TERRA INSIGHT

Lot 106 DP755923 Inyadda Dr, Manyana NSW

Preliminary Site Investigation with Soil Sampling

Prepared for:

HEIR ASQUITH

Our Ref: TERRA22-165 Rep 1 Rev 2 9 August 2023

Prepared for:
HEIR ASQUITH
C/ Egis Consulting Pty Ltd

Att: Mr T Nahra

RE: Lot 106 DP755923 Inyadda Dr, Manyana NSW
Preliminary Site Investigation with Soil Sampling

Dear Tony,

Please find enclosed our updated Preliminary Site Investigation ('PSI') report for Lot 106 DP755923 Inyadda Dr, Manyana NSW Lot 106 DP755923 Inyadda Dr, Manyana NSW hereafter referred to as the Site. This report should be read in conjunction with the attached document 'About Your Report' in Appendix A.

EXECUTIVE SUMMARY

Objectives

The objectives of the PSI were to assess whether Contamination exists that is at levels which may impact the Property (where Contamination is defined within Section 5 of the Contaminated Land Management Act 1997 (CLM Act)) and if present, to assess the requirement for any particularly contaminated land site management required.

The Property

The property consists of three large lots (Lot 106 DP755923, Lot 2 DP 1161638 and Lot 2 DP 1121854) which were originally a farm. It is located between the townships of Bendalong and Manyana, to the east of Inyadda Road and west of Inyadda Beach.

The property contains two very slight ridge lines that are aligned west to east with slopes that fall to the east. These are located roughly through the middle of the Site (ridge line 1) and along the southern boundary (ridge line 2) of the Site. Two small drainage depression cross the Site from the north-western corner (Creek 1) and south-western corner (Creek 2) of the Site. Creek 1 is located north of ridge line 1 and Creek 2 is located between ridge line 1 and ridge line 2. These flow eastwards, joining together within the eastern part of the Site (into Creek 3) and then flow into a small unnamed lake which overflows onto Inyadda Beach.

The property is currently zoned as R5 (large lot residential) to the west, R1 (general residential) towards the middle with the eastern part of the Site (Lot 2 DP1121854 zoned E3 (Environmental Management). The western and middle parts of the property (Lots 106 DP755923 and Lot 2 DP1161638) are proposed for residential development with the eastern part of the property (Lot 2 DO1121854) and areas along the existing creeks/drainage paths to remain undeveloped, creating green space within the subdivision.

Two portions of the property will be developed as shown on Figure 1 and is otherwise known as the Site. This includes an area towards the middle of the Site between Creek 1 and Creek 2, and area near the southern boundary of the property south of Creek 2. The proposed development is consistent with the NEPM definition of a low-density residential site and consequently, the health investigation levels for low density residential sites with access to the soil (HIL A) have therefore been adopted for the assessment.

Investigation Findings

The Site was in use as a farm until 1987. Several former residential buildings are visible on the Site on historical aerial images in two locations within Lot 2 DP1161638. The original buildings would have been of an age where they may have contained hazardous materials such as asbestos bonded/containing materials (ABM/ACM) and paints which contain heavy metals such as lead. These structures were removed prior to the late 1980's. Since 1987, the Site has not been in formal use but has been accessible to the public. This has resulted in the Site being used for recreational

off-road motoring sports and the illegal dumping of waste materials (eg fly-tipping). Parts of the Site have recently been exposed to bush fires.

The desk study and site walkover indicate there are several sources of potential contamination related activities that have occurred on the Site. Based on the potentially contaminating activities, six (6) Areas of Environmental Contamination (AECs) have been identified for the Site. They are summarised as follows:

- AEC 1 and AEC 2: Two cleared areas within the middle of the Site within Lot 106 DP 755923 which are visibly in use for recreational motor sports and the illegal dumping of waste materials;
- AEC 3: Includes the southern boundary of the Site where adjacent residential use is actively encroaching. This use could include pesticides and herbicides to manage vegetation and insects, disposal of household waste and building materials, supply of firewood, burning of fires and parking of vehicles.
- AEC 4: This area is located adjacent to Inyadda Road:
  - It may be subject to opportunistic illegal dumping of waste materials along the roadside;
  - The western part of this area was occupied by old farm buildings (now removed). These may have contained hazardous materials such as lead and asbestos which may impact areas within and near previous building foot prints;
- AEC 5: this includes the main access tracks throughout the Site which are used to access Areas 1 and 2. These areas are also used for recreational motor sports and illegal dumping of waste; and
- AEC 6: this includes the remainder of the Site. Within this area, pesticides have been used along creek lines to manage vegetation and old buildings may have been present and subsequently removed or become dilapidated. The area may also have been subject to motor sports and illegal waste dumping, but due to the dense vegetation this is expected to be at levels lower than within AEC 1 to 3 which are easily accessible to the public. Within this area are several old dams and creeks which are visible on aerial images. Many of these have become silted.

Soil sampling investigations have been conducted across the property on two occasions, in 2019 and in 2022. The 2019 investigation targeted specifically areas AEC 1 and AEC 2 as requested by the client at that time, as this was the area proposed for development. Further assessment was deemed required as:

- The proposed area for development was expanded to include areas along the southern portion of the property not yet investigated; and
- Additional testing was suggested in the 2019 PSI for clearings 1 and 2 located in the northern part of the Site. This part of the Site has been subject to ongoing use as well as bush fires between 2019 and 2020. This additional sampling allows for a more detailed inspection of the Site and the ability to undertaken additional testing to address any gaps in the 2019 assessment.

In total, 45 locations across the Site were undertaken during the two investigations. Soil samples were collected and tested for potential entrapped contaminants including heavy metals, asbestos and hydrocarbons. Samples taken in the 2019 investigation were named BH01 to BH24 and samples taken in the 2022 investigation were named D1 to D21.

The investigation identified analytes above the level of detection. These findings are summarised in Tables 10.1 and Table 10.2 based on the analytes detected and the test location respectively. In summary, the investigation found:

- Elevated of levels of lead above the HIL in sample location BH18 in Clearing 1 in the northern part of the Site. This sample was taken from below a burnt-out car.
- A large pile of asbestos sheeting was found on the ground surface around sample location D12. This was located in a clearing in the northern part of the Site. The material is relatively intact and made of bonded material that has been flytipped on the Site.
- Some samples taken from campfires in the southern part of the Site were found to be impacted by F2 hydrocarbons above the Health Screening levels. This suggests the use of hydrocarbon-based fire accelerants in the campfires. The levels are below HILS for direct soil contact.
- There are exceedances of EIL, ENM and GSW CT1 guidelines levels for some heavy metals (Nickel, Chromium and Zinc), but further testing for Nickel and Chromium indicates low leachability.
- Chromium (III) and Nickel were found to be elevated above the VENM guidelines levels across most of the Site.

A site walkover was undertaken to identify surface contaminants or aesthetic issues which may require further attention or assessment.

Several car bodies, a fridge, a caravan, a metal sheeted "lean-to" /"cubby house" and building waste materials were found across the Site, but mainly along the southern boundary adjacent the existing residential properties. This is indicative of long-term encroachment by neighbouring properties into AEC3. These findings are general comprised of inert materials that are likely to have on-surface impact on the Site's soils and can be easily removed from the Site.

In terms of asbestos, The WA DOH guidelines indicate a more qualitative approach can be adopted for low-risk residential sites that may have been subject to legacy contamination by demolition and/or illegal dumping. This assessment requires inspection of the Site based by a competent person on a grid basis to assess whether ACM is present at levels less than 10 cm^2/m^2.

An inspection and sampling programme was adopted to identify if asbestos was present on the Site or in the surface soils. The Site was walked over by two separate individuals to identify any suspected pieces of ACM on the ground surface. Soil samples was taken at several locations across the Site where a higher potential for impact by asbestos was identified. The results are summarised as follows:

- Several fragments >7mm in dimension of potentially asbestos containing material were observed on the Site. These potential asbestos finds occurred in one location in Area 1 (near D12 only) with the material found lying on the ground surface adjacent to a 1.5m by 1.5m pile of potential asbestos containing material (measuring conservatively). This is where asbestos was observed previously in the 2019 investigation. Four small fragments were tested which were confirmed by the laboratory to contain asbestos containing materials (bonded material / fibreboard). The estimated total area of asbestos is approximately 2.25m^2. This can be treated as a localised hot spot find.
- Eight bulk samples of subsurface material from across the Site were submitted to the laboratory for asbestos testing of fines and fibres. No asbestos finds were detected. No asbestos (bonded, FA or AF) was observed or detected in samples taken from the surface material. This includes surface material from where bonded fragments of asbestos were found near D12.

Conclusions

The investigation concluded the following:

- There are two localised areas which require further action, as follows:
  - Around sample location BH18, elevated of levels of lead occur that are above the HIL. This sample was taken from below a burnt-out car. The car and underlying soil should be removed from the Site and disposed of to landfill. Verification that the soils in this remediated area are clean should then be undertaken.
  - Around sample location D12 is a large pile of asbestos sheeting which is relatively intact and made of bonded material. Given the limited volume of material and the fact that soils are not impacted, this material would be best removed from the Site by a licenced contractor. The area below the stockpile should be verified as clean.
- Samples taken from campfires near sample locations D1 and D15, and from stockpiles of materials around sample location D6 are impacted by F2 hydrocarbons above Health Screening levels. However, these are deemed related to accelerant use in the campfires and are highly unlikely to result in a risk of vapour generation within the subsoils. The levels are below HILs for direct soil contact. It is recommended that in the areas of campfires and stockpiled materials, the surface topsoils are stripped and disposed of to landfill. The underlying soils should then be verified as clean. It is noted that hydrocarbons can biologically degrade with time, and so it may also be possible to remediate these affected soils on Site in the short to medium term or place the affected materials under proposed roads.
- There are some exceedances of EIL, ENM and GSW CT1 guidelines levels for some heavy metals, but leachate testing indicates that these do not have a potential environmental health impact and can be left on Site or disposed of to land fill.

- This VENM exceedances finding means that some soils on the Site cannot be used off site as VENM. The earthworks plans for the Site should consider these materials remaining on site with material that can be assessed as VENM being prioritised for reuse offsite. It is noted that Chromium (III) and Nickel was elevated above the VENM guidelines levels across most of the Site. An additional test to assess background levels of these metals would be beneficial to determine if these elevated levels are geologically related.

Where material that has been flytipped, stockpiled, or burnt in campfires is removed from the Site, the levels of residual contaminants on the Site should be below the HILs and EILS values. The levels of remaining elevated analytes on the Site are not deemed to result in "contamination" of the Site to levels which would preclude its residential development.

Gross contamination of bonded asbestos material across the Site due to illegal dumping (except for the hot spot around D12) was not identified. Areas of excavation and filling which may be associated with dumping of asbestos contaminated soil were also not observed. The hotspot of asbestos dumped material should be removed from the Site by a licenced professional. Once this is removed, the Site should not be impacted by asbestos at levels which would affect human health or the environment.

Recommendations

In terms of SEPP55, this assessment has been undertaken to assess where previous land use has caused contamination of the Site and whether this contamination has the potential to cause a risk to health or the environment. It should be noted that contamination is likely to be present on most sites as by definition, a contaminant is a substance present at a concentration above which it would not normally be present on that site. However, this contamination only becomes a risk to the proposed development where it is at a level where it becomes a potential risk to health or the environment. For this to occur the following is required:

- A contaminant must be present on a site above a given guideline value. Guidelines values have been derived to allow first tier assessments to be made in terms of the potential for health or environmental risk to exist;
- There must be a receptor that can be impacted by that contaminant. That receptor can be on and/or off the site; and
- There must be a pathway between the contaminant and the receptor.

For a contaminant to be considered a risk to health or environment, all of the above must be present. Where there are all present, decisions must then be made as to whether the land needs further assessment, should be remediated, or its use restricted, in order to reduce the risk.

In terms of SEPP (Resilience & Hazards) 2021, the investigation has identified that levels of contamination on the Site, associated with its historical residual use, have not resulted in contamination of the majority of the Site at a level where the Site would be deemed contaminated land and require full scale remediation.

The Site requires a general clean up and two areas of further action to address hot spots of lead and asbestos at sample locations BH18 and D12 respectively. Terra does not believe the level of contaminants identified in these two areas warrants a formalised Remediation Action Plan (RAP) for the Site.

The following recommendations are made:

1. Material fly tipped on the Site should be removed from the Site. This includes materials in stockpiles and campfires in and near sample locations D1,D6,D8, D11, D13, D15,D16, D18, and BH18;
2. A pile of asbestos in clearing 1 near sample location D12 on the Site shall be removed by a licensed contractor;
3. The existing lean-to/cubby house in AEC3 shall be subject to removal by a licenced professional. This structure does not appear to contain asbestos. As a precautionary measure, post removal, the near surface soils should be validated as clean of heavy metals and asbestos.
4. The near surface soils on the site beneath and surrounding test locations: D1, D6, D8, D12, D13 and BH18 should be disposed of off-site as General Solid Waste in accordance with waste classification requirements.

It is noted that sample locations D1,D6,D15, D11,D16, D18 have hydrocarbon EIL exceedances which are likely to reduce biologically with time. Some of these sample locations also have heavy metal EIL exceedances but leachate testing shows these values are unlikely to have an environmental impact. This means that with appropriate planning, these affected soils could remain on the Site. They could be buried under proposed roads for added conservatism. The exception to this is soils beneath the burnt-out car at sample location BH18 which have lead HIL exceedances and must be disposed of off-Site to landfill.

5. Testing indicates elevated levels of Chromium and Nickel across the Site. This impacts soils beneath and surrounding test locations BH03, BH04, BH07, BH08, BH11, BH14, BH17, BH19, BH21, BH23, D2-D5, D7, D9, D12, D14, D16, and D20. These soils must be disposed of as GSW if taken off-Site. They cannot be reused as VENM. Alternatively, testing indicates they contain contaminants are at levels that are low enough for them to remain in situ on Site. Consideration should be given to additional background testing to confirm that these elevated Chromium and Nickel levels are natural.
6. To prevent further fly tipping on the Site prior to development, the Site should be fenced. Immediately prior to development, the Site will require a general clean up to remove fly tipped inert material.
7. Post site clean-up activities and immediately prior to site development, a site walk over by a licenced asbestos assessor should be undertaken to ensure the Site has remained clean of asbestos.
8. An unexpected finds protocol should be documented for the Site.
9. Terra Insight recommends that to set out the appropriate management detailed in Recommendations 1 – 8 above, a short-term Construction Management Plan (CEMP) be developed for the Site. The plan shall address the following:

    a) Demolition and removal of the existing shed;
    b) Off-site disposal of general solid waste (GSW) impacted by heavy metals and hydrocarbons from the Site;
    c) Off-site disposal of the underlying VENM material generated by site earthworks;
    d) Unexpected findings of contaminated material and management of any underlying soil guidelines exceedances if unexpected findings occur.

Where the above recommendations are undertaken, the Site is deemed suitable for the proposed residential development. No further contamination assessment of the Site is deemed required.

For and on behalf of Terra Insight

Karen Gates
Principal Engineer/ Director
CPEng MIEaust MEIANZ BEng MEngSc(Geot) MEnvMgt MBA NPER CEng CEnvP

Contents

1 Introduction 9
2 Objectives – SEPP (Resilience & Hazards) 2021 and Contaminated Land Act 9
3 Scope of work 10
4 Desktop Study Findings 11
4.1 Site description 11
4.2 General Geology 12
4.3 Surface Topography 12
4.4 Surface hydrology and Subsurface Hydrogeology 12
4.5 Groundwater 12
4.6 Site history data sources 13
5 Summary of desktop Site history review 22
6 Site walkover 24
6.1 Site Walkover in 2019 24
6.2 Site Walkover in 2022 25
7 Preliminary Assessment Findings 26
7.1 Potential areas of environmental concern 26
7.2 Potential Contaminants of Concern (CoCs) 26
7.3 Potential receptors of concern 27
7.4 Conceptual Site model 28
8 Detailed Soil Sampling Investigation 32
8.1 Subsurface Conditions from 2019 32
8.2 Sampling Plan 2022 32
8.3 Field Investigation Methodology 33
8.4 Laboratory Testing 33
9 Review of Investigation Findings 34
9.1 Published guidelines and framework for contamination assessment 34
9.2 Derivation of Investigation levels for further assessment 34
9.3 Summary of Laboratory Findings 39
9.4 Aesthetic Criteria 48
9.5 Data Quality Objectives 48
10 SEPP55 Review 50
11 Conclusions 51
11.1 Subsurface conditions 51
11.2 Historical site use 51
11.3 Potential contamination due to site use 51
11.4 Summary of Sampling and Laboratory Testing Programme 52
11.5 Summary of Investigation Findings 52
11.6 SEPP Assessment 61
12 Recommendations 62
12.1 Construction Environmental Management Plan (CEMP) requirements 62
13 Limitations 64
14 List of Acronyms 65
15 List of Definitions 66

Tables

Table 4-1:Summary of Site identification, ownership and use information 11
Table 4-2: Summary NSW EPA search results for Contaminated Land Register 14
Table 4-3: Summary NSW EPA search results for PEOE Register 14
Table 4-4: Observations during review of Historical Aerial Imagery 15
Table 4-5: Summary of Owners Report – InfoTrack 20
Table 4-6: Summary of Council Historical Records Search 21
Table 5-1: Summary Desktop review findings 22
Table 7-2: Potential contamination-based pathways and receptors 27
Table 7-3: Preliminary Conceptual Site Model 29
Table 9-1: Summary of TPH HSL 35
Table 9-2: Reproduction of Table 6-1 from Schedule B1 of the ASC NEPM (Equivalency of terms used in the NEPM, WA DoH (2009) and Work Health and Safety legislation and guidelines) 37
Table 9-3 Health Screening Levels for Asbestos Contamination in Soil 38
Table 9-4 Parameters Used for Asbestos Quantity Assessment 39
Table 9-5: Summary of Exceedances by Location 40
Table 10-1: SEPP55 Checklist for initial site evaluation 50
Table 10-1: Summary of Exceedances by Contaminant 53
Table 10-2: Summary of Exceedances by test locationation 59

Figures

Figure 1: Site Location
Figure 2: Site Geology
Figure 3: Historical Aerial Images
Figure 4: Summary of Site Observations
Figure 5: Areas of Environmental Concern
Figure 6: Test Site Locations
Figure 7: Investigation Findings

Appendices

Appendix A: Your Report
Appendix B: Proposed Site Development
Appendix C: Lot Search report
Appendix D: Lotsearch Title Search
Appendix E: Site Images 2019
Appendix F: Site Images 2022 Northern
Appendix G: Site Images 2022 Southern
Appendix H: EIL Derivation
Appendix I: Laboratory summary and certificates

1 Introduction

At the request of Egis Consulting on behalf of Heir Asquith (the client), Terra Insight Pty Ltd (Terra) has updated our Preliminary Site (Contamination) Investigation (PSI) of Lot 106 DP755923 Inyadda Dr, Manyana NSW (the Property) to include the results of additional investigations. These additional investigations focused on the Areas of Environmental Concern (AECs) identified in the previous investigation conducted by Terra. The investigation previously undertaken by Terra in 2019 targeted the northern part of the Site proposed for development and included some sampling for contaminants and Acid Sulfate Soils (ASS). Since initial assessment, further investigation has been recommended by Terra as follows:

- A detailed walkover over of all the areas within the Site currently proposed for development;
- Soil sampling in areas previously sampled where the recent site walkover identified localised additional disposal of waste material or use of the land not consistent with its current undeveloped bush land setting; and
- Soil sampling of the southern portion of the Site which is now proposed for development.

Areas of the Site not proposed for development and to remain in their current undeveloped condition were not inspected or sampled.

For the purpose of this assessment, Investigation Levels are derived for four (4) generic land-use categories as follows:

- Class A: Standard residential with garden/ accessible soils (home produce <10%), no poultry, includes childcare centres, preschools, and primary schools;
- Class B: Residential with minimal opportunities for soil access, includes dwellings with full and permanently paved yard space such as high rise buildings;
- Class C: Includes developed open spaces such as parks, playgrounds, playing fields, secondary schools, and footpaths. Does not include undeveloped public open spaces which should be site specific.
- Class D: Commercial/ Industrial includes premises such as shops, offices, factories, and industrial sites.

We note that this development is residential with garden/accessible soils, consistent with a Class A site for the purpose of this assessment.

2 Objectives – SEPP (Resilience & Hazards) 2021 and Contaminated Land Act

The objective of this assessment was to:

- provide advice on the potential for Site contamination (as defined in Section 5 of the Contaminated Land Management Act, 1997) to be present on the Site due the deposition of the fill; and
- provide advice on whether the considerations of Cl 4 of SEPP55 have been satisfied; and
- assess whether this contamination will impact on the proposed use of the Site and whether further investigation or remediation of the Site is required.

We note that the *Contaminated Lands Management Act* 1997, defines the contamination of land as the presence (in, on, or under the land) of a substance at a concentration above the concentration at which the substance is normally present (in, on, or under the land respectively in the same locality), being a presence that presents a risk of harm to human health or any other aspects of the environment. However, land is not, for the purposes of this Act, contaminated land:

- Merely because in any surface water standing or running through the land, a substance is present in such concentration, or
- Merely because of the presence of a substance prescribed by the regulations, or
- In circumstances prescribed by regulations.

In terms of SEPP (Resilience & Hazards) 2021, a local authority must when carrying out planning functions under the *Environmental Planning and Assessment Act 1979*, consider the possibility that a previous land use has caused

contamination of the site as well as the potential risk to health or the environment from that contamination. It should be noted that contamination is likely to be present on most sites as by definition, a contaminant is a substance present at a concentration above which it would not normally be present on a site.

However, this contamination only becomes an issue where it is at a level where it becomes a potential risk to health or the environment. For this to occur the following is required:

- A contaminant must be present on a site above a given guidelines value. These guidelines values have been derived to allow a first-tier assessment to be made in terms of the potential for a health or environmental risk to exist;
- There must be a receptor that can be impacted by that contaminant. the receptor can be on and/or off the site; and
- There must be a pathway between the contaminant and the receptor.

For a contaminant to be considered a risk to health or environment, all of the above must be present. Where there are present, decisions must then be made as to whether the land needs further assessment, should be remediated, or its use restricted, to reduce the risk.

It is understood that the findings and conclusions of this PSI assessment will be used by Council to determine the need for any site management to occur. It is noted that if land is contaminated but this contamination is not determined to be 'significant enough to warrant regulation' then the *Contaminated Land Management Act 1997* does not apply. In such cases, the provisions within the planning legislation and/or the *Protection of the Environment Operations Act 1997* may be the appropriate mechanism for management of such contamination. This means that contamination can be present on a site, but at levels deemed to not require further assessment or remediation.

3 Scope of work

The proposed scope of work for a PSI is typically comprised of a desk study and a site walkover. Soil sampling may also be undertaken. For the Site, this revised 'PSI With Soil Sampling' included the following:

- Review of the following:
  - information available for the Site including topography, soil landscapes, and geology.
  - historical aerial photography; and
  - Specific historical information for assessing the likelihood of potential contamination to exist at the Site including publicly available information maintained by council, the department of land registry, and the New South Wales Environment Protection Authority (NSW EPA).
- A Site walkover by a principal geo-environmental engineer (CEnvP) who is experienced in contamination assessment to visually identify and observe:
  - topography, noting visual evidence of filling.
  - nearby sensitive environments.
  - potential areas of environmental concern (APECs) and chemicals of potential concern (COPC) associated with potentially contaminating activities on or near the Site.
- A subsurface investigation comprised of:
  - Forty-five (45) surface samples to 0.3m below the natural ground level and into natural material below the topsoil and stockpiled materials;
  - Sampling of fill materials encountered on the Site at regular intervals until natural soils are encountered;
- Report on activities above in relation to the objective outlined in Section 2.

The assessment is undertaken in accordance with consultants' guide/requirements 2011 (NSW) and ASC NEPM Schedule B2 and the NSW EPA 'Consultants Reporting on Contaminated Land' guidelines 2020.

4 Desktop Study Findings

4.1 Site description

A summary of key Site details is provided in Table 4.1.

Table 4-1:Summary of Site identification, ownership and use information

Road Address	Inyadda Drive Manyana	
Title Identifiers	Lot 106 DP755923, Lot 2 1161638, and Lot 2 DP 1121854	
Site Description	The Site is accessed via Inyadda Drive from the west of the Site. The Site is surrounded by undeveloped bushland to the north and west. The Site is bounded by Inyadda beach on the eastern boundary, residential properties along the southern boundary, Inyadda drive to the west and bushland to the north. The Site is comprised of three cleared areas (referred to Area 1 to Area 3). Two are located in the northern part of the site proposed for development (Area 1 and Area 2). These areas consist mostly of grassland surrounded by bushland. The third is the cleared land along the southern boundary referred to as Area 3. Within this area, along the southern portion of the Site, adjacent properties have cleared the land, most to likely provide a fire protection zone but also to allow informal extensions to their northern yards. Their residential occupation encroaches into the Site. There is an area associated with previous occupation located in the south-western corner of the site property. This is referred to as Area 4. The remaining areas of the property consists mostly of bushland with some bush tracks. Areas along the tracks are hereafter referred to as Area 5. Areas of undisturbed bush are referred to as Area 6.	
District/Division Name	Manyana	
Area	Property is ~ 76ha. The area for proposed development is ~13Ha over 65 lots.	
Current Zoning (Property)	E3 – Environmental management on the east part of the Property which is not to be developed (lot 2 DP1121854). R5 – Large Lot residential located on the western part of the site to be partly developed and R1 General residential located towards the middle of the site.	
Current Site Use	Undeveloped Residential and Environmental management – Meets NEPM definition of a residential site with minimum access to soils (HIL A) site.	
Proposed Site Use	Residential and conservation areas – Meets NEMP definition of a residential site with access to soils (HIL A) site.	
Surrounding Land Use	North	E2 and E3. Mostly bushland.
	South	R2 – low density residential
	East	RE1 – Public recreation
	West	SP2 (Inyadda Drive), RU2 – undeveloped land.
Council	Shoalhaven City Council (SCC)	

4.2 General Geology

The 1:250,000 geology sheet for Ulladulla indicates the site is underlain by 'Undifferentiated Tertiary' aged sediments, consisting of gravel, sand, clay, quartzite, sandstone and conglomerate (refer Figure 2). It also shows 'Quaternary' aged alluvial sediments located around Creek 2, and around the small lake and creek 3 located within the middle and eastern parts of the site respectively.

4.3 Surface Topography

According to online contour mapping, the Property contains two very slight ridge lines that are aligned west to east with slopes that fall to the east. These are located roughly through the middle of the site (ridge line 1) and along the southern boundary (ridge line 2) of the site.

Two small drainage depression cross the Property from the north-western corner (creek 1) and south-western corner (Creek 2) of the Site. Creek 1 is located north of ridge line 1 and Creek 2 is located between ridge line 1 and ridge line 2. These flow eastwards, joining together within the eastern part of the Site (into Creek 3) and then flow into a small unnamed lake which overflows onto Inyadda Beach.

The elevation of the Property is approximately 26m AHD on the western side of the Property, dropping to approximately 7m AHD on the eastern side of the Property. Elevations above creeks on the western and central parts of the Property are typically above 8m AHD.

4.4 Surface hydrology and Subsurface Hydrogeology

Rainfall that falls on the Property will follow the surface topology of the Property, draining towards the natural depressions referred to as Creek 1, Creek 2 and Creek 3. Groundwater if present is expected to be above the interface of residual and extremely weathered material and will likely follow the contours of the Property into one of the creeks or towards the east.

4.5 Groundwater

Groundwater boreholes within 2km of the Property are shown on Image 1 following. The nearest groundwater boreholes are listed as follows:

- GW056020: used as a water supply, 510m southwest of the Property, drilled in 1982, drilled depth of 9m;
- GW058302: used as a water supply, 1.15km southwest of the Property, drilled in 1982, drilled depth of 69.2m;
- GW058740: used as a water supply, 1.47km northeast of the Property, drilled in 1981, drilled depth of 33m.

Image 1 Groundwater Map, Minview.

4.6 Site history data sources

Information on the Site's history was obtained from:

- A search of NSW EPA register for listings of the Site and nearby sites;
- Review of historical aerial imagery;
- A Lotsearch title search report (refer appendix C).
- A review of site ownership (refer Appendix D); and
- A review of Council records.

The Site history documentation is summarized in the following sections.

4.6.1 NSW EPA Contaminated Land and POEO Records

Based on an online search conducted on the 6th of July 2022 there are currently no notices on or adjacent to the site on the NSW EPA contaminated land record as shown in Table 4.2.

4.6.2 Historical Aerial Imagery

Aerial imagery from 1961 to present day was reviewed. Select historical images of the area around and including the Site since 1961 are shown on Figure 2. Table 4-4 and presents a summary of observations made during the review.

Table 4-2: Summary NSW EPA search results for Contaminated Land Register

Home Public registers Contaminated land record of notices

Search results

Your search for: Suburb: MANYANA

Search Again Refine Search

did not find any records in our database.

Search TIP

To search for a specific site, search by LGA (local government area) and carefully review all sites listed.

... more search tips

If a site does not appear on the record it may still be affected by contamination. For example:

- Contamination may be present but the site has not been regulated by the EPA under the Contaminated Land Management Act 1997 or the Environmentally Hazardous Chemicals Act 1985.
- The EPA may be regulating contamination at the site through a licence or notice under the Protection of the Environment Operations Act 1997 (POEO Act).
- Contamination at the site may be being managed under the planning process.

More information about particular sites may be available from:

- The POEO public register
- The appropriate planning authority: for example, on a planning certificate issued by the local council under section 149 of the Environmental Planning and Assessment Act.

See What's in the record and What's not in the record.

If you want to know whether a specific site has been the subject of notices issued by the EPA under the CLM Act, we suggest that you search by Local Government Area only and carefully review the sites that are listed.
This public record provides information about sites regulated by the EPA under the Contaminated Land Management Act 1997, including sites currently and previously regulated under the Environmentally Hazardous Chemicals Act 1985. Your inquiry using the above search criteria has not matched any record of current or former regulation. You should consider searching again using different criteria. The fact that a site does not appear on the record does not necessarily mean that it is not affected by contamination. The site may have been notified to the EPA but not yet assessed, or contamination may be present but the site is not yet being regulated by the EPA. Further information about particular sites may be available from the appropriate planning authority, for example, on a planning certificate issued by the local council under section 149 of the Environmental Planning and Assessment Act. In addition the EPA may be regulating contamination at the site through a licence under the Protection of the Environment Operations Act 1997. You may wish to search the POEO public register.POEO public register

6 July 2022

No results were found on the Protection of the Environment Operations Act 1997 public register for the Manyana as shown in Table 4-3.

Table 4-3: Summary NSW EPA search results for PEOE Register

Home Public registers POEO Public Register Licences, applications and notices search

Search results

Your search for: **General Search** with the following criteria

Suburb - Manyana

returned 0 result

Table 4-4: Observations during review of Historical Aerial Imagery

Image Date	Onsite Observations	Offsite Observations
1961	The earliest image for the Property is 1961. The Site appears to be in use as a farm. Within the south-western corner of the Property is a farmhouse and several associated buildings. Two dams are visible on the site, one in the south-western corner of the Property, north of the dwelling (Dam 1) and one to the north-east of the dwelling (Dam 2). The western half of the Site is mainly grassed with some isolated stands of trees. There appears to be three (3) main access tracks visible on the Property with several smaller track coming off these tracks. The main track is aligned north to south through the middle of the Property (NS Track). The other is aligned west to east through the middle of the site (WE Track), but the western part of the track (track 3) is barely visible. The eastern end of the WE track appears to terminate near a water body (Dam 3) on the eastern half of the Property which flows into a creek (creek 3) and to the beach. There appears to be a filled platform adjacent to the Dam 3 (possibly a land jetty). A track is also visible along the northern boundary of the site (this may possibly be the formation of creek 1). The eastern half of the Property is well vegetated except for the south-eastern part near the beach and a portion towards the middle of the Property, which are cleared of vegetation. Other than the lake, the two dams, the creek on the eastern boundary of the Property, and the potential creek along the northern boundary, there are no obvious large-scale drainage lines traversing the site.	Residential development to the south of the Property has commenced with several roads under construction. The township of Bendalong is visible to the north-east of the Site.
1969	The entire Site has been cleared of vegetation except for a stand of trees to the east of the farmhouse and a stand of trees along the creek adjacent to the beach. This clearance of vegetation obscures the WE and NS tracks visible on the 1961 image. To the south of the WE track is a white structure (possibly the Goodsell Grave site). Two additional tracks are now visible on the Site. One traverses the Site from Inyadda Road, though Dam 1 (still visible) and to the east towards Creek 3 (Southern Track). This appears to be an access track but could be the early formation of Creek 2. Dam 2 is no longer visible, but another dam is now visible on this track (or Creek 2) towards the middle of the Property (Dam 4). The second track (Northern Track) is visible starting at the north-eastern corner of the Site at Inyadda Road and traverses eastwards and then south-eastwards towards Creek 3 (this may be the early formation of Creek 1). There is a new dam visible to the north of Creek 3 (Dam 5). Dam 3 is no longer visible. The Site appears to be in use as a farm.	To the south, houses are now being constructed within the township of Manyana. The coastal track (coastal Track) between Bendalong and Manyana is visible. Inyadda Road has been sealed.

Image Date	Onsite Observations	Offsite Observations
1979	Vegetation cover on the Property has increased, especially along the southern and Northern tracks and Creek 3. The farmhouse and associated structures are still visible. Dam 1, Dam 4 and Dam 5 are still visible. The northern and southern access tracks appear more like Creeks (eg Creek 1 and Creek 2).	Additional houses are visible within the township of Manyana.
1987	The farmhouse on the south-western corner of the Property is no longer visible. The southern track has several smaller tracks connecting with it from the north and south. Dam 1 is just visible. Dams 4 and 5 are just visible but appear to be silted. Midway along the southern track is a possible dwelling. There are a few other smaller structures near the southern tracks and on the southern part of the Site (possible shelter for animals). The density of vegetation has increased throughout the Site. There is an access track from the coastal road on the north-eastern corner of the site, which traverses westwards towards the middle of the site and the Northern Track (this is an early form of Track 3). There is also a new track visible within the eastern part of the Property, which traverses from the north-eastern corner of the Property towards the start of creek 3 and then back to the coastal road on the south-eastern part of the Property (Eastern track).	Manyana township is well established with only a few bare lots.
1993(First in colour)	The NW and WE track are again visible. The EW track has now formed Track 1. The southern track is partly visible but appears more like Creek 2. The eastern end of the northern track has formed Track 3 and is in increased use. The eastern track (near the coast) is also more defined due to increased use. The western end of the northern track appears to have formed Creek 1. A large circular track (Motor cross track 1) is visible within the north-western corner of the Property north of Track 1. This appears to be the early formation of the cleared “Area 1”. A white structure is visible within Area 1 (possibly a sea container). There are several tracks that branch out from Area 1 to the north and north-east towards Track 3. To the east of the NS track is a similar smaller circular track which appears to be an area cleared for Motor-Cross use. This appears to be the early formation of the cleared “Area 2”. Located to the south of Track 2, is a new track which traverses south-east to the southern part of the Site. This track is within the current location of Track 2. There are some white items on the ground part way along track 2. Track 2 provides access to a track forming the southern boundary of the Property. Dam 1 appears silted. Dam 4 appears to be containing water. Dam 5 appears silted. Dams 2 and 3 are not visible. No residential structures are visible.	Manyana township is continuing to develop with vacant blocks being infilled.

Image Date	Onsite Observations	Offsite Observations
01/02/2004	The Property is predominantly vegetated with low lying vegetation. The WE track now clearly resembles Track 1. Track 2 and 3 are also now also clearly visible. The eastern (near coastal) track is no longer visible. Areas 1 and 2 are clearly visible and appear to be in use for motor-cross riding and recreational vehicle off roading. Berms typical of those in motocross racing are present in Area 1. Numerous car bodies are visible in imagery. Three possible vehicles are in the southern part of Area 1. Seven locations within Area 2 contain vehicles and objects. Along track 2 the white objects are still visible on the ground (possibly dumped construction material or car bodies). Dam 1, 2 and 3 are not visible. Dam 4 and Dam 5 are visible but appear silted.	Residential development has infilled to the south of the Property. The western boundary of the Site is bounded by Inyadda Drive. To the west of the Inyadda Drive the land is underdeveloped mostly consisting of bushland/farmland. To the north, the land is still undeveloped, mostly consisting of bushland. A dirt road is still visible along the eastern boundary of the Property (the coastal track). This road provides access to Track 3 from Bendalong Road to the north.
20/10/2009	Tracks 1 to 3 and the eastern end of the northern track are still visible. There has been significant vegetation growth on the Property. The residential properties to the south continue to use the area adjacent to the southern boundary of the property. Multiple cars are parked in this area. Access to this area is from Sunset Strip to the east or via No. 24 which is a vacant block and No. 68 Curvers Drive. A small structure is visible on the Site (possibly a shed), to the north of No. 86 Curvers Drive. Miscellaneous items are also visible within this area. The vehicles and objects in Area 1 and 2 appear to have been removed. The berm in Area 1 is no longer present. A vehicle (appears to be dilapidated) is visible in the centre of Area 2. This vehicle was not present in imagery taken on 19/08/2019. Except for Dam 4, none of the original dams are visible. Dam 4 appears silted.	There are no notable changes.
06/09/2011	Numerous white objects are scattered near the southern and western tree line in Area 1. The dilapidated vehicle observed in previous imagery is no longer present. A car is visible on the southwestern tree line in Area 2.	There are no notable changes.
11/10/2013	White objects, potentially construction materials are near the northwestern tree line in Area 1. The car in Area 2 is no longer present in the original location. Another car, possibly the original car appears rusted and is located towards the centre of Area 2.	There are no notable changes.

Image Date	Onsite Observations	Offsite Observations
13/02/2016	Two car bodies are visible in the centre of Area 1. Additional imagery shows these cars were present in late 2015. Many items are littered on the ground near the southern tree line of Area 1. Another object, possible a vehicle is present in Area 2, near the western tree line. Sporadically spread objects are visible near the southern tree line of Area 2. Piles of construction material are visible within Area 3 to the north of No. 76 and No. 90 Curvers Drive. The rear yards of many of the residential properties continue to the north onto the Site. Cars are parked in multiple locations within this area.	There are no notable changes.
2018	Imagery from this time is blurry. No additional changes are noticeable in Area 1. An additional rusted vehicle appears to be present in Area 2.	There are no notable changes.
2022	Imagery shows some large objects to the east in Area 2. There are changes to the vegetation likely due to recent bushfires.	There are no notable changes.

4.6.3 Lot search GIS data base search

A Lotsearch Detailed Database search was requested for the property (refer Appendix C). This report indicates the following:

- There are no sites listed on the Contaminated Land Registry within 500m of the property.
- There is one site registered on the National Waste Management Site Database. This site is the Bendalong Waste Transfer Station owned by Shoalhaven City Council, located 185m to the northwest of the property.
- The site is not the subject of any publicly known PFAS investigation programmes.
- One Licenced Activity under the POEO Act 1997 is registered within 500m to the northwest of the property. The activity is a sewage treatment processing plant.
- Former Licenced and Delicensed EPA activities have occurred on the property. These activities all pertain to the application of herbicides adjacent to creeks within the property. The statuses of these licenses are now surrendered and all were issued by three organisations in September and November of 2000.
- No businesses have been listed as trading from or within 500m of the property. This includes business such as service stations, motor garages or dry cleaners.
- Topographic features indicate a grave is located within the property.
- The property is located to the south east of Conjola National Park.
- Contour mapping indicates the maximum height of the property is 24m AHD on the western boundary, dropping to less than 4m AHD on the eastern part of the property.
- The property is underlain by fractured, or fissured, extensive aquifers of low to moderate productivity,
- The closest groundwater well is within 505m to the south west of the site, (GW056020). This groundwater well is private and intended for domestic purposes.
- There is no naturally occurring asbestos identified in association with the geology that underlies the property.
- The risk of acid sulfate soils (ASS) is mapped as Extremely low (1-5%), class 5 meaning the site is located near areas with known ASS occurrence but the risk of ASS being present on the property is low.
- The property is not mapped as impacted by dry land salinity.
- The property is not mapped as impacted by mine subsidence.
- Part of the property is mapped with ecological constraint, specifically:
- coastal complexes, consisting of coastal swamp and a forest complex. These are located towards the middle of the northern boundary, southern and eastern portion of the property. Parts of these areas are proposed to be developed.
- Dry Shrubby forests, consisting of low land dry shrub forests. These are located towards the northwestern portion of the property. Parts of these areas are proposed to be developed.
- High and moderate groundwater dependant ecosystems are mapped within the property.

4.6.4 Lot search Title search

The property is comprised of three lots (Lot 106 on DO 755923, Lot 2 on DP1121854 and Lot 2 on DP1161638). A Lotsearch title report for the Site was requested (refer Appendix D). The summary of property ownership is provided in Table 4.5.

4.6.5 Review of council and land registry records

Terra Insight utilised Shoalhaven City Council to review relevant information pertaining to the property. This included property files, development applications (DA), complaints history, issues relating to contamination and current and previous zoning. Documents relating to the Inyadda Drive, Manyana Planning Proposal are available on the Shoalhaven City Council website. A summary of the documentation relevant to the Site is provided in Table 4.6.

Table 4-5: Summary of Owners Report – InfoTrack

Date	Ownership Details
(Lot 106 DP 755923)	
2018 – to 2021	**James Walter Douglas Pty Ltd**
1990 – 2018	**Kylor Pty. Limited**
	(Portion 106 Parish Conjola – Area 82 Acres – CTVol 3564 Fol 33)
1987 – 1990	**Kylor Pty. Limited**
1955 – 1987	**John William Antony Curvers, company director**
1943 – 1955	**Victor Hilton Sully, soldier**
1943 – 1943	**John Knight, general merchant** **Joseph Farrar Johnson, motor driver** **Paul Louis Herman Hoffman, labourer**
1924 – 1943	**Jesse Goodsell, grantee**
	(Portion 106 Parish Conjola – Area 82 Acres)
Prior – 1924	**Crown Land**
(1920 – 1924)	***(Conditional Purchase 1920 – 9 Milton to Jesse Goodsell)***
(Lot 2 DP 1121854)	
2018 – to 2021	***James Walter Douglas Pty Ltd***
2009 – 2018	***Kylor Pty. Limited***
	(Lot 204 DP 755923)
1996 – 2009	***Kylor Pty. Limited***
	(Portion 204 Parish Conjola – CTVol 12435 Fol 136)
1987 – 1996	***Kylor Pty. Limited***
1974 – 1987	***John William Antony Curvers, company director***
	(Portion 204 Parish Conjola – Area 58 Acres 2 Roods)
Prior – 1974	***Crown Land***
(1959 – 1974)	***(Conditional Purchase 1959 – 31 Milton to John William Antony Curvers, company director)***
(1951 – 1959)	***(Special Lease 1951 – 108 Milton to Victor Hilton Sully, soldier)***
(1911 – 1951)	***(Conditional Lease 1911 – 1 to Jesse Goodsell)***
(Lot 2 DP 1161638)	
2018 – to 2021*e*	***James Walter Douglas Pty Ltd***
2011 – 2018	***Kylor Pty. Limited***
	(Lot 1070 DP 836591)
1994 – 2011	***Kylor Pty. Limited***
	(Portion 107 Parish Conjola – Area 60 Acres – CTVol 8455 Fol 135)
1987 – 1994	***Kylor Pty. Limited***
1963 – 1987	***John William Antony Curvers, company director***
	(Portion 107 Parish Conjola – Area 60 Acres – CTVol 1540 Fol 141)
1955 – 1963	***John William Antony Curvers, company director***
1943 – 1955	***Victor Hilton Sully, soldier***
1943 – 1943	***John Knight, general merchant*** ***Joseph Farrar Johnson, motor driver*** ***Paul Louis Herman Hoffman, labourer***
(1922 – 1943)	***(lease to Kirton and Earnshaw Limited of part)***
1904 – 1943	***Jesse Goodsell, grantee***

Table 4-6: Summary of Council Historical Records Search

Site	Reference and Date	Comments
Inyadda Drive Planning Proposal, Manyana Shoalhaven City Council	**Urban Design Strategy 10/12/2018**	The zoning is proposed to be changed to R1 – General Residential, R2 – Low Density Residential and E2 – Environmental Conservation. The Site was rezoned in August 1992 to facilitate residential subdivision, commercial uses, golf course and tourist recreational facilities. Site originally identified as the 'Klor Site' during proposal to seek new zoning boundaries under the Shoalhaven Plan 2014 which were approved in 2015. White structure identified to the south of Area 1 in Historical Aerial Imagery is a Heritage Site, known as the Goodsell Grave.
	Kylor PP Attachment A, Appendix C 6/08/2013	The property was cleared for faming between 1950 and 1970. No further development occurred onsite and Site is now revegetated.

5 Summary of desktop Site history review

The following table summarises the significant activities observed in and around the Site from 1950s to the present.

Table 5-1: Summary Desktop review findings

Time Period	On Site	Off Site
1950 to 1987	The Property was in use as a farm between the 1950's and 1980's. The Property was mainly clear of vegetation during this time. Several access tracks were present on the Site and several dams. The main farmhouse was located within the south-western corner of the Property. This was removed prior to 1987 and a new dwelling constructed towards the middle of the Property. No grave is visible on the 1981 historical map covering the property. However, a structure is visible in this rough location the grave on the 1969 aerial image.	Bendalong township was established. Manayan Township was being developed. Inyadda Road was initially a dirt track but was then sealed. A coastal track was established between Bendalong and Manyana. A waste Transfer Station is located to 185m to the northwest of the property.
1987-2004	The Property was purchased by Kylor Pty Ltd in 1987 and rezoned in August 1992 to facilitate residential subdivision. However, no development occurred, and denser vegetation growth became established across the Property. The current tracks (Track 1 to 3) are becoming established. Other tracks have become overgrown. Area 1 and 2 (areas of active motor-cross riding and four wheel driving) are also becoming established. Objects are visible within Areas 1 and 2. These appear to be illegally dumped waste including car bodies. Herbicides were used around the drainage depressions to control vegetation between 2000 and 2001.	The township of Manyana is established.
2004-Present day	To the south of Area 1, a Heritage Site known as the Goodsell Grave is now shown on local mapping in 2015. Access to the Site is continuing to occur via several dirt tracks. These provide access through from Inyadda Road to the west of the Site through the Property (Track 1), from the southern boundary of the Property to the middle of the Site (Track 2), and from the north-eastern corner of Site to the middle of the site (Track 3). These access roads provide access to three cleared areas within the Property and a partly cleared area along the southern boundary of the Site. Inyadda Road provide access along the western edge of the Property. Area 1 appears to be in use for motocross racing and off-road driving.	A sewage treatment processing plants is operating (Conjola Regional Sewerage Scheme) 474m to the northwest of the Property. A waste transfer station is operating to the west of the property. No ground water wells are located within 500m of the Site. Residential dwellings to the south of the Site utilise the southern portion of the Site for residential activities.

Time Period	On Site	Off Site
	According to aerial imagery, the Site has been accessible to the public and has been prone to illegal dumping of cars, residential inert construction materials, and miscellaneous items. Imagery indicates some of these items may have been removed or moved around. In some locations objects on the ground are sporadic. Locations with visible dumping activity are largely within accessible parts of the Site (e.g., Areas 1 to 2). Properties along the southern boundary use the adjacent, partly cleared area of the Site (Area 3). Cars are parked within this area, the gardens of some of the properties encroach onto the Site and miscellaneous items are kept in this area by local residents. No.68 Curvers Drive is used as a major access point to Area 3. New zoning boundaries were approved in 2014.	

6 Site walkover

6.1 Site Walkover in 2019

An experienced Terra Insight geo-environmental engineer made observations of the Site in August 2019. The Site is a large site which has historically been in use as a farm. Consequently, as requested by the client, the site walkover focused only on Areas 1 and 2 and adjacent access tracks to these areas as these areas were identified as having the highest potential for contaminants to be present.

A summary of the relevant observations made during the Site walkover is provided below, annotated on Figure 4, with photographs provided in Appendix F.

- Site observations within Area 1:
  - The area is predominantly flat with a slight fall to the south east with an RL of between 24 to 17m AHD. The surface of the site is undulated with dirt roads and washouts within them,
  - Throughout the area is numerous car bodies some of which have been burnt out,
  - The surface of the area is scattered with foreign material including but not limited to glass bottles, building waste, rubbish, plastic, old fridges, paint containers, bricks and more,
  - Three or four zones within area 1 were observed to have large amounts of dumped building waste, some of which asbestos containing material was sampled for asbestos testing (refer to Figure 6 for locations),
  - In the middle of Area 1 it is predominantly grassed surrounded by thick bush. There are several dirt vehicle tracks in and around the grassed area,
  - The open grassy zone of the Area is where the car bodies are scattered,
  - Most of the dumping was noted to be just off the tracks on the boundary of the bush (r5efer to photograph 6),
  - Near the middle of the area a large mound of waste and vegetation was observed where burning of a mixture of material had occurred. Within this mound asbestos containing material (sample X002) was observed along with other material such as metal, bricks, wood, plastic, glass etc, refer to photograph 8.
- Site observations within Area 2:
  - Area 2 slightly slopes south eastward with an approximate RL of 14 to 8m AHD,
  - Like Area 1, Area 2 is predominantly grassed in the middle and has 3 car bodies scatted throughout this open area,
  - Unlike Area 1 the car bodies within Area 2 have not been burnt-out and appear to be more recent,
  - There is a dirt vehicle track around the perimeter of the grassed centre of the Area in which the dirt road continues northward which from the aerial photography is assumed to provide access to the lot north of the site,
  - Within the area there was notably less dumping other than the few car bodies and the odd paint can and glass bottles,
  - The vegetation on the eastern side of the area was a lot denser than the bush encountered in Area 1 and could be associated with a creek thought to be present near this side of the area (no creek was observed during the site visit).
  - General observations of the Site:
  - Areas surrounding Area 1 and Area 2 is mostly bushland.
  - Motocross and 4WD tracks are found throughout the remaining area, some parts of tracks are lined with tyres.
  - Areas near tracks around Area 1 and Area 2 contain dumped items including dilapidated car bodies and piles of rubbish.

6.2 Site Walkover in 2022

An experienced Terra Insight geo-environmental engineer made additional observations of the Site in August 2022 which included a detailed walkover of all areas proposed for development. The walkover was done in two parts focusing on the Northern parts of the Site inspected in 2019 and then the Southern parts of the Site now proposed for development. Photographs taken during these inspections are provided in Appendix G for the northern section and Appendix H for the southern section.

- Site observations within Northern Site (refer Appendix G):
  - There are some noticeable changes to the previous investigation. Since the 2020 bushfires, much of the vegetation in Area 2 has been destroyed and there is new growth occurring in the lower canopy.
  - There were numerous car burnout car bodies identified in the area. Some of them had "2022" spray painted on them.
  - The surface of the area is scattered with building materials. One pile was observed to be a pile of asbestos containing building materials which was approximately 1m by 1m in size.
  - There were many dirt tracks throughout the area.
  - Most of the dumped materials were noted to be adjacent to tracks. Few foreign items were found deep into the vegetation
  - There were remnants of small fires which included glass, metals and other materials which had been burnt.
- Site Observations within Southern Site (refer to Appendix H):
  - The southern boundary of this area is grassed and backs onto residential lots.
  - Along the boundary are numerous stockpiles of tree logs, garden waste and building materials.
  - The area behind No 108 Curvers Drive is in use by someone as an area for storing, chopping and supply wood for domestic use. Several access tracks from Curvers drive are visible providing ute access to this area.
  - The area behind No. 100 Curvers Drive is used for storing metal sheeting, a boat, timber, paint cans and other building materials (refer to photographs 15-17).
  - There is a small shed that has been constructed about 5m into the bush from the southern boundary. There is an old caravan adjacent to it. There are mattresses, insulation, glass, a lawn mower, a transformer and other objects around the shed and caravan (refer to photographs 19-22).
  - West of this area is the start of a bike track. There are small stockpiles of presumably local soils that have been built over fallen trees for a smooth surface (refer to photograph 18).
  - The bike tracks continue throughout this southern area. There are foreign objects including pieces of plywood and hard plastics creating ramps (refer to photographs 7-9).
  - There is an old light wooden post with wires and coils located to the west of the site there was found amongst the vegetation.
  - An old building foundation was found in the vegetation. This is presumed to date back prior to when there were council records.

7 Preliminary Assessment Findings

7.1 Potential areas of environmental concern

Site history information and site observations indicate that potentially contaminating activities may have occurred across the Site. These are typically associated with the Site's previous use as a farm and trespass of the Site for use which is not consistent with the Site's current bush land setting and non-occupation.

A summary of the potential contaminating activities and their potential areas of impact in the area of proposed development are detailed in table 7.1.

Table 7-1: Summary Desktop review findings

Potential areas of impact	Activity
Area 1 – Large cleared area and surrounding bushland towards the western side of the Site.	Dumping of waste (fly tipped) material, construction material, burning camp fires and cars. Use of the Site for recreational motor-cross and four-wheel driving.
Area 2 – Large cleared area and surrounding bushland towards the middle of the Site.	Dumping of waste (fly tipped) material, construction material, and cars. Use of the Site for recreational motor-cross and four-wheel driving.
Area 3 – Area adjacent to residential properties, along the southern boundary of the Site.	Dumping of waste (fly tipped) material along boundary (potential for construction waste, general house-hold waste) by adjacent residential properties. Active ongoing use of the area by adjacent residents e.g., use of herbicides and pesticides, parking of vehicles, burning campfires. This area is proposed for residential development. Use of the Site for provision of firewood commercially
Area 4 – Area within the south-western corner of the Site	Removal of original farmhouse which is likely to have been constructed using asbestos and lead paints. It is noted that only part of the area is proposed for residential development. Dumping of waste (fly tipped) material and construction material. Use of the Site for motor sports.
Area 5: Area along and around major tracks access through the Site.	Dumping of waste (fly tipped) material. Driving of vehicles. In our original report, this included a small cleared area to the south of Area 2 (which was referred to as Area 3), along Track 2 which is outside of the area of proposed development. In this area there is a small clearing in which flytipping has occurred.
Area 6: Remaining Areas of the Site.	Historic spraying of herbicides/pesticides adjacent to creeks for vegetation control. Historical infilling of dams. Potential removal of unknown structures. Sporadic use of the Site for illegal dumping of waste and motor sports. Most of these areas are not proposed for residential development.

7.2 Potential Contaminants of Concern (CoCs)

The potential contaminants of concern associated with the use of pesticides for vegetation control, dumping of waste, driving of vehicles, burning campfires and the demolition of former structures on the Site are detailed in section 8.1 include the following:

- **Pesticides:**
  The term pesticide covers a wide range of compounds including insecticides, fungicides, herbicides, rodenticides, molluscicides, nematicides, plant growth regulators and others. Among these, organochlorine (OC) insecticides (used successfully in controlling a number of diseases, such as malaria and typhus) were banned or restricted after the 1960s. This was followed by the introduction of synthetic insecticides including organophosphate (OP) insecticides in the 1960s, carbamates in 1970s and pyrethroids in 1980s. Pesticides are likely to have been used along drainage channels west of the Site to manage vegetation. When sprayed it is likely to have been blown by the wind to other areas including potentially the site. They can also flow with rainwater into nearby streams or can seep through the soil into ground water. Pesticides differ according to their effects on various organisms. Selective pesticides are toxic only to the target pests (e.g., termite treatment underneath proposed dwellings). Their persistent in the environment is dependent on each individual chemical's composition and the environment in which they are used. Typically, persistence is less than 5 years, with DDT and copper-based pesticides being a few of the exceptions. Such chemicals are typically used within proposed building footprints.
- **Total recoverable hydrocarbons (TRH), BTEX, PAHs (poly aromatic Hydrocarbons) and PCBs (Polychlorinated Biphenyl's):**
  These contaminants may potentially exist if fuel or oil was spilled accidently onto the source Site of the fill and then become entrapped within the fill. TRH and BTEX (benzene, toluene, ethylbenzene, and xylene) are not considered to be persistent in the environment due to their volatile nature. Some of these contaminants are typically used in oils. PCBs are generally non-soluble in water, non-volatile and resistant to flame, thermal and chemical degradation. PCBs are therefore relatively persistent in the environment and can bio-accumulate. PAHs are relatively persistent in the environment, due to their chemical composition, however in aerobic environments, bacteria can degrade PAHs.
- **Heavy Metals:**
  Heavy metals are likely to be associated with leaks of leaded fuel and from old paints which are known to contain lead and other heavy metals. Galvanised roofing may also be associated with elevated level of zinc. Such contaminants may also be associated with historical importation of fill materials (if this occurred) on the site.
- **Asbestos:**
  This material was used in construction of buildings prior to the 1990's. However, such material can also be associated with historical illegal dumping on the site or entrapment within fill material brought onto the Site. Although asbestos can enter the environment through the breakdown of natural deposits, the presence of asbestos on Site is mainly via the deterioration of manufactured asbestos products. Asbestos fibres do not breakdown in air or dissolve in water, and so they have the potential to be suspended or re-suspended and to travel large distances (by air and/or water) before settling. The larger fibres tend to settle more readily. Asbestos fibres do not readily move through the soil, and in general do not breakdown to other compounds, and therefore persist in the environment.

7.3 Potential receptors of concern

Review of historical aerial photographs and surrounding land uses indicates the following potential receptors of concern:

Table 7-2: Potential contamination-based pathways and receptors

Sources	Pathway	Receptor
Asbestos impacted soils	Inhalation of fugitive dust / airborne fibres	Construction/Maintenance Workers
		Current site occupiers
		Future Site occupiers
		Current fauna
	Inhalation of vapours	Construction/Maintenance Workers

Sources	Pathway	Receptor
Petroleum hydrocarbons, PAH, heavy metals, TPH, pesticides and BTEX		Current site occupiers
		Future Site occupiers
	Ingestion and absorption by direct contact	Future Site occupiers
		Current site occupiers
	Migration by surface run-off	Surface waters
	Migration by liquid flow	Surface waters
		Aquatic systems
	Plant uptake	Local flora
		Ingestion of home-grown vegetables

7.4 Conceptual Site model

The conceptual Site Model (CSM) detailed herein defines:

- the potential contaminants which may be present on the site from current and historical site uses,
- the potential areas these contaminants may be present;
- the receptors that may be impacted by these contaminants; and
- the potential pathways through which these receptors may be impacted.

In this Conceptual Site model (CSM), a contaminant can be any substance, which is in, on or under the land and which has the potential to cause harm or to cause pollution of controlled waters. A pathway is defined as one or more routes or means by, or through, which a receptor is being or can be exposed to, or affected by, a contaminant.

The CSM also provides an assessment of the risk associated with these potential contaminants on the site to allow for the identification and prioritisation of areas for further assessment.

Locations of Areas of Potential Environmental Concern are given in Figure 3. Table 7.3 summarises the following in a conceptual Site model (CSM) for the Site, specifically:

- The potential area of environmental concern (AEC) identified on the Site,
- The potential contaminating activities which are associated with the AEC identified on the Site;
- The potential contaminants of concern associated with the AEC identified on the Site; and
- The likelihood of contamination.

Table 7-3: Preliminary Conceptual Site Model

AEC	Potential Areas of Environmental Concern (See also Figure 3)	Potentially Contaminating Activity/Source	Sub Component / Description	Likelihood of Contamination*	Potential Chemicals of Concern
AEC 1	Cleared area (Area 1) used recreationally	Dumping of waste (fly tipped) material. Burning campfires Use of the area for motor-cross riding and by 4WDs	Potentially contaminants within the fly tipped and burnt material including construction material waste, asbestos, car bodies. Leaks from cars and motor bikes	**HIGH likelihood of contaminants being present** based on-ease of access to the Site by the public and the visibly deteriorated car bodies observed in historical aerial imagery and during the Site walkover.	Asbestos, lead, zinc, arsenic, PAHs, PCBs, BTEX, TRH.
AEC 2	Cleared Area (Area 2) used recreationally	Dumping of waste (fly tipped) material. Use of the area for motor-cross riding and by 4WDs	Potentially contaminants within the fly tipped material including construction material waste, asbestos, car bodies. Leaks from cars and motor bikes	**HIGH likelihood of contaminants being present** based on-ease of access to the Site by the public and the visibly deteriorated car bodies observed in historical aerial imagery and during the Site walkover.	Asbestos, lead, zinc, arsenic, PAHs, PCBs, BTEX, TRH.
AEC 3	The area immediately adjacent to the existing residential properties along the southern boundary of the Site.	Dumping of waste (fly tipped) material. Active use of the area by adjacent residents Burning of campfires Construction of unauthorised structures Stockpiling of wood and building materials	Potentially contaminants within the fly tipped material including construction waste and asbestos. Potentially contaminating residential activities, including use of herbicides and pesticides to manage vegetation, disposal of household chemicals, and leaks associated with the parking of cars for extended periods.	**HIGH likelihood of contaminants being present** as there has been significant use of this area by adjacent and local residents campfires, sheds and some storage of materials and including dumping of building materials and other foreign objects.	Asbestos, lead, zinc, arsenic, PAHs, PCBs. Herbicides and Pesticides.

AEC	Potential Areas of Environmental Concern (See also Figure 3)	Potentially Contaminating Activity/Source	Sub Component / Description	Likelihood of Contamination*	Potential Chemicals of Concern
AEC4	Area on south-western corner of Site.	Historical farm buildings now removed	Potential for these buildings to have contained asbestos and heavy metals (lead)	**MODERATE- potential for contaminants to be present** as the buildings are likely to have been removed without specialist assistance. Remnants of the previous structures were not observed during the Site walkover excluding a small section of foundation	Asbestos, lead, zinc, arsenic, PAHs, PCBs. Herbicides and Pesticides
AEC 5 (Sub areas 1 to 3)	Major access tracks (Track 1, 2 and 3) connecting cleared areas within the Site from boundaries.	Dumping of waste (fly tipped) material, use of the tracks by motor vehicles and bikes	Potentially contaminants within the fly tipped material.	**MODERATE likelihood of contaminants being present** based on the ease of access to the Site but also the lack of significant dumping observed along the tracks during the Site walkover.	Asbestos, lead, zinc, arsenic, PAHs, PCBs, BTEX, TRH.
AEC6	Remaining areas of the Site, predominantly consisting of bushland and minor tracks.	Dumping of waste (fly tipped) material	Potentially contaminating fly tipped material.	**LOW likelihood of contaminants being present** based on the extent of illegally dumping there is a moderate potential for contamination near actively used areas on the Site and along minor tracks. Areas that are isolated and heavily vegetated have a lower likelihood for contamination due to limited access. However, most of these parts of the Site are not being developed.	Asbestos, lead, zinc, arsenic, PAHs, PCBs, BTEX, TRH.
	Potential use of pesticides and herbicides around creeks on the remainder of the site.	Potential historic spraying of herbicides/pesticides adjacent to creeks for vegetation control.	Use of OCC and OCP chemicals along water ways	**LOW likelihood of contaminants being present** likelihood of potential soil contamination as use of herbicides along the drainage areas has ceased and any historical pesticide use would have been biologically degraded with time. The exception to this would be DDT which is unlikely to have been used in such a sensitive environment. It is noted that no residential development is proposed for this part of the Site. The area associated with the creeks is to set aside for green space within the development.	Pesticides, herbicides

AEC	Potential Areas of Environmental Concern (See also Figure 3)	Potentially Contaminating Activity/Source	Sub Component / Description	Likelihood of Contamination*	Potential Chemicals of Concern
AEC 6 cont.	Unknown buildings now removed	Demolished and deteriorated structures	Potential for these structures to have been constructed from hazardous materials	**LOW likelihood of contaminants being present** likelihood as little evidence on historical aerial images of existing structures on the Site except the old farmhouses.	Asbestos, lead, zinc, arsenic, PAHs, PCBs, BTEX, TRH.
	Old creeks and dams	Silting of these dams and potential filling of these dams with material won from off-site	Contaminants within any imported fill or fill won from the site	**LOW likelihood of contaminants being present** likelihood as aerial images suggest the dams and drainage depression have been filled by natural siltation processes and are not located within the area proposed for development.	Asbestos, lead, zinc, arsenic, PAHs, BTEX, TRH.

8 Detailed Soil Sampling Investigation

8.1 Subsurface Conditions from 2019

In the previous investigation that was conducted in 2019 boreholes were excavated across the Site for both contamination and ASS testing. Soils samples for contamination testing were generally taken from depths between 0m to 0.3m across the Site, from within near surface soils. Further samples for ASS testing were taken from depths up to 1.3m. Materials encountered were typically the following:

- Topsoil: consisting of Sandy CLAY of low to medium plasticity, red brown, brown, trace of fine gravel, foreign items in parts. Encountered at depths from 0 to 0.3m.
- Alluvial/Residual: consisting of Sandy CLAY to CLAY of medium to high plasticity, dark grey-brown, brown with fine to medium sand, trace of fine angular gravel. Encountered at depths between 0.2m to 1.2m across the Site.
- Extremely Weathered Material: consisting of material recovered as SAND, Silty SAND and Sandy CLAY, typically fine to coarse sand, yellow brown, low plasticity fines. Encountered at depths between 0.4m and 1.3m across the Site.

In test location BH08, fill was encountered to depths of 1.2m and in test location BH18, colluvial soil was encountered to depths of 0.6m.

8.2 Sampling Plan 2022

The areas of the Site that are to be developed have an approximate total area of 28 Ha. Prior to the field investigation, the AECs identified during the desk study and previous PSI, were “walked over” to identify areas where there would be a higher potential for contaminants to be present, such as adjacent to waste piles, in campfires, burnt out car bodies, potential asbestos containing materials, treated wood etc. The sampling plan developed for the additional investigation was comprised of the following:

- Northern Area: Additional sampling and testing to in fill any data gaps in the areas previous sampled in 2019 or to address any new areas of concern identified during the recent walkover. Samples were number D12 to D21.
- Southern Area: Detailed sampling and testing in the southern part of the site not yet investigated but now proposed for development. Samples were number D1 to D11.

The 2019 investigation identified Area 1 and Area 2 as having a high risk for contamination and in Stage 1, and subsequently twenty-four (24) locations were sampled across these areas. These two cleared areas were targeted as 1) they were identified in the clients brief specifically for assessment, 2) they were assessed as having the highest potential for contaminants to be present than other AECs subsequently identified on the site during the desk study phase of the PSI, and 3) were within the areas proposed for residential development.

In the Northern Area, any AECs that needed further sampling were identified in the PSI report with appropriate recommendation made. These recommendations were reviewed as part of the current investigation, with a more targeted sampling regime for the Northern Area adopted to infill any missing data gaps. Areas of Environmental Concerns AEC 1 and AEC 2 in the Northern Area, identified during the previous 2019 PSI, were associated with active use of the Site by the public for motor sports and for illegal dumping (fly tipping) of waste material. Since then, more potentially contaminating activity has been observed across these areas (including bush fires which allowed increased access to parts of the Site). Consequently, additional sampling was deemed required.

The southern section of the proposed development was not assessed in the prior investigation as at the time it was not planned to be developed. This part of the Site was therefore targeted for detailed investigation with 11 samples locations adopted.

Based on the historical aerial imagery and findings during the Site walkover, a targeted methodology was deemed most appropriate to detect potential contamination. Samples were taken from the locations using an excavator with bucket and/or augur attachment where the site was accessible and by spade where access was limited. The sampling locations were taken from the near surface materials (0.0-0.3m depth) as these were deemed most likely to be

impacted by the contaminating activities. No filling, other than some stockpiling, was observed on the Site. The locations of the sampling areas are shown on Figure 6 and 7.

8.3 Field Investigation Methodology

The field investigation was conducted on the 30th of June 2022. The investigation included the following:

- A grid walkover of the Site to detect the presence of asbestos on the ground surface;
- Sampling at 24 locations in 2019 and 21 locations across the Site in 2022. Sampling was undertaken at 45 locations in total;
- Testing for COCs including heavy metals, asbestos, PAHs, BTEX and hydrocarbons.
- The procedure involved the following:
  - Sampling using a spade to a depth of 0.3m into natural soils
  - Samples were collected of the dug-up materials.
  - Discrete samples were collected and placed in glass jars and placed within a chilled esky.
  - A bulk sample was taken from each hole was sieved. The sieved material was composited and bagged for asbestos testing. Composite samples included material from 2-3 nearby test locations to reduce laboratory cost.
- To prevent cross-contamination of soil samples, vinyl gloves were worn and changed between each sample. Soil samples were placed into laboratory provided acid-washed jars, or plastic bags. The soils were placed in a chilled ice chest (Esky) for delivery to the laboratory.
- The jars were filled to ensure minimum head space.
- The samples were accompanied by a chain of custody (COC) form identifying the analyses required for each sample.
- The supervision of the sampling of the materials encountered was undertaken by a Principal Geo-environmental Engineer;
- For quality control purposes, the following samples were also taken:
  - An intra-lab duplicate and triplicate sample was taken and submitted for testing to Eurofins ;
  - A tripblank sample was kept in the chilled esky and subject to testing.
- As the samples were taken direct from the auger pile, no rinsate sample was collected.

8.4 Laboratory Testing

It should be noted that many of the tests undertaken by the laboratory are implemented on a small sub-sample of the original sample provided by Terra. For some tests, the whole sample is screened for the potential contaminant such as for asbestos. This was considered in the sampling and testing regime.

Discrete samples only were taken from the surface material for testing of heavy metals, hydrocarbons and pesticides. The material from the test location was sieved. Any foreign material observed in the tailings was photographed. From the sieved sample, a grab sample was taken for further laboratory analysis for asbestos. The following samples were collected and submitted for analysis (refer Appendix G for test certificates):

- Discrete: samples from surface material were taken. All were used to assess for heavy metals. Hydrocarbon, PAH, and BTEX contamination. Sampling locations from the 2019 investigation were named BH01 to BH24. Samples locations from the 2022 investigation were named D1 to D21.
- Asbestos grab samples: These samples were taken from bulk samples sieved over a 7mm sieve. Foreign material identified during the sieving process were photographed. The ten samples were then sent to a NATA registered laboratory to assess for the presence of asbestos fines and fibres. Any foreign materials potentially contain asbestos were subject to further laboratory assessment.
- One (1) trip blank sample was taken and assessed for volatiles
- Two (2) duplicate samples were taken and assessed for volatiles and heavy metals.

9 Review of Investigation Findings.

9.1 Published guidelines and framework for contamination assessment

This contamination assessment detailed within has been prepared with reference to the following:

- DECC NSW Contaminated Sites Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997 (2009);
- DEC NSW Contaminated Sites Guidelines for the NSW Auditor Scheme (3RD Ed. – 2017);
- NEPC National Environmental Protection (assessment of Site Contamination) Measure, Schedule B (1) Guidelines on Investigation Levels for Soil and Groundwater (1999, revised 2013);
- NEPC National Environmental Protection (assessment of Site Contamination) Measure, Schedule B (2) Guidance on Site Investigation (1999, revised 2013);
- NSW EPA Contaminated Sites Sampling Design Guidelines (1995);
- NSW EPA Contaminated Sites Guidelines for Consultants Reporting on Contaminated Sites (1997); and
- NSW EPA and Department of Urban Affairs and Planning Guidelines SEPP (Resilience & Hazards) 2021.

These guidelines are used to identify levels of contamination that may pose ecological or health risks to future users of the Site. These documents provide guidelines for the derivation of levels (for various contaminates), above which further assessment is required to assess the potential impact on human health and the environment.

9.2 Derivation of Investigation levels for further assessment

9.2.1 VENM and background Investigation Levels

The initial assessment of the soils on the Site involved assessing whether the maximum or average concentrations for V/ENM (as published in the Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulations) were exceeded and whether the level of contaminants detected were above typical background levels.

This approach was undertaken, as in most cases, the health investigation and environmental investigation levels (HIL and EIL) are the same or higher than the ENM maximum average concentration guidelines values. Consequently, where exceedances of the average V/ENM guideline concentration were observed, a detailed review of the Health Investigation Levels (HIL) and/or Ecological Investigation Levels (EILs) was deemed warranted. It is noted that the VENM guidelines require soils to have a pH between 5 and 9. Testing indicates the soils have pH values between this range.

9.2.2 HIL Investigation Levels

For the purpose of assessments, Health Investigation Levels (HILs) are available for four (4) generic land-use categories as follows:

- HIL A : Standard residential with garden/ accessible soils (home produced < 10%), no poultry, includes childcare centres, preschools, and primary schools;
- HIL B : Residential with minimal opportunities for soil access, includes dwellings with full and permanently paved yard space such as high rise buildings;
- HIL C: Includes developed open spaces such as parks, playgrounds, playing fields, secondary schools, and footpaths. Does not include undeveloped public open spaces which should be site -specific assessment.
- HIL D: Commercial / Industrial includes premises such as shows, offices, factories and industrial sites.

The Site is a residential site which will be residentially developed. This use meets the definition of a HIL(A) site. Consequently, appropriate tier 1 soil screening criteria for HIL (A) site have been adopted as follows:

- Health Investigation Levels (HIL) A (residential with access to soil) for soil contaminants as per Table 1A (1) of Schedule B1 of the National Environment Protection (Assessment of Site Contamination) Measure 1999 as amended 2013 (ASC NEPM).

In addition to the above, and where the above is silent, analytical results were compared against screening criteria in the following guidelines:

- **Asbestos:** WA Department of Health (2009) Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (referred to herein as the WA Guidelines) and Table 7 Schedule B(1) NEPM 1999. These guidelines are discussed in detail in section 8.5.3.
- **Hydrocarbons, BTEX:** health screening levels from schedule B of the ASC NEPM and the CRC Care guidelines were adopted for fine soils as the soils were sandy to silty clays. A depth of 0m to 1m was adopted for the soil vapour health screening levels. Assessment was also undertaken using the HSL for direct contact. Details are as follows:

Table 9-1: Summary of TPH HSL

Analyte	HSL Health screening for vapour Intrusion (mg/kg) Ref Table 1A(3)	HSL direct contact (mg/kg) (Ref CRC Care)
F1 C6-C10	50	4400
F2 C10-C16	280	330
F3 C16-C34	NL	450
F4 C34-C40	NL	6300
Toluene:	480	14000
Xylenes:	0.7	100
Benzene	110	12000
Ethylbenzene	NL	4500

- **PAHs :** health screening levels from schedule B of the ASC NRPM have been adopted for the HIL A site . The following health investigation levels were adopted:
  - Benzo(a)pyrene: 3mg/kg; and
  - Total PAH: 300mg/kg.
- **Heavy Metals:** health screening levels from schedule B of the ASC NEPM for areas classed as HIL A (Residential with access to soils). The following health screening levels were adopted:
  - Arsenic: 100 mg/kg;
  - Cadmium: 20 mg/kg;
  - Chromium: 100 mg/kg;
  - Copper: 6000 mg/kg;
  - Lead: 300 mg/kg;
  - Mercury: 40 mg/kg;
  - Nickell: 400 mg/kg; and
  - Zinc: 7400 mg/kg.

9.2.3 Ecological Investigation Levels

Analytical results were compared initially with the Ecological Investigation Levels (EILs) presented in Schedule B1 of the ASC NEPM (2013), where available, to determine potential risks to current and future ecological receptors at the Site or near the Site. For other analytes, potentially phytotoxic to plants, the NEPM 1999 provisional phytotoxicity based investigation levels (PBILs) were also initially referenced. Reference was also made to the ANZECC B Environmental Investigation Levels.

It is noted that certain ASC NEPM (2013) EIL values rely on site specific inputs and calculations, whereas the (now rescinded) NEPM (1999) PBILs are indicative concentrations aimed at protecting plant health and were derived specifically for clayey soils or soils of a closely similar texture with a pH of 6 to 8. They were intended for assessment screening purpose only.

In the 2019 testing, local information was used to derive the EILs. In 2022, site specific testing to assess inputs to allow refinement of the ASC NEPM EILs for copper, chromium (III), nickel, and zinc was undertaken in accordance with the ASC NEPM 2013 guidelines. These Site-specific inputs include:

- Cation exchange capacity (CEC) 22;
- Soil iron content 9;
- Soil organic carbon content (OC) 6.3; and
- Soil pH 5.5.

These are used to derive the added contaminant limit (ACL). The ambient background concentration (ABC) is also required for each metal. The sum of the ACL and the ABC provides the EIL. An incomplete value is provided in the ASC NEPM for lead (i.e. just the ACL), where ABC must be added. EIL are also provided for arsenic, naphthalene and the pesticide DDT.

Having considerations for Site specific EIL calculation factors, any metals in the soils on the Site were considered 'aged', i.e. have been present for >2 years in current landform. The clay content of the soil is assumed to be at least 20% based of field observations. Cation Exchange Capacity values for (CEC) for sample D11 was determined by the laboratory to be for light clays a value of 22cmol/kg and soil pH of (based on laboratory testing) is used, a laboratory determined total organic carbon content of 6.3% and an iron content of 71% (based on laboratory testing) were adopted to derive the EILs. The EILS for residential areas are derived as follows (refer appendix I):

- Mercury: 1mg/kg;
- Cadmium: 3mg/kg;
- Arsenic: 100 mg/kg;
- Lead: 1100 mg/kg;
- Copper: 160 mg/kg;
- Nickel: 300 mg/kg;
- Chromium (III): 380 mg/kg; and
- Zinc: 350 mg/kg.

The ASC NEPM also provides ecological screening levels (ESL) for petroleum hydrocarbons and associated compounds, as Table 1B (6) of Schedule B1. These criteria are provided for fine- and coarse-grained soils. Visual assessment indicates the soils on Site are sandy clays to silty clays. However, laboratory testing indicates a clay content of 8%. Terra has undertaken site classifications and infiltration testing for sites adjacent and near the property, which indicate the soils are fine grained and medium plasticity and not granular. Consequently, the laboratory %Clay findings is deemed erroneous. The other soil characteristics data listed above is within the expected range for the soils on the site. As the primary concern was for fine grained soils, these criteria were used.

- C6-10: 180mg/kg;
- C10-C16: 120mg/kg;
- C16-C34: 1300mg/kg;
- C34-C40: 5600 mg/kg;
- Benzene: 65mg/kg;
- Ethylbenzene: 125mg/kg;
- Toluene: 105mg/kg;
- Xylene: 45mg/kg; and
- Benzo(a)pyrene: 0.7mg/kg

9.2.4 Asbestos Soil Contamination and Health Risk

The assessment of asbestos described here is for the sole purpose of site contamination assessment purposes. The principle guidance is as follows, noting reference (1) is based on reference (2):

1. Schedule B1 of the National Environment Protection (Assessment of Site Contamination) Measure, 2013 Amendment (National Environment Protection Council (NEPC), 1999) (ASC NEPM (1999, as amended 2013)); and

2. Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (WA DoH 2009).

The AC NEPM guidance applies to the assessment of known and suspected asbestos contamination in soil and addresses both friable and non-friable forms of asbestos. Most assessments will involve non-friable bonded forms of asbestos-containing-material (bonded ACM) as this is the most common type of asbestos soil contamination in Australia. The guidance is not applicable to asbestos materials which are:

- wastes such as demolition materials present on the surface of the land; or
- asbestos materials in buildings or structures including operational pipelines.

For the purpose of assessing the significance of asbestos in soil contamination, three terms are used in Schedule B1 of the ASC NEPM which are based on WA DoH (2009).

Table 9-2: Reproduction of Table 6-1 from Schedule B1 of the ASC NEPM (Equivalency of terms used in the NEPM, WA DoH (2009) and Work Health and Safety legislation and guidelines)

NEPM terminology (based on WA DoH 2009)	Work Health and Safety terminology
Bonded asbestos-containing-material or 'bonded ACM' *(referred to as ACM in WA DoH 2009)*	Bonded asbestos/non-friable asbestos
Fibrous asbestos, FA	Non-bonded/friable asbestos
Asbestos fines, AF	

Bonded ACM

Bonded ACM comprises asbestos-containing-material, which is in sound condition, although possibly broken or fragmented, and where the asbestos is bound in a matrix such as cement or resin (e.g. asbestos fencing and vinyl tiles). This term is restricted to material that cannot pass a 7 mm x 7 mm sieve. This sieve size is selected because it approximates the thickness of common asbestos cement sheeting and for fragments to be smaller than this would imply a high degree of damage and hence potential for fibre release.

Bonded ACM is equivalent to 'non-friable' asbestos in Safe Work Australia (2011), which is defined therein as 'material containing asbestos that is not friable asbestos, including material containing asbestos fibres reinforced with a bonding compound'.

Fibrous Asbestos (FA)

FA comprises friable asbestos material and includes severely weathered cement sheet, insulation products and woven asbestos material. This type of friable asbestos is defined here as asbestos material that is in a degraded condition such that it can be broken or crumbled by hand pressure. This material is typically unbonded or was previously bonded and is now significantly degraded (crumbling).

Asbestos fines (AF) AF includes free fibres, small fibre bundles and also small fragments of bonded ACM that pass through a 7 mm x 7 mm sieve. (Note that for bonded ACM fragments to pass through a 7 mm x 7 mm sieve implies a substantial degree of damage which increases the potential for fibre release.)

From a risk to human health perspective, FA and AF are considered to be equivalent to 'friable' asbestos in Safe Work Australia (2011), which is defined therein as 'material that is in a powder form or that can be crumbled, pulverised or reduced to a powder by hand pressure when dry, and contains asbestos'.

Asbestos only poses a risk to human health when asbestos fibres are made airborne and inhaled. If asbestos is bound in a matrix such as cement or resin, it is not readily made airborne except through substantial physical damage.

Assessment and management of asbestos contamination should take into account the condition of the asbestos materials and the potential for damage and resulting release of asbestos fibres. Bonded ACM in sound condition represents a low human health risk. However, both FA and AF materials have the potential to generate, or be associated with, free asbestos fibres. As a result, FA and AF must be carefully managed to prevent the release of asbestos fibres into the air.

Schedule B1 of the ASC NEPM notes that it is an inappropriate response to declare a site a human health risk on the basis of the presence of bonded ACM alone. However, if the bonded material is damaged or crumbling (that is, it has become friable), it may represent a significant human health risk if disturbed and fibres are made airborne.

Schedule B1 of the ASC NEPM states that the site-specific assessment of sites contaminated with asbestos in soil should be aimed at describing the nature and quantity of asbestos present in sufficient detail to enable a risk management plan to be developed for the current or proposed land use. The management plan should address potential scenarios for the relevant land use(s) whereby asbestos fibres may become airborne and pose a human health risk.

Health screening levels for asbestos in soil, which are based on scenario-specific likely exposure levels, are adopted from the WA DoH guidelines and are listed in Table 8.4.

Table 9-3 Health Screening Levels for Asbestos Contamination in Soil

	Health Screening Level (w/w)			
Form of asbestos	**Residential A[1]**	**Residential B[2]**	**Recreational C[3]**	**Commercial/ Industrial D[4]**
Bonded ACM	0.01%	0.04%	0.02%	0.05%
FA and AF[5] (friable asbestos)	0.001%			
All forms of asbestos	No visible asbestos for surface soil			

1. Residential A with garden/accessible soil also includes children's day care centres, preschools and primary schools.
2. Residential B with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments.
3. Recreational C includes public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and unpaved footpaths.
4. Commercial/industrial D includes premises such as shops, offices, factories and industrial sites.
5. The screening level of 0.001% w/w asbestos in soil for FA and AF (i.e. non-bonded/friable asbestos) only applies where the FA and AF are able to be quantified by gravimetric procedures (refer Section 4.10). This screening level is not applicable to free fibres.

Schedule B1 notes that there are various acceptable means to provide confidence that the soil surface is free of visible asbestos including, but not limited to, multi-directional raking of soil to about 10 cm depth picking of asbestos fragments or covering with a durable hard cover. The requirement for the soil surface to be free of visible asbestos applies to both assessment and remediation phases.

Assessment of bonded ACM is the recommended measure for total asbestos contamination where FA and AF (derived from bonded ACM only) are not likely to be significant as established by the preliminary site

investigation (PSI) including the site inspection (as a guide, this may be taken to be where FA and AF are likely to make up less than 10% of the total amount of asbestos present).

The asbestos concentration calculations are based on the amount of asbestos equivalent (i.e. asbestos in asbestos-containing-materials) in a measured/estimated amount of soil, expressed as a % weight for weight. The soil volume may be one or more individual 10 L samples from specific soil units or the area of a grid square multiplied by the investigation depth for raking and tilling methods (refer Schedule B2).

As outlined in enHealth (2005), the quantity of asbestos in soil may be estimated as follows:

%w/w asbestos in soil = % asbestos content x bonded ACM (kg) /soil volume (L) x soil density (kg/L)

In the example included in enHealth (2005) it was assumed that: % asbestos content (within bonded ACM) = 15% and soil density (for sandy soils) = 1.65 kg/L More representative results for asbestos concentration in soil can be calculated if the parameter values are analysed rather than assumed.

The assumption of 15% asbestos by weight in bonded ACM for sites contaminated with cement bonded ACM only is acceptable because typical compositions for bonded ACM products used in Australia are 10-15% asbestos by weight. However, other bonded products may contain much larger proportions of asbestos, e.g. asbestos vinyl floor tiles may contain 8-30% asbestos (Workplace Health and Safety Queensland, 2011).

Table 9-4 Parameters Used for Asbestos Quantity Assessment

Parameter	*Value*	*Rationale*
% asbestos content	15	Constant, as provided in ASC NEPM.
Bonded ACM (kg)	Cell Specific	Site Specific.
Soil Volume (L)	40,000	Based on 20 x 20 m by 0.1 m depth being 40 m^3 and where 1 m^3 = 1,000 L.
Soil Density (kg/L)	1.65	Straight adoption of the ASC NEPN quoted value noting that this is reasonable for sandy soils.

Note that the quantity assessment reported herein is to be considered indicative only as due to the volume of ACM not all fragments may have been observed / recovered.

9.3 Summary of Laboratory Findings

The laboratory test certificates, and summary of the laboratory results are provided in Appendix J. Table 9-1, Figure 7 and the following sections summarises the key exceedances from investigations in 2019 (BH01-BH18) and 2022 (D1-D21).

Table 9-5: Summary of Exceedances by Location

Sample and Location	Guideline levels (ppm)					
	HIL	HSL (A)	EIL	CT1 Waste Class	ENM	Background Levels
Northern part of the Site						
BH01						
Nickel – 53 mg/kg	No	NA	No	**Yes** (40 mg/kg)	No	No
BH02						
Nickel – 47 mg/kg	No	NA	No	**Yes** (40 mg/kg)	No	No
BH03						
Nickel – 90 mg/kg	No	NA	No	**Yes** (40 mg/kg)	**Yes** (60 mg/kg)	No
BH04						
Chromium – 211 mg/kg	No	No	No	No	**Yes** (150 mg/kg)	No
Nickel – 141 mg/kg	No	NA	No	**Yes** (40 mg/kg)	**Yes** (60 mg/kg)	No
BH06						
Nickel – 41 mg/kg	No	NA	No	**Yes** (40 mg/kg)	No	No
BH07						
Nickel –194 mg/kg	No	NA	No	**Yes** (40 mg/kg)	**Yes** (60 mg/kg)	No
BH08						
Chromium – 165 mg/kg	No	No	No	No	**Yes** (150 mg/kg)	No
Nickel – 146 mg/kg	No	NA	No	**Yes** (40 mg/kg)	**Yes** (60 mg/kg)	No
BH11						
Chromium – 152 mg/kg	No	No	No	No	**Yes** (150 mg/kg)	No
Nickel – 48 mg/kg	No	NA	No	**Yes** (40 mg/kg)	No	No
BH12						
Nickel – 44 mg/kg	No	NA	No	**Yes** (40 mg/kg)	No	No
BH14						
Chromium – 154 mg/kg	No	No	No	No	**Yes** (150 mg/kg)	No
BH17						
Chromium – 186 mg/kg	No	No	No	No	**Yes** (150 mg/kg)	No
BH18						
Copper - 617 mg/kg **TCLP - <0.1 mg/L**	No	NA	**Yes** (230 mg/kg)	No	**Yes** (200 mg/kg)	No
Lead – 506 mg/kg **TCLP – 0.1 mg/L**	**Yes** (300 mg/kg)	NA	nO	**Yes** (100 mg/kg)	**Yes** (100 mg/kg)	No
Nickel – 82 mg/kg	No	NA	No	**Yes** (40 mg/kg)	**Yes** (60 mg/kg)	No
Zinc – 2030 mg/kg	No	NA	**Yes** (350 mg/kg)	NA	**Yes** (300 mg/kg)	**Yes** (300 mg/kg)
BH19						
Chromium – 152 mg/kg	No	No	No	No	**Yes** (150 mg/kg)	No

Sample and Location	Guideline levels (ppm) HIL	HSL (A)	EIL	CT1 Waste Class	ENM	Background Levels
BH21						
Chromium – 184 mg/kg	No	No	No	No	**Yes** (150 mg/kg)	No
BH23						
Chromium – 156 mg/kg	No	No	No	No	**Yes** (150 mg/kg)	No
D12						
Chromium –170 mg/kg	No	NA	No	No	Yes (150 mg/kg)	No
Total C10-C36 – 648mg/kg	NA	NA	NA	NA	**Yes** (500 mg/kg)	**NA**
D13						
Arsenic- 21mg/kg	No	NA	No	No	NO (40 mg/kg)	No
Zinc – 570 mg/kg	No	NA	**Yes** (350 mg/kg)	NA	**Yes** (300 mg/kg)	**Yes** (300 mg/kg)
D14						
Total C10-C36 – 527mg/kg	NA	NA	NA	NA	**Yes** (500 mg/kg)	**NA**
D15						
Chromium – 210 mg/kg	No	NA	No	No	Yes (150 mg/kg)	No
Nickel – 68 mg/kg TCLP – 0.11 mg/kg	No	NA	No	**Yes** (40 mg/kg)	**Yes** (60 mg/kg)	No
F2>C10-C16-430 mg/kg	No	**Yes** (330 mg/kg)	**Yes** (120 mg/kg)	NA	NA	NA
Total C10-C36 – 1280mg/kg	NA	NA	NA	NA	**Yes** (500 mg/kg)	**NA**
D16						
Chromium – 190 mg/kg	No	NA	No	No	Yes (150 mg/kg)	No
Zinc – 350 mg/kg	No	NA	No	NA	**Yes** (300 mg/kg)	**Yes** (300 mg/kg)
F2>C10-C16-170 mg/kg	No	No	**Yes** (120 mg/kg)	NA	NA	NA
Total C10-C36 – 1280mg/kg	NA	NA	NA	NA	**Yes** (500 mg/kg)	**NA**
D18						
Cadmium – 8mg/kg	No	N/A	**Yes** (3mg/kg)	No	**Yes** (1 mg/kg)	N **Yes** (1 mg/kg)o
Nickel – 53 mg/kg TCLP – 0.11 mg/L	No	NA	No	**Yes** (40 mg/kg)	No	No
F2>C10-C16-140 mg/kg	No	No	**Yes** (120 mg/kg)	NA	NA	NA
Total C10-C36 – 1445mg/kg	NA	NA	NA	NA	**Yes** (500 mg/kg)	**NA**
D20						
Zinc – 330mg/kg	No	No	No	No	**Yes** (300 mg/kg)	**Yes** (300 mg/kg)

Sample and Location	HIL	HSL (A)	Guideline levels (ppm) EIL	CT1 Waste Class	ENM	Background Levels
Southern part of the site						
D1						
Zinc – 410 mg/kg	No	NA	No **Yes** (350 mg/kg)	NA	**Yes** (300 mg/kg)	**Yes** (300 mg/kg)
F2>C10-C16-450 mg/kg	No	**Yes** (330 mg/kg)	**Yes** (120 mg/kg)	NA	NA	NA
Total C10-C36 – 1480mg/kg	NA	NA	NA	NA	**Yes** (500 mg/kg)	**NA**
D2						
Total C10-36 – 603mg/kg	NA	NA	NA	NA	**Yes** (500 mg/kg)	NA
D3						
Total C10-36 – 621mg/kg	NA	NA	NA	NA	**Yes** (500 mg/kg)	NA
D4						
Total C10-C36 – 1050mg/kg	NA	NA	NA	NA	**Yes** (500 mg/kg)	NA
D5						
Total C10-C36 – 523mg/kg	NA	NA	NA	NA	**Yes** (500 mg/kg)	NA
D6						
F2>C10-C16-430 mg/kg	No	**Yes** (330 mg/kg)	**Yes** (120 mg/kg)	NA	NA	NA
Total C10C-36 – 523mg/kg	NA	NA	NA	NA	**Yes** (500 mg/kg)	NA
D7						
Chromium – 290 mg/kg	No	NA	No	No	Yes (150 mg/kg)	No
D8						
Lead – 110 mg/kg TCLP- 0.03 mg/L	No	No	No	**Yes** (100 mg/kg)	**Yes** (100 mg/kg)	No
Zinc – 420 mg/kg	No	NA	**Yes** (350 mg/kg)	NA	**Yes** (300 mg/kg)	**Yes** (300 mg/kg)
Total C10-C36 – 560mg/kg	NA	NA	NA	NA	**Yes** (500 mg/kg)	**NA**
D9						
Chromium – 290 mg/kg	No	NA	No	No	Yes (150 mg/kg)	No
Nickel – 52 mg/kg TCLP – <0.01 mg/kg	No	NA	No	**Yes** (40 mg/kg)	No	No
Total C10-C36 – 523mg/kg	NA	NA	NA	NA	**Yes** (500 mg/kg)	**NA**
D11						
F2>C10-C16-140 mg/kg	No	No	**Yes** (120 mg/kg)	NA	NA	NA
Total C10-C36 – 880mg/kg	NA	NA	NA	NA	**Yes** (500 mg/kg)	**NA**

9.3.1 Heavy Metals

No heavy metals above the Tier 1 health investigations for a class A site were identified excluding one sample (BH18) which was taken during the 2019 investigation and detected elevated lead at 506ppm.

