Premise Australia Pty Ltd
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Reference: 219391_LET_001A.docx

6 September 2019

The General Manager
Orange City Council
PO Box 35
ORANGE NSW 2800

Attention: Paul Johnston

Dear Mr Johnston

PROPOSED REGIONALLY SIGNIFICANT DEVELOPMENT APPLICATION FOR MULTI-DWELLING DEVELOPMENT AT EMERALD STREET, ORANGE (LOT 99 DP1234441)

Please find attached to this correspondence such necessary information to support a development application relating to a proposed multi-dwelling development, providing affordable and social housing, to be located at Emerald Street, Orange (Lot 99 DP1234441).

The proposal represents regionally significant development on the basis that it proposes affordable housing with a capital investment value of more than $5 million.

Please call David Standley for the applicant, who will pay the applicable DA fees. David's contact number is 0419 168 668.

Please do not hesitate to contact the undersigned if you have any questions regarding the enclosed.

Yours faithfully
Premise Australia Pty Ltd

DAVID WALKER
Senior Town Planner
Attachments: 3

1. Completed DA form
2. Fee quote
3. 5 x copies of the Statement of Environmental Effects including drawings and material details

ORANGE CITY COUNCIL

Quotation

Orange City Council
PO Box 35
ORANGE NSW 2800
Phone: (02) 6393 8000
ABN:85 985 402 386

Applicant : CO. Premise,
154 Peisley Street
ORANGE NSW 2800

Quote No. : **20608**
Quote Date : **5/09/2019**
Expiry Date : **30/06/2020**
Officer : **Lynette Thornberry**

Quote Type DA Only

Description Lot 99 Emerald Street - DA Only - Multi Dwelling Development - $5,303,520.00

		GST	Amt Inc. GST
ADVFEE	Advertising Fee	$0.00	$376.00
SFDA	Development Application	$0.00	$5,417.05
SFPF	Plan First	$0.00	$3,394.25

Orange City Council Direct Deposit Details
BSB: 062-587 A/C No. 0000 0120
Reference: **DAQ20608 (Insert Payers Name)**

	GST	QUOTE TOTAL
Quote Total	**$0.00**	**$9,187.30**

NOTE: This estimation of fees is given based on the information provided in the written request submitted by the applicant. Whilst Council endeavours to ensure that the informaton provided is accurate, such information is given in good faith and no responsibility is taken for any errors that may occur.
Council will send an account for any additional inspections that may be required above the fee package quoted. Council will invoice the applicant, for any additional inspection carried out, at the completion of the work.
This quotation **does not** include any engineering plan approval fees. Engineering fees will be calculated when and if engineering plans are required as part of development consent.
The fees that will need to be paid with any application will be calculated on the information submitted with a **complete application**. This estimation of fees is provided as an administative function only, no preliminary review of development controls have been referenced in the provision of this information.
Where this information is important, applicants are advised to establish the fees that will apply first hand. Copies of Council's Schedule of Fees may be obtained from Council's Customer Service counter or from Council's website (www.orange.nsw.gov.au)
Long Service Leave Levy and Plan First are NSW Government Fees and may be altered without notice.
All other fees are valid until 30 June in the financial year applicable to the date on which this quotation was issued.

STATEMENT OF ENVIRONMENTAL EFFECTS

PROPOSED MULTI DWELLING HOUSING DEVELOPMENT

LOT 99 DP1234441, 9 PEARL COURT, ORANGE

Premise

PREPARED FOR:

HOUSING PLUS

SEPTEMBER 2019

ENGINEERING ENVIRONMENT AGRICULTURE

Report Title:	*Statement of Environmental Effects*
Project:	*Proposed Multi Dwelling Housing Development*
Client:	*Housing Plus*
Report Ref.:	*219391_SEE_001B.docx*
Status:	*Final*
Issued:	*5 September 2019*

Premise Australia Pty Ltd (**Premise**) and the authors responsible for the preparation and compilation of this report declare that we do not have, nor expect to have a beneficial interest in the study area of this project and will not benefit from any of the recommendations outlined in this report.

The preparation of this report has been in accordance with the project brief provided by the client and has relied upon the information, data and results provided or collected from the sources and under the conditions outlined in the report.

All maps, plans, and cadastral information contained within this report are prepared for the exclusive use of Housing Plus to accompany this report for the land described herein and are not to be used for any other purpose or by any other person or entity. No reliance should be placed on the information contained in this report for any purposes apart from those stated therein.

Premise accepts no responsibility for any loss, damage suffered or inconveniences arising from, any person or entity using the plans or information in this study for purposes other than those stated above.

