



Greg Alderson & Associates

Chartered Professional Engineers and Scientists

Preliminary Contaminated Land Assessment 'Super Lot 5'

Proposed subdivision at
Lot 54 DP 1222919, Hutley Drive, Lennox Head

For: Clarence Property Corporation Ltd
Report No: 16174_sepp55_super_lot_5.docx
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ATTACHMENTS

- Exhibit No. 1 – Site locality plan
- Exhibit No. 2 – Sample locations
- Exhibit No. 3 – Site Conceptual model

EXECUTIVE SUMMARY

Greg Alderson and Associates have been commissioned by Clarence Property Corporation Ltd to undertake a preliminary contaminated land assessment at part of Lot 54 DP 1222919, Hutley Drive, Lennox Head, known as Super Lot 5. This assessment is required to determine that the investigation area is suitable for the proposed residential subdivision.

As required under Section 7 of SEPP 55, this assessment was conducted to determine if the site was contaminated from past or present land uses. A review of the sites history and soil testing was undertaken to assist in determining if contamination was present.

Staff of this office inspected the site as part of the assessment of any potential contamination. Due to the gaps in the known history of 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. Soil sampling occurred over the entire lot (known as super lot 5), as this area will be the most sensitive following the proposed development.

Five 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 organophosphorous, which were considered to be the most likely chemicals used on an agricultural/horticultural property or associated with buildings. The sampling results were compared to adjusted Health Investigation Limits (HIL's) from NEPM 1999 (2013).

The results showed all potential contaminants investigated were below the relevant HIL's.

Based on the known history of the site, inspection of the site and sampling regime, it is concluded that further assessment of contamination is not required in the investigation area. Sampling was limited to potential contamination based on probably land uses and involved surface samples of the fill only.

1. INTRODUCTION

Greg Alderson and Associates have been commissioned by Clarence Property Corporation Ltd to undertake a preliminary contaminated land assessment at Lot 54 DP 1222919, Hutley Drive, Lennox Head, in the area known as the "Super Lot 5" section. Contaminated land assessments for parts of

the remaining allotment have been undertaken for the overall subdivision for the rezoning and development applications.

As required under Section 7 of SEPP 55, this assessment was conducted to determine if the site and particularly the development area was contaminated from past or present land uses. Soil testing was undertaken in the proposed development location. The site was assessed for contamination in accordance with the requirements of the National Environmental Protection Measure 1999 (2013) (NEPM).

2. SCOPE OF WORK

This investigation is Tier 1 - preliminary site investigation, which is required to determine if contamination of the site's 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).

The relevant guidelines used for the investigation are as follows:

- Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (1992);
- National Environmental Protection Measure 1999 (2013);
- Northern Rivers Regional Councils *Regional Policy for the Management of Contaminated Land* (2006);
- NSW OEH (2011) *Guidelines for Consultants Reporting Contaminated Sites*.
- NSW EPA (1995) *Contaminated Sites Sampling Design Guidelines*.

Soil sampling methodology used in this investigation included:

- Soil analysis tests were undertaken to determine the presence of heavy metals, organochlorines and organophosphorous;
- All soil sampling was undertaken by Wendy Attrill (BAppSc) and Sandra Norris (BAppSc) of this office, using composite soil sampling of the sites 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 HIL's according to 'residential A' sensitivity;
- The site was assessed in accordance with the Tier 1 requirements of NEPM 1999 (2013);
- The report is written in accordance with the relevant chapters of NSW EPA (2000) *Guidelines for Consultants Reporting Contaminates Sites*.

3. SITE IDENTIFICATION

The site is formally known as Lot 54 DP 1222919, Lennox Head. The investigation area consists of the proposed residential area, located to the east of the existing ponds and towards the southern boundary of the lot.

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The subject site in its locality is presented in Figure 1 and Figure 2.