Heavy metals above the level of reporting were detected in all samples taken from the Site. Exceedance by contaminant are summarised in Table 9.6.

Table 9-6: Summary of Exceedances by Heavy Metal Contaminant

Heavy Metal	Location of exceedance				
	HIL	EIL	CT1	ENM(max)	Comment
Nickel			BH01-BH04, BH06-BH09, BH18, D15, D18, D9	D15	D4,D5,D6,D12 also above average ENM guideline
Lead	BH18		BH18, D8	D8	
Zinc		BH18, D1, D8, D13		BH18, D1, D8, D13, D16, D20	
Copper		BH18	BH18		
Cadmium		D18		D18	
Chromium				BH04, BH08, , BH11, BH14, BH17, BH19, BH21, BH23, D7, D8, D9, D12, D15, D16	Concentrations exceeded Total Chromium ENM guideline
Arsenic					D13 exceed the average for ENM.

From the above the following can be noted:

- Concentrations of Nickel were found above GSW CT1 and in some cases ENM maximum guideline levels across most of the northern cleared parts of the Site (eg Area 1 and 2) in borehole BH01 to BH04, BH06 to BH09, and BH18. Nickel was also at concentrations above CT1 guideline values across the southern parts of the Site in samples D9, D15 and D18, and also above the ENM Average guideline value in D4 to D6 and D12. Samples with elevated Nickel underwent leachate testing. These showed low levels of leachable concentrations below that for recommended for reassessment of the material by Specific Contamination Concentration (SSC1) for GSW. The elevated concentrations of nickel across the Site could be due to historical use of vehicles or burning of metals (eg hydrocarbons such as oils or petrol now naturally biologically removed or chromium plated metals), however, it is noted that there is little elevated lead for this to be associated with lead based fuels. It is also possible, based on the generally elevation of nickel across the Site that this is associated with the natural soils having a higher nickel content that is above ENM and CT1 but within background levels. The nickel concentrations were below all environmental and health guideline values and the levels are not deemed to pose any risk to human occupation or the environment if this material impacted by Nickel remains on Site.

- Concentrations of chromium were found above the ENM Maximum Concentration in sample locations D7 and D9 on the southern part of the Site and samples D15, D16, BH04, BH08, BH11, BH14, BH17, BH19, BH21, and BH23 on the northern part of the Site. Furter laboratory testing shows that this chromium is trivalent chromium (Cr III) and not hexavalent. This means there are no GSW CT1 exceedances or HIL or EIL exceedances. The average Chromium (total) across the Site is calculated as 137ppm which exceeds the average ENM guideline value. This means the material can be reused on-Site where not affected by other contaminants above HIL or EIL guidelines, but cannot be reused off-Site as VENM. The elevated concentrations of nickel across the Site, as for Nickel, could be due to historical use of vehicles, burning of chromium plated metals or more likely associated with the natural soils having a higher chromium content that is above ENM but within background levels. Nickel and Chromium deposits are often found together. They can also be found associated with Zinc in metals products such as roof sheeting.
- A sample from BH18 was found to have elevated levels of several heavy metals including lead above the HIL, copper and zinc above the EIL, and nickel above the GSW CT1 (see above). This sample was from soils beneath a burnt-out car body. Leachate testing for Lead, Copper and Nickel revealed that all are low in leachability and soils can therefore be disposed of as GSW.
- In the southern area, Sample D1 was taken from soils beneath a campfire where metals had visibly been burnt. This sample showed elevated levels of Zinc. Sample D8 was taken from beneath a pile of metal sheeting. This sample had elevated levels of lead (above ENM and GSW) and Zinc above EIL. Both these sample locations are adjacent to the southern boundary of the Site where residents have access. Leachate testing of Sample D8 for lead concluded that the locally Lead and Nickel affected soils can be disposed of as GSW.
- The sample D15 was impacted by heavy metal contaminants of Nickel above CT1/ENM and Chromium above ENM maximum guideline values. The was from a fire pit in AEC 3. As discussed above, these locally impacted soils can be reused on-Ste or removed from the Site and disposed of as GSW.
- The sample D18 was impacted by heavy metal contaminants of chromium (above average ENM), Cadmium (above ENM and EIL), and Nickel (above ENM average and above CT1). This sample was taken from below an old fridge. These locally impacted soils can be removed from the Site and disposed of as GSW. Subject to leachate testing of Cadmium, this material could also be potentially left on site.
- Zinc was found at several locations including D1, D13, D16, D18, D20, BH06 and BH18. Samples from BH18, D1, D8, D13 were above the EIL. The remaining samples were above the Maximum ENM guideline value. Sample D1 and D8 were from fire pit and a makeshift shed made from metal sheeting. Sample D13 was a sample taken from a stockpile of building materials and other foreign items. These locally affected soils can be removed from the Site as GSW.
- Sample 13 also identified elevated Arsenic at concentrations above the ENM average guideline value but below the maximum value.

9.3.2 Hydrocarbons, PAH and BTEX

There were no HIL exceedances for hydrocarbons. However, Hydrocarbons were detected above the laboratory level of reporting in many samples taken from Site. These were mostly detected within the background levels, below the Excavated Natural Material, below the General Solid Waste (GSW) maximum guideline values and below the health screening levels (HSL) excluding some samples as follows:

- Hydrocarbons above the EIL of 120 mg/kg and Health Screening Levels of 330 mg/kg (CH10 to CH16) for Class A site were identified as follows:
  - D1 F2>C10-C16 450 mg/kg depicted in Image 2
  - D6 F2>C10-C16 430 mg/kg depicted in Image 3
  - D15 F2>C10-C16 430 mg/kg depicted in Image 4.

Image 2: Sample location D1

Image 3: Sample location D6

Image 4: Sample location D15

Sample D6 was taken from a fill mound that had been placed over some tree roots to create a smooth surface for dirt bikes to traverse. The high concentration of hydrocarbons including the F2 fraction and total hydrocarbons is likely a result of accidental fuel spills.

In sample location D11, concentrations of the F2 fraction of hydrocarbons were found to exceed the environmental investigation levels (EILs) in a clearing adjacent to the western boundary of the southern residential development area. This location was targeted due to its previous use for farmhouses and its present use by 4WD vehicles. The sample was taken approximately 1m from the driven track as presented in Image 5. It is likely that accidental spills have taken place along tracks throughout the Site affecting the near surface soils.

Image 5: Sample location D11

- Hydrocarbons above the EIL of 120 mg/kg but below the Health Screening Levels of 330 mg/kg (CH10 to CH16) for Class A site were identified as follows:
  - D11 F2>C10-C16 140 mg/kg
  - D16 F2>C10-C16 170 mg/kg
  - D18 F2>C10-C16 140 mg/kg.

The sample D2 was taken from soil beneath a rusted fridge.

There are no guidelines for the F2 fraction of hydrocarbons for general solid waste disposal or ENM. However, there are guidelines for total hydrocarbons (eg C10-C36) for ENM of 500ppm maximum and GSW of 650 for F1 and 10,000 for combined F2 to F3.

There were numerous exceedances of the ENM maximum guidelines (and consequently the average guidelines). Samples were these exceedances occurred include D1 to D6, D8 to D9, D11 to D12, D14 to D16, and D18. The presence of hydrocarbons is likely due to fuels associated with vehicles (car and motor bike) accessing the Site for illegal use and human use such as accelerants in recreational camping fires.

There were no GSW exceedances, so all materials affected by hydrocarbons in camp fires at levels above the ENM guidelines values can be disposed of as GSW. Those due to accidental spills along tracks due to motor bike or vehicle use will biodegrade with time and can be left in situ.

9.3.3 Asbestos

It is noted that contamination of soils with asbestos containing materials can present a risk in urban and rural environments if the asbestos can give rise to elevated levels of airborne fibres that people can breathe. Notification of asbestos contamination is required where:

- Friable asbestos is present is present in or on soil on the land; and
- The level of asbestos (by % weight for weight) in an individual sample is equal to or above health screening level of friable asbestos in soil (0.001%) specified in Section 4.8, Schedule B1 of the NEPM 2013); and
- A person has been foreseeably will be exposed to elevated levels of asbestos fibres by breathing them into their lungs. Elevated levels are defined as concentrations at or above 0.01fibres/mL determined using the membrane filter method.

For the purposes of this assessment the following Tier 1 guideline values have been adopted for soil asbestos investigation criteria for low density residential areas:

  - 0.05% weight by weight of asbestos containing materials (ACM);
  - No visible asbestos material on the ground surface; and
  - 0.001% weight by weight of asbestos fibres (including friable ACM) or asbestos fines (including pieces of ACM less than 7 mm x 7 mm in size) for all site uses.

However, it is noted that the WA DOH asbestos guidelines indicate a more qualitative approach can be adopted at low-risk residential sites which may have been subject to legacy contamination by demolition and/or dumping.

In the previous investigation asbestos containing material was found at two locations. One of these locations called X004 is now outside the proposed area of development. A sample was taken at X002 which was confirmed to contain asbestos. This location was retested by Terra and is where large pile of potential asbestos containing material was observed.

Assessment for asbestos requires inspection of the site based by a competent person on a grid basis to assess whether ACM is present at levels less than 10 cm^2/m^2. During the 2022 investigation, the Site was walked over by two separate individuals to identify any suspected pieces of ACM on the ground surface.

The results are summarised as follows:

- Several fragments >7mm in dimension of potentially asbestos containing material were observed on the Site. These potential asbestos finds occurred in one location in Area 1 with the material found lying on the ground surface adjacent to a 1.5m by 1.5m pile of potential asbestos containing material (measuring conservatively). This is where asbestos was observed previously. Four small fragments were tested which were confirmed by the laboratory to contain asbestos containing materials (bonded material / fibreboard). The estimated total area of asbestos is approximately $2.25m^2$. This can be treated as a localised hot spot find.
- Eight bulk samples of subsurface material from each borehole were submitted to the laboratory for asbestos testing of fines and fibres. No asbestos finds were detected. No asbestos (bonded, FA or AF) was observed or detected in samples taken from the surface material. This includes surface material from where bonded fragments of asbestos were found.

Given the above it is assessed that surface contamnation of asbestos bonded material occurs on the Site, due to illegal dumping. The level of legacy contamination is below levels at which formalised remediation of the Site would be deemed required.

9.4 Aesthetic Criteria

It is noted that the Site is currently near areas of environmental conservation. Consequently, aesthetic issues have been considered as part of the assessment. Aesthetic issues generally relate to the presence of low-concern or non-hazardous inert foreign material (refuse) in soil or fill resulting from human activity. Sites that have been assessed as being acceptable from a human health and environmental perspective may still contain such foreign material.

The ASC NEPM (2013) Schedule B(1) Guideline states there are no specific numeric aesthetic guidelines, however site assessment requires balanced consideration of the quantity, type and distribution of foreign material or odours in relation to the specific land use and its sensitivity. For example, higher expectations for soil quality would apply to residential properties with gardens compared with industrial settings. General assessment considerations include:

- that chemically discoloured soils or large quantities of various types of inert refuse, particularly if unsightly, may cause ongoing concern to site users
- the depth of the materials, including chemical residues, in relation to the final surface of the site
- the need for, and practicality of, any long-term management of foreign material.

In some cases, documentation of the nature and distribution of the foreign material may be sufficient to address concerns relating to potential land use restrictions. In arriving at a balanced assessment, the presence of small quantities of non-hazardous inert material and low odour residue (for example, weak petroleum hydrocarbon odours) that will decrease over time should not be a cause of concern or limit the use of a site in most circumstances.

Various forms of refuse have been identified during the site walkover including stockpiled timber, building materials, metal, bricks, glass, trivial amounts of bonded asbestos-containing-materials in one location, ash in campfires, and green waste. On the Site, materials have been dumped and these have a localised visual impact on the current amenity of the site. However, there impact is localised to the areas of illegal dumping and much of this occurs along the southern boundary in association with residential encroachment into the Site.

It is noted that residential land use is typically deemed a sensitive land use which gives rise to minimal risk of contamination. Similarly, construction and building waste materials (observed to minimally affect the Site), are typically inert and non-hazardous, and are generally widely distributed in most urban areas. These materials can also occur in residential site that have been redeveloped.

Many of the aesthetic finds are associated with F2 HSL exceedance and heavy metal (Cr, Ni and Zn) ENM and EIL exceedances. As part of a general clean-up of the Site, these illegally dumped material and encroachments will be removed. In this case, no large-scale aesthetic issues were observed on the Site. No aesthetic issues that would give rise to concerns of contamination were observed.

9.5 Data Quality Objectives

The NSW EPA requires that a systematic planning process be adopted to define the objectives of all site assessments and remediation's programmes and to develop sampling and validation plans for the collection and evaluation of representative data to achieve those objectives. The requirements of the data quality objective (DQO) process for investigation programmes are defined in NEPM Schedule B2. To ensure that the soils sampled and tested were representative of the site conditions, quality control procedures were integrated into the sampling and laboratory analytical program. These procedures included:

- Fieldwork decontamination, sample preparation and handling in accordance with best practice and Australian Standards (AS 4482.1-2005);
- Use of experienced personnel and supervision by senior staff;
- Collection of quality control samples; and
- Use of NATA accredited laboratories and methods for analyses undertaken.

The samples, including QA samples, were transported to the laboratories with relevant CoC documentation. The CoC detailed the following information:

- Site identification;
- Name of the sampler;

- Nature of the sample – soil or water;
- Collection time and date;
- Analyses to be performed; and
- Sample preservation method.

The soil samples were placed in laboratory supplied and preserved jars, before being placed in chilled eskies, for transport to the laboratories with accompanying chain of custody documentation. All samples were submitted to a NATA accredited laboratory (Eurofins) for testing. A chain of custody documentation was signed and dated by ALS stating that samples:

- Were received cool and in good order;
- Were presented in adequate sample containers; and
- Were labelled appropriately according to current quality field sampling protocols.

The time between the field sampling and analyte result was as short as possible to prevent any biological, chemical or physical alteration of the analyte, i.e., samples were submitted to laboratory within 24 hours of sampling and at a temperature below 4 degrees.

Samples were analysed within the prescribed holding time for each analyte (Samples were analysed using analytical methods based on USEPA and APHA methods, to ensure compliance with Schedule B3 ASC NEPM recommendations).

Laboratory non-detectable levels are considered acceptable when the result is less than the lower limit of detection (LLD) for analysis where the lower limit of detection is higher than the Site criteria guidelines. Terra Insight considers the LLD of the nominated laboratories to be sufficient to detect the presence of contaminants on the Site.

For quality control purposes, the following sampling was undertaken:

- A duplicate sample for intra-laboratory testing was taken from sample locations D7 and D13. The intra-laboratory test results indicate that there was variation in the duplicate samples particularly in regards to hydrocarbons in one sample. This indicates variations in due to the use of variable use of hydrocarbons associated with spills and acceleration in fires. Also due to recent fires, some of the hydrocarbons may have been burnt off. However, given the level is well below the GSW values and there are no HIL exceedances, this variation does not change the assessment findings.

An assessment of the quality of the laboratory analytical data generated during these works was undertaken. This assessment indicated that:

- laboratory analysis of samples was undertaken by a NATA accredited environmental testing laboratory;
- the laboratory limits of reporting (LOR) were below the adopted assessment criteria;
- samples were extracted and analysed within holding times;
- analyte percentage recoveries of surrogates were within acceptance limits.

No rinsate sample was submitted for laboratory testing as part of the investigation as the samples were collected directly from the ground.

10 SEPP55 Review

The former SEPP55 notes that the potential for contamination is often linked to past uses of land and a good early indicator of possible uses is land zoning. It provides a brief checklist for allow council to undertake an initial evaluation of the need for further assessment. The conclusions in relation to this checklist are provided in Table 10.1.

Table 10-1: SEPP55 Checklist for initial site evaluation

Checklist	PSI findings
Is the planning authority aware of any previous investigations about contamination on the land? What were the results, including any previous initial evaluations	No previous investigations for contamination were identified on record for council with the Site.
Do existing records held by the planning authority show that an activity listed in Table 1 (refer section 5) has ever been approved on the subject land? (The use of records held by other authorities or libraries is not required for an initial evaluation.)	No
Contamination is more likely to have occurred if the land is currently, or was previously, zoned for industrial, agricultural or for defence purposes. Was the subject land at any time zoned for industrial, agricultural or defence purposes	The desk study has not identified that the Site has been subject to these zonings.
To the planning authority's knowledge was, or is, the subject land regulated through licensing or other mechanisms in relation to any activity listed in Table 1? Does a site inspection conducted by the planning authority [optional] suggest that the site may have been associated with any activities listed in Table 1	There is no record with council.
Are there any land use restrictions on the subject land relating to possible contamination, such as notices issued by the EPA or other regulatory authority?	No – there are no records for the Site with the NSW EPA and there are currently no EPA restrictions on the site or nearby sites
Is the planning authority aware of information concerning contamination impacts on land immediately adjacent to the subject land which could affect the subject land?	The lot search report does not identify high risk sites within a suitable buffer distance from the Site.

11 Conclusions

11.1 Subsurface conditions

The Site is underlain mainly by natural alluvial and residual soils. Some of these soils have been identified as naturally occurring acidic soils and rocks. These are not acid sulfate soils and do not require neutralisation if they remain on Site. Disposal to land fill of some soil from the Site may requiring liming.

11.2 Historical site use

The Site was historically cleared and used as a farm between 1950 and 1987. Farm buildings were located within the south-western corner of the Site. Post 1987, the Site has been vacant. It is not fenced and hence open to the public. People accessing the Site are using parts of the Site for recreational motor sports, possible recreational camping, and illegal dumping of waste material. Residential use is encroaching into the Site along the southern boundary. This includes use of the Site for processing of firewood for commercial sale, storage of material and property, camp fires and some dumping of waste. It is noted that residential use is typically deemed a sensitive land use with minimal risk of contamination at levels which would require remediation compared to land use associated with industrial or commercial use.

The Site is proposed for residential development. This development is focused mainly on the western middle and southern parts of the Site. The eastern part of the Site and area adjacent to existing creeks have been set aside for riparian and conservation areas.

11.3 Potential contamination due to site use

Site history information and Site observations indicate that potentially contaminating activities may have occurred on the Site. These activities, potential contaminants of concern (PCOCs) associated with these activities, and the potential areas of environmental concern (AECs) are defined in the Conceptual Site Model (CSM) provided in Table 7-3. They include the following:

- AEC 1 and AEC 2: Two cleared areas within the middle of the Site within Lot 106 DP 755923 which are visibly in use for recreational motor sports and the illegal dumping of waste materials. These were the focus of the 2019 investigation;
- AEC 3: now includes the southern boundary, where adjacent residential use is actively encroaching into the site. This use could include pesticides and herbicides to manage vegetation and insects, disposal of household waste and building materials, supply of firewood, burning of fires, extensions of their gardens and the parking of vehicles.
- AEC 4: This area is located adjacent to Inyadda Road and includes the part of the Site which had former historical residential use. This part of the Site:
  - May be subject to opportunistic illegal dumping of waste materials along the roadside;
  - The western part of this area was occupied by old farm buildings (now removed). These may have contained hazardous materials such as lead and asbestos which may impact areas within and near previous building foot prints;
- AEC 5: this includes the main access tracks throughout the Site which are used to access Areas 1 and 2. These areas are also used for recreation motor sports and give an opportunity for some limited illegal dumping of waste; and
- AEC 6: this includes the remainder of the Site. Within this area, pesticides could been used along creek lines to manage vegetation and old buildings may have been present and subsequently removed or become dilapidated. The area may also have been subject to motor sports and illegal waste dumping. However, due to the dense vegetation it is expected that impacts from these uses will be at levels much lower than within AEC 1 to 5, which are more easily accessible to the public. Within this area, are several old dams and creeks which are visible on aerial images. Many of these have become silted.

11.4 Summary of Sampling and Laboratory Testing Programme

Soil sampling investigations have been conducted across the property on two occasions, in 2019 and in 2022. The 2019 investigation targeted specifically areas AEC 1 and AEC 2 as requested by the client at the time. Further assessment was recommended in the 2019 PSI report. Further assessment was also deemed required as the proposed area for development has been expanded to include the southern portion of the property. Consequently, a second investigation in 2022 was conducted:

- to review the findings of 2019 investigation and infill any data gaps or additional testing required due to subsequent use between 2019 and 2022, including the fact that fire in 2019/2020 has provided greater access to the Site for better assessment; and
- To target the southern portion of the Site, which was not the subject of previous investigation but will is now proposed to be developed.

To assess the potential impact of activities on the Site surface material from 45 locations in total across the two investigations has been undertaken during both these investigations. Soil samples were collected and tested for potential entrapped contaminants including heavy metals, asbestos and hydrocarbons. Samples taken in the 2019 investigation were named BH01-BH24 and samples taken in the 2022 investigation were named D1-D21.

11.5 Summary of Investigation Findings

This testing identified contaminants above the laboratory limit of reporting with some exceeded guideline values as follows. Only two exceedances of a HIL was identified as follows:

- lead taken from beneath a burnt-out car; and
- A pile of bonded asbestos sheeting dumped on the site.

All other exceedances were of HSL, EIL, GSW CT1 or the ENM average or maximum guidelines values. Table 10.1 and 10.2 following summarise these key exceedances in terms of the analyte of concern and the test location respectively.

The Site was also reviewed in terms of aesthetic appearance such as the impact of illegally dumped waste. Several car bodies, a fridge, a caravan, a metal sheeted “lean-to” / “cubby house” and residential building waste materials were found across the Site, but mainly along the southern boundary adjacent the existing residential properties. This is indicative of long term encroachment by neighbouring properties into AEC3. These findings are general comprised of inert materials that can be removed from the site. The exception to this was the area of bonded asbestos sheeting identified near D12.

The findings are also summarised on Figure 7.

Table 11-1: Summary of Exceedances by Contaminant

Contaminant	Location of exceedance					
	HIL	HSL	EIL	CT1	ENM(max)	Comment
Lead	BH18			BH18, D8	D8	**HIL A exceedance: Sample BH18 HIL was from soils beneath a burnt-out car body. Once the locally affected soils are removed from around sample location BH18, the levels of lead remaining on the Site are not deemed to pose any risk to human occupation or the environment** ENM and CT1 exceedance: Sample D8 was taken from AEC3 from beneath a pile of metal sheeting. Leachate testing suggests this locally impacted material can be disposed of as GSW. This finding has no human health or environmental impact on the proposed site use.
Nickel				BH01-BH04, BH06-BH09, BH18, D15, D18, D9	D15, (D4,D5,D6,D12 also above average ENM guideline)	Concentrations of nickel were found above GSW CT1 and in some cases ENM maximum guideline levels across most of the northern cleared parts of the site (boreholes BH01 to BH04, BH06 to BH09, and BH18) and across the southern parts of the Site at concentrations above CT1 guideline values (D9, D15 and D18). and also above the ENM average guideline value (D4 to D6 and D12). Leachable concentrations of the nickel are low and below that for recommended for reassessment of the material by Specific Contamination Concentration (SSC1) for GSW. The elevated levels of nickel across the Site could be associated with the natural soils having a higher nickel content that is above ENM and CT1 but within background levels. The nickel concentrations were below all environmental and health guideline values and the levels are not deemed to pose any risk to human occupation or the environment if the material impacted by nickel remains on Site.
Chromium					BH04, BH08, , BH11, BH14, BH17, BH19, BH21, BH23, D7, D8, D9, D12, D15, D16	Chromium (Total, III and IV): Concentrations of chromium total were found above the ENM Maximum Concentration in sample locations D7 and D9 on the southern part of the Site and samples D15, D16, BH04, BH08, BH11, BH14, BH17, BH19, BH21, and BH23 on the northern part of the Site. Further laboratory testing shows that this chromium is trivalent chromium (Cr III) and not hexavalent (VI). This means there are no GSW CT1 exceedances or HIL or EIL exceedances.

Contaminant	Location of exceedance					
	HIL	HSL	EIL	CT1	ENM(max)	Comment
Chromium Cont.						The average Chromium (total) across the Site is calculate as 137ppm which exceeds the average ENM guideline value. This means the material can be reused on Site where not affected by other contaminants above HIL or EIL guidelines, but cannot be reused off-Site as VENM. The elevated concentrations of nickel across the Site, as for Nickel, are potentially due to natural geology as the soils have chromium III above ENM but within background levels. Nickel and Chromium deposits are often found together. They can also be found associated with zinc in metals products such as roof sheeting which may have been burnt on the Site in camp fires. The chromium concentrations are not deemed to pose any risk to human occupation or the environment if the material impacted by chromium remains on Site.
Zinc			BH18, D1, D8, D13		BH18, D1, D8, D13, D16, D20	EIL exceedance: zinc was found in BH18 at 2030mg/kg, notable above the ENM guideline of 300mg/kg and above the EIL derived for the site of 350mg/kg. Zinc found elsewhere on the Site was at much lower levels. Samples from D1, D8, D13 were above the EIL. The remaining samples were above the Maximum ENM guideline value. Sample D1 and D8 were from fire pit and a makeshift shed made from metal sheeting. Sample D13 was a sample taken from a stockpile of building materials and other foreign items. These locally affected soils can be removed from the Site as GSW. All levels of Zinc were below the HIL(A) soil guideline values. Once the locally affected soils are removed from around sample location BH18, the levels of Zinc remaining on the Site are not deemed to pose any risk to human occupation or the environment due to low leachability.
Copper			BH18	BH18		EIL exceedance: Copper was locally found in BH18 in AEC 1 at 617mg/kg above the ENM guideline of 200mg/kg. It was also elevated above the EIL of 230mg/kg but below the HIL(A) guideline level. This sample was from soils beneath a burnt-out car body. The copper concentrations were below health guideline values and the levels are not deemed to pose any risk to human occupation or the environment if the material impacted by Copper remains on Site.

Contaminant	Location of exceedance					
	HIL	HSL	EIL	CT1	ENM(max)	Comment
Cadmium			D18		D18	This sample was taken from below an old fridge. These locally impacted soils can be removed from the Site and disposed of as GSW. Subject to leachate testing of Cadmium, this material could potentially be left on Site. The cadmium concentrations were below health guideline values and the levels are not deemed to pose any risk to human occupation if the material remains on Site.
Arsenic					D13 exceed the average for ENM.	Sample D13 identified elevated Arsenic at concentrations above the ENM average guideline value but below the maximum value. The arsenic concentrations are below all environmental and health guideline values and the levels are not deemed to pose any risk to human occupation or the environment if the material impacted by Arsenic remains on Site.
Asbestos	D12					For the purposes of this assessment, Tier 1 guideline values have been adopted for soil asbestos investigation criteria for low density residential areas from the Western Australian (WA) department of Health (DOH) guidelines (As adopted by the NSW EPA): • 0.05% weight by weight of asbestos containing materials (ACM); • No visible asbestos material on the ground surface; and • 0.001% weight by weight of asbestos fibres (including friable ACM) or asbestos fines (including pieces of ACM less than 7 mm x 7 mm in size) for all site uses. The WA DOH asbestos guidelines indicate a more qualitative approach can be adopted for low-risk residential sites that may have been subject to legacy contamination by demolition and/or dumping. This assessment requires inspection of the site based by a competent person on a grid basis to assess whether ACM is present at levels less than 10 cm^2/m^2. The Site was walked over by two separate individuals to identify any suspected pieces of ACM on the ground surface. During the 2019 investigation, a Site walkover was undertaken to identify bonded asbestos on the surface from fly tipping but no bulk sampling of the near surface soils was undertaken to assess for the presence of asbestos containing material, asbestos

Contaminant	Location of exceedance					
	HIL	HSL	EIL	CT1	ENM(max)	Comment
Asbestos Cont.						fines or fibres in the near surface soils. Four areas with bonded sheeting were identified. Laboratory testing identified that in two of these locations (X002 and X004 on Figure 4) the bonded material did include asbestos containing bonded material. The soils underlying location X002 were not tested at the time but were retested in the 2022 investigation (reference D12). This location includes a large pile of asbestos containing bonded sheeting stockpiled on the site. No fines or fibres were found in the underlying soils. The other location, called X004, is now outside the proposed area of development. In the 2022 investigation, the Site was again subject to a Site walkover and bulk samples were taken and tested for the presence of asbestos in the subsurface soils. Fragments of bonded asbestos containing material (ACM) were found at test location D12 with a total area of approximately 1.5x1.5m. Testing of soils underlying this find did not detect asbestos fibres or fines. In the 2022 investigation, eight bulk samples of subsurface material including the locations potentially affected by asbestos disposal, were submitted to the laboratory for asbestos testing of fines and fibres. No asbestos finds were detected. No asbestos (bonded, FA or AF) was observed or detected in samples taken from the surface material. This includes surface material from where bonded fragments of asbestos were found. Given the above it is assessed that surface contamination of asbestos bonded material occurs on the Site, due to illegal dumping. The level of legacy contamination is below levels at which formalised remediation of the site would be deemed required. It is therefore assessed that surface contamination of asbestos bonded material occurs in a hotspot on the Site, due to illegal dumping. Gross contamination of bonded asbestos material across the areas of the property proposed for development was not identified. The level of legacy contamination is below levels at which formalised remediation of the Site would be deemed required. This illegally dumped material should be removed from the site by a licenced professional. Once this is removed, the Site should not be impacted by Asbestos at levels which would affect human health or the environment.

Contaminant	Location of exceedance					
	HIL	HSL	EIL	CT1	ENM(max)	Comment
Hydrocarbons		D1,D6,D15	D1,D6,D15, D11,D16, D18			HSL exceedances: HSL are provided to assess the potential health impacts due to vapour movement within soils. These allow the assessment of need for remediation of soils which accounts for site conditions. D1: elevated levels of hydrocarbons specifically the fraction F2>C10-C16 exceeding the HSL A guideline levels found in a campfire adjacent to the southern boundary of the Site where residents currently have access in AEC3. The fire also had elevated levels of zinc. D6: A stockpile placed over some tree roots at the rear of No. 94 Curvers Drive. Laboratory testing found the sample had levels of hydrocarbons specifically fraction F2>C10-C16 which exceeded HSL and EIL guideline values; D15 in AEC1. Concentrations of nickel, chromium and Total C10-C36 were found in this fire pit which exceeded ENM guidelines. F2>C10-C16 exceeded the HSL A guidelines levels. Additional EIL Exceedances: D11: in AEC4 was taken along the western boundary of the southern development area where historical buildings were located. Fraction F2 was found above EIL guideline values and Total C10-C36 was found to exceed ENM levels which is mostly likely due to recent activities on the site particularly use of vehicles by local residents; D16: A small stockpile of soil with building rubble located east of campfires D14 and D15. Laboratory testing confirmed concentrations of F2> C10-C16 exceeded EIL guideline values and chromium, zinc and Total C10-C36 exceeded ENM guideline values. D18: High concentrations of cadmium and hydrocarbons specifically the F2>C10-C16 fraction above EIL guideline values and total C10-C36 fraction which exceeded ENM guideline values in material found beneath a rusted fridge known as sample D18 in AEC1. The surface material also had concentrations of nickel above GSW.

Contaminant	Location of exceedance					
	HIL	HSL	EIL	CT1	ENM(max)	Comment
Hydrocarbons Cont.						Other elevated levels of note are as follows: D2: Campfire adjacent and east of D1 had elevated levels of total C10-C36 exceeding ENM guideline values; D3: a sample from a stockpile of garden waste and mulch in AEC3 which had elevated levels of Total C10-C36 above ENM guideline values; D4 and D5: Samples taken beneath a stockpile of metal sheeting and a boat behind No. 98 Curvers Drive in AEC3. The samples both had levels of hydrocarbons above ENM guideline values; D8: A sample taken from below metal sheeting had concentrations of hydrocarbons above ENM guideline values. Lead also exceeded CT1 guideline values but further leachate testing confirmed the material can be disposed of GSW. D9: A stockpile of fill material had been placed over some tree roots approximately 90m north of the southern Site boundary in AEC3 to create a flat surface for a track. Hydrocarbons and chromium were found to exceed ENM guideline values. Nickel was found in concentrations to exceed GSW guideline values. D12: A sample of surface material in AEC1 was taken beneath a pile of bonded asbestos material. Chromium and hydrocarbons were found to be above the ENM guideline values. No concentrations of fibrous asbestos were identified within the soil. D14: A campfire in AEC1 has elevated concentrations of Total C10-C36 above the ENM values; The hydrocarbon exceedance are localised to areas that have been subject to vehicle use or campfires. Local removal of impacted soils and confirmation that the natural soils underlying these materials are clean of hydrocarbon should be undertaken. As this contaminant can biodegrade with oxidation over time, it may be possible to leave this material on the site. Alternative the impacted material, can be removed and disposed of offsite. Once this has occurred, levels of hydrocarbons elsewhere on the Site should not affect human or environmental health.

Table 11-2: Summary of Exceedances by test location

Test Location	Aesthetic issue identified
Northern – AEC 1 to 2 and AEC 5 to 6	
BH01 to BH12 Clearing 2 (AEC2)	Samples in clearing 2 had nickel exceed GSW CT1 but below GSW SCC1 and in samples BH03, BH04 and BH07 to BH08, exceeding the maximum ENM guideline values, The average ENM guideline value was also exceeded in this clearing. Chromium ENM was also exceed in BH04, BH07 to BH08 and BH11. Leachate testing indicates these soils can be removed and disposed of as GSW but they cannot be reused of site as VENM. These exceedances pose no human health or environmental health issues if they remain on site. BH05, and BH09 to BH10 reported no exceedances.
D20 Clearing 2 (AEC2)	This was taken from Clearing 2 adjacent to a car body that has been dumped between 2019 and 2022. In this sample, zinc was found to exceed ENM. These soils can be removed and disposed of as GSW but they can not be reused off Site as VENM. These exceedances pose no human health or environmental health issues if they remain on Site.
BH18 Clearing 1 (AEC 1)	A sample from BH18 was found to have elevated levels of several heavy metals including lead above the HIL, copper and zinc above the EIL, and nickel above the GSW CT1 (see above). This sample was from soils beneath a burnt-out car body. Leachate testing for lead, copper and Nickel revealed that all are low in leachability and soils can therefore be disposed of as GSW.
D12 and D13	A pile of asbestos was observed near these sample locations. Testing indicates the underlying soils are not impacted by the asbestos dumped above which remains intact and is bonded. The bonded asbestos should be removed by licenced professional. In stockpile D12 adjacent, Chromium was found to exceed ENM and total hydrocarbons to also exceed ENM. In stockpile D13 adjacent, Arsenic was found to exceed ENM and Zinc to exceed EIL and ENM. Subject to leachate testing for Zinc the stockpile near D13 could remain on Site. If removed from Site, they must be disposed of as GSW.
D14 and D15	In campfire D14 adjacent, total hydrocarbons exceeded ENM. In campfire D15 adjacent, Chromium was found to exceed ENM, Nickel to exceed ENM and GSW CT1 but not GSW SCC1, Total Hydrocarbons exceeded ENM and F2 hydrocarbons exceeded EIL and HSL. It is recommended that the campfires and underlying soils are removed locally and disposed of as GSW to landfill. With time the hydrocarbons may biologically degrade with time and could be left on Site. Subject to leachate testing for Zinc these stockpiles could remain on Site. If removed from Site, they must be disposed of as GSW.
D16	Is a stockpile in which chromium and Zinc were found to exceed ENM, F2 was would to exceed EIL and total hydrocarbons were found to exceed ENM. It is recommended that the stockpile and underlying soils are removed locally and disposed of as GSW to landfill. With time the hydrocarbons may biologically degrade and so this material could also be potentially left on site. If removed from site, they must be disposed of as GSW.
D18	Is a sample taken from underneath a fridge disposed of illegal on the Site. In this sample, cadmium and zinc were found to exceed ENM, Nickel to exceed GSW CT1 but not GSW SCC1 and F2 exceeds EIL. It is recommended that the soils below the fridge are removed locally and disposed of as GSW to landfill. With time the hydrocarbons may biologically degrade and so this material could also be potentially left on site. If removed from site, they must be disposed of as GSW.

Test Location	Aesthetic issue identified
Southern – AEC3 land along southern boundary in active use by adjacent residents and AEC4 in previous area of residential use	
D1	Sample D1 was taken from soils beneath a campfire where metals had visibly been burnt. This samples showed elevated levels of F2 hydrocarbons above the EILs and HSLs, Total Hydrocarbons above ENM, and Zinc above ENM and EIL. It is recommended these soils and materials within the campfire are removed and disposed of off-site to landfill during site development. Further leachate testing for Zinc should indicate that this material could remain on site. Hydrocarbons are likely to biodegrade with time.
D2 to D5	Sample D2 was taken from a campfire near D1. D3 was a stockpile or garden waste, D4 was from soil adjacent to a boat and building materials paint tins stockpiled on the site. D5 was from metal sheeting stockpiled on the site. In these samples, hydrocarbons exceed ENM. These materials impacted by residential site use, if removed from the Site, will need to be disposed of to land fill. Otherwise the impacted soil can remain on Site.
D6	Sample D6 was taken from soils beneath a stockpile of soil placed over a tree root. This samples showed elevated levels of F2 hydrocarbons above the EILs and HSLs, and Total Hydrocarbons above ENM. It is recommended that this stockpile of soils is removed and disposed of to landfill during site development. These materials could remain on site as hydrocarbons are likely to biodegrade with time.
D7	This sample was from soil below a caravan and near a transformer. It has Chromium (III) above ENM. If removed, it will need to be disposed of to landfill. This material can remain on Site without human health or environmental impact.
D8	Sample D8 was taken from beneath a pile of metal sheeting. This sample had elevated levels of lead (above ENM and GSW) and Zinc above EIL. Leachate testing of Sample D8 for lead concluded that the affected soils can be disposed of as GSW.
D9	This sample was from a stockpile of fill. It has Chromium (III) above ENM. Nickel above CT1 but below SCC1. Total C10-36 above ENM. If removed, it will need to be disposed of to landfill. These materials can remain on Site without human health or environmental impact.
D10 and D11	This were taken from adjacent a track in AEC4. In sample D11, hydrocarbons exceed ENM. These materials impacted by residential site use near D11, if removed from the site, will need to be disposed of to land fill. Otherwise, the impacted soil can remain on Site

11.6 SEPP Assessment

In terms of SEPP (Resilience & Hazards) 2021, the investigation has identified that levels of contamination on the site, associated with its historical residual use, have not resulted in contamination on the site at a level where the majority of the site would be deemed contaminated land. There are some areas which require further action, but these are localised, as follows:

- Around sample location BH18, elevated of levels of lead occur that are above the HIL. This sample was taken from below a burnt-out car. The car and underlying soil should be removed from the site and disposed of to landfill. Verification that the soils in this area are clean should then be undertaken.
- Around sample location D12 is a large pile of asbestos sheeting which is relatively intact and made of bonded material. Given the limited volume of material and the fact that soils are not impacted, this material would be best removed from the site by a licenced contractor. The area below the stockpile should be verified as clean.
- Samples taken from campfires near sample locations D1 and D15, and from stockpiles of materials around sample location D6 are impacted by F2 hydrocarbons above Health Screening levels. These are deemed related to accelerant use in the campfires and are highly unlikely to result in a risk of vapour generation within the subsoils. The levels are below HILS for direct soil contact. It is recommended that in the areas of campfires and stockpiled materials, the surface topsoils, are stripped and disposed of to landfill. As a conservative measure, the underlying soils could also be verified as clean. It is noted that hydrocarbons can biologically degrade with time, and so it may also be possible to leave these affected soils on Site in the short to medium term or place the affected materials under the proposed roads.
- There are some exceedances of EIL, ENM and GSW CT1 guidelines levels for some heavy metals, but leachate testing indicates that these do not have a potential environmental health impact and can be left on Site or disposed of to land fill.
- This VENM exceedances finding means the some of the soils on the Site cannot be used off Site as VENM. Some of the soils and rock may also be acidic when oxidised and consequently would also not meet the definition of ENM. No Acid Sulafte Soils (ASS) were found to impact the proposed areas of development. The earthworks plans for the Site should consider these materials remaining on Site with material that can be assessed as VENM being priorities for reuse of Site. It is noted that Chromium (III) and Nickel was elevated above the VENM guidelines levels across most of the Site but within a range generally accepted as background levels for those metals. Further testing to assess the natural background levels of these metals on the Site would be beneficial to determine if these elevated levels are geologically related.

Where material has been flytipped, stockpiled or burnt on the Ste, and these materials are removed from the Site, the levels of residual contaminants on the Site should be below the HILs and EILS values are therefore not deemed to result in contamination of the Site which would prevent its residential development.

12 Recommendations

The following recommendations are made:

1. Material fly tipped on the Site should be removed from the Site. This includes materials in stockpiles and campfires in and near sample locations D1,D6,D8, D11, D13, D15,D16, D18, and BH18;
2. A pile of asbestos in clearing 1 near sample location D12 on the Site shall be removed by a licensed contractor;
3. The existing lean-to/cubby house in AEC3 shall be subject to demolition by a licenced professional. This structure does not appear to contain asbestos. As a precautionary measure, post-removal, the near surface soils should be validated as clean of heavy metals and asbestos.
4. The near surface soils on the Site beneath and surrounding test locations: D1, D6, D8, D12, D13 and BH18 should be disposed of off-site as General Solid Waste in accordance with waste classification requirements. It is noted that sample locations D1,D6,D15, D11,D16, D18 have hydrocarbon EIL exceedances which are likely to reduce biologically with time. Some of the hydrocarbon finds may be associated with natural oils from the vegetation post the fire. Further silica based hydrocarbon testing could be undertaken to confirm this assessment. Some of these sample locations also have heavy metal EIL exceedances but leachate testing shows these values are unlikely to have an environmental impact. This means that with appropriate planning, these affected soils could remain on the Site. They could be buried under proposed roads for added conservatism. The exception to this is soils beneath the burnt out car at sample Location BH18 which have lead HIL exceedances and must be disposed of site to landfill.
5. Testing indicates elevated levels of chromium and nickel across the Site. This impacts soils beneath and surrounding test locations BH03, BH04, BH07, BH08, BH11, BH14, BH17, BH19, BH21, BH23, D2-D5, D7, D9, D12, D14, D16, and D20. These soils must be disposed of as GSW if taken off Site. They cannot be reused as VENM. Alternatively, they can remain in situ on Site. Consideration should be given to additional background testing to confirm that these elevated Chromium and Nickel levels are natural and not associated with historical site use.
6. To prevent further fly tipping on the Site prior to development, the site should be fenced. Immediately prior to development, the Site will require a general clean up to remove fly tipped inert material.
7. Post site clean up activities and immediately prior to Site development, a Site walk over by a licenced asbestos assessor should be undertaken to ensure the Site has remained clean of asbestos.
8. An unexpected finds protocol should be documented for the Site where subsurface earthworks are required.
9. Terra Insight recommends that to set out the appropriate management detailed in Recommendations 1 – 8 above, a short-term Construction Management Plan (CEMP) be developed for the Site. The plan shall address the following:
    a) Demolition and removal of the existing shed;
    b) Off-site disposal of general solid waste (GSW) impacted by heavy metals and hydrocarbons from the site;
    c) Off-site disposal of the underlying VENM material generated by site earthworks;
    d) Unexpected findings of contaminated material and management of any underlying soil guidelines exceedances if unexpected findings occur.

The site is deemed suitable for the proposed residential development. No further contamination assessment of the Site is deemed required.

12.1 Construction Environmental Management Plan (CEMP) requirements

The CEMP shall address items such as:

- Rremoval of known asbestos containing material (ACM) waste;

- Removal of inert waste materials on the Site such as car bodies, campfires and any soil directly underlying these finds.
- Unexpected findings of contaminated material and management of adjacent or underlying EIL/ HIL exceedance material; and
- Validation of excavated surfaces beneath removed ACM/ACM and inert finds such as campfires, car bodies.

The main objectives of the CEMP would be to:

- Discuss known or likely development and construction issues relating to contamination of soil on Site;
- Provide environmental management procedures and advice regarding the development of the Site in the construction phase regarding contamination exposure;
- Provide advice to act in accordance with regulatory requirements to manage, amongst other aspects, the excavation, stockpiling and transport of materials; and
- Provide appropriate management measures for the handling and disturbance of unexpected finding of contaminated materials.

The CEMP would also outline, to contractors on Site, the requirements for identification and management of known or unexpected finds of ACM or other materials which could be encountered during construction.

It should be noted that general environmental protection measures (related to issues such as, water quality, dust, sediment and erosion), are to be implemented in accordance with the Contractors EMP. The CEMP will cover the entire Site including:

- Unexpected Finds Protocols;
- Requirements of the asbestos removal control plan to be prepared by a licensed asbestos removalist for any licensed asbestos removal work they are commissioned to undertake.
- Validation of surface below areas that have been subject to Site clean-up activities

In summary, the Construction Environmental Management Plan (CEMP) will be developed mainly:

- To provide a framework for implementation during construction phases of development;
- To include Incidental Finds Protocol for visible asbestos if encountered during GSW and ABM removal works in terms of isolation, management, assessment, classification and verification of the underlying clean layer;
- To include an Unexpected Finds Protocol in terms of other potential contaminants and waste;

The CEMP would also address potential Ecological Investigation Level (EIL) impacted soil that is to either be excavated, or remain in-situ during the construction phase of the project to:

- Ensure that excavated impacted soil is not placed within intended Road verges or open space areas, unless deemed appropriate by the supervising consultant;
- Any soil imported to the Site (if required) will be obtained from reputable suppliers and will comprise Virgin Excavated Natural Material (VENM) or ENM meeting Australian Standards (e.g. for landscaping materials). The fill should have soil contaminant analysis with NATA certification to validate that the imported fill/ topsoil is suitable for use on-Site.

13 Limitations

The findings contained in this report are the result of discrete/ specific methodologies used in accordance with normal practices and standards and in accordance with the agreed scope of works. Under no circumstances can it be considered that these findings represent the actual state of the Site at all points. The subsurface conditions may vary significantly across the Site, particularly where no nearby sampling and testing work has been carried out. This report has been prepared based on the understanding that following the design and construction of the building, this document is passed onto the owner of the property, and that it is that person's obligation to ensure that the document is passed onto future owners.

14 List of Acronyms

ACM	Asbestos containing materials
AECs	Areas of environmental concern
AF	Asbestos fines
ANZECC	Australian and New Zealand Environmental Conservation Council
ARCP	Asbestos removal control plan
BTEX	Benzene, toluene, ethylbenzene and xylene
CLMP	Contaminated land management plan
CMP	Construction management plan
COCs	Contaminants of concern
CSM	Conceptual Site model
DESA	Detailed environmental Site assessment
DQO	Data quality objective
EIL	Ecological Investigation level
EPA	Environmental protection Authority
FA	Fibrous Asbestos
GME	Groundwater Monitoring event
GSW	General solid waste
GWMP	Groundwater management plan
HIL	Health Investigation Levels
JSA	Job Safety analysis
LAA	Land application area
LOR	Limit of Reporting
LLD	Lower limit of detection
ML	Management limits
NATA	National Association of Testing Authorities
NEPC	National Environmental Protection Council
OCP	Organochlorine pesticides
OHS	Occupation Health safety
OPP	Organophosphorus pesticides
PAH	Polycyclic Aromatic Hydrocarbons
PBILs	Phyto-toxicity based investigation levels
PCBs	Polychlorinated by-phenols
PESA	Preliminary environmental Site assessment
PID	Photoionization detector
QC	Quality Control
RAP	remedial action plan
REF	Review of Environmental factors
RSW	restricted solid waste
SVOC	Semi-volatile organic compounds
TPH	Total Petroleum Hydrocarbons
TRH	Total recoverable hydrocarbons
VOC	Volatile organic compounds
WHS	Work health and safety

15 List of Definitions

- Airborne asbestos: means any fibres of asbestos small enough to be made airborne. For the purposes of monitoring airborne asbestos fibres, only respirable fibres are counted.
- Asbestos: means the asbestiform varieties of mineral silicates belonging to the serpentine or amphibole groups of rock-forming minerals, including actinolite asbestos, grunerite (or amosite) asbestos (brown), anthophyllite asbestos, chrysotile asbestos (white), crocidolite asbestos (blue) and tremolite asbestos.
- Asbestos containing material (ACM): means any material or thing that, as part of its design, contains asbestos.
- Asbestos removalist: means a person conducting a business or undertaking who carries out asbestos removal work.
- Asbestos removal work means:
  - Work involving the removal of asbestos or ACM
  - Class A asbestos removal work or Class B asbestos removal work as outlined in Part 8.10 of the WHS Regulations.
- Class A Licence: Can remove any amount or quantity of asbestos or ACM, including any amount of friable asbestos or non-friable asbestos or ACM.
- Class B Licence: Can remove any amount of non-friable asbestos or ACM.
- Friable asbestos: means material that is in a powder form or that can be crumbled, pulverised or reduced to a powder by hand pressure when dry, and contains asbestos.
- NATA-accredited laboratory: means a testing laboratory accredited by the National Association of Testing Authorities (NATA), Australia, or recognised by NATA either solely or with someone else.
- Non-friable asbestos: means material containing asbestos that is not friable asbestos, including material containing asbestos fibres reinforced with a bonding compound.
- Project Works Boundary: Fence to be erected for duration of construction works and operational maintenance areas.
- Project Works Zone: Construction area and potential ancillary Sites within project works boundary.
- Proposed Property Boundary: Future land title covering Road to be owned by LMCC Road Corridor: Cadastral boundaries associated with the proposal.

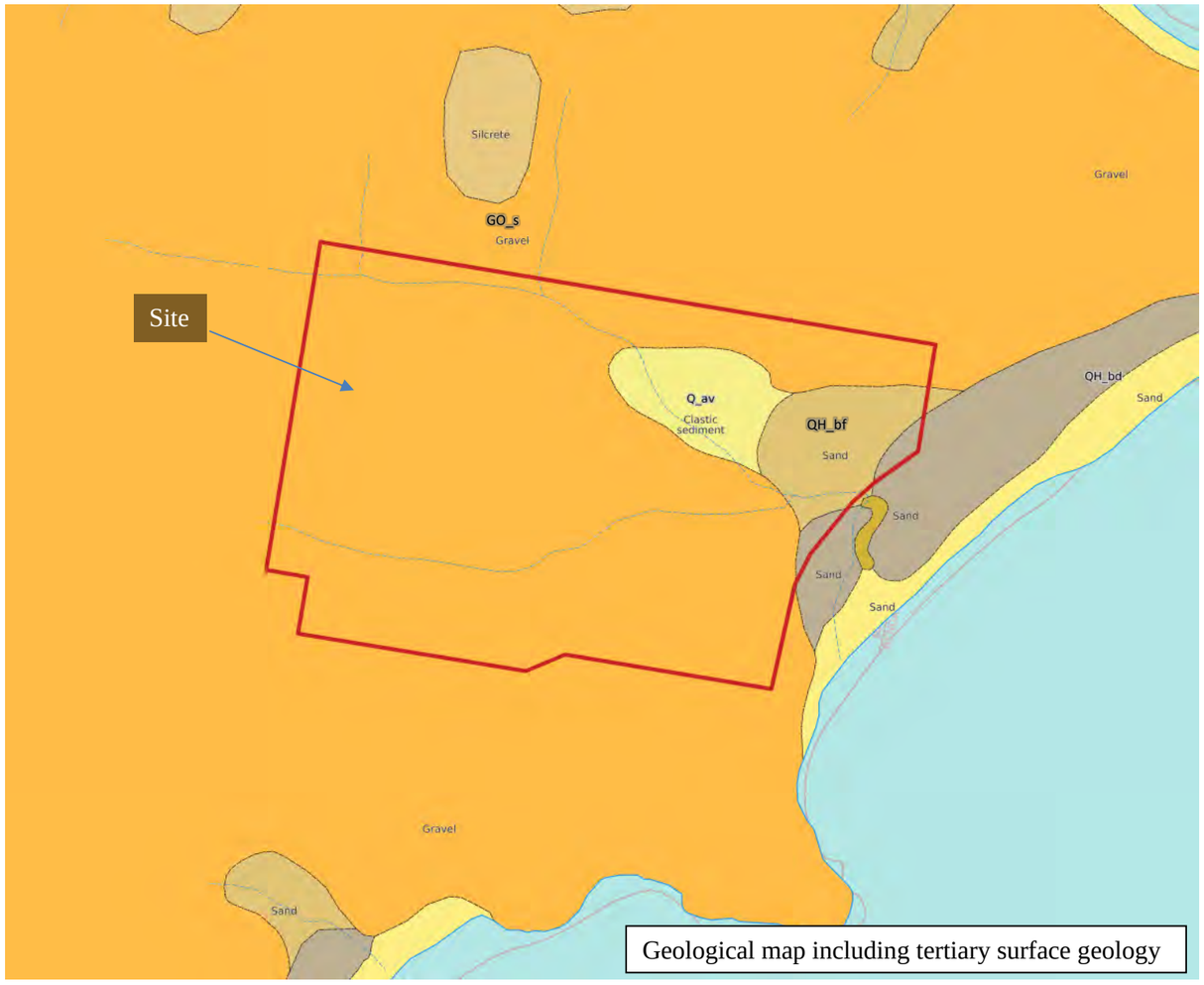
Figures

Site Location

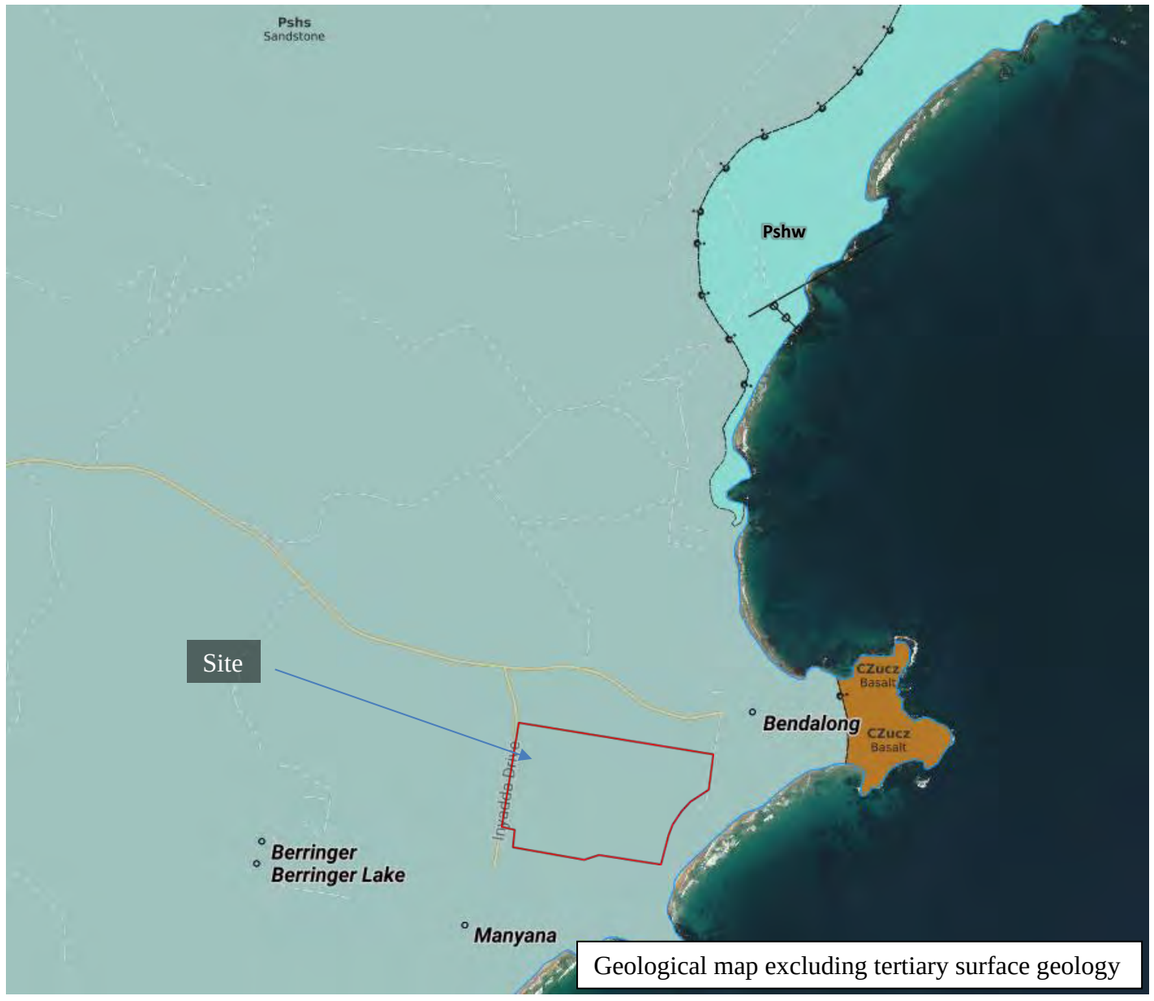
revision	description	drawn	approved	date
	Site location	SB	KEG	10/08/2023

TERRA INSIGHT

client:	**MDG Pty Ltd**		
project:	**Preliminary Site Investigation with Soil Sampling Lot 106 DP755923 Inyadda Drive, Manyana NSW**		
scale	NTS	title:	**Site Location**
original size	**A3**	project no: **TERRA22-165**	figure no: **FIGURE 1**



Geological map including tertiary surface geology



Geological map excluding tertiary surface geology

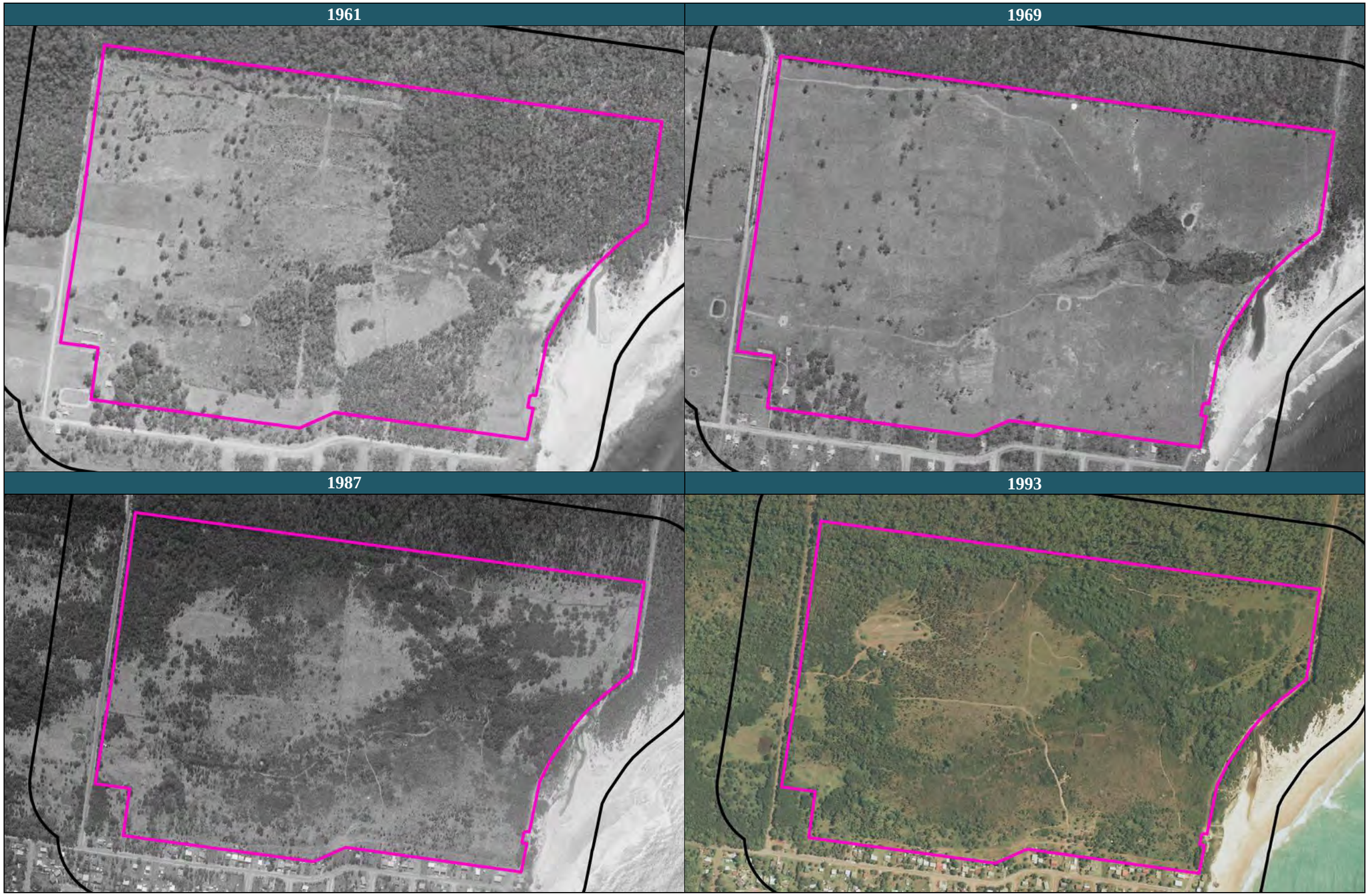
Symbol	Group	Sub-group	Unit	Lithology
GO_s	Oligocene	-	Alluvial gravel, sand and clay	Unconsolidated to poorly consolidated alluvial gravel, sand and clay deposits which are closely associated with basalts of similar age near Ulladulla
Q_av	Alluvium	-	Alluvial Valley Deposits	Silt, clay, (fluvially deposited) lithic to quartz-lithic sand, gravel.
QH_bf	Coastal Deposits	-	Backbarrier Flat	Fine-to medium-grained quartz-lithic sand with carbonate and humic components (marine-deposited), indurated sand, silt, clay, gravel, organic mud, peat.
QH_bd			Dune facies	Marine-deposited and aeolian-reworked coastal sand dunes.
Pshw	Shoalhaven Group	-	Wandrawandian Formation	Mid-grey to blue-grey fine-grained quartz-lithic silty sandstone, mudstone, siltstone (fine specs mica present: matrix supported polymictic pebbles within sequence. Commonly bioturbated, fossils include brachiopods, corals and crinoid stems
Pshs		-	Snapper Point Formation	Fine to medium grained sandstone, pebbly sandstone, and poly mictic pebble conglomerate (down sequence), medium to coarse grained sandstone with lithic pebbles and fragments, minor siltstone (up sequences): brachiopod, bivalve and bryozoan fossils common

Site Geology

revision	description	drawn	approved	date
	Site Geology	SB	KEG	5/09/2022
	NSW Government – Planning and Environment MinView online Seamless Geological Mapping			

TERRA INSIGHT

client:	**HEIR ASQUITH**		
project:	**Preliminary Site Investigation with Limited Soil Sampling Lot 106 DP755923 Inyadda Drive, Manyana NSW**		
scale	NTS	title:	**NSW Geology Mobile App Mapping**
original size	**A3**	project no: **TERRA22-165**	figure no: **FIGURE 2**



Historical Imagery

revision	description	drawn	approved	date
	Historical Aerial Imagery	SB	KEG	5/09/2022

N

TERRA INSIGHT

scale	NTS
original size	**A3**

client: **HEIR ASQUITH**

project: **Preliminary Site Investigation with Soil Sampling Lot 106 DP755923 Inyadda Drive, Manyana NSW**

title: **Historical Aerial Images**

project no: **TERRA22-165**

figure no: **FIGURE 3A**

Historical Imagery

revision	description	drawn	approved	date
	Historical Aerial Imagery	SB	KEG	5/09/2022

N

TERRA INSIGHT

scale	NTS
original size	**A3**

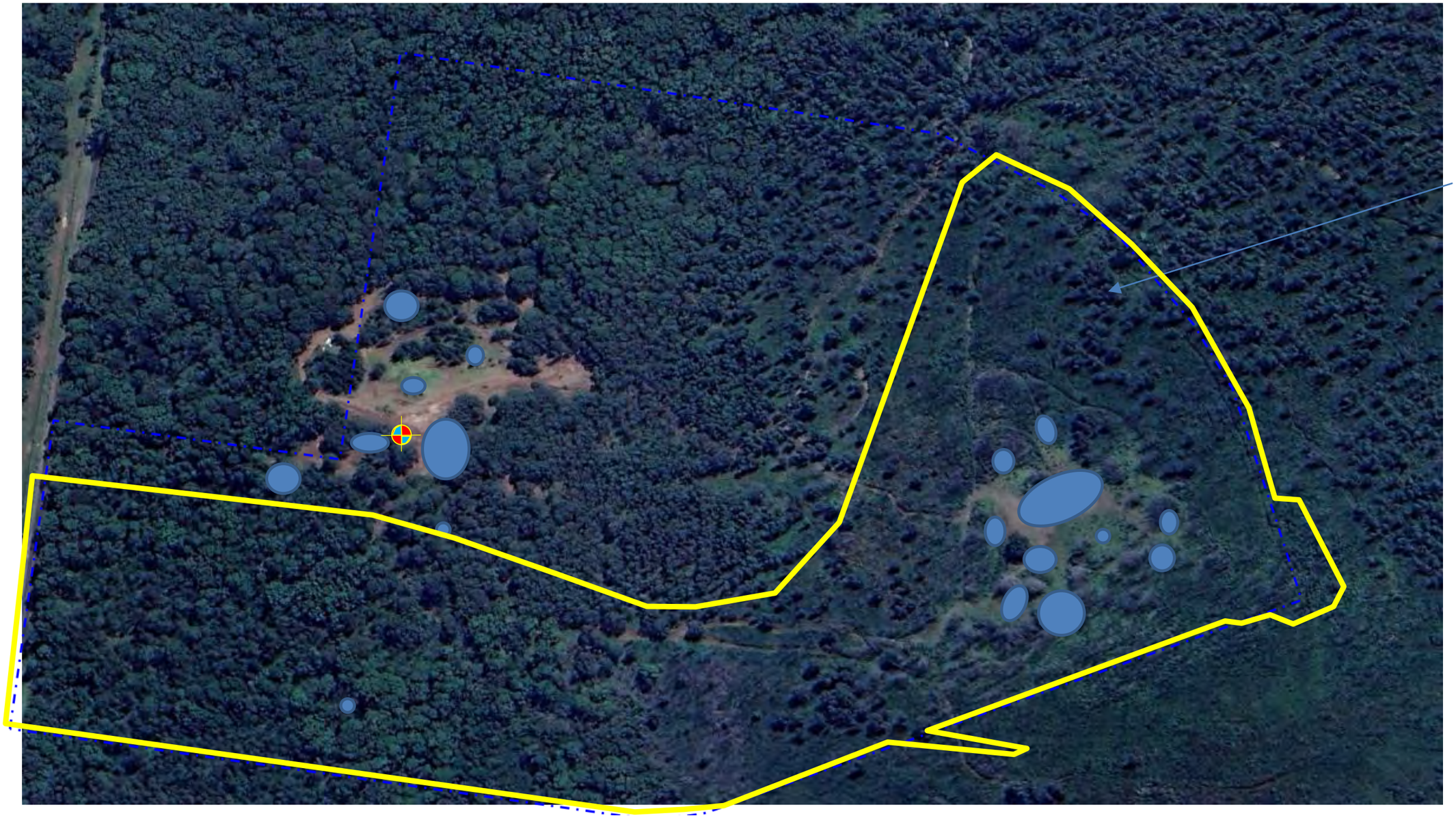
client: **HEIR ASQUITH**

project: **Preliminary Site Investigation with Soil Sampling Lot 106 DP755923 Inyadda Drive, Manyana NSW**

title: **Historical Aerial Images**

project no: **TERRA22-165**

figure no: **FIGURE 3B**



Locations of historic objects visible on Google Earth Imagery and current objects visible during the site walkover. Objects include construction materials, car bodies and miscellaneous inert items.

Asbestos Containing Material identified (and confirmed by laboratory testing) during Site walk over

Original Proposed Area of Development
Revised Proposed Area of Development (2023)

Areas of Environmental Concern

description	drawn	approved	date
Aerial images	SB	KEG	7/08/2019

TERRA INSIGHT

client:	**HEIR ASQUITH**
project:	**Preliminary Site Investigation with Soil Sampling Lot 106 DP755923 Inyadda Drive, Manyana NSW**
scale	NTS
title:	**Summary of Site observations**
original size	**A3**
project no: **TERRA22-165**	figure no: **FIGURE 4A**

Locations of historic objects visible on Google Earth Imagery and current objects visible during the site walkover. Objects include construction materials, car bodies and miscellaneous inert items.

Asbestos Containing Material identified (and confirmed by laboratory testing) during Site walk over

Original Proposed Area of Development
Revised Proposed Area of Development (2023)

Areas of Environmental Concern

description	drawn	approved	date
Aerial images	SB	KEG	7/08/2019

TERRA INSIGHT

client:	**HEIR ASQUITH**		
project:	**Preliminary Site Investigation with Soil Sampling Lot 106 DP755923 Inyadda Drive, Manyana NSW**		
scale	NTS	title:	**Summary of Site observations**
original size	**A3**	project no: **TERRA22-165**	figure no: **FIGURE 4B**

Legend

Original Proposed Area of Development
Revised Proposed Area of Development (2023)

Areas of Environmental Concern

description	drawn	approved	date
Areas of Environmental Concern	SB	KEG	13/07/2022

TERRA INSIGHT

client: **MDG Pty Ltd**

project: **Preliminary Site Investigation with Soil Sampling Lot 106 DP755923 Inyadda Drive, Manyana NSW**

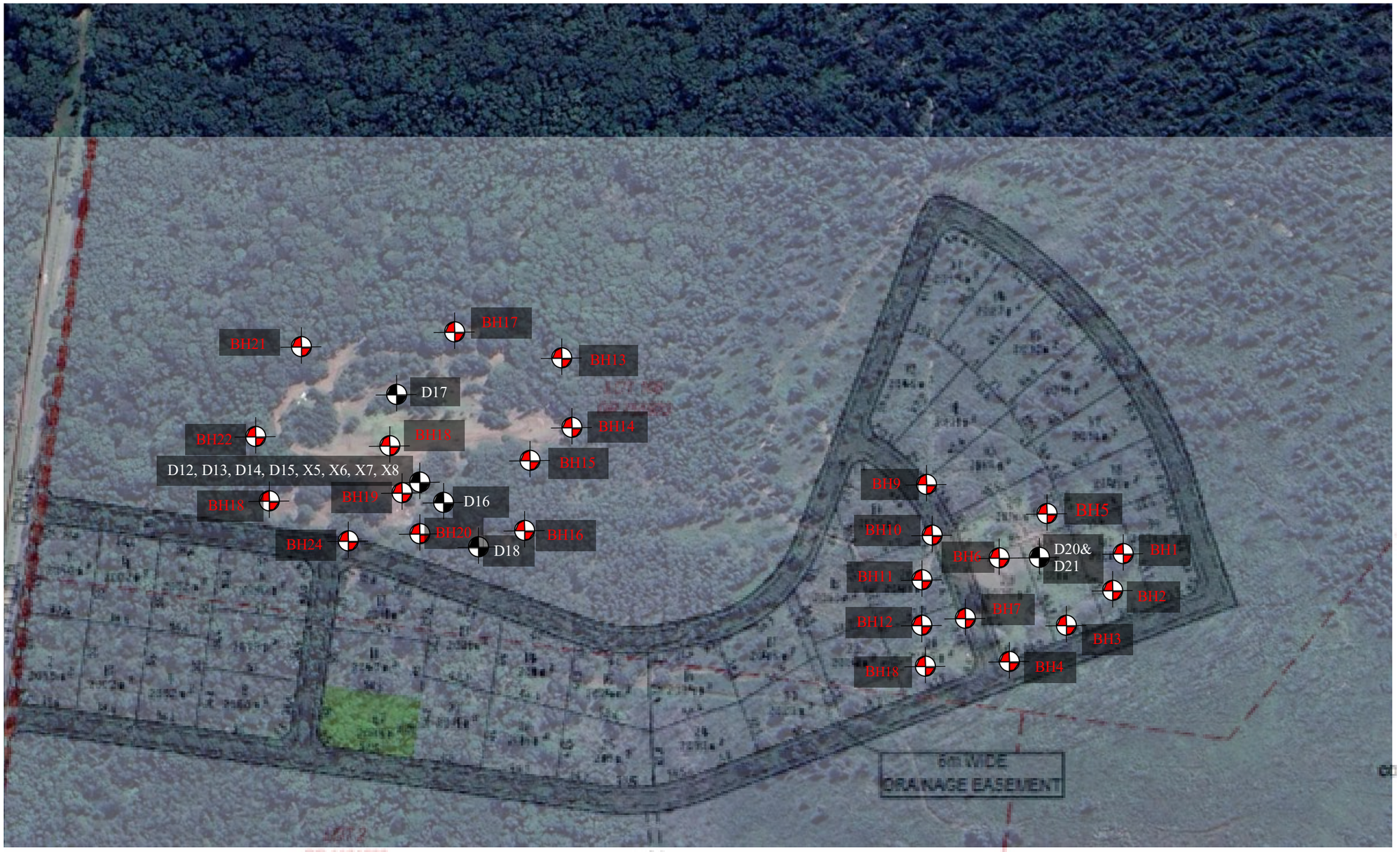
scale: NTS

title: **Summary of Site observations and historical Imagery**

original size: **A3**

project no: **TERRA22-165**

figure no: **FIGURE 5**



Legend

- Terra Test 2022 site
- Terra Test 2019 site

Test Site Locations

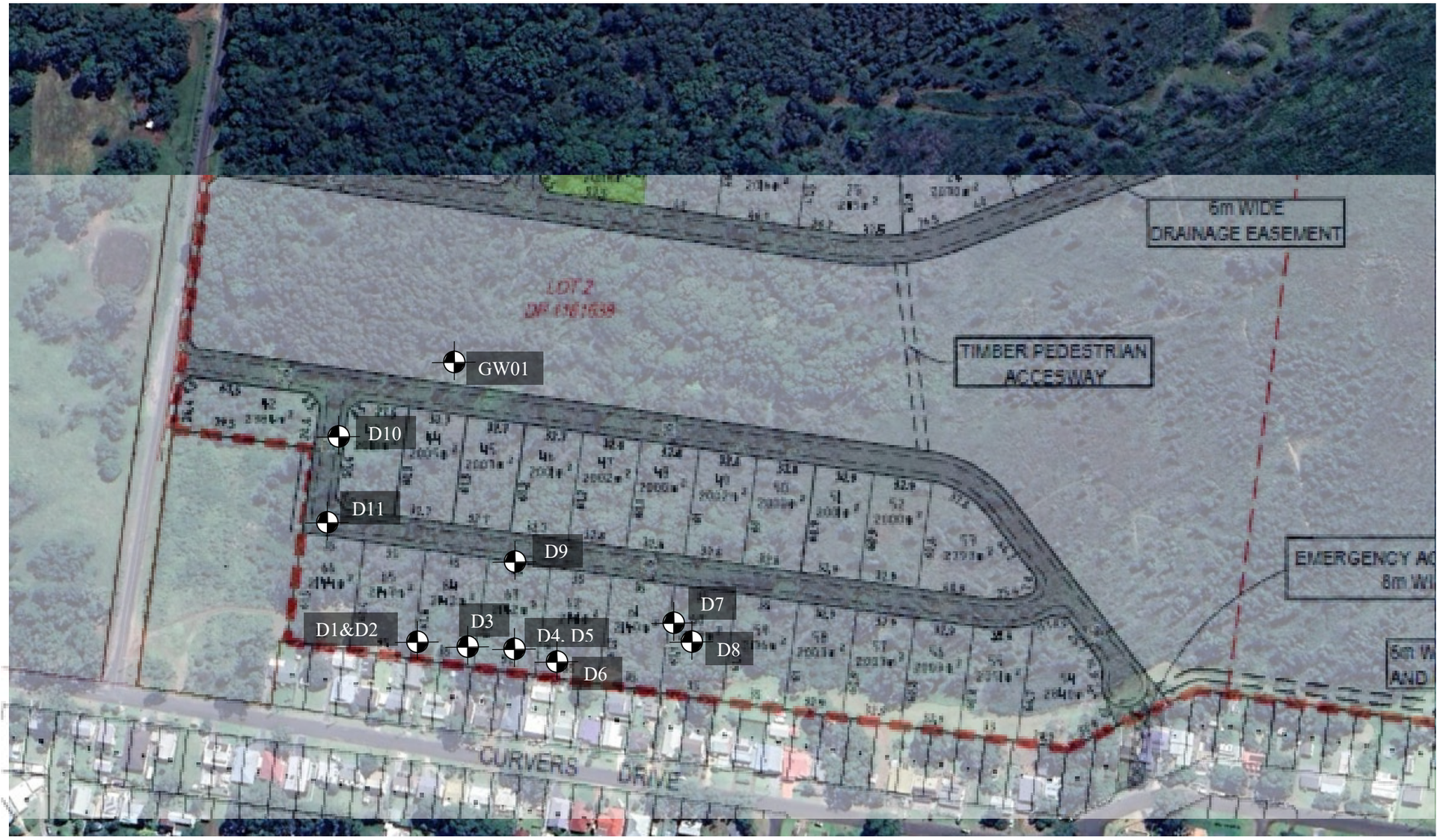
revision	description	drawn	approved	date
	Test Site Location	SB	KEG	19/07/2022

N

TERRA INSIGHT

scale	NTS
original size	**A3**

client:	**MDG Pty Ltd**
project:	**Preliminary Site Investigation with Soil Sampling Lot 106 DP755923 Inyadda Drive, Manyana NSW**
title:	**Site Plan and Test Location**
project no: **TERRA22-165**	figure no: **FIGURE 6.1**



Legend

- Terra Test 2022 site
- Terra Test 2019 site

Test Site Locations

revision	description	drawn	approved	date
	Test Site Location	SB	KEG	19/07/2022

N

TERRA INSIGHT

client:	**MDG Pty Ltd**
project:	**Preliminary Site Investigation with Soil Sampling Lot 106 DP755923 Inyadda Drive, Manyana NSW**
title:	**Site Plan and Test Location**
scale	NTS
original size	**A3**
project no:	**TERRA22-165**
figure no:	**FIGURE 6.2**

BH18
Copper: exceeds EIL & ENM
Lead: exceeds HIL & ENM
Zinc: exceeds EIL & ENM
Nickel: exceeds CT1 & ENM

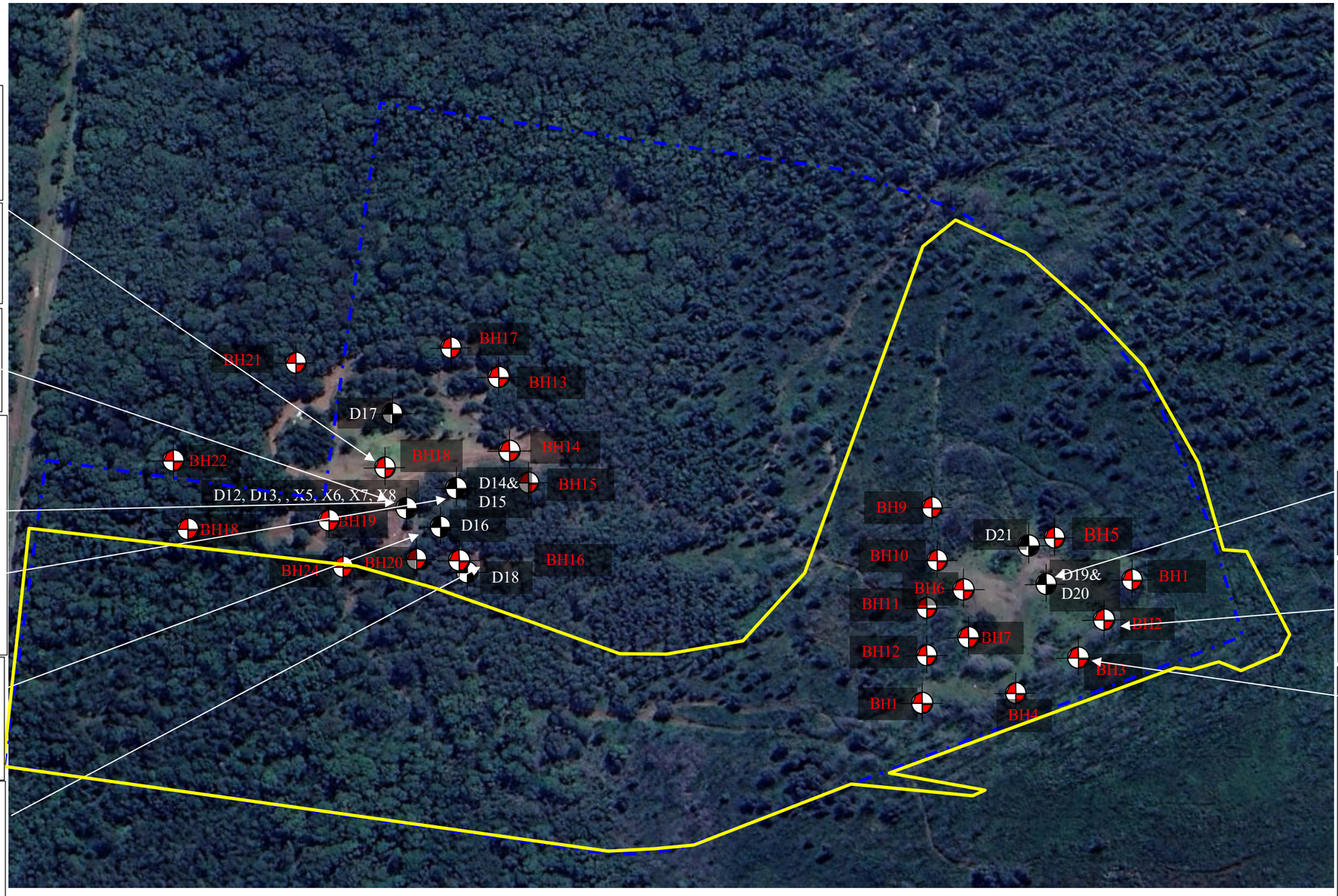
D13 (stockpile adjacent to asbestos pile)
Arsenic: exceeds ENM
Zinc: exceeds EIL & ENM

D12 (beneath asbestos stockpile)
Chromium: exceeds EMN
Total C10-C36: exceeds ENM

D14&D15 (two adjacent camp fires)
D14
Total C10-C36: exceeds ENM
D15
Chromium: exceeds ENM
Nickel: exceeds CT1 & ENM
F2>C10-C16: exceeds EIL&HSL
Total C10-C36: exceeds ENM

D16 (Stockpile)
Chromium: exceeds ENM
Zinc: exceeds ENM
F2> C10-C16: exceeds EIL
Total C10-C36: exceeds ENM

D18 (adjacent to fridge)
Cadmium: exceeds EIL & ENM
Nickel: Exceeds CT1
F2> C10-C16: exceeds EIL



D20 (adjacent to car body)
Zinc: exceeds ENM

BH01, BH02, BH06, BH12
Nickel: exceeding GSW

BH03
Nickel: exceeding GSW & ENM
BH04, BH07, BH08
Nickel: exceeding GSW & ENM, Chromium exceeding ENM
BH11
Nickel: exceeding GSW, Chromium exceeding ENM

Legend
- Terra Test 2022 site
- Terra Test 2019 site
- Original Proposed Area of Development
- Revised Proposed Area of Development (2023)

Test Site Locations

revision	description	drawn	approved	date
	Test Site Location	SB	KEG	19/07/2022

N

TERRA INSIGHT

scale	NTS
original size	A3

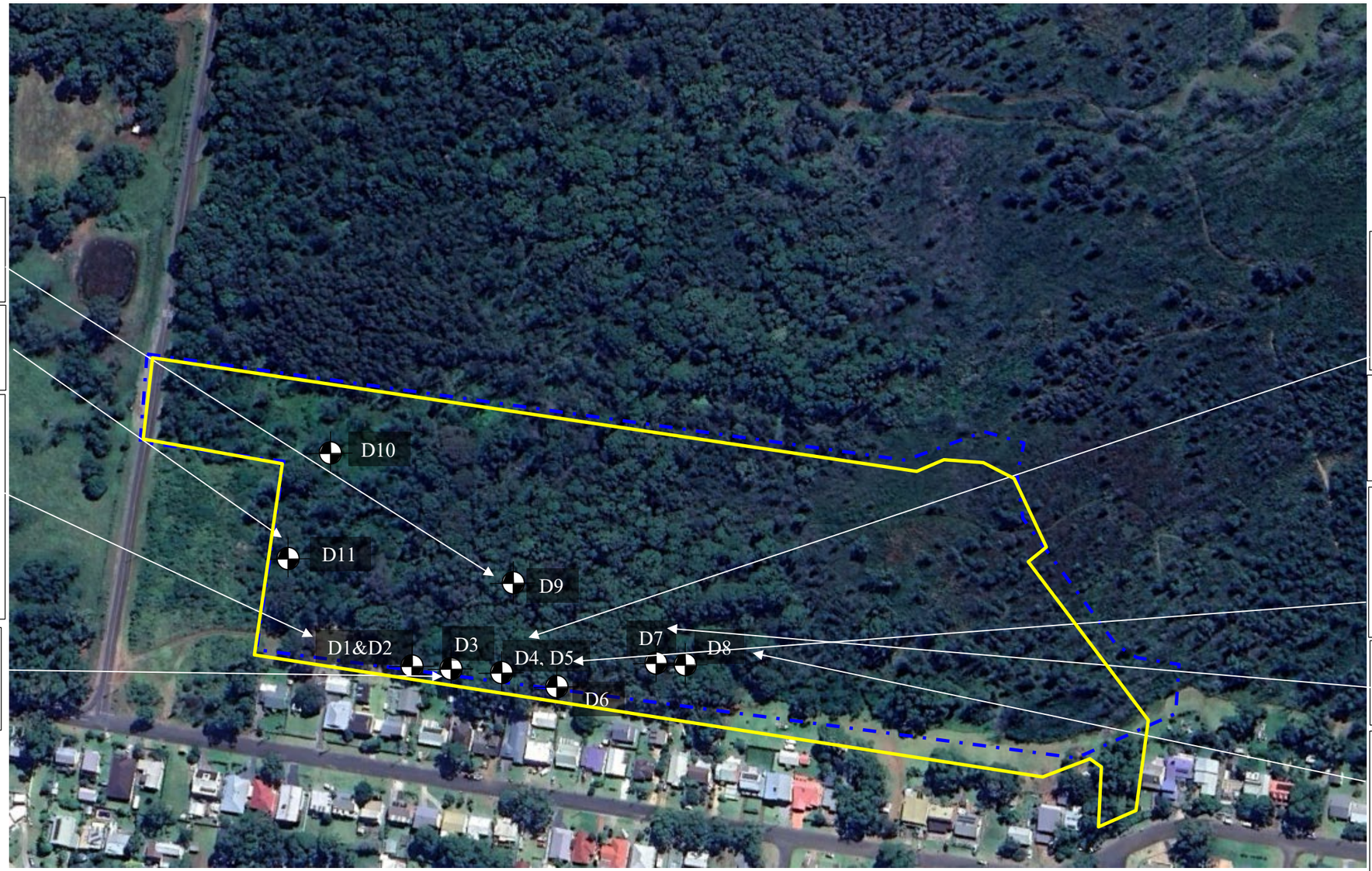
client: **MDG Pty Ltd**
project: **Preliminary Site Investigation with Soil Sampling Lot 106 DP755923 Inyadda Drive, Manyana NSW**
title: **Investigation Findings**
project no: **TERRA22-165**
figure no: **FIGURE 7.1**

D9 (stockpile of fill)
Chromium: exceeds ENM
Nickel: exceeds CT1
Total C10-C36: exceeds ENM

D11(near car track)
F2>C10-C16: exceeds EIL
Total C10-C36: exceeds ENM

D1&D2 (Two small campfires)
D1
Zinc: exceeds EIL & ENM
F2>C10-C16: exceeds EIL&HSL
Total C10-C36: exceeds ENM
D2
Total C10-C36: exceeds ENM

D3 (beneath stockpile of garden waste)
Total C10-C36: exceeds ENM



D4 (adjacent to boat, building materials and paint bucket)
Total C10-C36: exceeds ENM

D5 (underneath metal sheeting)
Total C10-C36: exceeds ENM

D6 (stockpile of fill over tree root)
F2>C10-C16: exceeds HSL&EIL
Total C10-C36: exceeds ENM

D7 (underneath transformer near caravan)
Chromium: exceeds ENM

D8 (underneath metal sheeting near shed)
Lead: exceeds ENM & CT1
Zinc: exceeds EIL&ENM
Total C10-C36: exceeds ENM

Legend

- Terra Test 2022 site
- Terra Test 2019 site
- Original Proposed Area of Development
- Revised Proposed Area of Development (2023)

Test Site Locations

revision	description	drawn	approved	date
	Test Site Location	SB	KEG	19/07/2022

N

TERRA INSIGHT

client:	**MDG Pty Ltd**
project:	**Preliminary Site Investigation with Soil Sampling Lot 106 DP755923 Inyadda Drive, Manyana NSW**
scale	NTS
title:	**Investigation Findings**
original size	**A3**
project no:	**TERRA22-165**
figure no:	**FIGURE 7.2**

Appendix A: Your Report

TERRA INSIGHT

Your Report

These notes have been prepared to help you understand the advice provided in Your Report and its limitations.

