Broadcrest Consulting Pty Ltd

45-47 Denman Ave, Kootingal

Preliminary Site Investigation

July 2023

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Approval and Authorisation

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Contents

1 INTRODUCTION

1.1 Background

Broadcrest Consulting Pty. Ltd. was engaged by Tycoon Consultants & Investments Pty Ltd to conduct a Preliminary Site Investigation at 45-47 Denman Avenue, Kootingal (hereafter referred to as the site). The assessment was undertaken as part of due diligence for the site, but may accompany a future Development Application for residential subdivision of the site (Appendix A).

A site inspection was undertaken on 20 July 2023 which involved a visual assessment of accessible areas of the site and the excavation of soil profiling boreholes. Details of the findings are presented within the body of this report, as well as an assessment of significance with regards to the findings of the investigation.

1.2 Objectives

The objectives of the Preliminary Site Investigation (PSI) are to:

- To identify any past or present potentially contaminating activities
- To describe the site and discuss its condition
- To determine the nature and possible extent of any contamination on site
- To identify potential contamination migration routes, and
- To determine the need for any further Detailed Site Investigation (DSI).

1.3 Scope of Works

The scope of works included the following:

- Acquisition of a Lotsearch Mapping and Spatial Information Report (Appendix B) comprising;
    - Cadastre and topography
    - Historical aerial imagery
    - EPA Contaminated Land Records and Records of Notice
    - Previous land uses
    - Groundwater bores
    - Geology and soils
    - Land zoning
- Acquisition and review of Historical Land Titles and Safework NSW Searches
- Acquisition and review of Section 10.7 Planning Certificate
- A review of past and current site uses
- An inspection of accessible areas of the site
- Drilling of boreholes for soil profiling purposes, and
- Reporting in accordance with the associated legislations and guidelines.

This assessment does **not** include a hazardous building materials assessment of any buildings. It is recommended that be undertaken by a suitably licensed and experienced building inspector / hygienist or equivalent prior to any future alterations or demolition.

1.4 Legislative Requirements

The legislative framework for the report is based on State Environmental Planning Policy (Resilience and Hazards) and the following Acts and Regulations:

- Protection of the Environment Operations Act (1997)
- Contaminated Land Management Act (1997)
- Protection of the Environment Operations (General) Regulation 2021

In addition, the following guidelines have been applied where necessary:

- Sampling Design Guidelines (NSW EPA, 1995)
- Guidelines for Consultants Reporting on Contaminated Sites (NSW EPA, 2020).
- National Environmental Protection Measure (NEPC, 2013)
- Waste Classification Guidelines Part 1: Classifying Waste (NSW DECCW, 2014)
- Australian Standard AS 4482.1 Guide to the Sampling and Investigation of Potentially Contaminated Soil. Part 1: Non-volatile and Semi-Volatile Compounds

1.5 Proposed Development

The assessment was undertaken as part of due diligence for the site, but may accompany a future Development Application for residential subdivision of the site (Appendix A).

2 PRELIMINARY SITE INVESTIGATION

2.1 Site Identification and Location

The site is 45-47 Denman Avenue, Kootingal and comprises the following Lots:

- Lot A of DP 364611
- Lot B1 of DP 378740, and
- Lot B4 of DP 382010

Collectively they occupy approximately 30,750 m^2 of residential land on the eastern side of Denman Road, Kootingal.