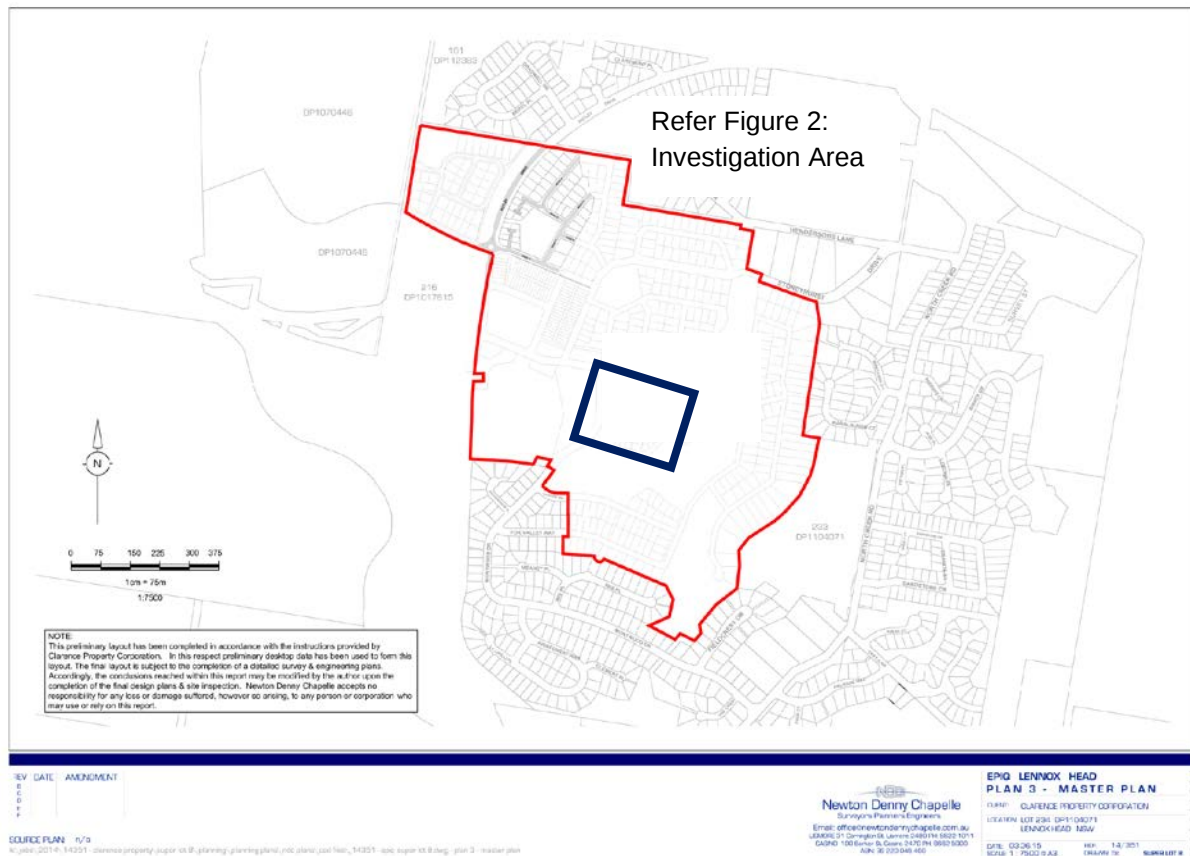


Figure 1: Approved Rezoning Development

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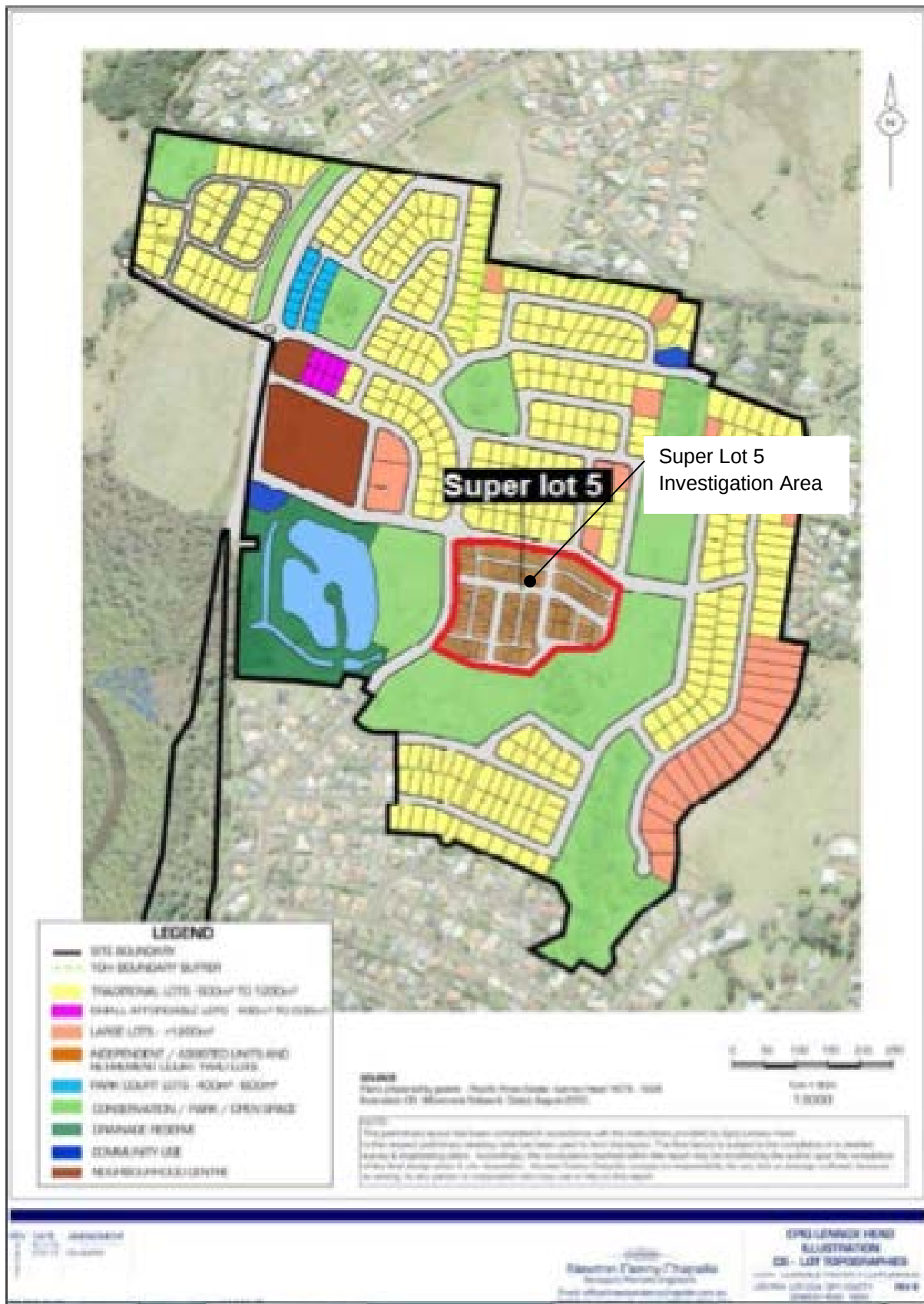


Figure 2: Proposed Super Lot 5

4. HISTORY OF SITE

The investigation area is now part of Lot 54 DP 1222919. Previously the property was part of the following titles:

- Lot 217 in DP 1017615 (registered 18/9/2000)
- Lot 175 in DP 851707 (registered 4/8/1995)
- Lot 127 in DP 828137 (registered 5/2/1993)

A previous Preliminary Site Investigation was undertaken by Ardill Payne and Partners for Lots 215, 216 and 217 DP 1017615 in 2003 for a proposed residential subdivision (reference 5028 Pacific Pines 5028 BO-GC05 contamination.doc). The investigation by Ardill Payne and Partners included a site land use history assessment by the then current owner, the Pidcocks, who had held the property for a period of at least 30 years, progressively buying portions of land from 1973, 1977 and 1979. Ardill Payne and Partners (2003) state that the land was used for cattle grazing at that time, including dairying previous to when the property was first purchased. The Ardill Payne and Partners (2003) report states that the owners of the site had not used fertilisers or horticultural sprays during their ownership nor was the site used for horticultural activities.

Aerial photography from 1958 and 1967 was used to establish potential land usage in the area of investigation. The historic aerial photographs were purchased from Land Property Information and excerpts are presented in Figure 3 and Figure 4. The aerial photography presents that part of the overall property had been used for agricultural activities at some stage with cropping being undertaken over the 1958-1967 period. Buildings were also observed in the aerial photographs to the north of the cropping area. These areas were subject to a previous investigation, and contamination was not found. The aerial photographs did not present that there were previous contaminating land activities in the subject investigation area of Super Lot 5. However, the photographs do present that the investigation area consisted of several drainage lines and now the site has been filled.