Your Report is based on what you tell us

Your Report has been developed based on the information you have provided such as the scope and size of your project. It applies only to the site investigated. If there are changes to the proposed works, then the advice provided within Your Report may need to be reviewed

Your Report is written with your needs in mind

The advice provided within Your Report is also not relevant to another purpose other than that originally specified at the time the report was issued. Please seek advice from Terra Insight before you share Your Report with another third party – except for the purpose for which the report was written.

Terra Insight assumes no responsibility and will not be liable to any other person or organisation for, or in relation to, any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in Your Report.

Your Report is based on what we observed

The advice provided within Your Report assumes that the site conditions, revealed through selective point sampling (undertaken in accordance with normal practices and standards) at a particular point in time, are indicative of the actual conditions on your site. However, the nature of the materials underlying your site is affected by natural processes and the activity of man. Under no circumstances can it be considered that these findings represent the actual state at all points. The subsurface conditions may vary significantly on the other parts of the site, particularly where no nearby sampling and testing work has been carried out.

As a result conditions on your site can change with time; they can also vary spatially. As a result, the actual conditions encountered may differ from those detailed within Your Report. Although nothing can be done to change the actual site conditions which exist, steps can be taken to gain a better understanding of the subsurface conditions underlying your site and reduce the potential for unexpected conditions to be encountered

The advice within Your Report also relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it. Only Terra Insight is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered as the project develops. If the details of your project have changed, the site conditions have changed or a significant amount of time as elapsed since our report was written, the advice provided within Your Report may need to be reviewed.

Your Report has been written by a Professional

The report has been prepared using accepted procedures and practices of the consulting profession at the time it was prepared, and the opinions, recommendations and conclusions set out in the report are made in accordance with generally accepted principles and practices of that profession.

Your Report is better when it is kept together

Your Report presents all the findings of the site assessment and should not be copied in part or altered in any way. Keeping Your Report intact reduces the potential for yourself or other design professionals to misinterpret the report.

Your Geo-Environmental Report

If Your Report is for geotechnical purposes only, it will not relate any findings, conclusions, or recommendations about the potential for hazardous materials to exist at the site unless you have specifically asked us to do so. If your report is written for Geo-Environmental purposes the following should be noted in addition to the above:

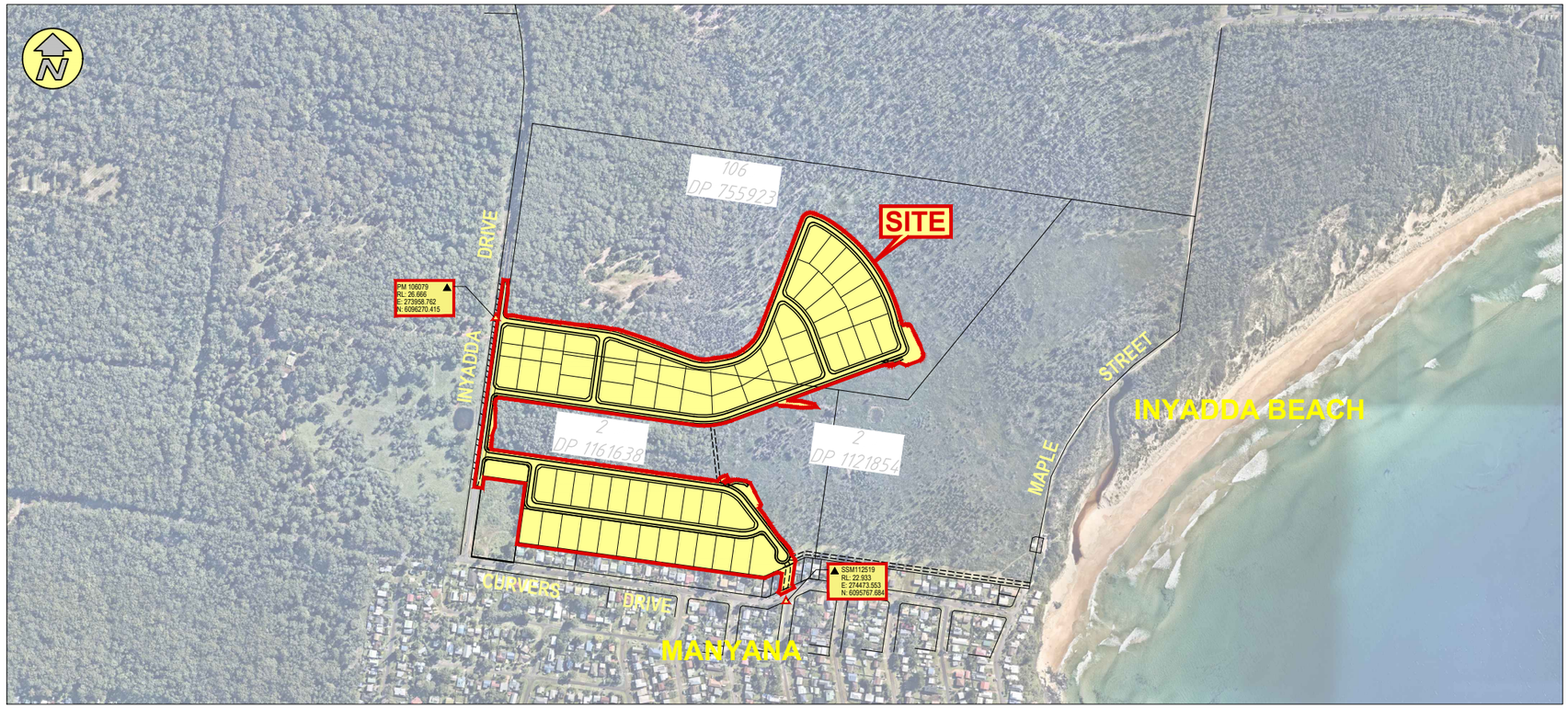
- Advancements in professional practice regarding contaminated land and changes in applicable statues and/or guidelines may affect the validity of this report. Consequently, the currency of conclusions and recommendations in Your Report should be verified if you propose to use this report more than 6 months after its date of issue;
- Your Report is based on information gained from environmental conditions (including assessment of some or all of soil, groundwater, vapour and surface water) and supplemented by reported data of the local area and professional experience. The assessment has been scoped with consideration to industry standards, regulations, guidelines and your specific requirements, which includes budget and timing;
- The characterisation of site conditions is an interpretation of information collected during assessment, in accordance with industry practice. Any interpretation in Your Report is not a complete description of all material on or in the vicinity of the site, due to the inherent variation in spatial and temporal patterns of contaminant presence and impact in the natural environment.
- We may have relied on data and other information provided by you and other qualified individuals in preparing Your Report. We have not verified the accuracy or completeness of such data or information except as otherwise stated in Your Report. For these reasons Your Report must be regarded as interpretative, in accordance with industry standards and practice, rather than being a definitive record.
- For each purpose, a tailored approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible quantify, risks that both recognised and potential contamination posed in the context of the agreed purpose. If the proposed use of the site changes, the assessment may no longer be valid and will need to be reviewed.

* For further information on this aspect reference should be made to "Guidelines for the Provision of Geotechnical information in Construction Contracts" published by the Institution of Engineers Australia, National headquarters, Canberra, 1987.

Appendix B: Proposed Site Development

INYADDA DRIVE, MANYANA
ROAD & DRAINAGE DESIGN

ISSUED FOR DEVELOPMENT APPLICATION



LOCALITY PLAN
N.T.S.

DRAWING LIST

NO.	Sheet Title
GENERAL	
000	COVER SHEET
001	GENERAL ARRANGEMENT PLAN
002	SHEET LAYOUT PLAN
003	GENERAL NOTES & LEGEND
004	DEMOLITION PLAN
SEDIMENT & EROSION CONTROL	
101	SEDIMENT BASIN CATCHMENT PLAN
102	SOIL & WATER MANAGEMENT PLAN - SHEET 01 OF 02
103	SOIL & WATER MANAGEMENT PLAN - SHEET 02 OF 02
SITE REGRADING	
201	SITE REGRADING PLAN - SHEET 01 OF 02
202	SITE REGRADING PLAN - SHEET 02 OF 02
203	SITE SECTIONS - SHEET 01 OF 02
204	SITE SECTIONS - SHEET 02 OF 02
ENGINEERING PLANS	
301	ENGINEERING PLAN - 01 OF 05
302	ENGINEERING PLAN - 02 OF 05
303	ENGINEERING PLAN - 03 OF 05
304	ENGINEERING PLAN - 04 OF 05
305	ENGINEERING PLAN - 05 OF 05
351	LANDSCAPE PLAN
ROAD LONGITUDINAL SECTIONS	
401	LONGITUDINAL & TYPICAL SECTIONS - ROAD No.01
402	LONGITUDINAL & TYPICAL SECTIONS - ROAD No.01 (CONT.)
403	LONGITUDINAL & TYPICAL SECTIONS - ROAD No.01 (CONT.)
404	LONGITUDINAL & TYPICAL SECTIONS - ROAD No.02 & 03
405	LONGITUDINAL & TYPICAL SECTIONS - ROAD No.06
406	LONGITUDINAL & TYPICAL SECTIONS - ROAD No.07
WATER QUALITY DETAILS	
850	BASIN No.01 PLAN & DETAILS
851	BASIN No.02 PLAN & DETAILS
852	CATCHMENT PLAN
853	SANDSTONE LOGWALL, BLOCKWALL & GRASSED ROADSIDE SWALE DETAILS

CLIENT:
HEIR ASQUITH

LGA SHOALHAVEN CITY COUNCIL

LOT 1 D.P.1161638
LOT 2 D.P.1121854
LOT 106 D.P.755923

INYADDA DRIVE, MANYANA
ROAD & DRAINAGE DESIGN

PROJECT No.:	STAGE:	MILESTONE:	REVISION DATE:	DRAWING No.:	REVISION:
21-000403	-	DA	30/06/2023	000	2

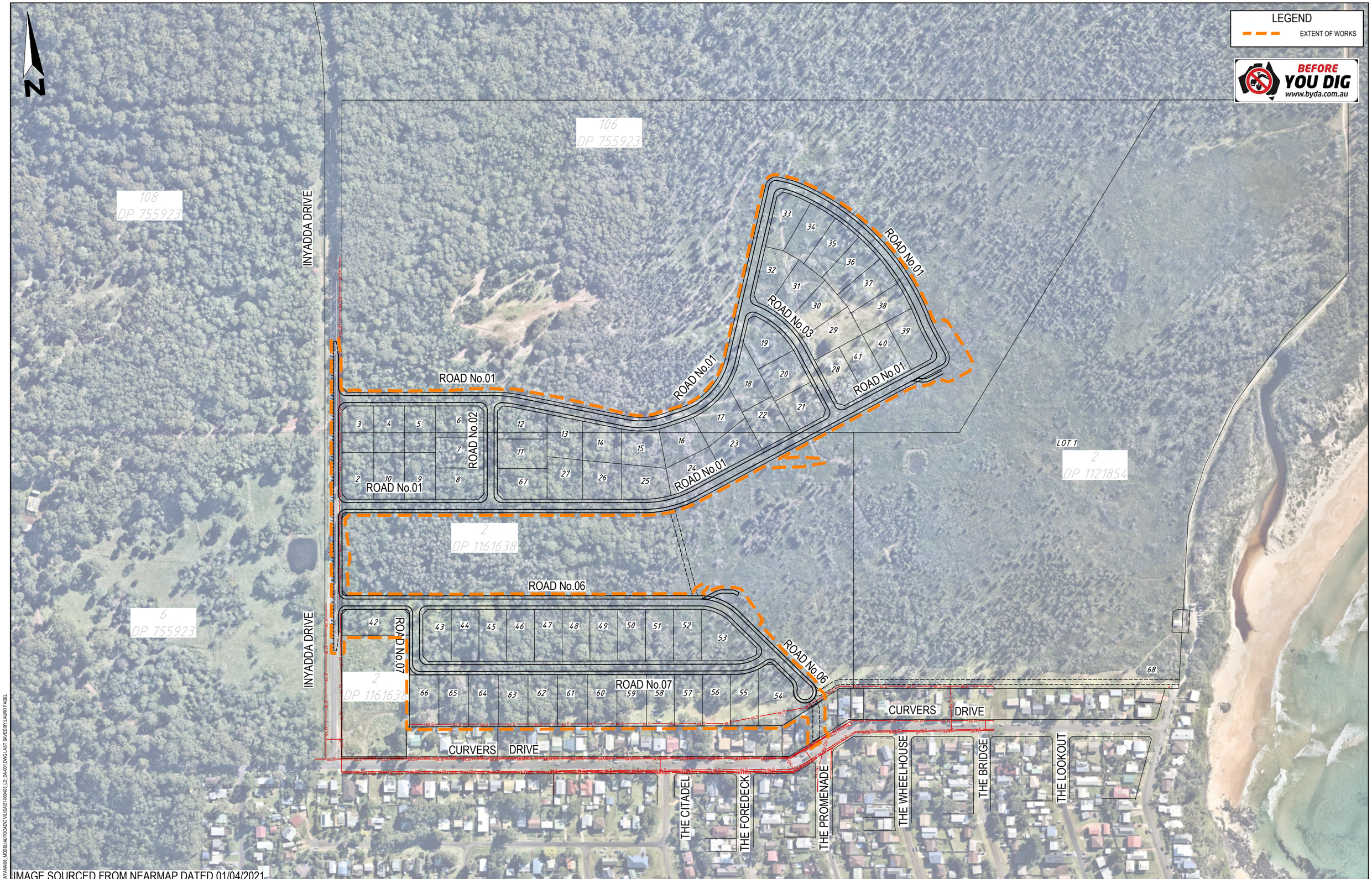


IMAGE SOURCED FROM NEARMAP DATED 01/04/2021

		DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
FIRST ISSUE		AW	JS	SA	EF	14/12/2021	
AMENDMENTS	1	AW	AW	SA	EF	12/01/2022	ISSUED FOR DEVELOPMENT APPLICATION
	2	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH SIGN:
MEng (Civil) MIEAust CPEng NER
DATE: 30/06/2023

SCALE: 0 20 40 60 80 100 120 140 160
SCALE 1:2000 (A1) SCALE 1:4000 (A3)

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

PROJECT: INYADDA DRIVE, MANYANA
ROAD & DRAINAGE DESIGN

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: GENERAL ARRANGEMENT PLAN

PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	001	DA	2

FILE: H:\21\21-000403 - INYADDA DRIVE, MANYANA\05_MODEL\AUTOCAD\CIVIL\DA\21-000403_LO_DA-001.DWG LAST SAVED BY LAURO FAGEL

IMAGE SOURCED FROM NEARMAP DATED 01/04/2021

AMENDMENTS	FIRST ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
		AW	JS	SA	EF	14/12/2021	
	1	AW	AW	SA	EF	12/01/2022	ISSUED FOR DEVELOPMENT APPLICATION
	2	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH SIGN:
MEng (Civil) MIEAust CPEng NER
DATE: 30/06/2023

SCALE
0 25 50 75 100 125 150 175 200
SCALE 1:2500 (A1) SCALE 1:5000 (A3)

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

PROJECT: INYADDA DRIVE, MANYANA ROAD & DRAINAGE DESIGN

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: SHEET LAYOUT PLAN

PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	002	DA	2

F:\E.H\21-000403 - INYADDA DRIVE, MANYANA\06_MODEL\AUTOCAD\CIVIL\DA21-000403_LD_DA-002.DWG LAST SAVED BY:JED SWEENEY

GENERAL NOTES

GENERAL

G1. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH SHOALHAVEN COUNCIL DESIGN GUIDELINES AND SHOALHAVEN COUNCIL ENGINEERING CONSTRUCTION SPECIFICATIONS AND TO THE REQUIREMENTS OF THE CERTIFYING AUTHORITY.

G2. INSPECTIONS BY CERTIFYING AUTHORITY ARE REQUIRED AT THE FOLLOWING STAGES AND THE WORKS APPROVED PRIOR TO CONTINUANCE OF ANY FUTURE WORK:

(A) FOLLOWING INSTALLATION OF EROSION AND SEDIMENT CONTROL STRUCTURES/MEASURES.

(B) PRIOR TO BACKFILLING PIPELINES, SUBSOIL DRAINS AND DAMS.

(C) PRIOR TO CASTING OF PITS AND OTHER CONCRETE STRUCTURES, INCLUDING KERB AND GUTTER BUT FOLLOWING PLACEMENT OF FOOTINGS, FORMWORK, AND REINFORCEMENT.

(D) PRIOR TO PLACEMENT OF SUB BASE AND ALL SUBSEQUENT PAVEMENT LAYERS, A PROOF ROLLER TEST OF EACH PAVEMENT LAYER IS REQUIRED.

(E) FORMWORKS PRIOR TO POURING CONCRETE IN PARKING AREA FOR FOOTPATH CROSSING AND OTHER ASSOCIATED WORK.

(F) PRIOR TO BACKFILLING PUBLIC UTILITY CROSSINGS IN ROAD RESERVES.

(G) FINAL INSPECTIONS AFTER ALL WORKS ARE COMPLETED AND 'WORKS AS EXECUTED' PLANS HAVE BEEN SUBMITTED TO COUNCIL.

G3. NO TREES ARE TO BE REMOVED UNLESS APPROVAL IS GRANTED BY COUNCIL'S LANDSCAPE COMPLIANCE OFFICER OR AS AUTHORISED BY DEVELOPMENT CONSENT.

G4. MAKE SMOOTH JUNCTIONS WITH EXISTING WORKS.

G5. NO WORK IS TO BE CARRIED OUT ON COUNCIL PROPERTY OR ADJOINING PROPERTIES WITHOUT THE WRITTEN PERMISSION FROM THE OWNER/S.

G6. VEHICULAR ACCESS AND ALL UTILITIES/SERVICES ARE TO BE MAINTAINED AT ALL TIMES TO ADJOINING PROPERTIES AFFECTED BY CONSTRUCTION.

G7. ALL RUBBISH, BUILDINGS, SHEDS AND FENCES TO BE REMOVED TO SATISFACTION OF COUNCIL'S ENGINEER.

G8. COUNCIL ENGINEERS HAVE DISCRETION TO VARY, AS CONSIDERED NECESSARY, THE ENGINEERING REQUIREMENTS IN RESPECT OF A PARTICULAR SUBDIVISION OR DEVELOPMENT HAVING REGARD TO THE SITE CONTEXT.

EARTHWORKS

E1. EARTHWORKS ARE TO BE CARRIED OUT TO THE SATISFACTION OF THE COUNCIL. UNSUITABLE MATERIALS ARE TO BE REMOVED FROM ROADS AND LOTS PRIOR TO FILLING. THE CONTRACTOR IS TO ARRANGE AND MAKE AVAILABLE COMPACTION TESTING RESULTS FOR ALL AREAS THAT CONTAIN FILL IN EXCESS OF 200mm.

E2. COMPACTION OF EARTHWORKS SHALL CONTINUE UNTIL A DRY DENSITY RATIO OF 95% FOR SITE FILLING AND 100% FOR ROAD PAVEMENT SUBGRADES HAS BEEN ACHIEVED IN ACCORDANCE WITH TEST METHOD AS1289.5.3.1 OR AS.1289.5.1.1. THE CONTROL TESTING OF EARTHWORKS SHALL BE IN ACCORDANCE WITH THE GUIDELINES IN AS3798 'GUIDELINES ON EARTHWORKS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENTS'. WHERE IT IS PROPOSED TO USE TEST METHOD AS1289.5.8.1 TO DETERMINE THE FIELD DENSITY, A SAND REPLACEMENT METHOD SHALL BE USED TO CONFIRM THE RESULTS.

E3. THE SUITABLE QUALIFIED GEOTECHNICAL ENGINEER, SHALL HAVE A LEVEL 1 RESPONSIBILITY FOR ALL FILLING AS DEFINED IN APPENDIX B AS3798 'GUIDELINES ON EARTHWORKS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENTS', AND AT THE END OF THE WORKS SHALL CONFIRM THE EARTHWORKS COMPLY WITH THE REQUIREMENTS OF THE SPECIFICATION AND DRAWINGS BY WRITTEN NOTIFICATION.

E4. IN AREAS TO BE FILLED WHERE THE SLOPE OF THE NATURAL SURFACE EXCEEDS 1(V):4(H), BENCHES ARE TO BE CUT TO PREVENT SLIPPING OF THE PLACED FILL MATERIAL AS REQUIRED BY THE COUNCIL.

E5. ALL BATTERS ARE TO BE SCARIFIED TO A DEPTH OF 50mm TO ASSIST WITH ADHESION OF TOP SOIL TO BATTER FACE.

E6. PROVIDE MINIMUM 150mm AND MAXIMUM 300mm TOPSOIL ON FOOTPATHS, FILLED AREAS AND ALL OTHER AREAS DISTURBED DURING CONSTRUCTION. TOPSOILED AREAS TO BE STABILISED WITH APPROVED VEGETATION A MAXIMUM OF 14 DAYS AFTER TOPSOILING AND ARE TO BE WATERED TO ENSURE GERMINATION.

E7. THE CONTRACTOR SHALL CONTROL SEDIMENTATION, EROSION AND POLLUTION DURING CONSTRUCTION IN ACCORDANCE WITH THE REQUIREMENTS OF THE CURRENT EDITION OF 'MANAGING URBAN STORMWATER: SOILS AND CONSTRUCTION' PRODUCED BY LANDCOM.

E8. A MINIMUM 1m WIDE, CONTINUOUS STRIP OF COUCH GRASS SHALL BE PLACED BEHIND THE BACK OF ALL KERBS & OTHER CONCRETE STRUCTURES IMMEDIATELY AFTER THE COMPLETION OF THE FOOTPATH GRADING OR OTHER ELEMENTS AS APPLICABLE, AND SHALL BE MAINTAINED AND REPLACED AS REQUIRED DURING THE CONSTRUCTION MAINTENANCE PERIOD.

EGIS GENERAL

EC1. SURVEY SOURCED FROM:
-SURVEYOR: EGIS
-D.T.M.: 211029 Detail Survey 1.dwg DATED 11/10/2021
-ALL FILES ARE ON MGA56 GDA 2020 CO-ORDINATE SYSTEM

EC2. CONTRACTOR IS TO ENSURE THAT ALL WORKS ASSOCIATED WITH PROPERTY BOUNDARIES ARE TO BE SET OUT OR VERIFIED BY A REGISTERED SURVEYOR

EC3. PIPES UP TO 750Ø SHALL BE CONSTRUCTED WITH SPIGOT AND SOCKET RUBBER RING JOINTS AND BE OF FIBRE REINFORCED CONCRETE WHICH SHALL CONFORM RESPECTIVELY TO THE REQUIREMENTS OF AS 4139 AND AS 4058. WHERE FIBRE REINFORCED CONCRETE PIPES ARE TO BE USED, A PROPRIETARY COLLAR IS TO BE APPLIED OVER THE PIPE JOINTS.

EC4. PIPES GREATER THAN 750Ø ARE TO BE CONSTRUCTED FROM SULPHATE RESISTANT CEMENT.

ROADWORKS

R1. SUBGRADES AND SUB BASES ARE TO BE COMPACTED IN ACCORDANCE WITH COUNCIL'S CONSTRUCTION SPECIFICATION.

R2. SUBSOIL DRAINS TO BE PROVIDED ON BOTH SIDES OF ROADS (EXCEPT WHERE THERE IS STORMWATER DRAINAGE).

R3. 150 x 50 H.D. GALVANISED STEEL KERB OUTLETS TO BE PLACED IN ALL KERB TYPES ON LOW SIDE OF LOTS. PROVIDE SUITABLE ADAPTOR TO ALLOW CONNECTION OF 90mm DIAMETER STORMWATER PIPE.

R4. LIPLESS PERAMBULATOR CROSSINGS ARE TO BE PROVIDED IN ALL KERB RETURNS AND WHERE REQUIRED BY COUNCIL.

R5. SERVICE CONDUITS TO BE PLACED AS DIRECTED BY ALL PUBLIC UTILITY AUTHORITIES INCLUDING ENDEVOUR ENERGY, NBN AND SYDNEY WATER

R6. PROPOSED UTILITIES AND SERVICES CROSSING EXISTING ROADS SHALL BE PROVIDED FOR USING A TRENCHLESS TECHNIQUE SO AS NOT TO DAMAGE THE EXISTING SURFACE. ALL SERVICE CONDUITS UNDER ROADS MUST BE LAID TO A MINIMUM DEPTH OF 750mm.

R7. CONCRETE FOOTPATH CONSTRUCTION MAY BE BONDED WITH COUNCIL PENDING COMPLETION OF UTILITY/SERVICES AND SURROUNDING DWELLINGS.

R8. ALL TEMPORARY ROADS MUST BE TEMPORARILY SEALED WITH A SINGLE COAT FLUSH SEAL.

R9. ALL PERMANENT ROADS MUST BE SEALED WITH A SINGLE COAT FLUSH SEAL AND 50mm OF AC TO BE APPLIED IN TWO 25mm THICK LAYERS. THE FINAL AC LAYER IS TO BE AC 10 AND MAY BE BONDED WITH COUNCIL AND PLACED FOLLOWING APPROVAL FROM COUNCIL.

R10. SIGNPOSTING AND LINE MARKING SHALL CONFORM TO AS1742.2 'TRAFFIC CONTROL DEVICES FOR GENERAL USE'. RAISED RETRO-REFLECTIVE PAVEMENT MARKERS TO CONFORM TO AS1906 'RETRO-REFLECTIVE MATERIALS AND DEVICES FOR ROAD TRAFFIC CONTROL PURPOSES'. ALL APRONS AND KERB FACE ON CENTRAL ISLANDS OF ROUNDABOUTS AND ALL OTHER ISLANDS TO BE DELINEATED BY REFLECTIVE WHITE MARKING. INSTALLATION SHALL OCCUR IN ACCORDANCE WITH THE PLAN APPROVED BY THE LOCAL TRAFFIC COMMITTEE.

R11. ALL LOT AND HOUSE NUMBERS MUST BE STENCILLED ON KERB FACE.

R12. STREET SIGNS TO COUNCIL STANDARD MUST BE INSTALLED BY THE CONTRACTOR.

STORMWATER

S1. ALL PIPES TO BE SPIGOT AND SOCKET, RUBBER RING JOINTED.

S2. ALL LONGITUDINAL PIPELINES IN ROADS MUST BE LOCATED UNDER KERB AND GUTTER AND BE BACKFILLED WITH APPROVED GRANULAR MATERIAL UNLESS OTHERWISE APPROVED BY THE COUNCIL ENGINEER.

S3. DRAINAGE LINES MUST BE BACKFILLED WITH APPROVED GRANULAR MATERIAL IN TRAFFICABLE AREAS. THREE (3) METRES OF SUBSOIL DRAINAGE WRAPPED IN GEOTEXTILE STOCKING MUST BE PROVIDED TO ALL DOWNSTREAM PITS.

S4. ALL GULLY PITS TO COUNCIL'S STANDARD AND LINTELS CENTRALLY PLACED AT SAG PITS.

S5. ALL PITS MUST BE BENCHED AND STREAMLINED. PROVIDE SL72 REINFORCEMENT AND GALVANISED STEP IRONS IN ALL PITS OVER 1.2-METRES DEEP AS MEASURED FROM THE TOP OF GRATE TO THE INVERT OF THE PIT.

S6. CONCRETE IS TO HAVE MINIMUM COMPRESSIVE STRENGTH OF 32MPA AT 28-DAYS UNLESS OTHERWISE APPROVED BY THE COUNCIL ENGINEER.

S7. ALL INTER-ALLOTMENT DRAINAGE MUST HAVE A MINIMUM PIPE DIAMETER OF 150mm AND A MINIMUM GRADE OF 1% UNLESS OTHERWISE APPROVED BY THE COUNCIL ENGINEER.

S8. ALL INTER-ALLOTMENT DRAINAGE LINES MUST BE LAID CENTRALLY WITHIN DRAINAGE EASEMENTS. INSPECTION PITS MUST BE PROVIDED AT ALL CHANGES OF GRADE AND DIRECTION.

S9. INTER-ALLOTMENT DRAINAGE LINES MUST BE INSTALLED AFTER SYDNEY WATER SEWERAGE LINES HAVE BEEN INSTALLED WHERE SEWER IS PROPOSED ADJACENT TO INTER-ALLOTMENT DRAINAGE LINES.

S10. 1% AEP OVERLAND FLOW PATHS MUST BE FORMED AND SHOWN ON 'WORKS AS EXECUTED' DRAWINGS.

S11. ALL PLANS (BOTH DESIGN AND WAE) ARE TO CLEARLY DELINEATE THE EXTENT/LOCATION OF FLOOD LINES INCLUDING THE 5% AEP, 1% AEP AND PMF.

S12. ADEQUATE PROVISION IS TO BE MADE TO PREVENT SCOURING AND SEDIMENTATION FOR ALL DRAINAGE WORKS IN ACCORDANCE WITH COUNCIL'S REQUIREMENTS.

S13. PIT LINTELS ARE TO BE STENCILLED WITH APPLICABLE DISTINCTION STENCIL AVAILABLE FROM COUNCIL.

S14. CATCH DRAINS MUST BE CONSTRUCTED AS REQUIRED BY THE APPROVED PLANS OR THE PRINCIPAL CERTIFYING AUTHORITY.

S15. SOIL AND WATER MANAGEMENT PLANS ARE TO BE PREPARED FOR ALL DISTURBED SITES AND ADHERED TO AT ALL TIMES DURING THE CONSTRUCTION AND MAINTENANCE PERIODS.

DIGITAL MODELS CREATED BY EGIS UNDER THIS COMMISSION ARE CREATED FOR THE PURPOSE OF THE PREPARATION OF DRAWINGS AND ESTIMATES OF QUANTITIES. INFORMATION CONTAINED IN THE DRAWINGS TAKES PRECEDENCE OVER THE DIGITAL MODEL UPON WHICH IT WAS BASED. USE OF DIGITAL MODELS, CREATED BY EGIS, BY OTHER PARTIES TO SET OUT WORKS OR FOR OTHER REASONS IS DONE ENTIRELY AT THE RISK OF THE PARTY SO USING THE DIGITAL MODEL

LEGEND

DESCRIPTION	PROPOSED	EXISTING	FUTURE
SITE BOUNDARY			
STORMWATER PIPELINE	375Ø		
STORMWATER DRAINAGE PITS			
DRAINAGE LINE No. 3 DRAINAGE PIT No. 10	3/10	3/10	3/10
CONCRETE HEADWALL			
CULVERT CROSSING			
SUBSOIL DRAIN	SS	SS	
150mm KERB AND GUTTER	K&G	EXIST. K&G	FUT. K&G
ROLL KERB AND GUTTER	RK	EXIST. RK	FUT. RK
KERB ONLY	KO	EXIST. KO	FUT. KO
EDGE STRIP	ES	EXIST. ES	FUT. ES
MOUNTABLE KERB	MK	EXIST. MK	FUT. MK
DISH CROSSING	DC	EXIST. DC	FUT. DC
VEHICULAR CROSSING	VC	EXIST. VC	FUT. VC
PEDESTRIAN RAMP	PR		
EDGE OF BITUMEN	EOB	EXIST. EOB	FUT. EOB
BATTERS			
CONCRETE PATHWAY			
CONTOURS	99.5 99.0	99.5 99.0	99.5 99.0
SITE REGRADING AREA	CUT FILL		
SERVICE LINES SEWER, GAS, WATER, ELECTRICITY, RECYCLED WATER	S G W E RW	ex.S ex.G ex.W ex.E ex.RW	fut.S fut.G fut.W fut.E fut.RW
COMMUNICATION LINES TELSTRA, FIBRE OPTIC, NBN	T OF NBN	ex.T ex.OF ex.NBN	fut.T fut.OF fut.NBN
OVER HEAD LINES AND POLES	OH	ex.OH	fut.OH
LIMIT OF CONSTRUCTION			
FENCE POST AND RAIL FENCE SECURITY FENCE			
LOT NUMBERS	2586		
RETAINING WALL			
SANDSTONE LOG WALL			
ROCK WALL			
ROOF WATER OUTLET TO KERB			
ROOF WATER OUTLET TO BACK OF PIT			

EXISTING TREES

EXISTING TREES	EXISTING TREES TO BE RETAINED	EXISTING TREES TO BE REMOVED

BEFORE YOU DIG www.byda.com.au

FIRST ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
	AW	JS	SA	EF	14/12/2021	
A 1	AW	AW	SA	EF	12/01/2022	ISSUED FOR DEVELOPMENT APPLICATION
M 2	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS
E						
N						
D						
M						
E						
N						
T						
S						

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH
MEng (Civil) MIEAust CPEng NER
SIGN:
DATE: 30/06/2023

SCALE:

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

PROJECT: INYADDA DRIVE, MANYANA ROAD & DRAINAGE DESIGN

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: GENERAL NOTES & LEGEND

PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	003	DA	2

FILE: H:\21\21-000403 - INYADDA DRIVE, MANYANA\06_MOD\BLIM\AUTOCAD\CIVIL\DWG\21-000403_LD_DA-003.DWG LAST SAVED BY PAMA.SENDURAN

IMAGE SOURCED FROM NEARMAP DATED 01/04/2021

FIRST ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
AMENDMENTS 1	AW	JS	SA	EF	14/12/2021	ISSUED FOR DEVELOPMENT APPLICATION
2	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH
MEng (Civil) MIEAust CPEng NER
SIGN:
DATE: 30/06/2023

SCALE
0 20 40 60 80 100 120 140 160
SCALE 1:2000 (A1) SCALE 1:4000 (A3)

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

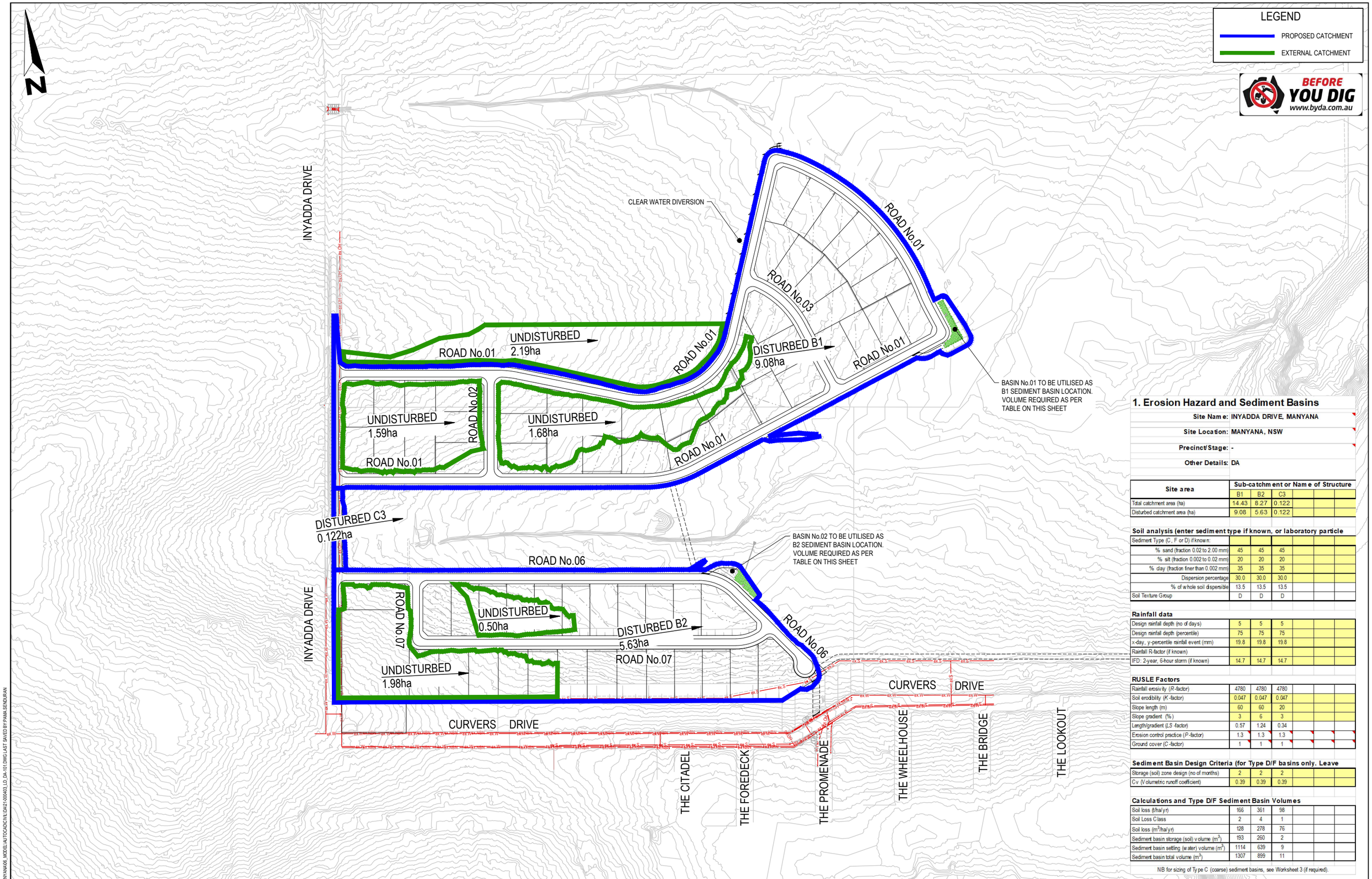
PROJECT: INYADDA DRIVE, MANYANA ROAD & DRAINAGE DESIGN

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: DEMOLITION PLAN

PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	004	DA	2

F:\E.H\21-000403 - INYADDA DRIVE, MANYANA\06_MODEL\AUTOCAD\CIVIL\DA21-000403_LD_DA-004.DWG LAST SAVED BY JED SWEENEY



1. Erosion Hazard and Sediment Basins

Site Name:	INYADDA DRIVE, MANYANA
Site Location:	MANYANA, NSW
Precinct/Stage:	-
Other Details:	DA

Site area	Sub-catchment or Name of Structure					
	B1	B2	C3			
Total catchment area (ha)	14.43	8.27	0.122			
Disturbed catchment area (ha)	9.08	5.63	0.122			

Soil analysis (enter sediment type if known, or laboratory particle

Sediment Type (C , F or D) if known:						
% sand (fraction 0.02 to 2.00 mm)	45	45	45			
% silt (fraction 0.002 to 0.02 mm)	20	20	20			
% clay (fraction finer than 0.002 mm)	35	35	35			
Dispersion percentage	30.0	30.0	30.0			
% of whole soil dispersible	13.5	13.5	13.5			
Soil Texture Group	D	D	D			

Rainfall data

Design rainfall depth (no of days)	5	5	5			
Design rainfall depth (percentile)	75	75	75			
x-day, y-percentile rainfall event (mm)	19.8	19.8	19.8			
Rainfall R-factor (if known)						
IFD: 2-year, 6-hour storm (if known)	14.7	14.7	14.7			

RUSLE Factors

Rainfall erosivity (*R*-factor)	4780	4780	4780			
Soil erodibility (*K*-factor)	0.047	0.047	0.047			
Slope length (m)	60	60	20			
Slope gradient (%)	3	6	3			
Length/gradient (*LS*-factor)	0.57	1.24	0.34			
Erosion control practice (*P*-factor)	1.3	1.3	1.3			
Ground cover (*C*-factor)	1	1	1			

Sediment Basin Design Criteria (for Type D/F basins only. Leave

Storage (soil) zone design (no of months)	2	2	2			
Cv (Volumetric runoff coefficient)	0.39	0.39	0.39			

Calculations and Type D/F Sediment Basin Volumes

Soil loss (t/ha/yr)	166	361	98			
Soil Loss Class	2	4	1			
Soil loss (m^3/ha/yr)	128	278	76			
Sediment basin storage (soil) volume (m^3)	193	260	2			
Sediment basin settling (water) volume (m^3)	1114	639	9			
Sediment basin total volume (m^3)	1307	899	11			

NB for sizing of Type C (coarse) sediment basins, see Worksheet 3 (if required).

FIRST ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
	AW	JS	SA	EF	14/12/2021	
1	AW	AW	SA	EF	12/01/2022	ISSUED FOR DEVELOPMENT APPLICATION
2	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS

AMENDMENTS

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH SIGN:
MEng (Civil) MIEAust CPEng NER
DATE: 30/06/2023

SCALE: 0 20 40 60 80 100 120 140 160
SCALE 1:2000 (A1) SCALE 1:4000 (A3)

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

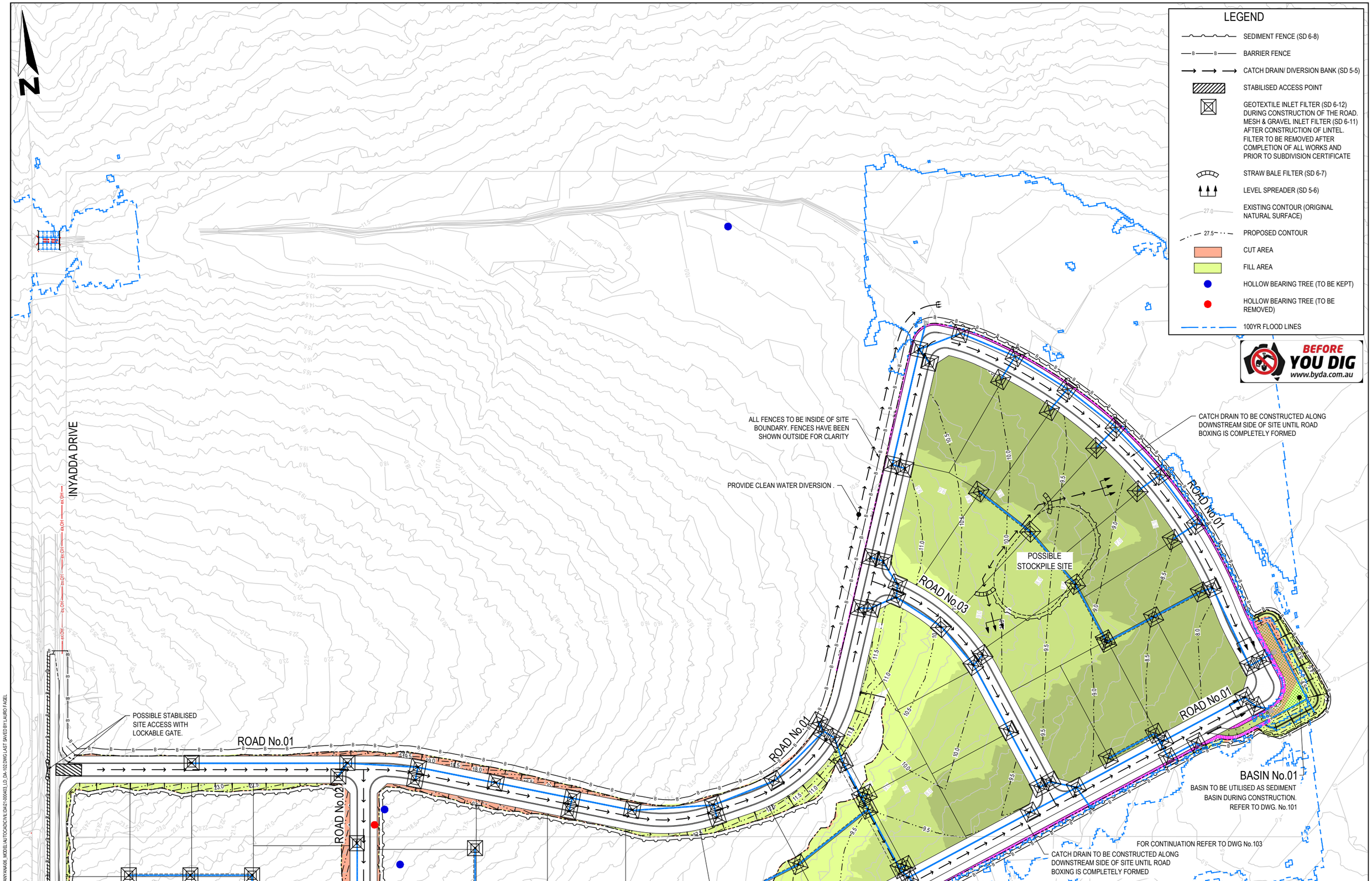
PROJECT: INYADDA DRIVE, MANYANA
ROAD & DRAINAGE DESIGN

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: SEDIMENT BASIN CATCHMENT PLAN

PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	101	DA	2

F:\E.H\21-000403 - INYADDA DRIVE, MANYANA\06_MODEL\AUTOCAD\CIVIL\DA21-000403_LD_DA-101.DWG LAST SAVED BY PANA.SENDURAN



FIRST ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
AMENDMENTS 1	AW	AW	SA	EF	12/01/2022	ISSUED FOR DEVELOPMENT APPLICATION
AMENDMENTS 2	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH
MEng (Civil) MIEAust CPEng NER
SIGN: Sina Arbabzadeh
DATE: 30/06/2023

SCALE: 0 10 20 30 40 50 60 70 80
SCALE 1:1000 (A1) SCALE 1:2000 (A3)

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

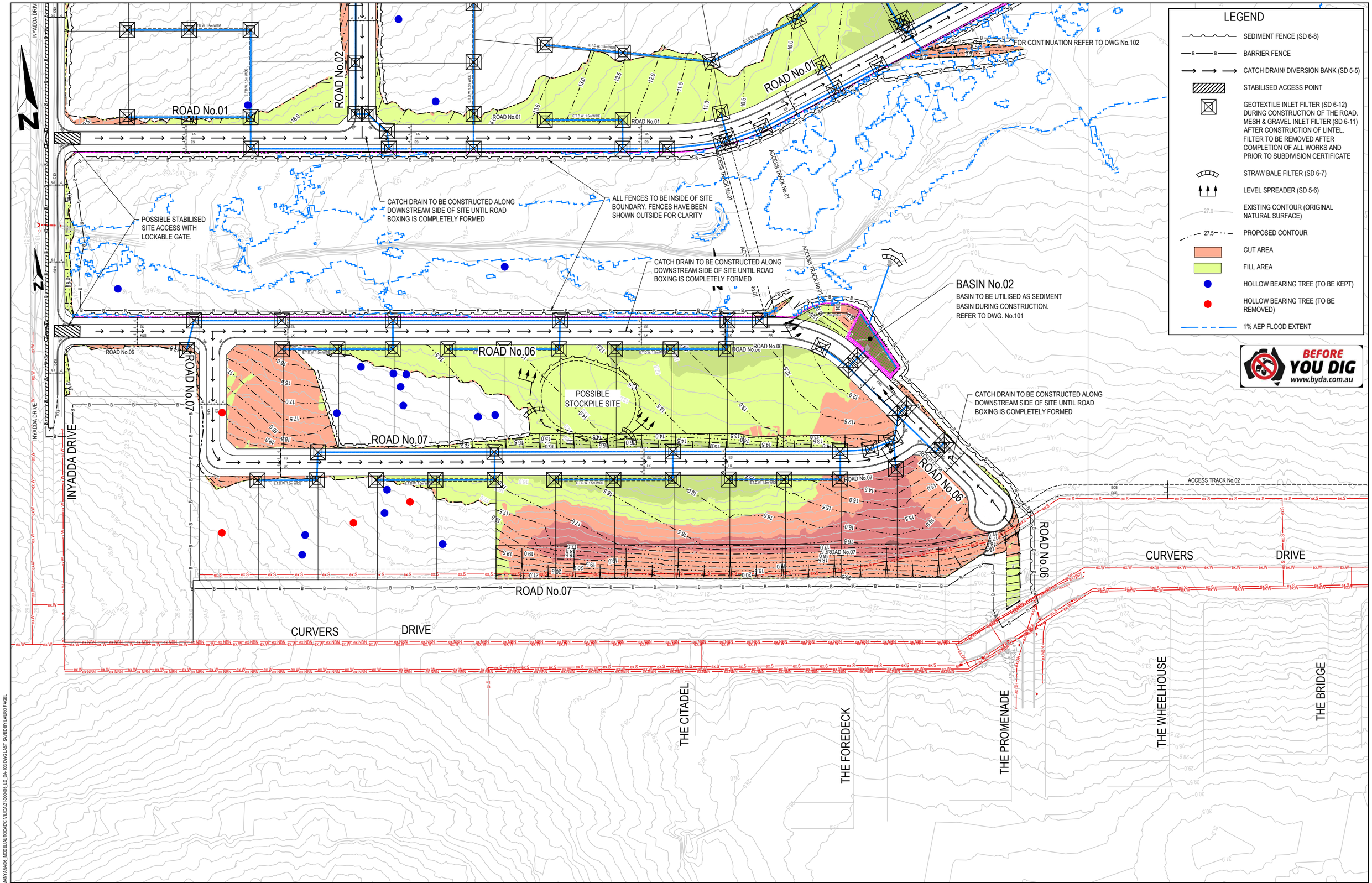
PROJECT: INYADDA DRIVE, MANYANA
ROAD & DRAINAGE DESIGN

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: SOIL & WATER MANAGEMENT PLAN - SHEET 01 OF 02

PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	102	DA	2

F:\E:\21\21-000403 - INYADDA DRIVE, MANYANA\05_MODEL\AUTOCAD\CIVIL\DA\21-000403_LD_DA-102.DWG LAST SAVED BY:LAURO.FAGEL



FIRST ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
	AW	JS	SA	EF	14/12/2021	
1	AW	AW	SA	EF	12/01/2022	ISSUED FOR DEVELOPMENT APPLICATION
2	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH
MEng (Civil) MIEAust CPEng NER
SIGN:
DATE: 30/06/2023

SCALE: 0 10 20 30 40 50 60 70 80
SCALE 1:1000 (A1) SCALE 1:2000 (A3)

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

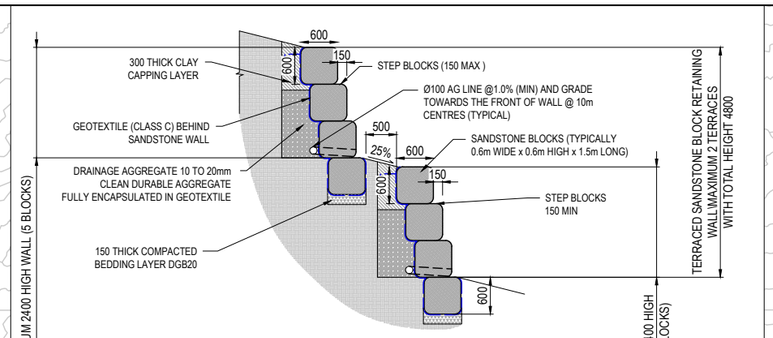
PROJECT: INYADDA DRIVE, MANYANA
ROAD & DRAINAGE DESIGN

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: SOIL & WATER MANAGEMENT PLAN - SHEET 02 OF 02

PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	103	DA	2

FILE: H:\21\21-000403 - INYADDA DRIVE, MANYANA\06_MODEL\AUTOCAD\CIVIL\DA\21000403_LD_DA-103.DWG LAST SAVED BY LAURO FADEL



INDICATIVE RETAINING WALL DETAIL
TERRACED SANDSTONE BLOCK WALL TYPICAL SECTION
SCALE 1:50

NOTES:

1. ALL SERVICES SHOWN ARE INDICATIVE ONLY. THE CONTRACTOR SHALL LOCATE, POTHOLE AND LEVEL ALL SERVICES WHERE NECESSARY, PRIOR TO COMMENCEMENT OF WORKS.
2. CONTRACTOR IS RESPONSIBLE FOR ALL SERVICES INVESTIGATION AND PROTECTION ON SITE.

BEFORE YOU DIG www.byda.com.au

LEGEND

- EXISTING CONTOUR
- PROPOSED CONTOUR
- RETAINING WALL TYPE TO BE CONFIRMED AT DETAIL DESIGN STAGE (TYPICAL)
- RETAINING WALL ALONG BIO
- HOLLOW BEARING TREE (TO BE KEPT)
- HOLLOW BEARING TREE (TO BE REMOVED)
- 1% AEP FLOOD EXTENT
- CUT -2m TO -100m
- CUT -1.5m TO -2m
- CUT -1m TO -1.5m
- CUT -0.5m TO -1m
- CUT 0m TO -0.5m
- FILL 0m TO 0.5m
- FILL 0.5m TO 1m
- FILL 1m TO 1.5m
- FILL 1.5m TO 2m
- FILL 2m TO 2.5m
- FILL 2.5m TO 3m
- FILL 3m TO 100m

CUT & FILL VOLUMES

CUT = 20,130 m³
FILL = 135,965 m³
BALANCE = 115,835 m³ IMPORT

NOTE:

VOLUMES PROVIDED ARE FROM THE NATURAL SURFACE LEVEL TO THE FINISHED PROPOSED LEVEL. VOLUMES DO NOT TAKE INTO ACCOUNT BOXING OF ROADS, SERVICES TRENCHING OR STRIPPING OF TOPSOIL.

REFER TO INDICATIVE WALL DETAIL FOR INFORMATION. WALL TYPE TO BE CONFIRMED AT DETAIL DESIGN STAGE

PROVIDE UPSTREAM DIVERSION SWALE

DIVERSION SWALE TO BE PROVIDED AT BOTTOM OF RETAINING WALL

OVERHEAD POWERLINE TO BE RELOCATED AS PER AUTHORITIES REQUIREMENT

INYADDA DRIVE

ROAD No.01

ROAD No.02

ROAD No.03

SLOPE 1:4

SLOPE 1:6

MAX. 2m RW

MAX. 3m RW

MAX. 4m RW

BASIN No.01

DP 755923

FOR CONTINUATION REFER TO DWG No.202

FIRST ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
AMENDMENTS 1	AW	JS	SA	EF	14/12/2021	ISSUED FOR DEVELOPMENT APPLICATION
AMENDMENTS 2	AW	AW	SA	EF	12/01/2022	ISSUED FOR DEVELOPMENT APPLICATION
	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH
MEng (Civil) MIEAust CPEng NER
SIGN:
DATE: 30/06/2023

SCALE
0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0
SCALE 1:50 (A1) SCALE 1:100 (A3)
0 10 20 30 40 50 60 70 80
SCALE 1:1000 (A1) SCALE 1:2000 (A3)

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

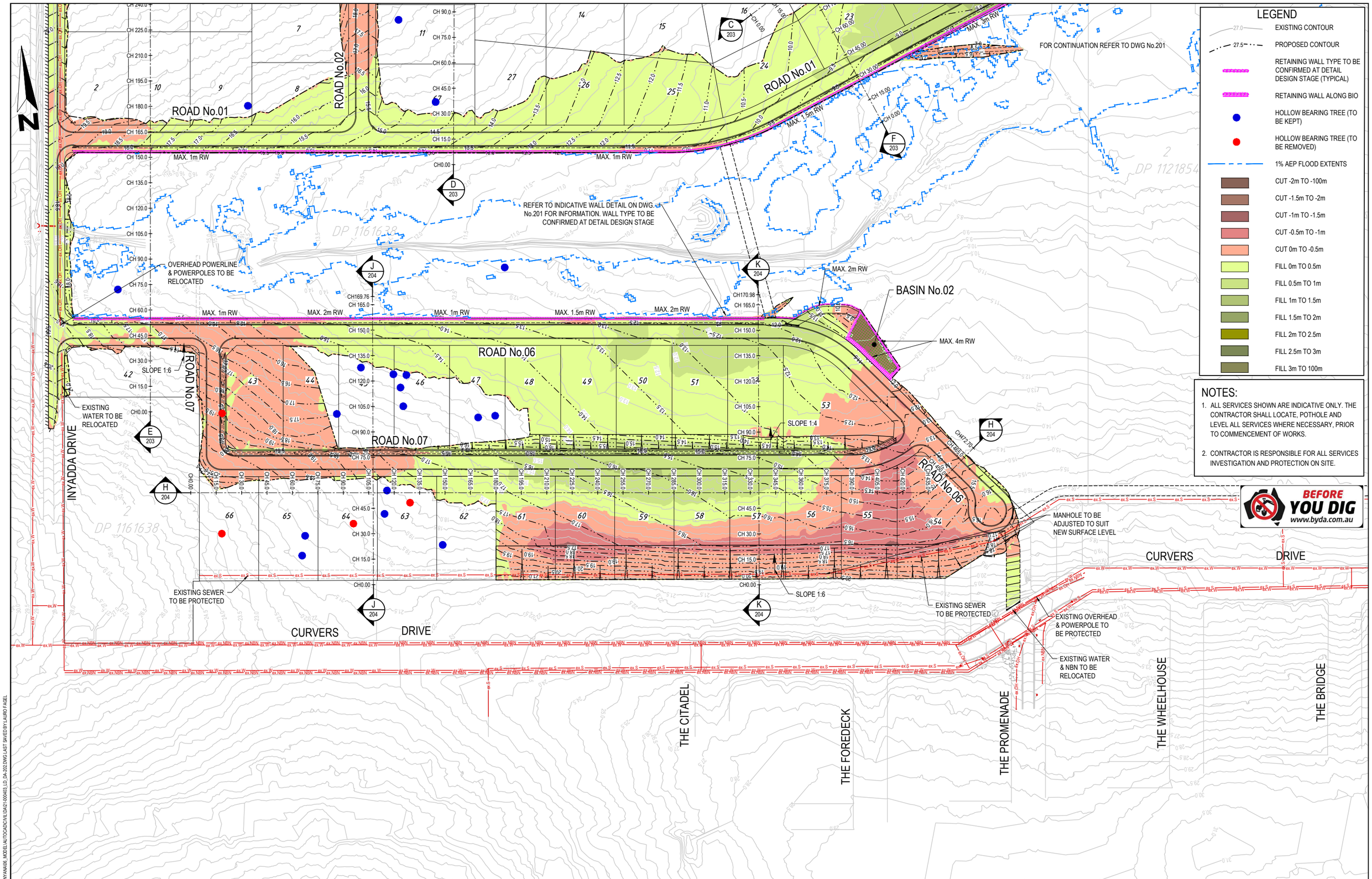
PROJECT: INYADDA DRIVE, MANYANA
ROAD & DRAINAGE DESIGN

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: SITE REGRADING PLAN - SHEET 01 OF 02

PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	201	DA	2

F:\E:\21\21-000403 - INYADDA DRIVE, MANYANA\05_MODEL\AUTOCAD\CIVIL\DA\21-000403_LD_DA-201.DWG LAST SAVED BY LAURO FAGEL



LEGEND

- EXISTING CONTOUR
- PROPOSED CONTOUR
- RETAINING WALL TYPE TO BE CONFIRMED AT DETAIL DESIGN STAGE (TYPICAL)
- RETAINING WALL ALONG BIO
- HOLLOW BEARING TREE (TO BE KEPT)
- HOLLOW BEARING TREE (TO BE REMOVED)
- 1% AEP FLOOD EXTENTS
- CUT -2m TO -100m
- CUT -1.5m TO -2m
- CUT -1m TO -1.5m
- CUT -0.5m TO -1m
- CUT 0m TO -0.5m
- FILL 0m TO 0.5m
- FILL 0.5m TO 1m
- FILL 1m TO 1.5m
- FILL 1.5m TO 2m
- FILL 2m TO 2.5m
- FILL 2.5m TO 3m
- FILL 3m TO 100m

NOTES:

1. ALL SERVICES SHOWN ARE INDICATIVE ONLY. THE CONTRACTOR SHALL LOCATE, POTHOLE AND LEVEL ALL SERVICES WHERE NECESSARY, PRIOR TO COMMENCEMENT OF WORKS.
2. CONTRACTOR IS RESPONSIBLE FOR ALL SERVICES INVESTIGATION AND PROTECTION ON SITE.

BEFORE YOU DIG www.byda.com.au

AMENDMENTS	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
FIRST ISSUE	AW	JS	SA	EF	14/12/2021	
1	AW	AW	SA	EF	12/01/2022	ISSUED FOR DEVELOPMENT APPLICATION
2	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH
MEng (Civil) MIEAust CPEng NER
SIGN:
DATE: 30/06/2023

SCALE: 0 10 20 30 40 50 60 70 80
SCALE 1:1000 (A1) SCALE 1:2000 (A3)

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

PROJECT: INYADDA DRIVE, MANYANA ROAD & DRAINAGE DESIGN

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: SITE REGRADING PLAN - SHEET 02 OF 02

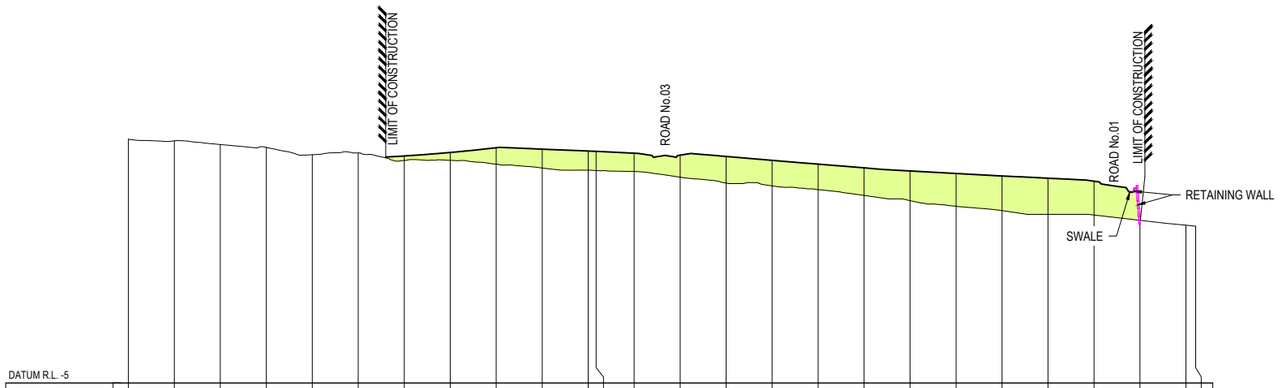
PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	202	DA	2

F:\E.H\21\21-000403 - INYADDA DRIVE, MANYANA\05_MODEL\AUTOCAD\CIVIL\DA\21-000403_LD_DA-202.DWG LAST SAVED BY LAURO.FAGEL

NOTE:
FOR EXISTING SURFACE INFORMATION, REFER TO EGIS CONSULTING GENERAL NOTE 1 ON DWG.No.003.

LEGEND
- EXISTING LEVEL
- DESIGN LEVEL
- CUT AREA
- FILL AREA
- RETAINING WALL TYPE TO BE CONFIRMED AT DETAIL DESIGN STAGE (TYPICAL)
- APPROXIMATE LOCATION OF EXISTING SEWER
- 1% AEP WATER LEVEL

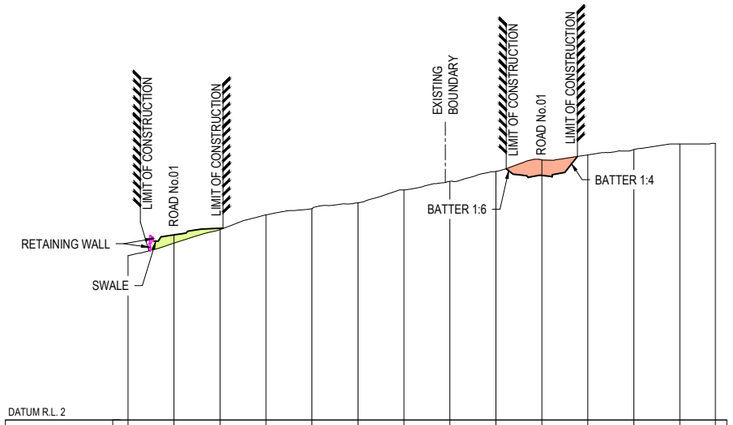
BEFORE YOU DIG www.byda.com.au



DATUM R.L. -5

W.A.E. LEVEL																																
DESIGN LEVEL							9.8	10.03	10.34	10.25	10.13	10.1	9.98	9.86	9.77	9.52	9.27	9.03	8.83	8.66	8.5	8.35	8.16	5.67								
EXISTING LEVEL	10.9	10.79	10.55	10.36	9.89	10	9.51	9.51	9.27	9.02	8.88	8.85	8.79	8.42	8.03	7.85	7.6	7.23	6.89	6.52	6.24	6	5.96	5.61	5.29	5.22						
CHAINAGE	0	15	30	45	60	75	90	105	120	135	150	152.563	165	180	195	210	225	240	255	270	285	300	315	330	345	348.158						

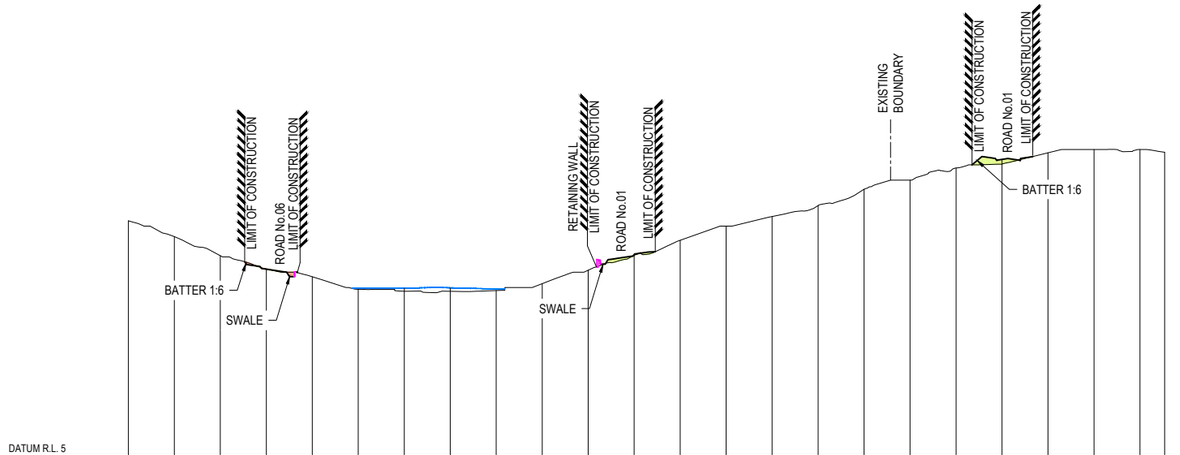
SECTION C 201 C 202
SCALE: 1:1000 (H)
SCALE: 1:200 (V)



DATUM R.L. 2

W.A.E. LEVEL																																
DESIGN LEVEL			14.07	14.5																				17.95								
EXISTING LEVEL	12.71	13.53	14.41	15.38	15.78	16.17	17	17.56	18.21	18.96	19.29	19.63	20	20.04																		
CHAINAGE	0	15	30	45	60	75	90	105	120	135	150	165	180	191.595																		

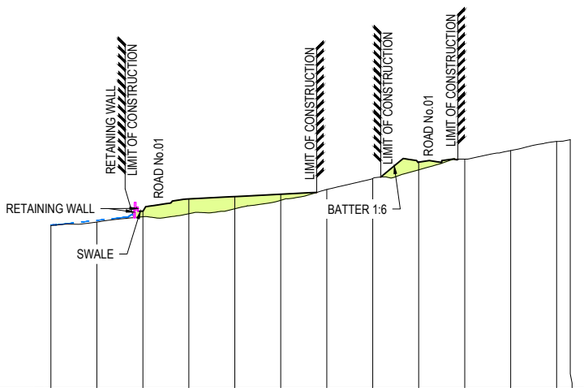
SECTION D 201 D 202
SCALE: 1:1000 (H)
SCALE: 1:200 (V)



DATUM R.L. 5

W.A.E. LEVEL																																
DESIGN LEVEL				17.19								18.14										24.35										
EXISTING LEVEL	20.35	19.32	18.07	17.21	16.7	15.88	15.76	15.75	15.8	16.25	17.13	18.1	19.07	20	20.63	21.34	22.41	23	23.79	24.05	24.78	25	25	24.82								
CHAINAGE	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	338.027								

SECTION E 201 E 202
SCALE: 1:1000 (H)
SCALE: 1:200 (V)



DATUM R.L. -3

W.A.E. LEVEL																																
DESIGN LEVEL			8.61	9.41	9.56	9.71				11.81																						
EXISTING LEVEL	7.67	7.9	8.24	8.44	8.77	9.32	10.02	10.74	11.3	12	12.56	13.16	13.27																			
CHAINAGE	0	15	30	45	60	75	90	105	120	135	150	165	169.441																			

SECTION F 201 F 202
SCALE: 1:1000 (H)
SCALE: 1:200 (V)

FIRST ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
	AW	JS	SA	EF	14/12/2021	
1	AW	AW	SA	EF	12/01/2022	ISSUED FOR DEVELOPMENT APPLICATION
2	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS

AMENDMENTS

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH SIGN:
MEng (Civil) MIEAust CPEng NER
DATE: 30/06/2023

SCALE
0 2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0
SCALE 1:200 (A1) SCALE 1:400 (A3)
0 10 20 30 40 50 60 70 80
SCALE 1:1000 (A1) SCALE 1:2000 (A3)

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

PROJECT: INYADDA DRIVE, MANYANA
ROAD & DRAINAGE DESIGN

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: SITE SECTIONS - SHEET 01 OF 02

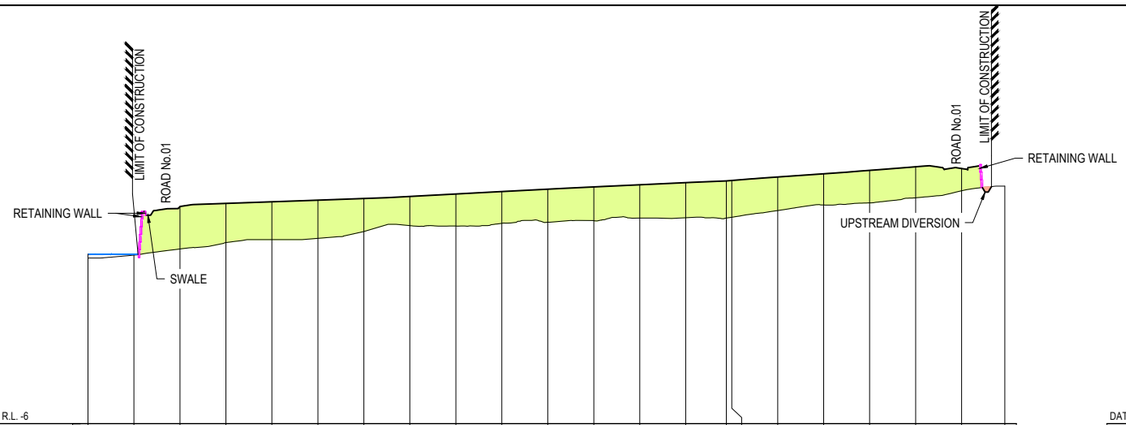
PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	203	DA	2

FILE: H:\21\21-000403 - INYADDA DRIVE, MANYANA\05_MODEL\AUTOCAD\CIVIL\DA\21-000403_LD_DA-203.DWG LAST SAVED BY: LAURO FAGEL

NOTE:
FOR EXISTING SURFACE INFORMATION, REFER TO EGIS CONSULTING GENERAL NOTE 1 ON DWG.No.003.

LEGEND
- EXISTING LEVEL
- DESIGN LEVEL
- CUT AREA
- FILL AREA
- RETAINING WALL TYPE TO BE CONFIRMED AT DETAIL DESIGN STAGE (TYPICAL)
- APPROXIMATE LOCATION OF EXISTING SEWER
- 1% AEP WATER LEVEL

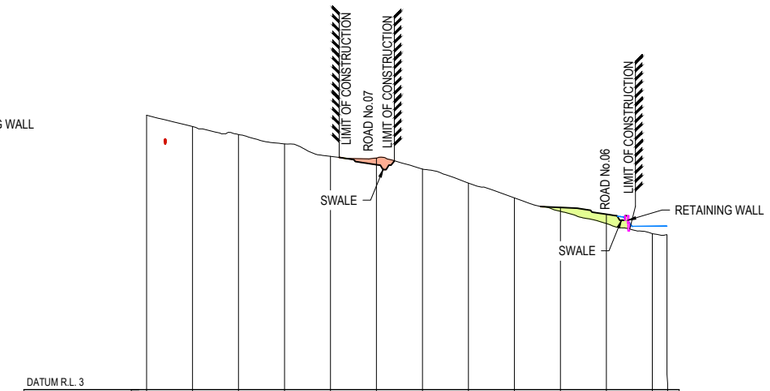
BEFORE YOU DIG www.byda.com.au



DATUM R.L. -6

CHAINAGE	0	15	30	45	60	75	90	105	120	135	150	165	180	195	208.255	210	225	240	255	270	285	299.093
EXISTING LEVEL	4.79	4.99	5.39	5.81	6	6.08	6.53	6.91	6.88	7.06	7.13	7.23	7.4	7.43	7.41	7.46	7.9	8.26	8.4	8.73	9.18	9.49
DESIGN LEVEL		5.02	8.15	8.36	8.47	8.57	8.68	8.81	8.97	9.13	9.29	9.44	9.57	9.71	9.82	9.85	10.09	10.29	10.52	10.75	10.63	
W.A.E. LEVEL																						

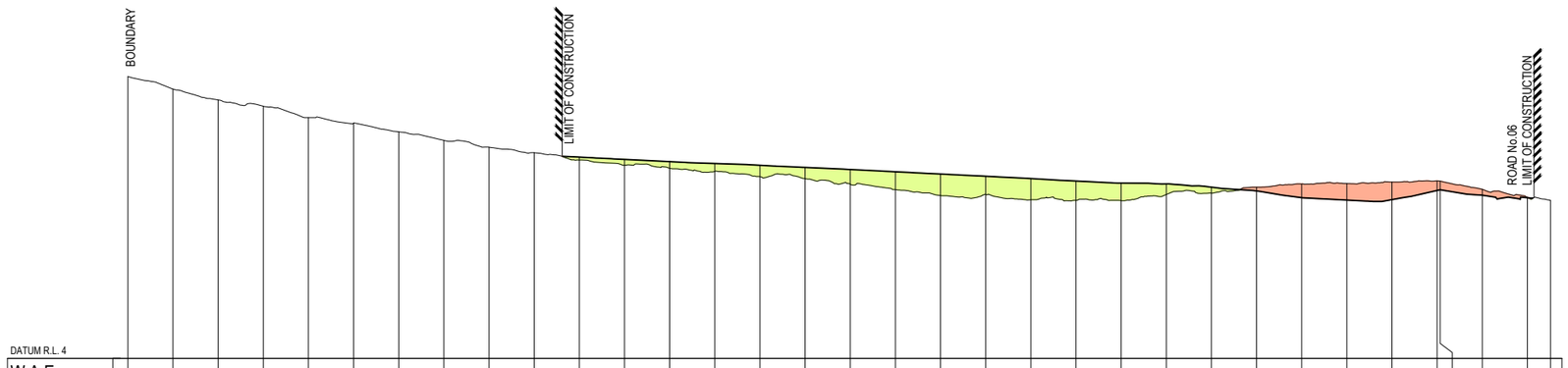
SECTION G 201
SCALE: 1:1000 (H)
SCALE: 1:200 (V)



DATUM R.L. 3

CHAINAGE	0	15	30	45	60	75	90	105	120	135	150	165	169.761
EXISTING LEVEL	20.89	20.16	19.63	19.02	18.21	18.1	17.39	16.46	15.5	14.63	13.83	13.17	13.1
DESIGN LEVEL						17.67				14.88	14.43		
W.A.E. LEVEL													

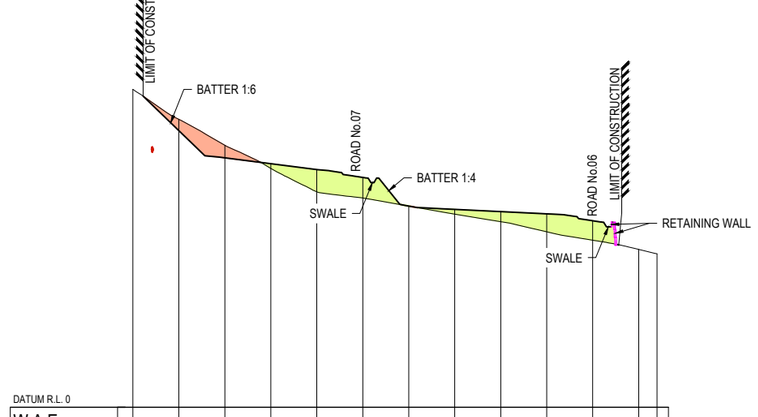
SECTION J 202
SCALE: 1:1000 (H)
SCALE: 1:200 (V)



DATUM R.L. 4

CHAINAGE	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360	375	390	405	420	435	435.98	450	465	472.698
EXISTING LEVEL	22.73	21.89	21.18	20.76	20	19.65	19.05	18.49	18.04	17.67	17.18	16.83	16.63	16.43	16.07	15.95	15.59	15.22	14.83	14.9	14.54	14.5	14.49	14.89	14.99	15.38	15.59	15.62	15.72	15.8	15.79	15.23	14.7	14.5
DESIGN LEVEL											17.38	17.23	17.07	16.95	16.84	16.69	16.55	16.4	16.25	16.1	15.95	15.79	15.65	15.59	15.38	15.13	14.68	14.52	14.55	15.16	15.21	14.84	14.67	
W.A.E. LEVEL																																		

SECTION H 202
SCALE: 1:1000 (H)
SCALE: 1:200 (V)



DATUM R.L. 0

CHAINAGE	0	15	30	45	60	75	90	105	120	135	150	165	170.983
EXISTING LEVEL	20.73	18.77	17.08	15.57	14.05	13.65	13.12	12.59	12.1	11.44	10.89	10.29	10
DESIGN LEVEL		18.04	16.26	15.88	15.5	14.99	13.12	12.9	12.76	12.61	12.16		
W.A.E. LEVEL													

SECTION K 202
SCALE: 1:1000 (H)
SCALE: 1:200 (V)

FIRST ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
	AW	JS	SA	EF	14/12/2021	
1	AW	AW	SA	EF	12/01/2022	ISSUED FOR DEVELOPMENT APPLICATION
2	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS

AMENDMENTS

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH SIGN: Sina Arbabzadeh 30/06/2023
MEng (Civil) MIEAust CPEng NER
DATE:

SCALE
0 2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0
SCALE 1:200 (A1) SCALE 1:400 (A3)
0 10 20 30 40 50 60 70 80
SCALE 1:1000 (A1) SCALE 1:2000 (A3)

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

PROJECT: INYADDA DRIVE, MANYANA ROAD & DRAINAGE DESIGN

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: SITE SECTIONS - SHEET 02 OF 02

PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	204	DA	2

F:\E:H:\21\21-000403 - INYADDA DRIVE, MANYANA\06_MODEL\AUTOCAD\CIVIL\DA\21-000403_LD_DA-204.DWG LAST SAVED BY LAURO.FAGEL

LEGEND

1% AEP FLOOD EXTENTS

OVERHEAD POWERLINE TO BE RELOCATED

ROAD No.01

ROAD No.02

TRANSITION FROM K&G TO LK AT KTP OVER 2m

PROVIDE 1.2m FOOTPATH TO COUNCIL STANDARD

E.T.D.W. 1.5m WIDE

TRANSITION FROM K&G TO ES AT KTP OVER 2m

PIPE CROSSING & HW TO BE ADJUSTED TO SUIT PROPOSED ROADWORKS

SURCHAGE PIT TO BIO-RETENTION SWALE

BIO-SWALE No.01

INSTALL "W-BEAM" OR APPROVED EQUIVALENT ALONG LENGTH OF RETAINING WALL.

FOR CONTINUATION REFER TO DWG No.302

FOR CONTINUATION REFER TO DWG No.304

INYADDA DRIVE

DP 1161638

BEFORE YOU DIG www.byda.com.au

FIRST ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
AMENDMENTS 1	AW	AW	SA	EF	12/01/2022	ISSUED FOR DEVELOPMENT APPLICATION
AMENDMENTS 2	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH
MEng (Civil) MIEAust CPEng NER
SIGN: Sina Arbabzadeh
DATE: 30/06/2023

SCALE
0 5 10 15 20 25 30 35 40
SCALE 1:500 (A1)
SCALE 1:1000 (A3)

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

PROJECT: INYADDA DRIVE, MANYANA ROAD & DRAINAGE DESIGN

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: ENGINEERING PLAN - 01 OF 05

PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	301	DA	2

FILE: H:\21\21-000403 - INYADDA DRIVE, MANYANA\05_MODEL\AUTOCAD\CIVIL\DA\21-000403_LD_DA-301.DWG LAST SAVED BY LAURO.FAGEL

PIPE CROSSING & HW TO BE ADJUSTED TO SUIT PROPOSED ROADWORKS

OUTLET HW WITH RIPRAP

OVERHEAD POWERLINE & POWERPOLES TO BE RELOCATED

FOR CONTINUATION REFER TO DWG No.301

INSTALL "W-BEAM" OR APPROVED EQUIVALENT ALONG LENGTH OF RETAINING WALL.

BIO-SWALE No.03

BIO-SWALE No.04

BIO-SWALE No.05

SURCHAGE PIT TO BIO-RETENTION SWALE

ROAD No.06

ROAD No.07

INYADDA DRIVE

E.T.D.W. 1.5m WIDE

TRANSITION FROM K&G TO ES AT KTP OVER 2m

TRANSITION FROM LK TO ES AT KTP OVER 2m

TRANSITION FROM K&G TO LK AT KTP OVER 2m

PROVIDE 1.2m FOOTPATH TO COUNCIL STANDARD

EXISTING WATER TO BE LOCATED PRIOR TO ANY WORKS. EXISTING WATER DEPTH TO BE FOUND & SUPERINTENDENT TO NOTIFY ASSET OWNER IF WATER MAIN REQUIRED TO BE LOWERED DUE TO PIPE COVER & TRAFFIC LOADS.EXISTING WATER BACKFILL TO BE TESTED TO COMPLY WITH COUNCIL STANDARDS FOR ALL TRAFFICABLE AREAS. SUPERINTENDENCY TO PROVIDE DIRECTION ONCE COMPACTION TEST RESULTS ARE COMPLETED.

EXISTING RESIDENTS TO BE PROTECTED ALONG ENTIRE LENGTH OF ROAD No.07. NO WORKS TO CROSS BOUNDARY

EXISTING SEWER TO BE PROTECTED

FOR CONTINUATION REFER TO DWG No.305

DP 1161638

LEGEND

1% AEP FLOOD EXTENTS

BEFORE YOU DIG www.byda.com.au

CURVERS DRIVE

FIRST ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
	AW	JS	SA	EF	14/12/2021	
1	AW	AW	SA	EF	12/01/2022	ISSUED FOR DEVELOPMENT APPLICATION
2	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS

AMENDMENTS

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH SIGN:
MEng (Civil) MIEAust CPEng NER
DATE: 30/06/2023

SCALE: 0 5 10 15 20 25 30 35 40
SCALE 1:500 (A1) SCALE 1:1000 (A3)

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

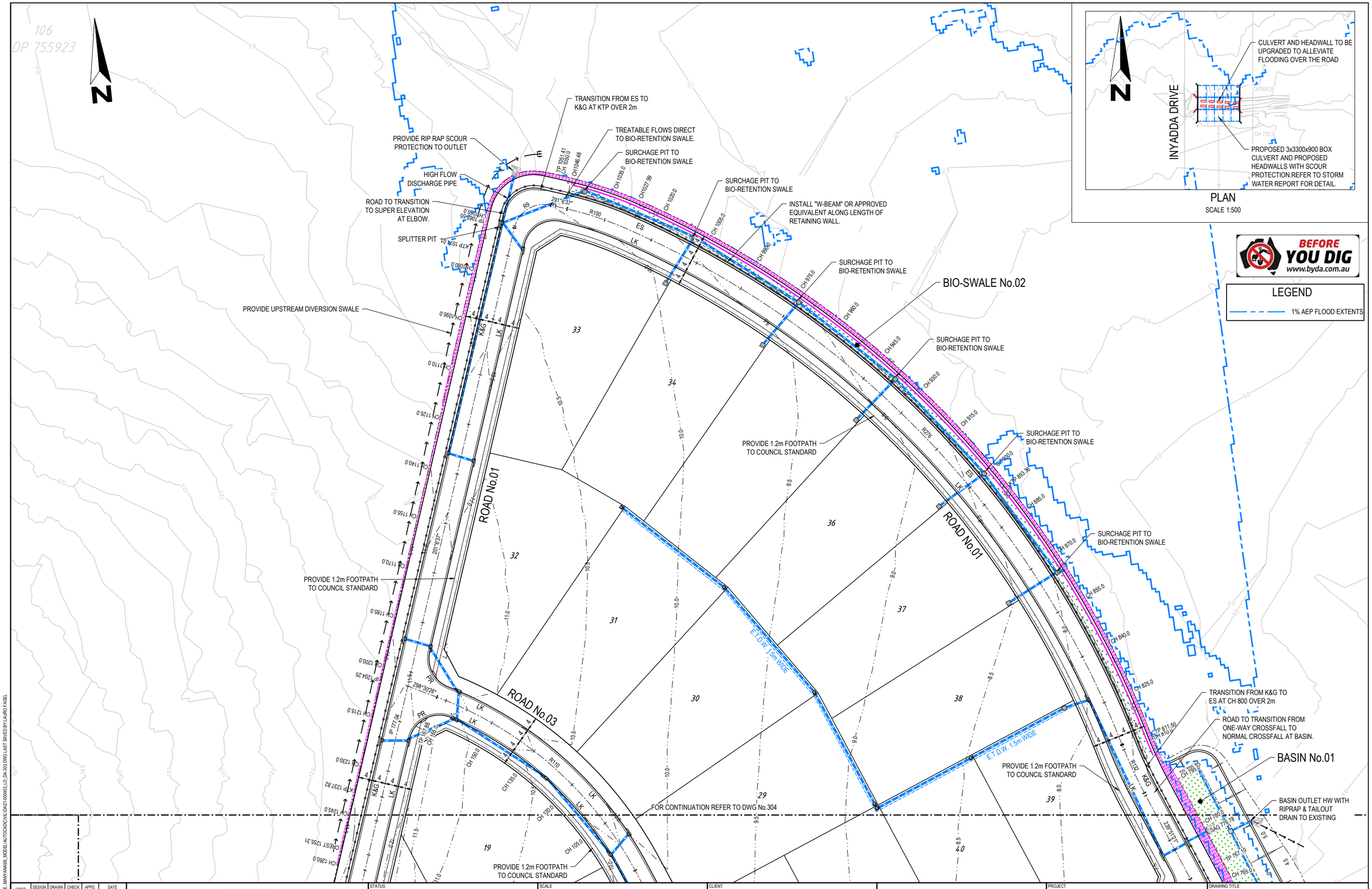
PROJECT: INYADDA DRIVE, MANYANA ROAD & DRAINAGE DESIGN

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: ENGINEERING PLAN - 02 OF 05

PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	302	DA	2

FILE: H:\21\21-000403 - INYADDA DRIVE, MANYANA\06_MODEL\AUTOCAD\CIVIL\DWG\21-000403_LD_DA-302.DWG LAST SAVED BY LAURO FAGEL



FIRST ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
	AW	JS	SA	EF	14/12/2021	
1	AW	AW	SA	EF	12/01/2022	ISSUED FOR DEVELOPMENT APPLICATION
2	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH
MEng (Civil) MIEAust CPEng NER
SIGN: 30/06/2023
DATE:

SCALE: 0 5 10 15 20 25 30 35 40
SCALE 1:500 (A1) SCALE 1:1000 (A3)

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

PROJECT: INYADDA DRIVE, MANYANA ROAD & DRAINAGE DESIGN

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: ENGINEERING PLAN - 03 OF 05

PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	303	DA	2

FILE: H:\21\21-000403 - INYADDA DRIVE, MANYANA\06_MOD\BLAD\TOCAD\CIVIL\DWG\000403_LD_DA-303.DWG LAST SAVED BY LAURO FADEL

FOR CONTINUATION REFER TO DWG No.303

CONSTRUCT SPLITTER PIT TO DISTRIBUTE ALL FLOWS EVENLY

PROVIDE 1.2m FOOTPATH TO COUNCIL STANDARD

900x900 G.S.I.P. DRAIN EXISTING LOW POINT

ROAD No.01

ROAD No.03

E.T.D.W. 1.5m WIDE

TRANSITION FROM ES TO K&G AT VC

BASIN No.01

ROAD TO TRANSITION FROM ONE-WAY CROSSFALL TO NORMAL CROSSFALL AT BASIN

PROVIDE RIP RAP SCOUR PROTECTION TO OUTLET

SURCHAGE PIT TO BIO-RETENTION SWALE

INSTALL "W-BEAM" OR APPROVED EQUIVALENT ALONG LENGTH OF RETAINING WALL.

