Greg Alderson Associates

Northern Rivers Contaminated Land Program - Contamination Report Summary Table

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| **Report details** | |
| **Report title: 21242_sepp55 4_amendment.docx** | |
| **Produced by:** Greg Alderson & Associates | **ABN:** 58 594 160 789 |
| **Provided to** Ballina Council **on:** July 2021 | |
| **I** [Wendy Attrill **of** Greg Alderson and Associates **state that I have undertaken this assessment in accordance with the guidelines made and approved by the NSW Environment Protection Authority.** | |
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# PRELIMINARY CONTAMINATED LAND ASSESSMENT

## PROPOSED WILDLIFE HOSPITAL

## LOT 237 DP 755745,

## 46 Lindendale Road, Wollongbar

| | |
|---|---|
| For: | Northern Rivers Wildlife Hospital |
| Report no: | 21242_sepp55 4_amendment.docx |
| Date: | July 2021 |

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| Project name | Proposed Northern Rivers Wildlife Hospital |
| Reference | 21242_sepp55 4_amendment.docx |
| Revision Summary | B – including proposed educational facility |

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# EXECUTIVE SUMMARY

Greg Alderson and Associates have been commissioned by the Northern Rivers Wildlife Hospital to undertake a preliminary contaminated land assessment at Lot 237 DP 755745, 46 Lindendale Road, Wollongbar.

As required under Clause 7 of SEPP 55, this assessment was conducted to determine if the building envelope around the former dwelling that is proposed to be converted to a wildlife hospital was contaminated from past or present land uses. Soil testing was undertaken around the building envelope and its curtilage (being the investigation area for this assessment) to determine if it is suitable for the proposed use. Staff of this office inspected the site on the 18/11/2020 and 26/5/2021 as part of the assessment of any potential contamination. The initial investigation was undertaken for the proposed development application, however subsequently a planning proposal has been lodged for the use of the subject site as a veterinary hospital, hence further investigation has been undertaken for a proposed future use area for education and training. The original report has been amended to provide information for both of the assessments.

To determine if any contamination was present on the site, a preliminary soil contamination assessment (Tier 1) was undertaken in accordance with NEPM 1999 (2013), DUAP and EPA (1998) and NSW EPA (1995) at the proposed development location. As the objective was to determine whether the proposed development area is contaminated, it was considered that a systematic sampling pattern be undertaken to determine the presence of possible chemical contamination in this area, in accordance with NSW EPA (1995) and Council's Contaminated Land Policy.

Six composite soil samples were collected in the investigation area. Samples were analysed for heavy metals (including arsenic, lead, zinc and copper), organochlorines (including DDT and aldrin/dieldrin) and organophosphorus, which were considered to be the most likely chemicals used on an agricultural property or associated with past buildings, cattle dip (as one located nearby) or plantations that may have been on the site as it has been part of an agricultural research station for over 100 years. The sampling results were compared to adjusted Health Investigation Limits (HIL) from NEPM 1999 (2013) and concentrations of all tested contaminants were below the relevant HILs.

Based on the known history of the site, inspection of the site and sampling regime, it is concluded that further soil contamination assessment is not required in the investigation area. NSW EPA (1995) & NEPM 1999 (2013) state that if the contaminant concentration of the site is below a threshold limit and there is no indication that further investigation is required, the site can be considered as uncontaminated and this is considered to be the case on this site.

# 1. INTRODUCTION

Greg Alderson and Associates have been commissioned by Northern Rivers Wildlife Hospital to undertake a preliminary contaminated land assessment at Lot 237 DP 755745, 46 Lindendale Road, Wollongbar. This assessment is required to determine that the subject site is suitable for the change of use from the existing dwelling to a proposed wildlife hospital and also encompasses a proposed information and education facility at the site.

This report is an addendum to the initial assessment that was undertaken for the change of use Development Application for the wildlife hospital in an existing dwelling. However, as Council have advised that an amendment to the Ballina LEP 1987 is required to allow for the use of the site as a veterinary hospital as well as the information and education facility, additional assessment has been undertaken for this area and has been included in this report.

As required under Clause 7 of SEPP 55, this assessment was conducted to determine if the investigation area was contaminated from past or present land uses. The site was assessed for contamination in accordance with the requirements of the National Environmental Protection Measure 1999 (2013) (NEPM).

The existing building and its curtilage were classed as the investigation area for this assessment and is shown in **Exhibit No. 2**.

# 2. SCOPE OF WORK

This investigation is Tier 1 - preliminary site investigation, which is required to determine if contamination of the investigation areas soil has occurred from past land usage in accordance with NEPM 1999 (2013), DUAP and EPA (1998). The investigation includes obtaining a history of land usage on the site and a preliminary soil-sampling regime. The results of the soil sample analysis are compared with the Health Investigation Levels (HIL's) outlined in NEPM 1999 (2013) and have been adjusted for composite soil sampling. If the sample results are above the relevant HIL a detailed investigation will be required in accordance with NEPM 1999 (2013) & NSW EPA (2000) which would include the ecological investigation levels and Groundwater investigation levels.

The relevant guidelines used for the investigation are as follows:

- NSW EPA (1995) Contaminated Sites – Sampling Design Guidelines;
- National Environmental Protection Measure 1999 (2013);
- Northern Rivers Regional Councils *Regional Policy for the Management of Contaminated Land* (2006);
- NSW EPA (2020) *Consultants reporting on contaminated land guidelines*

Soil sampling methodology used in this investigation included:

- Soil analysis tests were undertaken to determine the presence of heavy metals, organochlorines and organophosphorus;
- All soil sampling was undertaken by Wendy Attrill (BAppSc) of this office, using composite soil sampling of the investigation area's topsoil at intervals of a maximum 20m;
- All samples were collected using a hand auger, placed in a plastic bag and delivered to Richmond

Water Laboratories (RWL) who undertook analysis for the investigation for heavy metals and subcontracted to Envirolab for analysis of OrganoChlorines(OCs) and OrganoPhosphorus (OPs);
- All results from RWL were sent to this office for the completion of this report;
- Results were compared with NEPM 1999 (2013) HIL's according to 'residential A' sensitivity (conservative given the proposed use of the site);
- The site was assessed in accordance with the Tier 1 requirements of NEPM 1999 (2013);
- The report is written in accordance with NSW EPA (2020) *Consultants reporting on contaminated land guidelines*

# 3. SITE CHARACTERISTICS

## 3.1. Site Identification

The site is identified as Lot 237 DP *755745*, 46 Lindendale Road, Wollongbar. Access to Lindendale Road is via the Bruxner Highway. The land is designated as a deferred matter from Ballina LEP 2012, and is zoned 7(c) Environmental Protection (Water Catchment) under the provisions of Ballina LEP 1987.

## 3.2. Investigation area

The planning proposal applies to part of Lot 237 DP *755745*, 46 Lindendale Road, Wollongbar (Figure 1). The subject land, which is part of the planning proposal and also the investigation area, has an area of approximately 2.123ha and is part of the larger 106.4ha Wollongbar Primary Industries Institute site, owned by the NSW Government. The main buildings associated with the research station is located to the west of the investigation area. The investigation area consists of a former dwelling located to the west of Lindendale Road and the paddock to the south west continuing to an internal access road to the south. The centre of the structure, which will be modified to convert it to a wildlife hospital, is located at GDA 94 MGA 56 E538960 N6812156. The subject site in its locality is presented in Exhibit No. 1.

## 3.3. Topography and Drainage

The investigation area has a gentle gradient with a southerly aspect. There are no distinctive drainage channels, with stormwater having general overland flow to the table drains along Lindedale Road. There is only a relatively small catchment above the investigation area therefore the site would receive a small volume of stormwater run-off from the areas above.

There are no open surface water bodies, such as dams, creeks or gullies within 100 m of the site.

## 3.4. Hydrogeology

Land Insight Resources provided details for the hydrogeology and groundwater bores as part of the due diligence assessment. In general, there are no groundwater bores within 100 m of the investigation area. The mapping below also shows that the site is within an environmentally sensitive zone in regards to spills from underground petroleum storage systems, however, the majority of Ballina LGA is also mapped as sensitive zone.

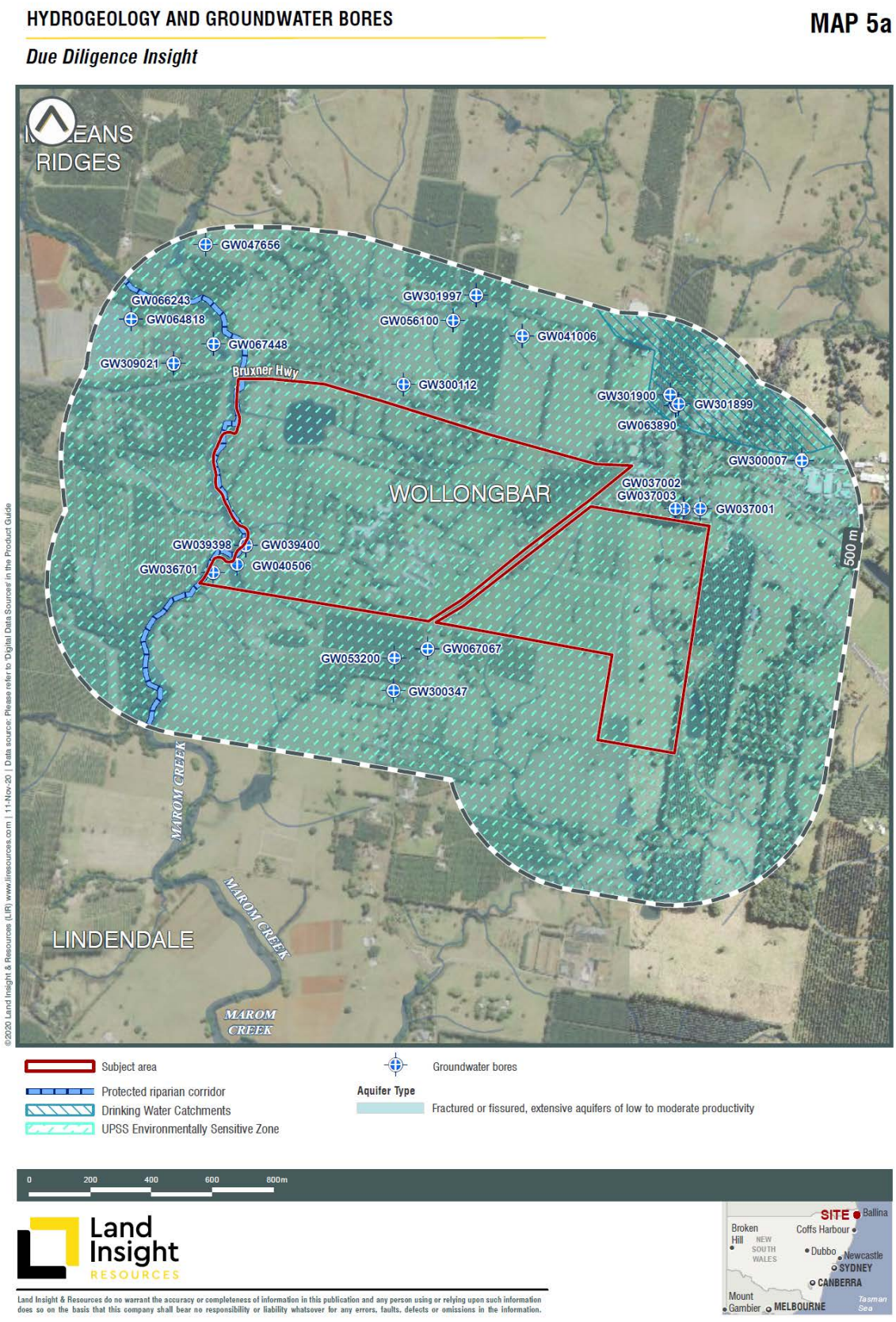


**Figure 1: Groundwater Bores (Land Insight Resources, 2020)**

The site is also with the hydrogeological Tertiary Basalt aquifer (fractured rock).