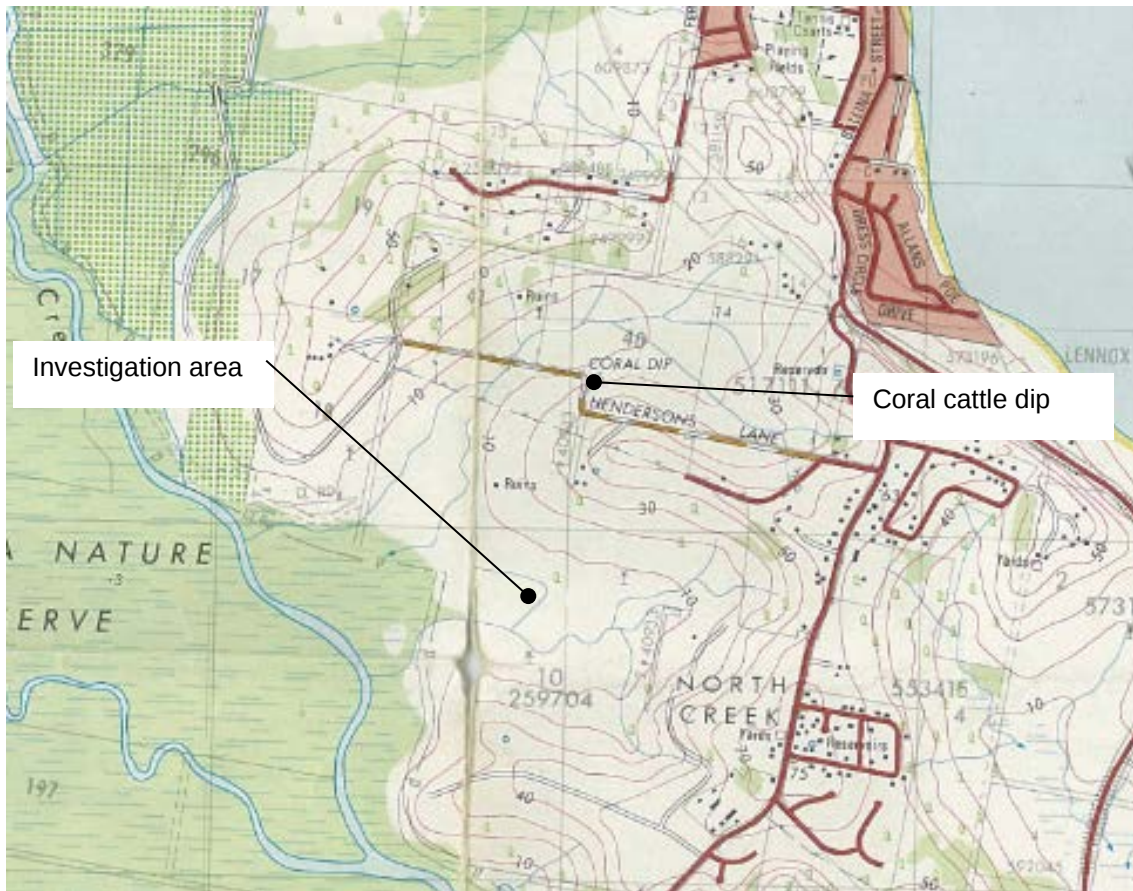


Figure 3: Ballina topographic map extract (CMA 1986)

