growth Centre

Prepared for
Mott MacDonald Pty Ltd

Project 73895
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Volume 3 – Preliminary Contamination Investigation Results
Report on Land Capability, Salinity and Contamination Investigation
Riverstone East Precinct, North West Growth Centre

1. Introduction

This report comprises Volume 3 of the overall Land Capability, Salinity and Contamination Investigation for the Riverstone East Precinct of the North West Growth Centre. The report presents results of the preliminary contamination investigation (PSI) portion of the project. This volume should be read in conjunction with the entire report.

Volume 1 presents and outlines the detailed background for the overall project and includes the following Sections;

- Study Area
- Proposed Development
- Scope of Works
- Previous Assessments
- Site Description
- Regional Topography, Geology, Soils and Water
- Methodology
- Limitations

Volume 2 provides the results of the geotechnical and salinity assessment and Volumes 4 to 6 provide the Appendices.

2. Search of NSW EPA Registers

A search was undertaken on 21 July 2014 for current Statutory Notices issued under the *Contaminated Land Management Act* 1997 (the CLM Act) and *Protection of the Environment Operations Act* 1997 (the POEO Act) available on the NSW EPA website.

The search results are detailed below.

2.1 CLM Act

- No properties within the Precinct were listed as being regulated by the EPA under the CLM Act; and

- No properties within the Precinct were listed as being notified to the EPA under Section 60 of the CLM Act.

2.2 POEO Act

The following records were held for the Precinct, the Licences are provided in Appendix D:

- Schofields Road East, Rouse Hill was listed as having a current Environmental Protection Licence (EPL). The EPL covers upgrade works to Schofields Road. The EPL was issued in July 2014.

  The Licensee was listed as "York Civil Pty. Ltd. Obrascon Huarte Lain S.A."

  The fee based activities in the EPL are listed as "*Land-based extractive activity, > 100,000-500,000 T extracted, processed or Stored*" and "*Road construction, 0-10 km constructed, widened or re-routed*".

  The EPL allows water discharge to sediment basins. Monitoring is required for oil and grease, pH and total suspended solids.

- 1106 Windsor Road, Riverstone, Corner of Windsor and Garfield East Roads, was listed as having an Environmental Protection Licence (EPL). The EPL is recorded as being issued in October 2000 with a number of S.58 Licence Variations Issued between 2002 and 2010.

  The Licensee was listed as "A J Bush & Sons (Manufactures) Pty Ltd".

  The fee based activities in the EPL are listed as "Rendering or fat extraction; > 4000 - T produced".

  The EPL lists three discharge points, all of the type "*Discharge to Utilisation Area Effluent quality and volume monitoring*". The EPL conditions state that "*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*"

  Each discharge point is assigned a daily limit of 700 kL. The EPL also stated that "*The quantity of effluent/solids applied to the utilisation area must not exceed the capacity of the area to effectively utilise the effluent/solids*." and "*For the purpose of this condition, 'effectively utilise' include the use of the effluent/solids for pasture or crop production, as well as the ability of the soil to absorb the nutrient, salt, hydraulic load and organic material*."

  The EPL records the Installation and operation of a biofilter in May 2003.

3. Review of Site History Information

The site history investigation is undertaken to identify significant large scale historical land use categories and issues of potential contamination concern. The information obtained is detailed below,

with the results used in determining the recommendations of this investigation, as detailed in Section 7.

3.1 Historical Aerial Photography

Aerial photographs from the years 1947, 1961, 1970, 1982, 1991 and 2002 were examined. Drawings D1 to D5 Appendix D provide an extract of aerial photography from 1961 to 2002. The 1947 aerial photography shows the area to be sparsely developed with varying degrees of tree clearing and areas under agricultural use.

3.2 Library Local Studies

A review was undertaken of relevant information in the Local Studies Section of the Hawkesbury Library Service and of Blacktown Council's Max Webber Library. The following relevant documents were identified:

- Strachan, Frank Ernest, 2008, *Frank Ernest Strachan and a history of the Vineyard District*
- Strachan, Alan R., 2011, *Godfrey families of the Vineyard and Riverstone Districts New South Wales*
- Clive Lucas, Stapleton and Partners Pty Ltd, 1999, *Riverstone Release Area European Heritage Study*

In general, the documents recorded the commencement of grazing in the area *circa* 1800. The land was naturally heavily wooded, and woodcutting and sawmilling were undertaken as the land was progressively cleared for agricultural use. Historical land uses in the area were predominantly agricultural, including grazing, horse agistment and training, viticulture, orchards, dairy, market gardens, poultry, pigs, mushrooms and wheat.