## 3.5. Geology And Soil

The soils of the site were generally clay loams. The soil is within the Wollongbar Residual Soil Landscape according to Soil Landscape Series Sheet Lismore –Ballina (Morand, 1994) and would be classified as Krasnozems according to the Great Soil Group Classification. Morand (1994) describes the Wollongbar Residual Soil Landscape as follows:

Soil Landscape: Residual Wollongbar Landscape

Soils: Deep (>200cm) well-drained Krasnozems with shallower (80-150cm), stonier Krasnozems on crest/ upper slope boundaries. Wet alluvial Krasnozems in drainage lines.

Geology: Lamington Volcanics consisting of the Lismore Tertiary Basalts, with bole and minor agglomerate

Some limitations associated with this type of soil include:

Can have high acidity which will inhibit plants from using nitrogen and phosphorous nutrients to their full potential, and will increase the risks of aluminium toxicity as more aluminium is available at a lower pH.High permeability.

If chemicals were used on the site, due to the soil texture and structure, the contaminants would be remaining in the upper layers, typically 0-150 mm for arsenic and 0-75 mm for dieldrin.

As stated in Schedule B1 of NEPM 1999 (2013), HIL's are generic to all soil types and so will not require a textural classification for determining investigation Levels. It is understood soil texture is applicable for determining Environmental Investigation Levels (EIL's) and Environmental Screening Levels (ESL's), however EIL's and ESL's are not calculated for the subject site as there are no environmentally sensitive locations at risk in or adjacent to the investigation area. The default values for aged EILs are provided.

## 3.6. Contaminated Land record and Record of Notices

Land Insight Resources have provided a plan as part of the due diligence assessment for sites that were licensed under the protection of the Environment Operations Act, sites that are listed on the contaminated land register (EPA Notifications) and potential contaminated sites. The information presents that the nearest potential contaminating site is the former Wollongbar Cattle Dip site, located to the south of the investigation area, and the service station on the corner of Lindendale Road and the Bruxner Highway.

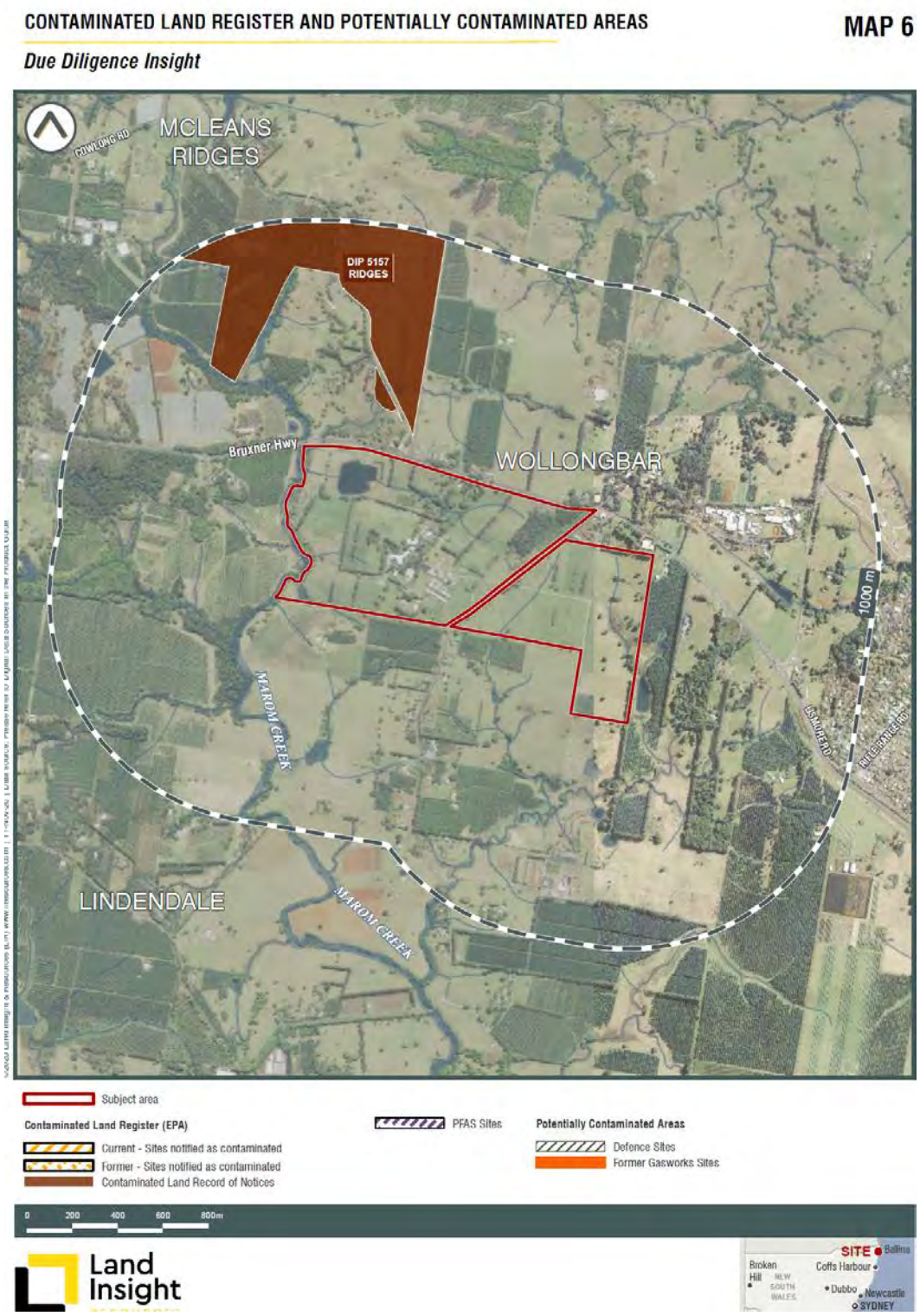


Figure 2: Contaminated Land Record (Land Insight Resources, 2020)


Figure 3: POEO Licenses (Land Insight Resources, 2020)

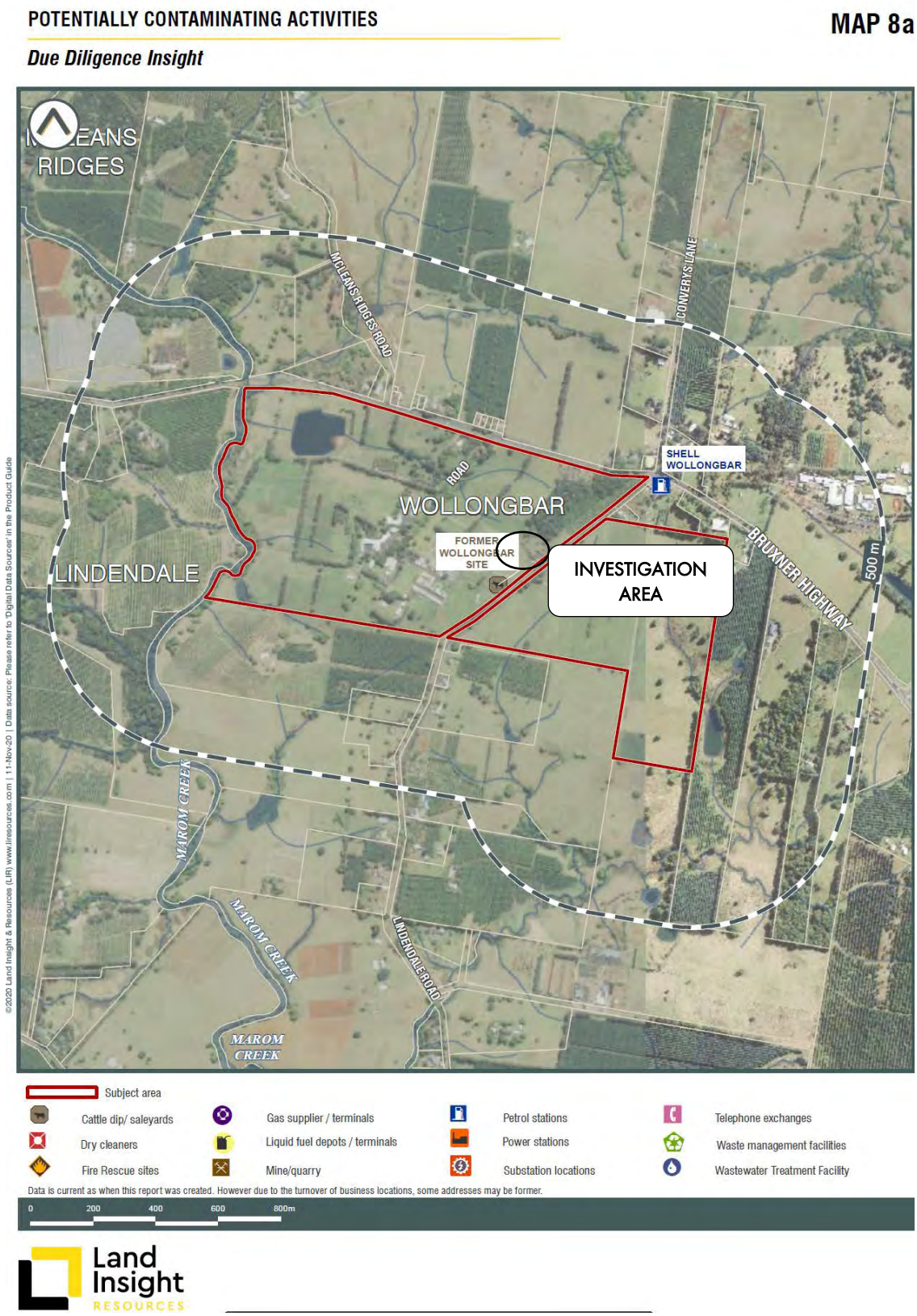


Figure 4: POEO Licenses (Land Insight Resources, 2020)

# 4. HISTORY OF SITE

The subject site has been part of the research station as shown in the topographical map in Figure 1. Figure 1 presents the locations of buildings within the research station, some which represent the existing dwelling and shed. The Wollongbar Dip is shown to the south of the laneway to the south of the site. This dip has since been decommissioned and capped.