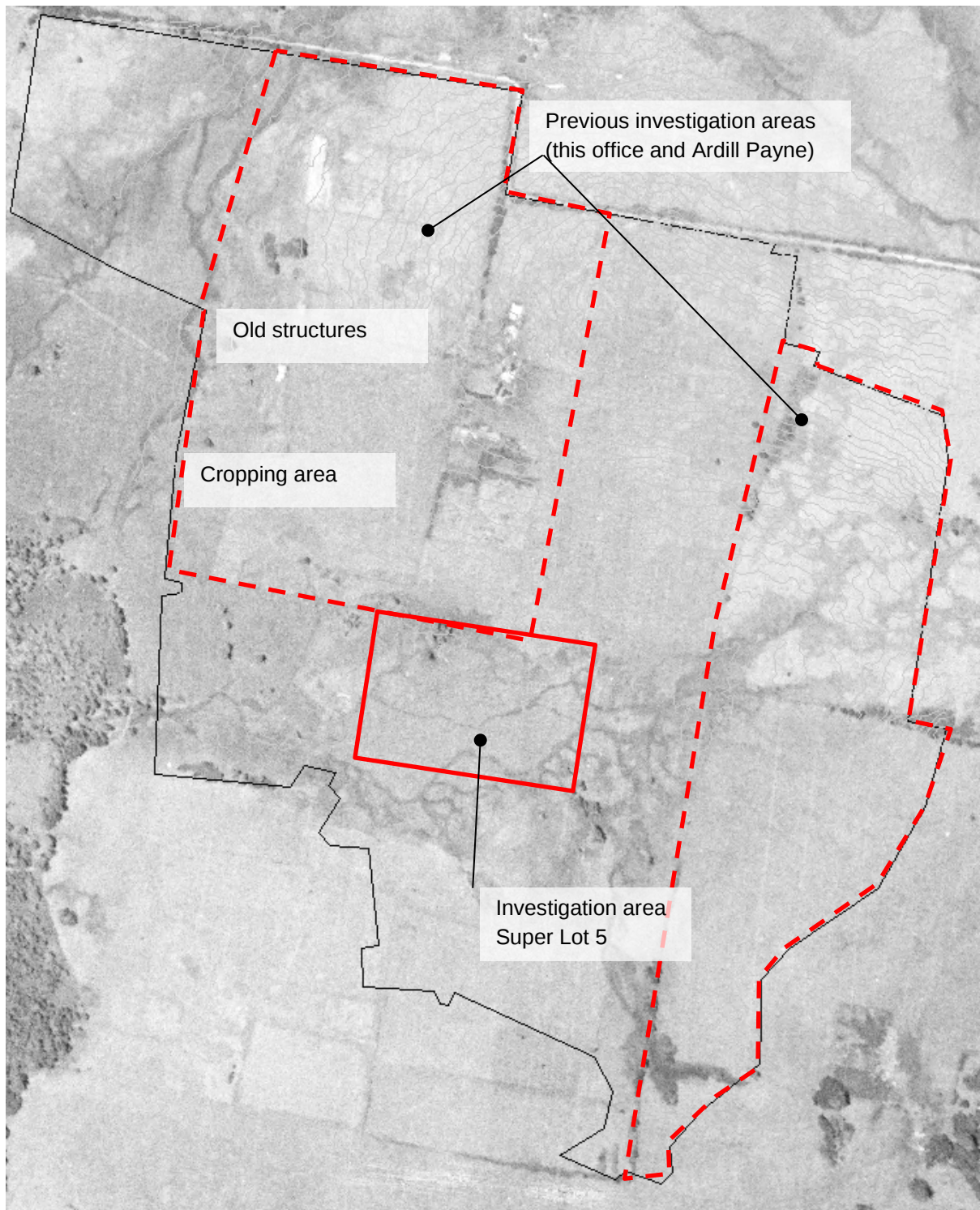


Figure 4: Aerial Photograph 1958 (LPI)

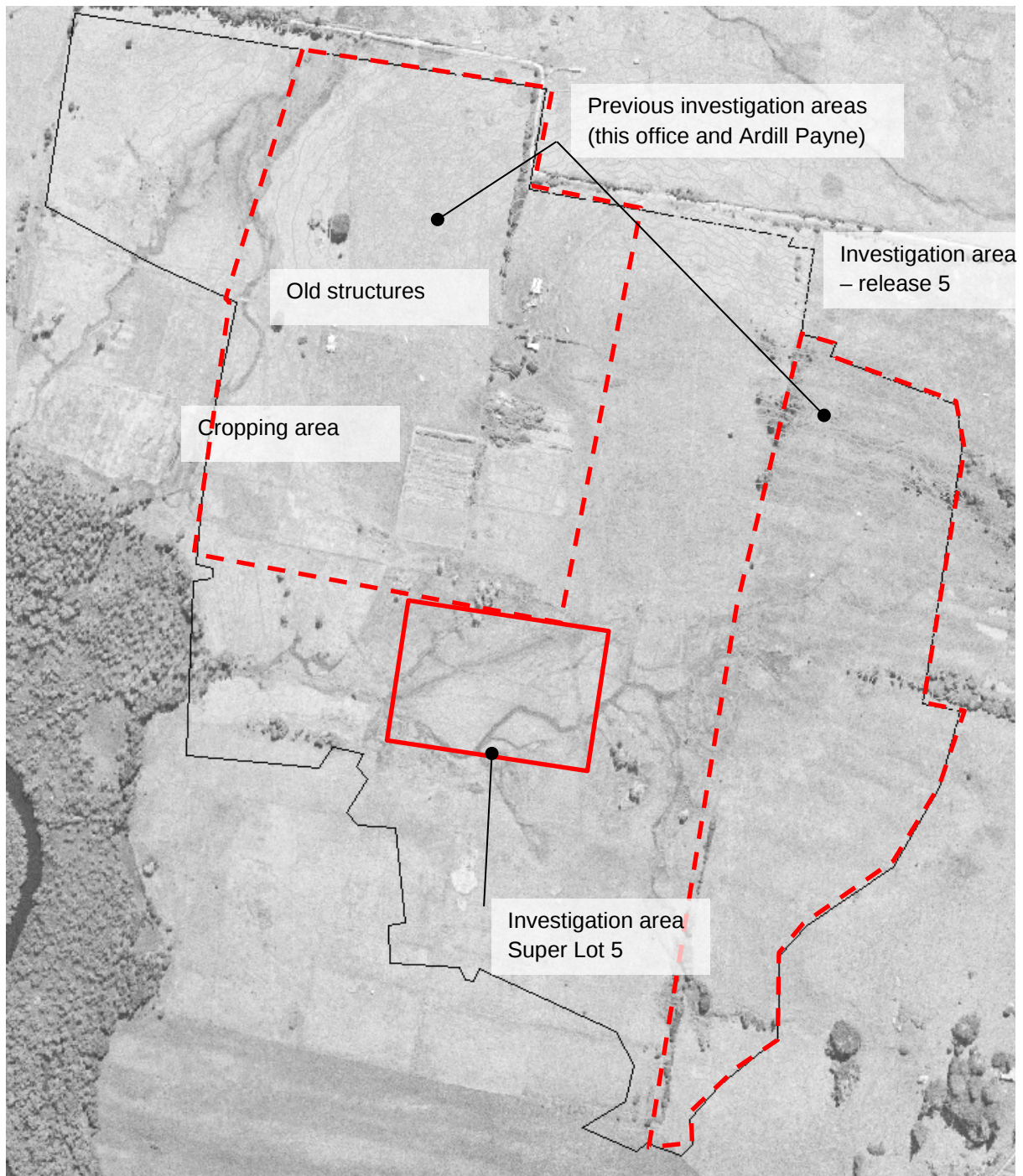


Figure 5: Aerial Photograph 1967 (LPI)

Previous assessments on the overall property have been undertaken by this office, which have included soil sampling to the north, north east and east of the investigation area. These investigations found that there were buildings and yards to the north east, and cropping to the immediate north, whilst the main northern area of the site was cleared and most likely used for grazing cattle only. Refer to reports *Preliminary Contaminated Land Assessment* (10 December, 2015); *Preliminary Contaminated Land Assessment* (March, 2016), *Detailed Contaminated Land Assessment* (17 March, 2017) and *Preliminary Contaminated Land Assessment* (29 March, 2017).

In recent past, the site has been used for grazing, as presented in Figure 6. The old buildings are no longer apparent in the 2014 and 2016 imagery and cropping that occurred in the 1950s and 1960s has ceased. The 2014 and 2016 imagery present that in the location of the former structures the area was being used at cattle yards and food/water areas for cattle.



Figure 6: Part of investigation area land use in 2014 (Google Earth Imagery 4-3-2014).

Currently the site is being developed, and has been disturbed through the construction of roads, drainage and earth moving for the residential subdivision.

5. SITE CONDITION AND SURROUNDING ENVIRONMENT

5.1. Site Investigation

Staff of this office investigated the Super Lot 5, which is accessed from Hutley Drive. The investigation occurred on the 13th December 2017. A general inspection of the surrounding area and land uses was also made.