TRUNK DRAINAGE TO BE MIDDLE OF EASEMENT

SPLITTER PIT

PROVIDE 1.2m FOOTPATH TO COUNCIL STANDARD

TREATABLE FLOWS DIRECTED TOWARDS BASIN

PROVIDE RIP RAP SCOUR PROTECTION TO OUTLET

HIGH FLOW OUTLET HW WITH RIPRAP

SPLITTER PIT

E.T.D.W. 6.0m WIDE

TREATABLE FLOWS DIRECTED TOWARDS BASIN

FOR CONTINUATION REFER TO DWG No.302

E.T.D.W. 1.5m WIDE

ROAD No.01

PROVIDE RIP RAP SCOUR PROTECTION TO OUTLET

PROVIDE TAILOUT AT 1% TO EXISTING

HIGH FLOW OUTLET HW WITH RIPRAP

PROVIDE RIP RAP SCOUR PROTECTION TO OUTLET

SURCHAGE PIT TO BIO-RETENTION SWALE

BIO-SWALE No.01

SURCHAGE PIT TO BIO-RETENTION SWALE

SURCHAGE PIT TO BIO-RETENTION SWALE

ACCESS TRACK No.01

FOR CONTINUATION REFER TO DWG No.305

LEGEND

1% AEP FLOOD EXTENTS

DIAL BEFORE YOU DIG www.1100.com.au

	FIRST ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
AMENDMENTS		AW	JS	SA	EF	14/12/2021	
	1	AW	AW	SA	EF	12/01/2022	ISSUED FOR DEVELOPMENT APPLICATION
	2	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH
MEng (Civil) MIEAust CPEng NER
SIGN:
DATE: 30/06/2023

SCALE: 0 5 10 15 20 25 30 35 40
SCALE 1:500 (A1) SCALE 1:1000 (A3)

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

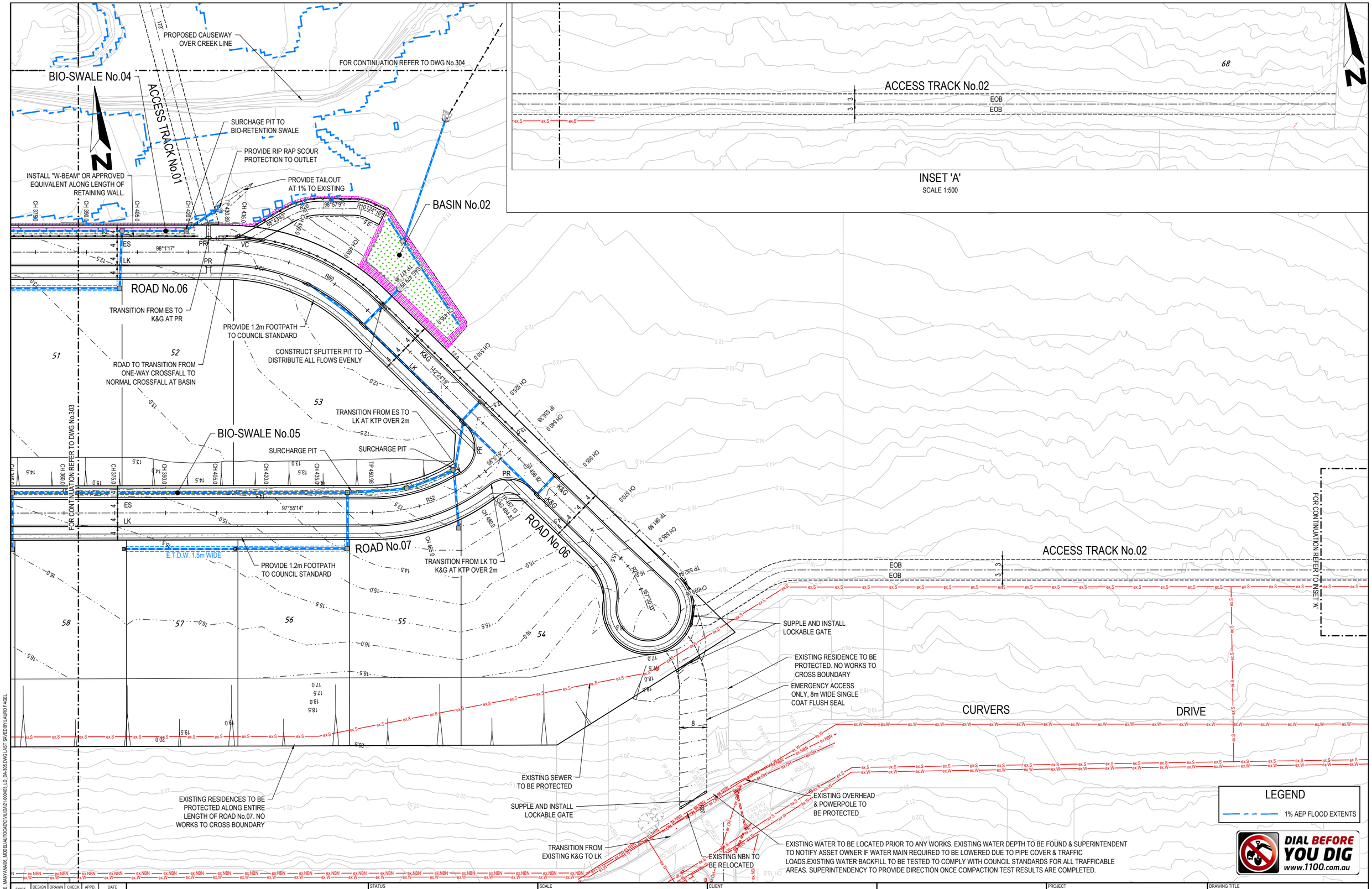
PROJECT: INYADDA DRIVE, MANYANA ROAD & DRAINAGE DESIGN

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: ENGINEERING PLAN - 04 OF 05

PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	304	DA	2

FILE: H:\21\21-000403 - INYADDA DRIVE, MANYANA\05_MODEL\AUTOCAD\CIVIL\DA\21-000403_LO_DA-304.DWG LAST SAVED BY: LAURO FADEL



FIRST ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
1	AW	AW	SA	EF	14/12/2021	ISSUED FOR DEVELOPMENT APPLICATION
2	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS

AMENDMENTS

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH
MEng (Civil) MIEAust CPEng NER
SIGN:
DATE: 30/06/2023

SCALE: 0 5 10 15 20 25 30 35 40
SCALE 1:500 (A1) SCALE 1:1000 (A3)

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

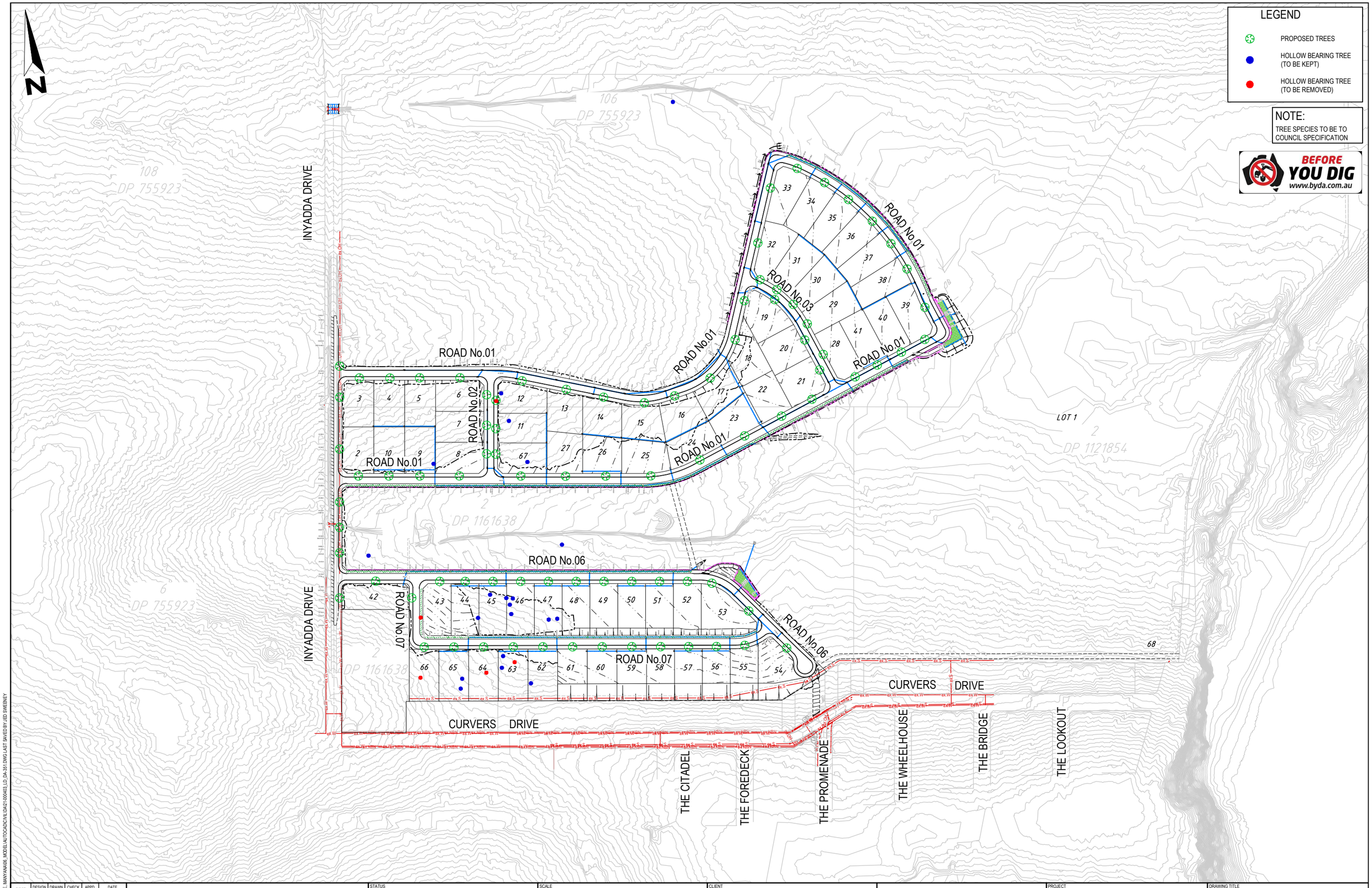
PROJECT: INYADDA DRIVE, MANYANA ROAD & DRAINAGE DESIGN

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: ENGINEERING PLAN - 05 OF 05

PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	305	DA	2

FILE: H:\21\21-000403 - INYADDA DRIVE, MANYANA\05_MODELS\AUTOCAD\CIVIL\DA\21000403_LD_DA-305.DWG LAST SAVED BY LAURO FABEL



FIRST ISSUE		DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
		AW	JS	SA	EF	14/12/2021	
AMENDMENTS	1	AW	AW	SA	EF	12/01/2022	ISSUED FOR DEVELOPMENT APPLICATION
	2	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH SIGN:
MEng (Civil) MIEAust CPEng NER
DATE: 30/06/2023

SCALE: 0 20 40 60 80 100 120 140 160
SCALE 1:2000 (A1) SCALE 1:4000 (A3)

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

PROJECT: INYADDA DRIVE, MANYANA
ROAD & DRAINAGE DESIGN

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

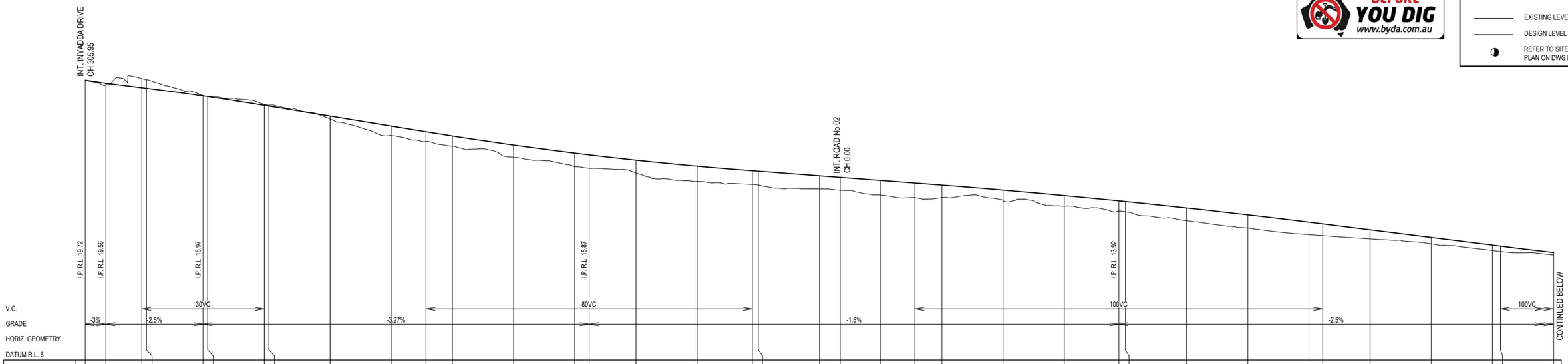
DRAWING TITLE: LANDSCAPE PLAN

PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	351	DA	2

FILE: H:\21\21-000403 - INYADDA DRIVE, MANYANA\06_MODEL\AUTOCAD\CIVIL\DA\21-000403_LD_DA-351.DWG LAST SAVED BY: JED SWEENEY

BEFORE YOU DIG www.byda.com.au

LEGEND
- EXISTING LEVEL
- DESIGN LEVEL
- REFER TO SITE REGRADING PLAN ON DWG No.201-202

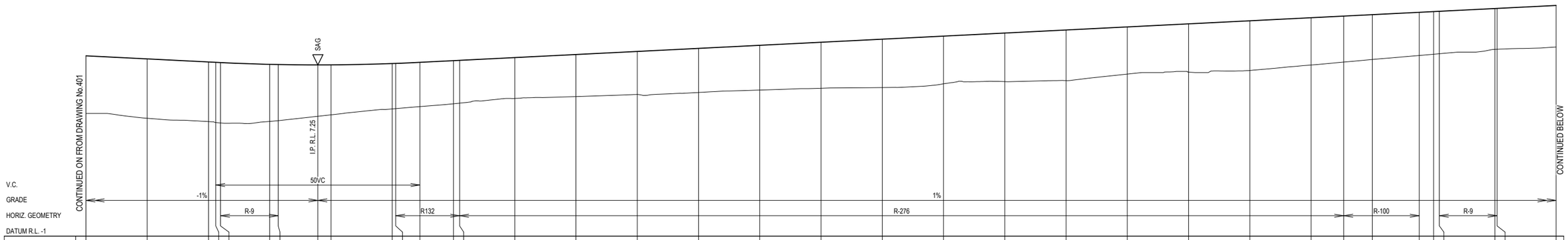


| | | |

BEFORE YOU DIG www.byda.com.au

LEGEND

- EXISTING LEVEL
- DESIGN LEVEL
- REFER TO SITE REGRADING PLAN ON DWG No.201-202

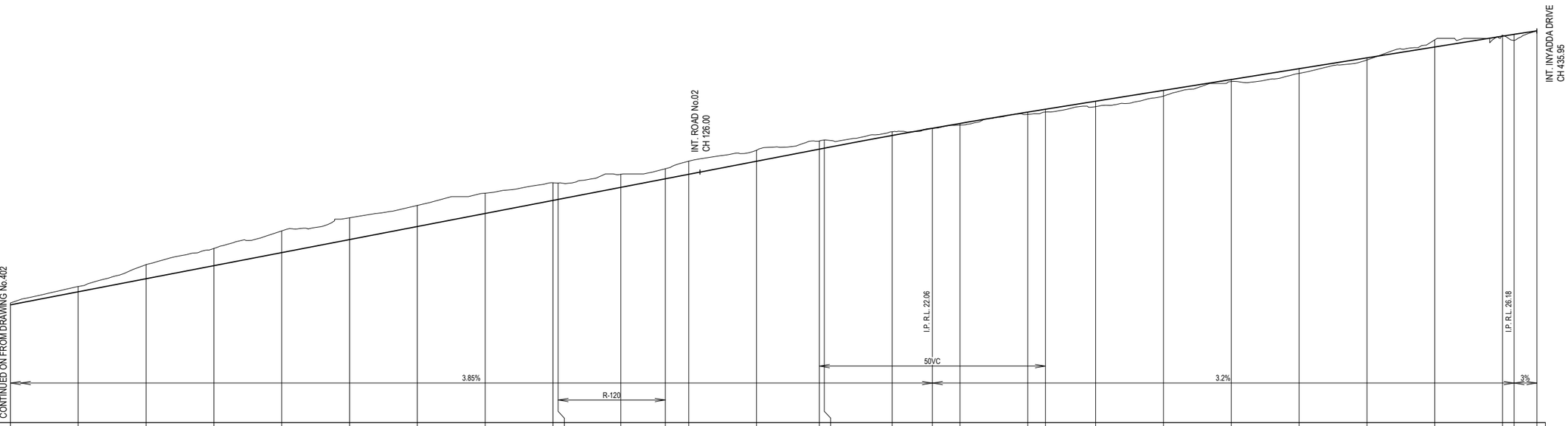


| | | |

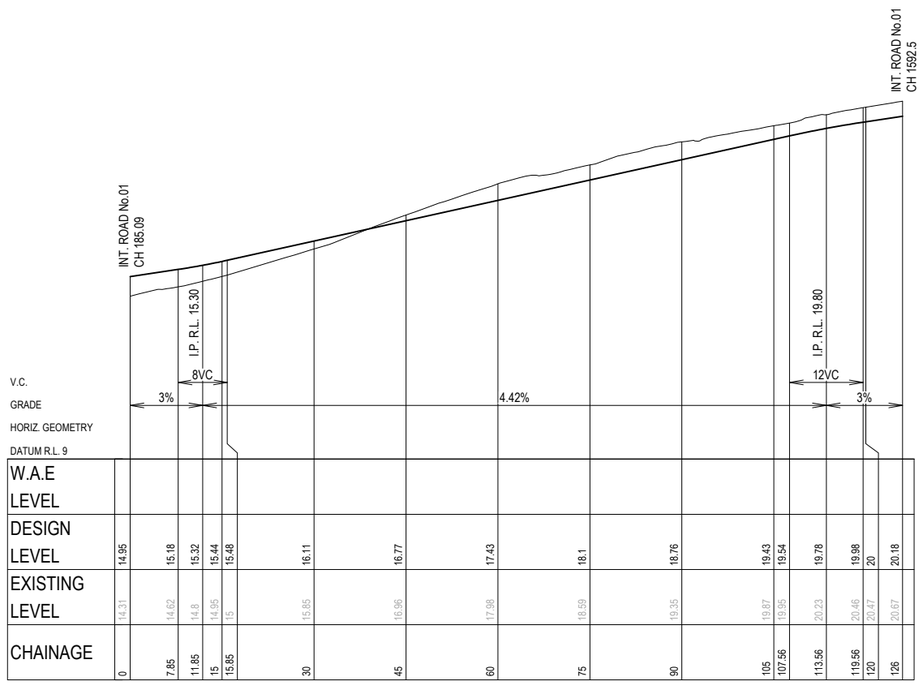
BEFORE YOU DIG www.byda.com.au

LEGEND

- EXISTING LEVEL
- DESIGN LEVEL
- REFER TO SITE REGRADING PLAN ON DWG No.201-202

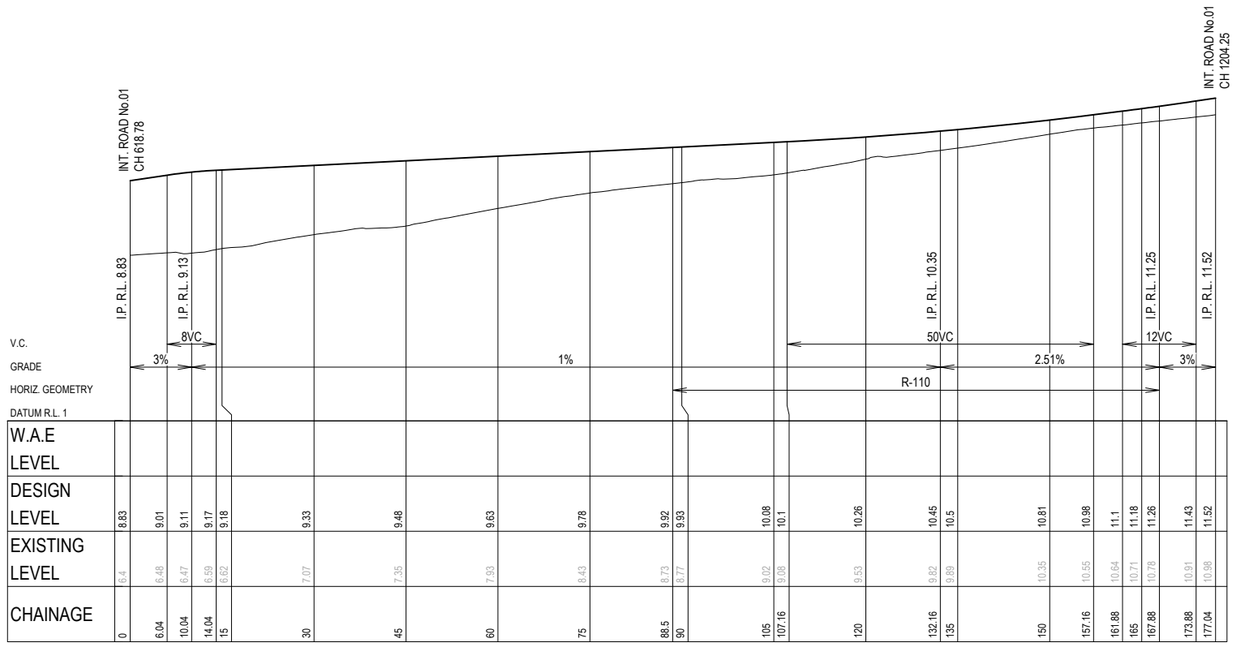


| | | |



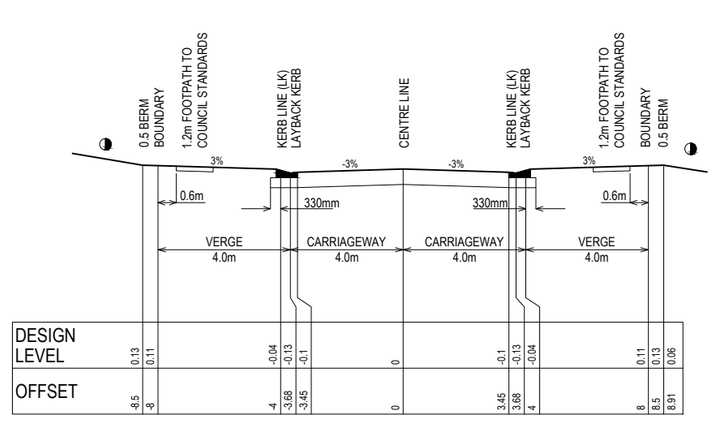
LONGITUDINAL SECTION CENTRELINE - ROAD No.02

SCALE 1:500 (H)
SCALE 1:100 (V)



LONGITUDINAL SECTION CENTRELINE - ROAD No.03

SCALE 1:500 (H)
SCALE 1:100 (V)



TYPICAL CROSS SECTION - ROADS No.02 & 03

SCALE 1:100 (H) 1:100 (V)

	FIRST ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
AMENDMENTS	1	AW	AW	SA	EF	12/01/2022	ISSUED FOR DEVELOPMENT APPLICATION
	2	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH
MEng (Civil) MIEAust CPEng NER
SIGN: Sina Arbabzadeh
DATE: 30/06/2023

SCALE
0 1 2 3 4 5 6 7 8
SCALE 1:100 (A1) SCALE 1:200 (A3)
0 5 10 15 20 25 30 35 40
SCALE 1:500 (A1) SCALE 1:1000 (A3)

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

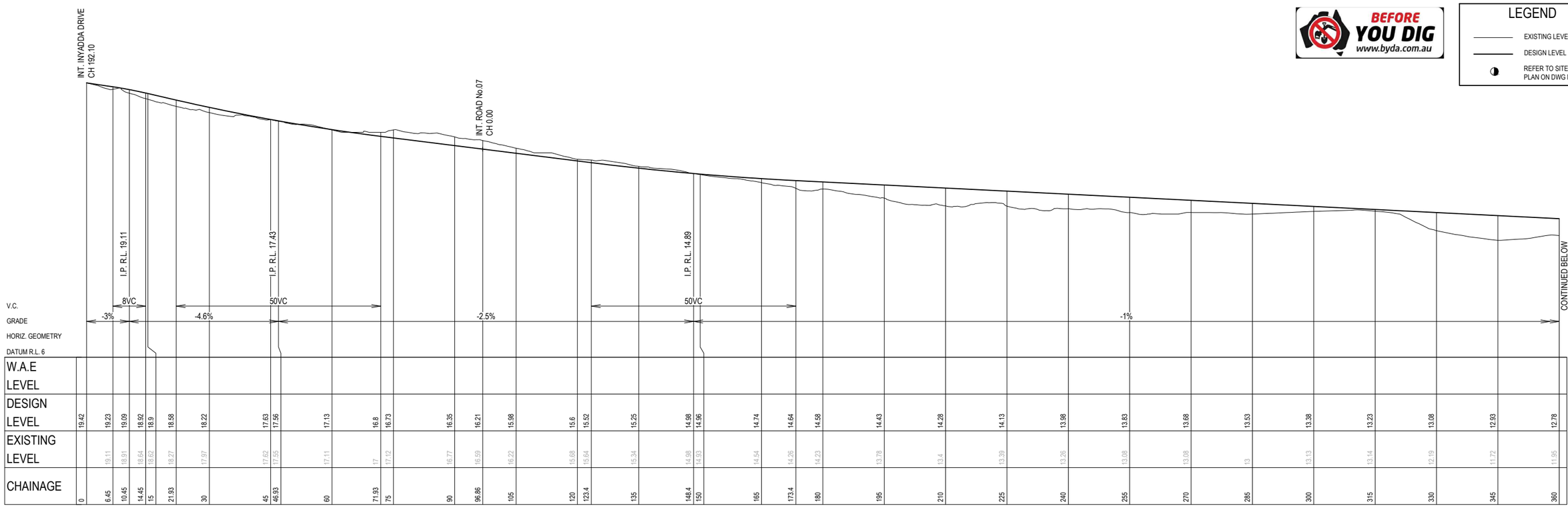
PROJECT: INYADDA DRIVE, MANYANA ROAD & DRAINAGE DESIGN

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: LONGITUDINAL & TYPICAL SECTIONS - ROAD No.02 & 03

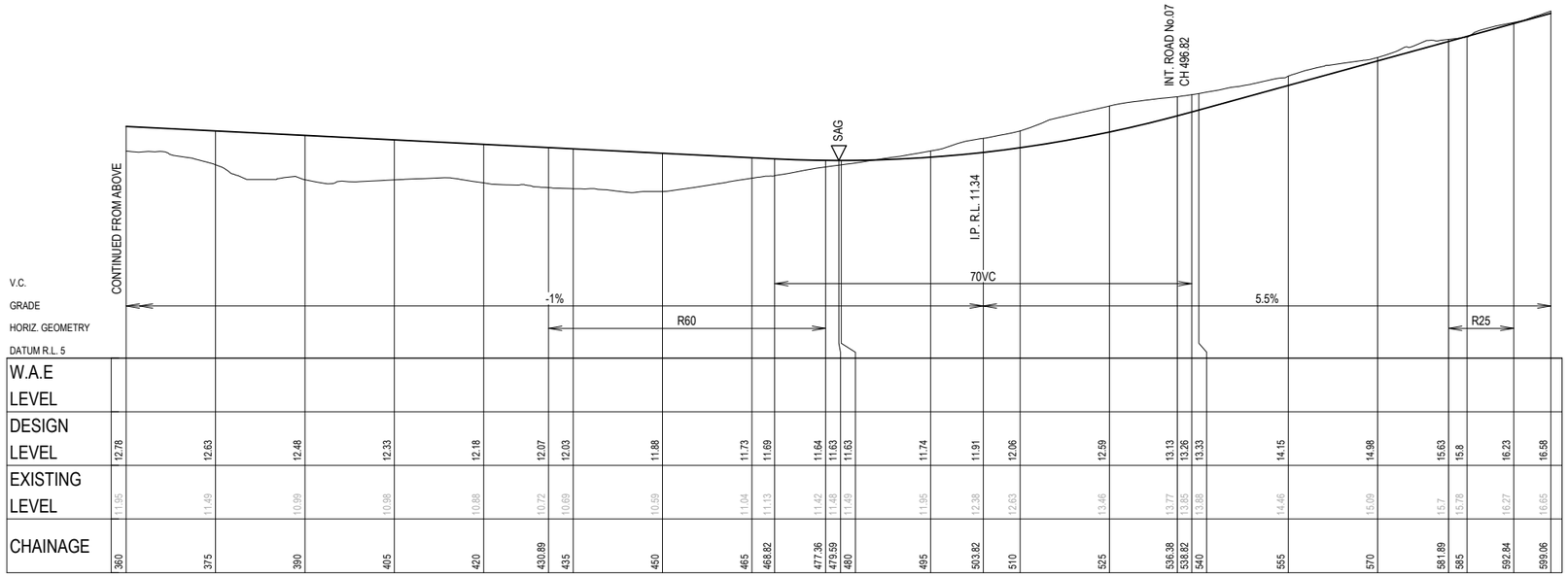
PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	404	DA	2

FILE: H:\21\21-000403 - INYADDA DRIVE, MANYANA\06_MODEL\AUTOCAD\CIVIL\DWG\21000403_LD_DA-404.DWG LAST SAVED BY: JED SWEENEY



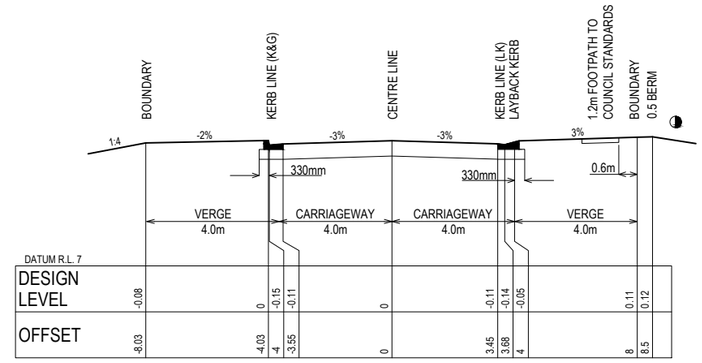
LONGITUDINAL SECTION CENTRELINE - ROAD No.06

SCALE 1:500 (H)
SCALE 1:100 (V)



LONGITUDINAL SECTION CENTRELINE - ROAD No.06

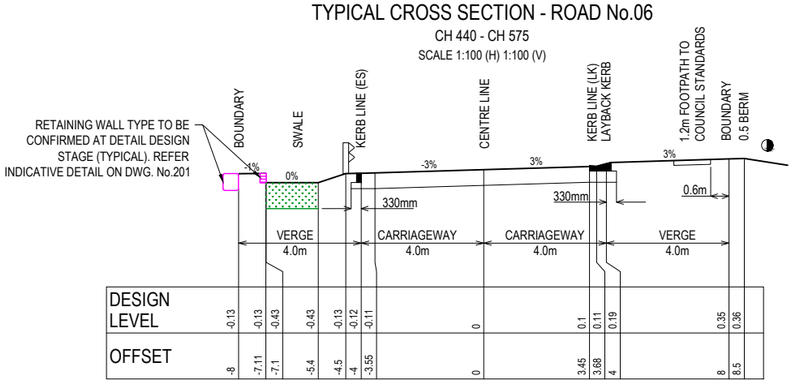
SCALE 1:500 (H)
SCALE 1:100 (V)



TYPICAL CROSS SECTION - ROAD No.06

CH 440 - CH 575

SCALE 1:100 (H) 1:100 (V)



TYPICAL CROSS SECTION - ROAD No.06

CH 0 - CH 420

SCALE 1:100 (H) 1:100 (V)

FIRST ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
AMENDMENTS 1	AW	JS	SA	EF	14/12/2021	
2	AW	AW	SA	EF	12/01/2022	ISSUED FOR DEVELOPMENT APPLICATION
	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH
MEng (Civil) MIEAust CPEng NER
SIGN:
DATE: 30/06/2023

SCALE
0 1 2 3 4 5 6 7 8
SCALE 1:100 (A1) SCALE 1:200 (A3)
0 5 10 15 20 25 30 35 40
SCALE 1:500 (A1) SCALE 1:1000 (A3)

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

PROJECT: INYADDA DRIVE, MANYANA ROAD & DRAINAGE DESIGN

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

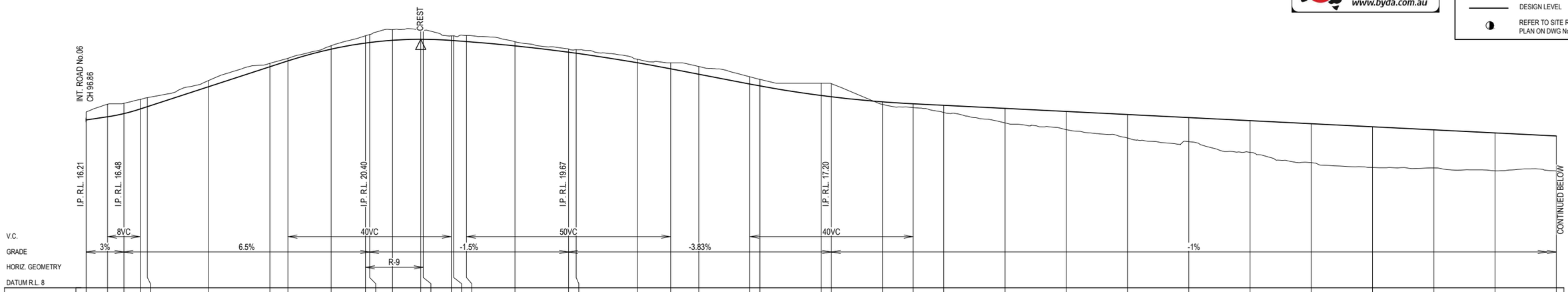
DRAWING TITLE: LONGITUDINAL & TYPICAL SECTIONS - ROAD No.06

PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	405	DA	2

F:\E:\H\21\21-000403 - INYADDA DRIVE, MANYANA\06_MODEL\AUTOCAD\CIVIL\DA21-000403_LD_DA-405.DWG LAST SAVED BY JED SWEENEY

BEFORE YOU DIG www.byda.com.au

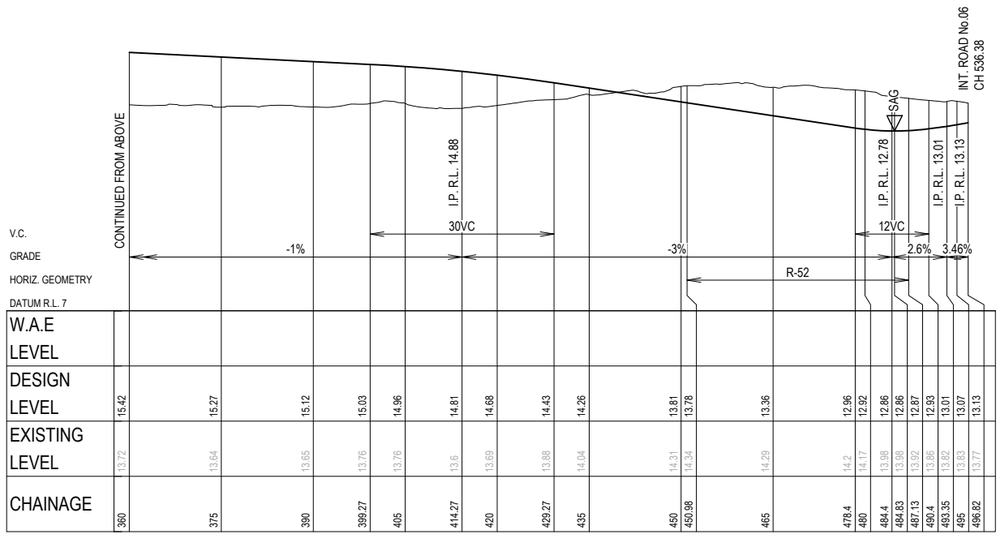
LEGEND
- EXISTING LEVEL
- DESIGN LEVEL
- REFER TO SITE REGRADING PLAN ON DWG No.201-202



CHAINAGE	0	5.25	9.25	13.25	15	30	45	49.43	60	68.4	69.43	75	81.93	82.55	89.43	90	93.13	105	118.13	120	135	143.13	150	162.5	165	180	182.5	195	202.5	210	225	240	255	270	285	300	315	330	345	360
EXISTING LEVEL	16.6	16.98	17.02	17.21	17.3	18.14	18.98	19.23	19.84	20.32	20.39	20.63	20.6	20.59	20.32	20.32	20.34	20.03	19.68	19.64	19.17	19	18.82	18.32	18.19	18	17.98	16.97	16.81	16.57	16.06	15.74	15.32	15.15	14.62	14.12	13.88	13.86	13.72	13.72
DESIGN LEVEL	16.21	16.36	16.52	16.74	16.86	17.83	18.81	19.1	19.67	19.97	20	20.1	20.15	20.15	20.1	20.09	20.04	19.83	19.52	19.47	19	18.71	18.44	17.97	17.87	17.4	17.34	17.09	17	16.92	16.77	16.62	16.47	16.32	16.17	16.02	15.87	15.72	15.57	15.42

LONGITUDINAL SECTION CENTRELINE - ROAD No.07

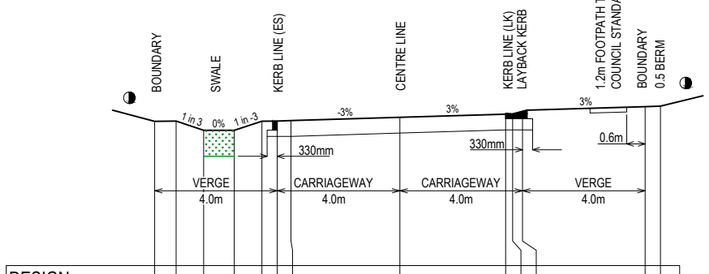
SCALE 1:500 (H)
SCALE 1:100 (V)



CHAINAGE	360	375	390	399.27	405	414.27	420	429.27	435	450	450.98	465	478.4	480	484.4	484.83	487.13	490.4	493.35	495	496.82
EXISTING LEVEL	13.72	13.64	13.65	13.76	13.76	13.6	13.69	13.88	14.04	14.31	14.34	14.29	14.2	14.17	13.98	13.98	13.92	13.86	13.82	13.83	13.77
DESIGN LEVEL	15.42	15.27	15.12	15.03	14.96	14.81	14.68	14.43	14.26	13.81	13.78	13.36	12.96	12.92	12.86	12.86	12.87	12.93	13.01	13.07	13.13

LONGITUDINAL SECTION CENTRELINE - ROAD No.07

SCALE 1:500 (H)
SCALE 1:100 (V)



OFFSET	-8	-7.3	-6.4	-5.4	-4.5	-4	-3.55	0	3.45	3.68	4	8	8.5
DESIGN LEVEL	-0.13	-0.12	-0.42	-0.42	-0.12	-0.12	-0.1	0	0.11	0.11	0.2	0.35	0.37

TYPICAL CROSS SECTION - ROAD No.07

SCALE 1:100 (H) 1:100 (V)

FIRST ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
	AW	JS	SA	EF	14/12/2021	
1	AW	AW	SA	EF	12/01/2022	ISSUED FOR DEVELOPMENT APPLICATION
2	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS

AMENDMENTS

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH SIGN:
MEng (Civil) MIEAust CPEng NER
DATE: 30/06/2023

SCALE
0 1 2 3 4 5 6 7 8
SCALE 1:100 (A1) SCALE 1:200 (A3)
0 5 10 15 20 25 30 35 40
SCALE 1:500 (A1) SCALE 1:1000 (A3)

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

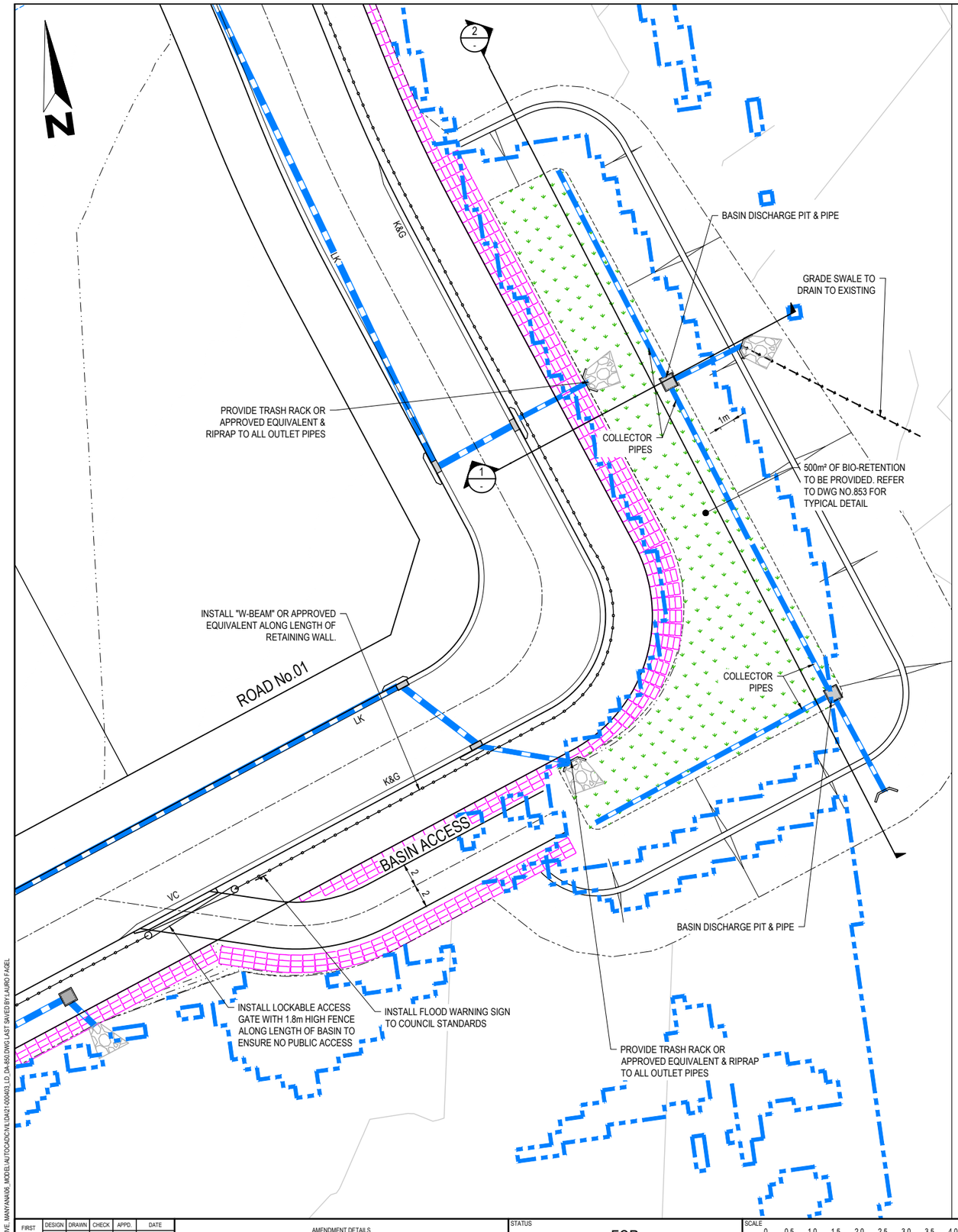
PROJECT: INYADDA DRIVE, MANYANA ROAD & DRAINAGE DESIGN

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: LONGITUDINAL & TYPICAL SECTIONS - ROAD No.07

PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	406	DA	2

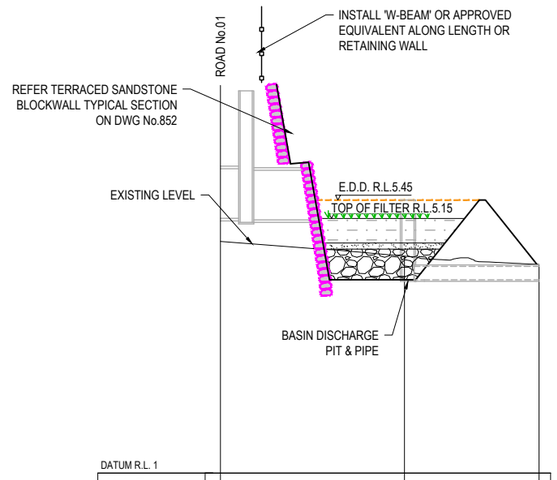
FILE: H:\21\21-000403 - INYADDA DRIVE, MANYANA\06_MODEL\AUTOCAD\CIVIL\DA\21-000403_LO_DA-406.DWG LAST SAVED BY JED SWEENEY



LEGEND

- EXISTING LEVEL
- DESIGN LEVEL
- RETAINING WALL TYPE TO BE CONFIRMED AT DETAIL DESIGN STAGE (TYPICAL)
- 100YR FLOOD LINES

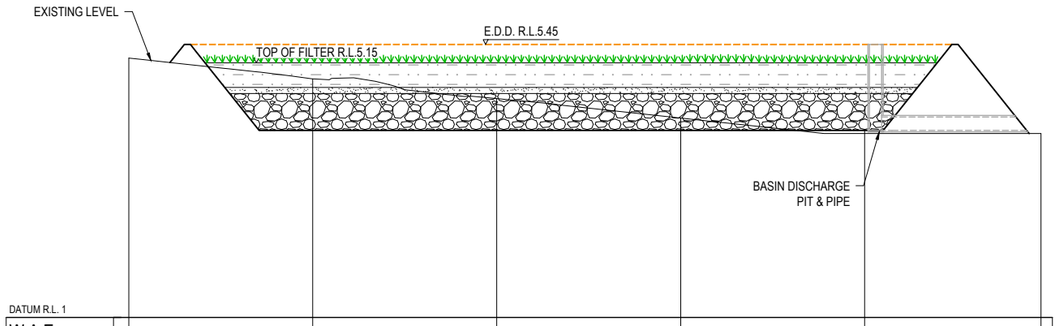
DIAL BEFORE YOU DIG www.1100.com.au



DATUM R.L. 1

W.A.E LEVEL				
DESIGN LEVEL	7.32	4.15		
EXISTING LEVEL	4.78	4.54	4.4	
CHAINAGE	0	15	25.979	

SECTION 1/850
SCALE: 1:250 (H)
SCALE: 1:50 (V)



DATUM R.L. 1

W.A.E LEVEL						
DESIGN LEVEL		4.15	4.15	4.15	4.15	
EXISTING LEVEL	5.23	4.89	4.57	4.25	4	4
CHAINAGE	0	15	30	45	60	74.378

SECTION 2/850
SCALE: 1:250 (H)
SCALE: 1:50 (V)

FIRST ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
	AW	JS	SA	EF	14/12/2021	
1	AW	AW	SA	EF	12/01/2022	ISSUED FOR DEVELOPMENT APPLICATION
2	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH
MEng (Civil) MIEAust CPEng NER
SIGN:
DATE: 30/06/2023

SCALE
0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0
SCALE 1:50 (A1) SCALE 1:100 (A3)
0 2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0
SCALE 1:200 (A1) SCALE 1:400 (A3)
0 2.5 5 7.5 10 12.5 15 17.5 20
SCALE 1:250 (A1) SCALE 1:500 (A3)

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

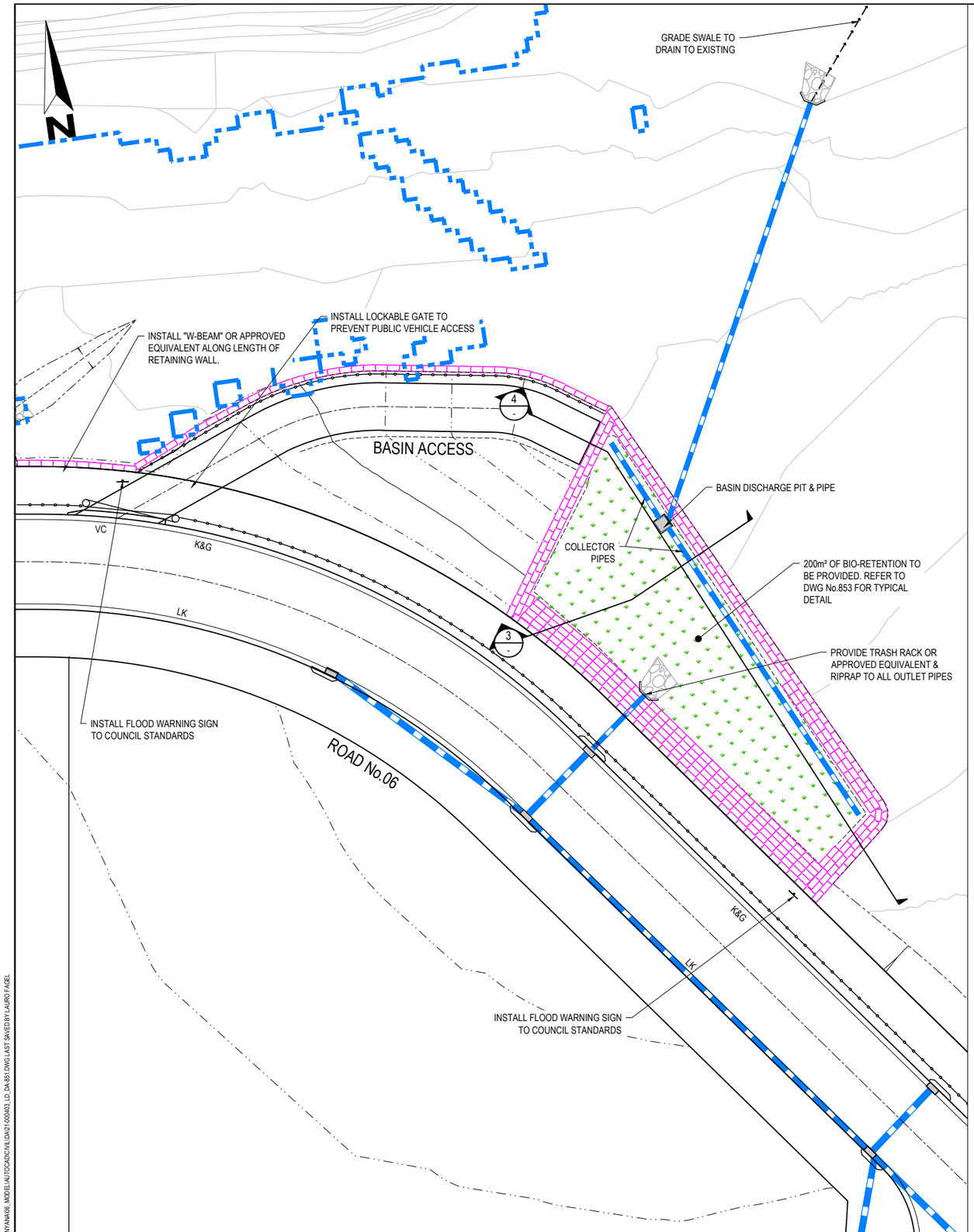
PROJECT: INYADDA DRIVE, MANYANA ROAD & DRAINAGE DESIGN

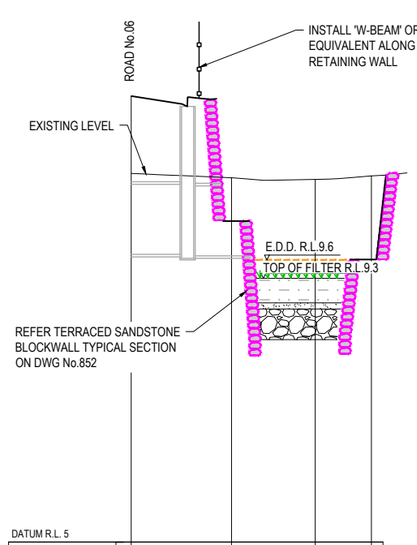
DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: BASIN No.01 PLAN & DETAILS

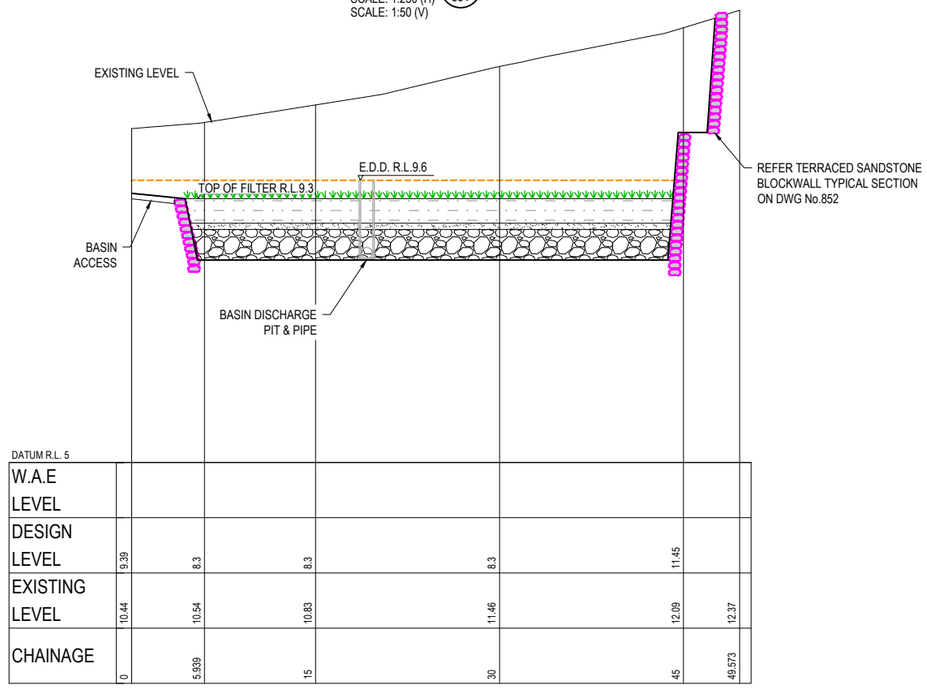
PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	850	DA	2

FILE: H:\21\21-000403 - INYADDA DRIVE, MANYANA\06_MODEL\AUTOCAD\CIVIL\DA21-000403_LD_DA-850.DWG LAST SAVED BY LAURO FADEL





SECTION 3 / 851
SCALE: 1:250 (H)
SCALE: 1:50 (V)



SECTION 4 / 851
SCALE: 1:250 (H)
SCALE: 1:50 (V)

LEGEND
- EXISTING LEVEL
- DESIGN LEVEL
- RETAINING WALL TYPE TO BE CONFIRMED AT DETAIL DESIGN STAGE (TYPICAL)
- 100YR FLOOD LINES

DIAL BEFORE YOU DIG www.1100.com.au

FIRST ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
	AW	JS	SA	EF	14/12/2021	
AMENDMENTS 1	AW	AW	SA	EF	12/01/2022	ISSUED FOR DEVELOPMENT APPLICATION
AMENDMENTS 2	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH
MEng (Civil) MIEAust CPEng NER
SIGN:
DATE: 30/06/2023

SCALE
0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0
SCALE 1:50 (A1) SCALE 1:100 (A3)
0 2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0
SCALE 1:200 (A1) SCALE 1:400 (A3)
0 2.5 5 7.5 10 12.5 15 17.5 20
SCALE 1:250 (A1) SCALE 1:500 (A3)

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

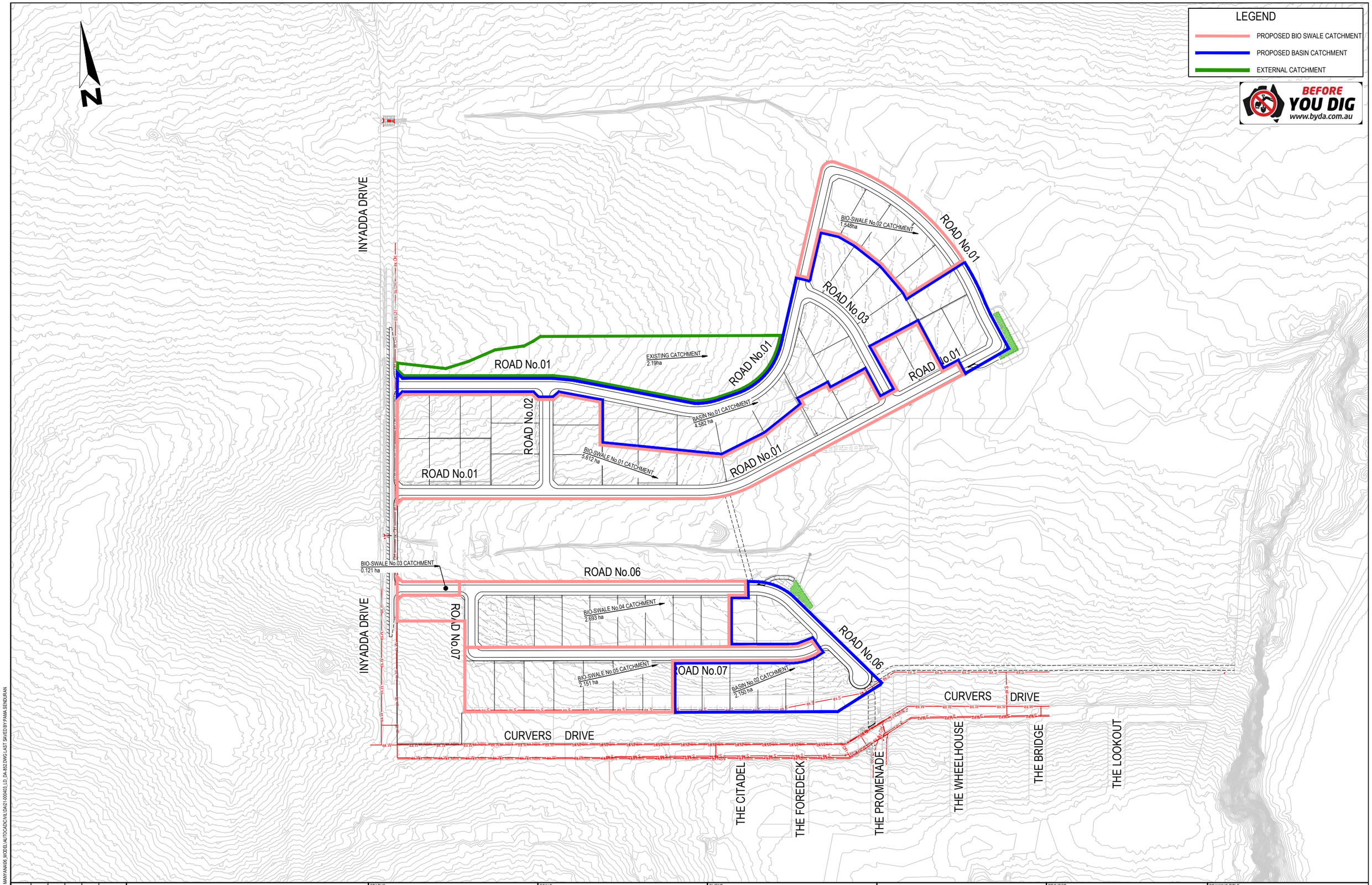
PROJECT: INYADDA DRIVE, MANYANA ROAD & DRAINAGE DESIGN

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: BASIN No.02 PLAN & DETAILS

PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	851	DA	2

F:\E.H\21\21-000403 - INYADDA DRIVE, MANYANA\05_MODEL\AUTOCAD\CIVIL\DA\21-000403_LD_DA-851.DWG LAST SAVED BY LAURO.FAGEL



FIRST ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
1	AW	AW	SA	EF	12/01/2022	ISSUED FOR DEVELOPMENT APPLICATION
2	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS

AMENDMENTS

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH
MEng (Civil) MIEAust CPEng NER
SIGN:
DATE: 30/06/2023

SCALE
0 20 40 60 80 100 120 140 160
SCALE 1:2000 (A1) SCALE 1:4000 (A3)

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

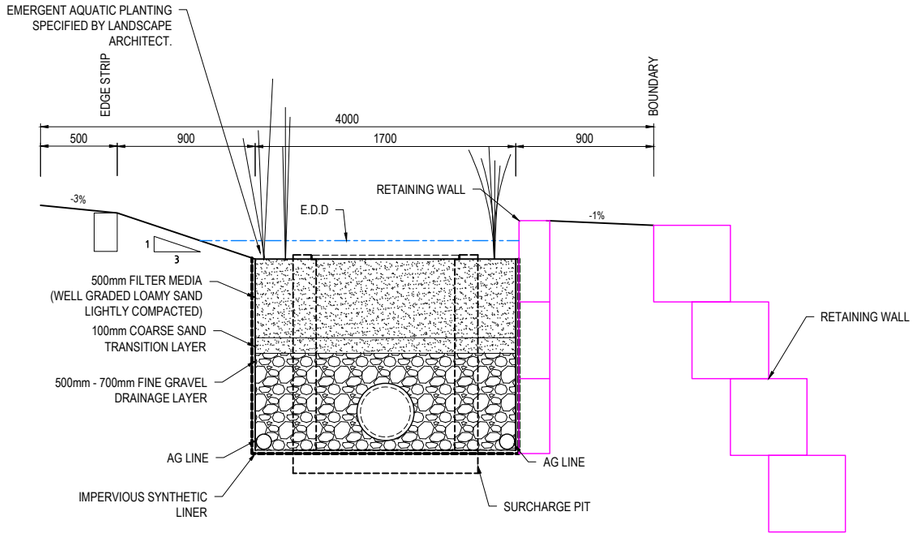
PROJECT: INYADDA DRIVE, MANYANA ROAD & DRAINAGE DESIGN

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: CATCHMENT PLAN

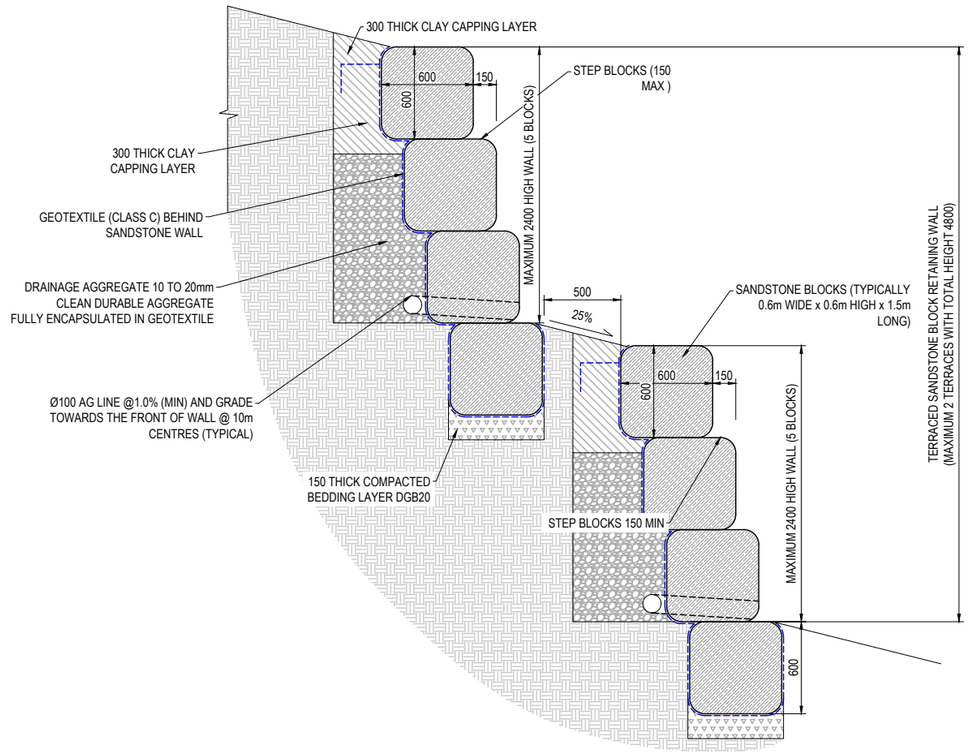
PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	852	DA	2

F:\E:\21\21-000403 - INYADDA DRIVE, MANYANA\06_MODEL\AUTOCAD\CIVIL\DA\21-000403_LD_DA-852.DWG LAST SAVED BY PAMA.SENDURAN



TYPICAL DETAIL ALONG BIO SWALE & BIO BASIN

SCALE 1:20



TERRACED SANDSTONE BLOCK WALL
TYPICAL SECTION

SCALE 1:10

FIRST ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
	AW	JS	SA	EF	14/12/2021	
1	AW	AW	SA	EF	12/01/2022	ISSUED FOR DEVELOPMENT APPLICATION
2	LF	PS	SA	SA	30/06/2023	ISSUED TO SUIT COUNCIL COMMENTS

AMENDMENTS

STATUS: FOR DEVELOPMENT APPLICATION

AUTHORISED FOR ISSUE:
BY: SINA ARBABZADEH SIGN:
MEng (Civil) MIEAust CPEng NER
DATE: 30/06/2023

SCALE
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8
SCALE 1:10 (A1) SCALE 1:20 (A3)
0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6
SCALE 1:20 (A1) SCALE 1:40 (A3)

CLIENT: HEIR ASQUITH

egis
www.egis-group.com
© 2023 Egis Consulting Pty Ltd

PROJECT: INYADDA DRIVE, MANYANA ROAD & DRAINAGE DESIGN

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: SANDSTONE LOGWALL, BLOCKWALL & GRASSED ROADSIDE SWALE DETAILS

PROJECT No.	DRAWING No.	STAGE	REVISION
21-000403	853	DA	2

FILE: H:\21\21-000403 - INYADDA DRIVE, MANYANA\06_MODEL\AUTOCAD\CIVIL\DN21-000403_LD_DA-853.DWG LAST SAVED BY LAURO FADEL

Appendix C: Lot Search report

LOTSEARCH

LOTSEARCH ENVIRO PROFESSIONAL

Date: 28 Aug 2019 18:02:57

Reference: LS008183 EP

Address: Inyadda Drive, Manyana, NSW 2539

Disclaimer:
The purpose of this report is to provide an overview of some of the site history, environmental risk and planning information available, affecting an individual address or geographical area in which the property is located. It is not a substitute for an on-site inspection or review of other available reports and records. It is not intended to be, and should not be taken to be, a rating or assessment of the desirability or market value of the property or its features.
You should obtain independent advice before you make any decision based on the information within the report.
The detailed terms applicable to use of this report are set out at the end of this report.

Table of Contents

Location Confidences 2
Dataset Listings 3
Site Location Aerial 5
Contaminated Land & Waste Management Facilities 6
PFAS Investigation Programs 9
Defence Sites 10
EPA Other Sites with Contamination Issues 11
EPA Current Licensed Activities 12
EPA Delicensed & Former Licensed Activities 14
UPSS Sensitive Zones 16
Historical Business Activities 17
Historical Aerial Imagery & Maps 24
Topographic Features 34
Elevation Contours 38
Hydrogeology & Groundwater 39
Geology 43
Naturally Occurring Asbestos Potential 45
Soils 46
Acid Sulfate Soils 48
Dryland Salinity 52
Mining Subsidence Districts 53
State Environmental Planning 54
Environmental Planning Instruments 55
Heritage 57
Natural Hazards 59
Ecological Constraints 61
Terms & Conditions 70

Location Confidences

Where Lotsearch has had to georeference features from supplied addresses, a location confidence has been assigned to the data record. This indicates a confidence to the positional accuracy of the feature. Where applicable, a code is given under the field heading “LC” or “LocConf”. These codes lookup to the following location confidences:

LC Code	Location Confidence
Premise match	Georeferenced to the site location / premise or part of site
General area or suburb match	Georeferenced with the confidence of the general/approximate area
Road match	Georeferenced to the road or rail
Road intersection	Georeferenced to the road intersection
Feature is a buffered point	Feature is a buffered point
Land adjacent to geocoded site	Land adjacent to Georeferenced Site
Network of features	Georeferenced to a network of features

Dataset Listing

Datasets contained within this report, detailing their source and data currency:

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Cadastre Boundaries	NSW Department of Finance, Services & Innovation	28/08/2019	28/08/2019	Daily	-	-	-	-
Topographic Data	NSW Department of Finance, Services & Innovation	25/06/2019	25/06/2019	As required	-	-	-	-
List of NSW contaminated sites notified to EPA	Environment Protection Authority	12/08/2019	01/08/2019	Monthly	1000	0	0	0
Contaminated Land Records of Notice	Environment Protection Authority	12/08/2019	12/08/2019	Monthly	1000	0	0	0
Former Gasworks	Environment Protection Authority	02/08/2019	11/10/2017	Monthly	1000	0	0	0
National Waste Management Facilities Database	Geoscience Australia	06/08/2019	07/03/2017	Quarterly	1000	0	0	1
EPA PFAS Investigation Program	Environment Protection Authority	02/08/2019	02/08/2019	Monthly	2000	0	0	0
Defence PFAS Investigation & Management Program	Department of Defence	02/08/2019	02/08/2019	Monthly	2000	0	0	0
Airservices Australia National PFAS Management Program	Airservices Australia	02/08/2019	02/08/2019	Monthly	2000	0	0	0
Defence 3 Year Regional Contamination Investigation Program	Department of Defence	02/08/2019	02/08/2019	Monthly	2000	0	0	0
EPA Other Sites with Contamination Issues	Environment Protection Authority	13/12/2018	13/12/2018	Annually	1000	0	0	0
Licensed Activities under the POEO Act 1997	Environment Protection Authority	26/08/2019	26/08/2019	Monthly	1000	0	0	1
Delicensed POEO Activities still regulated by the EPA	Environment Protection Authority	26/08/2019	26/08/2019	Monthly	1000	0	0	0
Former POEO Licensed Activities now revoked or surrendered	Environment Protection Authority	26/08/2019	26/08/2019	Monthly	1000	3	3	3
UPSS Environmentally Sensitive Zones	Environment Protection Authority	14/04/2015	12/01/2010	As required	1000	1	1	1
UBD Business to Business Directory 1991 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business to Business Directory 1991 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory 1982 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1982 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory 1970 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1970 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory 1961 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1961 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory 1950 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1950 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory Drycleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant			Not required	500	0	0	0
UBD Business Directory Drycleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant			Not required	500	-	0	0
Points of Interest	NSW Department of Finance, Services & Innovation	25/06/2019	25/06/2019	Quarterly	1000	1	1	18
Tanks (Areas)	NSW Department of Finance, Services & Innovation	25/06/2019	25/06/2019	Quarterly	1000	0	0	0

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Tanks (Points)	NSW Department of Finance, Services & Innovation	25/06/2019	25/06/2019	Quarterly	1000	0	0	0
Major Easements	NSW Department of Finance, Services & Innovation	25/06/2019	25/06/2019	Quarterly	1000	0	0	1
State Forest	NSW Department of Finance, Services & Innovation	18/01/2018	18/01/2018	As required	1000	0	0	0
NSW National Parks and Wildlife Service Reserves	NSW Office of Environment & Heritage	16/01/2019	14/11/2018	Annually	1000	0	1	1
Hydrogeology Map of Australia	Commonwealth of Australia (Geoscience Australia)	08/10/2014	17/03/2000	As required	1000	1	1	1
Botany Groundwater Management Zones	NSW Department of Primary Industries	15/03/2018	01/10/2005	As required	1000	0	0	0
Groundwater Boreholes	NSW Dept. of Primary Industries - Water NSW; Commonwealth of Australia (Bureau of Meteorology)	24/07/2018	23/07/2018	Annually	2000	0	0	3
Geological Units 1:250,000	NSW Dept. of Industry, Resources & Energy	20/08/2014		None planned	1000	2	-	3
Geological Structures 1:250,000	NSW Dept. of Industry, Resources & Energy	20/08/2014		None planned	1000	0	-	0
Naturally Occurring Asbestos Potential	NSW Dept. of Industry, Resources & Energy	04/12/2015	24/09/2015	Unknown	1000	0	0	0
Atlas of Australian Soils	ABARES	19/05/2017	17/02/2011	As required	1000	1	1	2
Environmental Planning Instrument Acid Sulfate Soils	NSW Department of Planning and Environment	23/08/2019	09/08/2019	Weekly	500	1	-	-
Atlas of Australian Acid Sulfate Soils	CSIRO	19/01/2017	21/02/2013	As required	1000	1	1	1
Dryland Salinity - National Assessment	National Land and Water Resources Audit	18/07/2014	12/05/2013	None planned	1000	0	0	0
Dryland Salinity Potential of Western Sydney	NSW Office of Environment & Heritage	12/05/2017	01/01/2002	None planned	1000	-	-	-
Mining Subsidence Districts	NSW Department of Finance, Services & Innovation	11/04/2019	11/04/2019	Quarterly	1000	0	0	0
Environmental Planning Instrument SEPP State Significant Precincts	NSW Department of Planning and Environment	23/08/2019	07/12/2018	Weekly	1000	0	0	0
Environmental Planning Instrument Land Zoning	NSW Department of Planning and Environment	23/08/2019	16/08/2019	Weekly	1000	3	11	22
Commonwealth Heritage List	Australian Government Department of the Environment and Energy - Heritage Branch	16/01/2019	31/07/2018	Unknown	1000	0	0	0
National Heritage List	Australian Government Department of the Environment and Energy - Heritage Branch	16/01/2019	28/09/2018	Unknown	1000	0	0	0
State Heritage Register - Curtilages	NSW Office of Environment & Heritage	15/07/2019	09/11/2018	Quarterly	1000	0	0	0
Environmental Planning Instrument Heritage	NSW Department of Planning and Environment	23/08/2019	09/08/2019	Weekly	1000	0	0	1
Bush Fire Prone Land	NSW Rural Fire Service	28/08/2019	03/06/2019	Quarterly	1000	2	2	3
Vegetation of Southern Forests	NSW Office of Environment & Heritage	09/12/2014	10/10/2011	Unknown	1000	3	5	16
Ramsar Wetlands of Australia	Commonwealth of Australia Department of the Environment	08/10/2014	24/06/2011	As required	1000	0	0	0
Groundwater Dependent Ecosystems	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000	4	5	5
Inflow Dependent Ecosystems Likelihood	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000	8	8	8
NSW BioNet Species Sightings	NSW Office of Environment & Heritage	28/08/2019	28/08/2019	Weekly	10000	-	-	-

Aerial Imagery 2018

Inyadda Drive, Manyana, NSW 2539

Scale:
0 100 200 400
Meters

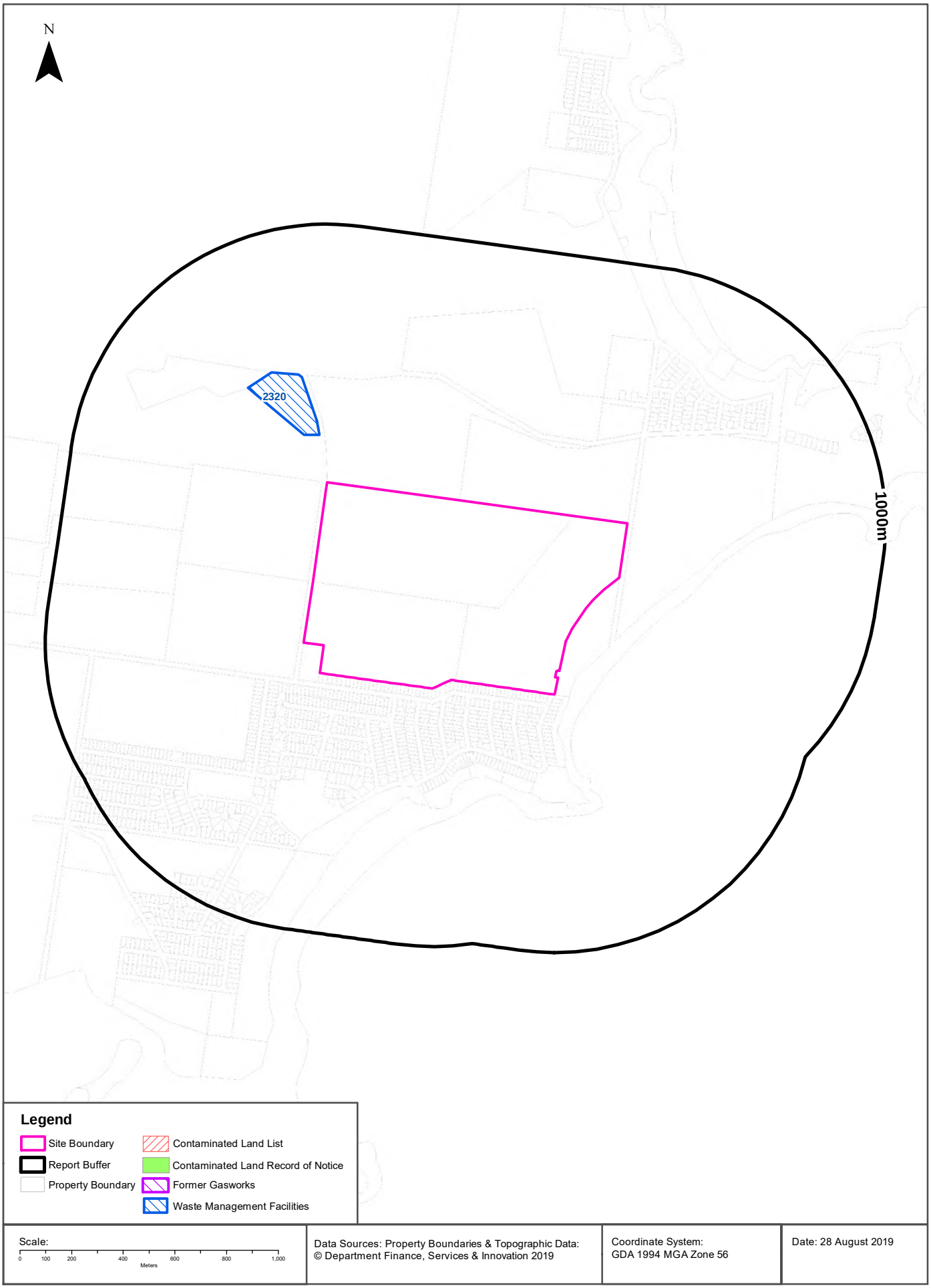
Data Source Aerial Imagery: © 2019 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.

Coordinate System:
GDA 1994 MGA Zone 56

Date: 27 August, 2019

Contaminated Land & Waste Management Facilities

Inyadda Drive, Manyana, NSW 2539



Contaminated Land & Waste Management Facilities

Inyadda Drive, Manyana, NSW 2539

List of NSW contaminated sites notified to EPA

Records from the NSW EPA Contaminated Land list within the dataset buffer:

Map Id	Site	Address	Suburb	Activity	Management Class	Status	Location Confidence	Dist (m)	Direction
N/A	No records in buffer								

The values within the EPA site management class in the table above, are given more detailed explanations in the table below:

EPA site management class	Explanation
Contamination being managed via the planning process (EP&A Act)	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. The contamination of this site is managed by the consent authority under the Environmental Planning and Assessment Act 1979 (EP&A Act) planning approval process, with EPA involvement as necessary to ensure significant contamination is adequately addressed. The consent authority is typically a local council or the Department of Planning and Environment.
Contamination currently regulated under CLM Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). Management of the contamination is regulated by the EPA under the CLM Act. Regulatory notices are available on the EPA's Contaminated Land Public Record of Notices.
Contamination currently regulated under POEO Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. Management of the contamination is regulated under the Protection of the Environment Operations Act 1997 (POEO Act). The EPA's regulatory actions under the POEO Act are available on the POEO public register.
Contamination formerly regulated under the CLM Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). The contamination was addressed under the CLM Act.
Contamination formerly regulated under the POEO Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed under the Protection of the Environment Operations Act 1997 (POEO Act).
Contamination was addressed via the planning process (EP&A Act)	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed by the appropriate consent authority via the planning process under the Environmental Planning and Assessment Act 1979 (EP&A Act).
Ongoing maintenance required to manage residual contamination (CLM Act)	The EPA has determined that ongoing maintenance, under the Contaminated Land Management Act 1997 (CLM Act), is required to manage the residual contamination. Regulatory notices under the CLM Act are available on the EPA's Contaminated Land Public Record of Notices.
Regulation being finalised	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997. A regulatory approach is being finalised.
Regulation under the CLM Act not required	The EPA has completed an assessment of the contamination and decided that regulation under the Contaminated Land Management Act 1997 is not required.
Under assessment	The contamination is being assessed by the EPA to determine whether regulation is required. The EPA may require further information to complete the assessment. For example, the completion of management actions regulated under the planning process or Protection of the Environment Operations Act 1997. Alternatively, the EPA may require information via a notice issued under s77 of the Contaminated Land Management Act 1997 or issue a Preliminary Investigation Order.

NSW EPA Contaminated Land List Data Source: Environment Protection Authority

© State of New South Wales through the Environment Protection Authority

Contaminated Land & Waste Management Facilities

Inyadda Drive, Manyana, NSW 2539

Contaminated Land: Records of Notice

Record of Notices within the dataset buffer:

Map Id	Name	Address	Suburb	Notices	Area No	Location Confidence	Distance	Direction
N/A	No records in buffer							

Contaminated Land Records of Notice Data Source: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority
Terms of use and disclaimer for Contaminated Land: Record of Notices, please visit
http://www.epa.nsw.gov.au/clm/clmdisclaimer.htm

Former Gasworks

Former Gasworks within the dataset buffer:

Map Id	Location	Council	Further Info	Location Confidence	Distance	Direction
N/A	No records in buffer					

Former Gasworks Data Source: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

National Waste Management Site Database

Sites on the National Waste Management Site Database within the dataset buffer:

Site Id	Owner	Name	Address	Suburb	Class	Landfill	Reprocess	Transfer	Comments	Loc Conf	Dist (m)	Direction
2320	Shoalhaven City Council	Bendalong Waste Transfer Station	1110 Bendalong Road	Bendalong	Transfer Station			Operational		Premise Match	185 m	North West

Waste Management Facilities Data Source: Geoscience Australia
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

PFAS Investigation Sites

Inyadda Drive, Manyana, NSW 2539

EPA PFAS Investigation Program

Sites that are part of the EPA PFAS investigation program, within the dataset buffer:

Id	Site	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

EPA PFAS Investigation Program: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

Defence PFAS Investigation & Management Program

Sites being investigated or managed by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

Defence PFAS Investigation & Management Program Data Custodian: Department of Defence, Australian Government

Airservices Australia National PFAS Management Program

Sites being investigated or managed by Airservices Australia for PFAS contamination within the dataset buffer:

Map ID	Site Name	Impacts	Loc Conf	Dist	Dir
N/A	No records in buffer				

Airservices Australia National PFAS Management Program Data Custodian: Airservices Australia

Defence Sites

Inyadda Drive, Manyana, NSW 2539

Defence 3 Year Regional Contamination Investigation Program

Sites which have been assessed as part of the Defence 3 Year Regional Contamination Investigation Program within the dataset buffer:

Property ID	Base Name	Address	Known Contamination	Loc Conf	Dist	Dir
N/A	No records in buffer					

Defence 3 Year Regional Contamination Investigation Program, Data Custodian: Department of Defence, Australian Government

EPA Other Sites with Contamination Issues

Inyadda Drive, Manyana, NSW 2539

EPA Other Sites with Contamination Issues

This dataset contains other sites identified on the EPA website as having contamination issues. This dataset currently includes:

- James Hardie asbestos manufacturing and waste disposal sites
- Radiological investigation sites in Hunter's Hill
- Pasminco Lead Abatement Strategy Area

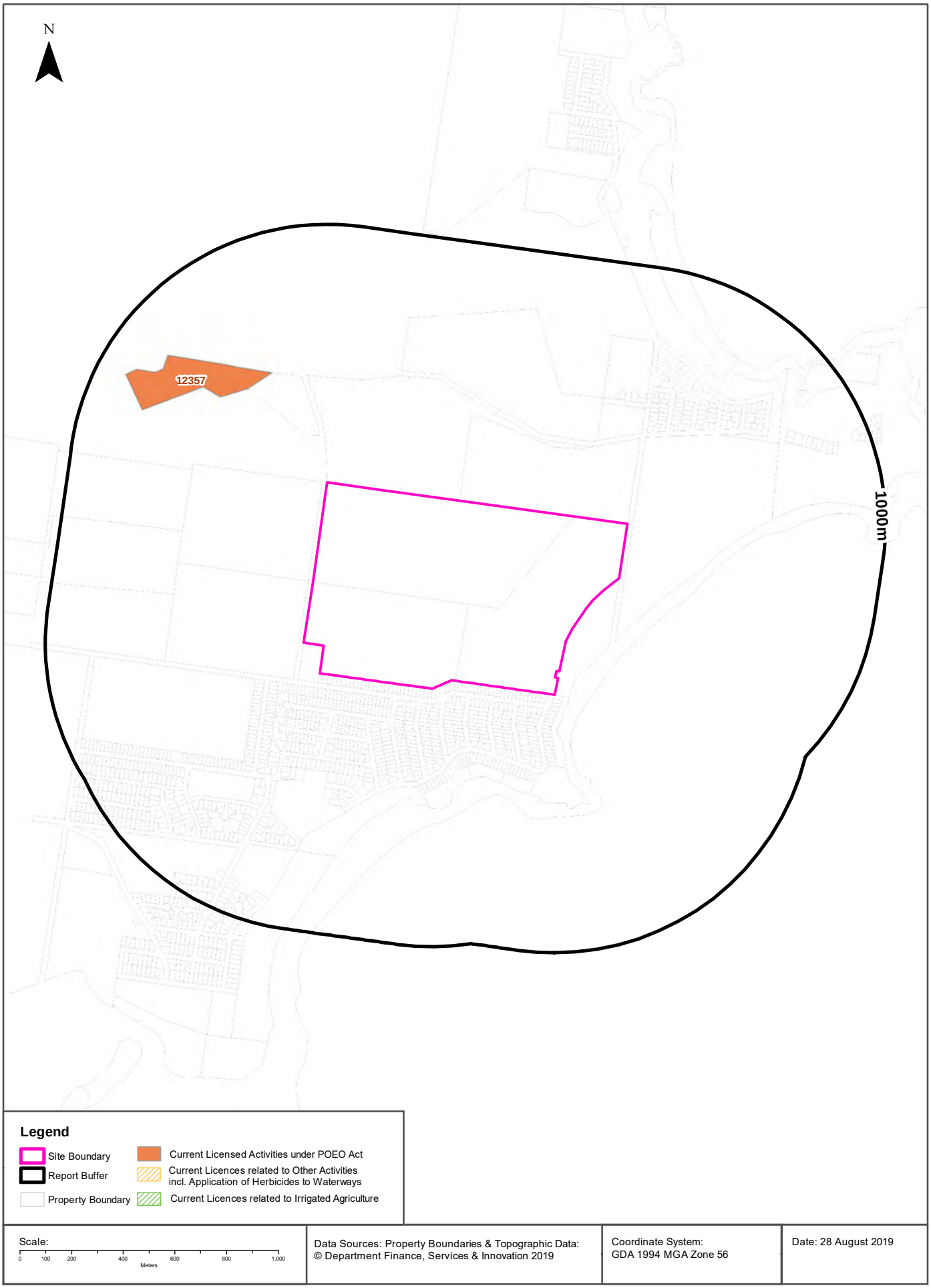
Sites within the dataset buffer:

Site Id	Site Name	Site Address	Dataset	Comments	Location Confidence	Distance	Direction
N/A	No records in buffer						

EPA Other Sites with Contamination Issues: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

Current EPA Licensed Activities

Inyadda Drive, Manyana, NSW 2539



EPA Activities

Inyadda Drive, Manyana, NSW 2539

Licensed Activities under the POEO Act 1997

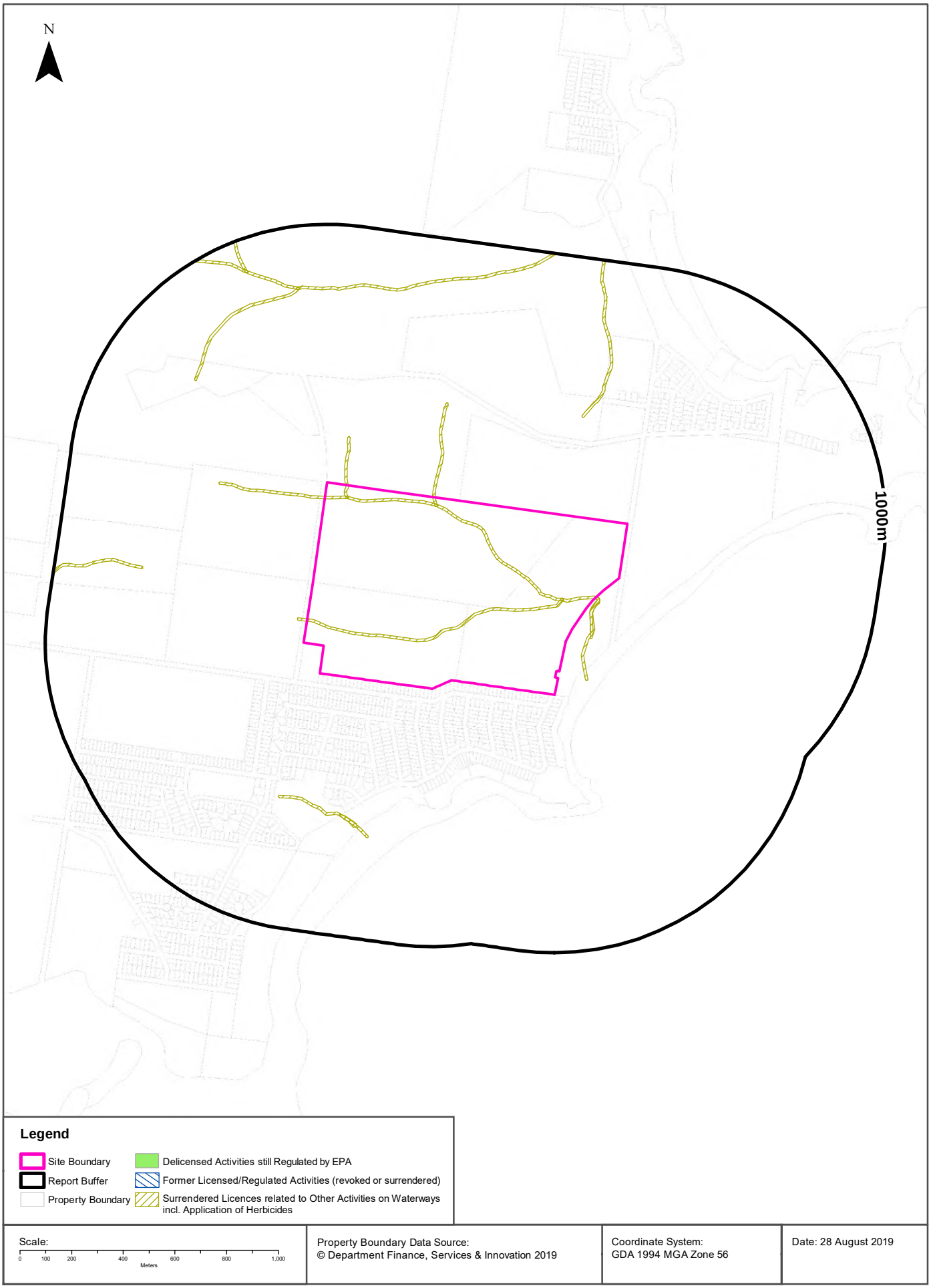
Licensed activities under the Protection of the Environment Operations Act 1997, within the dataset buffer:

EPL	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
12357	SHOALHAVEN CITY COUNCIL	CONJOLA REGIONAL SEWERAGE SCHEME	BENDALONG ROAD	BENDALONG	Sewage treatment processing by small plants	Premise Match	474m	North West

POEO Licence Data Source: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

Delicensed & Former Licensed EPA Activities

Inyadda Drive, Manyana, NSW 2539



EPA Activities

Inyadda Drive, Manyana, NSW 2539

Delicensed Activities still regulated by the EPA

Delicensed activities still regulated by the EPA, within the dataset buffer:

Licence No	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
N/A	No records in buffer							

Delicensed Activities Data Source: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

Former Licensed Activities under the POEO Act 1997, now revoked or surrendered

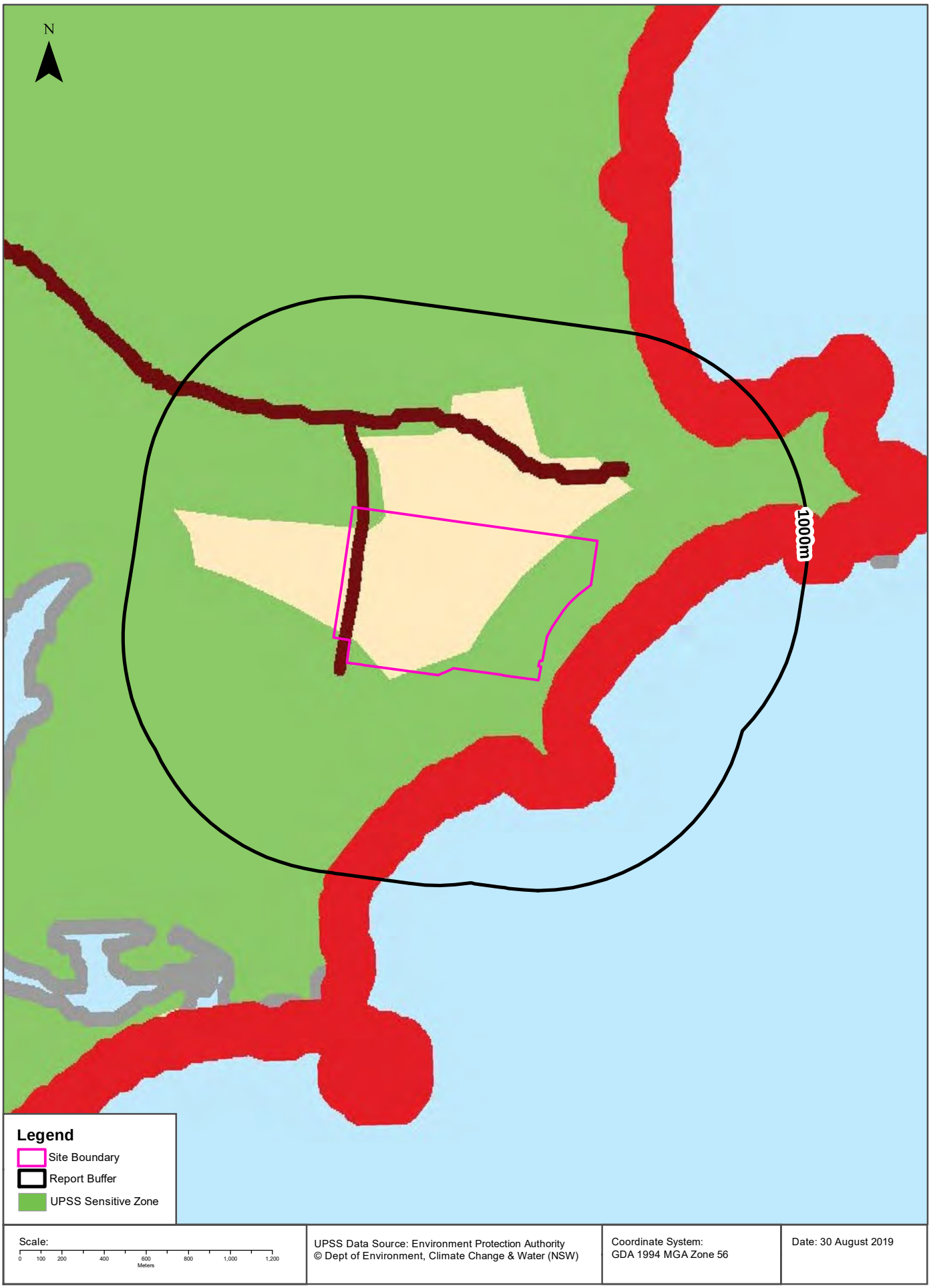
Former Licensed activities under the Protection of the Environment Operations Act 1997, now revoked or surrendered, within the dataset buffer:

Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
4653	LUHRMANN ENVIRONMENT MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW	Surrendered	06/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	0m	Onsite
4838	Robert Orchard	Various Waterways throughout New South Wales - SYDNEY NSW 2000	Surrendered	07/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	0m	Onsite
6630	SYDNEY WEED & PEST MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW - PROSPECT, NSW, 2148	Surrendered	09/11/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	0m	Onsite

Former Licensed Activities Data Source: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

UPSS Sensitive Zones

Inyadda Drive, Manyana, NSW 2539



Historical Business Directories

Inyadda Drive, Manyana, NSW 2539

1991 Business to Business Directory Records Premise or Road Intersection Matches

Records from the 1991 UBD Business to Business Directory, mapped to a premise or road intersection, within the dataset buffer:

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

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1991 Business to Business Directory Records Road or Area Matches

Records from the 1991 UBD Business to Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

Inyadda Drive, Manyana, NSW 2539

1982 Business Directory Records
Premise or Road Intersection Matches

Records from the 1982 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

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

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1982 Business Directory Records
Road or Area Matches

Records from the 1982 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

Inyadda Drive, Manyana, NSW 2539

1970 Business Directory Records
Premise or Road Intersection Matches

Records from the 1970 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

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

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1970 Business Directory Records
Road or Area Matches

Records from the 1970 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

Inyadda Drive, Manyana, NSW 2539

1961 Business Directory Records
Premise or Road Intersection Matches

Records from the 1961 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

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

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1961 Business Directory Records
Road or Area Matches

Records from the 1961 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

Inyadda Drive, Manyana, NSW 2539

1950 Business Directory Records
Premise or Road Intersection Matches

Records from the 1950 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

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

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1950 Business Directory Records
Road or Area Matches

Records from the 1950 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

Inyadda Drive, Manyana, NSW 2539

Dry Cleaners, Motor Garages & Service Stations Premise or Road Intersection Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a premise or road intersection, within the dataset buffer.

