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EXECUTIVE SUMMARY

Geotesta was engaged by JS Architects Pty Ltd to conduct a Stage 1 Preliminary Investigation (stage 1 PI) on the property known as 172 Tallawong Rd, Rouse Hill, NSW. The Stage 1 PI is a review of current and historical activities on the site and an assessment of the potential risk of soil/groundwater contamination existing on the land.

In accordance with the Department of Urban Affairs and Planning and Environment Protection Authority Managing Land Contamination: Planning Guidelines, State Environmental Planning Policy No. 55—Remediation of Land 1998, the site is considered to have a Low Risk of soil and groundwater contamination.

The site is considered suitable for the proposed development considering the following:

- the site history, desk study and inspection indicates past activities on the site have a low potential for environmental impacts on the soil and groundwater; and
- in accordance with the Department of Urban Affairs and Planning and Environment Protection Authority Managing Land Contamination: Planning Guidelines, State Environmental Planning Policy No. 55—Remediation of Land 1998, the site is suitable for the proposed use, however, a further Stage 2 environmental investigation is considered necessary.
1. INTRODUCTION

Geotesta was engaged by JS Architects Pty Ltd to conduct a Stage 1 Preliminary Investigation (stage 1 PI) on the property known as 172 Tallawong Rd, Rouse Hill NSW. The Stage 1 PI is a review of current and historical activities on the site and an assessment of the potential risk of soil/groundwater contamination existing on the land.

The property covers an area of approximately 2 ha and is currently covered by grass with medium to tall trees at the site perimeter. The site slopes gently from northwest to southeast with a farm dam located in the eastern corner of the site.

2. PLANNING GUIDELINES

It is understood that the land is to be developed into medium density residential blocks. This Preliminary Investigation was conducted in general accordance with the Department of Urban Affairs and Planning and Environment Protection Authority Managing Land Contamination: Planning Guidelines, State Environmental Planning Policy No. 55—Remediation of Land 1998.

Land contamination is most often the result of past uses. It can arise from activities that took place on or adjacent to a site and be the result of improper chemical handling or disposal practices, or accidental spillages or leakages of chemicals during manufacturing or storage. Activities not directly related to the site may also cause contamination; for example, from diffuse sources such as polluted groundwater migrating under a site or dust settling out from industrial emissions.

When carrying out planning functions under the EP&A Act, a planning authority must consider the possibility that a previous land use has caused contamination of the site as well as the potential risk to health or the environment from that contamination. Decisions must then be made as to whether the land should be remediated, or its use of the land restricted, in order to reduce the risk. Failure to consider the possibility of contamination at appropriate stages of the planning decision process may result in:

- inappropriate land use decisions
- increased risk to human health
- detrimental effects on the biophysical environment
- impacts on the safety of existing and new structures
- delay in realising developments
- substantial fall in the land value and the passing on of unanticipated development costs to other parties

When an authority carries out a planning function, the history of land use needs to be considered as an indicator of potential contamination. Where there is no reason to suspect contamination after acting substantially in accordance with these Guidelines, the proposal may be processed in the usual way. However, where there is an indication that the land is, or may be, contaminated, the appropriate procedures outlined in these Guidelines should be followed.

Essentially, the Guidelines recommend that rezonings, development control plans and development applications (DAs) are backed up by information demonstrating that the land is suitable for the proposed use or can be made suitable, either by remediation or by the way the land is used.
3. OBJECTIVES AND SCOPE

The objective of the work is to comply with the Department of Urban Affairs and Planning and Environment Protection Authority Managing Land Contamination: Planning Guidelines, State Environmental Planning Policy No. 55—Remediation of Land 1998 and gain a better understanding of the environmental risks associated with the site by conducting a Stage 1 PI.

The Stage 1 PI was conducted in general accordance and consideration of the Planning Guidelines and the Australian Standard AS 4482.1-2005 Guide to the sampling and investigation of potentially contaminated soil - Part 1: Non volatile and semi-volatile compounds, the Australian Standard AS 4482.2-1999 Guide to the sampling and investigation of potentially contaminated soil - Part 2: Volatile substances, the National Environment Protection (Assessment of Site Contamination) Measure (NEPM) 1999 (amended 2013), and other relevant NSW guidelines and legislation. The Stage 1 PI consisted of a desktop historical review. The works included the following:

- site inspection;
- Certificate of Titles;
- aerial photograph, public record search;
- geological and hydrogeological review;
- review of available environmental and planning reports in the area; and
- production of this report including recommendations and associated environmental risk.