5.2. General Site Condition

The investigation area was a filled/levelled paddock area. The land to the immediate west of the subject site contains a relatively new road and waterbody constructed as part of the development. The land to the north is being developed for residential development. The site was low lying and contained drainage lines, however we understand that the site has been filled with soil sourced from

the site (*pers comm* Newton Denny Chapelle). It can be seen from NSW LPI Six viewer that the land contained drainage lines that have been levelled and filled prior to the assessment being undertaken.



Figure 7: Aerial photo showing drainage lines prior to filling (SIX Viewer 2018)

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Photograph 1: Investigation area with construction work to the north west (December, 2017)



Photograph 2: Investigation area looking to west (December 2017)



Photograph 3: Rock fragments at surface of Investigation area (December 2017)

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, old buildings, plant stress or soil staining or bare patches. There was not any evidence of buildings or past plantations having occurred across the site.

6. GEOLOGY AND SOIL

Morand (1994) shows that the soil type of the investigation area is in the 'Bangalow Soil Landscape'. The soils are generally described as moderately deep to deep (100 – 200cm) well drained Krasnozems. The soils are derived from the Lamington volcanics: Lismore basalts-tertiary basalt with bole and minor agglomerate (Morand, 1994). If chemicals were used on the site, due to the clay loam soil texture and structure, the contaminants would be remaining in the upper layers, typically 0-150mm for arsenic, 0-300mm for lead and 0-75mm 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 preliminary assessment as there are no environmentally sensitive locations at risk in or adjacent to the investigation area. If contamination is detected in the preliminary assessment, EIL's will be included in the detailed assessment.

7. SAMPLING METHODOLOGY

The total size of the allotment consisting of the Super Lot 5 is approximately 4 ha. Using the sampling point densities in Table A NSW EPA (1995) it was extrapolated that 25 point samples were required to be collected to cover the investigation area. These point samples were collected using a composite sampling method, where 4 samples (a-d) were mixed to form 5 composite samples. In the event of there being high levels of contaminants found in a composite sample, further soil testing will be carried out to determine the extent of contamination by analysing the four point samples forming the relative composite sample.

The soil sampling was generally systematic, in that each composite sample was taken in transects across the site. It is considered that all samples are representative of the site condition.

Sampling was undertaken in the top soil at the site in order to provide a more conservative assessment (top soil is most accessible and therefore most high risk if contaminated). The description of the locations of the samples taken is given below:

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Sample location table

Sample ID	Easting	Northing	Description
sI5 1a	-28.8089	153.5851	Composite 1
sI5 1b	-28.8091	153.5853	Composite 1
sI5 1c	-28.8091	153.5855	Composite 1
sI5 1d	-28.8092	153.5857	Composite 1
sI5 2a	-28.8092	153.586	Composite 2
sI5 2b	-28.8094	153.5862	Composite 2
sI5 2c	-28.8094	153.5864	Composite 2
sI5 2d	-28.8094	153.5867	Composite 2
sI5 3a	-28.8097	153.5867	Composite 3
sI5 3b	-28.8097	153.5864	Composite 3
sI5 3c	-28.8097	153.5862	Composite 3
sI5 3d	-28.8097	153.5861	Composite 3
sI5 4a	-28.8097	153.5856	Composite 4
sI5 4b	-28.8096	153.5854	Composite 4
sI5 4c	-28.8096	153.5852	Composite 4
sI5 4d	-28.8096	153.585	Composite 4
sI5 5a	-28.8099	153.5851	Composite 5
sI5 5b	-28.81	153.5853	Composite 5
sI5 5c	-28.8101	153.5855	Composite 5
sI5 5d	-28.8101	153.5857	Composite 5

Exhibit No.2 presents the soil sample locations.

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 day following collection. The RWL made the composite sample 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.

8. BASIS FOR ASSESSMENT CRITERIA

We understand that the site has been filled with soil sourced from the site. The testing of these imported soils only was made, based on the more likely potential of being in contact with these soils and from the increased sensitivity from exposure when this site is redeveloped. It is not known what depth the fill covers the site, however, no drainage lines are evident in the area and it is expected that the fill is at least 500 mm deep. Furthermore, the aerial photographs indicated a low potential of contamination from past land use due to the drainage lines and lack of infrastructure for building or horticultural enterprise.

A soil sampling suite generic to the possible contamination source based on the assumption that the soil imported to the area may have been used for uses other than just cattle grazing, such as from around the previous building or cropping areas. Sample analysis included heavy metals and chemicals that were commonly used in fertilisers, pesticides and herbicides, used in crops, intensive horticulture, market gardens and found in the cattle dip site, as well as indications of previous buildings. Analysis included heavy metals such as arsenic which is an indicator of horticulture (commonly used in banana plantations) and lead which is an indicator of buildings (used in paint from the 1960s to 1980s), organochlorines (including DDT, Dieldrin/aldrin) and organophosphates.

A conceptual site model has been generated for the site showing potential paths of contamination if present (**Exhibit No. 3**).

Metals can be naturally occurring within a soil profile, these background levels are shown below (Table1).

Table 1: Background Ranges for Potential Contaminants

Pollutant	Background Range (mg/kg)
Arsenic	0-10
Lead	0-35
Cadmium	<1
Copper	0-25
Zinc	0-90

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.

As per Section 3.2.2 of Schedule B1 of NEPM 1999 (2013), if Tier 1 investigations levels are exceeded and it is indicated that there is a risk of negative impact to human or ecological health, a site specific risk assessment will be undertaken. This may involve additional soil sampling or development of a management plan to mitigate potential risks from contamination, and would involve the generation of Groundwater Investigation Levels (GILs) and Ecological Investigation Level's to ensure no contamination to the ground water was or has occurred.

8.1. Health Investigation Levels

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' (Table 2).

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, 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 2: NEPM 1999 (2013) HIL Acceptable Levels for Residential A.

