



**CAMDEN COUNCIL
PLANNING PROPOSAL**

Amendment to Camden LEP 2010

Lot 102 DP 1193881

182 Raby Road, Gledswood Hills

**Version 4
NOVEMBER 2018**

Document Register

Version	Date	Details	Reference
1	11 Nov 2017	Original Planning Proposal submitted by proponent	17/380713
2	23 Mar 2018	Revised Planning Proposal prepared by proponent	18/88668
3	23 Oct 2018	Draft Planning Proposal for Gateway Determination prepared by Council	18/346291
4	22 Nov 2018	Planning Proposal for Public Exhibition	18/346291

Table of Contents

- Table of Contentsi**
- Table of Figures.....iii**
- Executive Summary1**
- 1.0 Introduction2**
- 2.0 Site Description and Context.....3**
 - 2.1 Overview.....3
 - 2.2 Site Locality3
 - 2.3 Site Context4
 - 2.3.1 Outline.....4
 - 2.3.2 Surrounding Site.....5
 - 2.4 The Site5
- 3.0 Statutory Framework.....8**
 - 3.1 Zoning.....8
 - 3.2 Other Controls9
- 4.0 The Planning Proposal.....11**
 - 4.1 Objectives and Intended Outcomes.....11
 - 4.2 Explanation of Provisions.....11
 - 4.3 Justification14
 - 4.3.1 Section A – Need for the Planning Proposal14
 - 4.3.2 Section B – Relationship to Strategic Planning Framework.....14
 - 4.3.3 Section C – Environmental, Social and Economic Impact16
 - 4.3.4 State and Commonwealth Interests20
 - 4.5 Mapping21
 - 4.6 Community Consultation24
 - 4.7 Project Timeline24
- 5.0 Conclusions and Recommendations25**
- 6.0 Appendices.....26**
 - Appendix 1: Consistency against State Environmental Planning Policies27
 - Appendix 2 : S9.1 Directions31

Appendix 3: Additional Justification..... 38

Appendix 4: Rural Lands Strategy Criteria for Rezoning Proposals48

Appendix 5: Ecological Assessment prepared by Ecological Australia (August 2017)50

Appendix 6: Visual Impact Assessment prepared by MUSEcape (August 2017)71

Appendix 7: Central Hills Rezoning: Landscape & Visual Assessment prepared by LFA (Pacific) Pty Limited (November 2005)..... 81

Appendix 8: Potential Contamination Investigation prepared by Douglas Partners (October 2017)..... 110

Table of Figures

- Figure 1: Location of Subject Site (Source: Camden Council Intramaps) 3
- Figure 2: Subject Site Context (Source: Camden Council Intramaps) 4
- Figure 3: Aerial view of the site (outlined in red) (Source: Camden Council Intramaps) 6
- Figure 4: Aerial view of proposed rezoning area (outlined in red) (Source: Camden Council Intramaps) 7
- Figure 5: Zoning Extract from Camden LEP 2010 (Source: Camden LEP 2010) 8
- Figure 6: Lot Size Extract from Camden LEP 2010 (Source: Camden LEP 2010).....10
- Figure 7: Current and Proposed Land Zoning (Source Camden LEP 2010)12
- Figure 8: Current and Proposed Lot Size (Source: Camden LEP 2010)13
- Figure 9: View looking west from Raby Road (Source: SJB Planning).....18
- Figure 10: Aerial view of site showing view corridor from Figure 9 (Source: Six Maps)18
- Figure 11: View looking south from the intersection of Gledswood Hills Drive and Raby Road (Source: SJB Planning)18
- Figure 12: Sketched view of the location of the Planning Proposal (Source: SJB Planning) 19
- Figure 13: Proposed Land Zoning Map (Sheet LZN_016)21
- Figure 14: Proposed Lot Size Map (Sheet LSZ_016)22

Executive Summary

The subject site is located south of Raby Road and is accessible to Gledswood Hills Drive via a right-of-carriageway. The subject site is part of a larger lot (Lot 102 DP 1193881) that is partly located within the Campbelltown Local Government Area (LGA). The subject site is abutted by the larger lot with an existing right-of-carriageway and fencing.

In the context of the adjoining approved and existing residential development and proposed infrastructure and services, the rezoning of the site will facilitate development that is complementary to surrounding lands.

The Planning Proposal seeks to rezone the subject site from RU2 Rural Landscape and R5 Large Lot Residential to R5 - Large Lot Residential under Camden Local Environmental (Camden LEP) Plan 2010 to facilitate the development of one additional residential lot. The Planning Proposal also seeks to amend the minimum lot size from 2ha and 4000m² to 4000m². These amendments therefore seek changes to the Land Zoning and Lot Size Maps under Camden LEP 2010.

The Planning Proposal has demonstrated merit to proceed to Gateway Determination.

1.0 Introduction

This Planning Proposal seeks to make amendments to the Camden LEP 2010 to facilitate the development of one additional residential lot.

The Planning Proposal has been prepared in accordance with Section 3.33 of the *Environmental Planning and Assessment Act 1979* and guidelines published by the Department of Planning and Environment, namely 'A guide to preparing Planning Proposals' to ensure all matters requiring consideration are appropriately addressed.

This Planning Proposal explains the intent and justification for the amendments to the Camden LEP 2010, as it applies to the land.

At its meeting of 25 September 2018, Council considered a report on the Planning Proposal which is included as part of the exhibition package. Council subsequently resolved to forward the Planning Proposal to the Department of Planning and Environment (DPE) for Gateway Determination.

The Planning Proposal received a positive Gateway Determination on 6 November 2018 (included as part of exhibition package) subject to amending the current and proposed maps in Part 4.2 of the proposal to clearly outline the site and adjoining R5 zoned land in the manner indicated in *A guide to preparing local environmental plans* (Department of Planning and Environment 2016). This condition has been met.

2.0 Site Description and Context

2.1 Overview

This section describes the subject site, its location and its context in relation to nearby existing and approved development.

2.2 Site Locality

The area that is the subject of this Planning Proposal is shown edged blue in **Figure 1**.

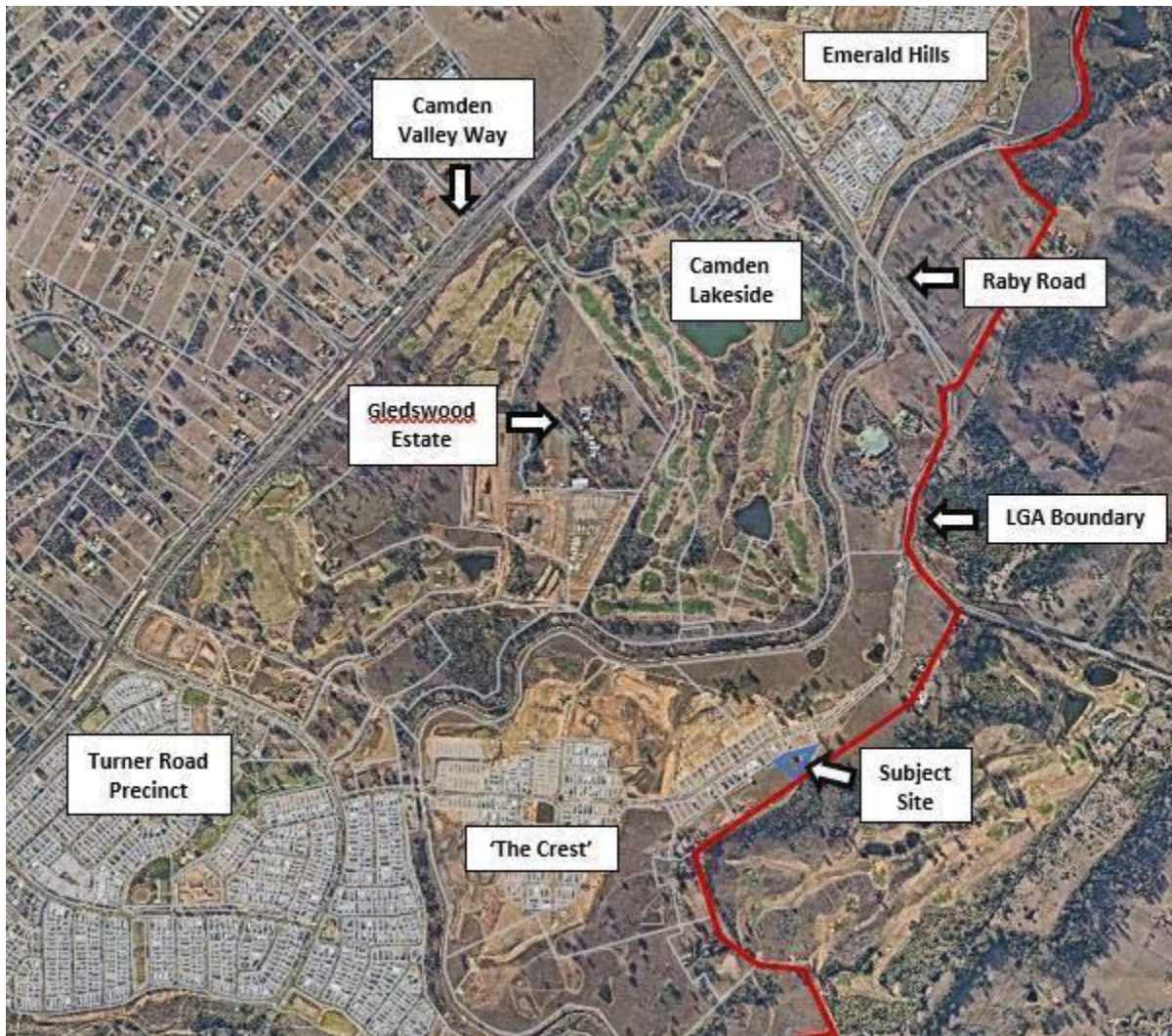


Figure 1: Location of Subject Site (Source: Camden Council Intramaps)

The subject site is irregular in shape and is located approximately 600m south of the Raby Road/Gledswood Hills Drive intersection. An existing right-of-carriageway dissects the lot. The site provides an area of transition between existing and approved urban development and rural landscapes.

2.3 Site Context

2.3.1 Outline

The subject site is part of the El Caballo Blanco Gledswood (ECBG) urban release area. The site is part of a larger lot that is partly located within the Campbelltown LGA. However, the site which is subject to the Planning Proposal is wholly within the Camden LGA. **Figure 2** shows the areas undergoing development in the locality.

The subject site and surrounding areas include ridgelines and rolling hills with visual perspectives of the Greater Blue Mountains approximately 21km to the west.

The context of the surrounding area is typically characterised as rural however the surrounding areas are experiencing rapid redevelopment. The surrounding areas are seeing significant changes with urban release areas developments and rezoning occurring to the surrounding site to the north, east and south.

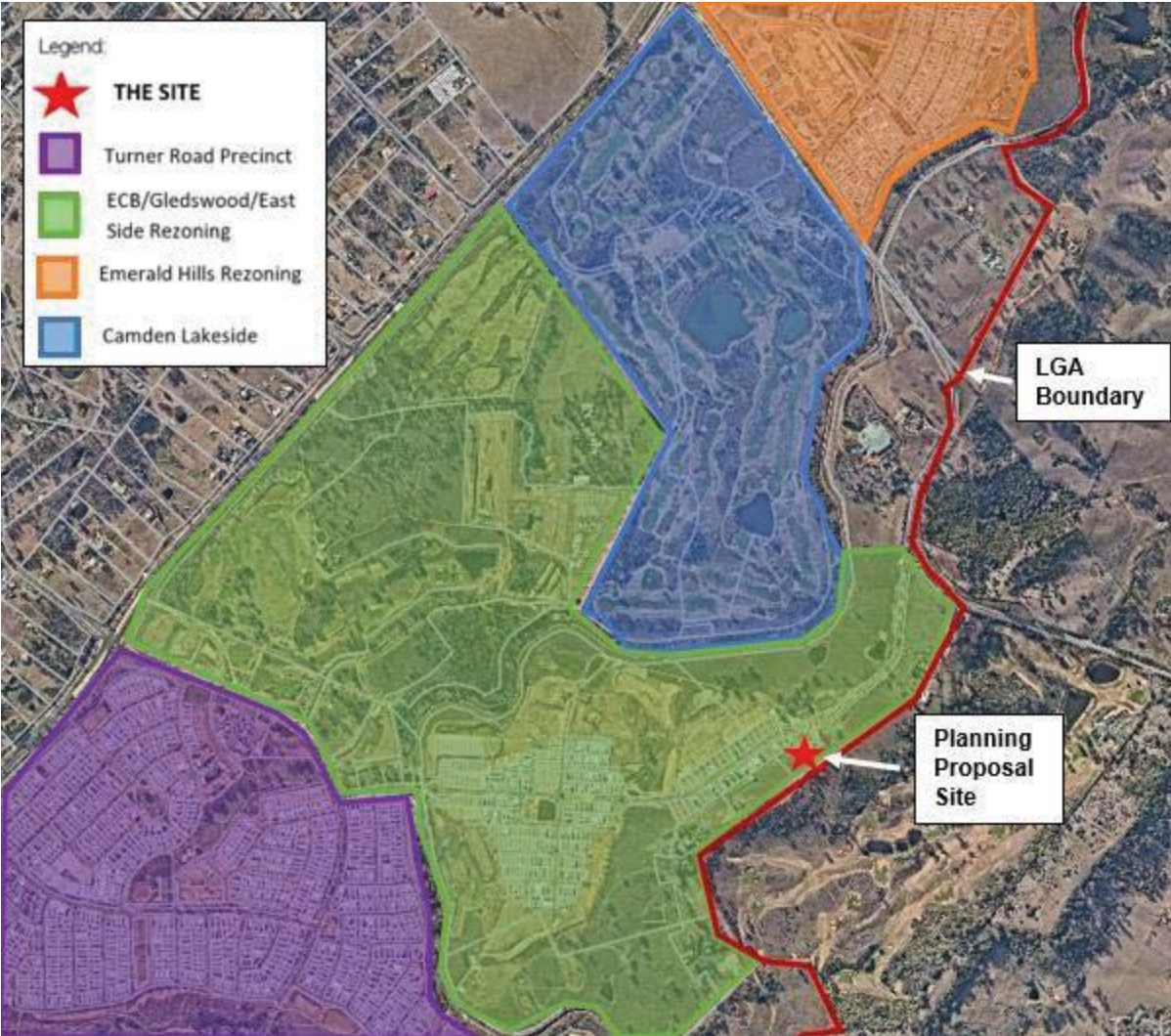


Figure 2: Subject Site Context (Source: Camden Council Intramaps)

2.3.2 Surrounding Sites

Emerald Hills

Located to the immediate north of the site and on the northern corner of Raby Road and Camden Valley Way, opposite the Camden Lakeside site, is a site known as Emerald Hills, 1100-1150 Camden Valley Way, Leppington.

The Emerald Hills estate has an area of approximately 151 hectares and was rezoned in 2014 to deliver approximately 1200 dwellings.

Emerald Hills is proposed to include a mix of housing types, a local shopping centre, open space, environmental protection zones, and riparian corridor improvements.

El Caballo Blanco/Gledswood/East Side Rezoning

The subject site is located within the El Caballo Blanco/Gledswood/ East Side release area. The urban release area is a precinct of approximately 160 hectares of former tourist park, rural and rural residential holdings. This precinct has recently been rezoned to accommodate approximately 860 dwellings, a golf course, and the restoration of the State Heritage listed Gledswood estate.

Camden Lakeside

The Camden Lakeside development will comprise of a mix of housing set amongst a golf course and clubhouse facilities. There are landscaping features including undulating hills, lakes, introduced vegetation and patches of protected native Cumberland Plain Woodland vegetation (CPW). Camden Lakeside is accessed directly off Raby Road which also facilitates access to the golf course.

Turner Road Precinct South West Growth Area

The Turner Road Precinct is located approximately 1km south west of the site. The Precinct was rezoned in December 2007 and was one of the first precincts released within the South West Growth Area. The Precinct has an area of approximately 536 hectares and will accommodate approximately 4,000 dwellings, 96 hectares of employment land, a town centre, open space and recreational facilities.

The Precinct comprises three main parts, being the Dart West/Marist Brother joint venture release area known as Gregory Hills, an employment lands area at the junction of Gregory Hills Drive and Camden Valley Way, and the Hermitage release area being developed by Sekisui House. Construction within the three areas is delivering key infrastructure, employment lands, a town centre and dwellings.

2.4 The Site

The land that is the subject of the Planning Proposal is located within the Camden LGA. The land is owned V & E Pisciuneri and is predominantly zoned RU2 – Rural Landscape. The property description of this site is Lot 102 in DP 1193881, known as 182 Raby Road, Gledswood Hills.

Existing development situated on the RU2 zoned land includes a single storey brick dwelling, swimming pool and metal sheds as indicated on **Figure 3** below. A close up aerial view illustrated in **Figure 4** shows the site, the right-of carriage-way and the existing and adjoining land.

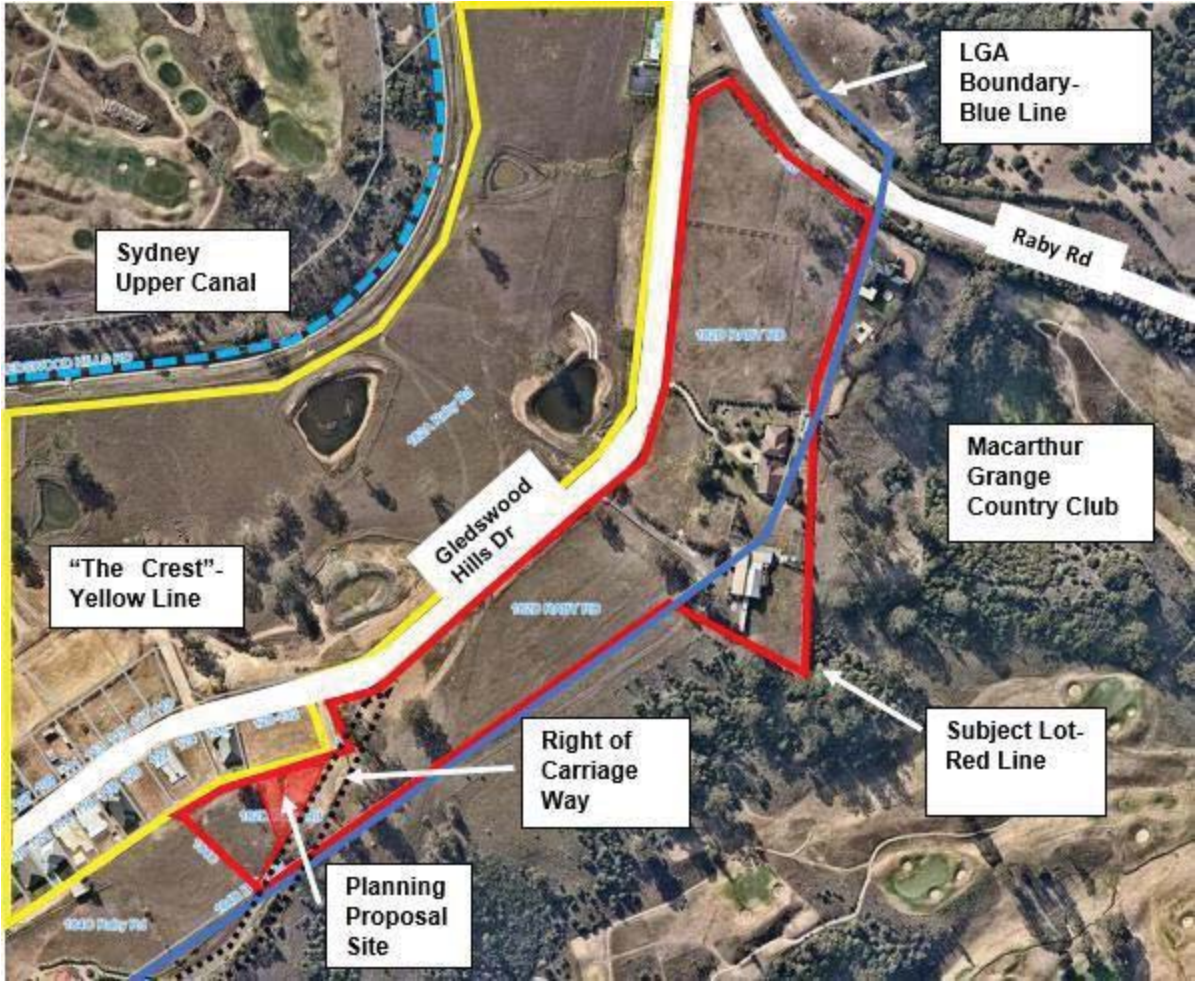


Figure 3: Aerial view of the site (outlined in red) (Source: Camden Council Intramaps)

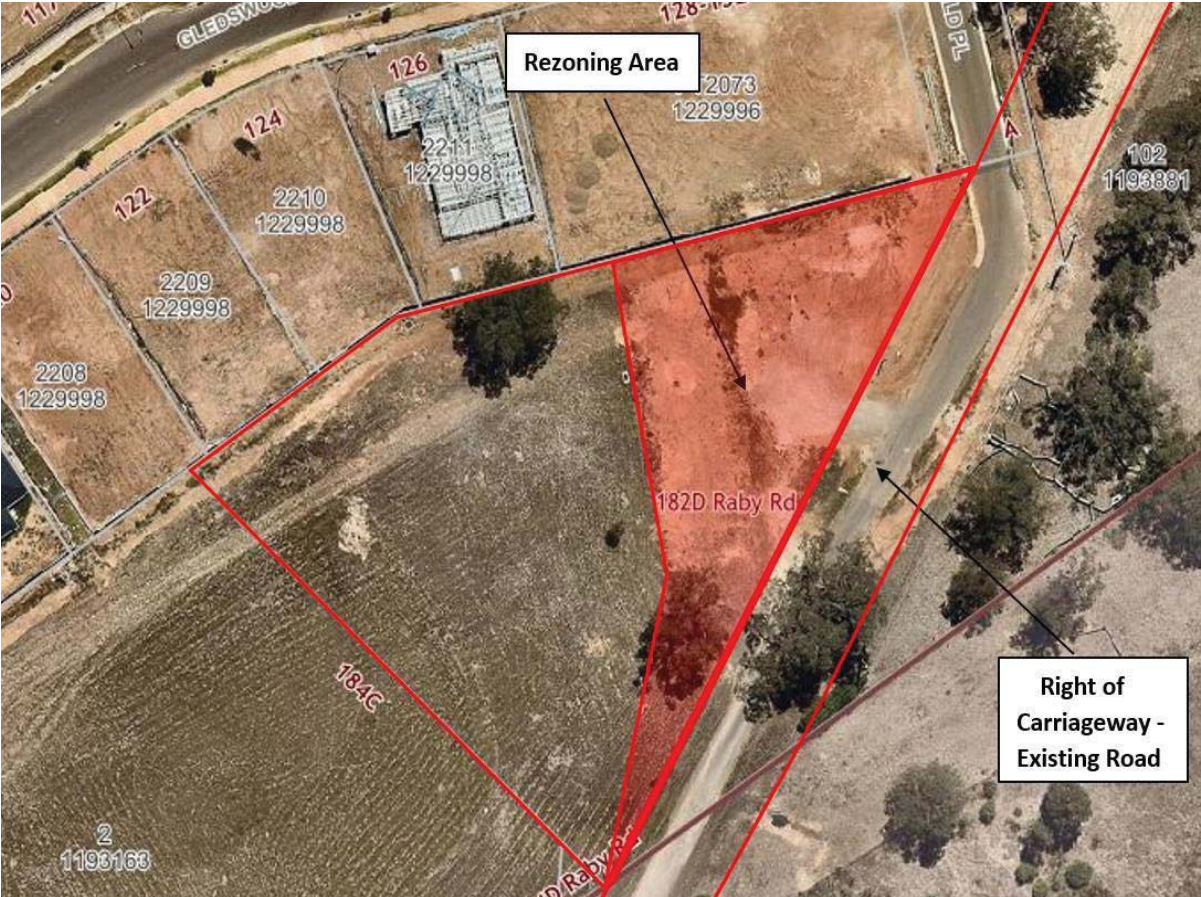


Figure 4: Aerial view of proposed rezoning area (outlined in red) (Source: Camden Council Intramaps)

3.0 Statutory Framework

3.1 Zoning

The site is currently zoned RU2 Rural Landscape and R5 Large Lot Residential under the provisions of Camden LEP 2010 (**Figure 5**).

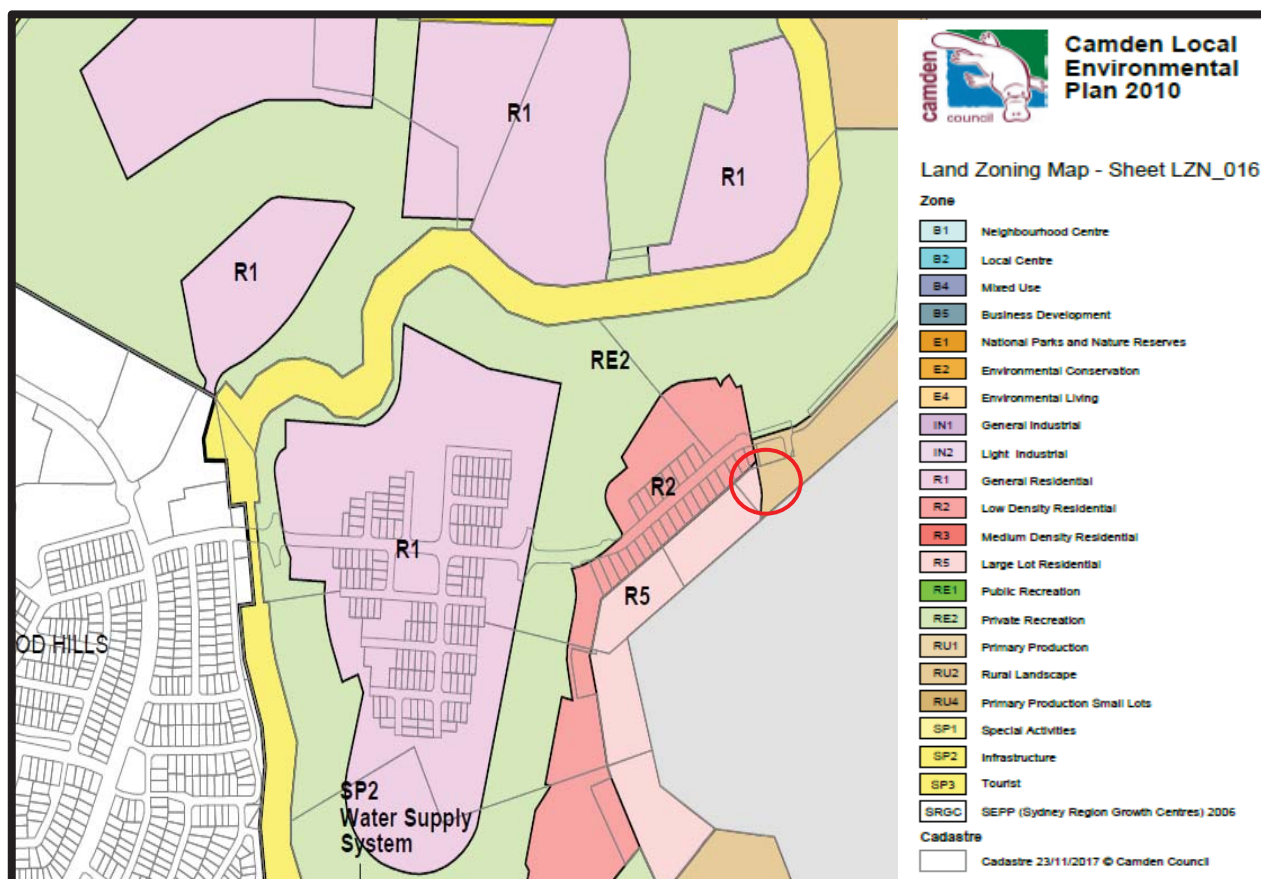


Figure 5: Zoning Extract from Camden LEP 2010 (September 2018)

The Planning Proposal seeks to rezone a portion of the subject site from RU2 to R5. An extract of the R5 land use table is provided below.

2. Permitted without consent
Extensive agriculture; Home occupations
3. Permitted with consent
Bed and breakfast accommodation; Dual occupancies (attached); Dwelling houses; Home-based child care; Home businesses; Home industries; Roads; Any other development not specified in item 2 or 4
4. Prohibited
Advertising structures; Agriculture; Air transport facilities; Amusement centres; Animal boarding or training establishments; Boat building and repair facilities; Boat sheds; Camping grounds; Car parks; Caravan parks; Charter and tourism boating facilities; Commercial premises; Correctional centres; Crematoria; Depots; Eco-tourist facilities; Electricity generating works; Entertainment facilities; Exhibition homes; Extractive industries; Forestry; Freight transport facilities; Function centres; Heavy industrial storage establishments; Home occupations (sex

services); Industries; Information and education facilities; Mortuaries; Neighbourhood shops; Public administration buildings; Recreation facilities (indoor); Recreation facilities (major); Registered clubs; Research stations; Residential accommodation; Restricted premises; Rural industries; Service stations; Sewerage systems; Sex services premises; Storage premises; Tourist and visitor accommodation; Transport depots; Truck depots; Vehicle body repair workshops; Vehicle repair stations; Veterinary hospitals; Warehouse or distribution centres; Waste or resource management facilities; Wharf or boating facilities; Wholesale supplies

Consistency with the Zone Objectives

1. Objectives of zone

- To provide residential housing in a rural setting while preserving, and minimising impacts on, environmentally sensitive locations and scenic quality.
- To ensure that large residential lots do not hinder the proper and orderly development of urban areas in the future.
- To ensure that development in the area does not unreasonably increase the demand for public services or public facilities.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.

This Planning Proposal is generally consistent with the relevant objectives of the R5 Large Lot Residential zone, for the following reasons:

- The planning proposal will allow for the preservation of the scenic qualities of the landscape whilst providing a rural setting; and
- The proposal of one additional rural residential allotment provides a transition between urban development and rural landscapes.

3.2 Other Controls

Other relevant planning controls applying to the subject site include the minimum lot size. The minimum lot size applying to site is 2ha and 4000sqm (refer to **Figure 6**). The Planning Proposal seeks to amend the minimum lot size from 2ha and 4000sqm to 4000sqm in conjunction with the amendment of the land zoning controls.

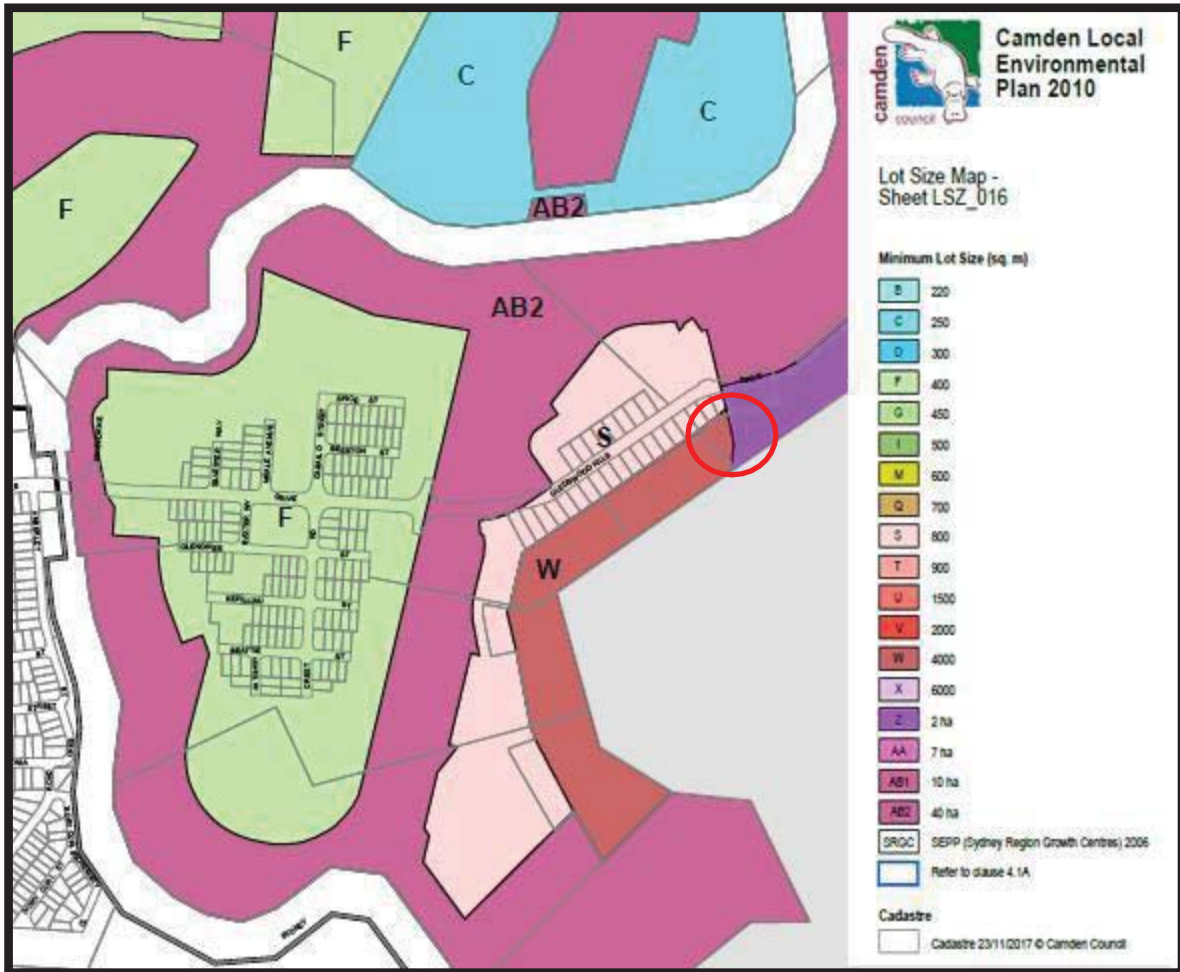


Figure 6: Minimum Lot Size Extract from Camden LEP 2010 (September 2018)

4.0 The Planning Proposal

4.1 Objectives and Intended Outcomes

The objective of this Planning Proposal is to amend the existing planning controls under the Camden LEP 2010 for the subject site as follows:

1. Amend the Land Zoning Map from RU2 Rural Landscape to R5 Large Lot Residential.
2. Amend the Minimum Lot Size Map from 2ha and 4000m² to 4000m².

The intended outcome of this Planning Proposal is to set a prescribed development footprint of 5,119m² for the purposes of one additional large residential allotment.

The proposed amendments to the Camden LEP 2010 will achieve the following:

- Provide feasible development to the land which is complementary to surrounding lands; and
- Allow changes to development standards (land zoning and minimum lot size) to facilitate the development of one additional large residential allotment.

The draft Planning Proposal is supported by additional information prepared by SJB Planning, providing for the justification for change in land zoning and minimum lot size applying to the site. This is included as **Appendix 3**.

4.2 Explanation of Provisions

This section addresses the need for the amendments to the Camden LEP 2010, identifies the background studies undertaken, details why the Planning Proposal is the best approach, and identifies what the community benefits will be.

The objectives and intended outcomes of this Planning Proposal are to be achieved by amendments to the following maps:

- Land Zoning Map (Sheet LZN_016).
- Lot Size Map (Sheet LSZ_016).

Land Zoning Map Changes

Figure 7 shows the extent of the proposed zoning amendment, limited to an approximate R5 Large Lot Residential maximum area of 5,119m² to the Planning Proposal site.