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

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Dry Cleaners, Motor Garages & Service Stations Road or Area Matches

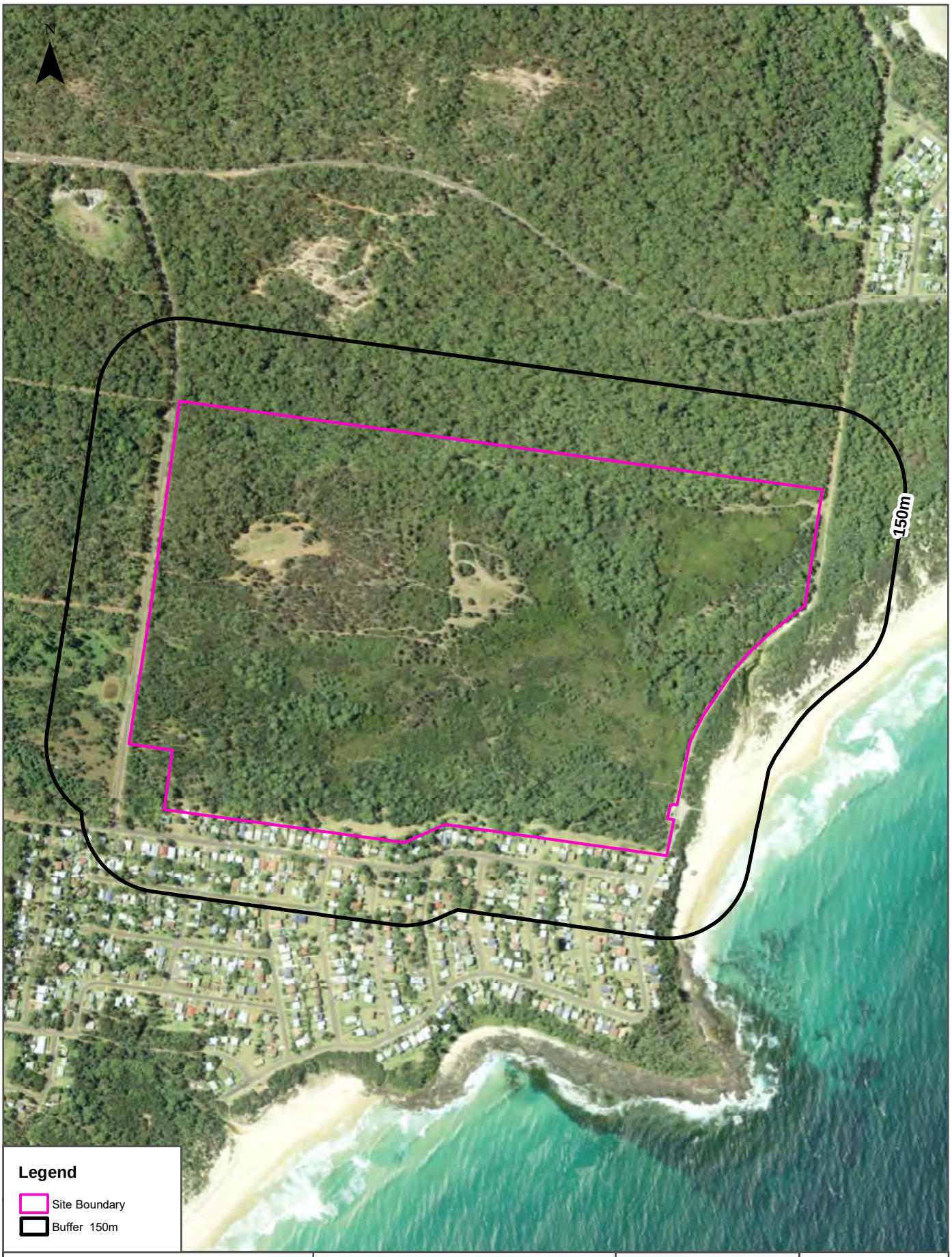
Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
	No records in buffer					

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Aerial Imagery 2014

Inyadda Drive, Manyana, NSW 2539



Aerial Imagery 2009

Inyadda Drive, Manyana, NSW 2539

Data Source Aerial Imagery: © 2019 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.

Coordinate System: GDA 1994 MGA Zone 56

Date: 27 August, 2019

Aerial Imagery 2004

Inyadda Drive, Manyana, NSW 2539

Scale:
0 100 200 400
Meters

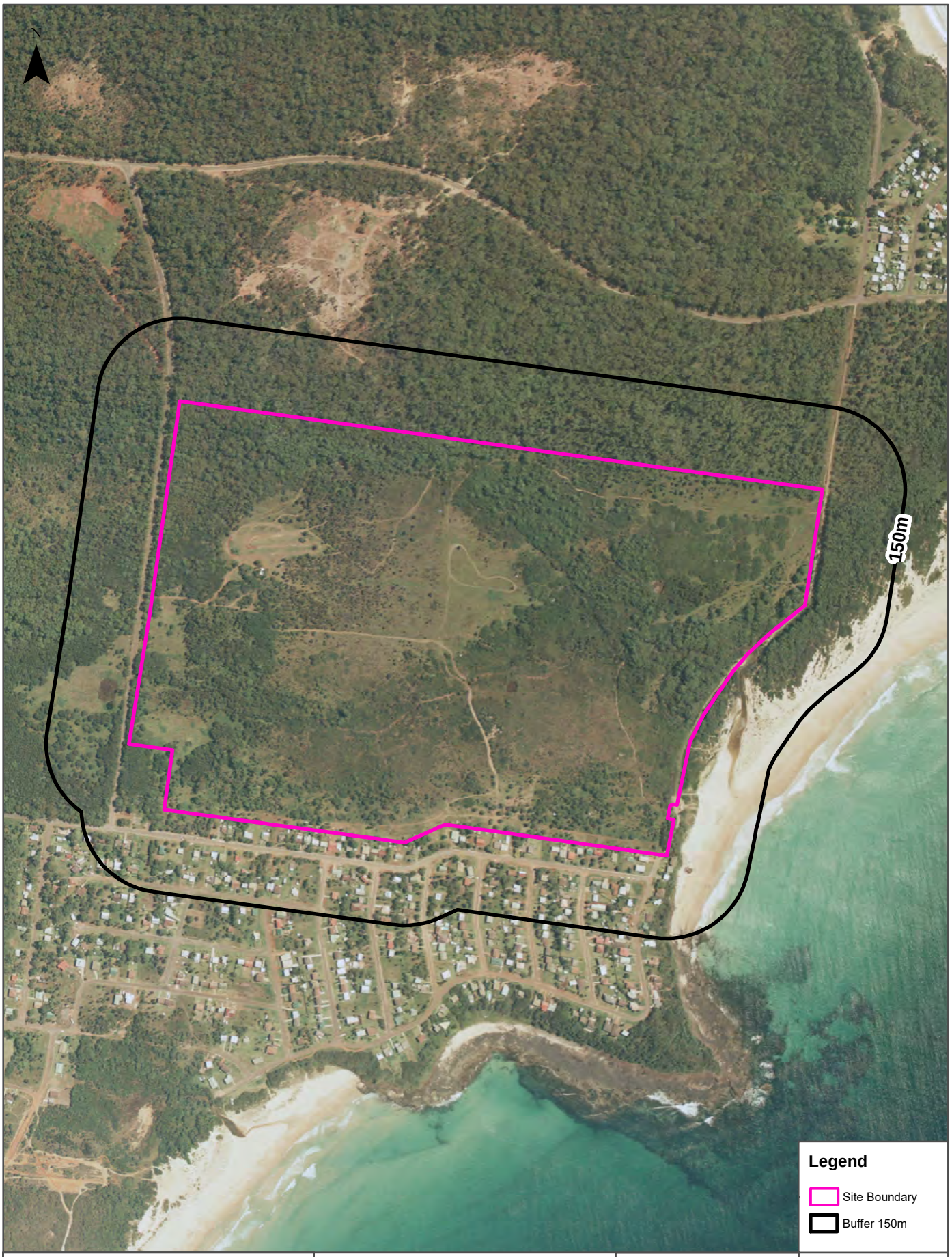
Data Source Aerial Imagery: © 2019 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.

Coordinate System:
GDA 1994 MGA Zone 56

Date: 27 August, 2019

Aerial Imagery 1993

Inyadda Drive, Manyana, NSW 2539



Aerial Imagery 1987

Inyadda Drive, Manyana, NSW 2539

Aerial Imagery 1979

Inyadda Drive, Manyana, NSW 2539

Aerial Imagery 1969

Inyadda Drive, Manyana, NSW 2539

Aerial Imagery 1961

Inyadda Drive, Manyana, NSW 2539

Topographic Map 2015

Inyadda Drive, Manyana, NSW 2539

Legend

- Site Boundary
- Buffer 1000m

© Department of Finance, Services & Innovation 2018

Scale: 0 100 200 400 600 800 1,000 Meters

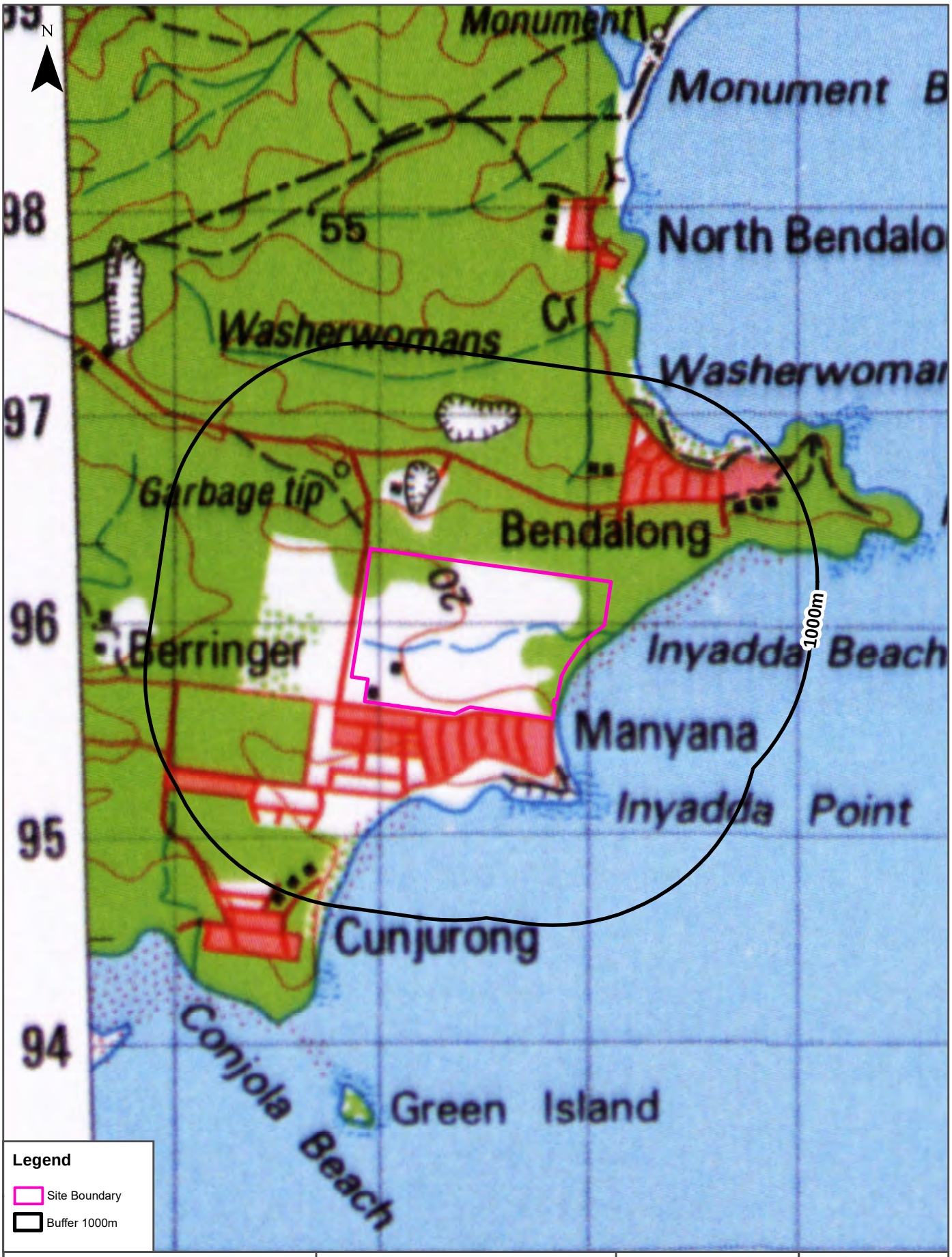
Data Sources: Topographic Map Data
© NSW Land and Property Information

Coordinate System:
GDA 1994 MGA Zone 56

Date: 28 August 2019

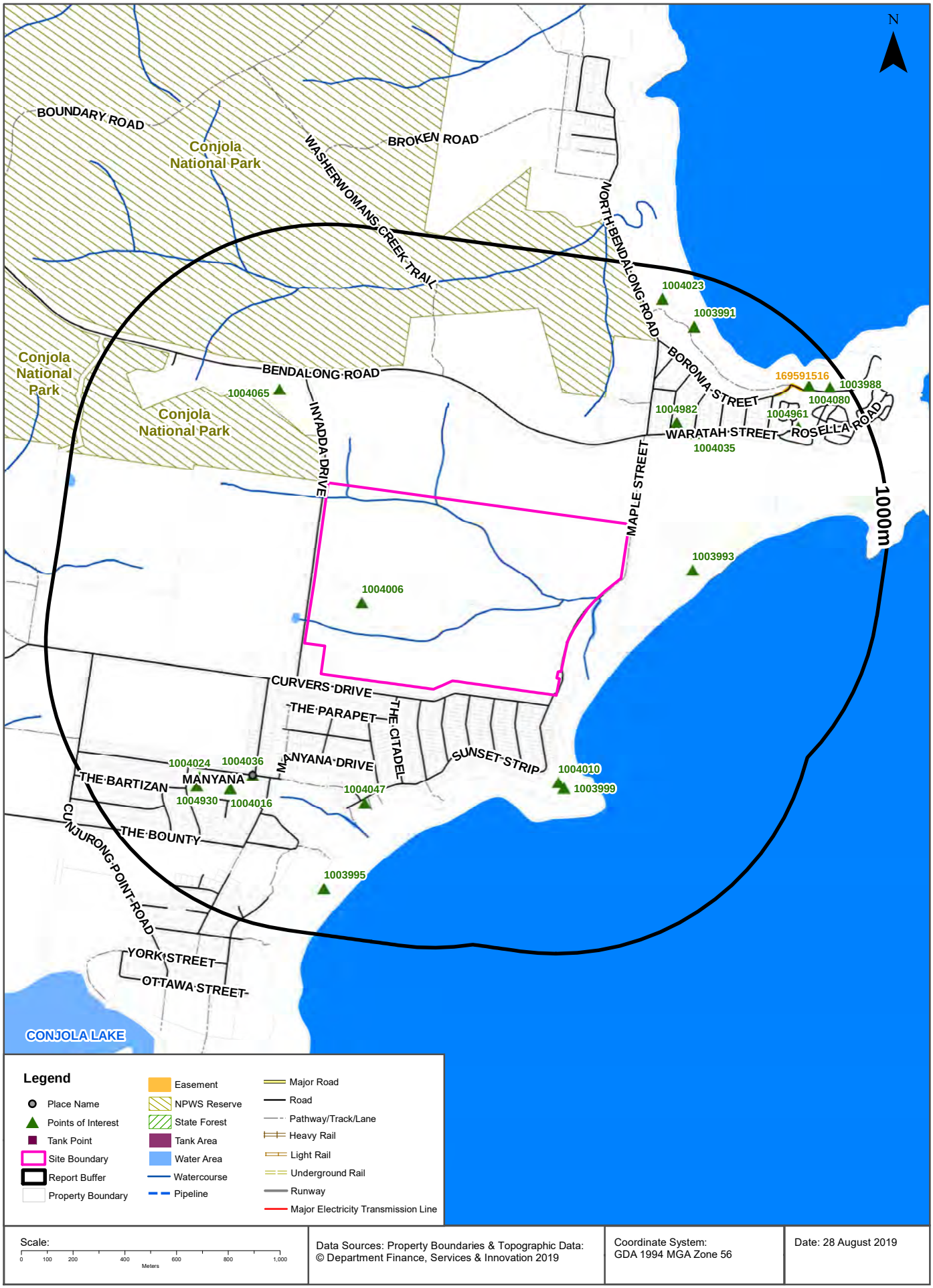
Historical Map 1981

Inyadda Drive, Manyana, NSW 2539



Topographic Features

Inyadda Drive, Manyana, NSW 2539



Scale: 0 100 200 400 600 800 1,000 Meters

Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2019

Coordinate System: GDA 1994 MGA Zone 56

Date: 28 August 2019

Topographic Features

Inyadda Drive, Manyana, NSW 2539

Points of Interest

What Points of Interest exist within the dataset buffer?

Map Id	Feature Type	Label	Distance	Direction
1004006	Grave	Grave	0m	Onsite
1003993	Beach	INYADDA BEACH	268m	East
1004010	Park	Park	338m	South East
1003999	Headland	INYADDA POINT	360m	South East
1004065	Rubbish Depot	BENDALONG WASTE AND RECYCLING DEPOT	408m	North West
1004035	Village	BENDALONG	432m	North East
1004982	Firestation - Bush	MANYANA SATELLITE RFB	432m	North East
1004036	Village	MANYANA	472m	South West
1004047	Picnic Area	Picnic Area	472m	South West
1004016	Park	YALUNGA RECREATION RESERVE	565m	South West
1004024	Sports Court	TENNIS COURTS	615m	South West
1004930	Community Facility	MANYANA COMMUNITY HALL	646m	South West
1004961	Tourist Park / Home Village	BENDALONG POINT TOURIST PARK	751m	North East
1003991	Beach	WASHERWOMANS BEACH	803m	North East
1003995	Beach	MANYANA BEACH	823m	South West
1004080	Picnic Area	Picnic Area	877m	North East
1004023	Picnic Area	Picnic Area	880m	North East
1003988	Beach	BOAT HARBOUR BEACH	938m	North East

Topographic Data Source: © Land and Property Information (2015)
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Topographic Features

Inyadda Drive, Manyana, NSW 2539

Tanks (Areas)

What are the Tank Areas located within the dataset buffer?
Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
	No records in buffer					

Tanks (Points)

What are the Tank Points located within the dataset buffer?
Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
	No records in buffer					

Tanks Data Source: © Land and Property Information (2015)
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Major Easements

What Major Easements exist within the dataset buffer?
Note. Easements provided by LPI are not at the detail of local governments. They are limited to major easements such as Right of Carriageway, Electrical Lines (66kVa etc.), Easement to drain water & Significant subterranean pipelines (gas, water etc.).

Map Id	Easement Class	Easement Type	Easement Width	Distance	Direction
169591516	Primary	Right of way	7 wide & VAR	747m	North East

Easements Data Source: © Land and Property Information (2015)
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Topographic Features

Inyadda Drive, Manyana, NSW 2539

State Forest

What State Forest exist within the dataset buffer?

State Forest Number	State Forest Name	Distance	Direction
N/A	No records in buffer		

State Forest Data Source: © NSW Department of Finance, Services & Innovation (2018)
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

National Parks and Wildlife Service Reserves

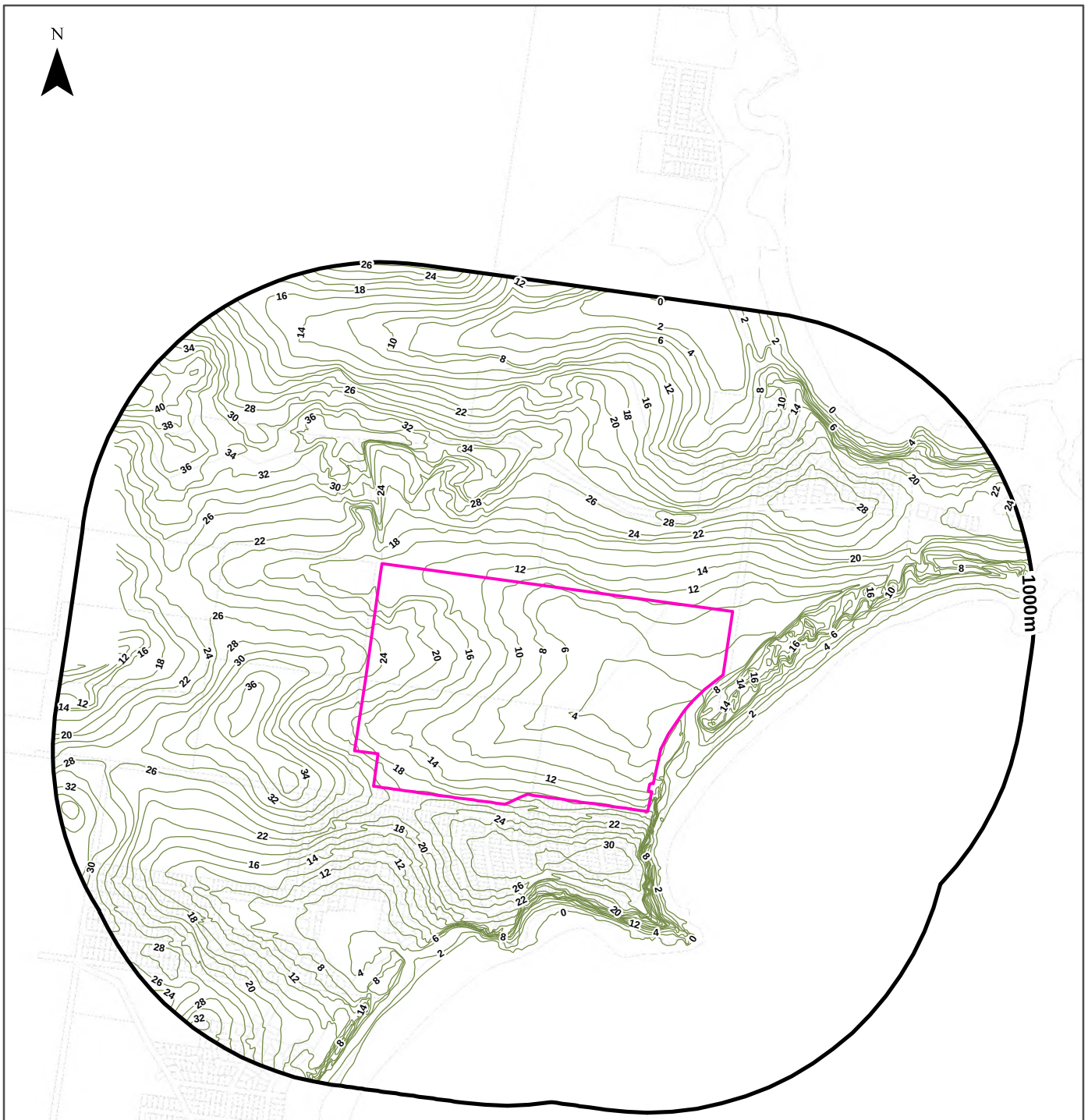
What NPWS Reserves exist within the dataset buffer?

Reserve Number	Reserve Type	Reserve Name	Gazetted Date	Distance	Direction
N0085	NATIONAL PARK	Conjola National Park	30/11/1994	20m	North

NPWS Data Source: © NSW Department of Finance, Services & Innovation (2018)
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Elevation Contours (m AHD)

Inyadda Drive, Manyana, NSW 2539



Legend

- Elevation Contour (m AHD)
- Site Boundary
- Report Buffer
- Property Boundary

Accuracy & Currency: This contour data can be up to 0.4 of the contour interval out in height and must therefore not be used for any design or engineering works, but only as a general guide to topography. Gaps may occur along contour lines due to vertical topography, obscured topography in the source photography such as buildings, dense vegetation or dead ground, or the fact that original buildings have been replaced in the intervening thirty years since the original contour capture.

Scale:	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2019	Coordinate System: GDA 1994 MGA Zone 56	Date: 28 August 2019

Scale: 0 100 200 400 Meters

Hydrogeology & Groundwater

Inyadda Drive, Manyana, NSW 2539

Hydrogeology

Description of aquifers on-site:

Description
Fractured or fissured, extensive aquifers of low to moderate productivity

Description of aquifers within the dataset buffer:

Description
Fractured or fissured, extensive aquifers of low to moderate productivity

Hydrogeology Map of Australia : Commonwealth of Australia (Geoscience Australia)
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Botany Groundwater Management Zones

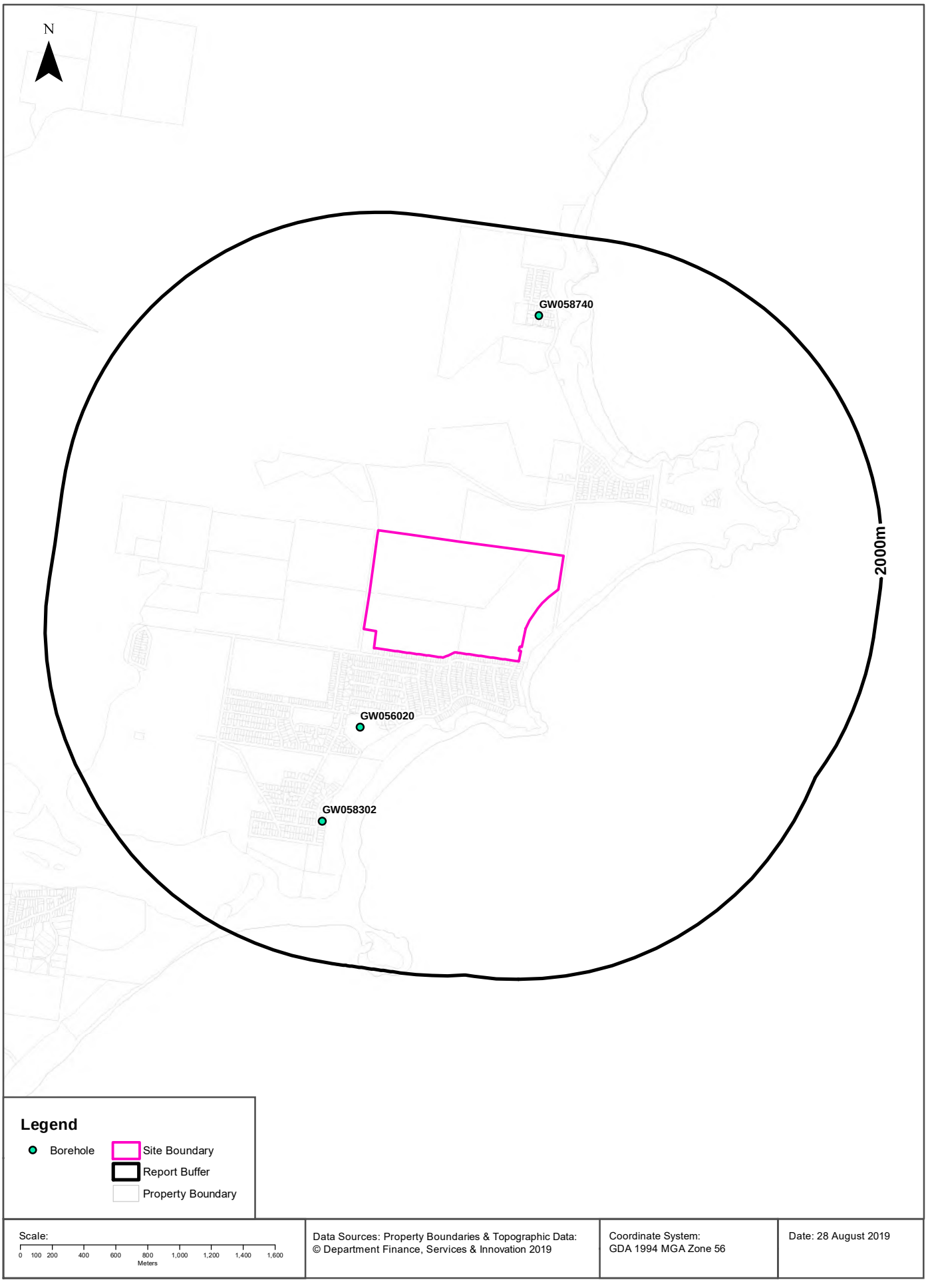
Groundwater management zones relating to the Botany Sand Beds aquifer within the dataset buffer:

Management Zone No.	Restriction	Distance	Direction
N/A	No records in buffer		

Botany Groundwater Management Zones Data Source : NSW Department of Primary Industries

Groundwater Boreholes

Inyadda Drive, Manyana, NSW 2539



Hydrogeology & Groundwater

Inyadda Drive, Manyana, NSW 2539

Groundwater Boreholes

Boreholes within the dataset buffer:

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW056020	10BL120055	Bore	Private	Domestic	Domestic		01/02/1982	9.00		Sweet				505m	South West
GW058302	10BL123571	Bore	Private	Domestic	Domestic		01/09/1982	65.80	69.20	Good				1136m	South West
GW058740	10BL130334	Bore open thru rock	Private	Domestic	Domestic		01/11/1981	33.00	33.00					1475m	North

Borehole Data Source : NSW Department of Primary Industries - Office of Water / Water Administration Ministerial Corporation for all bores prefixed with GW. All other bores © Commonwealth of Australia (Bureau of Meteorology) 2015. Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Hydrogeology & Groundwater

Inyadda Drive, Manyana, NSW 2539

Driller's Logs

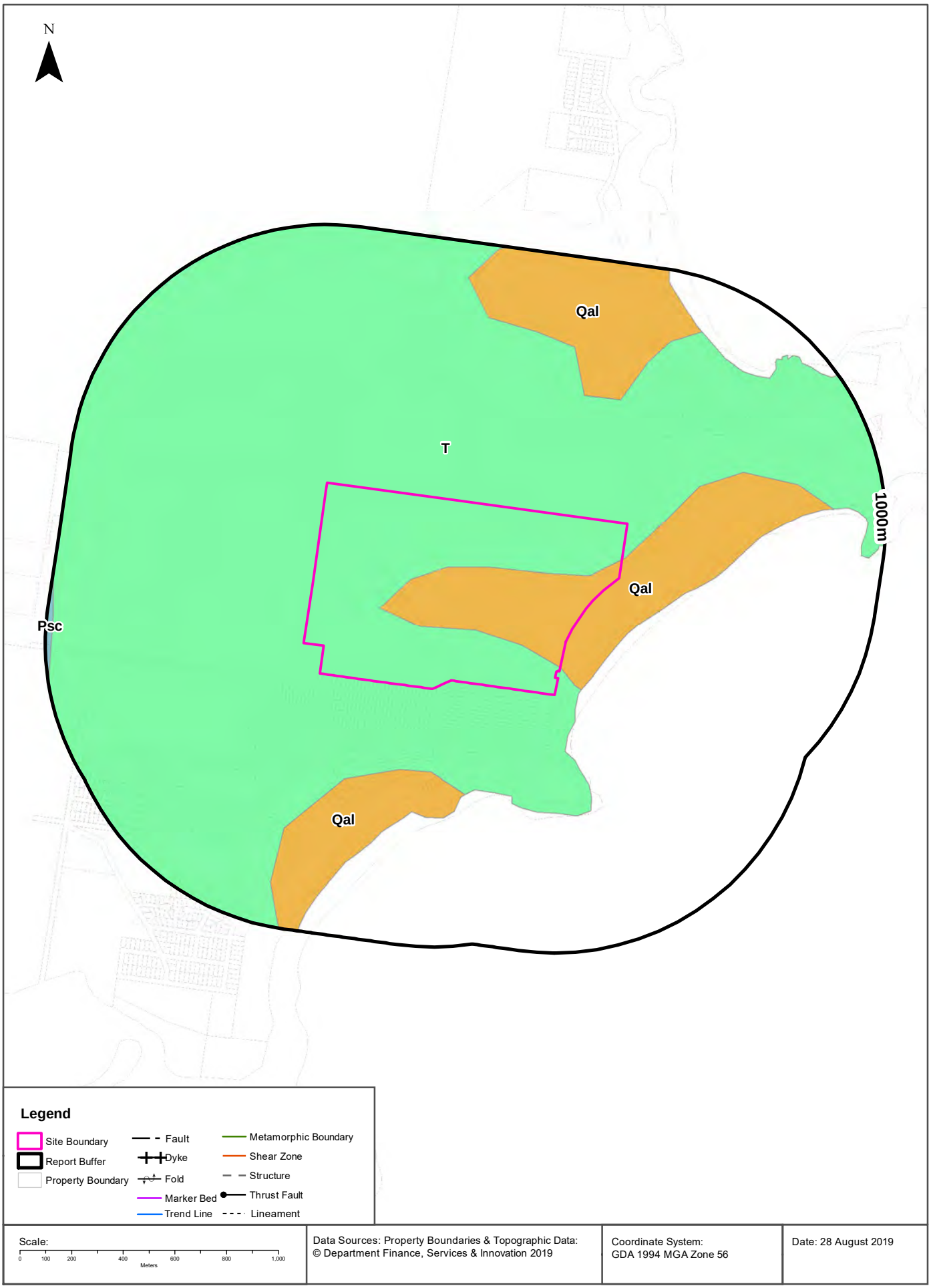
Drill log data relevant to the boreholes within the dataset buffer:

Groundwater No	Drillers Log	Distance	Direction
GW058302	0.00m-0.60m Topsoil 0.60m-1.80m Clay 1.80m-5.80m Clay Sandy 5.80m-11.90m Sandstone Weathered 11.90m-31.40m Shale Water Supply 31.40m-31.70m Sandstone 31.70m-69.20m Sandstone Hard Bands Shale Water Supply	1136m	South West
GW058740	0.00m-12.00m Overburden Clay 12.00m-33.00m Shale Soft	1475m	North

Drill Log Data Source: NSW Department of Primary Industries - Office of Water / Water Administration Ministerial Corp
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Geology 1:250,000

Inyadda Drive, Manyana, NSW 2539



Geology

Inyadda Drive, Manyana, NSW 2539

Geological Units

What are the Geological Units onsite?

Symbol	Description	Unit Name	Group	Sub Group	Age	Dom Lith	Map Sheet	Dataset
Qal	Alluvium, gravel, swamp deposits and sand dunes	undifferentiated			Cainozoic			1:250,000
T	Gravel, sand, clay, quartzite, quartz sandstone, minor pebble and cobble conglomerate-Poorly cemented in part, buff claystone	undifferentiated			Cainozoic			1:250,000

What are the Geological Units within the dataset buffer?

Symbol	Description	Unit Name	Group	Sub Group	Age	Dom Lith	Map Sheet	Dataset
Psc	Boulder and cobble conglomerate, pebbly sandstone, coarse grained and quartz-lithic	Snapper Point Formation	Shoalhaven Group	Conjola Subgroup	Palaeozoic			1:250,000
Qal	Alluvium, gravel, swamp deposits and sand dunes	undifferentiated			Cainozoic			1:250,000
T	Gravel, sand, clay, quartzite, quartz sandstone, minor pebble and cobble conglomerate-Poorly cemented in part, buff claystone	undifferentiated			Cainozoic			1:250,000

Geological Structures

What are the Geological Structures onsite?

Feature	Name	Description	Map Sheet	Dataset
No features				1:250,000

What are the Geological Structures within the dataset buffer?

Feature	Name	Description	Map Sheet	Dataset
No features				1:250,000

Geological Data Source : NSW Department of Industry, Resources & Energy
© State of New South Wales through the NSW Department of Industry, Resources & Energy

Naturally Occurring Asbestos Potential

Inyadda Drive, Manyana, NSW 2539

Naturally Occurring Asbestos Potential

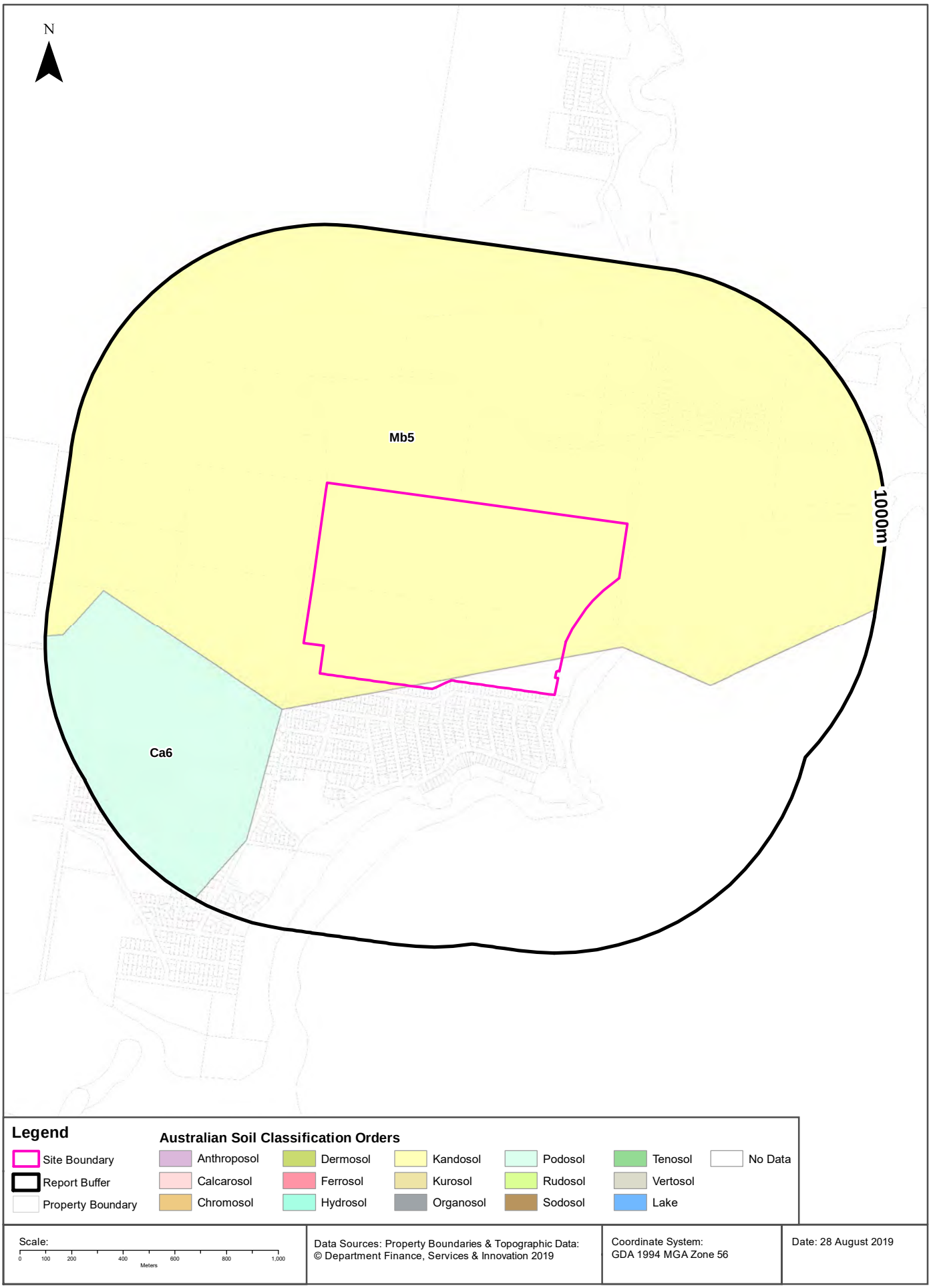
Naturally Occurring Asbestos Potential within the dataset buffer:

Potential	Sym	Strat Name	Group	Formation	Scale	Min Age	Max Age	Rock Type	Dom Lith	Description	Dist	Dir
No records in buffer												

Mining Subsidence District Data Source: © State of New South Wales through NSW Department of Industry, Resources & Energy

Atlas of Australian Soils

Inyadda Drive, Manyana, NSW 2539



Soils

Inyadda Drive, Manyana, NSW 2539

Atlas of Australian Soils

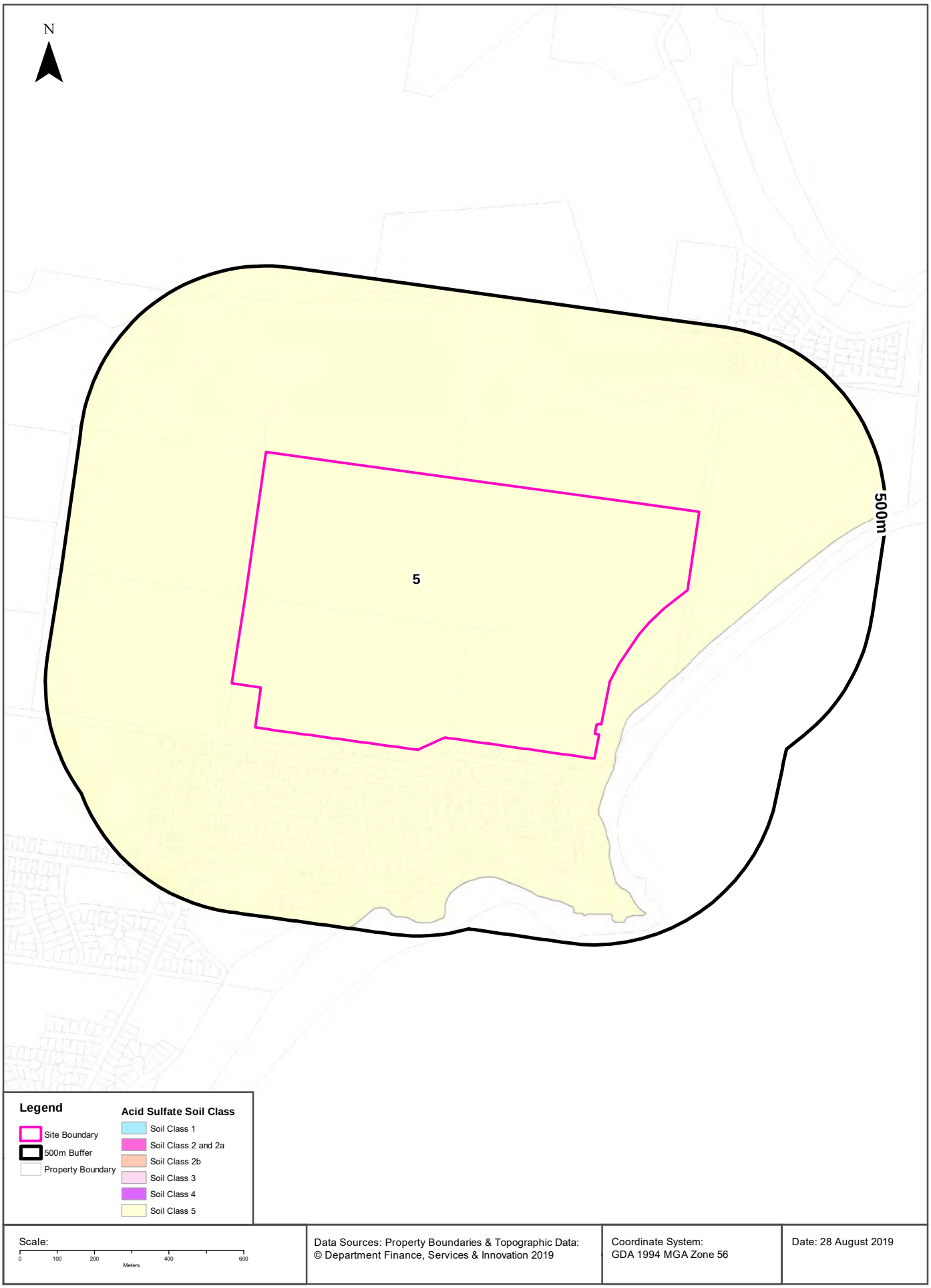
Soil mapping units and Australian Soil Classification orders within the dataset buffer:

Map Unit Code	Soil Order	Map Unit Description	Distance
Mb5	Kandosol	Dissected sandstone plateau--"terraced" ridges with flat to hilly crests and steep side slopes, scarps, canyons, rock walls, pillars, and slabs of sandstone: chief soils are acid yellow leached earths and acid yellow earths as follows: (i) flat to undulating areas of the original plateau surface--yellow leached earths (Gn2.74) and yellow earths (Gn2.21) and (Gn2.24) all containing large amounts of ironstone gravels and/or boulders; (ii) gently undulating ridge tops of leached sands (Uc2.12) and (Uc2.3) with open (treeless) areas of acid peats (O) and yellow leached earths (Gn2.74) and (Gn2.34), these areas are in part comparable with unit NZ1; (iii) hilly areas of the (Uc) soils and shallow forms of the (Gn2) soils; (iv) areas of (Dy3.41) and (Dy2.41) soils sometimes containing ironstone gravels on some ridge slopes; and (v) steep slopes with pockets of soil materials from the above soils. The unit has many features comparable with those of unit Mb2. Data are limited.	0m
Ca6	Podosol	Dunes of leached sands (Uc2.2) with some areas of (Uc2.3) soils in low-lying situations, also (Dy5.41) soils in some localities, and flanked by some dunes of calcareous sands (Uc1.11) along the coast.	202m

Atlas of Australian Soils Data Source: CSIRO
Creative Commons 4.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/4.0/au/deed.en

Acid Sulfate Soils

Inyadda Drive, Manyana, NSW 2539



Acid Sulfate Soils

Inyadda Drive, Manyana, NSW 2539

Environmental Planning Instrument - Acid Sulfate Soils

What is the on-site Acid Sulfate Soil Plan Class that presents the largest environmental risk?

Soil Class	Description	EPI Name
5	Works within 500 metres of adjacent Class 1, 2, 3, or 4 land that is below 5 metres AHD and by which the watertable is likely to be lowered below 1 metre AHD on adjacent Class 1, 2, 3 or 4 land, present an environmental risk	Shoalhaven Local Environmental Plan 2014

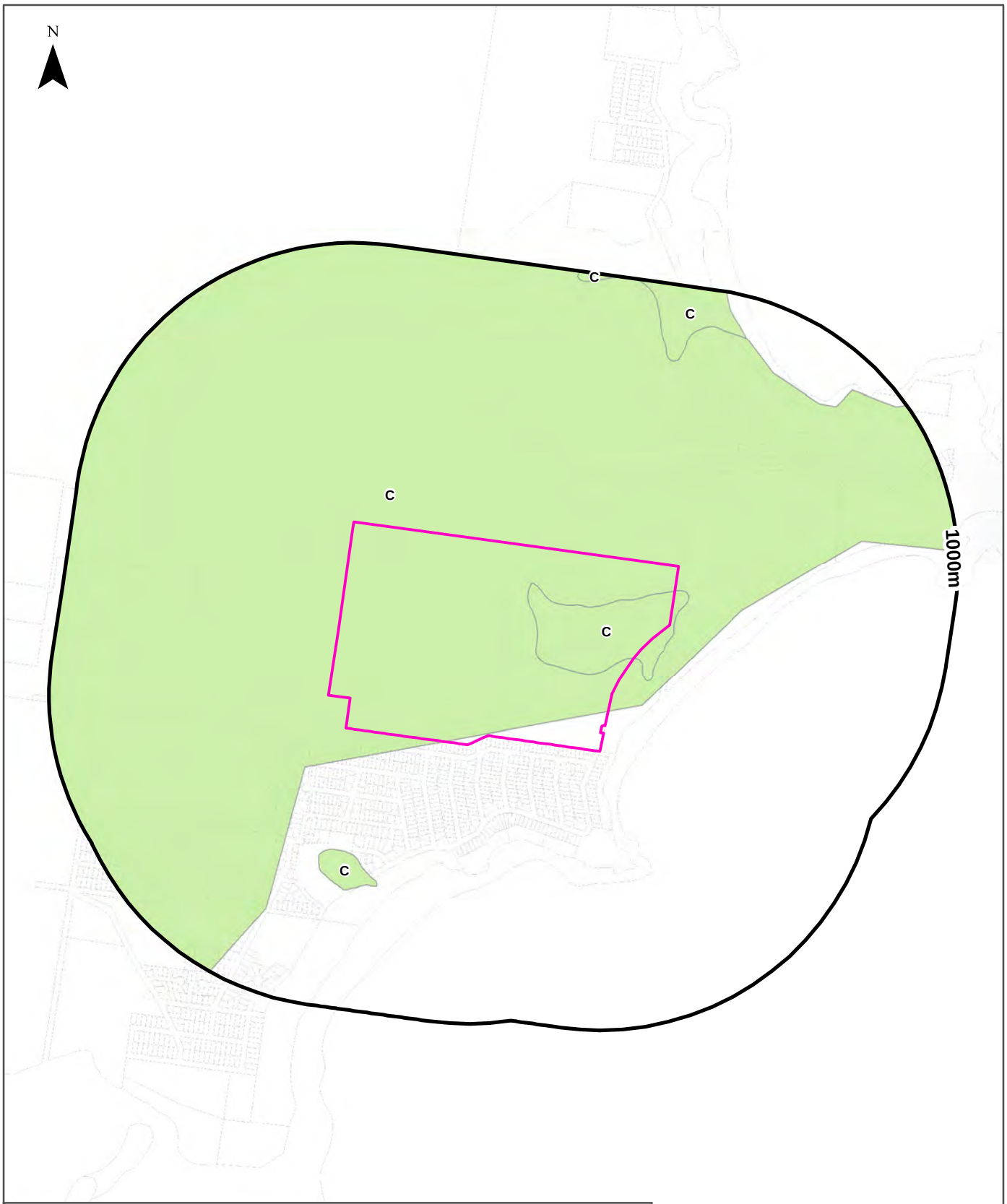
If the on-site Soil Class is 5, what other soil classes exist within 500m?

Soil Class	Description	EPI Name	Distance	Direction
None				

Acid Sulfate Data Source Accessed 23/10/2018: NSW Crown Copyright - Planning and Environment
Creative Commons 4.0 © Commonwealth of Australia https://creativecommons.org/licenses/by/4.0/

Atlas of Australian Acid Sulfate Soils

Inyadda Drive, Manyana, NSW 2539



Legend

Site Boundary
Report Buffer
Property Boundary

Probability of occurrence of Acid Sulfate Soils

A. High (>70%)
B. Low (6-70%)
C. Extremely Low (1-5%)
D. No Chance (0%)
No Data

Scale: 0 100 200 400 600 800 1,000 Meters

Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2019

Coordinate System: GDA 1994 MGA Zone 56

Date: 28August 2019

Acid Sulfate Soils

Inyadda Drive, Manyana, NSW 2539

Atlas of Australian Acid Sulfate Soils

Atlas of Australian Acid Sulfate Soil categories within the dataset buffer:

Class	Description	Distance
C	Extremely low probability of occurrence. 1-5% chance of occurrence with occurrences in small localised areas.	0m

Atlas of Australian Acid Sulfate Soils Data Source: CSIRO
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Dryland Salinity

Inyadda Drive, Manyana, NSW 2539

Dryland Salinity - National Assessment

Is there Dryland Salinity - National Assessment data onsite?

No

Is there Dryland Salinity - National Assessment data within the dataset buffer?

No

What Dryland Salinity assessments are given?

Assessment 2000	Assessment 2020	Assessment 2050	Distance	Direction
N/A	N/A	N/A	N/A	N/A

Dryland Salinity Data Source : National Land and Water Resources Audit
The Commonwealth and all suppliers of source data used to derive the maps of "Australia, Forecast Areas Containing Land of High Hazard or Risk of Dryland Salinity from 2000 to 2050" do not warrant the accuracy or completeness of information in this product. Any person using or relying upon such information does so on the basis that the Commonwealth and data suppliers shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information. Any persons using this information do so at their own risk.
In many cases where a high risk is indicated, less than 100% of the area will have a high hazard or risk.

Dryland Salinity Potential of Western Sydney

Dryland Salinity Potential of Western Sydney within the dataset buffer?

Feature Id	Classification	Description	Distance	Direction
N/A	Outside Data Coverage			

Dryland Salinity Potential of Western Sydney Data Source : NSW Office of Environment and Heritage
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Mining Subsidence Districts

Inyadda Drive, Manyana, NSW 2539

Mining Subsidence Districts

Mining Subsidence Districts within the dataset buffer:

District	Distance	Direction
There are no Mining Subsidence Districts within the report buffer		

Mining Subsidence District Data Source: © Land and Property Information (2016)
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

State Environmental Planning Policy

Inyadda Drive, Manyana, NSW 2539

State Significant Precincts

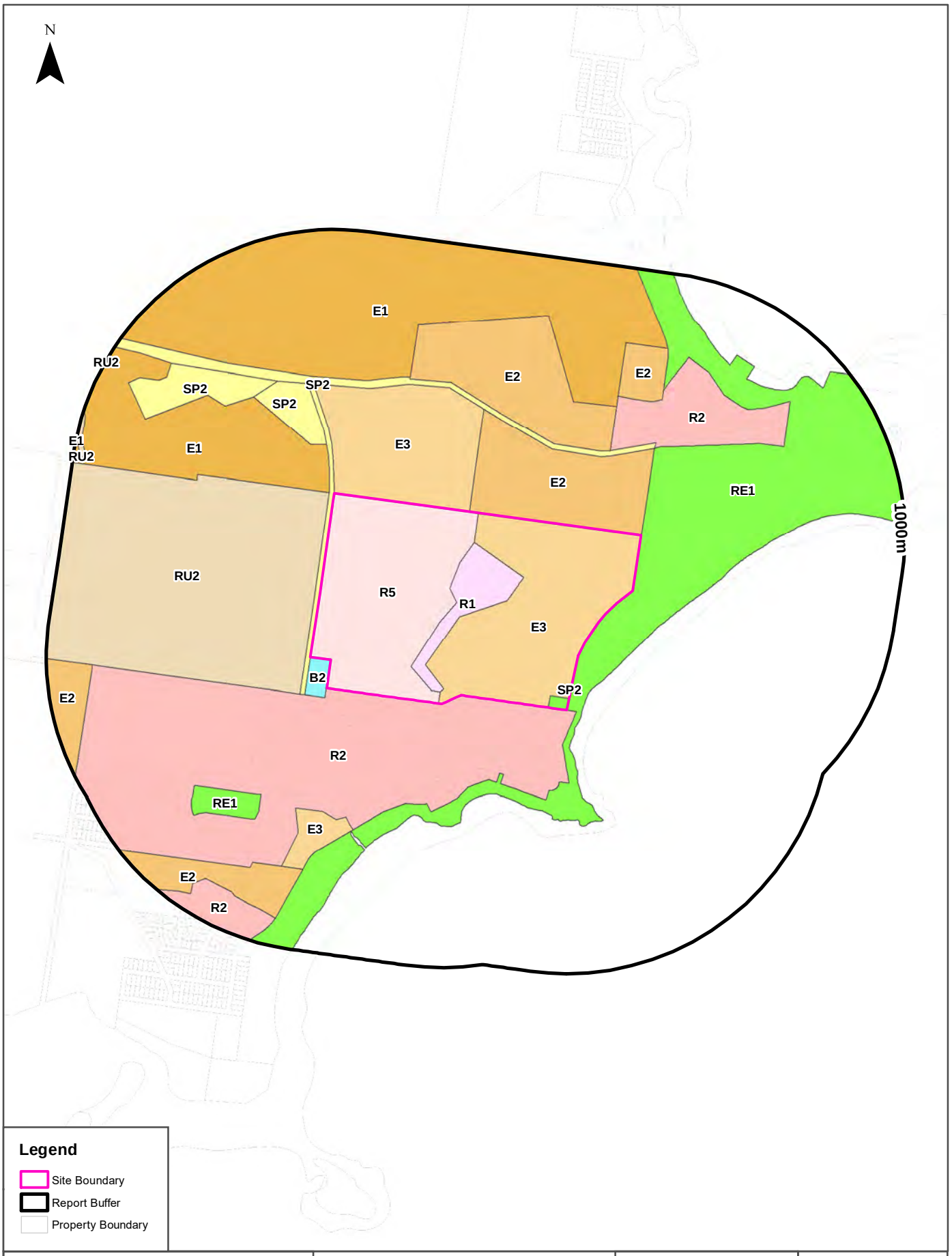
What SEPP State Significant Precincts exist within the dataset buffer?

Map Id	Precinct	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
N/A	No Records in Buffer							

State Environment Planning Policy Data Source: NSW Crown Copyright - Planning & Environment
Creative Commons 4.0 © Commonwealth of Australia https://creativecommons.org/licenses/by/4.0/

EPI Planning Zones

Inyadda Drive, Manyana, NSW 2539



Environmental Planning Instrument

Inyadda Drive, Manyana, NSW 2539

Land Zoning

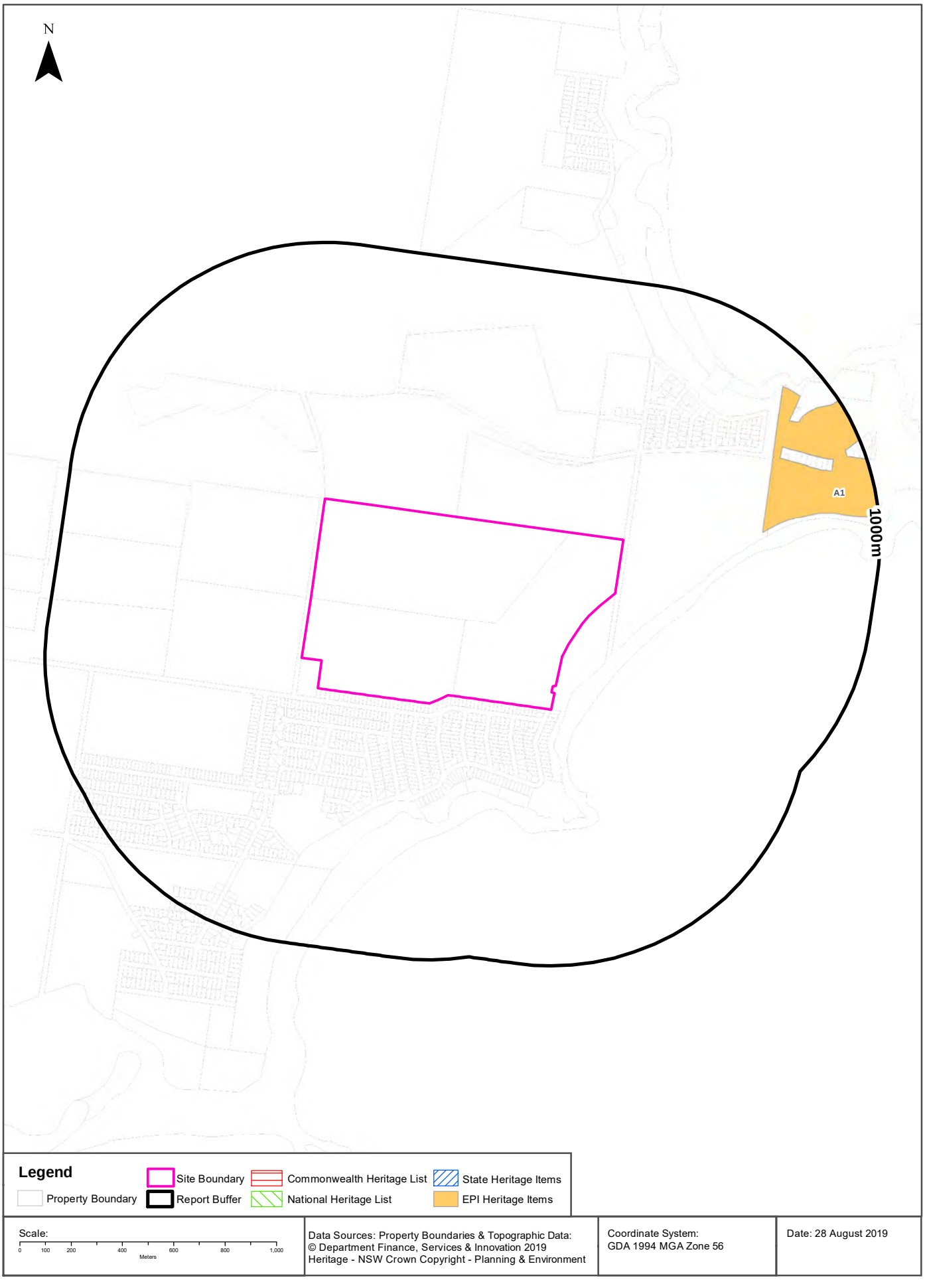
What EPI Land Zones exist within the dataset buffer?

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
E3	Environmental Management		Shoalhaven Local Environmental Plan 2014	08/04/2014	22/04/2014	03/08/2018		0m	Onsite
R5	Large Lot Residential		Shoalhaven Local Environmental Plan 2014	08/04/2014	22/04/2014	03/08/2018		0m	Onsite
R1	General Residential		Shoalhaven Local Environmental Plan 2014	08/04/2014	22/04/2014	03/08/2018		0m	Onsite
RE1	Public Recreation		Shoalhaven Local Environmental Plan 2014	08/04/2014	22/04/2014	03/08/2018		0m	South
B2	Local Centre		Shoalhaven Local Environmental Plan 2014	08/04/2014	22/04/2014	03/08/2018		0m	South West
E2	Environmental Conservation		Shoalhaven Local Environmental Plan 2014	08/04/2014	22/04/2014	03/08/2018		0m	North East
R2	Low Density Residential		Shoalhaven Local Environmental Plan 2014	08/04/2014	22/04/2014	03/08/2018		0m	South West
SP2	Infrastructure	Road	Shoalhaven Local Environmental Plan 2014	16/02/2018	16/02/2018	16/02/2018	Amendment No 18	0m	North
SP2	Infrastructure	Sewerage System	Shoalhaven Local Environmental Plan 2014	08/04/2014	22/04/2014	03/08/2018		0m	South East
RU2	Rural Landscape		Shoalhaven Local Environmental Plan 2014	08/04/2014	22/04/2014	03/08/2018		18m	West
E1	National Parks and Nature Reserves		Shoalhaven Local Environmental Plan 2014	08/04/2014	22/04/2014	03/08/2018		20m	North West
SP2	Infrastructure	Waste or Resource Management Facility	Shoalhaven Local Environmental Plan 2014	08/04/2014	22/04/2014	03/08/2018		185m	North West
E2	Environmental Conservation		Shoalhaven Local Environmental Plan 2014	08/04/2014	22/04/2014	03/08/2018		294m	North
R2	Low Density Residential		Shoalhaven Local Environmental Plan 2014	08/04/2014	22/04/2014	03/08/2018		302m	North East
E1	National Parks and Nature Reserves		Shoalhaven Local Environmental Plan 2014	08/04/2014	22/04/2014	03/08/2018		436m	North
E3	Environmental Management		Shoalhaven Local Environmental Plan 2014	08/04/2014	22/04/2014	03/08/2018		466m	South West
SP2	Infrastructure	Sewage Treatment Plant	Shoalhaven Local Environmental Plan 2014	08/04/2014	22/04/2014	03/08/2018		474m	North West
RE1	Public Recreation		Shoalhaven Local Environmental Plan 2014	08/04/2014	22/04/2014	03/08/2018		476m	South West
E2	Environmental Conservation		Shoalhaven Local Environmental Plan 2014	08/04/2014	22/04/2014	03/08/2018		509m	North East
E2	Environmental Conservation		Shoalhaven Local Environmental Plan 2014	08/04/2014	22/04/2014	03/08/2018		694m	South West
R2	Low Density Residential		Shoalhaven Local Environmental Plan 2014	08/04/2014	22/04/2014	03/08/2018		853m	South West
E1	National Parks and Nature Reserves		Shoalhaven Local Environmental Plan 2014	08/04/2014	22/04/2014	03/08/2018		979m	West

Environmental Planning Instrument Data Source: NSW Crown Copyright - Planning & Environment
Creative Commons 4.0 © Commonwealth of Australia https://creativecommons.org/licenses/by/4.0/

Heritage Items

Inyadda Drive, Manyana, NSW 2539



Heritage

Inyadda Drive, Manyana, NSW 2539

Commonwealth Heritage List

What are the Commonwealth Heritage List Items located within the dataset buffer?

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch
Creative Commons 3.0 © Commonwealth of Australia https://creativecommons.org/licenses/by/3.0/au/deed.en

National Heritage List

What are the National Heritage List Items located within the dataset buffer?
Note. Please click on Place Id to activate a hyperlink to online website.

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch
Creative Commons 3.0 © Commonwealth of Australia https://creativecommons.org/licenses/by/3.0/au/deed.en

State Heritage Register - Curtilages

What are the State Heritage Register Items located within the dataset buffer?

Map Id	Name	Address	LGA	Listing Date	Listing No	Plan No	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: NSW Crown Copyright - Office of Environment & Heritage
Creative Commons 4.0 © Commonwealth of Australia https://creativecommons.org/licenses/by/4.0/

Environmental Planning Instrument - Heritage

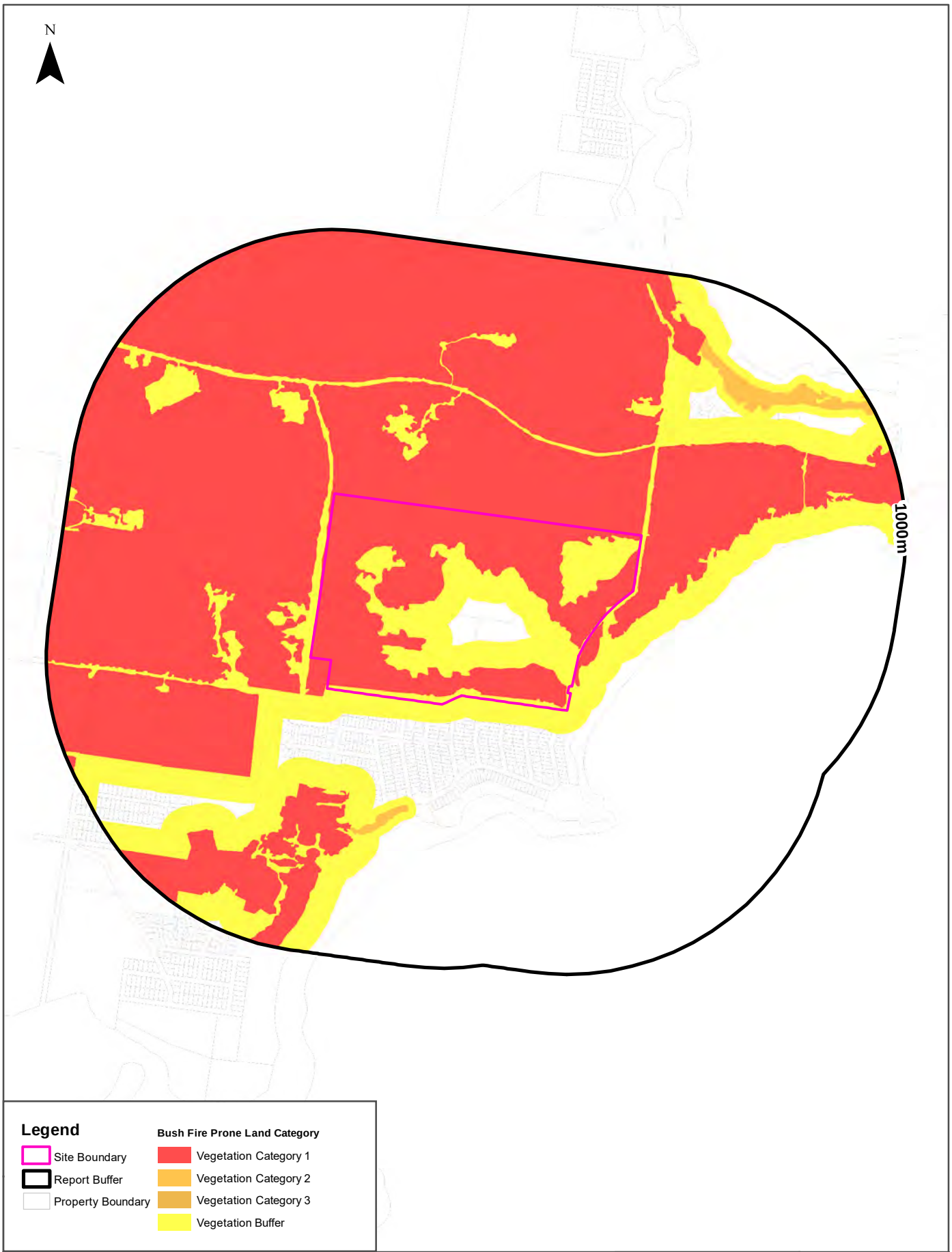
What are the EPI Heritage Items located within the dataset buffer?

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
A1	Archaeological Site - Red Head Timber Mill and Wharf	Item - Archaeological	Local	Shoalhaven Local Environmental Plan 2014	08/04/2014	22/04/2014	16/02/2018	542m	East

Heritage Data Source: NSW Crown Copyright - Planning & Environment
Creative Commons 4.0 © Commonwealth of Australia https://creativecommons.org/licenses/by/4.0/

Natural Hazards - Bush Fire Prone Land

Inyadda Drive, Manyana, NSW 2539



Data Sources: Bush Fire Prone Land: © NSW Rural Fire Service 2019. Property Boundaries: © Department Finance, Services & Innovation 2019

Coordinate System: GDA 1994 MGA Zone 56

Date: 28 August 2019

Natural Hazards

Inyadda Drive, Manyana, NSW 2539

Bush Fire Prone Land

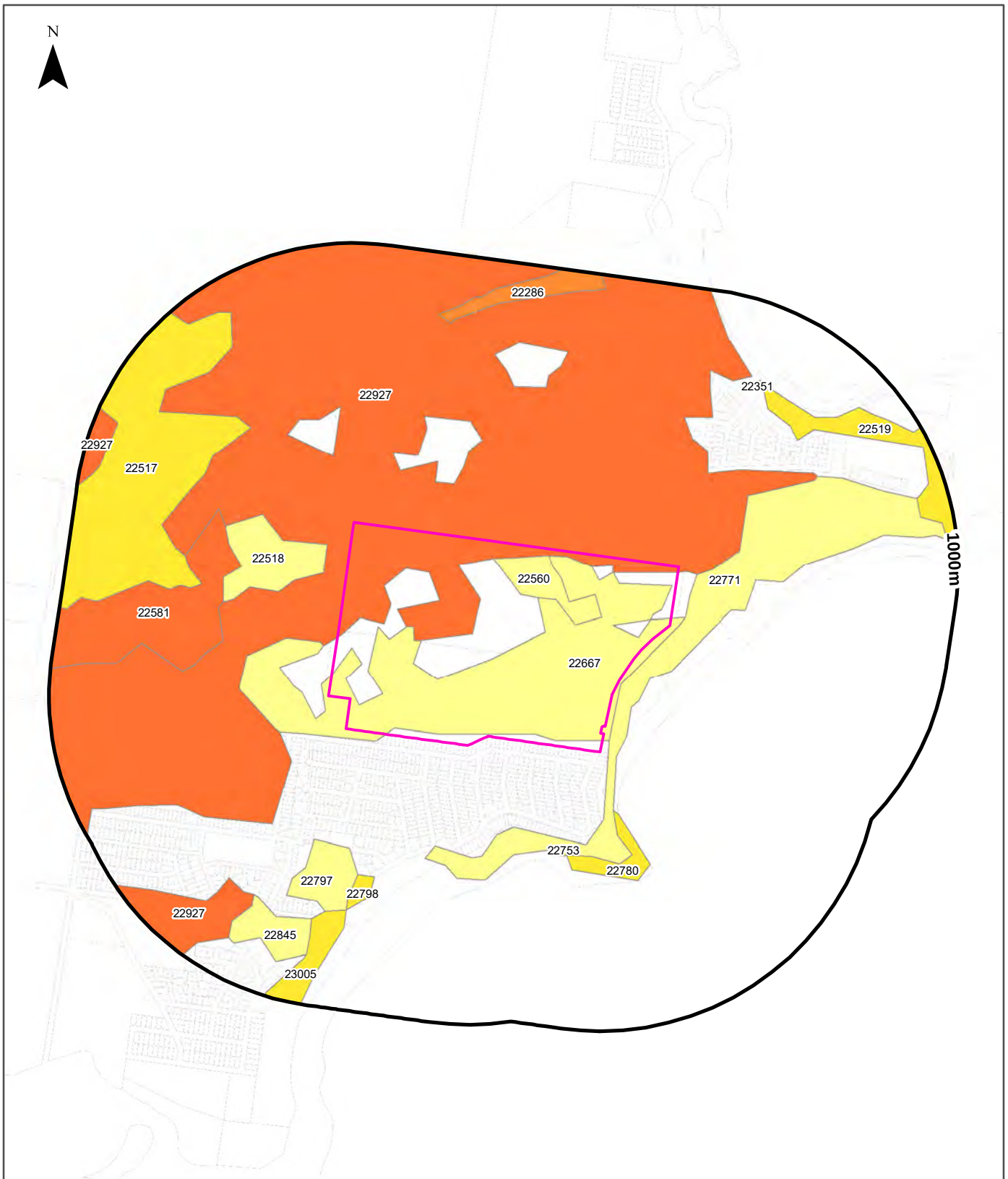
What are the nearest Bush Fire Prone Land Categories that exist within the dataset buffer?

Bush Fire Prone Land Category	Distance	Direction
Vegetation Buffer	0m	Onsite
Vegetation Category 1	0m	Onsite
Vegetation Category 2	394m	South

NSW Bush Fire Prone Land - © NSW Rural Fire Service under Creative Commons 4.0 International Licence

Ecological Constraints - Vegetation of the Southern Forests

Inyadda Drive, Manyana, NSW 2539



Legend

- Site Boundary
- Report Buffer
- Property Boundary
- Ramsar Wetlands
- 01 Rainforests
- 02 Wet Sclerophyll Forests
- 03 Ash Eucalypt Forests
- 04 Montane Tableland Forests
- 05 Dry Grass/Shrub Forests
- 06 Grassy Woodlands/Grasslands
- 07 Dry Shrubby Forests
- 08 Heath Forests, Mallee Low Forests, and Heathlands
- 09 Swamp Forests, Wet Heaths, & Sedgelands
- 10 Vegetation on Rock Outcrops / Screes
- 11 Riparian Forests
- 12 Sub-alpine Low Forests
- 13 Alpine/Sub-alpine Complex
- 14 Coastal Complex
- 15 Wetlands

Scale: 0 100 200 400 600 800 1,000 Meters

Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2019

Coordinate System: GDA 1994 MGA Zone 56

Date: 28 August 2019

Ecological Constraints

Inyadda Drive, Manyana, NSW 2539

Vegetation of the Southern Forests

What vegetation of the Southern Forests exists within the dataset buffer?

Map Id	Veg Code	Formation	Class	Group	Distance	Direction
22560	25	14 Coastal Complex	14b Coastal Swamp Heath/Forest Complex	South Coast Swamp Forest Complex	0m	Onsite
22667	24	14 Coastal Complex	14b Coastal Swamp Heath/Forest Complex	Coastal Wet Heath Swamp Forest	0m	Onsite
22927	2	07 Dry Shrubby Forests	07a SC Hinterland Dry Shrub Forests	Coastal Lowland Dry Shrub Forest	0m	Onsite
22771	22	14 Coastal Complex	14a Coastal Dune Complex	Southern Coastal Hind Dune-Headland Scrub	9m	East
22518	24	14 Coastal Complex	14b Coastal Swamp Heath/Forest Complex	Coastal Wet Heath Swamp Forest	83m	West
22780	187	08 Heath Forests, Mallee Low Forests, and Heathlands	08b Coastal/Hinterland Heath/Shrublands	Coastal Headland Heathlands	213m	South East
22753	187	08 Heath Forests, Mallee Low Forests, and Heathlands	08b Coastal/Hinterland Heath/Shrublands	Coastal Headland Heathlands	357m	South
22581	3	07 Dry Shrubby Forests	07a SC Hinterland Dry Shrub Forests	Northern Hinterland Dry Shrub Forest	375m	West
22797	24	14 Coastal Complex	14b Coastal Swamp Heath/Forest Complex	Coastal Wet Heath Swamp Forest	410m	South West
22517	139	08 Heath Forests, Mallee Low Forests, and Heathlands	08a Sandstone Plateau Heath Forests	Northern SC Hinterland Heath DryShrub Forest	501m	North West
22798	187	08 Heath Forests, Mallee Low Forests, and Heathlands	08b Coastal/Hinterland Heath/Shrublands	Coastal Headland Heathlands	510m	South West
22519	187	08 Heath Forests, Mallee Low Forests, and Heathlands	08b Coastal/Hinterland Heath/Shrublands	Coastal Headland Heathlands	621m	East
23005	187	08 Heath Forests, Mallee Low Forests, and Heathlands	08b Coastal/Hinterland Heath/Shrublands	Coastal Headland Heathlands	642m	South West
22845	24	14 Coastal Complex	14b Coastal Swamp Heath/Forest Complex	Coastal Wet Heath Swamp Forest	678m	South West
22351	187	08 Heath Forests, Mallee Low Forests, and Heathlands	08b Coastal/Hinterland Heath/Shrublands	Coastal Headland Heathlands	698m	North East
22286	212	10 Vegetation on Rock Outcrops / Screes	09a SC Swamp Forests	Jervis Bay Swamp Forest	753m	North

Vegetation of the Southern Forests: NSW Office of Environment and Heritage
Creative Commons 4.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/4.0/

Ramsar Wetlands

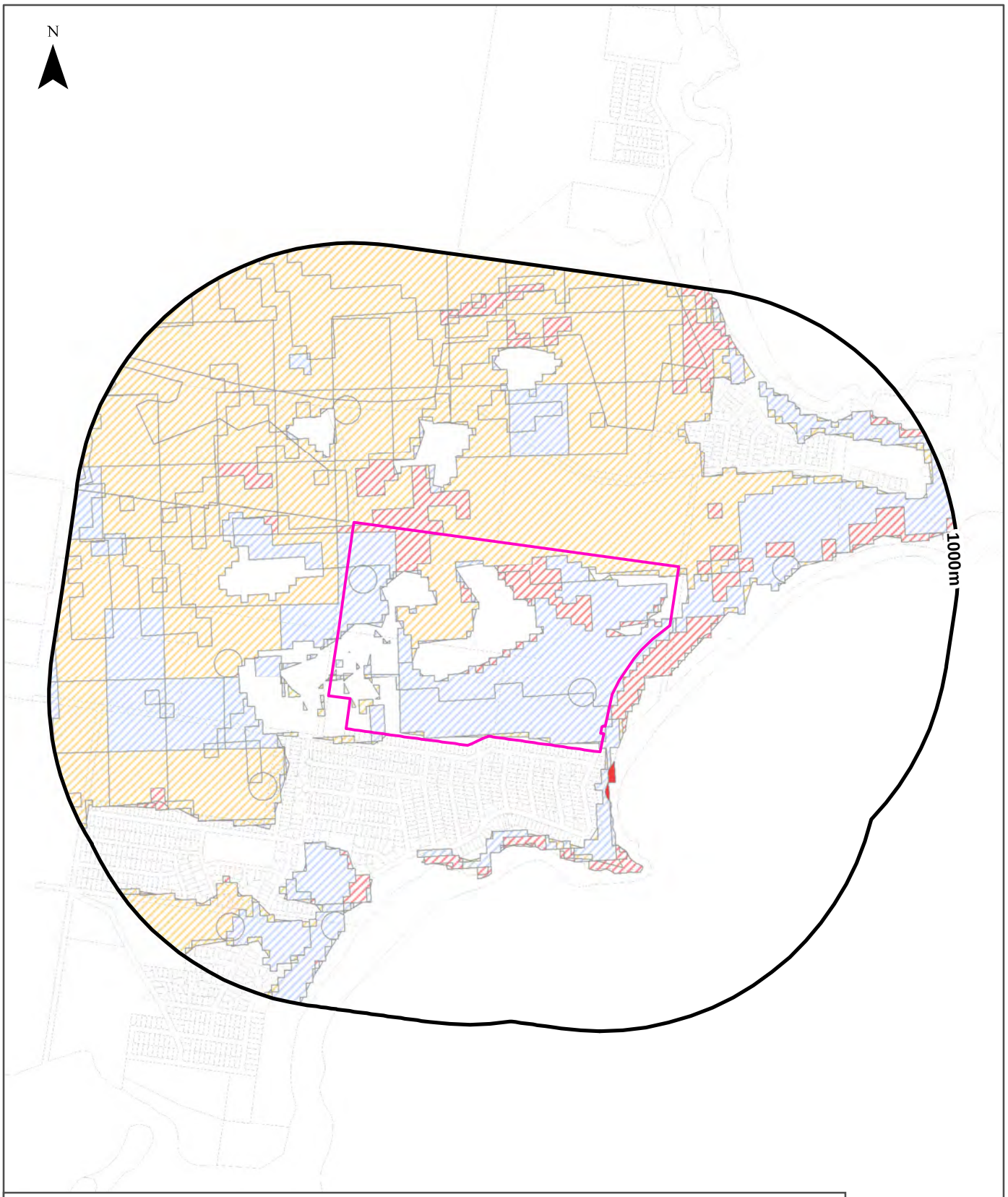
What Ramsar Wetland areas exist within the dataset buffer?

Map Id	Ramsar Name	Wetland Name	Designation Date	Source	Distance	Direction
N/A	No records in buffer					

Ramsar Wetlands Data Source: © Commonwealth of Australia - Department of Environment

Ecological Constraints - Groundwater Dependent Ecosystems Atlas

Inyadda Drive, Manyana, NSW 2539



Ecological Constraints

Inyadda Drive, Manyana, NSW 2539

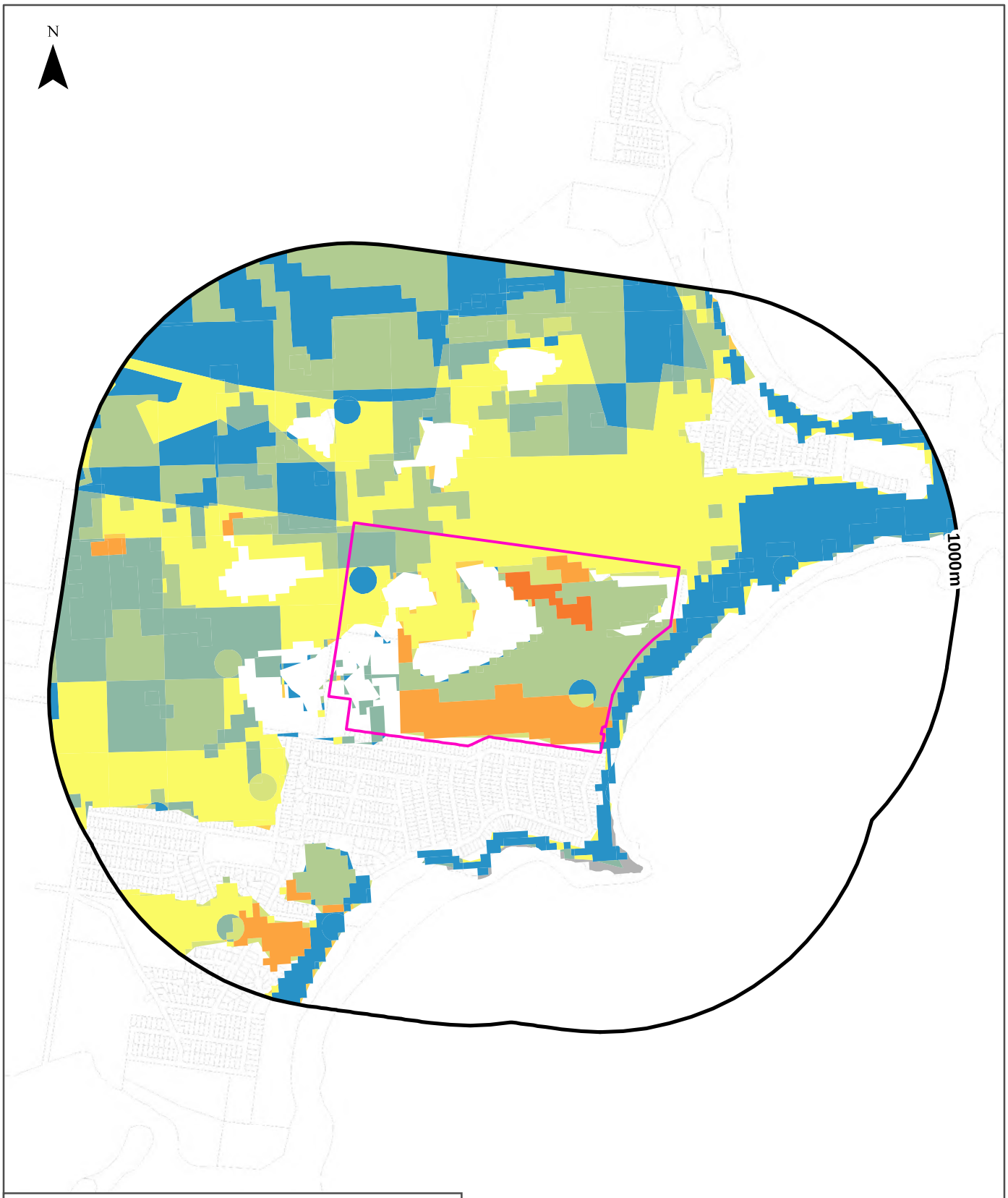
Groundwater Dependent Ecosystems Atlas

Type	GDE Potential	Geomorphology	Ecosystem Type	Aquifer Geology	Distance
Terrestrial	High potential GDE - from regional studies	Deeply dissected sandstone plateaus.	Vegetation		0m
Terrestrial	High potential GDE - from regional studies	Deeply dissected steeply sloping plateau margin in metamorphics and granite. Bounded in the west by the Great Escarpment.	Vegetation		0m
Terrestrial	Low potential GDE - from regional studies	Deeply dissected steeply sloping plateau margin in metamorphics and granite. Bounded in the west by the Great Escarpment.	Vegetation		0m
Terrestrial	Moderate potential GDE - from regional studies	Deeply dissected steeply sloping plateau margin in metamorphics and granite. Bounded in the west by the Great Escarpment.	Vegetation		0m
Terrestrial	High potential GDE - from national assessment	Deeply dissected steeply sloping plateau margin in metamorphics and granite. Bounded in the west by the Great Escarpment.	Vegetation	Consolidated sedimentary	59m

Groundwater Dependent Ecosystems Atlas Data Source: The Bureau of Meteorology
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Ecological Constraints - Inflow Dependent Ecosystems Likelihood

Inyadda Drive, Manyana, NSW 2539



Ecological Constraints

Inyadda Drive, Manyana, NSW 2539

Inflow Dependent Ecosystems Likelihood

Type	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance
Terrestrial	2	Deeply dissected sandstone plateaus.	Vegetation		0m
Terrestrial	3	Deeply dissected steeply sloping plateau margin in metamorphics and granite. Bounded in the west by the Great Escarpment.	Vegetation		0m
Terrestrial	4	Deeply dissected steeply sloping plateau margin in metamorphics and granite. Bounded in the west by the Great Escarpment.	Vegetation		0m
Terrestrial	5	Deeply dissected steeply sloping plateau margin in metamorphics and granite. Bounded in the west by the Great Escarpment.	Vegetation		0m
Terrestrial	6	Deeply dissected steeply sloping plateau margin in metamorphics and granite. Bounded in the west by the Great Escarpment.	Vegetation		0m
Terrestrial	7	Deeply dissected steeply sloping plateau margin in metamorphics and granite. Bounded in the west by the Great Escarpment.	Vegetation		0m
Terrestrial	8	Deeply dissected steeply sloping plateau margin in metamorphics and granite. Bounded in the west by the Great Escarpment.	Vegetation		0m
Terrestrial	10	Deeply dissected steeply sloping plateau margin in metamorphics and granite. Bounded in the west by the Great Escarpment.	Vegetation		0m

Inflow Dependent Ecosystems Likelihood Data Source: The Bureau of Meteorology
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Ecological Constraints

Inyadda Drive, Manyana, NSW 2539

NSW BioNet Atlas

Species on the NSW BioNet Atlas that have a NSW or federal conservation status, a NSW sensitivity status, or are listed under a migratory species agreement, and are within 10km of the site?