Activities undertaken to achieve the above objectives are reported and discussed in the following sections.
4. SITE DESCRIPTIONS

4.1. Site Details
The site under investigation is located on the eastern side of Tallawong Rd and southern side of Guntawong Rd, approximately 40 km northwest of Sydney CBD. The site is currently covered by one title.

Street address: 172 Tallawong Road
Suburb: Rouse Hill 2155
State: NSW
Council: The Hills Shire Council
Certificate of title: Volume 30186 Folio 53
Total Surface area: (approximately) 2.0 Hectares

4.2. Site, Surrounding Area and Topography
The site is covered by grass and a farm dam and old residential and machinery shed. Medium to tall trees are present on the perimeter of the site. There was no sign of intensive agriculture, such as market gardens, there were no stockyards of livestock dipping facilities on the property. There was no indication on the site of imported filling or major earthworks aside from the existing farm dam. The geotechnical investigation conducted by Geotesta included drilling of eight (8) boreholes across the site and no fill material was encountered outside the dam area.

The site is gently sloping from north to south with elevation between 64m AHD (Australian Height Datum) and 60m AHD. First Ponds Creek is present 300m west of the site.

4.3. Geology and Hydrogeology
The Penrith 1:100,000 Geological Sheet indicates that the underlying geology consist of the Bringelly Shale, which is part of the Wianamatta Group. The Bringelly Shales consist of shale, carbonaceous claystone, claystone laminates, fine to medium grained lithic sandstone and rare coal and tuff. The Bringelly Shale is the main outcropping geology of the Marsden Park area.

Groundwater in the area most likely occurs as an unconfined aquifer in fractures and joints of the shale and sandstone (fracture rock aquifer). The 1:2 000 000 Department
of Water Resources Groundwater in NSW, Assessment of Pollution Risk map indicates that the Site is likely to be underlain by shales and that the potential for groundwater movement is likely to be low. Groundwater salinity is mapped >14 000mg/l and therefore unsuitable for stock use. The direction of the regional groundwater flow is expected to follow the slight slope of the regional topography, towards the north and west.

A search of Department of Infrastructure Planning and Natural Resources (DIPNR) records identified three existing borehole wells located within an approximate distance of 1 kilometre from the Site. The groundwater bores are all located to the northeast of the site.

4.4. Acid Sulphate Soils

The Department for Infrastructure, Planning and Natural Resources (DIPNR) Acid Sulphate Soils Risk Mapping (1997) indicates that the Site is not expected to be underlain by acid sulphate soils.

5. SITE HISTORY

5.1. Historical Background

Rouse Hill encompasses what was originally known as the Village of Aberdour along with the area originally known as Vinegar Hill following the convict rebellion of 1804. Rouse Hill was serviced by the first ferry service in the colony, the Rose Hill Packet. Vinegar Hill Post Office opened on 1 October 1857 and was renamed Rouse Hill on 13 April 1858. The new name was chosen after the estate of Richard Rouse (1774-1852), a prominent free settler who arrived in the colony in 1801.

The settlement of the Shire followed its two main arterial systems, the road to Windsor and Wisemans Ferry, and the Hawkesbury River, with the later addition of Pennant Hills Road to the east. Most of the initial land grants followed these lines of communication and access. Many of these roads were constructed by convict labour. The Great North Road (which generally follows the line of Old Northern Road today) was constructed by convicts in the early 1800s providing a direct form of access to Wisemans Ferry and beyond to the present Hunter Valley.

Early settlers such as Andrew McDougall, John Smith, George Suttor, and Matthew Pearce stocked their land with cattle and sheep and cleared the bush to plant crops of wheat and maize. With the spread of citrus trees especially by George Suttor and the
Mobbs family, orchards developed all over the district and proved a more worthwhile crop.

From the 1860s large areas of land from Parramatta to Dural grew fruit. Bella Vista Farm, for example, quintupled its landholding to grow significant wool and citrus crops and was considered one of the major producers in the late 19th century. From the 1950s agriculture declined in the shire as urban development rapidly extended northward, with Box Hill being one of the last areas to change. There are still some rural properties in the north but many farms have been reduced in size to accommodate hobby farmers. NSW Department of Environment and Planning began looking at the potential development of the Rouse Hill area in 1980s with Rouse Hill Regional Centre plans revealed in 2001.

5.2. Aerial Photograph Review

An aerial photograph search was conducted on the site and the local area. The 1954, 1987, 2000, 2010 and 2017 were viewed with observations presented below. Larger detailed photographs are presented in Appendix A. Recent satellite images were also reviewed.