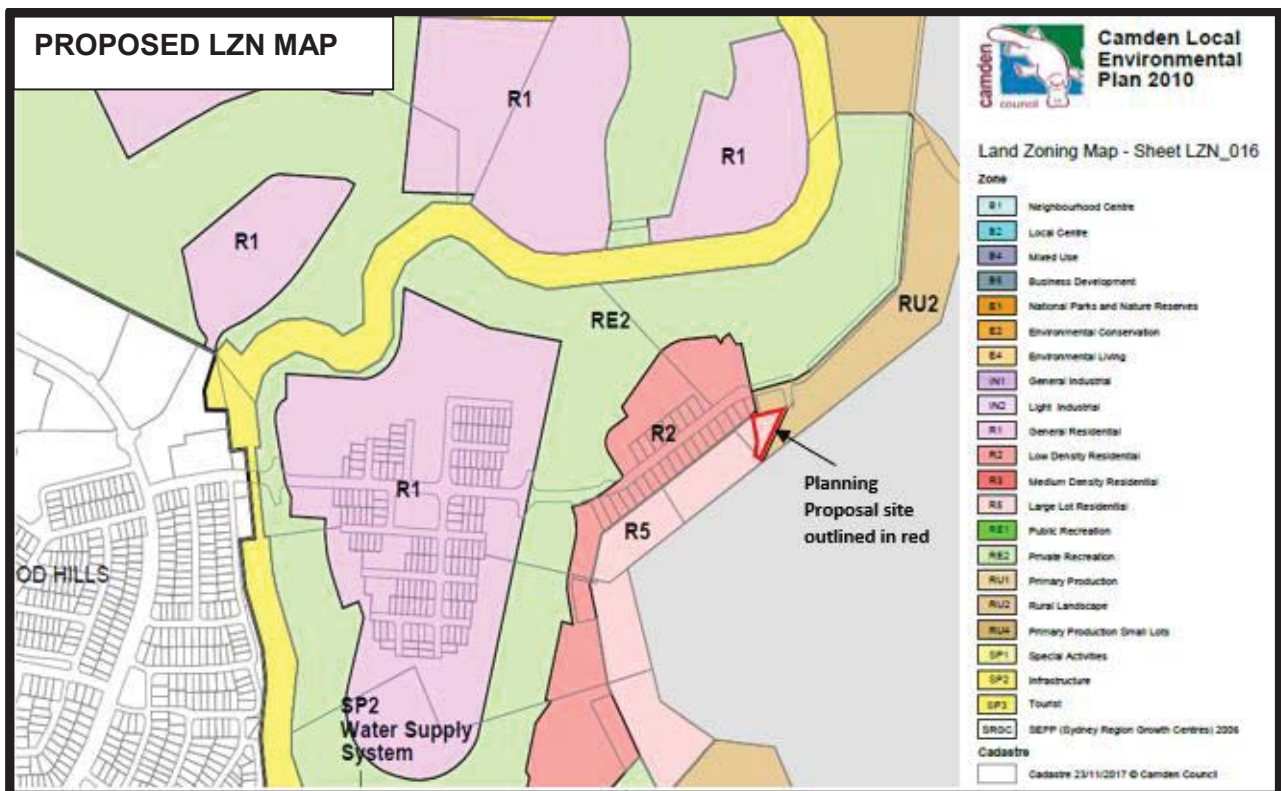
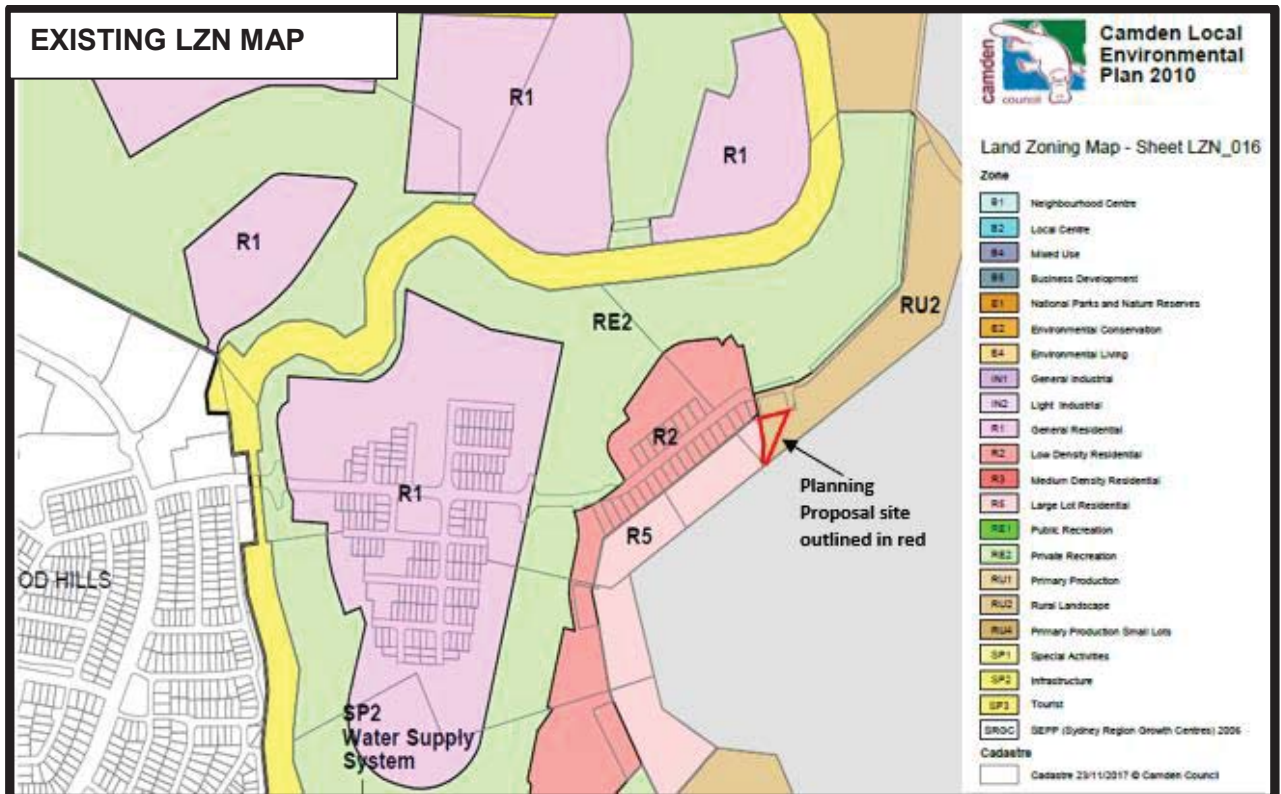


Figure 7: Current and Proposed Land Zoning Maps

Lot Size Map Changes

This Planning Proposal seeks to amend the Lot Size Map (Sheet LSZ_016) as shown in **Figure 8** to the site.

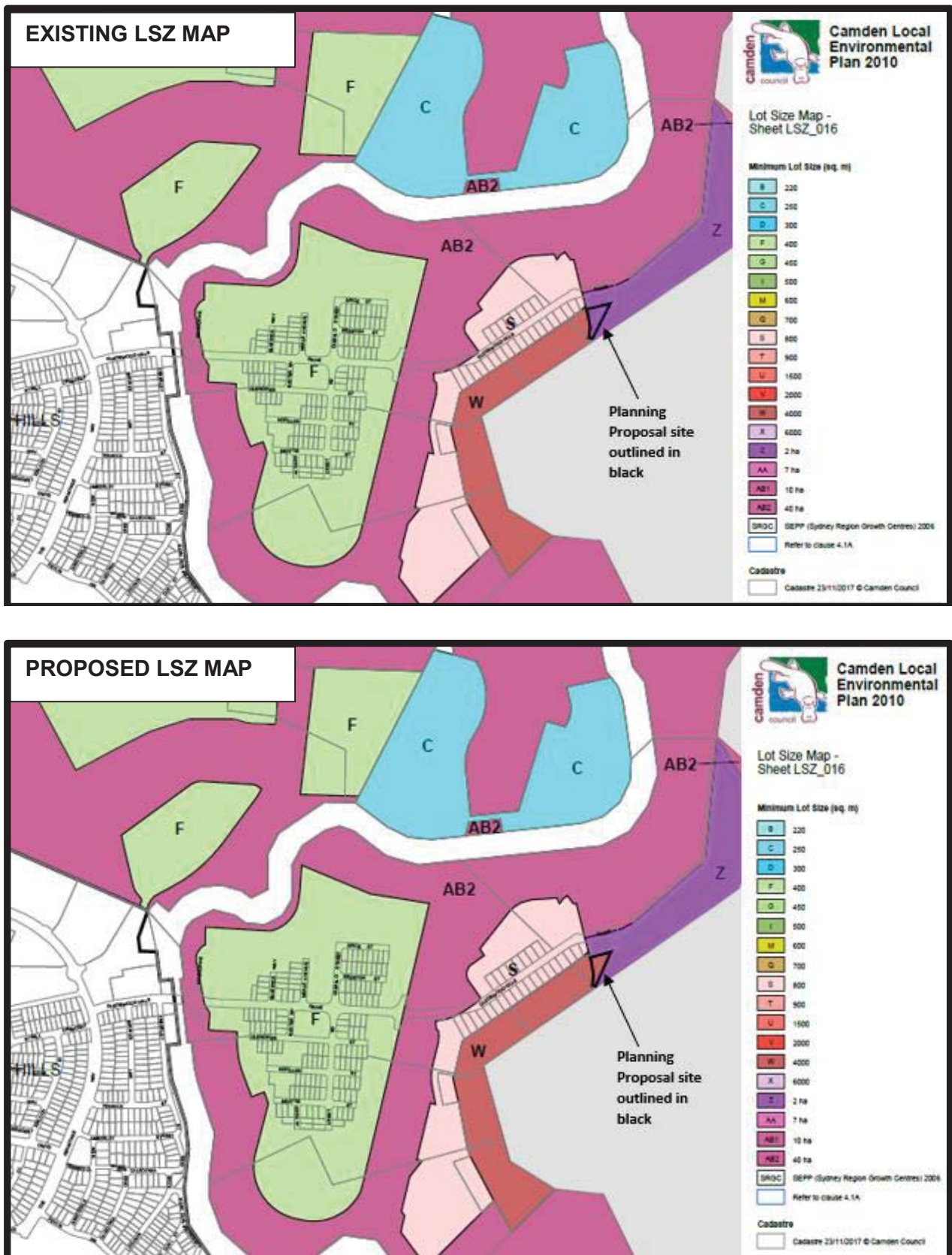


Figure 8: Current and Proposed Lot Size Maps

4.3 Justification

This section addresses the need for the rezoning, identifies the background studies undertaken, details why the Planning Proposal is the best approach, and identifies what the community benefits will be.

4.3.1 Section A – Need for the Planning Proposal

Is the planning proposal a result of any strategic study or report?

No. The Planning Proposal is not the result of a Strategic Study or Report.

Is the Planning Proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

Yes. The Planning Proposal is considered the best means of achieving the objectives and intended outcomes for the future development of one additional residential lot with a minimum lot size of 4000sqm on the subject site. The current R5 zoned portion of the subject site is approximately 2,797sqm and is therefore below the minimum lot size for the purposes of a large residential allotment. The proposed lot size cannot be supported under a Clause 4.6 Variation-Exception to Development Controls of Camden LEP 2010. A Planning Proposal is required to facilitate the proposed residential lot.

The proposed changes to the land zoning and lot size controls is necessary to enable the facilitation of one additional rural residential allotment. The proposal is seen as a logical extension of existing and approved adjoining residential development. Furthermore, the proposal has acceptable visual impacts and is not inconsistent with region, district and local strategic plans and their relevant objectives as detailed below.

4.3.2 Section B – Relationship to Strategic Planning Framework

Is the planning proposal consistent with the objectives and actions contained within the applicable regional or sub-regional strategy (including the Sydney Metropolitan Strategy and exhibited draft strategies)?

A Metropolis of Three Cities - Greater Sydney Region Plan

The Greater Sydney Region Plan was released by the Greater Sydney Commission (GSC) on 18 March 2018. The Greater Sydney Region Plan has a vision and plan to manage growth and change for Greater Sydney in the context of economic, social and environmental matters. The proposal is consistent with the relevant directions and objectives of the Plan as summarised below.

- Direction 4: Housing the City*
- Objective 10: Greater housing supply*

The proposal seeks to increase housing supply by providing one additional residential lot catering for a rural-residential setting.

- Direction 8: A City in its Landscape*
- Objective 28: Scenic and Cultural landscapes are protected*

The proposal will have minimal visual impact on the surrounding area, including the Scenic Hills.

Western City District Plan (District Plan)

The Western City District Plan was released by the GSC on 18 March 2018. The Western City District Plan guides the 20-year growth of the district to improve its social, economic and environmental assets. The draft Planning Proposal is consistent with the relevant Planning Priorities and Actions as summarised below.

- Planning Priority W5: Providing housing supply, choice and affordability with access to jobs and services

The proposal will provide the potential for an additional residential lot, which is close to existing and proposed infrastructure, jobs and services.

- Planning Priority W6: Creating and renewing great places and local centres, and respecting the District's heritage
- Key Action: Identify, conserve and enhance environmental heritage*

The Planning Proposal will not visually detract from the significance of heritage items within the vicinity of the subject site.

- Planning Priority W16: Protecting and enhancing scenic and cultural landscapes
- Key Action: Identify and protect ridgelines, scenic and cultural landscapes, specifically the Scenic Hills*

The subject site will have an acceptable level of visual impact, including minimal visual impact on the Scenic Hills.

- Planning Priority W17: Better managing rural areas
- Key Actions: Maintain or enhance the values of the Metropolitan Rural Area using place-based planning to deliver targeted environmental, social and economic outcomes*

The subject site is no longer used for the purposes of a rural enterprise and is separated from the remainder of the lot by a right-of-carriageway and fencing. The proposed development is unlikely to impact on existing rural enterprises in the vicinity.

The site is adjacent to existing and approved residential development that is consistent with the objectives and actions of the District Plan. The proposal is also consistent with the Camden DCP 2011 objectives for land as a rural living zone.

Is the planning proposal consistent with the local council's Community Strategic Plan, or other local strategic plan?

Community Strategic Plan (CSP)

The CSP is was adopted by Council in June 2017.

Key Direction 1 – Actively Managing Camden LGA’s Growth – Strategy 1.1.1 seeks to ensure the provision of appropriate urban development for sustainable growth in the Camden LGA. Strategy 1.1.2 seeks to manage and plan for a balance between population growth, urban development and environmental protection.

The draft Planning Proposal is consistent with Council’s CSP.

Rural Lands Strategy

Council adopted the Camden Rural Lands Strategy (RLS) in September 2017. The RLS applies to land zoned rural within the Camden LGA (excluding the South West Growth Area).

The RLS contains the following key planning principles:

- P1. Protect Camden’s remaining rural lands*
- P2. Retain Camden’s valued scenic and cultural landscapes*
- P3. Provide certainty and avoid rural land fragmentation*
- P4. Minimise and manage rural land use conflict*
- P5. Enhance Camden’s Rural Economy*
- P6. Minimise unplanned non-agricultural development*
- P7. Maximise opportunities for relocation of rural enterprises*

The RLS acts as a guide to decision making. The RLS has criteria for the assessment of planning proposals for rezoning of rural land as discussed below. The criteria for rezoning is addressed in **Appendix 4**.

Is the planning proposal consistent with applicable state environmental planning policies?

The relevant State Environmental Planning Policies and deemed State Environmental Policies have been addressed at **Appendix 1** to this report.

The consideration of these State Environmental Planning Policies and deemed SEPPs has identified that the Planning Proposal is consistent with these policies.

Is the planning proposal consistent with applicable Ministerial Directions (s9.1 Directions)?

The s9.1 directions applicable to the Planning Proposal have been addressed at **Appendix 2** of this report.

4.3.3 Section C – Environmental, Social and Economic Impact

Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected as a result of the proposal?

The subject site has three trees located within or nearby to it. Two of these trees are representative of the Cumberland Plain Woodland Community (CPW). An Ecological Assessment prepared by Ecological Australia has been undertaken and is included as

Appendix 5. The Ecological Assessment concludes the site is of limited value for fauna and is suitable for the proposal of one additional residential lot.

Are there any other likely environmental effects as a result of the planning proposal and how are they proposed to be managed?

Potential Visual Impacts

The Camden Local Environmental Plan 2010 (Camden LEP 2010) and Camden Development Control Plan (Camden DCP 2011) seek to protect important visual elements within the landscape including distant views, vegetation, water bodies and cultural elements.

The Visual Impact Assessment (VIA) prepared by MUSEcape in support of the Planning Proposal (**Appendix 6**) includes an assessment of current and previous viewpoints including:

- A review of the visual impacts from the Landscape and Visual Impact Assessment prepared in 2005 (**Appendix 7**) that informed the rezoning of the Central Hills to determine the extent of change and to assess the visual impact of the proposal.
- New viewpoints in the vicinity of the site.

The VIA found that existing vegetation and ridgelines provide a visual barrier to the site (including when viewed from the east in the Campbelltown LGA). The viewpoint looking towards the site from south-east as illustrated in Figures 9 and 10 (above The Macarthur Grange Country Club) provides distant partial views of the site which is interrupted by existing vegetation and ridgelines. The site is visible from the intersection of Raby Road and Gledswood Hills Drive as seen in **Figures 11 and 12**, however this viewpoint is also interrupted by existing vegetation.

In addition to the VIA, further information has been submitted to demonstrate that the site does not have an unacceptable detrimental visual impact on the surrounding area. This additional information is included as **Appendix 3**.

Furthermore, there was previously a hay shed on the site (approximate dimensions 47m long x 13m wide). The visual impact of a future dwelling would be no greater than the former hay shed.

The VIA assessment concludes the visual impact of the proposal is acceptable and provides the following recommendations:

- Exterior materials and finishes of any future development to be chosen from a colour palette to minimise visual impact when viewed from the public domain;
- Screen planting to be provided along the Gledswood Hills Drive boundary.

Should the Planning Proposal receive a favourable Gateway Determination, the recommended mitigation measure concerning external materials, finishes and colours will be incorporated as development controls as part of the comprehensive review of the Camden Development Control Plan 2011 (Camden DCP 2011).

In relation the recommendation for additional screen planting, there is no need for additional controls within the DCP. There are existing street trees along Gledswood Hills Drive that

provide screening as they mature, along with vegetation on the eastern side of the right-of-carriageway.

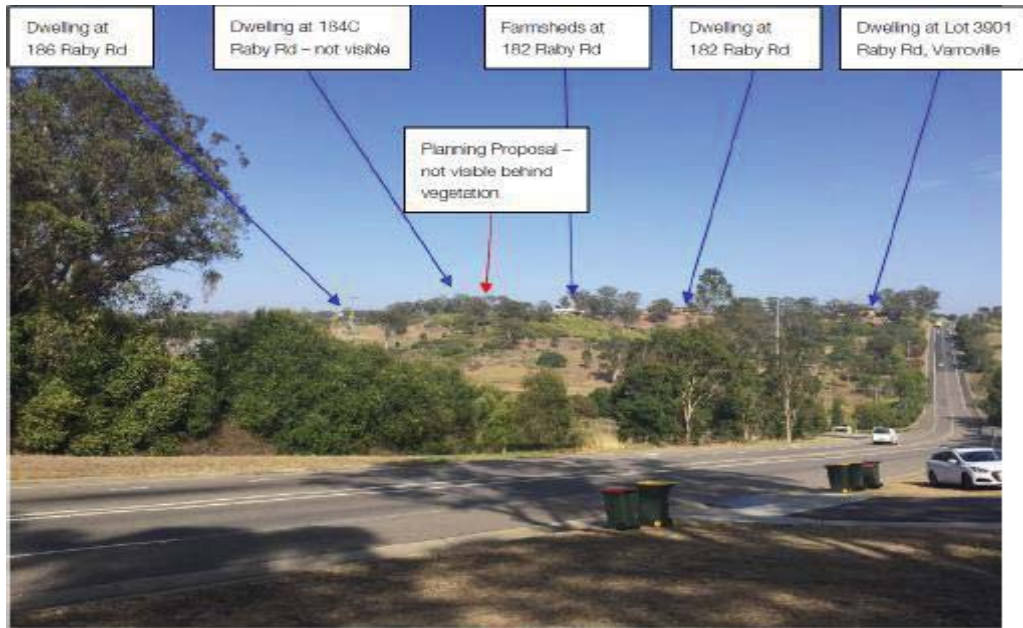


Figure 9: View looking west from Raby Road adjacent to 68 Raby Road Varroville (Source: SJB Planning)

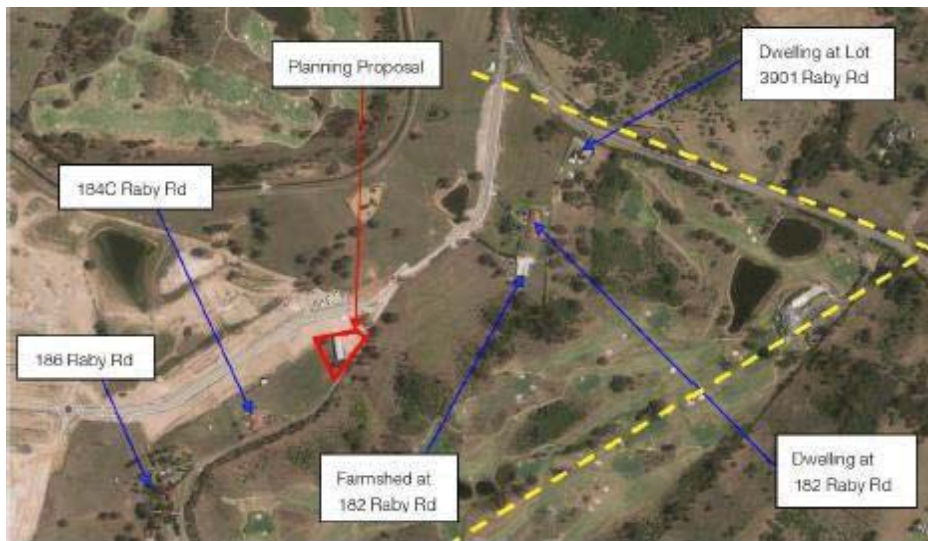


Figure 10: Aerial view of the site and surrounds showing view corridor from Figure 11 (Source: Six Maps)



Figure 11: View looking south from the intersection of Gledswood Hills Drive and Raby Road (Source: SJB Planning)

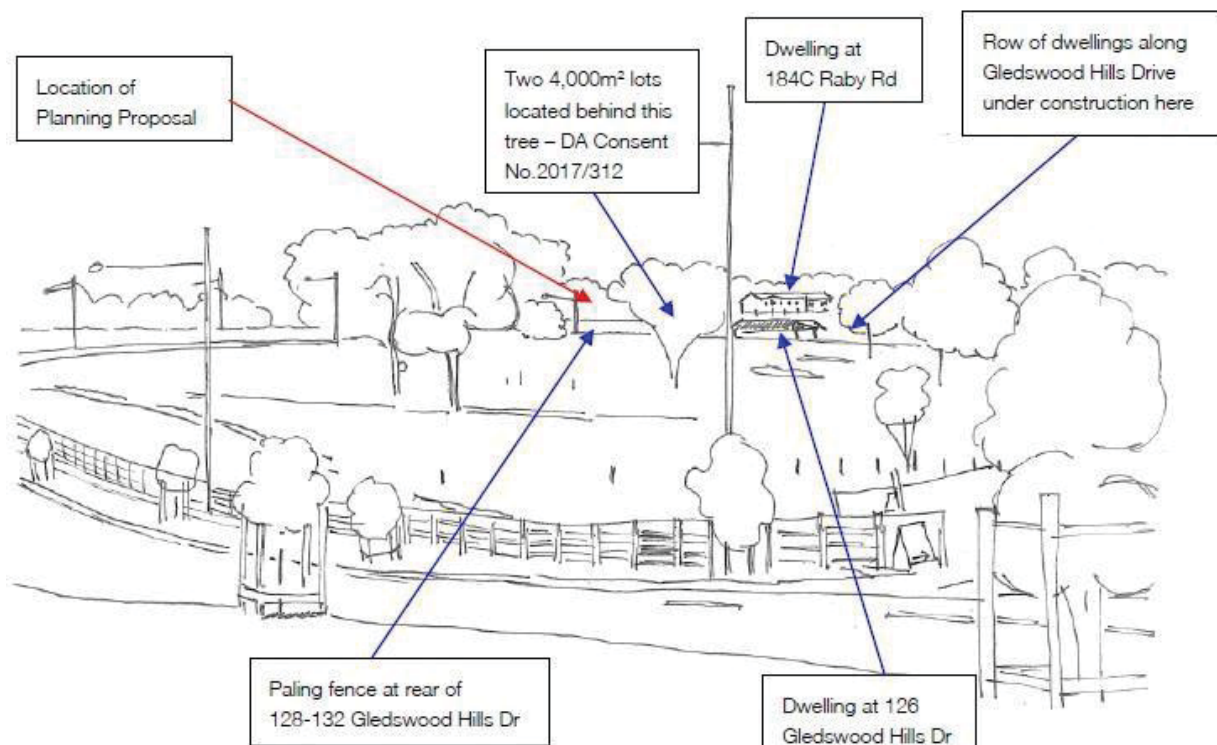


Figure 12: Enlarged sketched view of the location of the Planning Proposal (Source: SJB Planning)

Heritage Items in the Vicinity

The site is located approximately 270m south of the Sydney Water Upper Canal and 860m south-east of the Gledswood Estate, at its nearest points.

These two items are listed on the Office of Environment and Heritage (OEH) State Heritage Register. The Gledswood Estate is also listed as a local heritage item under Camden LEP 2010.

The Planning Proposal will not visually detract from the significance of these items.

Potential Contamination Investigation

A contamination investigation prepared by Douglas Partners accompanied the draft Planning Proposal and is included as **Appendix 8**. The contamination investigation concludes that the subject site is suitable for residential use.

How has the planning proposal adequately addressed any social and economic effects?

Social Effects

The Planning Proposal site forms part of the El Caballo Blanco Urban Release Area and will result in one additional residential lot which is acceptable given the context of existing and approved residential development and forms part of the ECBG Urban Release Area. The proposal is unlikely to provide any adverse impacts on community facilities planned for the nearby urban release areas. It is also noted the subject site is located nearby to future infrastructure and services.

The provision of greater housing choice and diversity to meet the needs of the growing population has the potential to provide a positive impact for the community given that the subject site is located nearby to future infrastructure and services.

Economic Effects

The Planning Proposal will provide increased housing supply and choice in a location with good access to nearby major employment centres.

4.3.4 State and Commonwealth Interests

Is there adequate public infrastructure for the planning proposal?

The subject site is currently serviced with adequate public infrastructure, with some surrounding sites currently undergoing redevelopment. The surrounding developments include provisions for additional public transports, roads, utilities and essential services. No required upgrades are identified for purpose of this Planning Proposal.

What are the views of State and Commonwealth public authorities consulted in accordance with the Gateway Determination?

The Planning Proposal has received a positive Gateway Determination. The City of Campbelltown will be notified during exhibition and comments will be addressed post-exhibition.

4.5 Mapping

The following maps are proposed:

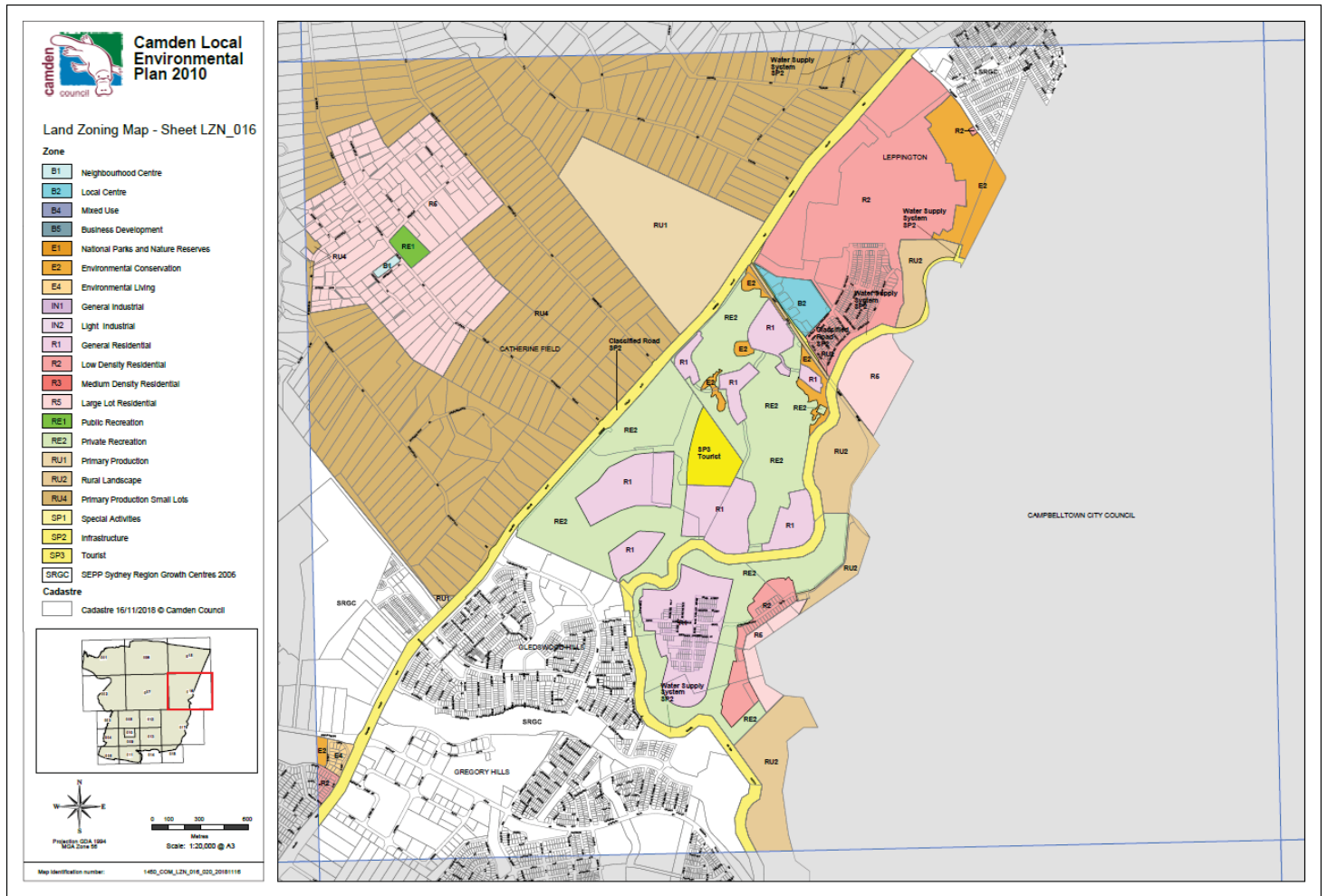


Figure 13: Proposed Land Zoning Map (sheet LZN_016)

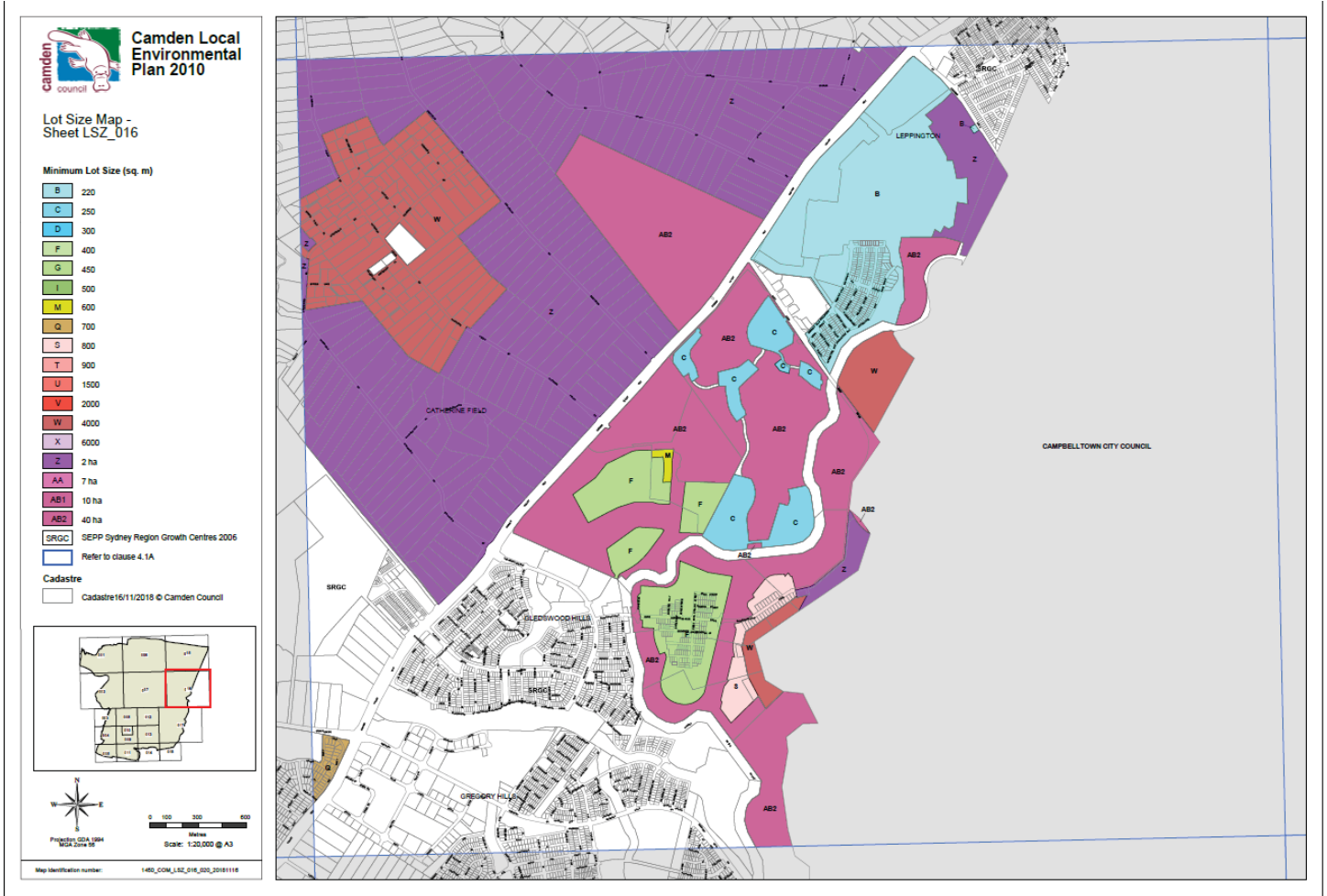


Figure 14: Proposed Lot Size Map (Sheet LSZ_016)

4.6 Community Consultation

The Planning Proposal will be publicly exhibited in accordance with the gateway determination. Notifications will be placed in the local newspaper and the exhibition material available at:

- Oran Park Administration Centre, 70 Central Avenue, Oran Park (Hard Copy)
- Oran Park Library, Central Avenue, Oran Park (Hard Copy)
- Narellan Library, Queen Street, Narellan (Hard Copy);
- Camden Library, John Street, Camden (Hard Copy); and
- Council website for the length of the exhibition period (Electronic Copy).

4.7 Project Timeline

Anticipated commencement date (date of Gateway determination)	November 2018
Anticipated timeframe for the completion of required technical information	N/A
Timeframe for government agency consultation (pre and post exhibition as required by Gateway determination)	December 2018-January 2019
Commencement and completion dates for public exhibition period	November 2018-January 2019
Dates for public hearing (if required)	N/A
Timeframe for consideration of submissions	February-March 2019
Timeframe for the consideration of a proposal post exhibition	March 2019
Date of submission to the department to finalise the LEP	March 2019
Anticipated date RPA will make the plan (if delegated)	March-April 2019
Anticipated date RPA will forward to the department for notification	May 2019

5.0 Conclusions and Recommendations

The Planning Proposal seeks amendments to Camden LEP 2010 to enable one additional large residential lot on the subject site, being Lot 102 DP1193881, 182 Raby Road, Gledswood Hills.

It is envisaged this Planning Proposal will enable development by amending land zoning from RU2 to R5 with a minimum lot size of 4000sqm.

The Planning Proposal is considered to demonstrate merit in the following respects:

- The proposed development of one additional lot will not have unacceptable visual impacts subject to appropriate mitigation measures.
- The proposal is a logical extension of existing and approved residential development.
- The proposal is not inconsistent with Region, District and local strategic plans and their relevant objectives.

The Planning Proposal has been prepared in accordance with Section 3.33 of the EPA Act 1979. Amendments to Land Zoning Map (Sheet LZN_016) and Lot Size Map (Sheet LSZ_016) is the most appropriate method to achieve the objectives of this Planning Proposal.

The Planning Proposal will have a positive outcome for the community and complement the existing land use of the surrounding area.

6.0 Appendices

Appendix 1: Consistency against State Environmental Planning Policies

Appendix 2: s9.1 Directions

Appendix 3: Additional Justification

Appendix 4: Rural Lands Strategy Criteria for Rezoning Proposals

Appendix 5: Ecological Assessment

Appendix 6: Visual Impact Assessment

Appendix 7: Central Hills Rezoning: Landscape & Visual Assessment

Appendix 8: Potential Contamination Investigation

Appendix 1: Consistency against State Environmental Planning Policies

SEPP Title	Consistency	Comment
1. Development Standards	N/A	This SEPP does not apply to the Camden LGA.
14. Coastal Wetlands	N/A	This SEPP does not apply to the Camden LGA.
15. Rural Land-sharing Communities	N/A	This SEPP does not apply to the Camden LGA.
19. Bushland in Urban Areas	Yes	The Planning Proposal does not have any adverse impacts upon urban bushland.
21. Caravan Parks	N/A	Not applicable to this Planning Proposal.
26. Littoral Rainforests	N/A	This SEPP does not apply to the Camden LGA.
29. Western Sydney Recreation Area	N/A	Not applicable to this Planning Proposal.
30. Intensive Agriculture	N/A	Not applicable to this Planning Proposal.
32. Urban Consolidation (Redevelopment of Urban Land)	N/A	Not applicable to this Planning Proposal.
33. Hazardous and Offensive Development	Yes	This SEPP applies to the state; however, the proposal is not hazardous or offensive. This Planning Proposal is not inconsistent with the SEPP.
36. Manufactured Home Estates	N/A	Not applicable to this Planning Proposal.
39. Spit Island Bird Habitat	N/A	Not applicable to this Planning Proposal.
41. Casino Entertainment Complex	N/A	Not applicable to this Planning Proposal.
44. Koala Habitat Protection	N/A	This SEPP does not apply to the Camden LGA.
47. Moore Park Showground	N/A	This SEPP does not apply to the Camden LGA.

50. Canal Estate Development	Yes	The provisions of this SEPP do not apply to the site.
52. Farm Dams and Other Works in Land and Water Management Plan Areas	N/A	This SEPP relates to the construction of artificial water bodies.
55. Remediation of Land	Yes	<p>SEPP 55 requires Council to consider whether the subject land is contaminated. If the land requires remediation for a proposed use or zoning, Council must be satisfied that the land can and will be remediated before the land is used for that purpose.</p> <p>It is considered unlikely that the area associated with Planning Proposal would be affected by contamination. Further detailed investigations will occur to satisfy SEPP 55 at any future Development Application stage.</p>
59. Central Western Sydney Economic and Employment Area	N/A	Not applicable to this Planning Proposal.
62. Sustainable Aquaculture	N/A	This SEPP related to land-based aquaculture development.
64. Advertising and Signage	Yes	No advertising or signage is proposed as part of this Planning Proposal. Any future Development Application for the subdivision and construction of a dwelling house will need to consider the provisions of this SEPP.
65. Design Quality of Residential Flat Development	N/A	This SEPP applies to development for the purpose of a residential flat building, shop top housing or mixed-use development with a residential accommodation component. Residential flat buildings are prohibited in R5 – Large Lot Residential Zone.
70. Affordable Housing (Revised Schemes)	N/A	Not applicable to this Planning Proposal.
71. Coastal Protection	N/A	Not applicable to this Planning Proposal.
SEPP (Building Sustainability Index: BASIX) 2004	Yes	This SEPP is relevant to specific development that would become permitted under the Planning Proposal. Future development would need to comply with

these provisions.

SEPP (Housing for Seniors or People with a Disability) 2004	N/A	Not applicable to this Planning Proposal.
SEPP (Major Development)	Yes	This SEPP applies to the state; however, the proposal has no relevance to the SEPP.
SEPP (Sydney Region Growth Centres) 2006	N/A	The site is not identified within the Sydney Region Growth Centre. The provisions of this SEPP do not apply to the site.
SEPP (Infrastructure) 2007	Yes	This SEPP is relevant to particular development categories. The Planning Proposal does not alter the application of the SEPP to future development.
SEPP (Kosciuszko National Park-Alpine Resorts) 2007	N/A	The provisions of this SEPP do not apply to the site.
SEPP (Mining, Petroleum Production and Extractive Industries) 2007	N/A	Not applicable to this Planning Proposal.
SEPP (Temporary Structures and Places of Public Entertainment) 2007	N/A	Not applicable to this Planning Proposal.
SEPP (Exempt and Complying Development Codes) 2008	Yes	This SEPP is relevant to particular development categories. The Planning Proposal does not alter the application of the SEPP to future development.
SEPP (Rural Lands) 2008	N/A	This SEPP does not apply to the Camden LGA.
SEPP (Western Sydney Parklands) 2009	N/A	The site is not identified within the Western Sydney Parklands. The provisions of this SEPP do not apply to the site.
SEPP (Affordable Rental Housing) 2009	Yes	This SEPP is relevant to particular forms of development. This Planning Proposal does not alter the application of the SEPP to future development.