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Amphibia	Litoria aurea	Green and Golden Bell Frog	Endangered	Not Sensitive	Vulnerable	
Animalia	Aves	Actitis hypoleucos	Common Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Anthochaera phrygia	Regent Honeyeater	Critically Endangered	Not Sensitive	Critically Endangered	
Animalia	Aves	Apus pacificus	Fork-tailed Swift	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Ardenna pacificus	Wedge-tailed Shearwater	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Ardenna tenuirostris	Short-tailed Shearwater	Not Listed	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Arenaria interpres	Ruddy Turnstone	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Callocephalon fimbriatum	Gang-gang Cockatoo	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Calyptorhynchus lathami	Glossy Black-Cockatoo	Vulnerable	Category 2	Not Listed	
Animalia	Aves	Charadrius mongolus	Lesser Sand-plover	Vulnerable	Not Sensitive	Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Daphoenositta chrysoptera	Varied Sittella	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Diomedea gibsoni	Gibson's Albatross	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Aves	Egretta sacra	Eastern Reef Egret	Not Listed	Not Sensitive	Not Listed	CAMBA
Animalia	Aves	Glossopsitta pusilla	Little Lorikeet	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Haematopus fuliginosus	Sooty Oystercatcher	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Haematopus longirostris	Pied Oystercatcher	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Haliaeetus leucogaster	White-bellied Sea-Eagle	Vulnerable	Not Sensitive	Not Listed	CAMBA
Animalia	Aves	Hieraaetus morphnoides	Little Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Hirundapus caudacutus	White-throated Needletail	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Hydroprogne caspia	Caspian Tern	Not Listed	Not Sensitive	Not Listed	CAMBA;JAMBA
Animalia	Aves	Ixobrychus flavicollis	Black Bittern	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Lathamus discolor	Swift Parrot	Endangered	Category 3	Critically Endangered	
Animalia	Aves	Limosa lapponica	Bar-tailed Godwit	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Lophoictinia isura	Square-tailed Kite	Vulnerable	Category 3	Not Listed	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Macronectes giganteus	Southern Giant Petrel	Endangered	Not Sensitive	Endangered	
Animalia	Aves	Macronectes halli	Northern Giant-Petrel	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Aves	Ninox connivens	Barking Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Ninox strenua	Powerful Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Numenius madagascariensis	Eastern Curlew	Not Listed	Not Sensitive	Critically Endangered	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Numenius phaeopus	Whimbrel	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Pandion cristatus	Eastern Osprey	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Petroica boodang	Scarlet Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Petroica rodinogaster	Pink Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Pezoporus wallicus wallicus	Eastern Ground Parrot	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Phaethon lepturus	White-tailed Tropicbird	Not Listed	Not Sensitive	Not Listed	CAMBA;JAMBA
Animalia	Aves	Pluvialis squatarola	Grey Plover	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Ptilinopus superbus	Superb Fruit-Dove	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Stercorarius parasiticus	Arctic Jaeger	Not Listed	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Sternula albifrons	Little Tern	Endangered	Not Sensitive	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Thalassarche cauta	Shy Albatross	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Aves	Thalassarche melanophris	Black-browed Albatross	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Aves	Thinornis rubricollis	Hooded Plover	Critically Endangered	Not Sensitive	Vulnerable	
Animalia	Aves	Tyto novaehollandiae	Masked Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Tyto tenebricosa	Sooty Owl	Vulnerable	Category 3	Not Listed	
Animalia	Mammalia	Arctocephalus forsteri	New Zealand Fur-seal	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Arctocephalus pusillus doriferus	Australian Fur-seal	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Cercartetus nanus	Eastern Pygmy-possum	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Dasyurus maculatus	Spotted-tailed Quoll	Vulnerable	Not Sensitive	Endangered	
Animalia	Mammalia	Dasyurus viverrinus	Eastern Quoll	Endangered	Not Sensitive	Endangered	
Animalia	Mammalia	Eubalaena australis	Southern Right Whale	Endangered	Not Sensitive	Endangered	
Animalia	Mammalia	Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	Endangered	Not Sensitive	Endangered	
Animalia	Mammalia	Kerivoula papuensis	Golden-tipped Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Megaptera novaeangliae	Humpback Whale	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Miniopterus australis	Little Bent-winged Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Miniopterus orianae oceanensis	Large Bent-winged Bat	Vulnerable	Not Sensitive	Not Listed	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Mammalia	Myotis macropus	Southern Myotis	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Petauroides volans	Greater Glider	Not Listed	Not Sensitive	Vulnerable	
Animalia	Mammalia	Petaurus australis	Yellow-bellied Glider	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Petaurus norfolcensis	Squirrel Glider	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Phascolarctos cinereus	Koala	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Physeter macrocephalus	Sperm Whale	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Potorous tridactylus	Long-nosed Potoroo	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Scoteanax rueppellii	Greater Broad-nosed Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Reptilia	Caretta caretta	Loggerhead Turtle	Endangered	Not Sensitive	Endangered	
Animalia	Reptilia	Chelonia mydas	Green Turtle	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Cryptostylis hunteriana	Leafless Tongue Orchid	Vulnerable	Category 2	Vulnerable	
Plantae	Flora	Galium australe	Tangled Bedstraw	Endangered	Not Sensitive	Not Listed	
Plantae	Flora	Rhodamnia rubescens	Scrub Turpentine	Critically Endangered	Not Sensitive	Not Listed	
Plantae	Flora	Wilsonia backhousei	Narrow-leafed Wilsonia	Vulnerable	Not Sensitive	Not Listed	

Data does not include NSW category 1 sensitive species.
NSW BioNet: © State of NSW and Office of Environment and Heritage
Data obtained 28/08/2019

USE OF REPORT - APPLICABLE TERMS

The following terms apply to any person (End User) who is given the Report by the person who purchased the Report from Lotsearch Pty Ltd (ABN: 89 600 168 018) (Lotsearch) or who otherwise has access to the Report (Terms). The contract terms that apply between Lotsearch and the purchaser of the Report are specified in the order form pursuant to which the Report was ordered and the terms set out below are of no effect as between Lotsearch and the purchaser of the Report.

1. End User acknowledges and agrees that:
   (a) the Report is compiled from or using content (**Third Party Content**) which is comprised of:
      (i) content provided to Lotsearch by third party content suppliers with whom Lotsearch has contractual arrangements or content which is freely available or methodologies licensed to Lotsearch by third parties with whom Lotsearch has contractual arrangements (**Third Party Content Suppliers**); and
      (ii) content which is derived from content described in paragraph (i);
   (b) Neither Lotsearch nor Third Party Content Suppliers takes any responsibility for or give any warranty in relation to the accuracy or completeness of any Third Party Content included in the Report including any contaminated land assessment or other assessment included as part of a Report;
   (c) the Third Party Content Suppliers do not constitute an exhaustive set of all repositories or sources of information available in relation to the property which is the subject of the Report (**Property**) and accordingly neither Lotsearch nor Third Party Content Suppliers gives any warranty in relation to the accuracy or completeness of the Third Party Content incorporated into the report including any contaminated land assessment or other assessment included as part of a Report;
   (d) Reports are generated at a point in time (as specified by the date/time stamp appearing on the Report) and accordingly the Report is based on the information available at that point in time and Lotsearch is not obliged to undertake any additional reporting to take into consideration any information that may become available between the point in time specified by the date/time stamp and the date on which the Report was provided by Lotsearch to the purchaser of the Report;
   (e) Reports must be used or reproduced in their entirety and End User must not reproduce or make available to other persons only parts of the Report;
   (f) Lotsearch has not undertaken any physical inspection of the property;
   (g) neither Lotsearch nor Third Party Content Suppliers warrants that all land uses or features whether past or current are identified in the Report;
   (h) the Report does not include any information relating to the actual state or condition of the Property;
   (i) the Report should not be used or taken to indicate or exclude actual fitness or unfitness of Land or Property for any particular purpose
   (j) the Report should not be relied upon for determining saleability or value or making any other decisions in relation to the Property and in particular should not be taken to be a rating or assessment of the desirability or market value of the property or its features; and
   (k) the End User should undertake its own inspections of the Land or Property to satisfy itself that there are no defects or failures
2. The End User may not make the Report or any copies or extracts of the report or any part of it available to any other person. If End User wishes to provide the Report to any other person or make extracts or copies of the Report, it must contact the purchaser of the Report before doing so to ensure the proposed use is consistent with the contract terms between Lotsearch and the purchaser.
3. Neither Lotsearch (nor any of its officers, employees or agents) nor any of its Third Party Content Suppliers will have any liability to End User or any person to whom End User provides the Report and End User must not represent that Lotsearch or any of its Third Party Content Suppliers accepts liability to any such person or make any other representation to any such person on behalf of Lotsearch or any Third Party Content Supplier.
4. The End User hereby to the maximum extent permitted by law:
   (a) acknowledges that the Lotsearch (nor any of its officers, employees or agents), nor any of its Third Party Content Supplier have any liability to it under or in connection with the

Report or these Terms;

(b) waives any right it may have to claim against Third Party Content Supplier in connection with the Report, or the negotiation of, entry into, performance of, or termination of these Terms; and

(c) releases each Third Party Content Supplier from any claim it may have otherwise had in connection with the Report, or the negotiation of, entry into, performance of, or termination of these Terms.

5. The End User acknowledges that any Third Party Supplier shall be entitled to plead the benefits conferred on it under clause 4, despite not being a party to these terms.
6. End User must not remove any copyright notices, trade marks, digital rights management information, other embedded information, disclaimers or limitations from the Report or authorise any person to do so.
7. End User acknowledges and agrees that Lotsearch and Third Party Content Suppliers retain ownership of all copyright, patent, design right (registered or unregistered), trade marks (registered or unregistered), database right or other data right, moral right or know how or any other intellectual property right in any Report or any other item, information or data included in or provided as part of a Report.
8. To the extent permitted by law and subject to paragraph 9, all implied terms, representations and warranties whether statutory or otherwise relating to the subject matter of these Terms other than as expressly set out in these Terms are excluded.
9. Subject to paragraph 6, Lotsearch excludes liability to End User for loss or damage of any kind, however caused, due to Lotsearch's negligence, breach of contract, breach of any law, in equity, under indemnities or otherwise, arising out of all acts, omissions and events whenever occurring.
10. Lotsearch acknowledges that if, under applicable State, Territory or Commonwealth law, End User is a consumer certain rights may be conferred on End User which cannot be excluded, restricted or modified. If so, and if that law applies to Lotsearch, then, Lotsearch's liability is limited to the greater of an amount equal to the cost of resupplying the Report and the maximum extent permitted under applicable laws.
11. Subject to paragraph 9, neither Lotsearch nor the End User is liable to the other for:

(a) any indirect, incidental, consequential, special or exemplary damages arising out of or in relation to the Report or these Terms; or

(b) any loss of profit, loss of revenue, loss of interest, loss of data, loss of goodwill or loss of business opportunities, business interruption arising directly or indirectly out of or in relation to the Report or these Terms,

irrespective of how that liability arises including in contract or tort, liability under indemnity or for any other common law, equitable or statutory cause of action or otherwise.

12. These Terms are subject to New South Wales law.

Appendix D: Lotsearch Title Search

ADVANCE LEGAL SEARCHERS PTY LTD

(ACN 147 943 842)
ABN 82 147 943 842

18/36 Osborne Road,
Manly NSW 2095

Telephone: +612 9977 6713
Mobile: 0412 169 809
Email: search@alsearchers.com.au

30th August, 2019

LOTSEARCH PTY LTD
Level 3, 68 Alfred Street,
MILSONS POINT, NSW 2061

Attention: Rosemary Hulak,

RE: **Inyadda Drive,**
Manyana
Reference LS008183_EP

Note 1:	**Lot 106**	**DP 755923**	(page 1)
Note 2:	**Lot 2**	**DP 1161638**	(page 3)
Note 3:	**Lot 2**	**DP 1121854**	(page 5)

Note 1:

Current Search

Folio Identifier 106/755923 (title attached)
Crown Plan 1635-2013 (plan attached)
Dated 28th August 2019
Registered Proprietor:
JAMES WALTER DOUGLAS PTY LTD

Title Tree
Lot 106 DP 755923

Folio Identifier 106/755923

Certificate of Title Volume 3564 Folio 33

Crown Land

****

Portion 106 Parish Conjola
Granted to Jesse Goodsell dated 27th February 1924

****

Summary of proprietor(s)
Lot 106 DP 755923

Year	Proprietor(s)
	(Lot 106 DP 755923)
2018 – todate	James Walter Douglas Pty Ltd
1990 – 2018	Kylor Pty. Limited
	(Portion 106 Parish Conjola – Area 82 Acres – CTVol 3564 Fol 33)
1987 – 1990	Kylor Pty. Limited
1955 – 1987	John William Antony Curvers, company director
1943 – 1955	Victor Hilton Sully, soldier
1943 – 1943	John Knight, general merchant Joseph Farrar Johnson, motor driver Paul Louis Herman Hoffman, labourer
1924 – 1943	Jesse Goodsell, grantee
	(Portion 106 Parish Conjola – Area 82 Acres)
Prior – 1924	Crown Land
(1920 – 1924)	*(Conditional Purchase 1920 – 9 Milton to Jesse Goodsell)*

****

Note 2:

Current Search

Folio Identifier 2/1161638 (title attached)
DP 1161638 (plan attached)
Dated 28th August 2019
Registered Proprietor:
JAMES WALTER DOUGLAS PTY LTD

Title Tree
Lot 2 DP 1161638

Folio Identifier 2/1161638

Folio Identifier 1070/836591

Certificate of Title Volume 8455 Folio 135

Certificate of Title Volume 1540 Folio 141

****

Portion 107 Parish Conjola
Granted to Jesse Goodsell dated 24th June 1904

****

Summary of proprietor(s)
Lot 2 DP 1161638

Year	Proprietor(s)
	(Lot 2 DP 1161638)
2018 – todate	James Walter Douglas Pty Ltd
2011 – 2018	Kylor Pty. Limited
	(Lot 1070 DP 836591)
1994 – 2011	Kylor Pty. Limited
	(Portion 107 Parish Conjola – Area 60 Acres – CTVol 8455 Fol 135)
1987 – 1994	Kylor Pty. Limited
1963 – 1987	John William Antony Curvers, company director
	(Portion 107 Parish Conjola – Area 60 Acres – CTVol 1540 Fol 141)
1955 – 1963	John William Antony Curvers, company director
1943 – 1955	Victor Hilton Sully, soldier
1943 – 1943	John Knight, general merchant Joseph Farrar Johnson, motor driver Paul Louis Herman Hoffman, labourer
(1922 – 1943)	*(lease to Kirton and Earnshaw Limited of part)*
1904 – 1943	Jesse Goodsell, grantee

****

Note 3:

Current Search

Folio Identifier 2/1121854 (title attached)
DP 1121854 (plan attached)
Dated 28th August 2019
Registered Proprietor:
JAMES WALTER DOUGLAS PTY LTD

Title Tree
Lot 2 DP 1121854

Folio Identifier 2/1121854

Folio Identifier 204/755923

Certificate of Title Volume 12435 Folio 136

Crown Land

****

Portion 204 Parish Conjola
Granted to John William Antony Curvers dated 10th May 1974

****

Summary of proprietor(s)
Lot 2 DP 1121854

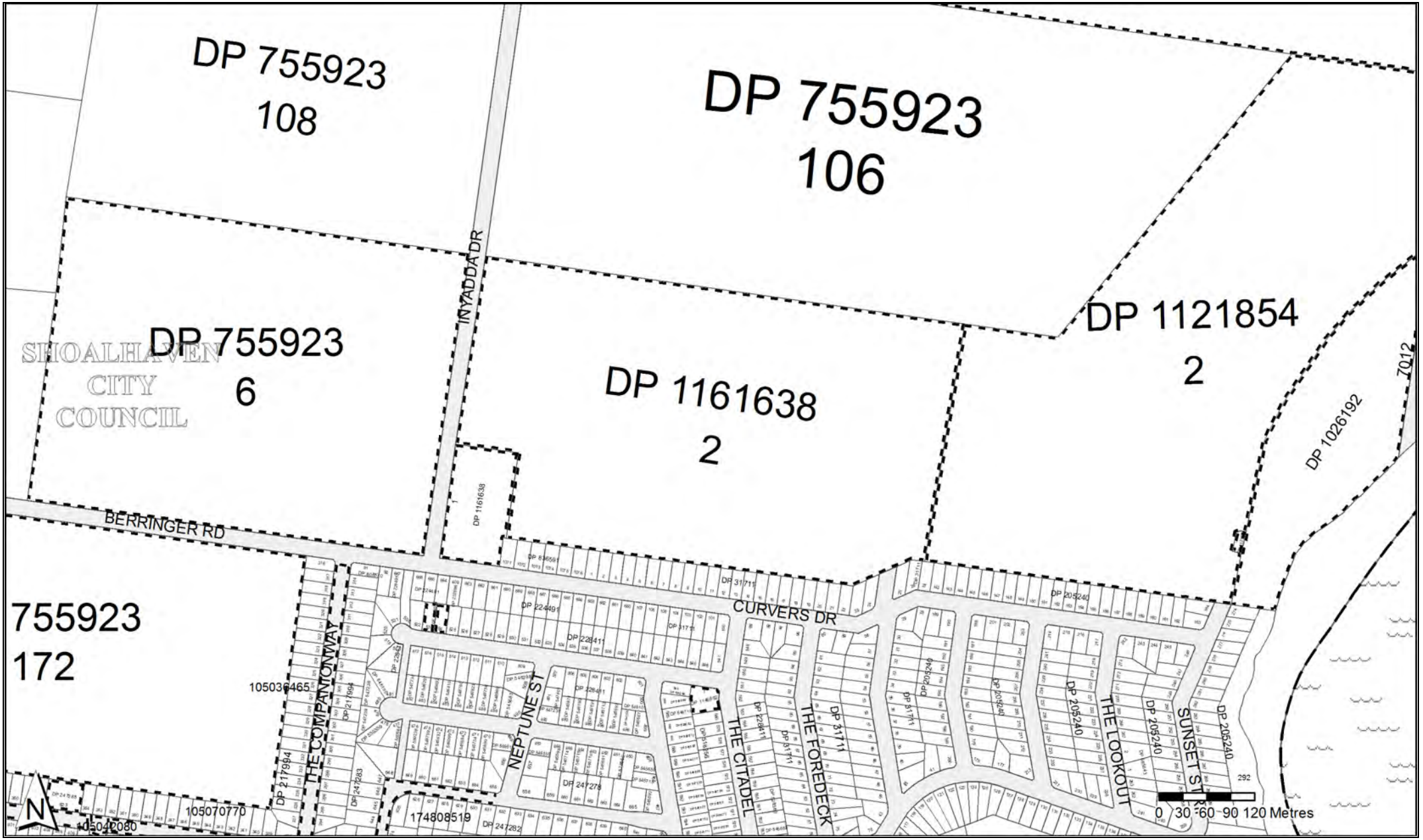
Year	Proprietor(s)
	(Lot 2 DP 1121854)
2018 – todate	James Walter Douglas Pty Ltd
2009 – 2018	Kylor Pty. Limited
	(Lot 204 DP 755923)
1996 – 2009	Kylor Pty. Limited
	(Portion 204 Parish Conjola – CTVol 12435 Fol 136)
1987 – 1996	Kylor Pty. Limited
1974 – 1987	John William Antony Curvers, company director
	(Portion 204 Parish Conjola – Area 58 Acres 2 Roods)
Prior – 1974	Crown Land
(1959 – 1974)	*(Conditional Purchase 1959 – 31 Milton to John William Antony Curvers, company director)*
(1951 – 1959)	*(Special Lease 1951 – 108 Milton to Victor Hilton Sully, soldier)*
(1911 – 1951)	*(Conditional Lease 1911 – 1 to Jesse Goodsell)*

****

Cadastral Records Enquiry Report : Lot 2 DP 1161638

Ref : NOUSER

Locality : MANYANA
Parish : CONJOLA
LGA : SHOALHAVEN
County : ST VINCENT



Report Generated 11:11:12 AM, 28 August, 2019
Copyright © Crown in right of New South Wales, 2017

This information is provided as a searching aid only.Whilst every endeavour is made to ensure that current map, plan and titling information is accurately reflected, the Registrar General cannot guarantee the information provided. For ALL ACTIVITY PRIOR TO SEPTEMBER 2002 you must refer to the RGs Charting and Reference Maps

	Status	Surv/Comp	Purpose
DP247285			
Lot(s): 823			
DP1238765	PRE-ALLOCATED	UNAVAILABLE	SUBDIVISION
DP1238772	PRE-ALLOCATED	UNAVAILABLE	CONSOLIDATION
DP1238774	PRE-ALLOCATED	UNAVAILABLE	SUBDIVISION
DP1238775	PRE-ALLOCATED	UNAVAILABLE	SUBDIVISION
DP1238776	PRE-ALLOCATED	UNAVAILABLE	SUBDIVISION
DP1238778	PRE-ALLOCATED	UNAVAILABLE	SUBDIVISION
DP1238779	PRE-ALLOCATED	UNAVAILABLE	SUBDIVISION
DP755923			
Lot(s): 172			
DP1238765	PRE-ALLOCATED	UNAVAILABLE	SUBDIVISION
DP1238772	PRE-ALLOCATED	UNAVAILABLE	CONSOLIDATION
DP1238774	PRE-ALLOCATED	UNAVAILABLE	SUBDIVISION
DP1238775	PRE-ALLOCATED	UNAVAILABLE	SUBDIVISION
DP1238776	PRE-ALLOCATED	UNAVAILABLE	SUBDIVISION
DP1238778	PRE-ALLOCATED	UNAVAILABLE	SUBDIVISION
DP1238779	PRE-ALLOCATED	UNAVAILABLE	SUBDIVISION
Lot(s): 205			
DP1121854	REGISTERED	SURVEY	RESUMPTION OR ACQUISITION
Lot(s): 6			
DP1110935	REGISTERED	COMPILATION	EASEMENT
Lot(s): 1			
NSW GAZ. 09-06-2006 RESERVATION OF CROWN LAND RESERVE NO. 1011528			Folio : 4010
DP1026192			
Lot(s): 7012			
DP1121854	REGISTERED	SURVEY	RESUMPTION OR ACQUISITION
NSW GAZ. 09-06-2006 RESERVATION OF CROWN LAND RESERVE NO. 1011528			Folio : 4010
DP1121854			
Lot(s): 1, 2			
DP755923	HISTORICAL	COMPILATION	CROWN ADMIN NO.
DP1146892			
Lot(s): 1			
DP866166	HISTORICAL	SURVEY	SUBDIVISION
DP1161638			
Lot(s): 1, 2			
DP836591	HISTORICAL	SURVEY	SUBDIVISION
DP1169534			
Lot(s): 53, 54			
DP228411	HISTORICAL	SURVEY	SUBDIVISION
Road			
Polygon Id(s): 105036465, 105042080, 105070770, 105087749, 105404828, 174808519			
EX-SUR 90/29 DP123460			

Caution: This information is provided as a searching aid only. Whilst every endeavour is made the ensure that current map, plan and titling information is accurately reflected, the Registrar General cannot guarantee the information provided. For **ALL ACTIVITY PRIOR TO SEPTEMBER 2002** you must refer to the RGs Charting and Reference Maps.

Copyright © Crown in right of New South Wales, 2017

Plan	Surv/Comp	Purpose
DP31711	SURVEY	UNRESEARCHED
DP205240	SURVEY	SUBDIVISION
DP217994	SURVEY	SUBDIVISION
DP217995	SURVEY	SUBDIVISION
DP222596	COMPILATION	SUBDIVISION
DP224491	SURVEY	SUBDIVISION
DP228411	SURVEY	SUBDIVISION
DP247278	SURVEY	SUBDIVISION
DP247281	SURVEY	SUBDIVISION
DP247282	SURVEY	SUBDIVISION
DP247283	SURVEY	SUBDIVISION
DP247285	SURVEY	SUBDIVISION
DP518256	SURVEY	SUBDIVISION
DP528560	SURVEY	SUBDIVISION
DP528562	SURVEY	SUBDIVISION
DP528563	SURVEY	SUBDIVISION
DP544410	COMPILATION	SUBDIVISION
DP545592	COMPILATION	SUBDIVISION
DP545593	COMPILATION	SUBDIVISION
DP545594	COMPILATION	SUBDIVISION
DP545595	COMPILATION	SUBDIVISION
DP545596	COMPILATION	SUBDIVISION
DP545631	COMPILATION	SUBDIVISION
DP545632	COMPILATION	SUBDIVISION
DP545683	COMPILATION	SUBDIVISION
DP545684	COMPILATION	SUBDIVISION
DP545686	COMPILATION	SUBDIVISION
DP545687	COMPILATION	SUBDIVISION
DP545688	COMPILATION	SUBDIVISION
DP545689	COMPILATION	SUBDIVISION
DP545690	COMPILATION	SUBDIVISION
DP545691	COMPILATION	SUBDIVISION
DP545692	COMPILATION	SUBDIVISION
DP545710	COMPILATION	SUBDIVISION
DP545712	COMPILATION	SUBDIVISION
DP545713	COMPILATION	SUBDIVISION
DP545714	COMPILATION	SUBDIVISION
DP545715	COMPILATION	SUBDIVISION
DP545716	COMPILATION	SUBDIVISION
DP545752	COMPILATION	SUBDIVISION
DP545754	COMPILATION	SUBDIVISION
DP545798	COMPILATION	SUBDIVISION
DP545871	COMPILATION	SUBDIVISION
DP545872	COMPILATION	SUBDIVISION
DP545900	COMPILATION	SUBDIVISION
DP546099	COMPILATION	SUBDIVISION
DP546100	COMPILATION	SUBDIVISION
DP546101	COMPILATION	SUBDIVISION
DP546190	COMPILATION	SUBDIVISION
DP546191	COMPILATION	SUBDIVISION
DP546297	COMPILATION	SUBDIVISION
DP546298	COMPILATION	SUBDIVISION
DP546355	COMPILATION	SUBDIVISION
DP546410	COMPILATION	SUBDIVISION
DP546923	COMPILATION	SUBDIVISION
DP547234	COMPILATION	SUBDIVISION
DP547235	COMPILATION	SUBDIVISION
DP547236	COMPILATION	SUBDIVISION
DP547237	COMPILATION	SUBDIVISION
DP547238	COMPILATION	SUBDIVISION
DP547239	COMPILATION	SUBDIVISION
DP547401	COMPILATION	SUBDIVISION
DP547936	COMPILATION	SUBDIVISION
DP548470	COMPILATION	SUBDIVISION
DP548758	COMPILATION	SUBDIVISION

Caution: This information is provided as a searching aid only. Whilst every endeavour is made the ensure that current map, plan and titling information is accurately reflected, the Registrar General cannot guarantee the information provided. For **ALL ACTIVITY PRIOR TO SEPTEMBER 2002** you must refer to the RGs Charting and Reference Maps.

Copyright © Crown in right of New South Wales, 2017

Plan	Surv/Comp	Purpose
DP548759	COMPILATION	SUBDIVISION
DP548760	COMPILATION	SUBDIVISION
DP548966	COMPILATION	SUBDIVISION
DP550238	COMPILATION	SUBDIVISION
DP550564	COMPILATION	SUBDIVISION
DP559359	COMPILATION	SUBDIVISION
DP559517	COMPILATION	SUBDIVISION
DP565643	SURVEY	SUBDIVISION
DP755923	COMPILATION	CROWN ADMIN NO.
DP808570	COMPILATION	SUBDIVISION
DP836591	SURVEY	SUBDIVISION
DP850469	SURVEY	SUBDIVISION
DP1026192	COMPILATION	DEPARTMENTAL
DP1121854	SURVEY	RESUMPTION OR ACQUISITION
DP1146892	COMPILATION	CONSOLIDATION
DP1161638	SURVEY	SUBDIVISION
DP1169534	SURVEY	SUBDIVISION

Caution: This information is provided as a searching aid only. Whilst every endeavour is made the ensure that current map, plan and titling information is accurately reflected, the Registrar General cannot guarantee the information provided. For **ALL ACTIVITY PRIOR TO SEPTEMBER 2002** you must refer to the RGs Charting and Reference Maps.

Copyright © Crown in right of New South Wales, 2017

Req:R865419 /Doc:CP 01635-2013 P /Rev:27-Nov-2012 /NSW LRS /Prt:28-Aug-2019 11:12 /Seq:1 of 1
© Office of the Registrar-General /Src:GLOBALX /Ref:advlegs

87.4432

Division

Resumed Area No.

Pastoral Holding

MILTON.
~~Now NOWRA Gaz. 27.9.18.~~
MILTON. Gaz. 14.11.19.

PLAN OF PORTION 106

County of St. Vincent Parish of Conjola

~~LAND DISTRICT OF MILTON~~ ~~LAND BOARD DISTRICT OF~~

Applied for under the ~~45th~~ 54th Section of the Crown Lands Act of 1884 by

Jesse Goodsell.

Partly cancels V244.787

~~Por. No. C.P. No. 8~~

Por No. 106 C.L. No. 85/5. of 2nd February

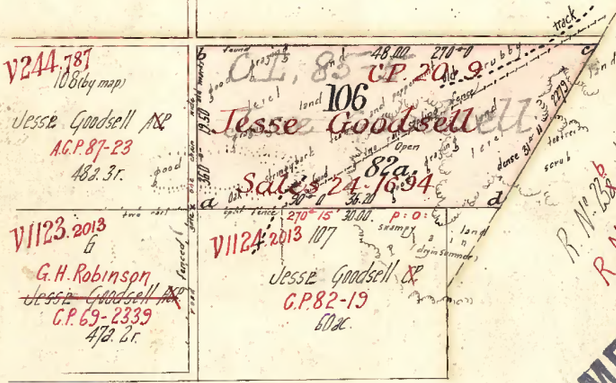
N° 5885 Conf. 12 Nov. 1886

Por. 106. A.C.P. 20.9 of 23rd Decr. (Conv.) Jesse Goodsell.

3192

V244.787

R. No. 94. Notified 15th June 1881.



PLAN MICROFILMED
NO ADDITIONS OR AMENDMENTS TO BE MADE

Examined & Charted
C. of Crest
22nd November 1887

Plan approved
Wellesley Pregrave
Chief Draftsman
for Minister. Dft. Gnl.
30th November 1887

Azimuth taken from a/b

Field Book Vol. Folio

Reference to Corners

Corner	Bearing	From	Links	N° on Tree	
a/	164° 30'	5ft. ch. bark	15½	106. 107.	✓
b	286° 30'	Bloodwood	29¾	106 new Cor. orig. not identified	
c	171° 20'/30'	Oak Woollybutt	23. 46.7	106. 204 vide V1976	
d	numbered	stake no tree	near	106	

Reference to Traverse

Line	Bearing	Distance

Account N° 87-90 passed
80.00 @ 5d.; 45.49@6d.
corners 3@5/-; 1@2/6
g.w.o.

I hereby certify that I in person made and on the 18th October 1887 completed the survey represented on this plan on which are written the bearings & the lengths of the lines measured by me and I declare that the Survey has been executed in accordance with the regulations published for the guidance of Licensed Surveyors and the practice of the ~~Surveyor Generals~~ Department of Lands.

J. Nicholson
Licensed Surveyor.

Transmitted to the District Surveyor with my letter of 19th Oct. 1887. N° 85

Situated in the

Value of Improvements fencing &c £7. 16.

Book 1342 :- fol. 42
Close = 0 x 0
Area = 82.035

1635-2013

Scale 20 Chains to an Inch

Voucher N° Passed

Calculation Book N° Folio

Checked and Charted

Examined

Plan approved 188

District Surveyor.

V1635.2013

Req:R865913 /Doc:CP 04288-2013 P /Rev:27-Nov-2012 /NSW LRS /Prt:28-Aug-2019 11:48 /Seq:1 of 1
© Office of the Registrar-General /Src:GLOBALX /Ref:advlegs

Cancels plan V1976 2013

PLAN OF PORTION 204

PAPERS L.B. 51·1602 T55·5089.

PARISH CONJOLA COUNTY ST VINCENT

LAND DISTRICT NOWRA LAND BOARD DISTRICT SYDNEY

SHIRE SHOALHAVEN

Applied for under the 75th Section of the Crown Lands Consolidation Act, 1913, by Victor Hilton Sully.

Sp.L. 51·108 (title limited to the surface & to a depth of 50 ft. below the surface.)

Now C.P. 59·31, 13th June, John William Anthony Curvers (conv^n).

PLAN MICROFILMED
NO ADDITIONS OR AMENDMENTS TO BE MADE

to Redhead

fm Princes Highway

205 V1978

Reserve 78155 fm. Sale (78156 fm. Lse. gen'ly) for Future Public Reqmts. not'd 9·12·55

Tree fd 42° 45' 39·9

359°59' 1679·0 Wide

Tree fd Nos Gone 15° 50' 46·7 Woollybutt

49a 3r

A 269° 59'

1100·00

B

Tree fd 82° 30' 19·9 Woollybutt

1 V244 787

R54419 fm. Sale or Lease generally. Not^d 11·2·21

R52246 fm. Sale & Lease other Nos Gone Sp.Lse. or Annual Lse. Not^d 1·6·17

R 61640 for Public Recreation Not^d 17·1·30

106 V1635

Jesse Goodsell

204

2280·40

1016·0

359°59'

C

58a 2r

Gently sloping land Dark Soil Undergrowth & Grass W'butt & Bloodwood

Lands

45° 06' 499·7

38° 10' 289·1

35° 41' 235·2

25° 47' 394·5

Posts

Thick Ti Tree

Sandy Soil

18° 02' 316·6

Flats

Tree Gone Posthole at intersection of fences adopted

Orig Peg fd

211° 10' 30"

82a

270° 01'

Q

Line of F 620·60

Road

Cor Gone

OCEAN

PACIFIC

SOUTH

107 V1124

Line of Posts 180° 02' 1500·00

58 AC. 3 R. 2 R.

Poor Swamp Woollybutt and Low scrub Sloping Lands

3° 13' 10" 558·8

349° 49' 39" 457·4

Line of Posts

Orig Cor Gone

Jesse Goodsell

60a

E 90° 00' 2013·5 1906·2 (dedn)

D

Tree fd Nos Gone 113° 27' 6·0 Woollybutt

64 V1898

Jesse Goodsell

Old Round Post adopted

81a 2r

& Cancelled by Ms. 17824 Sy

& {R78153 fm. Sale. ~~R78154 fm. Lse. gen'ly~~} for Public Recreation Not^d 9·12·55.

Surround: ~~58·84966 ac.~~ 58·61382 ac (by cac^ln.)

Plan of Portion 204 approved for gen. an area of 58 ac. 2 r (by cac^ln.)

Grant
Authorised Officer
3·2·1961

I Frederick Stapleton of MAINCE & T.A. Dalton & F.S. Mance, of 90 Junction St. Nowra, a Surveyor registered under the Surveyors Act, 1929 hereby certify that the survey represented in this plan is accurate and has been made by me in accordance with the Survey Practice Regulations 1933 and the special requirements of the Department of Lands was completed on the 24th August 1956, and the reference marks have been placed as shown hereon.

F. Mance

Surveyor registered under the Surveyors Act, 1929

REFERENCE MARKS

CORNER	BEARING	FROM	LINKS	No ON TREE
A	88°59'00"	G.I. Pipe	2·27	204
	333°15'30"	W'Butt	65·05	
B	269°59'00"	G.I. Pipe	2·27	204
	358°09'	W'Butt	50·95	
C	269°59'00"	G.I. Pipe	2·27	204
	77°48'20"	W'Butt	33·00	
~~D~~	~~270°00'~~	~~G.I. Pipe~~	~~2·27~~	~~204~~
	~~Numbered Peg~~	~~Peg~~	~~1093·0~~	
E	90°00'00"	G.I. Pipe	2·27	204
	Numbered Peg 204 at Corner			
F	90°01'00"	G.I. Pipe	2·27	204
	Numbered Peg 204 at Corner			
G	90°01'00"	G.I. Pipe	2·27	204
	Numbered Peg 204 at Corner			
D	Numbered Peg 270°00'	G.I. Pipe	1093	204

Ms. 17824 Sy.

Ms. 17824 Sy.

AZIMUTH TAKEN FROM A B
FIELD BOOK 3691 PAGES 5-8

NOTATION PLAN

I CERTIFY that this is a CORRECT COPY of the original plan of survey and of all notations thereon now relevant, I being the officer having the custody thereof.

Officer in Charge
Land Board Office

4 DEC 1956

NOTATION PLAN

Transmitted to the District Surveyor with my letter of 11·10·56 No 56·17

CHECKED & CHARTED Raymond 12/11/56

EXAMINED K.H. 12·11·1956

PLAN APPROVED [signature] 14·11·1956

SCALE 8 CHAINS TO AN INCH Authorised Officer

Lithographed & Printed at the Department of Lands, Sydney, N.S.W.

CAT. No V4288.2013.

Req:R865513 /Doc:CT 12435-136 CT /Rev:14-Jan-2011 /NSW LRS /Pgs:ALL /Prt:28-Aug-2019 11:21 /Seq:1 of 2
© Office of the Registrar-General /Src:GLOBALX /Ref:advlegs

CERTIFICATE OR ANY NOTIFICATION HEREON
PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS

12435 Fol. 136
(Page 1) Vol.

NEW SOUTH WALES three dollars

STAMP DUTY SYDNEY, N.S.W.

No. 1974/905

New South Wales

Vol. 12435 Fol. 136
Registered 21-5-1974

Registrar General.

DP 75703

CANCELLED

GRANT OF LAND

(PURCHASED BY CONDITIONAL SALE)

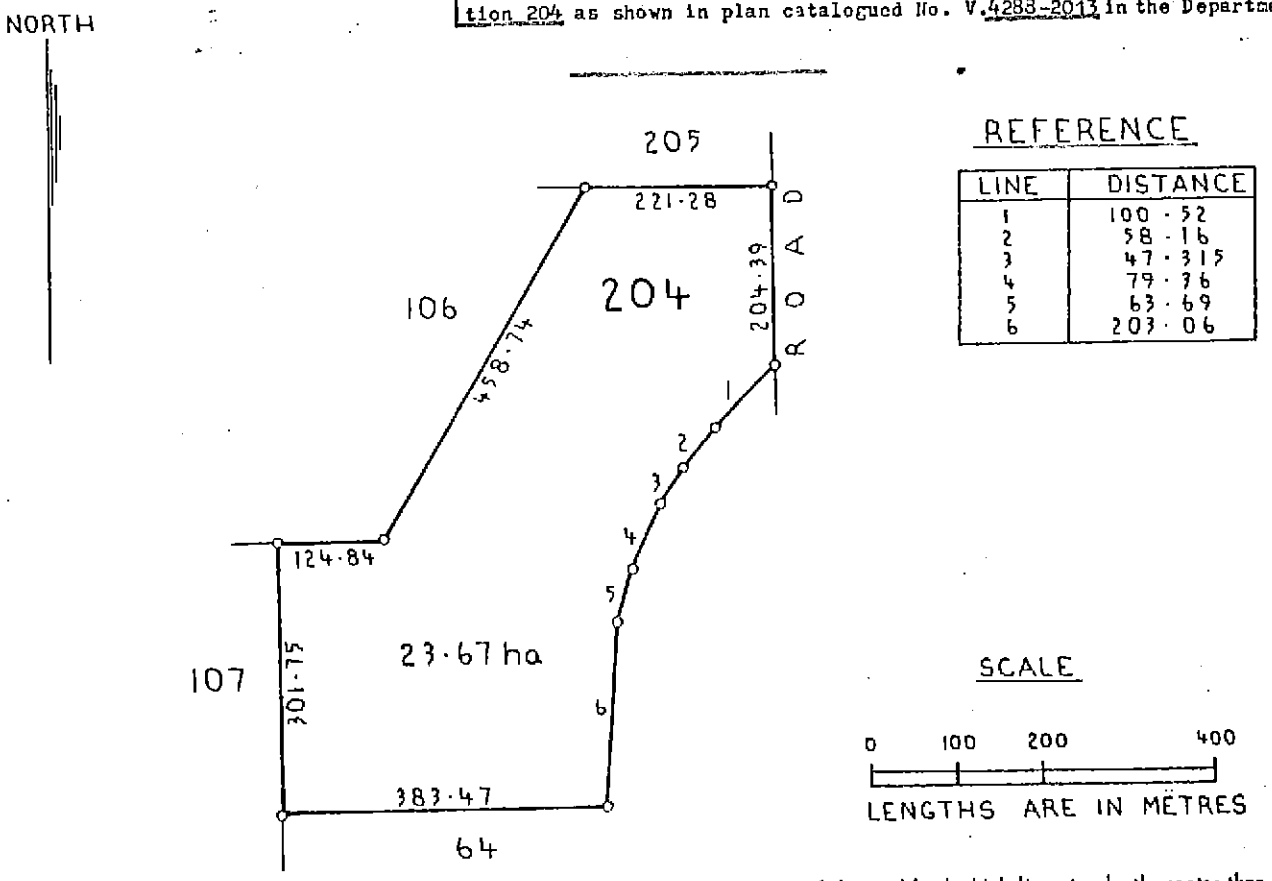
C.P. 1959/31
NOWRA

ELIZABETH the SECOND, by the Grace of God Queen of Australia and Her other Realms and Territories, Head of the Commonwealth:-

To All to whom these Presents shall come, Greeting:-

Whereas JOHN WILLIAM ANTONY CURVERS of Conjola in Our State of New South Wales (hereinafter called the GRANTEE) is the Holder of AdditionalConditional Purchase No. 1959/31 in the Land District of Nowra comprising the land hereinafter described and intended to be hereby granted limited to the surface thereof and to a depth of fifteen point two four metres below such surface which holding was acquired by way of conversion of a Special Lease being a Special Lease granted over an expired Conditional Lease the holder of which had failed to apply for extension of the term AND WHEREAS the sum of one thousand one hundred and seventy dollars being the purchase money payable for the said land has been duly paid and all things required by law to be done to entitle the GRANTEE to a Grant of the fee simple of the said land subject to the Reservations Exceptions and Conditions hereinafter contained have been done and performed NOW THESE PRESENTS WITNESS That in consideration of the premises WE DO HEREBY GRANT unto the GRANTEE subject to the Reservations Exceptions and Conditions hereinafter contained ALL THAT parcel of land containing by admeasurement twenty three point six seven hectares be the same more or less situated in the County of St. Vincent Parish of Conjola Portion 204 as shown in plan catalogued No. V.4288-2013 in the Department of Lands

10



REFERENCE

LINE	DISTANCE
1	100·52
2	58·16
3	47·315
4	79·36
5	63·69
6	203·06

SCALE

0 100 200 400
LENGTHS ARE IN METRES

GRM

As per Plan hereon SAVING AND EXCEPTING unto Us Our Heirs and Successors all that part of the said land which lies at a depth greater than 15.24 metres below the surface thereof TO HOLD unto the GRANTEE in fee simple PROVIDED NEVERTHELESS AND WE DO HEREBY RESERVE AND EXCEPT unto Us Our Heirs and Successors all minerals which the Land hereby granted contains with full power and authority for Us Our Heirs and Successors and such person or persons as shall from time to time be authorised by Us or Them to enter upon the Land hereby granted and to search for mine dig and remove the said minerals AND ALSO all such parts and so much of the Land hereby granted as may hereafter be required for public ways in over and through the same to be set out by Our Governor for the time being of Our said State or some person by him authorised in that respect with full power for Us Our Heirs and Successors and for Our Governor as aforesaid by such person or persons as shall be by Us Them or him authorised in that behalf to make and conduct all such public ways And the right of full and free ingress egress and regress into out of and upon the Land hereby granted for the several purposes aforesaid or any of them Provided Further AND IT IS EXPRESSLY DECLARED that mining operations may have been and may be carried on upon and in the land below the land hereby granted and the lands adjoining the land hereby granted and the land below the same and metals and minerals may have been and may be removed therefrom and that these presents are made upon and subject to the condition that neither the GRANTEE nor his sequels in title shall be entitled to make or prosecute any claim for damages or take any proceedings either by way of injunction or otherwise against Us Our Heirs and Successors or the Government of Our said State or any lessee or lessees under any Mining Act or Acts of Our said State or his or their executors administrators or assigns for or in respect of any damage or loss occasioned by the letting down subsidence or lateral movement of the land hereby granted or otherwise howsoever by reason of the following acts and matters that is to say by reason of Us Our Heirs or Successors or the Government of Our said State or any person on Our Their or its behalf or any lessee or lessees as aforesaid or his or their executors administrators or assigns having worked or now or hereafter working any mines or having carried on or now or hereafter carrying on mining operations or having searched for worked won or removed or now or hereafter searching for working winning or removing any metals or minerals under in or from the land below the land hereby granted or on in under or from any other lands situated laterally to the land hereby granted and the land below the same and whether on or below the surface of such other lands Provided Lastly AND WE DO HEREBY EXPRESSLY RESERVE unto Us Our Heirs and Successors and the Government of Our said State and any person on Our Their or its behalf and any lessee or lessees as aforesaid and his or their executors administrators and assigns to from time to time let down without payment of any compensation whatsoever any part of the land hereby granted and/or of the surface thereof IN TESTIMONY WHEREOF We have caused this Our Grant to be Sealed with the Seal of Our said State

Witness Our Governor of Our State of New South Wales and its Dependencies in the Commonwealth of Australia, at Sydney in Our said State, this tenth day of May in the twenty third year of Our Reign and in the year of Our Lord one Thousand nine hundred and seventy four

A. R. Butler
Governor

FOR ENDORSEMENTS SEE PAGE 2

WARNING: THIS DOCUMENT MUST BE REMOVED FROM THE LAND TITLES OFFICE.

V. C. N. BLIGHT, GOVERNMENT PRINTER

Vol. 12435 Fol 136

SCHEDULE OF REGISTERED PROPRIETORS

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar-General
Kylor Pty. Limited by Transfer W916364. Registered 10-6-1987					

CANCELLED

SEE AUTO FOLIO

V41128 M
W916363 D
— 4 T
— 5
DP 641439 (Easmt)

SCHEDULE OF ENCUMBRANCES ETC.

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar-General	CANCELLATION		
~~V41128 Mortgage to National Commercial Baking Corporation of Australia Limited. Registered 29-3-1984~~						Discharged	W916363	
MS W916365P	Mortgage	to State Bank of New South Wales. Registered 10-6-1987						

(Page 2 of 2 pages)

445

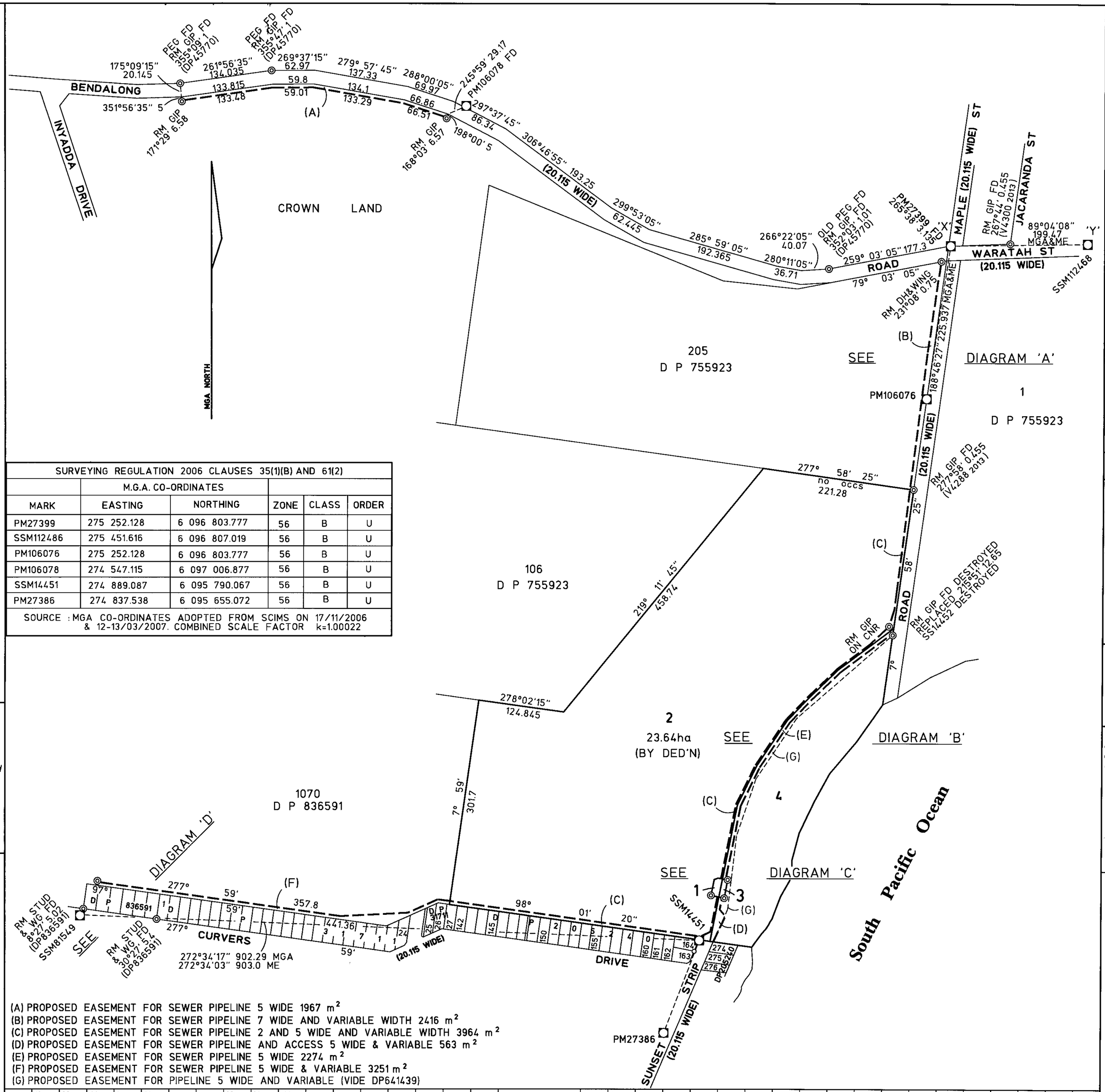
NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR-GENERAL ARE CANCELLED

Req:R865513 /Doc:CT 12435-136 CT /Rev:14-Jan-2011 /NSW LRS /Pgs:ALL
© Office of the Registrar-General /Src:GLOBALX /Ref:advlegs
/Prt:28-Aug-2019 11:21 /Seq:2 of 2

PLAN FORM 2 (APPROVED FORM 3)

Plan Drawing only to appear in this space

SIGNATURES, AND SEALS ONLY



SURVEYING REGULATION 2006 CLAUSES 35(1)(B) AND 61(2)					
	M.G.A. CO-ORDINATES				
MARK	EASTING	NORTHING	ZONE	CLASS	ORDER
PM27399	275 252.128	6 096 803.777	56	B	U
SSM112486	275 451.616	6 096 807.019	56	B	U
PM106076	275 252.128	6 096 803.777	56	B	U
PM106078	274 547.115	6 097 006.877	56	B	U
SSM14451	274 889.087	6 095 790.067	56	B	U
PM27386	274 837.538	6 095 655.072	56	B	U

SOURCE : MGA CO-ORDINATES ADOPTED FROM SCIMS ON 17/11/2006 & 12-13/03/2007. COMBINED SCALE FACTOR k=1.00022

(A) PROPOSED EASEMENT FOR SEWER PIPELINE 5 WIDE 1967 m²
(B) PROPOSED EASEMENT FOR SEWER PIPELINE 7 WIDE AND VARIABLE WIDTH 2416 m²
(C) PROPOSED EASEMENT FOR SEWER PIPELINE 2 AND 5 WIDE AND VARIABLE WIDTH 3964 m²
(D) PROPOSED EASEMENT FOR SEWER PIPELINE AND ACCESS 5 WIDE & VARIABLE 563 m²
(E) PROPOSED EASEMENT FOR SEWER PIPELINE 5 WIDE 2274 m²
(F) PROPOSED EASEMENT FOR SEWER PIPELINE 5 WIDE & VARIABLE 3251 m²
(G) PROPOSED EASEMENT FOR PIPELINE 5 WIDE AND VARIABLE (VIDE DP641439)

Department of Lands Approval

I, Mark McClellan ... in approving this plan certify
(Authorised Officer)
that all necessary approvals in regard to the allocation of the land shown hereon have been given.

Signature: MMcC
Date: 27/3/2008
File Number: NA04H105
Office: NOWRA

Subdivision Certificate

I certify that the provisions of s.109J of the Environmental Planning and Assessment Act 1979 have been satisfied in relation to the proposed

..... set out herein
* (insert 'subdivision' or 'new road')

.....
* Authorised Person/General Manager/Accredited Certifier

Consent Authority : .....
Date of Endorsement : .....
Accreditation no : .....
Subdivision Certificate no : .....
File no : .....

* Delete whichever is inapplicable.

DP1121854 P

Registered: R.V 14-4-2008*

Title System: TORRENS, CROWN LAND

Purpose: ACQUISITION

Ref. Map: SHOALHAVEN SH. C#

Last Plan: DP1026192

PLAN OF
PROPOSED ACQUISITION OF LOTS 1 & 3 AFFECTING LOT 204 DP755923 AND LOT 7012 DP1026192 AND EASEMENTS PROPOSED TO BE ACQUIRED

Lengths are in metres. Reduction Ratio 1: 4000

LGA: SHOALHAVEN CITY

Locality: BENDALONG/MANYANA

Parish: CONJOLA

County: ST. VINCENT

This is sheet 1 of my plan in 2 sheets.
(Delete if inapplicable)

Surveying Regulation, 2006

I, STEPHEN CHARLES SAUNDERS
of NSW DEPARTMENT OF COMMERCE
a surveyor registered under the Surveying Act, 2002, hereby certify that the survey represented in this plan is accurate, has been made in accordance with the Surveying Regulation, 2006 and was completed on 1 JUNE 2007
The survey relates to Lot 1 & 3 and easements
(here specify the land actually surveyed or specify any land shown in the plan that is not the subject of the survey)

(Signature) ... Dated 28/3/08.
Surveyor registered under the Surveying Act, 2002
Datum Line: 'X' - 'Y'
Type : ~~Urban~~/Rural

Plans used in preparation of Survey/~~Compilation~~.

V1976 2013	DP45770
V4288 2013	DP641439
V1978 2013	DP205240
	DP1026192
	DP836591

PANEL FOR USE ONLY for statements of intention to dedicate public roads, to create public reserves, drainage reserves, easements, restrictions on the use of land or positive covenants.

LOTS 1 & 3 AND EASEMENTS PROPOSED TO BE ACQUIRED

NSW DEPARTMENT OF COMMERCE

CONJOLA REGIONAL SEWERAGE SCHEME

WASTEWATER PUMPING STATION M1
TRANSFER MAIN M1
TRANSFER MAIN B1
RETIC LINE M1A/1 TO M1C/8

* OFFICE USE ONLY 446

B.55392

SURVEYOR'S REFERENCE: B.55392

WARNING CREASING OR FOLDING WILL LEAD TO REJECTION

Req:R865411 /Doc:DP 1121854 P /Rev:15-Apr-2008 /NSW LRS /Pgs:ALL /Prt:28-Aug-2019 11:11 /Seq:1 of 2
© Office of the Registrar-General /Src:GLOBALX /Ref:advlegs
B.55392

PLAN FORM 3 (APPROVED FORM 5) To be used in conjunction with Plan Form 2 WARNING CREASING OR FOLDING WILL LEAD TO REJECTION

DP1121854

Registered: 14-4-2008

This is sheet 2 of my plan in 2 sheets dated

Surveyor registered under Surveying Act, 2002

This is sheet of my plan of sheets covered by subdivision certificate No. of

Authorised Person/General Manager/Accredited Certifier

For use where space is insufficient in any panel on Plan Form 2.

Reduction Ratio 1: 1000

B.55392

OFFICE USE ONLY

MAPLE ST (20.115 WIDE)

JACARANDA ST (20.115 WIDE)

BENDALONG (20.115 WIDE) ROAD

WARATAH (20.115 WIDE) ST

ROAD (20.115 WIDE)

SUNSET (20.115 WIDE) STRIP

DIAGRAM 'A' (R.R.1:1000)

DIAGRAM 'B' (R.R.1:1000)

DIAGRAM 'C' (NOT TO SCALE)

DIAGRAM 'D' (NOT TO SCALE)

(A) PROPOSED EASEMENT FOR SEWER PIPELINE 5 WIDE 1967 m²
(B) PROPOSED EASEMENT FOR SEWER PIPELINE 7 WIDE AND VARIABLE WIDTH 2416 m²
(C) PROPOSED EASEMENT FOR SEWER PIPELINE 2 AND 5 WIDE AND VARIABLE WIDTH 3964 m²
(D) PROPOSED EASEMENT FOR SEWER PIPELINE AND ACCESS 5 WIDE & VARIABLE 563 m²
(E) PROPOSED EASEMENT FOR SEWER PIPELINE 5 WIDE 2274 m²
(F) PROPOSED EASEMENT FOR SEWER PIPELINE 5 WIDE & VARIABLE 3251 m²
(G) PROPOSED EASEMENT FOR PIPELINE 5 WIDE AND VARIABLE (VIDE DP641439)

Plan Drawing only to appear in this space

SURVEYOR'S REFERENCE B.55392

Req:R865411 /Doc:DP 1121854 P /Rev:15-Apr-2008 /NSW LRS /Pgs:ALL /Prt:28-Aug-2019 11:11 /Seq:2 of 2
© Office of the Registrar-General /Src:GLOBALX /Ref:advlegs
B.55392

448

SURVEYING REGULATION 2006 Part 2 Clause 61(2)						
MARK	MGA CO-ORDINATES EASTING	MGA CO-ORDINATES NORTHING	ZONE	ORDER	CSF	
X SSM 81549	273987.502	6095830.558	56	B U	1.000226	
Y SSM 81548	274087.900	6095816.469	56	B U	1.000226	
PM 27380	273788.220	6095847.681	56	B U	1.000225	
SOURCE: MGA CO-ORDINATES ADOPTED FROM DEPT LANDS S.C.I.M.S MAY 2010						

471
D.P. 41583

R.M.G.I.P. F.D. 271°19' - 1 (D.P. 41583)

169°30'19" 48.69

CONJOLA NATIONAL PARK

178°51'59" 72.04

R.M.G.I.P. F.D. 270°28' - 1 (D.P. 42812)

7051
D.P. 1101639

184° 05' 11" 71.695

PEG F.D.

98° 00' 50" 20.115

R.M.G.I.P. F.D. DIST. 277°59' - 1.02 ME. 276°03' - 1 (D.P.42812) (330.91)

R.M STUMP FD NOT MARKED 392.28

POR 106
D.P. 755923

POR 108
D.P. 755923

LINE PEG F.D.

774.5

8° 00' 50"

603.5 BY DEDN.

POR 6
D.P. 755923

D.P. 1121854

POR 6
D.P. 755923

8° 00' 50"

237.22 BY DEDN.

DRIVE (20.115 WIDE)

INYADDA

98° 00' 52" 2

82 (A)

8° 00' 52" 82

50"

R.M.G.I.P. 95°29' - 1535

98° 00' 50" 79.51

R.M.G.I.P. 278°01' - 1

00' 145

1
1.139ha

SEE DIAGRAM A

R.M.G.I.P. 98°01' - 1.21 LINE PEG

NAIL IN POST

8° 108.425 188°

R.M.G.I.P.F.D. 82°30' - 15.62 (D.P. 1121854)

(B) (104.305) (333.35 BY DEDN.) (F) 82.69 BY DEDN.

BY DEDN. 16.425

301.76 BY DEDN.

2
19.74ha
BY DEDN.

R.M.D.H. & W'S 346°11' - 5.535 358°38' - 15.245 PEG FD 300°-0.045

(70.765)

PM27380 (EST)

75.825 277°59'50"

187°59'50" 36.575

97° 59' 50" 108

R.M.STUD&W. F.D. 30°27'40" - 5.405 (D.P. 836591)

D.P. 836591

1071 1072

CURVERS (20.115 WIDE) DRIVE

97°59'50" 20.115

X SSM 81549 (EST)

Y SSM 81548 (EST)

THE COMPANIONWAY

THE CITADEL

THE FOREDECK

THE PROMENADE

POR 6
D.P. 755923

POR 204
D.P. 755923

DIAGRAM A
N.T.S.

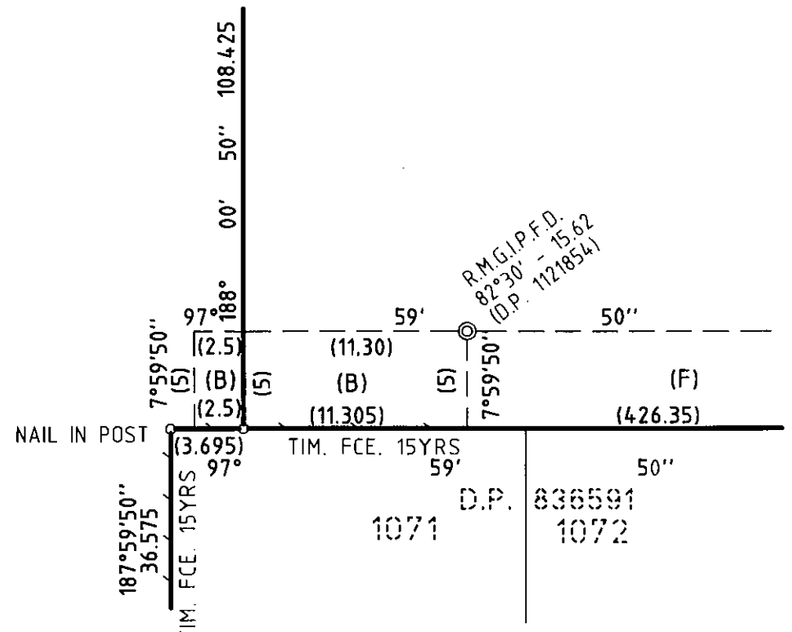


DIAGRAM B
N.T.S.

MGA

(A) EASEMENT FOR DRAINAGE OF WATER 2 WIDE

~~(A) PROPOSED EASEMENT FOR DRAINAGE 2 WIDE~~.

~~(B) PROPOSED EASEMENT FOR SEWER PIPELINE 5 WIDE~~.

(F) EASEMENT FOR SEWER PIPELINE 5 WIDE & VARIABLE (VIDE D.P.1121854). (AE870612)

(B) EASEMENT FOR DRAINAGE OF SEWAGE 5 WIDE

Surveyor :PHILLIP JOHN BROWN Date of Survey : 29TH OCT 2010 Surveyor's Ref : 3614DP Dep. of Lands Ref :2009M7100 (541)	PLAN OF SUBDIVISION OF LOT 1070 D.P. 836591	LGA: SHOALHAVEN Locality : MANYANA BEACH Subdivision No: SC11/1003 Lengths are in metres. Reduction Ratio 1:2500	Registered 14.2.2011

DP1161638 P

Req:R865410 /Doc:DP 1161638 P /Rev:14-Feb-2011 /NSW LRS /Pgs:ALL /Prt:28-Aug-2019 11:11 /Seq:1 of 2
© Office of the Registrar-General /Src:GLOBALX /Ref:advlegs

Req:R865410 /Doc:DP 1161638 P /Rev:14-Feb-2011 /NSW LRS /Pgs:ALL /Prt:28-Aug-2019 11:11 /Seq:2 of 2
© Office of the Registrar-General /Src:GLOBALX /Ref:advlegs

DEPOSITED PLAN ADMINISTRATION SHEET

Sheet 1 of 1 sheets

*OFFICE USE ONLY

SIGNATURES, SEALS and STATEMENTS of intention to dedicate public roads, to create public reserves, drainage reserves, easements, restrictions on the use of land or positive covenants.

Salvatore Paino
Director

PURSUANT TO SECTION 88B OF THE CONVEYANCING ACT 1919 AS AMENDED IT IS INTENDED TO CREATE:

1 ~ EASEMENT FOR DRAINAGE OF WATER 2 WIDE
2 ~ EASEMENT FOR DRAINAGE OF SEWAGE 5 WIDE
3 ~ RESTRICTION ON THE USE OF LAND
4 ~ RESTRICTION ON THE USE OF LAND
5 ~ RESTRICTION ON THE USE OF LAND

Peter Edward Cronin
Director/Secretary

Executed by Kylor Pty Limited
(ABN: 42 003 228 144)

Use PLAN FORM 6A
for additional certificates, signatures, seals and statements.

Crown Lands NSW/Western Lands Office Approval

I ..... in approving this plan certify
(Authorised Officer)
that all necessary approvals in regard to the allocation of the land shown hereon have been given.

Signature: .....
Date: .....
File No.: .....
Office: .....

Subdivision Certificate

I hereby certify that the provisions of s.109J of the Environmental Planning and Assessment Act 1979 have been satisfied in relation to the proposed

SUBDIVISION .....set out herein
* *(Insert "subdivision" or "new road")*

.....
* *Authorised Person/~~General Manager~~/~~Accredited Certifier~~*

Consent Authority: S.C.C.

Date of endorsement: 27/1/2011

Accreditation no: .....

Subdivision Certificate no: SC11/1003

File no.: SF10123

* Delete whichever is inapplicable.

DP1161638 S

Registered 14.2.2011

Title System: TORRENS

Purpose: SUBDIVISION

PLAN OF SUBDIVISION OF LOT 1070 D.P.836591.

L G A: SHOALHAVEN

Locality: MANYANA BEACH

Parish: CONJOLA

County: ST. VINCENT

Survey Certificate

I, PHILLIP JOHN BROWN
of 100 PRINCES HIGHWAY MILTON NSW 2538
a surveyor registered under the Surveying and Spatial Information Act 2002, certify that the survey represented in this plan is accurate, has been made in accordance with the Surveying and Spatial Information Regulation 2006 and was completed on 29TH OCT 2010

The survey relates to LOTS 1 & 2
.....
(here specify the land actually surveyed, or specify any land shown in the plan that is not the subject of the survey)

(Signature) ..... Dated: 5/1/2011
Surveyor registered under the Surveying and Spatial Information Act 2002

Datum Line: X - Y
Type: Urban/~~Rural~~

Plans used in preparation of survey/~~compilation.~~

D.P.41583	D.P.224491
D.P.1101639	D.P.222596
D.P.42812	D.P.836591
D.P.217994	D.P.1110935
D.P.228411	D.P.1121854
D.P.31711	V.244-787

(if insufficient space use Plan Form 6A annexure sheet)

SURVEYOR'S REFERENCE: 3614DP Ph 02 44540842

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
28/8/2019 11:14AM

FOLIO: 106/755923

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 3564 FOL 33

Recorded	Number	Type of Instrument	C.T. Issue
18/2/1989		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
25/6/1990		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
15/5/1991		AMENDMENT: TITLE DIAGRAM	
17/3/1992	E294702	DISCHARGE OF MORTGAGE	
17/3/1992	E294703	MORTGAGE	EDITION 1
24/4/1992	E407893	CAVEAT	
9/12/1992	E951593	DISCHARGE OF MORTGAGE	
9/12/1992	E951594	MORTGAGE	EDITION 2
23/11/1994	U811499	DISCHARGE OF MORTGAGE	
23/11/1994	U811500	MORTGAGE	EDITION 3
31/10/1996	2570870	DISCHARGE OF MORTGAGE	EDITION 4
18/10/2017	AM800138	CAVEAT	
9/4/2018	AN244387	WITHDRAWAL OF CAVEAT	
9/4/2018	AN244389	TRANSFER	
9/4/2018	AN244390	MORTGAGE	EDITION 5
9/4/2018	AN244391	CAVEAT	

*** END OF SEARCH ***

advlegs PRINTED ON 28/8/2019

Obtained from NSW LRS on 28 August 2019 11:14 AM AEST

© Office of the Registrar-General 2019

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 2/1121854

SEARCH DATE	TIME	EDITION NO	DATE
28/8/2019	11:13 AM	2	9/4/2018

LAND

LOT 2 IN DEPOSITED PLAN 1121854
AT BENDALONG
LOCAL GOVERNMENT AREA SHOALHAVEN
PARISH OF CONJOLA COUNTY OF ST VINCENT
TITLE DIAGRAM DP1121854

FIRST SCHEDULE

JAMES WALTER DOUGLAS PTY LTD (T AN244389)

SECOND SCHEDULE (5 NOTIFICATIONS)

1 LAND EXCLUDES MINERALS AND IS SUBJECT TO RESERVATIONS AND CONDITIONS IN FAVOUR OF THE CROWN - SEE CROWN GRANT(S)
2 EXCEPTING LAND BELOW A DEPTH FROM THE SURFACE OF 15.24 METRES
3 AE870612 EASEMENT FOR SEWER PIPELINE 2 AND 5 WIDE AND VARIABLE WIDTH AFFECTING THE PART DESIGNATED (C) IN DP1121854
4 AN244390 MORTGAGE TO HEIR ASQUITH PTY LIMITED
* 5 AN244391 CAVEAT BY SHOALHAVEN CITY COUNCIL

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

advlegs PRINTED ON 28/8/2019

Obtained from NSW LRS on 28 August 2019 11:13 AM AEST © Office of the Registrar-General 2019
* Any entries preceded by an asterisk do not appear on the current edition of the Certificate of Title. Warning: the information appearing under notations has not been formally recorded in the Register. GlobalX hereby certifies that the information contained in this document has been provided electronically by the Registrar General in accordance with Section 96B(2) of the Real Property Act 1900. Note: Information contained in this document is provided by GlobalX Pty Ltd, ABN 35 099 032 596, www.globalx.com.au an approved NSW Information Broker.

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 2/1161638

SEARCH DATE	TIME	EDITION NO	DATE
28/8/2019	11:12 AM	3	9/4/2018

LAND

LOT 2 IN DEPOSITED PLAN 1161638
AT MANYANA BEACH
LOCAL GOVERNMENT AREA SHOALHAVEN
PARISH OF CONJOLA COUNTY OF ST VINCENT
TITLE DIAGRAM DP1161638

FIRST SCHEDULE

JAMES WALTER DOUGLAS PTY LTD (T AN244389)

SECOND SCHEDULE (7 NOTIFICATIONS)

1 LAND EXCLUDES MINERALS AND IS SUBJECT TO RESERVATIONS AND CONDITIONS IN FAVOUR OF THE CROWN - SEE CROWN GRANT(S)
2 AE870612 EASEMENT FOR SEWER PIPELINE 5 METRE(S) WIDE & VARIABLE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
3 DP1161638 EASEMENT FOR DRAINAGE OF WATER 2 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
4 DP1161638 EASEMENT FOR DRAINAGE OF SEWAGE 5 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
5 DP1161638 RESTRICTION(S) ON THE USE OF LAND
6 AN244390 MORTGAGE TO HEIR ASQUITH PTY LIMITED
* 7 AN244391 CAVEAT BY SHOALHAVEN CITY COUNCIL

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

advlegs PRINTED ON 28/8/2019

Obtained from NSW LRS on 28 August 2019 11:12 AM AEST © Office of the Registrar-General 2019
* Any entries preceded by an asterisk do not appear on the current edition of the Certificate of Title. Warning: the information appearing under notations has not been formally recorded in the Register. GlobalX hereby certifies that the information contained in this document has been provided electronically by the Registrar General in accordance with Section 96B(2) of the Real Property Act 1900. Note: Information contained in this document is provided by GlobalX Pty Ltd, ABN 35 099 032 596, www.globalx.com.au an approved NSW Information Broker.

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 106/755923

SEARCH DATE	TIME	EDITION NO	DATE
28/8/2019	11:11 AM	5	9/4/2018

LAND

LOT 106 IN DEPOSITED PLAN 755923
LOCAL GOVERNMENT AREA SHOALHAVEN
PARISH OF CONJOLA COUNTY OF ST VINCENT
(FORMERLY KNOWN AS PORTION 106)
TITLE DIAGRAM CROWN PLAN 1635.2013

FIRST SCHEDULE

JAMES WALTER DOUGLAS PTY LTD (T AN244389)

SECOND SCHEDULE (3 NOTIFICATIONS)

1 LAND EXCLUDES MINERALS AND IS SUBJECT TO RESERVATIONS AND CONDITIONS IN FAVOUR OF THE CROWN - SEE CROWN GRANT(S)
2 AN244390 MORTGAGE TO HEIR ASQUITH PTY LIMITED
* 3 AN244391 CAVEAT BY SHOALHAVEN CITY COUNCIL

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

advlegs PRINTED ON 28/8/2019

Obtained from NSW LRS on 28 August 2019 11:11 AM AEST © Office of the Registrar-General 2019
* Any entries preceded by an asterisk do not appear on the current edition of the Certificate of Title. Warning: the information appearing under notations has not been formally recorded in the Register. GlobalX hereby certifies that the information contained in this document has been provided electronically by the Registrar General in accordance with Section 96B(2) of the Real Property Act 1900. Note: Information contained in this document is provided by GlobalX Pty Ltd, ABN 35 099 032 596, www.globalx.com.au an approved NSW Information Broker.

Appendix E: Site Images 2019

Photograph 1: view looking east over Area 1 from near the western side of the area

Photograph 2: view looking north east over Area 1 from near BH24

Photograph 3: view looking west over Area 1 from the middle of the area

Photograph 4: view of Area 1 looking north from BH19

revision	description	drawn	approved	date
	Plate1	HJP	KEG	30/08/2019

TERRA INSIGHT

client:	**HEIR ASQUITH**		
project:	**Preliminary Site Investigation with Limited Soil Sampling Lot 106 DP755923 Inyadda Drive, Manyana NSW**		
scale	NTS	Title	**Images of the site**
original size	**A3**	project no: **TERRA19272**	Plate no:**1**

Photograph 5: view of Area 1 looking south west from BH13

Photograph 6: view of rubbish dumped east of BH16

Photograph 7: Bonded material found near BH20. Sample ID = X001 testing has confirmed material does not contain asbestos

Photograph 8: burnt rubbish pile near BH19. Testing has confirmed material contains asbestos containing material. Sample ID = X002

revision	description	drawn	approved	date
	Plate2	HJP	KEG	30/08/2019

TERRA INSIGHT

client:	**HEIR ASQUITH**
project:	**Preliminary Site Investigation with Limited Soil Sampling Lot 106 DP755923 Inyadda Drive, Manyana NSW**
scale	NTS
Title	**Images of the site**
original size	**A3**
project no:	**TERRA19272**
Plate no:	**2**

Photograph 9: view of BH18 next to burnt-out car body in Area 1

Photograph 10: view of area 1 looking east from near BH17

Photograph 11: Bonded material found between BH21 and BH22. Sample ID = X003. Testing has confirmed material does not contain asbestos

Photograph 12: View of BH23. Note potential asbestos containing material to the left. Sample ID = X004. Testing has confirmed material contains asbestos

revision	description	drawn	approved	date
	Plate3	HJP	KEG	30/08/2019

TERRA INSIGHT

client: **HEIR ASQUITH**

project: **Preliminary Site Investigation with Limited Soil Sampling Lot 106 DP755923 Inyadda Drive, Manyana NSW**

scale: NTS

Title: **Images of the site**

original size: **A3**

project no: **TERRA19272**

Plate no:**3**

Photograph 13: view looking east from near the eastern boundary of Area1

Photograph 14: view of Area 2 looking east from the western side of the area

Photograph 15: view of Area 2 looking south from the eastern side of the area

Photograph 16: view looking west from BH06

revision	description	drawn	approved	date
	Plate4	HJP	KEG	30/08/2019

TERRA INSIGHT

client:	**HEIR ASQUITH**		
project:	**Preliminary Site Investigation with Limited Soil Sampling Lot 106 DP755923 Inyadda Drive, Manyana NSW**		
scale	NTS	Title	**Images of the site**
original size	**A3**	project no: **TERRA19272**	Plate no:**4**

Photograph 17: view of Area 2 looking south east from BH12

Photograph 18: view of Area 2 looking east from near BH11

revision	description	drawn	approved	date
	Plate4	HJP	KEG	30/08/2019

TERRA INSIGHT

client:	**HEIR ASQUITH**		
project:	**Preliminary Site Investigation with Limited Soil Sampling Lot 106 DP755923 Inyadda Drive, Manyana NSW**		
scale	NTS	Title	**Images of the site**
original size	**A3**	project no: **TERRA19272**	Plate no:**4**

Appendix F: Site Images 2022 Northern

Photograph 1: View of cleared area with dirt tracks in AEC1

Photograph 2: View of clearing in AEC1 facing north west

Photograph 3: Metal roofing found in the vegetation south of AEC1

Photograph 4: Large pile of glass bottles and metal drums found south east of AEC1

revision	description	drawn	approved	date
	Plate1	SB	KEG	5/09/2022

TERRA INSIGHT

client:	**HEIR ASQUITH**		
project:	**Detailed Site Investigation** **Lot 106 DP 755923 Inyadda Drive Manyana NSW**		
scale	NTS	Title	**Images of the site**
original size	**A3**	project no: **TERRA22-165**	Plate no:**1**

Photograph 5: View of tracks between in AEC5.1 facing east

Photograph 2: Adjacent to a track in AEC5.2facing north west

Photograph 7: A car body adjacent to a track in AEC5.2

Photograph 8: Car tyre adjacent to track in AEC5.2

revision	description	drawn	approved	date
	Plate2	SB	KEG	5/09/2022

TERRA INSIGHT

client:	**HEIR ASQUITH**		
project:	**Detailed Site Investigation** **Lot 106 DP 755923 Inyadda Drive Manyana NSW**		
scale	NTS	Title	**Images of the site**
original size	**A3**	project no: **TERRA22-165**	Plate no:**2**

Photograph 9: Rubbish pile including asbestos fragments, metal, glass bottles, cans etc in AEC1

Photograph 10: Close up view of samples taken for asbestos testing in AEC1

Photograph 11: Pieces of metal, wires, glass bottles, charcoal and other foreign materials found in AEC1 near asbestos pile.

Photograph 12: Pieces of glass found in the sieve at sample location D13 in AEC1.

revision	description	drawn	approved	date
	Plate3	SB	KEG	5/09/2022

TERRA INSIGHT

client:	**HEIR ASQUITH**
project:	**Detailed Site Investigation** **Lot 106 DP 755923 Inyadda Drive Manyana NSW**
Title	**Images of the site**
scale	NTS
original size	**A3**
project no:	**TERRA22-165**
Plate no:	**3**

Photograph 13: a fire pit in AEC1. Large pieces of blue glass can be seen.