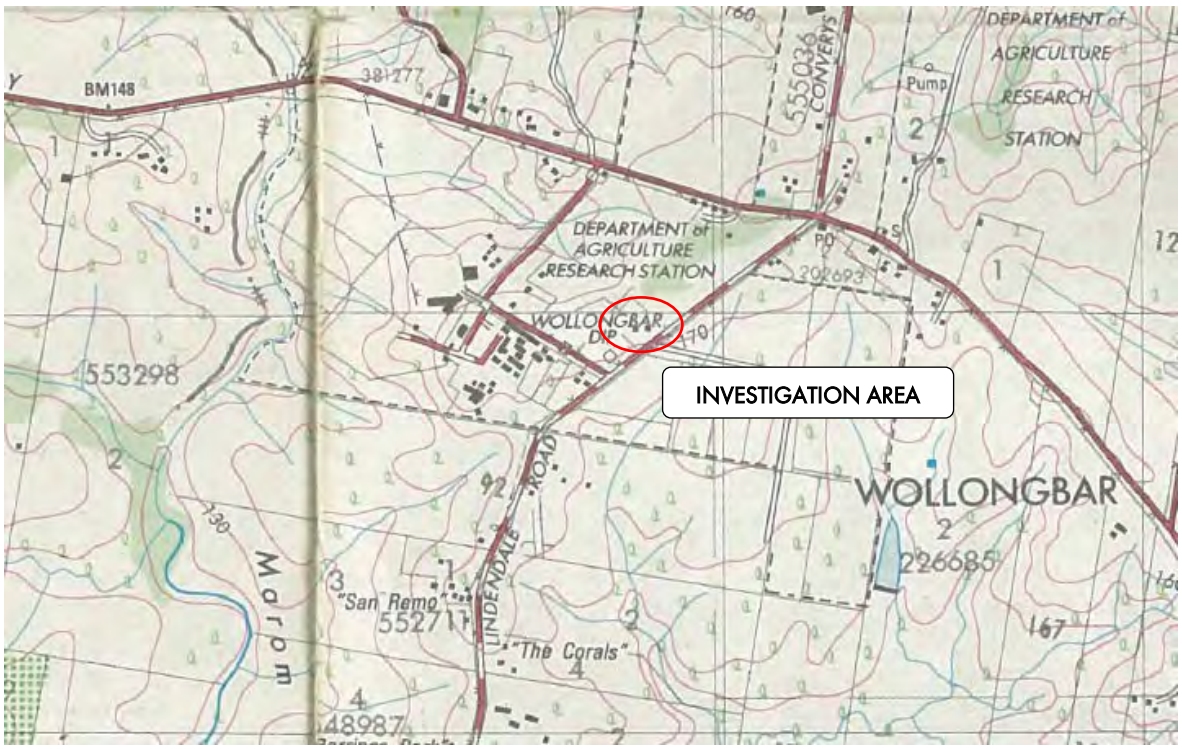


**Figure 5: Lismore Topographic Map extract 1986**

Historical images were sourced from the NSW Historical Imagery Viewer found within the Spatial Collaboration Portal. Aerial images sourced for the years 1958 **(Figure 6)**1971 (**Figure 7**), 1987 (**Figure 9**) and 1997 (**Figure 10**) were viewed for evidence of land uses and potentially contaminating acitivities. It can be seen from reviewing these aerial images that the investigation area has been used for cattle grazing and cropping in the area to the south of the dwelling, since at least 1958. The dwelling is first observed in the 1979 imagery.

A 2010 aerial image extract was also sourced from Google Earth (**Figure 11**) which also shows the investigation area being used for the existing dwelling.

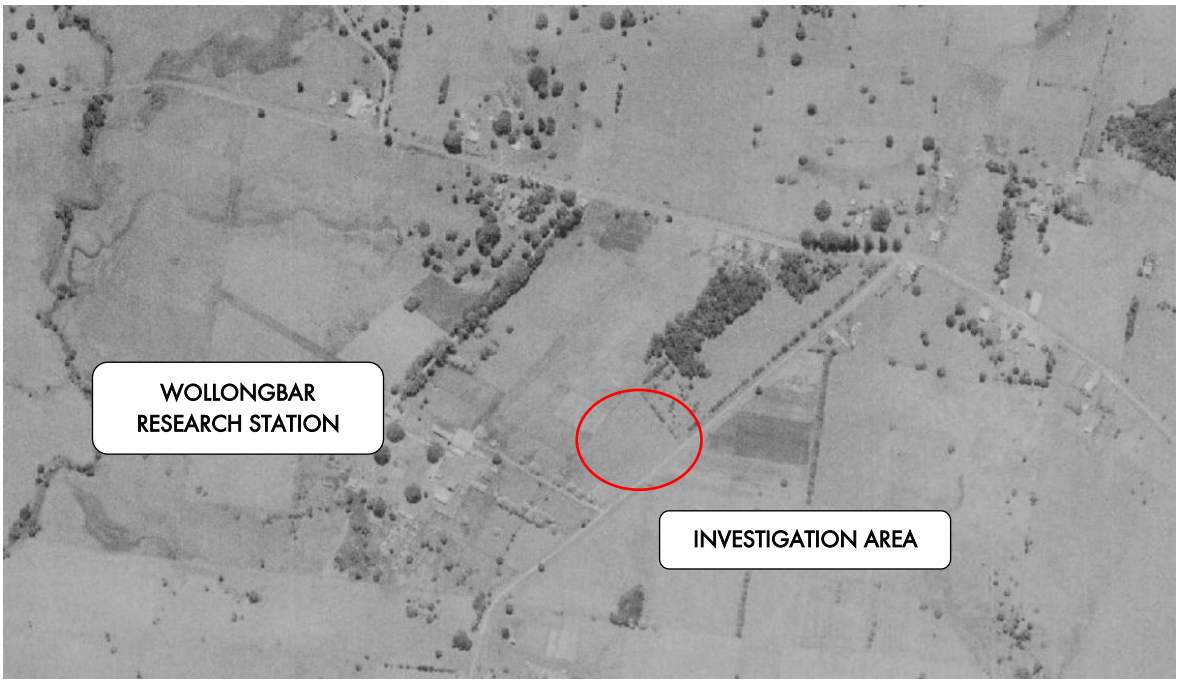


Figure 6:1958 Historical aerial image (Source: NSW Spatial Collaboration Portal, 2020).

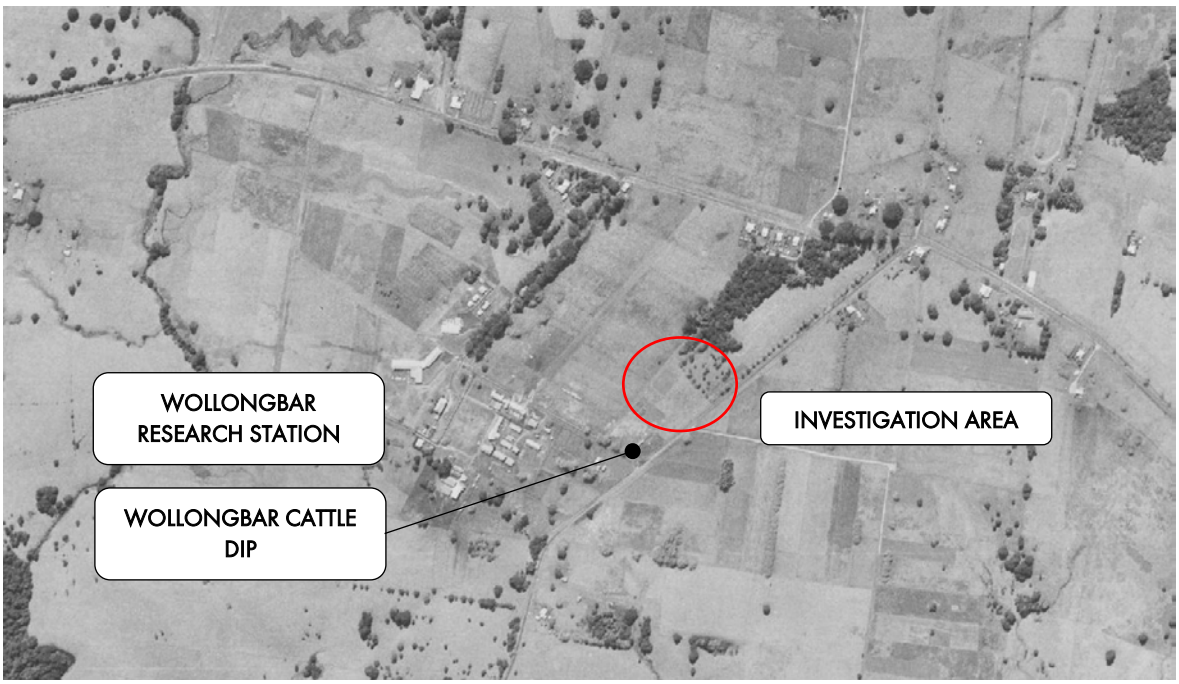


Figure 7: 1971Historical aerial image (Source: NSW Spatial Collaboration Portal, 2020).

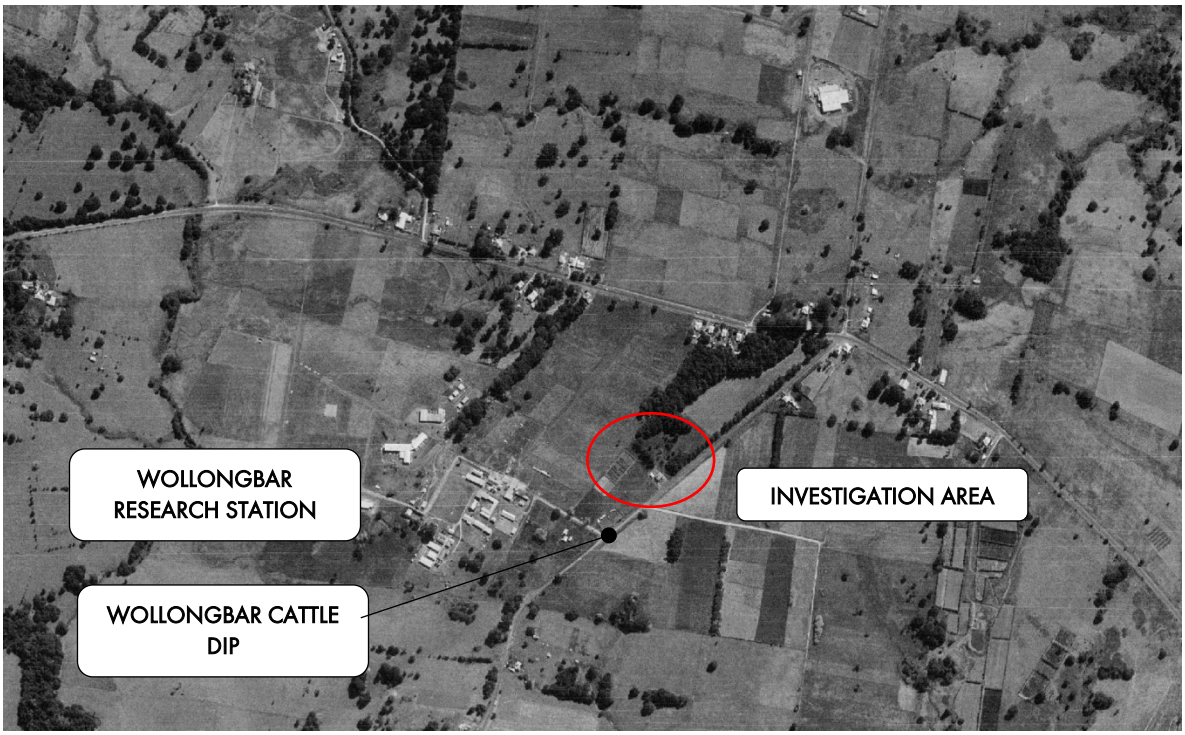


Figure 8: 1979Historical aerial image (Source: NSW Spatial Collaboration Portal, 2020).