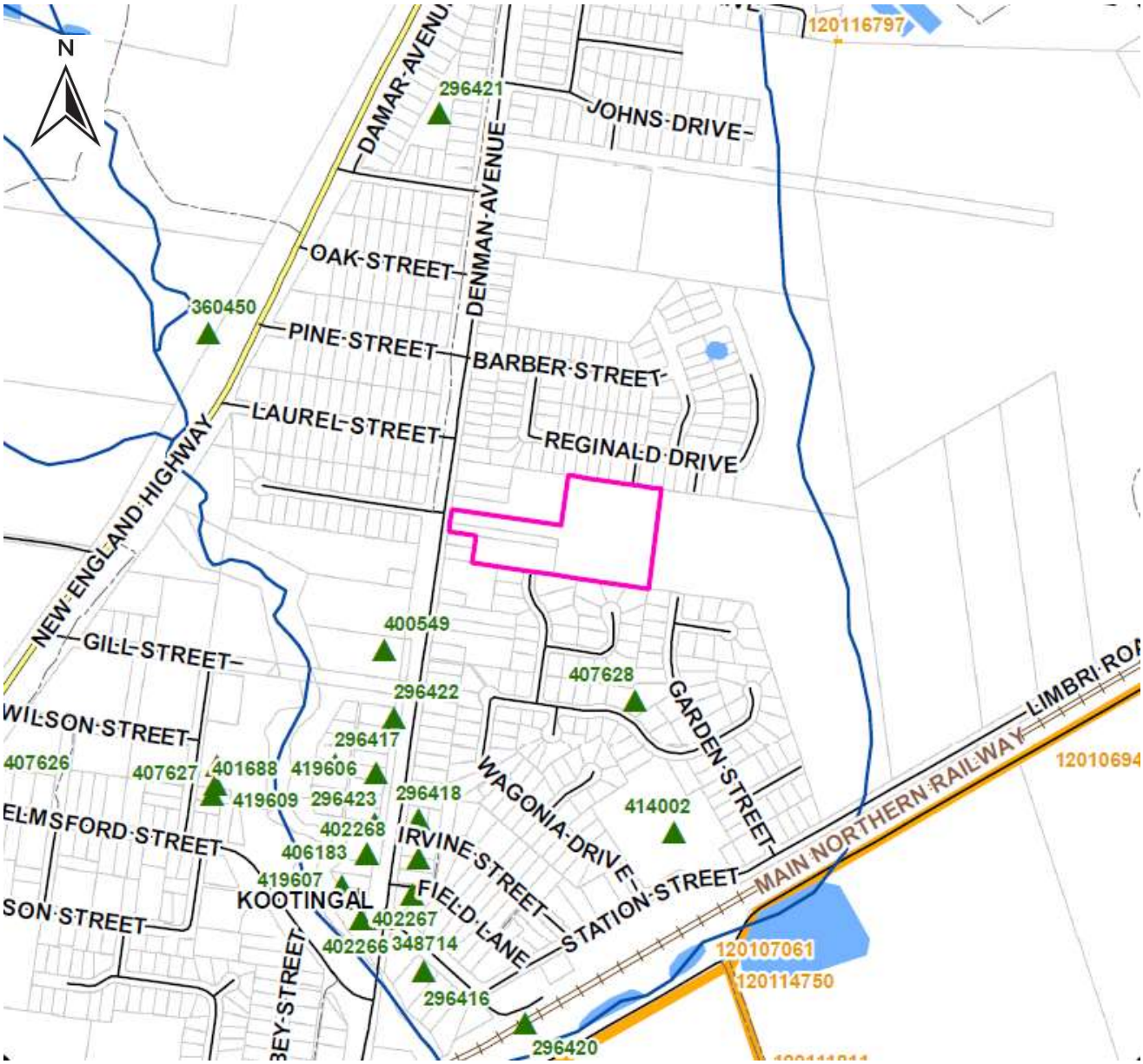

Figure 2-1: Site Location outlined in pink (Lotsearch Pty Ltd)

2.2 Site inspection

A site inspection was undertaken on 20 July 2023 by Broadcrest Pty Ltd consultants [redacted] At the time of inspection, the site was unoccupied and vegetated with pasture grass and scattered trees (Figure 2.2). The site was positioned within a mostly residential setting on the eastern side of Denman Road. Visual inspection failed to identify any obvious indicators of site contamination. However, several small stockpiles of soil and demolition waste were identified (Figure 2.3 – 2.5) which may contain contaminants of concern (refer to Section 2.8). The stockpiles were heavily grown over with grass so detailed inspection was not possible.

Figure 2-2: Looking west across the site – pasture grass and scattered trees

Figure 2-3: Foundations and stockpiled demolition waste from a former residence on site

Figure 2-4: One of several small stockpiles of concrete, brick and building rubble on site

Figure 2-5: One of several small stockpiles of soil

2.3 Surrounding land use

The site is situated within a zone of R1 General Residential per Tamworth Regional Local Environmental Plan (2010) and is bordered by:

- Residential properties to the north
- Residential properties to the south
- Vacant land to the east, and
- Denman Avenue and residential properties to the west.

Figure 2-6: Aerial imagery of the site & surrounding area (150m offset delineated by black line)

2.4 Topography

The site occupies a gently-sloping, south-facing side-slope of approximately 3% gradient. There were no indicators of mass cutting and filling, retaining or terra-forming on the site.

2.5 Geology and Soil Landscape Mapping

1:250,000 soil landscape mapping of NSW indicates the site occurs on a Kurosol. Undulating to hilly, granitic tors, chief soils seem to be sandy, acidic, yellow mottled soils and/or leached sands and/or yellow earths. Boreholes drilled on site indicate the mapping is accurate.

2.6 Surface and Ground Water Hydrology

The site currently consists of almost 100% permeable vegetated surface. It is anticipated that un-infiltrated stormwater will sheet across the property towards lower lying residential properties to the south. It is noted that an earth diversion bund had been formed adjacent to the southern property boundary to divert some stormwater run-on to the west and around the aforementioned residential properties.

The proposed development (Appendix A) is likely to result in a significant increase in impervious hard surface on the site which will need to be appropriately controlled and managed.

A review of regional groundwater bores has been undertaken by Lotsearch Pty Ltd (Appendix B). Review of the data indicates a highly variable groundwater depth across the region. Table 2.1 lists those bores within 1,000m of the site. Bore depths within the 1,000mm search radius range between 9m – 42m BGL with a standing water level 6m – 23m BGL. Direction of flow is difficult to determine without reference elevation.

Twelve (12) bore holes were drilled across the site using a 50mm push-tube sampler supplemented with dynamic cone penetrometer testing. Groundwater was not encountered within any of the boreholes.