Contaminant	NEPM HIL Acceptable Limit (mg/kg)	NEPM HIL Adjusted 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

8.2. Cattle Dip Site

The former cattle tick dip, known as 'Coral dip' was located approximately 600m to the north of the investigation area and confirms the cattle farming land use of the area. The dip site is located in a new residential estate, and from the information obtained from Primary Industries - Science and Research, the dip is noted as 'remediated' which is defined as:

..where the dip site has been demolished, extensive soil testing completed and any contaminated soil with Arsenic or DDT levels above human/environmental health thresholds is removed or securely buried. Please note that this status applies generally to where sites have been remediated by NSW DPI. Any other remediation initiated externally to us will not necessarily be registered and therefore must be checked for through Council (Primary Industries, Science and Research)

Although the cattle dip site is now remediated, it is considered that past use of the dip would not have caused contamination to the subject site due to spatial separation and the likelihood of contamination being contained within 50 m of the dip site (DIPMAC, 1994). It is noted however, the contaminants which are assessed as part of the analysis include those that were used in the dip which are shown below:

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Chemicals used in dip bath	Date first used
ARSENIC	6/43
ARSENIC	7/48
DDT	1/61
DIOXATHION	10/62
ETHION	10/72
ETHION CHLORDIMEFORM	10/73
PROMACYL	10/78
FLUMETHRIN	11/86

9. RESULTS

A site plan is provided in **Exhibit No. 2**, presenting soil test locations. Table 3 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.

Table 3: 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)
OC/OP in soil	<0.1	<0.1	<0.1	<0.1	<0.1
Arsenic	<5	<5	<5	<5	<5
Cadmium	<1	<1	<1	<1	<1
Copper	20	19	17	18	18
Lead	10	8	8	7	7
Zinc	58	55	51	54	51

Collected 13/12/2017

9.1. Interpretation of Results

The results of the soil analysis are compared with the HILs for this assessment. Organochlorines and organophosphates were not recorded at detectable concentrations, nor were the heavy metals cadmium and arsenic. Copper, zinc and lead were below the relevant HIL's and in low concentrations, indicating that the concentrations detected were background concentrations and there is no risk to human or ecological health from these potential contaminants within the surface soils of Super Lot 5.

The results of the sampling regime and the known history of the site indicate that further investigation is not warranted in the proposed investigation area. The contaminants found at the site are in low levels and are below the current HILs.

10. CONCLUSION

A preliminary contaminated soil investigation was undertaken in the proposed Super Lot 5 which is within Lot 54 DP 1222919, Lennox Head, in order to determine if the investigation area has been

contaminated from past land use. It is understood that the site has been filled with soil imported from other areas of the property. The fill is at least 500 mm deep and has covered the previous drainage lines that dissected the area. It is most likely that the fill was sourced from areas that were grazed by cattle, however, the fill may have come from areas that may have contained buildings or cropping that have not been analysed previously.

Soil samples were collected over the imported fill surface of the investigation area to determine if the site was contaminated from most potential contaminants used in agricultural pursuits or found around previous buildings. This formed a Tier 1 (NEPM, 2013) or Preliminary Contaminated Land Assessment (OEH, 2011) in order to determine if the site is suitable for the proposed development under SEPP 55.

Five soil composite samples were collected over the investigation area at the locations shown on **Exhibit No 2**. 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 potential agricultural use of the site and adjacent areas, and also if there had been old buildings in the investigation area (eg lead, zinc, organochlorines and organophosphates).

The sampling results were compared with the HILs determined from NEPM 1999 (2013). HIL's were those set out in Table 1A(1) of NEPM 1999 (2013) under Residential A, using 'adjusted acceptable levels'. All results were below the relevant HILs. The fill was not examined due to the unlikelihood that this would be intersected as part of the development and there was a low potential of contamination based on the aerial photographs.

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.

It is noted that the investigation although in accordance with the NSW OEH and NEPM requirements is limited to surface soils and no search for buried rubbish (a legacy from former rural properties) was undertaken for the site. In the event that rubbish is found, then Council is to be notified to determine if additional assessment is required.

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*.

Ardill Payne and Partners (2003) *Preliminary Site Investigation for Pacific Pines Estate*. 5028BO-GC05 Contamination.doc

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.

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NSW OEH (2011).*Guidelines for Consultants Reporting Contaminated Sites*. NSW EPA Sydney South

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

Stubbs, B. J. (2006). *Thematic History of Byron Bay*. Community Based Heritage Study Vol. 2.

CHAIN OF CUSTODY

CHAIN OF CUSTODY FORM									
INVESTIGATOR: GREG ALDERSON AND ASSOCIATES ABN 58 594 160 789 Scarrabelottis Rd, Nashua 2479 Ph: 02 6629 1552 Fax: 02 6629 1566 E-mail: office@aldersonassociates.com.au Contact: Wendy Attrill			Container		Sample Matrix			Sample Preservation	
Sample ID	Date of Collection	Plastic Bag	Plastic Bottle	Glass Bottle	Soil	Soil Composite	Water	Other	Other
1a-1d	10/10/17	/							
2a-2d	/	/							
3a-3d	/	/							
4a-4d	/	/							
5a-5d	/	/							
6a-6d	/	/							
7a-7d	/	/							
8a-8d	/	/							
9a-9d	/	/							
10a-10d	/	/							
Investigator: I attest that the proper field sampling procedures were used during the collection of these sample/s. Signed: Wendy Attrill									
Relinquished by: Wendy Attrill		Date: 11/10/17		Time: 8:30					
Relinquished by:		Date:		Time:					

Sheet 1 of 1	
SITE: 16174 RS	
COURIER: Greg Alderson & Associates	
LABORATORIES: RICHMOND WATER LABORATORY	
Contact: Allison Hawthorne	
Laboratory Analysis Required	
mix to form composite 1 heavy metals, OCS, OPS	
/	1
/	2
/	3
/	4
/	5
/	6
/	7
/	8
/	9
/	10
Sampler Name (print): Wendy Attrill	
Date: 10/10/17	
Received by: Wendy Attrill	Date: 11-10-17
Received by:	Date:
	Time: 8-30
	Time:

LABORATORY ANALYSIS RESULTS



Certificate Of Analysis

Client: Greg Alderson & Associates
Address: 43 Main St
Clunes NSW 2480
Contact: Greg Alderson
Sampled by: Wendy Attrill
Subcontract Laboratory: Envirolab (NATA2901)
Subcontract Reference: 177670

Final report

Report no: 17/1677
Date received: 11/10/2017
Testing commenced: 11/10/2017
Date reported: 24/10/2017
No. of samples: 10
Revision no: 00

GAA Soil - 16174 R5

Analysis results apply to samples as received.