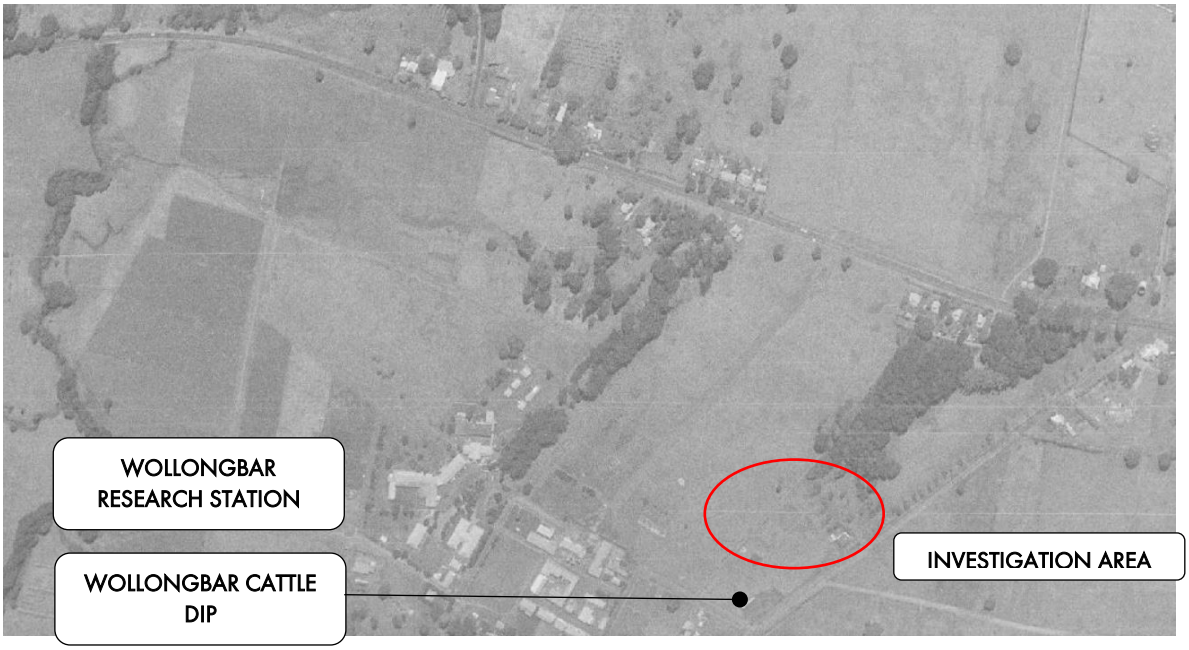


Figure 9: 1987 Historical aerial image (Source: NSW Spatial Collaboration Portal, 2020).

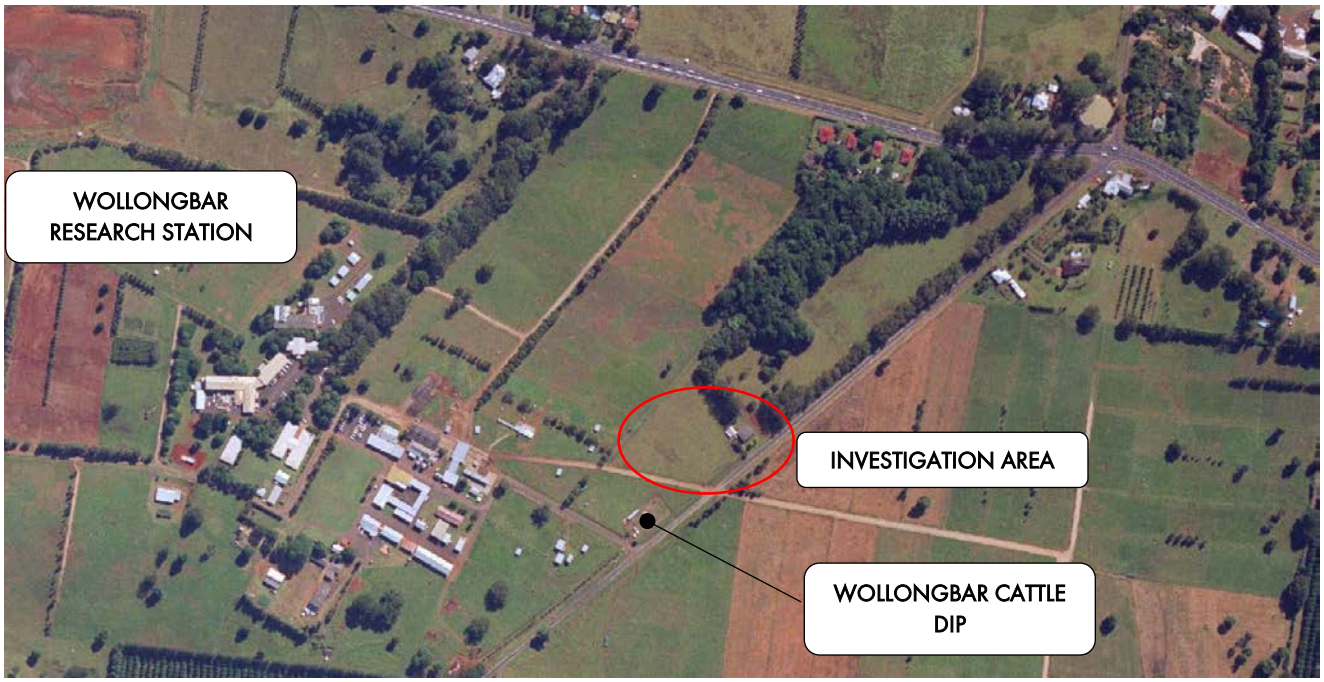


Figure 10: 1997 Historical aerial image (Source: NSW Spatial Collaboration Portal, 2020).


Figure 11: 2010 Google Earth image.

# 5. SITE CONDITION AND SURROUNDING ENVIRONMENT

## 5.1. Site Investigation

Staff of this office investigated the subject site, which is accessed from Lindendale Road. Two site investigations have been undertaken, initially on the 18th November 2020 and 26th may 2021. The investigation area consisted of the existing dwelling location, its curtilage where the proposed change of use from dwelling to Wildlife Hospital is proposed, and the latter investigation being within the proposed future education and training facility is proposed. The investigations also included a general inspection of the surrounding area and land uses was also made.

## 5.2. General Site Condition

The location of the existing dwelling is adjacent to Lindendale Road on the lower slope of the site below an area of regenerated forest. There are pecans located upslope from the existing dwelling. The western portion of the site is adjacent the access road which leads to the main facility of the Wollongbar Department of Primary Industries, and consists of an open paddock which has been under cropping/pasture over the years.

To the south west of the site access lane is a former cattle dip know as Wollongbar Dip site, which is noted not to have been remediated hence it is presumed to be remaining as a contaminated site.

The property extends to the east across Lindendale Road and is currently cropped, and it appears to have been cropped for many years, however this is outside the investigation area.

There is a petrol service station located at the corner of Lindendale and the Bruxner Highway, however, spatial separation of this from the investigation area would deem that the site would not be impacted from spills from the petrol station.

## 5.3. Signs of Contamination

The site was investigated in order to determine any physical signs of contamination, such as drums, waste, fill material, odours, plant stress or soil staining or bare patches. No obvious signs of past or present contamination and contaminating activities were evident in the investigation area.

It is noted however, that the building itself is most likely to contain asbestos, and therefore any building work must be in accordance with Workcover and Ballina Council requirements. No fragments of fibro cement were observed on the ground and therefore no investigation was undertaken.


**Photograph 1: Plate adjacent to front door of the building**

## 5.4. Wollongbar Dip Site

The investigation area is relatively close to a former cattle dip site, located about 106 m to the south. The dip site, known as Wollongbar dip is decommissioned, meaning that all the standing structures, shed, fencing and roof have been dismantled. The bath itself, if present, is emptied of all chemical fluid and may have contaminated timbers from the roof and draining pen put into it and then is capped with concrete lids. The bath may have already been demolished prior to decommissioning in which case it is usually smashed and buried. An information plaque is attached to one of the concrete lids to indicate its Departmental file number, dip name and direction of the dipping. Clean soil may be spread around the bath to run flush with the bath edge and then grassed. The draining pen concrete floor is usually left intact so as not to disturb the possibly contaminated soil (NSW DPI).

The chemical register for the dip site is as follows:

| Chemicals used in dip bath | Date first used |
|---|---|
| Arsenic | 7/53 |
| DDT | 12/57 |
| Dioxathion | 8/62 |
| Ethion | 10/65 |
| Ethion Chlordimeform | 7/71 |
| Ethion | 9/71 |
| Ethion Chlordimeform | 9/73 |
| Amitraz | 1/77 |

DDT: Organochlorine

Dioxathion: Organophosphate

Ethion: Organophosphate

Promacyl: Carbamate pesticide

Flumethrin: Pyrethroid insecticide

The distribution of contaminants around the dip bath were usually found in the following areas based on Guidelines for the Assessment and Cleanup of Cattle Tick Dip Sites for Residential Purposes 1996:

- Adjacent to bath, both in yard and externally (splash area);
- Adjacent to the crush and
- Disposal pit and scooping mound.

NSW Agriculture (1996) states that at sites where the slope away from the dip bath exceeds 5 degrees the contamination can extend down the hill for about 30 m from the dip bath. Furthermore, Department of Agriculture (1996) states that the residues are generally contained within the top 500 mm of soil in undisturbed areas and away from the splash areas. In splash areas the penetration into the soil could be further.

# 6. CONCEPTUAL SITE MODEL

From the known land use of the site, obtained from the desk top assessment, a preliminary conceptual site model (CSM) was developed to identify the potential contamination sources, the exposure pathways of these sources and the likely receptors of contamination associated with the land uses activities in the investigation area. The following provides a summary of the CSM.