2.7 Receptors and Sensitive Environments

The nearest sensitive environmental receivers are as follows:

- Residential properties immediately north (up-slope) and south (down-slope)
- Residential properties approximately 20m west (cross-slope)
- Kootingal public school approximately 160m south-west (down-slope)
- Sandy Creek approximately 250m west (cross-slope)
- A tributary of Sandy Creek approximately 250m east (cross-slope)

There are:

- No market gardens within 100m of the site
- No schools, pre-schools, day care centres or similar within 100m of the site.

Table 2.1: Groundwater Bores within 500m (Lotsearch Pty Ltd).

NSW Bore ID	Bore Type	Status	Drill Date	Bore Depth (m)	Reference Elevation	Height Datum	Salinity (mg/L)	Yield (L/s)	SWL (mbgl)	Distance	Direction
GW971576	Water Supply	Functioning	18/03/2016	42.00		AHD				12m	North West
GW969322	Stock and Domestic	Functioning	08/03/2010	40.00		AHD	1147	0.560	15.00	55m	South West
GW005625	Water Supply	Unknown	01/10/1958	33.80		AHD	Soft			231m	North West
GW054644	Stock and Domestic	Unknown	01/07/1981	39.00		AHD	Fresh			256m	East
GW029833	Stock and Domestic	Non-functional	01/04/1966	33.50		AHD				287m	East
GW019484	Water Supply	Unknown	01/12/1961	20.70		AHD				314m	North
GW012999	Water Supply	Unknown	01/02/1957	25.60		AHD				348m	West
GW028263	Irrigation	Functioning	01/10/1966	9.10		AHD				369m	South East
GW042790	Irrigation	Unknown	01/03/1976	9.40		AHD				386m	South
GW013627	Unknown	Unknown	01/11/1957	10.40		AHD				486m	South
GW903927	Stock and Domestic	Unknown	09/04/2019	42.00		AHD				523m	South West
GW902662	Water Supply	Unknown	01/06/1950	12.50		AHD	Good	0.600	9.00	546m	West
GW072817	Water Supply	Unknown	08/09/1994	33.50		AHD				682m	South West
GW902305	Water Supply	Unknown	02/03/1995	43.30		AHD			12.20	689m	South West
GW901157	Water Supply	Unknown		9.00		AHD			6.00	692m	South East
GW072864	Water Supply	Unknown	07/09/1994	21.30		AHD				713m	South West
GW011252	Stock and Domestic	Unknown	01/10/1955	28.30		AHD	501-1000 ppm			734m	South West
GW966215	Water Supply	Unknown	01/07/1992	13.30		AHD		0.360	6.00	770m	South
GW902465	Water Supply	Unknown	12/03/1995	72.00		AHD	Good	0.070	18.90	813m	South West
GW900521	Water Supply	Unknown	01/02/1996	40.00		AHD		4.950	23.00	903m	West
GW900899	Water Supply	Unknown		9.00		AHD			6.00	939m	South East
GW013885	Unknown	Functioning	01/01/1947	34.70		AHD	Good			944m	West
GW901158	Water Supply	Unknown		9.00		AHD				966m	North East
GW013404	Irrigation	Functioning	01/01/1959	9.80		AHD		12.630	7.30	970m	South
GW901159	Water Supply	Unknown		9.00		AHD				988m	North East