Sample No.: Sample description:	Unit	Method	LOR	17/1677-1 16174 - R5 - Composite 1 10/10/2017	17/1677-2 16174 - R5 - Composite 2 10/10/2017	17/1677-3 16174 - R5 - Composite 3 10/10/2017	17/1677-4 16174 - R5 - Composite 4 10/10/2017	17/1677-5 16174 - R5 - Composite 5 10/10/2017	17/1677-6 16174 - R5 - Composite 6 10/10/2017	17/1677-7 16174 - R5 - Composite 7 10/10/2017	17/1677-8 16174 - R5 - Composite 8 10/10/2017
Date sampled:											
OC/OP in soil*	mg/kg	Envirolab	0.1	[ND]	[ND]	[ND]	[ND]	[ND]	[ND]	[ND]	[ND]
OC/OP QC Recovery	%	Envirolab	0.1	88	82	81	82	83	82	81	90
Arsenic - soil	mg/kg	APHA3120B	5	<5	<5	<5	5	<5	<5	6	<5
Cadmium - soil	mg/kg	APHA3120B	1	<1	<1	<1	<1	<1	<1	<1	<1
Copper - soil	mg/kg	APHA3120B	1	21	24	19	19	18	19	16	20
Lead - soil	mg/kg	APHA3120B	1	11	12	10	10	11	11	12	10
Zinc - soil	mg/kg	APHA3120B	1	76	102	43	69	70	75	72	92
Arsenic -QC Recovery	%	APHA3120B	1	111	111	111	111	111	111	111	111
Cadmium - QC Recovery	%	APHA3120B	1	107	107	107	107	107	107	107	107
Copper - QC recovery	%	APHA3120B	1	111	111	111	111	111	111	111	111
Lead - QC recovery	%	APHA3120B	1	107	107	107	107	107	107	107	107
Zinc -QC recovery	%	APHA3120B	1	87	87	87	87	87	87	87	87



Certificate Of Analysis

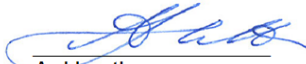
Client: Greg Alderson & Associates

Report no: 17/1677

Sample No.: Sample description: Date sampled:	Unit	Method	LOR	17/1677-9 16174 - R5 - Composite 9 10/10/2017	17/1677-10 16174 - R5 - Composite 10 10/10/2017
OC/OP in soil*	mg/kg	EnviroLab	0.1	[ND]	[ND]
OC/OP QC Recovery	%	EnviroLab	0.1	84	84
Arsenic - soil	mg/kg	APHA3120B	5	<5	<5
Cadmium - soil	mg/kg	APHA3120B	1	<1	<1
Copper - soil	mg/kg	APHA3120B	1	19	19
Lead - soil	mg/kg	APHA3120B	1	9	7
Zinc - soil	mg/kg	APHA3120B	1	85	85
Arsenic -QC Recovery	%	APHA3120B	1	111	111
Cadmium - QC Recovery	%	APHA3120B	1	107	107
Copper - QC recovery	%	APHA3120B	1	111	111
Lead - QC recovery	%	APHA3120B	1	107	107
Zinc -QC recovery	%	APHA3120B	1	87	87

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.
NATA accreditation does not cover the performance of this service. Tests marked with * are subcontracted.
LOR denotes 'Limit of Reporting'

Specific comments:


A. Hawthorne
Laboratory Manager
Approved Authoriser

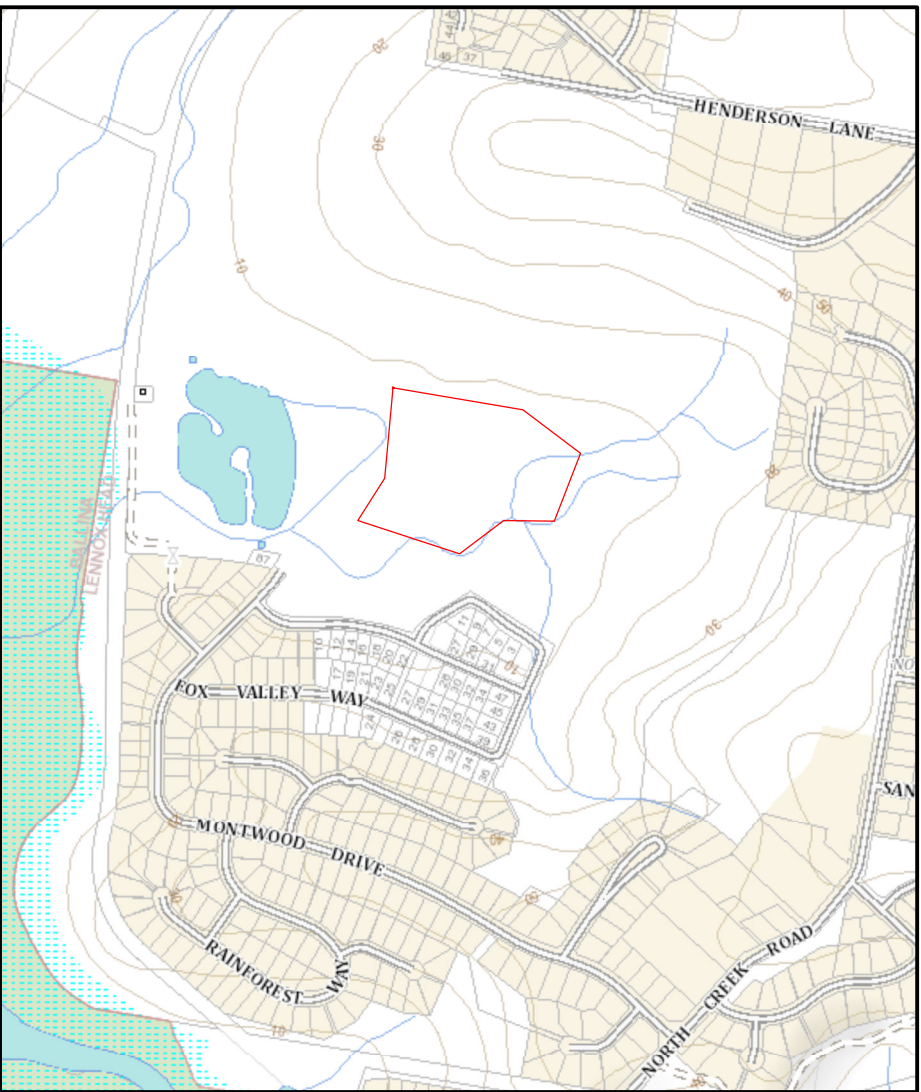


Source: NSW LPI Spatial Information
Exchange (2015)
Date 01/02/2018
Project No.
16174_sepp55_super_lot_5.docx
Scale: NTS