Sydney Regional Environmental Plan (Sydney Harbour Catchment)	N/A	Not applicable to this Planning Proposal.
SREP20 Hawkesbury-Nepean River	Yes	<p>The SREP requires consideration be given to the impact of future land use in Hawkesbury- Nepean River catchment in a regional context. The plan covers water quality and quantity, environmentally sensitive areas, riverine scenic quality, agriculture, and urban and rural residential development.</p> <p>The Planning Proposal is unlikely to alter or impact adversely upon the water quality and quantity, environmentally sensitive areas and flora and fauna within the Hawkesbury-Nepean River catchment.</p>

Appendix 2 : S9.1 Directions

S117 Direction Title	Consistency	Comment
1.0 Employment and Resources		
1.1 Business and Industrial Zones	NA	This site is not located within land zoned business or industrial.
1.2 Rural Zones	No	<p>The Planning Proposal proposes to rezone a small portion of RU2 Rural Landscape Zoned land to R5 Large Lot Residential which is inconsistent with this direction.</p> <p>Notwithstanding this, the proposal is considered acceptable for the following reasons:</p> <ul style="list-style-type: none"> • The site is located within the EL Caballo Urban Release Area and is immediately adjacent to existing and approved residential development including 'The Crest'. • The site adjoins R5 Large Lot Residential zoned lots to the south providing a logical extension of the rural living zone. • The site is separated from the remainder of the lot by an existing right-of-carriageway and fencing and effectively has limited agricultural potential. • The visual impacts of the proposal are considered acceptable. • The proposal is not inconsistent with Regional, District and local strategic plans and their relevant objectives.
1.3 Mining, Petroleum Production and Extractive Industries	N/A	This Planning Proposal does not propose the extraction of minerals specified within this direction.
1.4 Oyster Aquaculture	N/A	This Planning Proposal does not propose changes within a Priority Oyster Aquaculture Areas and does not propose oyster aquaculture outside such an area as

identified in the NSW Oyster Industry Sustainable Aquaculture Strategy (2006) (“the Strategy”).

1.5 Rural Lands	N/A	This Ministerial Direction does not apply to the Camden LGA.
2.0 Environment and Heritage		
2.1 Environment Protection Zones	N/A	This site is not located within land zoned environmental protection.
2.2 Coastal Protection	N/A	This site is not located within lands affected by the Coastal Protection Act 1979.
2.3 Heritage Conservation	N/A	The subject site does not contain heritage items, areas, objects and places of environmental heritage significance and indigenous heritage significance.
2.4 Recreation Vehicle Areas	N/A	This direction does not apply as the Planning Proposal does not seek to develop land for the purpose of a recreation vehicle area.
2.5 Application of E2 and E3 Zones and Environmental Overlays in Far North Coast LEPs	N/A	This direction does not apply as the Planning Proposal is not located within lands identified within this direction.
3.0 Housing, Infrastructure and Urban Development		
3.1 Residential Zones	Yes	<p>The subject site is located within an existing RU2 - Rural Landscape and R5 – Large Lot Residential under the provision of Camden LEP 2010.</p> <p>This Planning Proposal seeks to amend the Land Zoning Map and Lot Size Map clause to enable future development to occur with a minimum lot size of 4000sqm. The proposed zoning and lot size amendment is not considered to adversely impact the</p>

surroundings land use (as demonstrated by supporting studies).

3.2 Caravan Parks and Manufactured Home Estates	NA	The Planning Proposal is consistent with this direction as it does not modify provisions relating to the permissibility of caravan parks and the like.
3.3 Home Occupations	Yes	The Planning Proposal is consistent with this direction as it does not modify provisions relating to the permissibility of home occupations within dwellings.
3.4 Integrating Land Use and Transport	Yes	<p>The Planning Proposal is considered to be consistent with this Direction. As the Proposal will enable future development to be constructed in a location that is serviced by an existing public transport route along Raby Road; and it is likely that public transport provision will increase in this area in parallel to the urban development of the area;</p> <p>Future bus routes have been proposed as part of the urban development of the El Caballo Blanco/Gledswood/East Side and Camden Lakeside sites, which will provide access to Campbelltown and the Leppington Railway Station in the future Major Centre at Leppington. These routes are located less than 3km from the site.</p>
3.5 Development Near Licensed Aerodromes	Yes	This direction is not applicable as the planning proposal will not create, alter or remove a zone or a provision relating to land in the vicinity of a licensed aerodrome.
3.6 Shooting Ranges	NA	This direction is not applicable as the planning proposal will not affect, create, alter or remove a zone or a provision relating to

land adjacent to and/or adjoining an existing shooting range.

4.0 Hazard and Risk

4.1 Acid Sulphate Soils	N/A	This direction is not applicable as the land has not been identified as acid sulphate soils under Camden LEP 2010.
4.2 Mine Subsidence and Unstable Land	NA	This direction is not applicable as the land has not been identified within a mine subsidence district.
4.3 Flood Prone Land	N/A	This direction is not applicable as the Planning Proposal will not create, remove or alter a zone or a provision that affects flood prone land.
4.4 Planning for Bushfire Protection	Yes	This Planning Proposal is consistent with this Ministerial Direction as the proposal will not affect, or alter lands mapped as bushfire prone land. Further detailed investigations will occur to satisfy this direction at any future Development Application stage.

5.0 Regional Planning

5.1 Implementation of Regional Strategies	N/A	This direction is not applicable as the Planning Proposal is not considered a regional strategy released by the Minister for Planning.
5.2 Sydney Drinking Water Catchments	N/A	This direction is not applicable as the land has not been identified within the Sydney drinking water catchment.
5.3 Farmland of State and Regional Significance on the NSW Far North Coast	N/A	This Ministerial Direction does not apply to the Camden LGA.
5.4 Commercial and Retail Development along the Pacific Highway, North Coast	N/A	This direction is not applicable as the land is not within the vicinity of an existing and/or proposed alignment of the Pacific Highway.
5.5 Development in the vicinity of Ellalong, Paxton	Revoked N/A	Revoked 18 June 2010

and Millfield (Cessnock LGA)

5.6 Sydney to Canberra Corridor	Revoked	N/A	Revoked 10 July 2008
5.7 Central Coast	Revoked	N/A	Revoked 10 July 2008
5.8 Second Sydney Airport: Badgerys Creek	N/A		This direction is not applicable as the land is not in the vicinity of lands shown within the boundaries of the proposed airport site.
5.9 North West Rail Link Corridor Strategy	N/A		This direction is not applicable as the land is not within the North West Rail Link Corridor, as identified in the NWRL Corridor Strategy and Structure Plans.
5.10 Implementation of Regional Plans	Yes		This Planning Proposal is consistent with the vision, land use strategy, goals, directions and actions contained in the Sydney Metropolitan Strategy and Western Sydney District Plan.
6.0 Local Plan Making			
6.1 Approval and Referral Requirements	Yes		The Planning Proposal is not identified as designated development and is consistent with this direction as it does not alter any approval or referral requirements.
6.2 Reserving Land for Public Purposes	N/A		This direction is not applicable as this proposal does not request the provision of public services or facilities to reserve land for public purposes.
6.3 Site Specific Provisions	Yes		<p>The intent of this Planning Proposal is to amend the Land Zoning Map and Lot Size Map applying to the site from RU2 and R5 zones to R5 zone with a minimum lot size of 4000sqm.</p> <p>It is considered the Planning Proposal is consistent with the provisions of this direction.</p>

7.0 Metropolitan Plan Making

7.1 Implementation of A Plan for Growing Sydney	Yes	This Planning Proposal is consistent with this direction as the proposal is considered to achieve the overall intention of the Plan and does not undermine the achievement of its planning principles; directions; and priorities for sub regions, strategic centres and transport gateways.
7.2 Implementation of Greater Macarthur Land Release Investigation	N/A	This Ministerial Direction does not apply to the Camden LGA.
7.3 Parramatta Road Corridor Urban Transformation Strategy	N/A	This Ministerial Direction does not apply to the Camden LGA.
7.4 Implementation of North West Priority Growth Area Land Use And Infrastructure Implementation Plan	N/A	This Ministerial Direction does not apply to the Camden LGA.
7.5 Implementation of Greater Parramatta Priority Growth Area Interim Land Use and Infrastructure Implementation Plan	N/A	This Ministerial Direction does not apply to the Camden LGA.
7.6 Implementation of Wilton Priority Growth Area Interim Land Use and Infrastructure Implementation Plan	N/A	This Ministerial Direction does not apply to the Camden LGA.
7.7 Implementation of Glenfield to Macarthur Urban Renewal Corridor	N/A	This Ministerial Direction does not apply to the Camden LGA.

Appendix 3: Additional Justification



Camden Council
PO Box 183
Camden NSW 2570

Attn: Heath James / Mary-Anne Madden

Received IM U
23 MAR 2018
Camden Council

19 March 2018

Re: Planning Proposal - Lot 102 DP 1193881 at 182 Raby Road, Gledswood Hills

Dear Heath and Mary-Anne,

We refer to your correspondence dated 31 January 2018 and our subsequent meeting on site on 14 February 2018 in relation to the Planning Proposal for Lot 102 OP 1193881, known as 182 Raby Road, Gledswood Hills.

We note that the abovementioned correspondence raises the following issues:

1. Demonstrate the locality of adjacent ridgelines relative to the subject site in the Visual Impact Assessment (VIA).
2. Provide a copy of the visual analysis study by LFA (Pacific) Pty Ltd referred to in the VIA for the subject proposal.
3. There are inconsistencies between the proposal and the supporting technical studies in relation to the area of the proposed R5 zone. It is requested that the proposal and studies provide a clear indication of the size of the proposed R5 area. Specific attention is drawn to Figures 3 and 4 in the Ecological Assessment and Figure 8 in the VIA.

We also refer to your subsequent correspondence of 27 February 2018, which provided meeting notes and a summary of the actions outstanding:

1. Update the VIA with justification regarding no visual impact to Scenic Hills and no detrimental visual impact within Camden LGA.
2. Diagram of existing buildings, likely future buildings on approved subdivisions and an indicative house on the proposed lot - to show will be in keeping with surrounding area.
3. Updated justification within the Planning Proposal outlining that the proposal is a logical extension to the urban zone and the proposed lot is separate from the family holding.
4. Applicant to provide a photo of the shed that previously existed on the site, if possible.

We have reviewed Council's correspondence and write to provide further information as requested. **Please find attached a response to these issues and the following attachments:**

1. Revised Planning Proposal dated March 2018 prepared by SJB Planning.
2. Revised Ecological Assessment dated 28 February 2018 prepared by Eco Logical Australia Pty Ltd.
3. A copy of the Addendum Map to visual analysis study by LFA (Pacific) Pty Ltd forwarded to Council on 6 February 2018.

Should you wish to discuss any of the above matters, please do not hesitate to contact me on (02) 9380 9911 or by email at mbaker@sjb.com.au.

Yours sincerely



Michael Baker
Associate Director

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Response to Issues raised in correspondence dated 31 January 2018

1. *Demonstrate the locality of adjacent ridgelines relative to the subject site in the Visual Impact Assessment (VIA).*

Response:

The location of the adjacent ridgelines was demonstrated at our site meeting of 14 February 2018, at which point it was acknowledged that there is a ridgeline further to the east of the site on the eastern side of the Macarthur Grange Country Club.

2. *Provide a copy of the visual analysis study by LFA (Pacific) Pty Ltd referred to in the VIA for the subject proposal.*

Response:

A copy of the requested visual analysis study by LFA (Pacific) Pty Ltd and subsequent addendums was forwarded to Joyce Jiang of Council on 6 February 2018.

3. *There are inconsistencies between the proposal and the supporting technical studies in relation to the area of the proposed R5 zone. It is requested that the proposal and studies provide a clear indication of the size of the proposed R5 area. Specific attention is drawn to figures 3 and 4 in the Ecological Assessment and figure 8 in the VIA.*

Response:

Please find attached a revised Ecological Assessment dated 28 February 2018, which corrects the inconsistencies between the initial version and the Planning Proposal.

Response to Issues raised in correspondence dated 27 February 2018

1. *Update the VIA with justification regarding no visual impact to Scenic Hills and no detrimental visual impact within Camden LGA.*

The Planning Proposal, which should enable the creation of one (1) additional large residential lot will have a negligible visual impact on Scenic Hills and within the Camden LGA for the following reasons:

Proposed on site of former hayshed

Any future dwelling house constructed on the site of the proposal will be located in an area that has historically been the site of a large hayshed, used as part of the previous rural use of the site. An aerial photograph of the hayshed structure is provided in Figure 1.

The aerial photograph at Figure 1 provides evidence of the size and footprint of the hayshed that was previously located on the site. The hayshed was approximately 47m in length and 13m wide with a building footprint of approximately 611m². When compared with the scale of the neighbouring dwelling (refer to the bottom left hand corner of Figure 1), it is acknowledged that the hayshed that previously stood on the site was of a considerable scale and form. It was demolished in 2017 to facilitate the adjoining Mirvac subdivision as the hayshed was located partly within the adjoining Mirvac land and furthermore was separated from the remainder of the family landholding by the private road which provides access through to 184-188 Raby Road to the south.

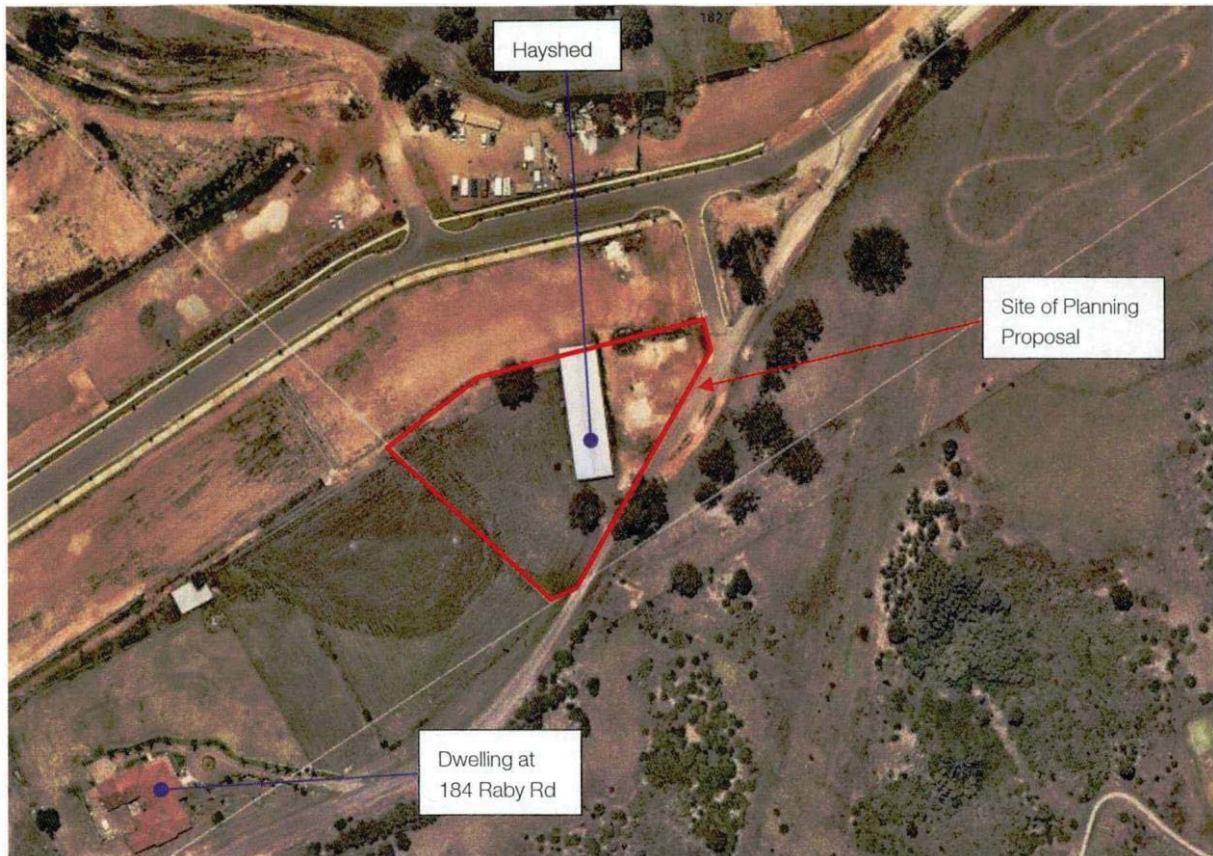


Figure 1: Aerial photograph of 17 Jan 2017 (Source: www.maps.au.nearmap.com)

In this respect, the visual character of this part of the site has been historically dominated by a large timber and corrugated iron structure. This Planning Proposal would enable the subdivision of one additional lot with a minimum lot size of 4,000m².

The construction of a dwelling house on this lot and site of the former hayshed will have a lesser impact on the visual landscaped character than what the hayshed would have historically had.

Development to the south and west will comprise urban development

The site of the Planning Proposal is on the fringe of the surrounding urban development with urban development with R5 Large Lot Residential development permitted on part of the site and to the south• west, which is No.184B and 184C Raby Road, which has recently obtained approval for a seven (7) large lot residential subdivision.

Furthermore, the timber paling fence of the adjoining R2 Low Density Residential abuts part of the site along the western boundary. This is illustrated in Figure 2.

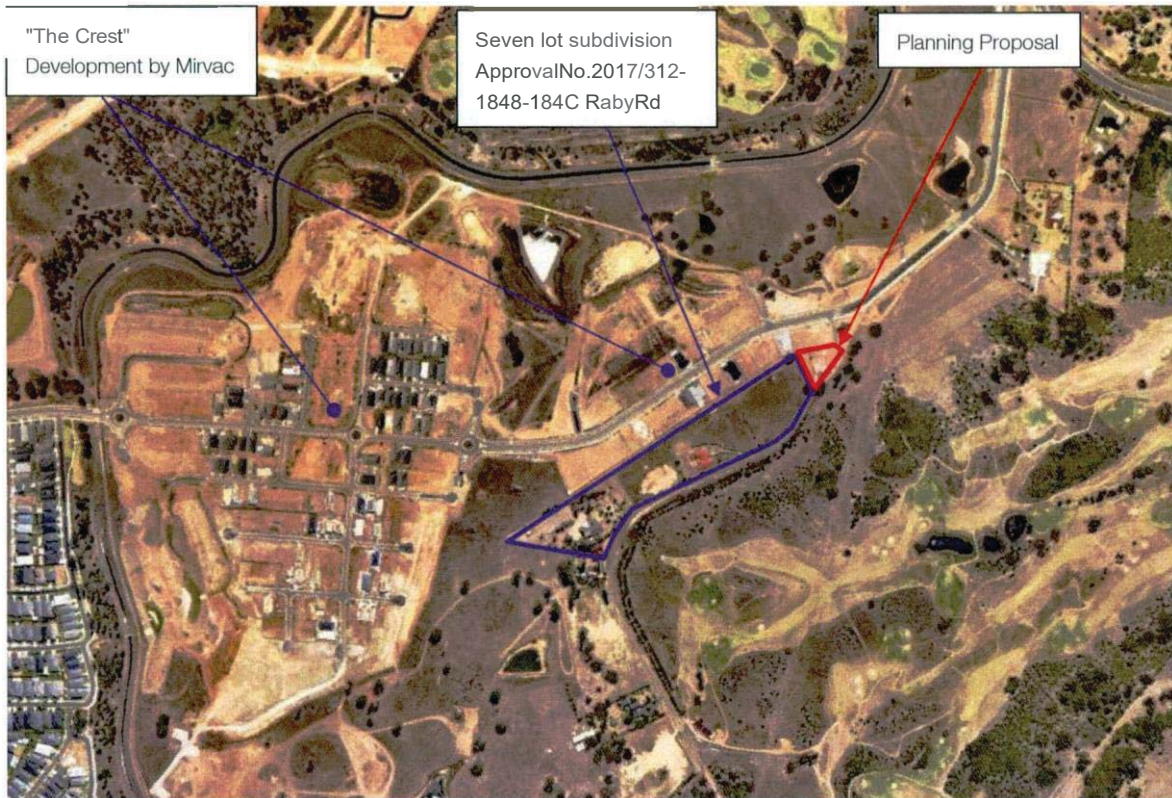


Figure 2: Aerial photograph dated 21 January 2018 (Source: maps .au.nearmap.com)

Location of Second Ridge

A second ridge exists to the east of the site on the eastern side of Macarthur Range Golf Club which separates the site from the residential properties to the east within the Campbelltown LGA, meaning there is limited visibility from the east.

Visibility from Scenic Hills

The location of the Planning Proposal and proposed lot is not visible from the ridge on the eastern side of Macarthur Range Golf Club, as was evident from our site meeting, and the photo at Figure 3.

It is evident from the photograph taken from Raby Road looking east toward the site, adjacent to No.68 Raby Road, Varroville that the location of the Planning Proposal cannot be seen - refer to Figure 3.

The aerial photograph at Figure 4 identifies the location from which the photograph at Figure 3 was taken from and identifies the key structures and land uses in the photograph.

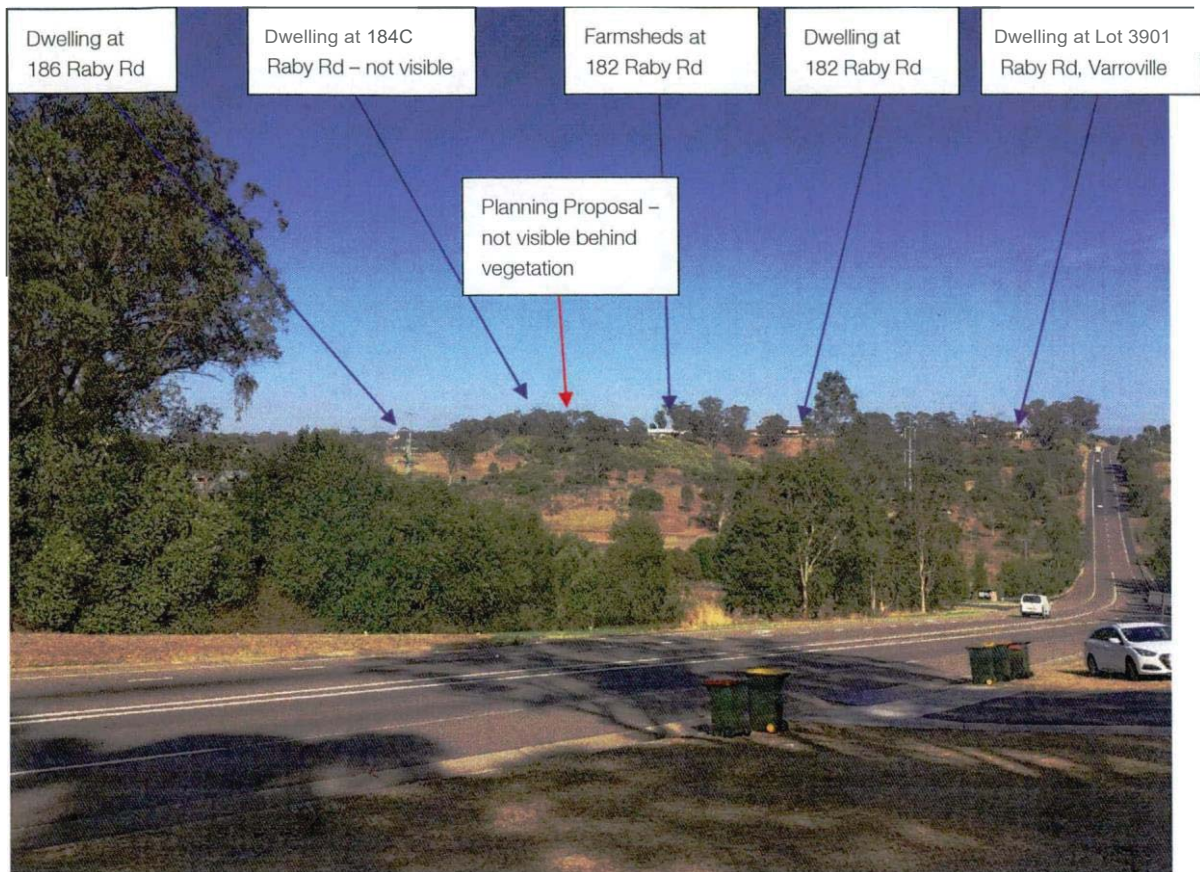


Figure 3: View looking west from Raby Road adjacent to 68 Raby Road, Varroville

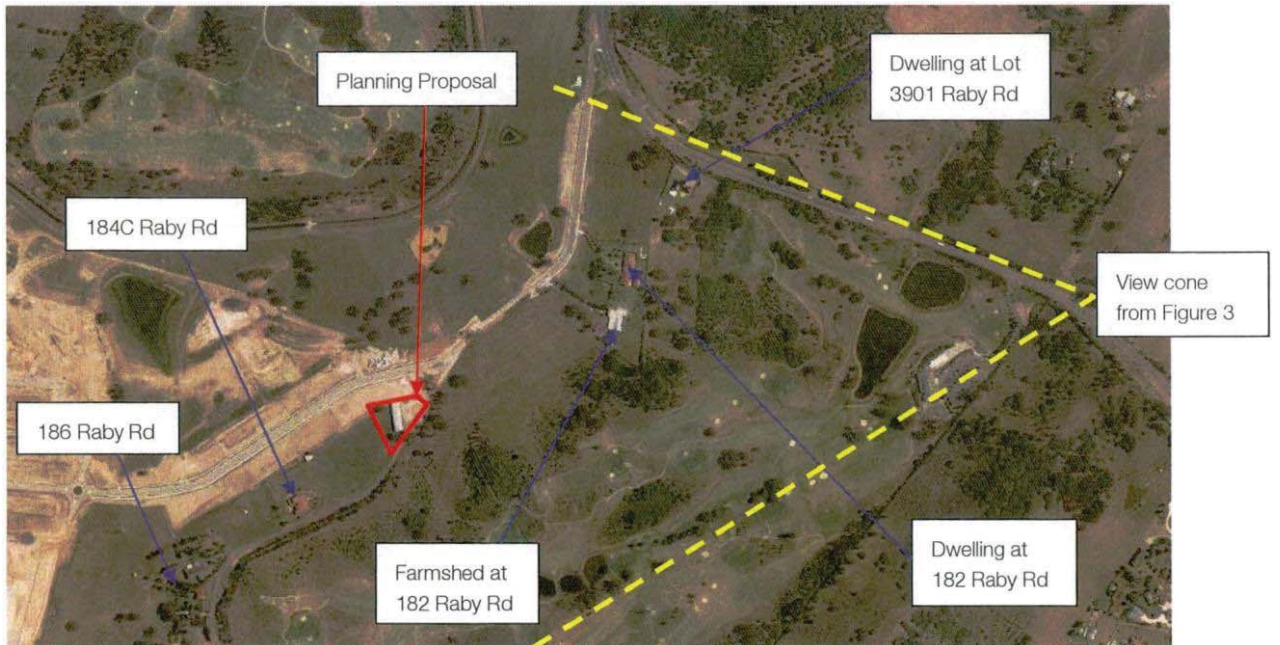


Figure 4: Aerial Photograph of the site and surrounds (Source: www.sixm.apns.nsw.gov.au)

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2 *Diagram of existing buildings, likely future buildings on approved subdivisions and an indicative house on the proposed lot - to show will be in keeping with surrounding area.*

When viewing the site from the north, adjacent to the Gledswood Hills Drive and Raby Road intersection, Council staff requested a diagram or sketch identifying the existing building and location of the future building on approved subdivisions. The photograph at Figure 5 illustrates the view from this current location.

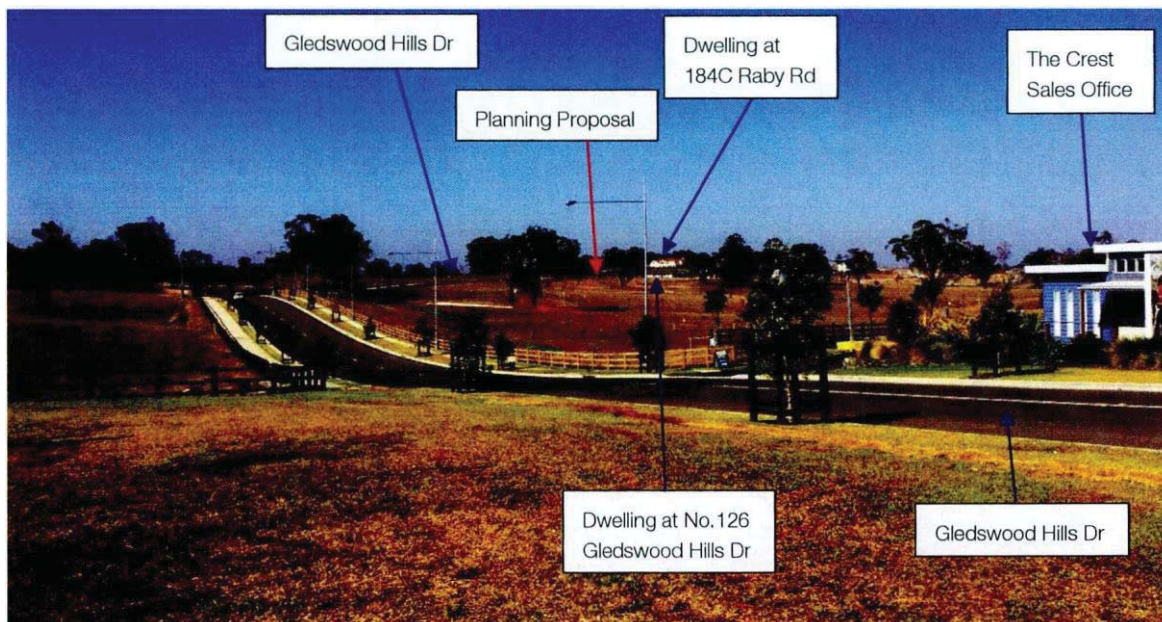


Figure 5: View looking south from the intersection of Gledswood Hills Drive and Raby Road

The photograph of the view looking south toward the Planning Proposal from the Gledswood Hills Drive/Raby Road intersection in Figure 5 comprises:

Gledswood Hills Drive in the centre of the photo heading south west, before turning in a westerly direction;

Former rural grazing land on the right of photo - west of Gledswood Hills Drive, now zoned RE2 Private Recreation, with the Crest Sales Office in the foreground and the urban development on the ridge in the background;

The black fenced land on the left of photo being 182 Raby Road zoned RU2 Rural landscape;

Centre of photo the location of the Planning Proposal south of Gledswood Hills Drive and the associated dwellings currently being constructed on either side of Gledswood Hills Drive;

The cream coloured walls and terracotta roofed dwelling centre of photo on the ridge being 184C Raby Road, which is zoned R5 Large Lot Residential, which has recently been approved for re-subdivision with 1846 Raby Road (not visible in photo) for subdivision into seven (7) large residential lots.

The sketch at Figure 6 highlights these key features and the location of the Planning Proposal. The sketch has not endeavoured to show a dwelling on the site of the Planning Proposal, nor the two future dwellings to be built on the two new lots approved between the dwelling at No.184C Raby Road and the site of the Planning Proposal, as these dwellings will largely be obscured from view by the existing tree and paling fence that sit forwards of this land.

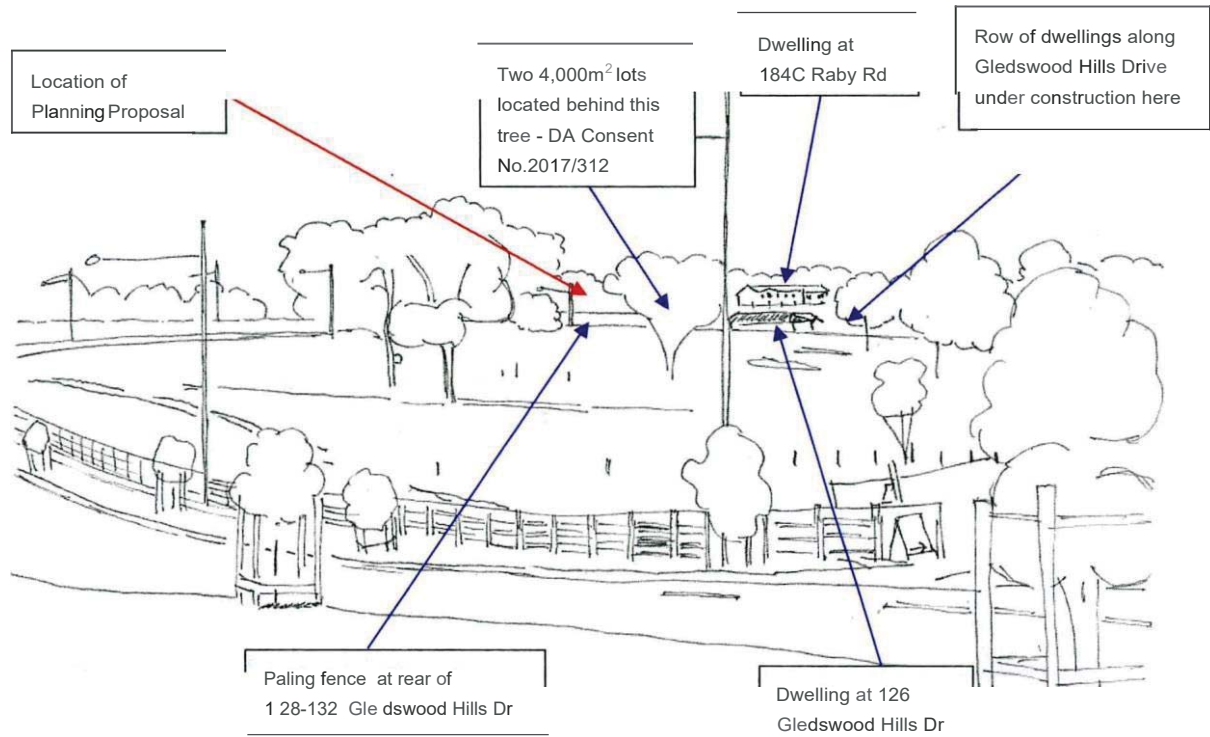


Figure 6: Enlarged sketched view of the location of the Planning Proposal

- 3 *Updated justification within the Planning Proposal outlining that the proposal is a logical extension to the urban zone and the proposed lot is separate from the family holding.*

Please find attached an updated Planning Proposal dated March 2018 .

- 4 *Applicant to provide a photo of the shed that previously existed on the site, if possible.*

A photograph of the former hayshed structure has not been located, however it is evident from the aerial photograph dated 17 January 2017 at Figure 1 and replicated at Figure 7, that the hayshed structure that stood on the site was of a significant scale.

It is evident from the aerial photograph from 21 January 2018 at Figure 8, the former location of the hayshed and its footprint in comparison to a new dwelling being built to the north at No.126 Gledswood Hills Drive.

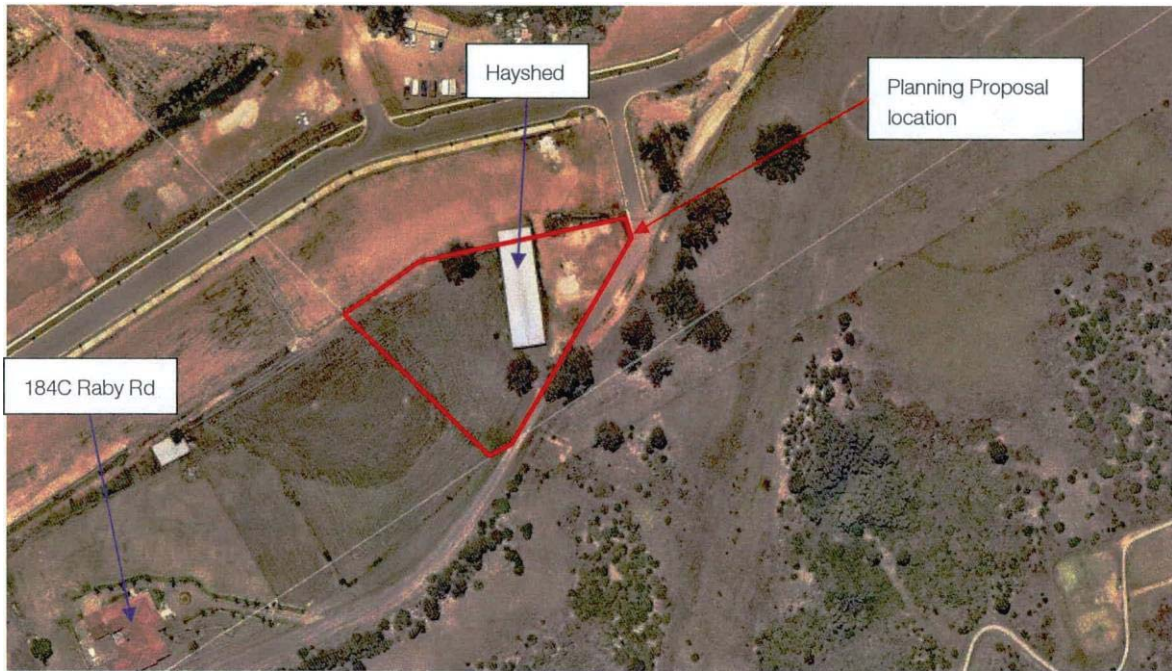


Figure 7: Aerial photograph of 17 Jan 2017 (Source: maps.au.nearmap.com)

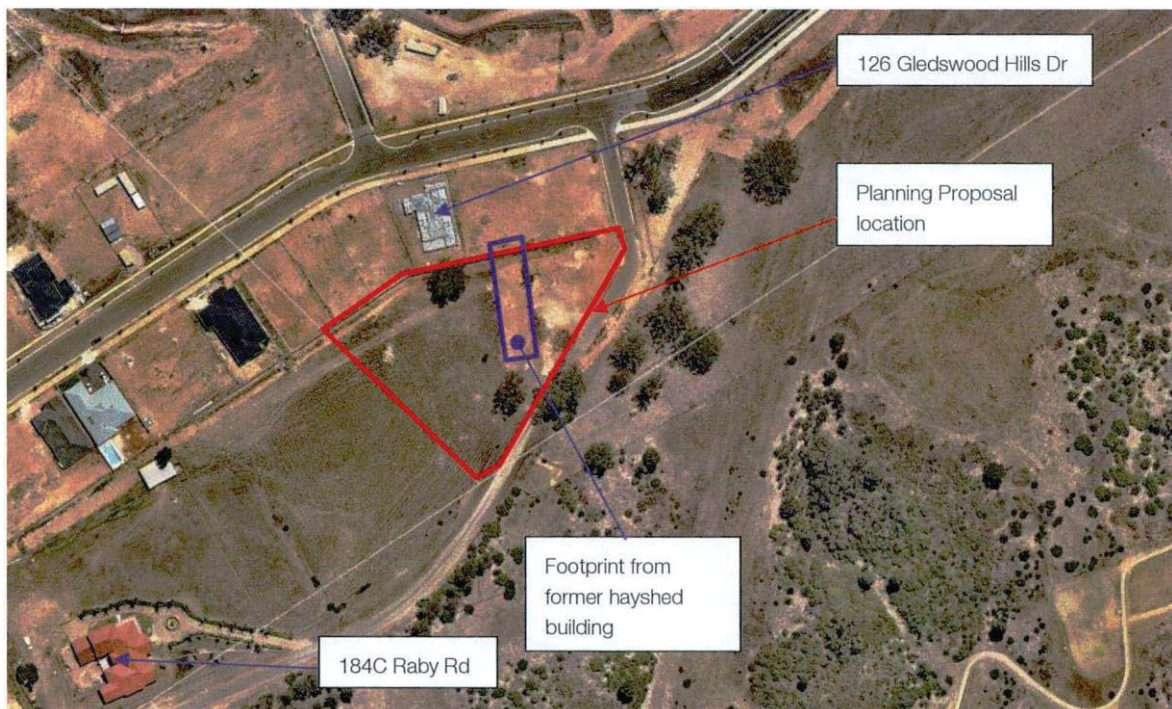


Figure 8: Aerial photograph of 21 Jan 2018 (Source: maps.au.nearmap.com)

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Appendix 4: Rural Lands Strategy Assessment Criteria for Rezoning Proposals

ID	Assessment Criteria	Key Considerations
1	Proposals must be consistent with state and local strategic plans	<ul style="list-style-type: none"> Improvement/ongoing maintenance of biodiversity, ecological, scenic and productive values. Agricultural land production value. Rural economic benefit. Net community benefit.
2	Proposals not adversely impact on the operation of existing rural enterprises	<ul style="list-style-type: none"> Existing intensive agricultural land uses. Land use conflict.
3	Proposals must be logical extension to existing urban area	<ul style="list-style-type: none"> Proximity to public transport and other community services. Essential services availability.
4	Proposals must not reduce the quality of scenic landscapes, vistas, ridgelines, or heritage values	<ul style="list-style-type: none"> Siting and design impacts. Natural and physical constraints and opportunity of rural land, including high value vegetation, bushfire and flooding.