## 6.1. Potential Contamination Sources

As determined above, the closes contamination source to the site is the former Wollongbar Cattle Dip which was dosed with chemicals including arsenic, OPs and OCs.

The dwelling is also a potential source of contamination, even though the structure is brick veneer, there are painted timber frames which may have been painted with lead based paint and other structures are painted. The use of lead based paint was still occurring when the building was constructed, albeit in a reduced capacity, at one stage paints contained up to 60% lead, the amount was reduced to 1% in 1969 and to 0.1% in December 1997 (Australian Government, 2009).

The area to the south of the building has been used for pastures and appears to have been cropped. It is possible that pesticides and herbicides may have been used in this area.

## 6.2. Potential Chemicals of Concern

- The chemical use of the Wollongbar Cattle Dip has been obtained, being:
    - arsenic
    - DDT: Organochlorine
    - Dioxathion: Organophosphate
    - Ethion: Organophosphate
    - Promacyl: Carbamate pesticide
    - Flumethrin: Pyrethroid insecticide
- The use of chemicals for termite control such as OCs and arsenic around the dwelling
- Asbestos in dwelling
- Potential heavy metal (copper) and pesticide or herbicide use in the cropping area OCs/Ops

## 6.3. Potential Receptors

The most likely potential receptors to the areas are:

- Current workers at the site
- Construction workers during site redevelopment
- Future staff and visitors to the Northern Rivers Wildlife Hospital and educational/training facility

## 6.4. Potential Exposure Pathways

The potential exposure pathways to the potential contamination are from contact with the soul, through either ingestion of dust/fibres and dermal contact.

The recommended management action is as follows:

Asbestos in building – undertake a hazardus buildings material survey prior to undertaken alterations/additions to the dwelling

If contaminants are found in soil – reduce risk through remediation or management of site (ie ensure no access to areas by children if remediation not possible, identify contaminated areas)

# 7. DATA QUALITY OBJECTIVES

In accordance with the requirements of NEPM 1999 (2013P the Data Quality Objectives is a seven step iterative planning approach that is used to define the type, quantity and quality of data needed to inform decisions relating to the environmental condition of a site.

## 7.1. Step 1: State the problem

The objective of the investigation is to ensure that the site will be suitable for the proposed use for an Wildlife Hospital (within the existing building, limited access to outside areas) and education facility which will have areas that will be readily accessible to people. The assessment is being undertaken on behalf of a not for profit organization.

## 7.2. Step 2: Identify the decision/goal of the study

A conceptual site model was prepared which has determined the potential contamination at the site and identified risk pathways.

The goal of the assessment is to determine a number of points being:

- if there is adequate spatial separation from the cattle dip site to ensure that the change of use in the investigation area is suitable, or if remediation will be required or if the site cannot be remediated to a level suitable for the proposed use
- Is there residue contamination from agricultural activities at the site within the soil that may prevent the change of use at the site

Asbestos has been identified within the building, and this will require the appropriate licensed personnel to remove any asbestos and dispose of at a landfill capable of receiving the waste.

Based on the contaminants of concern, the most likely receptor will be people using the site once it is developed, and having access to the soil within the education facility locations, which would be general walking/sitting on grassed areas. There is a low risk of groundwater, surface water contamination and low risk of contamination in service trenches.

## 7.3. Step 3: Identify the information inputs

It is determined that soil sampling is required as a preliminary assessment to determine if contamination is present. Sampling of groundwater is considered not to be required.

It is proposed that sampling be undertaken in the investigation area, using Table A of NSW EPA (1995) as an initial assessment.

## 7.4. Step 4: Define the boundaries of the study

The investigation area involves only the change of use area of the subject allotment, to be considered only for the Northern Rivers Wildlife Hospital and the ancillary education/information centre. This involves sampling of the readily accessible soil. It is understood that the existing buildings will remain and will be refurbished therefore a destructive investigation (ie sampling below buildings) is not required.

## 7.5. Step 5: Develop the analytical approach

Although the development is on a large parcel of land, only the investigation area was assessed and in accordance with the Regional Contaminated Land Policy a minimum area of10000 $m^2$ was assessed, which requires 21 point samples to be taken in accordance with NSW EPA (1995). A total of 24 samples were collected from the site. The samples were collected in systematic pattern, however, with specific attention around the existing dwelling and yard area of the house, and within the open paddock area. Samples were not collected more than 20 m apart.

Due to the sites soil type and geology, it was considered that only the topsoils of the soil profile require sampling due to arsenic and aldrin/dieldrin being commonly found within the first 150mm of soil (NSW EPA, 1997).

The samples were then taken to the laboratory who derived composite samples from 4 samples within each set. The composite samples were then anaysed.

In the event of there being high levels of contaminants found in a composite sample, further soil testing will be carried out to pin point contaminant locations and levels by analysing the sub samples forming the composite sample.

## 7.6. Step 6: Specify performance or acceptance criteria

Due to the known & unknown agricultural use & setting of the investigation area, soil sampling was undertaken for heavy metals and chemicals that were commonly used in fertilisers, pesticides, herbicides, dip formulas and with old building materials. These include pesticides and herbicides that contained heavy metals such as arsenic that is known to have been used in the cattle dip site and potentially used around the dwelling for termite control. Organochlorines (OC's) (DDT) and organophosphates (OPs) were also used in the dip site, and possibly may have been used for termite protection around the dwelling and hence were investigated. It was considered that if any of these contaminants were found, further analysis may be triggered for these contaminants and other suites.

Due to the use of a composite sampling technique, the acceptable limit outlined in Table 1A(1) of NEPM 1999 (2013) had to be adjusted by dividing the acceptable limit by the number of subsoil samples per composite (Table 2), which in this case is four. The adjustable acceptable limit, which is a very conservative approach, was used to determine the presence of hotspots, based on the worst-case scenario of presuming one sample has a high concentration while the remaining sub-samples all have zero concentration. If results from the composites taken from the site were above the adjusted acceptable limit, then all subsoils of the failed composite will be analysed individually.

Table 1 - NEPM 1999 (2013) HIL Acceptable Limits for Residential A.

| Contaminant | NEPM HIL Acceptable Limit (mg/kg) | Adjusted NEPM HIL Acceptable Limit for 4 subsamples (mg/kg) |
|---|---|---|
| Arsenic | 100 | 25 |
| Lead | 300 | 75 |
| Cadmium | 20 | 5 |

| | | |
|---|---|---|
| Copper | 6000 | 1500 |
| Zinc | 7400 | 1850 |
| DDT-DDE-DDD | 240 | 60 |
| Aldrin/Dieldrin | 6 | 1.5 |

Metals can be naturally occurring within a soil profile; these background levels are shown below (Table3).

**Table 2 - Background Ranges for Potential Contaminants**

| Pollutant | Background Range (mg/kg) |
|---|---|
| Arsenic | <15 |
| Lead | <25 |
| Cadmium | <1 |
| Copper | 10-30 |
| Zinc | 50-200 |

Source: Greg Alderson and Associates

NSW EPA (1995) & NEPM 1999 (2013) state that if the contaminant concentration of the site is below a threshold limit, the site can be considered as uncontaminated.

The results of the soil sample analysis are compared with the Health Investigation Levels (HILs) set out in Table 1A(1) of NEPM 1999 (2013) under Residential A.

The Ecological Investigation Levels (EILs) are compared with the National Environment Protection (Assessment of Site Contamination) Measure when assessing a contaminated site. NEPM 1999 (2013) states that the EILs are numerical limits that are designed to protect soil and terrestrial flora and fauna (including pets and wildlife) and soil microbial processes from experiencing substantial deleterious effects caused by contaminants. Ecological Investigation Levels are the ecological equivalents of the investigation levels that aim to protect human health (HILs) and groundwater (GILs). Measured concentrations of contaminants in the soil at a site are compared to the appropriate EILs and if they exceed the EILs then further investigation in the form of an ecological risk assessment that conforms to Schedule B5a (NEPC, 2011) should be conducted.

The EILs in Table 3 are based on the limit for 'aged' contaminant given that the contaminants of interest would have been present for two years or more. The default values for each contaminant were used in the NEPC 2011 EIL calculation spreadsheet.

**Table 3 - NEPM 1999 (2013) EIL Urban Residential**

| Contaminant | NEPM EIL Aged (mg/kg) |
|---|---|
| Arsenic | 100 |
| Lead | 1100 |
| Cadmium | 20 |
| Copper | 230 |

| | |
|---|---|
| Zinc | 770 |
| DDT | 180 |

Note – whole values only

## 7.7. Step 7: Develop the plan for obtaining data

The plan for obtaining data was developed through knowledge of past history, gaps in past history, knowledge of nearby contaminating sources and development of a surface soil sampling plan which meets the minimum requirements of NSW EPA (1995) using a systematic sampling pattern.

# 8. SAMPLING METHODOLOGY

Two site inspections were undertaken, initially for the change of use of the dwelling to the wildlife hospital on the 18th November 2020 and within the area proposed for future use as an educational facility on the 26th May 2021.

## 8.1. Sampling and Analysis Quality Plan (SAQP)

Soil sampling was undertaken on two dates, with targeting the surface soils only (-150 mm) as part of the preliminary assessment. The number of soil samples collected over the two sampling dates met the target being above the required number for the size of the investigation area compared with Table A NSW EPA (1995).

Sampling was undertaken using a hand auger, with grass, organic matter and rock removed from the soil before collecting in low density polyethylene ziplock bags.

A total of six composite soil samples were collected and analysed, over the proposed development site, as described below.

**Composite 1:** Consisting of sample points 1A, 1B, 1C, 1D. These samples were located as follows:

**1a**: Collected 0.5m off the south-easter corner wall of the building
**1b**: Collected at the corner of the dwelling
**1c**: Next to the timber deck
**1d:** Adjacent to the concrete path in the rear yard

**Composite 2:** Consisting of sample points 2A, 2B, 2C, 2D. These samples were located as follows:

**2a**: Collected 2 m from the power pole
**2b**: Adjacent concrete slab rear of house
**2c**: 0.5 m from garden tap, rear of shed
**2d:** 5.5 m in front of lean-to on garage in driveway

**Composite 3:** Consisting of sample points 3A, 3B, 3C, 3D. These samples were located as follows:

In a transect

**3a**: Western corner of paddock area
**3b**: 20 m north of 3a
**3c**: 20 m north of 3b
**3d:** 20 m north of 3c

**Composite 4:** Consisting of sample points 4A, 4B, 4C, 4D. These samples were located as follows:

In a transect continuing from composite 3

**4a**: 20 m north of 3d
**4b**: 20 m north of 4a
**4c**: 20 m east of 4b
**4d:** 20 m south of 4c

**Composite 5:** Consisting of sample points 5A, 5B, 5C, 5D. These samples were located as follows:

In a transect continuing from composite 4

**5a**: 20 m south of 4d
**5b**: 20 m south of 5a
**5c**: 20 m south of 5b
**5d:** 20 m east of 5c

**Composite 6:** Consisting of sample points 6A, 6B, 6C, 6D. These samples were located as follows:

In a transect continuing from composite 5

**6a**: 20 m north of 5d
**6b**: 20 m north of 6a
**6c**: 20 m east of 6b
**6d:** 20 m south of 6c

**Exhibit No.2** presents the soil sample location.

The use of composite sampling is considered appropriate for this site given the following:

- Known history indicated contamination was unlikely as the building was constructed from brick with some timber;
- Spatially separated from the former cattle dip site;
- Laboratory mixes composite samples (not done in field); and
- Although NEPM 1999 (2013) section 6.2.6 states that composite samples is not suitable for the assessment of semi volatile substances such as OC/OP pesticides, however it is considered that the use of composite samples is a cost effective measure to determine of OC/OP are on the site, and if so, individual samples that the laboratory retains would then be analysed for OC/OPs

## 8.2. Data Control

No duplicates were collected as part of the assessment. However, comparison of the samples can be observed from the four composite samples within the paddock which were expected to provide similar results.