The railway line is recorded as being constructed in the 1860s.

3.3 Search on the Department of Defence Website for Sites Affected by Unexploded Ordnance

The Directorate of Environmental Remediation Programs, Infrastructure Division, Defence Support & Reform Group stated in an email dated 2 April 2014 that "*Defence has no record of any known UXO risk in the Riverstone Area*."

4. Current Land Uses

The current land uses were reviewed based on aerial photography from 2014 and site inspections.

The contamination investigation identified that:

- The majority of the Riverstone East Precinct is currently used for rural residential purposes, including low intensity agriculture and minor commercial activities;
- Other land uses include market gardens, poultry sheds, low-risk commercial and a meat rendering works;

Drawing C5, Appendix A provides a visual representation of current land use types.

5. Site Observations and Personnel Communications: Contamination Issues

Land uses which can be indicative of contamination are summarised in Section 4.

Potential issues of environmental concern not related to specific land uses generally include:

- Filling with soil of unknown origin, which could potentially include contaminants. Extensive filling was only observed in the lower reaches of First Ponds Creek, immediately before it exited the Precinct under Windsor Road. The creek alignment in this area had been extensively modified and flood levees and other filling were observed.

  Filling is also present in dam walls, however this usually comprises local cut-and-fill with a lower potential for contamination.

  No other obvious signs of extensive filling were observed, however, filling is also likely to be present along some drainage lines and where cut and fill has occurred, and in localised areas.

  Filling is also likely to be present along some local drainage lines, and where cut and fill has occurred in localised areas;
- Asbestos. Asbestos cement from demolition or degradation of buildings is likely to be present on some properties within the Precinct. No obvious signs of asbestos cement fragments at the ground surface were observed, although some fibre cement buildings are present;
- Some potentially contaminating activities associated with former or current land uses were observed, including a yards/ depots associated with plant (such as excavators), other commercial/ industrial and agricultural land uses. These are considered under the review of previous and current land uses;
- Disposal of carcasses (e.g. cattle) by on site burial may have taken place in the Precinct;
- Pesticide use is likely to have occurred across the Precinct;
- Water from the creeks and dams is used for agriculture. This includes extraction of water with diesel powered pumps; and
- Electrical poles have been reclaimed on some properties for use as fence posts. These may have been treated with creosote.

6. Discussion of Laboratory Results

6.1 Soil

A summary of soil results is provided in Table E2, Appendix E, with NATA Laboratory Reports provided in Appendix F.

Selected soil samples from across the Precinct were analysed, with samples of natural materials from depths of between 0.05 and 0.8 m below ground level selected for analysis.

The soil testing aimed to provide data to calculate preliminary environmental investigation levels (EILs) for the Precinct. It is considered that these Preliminary EILs could be used as default thresholds for the Precinct in the absence of other data. It is anticipated that the Preliminary EILs may be updated as required for specific sites based on site specific data and assumptions.

Table 3.1 – Preliminary EILs

Analyte	Preliminary EIL (mg/kg)	Comments
Arsenic	100	Generic for landuse
Chromium (III)	520	Based on clay content, background concentrations, traffic volume
Copper	220	Based on CEC, pH, OC, background concentrations, traffic volume
Lead	1,100	Generic for landuse
Nickel	180	Based on CEC, background concentrations, traffic volume
Zinc	440	Based on CEC, pH , background concentrations, traffic volume
DDT	180	Generic for landuse
Naphthalene	170	Generic for landuse

The Preliminary EILs have been prepared based on the following:

- The assumption and methods in the *Ecological Investigation Level Calculation Spreadsheet* developed by CSIRO for NEPC (copyright 2010)[1];
- An Urban Residential or Public Open Space Landuse;
- Traffic Volumes being “low”;
- The contamination being “aged”;
- The mean measured CEC of 9.55 cmolc/kg;
- The mean measured pH of 7.1;
- The mean measured iron content of 2.8%;
- An assumed organic carbon content of 1%;
- An assumed clay content of 20%;

[1] As sourced from the ASC NEPM Toolbox: http://www.scew.gov.au/node/941

- The calculated 95% upper confidence limit (UCL) of the copper results of 22 mg/kg, used as a background concentration;
- The calculated 95% UCL of the nickel results of 10 mg/kg, used as a background concentration;
- The calculated 95% UCL of the chromium (III) results of 19 mg/kg, used as a background concentration; and
- The calculated 95% UCL of the zinc results of 41 mg/kg, used as a background concentration.