Assessment Against Criteria for Rezoning Proposals

1. Proposals must be consistent with state and local strategic plans

As discussed in the report, the Planning Proposal is consistent with the objectives of the Greater Sydney Region Plan, Western City District Plan, Camden's Community Strategic Plan.

Camden DCP 2011 identifies the site for rural living (Precinct 6 of the ECBG release area). This precinct provides a transition between residential development to the west and rural landscapes to the east. Housing in this area is intended to be larger dwellings on large lots consistent with transition from urban to non-urban land uses. The Planning Proposal is consistent with the Camden DCP 2011 rural living objectives.

2. Proposals not adversely impact on the operation of existing rural enterprises

The site was previously used for hay storage as part of a rural enterprise, however this use is no longer operational on the site. Physically, the site is separated from the remainder of the larger lot by a right-of-carriageway and fencing.

Furthermore, the site is adjacent to existing and approved residential development that is consistent with the Camden DCP objectives for the land as a rural living zone. An approved

large lot residential subdivision adjoins the site to the south-west (184C Raby Road, Gledswood Hills) which will result in additional traffic using the right-of-carriageway.

3. Proposals must be a logical extension to existing urban areas

The site forms part of the ECBG urban release area. 'The Crest' residential development (part of ECBG urban release area) directly adjoins the site. This development has facilitated services to the site.

In the context of the adjoining approved and existing residential development, the proposals would facilitate development that is complementary to its surrounding lands. The minor increase in development yield is supported by infrastructure upgrades, such as the Raby Road upgrade. Local infrastructure will be delivered as part of the ECBG urban release area.

4. Proposals must not reduce the quality of scenic landscapes, vistas, ridgelines or heritage values

The VIA in support of this Planning Proposal concludes that the proposal will have an acceptable level of visual impact. Additionally, the proposed visual impact mitigation methods of the Planning Proposal will be incorporated as part of Council's comprehensive review of the Camden DCP 2011 to ensure minimal impacts of residential developments in the vicinity of scenic landscapes are minimised.

Appendix 5: Ecological Assessment prepared by Ecological Australia
(August 2017)

Michael Baker
SJB Planning
Level 2, 490 Crown St
Surry Hills NSW 2010
Sent via email: mbaker@sjb.com.au

18SUT-9695

28 February 2018

Dear Michael,

Ecological assessment to support a planning proposal for 182A Raby Road, Gledswood Hills.

Background

In 2008, a Local Environmental Study (LES) was prepared by APP Corporation to support the rezoning of land known as El Caballo Blanco and Gledswood (ECBG) in Camden LGA. The ECBG study area comprises 207.4 hectares and includes the Gledswood Homestead and Winery property, the former El Caballo Blanco site and three adjoining sites to the east of the Upper Canal (Figure 1).

A number of specialist studies were prepared by Eco Logical Australia (ELA) to support the planning proposal including an Ecological Assessment (2008) and Vegetation Management Plan (2011) which recommended the conservation and restoration of key vegetation and riparian corridors. ELA also calculated offsets required as part of the rezoning (ELA 2010).

The ECBG site was rezoned by amending the Camden LEP 2010 from RU2 Rural Landscape to a number of different zonings including RE2 Private Recreation, SP3 Tourist, R1 General Residential, R2 Low Density Residential and R5 Large Lot Residential.

One of the lots within the ECBG study area that was subject to the rezoning is 182A Raby Road (Lot 102 DP1193881), shown in Figure 1 as the 'study area'. **Figure 2** and **Figure 3** shows that the majority of this lot retained the RU2 Rural Landscape zoning, apart from 2322 m² of the southern end, which was rezoned to R5 Large Lot Residential. A right of carriage (ROC) effectively separates the southern end of the lot as shown in **Figure 3**. Under the Camden LEP 2010, the minimum lot size for the R5 zoning is 4.000 m², which effectively renders this area zoned R5 too small for a dwelling entitlement.

Proposed rezoning

A planning proposal is being prepared by SJB to support the rezoning of this southern end, as shown in Figure 4. This rezoning will effectively shift the boundary of the R5 zone to the east, to create a lot of 5,119 m². This would enable the creation of a new lot with a dwelling entitlement.

This report provides ecological information to support the planning proposal. "Subject site" refers to the land shown in Figure 4 proposed to be zoned R5.

Methodology

Previous studies of the site were reviewed to provide background information regarding the ecological values of the site. This included the Local Environmental Study (APP 2008), Planning Proposal (Camden Council and APP, 2012) previous studies by ELA (2008, 2010, 2011 and 2015) and a tree plan based on the VMP (Brown Consulting 2014).

A site inspection was conducted on 13th June 2017 by ELA ecologist Karen Spicer, accompanied by site Project Manager Keith Apps. The vegetation and general site condition was noted. The boundaries of the subject site proposed for rezoning was defined onsite by Keith Apps.

Results

Literature review

Previous assessment of the site by ELA (2008) mapped the vegetation within 182A Raby Road as exotic with patches of Shale Hills Woodland (condition TX) and classified the Shale Hills Woodland as a moderate ecological constraint. Under the Camden Natural Assets Policy (CNAP), this vegetation was mapped as “Core-Local” and “Support for Core”. Based on the CNAP, ELA (2010) calculated the vegetation offsets required for the El Caballo Blanco / Gledswood rezoning. As part of the biodiversity certification process for the ECBG study area, the vegetation adjacent to the subject site was remapped by ELA (2015) as Shale Plains Woodland.

A tree survey by Brown Consulting (2014) prepared for the Mirvac residential development to the immediate north of 182A Raby Rd was reviewed. This plan showed the trees to be retained and removed based on the Vegetation Management Plan (ELA 2011). The trees within 182A Raby Rd were mapped as retained. As such, there will be no loss of native vegetation from the subject site proposed for rezoning and no requirement for recalculation of vegetation offsets under the CNAP.

Fauna species previously recorded by ELA within the ECBG study area include 58 species consisting of birds (37 species), mammals (11 species), amphibians (6 species), reptiles (2 species) and fish (2 species). No threatened fauna species were identified within the site, apart from a possible record of *Mormopterus norfolkensis* (Eastern Freetail-bat) based on an Anabat recording. Five threatened species were previously recorded within the ECBG study area based on records from the Atlas of NSW Wildlife including Grey-headed Flying Fox, Eastern Freetail-bat, Eastern False Pipistrelle, Greater Broad-nosed bat and Cumberland Plain Land Snail. ELA concluded that 18 listed threatened and migratory species may utilize habitat within the ECBG study area.

Site inspection

The boundaries of the subject site proposed for rezoning is shown in Figure 5 and includes vegetation mapping of the site. The site was previously used as a cattle yard and contained a large hay shed that has been recently removed. As a result, a large portion of the site is hard surface gravel or exposed soil with no vegetation as shown in Figure 5, **Plate 1** and **Plate 2**.

One native tree (*Eucalyptus tereticornis*) is present within the subject site (Figure 5). Another native tree (*Eucalyptus crebra*) sits just outside northern corner of the subject site. These trees are canopy species associated with the Shale Plains Woodland vegetation community, which is a sub-community of Cumberland Plain Woodland (CPW). CPW is listed as a critically endangered ecological community under the NSW *Threatened Species Conservation Act* (TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act* (EPBC Act). Under the EPBC Act, only CPW that meets certain condition criteria are protected (based on patch size and percentage cover of native perennial species). As such, these trees are only protected under the TSC Act, as the EPBC Act condition criteria are not met on site.

The shrub layer was absent and groundcover species were dominated by exotic species including *Bromus catharticus* (Prairie Grass), *Cenchrus clandestinus* (Kikuyu Grass), *Chloris gayana* (Rhodes Grass), *Lepidium africanum*, *Paspalum dilatatum*, *Plantago lanceolata*, *Senecio madagascarensis* (Fireweed) (Class 4 noxious weed), *Setaria parviflora* and *Sida rhombifolia*. A small number of native forbs were present including *Dichondra repens* (Kidney Weed) and *Einadia nutans* (Climbing Saltbush).

Shale Plains Woodland, dominated by *Eucalyptus molucanna* is present throughout 182A Raby Road, including the land to the north and east of the right of carriage. These trees will be maintained and will not be impacted by the proposed rezoning of the southern end of the lot. Shale Plains Woodland towards the north and west of the study site has been cleared to allow for residential development which is currently under construction by Mirvac. The tree survey plan by Brown Consulting (2014) is consistent with this, showing trees north and west of the subject site within the Mirvac residential area as "existing tree to be removed from resident development" and trees within 182A Raby Road as "existing trees to be retained".

Due to the paucity of vegetation within the subject site and a lack of vegetation structure and diversity, fauna habitat is poor. The tree present within the subject site did not contain hollows and fauna habitat would be limited to highly mobile species including birds and bats that are not cover dependent. Habitat for Cumberland Plain Land Snail was absent due to the lack of fallen logs and leaf litter.

Conclusion

The ecological values of the subject site are poor, as the site is either cleared or dominated by exotic grasses. One Cumberland Plain Woodland canopy species is present but will be retained within the site following the rezoning. As such, and consistent with the surrounding residential development, the proposed rezoning of the subject site will not impact the ecological values of the subject site.

Yours sincerely,



Karen Spicer

Ecologist

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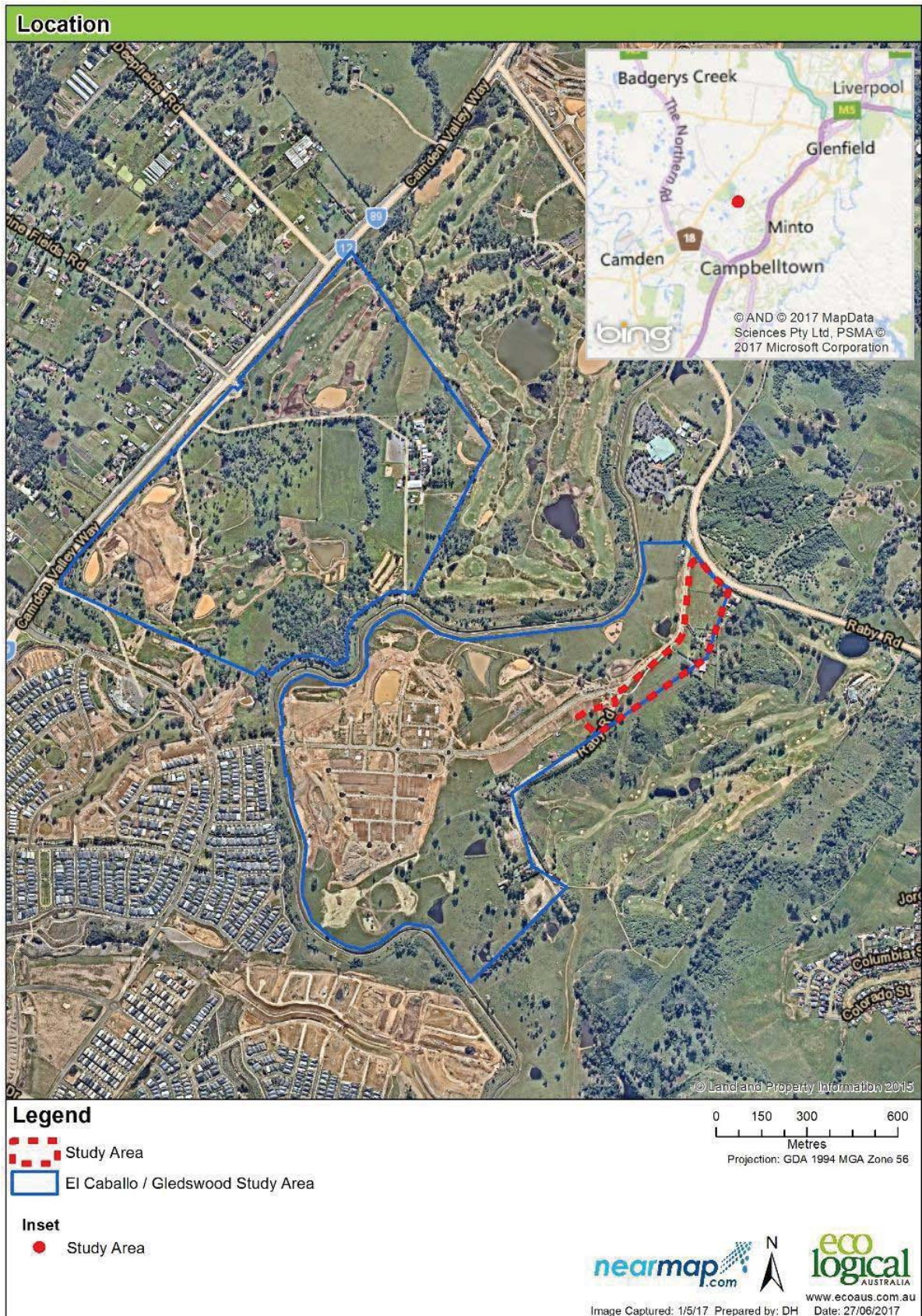


Figure 1: Location map for El Caballo Blanco / Gledswood study area.

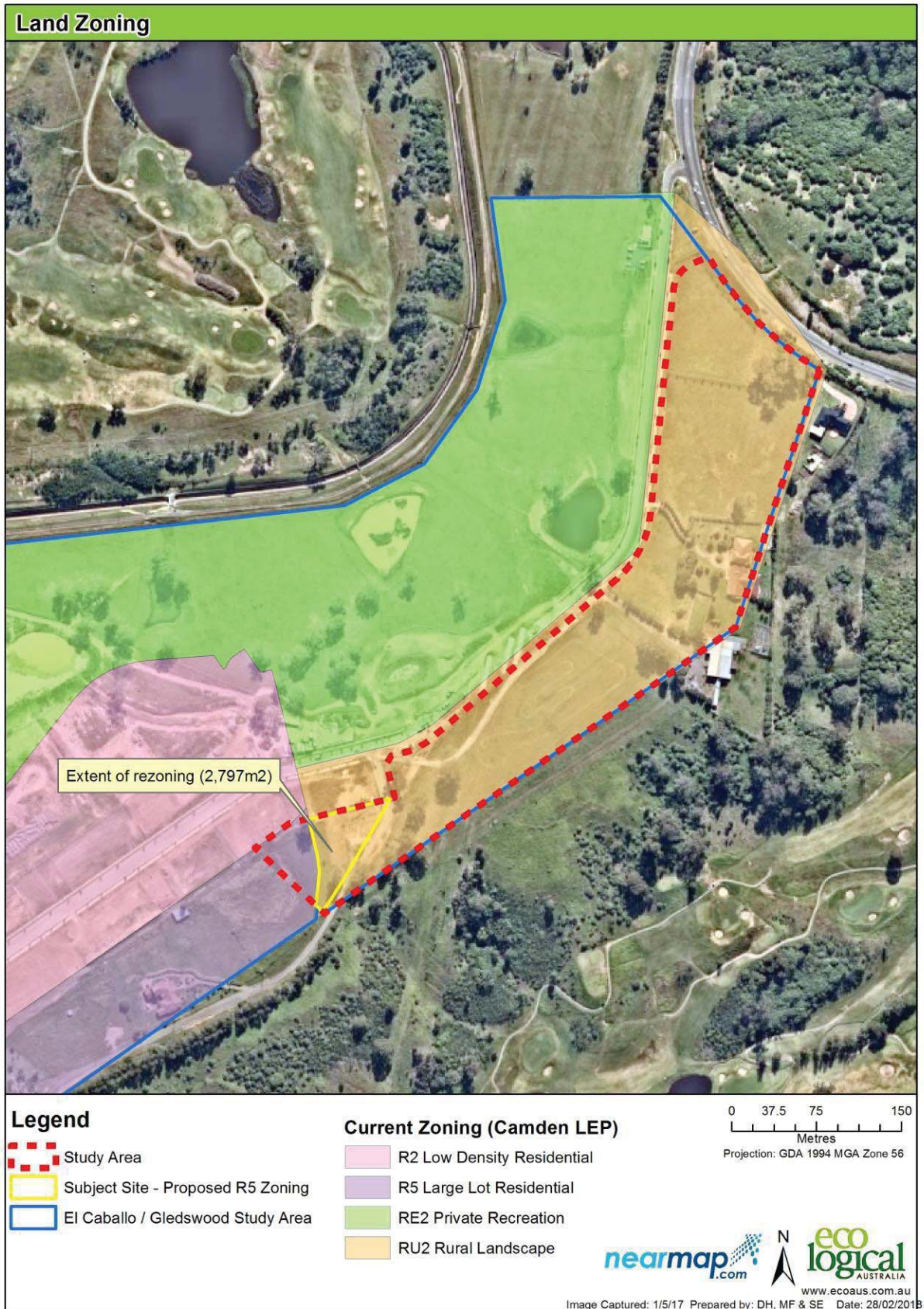


Figure 2: Current zoning of 182A Raby Road.

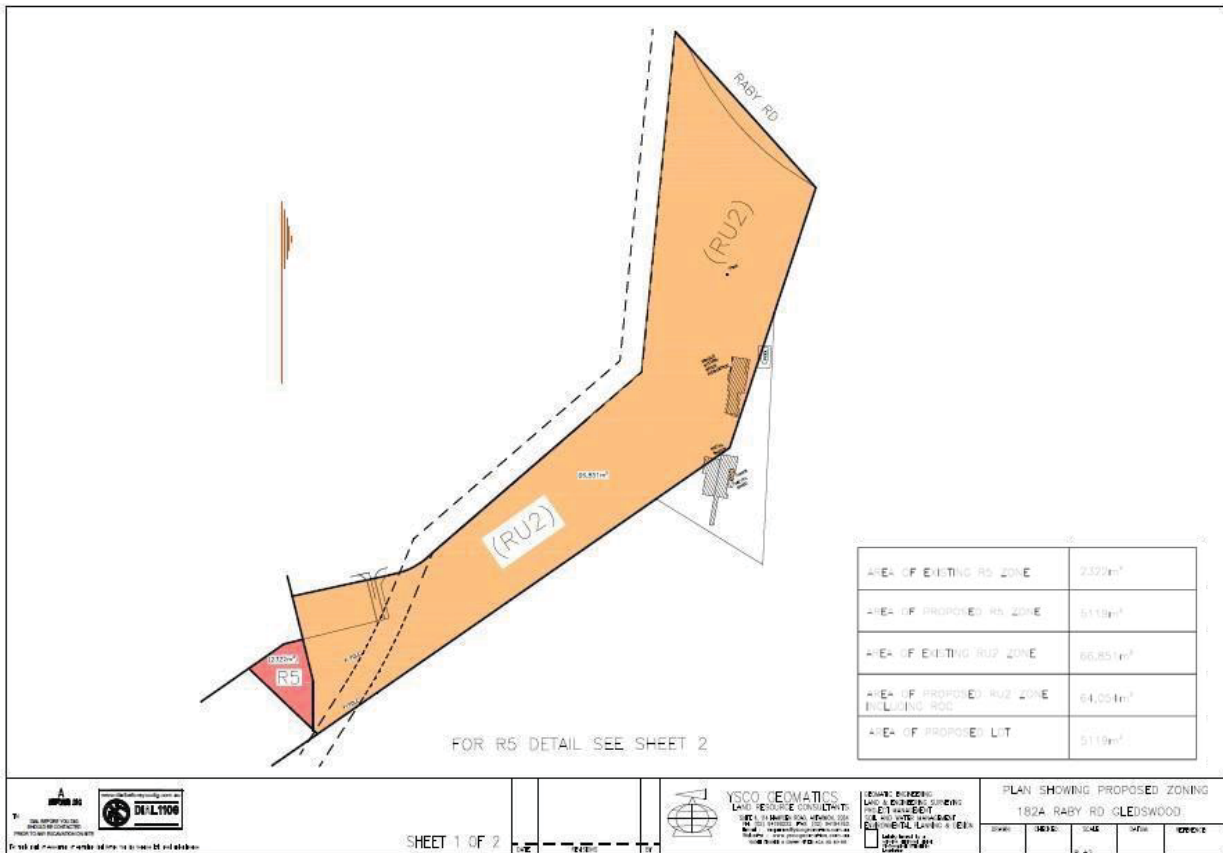


Figure 3: Survey plan showing existing zoning for the study area (182A Raby Road).

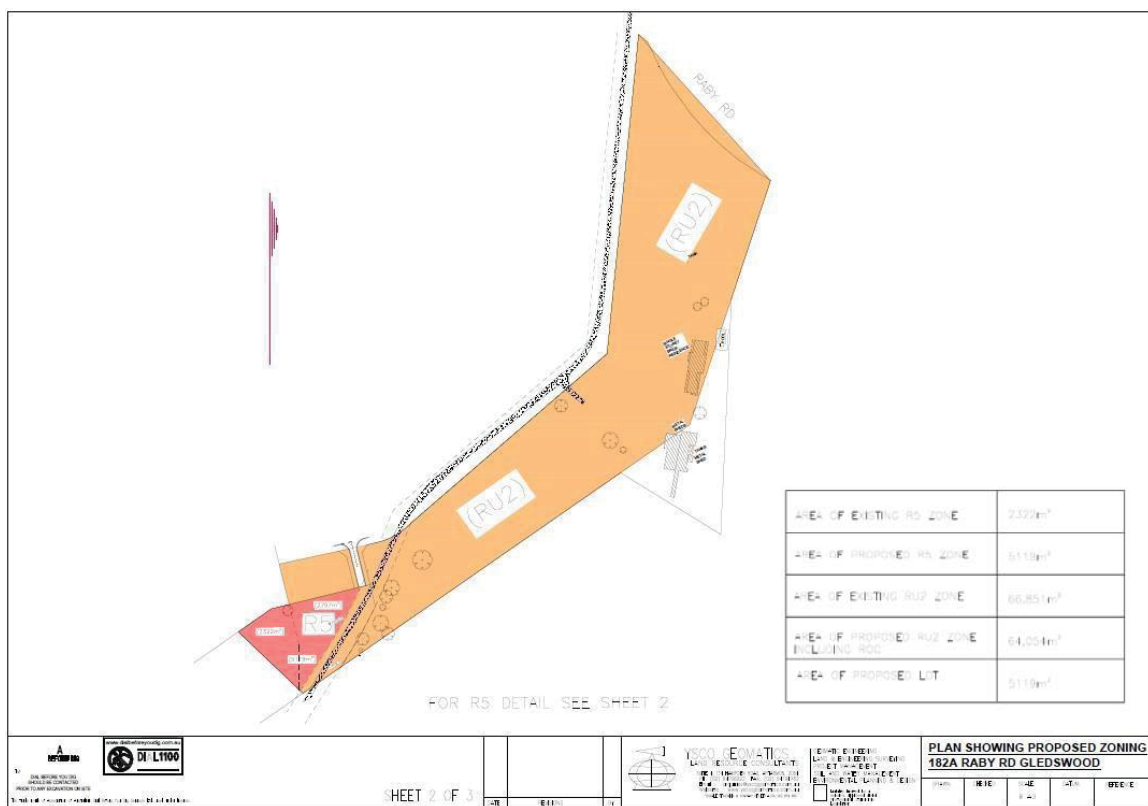


Figure 4: Survey plan showing the proposed zoning for the subject site.

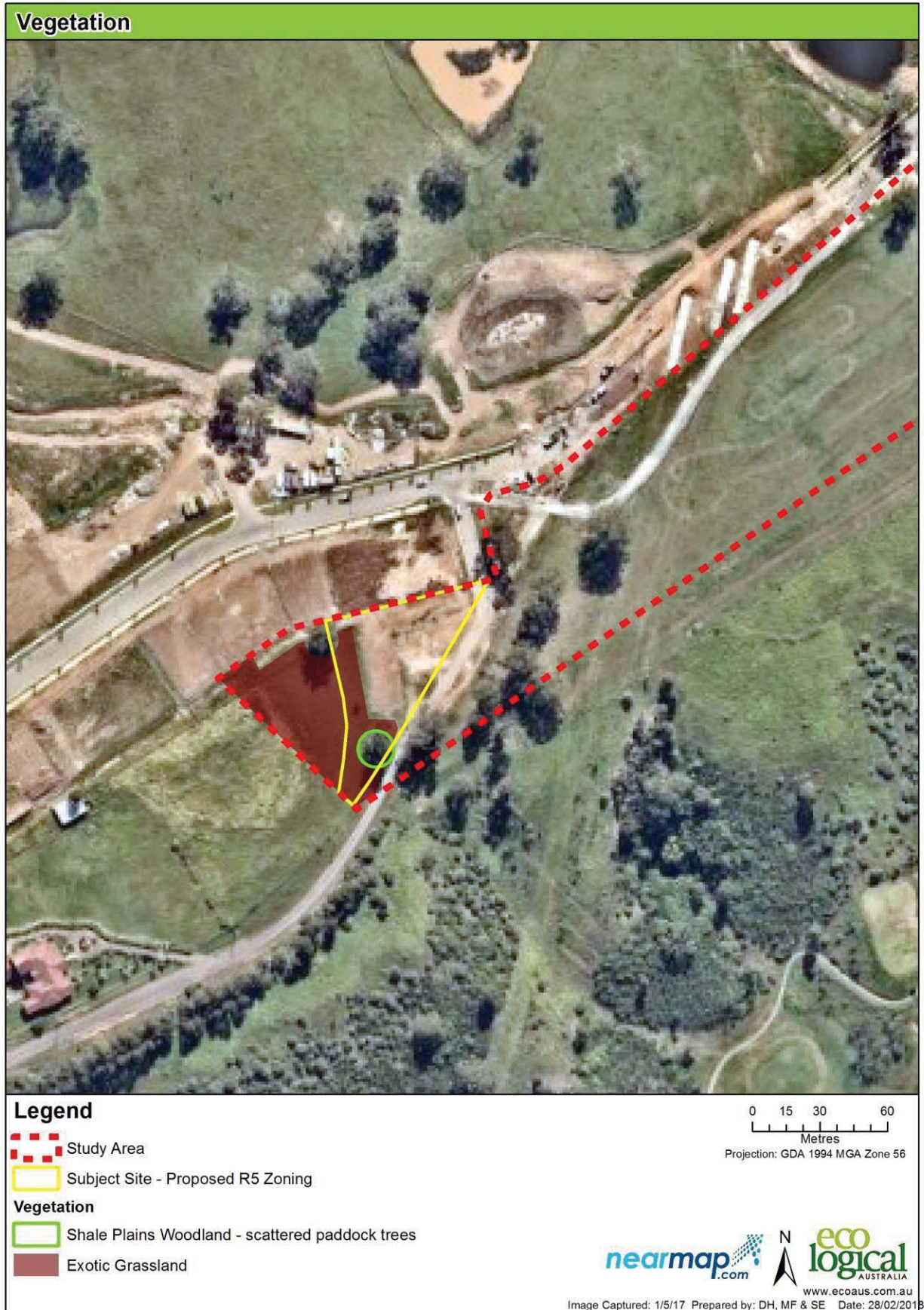


Figure 5: Vegetation map for the subject site.



Plate 1: Subject site of proposed rezoning – facing north. The majority of the site is cleared.



Plate 2: Subject site facing west towards the Mirvac development. The tree shown (*Eucalyptus crebra*) is just outside the subject site.

Appendix 6: Visual Impact Assessment prepared by MUSEcape (August 2017)



Visual Impact Assessment
Proposed rezoning of land at
182 Raby Road, Gledswood Hills



Prepared by
Chris Betteridge, Betteridge Consulting Pty Ltd t/a
MUSEcape

for

TN Consulting Pty Ltd
on behalf of the owner

23 August 2017

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SPECIALISTS IN THE IDENTIFICATION, ASSESSMENT, MANAGEMENT AND INTERPRETATION OF CULTURAL HERITAGE

Table of Contents

1.0	Introduction.....	3
1.1	Background.....	3
1.2	Property Location.....	3
1.3	Methodology.....	3
1.4	Authorship.....	3
1.5	Acknowledgments.....	4
2.0	Site description.....	4
2.1	The subject property.....	4
2.2	Landscape character and adjoining development.....	4
2.3	Views and visual absorption capacity.....	4
3.0	Visual Impact Assessment.....	7
3.1	Previous visual assessment.....	7
3.2	The proposal.....	8
3.3	Assessment of impact.....	8
3.4	Mitigative Measures.....	8
4.0	Conclusion.....	9

Figure 1 (Front cover) Panorama from part of the subject property looking towards Raby Road. (Photo: Chris Betteridge, 16 June 2017)

1.0 Introduction

1.1 Background

A parcel of land at 182 Raby Road, Gledswood Hills (the subject property) is currently zoned RU2 (Rural Landscape) but adjoins lands which have been rezoned to R5 (Rural Residential). The owner of the subject property wishes to convert 7,000m² of land zoned RU2 to R5 zone. For the original rezoning of the area, a visual analysis study by LFA (Pacific) Pty Ltd was completed which showed this section of the land as “highly visible” from Raby Road but not from the Scenic Hills.

TN Consulting Pty Ltd, on behalf of the owners of the subject property have engaged Chris Betteridge, Director, Betteridge Consulting Pty Ltd t/a **MUSEcape** to assess the potential visual impact of the proposed rezoning on major viewing points in the public domain and any other heritage or scenic viewing points.

This Visual Impact Assessment (VIA) has been prepared as part of the documentation to accompany a planning proposal for rezoning of the subject property.

1.2 Property Location

The location is shown in Figure 2 below.



Figure 2 Location of the subject property, edged red, with its northern boundary on Raby Road. (Source: *nearmap*, 9 August 2017)

1.3 Methodology

Preparation of this report involved a site inspection on 13 June 2017 and consultation with the client’s planning and environmental consultants. The report includes a brief physical description of the site, a visual analysis, description of the rezoning proposal, visual impact assessment, conclusion and recommended mitigative measures.

1.4 Authorship

This report has been prepared by Chris Betteridge, Director of Betteridge Consulting Pty Ltd trading as **MUSEcape**, specialists in the identification, assessment, management and interpretation of cultural landscapes. The author was Specialist – Environmental / Landscape in the Heritage & Conservation Branch, NSW Department of Planning for ten years. He was consultant Heritage Advisor to both Port Stephens Council and Wollondilly Shire Council for eight years and has been in

private practice as a heritage consultant since 1991. Chris has specialised in the conservation of significant places, including some of the most important cultural landscapes in NSW. He has prepared or contributed to conservation planning documents for many significant sites and in recent years has prepared many heritage impact statements for proposed developments affecting listed items or conservation areas.

1.5 Acknowledgments

The author would like to thank Keith Apps, TN Consulting for his kind assistance in the preparation of this report.

2.0 Site description

2.1 The subject property

The subject property is an irregularly shaped block with a frontage to Raby Road at its northern end. The western boundary mostly adjoins the road which will provide access from Raby Road to the Crest residential subdivision. The southwestern end of the subject property adjoins a rural residential lot. The eastern and south-eastern boundary adjoins rural land which in turn adjoins the golf course.



Figure 3 View north from the southern end of the subject property, showing part of the sound attenuation barrier along Gledswood Hills Drive at far left. (Photo: Chris Betteridge, 16 June 2017)

2.2 Landscape character and adjoining development

The bulk of the subject property is cleared grazing land, with scattered remnants of the original plant community, predominantly remnant woodland trees. The character of the adjoining lands is changing rapidly from gently undulating landscape with scattered residences and rural buildings in grazing land to a more urbanised environment of housing subdivisions and the Lakeside Golf Club Camden and The Grange Golf Club courses.

2.3 Views and visual absorption capacity

There are views towards the subject property from the intersection of Raby Road and Gledswood Hills Drive in the vicinity of the Crest Estate sales office but these are

interrupted to varying degrees by intervening vegetation. There are distant partial views towards the subject property from high points southeast of The Grange golf course.



Figure 4 Arcs of view over the subject property from Raby Road (red) and a high point on the ridge southeast of The Grange golf course (blue). (Source: *nearmap / MUSEcape*)



Figure 5 View from the eastbound carriageway of Raby Road over the northern part of Gledswood Hills Drive towards the subject property, within the area marked red. (Photo: Chris Betteridge, 13 June 2017)



Figure 6 View from high point southeast of The Grange golf course towards the subject property, marked red. (Photo: Chris Betteridge, 13 June 2017)

Visual absorption capacity is an estimation of the ability of a particular area of landscape to absorb development without creating a significant change in visual character or a reduction in scenic quality of the area. The capacity of an area to absorb development visually is primarily dependent on landform, vegetation and the location and nature of existing development. Generally, flat or gently undulating open forest or woodland has a higher capacity to visually absorb development than open heathland or swamp or heavily undulating topography with cleared ridges and slopes.

A major factor influencing visual absorption capacity is the level of visual contrast between the proposed development and the existing elements of the landscape in which it is to be located. If, for example, a visually prominent development already exists, then the capacity of that area to visually absorb an additional development of similar scale and form is higher than a similar section of land that has no similar development but has a natural undeveloped visual character.

The subject property is considered to have an increasingly high visual absorption capacity to absorb development of the type and density likely to follow the proposed rezoning without major changes to the way it is perceived from public viewing points, particularly Raby Road. However, adequate setbacks of any new residential development from roadways, combined with careful placement and design of any new houses and appropriate landscaping will reduce negative impacts on the scenic values of the place to an acceptable and manageable level.

3.0 Visual Impact Assessment

3.1 Previous visual assessment

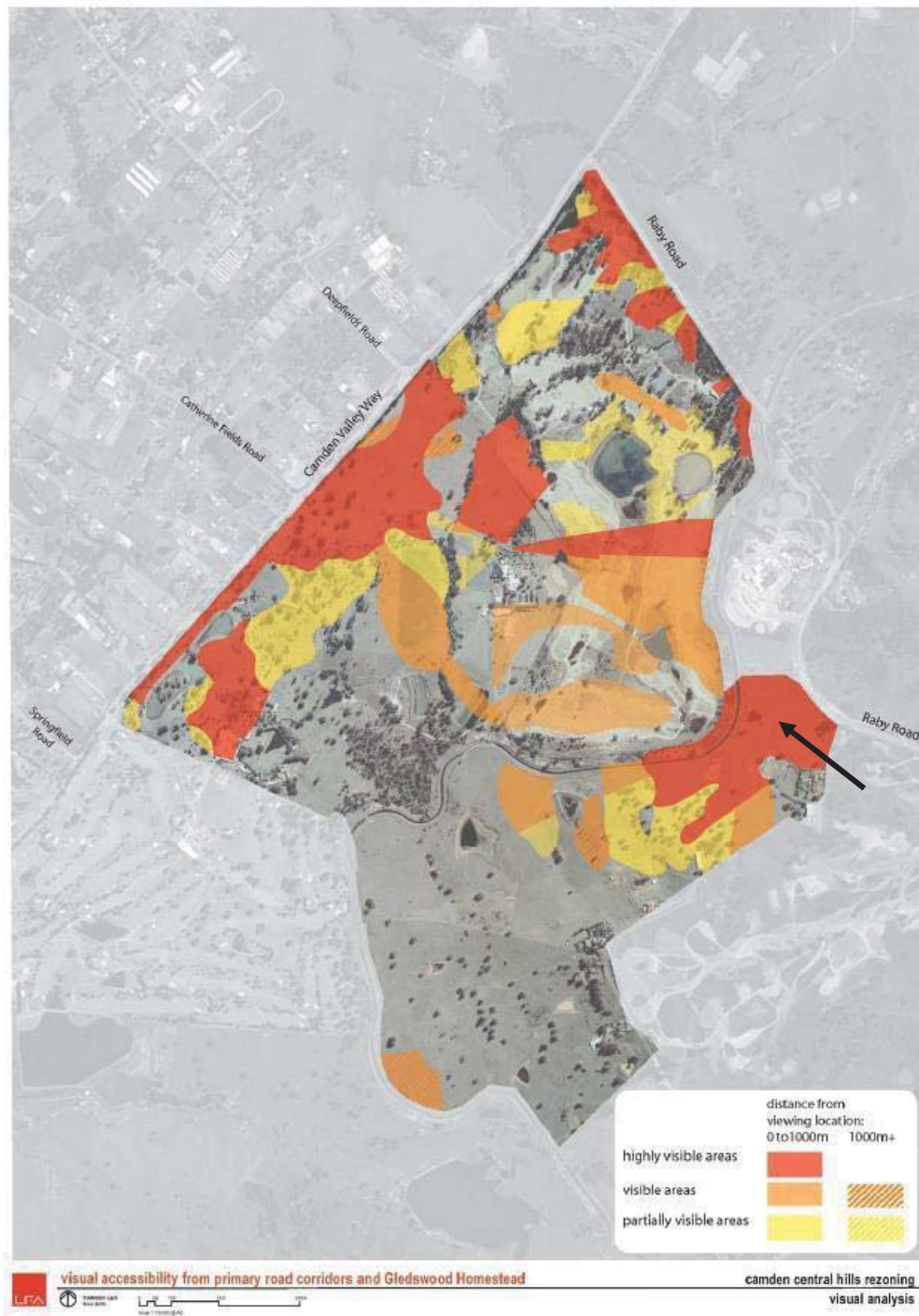


Figure 7 Visual accessibility from primary road corridors and Gledswood Homestead, showing the location of the subject property, arrowed black. (Source: LFA (Pacific) Pty Ltd)

3.2 The proposal

The proposal is detailed in the diagram below.