Adirect chain of custody was kept (see attached) and Laboratory quality assurance/quality checking was obtained.

Samples collected by this office were collected using a hand auger, placed in plastic bags and sealed prior to placing in an esky. All samples were transported by staff of this office to the Richmond Water Laboratories (RWL) the same day of collection. The RWL made the composite samples from the sub-samples provided and subcontracted organochlorines and organophosphorus analysis to Envirolab. The RWL analysed the soil samples for heavy metals. Laboratory QA/QC are attached to this report, with the chain of custody from this office.

# 9. RESULTS

A site plan is provided in **Exhibit No. 2**, presenting soil test locations. Table 4 presents a summary of the soil analysis results from the composite soil samples collected by this office. The full copies of the analysis results are also attached to this report in Appendix B.

Table 4 - Summary of composite soil sample analysis results.

| Parameter | Composite 1 (mg/kg) | Composite 2 (mg/kg) | Composite 3 (mg/kg) | Composite 4 (mg/kg) | Composite 5 (mg/kg) | Composite 6 (mg/kg) |
|---|---|---|---|---|---|---|
| OC/OP in soil | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Arsenic | 10 | 8 | 8 | 6 | 7 | 10 |
| Cadmium | <1 | <1 | <1 | <1 | <1 | <1 |
| Copper | 14 | 17 | 10 | 9 | 10 | 11 |
| Lead | 30 | 43 | 8 | 10 | 11 | 6 |
| Zinc | 146 | 181 | 91 | 73 | 79 | 73 |

NB – **Red bold** indicates above acceptable NEPM HIL A

## 9.1. Interpretation of Results

The results of the soil analysis are compared with the HILs set out in Table 1A(1) of NEPM 1999 (2013) under Residential A, using 'adjusted acceptable levels'. OP's or OC's were not detected in recordable concentrations within the soil samples, while all heavy metals were found lower than the adjusted HIL's. The concentration of lead within the two composites is elevated when compared to results that this office typically observes in locations that have not had a previous land use where lead may have been used, which is observed in comparison to the four composite samples from the open paddock. It is most likely that due to the age of the building (constructed between 1971 – 1979), some of the building is most likely to have been painted with lead based paints. Zinc is also elevated in composite 1 and 2 when compared to that of the composites from the paddock (composites 3 to 6). Arsenic concentration was well below the HIL and no significant difference between the 6 composite samples. No OCs/OPs were detected in any of the composite samples. Both arsenic and OCs/Ops are known to have been used in the nearby former cattle dip site, and the lack of elevated results in the investigation area presents that there is not contamination from the dipsite within the investigation area.

Based on the sampling results there are no triggers to undertake further assessment. No statistical anslysis is required due to all results being below the HILs and EILs.

# 10. Site Characterisation

## 10.1. Lead

The lead levels are below the HIL, but elevated above background levels, but due to the age of the structure are likely from the use of lead based paint used on some of the timber parts of the building.

As shown in Table 5 at one stage paints contained up to 60% lead, the amount was reduced to 1% in 1969 and to 0.1% in December 1997 (Australian Government, 2009).

Table 5: Compounds of Lead in Paint

| Name | Purpose | Years in Use |
|---|---|---|

| | | |
|---|---|---|
| Lead carbonate also known as 'white lead' | primary component (40%) for white paint | 1800s to 1960s |
| Calcium orthoplumbate | white pigment | 1960s |
| Lead orthoplumbate and lead monoxide | red/ and orange pigment, used as primers (60%). | Until 1980s |
| lead sulpha chromate, molybdate lead chromates | colour pigments | Until 1980s |

Source: Australian Government (2009)

Lead accumulates in soil from the weathering of lead based paint from flaking and peeling, or being removed during renovations, such as scraping or sandblasting.

Lead is strongly bound to soil by ion exchange and specific adsorption, hence lead will generally not move (leach) through the soil profile.

## 10.2. Asbestos

It is most likely that the building contains asbestos. Depending on the volume (ie above 10 $m^2$) the asbestos would require removing by a suitably experienced and qualified contractor, and at any volume, the asbestos will need to be disposed of at an appropriately licensed landfill that can receive asbestos (ie Tweed). Asbestos may also be present in other building materials in the structure, such as flooring underlays.

All work relating to removal of any asbestos will be required to be in accordance Work Cover requirements and compliance with legal requirements:

- Work involving bonded asbestos removal (of an area of more than 10 square metres) or friable asbestos removal must be undertaken by a person who carries on a business of such removal work in accordance with a licence under clause 318 of the Occupational Health and Safety Regulation 2001,
- the applicant must provide Council or the principal certifying authority with a copy of a signed contract with such a person before any demolition work commences,
- any such contract must indicate whether any bonded asbestos material or friable asbestos material will be removed, and if so, must specify the landfill site (that may lawfully receive asbestos to which the bonded asbestos material or friable asbestos material is to be delivered,
- if the contract indicates that bonded asbestos material or friable asbestos material will be removed to a specified landfill site, the applicant must give Council or the principal certifying authority a copy of a receipt from the operator of the landfill site stating that all the asbestos material referred to in the contract has been received by the operator.
- The applicant must give at least 2 days' notice in writing of the intention to commence the works to the owner or occupier of each dwelling that is situated within 20m of the lot on which the works will be carried out.
- The notice must state that the works may include the removal of asbestos and, if it does, it will be carried out by a licensed person in accordance with the requirements of the Occupational Health and Safety Regulations.
- A Clearance Certificate must be provided to the Principal Certifying Authority after clean up of asbestos is complete, which is to include landfill receipts
- Regulatory requirements to be followed are:
    - Occupational Health and Safety Act 2000;
    - Occupational Health and Safety Regulation 2001;
    - Code of Practice for the Safe Removal of Asbestos [NOHSC: 2002 (1998)] and

- Guide to the Control of Asbestos Hazards in Buildings and Structures [NOHSC: 3002 (1998)
- Schedule B1, sections 4 and 5, and Schedule B2, section 11 of NEPM 1999 . This guidance has been developed with regard to the *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*, published by the Western Australia Department of Health in May 2009.

# 11. CONCLUSION

A preliminary contaminated soil investigation was undertaken in the proposed development area of Lot 237 DP *755745*, Lindendale Road, Wollongbar. The purpose of this assessment was to determine if the location for the proposed wildlife hospital is suitable for the use and whether it has been contaminated from past land use. As part of the assessment under SEPP 55, to ensure that the investigation area has not been contaminated, soil testing was undertaken in six transects which included soil samples from within the dwelling envelope which is subject to a change of use to a wildlife hospital, and within an area that is currently a paddock which has a proposed future use of an education and training facility.

Samples were analysed for heavy metals (including arsenic, lead and copper), organochlorines (including DDT, aldrin/Dieldrin and endosulfan) and organophosphorus, which were considered to be the most likely chemicals to cause contamination at the site due to past agricultural use, cattle dips and buildings in and adjacent to the investigation area.

The sampling results were compared with the HILs set out in Table 1A(1) of NEPM (1999) under Residential A, using 'adjusted acceptable levels'. All soil contaminant concentration results were below the relevant HILs. Sample results were also below the aged EIL values.

Based on the known history of the site, inspection of the site and sampling regime, it is concluded that further soil contamination assessment is not required in the proposed development area. NSW EPA (1995) and NEPM 1999 (2013) state that if the contaminant concentration of the site is below a threshold limit, the investigation area can be considered as uncontaminated, and this is considered to be the case on this site.

This assessment has been undertaken in accordance with NEPM 1999 (2013). If rubbish or other indicators of contamination are found on the site that has not been addressed under this assessment, this office is to be notified.

# 12. REFERENCES

Australian and New Zealand Environment and Conservation Council and National Health and Medical Research Council (1992).*Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites*.

Department of Urban Affairs and Planning and the Environment Protection Authority (1998).*Managing Land Contamination, Planning Guidelines SEPP 55 – Remediation of Land*.

Morand, D.T. (1994). *Soil Landscapes of the Lismore-Ballina 1:100,000 Sheet* Report, Soil Conservation Service of NSW, Sydney.

National Environment Protection (Assessment of Site Contamination) Measure 1999 (revised 2013).

NSW EPA (2020). *Consultants reporting on contaminated land. Contaminated land guidelines.* NSW EPA Sydney South

NSW DEC (2017). *Contaminated Sites – Guidelines for the NSW Site Auditor Scheme*. NSW EPA Sydney South

NSW EPA (1995). *Contaminated Sites – Sampling Design Guidelines*.NSW EPA Chatswood.

# Summary of Experience and Qualifications.

Greg Alderson & Associates have been reporting on contaminated land since 1998 and are experienced in Tiers 1-4 assessments as described in NEPM 1999 (2013).

Greg Alderson and Associates have the following qualifications relevant to reporting on contaminated land:

- Bachelor of Applied Science - Conservation Technology
- Bachelor of Environmental Science - Natural Resource Management
- Bachelor of Engineering - Civil
- Bachelor of Engineering - Environmental.

Further qualifications & training our staff have include:

- Contaminated land training courses hosted by Environmental Health Australia,
- Competencies in RTC2701A Follow OHS procedures, RTC3705A Transport, handle and store chemicals,
- White card.

Greg Alderson and Associates have a wide range of experience and worked on a number of varied projects, which include:

- Petrochemical rehabilitation;
- Analysis and Rehabilitation of dipsites;
- Assessment & remediation of former banana plantations;
- Review of remediation plan for gas works site;
- Assessment & remediation of contamination caused from lead-based paints in residential settings;
- Assessment of general agricultural sites.