The 1954 photo shows the area covered mainly in grazing land with minor farming activities visible.

The 1980s aerial photograph indicates that the area is occupied by small farms, present of market gardens and poultries.

The latter photos show slow development of the area into rural residential sites. Other commercial activities are diminishing and farm dams left unused.
6. POTENTIAL FOR CONTAMINATION

Our assessment of site AECs and COPCs (Table 1) is made on the basis of available site history, aerial photograph interpretation and site walkovers. A map showing locations of identified AECs is provided in Figure 1 (Appendix B).

### Table 1: Areas of Environmental Concern and Contaminants of Primary Concern

<table>
<thead>
<tr>
<th>AEC(^1)</th>
<th>Potential for Contamination</th>
<th>COPC</th>
<th>Contamination Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td>A - Dwellings</td>
<td>Pesticides and heavy metals may have been utilised underneath dwellings (pest control). Dwelling Construction may include ACM and/or lead based paints.</td>
<td>HM, OCP/OPP and asbestos.</td>
<td>Low - Medium</td>
</tr>
<tr>
<td>B - Sheds</td>
<td>Sheds may have been treated with heavy metals and pesticides (pest control). Sheds may have been coated in lead based paints. Sheds may have previously stored fuel, oils etc.</td>
<td>HM, TRH, BTEX, PAH, OCP/OPP.</td>
<td>Low - Medium</td>
</tr>
<tr>
<td>C - Areas of possible cropping or market gardens</td>
<td>Application of pesticides and heavy metals for pest control.</td>
<td>HM and OCP/OPP.</td>
<td>Low - Medium</td>
</tr>
<tr>
<td>D - Dam filling</td>
<td>Fill material of unknown origin and quality.</td>
<td>HM, TRH, BTEX, PAH, OCP/OPP and asbestos.</td>
<td>Low - Medium</td>
</tr>
<tr>
<td>E - Stockpile</td>
<td>PACM in stockpile</td>
<td>Asbestos</td>
<td>Medium</td>
</tr>
<tr>
<td>F - Soil staining</td>
<td>Fuel or oil spills.</td>
<td>HM, TRH, BTEX, PAH</td>
<td>High</td>
</tr>
<tr>
<td>G - Fibre cement shed</td>
<td>As per that for AEC B with the addition of fibre cement sheeting which may contain asbestos.</td>
<td>HM, TRH, BTEX, PAH, OCP/OPP and asbestos.</td>
<td>Low - Medium</td>
</tr>
</tbody>
</table>

**Notes:**\(^1\) Locations identified on AEC map in attachment B
7. DISCUSSION OF RESULTS

In accordance the Department of Urban Affairs and Planning and Environment Protection Authority Managing Land Contamination: Planning Guidelines, State Environmental Planning Policy No. 55—Remediation of Land 1998, the site is considered to have the following concerns:

Based on the scope of works conducted the following conclusions can be made:

- The site history, desk study and inspection indicates past dwelling construction and activities on the site have the potential to have introduced contaminants to the site in the form of asbestos (as a construction material), pesticides (pest control) and heavy metals (paints, pest control); and
- Sheds may have previously (or currently) stored fuel, oils or other chemicals, leading to hydrocarbon contamination. Lead based paints or fibrous cement sheeting (containing asbestos) may have been used during construction. The sheds may have been treated with pesticides and heavy metals for pest control; and
- The dam has been filled using material of an unknown source and quality. Unless certification for material can be provided, assessment of potential heavy metals, hydrocarbons, BTEX, PAH and asbestos should be conducted; and
- Areas of former market gardens may have introduced heavy metals or pesticides to the soil.
8. RECOMMENDATIONS

To address identified AECs, an intrusive soil sampling regime is recommended to determine what, if any, remediation is required to render the site fit for residential use. In addition, further soil sampling and laboratory testing is recommended following demolition of dwelling and removal of sheds’ within their former footprints. The site investigation plan is to be developed in accordance with NSW EPA Sampling Design Guidelines (1995) and a risk based assessment.

Assessment shall address each of the identified AECs and assess COPC identified for each AEC (Table 1). Results of the site testing shall be assessed against site acceptance criteria (SAC) with reference to ASC NEPM (1999, amended 2013).

Should you require any further information regarding this report, please do not hesitate to contact the undersigned.