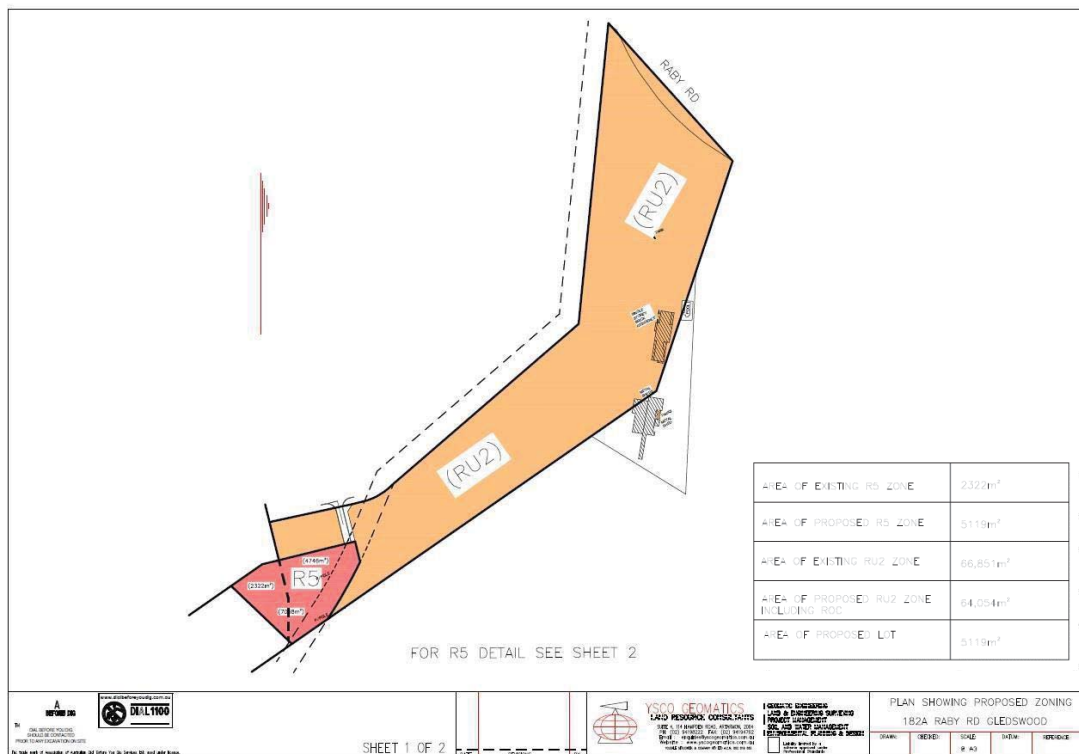


Figure 8 The subject property showing the current zonings and the areas of existing and proposed zonings. (Source: YSCO Geomatics Land Resource Consultants)

3.3 Assessment of impact

Rezoning of the subject property, *per se*, will have no visual impact on views from major viewing points in the public domain such as Raby Road or from other scenic viewing points in the nearby area. The type and scale of development likely to follow the proposed rezoning, subject to Council consent, is considered likely to have only minor and manageable impact on views from Raby road and other viewing points in the area.

3.4 Mitigative Measures

The following mitigative measures are recommended to reduce any adverse visual impacts likely to arise from implementation of the Planning Proposal.

1. Exterior finishes of any future development on the subject property to meet Council requirements and be chosen from a colour palette to minimise visual impact when viewed from the public domain.
2. Screen planting along the Gledswood Hills Drive boundary of the subject property with plant species to meet the following requirements:
 - Known to be part of the original plant community;
 - Environmentally sustainable;
 - Non-invasive;

- Any exotic ornamentals should be historically appropriate for the cultural landscape of the area.

4.0 Conclusion

The visual absorption capacity of the area is such that the proposed rezoning and any likely subsequent development can be accommodated without unacceptable changes to the perception of the site as viewed from major viewing points in the public domain.

In my opinion, provided the recommended mitigative measures are implemented, the proposal is within the limits of acceptable change for the place and any visual impacts will be minor and manageable.

In my opinion there are no visual quality grounds for refusal of the application.



Chris Betteridge
Director, Betteridge Consulting Pty Ltd t/a **MUSE**cape
Heritage Consultants

Date: 23 August 2017

**Appendix 8: Central Hills Rezoning: Landscape and Visual Assessment
prepared by LFA (Pacific) Pty Limited (November 2005)**

CENTRAL HILLS REZONING

CAMDEN COUNCIL

LANDSCAPE AND VISUAL ASSESSMENT

Prepared by
LFA (Pacific) Pty Limited
November 2005

DRAFT REPORT



TABLE OF CONTENTS

1	INTRODUCTION.....	1
2	CONTEXT	1
3	STUDY PURPOSE.....	4
4	PLANNING FRAMEWORK.....	4
5	METHODOLOGY.....	5
6	SITE ANALYSIS	6
7	CONCLUSION	8

1 INTRODUCTION

LFA (Pacific) was invited by Camden Council to undertake a landscape and visual assessment of part of the Central Hills area. The study area is defined to the west by Camden Valley Way and to the north by Raby Road and extends 2 km southward from Raby Road to abut the Camden Valley Golf Resort to the southwest and the Macarthur Grange Golf Course to the southeast. The total study area covers 321 ha.

This report includes a detailed analysis of the study area, sets out the visual assessment methodology and identifies the potential zones that could be developed for urban and tourism purposes without impacting on the prevailing rural qualities of the study area.

2 CONTEXT

The Central Hills lands identified within the Camden structure plan are significant in terms of maintaining the integrity of the Central Hills lands as an important scenic and rural buffer between the urban areas within the Camden and Campbelltown local government areas.

The essential character of the Central Hills is seen to be generally open landscape, such that any urban form components are to be subservient. The conservation and heritage qualities, including cultural landscapes as well as maintenance of biodiversity and vegetation corridors, are also regarded as integral elements of the Central Hills area.

Within the study area there are a number of existing land uses and activities including –

- Camden Lakeside Golf and Country Club
- Gledswood heritage buildings and supporting complex
- Gledswood Ponds which have been used for water treatment purposes
- The defunct El Caballo complex [tourist attraction]
- A water supply canal
- Rural residential lands

Camden Lakeside Golf and Country Club

Established in 1993 and opened as an 18-hole golf course in the same year. It is a high quality facility and is considered amongst Sydney's premier golf courses. The existing facilities within the complex include –

- 18-hole golf course
- clubhouse and conference facility
- fully equipped pro-shop

The 2nd stage of the staged development consent provides for -

- 22 villas containing
- 2 executive residences containing
- company lodge
- hotel/motel rooms (42)

Gledswood Heritage Buildings and supporting complex

An historically significant convict-built sandstone home set on 64 hectares of gently undulating rural lands. The homestead was originally built (C.1810) and owned by the Chilholms, an early pioneering family. The colonial homestead consists of two wings, one running north-south and the other east-west. An extensive lawn and garden extend out from the homestead with sweeping views across nearby lands and Rileys Creek.

Gledswood Homestead and Winery now operates as a tourism and entertainment facility including –

- a restaurant
- areas for corporate functions, weddings and parties
- educational excursions
- historic tours

Gledswood Ponds

Gledswood Ponds is located immediately south of the Gledswood Homestead property. The Ponds have operated as an effluent disposal site, regularly receiving waste by truck. Access to the Ponds is via an unsealed track that joins with the access road to Gledswood Homestead.

The future use of the site has been under review by Council.

El Cabello Blanco site

The remnants of the defunct El Cabello Blanco facility is located in the southwest corner of the study area adjacent Camden Valley Way. Otherwise known as “Australiana Park”, the facility included showrings, stables, exhibition rooms, picnic areas and associated amenities.

Many of the facilities remain in a dilapidated state on both the hillside and ridgeline facing Camden Valley Way. Access to the site is via a road connection to Camden Valley Way, opposite Catherine Fields Road.

Water Supply Canal

The Water Supply Canal is a formed channel traversing the study area in a north-south direction.

The canal crosses under Raby Road adjacent to the northeast corner of the study area and flanks the boundary of Camden Lakeside, Gledswood, Gledswood Ponds and Camden Valley Golf Resort. In the southern part of the study area, the canal is adjacent to rural lands.

The canal is primarily open apart from a short tunnel located adjacent to Camden Valley Golf Resort.

The canal and associated easement is maintained by Sydney Water. Public access to the canal and easement is not permitted.

3 RURAL RESIDENTIAL LANDS

Rural residential lands east of the canal are rural grazing lands with a small number of associated residences up to two storeys in height. The properties are accessed via a private road from Raby Road

4 STUDY PURPOSE

The study aim is to critically evaluate the study area and identify the visual qualities and the character of the study area with the broad objective of defining those areas that could be developed for residential, tourism and related purposes without impacting on the prevailing rural qualities of the scenic hills area.

5 PLANNING FRAMEWORK

The study area lies within the Camden Shire Council Local Government Area (LGA). The area is currently zoned 7(d) Environment Protection (scenic) under the Local Environmental Plan No. 48 1992.

The objectives of this zone are:

- To protect and enhance those areas of particular scenic value and ensure that the land remains a rural environment providing visual contrast to urban development
- To maintain the visual amenity of prominent ridgelines
- To enable cluster housing and recreation and tourist orientated uses to be carried out if they are in keeping with the environmentally sensitive nature of the zone.
- To prevent development in geologically hazardous areas and escarpment areas.

The draft Camden Scenic and Cultural landscape study prepared by Camden Council identifies the visual catchments of the scenic hills area. The study identifies the study area as the Raby/Gledswood area. Characteristics are predominantly broad-acre grazing with a pocket of re-growth woodland in the northeastern sector adjacent to Camden Valley Way. An area of large scale rural residential is identified in the eastern sector accessed from Raby Road.

6 METHODOLOGY

The initial assessment process involved a review of Council's strategic studies, in particular the Camden Scenic and Culture Landscape Study, to identify key thematic elements within the study area.

The study intent was also to review the RTA Camden Valley Way Urban Design Study to ensure that there was an understanding of the potential visual impacts associated with the proposed upgrading of Camden Valley Way. The objective was to gauge the likely effect of the proposed road design on existing views as well as the potential visual impact of any noise attenuation measures.

During the course of the study, it has become evident that the RTA Camden Valley Way document will not be made available and accordingly it has proved difficult to gauge the potential impacts of any upgrading roadworks. From the limited amount of information that has become available, it is understood that the general intent is to provide for a dual road system with two lanes in each direction. It is understood, but not certain, that the proposed new road will generally be located to the west of the existing Camden Valley Way and be separated from the existing road system by the existing vegetation.

From a visual and landscape point of view, LFA would recommend that the separation of the proposed upgrading roadworks from the existing Camden Valley Way be pursued together with the retention of the existing substantial vegetation that exists to varying degrees along the length of Camden Valley Way within the study area.

The detailed field datasheets, together with supporting site photographs, are set out in the Appendix.

Each viewing location is identified, together with a description of the existing visual and landscape qualities. An assessment of the potential visual impact of any new development is also defined.

7 SITE ANALYSIS

Significant remnant vegetation

The study area contains some significant remnant Cumberland Plain vegetation, albeit in relatively small quantities. The more intact vegetation communities are located in the upper reaches of Rileys Creek, along the banks of Rileys Creek and in the northern and north-eastern portions of the study area. Also scattered across the golf course, grazing lands and former El Cabello Blanco site are mature remnant trees, grass areas and regrowth.

In the northern corner of the study area, golf course lands have been categorized as 'linkages and corridor communities' by NSW National Parks and Wildlife Service (NPWS). Although the lands have been predominantly cleared of vegetation, some significant remnant vegetation has been identified, including a relatively small area of core support habitat for Cumberland Plain Woodland.

The core support habitat is a riparian vegetation community located adjacent the property boundary near the intersection point of Rileys Creek and Camden Valley Way. The vegetation is mostly comprised of *Casuarina* sp. and semi-aquatic species. The expansion of the community appears limited by Camden Valley Way and the adjacent irrigation lake.

A relatively small area of *Pimelea spicata* has also been identified within the Camden Lakeside property. The species is classified as 'threatened' by NPWS and is subject to protective legislation.

The remnant vegetation, in combination with planting mostly along the property boundaries, help in establishing a natural, bushy character within the study area.

Landform, slope and drainage

The landform within the study area is characterized by rolling hills, ridgelines and gently sloping plains.

Generally the natural landform has not been modified, except within areas of the golf course, probably in the area around Gledswood Homestead and on lands occupied and adjacent the irrigation dams.

For the most part, the study area is comprised of gentle to moderate slopes, ranging mostly from around 1 in 20 to 1 in 50, with some limited areas of ground steeper than 1 in 10. Almost no land areas are steeper than 1 in 5.

The flattest land is located within the south-eastern part of the golf course, in the central areas of the grazing lands east of the water supply canal and along the ridgelines. The lands within the water supply canal easement are generally also relatively flat. Overland drainage flows are directed away from the canal.

The steeper slopes within the study area are primarily located on the lands falling away from the dominant ridgelines located on the El Cabello Blanco site and adjacent the boundary with Macarthur Grange Golf Course. Some of the lands falling away from Camden Valley Way, especially around the boundary of Camden Lakeside and Gledswood properties, are moderately steep from 1 in 10 to 1:20.

The primary drainage line through the west of the study area is Rileys Creek. The upper reaches of the creek are located amongst remnant vegetation immediately south of Gledswood Ponds. The creek flows toward the north, transecting the Gledswood property and flowing on to the golf course lands where it passes through a series of small wetlands and lakes.

Other minor drainage lines are located across the study area, generally terminating at small dams intended for irrigation use. There appear to be no signs of erosion on any lands within the study area.

Infrastructure and roads

Included within the study area are regional power, gas and water infrastructure services. The eastern half of Camden Lakeside golf course and the lands east of the water supply canal contain 330kV and 132kV overhead power lines, oriented in a north-south direction, with associated easements. Close to Raby Road are an underground gas mains and a 20 metre easement.

The water supply canal is responsible for movement of fresh water to areas south of the study area. Flows along the canal are toward the south. Sydney Water maintains an easement associated with the canal.

Vehicular access into the subject land is available from two points along Raby Road and one location along Camden Valley Way. On Raby Road, a road provides access to the Camden Lakeside golf club and another road, located within a 20 metre easement, services rural-residential properties in the east of the study lands. Access to the former El Cabello Blanco site, Gledswood Homestead and Gledswood Ponds is provided via a road serviced from Camden Valley Way, near Catherine Fields Road.

8 CONCLUSION

The analysis process indicated that there were substantial areas that potentially could be developed within the study area without impacting adversely on the scenic qualities. Two categories of potential development zones were identified based on a 'sieve' process including –

- Areas where development could occur without any form of screening, given topographic and other constraints that inhibited visual access to the identified areas from Camden Valley Way, Raby Road and Gledswood

- Potential areas that could be developed subject to landscape screening measures. In general, such areas would draw upon existing landscape which would need to be supplemented to provide an appropriate screen

The principal areas of potential development included areas within Camden Lakeside where screening was generally achieved by both topographic form and existing landscape. There were also substantial areas located within the eastern sector of El Caballo Blanco lands and areas south of Gledswood. Substantial areas were also identified in the southern sector of the study area, currently occupied by rural land use.

Although the potential development areas identified above were significant, the next step was to overlay the various golf course commitments, both existing and proposed, given that the footprint of the golf courses will effectively limit the residual development capacity of the potential areas for urban development.

The next step in the 'sieve' process was to overlay the existing Camden Lakeside Golf Course and then the proposed Medallist Golf Course. The latter occupies sectors of El Caballo Blanco lands, the Gledswood Ponds area and part of the rural residential lands located to the south of the water supply canal.

A further constraint was also identified stemming from the defined riparian corridors associated with the creek systems within the study area. Rileys Creek was defined as Category 1 with the remaining creeks categorized as Category 2. This also had the effect of further limiting the capacity of the potential development zones.

It became evident that overlaying the riparian zones on both the Camden Lakeside and proposed Medallist course had significant impacts. In the case of the Camden Lakeside course, it is understood that the riparian zones will not impact on the existing golf course layout but could impact on lands otherwise considered to have development potential.

In terms of the proposed Medallist Golf Course, it is evident that, should there be a requirement that the golf course layout not traverse the defined riparian corridors, there

will be a need to modify the proposed layout of the Medallist Golf Course which, in turn, could impact on the development potential of the southern lands within the study area.

A further consideration that needs to be taken into account, once the residual development zones have been identified, is an appreciation of the topographic structure and creek patterns and the effect they will have on development potential. To maintain the visual qualities of the area, it will be necessary to provide landscape buffers along prominent ridge lines thus inhibiting further development crossing the skyline.

A further constraint that also needs to be taken into account is the series of easements that traverse the area. These easements include a number of high voltage and low voltage electricity transmission lines together with gas pipelines.

The final drawing – Potential Development Pattern – indicates the identified pockets of potential development areas that are compatible with the existing and proposed golf courses, together with the constraints imposed by the major infrastructure elements that traverse the site, as well as taking into account ridgelines and drainage lines.

82 ha of land has been identified to have development potential that would not impact on the scenic and visual qualities of the 351 ha study area.

It is acknowledged that the potential development patterns so identified will still need to be informed by a series of parallel studies which may place further limitations on the development potential. Such studies include –

- Acoustic
- Ecological
- Heritage
- Golf course layout
- RTA Camden Valley Way
- Geotech/Contamination

**CENTRAL HILLS REZONING
CAMDEN COUNCIL
LANDSCAPE AND VISUAL ASSESSMENT**

Prepared by
LFA (Pacific) Pty Limited

November 2005

DRAFT APPENDIX



FIELD DATA SHEETS

Viewing Location 5

Location description Camden Valley Way at intersection with Deepfields Road.

View direction North along Camden Valley Way and south toward study area.

Existing visual and landscape qualities Clear views are limited to the relatively small open grass area immediately adjacent Camden Valley Way. The area is located within the Gledswood property. More expansive views of the hillside west of Rileys Creek and beyond are impeded by the roadside embankment commencing adjacent the intersection and running south along Camden Valley Way.

Views from Camden Lakeside are blocked by nature remnant vegetation and regrowth located within the roadside verge and western corner of the Camden Lakeside property. No existing built form within the study area is visible from the viewing location

Likely visual impact of new development and recommendations New Development on the cleared area within Gledswood lands would be highly visible from the viewing location. Earth mounding or vegetation screening would have limited success in obscuring development in this area and would diminish the experience of visual interaction with the rural environment and hilltop. Development would detract from the rural character and is not recommended in the cleared area.

The visual impact of new development within other parts of the study area is likely to be low or non-existent. With some accompanying vegetation screening, development within Camden Lakeside would have almost no visual impact from the viewing location. Other development, including around Gledswood Homestead, east of the water canal and on the former El Caballo Blanco site, would not be visible from viewing location 5 and therefore would have no visual impact

VIEWING LOCATION 5



FIELD DATA SHEETS

Viewing Location 6

Location Description Camden Valley Way, approximately 100m north of intersection with Catherine Fields Road.

View Direction South east toward the study area

Existing Visual and Landscape Qualities Clear panoramic views of large parts of the study area are available from this viewing location. The viewcone sweeps from the north east around to the south east.

In the foreground area (west of Rileys Creek) are highly visible grazing lands within the Gledswood property. The cleared grass hillside and dam combine to create a distinctly rural landscape character.

Beyond Rileys Creek partial views of Gledswood Homestead and gardens are available, allowing a significant visual connection between the grazing lands and the Homestead.

Toward the north east, parts of Camden Lakeside are visible, including the clubhouse which is almost 1km from the viewing location.

Toward the south east views extend past the driveway to Gledswood, up to Gledswood ponds. However, this aspect is secondary to the main views of the immediate grazing lands and Gledswood Homestead.

Likely visual impact of New development and recommendations

The vista available from the viewing location has been identified in Camden Council's *Camden Scenic and Cultural Landscapes Study* as 'significant'. The existing conditions allow one of the best views of the study area from Camden Valley Way.

The expansive views of the hillside, Rileys Creek, Gledswood and Camden Lakeside golf course, including the clubhouse, provide an excellent snapshot of the various land uses and natural features, such as topography, drainage and vegetation, within the study area.

Any new development in the areas north of the access road to Gledswood Homestead between Rileys Creek and Camden Valley way, in the visible areas adjacent the Homestead and in visible areas of the golf course would detract from the viewing experience. Therefore, it is not recommended that these areas be subject to any new development. Should there be any development in other areas then it should be ensured that it screened adequately so as to not be visible from the viewing location.

Finally, it is also recommended that the existing viewing conditions be maintained in the future to retain this significant vista.

VIEWING LOCATION 6



Viewing Location **7**

Location Description: Camden Valley Way at intersection with Catherine Fields Road

View Direction: South East Toward the study area

Existing Visual and Landscape Qualities: The views available from this viewing location are similar to location 6.

In the foreground area adjacent Camden Valley the Gledswood grazing lands and drain are clearly visible.

Although the homestead is obscured by remnant trees parts of its formal gardens and expansive northern lawn are clearly visible.

Views north east to Camden Lakeside golf course are almost entirely blocked by riparian vegetation lining Rileys Creek.

In the immediate vicinity of the viewing location is the public entry road to Gledswood Homestead and the former El Caballo Blanco site. The road level and woodland immediately behind impede views further into the study area.

Likely Visual Impact of New Development and Recommendations:

Any new development sited on visible areas within the Gledswood property would have a significant impact on the existing landscape character of Gledswood. Development would also be likely to block the existing visual link to Gledswood Homestead's formal gardens. New development is not recommended.

In ending there is appropriate placement of screen planting it may be possible to locate development in the wooded lands east of the public entry road and south of the entry drive to Gledswood without the development being visible from the viewing location.

VIEWING LOCATION 7



Viewing Location 8

Location Description: Camden Valley approximately 200m south of intersection with Catherine Fields Road

View Direction: South east toward study area

Existing Visual and Landscape Qualities: Clear views are limited from this viewing location by scattered remnant and planted vegetation, changes in landform and two chain wire fences in the foreground.

The flat grassed area located between Camden Valley Way and the entry road to the former El Caballo Blanco site is highly visible.

Beyond this clearing, Eucalypt and Melaleuca tree planting mostly obscure views of the hillside and existing development located along the ridgeline.

The area immediately east of the entry road is barely visible or not visible due to a depression in the landform.

Likely visual Impact of New Development and Recommendations: Any new development sited between the access road and Camden Valley Way would be highly visible from the viewing location and therefore, not recommended. East of the access road it would be possible to enhance existing planting, ensuring retention of nature significant remnant trees, and successfully screen new development from view.



Viewing Location 9

Location Description: Camden Valley Way approximately midway between Catherine Fields Road and Springfield Road.

View Direction: South east toward former El Caballo Blanco development

Existing Visual and Landscape Qualities: A sweeping view of the hillside and ridgeline is available from the viewing location. Beyond the grass embankment immediately adjacent Camden Valley Way is the predominantly cleared and highly visible hillside adjoining the ridgetop development formerly known as El Caballo Blanco.

The ridgetop is comprised of a collection of dilapidated showings, riding tracks, recreation areas, exhibition and facilities buildings. The view of the development is partially obscured by screen planting adjacent Camden Valley Way, a limited number of nature remnant trees and exotic planting along the ridge.

The development appears to be in a state of semi-ruin and does not exemplify an Australian rural vernacular in its current architectural form.

Scattered across the hillside are picnic shelters with tables and seating, and an amenities block. Most of the shelters front the lake, which is not visible from Camden Valley Way.

Likely visual impact of new development and recommendations:

The former El Caballo Blanco site provides an excellent opportunity to remediate and improve existing land uses, whilst conserving existing remnant vegetation and open space.

A redevelopment approach that results in a no-net-increase in built form in visible areas and an enhancement of indigenous vegetation would provide a desirable outcome.

This approach would permit appropriate redevelopment in locations currently built on and additional development in locations not visible from Camden Valley Way.

Removal of existing palm trees and other insignificant exotic vegetation and planting of indigenous vegetation is recommended to further remediate the site and enhance the natural character of the locality.

Retention or removal of the lake would be inconsequential to the landscape experience as it is not visible from Camden Valley Way.

Finally, it is recommended that the chain wire fence fronting Camden Valley Way be removed and if necessary replaced by a fence of more appropriate rural character.

VIEWING LOCATION 9



Viewing Location	10
Location Description:	Camden Valley Way at the intersection of the entry road to Camden Valley Golf Resort (approximately 150m north of Springfield Road)
View Direction:	North along Camden Valley Way, east toward the study area and south east along the entry road to Camden Valley Golf Resort.
Existing Visual and Landscape Qualities:	<p>Limited views of the study area are available from the viewing location due to dense screen planting along the property boundary of the former El Caballo Blanco site.</p> <p>Some clear views are possible of the roadside area adjacent Camden Valley Way and small sections of development along the ridgeline and the adjacent hillside.</p> <p>A number of mature remnant Eucalypt trees are visible along the property boundaries and ridge.</p>
Likely visual impact of new development and recommendations:	<p>Existing views beyond the boundary vegetation and into the study area are mostly fragmented and limited. With minimal additional screen planting, new development could most likely be absorbed without significant visual impact or diminishment of the existing natural landscape character.</p> <p>It would be desirable for new screen planting to be comprised of indigenous vegetation consistent with existing remnant species.</p>

VIEWING LOCATION 10



Viewing Landscape 11

Location Camden Valley Way 50m south of Cobbity Road
Description:

View Direction: North east toward study area.

Existing visual and landscape qualities: The viewshed takes in rural grazing lands immediately south of the Camden Valley Golf Resort, including the banks of the large drain a few hundred metres east of Camden Valley Way, remnant vegetation located on the golf course and some distant views of southern lands within the study area.

Large 320kv powerlines traverse the grazing lands in an east-west direction, interacting with the north-south oriented 320kv line transecting the study area.

The viewing location affords a sweeping and comprehensive view of the rural plains and slopes beyond the study area and limited views of the grazing lands in the far south of the study area adjacent the water supply canal.

Likely visual impact of new development and recommendations

New development within the vast majority of the study lands would not be visible from the viewing location and therefore, would result in no visual impact.

However, new development on some lands within the southern part of the subject area would most likely be visible, albeit from a long distance away. It is recommended that any development is sited in areas not visible or only partially visible from the viewing location and that appropriate vegetation screening is implemented where necessary to obscure views of new development.

VIEWING LOCATION 11



**VISUAL ANALYSIS
FIELD DATA SHEETS**

Viewing Location 12

Location Description: Raby Road approximately 300m south east of intersection with Camden Valley Way

View Direction: South toward Camden Lakeside Golf Club

Existing visual and landscape qualities: The viewing location affords clear views of golf holes number two and three, associated 'rough' grass areas between fairways, and Cumberland Woodland vegetation.

Due to their open nature, the golf play areas (including fairways, greens and tees) are highly visible from the viewing location.

The combination of semi-mature and mature remnant vegetation, as well as recent boundary screen planting, obscure views of the highly wooded ridgeline east of the second fairway and other lands further south. Neither the golf clubhouse nor the Gledswood property is visible from the viewing location.

Likely visual impact of new development and recommendations

Siting of new development in existing highly visible golf play areas would result in a significant alteration to the existing landscape character, as experienced from the viewing location.

On partially visible land, such as the ridgeline referred to above, new development would be less likely to have an adverse visual impact and would allow the existing land use, with its generous open space provisions, to continue without interruption.

Providing existing vegetation screening was maintained, new development on partially and non-visible areas would not significantly detract from the existing landscape experience nor be incompatible with the existing land use. However, some additional screening where necessary is recommended.

VIEWING LOCATION 12



Viewing Landscape 13

Location Description: Raby Road at the intersection with the private access road to Camden Lakeside clubhouse.

View Direction: South west toward golf course

Existing visual and landscape qualities: The view available from this viewing location is dominated by the two-lane access road to the Camden Lakeside clubhouse and carpark. In the foreground semi-mature tree plantings and a low grass understorey flank the road.

Beyond this planting is a gently sloping predominantly cleared hillside, covered by native grasses.

On the upper slopes of the hillside and along the ridgeline, mature remnant trees are visible.

No built form or golf play areas are visible from the viewing location.

Aside from the road, the landscape has a natural, relatively undisturbed character typical of Cumberland Plain Woodland.

Likely visual impact of new development and recommendations New development in close vicinity to Raby Road would be highly visible and likely to obscure views of remnant vegetation beyond, significantly diminishing the natural landscape character of the area.

With addition of vegetation screening some appropriate placement of new development in partially visible areas would barely be visible from the viewing location, allowing the natural landscape qualities to be maintained.

VIEWING LOCATION 13



Viewing Landscape 14

Location Description: Raby Road approximately 50m east of the golf club entry road.

View Direction: South west toward Camden Lakeside clubhouse and golf club.

Existing visual and landscape qualities: The viewing location allows clear views of the majority of the hillside immediately north of the clubhouse building.

Views of parts of the grass hillside are partially obscured by some semi-mature vegetation located close to the boundary fence and immature vegetation precinct over small areas of the slope.

The landform and vegetation block views beyond the hillside, although parts of the roof structure to the clubhouse are clearly visible.

Toward the south east of the 320kv overhead transmission lines and a carpark park light pole are visible. The carpark itself is not visible from the viewing location

Likely visual impact of new development and recommendations

The likely visual impact and effects of new development would be similar to those described for Viewing Location 13

Due to the way in which the landform slopes down toward Raby Road exposing the hillside to full view and due to the general lack of vegetation, the area would be likely to have a limited capacity to absorb new development without significant visual impact and diminishment of the existing rural and natural character of the landscape.

It may be possible to site new development on the hillside and mostly screen it from view with vegetation but the screening would most likely indicate to the viewer to presence of development, whilst also reducing the open feel of the landscape.

New development located behind the hillside could be suitably screened from view and allow maintenance of the natural hillside setting.

VIEWING LOCATION 14



Viewing Landscape 15

Location Description: Raby Road approximately 50m west of the road bridge over the water supply canal.

View Direction: North west along Raby Road and toward Camden Lakeside Golf Club.

Existing visual and landscape qualities: Views into the study area are very limited by relatively dense Cumberland Plain Woodland vegetation.

The remnant vegetation is comprised of mature Eucalypt trees, a mixture of indigenous shrubs and an understorey of indigenous and exotic grasses.

The vegetation community appears to be in relatively good condition with a divergent species selection and significant regrowth.

Neither the golf course nor any other part of the study area is visible beyond the vegetation.

In the direction of Camden Valley Way, the turnoff to the access road to the golf club is just visible.

Likely visual impact of new development and recommendations The golf course lands are heavily screened by existing vegetation fringing the property boundary.

Assuring retention of the vegetation, new development sited back from Raby Road would have little or no visual impact from the viewing location nor would it detract from the existing natural bush character of the area.

VIEWING LOCATION 15



Viewing Landscape 16

Location Description: Raby Road approximately 150m east of the road bridge over the water supply canal

View Direction: West toward Camden Lakeside Golf Club.

Existing visual and landscape qualities: The vista from viewing location 16 is dominated by a dense patch of remnant Cumberland Plain Woodland occupying golf course lands adjacent the eastern property boundary.

Like the remnant vegetation visible from viewing location 15, the vegetation community appears to be in good condition and relatively undisturbed by human activity.

Beyond the foreground vegetation which is highly visible, there are no clear views through to the golf course lands or other parts of the study area.

Likely visual impact of new development and recommendations Refer to Viewing Location 15.

VIEWING LOCATION 16



Appendix 9: Potential Contamination Investigation prepared by Douglas Partners (October 2017)



Douglas Partners

Geotechnics | Environment | Groundwater

Report on
Supplementary Contamination Investigation

Proposed Residential Subdivision
182 Raby Road, Gledswood Hills, NSW

Prepared for
Vince and Elizabeth Pisciuoneri

Project 92228.00
October 2017

Integrated Practical Solutions





Douglas Partners

Geotechnics | Environment | Groundwater

Document History

Document details

Project No.	92228.00	Document No.	R.001.RevO
Document title	Report on Supplementary Contamination Investigation Proposed Residential Subdivision		
Site address	182 Raby Road, Gledswood Hills, NSW		
Report prepared for	Vince and Elizabeth Pisciuneri		
File name	92228.00.R.001.RevO		

Document status and review

Status	Prepared by	Reviewed by	Date issued
Revision 0	Grant Russell	J M Nash	3 October 2017

Distribution of copies

Status	Electronic	Paper	Issued to
Revision 0	1	0	Vince and Elizabeth Pisciuneri

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

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Executive Summary

Douglas Partners (DP) was commissioned by Vince and Elizabeth Pisciueneri c/- TN Consulting Pty Ltd (TN Consulting) to complete a Supplementary Contamination Investigation (SCI) for the south western portion of the property at 182 Raby Road, Gledswood Hills (the "Site"). The Site encompasses an approximate area of 0.1 ha of the property. The SCI is required to support a Development Application (DA) being made with Camden Council for a proposed residential subdivision.

Previous investigations by DP, including a Land Capability Assessment (LCA) completed in 2005 and a Phase 2 Contamination Assessment (Phase 2) completed in 2010 identified the Site as an Area of Environmental Concern (AEC) due to the presence of a cattle yard and shed potentially used for chemical storage. Whilst the Phase 2 concluded that no further investigation of the cattle yard was required a recent review of the Nearmap imagery indicates that the Site has since been used as a compound area for the adjacent subdivision works. The following activities have been identified as recently occurring within the compound area:

- Soil stockpiling; and
- Vehicle storage / parking activities.

Given the identified activities recently occurring at the Site and the time elapsed since the previous investigation the SCI is required to update the contamination status of the Site.

Shallow soil sampling was initially undertaken for the SCI on 28 June 2017 by completion of eight test pit excavations across the site targeting areas of potential filling, the former shed/cattle yard and the compound areas. Surface samples collected at all locations were analysed for a range of contaminants of potential concern that included total recoverable hydrocarbons, benzene, toluene, ethylbenzene and xylene, polycyclic aromatic hydrocarbons, organochlorine and organophosphorous pesticide, polychlorinated biphenyls, metals (As, Cd, Cr, Cu, Pb, Ni, Hg and Zn) and asbestos.

Results of initial SCI sampling identified the following that required further investigation:

- An ACM fragment identified on surface soils in the north eastern portion of the Site which was removed from site at time of sampling; and
- Several fibrous cement fragments (suspected ACM) observed near a small soil/building waste stockpile in the central northern portion of the Site.

Additional sampling completed at the site did not identify further fragments or asbestos in soils in the north eastern portion of the site therefore the ACM fragment identified in the north eastern portion is considered an anomalous/isolated occurrence (since removed) and not indicative of widespread impact. Additional sampling of did not identify asbestos within any of the four additional fragments or the soil sample collected from the stockpile. The stockpile is therefore not considered to be impacted by asbestos.

Remaining COPC was not detected at concentrations above SAC in any soil samples collected from the site. From a contamination perspective, based on the findings of this SCI and previous environmental investigations, it is concluded that no further investigations or remediation works are warranted and the Site is considered suitable for the proposed development.

Table of Contents

	Page
1. Introduction.....	1
2. Scope of Work.....	1
3. Site Description	2
3.1 Site Identification.....	2
3.2 Site Description	2
3.3 Surrounding Landuse.....	3
3.4 Soil Landscapes.....	3
3.5 Geology.....	3
3.6 Hydrology and Hydrogeology.....	3
4. Background	4
4.1 DP (2005) Land Capability Assessment	4
4.2 DP (2010) Phase 2 Contamination Assessment	5
5. Site History Summary	5
5.1 Pre 2005.....	5
5.2 2005 to 2015	5
5.3 2015 to present	5
6. Preliminary Conceptual Site Model	6
6.1 Potential Sources.....	6
6.2 Potential Receptors.....	7
6.3 Potential Pathways	7
6.4 Summary of Potential Complete Pathways.....	7
7. Soil Sampling	8
7.1 Sampling and Analysis Rationale	8
8. Sampling Procedure and QA/QC.....	10
8.1 Sample Analysis and Laboratory Quality Assurance / Quality Control	10
9. Site Assessment Criteria	11
10. Results	11
10.1 Field Work Observations.....	11
10.2 Laboratory Analytical Results	12
10.3 Quality Assurance and Quality Control	13
11. Additional Soil Sampling	13
11.1 Additional Soil Sampling Laboratory Analytical Results	14
12. Discussion	14
13. Conclusions and Recommendations	15
14. Limitations	16
Appendix A: Drawings 1 to 3	
Appendix B: Site Photographs	
Appendix C: Phase 2 Sample Locations	
Appendix D: Laboratory Results Summary Table D1	
Appendix E: Data Quality Objectives and Site Assessment Criteria	
Appendix F: Lab Certificates of Analysis and Chain-of-Custody documentation	
Appendix G: Test Pit Logs	
Appendix H: QA/QC	
Appendix I: About This Report	

Report on Supplementary Contamination Investigation Proposed Residential Subdivision 182 Raby Road, Gledswood Hills, NSW

1. Introduction

Douglas Partners (DP) was commissioned by Vince and Elizabeth Pisciueneri c/o TN Consulting Pty Ltd (TN Consulting) to complete a Supplementary Contamination Investigation (SCI) for the south western portion of the property at 182 Raby Road, Gledswood Hills (the "Site") as shown on Drawing 1 (Appendix A). The property at 182 Raby Road has an approximate area of 5,000 m² and is located within the larger Central Hills Precinct, as defined by the former Growth Centres Commission. The Site subject to this investigation comprises the south western portion of the property and encompasses an approximate area of 0.1 ha. The SCI is required to support a Development Application (DA) being made with Camden Council for a proposed residential subdivision.