Greg Alderson and Associates has the following Public Liability Insurance:

**Agent:** CGU Insurance Ltd

**Policy Number:** 15T2402648

**Expiry Date:** 23/2/2022

Greg Alderson and Associates has the following Professional Indemnity Insurance:

**Agent:** Solution Underwriting Agency Pty Ltd

**Policy Number:** 9009711PIN

**Expiry Date:** 4/03/2021

# CHAIN OF CUSTODY

# CHAIN OF CUSTODY FORM

Sheet 1 of 1

**INVESTIGATOR:**
**GREG ALDERSON AND ASSOCIATES**
ABN 58 594 160 789
43 Main Street, Clunes NSW 2480
Ph: 02 6629 1552
E-mail:
office@aldersonassociates.com.au
**Contact:**
Wendy Attrill

**SITE:** 21242

**COURIER:**
Greg Alderson & Associates

**LABORATORIES:** RICHMOND WATER LABORATORY

**Contact:** Allison Hawthorne

| Sample ID | Date of Collection | Container: Plastic Bag | Container: Plastic Bottle | Container: Glass Bottle | Sample Matrix: Soil | Sample Matrix: Soil Composite | Sample Matrix: Water | Sample Matrix: Other | Sample Preservation: Esky | Sample Preservation: Esky & Ice | Sample Preservation: Other | Laboratory Analysis Required |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1a | 18/11/20 | ✓ | | | ✓ | | | | ✓ | | | mix to form COMPOSITE 1 |
| 1b | ✓ | ✓ | | | ✓ | | | | ✓ | | | heavy metals, OCs, OPs |
| 1c | ✓ | ✓ | | | ✓ | | | | ✓ | | | |
| 1d | ✓ | ✓ | | | ✓ | | | | ✓ | | | |
| 2a | ✓ | ✓ | | | ✓ | | | | ✓ | | | mix to form COMPOSITE 2 |
| 2b | ✓ | ✓ | | | ✓ | | | | ✓ | | | heavy metals, OCs, OPs |
| 2c | ✓ | ✓ | | | ✓ | | | | ✓ | | | |
| 2d | ✓ | ✓ | | | ✓ | | | | | | | |
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**Investigator:** I attest that the proper field sampling procedures were used during the collection of these sample/s.

**Signed:** Wendy Attrill

**Sampler Name** (print): Wendy Attrill

**Date:** 18/11/20

**Hazardous:** Y ☐ N ☑

**Comment:**

| | | | | | |
|---|---|---|---|---|---|
| Relinquished by: Wendy Attrill | Date: 18/11/20 | Time: 13.45 | Received by: Barbara Nelson | Date: 18/11/20 | Time: 13:45 |
| Relinquished by: Barbara Nelson | Date: 18/11/20 | Time: 2:25pm | Received by: | Date: 18/11/20 | Time: 14.25 |

# CHAIN OF CUSTODY FORM

Sheet 1 of 1

**INVESTIGATOR:**
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E-mail:
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**Contact:**
Wendy Attrill

**SITE:** 21242

**COURIER:**
Greg Alderson & Associates

**LABORATORIES:** RICHMOND WATER LABORATORY

**Contact:** ~~Allison Hawthorne~~ Veronica Bennett

| Sample ID | Date of Collection | Container: Plastic Bag | Container: Plastic Bottle | Container: Glass Bottle | Sample Matrix: Soil | Sample Matrix: Soil Composite | Sample Matrix: Water | Sample Matrix: Other | Sample Preservation: Esky | Sample Preservation: Esky & Ice | Sample Preservation: Other | Laboratory Analysis Required |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3a – 3d | 26/5/21 | ✓ | | | ✓ | | | | ✓ | | | mix to form COMPOSITE 3 heavy metals, OPs, OCs |
| 4a – 4d | ✓ | ✓ | | | ✓ | | | | ✓ | | | ✓ ✓ 4 ✓ - - |
| 5a – 5d | ✓ | ✓ | | | ✓ | | | | ✓ | | | ✓ ✓ 5 ✓ ✓ ✓ |
| 6a – 6d | ✓ | ✓ | | | ✓ | | | | ✓ | | | ✓ ✓ 6 ✓ ✓ ✓ |

**Investigator:** I attest that the proper field sampling procedures were used during the collection of these sample/s.
**Signed:** Wendy Attrill

**Sampler Name** (print): Wendy Attrill
**Date:** 26/5/21

**Hazardous:** Y ☐ N ☑
Comment:

| | | | |
|---|---|---|---|
| Relinquished by: Wendy Attrill | Date: 27/5/21 | Time: 8.40a | Received by: WFN |
| Relinquished by: | Date: | Time: | Received by: |

Date: 27/5
Time: 8.40

# CHAIN OF CUSTODY FORM

Sheet 1 of 1

**INVESTIGATOR:**
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**Contact:**
Wendy Attrill

**SITE:** 04005

**COURIER:**
Greg Alderson & Associates

**LABORATORIES:** RICHMOND WATER LABORATORY

**Contact:** Allison Hawthorne

| Sample ID | Date of Collection | Container: Plastic Bag | Container: Plastic Bottle | Container: Glass Bottle | Sample Matrix: Soil | Sample Matrix: Soil Composite | Sample Matrix: Water | Sample Matrix: Other | Sample Preservation: Esky | Sample Preservation: Esky & Ice | Sample Preservation: Other | Laboratory Analysis Required |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Art | 26/5/21 | | ✓ | | | | ✓ | | ✓ | | | Heavy metals, pH, $BOD^5$, TDS, EC, TSS, Nitrogen TK |
| Photo | " | | ✓ | | | | ✓ | | ✓ | | | " |
| Science | " | | ✓ | | | | ✓ | | ✓ | | | " |
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**Investigator:** I attest that the proper field sampling procedures were used during the collection of these sample/s.
**Signed:** D Brooks

**Sampler Name** (print): Dylan Brooks
**Date:** 26/5/21

**Hazardous:** Y ☐ N ☒
Comment:

| | | | | | |
|---|---|---|---|---|---|
| Relinquished by: D Brooks | Date: 26/5 | Time: 12:35 | Received by: [illegible] | Date: 26/5/21 | Time: 12.35 |
| Relinquished by: W Attrill | Date: 27/5 | Time: 8.40am | Received by: [illegible] | Date: 27/5/21 | Time: 8.40 |

# CHAIN OF CUSTODY FORM

*Sheet ____ of ____*


**INVESTIGATOR:**
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**Contact:**
Wendy Attrill


**SITE:**

**COURIER:**
Greg Alderson & Associates

**LABORATORIES:** RICHMOND WATER LABORATORY

**Contact:** Allison Hawthorne

| Sample ID | Date of Collection | Container | | | Sample Matrix | | | | Sample Preservation | | | Laboratory Analysis Required |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Plastic Bag | Plastic Bottle | Glass Bottle | Soil | Soil Composite | Water | Other | Esky | Esky & Ice | Other | |
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**Investigator:** I attest that the proper field sampling procedures were used during the collection of these sample/s.
**Signed:**

**Sampler Name** (print):

**Date:**

**Hazardous:** Y☐ N☐

Comment:

| Relinquished by: | Date: | Time: | Received by: | Date: | Time: |
|---|---|---|---|---|---|
| Relinquished by: | Date: | Time: | Received by: | Date: | Time: |

# LABORATORY ANALYSIS RESULTS

Richmond Water Laboratories
Environmental Analysis - Water Sampling - Data Management
NATA No: 14914

# Certificate Of Analysis

**Client:** Greg Alderson & Associates
**Address:** 43 Main St
Clunes NSW 2480
**Contact:** Stuart Edwards
**Sampled by:** Wendy Attrill
**Subcontract Laboratory:** Envirolab (NATA 2901)
**Subcontract Reference:** 256253

Final report

GAA Soil - 21242

**Report no:** 20/1781
**Date received:** 18/11/2020
**Testing commenced:** 18/11/2020
**Date reported:** 1/12/2020
**No. of samples:** 2
**Revision no:** 00

***Analysis results apply to samples as received.***

| Sample No.: / Sample description: / Date sampled: / Time sampled: | Unit | Method | LOR | 20/1781-1 21242 - Composite 1 18/11/2020 | 20/1781-2 21242 - Composite 2 18/11/2020 |
|---|---|---|---|---|---|
| OC/OP in soil* | mg/kg | Envirolab | 0.1 | [ND] | [ND] |
| OC/OP QC Recovery | % | Envirolab | 1 | 113 | 113 |
| Arsenic - soil | mg/kg | APHA3120B | 5 | 10 | 8 |
| Cadmium - soil | mg/kg | APHA3120B | 1 | <1 | <1 |
| Copper - soil | mg/kg | APHA3120B | 1 | 14 | 17 |
| Lead - soil | mg/kg | APHA3120B | 1 | 30 | 43 |
| Zinc - soil | mg/kg | APHA3120B | 1 | 146 | 181 |
| Arsenic -QC Recovery | % | APHA3120B | 1 | 107 | 107 |
| Cadmium - QC Recovery | % | APHA3120B | 1 | 100 | 100 |
| Copper - QC recovery | % | APHA3120B | 1 | 102 | 102 |
| Lead - QC recovery | % | APHA3120B | 1 | 92 | 92 |
| Zinc -QC recovery | % | APHA3120B | 1 | 88 | 88 |


Level 2, 218-232 Molesworth St, Lismore NSW 2480 Telephone: 02 6623 3888

# Certificate Of Analysis

**Client:** Greg Alderson & Associates **Report no:** 20/1781

End of results

General comments: This report must not be reproduced except in full. This report relates to items tested as specified herein.
Samples tested between date received and date reported. Accredited for compliance with ISO/IEC 17025 - Testing
# NATA accreditation does not cover the performance of this service.Tests marked with * are subcontracted.
LOR denotes 'Limit of Reporting' < denotes less than; > denotes greater than; ND denotes 'not detected'
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards

Specific comments:

V. Barnett
Laboratory Analyst
Approved Authoriser


Level 2, 218-232 Molesworth St, Lismore NSW 2480 Telephone: 02 6623 3888

Richmond Water Laboratories
Environmental Analysis - Water Sampling - Data Management
NATA No: 14914

# Certificate Of Analysis

**Client:** Greg Alderson & Associates
**Address:** 43 Main St
Clunes NSW 2480
**Contact:** Stuart Edwards
**Sampled by:** Wendy Attrill
**Subcontract Laboratory:** Envirolab (NATA 2901)
**Subcontract Reference:** 270219