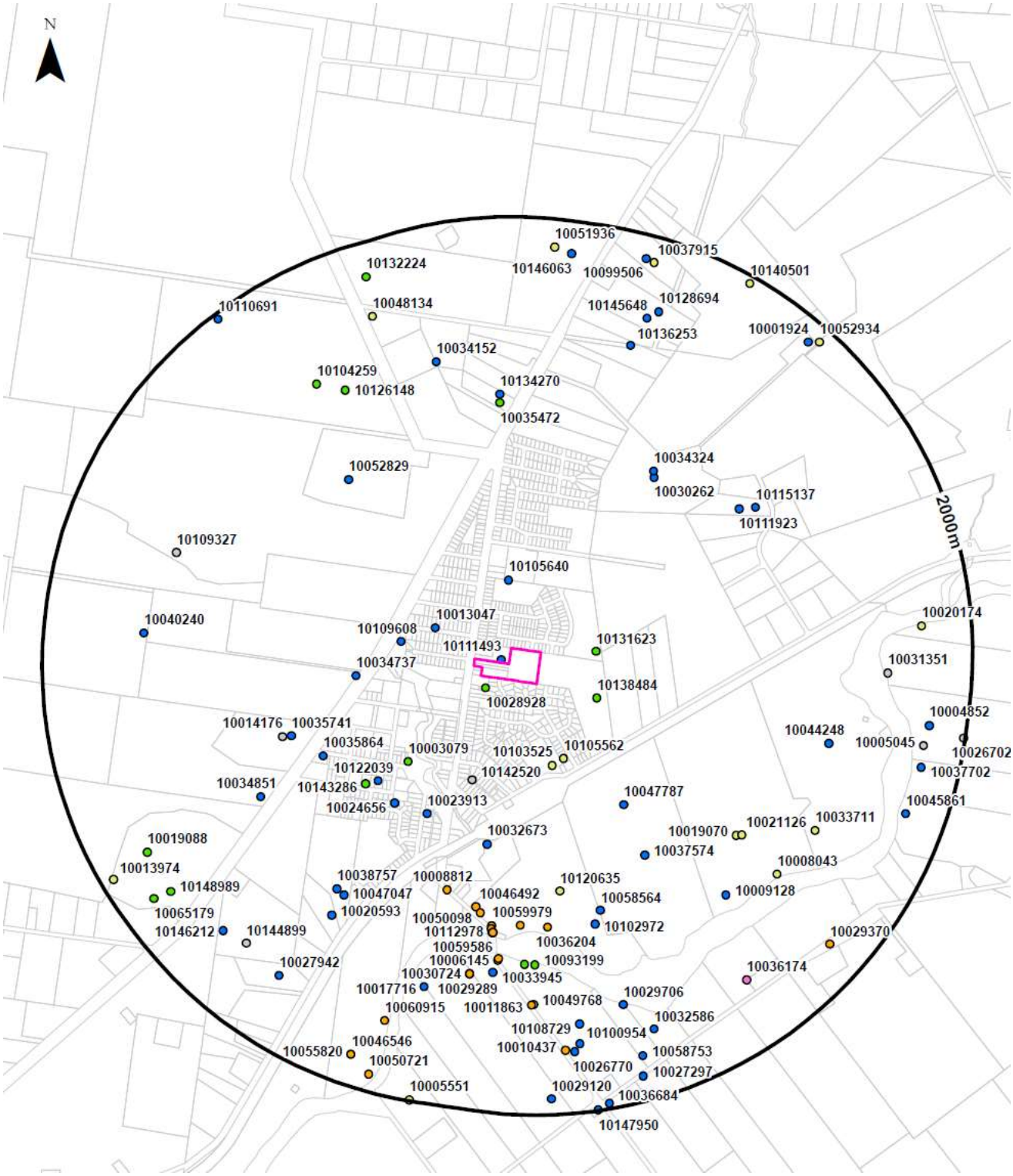

Figure 2-7: Groundwater bores across the region (Lotsearch Pty Ltd)

2.8 Material Storage and Handling

At the time of inspection, the site was unoccupied. However, several small stockpiles of soil and demolition waste were identified which may contain contaminants of concern. Each location is described within Table 2.1 below and annotated on Figure 3.1. It is noted that the stockpiles were heavily grown over with grass so detailed inspection was not possible. Additional lengths and large fragments of concrete were also identified elsewhere on site which will require removal prior to any future subdivision.

Table 2.1: Description of stockpiled media identified on site

Reference	Discussion
1	Remnants of demolished residence including bricks, concrete slab & tile rubble
2	Small stockpile of bricks and concrete rubble
3	Small stockpiles of bricks, roof tiles, concrete and timber pallets
4	Small stockpile of dark brown topsoil and tree limbs
5	Small stockpile of dark brown topsoil and rocks
6	Small stockpile of dark brown topsoil, tree limbs, timber and fabrics

2.9 Soil Materials

The site occupies a gently-sloping, south-facing side-slope of approximately 3% gradient. There were no indicators of mass cutting and filling, retaining or terra-forming on the site. Twelve (12) bore holes were drilled across the site using a 50mm push-tube sampler supplemented with dynamic cone penetrometer testing (Figure 2.9). Soil profiles were highly consistent comprising:

- 0-200mm: Topsoil, SAND with trace of gravel
- 200-800mm: Sandy Silty CLAY with trace of gravel
- 800 – 1200 Refusal: Granite, presenting as Sandy CLAY with trace of gravel

There were no signs of filling within any of the twelve drilled boreholes. Soil logs are provided within Appendix D. Additional information pertaining to subterranean conditions can be found within accompanying Geotechnical Investigation by Broadcrest Consulting (July, 2023).

Figure 2-8: Typical soil profile across site: loamy-sand over sandy-silty-clay overlying granite

Figure 2-9: Location of soil profiling boreholes

2.10 NSW EPA Site Records

A strategy to systematically assess, prioritise and respond to notifications under the Contaminated Land Management Act 1997 (CLM Act) has been developed by the EPA. This strategy acknowledges the EPA's obligations to make information available to the public under Government Information (Public Access) Act 2009.

Sites appearing in the list of *NSW Contaminated Sites Notified to the EPA* indicate that the notifiers consider that the sites are contaminated and warrant reporting to EPA. However, the contamination may or may not be significant enough to warrant regulation by the EPA. The EPA needs to review and, if necessary, obtain more information before it can determine as to whether the site warrants regulation.

A site will appear on the *Contaminated Land: Record of Notices* once the EPA has issued a regulatory notice in relation to the site under the Contaminated Land Management Act 1997 (CLM Act) or Protection of the Environment Operations Act 1997 (POEO Act).

Facilities will also appear on the *Register of Environmental Protection Licenses* once a license application has been submitted, approved or revoked under the Protection of the Environment Operations Act 1997 (POEO Act). A search on all databases for the site and premises within 1,000m thereof was undertaken by Lotsearch Pty Ltd (Appendix B). The results are provided within Tables 2.2 – 2.10.