Previous investigations completed by DP, including a Land Capability Assessment (LCA) completed in 2005 and a Phase 2 Contamination Assessment (Phase 2) completed in 2010 identified the Site as an Area of Environmental Concern (AEC) due to the presence of a cattle yard and shed potentially used for chemical storage. Whilst the Phase 2 concluded that no further investigation of the cattle yard was required a recent review of the Nearmap imagery indicates that the Site has since been used as a compound area for the adjacent subdivision works. The following activities have been identified as recently occurring within the compound area:

- Soil stockpiling; and
- Vehicle storage/parking activities.

Given the identified activities recently occurring at the Site and the time elapsed since the previous investigation the SCI is required to update the contamination status of the Site.

2. Scope of Work

DP carried out the following scope of work as part of the SCI:

- Review of previous environmental investigations and results relevant to the Site;
- Review of recent Nearmap Aerial photography to identify any areas of concern;
- A site walkover to identify any additional areas of concern (beyond those identified in the previous investigations);
- Excavation of eight test pits (TP1 to TP8) across the Site to a maximum depth of 3.0 m;
- Collection of soil samples from surface soils, where filling was encountered and from regular depth intervals based on field observation;
- Laboratory analysis of selected soil samples for commonly encountered contaminants of potential concern (COPC);
- Interpretation of results in accordance with current NSW EPA endorsed guidelines;

- Collection of additional soil and suspected ACM fragment samples from potentially contaminated areas identified from test pit sampling; and
- Preparation of this report detailing the methodology and results of the investigation and assessment of the suitability of the Site for the proposed residential land use.

3. Site Description

3.1 Site Identification

The Site covers an approximate total area of 0.1 ha and comprises the following land parcel as detailed in Table 1 below.

Table 1: Study Area Identification

Lot / Deposited Plan	Current Land Use	Approx. Area (ha)
182 Raby Road (Far Western Portion)		
Part 102 / 1193881	Rural residential	0.1

The Site location and boundaries are shown on Drawing 1, Appendix A.

3.2 Site Description

The following site description is based on a site walkover conducted by DP on 8 June 2017 and fieldworks completed by DP on 28 June 2017. Photographs taken during the site walkover and field works are presented in Photographic Plates 1 to 5, Appendix B.

At the time of the SCI, the Site consisted of a portion of a vacant property. The western half of the site was covered by grass and the eastern half unsealed exposed bare earth. The north eastern portion of the site with exposed earth was observed to be partially filled, as well as a small grass covered portion to the west, which showed different vegetation to the remainder of the site.

A small stockpile (3 m³) of soil mixed with building/demolition waste was observed in the central northern portion of the site. The building waste observed within the stockpile included fragments of fibrous cement (suspected ACM), bricks, crushed concrete, gravel and plastic. Several fragments of fibrous cement (suspected ACM) were also observed in the immediate vicinity of the stockpile. Additionally remnants of building debris were observed scattered across the site surface including timber pallets in the central eastern and north western portions of the site and a bathtub located in the central northern portion of the site. One small fragment of ACM (confirmed by the laboratory) was observed in the north eastern portion of the site.

The general topography of the Site and surrounding areas slopes gently towards the north. Overall topographic relief ranges by approximately 4 m from the highest part (approximately RL 128, relative to Australian height datum - AHD) in the southern central portion of the Site, to the lowest part (approximately RL 124) within the north eastern corner of the Site.

3.3 Surrounding Landuse

North:	Vacant land undergoing residential subdivision works with Gledswood Hills Drive and further subdivision development beyond.
East:	Mayfield Place with rural residential properties beyond.
South:	Mayfield Place with rural residential properties beyond.
West:	Vacant land undergoing residential subdivision works to the northwest and rural residential properties to the southwest.

3.4 Soil Landscapes

Reference to the Wollongong-Port Hacking 1:100 000 Soils Landscape Sheet indicates that the Site is underlain by the Blacktown soil landscape (mapping unit bt), characterised by gently undulating landscape with gently inclined slopes. Yellow, red and brown podzolic soils are characteristic of the area. Characteristics include moderately reactive, highly plastic subsoil, low soil fertility and poor soil drainage.

3.5 Geology

Reference to the Wollongong-Port Hacking 1:100 000 Geology Sheet indicates that the Site is underlain by Bringelly Shale (mapping unit Rwb) of the Wianamatta Group from the Triassic period. This formation typically comprises shale, carbonaceous claystone, laminite, and some minor bands of coal.

3.6 Hydrology and Hydrogeology

The Site slopes to the north – northeast and groundwater is expected to follow the topographic slope towards a concrete lined drainage canal located approximately 270 m north of the Site.

Investigation of urban salinity - case studies from western Sydney, UrbanSalt 2005 Conference Paper, Parramatta (McNally, 2005) describes some general features of the hydrogeology of Western Sydney which are relevant to this Site. The shale terrain of much of Western Sydney is known for saline groundwater, resulting either from the release of connate salt in shales of marine origin or from the accumulation of windblown sea salt.

4. Background

The following reports have previously been prepared for the Site:

- DP Report on Land Capability and Contamination Assessment, Proposed Development 'Central Hills' - Catherine Field, NSW Project 40470 dated 21 November 2005, (the Land Capability Assessment; DP 2005); and
- DP Report on Phase 2 Contamination Assessment, Gledswood Homestead and Rural Properties, Catherine Field, NSW, Project 40470.10 dated 29 January 2010 (DP, 2010).

4.1 DP (2005) Land Capability Assessment

DP completed a LCA for the larger Central Hills Precinct, which included the current Site, in November 2005. The LCA included Phase 1 contamination assessment with limited surface and groundwater water sampling. The investigation also included site history searches, site inspection, non-intrusive and intrusive site investigation, laboratory testing of selected samples, engineering analysis and reporting.

The historical information indicated that the Central Hills Precinct has been used for agricultural, recreational and rural residential purposes during the period from 1941 to 2005. Based on the historical information a number of AEC were identified across the Central Hills Precinct which required targeted investigations. One AEC was identified within the current Site boundary due to the presence of a cattle yard and shed.

A review of the Central Hills Precinct's hydrogeology was also undertaken as part of the Land Capability Assessment. The review examined regional groundwater, with limited investigation of surface water and groundwater. The monitoring well locations were selected on a catchment basis using geographical information system (GIS) interpretation of the topographic data. The bores were placed at the inferred exit points of the major catchments. No bores were located within the current Site boundary.

Groundwater and surface water samples collected from the Central Hills Precinct were analysed at the laboratory for a range of common chemical contaminants comprising heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn), polycyclic aromatic hydrocarbons (PAH), total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene and xylene (BTEX), polychlorinated biphenyls (PCB), organochlorine pesticide (OCP) and organophosphorous pesticide (OPP). All analytes returned results within the relevant guidelines with the exception of heavy metals. Copper and zinc levels were elevated above the guidelines, however, this was expected in waters from the western Sydney region with a dominant shale geology. In general, there was no indication of contamination and the results supported the findings of a low potential for contamination.

4.2 DP (2010) Phase 2 Contamination Assessment

DP (2010) completed a Phase 2 in 2010 further investigating the eastern, southern and western properties of the larger Central Hills Precinct which included the current Site (referred to as AEC 14 in the Phase 2). The investigation comprised intrusive sampling and analysis of soil samples for a range of identified potential contaminants. The investigation targeted AEC that were identified during the Land Capability Assessment. Seven samples were collected within the current Site boundary (14 - 1 to 14 - 7) from shallow soils at depths between 0.0 - 0.2 m. The locations of these samples are shown on the figure presented in Appendix C. The analytical results of these samples have been utilised for this assessment and are included in Table D1, Appendix D.

5. Site History Summary

The following site history summary is based on the findings of previous investigations and a recent review of recent Nearmap Aerial Photography from 2005 onwards undertaken as part of this SCI.

5.1 Pre 2005

Based on the information provided in DP (2005), the Site and surrounds were generally used for agricultural and rural residential purposes during the period from 1941 to 2005. A cattle yard and shed appear to have been constructed on the site sometime between 1966 and 1979.

5.2 2005 to 2015

Since the completion of DP (2005), the Site and surrounds continued to be used for rural residential purposes. The review Nearmap imagery indicated that the site remained relatively unchanged since 2005 to 2015.

5.3 2015 to present

Nearmap imagery indicates that sometime between August and November 2015 subdivision construction works appear to have begun in the area directly to the north of the site. Large areas to the north of the site have been stripped of vegetation and there are indications of bulk earthworks being carried out. During this period the cattle yard was removed from the Site and the Site appears to be used as a site compound associated with the adjacent subdivision. Soil stockpiles and parked motor vehicles were observed within this compound area. The shed was removed between January and May 2017.

In addition, during the site walkover undertaken as part of this SCI (refer Section 6), it was noted that site conditions appeared to be similar to those reported in previous investigations, with the exception of the shed and cattle yard being removed.

6. Preliminary Conceptual Site Model

A conceptual site model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors (linkages). A preliminary CSM provides a framework to identify potential contamination sources and how potential receptors may be exposed to contamination either in the present or the future (i.e. it enables an assessment of the potential source - pathway - receptor linkages).

6.1 Potential Sources

Based on the review of site history information and the site walkover, the identified potential sources, description of sources and contaminants of potential concern (COPC) at the Site have been summarised in Table 1.

Table 1: Potential Contamination Sources and COPC

Potential Source	Description of Potential Source	Contaminants of Potential Concern
Site Compound / Demolition (S1)	<p>Shed once located within the site was used as a site compound during construction and then was demolished.</p> <p>There is also potential for alterations to the building including renovations and degradation of paints.</p> <p>There is therefore potential for hazardous building materials being present within the near surface soils surrounding the former shed structure.</p>	Hazardous building material related COPC include asbestos and lead
Site Compound / Chemical or fuel storage (S2)	The Site was used for agricultural purposes until recently and then as part of the compound associate with the nearby subdivision. There is potential for chemicals and fuel storage within the shed and nearby cattle yard areas	Chemical and fuel related COPC include Metals, TRH, BTEX, PAH and OCP and OPPs
Import of Fill and Fly tipping waste (S3)	The Nearmap aerial photograph review indicates that filling may have been imported from an unknown origin and placed in the north eastern and western portions of the Site	COPC commonly associated with fill of an unknown origin include Metals, TRH, BTEX, PAH, OCP, OPP, PCB, phenols, and asbestos

Notes: *Metals* - comprising arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), mercury (Hg), nickel (Ni) and zinc (Zn);

TRH - Total recoverable hydrocarbons;

BTEX - Benzene, toluene, ethylbenzene and xylene;

PAH - Polycyclic aromatic hydrocarbons;

OCP and OPP - Organochlorine and organophosphorous pesticides;

PCB - Polychlorinated biphenyls;

6.2 Potential Receptors

The following potential human receptors (R) have been identified for the Site:

- R1 – Construction and maintenance workers (during Site redevelopment);
- R2 – Future site users following development of the Site; and
- R3 – Land users in adjacent areas (residential).

The following potential ecological receptors (R) have been identified for the Site:

- R4 – Local groundwater;
- R5 – Surface water bodies (creeks); and
- R6 – Terrestrial ecology.

6.3 Potential Pathways

Potential pathways for contamination include the following:

- P1 – Ingestion and dermal contact;
- P2 – Inhalation of fibres and/or dust and/or vapours;
- P3 – Leaching of contaminants and vertical migration into groundwater;
- P4 – Surface water run-off;
- P5 – Lateral migration of groundwater providing base flow to watercourses; and
- P6 – Direct contact with terrestrial ecology.

6.4 Summary of Potential Complete Pathways

A 'source – pathway – receptor' approach has been used to assess the potential risks of harm being caused to human or ecological receptors from contamination sources on or in the vicinity of the Site, via exposure pathways. The possible pathways between the above sources (S1 to S3) and receptors (R1 to R6) are provided in Table 2 below. Assessment of the preliminary CSM was used to determine data gaps and the requirement for sampling and analysis to assess the suitability of the Site for the proposed residential use.

Table 2: Preliminary Conceptual Site Model

Source	Exposure Pathway	Receptor	Requirement for Additional Data and / or Management
S1: Site Compound / Demolition	P1 – Ingestion and dermal contact; P2 – Inhalation of fibres and/or dust and/or vapours	R1 - Construction and maintenance workers. R2 – Future site users following development of the site.	<p>Given the identified potential contaminant sources the initial fate (lay down mechanism) of potential contaminants is likely to be expressed firstly in surface soils.</p> <p>An intrusive investigation is therefore required to quantify and assess potential contamination impact to surface soils.</p> <p>(A further assessment of deeper soils and groundwater may be deemed necessary should significant contamination be identified in surface soils).</p>
S2: Site Compound / Potential Chemical and fuel storage	P2 – Inhalation of fibres and/or dust and/or vapours	R3 – Land users in adjacent areas.	
S3: Import of Fill and Fly Tipping Waste	P3 – Leaching of contaminants and vertical migration into groundwater.	R4 – Local groundwater and receiving water bodies.	
	P4 – Surface water run-off. P5 – Lateral migration of groundwater providing baseflow to watercourses.	R5 – Surface water bodies.	
	P6 – Direct contact with terrestrial ecology.	R6 – Local ecology.	

7. Soil Sampling

7.1 Sampling and Analysis Rationale

Field investigations for the SCI were undertaken by a DP environmental scientist on 28 June 2017.

Eight test pits (TP1 to TP8) were excavated with a John Deere 315SE Backhoe fitted with a 450 mm toothed bucket across the site. Six of the test pits (TP3 to TP8) were completed targeting areas of potential filling and the former shed/cattle yard in the eastern half of the site. Two test pits (TP1 and TP2) were completed in relatively undisturbed (background) areas in the western half of the site. The number of test pit locations exceeds the minimum number of sampling points recommended for a site of 0.1 ha by NSW EPA (1995) *Contaminated Sites - Design Guidelines* for the site area. Test pit locations are presented on Drawing 2 (Appendix A).

With the exception of test pit TP2 all test pits were excavated through fill soils and into underlying natural material. TP2 was excavated into natural material. Given the potential for shallow soil impact from identified COPC surface samples were collected at all locations (0.0 - 0.1 mbg). Additional samples were also collected at depth based on field observations. All surface samples from the test pits were tested for the COPC identified in the CSM (refer Tables 1 and 3).

One fragment (F1) of suspected ACM was observed on surface soils in the north eastern portion of the site and collected for laboratory analysis. Another fragment (F2) was collected from the vicinity of the soil/building waste stockpile (with several other suspected ACM fragments from nearby) in the central northern portion of the site. Both fragments (F1 and F2) were sent to the laboratory for asbestos identification analysis.

The adopted Data Quality Objectives are provided in Appendix E.

Table 3: Summary of Sampling and Analysis Rationale

Location	Sample Depth	TP depth (m bgl)	Depth of filling (m bgl)	Analytes	Location Target	Sample Target
TP1	0 – 0.1	3.0	0.3	Metals, PAH, Phenols, TRH, BTEX, ASB	Background / Filling	Filling
TP2	0 – 0.1	0.9	N/A	Metals, PAH, TRH, BTEX	Background	Topsoil
TP3	0 – 0.05	2.4	0.05	Metals, PAH, TRH, BTEX	Filling / Compound area	Filling
TP4	0 – 0.1	1.0	0.2	Metals, PAH, Phenols, TRH, BTEX, ASB	Filling / Compound area	Filling
TP5	0 – 0.1	2.8	0.2	Metals, PAH, Phenols, TRH, BTEX, ASB	Filling / Compound area	Filling
TP6	0 – 0.1	1.1	0.2	Metals, PAH, TRH, BTEX, OCP, OPP, PCB	Filling / Compound area	Filling
TP7	0 – 0.1	1.0	0.1	Metals, PAH, Phenols, TRH, BTEX, OCP, OPP, PCB, ASB	Filling / Compound area	Filling
TP8	0 – 0.1	1.0	0.3	Metals, PAH, Phenols, TRH, BTEX, OCP, OPP, PCB, ASB	Filling / Compound area	Filling
F1	Fragment of suspected ACM collected from surface soils in the north eastern portion of the site			ASB	-	-

Location	Sample Depth	TP depth (m bgl)	Depth of filling (m bgl)	Analytes	Location Target	Sample Target
F2	Fragment of suspected ACM collected from within a scatter of several fragments identified on surface soils in the vicinity of a stockpile of soil and building waste in the central northern portion of the site			ASB	-	-

Notes: *Metals - comprising arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), mercury (Hg), nickel (Ni) and zinc (Zn);*
TRH - Total recoverable hydrocarbons;
BTEX - Benzene, toluene, ethylbenzene and xylene;
PAH - Polycyclic aromatic hydrocarbons;
OCP and OPP - Organochlorine and organophosphorous pesticides;
PCB - Polychlorinated biphenyls;

8. Sampling Procedure and QA/QC

Sampling data was recorded to with reference to with routine Chain-of-Custody requirements and DP's standard operating procedures. The general sampling, handling, transport and tracking procedures are detailed below:

- Sample locations were located in the field using aerial imaging;
- Collection of soil samples was completed using disposable sampling equipment (new nitrile glove for each sample) from the bucket of the backhoe. Samples were collected taking care to not include soil that was directly in contact with either the surface of bucket;
- Samples were placed into new laboratory prepared glass jars, with minimal headspace, and sealed with a Teflon lined lid. In addition, 500 g bag samples were collected for asbestos testing;
- Sample containers were labelled with individual and unique identification including project number, sample ID, depth and date of sampling; and
- Logs were completed for all test pits. Test pit logs included, where relevant, sample identification, coordinates, date of collection, a description of the substrate conditions encountered, visual or olfactory evidence of contamination, the depth of samples collected, QA/QC samples collected, the sampler and equipment used.

8.2 Sample Analysis and Laboratory Quality Assurance / Quality Control

Samples designated for analysis were dispatched to NATA accredited laboratory Envirolab Services at Chatswood NSW for analysis of primary samples and intra-laboratory replicates. Samples were received by the laboratory in good condition, accompanied by the chain-of-custody documentation with the analysis requested.

Envirolab is accredited by the National Association of Testing Authorities (NATA) and is required to conduct in-house QA/QC procedures. These are normally incorporated into every analytical run and include assessment of reagent blanks, spike recovery, surrogate recovery and laboratory duplicates.

The analytical methods used are summarised in the laboratory certificate of analysis, included in Appendix F.

9. Site Assessment Criteria

The Site Assessment Criteria (SAC) applied in this SCI have been informed by the proposed land use (i.e. residential with accessible soils) and the CSM - which identified human and ecological receptors to potential contamination on the site (refer to Section 7). Analytical results were assessed (as a Tier 1 assessment) against the investigation and screening levels as per Schedule B1, National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended 2013 (NEPC, 2013).

As the Site is proposed to be subdivided for residential land use, the investigation and screening levels adopted are consistent with a generic residential land use scenario with accessible soil. The derivation of the SAC is included in Appendix E and the adopted SAC are listed in the analytical results table (Table D1 in Appendix D).

10. Results

10.1 Field Work Observations

The test pit logs are included in Appendix G, together with notes defining classification methods and descriptive terms.

Relatively uniform conditions were encountered across the Site, with filling observed at the majority of test pit locations. The general strata across the Site are consistent with the DP (2010) findings and are summarised as follows:

- **FILLING** – Filling was encountered at locations TP1, TP3, TP4, TP5, TP6, TP7 and TP8 from the surface to a depth of approximately 0.3 m bgl. Filling generally comprised dark brown, brown/red clayey silt with trace siltstone cobbles, concrete, tile, basaltic gravel and timber. In TP1 filling comprised red and grey silty clay and clayey silt with some siltstone gravel; overlying
- **SILTY CLAY** – Red/brown silty clay was encountered in all test pits to depths of 2.1 m, 1.8 m, 2.6 m and 0.9 m in TP1, TP3, TP5 and TP8 respectively, and to the depth of test pit termination in all remaining pits; overlying
- **ROCK (Siltstone)** – Extremely low strength to low strength, extremely weathered to highly weathered dark brown, grey and red siltstone with some ironstone banding was encountered in TP 1, TP 3, TP 5 and TP to depths of 0.9 m and 3.0 m or depth of test pit termination.

Filling was not encountered at test pit location TP2. Dark brown clayey silt topsoil was encountered to 0.05 m bgl at location TP2 overlying dark brown clayey silt to a depth of 0.2 m bgl.

No free groundwater was observed in any of the test pits during excavation or for the short time that they were left open.

10.2 Laboratory Analytical Results

The laboratory analytical results for the soil samples collected during this SCI and DP (2010) are summarised in Table D1 in Appendix D, together with the adopted SAC. The laboratory certificate of analysis for this SCI is provided in Appendix F.

TRH and BTEX

TRH was detected at concentrations exceeding laboratory limits of reporting (LOR) but below SAC in the soil sample collected from TP7 at a depth of 0 - 0.1 m bgl.

TRH and BTEX were not detected at concentrations exceeding LOR in remaining soil samples analysed.

PAHs

Benzo(a) Pyrene (BaP) and total PAHs were detected at concentrations exceeding LOR but below SAC in the soil sample collected from TP3 at a depth of 0 - 0.05 m bgl.

Total PAHs were also detected at concentrations exceeding LOR but below SAC in the soil sample collected from TP7 at a depth of 0 - 0.1 m bgl.

PAHs were not detected at concentrations exceeding LOR in remaining soil samples analysed.

Heavy Metals

Heavy metals were not detected at concentrations exceeding SAC in any soil samples analysed.

OCPs, OPPs, PCBs and Phenols

OCPs, OPPs and PCBs were not detected at concentrations exceeding LOR in any soil samples analysed.

Asbestos

Asbestos was detected by the laboratory as chrysotile asbestos in the fibre cement sample (F1) collected from the surface in the north eastern portion of the site.

Laboratory analysis of the fragment of suspected ACM (F2) collected within stockpile in the central northern portion of the site did not identify asbestos in the fragment.

Asbestos was not detected in any soil samples analysed.

10.3 Quality Assurance and Quality Control

A review of the adopted QA/QC procedures and results (Appendix H) indicates that the DQIs have generally been met. On this basis, the sampling and laboratory methods used during the investigation were found to meet DQOs for this project.

11. Additional Sampling

Additional sampling was completed at the site on 13 September 2017 due to the identification of the following Issues of Environmental Concern as described below. Sampling locations are presented on Drawing 3 (Appendix A).

11.1 Fragment of ACM in Northeast Portion of Site

Asbestos was detected by the laboratory as chrysotile asbestos in the fragment of FCS (F1) collected from the surface in the north eastern portion of the site. Whilst no other fragments were visibly identified on surface soils in the immediate vicinity further assessment for any additional fragments that may have been buried or existed within fill in the vicinity of F1 was undertaken.

To determine whether the identified fragment of ACM was an anomalous/isolated fragment or indicative of wide-spread ACM impact of fill soils in the north eastern portion of the site the following was completed:

- A thorough walkover on an approximate 3 m grid was completed across the north eastern portion of the site to confirm absence of ACM fragments on the site surface;
- Four 500 mL samples were collected from the near surface (0.0 - 0.1 m) in the fill soils at locations 1m north (SS1-FN), south (SS4-F1S), east (SS2-F1E) and west (SS5-F1W) of location F1;
- One 500 mL sample (SS1-F1) was also collected from the near surface (0.0 - 0.1 m) in fill soils at location F1; and
- The samples were sent for laboratory asbestos analysis (% w/w).

11.2 Suspected ACM in Stockpile in Northern Central Portion of Site

Numerous suspected ACM fragments (fibrous cement) were also observed in the vicinity of a small stockpile of mixed soil/building waste of approximately 3 m³ in the central northern portion of the site. Whilst laboratory analysis of a fragment (F2) collected from the vicinity of the stockpile did not identify asbestos the presence of asbestos in other nearby fragments could be ruled out given:

- The fragments appeared to be of varied types and ages;
- Many of the fragments exhibited traits commonly associated with ACM (e.g. distinct dimple patterns, visible fibres); and
- The detected presence of asbestos within the fragment (F1) of ACM collected approximately 30 m to the northeast of the stockpile area.

To further investigate the presence of asbestos in fragments in the vicinity of the stockpile the following was completed:

- Collection of four additional fragment samples (F3 to F6) in the vicinity of the soil/building waste stockpile to confirm the presence or absence of asbestos. Samples were collected based on physical differences between the fragments to ensure samples were representative of the different materials encountered;
- Collection of one 500 mL soil sample (S1) from the soil stockpile; and
- Submission of fibrous cement fragments and the soil sample to the laboratory for asbestos identification.

To confirm the presence/ absence of other fill related COPC the soil sample (S1) was additionally analysed for TRH, BTEX, PAHs, metals and OCPs.

11.3 Additional Sampling Laboratory Analytical Results

The laboratory analytical results for the samples collected during additional sampling are also summarised in Table D1 in Appendix D, together with the adopted SAC. The laboratory certificate of analysis for additional sampling is also provided in Appendix F.

Asbestos

Laboratory analysis of the four fragments of suspected ACM collected in the vicinity of the stockpile in the central northern portion of the site did not identify asbestos in any of the fragments.

Asbestos was not detected in any corresponding soil samples analysed.

Other Fill Related COPC in Soil Stockpile

Laboratory analysis did not detect other fill related COPC at concentrations exceeding SAC in the soil sample (S1) collected from the stockpile.

12. Discussion

12.1 ACM Fragment in North Eastern Portion of Site

Laboratory analysis of a fragment (F1) of fibre cement material collected during the initial sampling from surface soils in the north eastern portion of the site identified chrysotile asbestos within the material. The fragment of ACM is considered to be isolated occurrence and not indicative of widespread impact given:

- Site walkover undertaken during initial sampling and additional sampling did not identify any additional fragments on the site surface across the north eastern portion of the site;
- Further near surface sampling at and surrounding F1 did not identify asbestos within soil samples collected approximately 1m north, east, south and west of F1 and at the location of F1; and
- The only fragment of ACM found was removed for laboratory testing.

12.2 Suspected ACM Fragments in the Vicinity of Soil Stockpile

Numerous suspected ACM fragments were also observed in the vicinity of a stockpile of mixed soil/building waste in the central northern portion of the site. Laboratory analysis of the fragment (F2) collected in the initial sampling, plus four additional fragments (F3 to F6) and the 500 mL soil sample collected in the vicinity of the stockpile did not identify asbestos within any of the samples. The stockpile is therefore not considered to be impacted by asbestos.

13. Conclusions and Recommendations

The results of the SCI and previous investigations have identified that the site and surrounds have a history of rural residential land-use with recent use of the Site as a compound for adjacent subdivision works. The investigations have identified the following activities that have the potential for contamination of surface soils at the site:

- A former shed and cattle yard on the Site;
- Potential use of the former shed for chemical/fuel storage; and
- Stockpiling of soils and vehicle storage on the Site during recent use of the Site as a compound for the adjacent subdivision works.

Shallow soil sampling initially undertaken for the SCI at eight locations across the Site in the compound areas and former shed and cattle yard identified the following that required further investigation:

- An ACM fragment identified on surface soils in the north eastern portion of the Site; and
- Several suspected ACM fragments observed near a soil/building waste stockpile in the central northern portion of the Site.

Additional sampling completed at the site did not identify further fragments or asbestos in soils in the north eastern portion of the site therefore the ACM fragment identified in the north eastern portion is considered an anomalous/isolated occurrence (since removed) and not indicative of widespread impact. Additional sampling did not identify asbestos within any of the four additional fragments or the soil sample collected from the stockpile. The stockpile is therefore not considered to be impacted by asbestos.

Remaining COPC were not detected at concentrations above SAC in any soil samples collected from the site. From a contamination perspective, based on the findings of this SCI and previous environmental investigations, it is concluded that no further investigations or remediation works are warranted and the Site is considered suitable for the proposed development.

14. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report (or services) for this project at 182 Raby Road, Gledswood Hills in accordance with DP's proposal dated 7 April 2017 and acceptance received from Vince Pisciueneri dated 2 June 2017. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Vince and Elizabeth Pisciueneri for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

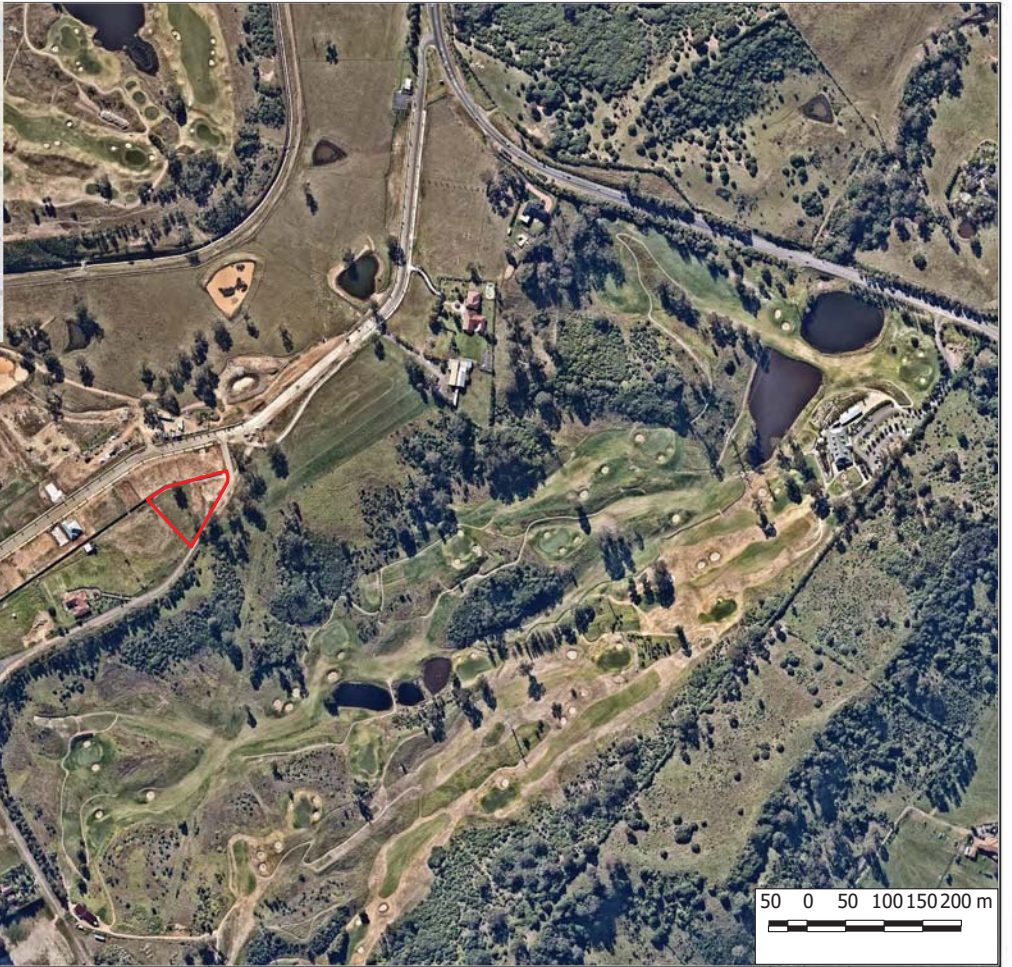
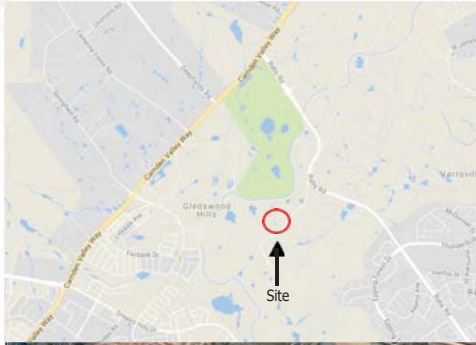
This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.


This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

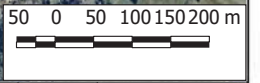
Douglas Partners Pty Ltd

Appendix A

Drawings 1 to 3



Legend
 Site Boundary




Douglas Partners
 Geotechnics | Environment | Groundwater

CLIENT: TN Consulting Pty Ltd	
OFFICE: Macarthur	DRAWN BY: LOC
SCALE: As shown	DATE: 09/08/2017

TITLE: **Site Locality**
Proposed Residential Subdivision
182 Raby Road, Gledwood Hills, NSW

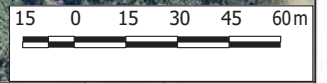
PROJ: 92228.00
 DRAWING No: 1
 REVISION: A





Legend

- Test Pit Location
- Site Boundary



Douglas Partners <small>Geotechnics Environment Groundwater</small>	CLIENT: TN Consulting Pty Ltd	TITLE: Sample Plan Layout Proposed Residential Subdivision 182 Raby Road, Gledswood Hills, NSW	 <small>MGR</small>
	OFFICE: Macarthur	DRAWN BY: SJL	PROJ: 92228.00
	SCALE: As shown	DATE: 21/06/2017	DRAWING No: 2 REVISION: A



Legend

- Stockpile 1
- Surface Samples Locations
- Stockpile Sample Location

CLIENT: TN Consulting Pty Ltd	
OFFICE: Macarthur	DRAWN BY: LOC
SCALE: As shown	DATE: 21/09/2017

TITLE: **Additional Sampling Locations**
Proposed Residential Subdivision
182 Raby Road, Gledswood Hills, NSW

	PROJ: 92228.00
	DRAWING No: 3
	REVISION: A

Appendix B


Site Photographs



Photograph 1 - North eastern portion of the site with Mayfield Place and rural residential properties beyond.



Photograph 2 - Eastern portion of site.


	Site Photographs	PROJ:	92228.00
	Supplementary Contamination Investigation	PLATE:	1
	182 Raby Road, Gledswood Hills	REV:	A
	CLIENT: Vince and Elizabeth Piscuneri	DATE:	10.08.2017



Photograph 3 - Northern portion of site with timber fence along northern boundary.



Photograph 4 - Soil / building waste stockpile located in central northern portion of site. Several fragments of fibrous cement material observed in vicinity of stockpile.


 Douglas Partners <i>Geotechnics Environment Groundwater</i>	Site Photographs	PROJ:	92228.00
	Supplementary Contamination Investigation	PLATE:	2
	182 Raby Road, Gledswood Hills	REV:	A
	CLIENT: Vince and Elizabeth Piscinieri	DATE:	10.08.2017



Photograph 5 - Fragments of fibrous cement material in the immediate vicinity of stockpile in central northern portion of site.



Photograph 6 - Western portion of site.


 Douglas Partners <small>Geotechnics Environment Groundwater</small>	Site Photographs	PROJ: 92228.00
	Supplementary Contamination Investigation	PLATE: 3
	182 Raby Road, Gledswood Hills	REV: A
	CLIENT: Vince and Elizabeth Pisciuneri	DATE: 10.08.2017



Photograph 7 - Mayfield Place with rural residential properties beyond to the southeast of the site.



Photograph 8 - South eastern portion of site.


	Site Photographs	PROJ: 92228.00
	Supplementary Contamination Investigation	PLATE: 4
	182 Raby Road, Gledswood Hills	REV: A
	CLIENT: Vince and Elizabeth Pisciuneri	DATE: 10.08.2017



Photograph 9 - Fragment of ACM on surface soils in north eastern portion of site.



Photograph 10 - Test pit 4 completed in north eastern portion of site.

	Site Photographs	PROJ:	92228.00
	Supplementary Contamination Investigation	PLATE:	5
	182 Raby Road, Gledswood Hills	REV:	A
	CLIENT: Vince and Elizabeth Piscuneri	DATE:	10.08.2017

Appendix C

Phase 2 Sample Locations



r. Douglas Partners
Geotechnics . Environment . Groundwater

Brisbane, Cairns, Campbelltown, Canberra, Darwin, Gold Coast, Melbourne
 Newcastle, Perth, Sydney, Townsville, Wollongong, Wyong

Title: **SAMPLE LOCATIONS - AEC 14
 PHASE 2 CONTAMINATION ASSESSMENT
 GLEDSDOOD HOMESTEAD & RURAL PROPERTIES**

Client: SH Camden Valley Pty Ltd

Office: Wollongong

Drawn by: OBY Scale: As Shown

Project Number: 40470.10

Drawing No: 17

Approved by: NLE

Date: 10/09/2009

Appendix D

Laboratory Results Summary Table D1

Appendix E

Data Quality Objectives and Site Assessment Criteria

Appendix E - 1 Data Quality Objectives

The SCI has been devised broadly in accordance with the seven step data quality objective (DQO) process which is provided in Appendix B, Schedule B2 of the *National Environment Protection (Assessment of Site Contamination) Measure* 1999 as amended 2013 (NEPC, 2013). The DQO process is outlined as follows:

E1.1 State the Problem

Vince and Elizabeth Pisciueneri are considering redeveloping the site for residential purposes. Desktop studies have identified that the site has recently been used as a site compound for the nearby residential subdivision works. The following potentially contaminating activities have been identified occurring onsite that have the potential to impact surface soils at the site:

- Former shed on site – potential for hazardous materials;
- Former shed on site – potential for storage of chemicals and fuel;
- Former use of the site as a cattle yard;
- Vehicle storage and parking; and
- Imported fill or fly tipping of waste of an unknown origin.

The “problem” to be addressed is the extent and nature of potential contamination at the site and whether the site is suitable for the proposed development.

The objectives of the investigation are as follows:

- Assess the contamination status of the site and the suitability of the site, from a contamination standpoint, for the proposed residential development.

E1.2 Identify the Decision/Goal of the Study

The suitability of the site for the proposed residential development was assessed based on the findings of the site walkover and a comparison of the analytical results for contaminants of potential concern (COPC) with the adopted site assessment criteria (SAC). The adopted SAC are provided in Section E2 below.

Based on the past land use, the main COPC are expected to be total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAH), organochlorine pesticides (OCP), heavy metals and asbestos. Other commonly found contaminants which may be present include phenols, organophosphate pesticides (OPP) and polychlorinated biphenyls (PCB).

The following specific decisions were considered as part of the SCI:

- Did field observation and analytical results identify potential contamination sources (AEC) which were not included in the preliminary CSM?
- Were COPC present in soil at concentrations that pose a potential risk to identified receptors?