6.2 Groundwater

All groundwater analyte concentrations were within the investigation levels[2] with the exception of manganese. This is, however, considered to be naturally occurring and not to present a limitation on residential rezoning or development.

A low concentration of the organochlorine pesticide dieldrin was detected in one sample. This result was within the investigation level but is likely to be indicative of the use and presence of dieldrin in the area near this well (Well 43), which included market garden land use.

7. Contamination Risks and Recommendations

7.1 Overall Risks and Constraints from Contamination

The risk of contamination over the Precinct is generally considered to be low to moderate, although more elevated risk is associated with some commercial properties (i.e. sites where DSI is recommended, refer to Drawing C6, Appendix A). The main constraints for residential redevelopment of the Precinct from contamination issues are expected to be additional costs and time associated with the development process. With the exception of the property discussed below these risks are not considered to be significant enough to prevent rezoning or redevelopment of the Precinct for residential development.

The potential for contamination at the following property is considered to present a significant potential constraint for residential redevelopment:

- The meat rendering works, located at the corner of Windsor and Garfield East Roads (1106 Windsor Road, Riverstone) (shown on Drawing C7, Appendix A).

  It is noted that this property was not accessible for inspection, and a preliminary site investigation would be required to determine the contamination potential at the property. Contaminants of concern are, however, expected to include petroleum compounds, pesticides, heavy metals, polychlorinated biphenyls and asbestos as well as water pollutants (nutrients, biological oxygen demand, salts, suspended solids, faecal matter and bacteria). Potential presence of animal fats

[2] Australian and New Zealand Environment and Conservation Council (ANZECC) / Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (2000). 95% Level or Protection thresholds for freshwater

and wastes (including buried carcases) and diseases are also of concern and could be present a risk to human health and the environment and/ or unacceptable aesthetic concerns.

It is recommended that a Detailed Site Investigation is undertaken for this site, and that the contaminated land assessment and management process be subject to a Site Audit.

It is understood that the meat rendering works has been rezoned for public recreation. The potential for contamination is not expected to prevent the site being used for open space subject to appropriate investigation and remediation and/ or management of any identified contaminants. It is further understood that areas in the north and west of the property are being considered for urban uses. It is advised that there could be sub-areas where significant contamination may constrain residential development in the short to medium term (several years or more), particularly if significant groundwater contamination is present. It is recommended that a DSI be undertaken prior to finalising plans for urban uses at the property, with the results of the DSI considered in determining appropriate land uses.

7.2 Recommendations for Minimum Investigation

Drawing C6 provides a visual representation of the recommended categories for further contamination investigation to be undertaken on each property prior to redevelopment. The minimum initial investigation scope for each category is detailed below. Additional investigation and/ or remediation and/ or management are expected to be required for some properties depending on the recommendations of the initial investigation, or to meet Council specific requirements.

Category 1 – Site Inspection

- Detailed site inspection for signs of concern;
- Hazardous Building Materials Survey of any buildings built during or before 2003;
- Implementation of the recommendations from the above; and
- Unexpected Finds Protocol (see below).

Category 2 – PSI

- Preliminary Site Investigation, including a detailed review of site history;
- Hazardous Building Materials Survey of any buildings built during or before 2003;
- Implementation of the recommendations from the above; and
- Unexpected Finds Protocol (see below).

Category 3 – PSI with Limited Sampling

- Preliminary Site Investigation with limited sampling aimed at targeting any areas of potential chemical use and filling;
- Hazardous Building Materials Survey of any buildings built during or before 2003;
- Implementation of the recommendations from the above; and
- Unexpected Finds Protocol (see below).

Category 4 – DSI

- Preliminary and Detailed Site Investigation, including detailed site history review, and intrusive sampling, analysis and reporting in accordance with NSW EPA guidelines;
- Hazardous Building Materials Survey of any buildings built during or before 2003;
- Implementation of the recommendations from the above; and
- Unexpected Finds Protocol (see below).

Category 5 – DSI and Site Audit

- Preliminary and Detailed Site Investigation, including detailed site history review, and intrusive sampling, analysis and reporting in accordance with NSW EPA guidelines;
- Contaminated Land Site Audit by a NSW EPA accredited Site Auditor;
- Hazardous Building Materials Survey of any buildings built during or before 2003;
- Implementation of the recommendations from the above; and
- Unexpected Finds Protocol (see below).

An Unexpected Finds Protocol should be included in all site management plans for redevelopment works setting out the steps to be taken to ensure that any signs of potential environmental concern are appropriately identified and managed.

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