Table 2.2: List of NSW contaminated sites notified to the EPA within 1,000m

Site	Address	Suburb	Activity	Management Class	Status	Location Confidence	Dist	Direction
No records in buffer								

Table 2.3: List of NSW Records of Notice within 1,000m

Site	Address	Suburb	Activity	Management Class	Status	Location Confidence	Dist	Direction
No records in buffer								

Table 2.4: List of Former Gasworks within 1,000m

Site	Address	Suburb	Activity	Management Class	Status	Location Confidence	Dist	Direction
No records in buffer								

Table 2.5: List of National Liquid Fuel Facilities within 1,000m

Site	Address	Suburb	Activity	Management Class	Status	Location Confidence	Dist	Direction
No records in buffer								

Table 2.6: EPA PFAS Investigation Program sites within 2,000m

Site	Address	Suburb	Activity	Management Class	Status	Location Confidence	Dist	Direction
No records in buffer								

Table 2.7: List of other EPA sites with contamination issues within 1,000m

Site	Address	Suburb	Activity	Management Class	Status	Location Confidence	Dist	Direction
No records in buffer								

Table 2.8: Delicensed Activities still regulated by the EPA within 1,000m

Site	Address	Suburb	Activity	Management Class	Status	Location Confidence	Dist	Direction
No records in buffer								

Table 2.9: Licensed Activities under the POEO Act 1997 within 1,000m

EPL	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
13421	UGL REGIONAL LINX PTY LTD		COUNTRY REGIONAL NETWORK, ORANGE, NSW 2800		Railway systems activities	Premise Match	454m	South East

Table 2.10: Former Licensed Activities under the POEO Act 1997, now revoked / surrendered

Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
4653	LUHRMANN ENVIRONMENT MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW	Surrendered	06/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	203m	West
4838	Robert Orchard	Various Waterways throughout New South Wales - SYDNEY NSW 2000	Surrendered	07/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	203m	West
6630	SYDNEY WEED & PEST MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW - PROSPECT, NSW, 2148	Surrendered	09/11/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	203m	West

2.11 Historical Business Directories

A list of Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories between 1950-1991 within 500m of the site was compiled by Lotsearch Pty Ltd. Results mapped to premises or road intersection accuracy within 200m of the site are summarised in Table 2.11 below. Results from further abroad or mapped with less accuracy can be viewed within Appendix B.

Table 2.11: Universal Business Directory records from 1950 – 1991 mapped within 500m of site

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
N/A	No records in buffer						

2.12 Section 10.7 Certificate

A Section 10.7 certificate as issued by Tamworth Regional Council has been reviewed (Appendix E). With regard to Section 59(2) of the Contaminated Land Management Act 1997, Council is NOT aware of the land being:

- Significantly contaminated land within the meaning of that Act
- Subject to a management order within the meaning of that Act
- Subject of an approved voluntary management proposal
- Subject to an ongoing maintenance order within the meaning of that Act, or
- Subject of a site audit statement within the meaning of that Act.

Council is NOT aware that the land includes residential premises that are listed on the Register kept under the *Home Building Act 1989*, Part 8, Division 1A (loose-fill asbestos insulation).

2.13 Historical Land Titles

A review of Historical Land Titles as provided by InfoTrack Pty Ltd was undertaken (Appendix F), a summary of which is provided within Tables 2.12 - 2.15 below. Significant points include:

- Lot B4 of DP 382010 was first referenced in approximately 1981
- Lot B1 of DP 378740 was first referenced in approximately 1981
- Lot A of DP 364611 was first referenced in approximately 1981
- For the most part, the lots have been sold and purchased cumulatively by the same owners
- In 1953 the site was purchased by Edward Owens (Poultry Farmer) – which potentially explains the sheds that became visible on-site aerial imagery in 1954.
- The lots have never been owned by any known contaminating corporations

Table 2.12: Historical Land Titles with regards to Lot B4 DP 382010.

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
24.06.1908	[redacted]	Volume 1293 Folio 34 Then Volume 2130 Folio 128 Volume 2226 Folio 163 Now Volume 3029 Folio 121
30.03.1920	[redacted]	Volume 3029 Folio 121 Then Volume 3743 Folio 20 Volume 4410 Folio 135 Volume 4600 Folio 239 Now Volume 4661 Folio 227
06.03.1940	[redacted]	Volume 4661 Folio 227 Now Volume 5136 Folio 170
27.02.1947	[redacted]	Volume 5136 Folio 170 Now Volume 5721 Folio 67
08.04.1949	[redacted]	Volume 5721 Folio 67 Now Volume 6068 Folio 115
20.11.1951	[redacted]	Volume 6068 Folio 115 Now Volume 6558 Folio 58