Photograph 14: Pieces of glass found in the sieve at sample location D15 in AEC1

Photograph 15: Stockpile with foreign materials at sample location D16 in AEC1

Photograph 16: Piles of sheeting not containing asbestos in AEC1

revision	description	drawn	approved	date
	Plate4	SB	KEG	5/09/2022

TERRA INSIGHT

client:	**HEIR ASQUITH**		
project:	**Detailed Site Investigation** **Lot 106 DP 755923 Inyadda Drive Manyana NSW**		
scale	NTS	Title	**Images of the site**
original size	**A3**	project no: **TERRA22-165**	Plate no:**4**

Photograph 17: A rusted fridge where sample D18 was taken in AEC1

Photograph 18: Burnt out car bodies in AEC2

Photograph 19: Sieve findings from sample location D19 in fire pit near car bodies including glass and metal in AEC2

Photograph 20: Sample location D20 directly adjacent to car bodies in AEC2

revision	description	drawn	approved	date
	Plate5	SB	KEG	5/09/2022

TERRA INSIGHT

client: **HEIR ASQUITH**

project: **Detailed Site Investigation**
Lot 106 DP 755923 Inyadda Drive Manyana NSW

scale	NTS	Title	**Images of the site**	
original size	**A3**	project no: **TERRA22-165**		Plate no:**5**

Photograph 21: Sample location D21 on cement treated track surface in AEC2

Photograph 22: Track in AEC2 near car bodies. Car tyre visible in background

Photograph 23: Sieve findings from sample location D21 including plastics in AEC2

revision	description	drawn	approved	date
	Plate6	SB	KEG	5/09/2022

TERRA INSIGHT

client:	**HEIR ASQUITH**		
project:	**Detailed Site Investigation** **Lot 106 DP 755923 Inyadda Drive Manyana NSW**		
scale	NTS	Title	**Images of the site**
original size	**A3**	project no: **TERRA22-165**	Plate no:**6**

Appendix G: Site Images 2022 Southern

Photograph 1: Vehicle tracks in AEC4

Photograph 2: Old building foundation from previous farm house in AEC4

Photograph 3: Dried creek bed in AEC6

Photograph 4: Plastic tyre dumped in AEC6

revision	description	drawn	approved	date
	Plate1	SB	KEG	5/09/2022

TERRA INSIGHT

client:	**HEIR ASQUITH**
project:	**Detailed Site Investigation** **Lot 106 DP 755923 Inyadda Drive Manyana NSW**
Title	**Images of the site**
scale	NTS
original size	**A3**
project no: **TERRA22-165**	Plate no:**1**

Photograph 5: Creek on border of area to be developed in AEC6

Photograph 6: Shelter constructed from fallen branches and sticks in AEC6

Photograph 7: Bike ramp constructed in AEC6

Photograph 8: View of residential area facing south in AEC6

revision	description	drawn	approved	date
	Plate2	SB	KEG	5/09/2022

TERRA INSIGHT

client:	**HEIR ASQUITH**
project:	**Detailed Site Investigation** **Lot 106 DP 755923 Inyadda Drive Manyana NSW**
scale	NTS
Title	**Images of the site**
original size	**A3**
project no:	**TERRA22-165**
Plate no:	**2**

Photograph 9: Bike ramp in eastern part of AEC6

Photograph 10: Stockpile of soil over tree roots in AEC3

Photograph 11: Camp fire where sample D1 was taken in AEC3

Photograph 12: Close up of findings in fire pit where D1 was taken in AEC3

revision	description	drawn	approved	date
	Plate3	SB	KEG	5/09/2022

TERRA INSIGHT

client:	**HEIR ASQUITH**		
project:	**Detailed Site Investigation** **Lot 106 DP 755923 Inyadda Drive Manyana NSW**		
scale	NTS	Title	**Images of the site**
original size	**A3**	project no: **TERRA22-165**	Plate no:**3**

Photograph 13: Fire pit where sample D2 was taken in AEC3

Photograph 14: waste stockpile in AEC3 where sample D3 was taken

Photograph 15: Stockpile of building materials where sample D4 was taken in AEC3

Photograph 16: Building materials piled adjacent to a boat in AEC3

revision	description	drawn	approved	date
	Plate4	SB	KEG	5/09/2022

TERRA INSIGHT

client:	**HEIR ASQUITH**		
project:	**Detailed Site Investigation** **Lot 106 DP 755923 Inyadda Drive Manyana NSW**		
scale	NTS	Title	**Images of the site**
original size	**A3**	project no: **TERRA22-165**	Plate no:**4**

Photograph 17: Metal sheeting and exposed soil beneath it where sample D5 was taken in AEC3

Photograph 18: Stockpile of fill where sample D6 was taken in AEC3

Photograph 19: Shed found in AEC3. A caravan can be seen on the other side of the shed

Photograph 20: Stockpile of building materials in AEC3 including metal sheeting, wire netting, a sink adjacent to the caravan and shed.

revision	description	drawn	approved	date
	Plate5	SB	KEG	5/09/2022

TERRA INSIGHT

client:	**HEIR ASQUITH**		
project:	**Detailed Site Investigation** **Lot 106 DP 755923 Inyadda Drive Manyana NSW**		
scale	NTS	Title	**Images of the site**
original size	**A3**	project no: **TERRA22-165**	Plate no:**5**

Photograph 21: Battery cases found adjacent to the caravan in AEC3

Photograph 22: Inside of the battery found adjacent to the caravan in AEC3

Photograph 23: Shimmery creek water likely due to the presence of sulphate reducing bacteria on northern boundary of in AEC6

Photograph 24: Location of sample D10 in AEC4

revision	description	drawn	approved	date
	Plate6	SB	KEG	5/09/2022

TERRA INSIGHT

client:	**HEIR ASQUITH**		
project:	**Detailed Site Investigation** **Lot 106 DP 755923 Inyadda Drive Manyana NSW**		
scale	NTS	Title	**Images of the site**
original size	**A3**	project no: **TERRA22-165**	Plate no:**6**

Appendix H: EIL Derivation

Inputs
Select contaminant from list below
Cu
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
22
Enter soil pH (calcium chloride method) (values from 1 to 14)
5.5
Enter organic carbon content (%OC) (values from 0 to 50%)
6.3
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
30
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
9.1
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Cu soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	60	75
Urban residential and open public spaces	100	160
Commercial and industrial	130	220

Inputs
Select contaminant from list below
Zn
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
22
Enter soil pH (calcium chloride method) (values from 1 to 14)
5.5
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
9
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Zn soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	65	140
Urban residential and open public spaces	140	350
Commercial and industrial	200	500

Inputs
Select contaminant from list below
Pb
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	Lead generic EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	110	470
Urban residential and open public spaces	270	1100
Commercial and industrial	440	1800

Inputs
Select contaminant from list below
Ni
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
22
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
15
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
9.1
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Ni soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	25	65
Urban residential and open public spaces	100	300
Commercial and industrial	190	500

Inputs
Select contaminant from list below
Cu
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
22
Enter soil pH (calcium chloride method) (values from 1 to 14)
5.5
Enter organic carbon content (%OC) (values from 0 to 50%)
6.3
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
30
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
9
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Cu soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	60	75
Urban residential and open public spaces	100	160
Commercial and industrial	130	220

Inputs
Select contaminant from list below
Cr_III
Below needed to calculate fresh and aged ACLs
Enter % clay (values from 0 to 100%)
8.5
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
0
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
9.1
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Cr III soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	50	120
Urban residential and open public spaces	150	380
Commercial and industrial	250	630

Inputs
Select contaminant from list below
As
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	Arsenic generic EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	20	40
Urban residential and open public spaces	50	100
Commercial and industrial	80	160

Appendix I: Laboratory summary and certificates

Project Ref:	TERRA22-165
Site Details	Manyana Development
SUMMARY OF LABORATORY RESULTS FOR SOIL SAMPLES	Heavy metals, TPH, BTEX, PAH, OCP, OPP, PCB, Asbestos, pH,
All resullts in mg/kg unless noted otherwise	

Sample ID	THRESHOLD CONCENTRATIONS								D1	D2	D3	D4	D5	D6	D7	D7.2	RPD	D8
Sample Location No.																		
Eurofins test Reference no		GSW	RSW				TPH Mgt Limits		W22-J0000485	W22-J0000486	W22-J0000487	W22-J0000488	W22-J0000489	W22-J0000490	W22-J0000506	W22-J0000492		W22-J0000492
Date of Sampling	ENM	CCT1	CCT2	EIL/ESL	HSL (A) Soil	HIL (A)		(ref 2a)	30/06/2022	30/06/2022	30/06/2022	30/06/2022	30/06/2022	30/06/2022	30/06/2022	30/06/2022		30/06/2022
Soil Classification																		
Unit	Abs. Max. Concentration (max Ave Conc) (Part 9 Clause 9.3)	(EPA NSW) UNO	(EPA NSW) UNO	open parkland and urban resdiential	(0.0m to < 1m) sandy Clay	Low density residential	residential, parkland and open spaces (Fine Soils)	Background			%							
Depth interval (m)																		
pH									-	-	-	-	-	-	-	-		-
Moisture content (%)									34.0	36.0	40.0	29.0	26.0	46.0	24.0	29.0		29.0
HEAVY METALS (TOTAL mg/kg)																		
Arsenic	40 (20)	100	400	100 [2 (Aged)]		100 [2]		1-50	**6**	<2	<2	9	<2	**8**	<2	-		**13**
Cadmium	1 (0.5)	20	80	3 [2a]		15 [2]		1	<0.4	<0.4	<0.4	<0.4	<0.4	**0.60**	<0.4	-		<0.4
Chromium (total)	150 (total) (75)	100 (VI)	400	380 (III) [2(aged)]		80 (VI) [2]		5-1000	**71**	**90**	**50**	**150**	**130**	**68**	**290**	-		**240**
Chromium (III)	150 (total)								**-**	**90**	**50**	**150**	**130**	**68**	**290**			**240**
Chromium (VI)									-	<1	<1	<1	<1	<1	<1			<1
Copper	200 (100)	NA	NA	160 [2(aged)]		6,000 [2]		2-100	**58**	**21**	**15**	**32**	**51**	**73**	**11**	-		**22**
Lead	100 (50)	100	400	1100 [2(aged)]		300 [2a]		2-200	**9**	**12**	**9**	**32**	**13**	**14**	**9**	-		**110**
US Leachate (mg/L)																		0
Mercury	1 (0.5)	4	16	1		40 [2]		0.03	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-		<0.1
Nickel	60 (30)	40	160	300 [2(aged)]		400 [2]		5-500	**25**	**21**	**15**	**32**	32	**31**	**19**	-		**28**
Zinc	300 (150)	NA	NA	350 [2(aged)]		7400 [2]		10-300	**410**	**83**	**24**	**160**	**88**	**74**	**180**	-		**420**
BTEX (mg/kg)																		
Benzene	0.5	10		65 [6]	0.8 [12]	0.7 [10]			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1
Toluene	65	288		105 [8]	560 [12]	480 [10]			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1
Ethylbenzene	25	600		125 [8]	NL [12]	12000 [10]			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1
Total Xylene	15	1000		45 [8]	130 [12]	110 [10]			<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3		<0.3
TOTAL PETROLEUM HYDROCARBONS (mg/kg)																		
F1 - C6 - C10 Fraction	-	650		180 [12]	60 [12]	4400 [13]	800 [14]		<20	<20	<20	<20	<20	<20	<20	<20		<20
C6 - C9									<20	<20	<20	<20	<20	<20	<20	<20		<20
F2 >C10 - C16 Fraction	-	-		120 [12]	330 [12]	3300 [13]	1000 [14]		**450**	**53**	**54**	**100**	<50	**360**	<50	<50		**100**
C10 - C14									**450**	**43**	**61**	**100**	**37**	**310**	**39**	**39**	**0.0**	**130**
F3 > C16- C34 Fraction	-	-		1300 [12]		4,500 [13]	3500 [14]		**870**	**480**	**440**	**800**	**460**	**2300**	**180**	**180**	**0.0**	**360**
C15 - C28									**720**	**250**	**150**	**390**	**220**	**1200**	**86**	**88**	**2.3**	**190**
F4 >C34-C40 Fraction	-	-		5600		6,300 [13]	#### [14]		**260**	**180**	**280**	**340**	**170**	**780**	<100	<100		**190**
C29 - C36									**310**	**310**	**410**	**560**	**320**	**1400**	**130**	**130**	**0.0**	**240**
Total C10-C40	-								**1580**	**713**	**774**	**1240**	**630**	**3440**	**180**	**180**	**0.0**	**650**
Total C6-C9	-	650	####						-	-	-	-	-	-	-			-
Total C10-C36	500 (250)	10000	####						**1480**	**603**	**621**	**1050**	**577**	**2910**	**255**	**257**	**0.8**	**560**
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)																		
Benzo(a)pyrene (TEQ (Zero)	1 (0.5)	0.8		0.7 [8]		3 [2]			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5
Total PAH (mg/kg)	40 (20)	200				300 [2a]			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5
ORGANOCHLORINE PESTICIDES																		
Total OCPs (mg/kg)				1 [8]		240 [2a]			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1
ORGANOPHOSPHOROUS PESTICIDES																		
Total OPPs (mg/kg)				2 [8]					<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2
POLYCHLORINATED BIPHENYLS																		
Total PCBs (mg/kg)		<50		1 [6]		1 [2a]			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1
pH	4.5 to 10 (5 to 9)																	
Electrical Conductivity (dS/m)*																		
Electrical Conductivity (DS/m)*																		
RTA FOREIGN MATERIALS (%)																		
Rubber, plastic, bitumen, paper, cloth, paint and wood	<0.05 (0.1%)																	
ASBESTOS grab sample																		
Asbestos detected									-	-	-	-	-	-	-	-		-
Grab Sample (ABM and Fibres)	ND	ND				0.01% [2aa]			-	-	-	-	-	-	-	-		-
ABM in bulk solids confirmed						bonded			-	-	-	-	-	-	-	-		-

NOTES:

Bold	Above laboratory limits of detection
Bold	Exceeds ENM Abs. Maximum Concentrations
Bold	Concentration exceeds the HIL A
Bold	Concentration exceeds the EIL (Urban Residential and Urban Res)
Bold	Concentration exceeds the HSL (A) Soil for vapour intrusion

[1] Based on Protection of the Environment Operations (Waste) Regulation 2005 - General Exemption Under Part 9, "The excavated natural material exemption" (2014).
[2] Column 2 - Maximum average concentration for characterisation
[2a] Column 3 - Absolute maximum concentration
[2aa] Based on RTA Test Method T276
[2aaa] Under Section 6 (Definitions) of the 'excavated natural exemption' (2012). Excavated Natural Material does not include material that contains asbestos.
[3] Based on Table 1a(1)A Schedule B(1), National Environmental Protection (Assessment of Site Contamination) Measure 2011
[4] Based on Table 1a(1)A Schedule B(1), National Environmental Protection (Assessment of Site Contamination) Measure 2011
[5] Based on Investigations levels for soil and groundwater Table 1a(1) SCPF (5) Residential B - minimal opportunities for soil access
[6] Based on Taylor and Langley 1998 Residential D - with minimal opportunities for soil interaction
[7] National Environmental Protection (assessment of Site Contamination) Measure (NEPC 1999)
[8] ANZECC & (Environmental Investigation Level) from ANZECC and NHMRC (1992) Australian and NZ guidelines for the assessment and management of contaminated sites
[9] For protection of structures
[10] HSL-D (2015) Commercial
[11] UKEPA R&D (2009)
[12] Based on NSW EPA, guidelines for Assessing Service station sites
[13] DER - Interim guidelines on the assessment and management of Perfluoroalkyl and Polyfluoroalkyl substances (PFAS).
[14] Table 1A(3) HSLs Soil
[15] Table 1A(6) HSLs direct contact
[16] Table 1A(7) Ecological direct contact
ND: Not Detected
-: Not Analysed
LOR: Limits of Reporting
See original laboratory reports for detection limits

Project Ref:	TERRA22-165																			
Site Details	Manyana Development																			
SUMMARY OF LABORATORY RESULTS FOR SOIL SAMPLES	Heavy metals, TPH, BTEX, PAH, OCP, OPP, PCB, Asbestos, pH,																			
All resullts in mg/kg unless noted otherwise																				
		THRESHOLD CONCENTRATIONS								D9	D10	D11	D12	D13	D13.2	RPD	D14	D15	D16
Sample ID																				
Sample Location No.																				
Eurofins test Reference no		GSW	RSW				TPH Mgt Limits			W22-JI0000493	W22-JI0000486	W22-JI0000487	W22-JI0000488	W22-JI0000489	W22-JI0000507		W22-JI0000498	W22-JI0000499	W22-JI0000500
Date of Sampling	ENM	CCT1	CCT2	EIL/ESL	HSL (A) Soil	HIL (A)		(ref 2a)		30/06/2022	30/06/2022	30/06/2022	30/06/2022	30/06/2022	30/06/2022		30/06/2022	30/06/2022	30/06/2022
Soil Classification																				
Unit	Abs. Max. Concentration (max Ave Conc)	(EPA NSW) UNO	(EPA NSW) UNO	open parkland and urban resdiential	(0.0m to < 1m) sandy Clay	Low density residential	residential, parkland and open spaces (Fine Soils)	Background				%							
Depth interval (m)	(Part 9 Clause 9.3)																			
pH										-	-	-	-	-	-		-	-	-
Moisture content (%)										48.0	45.0	44.0	52.0	15.0	46.0		23.0	17.0	14.0
HEAVY METALS (TOTAL mg/kg)																				
Arsenic	40 (20)	100	400	100 [2 (Aged)]		100 [2]		1-50		<2	<2	<2	6	**21**	**-**		**3**	**3**	**6**
Cadmium	1 (0.5)	20	80	3 [2a]		15 [2]		1		<0.4	<0.4	<0.4	<0.4	<0.4	**-**		<0.4	<0.4	0.7
Chromium (total)	150 (total) (75)	100 (VI)	400	380 (III) [2(aged)]		80 (VI) [2]		5-1000		**290**	**140**	**140**	**170**	**130**	**-**		**90**	**210**	**190**
Chromium (III)	150 (total) (75)									**290**	**140**	**140**	**170**	**130**					
Chromium (VI)										<1	<1	<1	<1	<1					
Copper	200 (100)	NA	NA	160 [2(aged)]		6,000 [2]		2-100		**23**	**99**	**24**	**37**	**38**	**-**		**38**	**160**	**47**
Lead	100 (50)	100	400	1100 [2(aged)]		300 [2a]		2-200		**8**	**21**	**17**	**21**	**39**	**-**		**10**	**16**	**46**
Mercury	1 (0.5)	4	16	1 [2(aged)]		40 [2]		0.03		<0.1	<0.1	<0.1	<0.1	<0.1	**-**		<0.1	<0.1	<0.1
Nickel	60 (30)	40	160	300 [2(aged)]		400 [2]		5-500		**52**	**15**	**21**	**36**	**29**	**-**		**30**	**68**	**37**
US Leachate (mg/L)										<0.01								**0.11**	
Zinc	300 (150)	NA	NA	350 [2(aged)]		7400 [2]		10-300		**41**	**98**	**50**	**190**	**570**	**-**		**150**	**210**	**350**
BTEX (mg/kg)																			
Benzene	0.5	10		65 [6]	0.8 [12]	0.7 [10]				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1
Toluene	65	288		105 [8]	560 [12]	480 [10]				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1
Ethylbenzene	25	600		125 [8]	NL [12]	12000 [10]				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1
Total Xylene	15	1000		45 [8]	130 [12]	110 [10]				<0.3	<0.3	<0.3	<0.3	<0.3	<0.3		<0.3	<0.3	<0.3
TOTAL PETROLEUM HYDROCARBONS (mg/kg)																			
F1 - C6 - C10 Fraction	-	650		180 [12]	60 [12]	4400 [13]	800 [14]			<20	<20	<20	<20	<20	<20		<20	<20	<20
C6 - C9										<20	<20	<20	<20	<20	<20		<20	<20	<20
F2 >C10 - C16 Fraction	-	-		120 [12]	330 [12]	3300 [13]	1000 [14]			**52**	**<50**	**140**	**58**	<50	<50		<50	**430**	**170**
C10 - C14										**33**	**24**	**110**	**58**	<20	**39**	64	**27**	**260**	**230**
F3 > C16- C34 Fraction	-	-		1300 [12]		4,500 [13]	3500 [14]			**410**	**240**	**640**	**490**	<100	**110**	10	**440**	**850**	**1000**
C15 - C28										**210**	**94**	**370**	**280**	<50	**66**	28	**130**	**890**	**650**
F4 >C34-C40 Fraction	-	-		5600		6,300 [13]	#### [14]			**180**	**100**	**210**	**170**	<100	<100		**110**	<100	**140**
C29 - C36										**280**	**210**	**400**	**310**	<50	<50		**370**	**130**	**490**
Total C10-C40	-									**642**	**340**	**990**	**718**	<100	**110**	10	**550**	**1280**	**1310**
Total C6-C9	-	650	####							-	-	-	-	-	-		-	-	
Total C10-C36	500 (250)	10000	####							**523**	**328**	**880**	**648**	<50	**140**	95	**527**	**1280**	**1370**
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)																			
Benzo(a)pyrene (TEQ (Zero)	1 (0.5)	0.8		0.7 [8]		3 [2]				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	
Total PAH (mg/kg)	40 (20)	200				300 [2a]				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	
ORGANOCHLORINE PESTICIDES																			
Total OCPs (mg/kg)				1 [8]		240 [2a]				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	
ORGANOPHOSPHOROUS PESTICIDES																			
Total OPPs (mg/kg)				2 [8]						<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	
POLYCHLORINATED BIPHENYLS																			
Total PCBs (mg/kg)		<50		1 [6]		1 [2a]				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	
pH	4.5 to 10 (5 to 9)																		
Electrical Conductivity (dS/m)*																			
Electrical Conductivity (DS/m)*																			
RTA FOREIGN MATERIALS (%)																			
Rubber, plastic, bitumen, paper, cloth,	<0.05 (0.1%)																		
paint and wood																			
ASBESTOS grab sample																			
Asbestos detected										-	-	-	-	-	-		-	-	
Grab Sample (ABM and Fibres)	ND	ND				0.01% bonded [2aa]				-	-	-	-	-	-		-	-	
ABM in bulk solids confirmed										-	-	-	-	-	-		-	-	

NOTES:

Bold	Above laboratory limits of detection
Bold	Exceeds ENM Abs. Maximum Concentrations
Bold	Concentration exceeds the HIL A
Bold	Concentration exceeds the EIL (0 - 2m Depth) and Urban Res)
Bold	Concentration exceeds the HSL (A) Soil (0 - 1 metre disposal guidelines

[1] Based on Protection of the Environment Operations (Waste) Regulation 2005 - General Exemption Under Part 9, "The excavated natural material exemption" (2014).
[2] Column 2 - Maximum average concentration for characterisation
[2a] Column 3 - Absolute maximum concentration
[2aa] Based on RTA Test Method T276
[2ab] Under Section 6 (Definitions) of the 'excavated natural exemption' (2012). Excavated Natural Material does not include material that contains asbestos.
[3] Based on Table 1a(1)A Schedule B(1), National Environmental Protection (Assessment of Site Contamination) Measure 2011
[4] Based on Table 1a(1)A Schedule B(1), National Environmental Protection (Assessment of Site Contamination) Measure 2011
[5] Based on Investigations levels for soil and groundwater Table 1a(1) SCPF (5) Residential B - minimal opportunities for soil access
[6] Based on Taylor and Langley 1998 Residential D - with minimal opportunities for soil interaction
[7] National Environmental Protection (assessment of Site Contamination) Measure (NEPC 1999)
[8] ANZECC & (Environmental Investigation Level) from ANZECC and NHMRC (1992) Australian and NZ guidelines for the assessment and management of contaminated sites
[9] For protection of structures
[10] NEPC 1999 (Table 1A(3))
[11] USEPA RSL (Jun'06)
[12] Based on NSW EPA, guidelines for Assessing Service station sites
[13] DER - Interim guidelines on the assessment and management of Perfluoroalkyl and Polyfluoroalkyl substances (PFAS).
[14] Table 1A(3) HSLs Soil
[15] Table 1A(6) HSLs direct contact
[16] Table 1A(7) Volume direct contact
ND: Not Detected
-: Not Analysed
LOR: Limits of Reporting
See original laboratory reports for detection limits

Project Ref:	TERRA22-165												
Site Details	Manyana Development												
SUMMARY OF LABORATORY RESULTS FOR SOIL SAMPLES	Heavy metals, TPH, BTEX, PAH, OCP, OPP, PCB, Asbestos, pH,												
All resullts in mg/kg unless noted otherwise													
Sample ID	THRESHOLD CONCENTRATIONS								D17	D18	D19	D20	D21	TB01
Sample Location No.														
Eurofins test Reference no		GSW	RSW				TPH Mgt Limits		W22-J0000501	W22-J0000502	W22-J0000503	W22-J0000504	W22-J0000505	W22-J0000508
Date of Sampling	ENM	CCT1	CCT2	EIL/ESL	HSL (A) Soil	HIL (A)		(ref 2a)	30/06/2022	30/06/2022	30/06/2022	30/06/2022	30/06/2022	30/06/2022
Soil Classification														
Unit	Abs. Max. Concentration (max Ave Conc)	(EPA NSW) UNO	(EPA NSW) UNO	open parkland and urban resdiential	(0.0m to < 1m) sandy Clay	Low density residential	residential, parkland and open spaces (Fine Soils)	Background			%			
Depth interval (m)	(Part 9 Clause 9.3)													
pH									-	-	-	-	-	
Moisture content (%)									23.0	15.0	18.0	12.0	9.6	<1
HEAVY METALS (TOTAL mg/kg)														
Arsenic	40 (20)	100	400	100 [2 (Aged)]		100 [2]		1-50	<2	**6**	<2	<2	<2	-
Cadmium	1 (0.5)	20	80	3 [2a]		15 [2]		1	<0.4	**8**	<0.4	<0.4	<0.4	-
Chromium (total)	150 (total) (75)	100 (VI)	400	380 (III) [2(aged)]		80 (VI) [2]		5-1000	**140**	**86**	**76**	**110**	**33**	-
Chromium (III)	150 (total)								**140**	**86**	**76**	**110**	**33**	
Chromium (VI)									<1	<1	<1	<1	<1	
Copper	200 (100)	NA	NA	160 [2(aged)]		6,000 [2]		2-100	**13**	**83**	**31**	**44**	**13**	-
Lead	100 (50)	100	400	1100 [2(aged)]		300 [2a]		2-200	**17**	**76**	**8**	**63**	**12**	-
Mercury	1 (0.5)	4	16	1 [2(aged)]		40 [2]		0.03	<0.1	<0.1	<0.1	<0.1	<0.1	-
Nickel	60 (30)	40	160	300 [2(aged)]		400 [2]		5-500	**21**	**53**	**27**	**24**	**15**	-
										0.11				
Zinc	300 (150)	NA	NA	350 [2(aged)]		7400 [2]		10-300	**35**	**83**	**110**	**350**	**42**	-
BTEX (mg/kg)														
Benzene	0.5	10		65 [6]	0.8 [12]	0.7 [10]			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	65	288		105 [8]	560 [12]	480 [10]			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	25	600		125 [8]	NL [12]	12000 [10]			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylene	15	1000		45 [8]	130 [12]	110 [10]			<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
TOTAL PETROLEUM HYDROCARBONS (mg/kg)														
F1 - C6 - C10 Fraction	-	650		180 [12]	60 [12]	4400 [13]	800 [14]		<20	<20	<20	<20	<20	<20
C6 - C9									<20	<20	<20	<20	<20	<20
F2 >C10 - C16 Fraction	-	-		120 [12]	330 [12]	3300 [13]	1000 [14]		**57**	**140**	<50	<50	<50	<50
C10 - C14									**54**	**85**	<20	**48**	<20	<20
F3 > C16- C34 Fraction	-	-		1300 [12]		4,500 [13]	3500 [14]		**230**	**1200**	**170**	**340**	<100	<100
C15 - C28									**130**	**850**	**90**	**200**	<50	<50
F4 >C34-C40 Fraction	-	-		5600		6,300 [13]	#### [14]		<100	**240**	<100	<100	<100	<100
C29 - C36									**150**	**510**	**110**	**190**	<50	<50
Total C10-C40	-								**287**	**1580**	**170**	**340**	<100	<100
Total C6-C9	-	650	####						-	-	-	-	-	-
Total C10-C36	500 (250)	10000	####						**334**	**1445**	**200**	**438**	<50	<50
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)														
Benzo(a)pyrene (TEQ (Zero)	1 (0.5)	0.8		0.7 [8]		3 [2]			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total PAH (mg/kg)	40 (20)	200				300 [2a]			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ORGANOCHLORINE PESTICIDES														
Total OCPs (mg/kg)				1 [8]		240 [2a]			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
ORGANOPHOSPHORUS PESTICIDES														
Total OPPs (mg/kg)				2 [8]					<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
POLYCHLORINATED BIPHENYLS														
Total PCBs (mg/kg)		<50		1 [6]		1 [2a]			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
pH	4.5 to 10 (5 to 9)													
Electrical Conductivity (dS/m)*														
Electrical Conductivity (DS/m)*														
RTA FOREIGN MATERIALS (%)														
Rubber, plastic, bitumen, paper, cloth,	<0.05 (0.1%)													
paint and wood														
ASBESTOS grab sample														
Asbestos detected									-	-	-	-	-	-
Grab Sample (ABM and Fibres)	ND	ND				0.01% bonded [2aa]			-	-	-	-	-	-
ABM in bulk solids confirmed									-	-	-	-	-	-

NOTES:

Bold	Above laboratory limits of detection
Bold	Exceeds ENM Abs. Maximum Concentrations
Bold	Concentration exceeds the HIL A
Bold	Concentration exceeds the EIL (Urban Residential and Urban Res)
Bold	Concentration exceeds the HSL (D) assets disposal guidelines

[1] Based on Protection of the Environment Operations (Waste) Regulation 2005 - General Exemption Under Part 9, "The excavated natural material exemption" (2014).
[2] * Column 2 - Maximum average concentration for characterisation
[2a] * Column 3 - Absolute maximum concentration
[2aa] * Based on RTA Test Method T276
[2] * Under Section 6 (Definitions) of the "excavated natural exemption" (2012). Excavated Natural Material does not include material that contains asbestos.
[3] * Based on Table 1a(1)A Schedule B(1), National Environmental Protection (Assessment of Site Contamination) Measure 2011
[4] * Based on Table 1a(1)A Schedule B(1), National Environmental Protection (Assessment of Site Contamination) Measure 2011
[5] * Based on Investigations levels for soil and groundwater Table 1a(1) SCPF 5) Residential B - minimal opportunities for soil access
[6] * Based on Taylor and Langley 1998 Residential D - with minimal opportunities for soil interaction
[7] * National Environmental Protection (assessment of Site Contamination) Measure (NEPC 1999)
[8] * ANZECC & (Environmental Investigation Level) from ANZECC and NHMRC (1992) Australian and NZ guidelines for the assessment and management of contaminated sites
[9] * For protection of structures
[10] * Based on NSW EPA
[11] * USEPA RSLs (2019)
[12] * Based on NSW EPA, guidelines for Assessing Service station sites
[13] * DER - Interim guidelines on the assessment and management of Perfluoroalkyl and Polyfluoroalkyl substances (PFAS).
[14] * Table 1A(3) HSLs Soil
[15] * Table 1A(6) HSLs direct contact
[16] * Table 1A(7) Volume direct contact
ND: Not Detected
-: Not Analysed
LOR: Limits of Reporting
See original laboratory reports for detection limits

Project Ref:	TERRA22-165
Site Details	Manyana Development
SUMMARY OF LABORATORY RESULTS FOR SOIL SAMPLES	Heavy metals, TPH, BTEX, PAH, OCP, OPP, PCB, Asbestos, pH,
All resullts in mg/kg unless noted otherwise	

TERRA INSIGHT

Sample ID	THRESHOLD CONCENTRATIONS								A1 A2 A11	A3 A4 A5	A6 A7 A8	A9 A10	A12 A13	A14 A15 A16	A17 A18	A19 A20 A21	X5 X6 X7 X8	GW01
Sample Location No.																		
Eurofins test Reference no		GSW	RSW				TPH Mgt Limits		W22-J0000555	W22-J0000556	W22-J0000557	W22-J0000558	W22-J0000559	W22-J0000560	W22-J0000561	W22-J0000562	W22-J0000563	W22-J0000509
Date of Sampling	ENM	CCT1	CCT2	EIL/ESL	HSL (A) Soil direct contact	HIL (A)		(ref 2a)	30/06/2022	30/06/2022	30/06/2022	30/06/2022	30/06/2022	30/06/2022	30/06/2022	30/06/2022	30/06/2022	30/06/2022
Soil Classification																		
Unit	Abs. Max. Concentration (max Ave Conc)	(EPA NSW) UNO	(EPA NSW) UNO	open parkland and urban resdiential	(0.0m to < 1m) sandy Clay	Low density residential	residential, parkland and open spaces (Fine Soils)	Background			%							
Depth interval (m)	(Part 9 Clause 9.3)																	
pH									-	-								
Moisture content (%)									-	-								
HEAVY METALS (TOTAL mg/kg)																		
Arsenic	40 (20)	100	400	100 [2 (Aged)]		100 [2]		1-50	-	-								
Cadmium	1 (0.5)	20	80	3 [2a]		15 [2]		1	-	-								
Chromium	150 (IV) (75)	100 (VI)	400	380 [2(aged)]		80 [2]		5-1000	-	-								
Copper	200 (100)	NA	NA	160 [2(aged)]		6,000 [2]		2-100	-	-								
Lead	100 (50)	100	400	1100 [2(aged)]		300 [2a]		2-200	-	-								
Mercury	1 (0.5)	4	16	1		40 [2]		0.03	-	-								
Nickel	60 (30)	40	160	300 [2(aged)]		400 [2]		5-500	-	-								
Zinc	300 (150)	NA	NA	350 [2(aged)]		7400 [2]		10-300	-	-								
BTEX (mg/kg)																		
Benzene	0.5	10		65 [6]	0.8 [12]	0.7 [10]			-	-								
Toluene	65	288		105 [8]	560 [12]	480 [10]			-	-								
Ethylbenzene	25	600		125 [8]	NL [12]	12000 [10]			-	-								
Total Xylene	15	1000		45 [8]	130 [12]	110 [10]			-	-								
TOTAL PETROLEUM HYDROCARBONS (mg/kg)																		
F1 - C6 - C10 Fraction	-	650		180 [12]	60 [12]	4400 [13]	800 [14]			-	-	-	-	-	-	-	-	-
C6 - C9										-	-	-	-	-	-	-	-	-
F2 >C10 - C16 Fraction	-	-		120 [12]	330 [12]	3300 [13]	1000 [14]			-	-	-	-	-	-	-	-	-
C10 - C14										-	-	-	-	-	-	-	-	-
F3 > C16- C34 Fraction	-	-		1300 [12]		4,500 [13]	3500 [14]			-	-	-	-	-	-	-	-	-
C15 - C28										-	-	-	-	-	-	-	-	-
F4 >C34-C40 Fraction	-	-		5600		6,300 [13]	#### [14]			-	-	-	-	-	-	-	-	-
C29 - C36										-	-	-	-	-	-	-	-	-
Total C10-C40	-									-	-	-	-	-	-	-	-	-
Total C6-C9	-	650	####						-	-	-	-	-	-	-	-	-	-
Total C10-C36	500 (250)	10000	####															
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)																		
Benzo(a)pyrene (TEQ (Zero)	1 (0.5)	0.8		0.7 [8]		3 [2]			-	-								
Total PAH (mg/kg)	40 (20)	200				300 [2a]			-	-								
ORGANOCHLORINE PESTICIDES																		
Total OCPs (mg/kg)				1 [8]		240 [2a]												
ORGANOPHOSPHOROUS PESTICIDES																		
Total OPPs (mg/kg)				2 [8]														
POLYCHLORINATED BIPHENYLS																		
Total PCBs (mg/kg)		<50		1 [6]		1 [2a]												
pH	4.5 to 10 (5 to 9)																	
Electrical Conductivity (dS/m)*																		
Electrical Conductivity (DS/m)*																		
RTA FOREIGN MATERIALS (%)																		
Rubber, plastic, bitumen, paper, cloth, paint and wood	<0.05 (0.1%)																	
ASBESTOS grab sample																		
Asbestos detected									No	No	No	No	No	No	No	No	Yes	
Grab Sample (ABM and Fibres)	ND	ND				0.01% [2aa]			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
ABM in bulk solids confirmed						bonded			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Chrostile and Amosite	

NOTES:

Bold	Above laboratory limits of detection
Bold	Exceeds ENM Abs. Maximum Concentrations
Bold	Concentration exceeds the HIL A
Bold	Concentration exceeds the EIL (Open Parkland and Urban Res)
Bold	Concentration exceeds the CCT1 waste disposal guideline

[1] Excluded Material Order, Waste Avoidance and Resource Recovery Act 2001: Environment Operations (Waste) Regulation 2005 - General Exemption Under Part 9, "The excavated natural material exemption" (2014).
[2] Column 2 - Maximum average concentration for characterisation
[2a] Column 3 - Absolute maximum concentration
[2aa] Based on RSL Test Method T276
[3] Under Section 6 (Definitions) of the 'excavated natural exemption' (2012), Excavated Natural Material does not include material that contains asbestos.
[4] Based on Table 1a(1)A Schedule B(1), National Environmental Protection (Assessment of Site Contamination) Measure 2011
[5] Based on Table 7 Schedule B(1), National Environmental Protection (Assessment of Site Contamination) Measure 1999
[6] For protection of human health for residential A - with garden/accessible soil - home grown produce/minimal opportunities for soil access
[7] Based on Taylor and Langley 1998 Residential D - with minimal opportunities for soil interaction
[8] National Environmental Protection (assessment of Site Contamination) Measure (NEPC 1999)
[9] ANZECC/ (Environmental Investigation Level) from ANZECC and NHMRC (1992) Australian and NZ guidelines for the assessment and management of contaminated sites
[10] For protection of structures
[11] Table 1B(5) EILs Soil
[12] USEPA (RSLs (2010)
[13] Table 1B(6) HSLs - guidelines for Assessing Service station sites
[14] DER - Interim guidelines on the assessment and management of Perfluoroalkyl and Polyfluoroalkyl substances (PFAS)
[15] Table 1A(3) HSLs Soil
[16] Table 1A(5) HSLs direct contact
[17] Table 1B(6) HSLs direct contact
ND - Not Detected
NA - Not Analysed
LOR Limits of Reporting
See original laboratory reports for detection limits
* Electrical conductivity was measured as received
# For samples >1:05, the CCR is conservatively assumed to be the concentration for calculating average concentrations

TerraInsight Pty Ltd
U34 no 10-12 Sylvester Ave
Unanderra
NSW 2626

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Karen Gates (cc results/SRAs)**

Report **907069-L**
Project name ADDITIONAL-MANYANA DEVELOPMENT
Project ID TERRA22-165
Received Date Jul 18, 2022

Client Sample ID			**D4**	**D9**	**D12**	**D15**
Sample Matrix			**US Leachate**	**US Leachate**	**US Leachate**	**US Leachate**
Eurofins Sample No.			**S22-JI0038863**	**S22-JI0038864**	**S22-JI0038865**	**S22-JI0038866**
Date Sampled			**Jun 30, 2022**	**Jun 30, 2022**	**Jun 30, 2022**	**Jun 30, 2022**
Test/Reference	LOR	Unit				
Heavy Metals						
Nickel	0.01	mg/L	0.02	< 0.01	< 0.01	0.11
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	2.0
pH (initial)	0.1	pH Units	7.2	6.2	7.8	9.2
pH (off)	0.1	pH Units	5.2	4.5	4.9	5.3
pH (USA HCl addition)	0.1	pH Units	2.1	2.1	2.2	5.0

Client Sample ID			**D18**	**D21**
Sample Matrix			**US Leachate**	**US Leachate**
Eurofins Sample No.			**S22-JI0038867**	**S22-JI0038868**
Date Sampled			**Jun 30, 2022**	**Jun 30, 2022**
Test/Reference	LOR	Unit		
Heavy Metals				
Nickel	0.01	mg/L	0.11	0.14
USA Leaching Procedure				
Leachate Fluid[C01]		comment	1.0	1.0
pH (initial)	0.1	pH Units	6.5	6.6
pH (off)	0.1	pH Units	5.2	4.8
pH (USA HCl addition)	0.1	pH Units	2.1	2.1

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Jul 19, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
USA Leaching Procedure	Sydney	Jul 19, 2022	14 Days
- Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes			

eurofins

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
Tel: +61 7 3902 4600
NATA# 1261 Site# 20794

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Tel: +61 2 4968 8448
NATA# 1261 Site# 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool
WA 6106
Tel: +61 8 6253 4444
NATA# 2377 Site# 2370

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
Tel: +64 9 526 45 51
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Company Name: TerraInsight Pty Ltd
Address: U34 no 10-12 Sylvester Ave
Unanderra
NSW 2626

Project Name: ADDITIONAL-MANYANA DEVELOPMENT
Project ID: TERRA22-165

Order No.:
Report #: 907069
Phone: 0458 008 030
Fax:

Received: Jul 18, 2022 3:07 PM
Due: Jul 19, 2022
Priority: 1 Day
Contact Name: Karen Gates (cc results/SRAs)

Eurofins Analytical Services Manager : Hannah Mawbey

Sample Detail						Nickel	USA Leaching Procedure
Sydney Laboratory - NATA # 1261 Site # 18217						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	D4	Jun 30, 2022		US Leachate	S22-Jl0038863	X	X
2	D9	Jun 30, 2022		US Leachate	S22-Jl0038864	X	X
3	D12	Jun 30, 2022		US Leachate	S22-Jl0038865	X	X
4	D15	Jun 30, 2022		US Leachate	S22-Jl0038866	X	X
5	D18	Jun 30, 2022		US Leachate	S22-Jl0038867	X	X
6	D21	Jun 30, 2022		US Leachate	S22-Jl0038868	X	X
Test Counts						6	6

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
µg/L: micrograms per litre
ppm: parts per million
ppb: parts per billion
%: Percentage
org/100 mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Nickel			mg/L	< 0.01			0.01	Pass	
LCS - % Recovery									
Heavy Metals									
Nickel			%	95			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Nickel	S22-Jl0038867	CP	%	95			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Nickel	S22-Jl0031892	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
C01	Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other

Authorised by:

Hannah Mawbey	Analytical Services Manager
Gabriele Cordero	Senior Analyst-Metal

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

TerraInsight Pty Ltd
U34 no 10-12 Sylvester Ave
Unanderra
NSW 2626

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Karen Gates (cc results/SRAs)**

Report **907441-L**
Project name ADDITIONAL-MANYANA DEVELOPMENT
Project ID TERRA22-165
Received Date Jul 20, 2022

Client Sample ID			**D8**
Sample Matrix			**US Leachate**
Eurofins Sample No.			**S22-JI0041744**
Date Sampled			**Jun 30, 2022**
Test/Reference	LOR	Unit	
Heavy Metals			
Lead	0.01	mg/L	0.03
USA Leaching Procedure			
Leachate Fluid[C01]		comment	1.0
pH (initial)	0.1	pH Units	6.5
pH (off)	0.1	pH Units	5.4
pH (USA HCl addition)	0.1	pH Units	2.1

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Jul 20, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
USA Leaching Procedure	Sydney	Jul 20, 2022	14 Days
- Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes			

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
Tel: +61 7 3902 4600
NATA# 1261 Site# 20794

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Tel: +61 2 4968 8448
NATA# 1261 Site# 25079

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool
WA 6106
Tel: +61 8 6253 4444
NATA# 2377 Site# 2370

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
Tel: +64 9 526 45 51
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Company Name: TerraInsight Pty Ltd
Address: U34 no 10-12 Sylvester Ave
Unanderra
NSW 2626

Project Name: ADDITIONAL-MANYANA DEVELOPMENT
Project ID: TERRA22-165

Order No.:
Report #: 907441
Phone: 0458 008 030
Fax:

Received: Jul 20, 2022 11:07 AM
Due: Jul 21, 2022
Priority: 1 Day
Contact Name: Karen Gates (cc results/SRAs)

Eurofins Analytical Services Manager : Hannah Mawbey

Sample Detail						Lead	USA Leaching Procedure
Sydney Laboratory - NATA # 1261 Site # 18217						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	D8	Jun 30, 2022		US Leachate	S22-Jl0041744	X	X
Test Counts						1	1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
µg/L: micrograms per litre
ppm: parts per million
ppb: parts per billion
%: Percentage
org/100 mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/L	< 0.01			0.01	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	95			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S22-Jl0041719	NCP	%	106			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	N22-Jl0024308	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
C01	Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other

Authorised by:

Quinn Raw	Analytical Services Manager
Gabriele Cordero	Senior Analyst-Metal

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

Certificate of Analysis

TerraInsight Pty Ltd
U34 no 10-12 Sylvester Ave
Unanderra
NSW 2626

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025–Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention:	Karen Gates (cc results/SRAs)
Report	902307-AID
Project Name	MANYANA DEVELOPMENT
Project ID	TERRA22-165
Received Date	Jul 01, 2022
Date Reported	Jul 08, 2022

Methodology:

Asbestos Fibre Identification	Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques. *NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.*
Unknown Mineral Fibres	Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity. *NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.*
Subsampling Soil Samples	The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) is employed. *NOTE: Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis, in accordance with AS 4964-2004.*
Bonded asbestos-containing material (ACM)	The material is first examined and any fibres isolated for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination.The resultant material is then further examined in accordance with AS 4964 - 2004. *NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.*
Limit of Reporting	The performance limitation of the AS 4964 (2004) method for non-homogeneous samples is around 0.1 g/kg (equivalent to 0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis, this is considered to be at the nominal reporting limit of 0.01% (w/w). The NEPM screening level of 0.001% (w/w) is intended as an on-site determination, not a laboratory Limit of Reporting (LOR), per se. Examination of a large sample size (e.g. 500 mL) may improve the likelihood of detecting asbestos, particularly AF, to aid assessment against the NEPM criteria. Gravimetric determinations to this level of accuracy are outside of AS 4964 and hence NATA Accreditation does not cover the performance of this service (non-NATA results shown with an asterisk). *NOTE: NATA News March 2014, p.7, states in relation to AS 4964: "This is a qualitative method with a nominal reporting limit of 0.01 % " and that currently in Australia "there is no validated method available for the quantification of asbestos".This report is consistent with the analytical procedures and reporting recommendations in the NEPM and the WA DoH.*

Project Name MANYANA DEVELOPMENT
Project ID TERRA22-165
Date Sampled Jun 30, 2022
Report 902307-AID

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
A1 A2 A11	22-Jl0000555	Jun 30, 2022	Approximate Sample 460g Sample consisted of: Brown fine-grained clayey soil, plaster, organic debris and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
A3 A4 A5	22-Jl0000556	Jun 30, 2022	Approximate Sample 337g Sample consisted of: Brown coarse-grained soil, organic debris and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
A6 A7 A8	22-Jl0000557	Jun 30, 2022	Approximate Sample 381g Sample consisted of: Brown fine-grained clayey soil, plaster, organic debris and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
A9 A10	22-Jl0000558	Jun 30, 2022	Approximate Sample 385g Sample consisted of: Brown fine-grained clayey soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
A12 A13	22-Jl0000559	Jun 30, 2022	Approximate Sample 411g Sample consisted of: Brown coarse-grained soil, plaster, organic debris and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
A14 A15 A16	22-Jl0000560	Jun 30, 2022	Approximate Sample 422g Sample consisted of: Brown coarse-grained soil, plaster, glass, organic debris and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
A17 A18	22-Jl0000561	Jun 30, 2022	Approximate Sample 364g Sample consisted of: Brown fine-grained clayey soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
A19 A20 A21	22-Jl0000562	Jun 30, 2022	Approximate Sample 464g Sample consisted of: Brown fine-grained clayey soil, plaster, organic debris and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
X5 X6 X7 X8 (NEAR A12)	22-Jl0000563	Jun 30, 2022	Approximate Sample 124g / 100x65x10mm Sample consisted of: Grey fibre cement material and coating	Chrysotile and amosite asbestos detected.

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Asbestos - LTM-ASB-8020	Sydney	Jul 01, 2022	Indefinite
Asbestos - LTM-ASB-8020	Sydney	Jul 01, 2022	Indefinite

eurofins

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
Tel: +61 7 3902 4600
NATA# 1261 Site# 20794

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Tel: +61 2 4968 8448
NATA# 1261 Site# 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool
WA 6106
Tel: +61 8 6253 4444
NATA# 2377 Site# 2370

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
Tel: +64 9 526 45 51
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Company Name: TerraInsight Pty Ltd
Address: U34 no 10-12 Sylvester Ave
Unanderra
NSW 2626

Project Name: MANYANA DEVELOPMENT
Project ID: TERRA22-165

Order No.:
Report #: 902307
Phone: 0458 008 030
Fax:

Received: Jul 1, 2022 9:45 AM
Due: Jul 8, 2022
Priority: 5 Day
Contact Name: Karen Gates (cc results/SRAs)

Eurofins Analytical Services Manager : Hannah Mawbey

Sample Detail						Asbestos - WA guidelines	Asbestos Absence /Presence
Sydney Laboratory - NATA # 1261 Site # 18217						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	A1 A2 A11	Jun 30, 2022		Soil	W22-JI0000555	X	
2	A3 A4 A5	Jun 30, 2022		Soil	W22-JI0000556	X	
3	A6 A7 A8	Jun 30, 2022		Soil	W22-JI0000557	X	
4	A9 A10	Jun 30, 2022		Soil	W22-JI0000558	X	
5	A12 A13	Jun 30, 2022		Soil	W22-JI0000559	X	
6	A14 A15 A16	Jun 30, 2022		Soil	W22-JI0000560	X	
7	A17 A18	Jun 30, 2022		Soil	W22-JI0000561	X	
8	A19 A20 A21	Jun 30, 2022		Soil	W22-JI0000562	X	
9	X5 X6 X7 X8 (NEAR A12)	Jun 30, 2022		Building Materials	W22-JI0000563		X
Test Counts						8	1

Internal Quality Control Review and Glossary General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. Information identified on this report with the colour **blue** indicates data provided by customer that may have an impact on the results.
5. Information identified on this report with the colour **orange** indicates sections of the report not covered by the laboratory's scope of NATA accreditation.
6. This report replaces any interim results previously issued.

Holding Times

Please refer to the most recent version of the 'Sample Preservation and Container Guide' for holding times (QS3001).
If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported. Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

Units

% w/w:	Percentage weight-for-weight basis, e.g. of asbestos in asbestos-containing finds in soil samples (**% w/w**)
F/fld	Airborne fibre filter loading as Fibres (**N**) per Fields counted (**n**)
F/mL	Airborne fibre reported concentration as Fibres per millilitre of air drawn over the sampler membrane (**C**)
g, kg	Mass, e.g. of whole sample (**M**) or asbestos-containing find within the sample (**m**)
g/kg	Concentration in grams per kilogram
L, mL	Volume, e.g. of air as measured in AFM (**V = r x t**)
L/min	Airborne fibre sampling Flowrate as litres per minute of air drawn over the sampler membrane (**r**)
min	Time (**t**), e.g. of air sample collection period

Calculations

Airborne Fibre Concentration: $C = \left(\frac{A}{a}\right) \times \left(\frac{N}{n}\right) \times \left(\frac{1}{r}\right) \times \left(\frac{1}{t}\right) = K \times \left(\frac{N}{n}\right) \times \left(\frac{1}{V}\right)$

Asbestos Content (as asbestos): $\%\, w/w = \frac{(m \times P_A)}{M}$

Weighted Average (of asbestos): $\%_{WA} = \sum \frac{(m \times P_A)_x}{x}$

Terms

%asbestos	Estimated percentage of asbestos in a given matrix. May be derived from knowledge or experience of the material, informed by HSG264 *Appendix 2*, else assumed to be 15% in accordance with WA DOH *Appendix 2* (**P_A**).
ACM	Asbestos Containing Materials. Asbestos contained within a non-asbestos matrix, typically presented in bonded (non-friable) condition. For the purposes of the NEPM and WA DOH, ACM corresponds to material larger than 7 mm x 7 mm.
AF	Asbestos Fines. Asbestos contamination within a soil sample, as defined by WA DOH. Includes loose fibre bundles and small pieces of friable and non-friable material such as asbestos cement fragments mixed with soil. Considered under the NEPM as equivalent to "non-bonded / friable".
AFM	Airborne Fibre Monitoring, e.g. by the MFM.
Amosite	Amosite Asbestos Detected. Amosite may also refer to Fibrous Grunerite or Brown Asbestos. Identified in accordance with AS 4964-2004.
AS	Australian Standard.
Asbestos Content (as asbestos)	Total % w/w asbestos content in asbestos-containing finds in a soil sample (**% w/w)**.
Chrysotile	Chrysotile Asbestos Detected. Chrysotile may also refer to Fibrous Serpentine or White Asbestos. Identified in accordance with AS 4964-2004.
COC	Chain of Custody.
Crocidolite	Crocidolite Asbestos Detected. Crocidolite may also refer to Fibrous Riebeckite or Blue Asbestos. Identified in accordance with AS 4964-2004.
Dry	Sample is dried by heating prior to analysis.
DS	Dispersion Staining. Technique required for Unequivocal Identification of asbestos fibres by PLM.
FA	Fibrous Asbestos. Asbestos containing material that is wholly or in part friable, including materials with higher asbestos content with a propensity to become friable with handling, and any material that was previously non-friable and in a severely degraded condition. For the purposes of the NEPM and WA DOH, FA generally corresponds to material larger than 7 mm x 7 mm, although FA may be more difficult to visibly distinguish and may be assessed as AF.
Fibre Count	Total of all fibres (whether asbestos or not) meeting the counting criteria set out in the NOHSC:3003
Fibre ID	Fibre Identification. Unequivocal identification of asbestos fibres according to AS 4964-2004. Includes Chrysotile, Amosite (Grunerite) or Crocidolite asbestos.
Friable	Asbestos-containing materials of any size that may be broken or crumbled by hand pressure. For the purposes of the NEPM, this includes both AF and FA. It is outside of the laboratory's remit to assess degree of friability.
HSG248	UK HSE HSG248, *Asbestos: The Analysts Guide*, 2nd Edition (2021).
HSG264	UK HSE HSG264, *Asbestos: The Survey Guide* (2012).
ISO (also ISO/IEC)	International Organization for Standardization / International Electrotechnical Commission.
K Factor	Microscope constant (**K**) as derived from the effective filter area of the given AFM membrane used for collecting the sample (**A**) and the projected eyepiece graticule area of the specific microscope used for the analysis (**a**).
LOR	Limit of Reporting.
MFM (also NOHSC:3003)	Membrane Filter Method. As described by the Australian Government National Occupational Health and Safety Commission, *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres*, 2nd Edition [NOHSC:3003(2005)].
NEPM (also ASC NEPM)	National Environment Protection (Assessment of Site Contamination) Measure, (2013, as amended).
Organic	Organic Fibres Detected. Organic may refer to Natural or Man-Made Polymeric Fibres. Identified in accordance with AS 4964-2004.
PCM	Phase Contrast Microscopy. As used for Fibre Counting according to the MFM.
PLM	Polarised Light Microscopy. As used for Fibre Identification and Trace Analysis according to AS 4964-2004.
SMF	Synthetic Mineral Fibre Detected. SMF may also refer to Man Made Vitreous Fibres. Identified in accordance with AS 4964-2004.
SRA	Sample Receipt Advice.
Trace Analysis	Analytical procedure used to detect the presence of respirable fibres (particularly asbestos) in a given sample matrix.
UK HSE HSG	United Kingdom, Health and Safety Executive, Health and Safety Guidance, publication.
UMF	Unidentified Mineral Fibre Detected. Fibrous minerals that are detected but have not been unequivocally identified by PLM with DS according the AS 4964-2004. May include (but not limited to) Actinolite, Anthophyllite or Tremolite asbestos.
WA DOH	Reference document for the NEPM. Government of Western Australia, *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia* (updated 2021), including Appendix Four: *Laboratory analysis*
Weighted Average	Combined average % w/w asbestos content of all asbestos-containing finds in the given aliquot or total soil sample (**$\%_{WA}$**).

Comments

22-JI0000555 to 22-JI0000562: Samples received were less than the nominal 500mL as recommended in Section 4.10 of the NEPM Schedule B1 - Guideline on Investigation Levels for Soil and Groundwater.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Asbestos Counter/Identifier:

Laxman Dias	Senior Analyst-Asbestos

Authorised by:

Sayeed Abu	Senior Analyst-Asbestos

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

TerraInsight Pty Ltd
U34 no 10-12 Sylvester Ave
Unanderra
NSW 2626

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Karen Gates (cc results/SRAs)**

Report **902292-W-V3**
Project name MANYANA DEVELOPMENT
Project ID TERRA22-165
Received Date Jul 01, 2022

Client Sample ID			**6W01**
Sample Matrix			**Water**
Eurofins Sample No.			**W22-JI0000509**
Date Sampled			**Jun 30, 2022**
Test/Reference	LOR	Unit	
Organochlorine Pesticides			
Chlordanes - Total	0.002	mg/L	< 0.002
4.4'-DDD	0.0002	mg/L	< 0.0002
4.4'-DDE	0.0002	mg/L	< 0.0002
4.4'-DDT	0.0002	mg/L	< 0.0002
a-HCH	0.0002	mg/L	< 0.0002
Aldrin	0.0002	mg/L	< 0.0002
b-HCH	0.0002	mg/L	< 0.0002
d-HCH	0.0002	mg/L	< 0.0002
Dieldrin	0.0002	mg/L	< 0.0002
Endosulfan I	0.0002	mg/L	< 0.0002
Endosulfan II	0.0002	mg/L	< 0.0002
Endosulfan sulphate	0.0002	mg/L	< 0.0002
Endrin	0.0002	mg/L	< 0.0002
Endrin aldehyde	0.0002	mg/L	< 0.0002
Endrin ketone	0.0002	mg/L	< 0.0002
g-HCH (Lindane)	0.0002	mg/L	< 0.0002
Heptachlor	0.0002	mg/L	< 0.0002
Heptachlor epoxide	0.0002	mg/L	< 0.0002
Hexachlorobenzene	0.0002	mg/L	< 0.0002
Methoxychlor	0.0002	mg/L	< 0.0002
Toxaphene	0.005	mg/L	< 0.005
Aldrin and Dieldrin (Total)*	0.0002	mg/L	< 0.0002
DDT + DDE + DDD (Total)*	0.0002	mg/L	< 0.0002
Vic EPA IWRG 621 OCP (Total)*	0.002	mg/L	< 0.002
Vic EPA IWRG 621 Other OCP (Total)*	0.002	mg/L	< 0.002
Dibutylchlorendate (surr.)	1	%	102
Tetrachloro-m-xylene (surr.)	1	%	83
Organophosphorus Pesticides			
Azinphos-methyl	0.002	mg/L	< 0.002
Bolstar	0.002	mg/L	< 0.002
Chlorfenvinphos	0.02	mg/L	< 0.02
Chlorpyrifos	0.002	mg/L	< 0.002
Chlorpyrifos-methyl	0.002	mg/L	< 0.002
Coumaphos	0.02	mg/L	< 0.02
Demeton-S	0.002	mg/L	< 0.002

Client Sample ID			6W01
Sample Matrix			Water
Eurofins Sample No.			W22-JI0000509
Date Sampled			Jun 30, 2022
Test/Reference	LOR	Unit	
Organophosphorus Pesticides			
Demeton-O	0.002	mg/L	< 0.002
Diazinon	0.002	mg/L	< 0.002
Dichlorvos	0.002	mg/L	< 0.002
Dimethoate	0.002	mg/L	< 0.002
Disulfoton	0.002	mg/L	< 0.002
EPN	0.002	mg/L	< 0.002
Ethion	0.002	mg/L	< 0.002
Ethoprop	0.002	mg/L	< 0.002
Ethyl parathion	0.002	mg/L	< 0.002
Fenitrothion	0.002	mg/L	< 0.002
Fensulfothion	0.002	mg/L	< 0.002
Fenthion	0.002	mg/L	< 0.002
Malathion	0.002	mg/L	< 0.002
Merphos	0.002	mg/L	< 0.002
Methyl parathion	0.002	mg/L	< 0.002
Mevinphos	0.002	mg/L	< 0.002
Monocrotophos	0.002	mg/L	< 0.002
Naled	0.002	mg/L	< 0.002
Omethoate	0.02	mg/L	< 0.02
Phorate	0.002	mg/L	< 0.002
Pirimiphos-methyl	0.02	mg/L	< 0.02
Pyrazophos	0.002	mg/L	< 0.002
Ronnel	0.002	mg/L	< 0.002
Terbufos	0.002	mg/L	< 0.002
Tetrachlorvinphos	0.002	mg/L	< 0.002
Tokuthion	0.002	mg/L	< 0.002
Trichloronate	0.002	mg/L	< 0.002
Triphenylphosphate (surr.)	1	%	131
Polychlorinated Biphenyls			
Aroclor-1016	0.005	mg/L	< 0.005
Aroclor-1221	0.005	mg/L	< 0.005
Aroclor-1232	0.005	mg/L	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005
Total PCB*	0.005	mg/L	< 0.005
Dibutylchlorendate (surr.)	1	%	102
Tetrachloro-m-xylene (surr.)	1	%	83

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B15			
Organochlorine Pesticides	Sydney	Jul 07, 2022	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
Organophosphorus Pesticides	Sydney	Jul 07, 2022	7 Days
- Method: LTM-ORG-2200 Organophosphorus Pesticides by GC-MS			
Polychlorinated Biphenyls	Sydney	Jul 07, 2022	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			

eurofins

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
Tel: +61 7 3902 4600
NATA# 1261 Site# 20794

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Tel: +61 2 4968 8448
NATA# 1261 Site# 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool
WA 6106
Tel: +61 8 6253 4444
NATA# 2377 Site# 2370

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
Tel: +64 9 526 45 51
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Company Name: TerraInsight Pty Ltd
Address: U34 no 10-12 Sylvester Ave
Unanderra
NSW 2626

Project Name: MANYANA DEVELOPMENT
Project ID: TERRA22-165

Order No.:
Report #: 902292
Phone: 0458 008 030
Fax:

Received: Jul 1, 2022 9:45 AM
Due: Jul 8, 2022
Priority: 5 Day
Contact Name: Karen Gates (cc results/SRAs)

Eurofins Analytical Services Manager : Hannah Mawbey

Sample Detail						Eurofins Suite B15	Chromium (speciated)	Moisture Set	NEPM Screen for Soil Classification	Eurofins Suite B1	Eurofins Suite B7A
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X
External Laboratory											
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**						
1	D1	Jun 30, 2022		Soil	W22-JI0000485			X			X
2	D2	Jun 30, 2022		Soil	W22-JI0000486	X	X	X			X
3	D3	Jun 30, 2022		Soil	W22-JI0000487		X	X			X
4	D4	Jun 30, 2022		Soil	W22-JI0000488		X	X			X
5	D5	Jun 30, 2022		Soil	W22-JI0000489	X	X	X			X
6	D6	Jun 30, 2022		Soil	W22-JI0000490		X	X			X
7	D7	Jun 30, 2022		Soil	W22-JI0000491		X	X			X
8	D8	Jun 30, 2022		Soil	W22-JI0000492		X	X			X
9	D9	Jun 30, 2022		Soil	W22-JI0000493		X	X			X
10	D10	Jun 30, 2022		Soil	W22-JI0000494		X	X			X
11	D11	Jun 30, 2022		Soil	W22-JI0000495		X	X	X		X
12	D12	Jun 30, 2022		Soil	W22-JI0000496		X	X			X
13	D13	Jun 30, 2022		Soil	W22-JI0000497		X	X			X

eurofins

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
Tel: +61 7 3902 4600
NATA# 1261 Site# 20794

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Tel: +61 2 4968 8448
NATA# 1261 Site# 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool
WA 6106
Tel: +61 8 6253 4444
NATA# 2377 Site# 2370

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
Tel: +64 9 526 45 51
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Company Name: TerraInsight Pty Ltd
Address: U34 no 10-12 Sylvester Ave
Unanderra
NSW 2626

Project Name: MANYANA DEVELOPMENT
Project ID: TERRA22-165

Order No.:
Report #: 902292
Phone: 0458 008 030
Fax:

Received: Jul 1, 2022 9:45 AM
Due: Jul 8, 2022
Priority: 5 Day
Contact Name: Karen Gates (cc results/SRAs)

Eurofins Analytical Services Manager : Hannah Mawbey

Sample Detail						Eurofins Suite B15	Chromium (speciated)	Moisture Set	NEPM Screen for Soil Classification	Eurofins Suite B1	Eurofins Suite B7A
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X
14	D14	Jun 30, 2022		Soil	W22-Jl0000498			X			X
15	D15	Jun 30, 2022		Soil	W22-Jl0000499			X			X
16	D16	Jun 30, 2022		Soil	W22-Jl0000500			X			X
17	D17	Jun 30, 2022		Soil	W22-Jl0000501		X	X			X
18	D18	Jun 30, 2022		Soil	W22-Jl0000502		X	X			X
19	D19	Jun 30, 2022		Soil	W22-Jl0000503		X	X			X
20	D20	Jun 30, 2022		Soil	W22-Jl0000504		X	X			X
21	D21	Jun 30, 2022		Soil	W22-Jl0000505		X	X			X
22	D7.2	Jun 30, 2022		Soil	W22-Jl0000506			X		X	
23	D13.2	Jun 30, 2022		Soil	W22-Jl0000507			X		X	
24	TB01	Jun 30, 2022		Soil	W22-Jl0000508			X		X	
25	6W01	Jun 30, 2022		Water	W22-Jl0000509	X					
Test Counts						3	17	24	1	3	21

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
µg/L: micrograms per litre
ppm: parts per million
ppb: parts per billion
%: Percentage
org/100 mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/L	< 0.002			0.002	Pass	
4.4'-DDD	mg/L	< 0.0002			0.0002	Pass	
4.4'-DDE	mg/L	< 0.0002			0.0002	Pass	
4.4'-DDT	mg/L	< 0.0002			0.0002	Pass	
a-HCH	mg/L	< 0.0002			0.0002	Pass	
Aldrin	mg/L	< 0.0002			0.0002	Pass	
b-HCH	mg/L	< 0.0002			0.0002	Pass	
d-HCH	mg/L	< 0.0002			0.0002	Pass	
Dieldrin	mg/L	< 0.0002			0.0002	Pass	
Endosulfan I	mg/L	< 0.0002			0.0002	Pass	
Endosulfan II	mg/L	< 0.0002			0.0002	Pass	
Endosulfan sulphate	mg/L	< 0.0002			0.0002	Pass	
Endrin	mg/L	< 0.0002			0.0002	Pass	
Endrin aldehyde	mg/L	< 0.0002			0.0002	Pass	
Endrin ketone	mg/L	< 0.0002			0.0002	Pass	
g-HCH (Lindane)	mg/L	< 0.0002			0.0002	Pass	
Heptachlor	mg/L	< 0.0002			0.0002	Pass	
Heptachlor epoxide	mg/L	< 0.0002			0.0002	Pass	
Hexachlorobenzene	mg/L	< 0.0002			0.0002	Pass	
Methoxychlor	mg/L	< 0.0002			0.0002	Pass	
Toxaphene	mg/L	< 0.005			0.005	Pass	
Method Blank							
Organophosphorus Pesticides							
Bolstar	mg/L	< 0.002			0.002	Pass	
Chlorfenvinphos	mg/L	< 0.02			0.02	Pass	
Chlorpyrifos	mg/L	< 0.002			0.002	Pass	
Chlorpyrifos-methyl	mg/L	< 0.002			0.002	Pass	
Coumaphos	mg/L	< 0.02			0.02	Pass	
Demeton-S	mg/L	< 0.002			0.002	Pass	
Demeton-O	mg/L	< 0.002			0.002	Pass	
Diazinon	mg/L	< 0.002			0.002	Pass	
Dichlorvos	mg/L	< 0.002			0.002	Pass	
Dimethoate	mg/L	< 0.002			0.002	Pass	
Disulfoton	mg/L	< 0.002			0.002	Pass	
EPN	mg/L	< 0.002			0.002	Pass	
Ethion	mg/L	< 0.002			0.002	Pass	
Ethoprop	mg/L	< 0.002			0.002	Pass	
Ethyl parathion	mg/L	< 0.002			0.002	Pass	
Fenitrothion	mg/L	< 0.002			0.002	Pass	
Fensulfothion	mg/L	< 0.002			0.002	Pass	
Fenthion	mg/L	< 0.002			0.002	Pass	
Malathion	mg/L	< 0.002			0.002	Pass	
Merphos	mg/L	< 0.002			0.002	Pass	
Methyl parathion	mg/L	< 0.002			0.002	Pass	
Mevinphos	mg/L	< 0.002			0.002	Pass	
Monocrotophos	mg/L	< 0.002			0.002	Pass	
Naled	mg/L	< 0.002			0.002	Pass	
Omethoate	mg/L	< 0.02			0.02	Pass	
Phorate	mg/L	< 0.002			0.002	Pass	
Pirimiphos-methyl	mg/L	< 0.02			0.02	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Ronnel	mg/L	< 0.002			0.002	Pass	
Terbufos	mg/L	< 0.002			0.002	Pass	
Tetrachlorvinphos	mg/L	< 0.002			0.002	Pass	
Tokuthion	mg/L	< 0.002			0.002	Pass	
Trichloronate	mg/L	< 0.002			0.002	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/L	< 0.005			0.005	Pass	
Aroclor-1221	mg/L	< 0.005			0.005	Pass	
Aroclor-1232	mg/L	< 0.005			0.005	Pass	
Aroclor-1242	mg/L	< 0.005			0.005	Pass	
Aroclor-1248	mg/L	< 0.005			0.005	Pass	
Aroclor-1254	mg/L	< 0.005			0.005	Pass	
Aroclor-1260	mg/L	< 0.005			0.005	Pass	
Total PCB*	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
4.4'-DDE	%	76			70-130	Pass	
4.4'-DDT	%	79			70-130	Pass	
a-HCH	%	85			70-130	Pass	
b-HCH	%	71			70-130	Pass	
d-HCH	%	71			70-130	Pass	
Endrin aldehyde	%	75			70-130	Pass	
g-HCH (Lindane)	%	96			70-130	Pass	
Heptachlor	%	88			70-130	Pass	
Methoxychlor	%	117			70-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides							
Dimethoate	%	71			70-130	Pass	
Ethion	%	108			70-130	Pass	
Fenitrothion	%	124			70-130	Pass	
Mevinphos	%	78			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls							
Aroclor-1016	%	74			70-130	Pass	
Aroclor-1260	%	73			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
4.4'-DDD	S22-Jn0062338	NCP	%	77			70-130	Pass	
4.4'-DDE	S22-Jn0062338	NCP	%	74			70-130	Pass	
4.4'-DDT	S22-Jn0062338	NCP	%	77			70-130	Pass	
b-HCH	S22-Jn0062338	NCP	%	81			70-130	Pass	
d-HCH	S22-Jn0062338	NCP	%	75			70-130	Pass	
Dieldrin	S22-Jn0062338	NCP	%	70			70-130	Pass	
Endrin aldehyde	S22-Jn0062338	NCP	%	73			70-130	Pass	
g-HCH (Lindane)	S22-Jn0062338	NCP	%	82			70-130	Pass	
Heptachlor	S22-Jn0062338	NCP	%	97			70-130	Pass	
Heptachlor epoxide	S22-Jn0062338	NCP	%	72			70-130	Pass	
Methoxychlor	S22-Jn0062338	NCP	%	124			70-130	Pass	
Spike - % Recovery									
Organophosphorus Pesticides				Result 1					
Ethion	S22-Jn0062338	NCP	%	103			70-130	Pass	
Fenitrothion	S22-Jn0062338	NCP	%	121			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Polychlorinated Biphenyls				Result 1					
Aroclor-1016	S22-Jn0062338	NCP	%	94			70-130	Pass	
Aroclor-1260	S22-Jn0062338	NCP	%	104			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
4.4'-DDD	S22-Jn0062337	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
4.4'-DDE	S22-Jn0062337	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
4.4'-DDT	S22-Jn0062337	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
a-HCH	S22-Jn0062337	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Aldrin	S22-Jn0062337	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
b-HCH	S22-Jn0062337	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
d-HCH	S22-Jn0062337	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Dieldrin	S22-Jn0062337	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Endosulfan I	S22-Jn0062337	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Endosulfan II	S22-Jn0062337	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Endosulfan sulphate	S22-Jn0062337	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Endrin	S22-Jn0062337	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Endrin aldehyde	S22-Jn0062337	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Endrin ketone	S22-Jn0062337	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
g-HCH (Lindane)	S22-Jn0062337	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Heptachlor	S22-Jn0062337	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Heptachlor epoxide	S22-Jn0062337	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Hexachlorobenzene	S22-Jn0062337	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Methoxychlor	S22-Jn0062337	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Toxaphene	S22-Jn0062337	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Bolstar	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Chlorfenvinphos	S22-Jn0062337	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Chlorpyrifos	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Chlorpyrifos-methyl	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Coumaphos	S22-Jn0062337	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Demeton-S	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Demeton-O	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Diazinon	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Dichlorvos	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Dimethoate	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Disulfoton	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
EPN	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Ethion	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Ethoprop	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Ethyl parathion	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Fenitrothion	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Fensulfothion	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Fenthion	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Malathion	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Merphos	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Methyl parathion	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Mevinphos	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Monocrotophos	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	

Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Naled	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Omethoate	S22-Jn0062337	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Phorate	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Pirimiphos-methyl	S22-Jn0062337	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Pyrazophos	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Ronnel	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Terbufos	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Tetrachlorvinphos	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Tokuthion	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Trichloronate	S22-Jn0062337	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Duplicate									
Polychlorinated Biphenyls				Result 1	Result 2	RPD			
Aroclor-1016	S22-Jn0062337	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1221	S22-Jn0062337	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1232	S22-Jn0062337	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1242	S22-Jn0062337	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1248	S22-Jn0062337	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1254	S22-Jn0062337	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1260	S22-Jn0062337	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Total PCB*	S22-Jn0062337	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Hannah Mawbey	Analytical Services Manager
Roopesh Rangarajan	Senior Analyst-Organic

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

TerraInsight Pty Ltd
U34 no 10-12 Sylvester Ave
Unanderra
NSW 2626

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Karen Gates (cc results/SRAs)**

Report **902292-S-V3**
Project name MANYANA DEVELOPMENT
Project ID TERRA22-165
Received Date Jul 01, 2022

Client Sample ID			**D1**	[G01]**D2**	**D3**	[G01]**D4**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**W22-JI0000485**	**W22-JI0000486**	**W22-JI0000487**	**W22-JI0000488**
Date Sampled			**Jun 30, 2022**	**Jun 30, 2022**	**Jun 30, 2022**	**Jun 30, 2022**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	450	43	61	100
TRH C15-C28	50	mg/kg	720	250	150	390
TRH C29-C36	50	mg/kg	310	310	410	560
TRH C10-C36 (Total)	50	mg/kg	1480	603	621	1050
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	78	81	69	85
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	450	53	54	100
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5

Client Sample ID			D1	[G01]D2	D3	[G01]D4
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			W22-JI0000485	W22-JI0000486	W22-JI0000487	W22-JI0000488
Date Sampled			Jun 30, 2022	Jun 30, 2022	Jun 30, 2022	Jun 30, 2022
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	19	132	90	127
p-Terphenyl-d14 (surr.)	1	%	[Q09]INT	118	91	115
Phenols (Halogenated)						
2-Chlorophenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2.4-Dichlorophenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2.4.5-Trichlorophenol	1	mg/kg	< 1	< 1	< 1	< 1
2.4.6-Trichlorophenol	1	mg/kg	< 1	< 1	< 1	< 1
2.6-Dichlorophenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
4-Chloro-3-methylphenol	1	mg/kg	< 1	< 1	< 1	< 1
Pentachlorophenol	1	mg/kg	< 1	< 1	< 1	< 1
Tetrachlorophenols - Total	10	mg/kg	< 10	< 10	< 10	< 10
Total Halogenated Phenol*	1	mg/kg	< 1	< 1	< 1	< 1
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	20	mg/kg	< 20	< 20	< 20	< 20
2-Methyl-4.6-dinitrophenol	5	mg/kg	< 5	< 5	< 5	< 5
2-Nitrophenol	1	mg/kg	< 1	< 1	< 1	< 1
2.4-Dimethylphenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2.4-Dinitrophenol	5	mg/kg	< 5	< 5	< 5	< 5
2-Methylphenol (o-Cresol)	0.2	mg/kg	< 0.2	< 0.5	< 0.2	< 0.5
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	< 0.4	< 1	< 0.4	< 1
Total cresols*	0.5	mg/kg	< 0.5	< 1	< 0.5	< 1
4-Nitrophenol	5	mg/kg	< 5	< 5	< 5	< 5
Dinoseb	20	mg/kg	< 20	< 20	< 20	< 20
Phenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenol-d6 (surr.)	1	%	36	84	74	89
Total Non-Halogenated Phenol*	20	mg/kg	< 20	< 20	< 20	< 20
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	450	53	54	100
TRH >C16-C34	100	mg/kg	870	480	440	800
TRH >C34-C40	100	mg/kg	260	180	280	340
TRH >C10-C40 (total)*	100	mg/kg	1580	713	774	1240
Metals M8						
Arsenic	2	mg/kg	5.7	< 2	< 2	8.8
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	71	90	50	150
Copper	5	mg/kg	58	21	15	32
Lead	5	mg/kg	8.7	12	8.9	12
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	25	21	15	32
Zinc	5	mg/kg	410	83	24	160
% Moisture	1	%	34	36	40	29
Chromium (hexavalent)	1	mg/kg	-	< 1	< 1	< 1
Chromium (trivalent)	5	mg/kg	-	90	50	150

Client Sample ID			D1	[G01]D2	D3	[G01]D4
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			W22-JI0000485	W22-JI0000486	W22-JI0000487	W22-JI0000488
Date Sampled			Jun 30, 2022	Jun 30, 2022	Jun 30, 2022	Jun 30, 2022
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	-	< 1	-	-
4.4'-DDD	0.05	mg/kg	-	< 0.5	-	-
4.4'-DDE	0.05	mg/kg	-	< 0.5	-	-
4.4'-DDT	0.05	mg/kg	-	< 0.5	-	-
a-HCH	0.05	mg/kg	-	< 0.5	-	-
Aldrin	0.05	mg/kg	-	< 0.5	-	-
b-HCH	0.05	mg/kg	-	< 0.5	-	-
d-HCH	0.05	mg/kg	-	< 0.5	-	-
Dieldrin	0.05	mg/kg	-	< 0.5	-	-
Endosulfan I	0.05	mg/kg	-	< 0.5	-	-
Endosulfan II	0.05	mg/kg	-	< 0.5	-	-
Endosulfan sulphate	0.05	mg/kg	-	< 0.5	-	-
Endrin	0.05	mg/kg	-	< 0.5	-	-
Endrin aldehyde	0.05	mg/kg	-	< 0.5	-	-
Endrin ketone	0.05	mg/kg	-	< 0.5	-	-
g-HCH (Lindane)	0.05	mg/kg	-	< 0.5	-	-
Heptachlor	0.05	mg/kg	-	< 0.5	-	-
Heptachlor epoxide	0.05	mg/kg	-	< 0.5	-	-
Hexachlorobenzene	0.05	mg/kg	-	< 0.5	-	-
Methoxychlor	0.05	mg/kg	-	< 0.5	-	-
Toxaphene	0.5	mg/kg	-	< 10	-	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	-	< 0.5	-	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	-	< 0.5	-	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	-	< 1	-	-
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	-	< 1	-	-
Dibutylchlorendate (surr.)	1	%	-	62	-	-
Tetrachloro-m-xylene (surr.)	1	%	-	111	-	-
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	-	< 0.5	-	-
Bolstar	0.2	mg/kg	-	< 0.5	-	-
Chlorfenvinphos	0.2	mg/kg	-	< 0.5	-	-
Chlorpyrifos	0.2	mg/kg	-	< 0.5	-	-
Chlorpyrifos-methyl	0.2	mg/kg	-	< 0.5	-	-
Coumaphos	2	mg/kg	-	< 5	-	-
Demeton-S	0.2	mg/kg	-	< 0.5	-	-
Demeton-O	0.2	mg/kg	-	< 0.5	-	-
Diazinon	0.2	mg/kg	-	< 0.5	-	-
Dichlorvos	0.2	mg/kg	-	< 0.5	-	-
Dimethoate	0.2	mg/kg	-	< 0.5	-	-
Disulfoton	0.2	mg/kg	-	< 0.5	-	-
EPN	0.2	mg/kg	-	< 0.5	-	-
Ethion	0.2	mg/kg	-	< 0.5	-	-
Ethoprop	0.2	mg/kg	-	< 0.5	-	-
Ethyl parathion	0.2	mg/kg	-	< 0.5	-	-
Fenitrothion	0.2	mg/kg	-	< 0.5	-	-
Fensulfothion	0.2	mg/kg	-	< 0.5	-	-
Fenthion	0.2	mg/kg	-	< 0.5	-	-
Malathion	0.2	mg/kg	-	< 0.5	-	-
Merphos	0.2	mg/kg	-	< 0.5	-	-

Client Sample ID			D1	[G01]D2	D3	[G01]D4
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			W22-JI0000485	W22-JI0000486	W22-JI0000487	W22-JI0000488
Date Sampled			Jun 30, 2022	Jun 30, 2022	Jun 30, 2022	Jun 30, 2022
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Methyl parathion	0.2	mg/kg	-	< 0.5	-	-
Mevinphos	0.2	mg/kg	-	< 0.5	-	-
Monocrotophos	2	mg/kg	-	< 5	-	-
Naled	0.2	mg/kg	-	< 0.5	-	-
Omethoate	2	mg/kg	-	< 5	-	-
Phorate	0.2	mg/kg	-	< 0.5	-	-
Pirimiphos-methyl	0.2	mg/kg	-	< 0.5	-	-
Pyrazophos	0.2	mg/kg	-	< 0.5	-	-
Ronnel	0.2	mg/kg	-	< 0.5	-	-
Terbufos	0.2	mg/kg	-	< 0.5	-	-
Tetrachlorvinphos	0.2	mg/kg	-	< 0.5	-	-
Tokuthion	0.2	mg/kg	-	< 0.5	-	-
Trichloronate	0.2	mg/kg	-	< 0.5	-	-
Triphenylphosphate (surr.)	1	%	-	71	-	-
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	-	< 1	-	-
Aroclor-1221	0.1	mg/kg	-	< 1	-	-
Aroclor-1232	0.1	mg/kg	-	< 1	-	-
Aroclor-1242	0.1	mg/kg	-	< 1	-	-
Aroclor-1248	0.1	mg/kg	-	< 1	-	-
Aroclor-1254	0.1	mg/kg	-	< 1	-	-
Aroclor-1260	0.1	mg/kg	-	< 1	-	-
Total PCB*	0.1	mg/kg	-	< 1	-	-
Dibutylchlorendate (surr.)	1	%	-	62	-	-
Tetrachloro-m-xylene (surr.)	1	%	-	111	-	-

Client Sample ID			[G01]D5	D6	D7	D8
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			W22-JI0000489	W22-JI0000490	W22-JI0000491	W22-JI0000492
Date Sampled			Jun 30, 2022	Jun 30, 2022	Jun 30, 2022	Jun 30, 2022
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	37	310	39	130
TRH C15-C28	50	mg/kg	220	1200	86	190
TRH C29-C36	50	mg/kg	320	1400	130	240
TRH C10-C36 (Total)	50	mg/kg	577	2910	255	560
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	54	77	78	63

Client Sample ID			[G01]D5	D6	D7	D8
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			W22-JI0000489	W22-JI0000490	W22-JI0000491	W22-JI0000492
Date Sampled			Jun 30, 2022	Jun 30, 2022	Jun 30, 2022	Jun 30, 2022
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	360	< 50	100
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	127	119	92	96
p-Terphenyl-d14 (surr.)	1	%	117	87	89	88
Phenols (Halogenated)						
2-Chlorophenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2.4-Dichlorophenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2.4.5-Trichlorophenol	1	mg/kg	< 1	< 1	< 1	< 1
2.4.6-Trichlorophenol	1	mg/kg	< 1	< 1	< 1	< 1
2.6-Dichlorophenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
4-Chloro-3-methylphenol	1	mg/kg	< 1	< 1	< 1	< 1
Pentachlorophenol	1	mg/kg	< 1	< 1	< 1	< 1
Tetrachlorophenols - Total	10	mg/kg	< 10	< 10	< 10	< 10
Total Halogenated Phenol*	1	mg/kg	< 1	< 1	< 1	< 1
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	20	mg/kg	< 20	< 20	< 20	< 20
2-Methyl-4.6-dinitrophenol	5	mg/kg	< 5	< 5	< 5	< 5
2-Nitrophenol	1	mg/kg	< 1	< 1	< 1	< 1
2.4-Dimethylphenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2.4-Dinitrophenol	5	mg/kg	< 5	< 5	< 5	< 5
2-Methylphenol (o-Cresol)	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	< 1	< 0.4	< 0.4	< 0.4
Total cresols*	0.5	mg/kg	< 1	< 0.5	< 0.5	< 0.5
4-Nitrophenol	5	mg/kg	< 5	< 5	< 5	< 5
Dinoseb	20	mg/kg	< 20	< 20	< 20	< 20
Phenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5

Client Sample ID			[G01]D5	D6	D7	D8
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			W22-JI0000489	W22-JI0000490	W22-JI0000491	W22-JI0000492
Date Sampled			Jun 30, 2022	Jun 30, 2022	Jun 30, 2022	Jun 30, 2022
Test/Reference	LOR	Unit				
Phenols (non-Halogenated)						
Phenol-d6 (surr.)	1	%	81	91	74	87
Total Non-Halogenated Phenol*	20	mg/kg	< 20	< 20	< 20	< 20
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	360	< 50	100
TRH >C16-C34	100	mg/kg	460	2300	180	360
TRH >C34-C40	100	mg/kg	170	780	< 100	190
TRH >C10-C40 (total)*	100	mg/kg	630	3440	180	650
Metals M8						
Arsenic	2	mg/kg	< 2	7.3	< 2	13
Cadmium	0.4	mg/kg	< 0.4	0.4	< 0.4	< 0.4
Chromium	5	mg/kg	130	68	290	240
Copper	5	mg/kg	51	73	11	22
Lead	5	mg/kg	13	14	8.9	110
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	31	19	24	28
Zinc	5	mg/kg	74	180	30	420
% Moisture	1	%	26	46	24	29
Chromium (hexavalent)	1	mg/kg	< 1	< 1	< 1	< 1
Chromium (trivalent)	5	mg/kg	130	68	290	240
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 1	-	-	-
4.4'-DDD	0.05	mg/kg	< 0.5	-	-	-
4.4'-DDE	0.05	mg/kg	< 0.5	-	-	-
4.4'-DDT	0.05	mg/kg	< 0.5	-	-	-
a-HCH	0.05	mg/kg	< 0.5	-	-	-
Aldrin	0.05	mg/kg	< 0.5	-	-	-
b-HCH	0.05	mg/kg	< 0.5	-	-	-
d-HCH	0.05	mg/kg	< 0.5	-	-	-
Dieldrin	0.05	mg/kg	< 0.5	-	-	-
Endosulfan I	0.05	mg/kg	< 0.5	-	-	-
Endosulfan II	0.05	mg/kg	< 0.5	-	-	-
Endosulfan sulphate	0.05	mg/kg	< 0.5	-	-	-
Endrin	0.05	mg/kg	< 0.5	-	-	-
Endrin aldehyde	0.05	mg/kg	< 0.5	-	-	-
Endrin ketone	0.05	mg/kg	< 0.5	-	-	-
g-HCH (Lindane)	0.05	mg/kg	< 0.5	-	-	-
Heptachlor	0.05	mg/kg	< 0.5	-	-	-
Heptachlor epoxide	0.05	mg/kg	< 0.5	-	-	-
Hexachlorobenzene	0.05	mg/kg	< 0.5	-	-	-
Methoxychlor	0.05	mg/kg	< 0.5	-	-	-
Toxaphene	0.5	mg/kg	< 10	-	-	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.5	-	-	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.5	-	-	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 1	-	-	-
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 1	-	-	-
Dibutylchlorendate (surr.)	1	%	109	-	-	-
Tetrachloro-m-xylene (surr.)	1	%	109	-	-	-

Client Sample ID			[G01]D5	D6	D7	D8
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			W22-JI0000489	W22-JI0000490	W22-JI0000491	W22-JI0000492
Date Sampled			Jun 30, 2022	Jun 30, 2022	Jun 30, 2022	Jun 30, 2022
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.5	-	-	-
Bolstar	0.2	mg/kg	< 0.5	-	-	-
Chlorfenvinphos	0.2	mg/kg	< 0.5	-	-	-
Chlorpyrifos	0.2	mg/kg	< 0.5	-	-	-
Chlorpyrifos-methyl	0.2	mg/kg	< 0.5	-	-	-
Coumaphos	2	mg/kg	< 5	-	-	-
Demeton-S	0.2	mg/kg	< 0.5	-	-	-
Demeton-O	0.2	mg/kg	< 0.5	-	-	-
Diazinon	0.2	mg/kg	< 0.5	-	-	-
Dichlorvos	0.2	mg/kg	< 0.5	-	-	-
Dimethoate	0.2	mg/kg	< 0.5	-	-	-
Disulfoton	0.2	mg/kg	< 0.5	-	-	-
EPN	0.2	mg/kg	< 0.5	-	-	-
Ethion	0.2	mg/kg	< 0.5	-	-	-
Ethoprop	0.2	mg/kg	< 0.5	-	-	-
Ethyl parathion	0.2	mg/kg	< 0.5	-	-	-
Fenitrothion	0.2	mg/kg	< 0.5	-	-	-
Fensulfothion	0.2	mg/kg	< 0.5	-	-	-
Fenthion	0.2	mg/kg	< 0.5	-	-	-
Malathion	0.2	mg/kg	< 0.5	-	-	-
Merphos	0.2	mg/kg	< 0.5	-	-	-
Methyl parathion	0.2	mg/kg	< 0.5	-	-	-
Mevinphos	0.2	mg/kg	< 0.5	-	-	-
Monocrotophos	2	mg/kg	< 5	-	-	-
Naled	0.2	mg/kg	< 0.5	-	-	-
Omethoate	2	mg/kg	< 5	-	-	-
Phorate	0.2	mg/kg	< 0.5	-	-	-
Pirimiphos-methyl	0.2	mg/kg	< 0.5	-	-	-
Pyrazophos	0.2	mg/kg	< 0.5	-	-	-
Ronnel	0.2	mg/kg	< 0.5	-	-	-
Terbufos	0.2	mg/kg	< 0.5	-	-	-
Tetrachlorvinphos	0.2	mg/kg	< 0.5	-	-	-
Tokuthion	0.2	mg/kg	< 0.5	-	-	-
Trichloronate	0.2	mg/kg	< 0.5	-	-	-
Triphenylphosphate (surr.)	1	%	58	-	-	-
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	< 1	-	-	-
Aroclor-1221	0.1	mg/kg	< 1	-	-	-
Aroclor-1232	0.1	mg/kg	< 1	-	-	-
Aroclor-1242	0.1	mg/kg	< 1	-	-	-
Aroclor-1248	0.1	mg/kg	< 1	-	-	-
Aroclor-1254	0.1	mg/kg	< 1	-	-	-
Aroclor-1260	0.1	mg/kg	< 1	-	-	-
Total PCB*	0.1	mg/kg	< 1	-	-	-
Dibutylchlorendate (surr.)	1	%	109	-	-	-
Tetrachloro-m-xylene (surr.)	1	%	109	-	-	-

Client Sample ID			D9	D10	D11	D12
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			W22-JI0000493	W22-JI0000494	W22-JI0000495	W22-JI0000496
Date Sampled			Jun 30, 2022	Jun 30, 2022	Jun 30, 2022	Jun 30, 2022
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	33	24	110	58
TRH C15-C28	50	mg/kg	210	94	370	280
TRH C29-C36	50	mg/kg	280	210	400	310
TRH C10-C36 (Total)	50	mg/kg	523	328	880	648
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	91	64	85	89
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	52	< 50	140	58
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	99	81	125	101
p-Terphenyl-d14 (surr.)	1	%	91	85	84	81
Phenols (Halogenated)						
2-Chlorophenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2.4-Dichlorophenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2.4.5-Trichlorophenol	1	mg/kg	< 1	< 1	< 1	< 1
2.4.6-Trichlorophenol	1	mg/kg	< 1	< 1	< 1	< 1
2.6-Dichlorophenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
4-Chloro-3-methylphenol	1	mg/kg	< 1	< 1	< 1	< 1
Pentachlorophenol	1	mg/kg	< 1	< 1	< 1	< 1

Client Sample ID			D9	D10	D11	D12
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			W22-JI0000493	W22-JI0000494	W22-JI0000495	W22-JI0000496
Date Sampled			Jun 30, 2022	Jun 30, 2022	Jun 30, 2022	Jun 30, 2022
Test/Reference	LOR	Unit				
Phenols (Halogenated)						
Tetrachlorophenols - Total	10	mg/kg	< 10	< 10	< 10	< 10
Total Halogenated Phenol*	1	mg/kg	< 1	< 1	< 1	< 1
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	20	mg/kg	< 20	< 20	< 20	< 20
2-Methyl-4.6-dinitrophenol	5	mg/kg	< 5	< 5	< 5	< 5
2-Nitrophenol	1	mg/kg	< 1	< 1	< 1	< 1
2.4-Dimethylphenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2.4-Dinitrophenol	5	mg/kg	< 5	< 5	< 5	< 5
2-Methylphenol (o-Cresol)	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	< 0.4	< 0.4	< 1	< 0.4
Total cresols*	0.5	mg/kg	< 0.5	< 0.5	< 1	< 0.5
4-Nitrophenol	5	mg/kg	< 5	< 5	< 5	< 5
Dinoseb	20	mg/kg	< 20	< 20	< 20	< 20
Phenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenol-d6 (surr.)	1	%	116	65	82	89
Total Non-Halogenated Phenol*	20	mg/kg	< 20	< 20	< 20	< 20
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	52	< 50	140	58
TRH >C16-C34	100	mg/kg	410	240	640	490
TRH >C34-C40	100	mg/kg	180	100	210	170
TRH >C10-C40 (total)*	100	mg/kg	642	340	990	718
Metals M8						
Arsenic	2	mg/kg	< 2	< 2	< 2	6.1
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	290	140	140	170
Copper	5	mg/kg	23	99	24	37
Lead	5	mg/kg	7.5	21	17	21
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	52	15	21	36
Zinc	5	mg/kg	41	98	50	190
% Moisture	1	%	22	24	32	20
Chromium (hexavalent)	1	mg/kg	< 1	< 1	< 1	< 1
Chromium (trivalent)	5	mg/kg	290	140	140	170
% Clay	1	%	-	-	8.5	-
Conductivity (1:5 aqueous extract at 25 °C as rec.)	10	uS/cm	-	-	43	-
pH (units)(1:5 soil:CaCl2 extract at 25 °C as rec.)	0.1	pH Units	-	-	5.5	-
Total Organic Carbon	0.1	%	-	-	6.3	-
Heavy Metals						
Iron	20	mg/kg	-	-	91000	-
Iron (%)	0.01	%	-	-	9.1	-
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	-	22	-

Client Sample ID			D13	D14	D15	D16
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			W22-JI0000497	W22-JI0000498	W22-JI0000499	W22-JI0000500
Date Sampled			Jun 30, 2022	Jun 30, 2022	Jun 30, 2022	Jun 30, 2022
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	27	260	230
TRH C15-C28	50	mg/kg	< 50	130	890	650
TRH C29-C36	50	mg/kg	< 50	370	130	490
TRH C10-C36 (Total)	50	mg/kg	< 50	527	1280	1370
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	59	91	66	89
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	430	170
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	79	74	[Q09]INT	84
p-Terphenyl-d14 (surr.)	1	%	75	[Q09]INT	[Q09]INT	83
Phenols (Halogenated)						
2-Chlorophenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2.4-Dichlorophenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2.4.5-Trichlorophenol	1	mg/kg	< 1	< 1	< 1	< 1
2.4.6-Trichlorophenol	1	mg/kg	< 1	< 1	< 1	< 1
2.6-Dichlorophenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
4-Chloro-3-methylphenol	1	mg/kg	< 1	< 1	< 1	< 1
Pentachlorophenol	1	mg/kg	< 1	< 1	< 1	< 1

Client Sample ID			D13	D14	D15	D16
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			W22-JI0000497	W22-JI0000498	W22-JI0000499	W22-JI0000500
Date Sampled			Jun 30, 2022	Jun 30, 2022	Jun 30, 2022	Jun 30, 2022
Test/Reference	LOR	Unit				
Phenols (Halogenated)						
Tetrachlorophenols - Total	10	mg/kg	< 10	< 10	< 10	< 10
Total Halogenated Phenol*	1	mg/kg	< 1	< 1	< 1	< 1
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	20	mg/kg	< 20	< 20	< 20	< 20
2-Methyl-4.6-dinitrophenol	5	mg/kg	< 5	< 5	< 5	< 5
2-Nitrophenol	1	mg/kg	< 1	< 1	< 1	< 1
2.4-Dimethylphenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2.4-Dinitrophenol	5	mg/kg	< 5	< 5	< 5	< 5
2-Methylphenol (o-Cresol)	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	< 0.4	< 0.4	< 0.4	0.5
Total cresols*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	0.5
4-Nitrophenol	5	mg/kg	< 5	< 5	< 5	< 5
Dinoseb	20	mg/kg	< 20	< 20	< 20	< 20
Phenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenol-d6 (surr.)	1	%	59	73	66	68
Total Non-Halogenated Phenol*	20	mg/kg	< 20	< 20	< 20	< 20
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	430	170
TRH >C16-C34	100	mg/kg	< 100	440	850	1000
TRH >C34-C40	100	mg/kg	< 100	110	< 100	140
TRH >C10-C40 (total)*	100	mg/kg	< 100	550	1280	1310
Metals M8						
Arsenic	2	mg/kg	21	3.1	2.5	6.4
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	0.7
Chromium	5	mg/kg	130	90	210	190
Copper	5	mg/kg	38	38	160	47
Lead	5	mg/kg	39	9.6	16	46
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	29	30	68	37
Zinc	5	mg/kg	570	150	210	350
% Moisture	1	%	15	23	17	14
Chromium (hexavalent)	1	mg/kg	< 1	-	-	-
Chromium (trivalent)	5	mg/kg	130	-	-	-

Client Sample ID			D17	D18	D19	D20
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			W22-JI0000501	W22-JI0000502	W22-JI0000503	W22-JI0000504
Date Sampled			Jun 30, 2022	Jun 30, 2022	Jun 30, 2022	Jun 30, 2022
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	54	85	< 20	48
TRH C15-C28	50	mg/kg	130	850	90	200
TRH C29-C36	50	mg/kg	150	510	110	190
TRH C10-C36 (Total)	50	mg/kg	334	1445	200	438

Client Sample ID			D17	D18	D19	D20
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			W22-JI0000501	W22-JI0000502	W22-JI0000503	W22-JI0000504
Date Sampled			Jun 30, 2022	Jun 30, 2022	Jun 30, 2022	Jun 30, 2022
Test/Reference	LOR	Unit				
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	0.5	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	0.4	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	0.2	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	0.6	< 0.3
4-Bromofluorobenzene (surr.)	1	%	90	71	81	72
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	57	140	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	101	101	102	83
p-Terphenyl-d14 (surr.)	1	%	90	94	107	83
Phenols (Halogenated)						
2-Chlorophenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2.4-Dichlorophenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2.4.5-Trichlorophenol	1	mg/kg	< 1	< 1	< 1	< 1
2.4.6-Trichlorophenol	1	mg/kg	< 1	< 1	< 1	< 1
2.6-Dichlorophenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
4-Chloro-3-methylphenol	1	mg/kg	< 1	< 1	< 1	< 1
Pentachlorophenol	1	mg/kg	< 1	< 1	< 1	< 1
Tetrachlorophenols - Total	10	mg/kg	< 10	< 10	< 10	< 10
Total Halogenated Phenol*	1	mg/kg	< 1	< 1	< 1	< 1

Client Sample ID			D17	D18	D19	D20
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			W22-JI0000501	W22-JI0000502	W22-JI0000503	W22-JI0000504
Date Sampled			Jun 30, 2022	Jun 30, 2022	Jun 30, 2022	Jun 30, 2022
Test/Reference	LOR	Unit				
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	20	mg/kg	< 20	< 20	< 20	< 20
2-Methyl-4.6-dinitrophenol	5	mg/kg	< 5	< 5	< 5	< 5
2-Nitrophenol	1	mg/kg	< 1	< 1	< 1	< 1
2.4-Dimethylphenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2.4-Dinitrophenol	5	mg/kg	< 5	< 5	< 5	< 5
2-Methylphenol (o-Cresol)	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Total cresols*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
4-Nitrophenol	5	mg/kg	< 5	< 5	< 5	< 5
Dinoseb	20	mg/kg	< 20	< 20	< 20	< 20
Phenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenol-d6 (surr.)	1	%	79	74	118	79
Total Non-Halogenated Phenol*	20	mg/kg	< 20	< 20	< 20	< 20
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	57	140	< 50	< 50
TRH >C16-C34	100	mg/kg	230	1200	170	340
TRH >C34-C40	100	mg/kg	< 100	240	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	287	1580	170	340
Metals M8						
Arsenic	2	mg/kg	< 2	6.4	< 2	< 2
Cadmium	0.4	mg/kg	< 0.4	8.3	< 0.4	0.4
Chromium	5	mg/kg	140	86	76	110
Copper	5	mg/kg	13	83	31	44
Lead	5	mg/kg	17	76	7.9	63
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	21	53	27	24
Zinc	5	mg/kg	35	83	110	350
% Moisture	1	%	23	15	18	12
Chromium (hexavalent)	1	mg/kg	< 1	< 1	< 1	< 1
Chromium (trivalent)	5	mg/kg	140	86	76	110

Client Sample ID			D21	D7.2	D13.2	TB01
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			W22-JI0000505	W22-JI0000506	W22-JI0000507	W22-JI0000508
Date Sampled			Jun 30, 2022	Jun 30, 2022	Jun 30, 2022	Jun 30, 2022
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	40	39	< 20	< 20
TRH C15-C28	50	mg/kg	280	88	66	< 50
TRH C29-C36	50	mg/kg	320	130	74	< 50
TRH C10-C36 (Total)	50	mg/kg	640	257	140	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2

Client Sample ID			D21	D7.2	D13.2	TB01
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			W22-JI0000505	W22-JI0000506	W22-JI0000507	W22-JI0000508
Date Sampled			Jun 30, 2022	Jun 30, 2022	Jun 30, 2022	Jun 30, 2022
Test/Reference	LOR	Unit				
BTEX						
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	126	79	91	78
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	-	-	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	-	-	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	-	-	-
Acenaphthene	0.5	mg/kg	< 0.5	-	-	-
Acenaphthylene	0.5	mg/kg	< 0.5	-	-	-
Anthracene	0.5	mg/kg	< 0.5	-	-	-
Benz(a)anthracene	0.5	mg/kg	< 0.5	-	-	-
Benzo(a)pyrene	0.5	mg/kg	< 0.5	-	-	-
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	-	-	-
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	-	-	-
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	-	-	-
Chrysene	0.5	mg/kg	< 0.5	-	-	-
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	-	-	-
Fluoranthene	0.5	mg/kg	< 0.5	-	-	-
Fluorene	0.5	mg/kg	< 0.5	-	-	-
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	-	-	-
Naphthalene	0.5	mg/kg	< 0.5	-	-	-
Phenanthrene	0.5	mg/kg	< 0.5	-	-	-
Pyrene	0.5	mg/kg	< 0.5	-	-	-
Total PAH*	0.5	mg/kg	< 0.5	-	-	-
2-Fluorobiphenyl (surr.)	1	%	82	-	-	-
p-Terphenyl-d14 (surr.)	1	%	61	-	-	-
Phenols (Halogenated)						
2-Chlorophenol	0.5	mg/kg	< 0.5	-	-	-
2.4-Dichlorophenol	0.5	mg/kg	< 0.5	-	-	-
2.4.5-Trichlorophenol	1	mg/kg	< 1	-	-	-
2.4.6-Trichlorophenol	1	mg/kg	< 1	-	-	-
2.6-Dichlorophenol	0.5	mg/kg	< 0.5	-	-	-
4-Chloro-3-methylphenol	1	mg/kg	< 1	-	-	-
Pentachlorophenol	1	mg/kg	< 1	-	-	-
Tetrachlorophenols - Total	10	mg/kg	< 10	-	-	-
Total Halogenated Phenol*	1	mg/kg	< 1	-	-	-
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	20	mg/kg	< 20	-	-	-
2-Methyl-4.6-dinitrophenol	5	mg/kg	< 5	-	-	-
2-Nitrophenol	1	mg/kg	< 1	-	-	-
2.4-Dimethylphenol	0.5	mg/kg	< 0.5	-	-	-
2.4-Dinitrophenol	5	mg/kg	< 5	-	-	-
2-Methylphenol (o-Cresol)	0.2	mg/kg	< 0.2	-	-	-
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	< 0.4	-	-	-