For and on behalf of

GEOTESTA PTY LTD

Amir Farazmand

Senior Consultant
References

Department of Urban Affairs and Planning and Environment Protection Authority Managing Land Contamination: Planning Guidelines, State Environmental Planning Policy No. 55—Remediation of Land 1998


NSW Department of Environment & Heritage (eSPADE, NSW soil and land information), www.environment.nsw.gov.au.


Information about This Report

The report contains the results of Soil Contamination Assessment conducted for a specific purpose and client. The results should not be used by other parties, or for other purposes, as they may contain neither adequate nor appropriate information.

Test Hole Logging

The information on the test hole logs (boreholes, test pits, exposures etc.) is based on a visual and tactile assessment, except at the discrete locations where test information is available (field and/or laboratory results). The test hole logs include both factual data and inferred information.

Groundwater

Unless otherwise indicated, the water levels presented on the test hole logs are the levels of free water or seepage in the test hole recorded at the given time of measuring. The actual groundwater level may differ from this recorded level depending on material permeability (i.e. depending on response time of the measuring instrument). Further, variations of this level could occur with time due to such effects as seasonal, environmental and tidal fluctuations or construction activities. Confirmation of groundwater levels, pheratic surfaces or piezometric pressures can only be made by appropriate instrumentation techniques and monitoring programmes.

Limitations

Professional advice and opinion provided in this report is for Client requesting the work in accordance with the agreed scope of work and is not to be relied on by any other third party for any and all purposes except with the prior written consent of Geotesta (which consent may or may not be given at its discretion).

Advice and interpretation is provided on the basis that subsequent site work will be undertaken by Geotesta. Should other parties be engaged to implement recommendations made by Geotesta, or undertake further assessment work on the site, Geotesta is not responsible for how the information in this report is used by those other parties or any other party.

A report is provided inclusive of all documentation sections, tables, figures and appendices and should not be provided or copied in part without all supporting documentation for any reason, because misinterpretation may occur.

Site assessments and validation studies identify actual sub-surface conditions only at those points where samples are taken, and when they are taken. Data obtained from the sampling and subsequent laboratory analyses are interpreted by geologists, engineers or scientists and opinions are presented regarding the overall sub-surface conditions, the nature and extent of groundwater, the likely impact on any proposed development and appropriate remediation measures. Actual conditions between sampling locations may differ from those inferred because no professional, no matter how qualified, and no sub-surface exploration program, no matter how comprehensive, can reveal what is hidden below the ground surface. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from that predicted. Nothing can be done to prevent the unanticipated. However, steps can be taken to help minimize the impact.
Sub-surface conditions can change by natural processes and site activities. This report presents the conditions assessed at the time the investigation/validation study was undertaken. Consequently, project decisions should not be based on environmental site assessment or validation data that may have been affected by time. The consultant should be requested to advise if additional testing is required.

This site has been assessed /validated for a particular proposed or existing land use based on the limitations of the scope of works. No warranty or guarantee is made in regard to any other use, only to the depth tested. Fill, soil, groundwater and rock to the depth tested on the site may be fit for the specified use.

**Interpretation of Results**

The discussion or recommendations contained within this report normally are based on a site evaluation from discrete test hole data. Generalised, idealised or inferred subsurface conditions (including any geotechnical cross-sections) have been assumed or prepared by interpolation and/or extrapolation of these data. As such these conditions are an interpretation and must be considered as a guide only.

**Change in Conditions**

Local variations or anomalies in the generalised ground conditions do occur in the natural environment, particularly between discrete test hole locations. Additionally, certain design or construction procedures may have been assumed in assessing the soil-structure interaction behaviour of the site. Furthermore, conditions may change at the site from those encountered at the time of the geotechnical investigation through construction activities and constantly changing natural forces.

Any change in design, in construction methods, or in ground conditions as noted during construction, from those assumed or reported should be referred to GEOTESTA for appropriate assessment and comment.

**Reproduction of Reports**

Where it is desired to reproduce the information contained in our geotechnical report, or other technical information, for the inclusion in contract documents or engineering specification of the subject development, such reproductions should include at least all of the relevant test hole and test data, together with the appropriate standard description sheets and remarks made in the written report of a factual or descriptive nature. Reports are the subject of copyright and shall not be reproduced without the permission of Geotesta.
Appendix A

Aerial Photographs
Aerial Photo 1954
Aerial Photo 1987
172 Tallawong Rd Rouse Hill

Aerial Photo 2000

Image © 2017 DigitalGlobe
Appendix B

Areas of Environmental Concern
Figure 1: Areas of Contamination Concerns

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<td>A</td>
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<td>F</td>
</tr>
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