Table 2.13: Historical Land Titles with regards to Lot B1 DP 378740

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
24.06.1908	[redacted]	Volume 1293 Folio 34 Then Volume 2130 Folio 128 Volume 2226 Folio 163 Now Volume 3029 Folio 121
30.03.1920	[redacted]	Volume 3029 Folio 121 Then Volume 3743 Folio 20 Volume 4410 Folio 135 Volume 4600 Folio 239 Now Volume 4661 Folio 227
06.03.1940	[redacted]	Volume 4661 Folio 227 Now Volume 5136 Folio 170
27.02.1947	[redacted]	Volume 5136 Folio 170 Now Volume 5721 Folio 67
08.04.1949	[redacted]	Volume 5721 Folio 67 Now Volume 6068 Folio 115
07.11.1952	[redacted]	Volume 6068 Folio 115 Now Volume 6669 Folio 229

Table 2.14: Historical Land Titles with regards to Lot B4 DP 382010 & B1 DP 378740 combined

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
11.12.1953	[redacted]	Volume 6558 Folio 58 & Volume 6669 Folio 229
15.07.1958	[redacted]	Volume 6558 Folio 58 & Volume 6669 Folio 229
24.11.1958	[redacted]	Volume 6558 Folio 58 & Volume 6669 Folio 229
25.03.1974	[redacted]	Volume 6558 Folio 58 & Volume 6669 Folio 229
03.02.1976	[redacted]	Volume 6558 Folio 58 & Volume 6669 Folio 229
29.06.1981	[redacted]	Volume 6558 Folio 58 & Volume 6669 Folio 229 Now B1/378740 & B4/382010
12.01.1990	[redacted]	B1/378740 & B4/382010
12.01.1990	[redacted]	B1/378740 & B4/382010
09.08.2021 to date	[redacted]	B1/378740 & B4/382010

Table 2.14: Historical Land Titles with regards to Lot A DP 364611

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
24.06.1908	[redacted]	Volume 1293 Folio 34 Then Volume 2130 Folio 128 Volume 2226 Folio 163 Now Volume 3029 Folio 121
30.03.1920	[redacted]	Volume 3029 Folio 121 Then Volume 3743 Folio 20 Volume 4410 Folio 135 Volume 4600 Folio 239 Now Volume 4661 Folio 227
06.03.1940	[redacted]	Volume 4661 Folio 227 Now Volume 5136 Folio 170
27.02.1947	[redacted]	Volume 5136 Folio 170 Now Volume 5721 Folio 67
20.09.1949	[redacted]	Volume 5721 Folio 67 Now Volume 6123 Folio 76

31.03.1950	[redacted]	Volume 6123 Folio 76
08.08.1950	[redacted]	Volume 6123 Folio 76
11.12.1953	[redacted]	Volume 6123 Folio 76
15.07.1958	[redacted]	Volume 6123 Folio 76
24.11.1958	[redacted]	Volume 6123 Folio 76
25.03.1974	[redacted]	Volume 6123 Folio 76
03.02.1976	[redacted]	Volume 6123 Folio 76
29.06.1981	[redacted]	Volume 6123 Folio 76 Now A/364611
12.01.1990	[redacted]	A/364611
12.01.1990	[redacted]	A/364611
09.08.2021 to date	[redacted]	A/364611

2.14 Historical Aerial Photographs

A review of historical aerial photographs provided in Appendix B was undertaken. The results of which are summarised in Table 2.13.

Table 2.13: Findings of the Historical Photograph Review

Year	Description
1943	• Low resolution black and white aerial photograph • Site vacant and vegetated with grass • Surrounding area rural
1954	• Low resolution black and white aerial photograph • New house and several nearby sheds in west of site
1966	• Low resolution black and white aerial photograph • No significant changes discernible since 1954 • Potential lumber yard or similar on southern adjacent allotment
1971	• Low resolution black and white aerial photograph • Most sheds previously visible on site have been removed • New warehouses or factory buildings in north of photograph (not on site)
1983	• Low resolution black and white aerial photograph • No significant changes discernible since 1971
1989	• Moderate resolution colour aerial photograph • House and last remaining shed under demolition
1997	• Moderate resolution colour aerial photograph • House and remaining shed have been removed from site – site now vacant
2003	• Moderate resolution colour aerial image • No significant changes discernible since 1997 • New residential housing developments visible south of the site
2010	• High resolution colour aerial image • No significant changes discernible since 2003
2013	• High resolution colour aerial image • No significant changes discernible since 2010 • Increasing number of residential housing developments south of the site • Warehouses or factory buildings in north of photograph (not on site) under demolition
2017	• High resolution colour aerial image • No significant changes discernible since 2013 • New residential housing developments to the north and south of the site
2019	• High resolution colour aerial image • No significant changes discernible since 2017
2022	• High resolution colour aerial image • No significant changes discernible since 2019 • New residential housing developments to the north and south of the site • Conditions per site inspection

The photos revealed that the site was first developed sometime between 1943 – 1954 with the construction of a house and several sheds in the west of the site. However, by 1971 all but one of the sheds had been demolished and removed from site, and by 1997 the house and last remaining shed were also demolished and removed from site. The aerial photographs also revealed a steadily increasing residential setting, particularly post 2003.

2.15 Information Gaps

A site history has been established using the sources outlined in Section 2 above. Although inferences have been drawn based on 'point in time' documents and aerial photographs, the information presented is consistent the industry standard and considered suitable for assessing the overall site history.