Final report

GAA Soil - 21242

***Analysis results apply to samples as received.***

**Report no:** 21/0743
**Date received:** 27/05/2021
**Testing commenced:** 27/05/2021
**Date reported:** 8/06/2021
**No. of samples:** 4
**Revision no:** 00

| Sample No.: / Sample description: / Date sampled: / Time sampled: | Unit | LOR | 21/0743-1 Composite 3 27/05/2021 | 21/0743-2 Composite 4 27/05/2021 | 21/0743-3 Composite 5 27/05/2021 | 21/0743-4 Composite 6 27/05/2021 |
|---|---|---|---|---|---|---|
| OC/OP in soil* | mg/kg | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| OC/OP QC Recovery | % | 1 | 114 | 113 | 114 | 109 |
| Arsenic - soil | mg/kg | 5 | 8 | 6 | 7 | 10 |
| Cadmium - soil | mg/kg | 1 | <1 | <1 | <1 | <1 |
| Copper - soil | mg/kg | 1 | 10 | 9 | 10 | 11 |
| Lead - soil | mg/kg | 1 | 8 | 10 | 11 | 6 |
| Zinc - soil | mg/kg | 1 | 91 | 73 | 79 | 73 |
| Arsenic -QC Recovery | % | 1 | 101 | 101 | 101 | 101 |
| QC As - AB Duplicate RPD% | % | | 0 | [NT] | [NT] | [NT] |
| QC As - AB Spike Recovery% | % | | 69 | [NT] | [NT] | [NT] |
| Cadmium - QC Recovery | % | 1 | 99 | 99 | 99 | 99 |
| QC Cd - AB Duplicate RPD% | % | | 0 | [NT] | [NT] | [NT] |
| QC Cd - AB Spike Recovery% | % | | 94 | [NT] | [NT] | [NT] |
| Copper - QC recovery | % | 1 | 105 | 105 | 105 | 105 |


Level 2, 218-232 Molesworth St, Lismore NSW 2480 Telephone: 02 6623 3888

# Certificate Of Analysis

**Client:** Greg Alderson & Associates **Report no:** 21/0743

| Sample No.: / Sample description: / Date sampled: / Time sampled: | Unit | LOR | 21/0743-1 Composite 3 27/05/2021 | 21/0743-2 Composite 4 27/05/2021 | 21/0743-3 Composite 5 27/05/2021 | 21/0743-4 Composite 6 27/05/2021 |
|---|---|---|---|---|---|---|
| QC Cu - AB Duplicate RPD% | % | | 1 | [NT] | [NT] | [NT] |
| QC Cu - AB Spike Recovery% | % | | 111 | [NT] | [NT] | [NT] |
| Lead - QC recovery | % | 1 | 89 | 89 | 89 | 89 |
| QC Pb - AB Duplicate RPD% | % | | 3 | [NT] | [NT] | [NT] |
| QC Pb - AB Spike Recovery% | % | | 75 | [NT] | [NT] | [NT] |
| Zinc -QC recovery | % | 1 | 85 | 85 | 85 | 85 |
| QC Zn - AB Duplicate RPD% | % | | 0 | [NT] | [NT] | [NT] |
| QC Zn - AB Spike Recovery% | % | | 85 | [NT] | [NT] | [NT] |

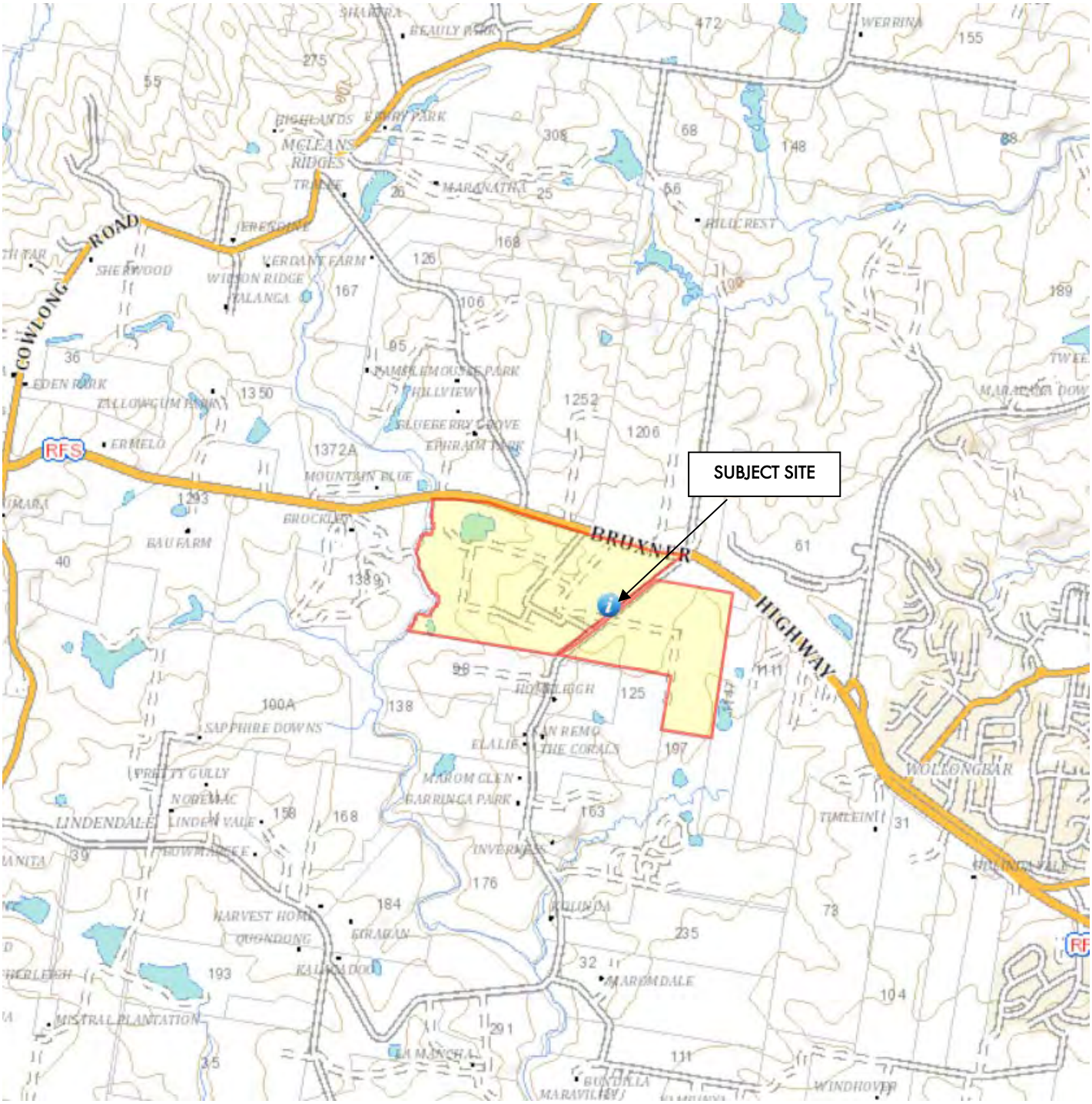
End of results

General comments: This report must not be reproduced except in full. This report relates to items tested as specified herein.
Samples tested between date received and date reported. Accredited for compliance with ISO/IEC 17025 - Testing
# NATA accreditation does not cover the performance of this service.Tests marked with * are subcontracted.
LOR denotes 'Limit of Reporting' < denotes less than; > denotes greater than; ND denotes 'not detected'
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards

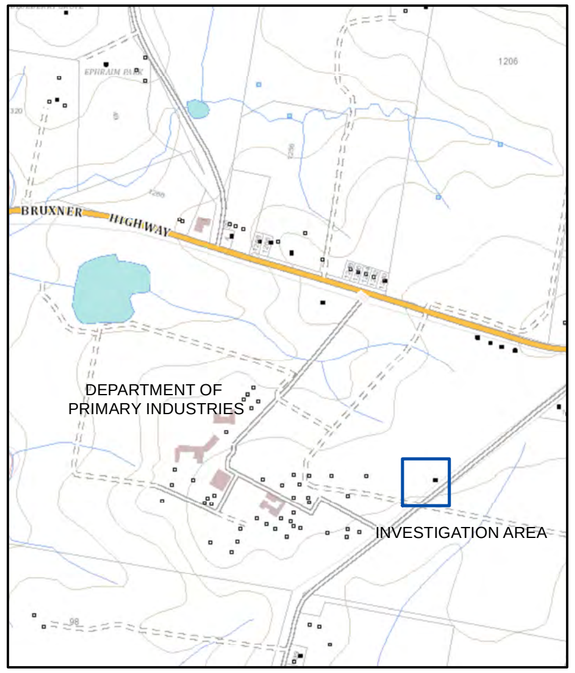
Specific comments: Soils are air dried and ground to a fine powder.
Metals are extracted with $HNO_3$ and HCl and digested at $105^0$C then analysed by ICP/OES.

M Window
Laboratory Analyst
Approved Authoriser


Level 2, 218-232 Molesworth St, Lismore NSW 2480 Telephone: 02 6623 3888




| | | |
|---|---|---|
| Source: NSW LPI Spatial Information Exchange (2020)<br>Date: 24/02/21<br>Project No. 21242_sepp55 4_amendment.docx<br>Scale: NTS | **GREG ALDERSON AND ASSOCIATES**<br>**ABN 58 594 160 789**<br>43 Main Street Clunes NSW 2480<br>Phone: (02) 6629 1552<br>Email: office@aldersonassociates.com.au | **Exhibit No. 1.**<br>**SITE LOCATION**<br>Lot 237 DP 755745, Lindendale Road, Wollongbar |


1:10,000

SITE LOCALITY

| Name | Easting | Northing |
|---|---|---|
| 21242-1A | 538958.8 | 6812143 |
| 21242-1B | 538969.2 | 6812152 |
| 21242-1C | 538966.9 | 6812167 |
| 21242-1D | 538951.4 | 6812158 |
| 21242-2A | 538971.2 | 6812181 |
| 21242-2C | 538941.3 | 6812163 |
| 21242-2D | 538949 | 6812147 |
| 21242-2B | 538951.4 | 6812173 |
| 3a | 538834.7 | 6812130 |
| 3b | 538846.7 | 6812144 |
| 3c | 538860.4 | 6812162 |
| 3d | 538873.1 | 6812175 |
| 4a | 538885.1 | 6812189 |
| 4b | 538896.5 | 6812201 |
| 4c | 538913.9 | 6812188 |
| 4d | 538900.9 | 6812174 |
| 5a | 538887.1 | 6812161 |
| 5b | 538872.3 | 6812147 |
| 5c | 538860.6 | 6812131 |
| 5d | 538878 | 6812125 |
| 6a | 538894.7 | 6812142 |
| 6b | 538907.1 | 6812157 |
| 6c | 538918.8 | 6812142 |
| 6d | 538909 | 6812124 |

SOIL SAMPLES

Boundaries are shown approximate only

N



SCALE 1:500

0 65 130 260 390 520 Metres

DRAWN WAA

Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse MercatorDatum:GDA 1994

CLIENT
Northern Rivers Wildlife Hospital

SITE ADDRESS
Lot 237 DP 755745
Lindendale Road, Wollongbar

Document Name: 21242_sepp55plan

SOURCE
Service Layer Credits: © Department of Customer Service 2020

JOB NUMBER
21242

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DRAWING TITLE:
SOIL SAMPLING LOCATIONS

EXHIBIT NO.: 2
DATE 8-7-21
PROJECT
REVISION 1 - additional samples

PROPOSED WILDLIFE HOSPITAL

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Roads
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Wind Bracing & Tie Down
Framing
Retaining Walls

House Plan Drafting
BASIX Certificates

## Environmental

Contaminated Land (SEPP 55)
Acoustics & Noise
Wastewater
Acid Sulfate Soil
Water Quality
Ecology