GREG ALDERSON AND ASSOCIATES
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43 Main Street Nashua NSW 2479
Phone: (02) 6629 1552
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Exhibit No. 1. **SITE LOCATION**

Lot 234 DP 1104071,
Lennox Head

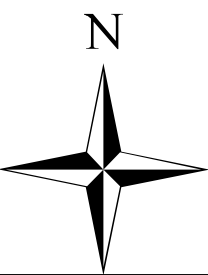


1:10,000 SITE LOCALITY

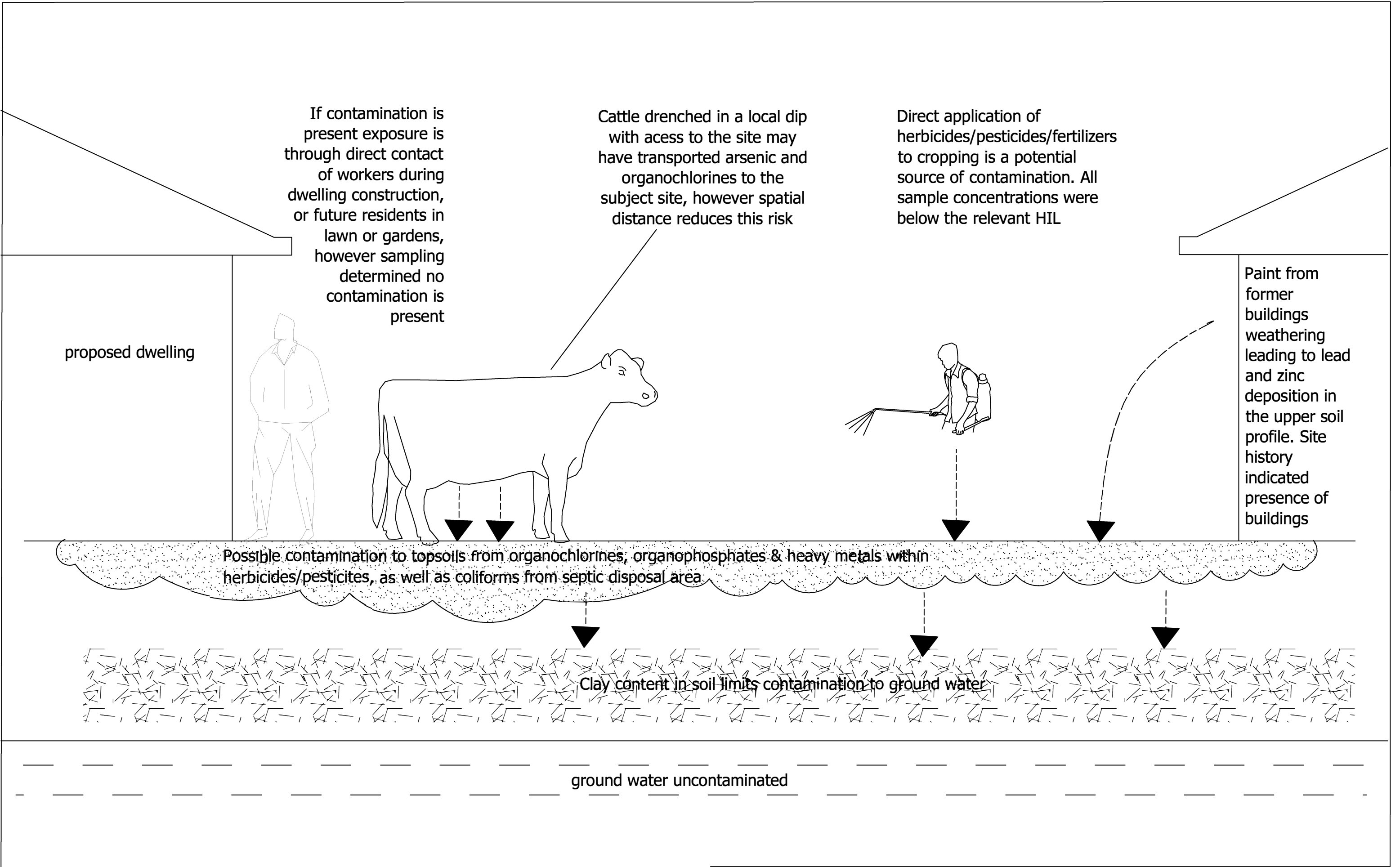
SymbolID

 Soil Sample Location

 super_lot_5_boundary



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DRAWN WAA	Coordinate System: GDA 1994 MGA Zone 56 Projection: Transverse MercatorDatum:GDA 1994	CLIENT CLARENCE PROPERTY CORPORATION LTD	
DRAWING NUMBER: CLARENCE/NTS - NRE Epa Super Lot 5/Super Lot 5/NTS - super_lot_5.mxd		SITE ADDRESS LOT 54 DP 1222919 HUTLEY DRIVE, LENNOX HEAD	
SOURCE Service Layer Credits © Department of Finance, Services &		JOB NUMBER 16174	
GREG ALDERSON & ASSOCIATES ABN 58 594 160 789 43 MAIN STREET CLUNES NSW 2480 Ph: 02 6629 1552 Fax: 02 6629 1566 E: office@aldersonassociates.com.au Web: aldersonassociates.com.au		DRAWING TITLE: SOIL SAMPLING LOCATIONS	
		EXHIBIT NO.: 1	DATE: 30-1-18
		PROJECT: SUPER LOT 5	REVISION: 0



Scale: As shown at A3
Job No: 16174_release 5
Drawn: DJB Date:
03/04/2017 Source: Newton
Denny Chapelle

**GREG ALDERSON &
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Exhibit 3
**Conceptual Site Model -
Release 5**

Lot 54 DP 1222919
Lennox Head