3 SUMMARY OF FINDINGS AND RECOMMENDATIONS

3.1 Site Observations

A site inspection was undertaken on 20 July 2023 by Broadcrest Pty Ltd consultants [redacted] At the time of inspection, the site was unoccupied and vegetated with pasture grass and scattered trees (Figure 2.2). The site was positioned within a mostly residential setting on the eastern side of Denman Road. Visual inspection failed to identify any obvious indicators of site contamination. However, several small stockpiles of soil and demolition waste were identified (Figure 2.3 – 2.5) which may contain contaminants of concern.

The site occupies a gently-sloping, south-facing side-slope of approximately 3% gradient. There were no indicators of mass cutting and filling, retaining or terra-forming on the site. Twelve (12) bore holes were drilled across the site using a 50mm push-tube sampler supplemented with dynamic cone penetrometer testing (Figure 2.9). Soil profiles were highly consistent, comprising brown loamy-sand over a layer of sandy-silty-clay in each instance. Refusal occurred on what appeared to be weathering granodiorite between 800 – 1,200mm depth. There were no signs of filling within any of the twelve drilled boreholes.

3.2 Regional

The site is situated within a zone of R1 General Residential per Tamworth Regional Local Environmental Plan (2010) and is bordered by residential properties to the north, south and west, and vacant land to the east. Kootingal Public School can be identified approximately 160m south-west (down-slope).

3.3 Historical

The photos revealed that the site was first developed sometime between 1943 – 1954 with the construction of a house and several sheds in the west of the site. However, by 1971 all but one of the sheds had been demolished and removed from site, and by 1997 the house and last remaining shed were also demolished and removed from site. The aerial photographs also revealed a steadily increasing residential setting, particularly post 2003. The site itself has changed very little since 1997.

3.4 Areas and Contaminants of Potential Concern

Table 3.1 below lists locations and contaminants of potential concern that have been identified by this assessment.

Table 3.1: Areas and Contaminants of Potential Concern

Ref	Discussion	Area	Contaminants of Concern
#1	Remnants of demolished residence including bricks, concrete slab & tile rubble	150m^2	• Heavy Metals • Asbestos
#2	Small stockpile of bricks and concrete rubble	10m^2	
#3	Small stockpiles of bricks, roof tiles, concrete and timber pallets	10m^2	
#4	Small stockpile of dark brown topsoil and tree limbs	10m^2	• Heavy Metals • Asbestos • TRH • PAH • BTEXN • OCOP
#5	Small stockpile of dark brown topsoil and rocks	10m^2	
#6	Small stockpile of dark brown topsoil, tree limbs, timber & fabrics	10m^2	
#7	Location of former sheds	500m^2	

3.5 Potential Risks to Onsite Receptors

Heavy Metals, Hydrocarbons (TRH / PAH), BTEXN, OCOP and Asbestos have been identified as potential contaminants of concern within selected locations on this site. Based on current land usage (vacant allotment) exposure risk to on-site personnel is considered **Very Low**. However, exposure risk to on-site personnel during the construction phase of the development and potential occupants of future residential allotments is considered **Moderate.** An exposure risk via dermal contact and/or inhalation is considered possible without appropriate remediation or preventative measures.

3.6 Potential for Migration of Contaminants

The current risk of contaminant migration from site is considered **Very Low** as the site is stable, well vegetated and undisturbed. However, potential for contaminant migration will increase upon commencement of excavations as soils are exposed to the elements of wind and rain. It is recommended that a Construction Environmental Management Plan be prepared to ensure materials are safely excavated with minimal risk to staff and the surrounding environment. The plan should include measures to mitigate potential off-site losses via wind, water and transport vehicles.

In the unlikely event that it is encountered, groundwater must not be pumped into the stormwater network without appropriate pre-treatment and approval from Council to do so.

Figure 3-1: Locations of areas of concern across the site – red dots represent stockpiles whilst yellow shaded areas represent location of former residence and sheds

3.7 Recommendations

Based on the findings of this investigation, it is considered that the site can be made suitable to potential residential sub-division. The measures below are recommended to be completed prior to development approval:

1. Stockpiles identified on the site (Locations of concern #1 – #6) are removed by suitably licensed waste management contractors. All stockpiled materials are to be pre-classified in accordance with the NSW EPA Waste Classification Guidelines by a suitably qualified person **prior to** excavation or removal from site. If potentially hazardous materials are encountered:
    a. They must be handled by suitably licensed contractors and disposed at a licensed facility appropriate to their classification.
    b. A clearance certificate must be provided by a suitably licensed and experienced building inspector / hygienist upon removal.
2. Other stockpiles of concrete on the site be removed.
3. The location of former sheds on the site (Location of Concern #7 shaded yellow on Figure 3.1) be investigated for respective contaminants of concern by way of a Detailed Site Investigation (DSI). This must be undertaken by a suitably qualified and experienced land contamination consultant. Should significant contamination be identified, an appropriate Remediation Action Plan be prepared for the site.
4. Should any unidentified or potentially contaminated material be excavated whilst on site it is recommended that the advice of a trained and experienced contaminated lands consultant be sought. The site foreman should be advised immediately for appropriate action.