- Is the data sufficient to make a decision regarding the abovementioned risks, the suitability of the site for the proposed development?
- Does contamination at the site, if encountered, trigger the Duty to Report requirements under the CLM Act 1997?
- Are there any off-site migration issues that need to be considered?

E1.3 Identify Information Inputs

Inputs into the decisions are as follows:

- Review of regional geology, topography and hydrogeology information;
- Review of site history information;
- Completion of a site inspection;
- Soil samples were collected in the immediate vicinity of identified potential sources of contamination (AEC) across the Site from a total of 11 test pits locations and surface soils sample locations;
- The lithology of the Site as described in the test pit logs (Appendix E);
- Field and laboratory QA/QC data to assess the suitability of the environmental data for the SCI (Appendix H);
- All analysis was undertaken at a NATA accredited laboratory; and
- Laboratory reported concentrations of contaminants of concern were compared with the NEPC (2013) criteria as discussed in Section D2.

E1.4 Define the Study Boundaries

The site is identified as Part lot 102 in DP 1193881, within the local government area of Camden Council and comprises approximately 0.1 hectare. The Site location and boundaries are shown on Drawing 1, Appendix A.

The investigation was undertaken to a maximum depth of 3.0 m below ground level (bgl) across the Site.

Field investigations were undertaken on 28 July 2017 by a DP Environmental Scientist.

E1.5 Develop the Analytical Approach (or decision rule)

The information obtained during the assessment was used to characterise the Site in terms of contamination issues and risk to human health and the environment. The decision rules used in characterising the site were as follows:

- The adopted SAC was the NSW Environment Protection Authority (EPA) endorsed criteria; and
- The contaminant concentrations in soil were compared to the adopted SAC to determine whether further investigation or remedial action was required.

Field and laboratory test results were considered useable for the assessment after evaluation against the following data quality indicators (DQIs):

- Precision – a measure of variability or reproducibility of data;
- Accuracy – a measure of closeness of the data to the ‘true’ value;
- Representativeness – the confidence (qualitative) of data representativeness of media present on site;
- Completeness – a measure of the amount of usable data from a data collection activity; and
- Comparability – the confidence (qualitative) that data may be considered to be equivalent for each sampling and analytical event.

The specific limits are outlined in the data QA/QC procedures and results (Appendix G).

E1.6 Specify the Performance or Acceptable Criteria

Decision errors for the respective COPC for fill and natural soils are:

1. Deciding that fill and natural soil at the Site exceeds the adopted SAC when they truly do not; and
2. Deciding that fill and natural soil at the Site is within the adopted SAC when they truly do not.

Decision errors for the SCI were minimised and measured by the following:

- The sampling regime targeted each stratum identified to account for site variability;
- Sample collection and handling techniques were in accordance with DP’s *Field Procedures Manual*;
- Samples were prepared and analysed by a NATA-accredited laboratory with the acceptance limits for laboratory QA/QC parameters based on the laboratory reported acceptance limits and those stated in NEPC (2013);
- The analyte selection is based on the available site history, past site activities and site features. The potential for contaminants other than those proposed to be analysed is considered to be low;
- The SAC were adopted from established and NSW EPA endorsed guidelines. The SAC have risk probabilities already incorporated; and
- A NATA accredited laboratory using NATA endorsed methods are used to perform laboratory analysis. Where NATA endorsed methods are not used, the reasons are stated. The effect of using non-NATA methods on the decision making process are explained.

E1.7 Optimise the design for obtaining data

Sampling design and procedures that were implemented to optimise data collection for achieving the DQOs included the following;

- A NATA accredited laboratory using NATA endorsed methods were used to perform laboratory analysis;

- Additional soil samples were collected but kept 'on hold' pending details of initial analysis so that they could be analysed if further delineation was required; and
- Adequately experienced environmental scientists/engineers were chosen to conduct field work and sample analysis interpretation.

Appendix E – 2 - Site Assessment Criteria

The Site Assessment Criteria (SAC) applied in the current investigation are informed by the preliminary CSM which identified human and environmental receptors to potential contamination on the site (refer to Section 7). Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising investigation and screening levels as per Schedule B1, *National Environment Protection (Assessment of Site Contamination) Measure* 1999, as amended 2013 (NEPC, 2013).

The investigation and screening levels applied in the current investigation comprise levels adopted for a generic residential land use scenario with accessible soils.

E2.1 Health Investigation and Screening Levels

The generic Health Investigation Levels (HILs) and Health Screening Levels (HSLs) are considered to be appropriate for the assessment of human health risk associated with contamination at the site. The adopted soil HILs and HSLs for the potential contaminants of concern are presented in Table D2, with inputs into their derivation shown in Table D1.

As shown in Table D2 the adopted HSLs are based on a potential vapour intrusion pathway, as identified in the CSM. Although the CSM also identifies a direct contact pathway as well as construction worker receptors, the corresponding HSLs are significantly higher than those for the vapour intrusion pathway and are therefore not drivers for further assessment and/or remediation. As such the direct contact and intrusive maintenance worker HSLs have not been listed.

Table E1: Inputs to the Derivation of HSLs

Variable	Input	Rationale
Potential exposure pathway	Inhalation of vapours	Potential exposure pathways
Soil Type	Silt and clay	Dominant soil type in surface soils (see Test Pit Logs – Appendix E)
Depth to contamination	0 m to <1 m	Potential contamination sources likely to impact surface soils

Table E2: HIL and HSL in mg/kg Unless Otherwise Indicated

Contaminants		HIL- A	HSL- A & B
Metals	Arsenic	100	-
	Cadmium	20	-
	Chromium (VI)	100	-
	Copper	6000	-
	Lead	300	-
	Mercury (inorganic)	40	-
	Nickel	400	-
	Zinc	7400	-
PAH	Benzo(a)pyrene TEQ ¹	3	-
	Total PAH	300	-
	Naphthalene	-	4
TRH	C6 – C10 (less BTEX) [F1]	-	40
	>C10-C16 (less Naphthalene) [F2]	-	230
	>C16-C34 [F3]	-	-
	>C34-C40 [F4]	-	-
BTEX	Benzene	-	0.6
	Toluene	-	390
	Ethylbenzene	-	NL ³
	Xylenes	-	95
OCP	Aldrin + Dieldrin	6	-
	Chlordane	50	-
	DDT+DDE+DDD	240	-
	Endosulfan	270	-
	Endrin	10	-
	Heptachlor	6	-
	HCB	10	-
	Methoxychlor	300	-
OPP	Chlorpyrifos	160	-
PCB ²		1	-

Notes:

- 1 Sum of carcinogenic PAH
- 2 Non dioxin-like PCBs only.
- 3 The soil saturation concentration (C_{sat}) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds C_{sat}, a soil vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'.

E2.2 Ecological Investigation Levels

Ecological Investigation Levels (EILs) and Added Contaminant Limits (ACLs), where appropriate, have been derived in NEPC (2013) for only a short list of contaminants comprising As, Cu, Cr (III), DDT, naphthalene, Ni, Pb and Zn. The adopted EILs, derived using the *Interactive (Excel) Calculation Spreadsheet* (Standing Council on Environment and Water (SCEW) website (<http://www.scew.gov.au/node/941>)) are shown in the following Table D4, with inputs into their derivation shown on Table D3.

Table D3: Inputs to the Derivation of EILs

Variable	Input	Rationale
Age of contaminants	"Aged" (>2 years)	Given the potential sources of soil contamination are from historic use, the contamination is considered as "aged" (>2 years);
pH	4.7	17 selected samples were tested for pH during a salinity investigation for the site. The lowest pH value has been used as an initial screening. The pH value adopted is a pH of 4.7.
CEC	7.4 cmolc/kg	2 selected samples were tested for CEC during a salinity investigation for the site. The lowest CEC value has been used as an initial screening. The CEC value adopted is 7.4 cmolc/kg.
Clay content	10 %	Conservative value for initial screen
Traffic volumes	low	The Site is considered to be located within a low traffic area
State / Territory	New South Wales	-

Table E4: EIL in mg/kg

	Analyte	EIL
Metals	Arsenic	100
	Copper	100
	Nickel	35
	Chromium III	410
	Lead	1100
	Zinc	300
PAH	Naphthalene	170
OCP	DDT	180

E2.3 Ecological Screening Levels

Ecological Screening Levels (ESLs) are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. The adopted ESLs, based on a fine soil type are shown in the following Table D5.

Table D5: ESL in mg/kg

	Analyte	ESL ¹	Comments
TRH	C6 – C10 (less BTEX) [F1]	180*	All ESLs are low reliability apart from those marked with * which are moderate reliability
	>C10-C16 (less Naphthalene) [F2]	120*	
	>C16-C34 [F3]	1300	
	>C34-C40 [F4]	5600	
BTEX	Benzene	65	
	Toluene	105	
	Ethylbenzene	125	
	Xylenes	45	
PAH	Benzo(a)pyrene	0.7	

E2.4 Management Limits

In addition to appropriate consideration and application of the HSLs and ESLs, there are additional considerations which reflect the nature and properties of petroleum hydrocarbons, including:

- Formation of observable light non-aqueous phase liquids (LNAPL);
- Fire and explosion hazards; and
- Effects on buried infrastructure e.g. penetration of, or damage to, in-ground services.

The adopted management limits, based on a fine soil type (Section 11.1), are shown in the following Table D6.

Table D5: Management Limits in mg/kg

	Analyte	Management Limit
TRH	C ₆ – C ₁₀ (F1) #	800
	>C ₁₀ -C ₁₆ (F2) #	1000
	>C ₁₆ -C ₃₄ (F3)	3500
	>C ₃₄ -C ₄₀ (F4)	10 000

Separate management limits for BTEX and naphthalene are not available hence these have not been subtracted from the relevant fractions to obtain F1 and F2

E2.5 Asbestos in Soil

NEPC (2013) defines the various asbestos types as follows:

Bonded ACM: Asbestos containing material which is in sound condition, bound in a matrix of cement or resin, and cannot pass a 7 mm x 7 mm sieve.

FA: Fibrous asbestos material including severely weathered cement sheet, insulation products and woven asbestos material. This material is typically unbonded or was previously bonded and is now significantly degraded and crumbling.

AF: Asbestos fines including free fibres, small fibre bundles and also small fragments of bonded ACM that pass through a 7 mm x 7 mm sieve.

Health Screening Levels (HSLs) for asbestos in soil, which are based on likely exposure levels for different scenarios, have been adopted in NEPC (2013) from the Western Australian Department of Health (WA DoH) publication Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia 2009 (WA DoH 2009).

On the basis of the proposed land use, and in accordance with Table 7, Schedule B1, NEPC (2013) the following asbestos HSLs have been adopted:

Table D6: Health Screening Levels for Asbestos Contamination in Soil (% w/w)

Form of Asbestos	HSL
Bonded ACM	0.01%
FA and AF	0.001 %
All Forms of Asbestos	No visible asbestos for surface soil

Appendix F

Laboratory Certificates



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envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS

170364

Client:

Douglas Partners Pty Ltd Smeaton Grange
18 Waler Crescent
Smeaton Grange
NSW 2567

Attention: Bradley Harris, Simon Longhurst

Sample log in details:

Your Reference:	<u>92228.00, DPI 182 Raby Road, Gleswood Hills, NSW</u>
No. of samples:	12 soils, 2 materials
Date samples received / completed instructions received	29/06/17 / 29/06/17

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date: 6/07/17 / 6/07/17
Date of Preliminary Report: Not Issued

NATA accreditation number 2901. This document shall not be reproduced except in full.

Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

David Springer
General Manager

Envirolab Reference: 170364

Revision No: R 00



vTRH(C6-C10)/BTEXN in Soil Our Reference: Your Reference	UNITS ----- -	170364-1 1	170364-2 2	170364-3 3	170364-4 4	170364-5 5
Depth	-----	0-0.1	0-0.1	0-0.05	0-0.1	0-0.1
Date Sampled		28/06/2017	28/06/2017	28/06/2017	28/06/2017	28/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/07/2017	03/07/2017	03/07/2017	03/07/2017	03/07/2017
Date analysed	-	04/07/2017	04/07/2017	04/07/2017	04/07/2017	04/07/2017
TRHC ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRHC ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPHC ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	105	107	100	91	109

vTRH(C6-C10)/BTEXN in Soil Our Reference: Your Reference	UNITS ----- -	170364-6 6	170364-7 7	170364-8 8	170364-9 BD1 280617	170364-10 BD2 280617
Depth	-----	0-0.1	0-0.1	0-0.1	-	-
Date Sampled		28/06/2017	28/06/2017	28/06/2017	28/06/2017	28/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/07/2017	03/07/2017	03/07/2017	03/07/2017	03/07/2017
Date analysed	-	04/07/2017	04/07/2017	04/07/2017	04/07/2017	04/07/2017
TRHC ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRHC ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPHC ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	110	107	103	103	75

vTRH(C6-C10)/BTEXN in Soil			
Our Reference:	UNITS	170364-11	170364-12
Your Reference	-----	TB/280617	TS/280617
	-		
Depth	-----	-	-
Date Sampled		28/06/2017	28/06/2017
Type of sample		Soil	Soil
Date extracted	-	03/07/2017	03/07/2017
Date analysed	-	04/07/2017	04/07/2017
TRHC ₆ - C ₉	mg/kg	<25	[NA]
TRHC ₆ - C ₁₀	mg/kg	<25	[NA]
Benzene	mg/kg	<0.2	95%
Toluene	mg/kg	<0.5	98%
Ethylbenzene	mg/kg	<1	87%
m+p-xylene	mg/kg	<2	86%
o-Xylene	mg/kg	<1	88%
Total +ve Xylenes	mg/kg	<1	[NA]
Surrogate aaa-Trifluorotoluene	%	103	97

svTRH(C10-C40)inSoil Our Reference: Your Reference	UNITS ----- -	170364-1 1	170364-2 2	170364-3 3	170364-4 4	170364-5 5
Depth	-----	0-0.1	0-0.1	0-0.05	0-0.1	0-0.1
Date Sampled		28/06/2017	28/06/2017	28/06/2017	28/06/2017	28/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/07/2017	03/07/2017	03/07/2017	03/07/2017	03/07/2017
Date analysed	-	04/07/2017	04/07/2017	04/07/2017	04/07/2017	04/07/2017
TRHC ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRHC ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	<100
TRHC ₂₉ - C ₃₆	mg/kg	<100	<100	<100	<100	<100
TRH>C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50	<50
TRH>C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C ₁₆ -C ₃₄	mg/kg	<100	<100	<100	<100	<100
TRH>C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C ₁₀ -C ₄₀)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	92	94	95	93	93

svTRH(C10-C40)inSoil Our Reference: Your Reference	UNITS ----- -	170364-6 6	170364-7 7	170364-8 8	170364-9 BD1 280617	170364-10 BD2 280617
Depth	-----	0-0.1	0-0.1	0-0.1	-	-
Date Sampled		28/06/2017	28/06/2017	28/06/2017	28/06/2017	28/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/07/2017	03/07/2017	03/07/2017	03/07/2017	03/07/2017
Date analysed	-	04/07/2017	04/07/2017	04/07/2017	04/07/2017	04/07/2017
TRHC ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRHC ₁₅ - C ₂₈	mg/kg	<100	180	<100	<100	<100
TRHC ₂₉ - C ₃₆	mg/kg	<100	210	<100	<100	<100
TRH>C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50	<50
TRH>C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C ₁₆ -C ₃₄	mg/kg	<100	330	<100	<100	<100
TRH>C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C ₁₀ -C ₄₀)	mg/kg	<50	330	<50	<50	<50
Surrogate o-Terphenyl	%	99	102	94	95	93

PAHs in Soil Our Reference: Your Reference	UNITS ----- -	170364-1 1	170364-2 2	170364-3 3	170364-4 4	170364-5 5
Depth	-----	0-0.1	0-0.1	0-0.05	0-0.1	0-0.1
Date Sampled		28/06/2017	28/06/2017	28/06/2017	28/06/2017	28/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/07/2017	03/07/2017	03/07/2017	03/07/2017	03/07/2017
Date analysed	-	05/07/2017	05/07/2017	05/07/2017	05/07/2017	05/07/2017
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	0.3	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	0.4	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	0.3	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.1	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	<0.05	<0.05	2.0	<0.05	<0.05
Surrogate p-Terphenyl-d14	%	101	94	96	98	94

PAHs in Soil Our Reference: Your Reference	UNITS ----- -	170364-6 6	170364-7 7	170364-8 8
Depth	-----	0-0.1	0-0.1	0-0.1
Date Sampled		28/06/2017	28/06/2017	28/06/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	03/07/2017	03/07/2017	03/07/2017
Date analysed	-	05/07/2017	05/07/2017	05/07/2017
Naphthalene	mg/kg	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.2	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.1	<0.1
Pyrene	mg/kg	<0.1	0.2	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	<0.05	0.52	<0.05
Surrogate p-Terphenyl-d14	%	96	97	98

Organochlorine Pesticides in soil		170364-6	170364-7	170364-8
Our Reference:	UNITS	6	7	8
Your Reference	-----			
	-			
Depth	-----	0-0.1	0-0.1	0-0.1
Date Sampled		28/06/2017	28/06/2017	28/06/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	03/07/2017	03/07/2017	03/07/2017
Date analysed	-	03/07/2017	03/07/2017	03/07/2017
HCB	mg/kg	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Total+veDDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	92	92	90

Organophosphorus Pesticides				
Our Reference:	UNITS	170364-6	170364-7	170364-8
Your Reference	-----	6	7	8
	-			
Depth	-----	0-0.1	0-0.1	0-0.1
Date Sampled		28/06/2017	28/06/2017	28/06/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	03/07/2017	03/07/2017	03/07/2017
Date analysed	-	03/07/2017	03/07/2017	03/07/2017
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	92	92	90

PCBs in Soil				
Our Reference:	UNITS	170364-6	170364-7	170364-8
Your Reference	-----	6	7	8
	-			
Depth	-----	0-0.1	0-0.1	0-0.1
Date Sampled		28/06/2017	28/06/2017	28/06/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	03/07/2017	03/07/2017	03/07/2017
Date analysed	-	03/07/2017	03/07/2017	03/07/2017
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCLMX	%	92	92	90

Acid Extractable metals in soil Our Reference: Your Reference	UNITS ----- -	170364-1 1	170364-2 2	170364-3 3	170364-4 4	170364-5 5
Depth	-----	0-0.1	0-0.1	0-0.05	0-0.1	0-0.1
Date Sampled		28/06/2017	28/06/2017	28/06/2017	28/06/2017	28/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	03/07/2017	03/07/2017	03/07/2017	03/07/2017	03/07/2017
Date analysed	-	03/07/2017	03/07/2017	03/07/2017	03/07/2017	03/07/2017
Arsenic	mg/kg	9	5	<4	6	5
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	16	18	16	24	18
Copper	mg/kg	27	24	37	17	19
Lead	mg/kg	15	22	30	32	120
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	12	8	10	9	7
Zinc	mg/kg	45	37	110	93	67

Acid Extractable metals in soil Our Reference: Your Reference	UNITS ----- -	170364-6 6	170364-7 7	170364-8 8	170364-9 BD1 280617	170364-10 BD2 280617
Depth	-----	0-0.1	0-0.1	0-0.1	-	-
Date Sampled		28/06/2017	28/06/2017	28/06/2017	28/06/2017	28/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	03/07/2017	03/07/2017	03/07/2017	03/07/2017	03/07/2017
Date analysed	-	03/07/2017	03/07/2017	03/07/2017	03/07/2017	03/07/2017
Arsenic	mg/kg	5	5	5	4	5
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	11	16	17	17	20
Copper	mg/kg	24	32	26	25	18
Lead	mg/kg	82	49	31	22	19
Mercury	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	8	10	11	9	7
Zinc	mg/kg	120	150	110	51	53

Acid Extractable metals in soil		
Our Reference:	UNITS	170364-11
Your Reference	-----	TB/280617
	-	
Depth	-----	-
Date Sampled		28/06/2017
Type of sample		Soil
<hr/>		
Date prepared	-	03/07/2017
Date analysed	-	03/07/2017
Arsenic	mg/kg	5
Cadmium	mg/kg	<0.4
Chromium	mg/kg	2
Copper	mg/kg	<1
Lead	mg/kg	<1
Mercury	mg/kg	<0.1
Nickel	mg/kg	<1
Zinc	mg/kg	2

Moisture Our Reference: Your Reference	UNITS ----- -	170364-1 1	170364-2 2	170364-3 3	170364-4 4	170364-5 5
Depth Date Sampled Type of sample	----- ----- -----	0-0.1 28/06/2017 Soil	0-0.1 28/06/2017 Soil	0-0.05 28/06/2017 Soil	0-0.1 28/06/2017 Soil	0-0.1 28/06/2017 Soil
Date prepared	-	03/07/2017	03/07/2017	03/07/2017	03/07/2017	03/07/2017
Date analysed	-	04/07/2017	04/07/2017	04/07/2017	04/07/2017	04/07/2017
Moisture	%	17	17	7.7	13	11

Moisture Our Reference: Your Reference	UNITS ----- -	170364-6 6	170364-7 7	170364-8 8	170364-9 BD1 280617	170364-10 BD2 280617
Depth Date Sampled Type of sample	----- ----- -----	0-0.1 28/06/2017 Soil	0-0.1 28/06/2017 Soil	0-0.1 28/06/2017 Soil	- 28/06/2017 Soil	- 28/06/2017 Soil
Date prepared	-	03/07/2017	03/07/2017	03/07/2017	03/07/2017	03/07/2017
Date analysed	-	04/07/2017	04/07/2017	04/07/2017	04/07/2017	04/07/2017
Moisture	%	12	11	11	11	12

Moisture Our Reference: Your Reference	UNITS ----- -	170364-11 TB/280617
Depth Date Sampled Type of sample	----- ----- -----	- 28/06/2017 Soil
Date prepared	-	03/07/2017
Date analysed	-	04/07/2017
Moisture	%	0.1

Misc Soil - Inorg						
Our Reference:	UNITS	170364-1	170364-4	170364-5	170364-7	170364-8
Your Reference	-----	1	4	5	7	8
	-					
Depth	-----	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		28/06/2017	28/06/2017	28/06/2017	28/06/2017	28/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	03/07/2017	03/07/2017	03/07/2017	03/07/2017	03/07/2017
Date analysed	-	04/07/2017	04/07/2017	04/07/2017	04/07/2017	04/07/2017
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Asbestos ID - soils NEPM Our Reference: Your Reference	UNITS ----- -	170364-1 1	170364-4 4	170364-5 5	170364-7 7	170364-8 8
Depth	-----	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		28/06/2017	28/06/2017	28/06/2017	28/06/2017	28/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	6/07/2017	6/07/2017	6/07/2017	6/07/2017	6/07/2017
Sample mass tested	g	611.21	723.45	803.18	606.15	751.52
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos ^{#1}	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	-	-	-	-	-
FA and AF Estimation*	g	-	-	-	-	-
FA and AF Estimation ^{**2}	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - materials			
Our Reference:	UNITS	170364-13	170364-14
Your Reference	-----	F1	F2
	-		
Depth	-----	-	-
Date Sampled		28/06/2017	28/06/2017
Type of sample		Material	Material
Date analysed	-	05/07/2017	05/07/2017
Mass/Dimension of Sample	-	80x60x7mm	100x70x5mm
Sample Description	-	Grey compressed fibre cement material	Beige layered fibre cement material
Asbestos ID in materials	-	Chrysotile asbestos detected	No asbestos detected Organic fibre detected

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PCBs" is simply a sum of the positive individual PCBs.

Method ID	Methodology Summary
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
ASB-001	<p>Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004.</p> <p>Results reported denoted with * are outside our scope of NATA accreditation.</p> <p>NOTE #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF)</p> <p>NOTE #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres.</p> <p>Estimation = Estimated asbestos weight</p> <p>Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.</p>
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.

QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
vTRH(C6-C10)/BTEXN in Soil						Base II Duplicate II %RPD		
Date extracted	-			03/07/2017	170364-1	03/07/2017 03/07/2017	LCS-9	03/07/2017
Date analysed	-			04/07/2017	170364-1	04/07/2017 04/07/2017	LCS-9	04/07/2017
TRHC ₆ - C ₉	mg/kg	25	Org-016	<25	170364-1	<25 <25	LCS-9	116%
TRHC ₆ - C ₁₀	mg/kg	25	Org-016	<25	170364-1	<25 <25	LCS-9	116%
Benzene	mg/kg	0.2	Org-016	<0.2	170364-1	<0.2 <0.2	LCS-9	100%
Toluene	mg/kg	0.5	Org-016	<0.5	170364-1	<0.5 <0.5	LCS-9	108%
Ethylbenzene	mg/kg	1	Org-016	<1	170364-1	<1 <1	LCS-9	122%
m+p-xylene	mg/kg	2	Org-016	<2	170364-1	<2 <2	LCS-9	125%
o-Xylene	mg/kg	1	Org-016	<1	170364-1	<1 <1	LCS-9	122%
naphthalene	mg/kg	1	Org-014	<1	170364-1	<1 <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	120	170364-1	105 90 RPD: 15	LCS-9	102%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
svTRH (C10-C40) in Soil						Base II Duplicate II %RPD		
Date extracted	-			03/07/2017	170364-1	03/07/2017 03/07/2017	LCS-9	03/07/2017
Date analysed	-			04/07/2017	170364-1	04/07/2017 04/07/2017	LCS-9	04/07/2017
TRHC ₁₀ - C ₁₄	mg/kg	50	Org-003	<50	170364-1	<50 <50	LCS-9	104%
TRHC ₁₅ - C ₂₈	mg/kg	100	Org-003	<100	170364-1	<100 <100	LCS-9	99%
TRHC ₂₉ - C ₃₆	mg/kg	100	Org-003	<100	170364-1	<100 <100	LCS-9	91%
TRH>C ₁₀ -C ₁₆	mg/kg	50	Org-003	<50	170364-1	<50 <50	LCS-9	104%
TRH>C ₁₆ -C ₃₄	mg/kg	100	Org-003	<100	170364-1	<100 <100	LCS-9	99%
TRH>C ₃₄ -C ₄₀	mg/kg	100	Org-003	<100	170364-1	<100 <100	LCS-9	91%
Surrogate o-Terphenyl	%		Org-003	94	170364-1	92 93 RPD: 1	LCS-9	96%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Soil						Base II Duplicate II %RPD		
Date extracted	-			03/07/2017	170364-1	03/07/2017 03/07/2017	LCS-9	03/07/2017
Date analysed	-			05/07/2017	170364-1	05/07/2017 05/07/2017	LCS-9	05/07/2017
Naphthalene	mg/kg	0.1	Org-012	<0.1	170364-1	<0.1 <0.1	LCS-9	101%
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	170364-1	<0.1 <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	170364-1	<0.1 <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012	<0.1	170364-1	<0.1 <0.1	LCS-9	98%
Phenanthrene	mg/kg	0.1	Org-012	<0.1	170364-1	<0.1 <0.1	LCS-9	98%
Anthracene	mg/kg	0.1	Org-012	<0.1	170364-1	<0.1 <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	170364-1	<0.1 <0.1	LCS-9	105%
Pyrene	mg/kg	0.1	Org-012	<0.1	170364-1	<0.1 <0.1	LCS-9	107%
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	170364-1	<0.1 <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012	<0.1	170364-1	<0.1 <0.1	LCS-9	110%
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	<0.2	170364-1	<0.2 <0.2	[NR]	[NR]

Client Reference: 92228.00, DPI 182 Raby Road, Gleswood Hills, NSW

QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Soil						Base II Duplicate II %RPD		
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	170364-1	<0.05 <0.05	LCS-9	79%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	170364-1	<0.1 <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	170364-1	<0.1 <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	170364-1	<0.1 <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	100	170364-1	101 93 RPD: 8	LCS-9	120%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Organochlorine Pesticides in soil						Base II Duplicate II %RPD		
Date extracted	-			03/07/2017	[NT]	[NT]	LCS-9	03/07/2017
Date analysed	-			03/07/2017	[NT]	[NT]	LCS-9	03/07/2017
HCB	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-9	83%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-9	96%
Heptachlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-9	99%
delta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-9	98%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-9	101%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-9	99%
Dieldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-9	110%
Endrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-9	98%
pp-DDD	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-9	102%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-9	84%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate TCMX	%		Org-005	92	[NT]	[NT]	LCS-9	114%

QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Organophosphorus Pesticides						Base II Duplicate II %RPD		
Date extracted	-			03/07/2017	[NT]	[NT]	LCS-9	03/07/2017
Date analysed	-			03/07/2017	[NT]	[NT]	LCS-9	03/07/2017
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Chlorpyrifos	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-9	84%
Chlorpyrifos-methyl	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Diazinon	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-9	80%
Dimethoate	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-9	83%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-9	95%
Malathion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-9	73%
Parathion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-9	115%
Ronnel	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-9	91%
Surrogate TCMX	%		Org-008	92	[NT]	[NT]	LCS-9	93%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PCBs in Soil						Base II Duplicate II %RPD		
Date extracted	-			03/07/2017	[NT]	[NT]	LCS-9	03/07/2017
Date analysed	-			03/07/2017	[NT]	[NT]	LCS-9	03/07/2017
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	LCS-9	123%
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%		Org-006	92	[NT]	[NT]	LCS-9	93%

QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Acid Extractable metals in soil						Base II Duplicate II %RPD		
Date prepared	-			03/07/2017	170364-1	03/07/2017 03/07/2017	LCS-9	03/07/2017
Date analysed	-			04/07/2017	170364-1	03/07/2017 03/07/2017	LCS-9	03/07/2017
Arsenic	mg/kg	4	Metals-020	<4	170364-1	9 9 RPD: 0	LCS-9	111%
Cadmium	mg/kg	0.4	Metals-020	<0.4	170364-1	<0.4 <0.4	LCS-9	108%
Chromium	mg/kg	1	Metals-020	<1	170364-1	16 14 RPD: 13	LCS-9	111%
Copper	mg/kg	1	Metals-020	<1	170364-1	27 29 RPD: 7	LCS-9	111%
Lead	mg/kg	1	Metals-020	<1	170364-1	15 16 RPD: 6	LCS-9	106%
Mercury	mg/kg	0.1	Metals-021	<0.1	170364-1	<0.1 <0.1	LCS-9	101%
Nickel	mg/kg	1	Metals-020	<1	170364-1	12 12 RPD: 0	LCS-9	104%
Zinc	mg/kg	1	Metals-020	<1	170364-1	45 49 RPD: 9	LCS-9	105%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Misc Soil - Inorg						Base II Duplicate II %RPD		
Date prepared	-			04/07/2017	170364-1	03/07/2017 03/07/2017	LCS-9	04/07/2017
Date analysed	-			04/07/2017	170364-1	04/07/2017 04/07/2017	LCS-9	04/07/2017
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	170364-1	<5 <5	LCS-9	103%
QUALITYCONTROL	UNITS	Dup. Sm#		Duplicate Base + Duplicate + %RPD		Spike Sm#	Spike % Recovery	
vTRH(C6-C10)/BTEXN in Soil								
Date extracted	-	170364-6		03/07/2017 03/07/2017		170364-7	03/07/2017	
Date analysed	-	170364-6		04/07/2017 04/07/2017		170364-7	04/07/2017	
TRHC ₆ - C ₉	mg/kg	170364-6		<25 <25		170364-7	95%	
TRHC ₆ - C ₁₀	mg/kg	170364-6		<25 <25		170364-7	95%	
Benzene	mg/kg	170364-6		<0.2 <0.2		170364-7	80%	
Toluene	mg/kg	170364-6		<0.5 <0.5		170364-7	90%	
Ethylbenzene	mg/kg	170364-6		<1 <1		170364-7	96%	
m+p-xylene	mg/kg	170364-6		<2 <2		170364-7	105%	
o-Xylene	mg/kg	170364-6		<1 <1		170364-7	97%	
naphthalene	mg/kg	170364-6		<1 <1		[NR]	[NR]	
Surrogate aaa-Trifluorotoluene	%	170364-6		110 104 RPD: 6		170364-7	87%	

QUALITYCONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	170364-6	03/07/2017 03/07/2017	170364-7	03/07/2017
Date analysed	-	170364-6	04/07/2017 04/07/2017	170364-7	04/07/2017
TRHC ₁₀ - C ₁₄	mg/kg	170364-6	<50 <50	170364-7	113%
TRHC ₁₅ - C ₂₈	mg/kg	170364-6	<100 <100	170364-7	105%
TRHC ₂₉ - C ₃₆	mg/kg	170364-6	<100 <100	170364-7	96%
TRH>C ₁₀ -C ₁₆	mg/kg	170364-6	<50 <50	170364-7	113%
TRH>C ₁₆ -C ₃₄	mg/kg	170364-6	<100 <100	170364-7	105%
TRH>C ₃₄ -C ₄₀	mg/kg	170364-6	<100 <100	170364-7	96%
Surrogate o-Terphenyl	%	170364-6	99 99 RPD: 0	170364-7	102%
QUALITYCONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	170364-6	03/07/2017 03/07/2017	170364-7	03/07/2017
Date analysed	-	170364-6	05/07/2017 05/07/2017	170364-7	05/07/2017
Naphthalene	mg/kg	170364-6	<0.1 <0.1	170364-7	100%
Acenaphthylene	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
Acenaphthene	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
Fluorene	mg/kg	170364-6	<0.1 <0.1	170364-7	97%
Phenanthrene	mg/kg	170364-6	<0.1 <0.1	170364-7	94%
Anthracene	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
Fluoranthene	mg/kg	170364-6	<0.1 <0.1	170364-7	100%
Pyrene	mg/kg	170364-6	<0.1 <0.1	170364-7	106%
Benzo(a)anthracene	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
Chrysene	mg/kg	170364-6	<0.1 <0.1	170364-7	113%
Benzo(b,j+k)fluoranthene	mg/kg	170364-6	<0.2 <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	170364-6	<0.05 <0.05	170364-7	90%
Indeno(1,2,3-c,d)pyrene	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	170364-6	96 98 RPD: 2	170364-7	118%

QUALITYCONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	170364-6	03/07/2017 03/07/2017	170364-7	03/07/2017
Date analysed	-	170364-6	03/07/2017 03/07/2017	170364-7	03/07/2017
HCB	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
alpha-BHC	mg/kg	170364-6	<0.1 <0.1	170364-7	80%
gamma-BHC	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
beta-BHC	mg/kg	170364-6	<0.1 <0.1	170364-7	96%
Heptachlor	mg/kg	170364-6	<0.1 <0.1	170364-7	101%
delta-BHC	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
Aldrin	mg/kg	170364-6	<0.1 <0.1	170364-7	99%
Heptachlor Epoxide	mg/kg	170364-6	<0.1 <0.1	170364-7	102%
gamma-Chlordane	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
Endosulfan I	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
pp-DDE	mg/kg	170364-6	<0.1 <0.1	170364-7	99%
Dieldrin	mg/kg	170364-6	<0.1 <0.1	170364-7	111%
Endrin	mg/kg	170364-6	<0.1 <0.1	170364-7	103%
pp-DDD	mg/kg	170364-6	<0.1 <0.1	170364-7	102%
Endosulfan II	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
pp-DDT	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	170364-6	<0.1 <0.1	170364-7	81%
Methoxychlor	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
Surrogate TCMX	%	170364-6	92 92 RPD: 0	170364-7	113%

QUALITYCONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	170364-6	03/07/2017 03/07/2017	170364-7	03/07/2017
Date analysed	-	170364-6	03/07/2017 03/07/2017	170364-7	03/07/2017
Azinphos-methyl (Guthion)	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
Bromophos-ethyl	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	170364-6	<0.1 <0.1	170364-7	85%
Chlorpyriphos-methyl	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
Diazinon	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
Dichlorvos	mg/kg	170364-6	<0.1 <0.1	170364-7	91%
Dimethoate	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
Ethion	mg/kg	170364-6	<0.1 <0.1	170364-7	99%
Fenitrothion	mg/kg	170364-6	<0.1 <0.1	170364-7	95%
Malathion	mg/kg	170364-6	<0.1 <0.1	170364-7	75%
Parathion	mg/kg	170364-6	<0.1 <0.1	170364-7	114%
Ronnel	mg/kg	170364-6	<0.1 <0.1	170364-7	92%
Surrogate TCMX	%	170364-6	92 92 RPD: 0	170364-7	91%

QUALITYCONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	170364-6	03/07/2017 03/07/2017	170364-7	03/07/2017
Date analysed	-	170364-6	03/07/2017 03/07/2017	170364-7	03/07/2017
Aroclor 1016	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
Aroclor 1221	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
Aroclor 1232	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
Aroclor 1242	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
Aroclor 1248	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
Aroclor 1254	mg/kg	170364-6	<0.1 <0.1	170364-7	115%
Aroclor 1260	mg/kg	170364-6	<0.1 <0.1	[NR]	[NR]
Surrogate TCLMX	%	170364-6	92 92 RPD: 0	170364-7	91%

QUALITYCONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	170364-6	03/07/2017 03/07/2017	170364-7	03/07/2017
Date analysed	-	170364-6	03/07/2017 03/07/2017	170364-7	04/07/2017
Arsenic	mg/kg	170364-6	5 6 RPD: 18	170364-7	93%
Cadmium	mg/kg	170364-6	<0.4 <0.4	170364-7	89%
Chromium	mg/kg	170364-6	11 16 RPD: 37	170364-7	95%
Copper	mg/kg	170364-6	24 22 RPD: 9	170364-7	102%
Lead	mg/kg	170364-6	82 110 RPD: 29	170364-7	90%
Mercury	mg/kg	170364-6	0.1 0.2 RPD: 67	170364-7	96%
Nickel	mg/kg	170364-6	8 10 RPD: 22	170364-7	88%
Zinc	mg/kg	170364-6	120 140 RPD: 15	170364-7	#

Report Comments:

Acid Extractable Metals in Soil:

Poor spike recovery was obtained for this sample. The sample was re-digested and re-spiked and the poor recovery was confirmed. This is due to matrix interferences and the inhomogeneous nature of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

Asbestos-ID in soil: NEPM

This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

Asbestos ID was analysed by Approved Identifier: Matt Tang
Asbestos ID was authorised by Approved Signatory: Paul Ching

INS: Insufficient sample for this test
NR: Test not required
<: Less than

PQL: Practical Quantitation Limit
RPD: Relative Percent Difference
>: Greater than

NT: Not tested
NA: Test not required
LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate : This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Project Name: DPI 182 Raby Road, Gledswood Hills, NSW	To: Envirolab Services
Project No: 92228.00	Sampler: SJL/LOC
Project Mgr: BAH	Attn: Tania Notaras
Email: Bradlev.Harris@ douq lasoartners.com.au · Simon.Lo nqhurs t@ doualas oartners.	Phone: (02) 9910 6200 Fax: (02) 9910 6201
Date Required: Standard	Email: tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date	Sample Type	Container Type	Analytes										Notes/preservation		
					1	2	3	4	5	6	7	8	9	10		11	12
1/0-0.1	1	28/06/17	S	G&P	X		X	X	X	X							
2/0-0.1	2	28/06/17	S	G&P	X		X	X									
3/0-0.05	3	28/06/17	S	G&P	X		X	X									
4/0-0.1	4	28/06/17	S	G&P	X		X	X	X	X							
5/0-0.1	5	28/06/17	S	G&P	X		X	X	X	X							
6/0-0.1	6	28/06/17	S	G&P	X	X	X	X									
7/0-0.1	7	28/06/17	S	G&P	X	X	X	X	X	X							
8/0-0.1	8	28/06/17	S	G&P	X	X	X	X	X	X							
BD1 280617	9	28/06/17	S	G	X		X										
BD2 280617	10	28/06/17	S	G	X		X										
TB/280617	11	28/06/17	S	G	X		X										
TS/280617	12	28/06/17	S	G			X										

Lab Report No:			
Send Results to: Douglas Partners Pty Ltd	Address: 18 Water Crescent Smeaton Grange	Phone: (02) 4647 0075	Fax: (02) 4646 1886
Relinquished by: LOC/SJL	Transported to laboratory by:		
Signed: & A'	Date & Time: 15.02.2017	Received by: JOV/12, -W.L.:7	

Project Name: DPI 182 Raby Road, Gledswood Hills, NSW	To: Envirolab Services
Project No: 92228.00	Sampler: SJL/LOC
Project Mgr: BAH	Mob. Phone: 0412 754 162
Email: Bradlev.Harris@doualasoartners.com.au · Simon.Lonahurst @ doualasoartners.	Attn: Tania Notaras
Date Required: Standard	Phone: (02) 9910 6200 Fax: (02) 9910 6201
	Email: tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date	Sample Type	Container Type	Analytes										Notes/preservation			
					0	0	0	0	0	0	0	0	0	0		0		
F1	15	28/06/17	-	M														
SP-2 -Y	15	28/06/17	-	M														

Lab Report No:	
Send Results to: Douglas Partners Pty Ltd	Address 18 Waler Crescent, Smeaton Grange 2567
Relinquished by: LOC/SJL	Phone: (02) 4647 0075 Fax: (02) 4646 1886
Signed: /d/ 4;?	Date & Time: 8.12.20161 Received by: xxrv\lh -Cc,l,l-7
Transported to laboratory by:	

CERTIFICATE OF ANALYSIS 175552

Client Details

Client	Douglas Partners Pty Ltd Smeaton Grange
Attention	Grant Russell
Address	18 Waler Crescent, Smeaton Grange, NSW, 2567

Sample Details

Your Reference	<u>92228.00, Soil Investigation</u>
Number of Samples	7 Soils, 4 Materials
Date samples received	13/09/2017
Date completed instructions received	13/09/2017

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
 Samples were analysed as received from the client. Results relate specifically to the samples as received.
 Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	20/09/2017
Date of Issue	20/09/2017
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Report Comments

Asbestos-ID in soil: NEPM
 This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.
 This is reported outside our scope of NATA accreditation.