Client Sample ID			D21	D7.2	D13.2	TB01
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			W22-JI0000505	W22-JI0000506	W22-JI0000507	W22-JI0000508
Date Sampled			Jun 30, 2022	Jun 30, 2022	Jun 30, 2022	Jun 30, 2022
Test/Reference	LOR	Unit				
Phenols (non-Halogenated)						
Total cresols*	0.5	mg/kg	< 0.5	-	-	-
4-Nitrophenol	5	mg/kg	< 5	-	-	-
Dinoseb	20	mg/kg	< 20	-	-	-
Phenol	0.5	mg/kg	< 0.5	-	-	-
Phenol-d6 (surr.)	1	%	75	-	-	-
Total Non-Halogenated Phenol*	20	mg/kg	< 20	-	-	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	510	180	110	< 100
TRH >C34-C40	100	mg/kg	150	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	660	180	110	< 100
Metals M8						
Arsenic	2	mg/kg	< 2	-	-	-
Cadmium	0.4	mg/kg	< 0.4	-	-	-
Chromium	5	mg/kg	33	-	-	-
Copper	5	mg/kg	13	-	-	-
Lead	5	mg/kg	12	-	-	-
Mercury	0.1	mg/kg	< 0.1	-	-	-
Nickel	5	mg/kg	15	-	-	-
Zinc	5	mg/kg	42	-	-	-
% Moisture	1	%	9.6	23	14	< 1
Chromium (hexavalent)	1	mg/kg	< 1	-	-	-
Chromium (trivalent)	5	mg/kg	33	-	-	-

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Jul 07, 2022	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Sydney	Jul 07, 2022	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Jul 07, 2022	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Sydney	Jul 07, 2022	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Sydney	Jul 07, 2022	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Sydney	Jul 07, 2022	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Jul 07, 2022	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Metals M8	Sydney	Jul 18, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Jul 01, 2022	14 Days
- Method: LTM-GEN-7080 Moisture			
Chromium (speciated)			
Chromium (hexavalent)	Sydney	Jul 19, 2022	28 Days
- Method: In-house method E057.2			
Chromium (trivalent)	Sydney	Jul 19, 2022	28 Days
- Method: E043 /E057 Total Speciated Chromium			
NEPM Screen for Soil Classification			
% Clay	Brisbane	Jul 13, 2022	14 Days
- Method: LTM-GEN-7040			
Conductivity (1:5 aqueous extract at 25 °C as rec.)	Sydney	Jul 06, 2022	7 Days
- Method: LTM-INO-4030 Conductivity			
pH (units)(1:5 soil:CaCl2 extract at 25 °C as rec.)	Sydney	Jul 06, 2022	7 Days
- Method: LTM-GEN-7090 pH in soil by ISE			
Total Organic Carbon	Melbourne	Jul 13, 2022	28 Days
- Method: LTM-INO-4060 Total Organic Carbon in water and soil			
Heavy Metals	Sydney	Jul 06, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Cation Exchange Capacity	Melbourne	Jul 13, 2022	28 Days
- Method: LTM-MET-3060 Cation Exchange Capacity by bases & Exchangeable Sodium Percentage			
Eurofins Suite B15			
Organochlorine Pesticides	Sydney	Jul 06, 2022	14 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
Organophosphorus Pesticides	Sydney	Jul 06, 2022	14 Days
- Method: LTM-ORG-2200 Organophosphorus Pesticides by GC-MS			
Polychlorinated Biphenyls	Sydney	Jul 06, 2022	28 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			

eurofins

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
Tel: +61 7 3902 4600
NATA# 1261 Site# 20794

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Tel: +61 2 4968 8448
NATA# 1261 Site# 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool
WA 6106
Tel: +61 8 6253 4444
NATA# 2377 Site# 2370

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
Tel: +64 9 526 45 51
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Company Name: TerraInsight Pty Ltd
Address: U34 no 10-12 Sylvester Ave
Unanderra
NSW 2626

Project Name: MANYANA DEVELOPMENT
Project ID: TERRA22-165

Order No.:
Report #: 902292
Phone: 0458 008 030
Fax:

Received: Jul 1, 2022 9:45 AM
Due: Jul 8, 2022
Priority: 5 Day
Contact Name: Karen Gates (cc results/SRAs)

Eurofins Analytical Services Manager : Hannah Mawbey

Sample Detail						Eurofins Suite B15	Chromium (speciated)	Moisture Set	NEPM Screen for Soil Classification	Eurofins Suite B1	Eurofins Suite B7A
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X
External Laboratory											
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**						
1	D1	Jun 30, 2022		Soil	W22-JI0000485			X			X
2	D2	Jun 30, 2022		Soil	W22-JI0000486	X	X	X			X
3	D3	Jun 30, 2022		Soil	W22-JI0000487		X	X			X
4	D4	Jun 30, 2022		Soil	W22-JI0000488		X	X			X
5	D5	Jun 30, 2022		Soil	W22-JI0000489	X	X	X			X
6	D6	Jun 30, 2022		Soil	W22-JI0000490		X	X			X
7	D7	Jun 30, 2022		Soil	W22-JI0000491		X	X			X
8	D8	Jun 30, 2022		Soil	W22-JI0000492		X	X			X
9	D9	Jun 30, 2022		Soil	W22-JI0000493		X	X			X
10	D10	Jun 30, 2022		Soil	W22-JI0000494		X	X			X
11	D11	Jun 30, 2022		Soil	W22-JI0000495		X	X	X		X
12	D12	Jun 30, 2022		Soil	W22-JI0000496		X	X			X
13	D13	Jun 30, 2022		Soil	W22-JI0000497		X	X			X

eurofins

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
Tel: +61 7 3902 4600
NATA# 1261 Site# 20794

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Tel: +61 2 4968 8448
NATA# 1261 Site# 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool
WA 6106
Tel: +61 8 6253 4444
NATA# 2377 Site# 2370

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
Tel: +64 9 526 45 51
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Company Name: TerraInsight Pty Ltd
Address: U34 no 10-12 Sylvester Ave
Unanderra
NSW 2626

Project Name: MANYANA DEVELOPMENT
Project ID: TERRA22-165

Order No.:
Report #: 902292
Phone: 0458 008 030
Fax:

Received: Jul 1, 2022 9:45 AM
Due: Jul 8, 2022
Priority: 5 Day
Contact Name: Karen Gates (cc results/SRAs)

Eurofins Analytical Services Manager : Hannah Mawbey

Sample Detail						Eurofins Suite B15	Chromium (speciated)	Moisture Set	NEPM Screen for Soil Classification	Eurofins Suite B1	Eurofins Suite B7A
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X
14	D14	Jun 30, 2022		Soil	W22-JI0000498			X			X
15	D15	Jun 30, 2022		Soil	W22-JI0000499			X			X
16	D16	Jun 30, 2022		Soil	W22-JI0000500			X			X
17	D17	Jun 30, 2022		Soil	W22-JI0000501		X	X			X
18	D18	Jun 30, 2022		Soil	W22-JI0000502		X	X			X
19	D19	Jun 30, 2022		Soil	W22-JI0000503		X	X			X
20	D20	Jun 30, 2022		Soil	W22-JI0000504		X	X			X
21	D21	Jun 30, 2022		Soil	W22-JI0000505		X	X			X
22	D7.2	Jun 30, 2022		Soil	W22-JI0000506			X		X	
23	D13.2	Jun 30, 2022		Soil	W22-JI0000507			X		X	
24	TB01	Jun 30, 2022		Soil	W22-JI0000508			X		X	
25	6W01	Jun 30, 2022		Water	W22-JI0000509	X					
Test Counts						3	17	24	1	3	21

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
µg/L: micrograms per litre
ppm: parts per million
ppb: parts per billion
%: Percentage
org/100 mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total*	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Total PAH*	mg/kg	-			0.5	N/A	
Method Blank							
Phenols (Halogenated)							
2-Chlorophenol	mg/kg	< 0.5			0.5	Pass	
2.4-Dichlorophenol	mg/kg	< 0.5			0.5	Pass	
2.4.5-Trichlorophenol	mg/kg	< 1			1	Pass	
2.4.6-Trichlorophenol	mg/kg	< 1			1	Pass	
2.6-Dichlorophenol	mg/kg	< 0.5			0.5	Pass	
4-Chloro-3-methylphenol	mg/kg	< 1			1	Pass	
Pentachlorophenol	mg/kg	< 1			1	Pass	
Tetrachlorophenols - Total	mg/kg	< 10			10	Pass	
Method Blank							
Phenols (non-Halogenated)							
2-Cyclohexyl-4.6-dinitrophenol	mg/kg	< 20			20	Pass	
2-Methyl-4.6-dinitrophenol	mg/kg	< 5			5	Pass	
2-Nitrophenol	mg/kg	< 1			1	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
2.4-Dimethylphenol	mg/kg	< 0.5			0.5	Pass	
2.4-Dinitrophenol	mg/kg	< 5			5	Pass	
2-Methylphenol (o-Cresol)	mg/kg	< 0.2			0.2	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/kg	< 0.4			0.4	Pass	
4-Nitrophenol	mg/kg	< 5			5	Pass	
Dinoseb	mg/kg	< 20			20	Pass	
Phenol	mg/kg	< 0.5			0.5	Pass	
Total Non-Halogenated Phenol*	mg/kg	< 0			20	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Metals M8							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
Method Blank							
Chromium (hexavalent)	mg/kg	< 1			1	Pass	
Conductivity (1:5 aqueous extract at 25 °C as rec.)	uS/cm	< 10			10	Pass	
Total Organic Carbon	%	< 0.1			0.1	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/kg	< 0.1			0.1	Pass	
4.4'-DDD	mg/kg	< 0.05			0.05	Pass	
4.4'-DDE	mg/kg	< 0.05			0.05	Pass	
4.4'-DDT	mg/kg	< 0.05			0.05	Pass	
a-HCH	mg/kg	< 0.05			0.05	Pass	
Aldrin	mg/kg	< 0.05			0.05	Pass	
b-HCH	mg/kg	< 0.05			0.05	Pass	
d-HCH	mg/kg	< 0.05			0.05	Pass	
Dieldrin	mg/kg	< 0.05			0.05	Pass	
Endosulfan I	mg/kg	< 0.05			0.05	Pass	
Endosulfan II	mg/kg	< 0.05			0.05	Pass	
Endosulfan sulphate	mg/kg	< 0.05			0.05	Pass	
Endrin	mg/kg	< 0.05			0.05	Pass	
Endrin aldehyde	mg/kg	< 0.05			0.05	Pass	
Endrin ketone	mg/kg	< 0.05			0.05	Pass	
g-HCH (Lindane)	mg/kg	< 0.05			0.05	Pass	
Heptachlor	mg/kg	< 0.05			0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05			0.05	Pass	
Hexachlorobenzene	mg/kg	< 0.05			0.05	Pass	
Methoxychlor	mg/kg	< 0.05			0.05	Pass	
Toxaphene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organophosphorus Pesticides							
Azinphos-methyl	mg/kg	< 0.2			0.2	Pass	
Bolstar	mg/kg	< 0.2			0.2	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Chlorfenvinphos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos-methyl	mg/kg	< 0.2			0.2	Pass	
Coumaphos	mg/kg	< 2			2	Pass	
Demeton-S	mg/kg	< 0.2			0.2	Pass	
Demeton-O	mg/kg	< 0.2			0.2	Pass	
Diazinon	mg/kg	< 0.2			0.2	Pass	
Dichlorvos	mg/kg	< 0.2			0.2	Pass	
Dimethoate	mg/kg	< 0.2			0.2	Pass	
Disulfoton	mg/kg	< 0.2			0.2	Pass	
EPN	mg/kg	< 0.2			0.2	Pass	
Ethion	mg/kg	< 0.2			0.2	Pass	
Ethoprop	mg/kg	< 0.2			0.2	Pass	
Ethyl parathion	mg/kg	< 0.2			0.2	Pass	
Fenitrothion	mg/kg	< 0.2			0.2	Pass	
Fensulfothion	mg/kg	< 0.2			0.2	Pass	
Fenthion	mg/kg	< 0.2			0.2	Pass	
Malathion	mg/kg	< 0.2			0.2	Pass	
Merphos	mg/kg	< 0.2			0.2	Pass	
Methyl parathion	mg/kg	< 0.2			0.2	Pass	
Mevinphos	mg/kg	< 0.2			0.2	Pass	
Monocrotophos	mg/kg	< 2			2	Pass	
Naled	mg/kg	< 0.2			0.2	Pass	
Omethoate	mg/kg	< 2			2	Pass	
Phorate	mg/kg	< 0.2			0.2	Pass	
Pirimiphos-methyl	mg/kg	< 0.2			0.2	Pass	
Pyrazophos	mg/kg	< 0.2			0.2	Pass	
Ronnel	mg/kg	< 0.2			0.2	Pass	
Terbufos	mg/kg	< 0.2			0.2	Pass	
Tetrachlorvinphos	mg/kg	< 0.2			0.2	Pass	
Tokuthion	mg/kg	< 0.2			0.2	Pass	
Trichloronate	mg/kg	< 0.2			0.2	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/kg	< 0.1			0.1	Pass	
Aroclor-1221	mg/kg	< 0.1			0.1	Pass	
Aroclor-1232	mg/kg	< 0.1			0.1	Pass	
Aroclor-1242	mg/kg	< 0.1			0.1	Pass	
Aroclor-1248	mg/kg	< 0.1			0.1	Pass	
Aroclor-1254	mg/kg	< 0.1			0.1	Pass	
Aroclor-1260	mg/kg	< 0.1			0.1	Pass	
Total PCB*	mg/kg	< 0.1			0.1	Pass	
Method Blank							
Heavy Metals							
Iron	mg/kg	< 20			20	Pass	
Method Blank							
Cation Exchange Capacity							
Cation Exchange Capacity	meq/100g	< 0.05			0.05	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	86			70-130	Pass	
TRH C10-C14	%	87			70-130	Pass	
LCS - % Recovery							
BTEX							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Benzene	%	89			70-130	Pass	
Toluene	%	98			70-130	Pass	
Ethylbenzene	%	96			70-130	Pass	
m&p-Xylenes	%	98			70-130	Pass	
o-Xylene	%	95			70-130	Pass	
Xylenes - Total*	%	97			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	114			70-130	Pass	
TRH C6-C10	%	82			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	81			70-130	Pass	
Acenaphthylene	%	76			70-130	Pass	
Anthracene	%	86			70-130	Pass	
Benz(a)anthracene	%	72			70-130	Pass	
Benzo(a)pyrene	%	79			70-130	Pass	
Benzo(b&j)fluoranthene	%	88			70-130	Pass	
Benzo(g.h.i)perylene	%	84			70-130	Pass	
Benzo(k)fluoranthene	%	103			70-130	Pass	
Chrysene	%	82			70-130	Pass	
Dibenz(a.h)anthracene	%	80			70-130	Pass	
Fluoranthene	%	77			70-130	Pass	
Fluorene	%	80			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	75			70-130	Pass	
Naphthalene	%	79			70-130	Pass	
Phenanthrene	%	71			70-130	Pass	
Pyrene	%	77			70-130	Pass	
LCS - % Recovery							
Phenols (Halogenated)							
2-Chlorophenol	%	75			25-140	Pass	
2.4-Dichlorophenol	%	74			25-140	Pass	
2.4.5-Trichlorophenol	%	80			25-140	Pass	
2.4.6-Trichlorophenol	%	125			25-140	Pass	
2.6-Dichlorophenol	%	75			25-140	Pass	
4-Chloro-3-methylphenol	%	80			25-140	Pass	
Pentachlorophenol	%	74			25-140	Pass	
Tetrachlorophenols - Total	%	83			25-140	Pass	
LCS - % Recovery							
Phenols (non-Halogenated)							
2-Cyclohexyl-4.6-dinitrophenol	%	35			25-140	Pass	
2-Methyl-4.6-dinitrophenol	%	86			25-140	Pass	
2-Nitrophenol	%	76			25-140	Pass	
2.4-Dimethylphenol	%	75			25-140	Pass	
2.4-Dinitrophenol	%	35			25-140	Pass	
2-Methylphenol (o-Cresol)	%	76			25-140	Pass	
3&4-Methylphenol (m&p-Cresol)	%	82			25-140	Pass	
4-Nitrophenol	%	70			25-140	Pass	
Dinoseb	%	110			25-140	Pass	
Phenol	%	80			25-140	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	85			70-130	Pass	
LCS - % Recovery							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Metals M8							
Arsenic	%	103			80-120	Pass	
Cadmium	%	100			80-120	Pass	
Chromium	%	104			80-120	Pass	
Copper	%	101			80-120	Pass	
Lead	%	98			80-120	Pass	
Mercury	%	97			80-120	Pass	
Nickel	%	103			80-120	Pass	
Zinc	%	101			80-120	Pass	
LCS - % Recovery							
Chromium (hexavalent)	%	101			70-130	Pass	
% Clay	%	117			70-130	Pass	
Conductivity (1:5 aqueous extract at 25 °C as rec.)	%	94			70-130	Pass	
Total Organic Carbon	%	114			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
Chlordanes - Total	%	119			70-130	Pass	
4.4'-DDD	%	122			70-130	Pass	
4.4'-DDE	%	128			70-130	Pass	
4.4'-DDT	%	116			70-130	Pass	
a-HCH	%	118			70-130	Pass	
Aldrin	%	108			70-130	Pass	
b-HCH	%	109			70-130	Pass	
d-HCH	%	98			70-130	Pass	
Dieldrin	%	121			70-130	Pass	
Endosulfan I	%	110			70-130	Pass	
Endosulfan II	%	98			70-130	Pass	
Endosulfan sulphate	%	130			70-130	Pass	
Endrin	%	121			70-130	Pass	
Endrin aldehyde	%	93			70-130	Pass	
Endrin ketone	%	97			70-130	Pass	
g-HCH (Lindane)	%	110			70-130	Pass	
Heptachlor	%	117			70-130	Pass	
Heptachlor epoxide	%	118			70-130	Pass	
Hexachlorobenzene	%	109			70-130	Pass	
Methoxychlor	%	130			70-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides							
Diazinon	%	95			70-130	Pass	
Dimethoate	%	107			70-130	Pass	
Ethion	%	94			70-130	Pass	
Fenitrothion	%	91			70-130	Pass	
Methyl parathion	%	122			70-130	Pass	
Mevinphos	%	109			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls							
Aroclor-1016	%	80			70-130	Pass	
Aroclor-1221	%	80			70-130	Pass	
Aroclor-1254	%	93			70-130	Pass	
Aroclor-1260	%	110			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Iron	%	100			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S22-Jl0021071	NCP	%	87			70-130	Pass	
Acenaphthylene	S22-Jl0021071	NCP	%	82			70-130	Pass	
Anthracene	S22-Jl0021071	NCP	%	115			70-130	Pass	
Benz(a)anthracene	S22-Jl0021071	NCP	%	93			70-130	Pass	
Benzo(a)pyrene	S22-Jl0025930	NCP	%	86			70-130	Pass	
Benzo(b&j)fluoranthene	S22-Jl0014803	NCP	%	96			70-130	Pass	
Benzo(g.h.i)perylene	S22-Jl0025930	NCP	%	90			70-130	Pass	
Benzo(k)fluoranthene	S22-Jl0021071	NCP	%	100			70-130	Pass	
Chrysene	S22-Jl0025930	NCP	%	92			70-130	Pass	
Dibenz(a.h)anthracene	S22-Jl0025930	NCP	%	79			70-130	Pass	
Fluoranthene	S22-Jl0025930	NCP	%	84			70-130	Pass	
Fluorene	S22-Jl0021071	NCP	%	77			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S22-Jl0025930	NCP	%	81			70-130	Pass	
Naphthalene	S22-Jl0021071	NCP	%	94			70-130	Pass	
Phenanthrene	S22-Jl0025930	NCP	%	80			70-130	Pass	
Pyrene	S22-Jl0025930	NCP	%	84			70-130	Pass	
Spike - % Recovery									
Metals M8				Result 1					
Arsenic	S22-Jl0014172	NCP	%	87			75-125	Pass	
Cadmium	S22-Jl0014172	NCP	%	87			75-125	Pass	
Chromium	S22-Jl0014172	NCP	%	80			75-125	Pass	
Copper	S22-Jl0014172	NCP	%	92			75-125	Pass	
Lead	S22-Jl0014172	NCP	%	80			75-125	Pass	
Mercury	S22-Jl0014172	NCP	%	84			75-125	Pass	
Nickel	S22-Jl0014172	NCP	%	82			75-125	Pass	
Zinc	S22-Jl0014172	NCP	%	87			75-125	Pass	
Spike - % Recovery									
Phenols (Halogenated)				Result 1					
2-Chlorophenol	S22-Jn0068111	NCP	%	98			30-130	Pass	
2.4-Dichlorophenol	S22-Jn0068111	NCP	%	113			30-130	Pass	
2.6-Dichlorophenol	S22-Jn0068111	NCP	%	113			30-130	Pass	
4-Chloro-3-methylphenol	S22-Jn0068111	NCP	%	100			30-130	Pass	
Pentachlorophenol	S22-Jn0068111	NCP	%	130			30-130	Pass	
Tetrachlorophenols - Total	S22-Jn0068111	NCP	%	122			30-130	Pass	
Spike - % Recovery									
Phenols (non-Halogenated)				Result 1					
2-Cyclohexyl-4.6-dinitrophenol	S22-Jn0068111	NCP	%	120			30-130	Pass	
2-Nitrophenol	S22-Jn0068111	NCP	%	126			30-130	Pass	
2.4-Dimethylphenol	S22-Jn0068111	NCP	%	83			30-130	Pass	
2.4-Dinitrophenol	S22-Jn0068111	NCP	%	127			70-130	Pass	
2-Methylphenol (o-Cresol)	S22-Jn0068111	NCP	%	113			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	S22-Jn0068111	NCP	%	88			30-130	Pass	
4-Nitrophenol	S22-Jn0068111	NCP	%	116			30-130	Pass	
Phenol	S22-Jn0068111	NCP	%	95			30-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
Chlordanes - Total	S22-Jn0066554	NCP	%	128			70-130	Pass	
4.4'-DDD	S22-Jn0066554	NCP	%	99			70-130	Pass	
4.4'-DDE	S22-Jn0066554	NCP	%	108			70-130	Pass	
4.4'-DDT	S22-Jn0066554	NCP	%	106			70-130	Pass	
a-HCH	S22-Jn0066554	NCP	%	92			70-130	Pass	
Aldrin	S22-Jn0066554	NCP	%	115			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
b-HCH	S22-Jn0066554	NCP	%	86			70-130	Pass	
d-HCH	S22-Jn0066554	NCP	%	78			70-130	Pass	
Dieldrin	S22-Jn0066554	NCP	%	95			70-130	Pass	
Endosulfan I	S22-Jn0066554	NCP	%	102			70-130	Pass	
Endosulfan II	S22-Jn0066554	NCP	%	89			70-130	Pass	
Endosulfan sulphate	S22-Jn0066554	NCP	%	97			70-130	Pass	
Endrin	S22-Jn0066554	NCP	%	111			70-130	Pass	
Endrin aldehyde	S22-Jn0066554	NCP	%	87			70-130	Pass	
Endrin ketone	S22-Jn0066554	NCP	%	100			70-130	Pass	
g-HCH (Lindane)	S22-Jn0066554	NCP	%	103			70-130	Pass	
Heptachlor	S22-Jn0066554	NCP	%	111			70-130	Pass	
Heptachlor epoxide	S22-Jn0066554	NCP	%	130			70-130	Pass	
Hexachlorobenzene	S22-Jn0066554	NCP	%	103			70-130	Pass	
Methoxychlor	S22-Jn0066554	NCP	%	94			70-130	Pass	
Spike - % Recovery									
Metals M8				Result 1					
Chromium	W22-Jl0000487	CP	%	107			75-125	Pass	
Nickel	W22-Jl0000487	CP	%	80			75-125	Pass	
Zinc	W22-Jl0000487	CP	%	80			75-125	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C10-C14	W22-Jl0000488	CP	%	110			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	W22-Jl0000488	CP	%	115			70-130	Pass	
Spike - % Recovery									
Phenols (Halogenated)				Result 1					
2.4.5-Trichlorophenol	N22-Jl0001940	NCP	%	108			30-130	Pass	
2.4.6-Trichlorophenol	N22-Jl0001940	NCP	%	99			30-130	Pass	
Spike - % Recovery									
Phenols (non-Halogenated)				Result 1					
Dinoseb	N22-Jl0001940	NCP	%	76			30-130	Pass	
Spike - % Recovery									
Organophosphorus Pesticides				Result 1					
Diazinon	S22-Jn0067717	NCP	%	86			70-130	Pass	
Fenitrothion	S22-Jn0067717	NCP	%	77			70-130	Pass	
Methyl parathion	S22-Jn0067717	NCP	%	85			70-130	Pass	
Mevinphos	S22-Jn0067717	NCP	%	114			70-130	Pass	
Spike - % Recovery									
Polychlorinated Biphenyls				Result 1					
Aroclor-1221	S22-Jn0068138	NCP	%	80			70-130	Pass	
Aroclor-1254	S22-Jn0068138	NCP	%	74			70-130	Pass	
Spike - % Recovery									
Phenols (non-Halogenated)				Result 1					
2-Methyl-4.6-dinitrophenol	S22-Jl0021045	NCP	%	85			30-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	W22-Jl0000504	CP	%	94			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	W22-Jl0000504	CP	%	89			70-130	Pass	
Toluene	W22-Jl0000504	CP	%	93			70-130	Pass	
Ethylbenzene	W22-Jl0000504	CP	%	98			70-130	Pass	
m&p-Xylenes	W22-Jl0000504	CP	%	101			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
o-Xylene	W22-Jl0000504	CP	%	96			70-130	Pass	
Xylenes - Total*	W22-Jl0000504	CP	%	99			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	W22-Jl0000504	CP	%	105			70-130	Pass	
TRH C6-C10	W22-Jl0000504	CP	%	94			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	W22-Jl0000486	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Cadmium	W22-Jl0000486	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	W22-Jl0000486	CP	mg/kg	90	96	6.2	30%	Pass	
Copper	W22-Jl0000486	CP	mg/kg	21	23	11	30%	Pass	
Lead	W22-Jl0000486	CP	mg/kg	12	11	8.3	30%	Pass	
Mercury	W22-Jl0000486	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	W22-Jl0000486	CP	mg/kg	21	19	9.8	30%	Pass	
Zinc	W22-Jl0000486	CP	mg/kg	83	72	14	30%	Pass	
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	R22-Jn0069171	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	R22-Jn0069171	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	R22-Jn0069171	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	R22-Jn0069171	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-HCH	R22-Jn0069171	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	R22-Jn0069171	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-HCH	R22-Jn0069171	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-HCH	R22-Jn0069171	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	R22-Jn0069171	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	R22-Jn0069171	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	R22-Jn0069171	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	R22-Jn0069171	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	R22-Jn0069171	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	R22-Jn0069171	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	R22-Jn0069171	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-HCH (Lindane)	R22-Jn0069171	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	R22-Jn0069171	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	R22-Jn0069171	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	R22-Jn0069171	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	R22-Jn0069171	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Toxaphene	R22-Jn0069171	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	R22-Jn0069171	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	

Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
EPN	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Malathion	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Merphos	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Methyl parathion	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	R22-Jn0069171	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Naled	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Omethoate	R22-Jn0069171	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Phorate	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbufos	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tetrachlorvinphos	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tokuthion	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Trichloronate	R22-Jn0069171	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
Polychlorinated Biphenyls				Result 1	Result 2	RPD			
Aroclor-1016	R22-Jn0069171	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1221	R22-Jn0069171	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1232	R22-Jn0069171	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1242	R22-Jn0069171	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1248	R22-Jn0069171	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1254	R22-Jn0069171	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1260	R22-Jn0069171	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Total PCB*	R22-Jn0069171	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chromium (hexavalent)	W22-Jl0000487	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	W22-Jl0000488	CP	mg/kg	8.8	6.8	25	30%	Pass	Q15
Cadmium	W22-Jl0000488	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Copper	W22-Jl0000488	CP	mg/kg	32	27	18	30%	Pass	
Lead	W22-Jl0000488	CP	mg/kg	12	13	5.6	30%	Pass	
Mercury	W22-Jl0000488	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	W22-Jl0000488	CP	mg/kg	32	38	18	30%	Pass	
Zinc	W22-Jl0000488	CP	mg/kg	160	130	24	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	W22-Jl0000489	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	W22-Jl0000489	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	W22-Jl0000489	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	W22-Jl0000489	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	W22-Jl0000489	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	W22-Jl0000489	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	W22-Jl0000489	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	W22-Jl0000489	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Chrysene	W22-JI0000489	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	W22-JI0000489	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	W22-JI0000489	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	W22-JI0000489	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	W22-JI0000489	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	W22-JI0000489	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	W22-JI0000489	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	W22-JI0000489	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Phenols (Halogenated)				Result 1	Result 2	RPD			
2-Chlorophenol	W22-JI0000489	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4-Dichlorophenol	W22-JI0000489	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4.5-Trichlorophenol	W22-JI0000489	CP	mg/kg	< 1	< 1	<1	30%	Pass	
2.4.6-Trichlorophenol	W22-JI0000489	CP	mg/kg	< 1	< 1	<1	30%	Pass	
2.6-Dichlorophenol	W22-JI0000489	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
4-Chloro-3-methylphenol	W22-JI0000489	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Pentachlorophenol	W22-JI0000489	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Tetrachlorophenols - Total	W22-JI0000489	CP	mg/kg	< 10	< 10	<1	30%	Pass	
Duplicate									
Phenols (non-Halogenated)				Result 1	Result 2	RPD			
2-Cyclohexyl-4.6-dinitrophenol	W22-JI0000489	CP	mg/kg	< 20	< 20	<1	30%	Pass	
2-Methyl-4.6-dinitrophenol	W22-JI0000489	CP	mg/kg	< 5	< 5	<1	30%	Pass	
2-Nitrophenol	W22-JI0000489	CP	mg/kg	< 1	< 1	<1	30%	Pass	
2.4-Dimethylphenol	W22-JI0000489	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4-Dinitrophenol	W22-JI0000489	CP	mg/kg	< 5	< 5	<1	30%	Pass	
4-Nitrophenol	W22-JI0000489	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Dinoseb	W22-JI0000489	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Phenol	W22-JI0000489	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	W22-JI0000489	CP	mg/kg	< 2	2.2	13	30%	Pass	
Cadmium	W22-JI0000489	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	W22-JI0000489	CP	mg/kg	130	120	7.1	30%	Pass	
Copper	W22-JI0000489	CP	mg/kg	51	45	11	30%	Pass	
Lead	W22-JI0000489	CP	mg/kg	13	15	15	30%	Pass	
Mercury	W22-JI0000489	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	W22-JI0000489	CP	mg/kg	31	33	5.6	30%	Pass	
Zinc	W22-JI0000489	CP	mg/kg	74	78	4.7	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	W22-JI0000489	CP	%	26	28	7.2	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	W22-JI0000490	CP	mg/kg	7.3	18	85	30%	Fail	Q15
Cadmium	W22-JI0000490	CP	mg/kg	0.4	< 0.4	59	30%	Fail	Q15
Copper	W22-JI0000490	CP	mg/kg	73	25	99	30%	Fail	Q15
Mercury	W22-JI0000490	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	W22-JI0000490	CP	mg/kg	19	55	96	30%	Fail	Q15
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	W22-JI0000491	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Cadmium	W22-JI0000491	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	W22-JI0000491	CP	mg/kg	290	240	21	30%	Pass	
Copper	W22-JI0000491	CP	mg/kg	11	12	5.9	30%	Pass	

Duplicate									
Metals M8				Result 1	Result 2	RPD			
Lead	W22-JI0000491	CP	mg/kg	8.9	8.4	6.1	30%	Pass	
Mercury	W22-JI0000491	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	W22-JI0000491	CP	mg/kg	24	25	3.8	30%	Pass	
Zinc	W22-JI0000491	CP	mg/kg	30	29	4.5	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	W22-JI0000492	CP	mg/kg	13	14	4.7	30%	Pass	
Cadmium	W22-JI0000492	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	W22-JI0000492	CP	mg/kg	240	260	8.0	30%	Pass	
Copper	W22-JI0000492	CP	mg/kg	22	19	14	30%	Pass	
Lead	W22-JI0000492	CP	mg/kg	110	96	11	30%	Pass	
Mercury	W22-JI0000492	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	W22-JI0000492	CP	mg/kg	28	43	43	30%	Fail	Q15
Zinc	W22-JI0000492	CP	mg/kg	420	420	1.8	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	W22-JI0000493	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	W22-JI0000493	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	W22-JI0000493	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	W22-JI0000493	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	W22-JI0000493	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	W22-JI0000493	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	W22-JI0000493	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	W22-JI0000493	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	W22-JI0000493	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	W22-JI0000493	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Cadmium	W22-JI0000493	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	W22-JI0000493	CP	mg/kg	290	270	4.6	30%	Pass	
Copper	W22-JI0000493	CP	mg/kg	23	22	4.0	30%	Pass	
Lead	W22-JI0000493	CP	mg/kg	7.5	7.2	4.3	30%	Pass	
Mercury	W22-JI0000493	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	W22-JI0000493	CP	mg/kg	52	50	2.9	30%	Pass	
Zinc	W22-JI0000493	CP	mg/kg	41	39	3.3	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	W22-JI0000494	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	W22-JI0000494	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	W22-JI0000494	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	W22-JI0000494	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	W22-JI0000494	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	W22-JI0000494	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	W22-JI0000494	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	W22-JI0000494	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	W22-JI0000494	CP	mg/kg	< 20	< 20	<1	30%	Pass	

Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	W22-JI0000494	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Cadmium	W22-JI0000494	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	W22-JI0000494	CP	mg/kg	140	160	12	30%	Pass	
Copper	W22-JI0000494	CP	mg/kg	99	140	32	30%	Fail	Q15
Lead	W22-JI0000494	CP	mg/kg	21	23	11	30%	Pass	
Mercury	W22-JI0000494	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	W22-JI0000494	CP	mg/kg	15	15	4.3	30%	Pass	
Zinc	W22-JI0000494	CP	mg/kg	98	120	16	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	W22-JI0000495	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Cadmium	W22-JI0000495	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	W22-JI0000495	CP	mg/kg	140	120	13	30%	Pass	
Copper	W22-JI0000495	CP	mg/kg	24	24	1.2	30%	Pass	
Lead	W22-JI0000495	CP	mg/kg	17	16	6.9	30%	Pass	
Mercury	W22-JI0000495	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	W22-JI0000495	CP	mg/kg	21	20	4.2	30%	Pass	
Zinc	W22-JI0000495	CP	mg/kg	50	49	1.6	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25 °C as rec.)	W22-JI0000495	CP	uS/cm	43	47	8.5	30%	Pass	
Total Organic Carbon	W22-JI0000495	CP	%	6.3	6.3	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Iron	W22-JI0000495	CP	mg/kg	91000	76000	19	30%	Pass	
Duplicate									
Cation Exchange Capacity				Result 1	Result 2	RPD			
Cation Exchange Capacity	M22-JI0020910	NCP	meq/100g	21	22	4.7	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	W22-JI0000496	CP	mg/kg	6.1	4.9	22	30%	Pass	
Cadmium	W22-JI0000496	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	W22-JI0000496	CP	mg/kg	170	150	12	30%	Pass	
Copper	W22-JI0000496	CP	mg/kg	37	34	9.8	30%	Pass	
Lead	W22-JI0000496	CP	mg/kg	21	19	15	30%	Pass	
Mercury	W22-JI0000496	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	W22-JI0000496	CP	mg/kg	36	34	4.4	30%	Pass	
Zinc	W22-JI0000496	CP	mg/kg	190	170	8.2	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	W22-JI0000497	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	W22-JI0000497	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	W22-JI0000497	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	W22-JI0000497	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	W22-JI0000497	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	W22-JI0000497	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	W22-JI0000497	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	W22-JI0000497	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	W22-JI0000497	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	W22-JI0000497	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	W22-JI0000497	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	W22-JI0000497	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	W22-JI0000497	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Naphthalene	W22-JI0000497	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	W22-JI0000497	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	W22-JI0000497	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Phenols (Halogenated)				Result 1	Result 2	RPD			
2-Chlorophenol	W22-JI0000497	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4-Dichlorophenol	W22-JI0000497	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4.5-Trichlorophenol	W22-JI0000497	CP	mg/kg	< 1	< 1	<1	30%	Pass	
2.4.6-Trichlorophenol	W22-JI0000497	CP	mg/kg	< 1	< 1	<1	30%	Pass	
2.6-Dichlorophenol	W22-JI0000497	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
4-Chloro-3-methylphenol	W22-JI0000497	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Pentachlorophenol	W22-JI0000497	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Tetrachlorophenols - Total	W22-JI0000497	CP	mg/kg	< 10	< 10	<1	30%	Pass	
Duplicate									
Phenols (non-Halogenated)				Result 1	Result 2	RPD			
2-Cyclohexyl-4.6-dinitrophenol	W22-JI0000497	CP	mg/kg	< 20	< 20	<1	30%	Pass	
2-Methyl-4.6-dinitrophenol	W22-JI0000497	CP	mg/kg	< 5	< 5	<1	30%	Pass	
2-Nitrophenol	W22-JI0000497	CP	mg/kg	< 1	< 1	<1	30%	Pass	
2.4-Dimethylphenol	W22-JI0000497	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4-Dinitrophenol	W22-JI0000497	CP	mg/kg	< 5	< 5	<1	30%	Pass	
2-Methylphenol (o-Cresol)	W22-JI0000497	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
3&4-Methylphenol (m&p-Cresol)	W22-JI0000497	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
4-Nitrophenol	W22-JI0000497	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Dinoseb	W22-JI0000497	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Phenol	W22-JI0000497	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	W22-JI0000497	CP	mg/kg	21	21	2.0	30%	Pass	
Cadmium	W22-JI0000497	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	W22-JI0000497	CP	mg/kg	130	150	16	30%	Pass	
Copper	W22-JI0000497	CP	mg/kg	38	52	32	30%	Fail	Q15
Lead	W22-JI0000497	CP	mg/kg	39	45	15	30%	Pass	
Mercury	W22-JI0000497	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	W22-JI0000497	CP	mg/kg	29	36	24	30%	Pass	
Zinc	W22-JI0000497	CP	mg/kg	570	700	19	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	W22-JI0000498	CP	mg/kg	3.1	2.4	26	30%	Pass	
Cadmium	W22-JI0000498	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	W22-JI0000498	CP	mg/kg	90	94	4.0	30%	Pass	
Copper	W22-JI0000498	CP	mg/kg	38	36	6.2	30%	Pass	
Lead	W22-JI0000498	CP	mg/kg	9.6	10.0	4.0	30%	Pass	
Mercury	W22-JI0000498	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	W22-JI0000498	CP	mg/kg	30	31	<1	30%	Pass	
Zinc	W22-JI0000498	CP	mg/kg	150	140	8.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	W22-JI0000499	CP	%	17	18	4.5	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	W22-JI0000500	CP	mg/kg	6.4	6.4	<1	30%	Pass	
Cadmium	W22-JI0000500	CP	mg/kg	0.7	0.6	8.0	30%	Pass	
Chromium	W22-JI0000500	CP	mg/kg	190	180	3.2	30%	Pass	
Copper	W22-JI0000500	CP	mg/kg	47	46	1.9	30%	Pass	

Duplicate									
Metals M8				Result 1	Result 2	RPD			
Lead	W22-JI0000500	CP	mg/kg	46	35	28	30%	Pass	
Mercury	W22-JI0000500	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	W22-JI0000500	CP	mg/kg	37	40	8.4	30%	Pass	
Zinc	W22-JI0000500	CP	mg/kg	350	280	22	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	W22-JI0000501	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Cadmium	W22-JI0000501	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	W22-JI0000501	CP	mg/kg	140	120	14	30%	Pass	
Copper	W22-JI0000501	CP	mg/kg	13	20	39	30%	Fail	Q15
Lead	W22-JI0000501	CP	mg/kg	17	16	3.4	30%	Pass	
Mercury	W22-JI0000501	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	W22-JI0000501	CP	mg/kg	21	22	5.1	30%	Pass	
Zinc	W22-JI0000501	CP	mg/kg	35	39	12	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	W22-JI0000502	CP	mg/kg	6.4	18	94	30%	Fail	Q15
Cadmium	W22-JI0000502	CP	mg/kg	8.3	15	55	30%	Fail	Q15
Chromium	W22-JI0000502	CP	mg/kg	86	130	40	30%	Fail	Q15
Copper	W22-JI0000502	CP	mg/kg	83	160	64	30%	Fail	Q15
Mercury	W22-JI0000502	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	W22-JI0000502	CP	mg/kg	53	92	54	30%	Fail	Q15
Zinc	W22-JI0000502	CP	mg/kg	83	130	47	30%	Fail	Q15
Duplicate									
				Result 1	Result 2	RPD			
Chromium (hexavalent)	W22-JI0000502	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	W22-JI0000503	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	W22-JI0000503	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	W22-JI0000503	CP	mg/kg	0.5	1.7	110	30%	Fail	Q15
Ethylbenzene	W22-JI0000503	CP	mg/kg	0.1	0.3	93	30%	Fail	Q15
m&p-Xylenes	W22-JI0000503	CP	mg/kg	0.4	0.9	71	30%	Fail	Q15
o-Xylene	W22-JI0000503	CP	mg/kg	0.2	0.4	71	30%	Fail	Q15
Xylenes - Total*	W22-JI0000503	CP	mg/kg	0.6	1.2	71	30%	Fail	Q15
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	W22-JI0000503	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	W22-JI0000503	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	W22-JI0000503	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Cadmium	W22-JI0000503	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	W22-JI0000503	CP	mg/kg	76	84	9.9	30%	Pass	
Lead	W22-JI0000503	CP	mg/kg	7.9	8.1	2.6	30%	Pass	
Mercury	W22-JI0000503	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	W22-JI0000503	CP	mg/kg	27	32	17	30%	Pass	
Zinc	W22-JI0000503	CP	mg/kg	110	110	6.0	30%	Pass	

Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	W22-JI0000504	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Cadmium	W22-JI0000504	CP	mg/kg	0.4	< 0.4	57	30%	Fail	Q15
Chromium	W22-JI0000504	CP	mg/kg	110	82	32	30%	Fail	Q15
Copper	W22-JI0000504	CP	mg/kg	44	25	53	30%	Fail	Q15
Lead	W22-JI0000504	CP	mg/kg	63	45	34	30%	Fail	Q15
Mercury	W22-JI0000504	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	W22-JI0000504	CP	mg/kg	24	21	17	30%	Pass	
Zinc	W22-JI0000504	CP	mg/kg	350	240	35	30%	Fail	Q15
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	W22-JI0000505	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Cadmium	W22-JI0000505	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Copper	W22-JI0000505	CP	mg/kg	13	51	120	30%	Fail	Q15
Lead	W22-JI0000505	CP	mg/kg	12	44	110	30%	Fail	Q15
Mercury	W22-JI0000505	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C10-C14	W22-JI0000508	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	W22-JI0000508	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	W22-JI0000508	CP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	W22-JI0000508	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	W22-JI0000508	CP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	W22-JI0000508	CP	mg/kg	< 100	< 100	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
G01	The LORs have been raised due to matrix interference
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q09	The Surrogate recovery is outside of the recommended acceptance criteria due to matrix interference. Acceptance criteria were met for all other QC
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Hannah Mawbey	Analytical Services Manager
Charl Du Preez	Senior Analyst-Organic
Gabriele Cordero	Senior Analyst-Metal
Mary Makarios	Senior Analyst-Metal
Roopesh Rangarajan	Senior Analyst-Organic
Roopesh Rangarajan	Senior Analyst-Volatile
Ryan Phillips	Senior Analyst-Inorganic
Scott Beddoes	Senior Analyst-Inorganic

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

Project Ref:	TERRA19271																								
Site Details	Manyana Development - AREA AEC 1																								
SUMMARY OF LABORATORY RESULTS FOR SOIL SAMPLES	Heavy metals, TPH, BTEX, PAH																								
All resullts in mg/kg unless noted otherwise																									
	THRESHOLD CONCENTRATIONS																								
Sample ID										BH13	BH14	BH15	BH16	BH17	BH18	BH19	BH20	BH21	BH22	BH23	BH24	Quality Sample 1	Quality Sample 2	RP
Sample Location No.																						BH18	BH18D		
ALS test Reference no		GSW	RSW																						
Date of Sampling	ENM	CCT1	CCT2	EIL/ESL		HSL (A) Soil		HIL		TPH Mgt Limits		(ref 2a)	5/08/2019	5/08/2019	5/08/2019	5/08/2019	5/08/2019	5/08/2019	5/08/2019	5/08/2019	5/08/2019	5/08/2019	5/08/2019	5/08/2019	5/08/2019	
Soil Classification																									
Grid Sample Location	Abs. Max. Concentration (max Ave Conc)	(EPA NSW) UNO	(EPA NSW) UNO	open parkland and urban resdiential		(0.0m to < 1m) sandy Clay		Low Density Residential		residential, parkland and open spaces (Fine Soils)		Background													
Unit																									
Depth interval (m)	(Part 9 Clause 9.3)																								
Moisture content (%)													13.2	11.3	14.1	12.2	15.0	7.9	15.3	8.7	23.2	7.4	19.0	17.3		10.6	20
pH																		7.5									
Total Organic Carbon %																		4.0									
Cation Exchange capacity meq/100g																		0.8									
HEAVY METALS (TOTAL mg/kg)																											
Arsenic	40 (20)	100	400	100	2 (Aged)			100	2			1-50	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	
Cadmium	1 (0.5)	20	80	3	2a			20	2			1	<1	<1	<1	<1	<1	3	<1	<1	<1	<1	<1	<1	2	<1	
Chromium (total)				380 (III)	2(aged)							5-1000	**129**	**154**	**138**	**135**	**186**	**103**	**152**	**68**	**184**	**97**	**156**	**134**	**102**	**145**	5
Chromimum (Hexavalent)	150 (IV) (75)	100 (VI)	400					100 (IV)	2									**<5**									
Copper	200 (100)	NA	NA	160	2(aged)	1		6,000	2			2-100	**10**	**44**	**22**	**18**	**18**	**617**	**23**	**18**	**12**	**22**	**14**	**16**	**497**	**268**	18
Copper TLCP Leachate mg/l																		**<0.1**									
Lead	100 (50)	100	400	1100	2(aged)			300	2a			2-200	**8**	**8**	**5**	**10**	**8**	**506**	<5	**9**	**11**	**20**	**6**	**6**	**483**	**103**	19
Lead TLCP Leachate mg/l																		**0.1**									
Mercury	1 (0.5)	4	16	1				40	2			0.03	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	
Nickel	60 (30)	40	160	300	2(aged)			400	2			5-500	**16**	**26**	**26**	**28**	**36**	**82**	**34**	**15**	**17**	**17**	**22**	**26**	**56**	**39**	4
Nickel TLCP Leachate mg/l																		**<0.1**									
Zinc	300 (150)	NA	NA	350	2(aged)			7400	2			10-300	**23**	**31**	**36**	**44**	**39**	**2030**	**64**	**61**	**29**	**34**	**19**	**28**	**692**	**558**	17
BTEX (mg/kg)																											
Benzene	0.5	10		65	6	0.8	12	0.7	10								<0.2	<0.2	<0.2	<0.2				<0.2	<0.2	
Toluene	65	288		105	8	560	12	480	10								<0.5	<0.5	<0.5	<0.5				<0.5	<0.5	
Ethylbenzene	25	600		125	8	NL	12	12000	10								<0.5	<0.5	<0.5	<0.5				<0.5	<0.5	
Total Xylene	15	1000		45	8	130	12	110	10								<0.5	<0.5	<0.5	<0.5				<0.5	<0.5	
TOTAL PETROLEUM HYDROCARBONS (mg/kg)																											
F1 - C6 - C10 Fraction	-	650		180	12	60	12	4400	13	800	14						<10	<10	<10	<10				<10	<10	
F2 >C10 - C16 Fraction	-	-		120	12	330	12	3300	13	1000	14						<50	<50	<50	<50				<50	<50	
F3 > C16- C34 Fraction	-	-		1300	12			4,500	13	3500	14						<100	<100	**140**	**60**				<100	<100	
F4 >C34-C40 Fraction	-	-		5600				6,300	13	10000	14						<100	<100	<100	<100				<100	<100	
Total C10-C40	-																<50	<50	**140**	**60**				<50	<50	
Total C6-C9	-	650	2,600														<10	<10	<10	<10				<10	<10	
Total C10-C36	500 (250)	10000	40000														<50	<50	<50	<50				<50	<50	
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)																											
Benzo(a)pyrene	1 (0.5)	0.8		0.7	8			3	2								<0.5	<0.5	<0.5	<0.5				<0.5	<0.5	
Total PAH (mg/kg)	40 (20)	200						300	2a								<0.5	<0.5	<0.5	<0.5				<0.5	<0.5	

NOTES:

Bold	Above laboratory limits of detection
Bold	Exceeds ENM Abs. Maximum Concentrations
Bold	Concentration exceeds the HIL A
Bold	Concentration exceeds the EIL (Open Parkland and Urban Res)
Bold	Concentration exceeds the CCT1 waste disposal guidelines

[1] Based on Protection of the Environment Operations (Waste) Regulation 2005 - General Exemption Under Part 9, "The excavated natural material exemption" (2014).
[2] Column 2 - Maximum average concentration for characterisation
[3] Column 3 - Absolute maximum concentration
[4] Based on RTA Test Method T276
[5] Under Section 6 (Definitions) of the 'excavated natural exemption' (2012), Excavated Natural Material does not include material that contains asbestos.
[6] Based on Table 1a(1)A Schedule B(1), National Environmental Protection (Assessment of Site Contamination) Measure 2011
[7] Based on Table 7 Schedule B(1), National Environmental Protection (Assessment of Site Contamination) Measure 1999
[8] Based on Investigations levels for soil and groundwater Table 1a(1) SEPP 55 Residential B - minimal opportunities for soil access
[9] Based on Taylor and Langley 1998 Residential D - with minimal opportunities for soil interaction
[10] National Environmental Protection (assessment of Site Contamination) Measure (NEPC 1999)
[11] ANZECC B (Environmental Investigation Level) from ANZECC and NHMRC (1992) Australian and NZ guidelines for the assessment and management of contaminated sites
[12] For protection of structures
[13] Table 1B(5) ESLs Soil
[14] USEPA RSLs (2016)
[15] Based on NSW EPA, guidelines for Assessing Service station sites
[16] DER - Interim guidelines on the assessment and management of Perfluoroalkyl and Polyfluoroalkyl substances (PFAS)
[17] Table 1A(3) HSLs Soil
[18] Table 1A(6) HSLs direct contact
[19] Table 1B(6) HSLs direct contact

ND Not Detected
- Not Analysed
LOR Limits of Reporting
See original laboratory reports for detection limits
* Electrical conductivity was measured as received
# For samples < LOR, the LOR is conservatively assumed to be the concentraton for calculating average concentrations

Project Ref:	TERRA19271																					
Site Details	Manyana Development - AREA AEC 2																					
SUMMARY OF LABORATORY RESULTS FOR SOIL SAMPLES	Heavy metals, TPH, BTEX, PAH																					
All resullts in mg/kg unless noted otherwise																						
	THRESHOLD CONCENTRATIONS								BH01	BH02	BH03	BH04	BH05	BH06	BH07	BH08	BH09	BH10	BH11	BH12
Sample ID																				
Sample Location No.																				
ALS test Reference no		GSW	RSW																	
Date of Sampling	ENM	CCT1	CCT2	EIL/ESL	HSL (A) Soil	HIL	TPH Mgt Limits	(ref 2a)	5/08/2019	5/08/2019	5/08/2019	5/08/2019	5/08/2019	5/08/2019	5/08/2019	5/08/2019	5/08/2019	5/08/2019	5/08/2019	5/08/2019
Soil Classification																				
Grid Sample Location	Abs. Max. Concentration (max Ave Conc)	(EPA NSW) UNO	(EPA NSW) UNO	open parkland and urban resdiential	(0.0m to < 1m) sandy Clay	Low Density Residential	residential, parkland and open spaces (Fine Soils)	Background												
Unit																				
Depth interval (m)	(Part 9 Clause 9.3)																			
Moisture content (%)									28.7	22.4	36.8	24.5	25.3	13.8	16.5	20.9	8.2	14.7	20.2	14.1
HEAVY METALS (TOTAL mg/kg)																				
Arsenic	40 (20)	100	400	100 [2 (Aged)]		100 [2]		1-50	<5	<5	<5	<5	<5	<5	**6**	**5**	<5	<5	<5	<5
Cadmium	1 (0.5)	20	80	3 [2a]		20 [2]		1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium (total)	150 (IV) (75)	100 (VI)	400	380 (III) [2(aged)]		100 [2]		5-1000	**83**	**95**	**97**	**211**	**135**	**105**	**74**	**165**	**89**	**92**	**152**	**134**
Copper	200 (100)	NA	NA	160 [2(aged)]		6,000 [2]		2-100	**10**	**40**	**16**	**30**	**14**	**38**	**49**	**30**	**6**	**15**	**18**	**13**
Lead	100 (50)	100	400	1100 [2(aged)]		300 [2a]		2-200	**7**	**6**	<5	<5	**6**	**23**	<5	**6**	**10**	**9**	**8**	**8**
Mercury	1 (0.5)	4	16	1		40 [2]		0.03	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	60 (30)	40	160	300 [2(aged)]		400 [2]		5-500	53	47	90	141	36	41	194	146	**18**	33	48	44
Zinc	300 (150)	NA	NA	350 [2(aged)]		7400 [2]		10-300	**17**	**15**	**20**	**32**	**14**	165	**76**	**49**	**9**	**21**	**18**	**15**
BTEX (mg/kg)																				
Benzene	0.5	10		65 [6]	0.8 [12]	0.7 [10]							<0.2	<0.2	<0.2	<0.2				
Toluene	65	288		105 [8]	560 [12]	480 [10]							<0.5	<0.5	<0.5	<0.5				
Ethylbenzene	25	600		125 [8]	NL [12]	12000 [10]							<0.5	<0.5	<0.5	<0.5				
Total Xylene	15	1000		45 [8]	130 [12]	110 [10]							<0.5	<0.5	<0.5	<0.5				
TOTAL PETROLEUM HYDROCARBONS (mg/kg)																				
F1 - C6 - C10 Fraction	-	650		180 [12]	60 [12]	4400 [13]	800 [14]						<10	<10	<10	<10				
F2 >C10 - C16 Fraction	-	-		120 [12]	330 [12]	3300 [13]	1000 [14]						<50	<50	<50	<50				
F3 > C16- C34 Fraction	-	-		1300 [12]		4,500 [13]	3500 [14]						<100	<100	<100	<100				
F4 >C34-C40 Fraction	-	-		5600		6,300 [13]	10000 [14]						<100	<100	<100	<100				
Total C10-C40	-												<50	<50	<50	<50				
Total C6-C9	-	650	2,600										<10	<10	<10	<10				
Total C10-C36	500 (250)	10000	40000										<50	<50	<50	<50				
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)																				
Benzo(a)pyrene	1 (0.5)	0.8		0.7 [8]		3 [2]							<0.5	<0.5	<0.5	<0.5				
Total PAH (mg/kg)	40 (20)	200				300 [2a]							<0.5	<0.5	<0.5	<0.5				

NOTES:

Bold	Above laboratory limits of detection
Bold	Exceeds ENM Abs. Maximum Concentrations
Bold	Concentration exceeds the HIL A
Bold	Concentration exceeds the EIL (Open Parkland and Urban Res)
Bold	Concentration exceeds the CCT1 waste disposal guidelines

[1] Based on Protection of the Environment Operations (Waste) Regulation 2005 - General Exemption Under Part 9, "The excavated natural material exemption" (2014).

[a] Column 2 - Maximum average concentration for characterisation

[*] Column 3 - Absolute maximum concentration

[*] Based on RTA Test Method T276

[#] Under Section 6 (Definitions) of the 'excavated natural exemption' (2012), Excavated Natural Material does not include material that contains asbestos.

[2] Based on Table 1a(1)A Schedule B(1), National Environmental Protection (Assessment of Site Contamination) Measure 2011

[2a] Based on Table 7 Schedule B(1), National Environmental Protection (Assessment of Site Contamination) Measure 1999

[3] Based on Investigations levels for soil and groundwater Table 1a(1) SEPP 55 Residential B - minimal opportunities for soil access

[4] Based on Taylor and Langley 1998 Residential D - with minimal opportunities for soil interaction

[5] National Environmental Protection (assessment of Site Contamination) Measure (NEPC 1999)

[6] ANZECC & (Environmental Investigation Level) from ANZECC and NHMRC (1992) Australian and NZ guidelines for the assessment and management of contaminated sites

[7] For protection of structures

[8] Table 1B(3) EILs Soil

[9] USEPA RSLs (2016)

[10] Based on NSW EPA, guidelines for Assessing Service station sites

[11] DER - Interim guidelines on the assessment and management of Perfluoroalkyl and Polyfluoroalkyl substances (PFAS)

[12] Table 1A(3) HSLs Soil

[13] Table 1A(6) HSLs direct contact

[14] Table 1B(6) HSLs direct contact

ND Not Detected

- Not Analysed

LOR Limits of Reporting

See original laboratory reports for detection limits

* Electrical conductivity was measured as received

For samples < LOR, the LOR is conservatively assumed to be the concentration for calculating average concentrations

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB1922429**	Page	: 1 of 2
Client	: **TERRA INSIGHT**	Laboratory	: Environmental Division Brisbane
Contact	: MS KAREN GATES	Contact	: Aneta Prosaroski
Address	: PO BOX 414 UNANDERRA NSW 2526	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61 2 4225 3125
Project	: TERRA 19271	Date Samples Received	: 27-Aug-2019 15:30
Order number	:	Date Analysis Commenced	: 29-Aug-2019
C-O-C number	: ----	Issue Date	: 03-Sep-2019 10:50
Sampler	: ----		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)			Client sample ID	**BH20 0-0.5**	**----**	**----**	**----**	**----**
			Client sampling date / time	05-Aug-2019 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EB1922429-001**	**--------**	**--------**	**--------**	**--------**
				Result	----	----	----	----
EA009: Nett Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**3.4**	**----**	**----**	**----**	**----**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	**----**	**----**	**----**	**----**
ANC as CaCO3	----	0.1	% CaCO3	<0.1	**----**	**----**	**----**	**----**
Fizz Rating	----	0	Fizz Unit	**0**	**----**	**----**	**----**	**----**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.11**	**----**	**----**	**----**	**----**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EW1903386**	Page	: 1 of 21
Client	: **TERRA INSIGHT**	Laboratory	: Environmental Division NSW South Coast
Contact	: MS KAREN GATES	Contact	: Aneta Prosaroski
Address	: PO BOX 414 UNANDERRA NSW 2526	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 4/13 Geary Pl, North Nowra 2541 Australia NSW Australia
Telephone	: ----	Telephone	: +61 2 4225 3125
Project	: TERRA 19271	Date Samples Received	: 06-Aug-2019 11:31
Order number	: ----	Date Analysis Commenced	: 07-Aug-2019
C-O-C number	: ----	Issue Date	: 16-Aug-2019 16:47
Sampler	: ----		
Site	: MANAYANA LOT 106		
Quote number	: EN/222		
No. of samples received	: 69		
No. of samples analysed	: 69		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Alana Smylie	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Evie Sidarta	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- **EA200 Legend**
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- ASS: EA037 (Rapid Field and F(ox) screening): pH F(ox) Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Strong; 4 - Extreme
- EA037 ASS Field Screening: NATA accreditation does not cover performance of this service.
- EA200: N/A - Not Applicable

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH01 0-0.5	BH01 0.5-1.0	BH02 0-0.5	BH02 0.5-1.0	BH02 1.0-1.5
			Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit	EW1903386-001	EW1903386-002	EW1903386-003	EW1903386-004	EW1903386-005
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø **pH (F)**	----	0.1	pH Unit	**6.9**	**7.6**	**6.8**	**7.6**	**6.4**
ø **pH (Fox)**	----	0.1	pH Unit	**5.1**	**5.7**	**4.9**	**5.7**	**4.9**
ø **Reaction Rate**	----	1	-	**3**	**2**	**3**	**2**	**3**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH03 0-0.5	BH03 0.5-1.0	BH04 0-0.5	BH04 0.5-1.0	BH1
			Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit	EW1903386-006	EW1903386-007	EW1903386-008	EW1903386-009	EW1903386-010
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)	----	0.1	pH Unit	6.2	6.7	7.3	8.2	----
ø pH (Fox)	----	0.1	pH Unit	5.1	5.4	6.0	6.3	----
ø Reaction Rate	----	1	-	3	3	2	4	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	----	----	----	----	28.7
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	----	----	----	----	<5
Cadmium	7440-43-9	1	mg/kg	----	----	----	----	<1
Chromium	7440-47-3	2	mg/kg	----	----	----	----	83
Copper	7440-50-8	5	mg/kg	----	----	----	----	10
Lead	7439-92-1	5	mg/kg	----	----	----	----	7
Nickel	7440-02-0	2	mg/kg	----	----	----	----	53
Zinc	7440-66-6	5	mg/kg	----	----	----	----	17
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	----	----	<0.1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH2	BH3	BH4	BH9	BH10
				Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit		EW1903386-011	EW1903386-012	EW1903386-013	EW1903386-014	EW1903386-015
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		**22.3**	**36.8**	**24.5**	**8.2**	**14.7**
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		**95**	**97**	**211**	**89**	**92**
Copper	7440-50-8	5	mg/kg		**10**	**16**	**30**	**6**	**15**
Lead	7439-92-1	5	mg/kg		**6**	<5	<5	**10**	**9**
Nickel	7440-02-0	2	mg/kg		**47**	**90**	**141**	**18**	**33**
Zinc	7440-66-6	5	mg/kg		**15**	**20**	**32**	**9**	**21**
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH11	BH12	BH13	BH14	BH15
				Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit		EW1903386-016	EW1903386-017	EW1903386-018	EW1903386-019	EW1903386-020
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		**20.2**	**14.1**	**13.2**	**11.3**	**14.1**
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		**152**	**134**	**129**	**154**	**138**
Copper	7440-50-8	5	mg/kg		**18**	**13**	**10**	**14**	**22**
Lead	7439-92-1	5	mg/kg		**8**	**8**	**8**	**8**	**5**
Nickel	7440-02-0	2	mg/kg		**48**	**44**	**16**	**26**	**26**
Zinc	7440-66-6	5	mg/kg		**18**	**15**	**23**	**31**	**36**
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH16	BH21	BH22	BH23	BH24
				Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit		EW1903386-021	EW1903386-022	EW1903386-023	EW1903386-024	EW1903386-025
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		**12.2**	**23.2**	**7.4**	**19.0**	**17.3**
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		**135**	**184**	**97**	**156**	**134**
Copper	7440-50-8	5	mg/kg		**18**	**12**	**22**	**14**	**16**
Lead	7439-92-1	5	mg/kg		**10**	**11**	**20**	**6**	**6**
Nickel	7440-02-0	2	mg/kg		**28**	**17**	**17**	**22**	**26**
Zinc	7440-66-6	5	mg/kg		**44**	**29**	**34**	**19**	**28**
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH5 0-0.5	BH6 0-0.5	BH7 0-0.5	BH8 0-0.5	BH17 0-0.5
			Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit	EW1903386-030	EW1903386-031	EW1903386-032	EW1903386-033	EW1903386-034
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	25.3	13.8	16.5	20.9	15.0
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	6	5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	135	105	74	165	186
Copper	7440-50-8	5	mg/kg	14	38	49	30	18
Lead	7439-92-1	5	mg/kg	6	23	<5	6	8
Nickel	7440-02-0	2	mg/kg	36	41	194	146	36
Zinc	7440-66-6	5	mg/kg	14	165	76	49	39
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH5 0-0.5	BH6 0-0.5	BH7 0-0.5	BH8 0-0.5	BH17 0-0.5
				Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit		EW1903386-030	EW1903386-031	EW1903386-032	EW1903386-033	EW1903386-034
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**90.7**	**85.3**	**89.2**	**86.6**	**87.7**
2-Chlorophenol-D4	93951-73-6	0.5	%		**98.0**	**90.4**	**94.5**	**90.6**	**91.5**
2.4.6-Tribromophenol	118-79-6	0.5	%		**65.4**	**68.3**	**64.2**	**61.3**	**63.8**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**101**	**93.9**	**95.9**	**94.3**	**92.3**
Anthracene-d10	1719-06-8	0.5	%		**105**	**97.4**	**102**	**102**	**101**
4-Terphenyl-d14	1718-51-0	0.5	%		**114**	**104**	**107**	**105**	**108**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**95.8**	**88.6**	**94.7**	**86.1**	**94.6**
Toluene-D8	2037-26-5	0.2	%		**89.0**	**77.1**	**86.9**	**76.3**	**87.0**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH5 0-0.5	BH6 0-0.5	BH7 0-0.5	BH8 0-0.5	BH17 0-0.5
				Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit		EW1903386-030	EW1903386-031	EW1903386-032	EW1903386-033	EW1903386-034
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**88.6**	**85.7**	**85.4**	**79.7**	**89.4**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH18 0-0.5	BH19 0-0.5	BH20 0-0.5	BH18D 0.0-0.5	BH5 0-0.5
			Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit	EW1903386-035	EW1903386-036	EW1903386-037	EW1903386-038	EW1903386-039
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)	----	0.1	pH Unit	----	----	----	----	6.1
ø pH (Fox)	----	0.1	pH Unit	----	----	----	----	5.1
ø Reaction Rate	----	1	-	----	----	----	----	2
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	7.9	15.3	8.7	10.6	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	----
Cadmium	7440-43-9	1	mg/kg	3	<1	<1	<1	----
Chromium	7440-47-3	2	mg/kg	103	152	68	145	----
Copper	7440-50-8	5	mg/kg	617	23	18	268	----
Lead	7439-92-1	5	mg/kg	506	<5	9	103	----
Nickel	7440-02-0	2	mg/kg	82	34	15	39	----
Zinc	7440-66-6	5	mg/kg	2030	64	61	558	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH18 0-0.5	BH19 0-0.5	BH20 0-0.5	BH18D 0.0-0.5	BH5 0-0.5
				Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit		EW1903386-035	EW1903386-036	EW1903386-037	EW1903386-038	EW1903386-039
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	----
C10 - C14 Fraction	----	50	mg/kg		<50	<50	**80**	<50	----
C15 - C28 Fraction	----	100	mg/kg		<100	**100**	<100	<100	----
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	**100**	**80**	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	----
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	**60**	<50	----
>C16 - C34 Fraction	----	100	mg/kg		<100	**140**	<100	<100	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	**140**	**60**	<50	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	**60**	<50	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	----
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	----
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**86.6**	**90.3**	**88.7**	**83.6**	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**90.2**	**95.5**	**92.0**	**88.4**	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**88.9**	**79.2**	**79.8**	**66.2**	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**92.1**	**96.5**	**93.6**	**95.0**	----
Anthracene-d10	1719-06-8	0.5	%		**94.2**	**103**	**102**	**98.4**	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH18 0-0.5	BH19 0-0.5	BH20 0-0.5	BH18D 0.0-0.5	BH5 0-0.5
				Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit		EW1903386-035	EW1903386-036	EW1903386-037	EW1903386-038	EW1903386-039
					Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates - Continued									
4-Terphenyl-d14	1718-51-0	0.5	%		102	111	105	112	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		95.3	87.0	88.1	90.3	----
Toluene-D8	2037-26-5	0.2	%		85.4	76.2	80.3	78.9	----
4-Bromofluorobenzene	460-00-4	0.2	%		83.9	77.6	80.1	80.2	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH6 0.0-0.5	BH6 0.5-1.0	BH7 0.0-0.5	BH7 0.5-1	BH8 0.-0.5
			Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit	EW1903386-040	EW1903386-041	EW1903386-042	EW1903386-043	EW1903386-044
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)	----	0.1	pH Unit	6.9	8.8	7.0	8.8	7.7
ø pH (Fox)	----	0.1	pH Unit	5.8	6.3	5.2	6.3	6.0
ø Reaction Rate	----	1	-	3	4	3	4	3

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH8 0.5-1.0	BH9 0.0-0.5	BH9 0.5-1.0	BH10 0.0-0.5	BH11 0-0.5
			Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit	EW1903386-045	EW1903386-046	EW1903386-047	EW1903386-048	EW1903386-049
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)	----	0.1	pH Unit	**8.0**	**7.3**	**8.6**	**6.0**	**7.6**
ø pH (Fox)	----	0.1	pH Unit	**7.2**	**5.6**	**6.5**	**4.2**	**6.1**
ø Reaction Rate	----	1	-	**4**	**3**	**4**	**2**	**4**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH11 0.5-1.0	BH12 0.0-0.5	BH12 0.5-1.0	BH13 0.0-0.5	BH13 0.5-1.0
			Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit	EW1903386-050	EW1903386-051	EW1903386-052	EW1903386-053	EW1903386-054
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø **pH (F)**	----	0.1	pH Unit	**8.6**	**7.6**	**7.9**	**5.2**	**4.7**
ø **pH (Fox)**	----	0.1	pH Unit	**7.6**	**7.1**	**7.7**	**4.0**	**3.6**
ø **Reaction Rate**	----	1	-	**4**	**4**	**4**	**2**	**2**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH14 0-0.5	BH14 0.5-1.0	BH15 0-0.5	BH16 0-0.5	BH16 0.5-1.0
			Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit	EW1903386-055	EW1903386-056	EW1903386-057	EW1903386-058	EW1903386-059
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)	----	0.1	pH Unit	**7.4**	**8.5**	**5.4**	**6.1**	**5.6**
ø pH (Fox)	----	0.1	pH Unit	**6.0**	**5.8**	**4.2**	**4.0**	**3.9**
ø Reaction Rate	----	1	-	**3**	**2**	**3**	**3**	**2**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH17 0-0.5	BH18 0-0.5	BH18 0.5-1.0	BH19 0-0.5	BH20 0-0.5
			Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit	EW1903386-060	EW1903386-061	EW1903386-062	EW1903386-063	EW1903386-064
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)	----	0.1	pH Unit	7.4	6.4	5.6	5.7	5.1
ø pH (Fox)	----	0.1	pH Unit	5.4	4.4	4.1	4.1	3.7
ø Reaction Rate	----	1	-	3	3	3	3	3

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH21 0-0.5	BH22 0-0.5	BH22 0.5-1.0	BH23 0-0.5	BH24 0.0-0.5
			Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit	EW1903386-065	EW1903386-066	EW1903386-067	EW1903386-068	EW1903386-069
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)	----	0.1	pH Unit	**5.1**	**5.2**	**5.0**	**5.4**	**5.3**
ø pH (Fox)	----	0.1	pH Unit	**3.6**	**3.7**	**4.0**	**4.2**	**3.9**
ø Reaction Rate	----	1	-	**2**	**2**	**3**	**2**	**2**

Analytical Results

Sub-Matrix: SOLID (Matrix: SOLID)			Client sample ID	X001	X002	X003	X004	----
			Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	----
Compound	CAS Number	LOR	Unit	EW1903386-026	EW1903386-027	EW1903386-028	EW1903386-029	--------
				Result	Result	Result	Result	----
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples								
Asbestos Detected	1332-21-4	0.1	g/kg	**No**	**Yes**	**No**	**Yes**	**----**
Asbestos Type	1332-21-4	-	--	**-**	**Ch + Am**	**-**	**Ch**	**----**
Asbestos (Trace)	1332-21-4	5	Fibres	**N/A**	**N/A**	**N/A**	**N/A**	**----**
Sample weight (dry)	----	0.01	g	**75.6**	**52.3**	**106**	**54.2**	**----**
APPROVED IDENTIFIER:	----	-	--	**A. RISTOSKI**	**A. RISTOSKI**	**A. RISTOSKI**	**A. RISTOSKI**	**----**
Synthetic Mineral Fibre	----	0.1	g/kg	**No**	**No**	**No**	**No**	**----**
Organic Fibre	----	0.1	g/kg	**Yes**	**No**	**Yes**	**No**	**----**

Analytical Results

Descriptive Results

Sub-Matrix: **SOLID**

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples		
EA200: Description	X001 - 05-Aug-2019 00:00	Several pieces of cement sheeting.
EA200: Description	X002 - 05-Aug-2019 00:00	One piece of asbestos cement sheeting approximately 120x100x5mm.
EA200: Description	X003 - 05-Aug-2019 00:00	Two pieces of cement sheeting.
EA200: Description	X004 - 05-Aug-2019 00:00	Two pieces of asbestos cement sheeting approximately 70x65x5mm.

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EW1903386**	Page	: 1 of 21
Client	: **TERRA INSIGHT**	Laboratory	: Environmental Division NSW South Coast
Contact	: MS KAREN GATES	Contact	: Aneta Prosaroski
Address	: PO BOX 414 UNANDERRA NSW 2526	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 4/13 Geary Pl, North Nowra 2541 Australia NSW Australia
Telephone	: ----	Telephone	: +61 2 4225 3125
Project	: TERRA 19271	Date Samples Received	: 06-Aug-2019 11:31
Order number	: ----	Date Analysis Commenced	: 07-Aug-2019
C-O-C number	: ----	Issue Date	: 16-Aug-2019 16:47
Sampler	: ----		
Site	: MANAYANA LOT 106		
Quote number	: EN/222		
No. of samples received	: 69		
No. of samples analysed	: 69		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Alana Smylie	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Evie Sidarta	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- **EA200 Legend**
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- ASS: EA037 (Rapid Field and F(ox) screening): pH F(ox) Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Strong; 4 - Extreme
- EA037 ASS Field Screening: NATA accreditation does not cover performance of this service.
- EA200: N/A - Not Applicable

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH01 0-0.5	BH01 0.5-1.0	BH02 0-0.5	BH02 0.5-1.0	BH02 1.0-1.5
			Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit	EW1903386-001	EW1903386-002	EW1903386-003	EW1903386-004	EW1903386-005
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø **pH (F)**	----	0.1	pH Unit	**6.9**	**7.6**	**6.8**	**7.6**	**6.4**
ø **pH (Fox)**	----	0.1	pH Unit	**5.1**	**5.7**	**4.9**	**5.7**	**4.9**
ø **Reaction Rate**	----	1	-	**3**	**2**	**3**	**2**	**3**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH03 0-0.5	BH03 0.5-1.0	BH04 0-0.5	BH04 0.5-1.0	BH1
			Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit	EW1903386-006	EW1903386-007	EW1903386-008	EW1903386-009	EW1903386-010
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)	----	0.1	pH Unit	6.2	6.7	7.3	8.2	----
ø pH (Fox)	----	0.1	pH Unit	5.1	5.4	6.0	6.3	----
ø Reaction Rate	----	1	-	3	3	2	4	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	----	----	----	----	28.7
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	----	----	----	----	<5
Cadmium	7440-43-9	1	mg/kg	----	----	----	----	<1
Chromium	7440-47-3	2	mg/kg	----	----	----	----	83
Copper	7440-50-8	5	mg/kg	----	----	----	----	10
Lead	7439-92-1	5	mg/kg	----	----	----	----	7
Nickel	7440-02-0	2	mg/kg	----	----	----	----	53
Zinc	7440-66-6	5	mg/kg	----	----	----	----	17
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	----	----	<0.1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH2	BH3	BH4	BH9	BH10
				Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit		EW1903386-011	EW1903386-012	EW1903386-013	EW1903386-014	EW1903386-015
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		**22.3**	**36.8**	**24.5**	**8.2**	**14.7**
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		**95**	**97**	**211**	**89**	**92**
Copper	7440-50-8	5	mg/kg		**10**	**16**	**30**	**6**	**15**
Lead	7439-92-1	5	mg/kg		**6**	<5	<5	**10**	**9**
Nickel	7440-02-0	2	mg/kg		**47**	**90**	**141**	**18**	**33**
Zinc	7440-66-6	5	mg/kg		**15**	**20**	**32**	**9**	**21**
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH11	BH12	BH13	BH14	BH15
				Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit		EW1903386-016	EW1903386-017	EW1903386-018	EW1903386-019	EW1903386-020
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		**20.2**	**14.1**	**13.2**	**11.3**	**14.1**
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		**152**	**134**	**129**	**154**	**138**
Copper	7440-50-8	5	mg/kg		**18**	**13**	**10**	**14**	**22**
Lead	7439-92-1	5	mg/kg		**8**	**8**	**8**	**8**	**5**
Nickel	7440-02-0	2	mg/kg		**48**	**44**	**16**	**26**	**26**
Zinc	7440-66-6	5	mg/kg		**18**	**15**	**23**	**31**	**36**
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH16	BH21	BH22	BH23	BH24
				Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit		EW1903386-021	EW1903386-022	EW1903386-023	EW1903386-024	EW1903386-025
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		**12.2**	**23.2**	**7.4**	**19.0**	**17.3**
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		**135**	**184**	**97**	**156**	**134**
Copper	7440-50-8	5	mg/kg		**18**	**12**	**22**	**14**	**16**
Lead	7439-92-1	5	mg/kg		**10**	**11**	**20**	**6**	**6**
Nickel	7440-02-0	2	mg/kg		**28**	**17**	**17**	**22**	**26**
Zinc	7440-66-6	5	mg/kg		**44**	**29**	**34**	**19**	**28**
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Client sample ID	BH5 0-0.5	BH6 0-0.5	BH7 0-0.5	BH8 0-0.5	BH17 0-0.5
				Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
					EW1903386-030	EW1903386-031	EW1903386-032	EW1903386-033	EW1903386-034
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		**25.3**	**13.8**	**16.5**	**20.9**	**15.0**
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	**6**	**5**	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		**135**	**105**	**74**	**165**	**186**
Copper	7440-50-8	5	mg/kg		**14**	**38**	**49**	**30**	**18**
Lead	7439-92-1	5	mg/kg		**6**	**23**	<5	**6**	**8**
Nickel	7440-02-0	2	mg/kg		**36**	**41**	**194**	**146**	**36**
Zinc	7440-66-6	5	mg/kg		**14**	**165**	**76**	**49**	**39**
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH5 0-0.5	BH6 0-0.5	BH7 0-0.5	BH8 0-0.5	BH17 0-0.5
				Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit		EW1903386-030	EW1903386-031	EW1903386-032	EW1903386-033	EW1903386-034
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**90.7**	**85.3**	**89.2**	**86.6**	**87.7**
2-Chlorophenol-D4	93951-73-6	0.5	%		**98.0**	**90.4**	**94.5**	**90.6**	**91.5**
2.4.6-Tribromophenol	118-79-6	0.5	%		**65.4**	**68.3**	**64.2**	**61.3**	**63.8**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**101**	**93.9**	**95.9**	**94.3**	**92.3**
Anthracene-d10	1719-06-8	0.5	%		**105**	**97.4**	**102**	**102**	**101**
4-Terphenyl-d14	1718-51-0	0.5	%		**114**	**104**	**107**	**105**	**108**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**95.8**	**88.6**	**94.7**	**86.1**	**94.6**
Toluene-D8	2037-26-5	0.2	%		**89.0**	**77.1**	**86.9**	**76.3**	**87.0**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH5 0-0.5	BH6 0-0.5	BH7 0-0.5	BH8 0-0.5	BH17 0-0.5
				Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit		EW1903386-030	EW1903386-031	EW1903386-032	EW1903386-033	EW1903386-034
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**88.6**	**85.7**	**85.4**	**79.7**	**89.4**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH18 0-0.5	BH19 0-0.5	BH20 0-0.5	BH18D 0.0-0.5	BH5 0-0.5
			Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit	EW1903386-035	EW1903386-036	EW1903386-037	EW1903386-038	EW1903386-039
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)	----	0.1	pH Unit	----	----	----	----	6.1
ø pH (Fox)	----	0.1	pH Unit	----	----	----	----	5.1
ø Reaction Rate	----	1	-	----	----	----	----	2
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	7.9	15.3	8.7	10.6	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	----
Cadmium	7440-43-9	1	mg/kg	3	<1	<1	<1	----
Chromium	7440-47-3	2	mg/kg	103	152	68	145	----
Copper	7440-50-8	5	mg/kg	617	23	18	268	----
Lead	7439-92-1	5	mg/kg	506	<5	9	103	----
Nickel	7440-02-0	2	mg/kg	82	34	15	39	----
Zinc	7440-66-6	5	mg/kg	2030	64	61	558	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH18 0-0.5	BH19 0-0.5	BH20 0-0.5	BH18D 0.0-0.5	BH5 0-0.5
				Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit		EW1903386-035	EW1903386-036	EW1903386-037	EW1903386-038	EW1903386-039
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	----
C10 - C14 Fraction	----	50	mg/kg		<50	<50	**80**	<50	----
C15 - C28 Fraction	----	100	mg/kg		<100	**100**	<100	<100	----
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	**100**	**80**	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	----
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	**60**	<50	----
>C16 - C34 Fraction	----	100	mg/kg		<100	**140**	<100	<100	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	**140**	**60**	<50	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	**60**	<50	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	----
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	----
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**86.6**	**90.3**	**88.7**	**83.6**	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**90.2**	**95.5**	**92.0**	**88.4**	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**88.9**	**79.2**	**79.8**	**66.2**	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**92.1**	**96.5**	**93.6**	**95.0**	----
Anthracene-d10	1719-06-8	0.5	%		**94.2**	**103**	**102**	**98.4**	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH18 0-0.5	BH19 0-0.5	BH20 0-0.5	BH18D 0.0-0.5	BH5 0-0.5
				Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit		EW1903386-035	EW1903386-036	EW1903386-037	EW1903386-038	EW1903386-039
					Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates - Continued									
4-Terphenyl-d14	1718-51-0	0.5	%		102	111	105	112	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		95.3	87.0	88.1	90.3	----
Toluene-D8	2037-26-5	0.2	%		85.4	76.2	80.3	78.9	----
4-Bromofluorobenzene	460-00-4	0.2	%		83.9	77.6	80.1	80.2	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH6 0.0-0.5	BH6 0.5-1.0	BH7 0.0-0.5	BH7 0.5-1	BH8 0.-0.5
			Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit	EW1903386-040	EW1903386-041	EW1903386-042	EW1903386-043	EW1903386-044
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)	----	0.1	pH Unit	6.9	8.8	7.0	8.8	7.7
ø pH (Fox)	----	0.1	pH Unit	5.8	6.3	5.2	6.3	6.0
ø Reaction Rate	----	1	-	3	4	3	4	3

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH8 0.5-1.0	BH9 0.0-0.5	BH9 0.5-1.0	BH10 0.0-0.5	BH11 0-0.5
			Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit	EW1903386-045	EW1903386-046	EW1903386-047	EW1903386-048	EW1903386-049
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)	----	0.1	pH Unit	**8.0**	**7.3**	**8.6**	**6.0**	**7.6**
ø pH (Fox)	----	0.1	pH Unit	**7.2**	**5.6**	**6.5**	**4.2**	**6.1**
ø Reaction Rate	----	1	-	**4**	**3**	**4**	**2**	**4**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH11 0.5-1.0	BH12 0.0-0.5	BH12 0.5-1.0	BH13 0.0-0.5	BH13 0.5-1.0
			Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit	EW1903386-050	EW1903386-051	EW1903386-052	EW1903386-053	EW1903386-054
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)	----	0.1	pH Unit	**8.6**	**7.6**	**7.9**	**5.2**	**4.7**
ø pH (Fox)	----	0.1	pH Unit	**7.6**	**7.1**	**7.7**	**4.0**	**3.6**
ø Reaction Rate	----	1	-	**4**	**4**	**4**	**2**	**2**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH14 0-0.5	BH14 0.5-1.0	BH15 0-0.5	BH16 0-0.5	BH16 0.5-1.0
			Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit	EW1903386-055	EW1903386-056	EW1903386-057	EW1903386-058	EW1903386-059
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)	----	0.1	pH Unit	**7.4**	**8.5**	**5.4**	**6.1**	**5.6**
ø pH (Fox)	----	0.1	pH Unit	**6.0**	**5.8**	**4.2**	**4.0**	**3.9**
ø Reaction Rate	----	1	-	**3**	**2**	**3**	**3**	**2**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH17 0-0.5	BH18 0-0.5	BH18 0.5-1.0	BH19 0-0.5	BH20 0-0.5
			Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit	EW1903386-060	EW1903386-061	EW1903386-062	EW1903386-063	EW1903386-064
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)	----	0.1	pH Unit	7.4	6.4	5.6	5.7	5.1
ø pH (Fox)	----	0.1	pH Unit	5.4	4.4	4.1	4.1	3.7
ø Reaction Rate	----	1	-	3	3	3	3	3

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH21 0-0.5	BH22 0-0.5	BH22 0.5-1.0	BH23 0-0.5	BH24 0.0-0.5
			Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00
Compound	CAS Number	LOR	Unit	EW1903386-065	EW1903386-066	EW1903386-067	EW1903386-068	EW1903386-069
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)	----	0.1	pH Unit	**5.1**	**5.2**	**5.0**	**5.4**	**5.3**
ø pH (Fox)	----	0.1	pH Unit	**3.6**	**3.7**	**4.0**	**4.2**	**3.9**
ø Reaction Rate	----	1	-	**2**	**2**	**3**	**2**	**2**

Analytical Results

Sub-Matrix: SOLID (Matrix: SOLID)			Client sample ID	X001	X002	X003	X004	----
			Client sampling date / time	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	05-Aug-2019 00:00	----
Compound	CAS Number	LOR	Unit	EW1903386-026	EW1903386-027	EW1903386-028	EW1903386-029	--------
				Result	Result	Result	Result	----
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples								
Asbestos Detected	1332-21-4	0.1	g/kg	**No**	**Yes**	**No**	**Yes**	**----**
Asbestos Type	1332-21-4	-	--	**-**	**Ch + Am**	**-**	**Ch**	**----**
Asbestos (Trace)	1332-21-4	5	Fibres	**N/A**	**N/A**	**N/A**	**N/A**	**----**
Sample weight (dry)	----	0.01	g	**75.6**	**52.3**	**106**	**54.2**	**----**
APPROVED IDENTIFIER:	----	-	--	**A. RISTOSKI**	**A. RISTOSKI**	**A. RISTOSKI**	**A. RISTOSKI**	**----**
Synthetic Mineral Fibre	----	0.1	g/kg	**No**	**No**	**No**	**No**	**----**
Organic Fibre	----	0.1	g/kg	**Yes**	**No**	**Yes**	**No**	**----**

Analytical Results

Descriptive Results

Sub-Matrix: **SOLID**

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples		
EA200: Description	X001 - 05-Aug-2019 00:00	Several pieces of cement sheeting.
EA200: Description	X002 - 05-Aug-2019 00:00	One piece of asbestos cement sheeting approximately 120x100x5mm.
EA200: Description	X003 - 05-Aug-2019 00:00	Two pieces of cement sheeting.
EA200: Description	X004 - 05-Aug-2019 00:00	Two pieces of asbestos cement sheeting approximately 70x65x5mm.

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1926297**	Page	: 1 of 4
Client	: **TERRA INSIGHT**	Laboratory	: Environmental Division Sydney
Contact	: MS KAREN GATES	Contact	: Aneta Prosaroski
Address	: PO BOX 414 UNANDERRA NSW 2526	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61 2 4225 3125
Project	: TERRA19271 MANAYANA LOT 106	Date Samples Received	: 06-Aug-2019 11:31
Order number	:	Date Analysis Commenced	: 21-Aug-2019
C-O-C number	: ----	Issue Date	: 26-Aug-2019 17:53
Sampler	: H. Perry		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Dian Dao		Sydney Inorganics, Smithfield, NSW
Evie Sidarta	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EG048G: LOR raised for Alkyl Hexavalent Chromium on sample No 1 due to sample matrix.
- ALS is not NATA accredited for the analysis of Exchangeable Cations on Alkaline Soils when performed under ALS Method ED006.
- EG048G: Poor spike recovery for Alkyl Hexavalent Chromium due to matrix interferences(confirmed by re-analysis)
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H+ + Al3+).

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH18 0.0-0.5	----	----	----	----
			Client sampling date / time	05-Aug-2019 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1926297-001	--------	--------	--------	--------
				Result	----	----	----	----
EA001: pH in soil using 0.01M CaCl extract								
pH (CaCl2)	----	0.1	pH Unit	**7.5**	----	----	----	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**8.0**	----	----	----	----
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**221**	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**8.2**	----	----	----	----
ED006: Exchangeable Cations on Alkaline Soils								
Exchangeable Calcium	----	0.2	meq/100g	**0.6**	----	----	----	----
Exchangeable Magnesium	----	0.2	meq/100g	<0.2	----	----	----	----
Exchangeable Potassium	----	0.2	meq/100g	<0.2	----	----	----	----
Exchangeable Sodium	----	0.2	meq/100g	<0.2	----	----	----	----
Cation Exchange Capacity	----	0.2	meq/100g	**0.8**	----	----	----	----
Exchangeable Sodium Percent	----	0.2	%	<0.2	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Iron	7439-89-6	0.005	%	**13.3**	----	----	----	----
Arsenic	7440-38-2	5	mg/kg	<5	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	**2**	----	----	----	----
Chromium	7440-47-3	2	mg/kg	**102**	----	----	----	----
Copper	7440-50-8	5	mg/kg	**497**	----	----	----	----
Lead	7439-92-1	5	mg/kg	**483**	----	----	----	----
Nickel	7440-02-0	2	mg/kg	**56**	----	----	----	----
Zinc	7440-66-6	5	mg/kg	**692**	----	----	----	----
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	<5.0	----	----	----	----
EG049: Trivalent Chromium								
Trivalent Chromium	16065-83-1	2	mg/kg	**102**	----	----	----	----
EN33: TCLP Leach								
Initial pH	----	0.1	pH Unit	**8.5**	----	----	----	----
After HCl pH	----	0.1	pH Unit	**2.0**	----	----	----	----
Extraction Fluid Number	----	1	-	**1**	----	----	----	----
Final pH	----	0.1	pH Unit	**5.8**	----	----	----	----
EP004: Organic Matter								
Total Organic Carbon	----	0.5	%	**4.0**	----	----	----	----

Analytical Results

Sub-Matrix: **TCLP LEACHATE** (Matrix: **WATER**)				Client sample ID	**BH18 0.0-0.5**	**----**	**----**	**----**	**----**
				Client sampling date / time	05-Aug-2019 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*		**ES1926297-001**	**--------**	**--------**	**--------**	**--------**
					Result	----	----	----	----
EG005(ED093)C: Leachable Metals by ICPAES									
Copper	7440-50-8	0.1	mg/L		<0.1	**----**	**----**	**----**	**----**
Lead	7439-92-1	0.1	mg/L		**0.1**	**----**	**----**	**----**	**----**
Nickel	7440-02-0	0.1	mg/L		<0.1	**----**	**----**	**----**	**----**