4 CONCLUSIONS

Broadcrest Consulting Pty. Ltd. was engaged by Tycoon Consultants & Investments Pty Ltd to conduct a Preliminary Site Investigation at 45-47 Denman Avenue, Kootingal (hereafter referred to as the site). The assessment was undertaken as part of due diligence for the site, but may accompany a future Development Application for residential subdivision of the site (Appendix A).

A site inspection was undertaken on 20 July 2023 which involved a visual assessment of accessible areas of the site and the excavation of soil profiling boreholes. Details of the findings are presented within the body of this report, as well as an assessment of significance with regards to the findings of the investigation.

Based on the findings of this investigation, it is considered that the site can be made suitable to potential residential sub-division. The measures below are recommended to be completed prior to development approval:

1. Stockpiles identified on the site (Locations of concern #1 – #6) are removed by suitably licensed waste management contractors. All stockpiled materials are to be pre-classified in accordance with the NSW EPA Waste Classification Guidelines by a suitably qualified person **prior to** excavation or removal from site. If potentially hazardous materials are encountered:

    a. They must be handled by suitably licensed contractors and disposed at a licensed facility appropriate to their classification.
    b. A clearance certificate must be provided by a suitably licensed and experienced building inspector / hygienist upon removal.

2. Other stockpiles of concrete on the site be removed.
3. The location of former sheds on the site (Location of Concern #7) be investigated for respective contaminants of concern by way of a Detailed Site Investigation (DSI). This must be undertaken by a suitably qualified and experienced land contamination consultant. Should significant contamination be identified, an appropriate Remediation Action Plan be prepared for the site.
4. Should any unidentified or potentially contaminated material be excavated whilst on site it is recommended that the advice of a trained and experienced contaminated lands consultant be sought. The site foreman should be advised immediately for appropriate action.

5 DISCLAIMER

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only and has been based on information provided by the client. The advice herein relates only to this project and all results, and conclusions made should be reviewed by a competent and experienced person with experience in environmental investigations, before being used for any other purpose. Broadcrest Consulting Pty Ltd accepts no liability for use or interpretation by any person or body outside the consent authority. This report should not be reproduced or amended in any away without prior approval by the client or Broadcrest Consulting Pty Ltd and should not be relied upon by any other party, who should make their own independent enquiries.

The extent of sampling of soils and subsequent analysis has been necessarily limited and has been targeted towards areas where contamination is most likely based on the knowledge of the Site history and visual observation. This approach maximises the probability of identifying contaminants, however, it may not identify contamination which occurs in unexpected locations or from unexpected sources.

Further, soils rock and aquifer conditions are often variable, resulting in non-homogenous contaminant distributions across a site. Contaminant concentrations have been identified at chosen sample locations, however, conditions between samples locations can only be inferred based on the estimated geological and hydrogeological conditions and the nature and extent of identified contamination.

Boundaries between zones of variable contamination are often indistinct and have been interpreted based on available information and the application of professional judgement. The accuracy with which the subsurface conditions have been characterised depends on the frequency and methods of sampling and the uniformity of subsurface conditions and is therefore limited by the scope of works undertaken.

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

Broadcrest Consulting Pty Ltd accepts no liability for the unlawful disposal of waste materials from any site. Broadcrest Consulting Pty Ltd does not accept any responsibility for the material tracking, loading, management, transport or disposal of waste from the site.

Broadcrest Consulting Pty Ltd professional opinions are based upon its professional judgement, experience, training and results from analytical data. In some cases, further testing and analysis may be required, thus producing different results and/or opinions. Broadcrest Consulting Pty Ltd has limited investigation to the scope agreed upon with its client.

Broadcrest Consulting Pty Ltd has used a degree of care and skill ordinarily exercised in similar investigations by reputable member of the Environmental Industry within Australia. No other warranty, expressed or implied, is made or intended.

6 GLOSSARY

Abbreviation	Term
ANZECC	Australia and New Zealand Environment Conservation Council
AS	Australian Standard
AS/NZS	Combined Australian Standard and New Zealand Standard
BOD	Biological oxygen demand
DA	Development Application
DC	Development Consent
DEC	Department of Environment and Conservation (NSW)
EC	Electrical Conductivity
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EP&A Act	NSW Environmental Planning and Assessment Act 1979
EPA	Environment Protection Authority
ESA	Environmental Site Assessment
ESD	Ecologically Sustainable Development
ISO	International Organisation for Standardization
LEP	Local Environmental Plan
LGA	Local Government Area
Leachate:	Any liquid that, in the course of passing through matter, extracts soluble or suspended solids, or any other component of the material through which it has passed
mg/L	Milligrams per litre
NTU	Nominal Turbidity Units
PAH	Polyaromatic Hydrocarbons
RAP	Remediation Action Plan
REP	Regional Environmental Plan
RPD	Relative Percent Difference
SEPP	State Environmental Planning Policy
USEPA	United States Environment Protection Agency
µg/L	Micrograms per litre