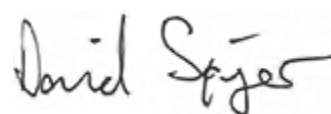
Asbestos Approved By

Analysed by Asbestos Approved Identifier: Paul Ching, Lucy Zhu
 Authorised by Asbestos Approved Signatory: Paul Ching

Results Approved By

Giovanni Agosti, Group Technical Manager
 Jeremy Faircloth, Organics Supervisor
 Paul Ching, Senior Analyst

Authorised By



David Springer, General Manager

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		175552-10
Your Reference	UNITS	Stockpile (S1)
Date Sampled		13/09/2017
Type of sample		Soil
Date extracted	-	14/09/2017
Date analysed	-	15/09/2017
TRH C ₆ - C ₉	mg/kg	<25
TRH C ₆ - C ₁₀	mg/kg	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
naphthalene	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	101

svTRH (C10-C40) in Soil		
Our Reference		175552-10
Your Reference	UNITS	Stockpile (S1)
Date Sampled		13/09/2017
Type of sample		Soil
Date extracted	-	14/09/2017
Date analysed	-	15/09/2017
TRH C ₁₀ - C ₁₄	mg/kg	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100
TRH C ₂₉ - C ₃₆	mg/kg	140
TRH >C ₁₀ -C ₁₆	mg/kg	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50
TRH >C ₁₆ -C ₃₄	mg/kg	120
TRH >C ₃₄ -C ₄₀	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	120
Surrogate o-Terphenyl	%	101

PAHs in Soil		
Our Reference		175552-10
Your Reference	UNITS	Stockpile (S1)
Date Sampled		13/09/2017
Type of sample		Soil
Date extracted	-	14/09/2017
Date analysed	-	15/09/2017
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Total +ve PAH's	mg/kg	0.05
Surrogate <i>p</i> -Terphenyl-d14	%	86

Organochlorine Pesticides in soil		
Our Reference		175552-10
Your Reference	UNITS	Stockpile (S1)
Date Sampled		13/09/2017
Type of sample		Soil
Date extracted	-	14/09/2017
Date analysed	-	15/09/2017
HCB	mg/kg	<0.1
alpha-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1
Surrogate TCMX	%	107

Acid Extractable metals in soil		
Our Reference		175552-10
Your Reference	UNITS	Stockpile (S1)
Date Sampled		13/09/2017
Type of sample		Soil
Date prepared	-	14/09/2017
Date analysed	-	14/09/2017
Arsenic	mg/kg	5
Cadmium	mg/kg	<0.4
Chromium	mg/kg	13
Copper	mg/kg	26
Lead	mg/kg	56
Mercury	mg/kg	<0.1
Nickel	mg/kg	9
Zinc	mg/kg	240

Moisture		
Our Reference		175552-10
Your Reference	UNITS	Stockpile (S1)
Date Sampled		13/09/2017
Type of sample		Soil
Date prepared	-	14/09/2017
Date analysed	-	15/09/2017
Moisture	%	1.9

Client Reference: 92228.00, Soil Investigation

Asbestos ID - soils NEPM - ASB-001						
Our Reference		175552-1	175552-2	175552-3	175552-4	175552-5
Your Reference	UNITS	SS1-F1	SS2-F1N	SS3-F1E	SS4-F1S	SS5-F1W
Date Sampled		13/09/2017	13/09/2017	13/09/2017	13/09/2017	13/09/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	19/09/2017	19/09/2017	19/09/2017	19/09/2017	19/09/2017
Sample mass tested	g	768.92	709.04	853.72	960.76	721.94
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos ^{#1}	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	-	-	-	-	-
FA and AF Estimation*	g	-	-	-	-	-
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Client Reference: 92228.00, Soil Investigation

Asbestos ID - materials					
Our Reference		175552-6	175552-7	175552-8	175552-9
Your Reference	UNITS	F3	F4	F5	F6
Date Sampled		13/09/2017	13/09/2017	13/09/2017	13/09/2017
Type of sample		Material	Material	Material	Material
Date analysed	-	19/09/2017	19/09/2017	19/09/2017	19/09/2017
Mass / Dimension of Sample	-	55x29x5mm	85x85x5mm	30x30x5mm	48x27x2mm
Sample Description	-	Beige fibre cement material	Beige fibre cement material	Beige fibre cement material	Grey fibre cement material
Asbestos ID in materials	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
		Organic fibres detected	Organic fibres detected	Organic fibres detected	Organic fibres detected

Client Reference: 92228.00, Soil Investigation

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	<p>Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004.</p> <p>Results reported denoted with * are outside our scope of NATA accreditation.</p> <p>NOTE #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF)</p> <p>NOTE #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres.</p> <p>Estimation = Estimated asbestos weight</p> <p>Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.</p>
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	<p>Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.</p> <p>F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.</p> <p>Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).</p>
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.

Client Reference: 92228.00, Soil Investigation

Method ID	Methodology Summary
Org-005	<p>Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.</p> <p>Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.</p>
Org-012	<p>Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.</p> <p>For soil results:-</p> <ol style="list-style-type: none"> 1. 'EQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. <p>Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.</p>
Org-014	<p>Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.</p>
Org-016	<p>Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.</p>
Org-016	<p>Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.</p> <p>Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.</p>

Client Reference: 92228.00, Soil Investigation

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			14/09/2017	[NT]	[NT]	[NT]	[NT]	14/09/2017	[NT]
Date analysed	-			15/09/2017	[NT]	[NT]	[NT]	[NT]	15/09/2017	[NT]
TRH C ₆ - C ₉	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	125	[NT]
TRH C ₆ - C ₁₀	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	125	[NT]
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]	[NT]	[NT]	[NT]	112	[NT]
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	[NT]	[NT]	117	[NT]
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	130	[NT]
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	[NT]	[NT]	132	[NT]
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	128	[NT]
naphthalene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	115	[NT]	[NT]	[NT]	[NT]	124	[NT]

Client Reference: 92228.00, Soil Investigation

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			14/09/2017	[NT]	[NT]	[NT]	[NT]	14/09/2017	[NT]
Date analysed	-			14/09/2017	[NT]	[NT]	[NT]	[NT]	14/09/2017	[NT]
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	100	[NT]
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	101	[NT]
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	106	[NT]
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	100	[NT]
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	101	[NT]
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	106	[NT]
Surrogate o-Terphenyl	%		Org-003	83	[NT]	[NT]	[NT]	[NT]	100	[NT]

Client Reference: 92228.00, Soil Investigation

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			14/09/2017	[NT]	[NT]	[NT]	[NT]	14/09/2017	[NT]
Date analysed	-			15/09/2017	[NT]	[NT]	[NT]	[NT]	15/09/2017	[NT]
Naphthalene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Phenanthrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	115	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	[NT]	[NT]	[NT]	[NT]	104	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	87	[NT]	[NT]	[NT]	[NT]	85	[NT]

Client Reference: 92228.00, Soil Investigation

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			14/09/2017	[NT]	[NT]	[NT]	[NT]	14/09/2017	[NT]
Date analysed	-			15/09/2017	[NT]	[NT]	[NT]	[NT]	15/09/2017	[NT]
HCB	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	112	[NT]
gamma-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	109	[NT]
Heptachlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
delta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Dieldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	119	[NT]
Endrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]
pp-DDD	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Endosulfan II	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Methoxychlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-005	113	[NT]	[NT]	[NT]	[NT]	122	[NT]

Client Reference: 92228.00, Soil Investigation

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			14/09/2017	[NT]	[NT]	[NT]	[NT]	14/09/2017	[NT]
Date analysed	-			14/09/2017	[NT]	[NT]	[NT]	[NT]	14/09/2017	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	110	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	97	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	120	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

CERTIFICATE OF ANALYSIS 175552-A

Client Details

Client	Douglas Partners Pty Ltd Smeaton Grange
Attention	Grant Russell
Address	18 Waler Crescent, Smeaton Grange, NSW, 2567

Sample Details

Your Reference	<u>92228.00, Soil Investigation</u>
Number of Samples	Additional Testing on 1 Soil
Date samples received	13/09/2017
Date completed instructions received	20/09/2017

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
 Samples were analysed as received from the client. Results relate specifically to the samples as received.
 Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	27/09/2017
Date of Issue	27/09/2017
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Report Comments

Asbestos-ID in soil: NEPM
 This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.
 This is reported outside our scope of NATA accreditation.

Asbestos Approved By

Analysed by Asbestos Approved Identifier: Paul Ching
 Authorised by Asbestos Approved Signatory: Paul Ching

Results Approved By

Paul Ching, Senior Analyst

Authorised By



David Springer, General Manager

Asbestos ID - soils NEPM		
Our Reference		175552-A-11
Your Reference	UNITS	S1
Date Sampled		13/09/2017
Type of sample		Soil
Date analysed	-	27/09/2017
Sample mass tested	g	575.6
Sample Description	-	Brown soil, rocks & organic debris
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected
Trace Analysis	-	No asbestos detected
Total Asbestos#1	g/kg	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected
ACM >7mm Estimation*	g	-
FA and AF Estimation*	g	-
FA and AF Estimation*#2	%(w/w)	<0.001

Client Reference: 92228.00, Soil Investigation

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	<p>Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004.</p> <p>Results reported denoted with * are outside our scope of NATA accreditation.</p> <p>NOTE #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF)</p> <p>NOTE #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres.</p> <p>Estimation = Estimated asbestos weight</p> <p>Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.</p>

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd Smeaton Grange
Attention	Grant Russell

Sample Login Details

Your reference	92228.00, Soil Investigation
Envirolab Reference	175552-A
Date Sample Received	13/09/2017
Date Instructions Received	20/09/2017
Date Results Expected to be Reported	27/09/2017

Sample Condition

Samples received in appropriate condition for analysis	YES
No. of Samples Provided	Additional Testing on 1 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	21.4
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	Phone: 02 9910 6200
Fax: 02 9910 6201	Fax: 02 9910 6201
Email: ahie@envirolab.com.au	Email: jhurst@envirolab.com.au

Analysis Underway, details on the following page:



Sample ID	Asbestos ID - soils NEPM	On Hold
SS1-F1		P
SS2-F1N		P
SS3-F1E		P
SS4-F1S		P
SS5-F1W		P
F3		P
F4		P
F5		P
F6		P
Stockpile (S1)		P
S1	P	

The 'P' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Project Name: Soil Investigation and Waste Classification	To: Envirolab Services
Project No: 92228.00	Sampler: Lachlan Clement
Project Mgr: Grant Russell	Attn: Tania Notaras
Email: Lachlan.Clement@DouglasPartners.com.au; Grant.Russell@douglaspartners.com.au	Phone: (02) 9910 6200 Fax: (02) 9910 6201
Date Required: Standard	Email: tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date	Sample Type	Container Type	Analytes										Notes/preservation		
					Asbestos	Lead	Cadmium	Copper	Chromium	Iron	Manganese	Nickel	Vanadium	Zinc		Barium	Strontium
SS1-F1	1	13/09/17	S	p	X												
SS2-F1N	7	13/09/17	S	p	X												
SS3-F1E		13/09/17	S	p	X												
SS4-F1S	i	13/09/17	S	p	X												Envirolab Services 12 Ashley Street Chatswood NSW 2067
SS5-F1W		13/09/17	S	p	X												Job No: (505)S2-
F3	lo	13/09/17	F	p		X											Date Received: 11/09/17
F4	?	13/09/17	F	p		X											Received by: 101
F5	q	13/09/17	F	p		X											Cooperativa Australia
F6	?	13/09/17	F	p		X											Token/None
Stockpile (S1)	t	13/09/17	S	G			X	X	X	X	X						
S1	1	13/09/17	S	p												X	500ml Plastic Bag

Lab Report No:	
Send Results to: Douglas Partners Pty Ltd	Address: 18 Water Crescent, Smeaton Grange 2567
Relinquished by: LC)e	Transported to: Sydney
Signed: <i>[Signature]</i>	Date & Time: 13/09/2017
	Received by: () rfg/11 14.1.p

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd Smeaton Grange
Attention	Grant Russell

Sample Login Details

Your reference	92228.00, Soil Investigation
Envirolab Reference	175552
Date Sample Received	13/09/2017
Date Instructions Received	13/09/2017
Date Results Expected to be Reported	20/09/2017

Sample Condition

Samples received in appropriate condition for analysis	YES
No. of Samples Provided	7 Soils, 4 Materials
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	21.4
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	Phone: 02 9910 6200
Fax: 02 9910 6201	Fax: 02 9910 6201
Email: ahie@envirolab.com.au	Email: jhurst@envirolab.com.au

Analysis Underway, details on the following page:



Sample ID	VTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Acid Extractable metals in soil	Asbestos ID - soils NEPM - ASB-001	Asbestos ID - materials	On Hold
SS1-F1						P		
SS2-F1N						P		
SS3-F1E						P		
SS4-F1S						P		
SS5-F1W						P		
F3							P	
F4							P	
F5							P	
F6							P	
Stockpile (S1)	P	P	P	P	P			
S1								P

The 'P' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Appendix G

Test Pit Logs

TEST PIT LOG

CLIENT: Vince and Elizabeth Pisciueneri
PROJECT: Proposed Residential Subdivision
LOCATION: 182 Raby Road, Gledswood Hills, NSW

SURFACE LEVEL: --
EASTING: 295956
NORTHING: 6234168

PIT No: 1
PROJECT No: 92228.00
DATE: 28/6/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)					
				Type	Depth	Sample	Results & Comments		5	10	15	20		
	0.0 - 0.3	FILLING - red and grey silty clay and clayey silt with some siltstone gravel		D	0.0 - 0.1									
	0.3 - 2.1	SILTY CLAY - red silty clay, MC<PL - becoming red mottled grey below 0.6m - becoming grey mottled red with ironstone gravel below 1.2m		D	0.4 - 0.5									
	2.1 - 3.0	SILTSTONE - extremely low strength, extremely weathered, dark brown siltstone with some ironstone banding - becoming very low to low strength, highly to moderately weathered below 2.4m		D	2.5									
	3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0									

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: LOC

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

- Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)	
BLK Block sample	U, Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	☼ Water level	V Shear vane (kPa)	

TEST PIT LOG

CLIENT: Vince and Elizabeth Pisciueneri
PROJECT: Proposed Residential Subdivision
LOCATION: 182 Raby Road, Gledswood Hills, NSW

SURFACE LEVEL: --
EASTING: 295990
NORTHING: 6234157

PIT No: 2
PROJECT No: 92228.00
DATE: 28/6/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)				
				Type	Depth	Sample	Results & Comments		5	10	15	20	
	0.05	TOPSOIL - dark brown clayey silt with rootlets		D	0.0								
	0.1	CLAYEY SILT - dark brown clayey silt with a trace of rootlets		D	0.1								
	0.2	SILTY CLAY - red silty clay, MC<PL		D	0.4								
		- becoming red mottled brown and grey below 0.7m		D	0.5								
	0.9	Pit discontinued at 0.9m - limit of investigation											
1								1					
2								2					
3								3					

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: LOC

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: No odour/staining noted

- Sand Penetrometer AS1289.6.3.3
- Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U _s	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	☼	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Vince and Elizabeth Pisciueneri
PROJECT: Proposed Residential Subdivision
LOCATION: 182 Raby Road, Gledswood Hills, NSW

SURFACE LEVEL: --
EASTING: 296022
NORTHING: 6234175

PIT No: 3
PROJECT No: 92228.00
DATE: 28/6/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic	Sampling & In Situ Testing			Water	Dynamic Penetrometer Test (blows per mm)									
				Type	Depth	Sample		Results & Comments	5	10	15	20					
	0.05	FILLING - red silt with basaltic gravel		D	0.0												
		SILTY CLAY - red silty clay, MC<PL		D	0.05												
		- with a trace of siltstone gravel below 0.5m		D	0.4												
				D	0.5												
	1	- becoming red mottled grey with ironstone gravel below 1.0m		D	1.0												
				D	1.5												
	1.8	SILTSTONE - extremely low to very low strength, extremely to moderately weathered, grey siltstone with ironstone banding		D	2.0												
	2			D	2.0												
		- becoming low strength, moderately weathered, dark brown below 2.3m		D	2.4												
	2.4	Pit discontinued at 2.4m - practical refusal on low strength siltstone		D	2.4												
	3																

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: LOC

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: No odour/staining noted

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)	
BLK Block sample	U _s Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	☼ Water level	V Shear vane (kPa)	

TEST PIT LOG

CLIENT: Vince and Elizabeth Pisciuneri
PROJECT: Proposed Residential Subdivision
LOCATION: 182 Raby Road, Gledswood Hills, NSW

SURFACE LEVEL: --
EASTING: 296018
NORTHING: 6234209

PIT No: 4
PROJECT No: 92228.00
DATE: 28/6/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)										
				Type	Depth	Sample	Results & Comments		5	10	15	20							
	0.0	FILLING - dark brown clayey silt with a trace of basaltic gravel and tiles		D*	0.0 0.01														
	0.2	SILTY CLAY - red brown silty clay, MC<PL																	
		- becoming mottled grey below 0.6m																	
	0.9	SILTSTONE - very low to low strength, highly to moderately weathered, grey brown siltstone with a trace of ironstone banding																	
1	1.0	Pit discontinued at 1.0m - limit of investigation																	
	2																		
	3																		

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: LOC

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: * Replicate sample BD2/280617 collected; No odour/staining noted

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)
BLK Block sample	U, Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)
D Disturbed sample	> Water seep	S Standard penetration test
E Environmental sample	⚡ Water level	V Shear vane (kPa)

TEST PIT LOG

CLIENT: Vince and Elizabeth Pisciueneri
PROJECT: Proposed Residential Subdivision
LOCATION: 182 Raby Road, Gledswood Hills, NSW

SURFACE LEVEL: --
EASTING: 296028
NORTHING: 6234208

PIT No: 5
PROJECT No: 92228.00
DATE: 28/6/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)				
				Type	Depth	Sample	Results & Comments		5	10	15	20	
	0.0 - 0.1	FILLING - brown clayey silt with basaltic gravel		D*									
	0.1 - 0.4	SILTY CLAY - red silty clay with a trace of tree roots, MC<PL - becoming mottled grey and brown below 0.8m		D	0.4								
	0.4 - 0.5			D	0.5								
	0.5 - 1.0			D	1.0								
	1.0 - 1.5	- becoming grey with ironstone gravel below 1.8m		D	1.5								
	1.5 - 2.0			D	2.0								
	2.0 - 2.5			D	2.5								
	2.5 - 2.6	SILTSTONE - very low to low strength, highly to moderately weathered, brown and red siltstone with ironstone banding											
	2.6 - 2.8	Pit discontinued at 2.8m - practical refusal on low strength siltstone		D	2.8								
	2.8 - 3.0												

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: LOC

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: * Replicate sample BD3/280617 collected; No odour/staining noted

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)	
BLK Block sample	U, Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	⚡ Water level	V Shear vane (kPa)	

TEST PIT LOG

CLIENT: Vince and Elizabeth Pisciueneri
PROJECT: Proposed Residential Subdivision
LOCATION: 182 Raby Road, Gledswood Hills, NSW

SURFACE LEVEL: --
EASTING: 296002
NORTHING: 6234207

PIT No: 6
PROJECT No: 92228.00
DATE: 28/6/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)					
				Type	Depth	Sample	Results & Comments		5	10	15	20		
	0.2	FILLING - dark brown clayey silt with a trace of siltstone cobbles		D	0.0 0.1									
		SILTY CLAY - red brown mottled grey silty clay, MC<PL		D	0.4 0.5									
	1	- becoming mottled grey with siltstone and ironstone gravel below 0.9m												
	1.1	Pit discontinued at 1.1m - limit of investigation												
	2													
	3													

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: LOC

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: No odour/staining noted

- Sand Penetrometer AS1289.6.3.3
- Cone Penetrometer AS1289.6.3.2



SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)
BLK Block sample	U _s Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)
D Disturbed sample	> Water seep	S Standard penetration test
E Environmental sample	☼ Water level	V Shear vane (kPa)

TEST PIT LOG

CLIENT: Vince and Elizabeth Pisciueneri
PROJECT: Proposed Residential Subdivision
LOCATION: 182 Raby Road, Gledswood Hills, NSW

SURFACE LEVEL: --
EASTING: 296002
NORTHING: 6234191

PIT No: 7
PROJECT No: 92228.00
DATE: 28/6/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)					
				Type	Depth	Sample	Results & Comments		5	10	15	20		
	0.1	FILLING - brown and red clayey silt with a trace of concrete and wood SILTY CLAY - red brown silty clay, MC<PL		D	0.0 0.1									
		- becoming mottled brown and grey below 0.6m		D	0.4 0.5									
1	1.0	Pit discontinued at 1.0m - limit of investigation												
	2													
	3													

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: LOC

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: No odour/staining noted

- Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)
BLK Block sample	U, Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)
D Disturbed sample	> Water seep	S Standard penetration test
E Environmental sample	⚡ Water level	V Shear vane (kPa)

TEST PIT LOG

CLIENT: Vince and Elizabeth Pisciuneri
PROJECT: Proposed Residential Subdivision
LOCATION: 182 Raby Road, Gledswood Hills, NSW

SURFACE LEVEL: --
EASTING: 295999
NORTHING: 6234180

PIT No: 8
PROJECT No: 92228.00
DATE: 28/6/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)									
				Type	Depth	Sample	Results & Comments		5	10	15	20						
	0.0 - 0.1	FILLING - brown and red clayey silt and silty clay with a trace of concrete		D*	0.0 0.1													
	0.3 - 0.5	SILTY CLAY - red mottled silty clay, MC<PL		D	0.4 0.5													
	0.9 - 1.0	SILTSTONE - very low to low strength, highly to moderately weathered, grey siltstone with some ironstone banding																
	1.0	Pit discontinued at 1.0m - limit of investigation																
	2.0																	
	3.0																	

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: LOC

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: * Replicate sample BD1/280617 collected; No odour/staining noted

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)
BLK Block sample	U, Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)
D Disturbed sample	> Water seep	S Standard penetration test
E Environmental sample	⚡ Water level	V Shear vane (kPa)

Appendix H

QA/QC

Appendix H

Data Quality Assurance and Quality Control Assessment

H1 Data Quality Indicators

Field and laboratory procedures were assessed against the following data quality indicators (DQIs):

Table H1: Data Quality Indicators

DQI	Performance Indicator	Acceptable Range
Precision		
Field considerations	SOPs appropriate and complied with	Field staff follow SOPs in the DP <i>Field Procedures Manual</i>
	field replicates	Precision average relative percent difference (RPD) result <5 times PQL, no limit; results >5 times PQL, 0% - 30%
Laboratory considerations	laboratory duplicates	Precision average RPD result <5 times PQL, no limit; results >5 times PQL, 0% - 50%
	laboratory-prepared volatile trip spikes	Recovery of 60-140%
Accuracy (bias)		
Field considerations	SOPs appropriate and complied with	Field staff to follow SOPs in the DP <i>Field Procedures Manual</i>
Laboratory considerations	Analysis of:	
	laboratory-prepared volatile trip spikes	Recovery of 60-140%
	Laboratory-prepared trip blanks (field blanks)	<PQL
	method blanks (laboratory blanks)	Recovery of 60-140%
	matrix spikes	Recovery of 70-130% (inorganics); 60-140% (organics)
	matrix spike duplicates	Recovery of 70-130% (inorganics); 60-140% (organics); Recovery 70 "low" to 130% "high" indicates interference
	surrogate spikes	Recovery of 70-130% (inorganics); 60-140% (organics)
	laboratory control samples	Recovery of 70-130% (inorganics); 60-140% (organics)
Completeness		
Field considerations	All critical locations sampled	All critical locations sampled in accordance with the DQO's (Appendix D)
	SOPs appropriate and complied with	Field staff to follow SOPs in the DP <i>Field Procedures Manual</i>
	Experienced sampler	Experienced DP Environmental Engineer to conduct field work and sampling
	Documentation correct	Maintain COC documentation at all times
	Sample holding times complied with	Sample holding times complied with

DQI	Performance Indicator	Acceptable Range
Laboratory considerations	All critical samples analysed according to DQO's	All critical locations analysed in accordance with the DQO's
	Appropriate methods and PQLs	Appropriate methods and PQLs have been used by the contract laboratory
	Sample documentation complete	Maintain COC documentation at all times
Comparability		
Field considerations	Same SOPs used on each occasion	Field staff to follow SOPs in the DP <i>Field Procedures Manual</i>
	Experienced sampler	Experienced DP Environmental Scientist/Engineer to conduct field work and sampling
Laboratory considerations	Same types of samples collected	Same types of samples collected
	Sample analytical methods used (including clean-up)	Methods to be NATA accredited
	Sample PQLs (justify/quantify if different)	Consistent PQLs to be used
	Same laboratories (justify/quantify if different)	Same analytical laboratory for primary samples to be used
Representativeness		
Field considerations	Appropriate media sampled according to DQO's (Appendix D)	Appropriate media sampled according to DQO's (Appendix D)
	All media identified in DQO's sampled	All media identified in DQO's sampled
Laboratory considerations	All samples analysed according to DQO's	All samples analysed according to DQO's

Notes to Table 1: SOP – Standard Operating Procedure
 DQO – Data Quality Objectives (Appendix D)

H2 Field Quality Assurance and Quality Control

The field QC procedures for sampling as prescribed in the standard operating procedures (SOPs) in the Douglas Partners *Field Procedures Manual* were followed at all times during the assessment. All sample locations and media were in accordance with the DQO (i.e. as per scope of work in DP's proposal).

H2.1 Sampling Team

Sampling was undertaken by an experienced DP Environmental Scientist.

H2.2 Sample Collection and Weather Conditions

Sample collection procedures and dispatch are reported in body of the report. Sampling was undertaken during sunny and hot conditions.

H2.3 Logs

Logs for each soil sampling location were recorded in the field. The individual samples were recorded on the field logs along with the sample identity, location, depth, initials of sampler, duplicate locations, duplicate type and site observations. Logs are presented in Appendix E.

H2.4 Chain-of-Custody

Chain-of-Custody information was recorded on the Chain-of-Custody (COC) sheets and accompanied samples to the analytical laboratory. Signed copies of COCs are presented in Appendix F, prior to the laboratory certificates.

H2.5 Sample Splitting Techniques

Replicate samples were collected in the field as a measure of precision of the results. Field replicates samples for soil were collected from the same location and an identical depth to the primary sample. Equal portions of the primary sample were placed into the sampling jars and sealed. The sample was not homogenised in a bowl to prevent the loss of volatiles from the soil. Replicate samples were labelled with a DP identification number, recorded on DP logs, so as to conceal their relationship to their primary sample from the analysing laboratory.

H2.6 Duplicate Frequency

Field sampling comprised intra-laboratory duplicate sampling, at a rate of approximately one duplicate sample for every ten primary samples.

H2.7 Relative Percentage Difference

A measure of the consistency of results for field samples is derived by the calculation of relative percentage differences (RPDs) for duplicate samples. RPDs have only been considered where a concentration is greater than five times the practical quantitation limit (PQL).

H2.7.1 Intra-Laboratory Replicate Analysis

Replicates were tested to assess data 'precision' and the reproducibility within the primary laboratory (Envirolab Pty Ltd) as a measure of consistency of sampling techniques. One replicate sample was analysed. The Relative Percent Difference (RPD) between replicate results is used as a measure of laboratory reproducibility and is given by the following:

$$RPD = \frac{(\text{Replicate result 1} - \text{Replicate result 2})}{(\text{Replicate result 1} + \text{Replicate result 2})/2} \times 100$$

The RPD can have a value between 0% and 200%. An RPD data quality objective of up to 30% is considered to be within the acceptable range.

The comparative results of analysis between primary and duplicate samples are summarised in the table below. Where one or both results were below the PQL, an RPD was not calculated.

Table H2: RPD Results

Sample	As	Cd	Cr	Cu	Pb	Hg	Ni	Zn
TP8/0.0-0.1	5	<0.4	17	26	31	<0.1	11	110
BD1/280617	4	<0.4	17	25	22	<0.1	9	51
Difference	1	-	0	1	9	-	2	59
RPD (%)	22.2	-	0	3.9	33.9	-	20	73.3

Sample	As	Cd	Cr	Cu	Pb	Hg	Ni	Zn
TP5/0.0-0.1	5	<0.4	18	19	120	<0.1	7	67
BD3/280617	5	<0.4	20	18	19	<0.1	7	53
Difference	0	-	2	1	101	-	0	14
RPD (%)	0	-	10.5	5.4	145.3	-	0	23.3

Notes: **Bold RPD >30**
 Concentration of either paired duplicated not greater than five times PQL

All RPD values were within the acceptable range of ± 30 with the exception of:

- Lead and zinc in laboratory duplicate pair TP8 and BD1; and
- Lead in laboratory duplicate pair TP5 and BD3.

The exceedances are considered likely due to the heterogeneity of the soil and are not considered to affect the results of the investigation.

Overall, the intra-laboratory and inter-laboratory comparisons indicate that the sampling technique was consistent and repeatable and therefore acceptable precision was achieved.

H3 Laboratory Quality Assurance and Quality Control

Envirolab Services was used as the primary laboratory. Appropriate methods and PQLs were used by the laboratory. Sample methods were NATA accredited (noting the exception for fibrous asbestos (FA) and asbestos fines (AF) quantification to 0.001% w/w).

H3.1 Surrogate Spike

This sample is prepared by adding a known amount of surrogate, which behaves similarly to the analyte, prior to analysis to each sample. The recovery result indicates the proportion of the known concentration of the surrogate that is detected during analysis and is used to assess data 'accuracy'. Results within acceptance limits indicate that the extraction technique was effective.

H3.2 Reference and Daily Check Sample Results – Laboratory Control Sample (LCS)

This sample comprises spiking either a standard reference material or a control matrix (such as a blank of sand or water) with a known concentration of specific analytes. The LCS is then analysed and results compared against each other to determine how the laboratory has performed with regard to sample preparation and analytical procedure and is used to assess data 'accuracy'. LCSs are analysed at a frequency of one in 20, with a minimum of one analysed per batch.

H3.3 Laboratory Duplicate Results

These are additional portions of a sample which are analysed in exactly the same manner as all other samples and is used to assess data 'precision'. The laboratory acceptance criteria for duplicate samples is: in cases where the level is $<5 \times PQL$ - any RPD is acceptable; and in cases where the level is $>5 \times PQL$ - 0-50% RPD is acceptable.

H3.4 Laboratory Blank Results

The laboratory blank, sometimes referred to as the method blank or reagent blank is the sample prepared and analysed at the beginning of every analytical run, following calibration of the analytical apparatus and is used to assess data 'accuracy'. This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, it can be determined by processing solvents and reagents in exactly the same manner as for samples. Laboratory blanks are analysed at a frequency of 1 in 20, with a minimum of one per batch.

H3.5 Matrix Spike

This is a sample duplicate prepared by adding a known amount of analyte prior to analysis, and then treated exactly the same as all other samples. The recovery result indicates the proportion of the known concentration of the analyte that is detected during analysis and is used to assess data 'accuracy'. The laboratory acceptance criteria for matrix spike samples are generally 70 - 130% for inorganic/metals; and 60 - 140% for organics; and 10 - 140% for SVOC and speciated phenols.

H3.6 Results of Laboratory QC

The laboratory QC for surrogate spikes, LCS, laboratory duplicate results, laboratory blanks and matrix spikes results are reported in the laboratory certificate of analysis.

The laboratory quality control samples were within the laboratory acceptance criteria. It is considered that an acceptable level of laboratory precision and accuracy was achieved and that surrogate spikes, LCS, laboratory duplicate results, laboratory blanks and matrix spike results were of an acceptable level overall. On the basis of this assessment, the laboratory data set is considered to have complied with the DQIs.

H3.7 Overall Assessment of QA/QC

Specific limits associated with sample handling and laboratory QA/QC were assessed against the DQIs and a summary of compliance is presented in the following table.

Table H5: Data Quality Indicators

DQI	Performance Indicator	Acceptable Range	Compliance
Precision			
Field considerations	SOPs appropriate and complied with	Field staff follow SOPs in the DP <i>Field Procedures Manual</i>	C
	field replicates	Precision average relative percent difference (RPD) result <5 times PQL, no limit; results >5 times PQL, 0% - 30%	C
Laboratory considerations	laboratory duplicates	Precision average RPD result <5 times PQL, no limit; results >5 times PQL, 0% - 50%	C
	laboratory-prepared volatile trip spikes	Recovery of 60-140%	C
Accuracy (bias)			
Field considerations	SOPs appropriate and complied with	Field staff to follow SOPs in the DP <i>Field Procedures Manual</i>	C
Laboratory considerations	Analysis of:		
	laboratory-prepared volatile trip spikes	Recovery of 60-140%	C
	laboratory-prepared trip blanks (field blanks)	<PQL	C
	method blanks (laboratory blanks)	Recovery of 60-140%	C
	matrix spikes	Recovery of 70-130% (inorganics); 60-140% (organics)	C
	matrix spike duplicates	Recovery of 70-130% (inorganics); 60-140% (organics); Recovery 70 "low" to 130% "high" indicates interference	C
	surrogate spikes	Recovery of 70-130% (inorganics); 60-140% (organics)	C
	laboratory control samples	Recovery of 70-130% (inorganics); 60-140% (organics)	C
Completeness			
Field considerations	All critical locations sampled	All critical locations sampled in accordance with the SAQP	C
	SOPs appropriate and complied with	Field staff to follow SOPs in the DP <i>Field Procedures Manual</i>	C
	Experienced sampler	Experienced DP Environmental Scientist/Engineer to conduct field work and sampling	C
	Documentation correct	Maintain COC documentation at all times	C
	Sample holding times complied with	Sample holding times complied with	C

DQI	Performance Indicator	Acceptable Range	Compliance
Laboratory considerations	All critical samples analysed according to SAQP	All critical locations analysed in accordance with the SAQP	C
	Appropriate methods and PQLs	Appropriate methods and PQLs have been used by the contract laboratory	C
	Sample documentation complete	Maintain COC documentation at all times	C
Comparability			
Field considerations	Same SOPs used on each occasion	Field staff to follow SOPs in the DP <i>Field Procedures Manual</i>	C
	Experienced sampler	Experienced DP Environmental Scientist/Engineer to conduct field work and sampling	C
Laboratory considerations	Same types of samples collected (filtered)	Field filtering for metals	NA
	Sample analytical methods used (including clean-up)	Methods to be NATA accredited	C
	Sample PQLs (justify/quantify if different)	Consistent PQLs to be used	C
	Same laboratories (justify/quantify if different)	Same analytical laboratory for primary samples to be used	C
Representativeness			
Field considerations	Appropriate media sampled according to DQOs	Appropriate media sampled according to DQOs	C
	All media identified in DQOs sampled	All media identified in DQOs sampled	C
Laboratory considerations	All samples analysed according to DQOs	All samples analysed according to DQOs	C

Notes to Table 5:

- C – Compliance
- PC – Partial Compliance
- NC – Non-Compliance
- NA – Not Applicable
- SOP – Standard Operating Procedure
- DQO – Data Quality Objectives

A review of the adopted QA/QC procedures and results indicates that the DQIs have generally been met with compliance and a minor partial-compliance. On this basis, the sampling and laboratory methods used during the investigation were found to meet DQOs for this project.

Appendix I

About This Report

About this Report

Douglas Partners



Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

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This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;

- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Douglas Partners



Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.