TABLE OF CONTENTS

DRAWINGS

Premise Architecture

Drawing A000 TITLE SHEET AND SITE LOCALITY
Drawing A001 SITE DETAIL SURVEY
Drawing A002 SITE ANALYSIS PLAN
Drawing A003 PROPOSED GROUND LEVEL SITE PLAN
Drawing A004 PROPOSED ROOF LEVEL SITE PLAN
Drawing A005 PROPOSED SITE AREAS PLAN
Drawing A006 SITE VEHICLE PATHWAYS SHEET 1 OF 2
Drawing A007 SITE VEHICLE PATHWAYS SHEET 2 OF 2
Drawing A008 STREETSCAPE SHEET 1 OF 2
Drawing A009 STREETSCAPE SHEET 2 OF 2
Drawing A010 SOLAR ACCESS SITE PLAN
Drawing A011 SHADOW DIAGRAMS SHEET 1 OF 4
Drawing A012 SHADOW DIAGRAMS SHEET 2 OF 4
Drawing A013 SHADOW DIAGRAMS SHEET 3 OF 4
Drawing A014 SHADOW DIAGRAMS SHEET 4 OF 4
Drawing A015 TYPE #1 UNIT PLAN
Drawing A016 TYPE #1 UNIT ELEVATIONS
Drawing A017 TYPE #2 UNIT PLAN
Drawing A018 TYPE #2 UNIT ELEVATIONS
Drawing A019 TYPE #3 UNIT PLAN
Drawing A020 TYPE #3 UNIT ELEVATIONS
Drawing A021 TYPE #4 UNIT PLAN
Drawing A022 TYPE #4 UNIT ELEVATIONS
Drawing A023 TYPE #5 UNIT PLAN
Drawing A024 TYPE #5 UNIT ELEVATIONS
Drawing A025 TYPE #6 UNIT PLAN

Drawing A026 TYPE #6 UNIT ELEVATIONS
Drawing A027 TYPE #7 UNIT PLAN
Drawing A028 TYPE #7 UNIT ELEVATIONS
Drawing A029 EXTERNAL MATERIALS SCHEDULE

Premise Civil Engineering

Drawing C001 TITLE SHEET AND SCHEDULE OF DRAWINGS
Drawing C002 EXISTING SITE PLAN
Drawing C003 PROPOSED SITE PLAN
Drawing C004 CONCEPT SEWER RETICULATION PLAN
Drawing C005 CONCEPT STORMWATER RETICULATION PLAN
Drawing C006 CONCEPT WATER RETICULATION PLAN

House of Manuela Landscaping Drawings
Page 1 of 2 – Landscape Plan
Page 2 of 2 – Landscape Plan

TABLES

FIGURES

PLATES

APPENDICES

APPENDIX A
Deposited Plan

APPENDIX B
Phase 1 Contamination Assessment

APPENDIX C
CIV Estimate

APPENDIX D
Aboriginal Heritage Information Management System Search Results

APPENDIX E
BASIX/NaTHERS

APPENDIX F
Geotechnical report

APPENDIX G
Planning Note PN 11-003

1. INTRODUCTION

1.1 BACKGROUND

Premise has been commissioned by Housing Plus to prepare a Statement of Environmental Effects (SEE) to accompany a Development Application (DA) for a multi-dwelling housing development at Lot 99 DP1234441, 9 Pearl Court, Orange.

1.2 SCOPE OF THIS REPORT

This SEE has been prepared pursuant to Clause 50 and Part 1 of Schedule 1 of the *Environmental Planning and Assessment Regulation 2000* and is provided in the following format.

- **Section 2** of this report provides a description of the subject site and its locality.
- **Section 3** outlines the proposed development.
- **Section 4** details the planning framework applicable to the subject site and proposed development.
- **Section 5** identifies the impacts of the proposed development.
- **Section 6** provides a conclusion to the SEE.

2. THE SITE & ITS LOCALITY

2.1 THE SITE

The site (depicted in **Figure 1**) is formed of Lot 99 in DP1234441, 9 Pearl Court, Orange. The site has an area of approximately 5,216 square metres and is located on the northern western side of the Pearl Court and Emerald Street intersection and is bounded to the south, east and west by zoned and developed residential land. Despite the residential zoning, land to the south-west is approved for a medical centre (currently under construction) and land to the west is approved for a child care centre (no work having commenced at the time of preparation of this report).

Land to the north and north-west is zoned and in use for recreation purposes.

The deposited plan is attached as **Appendix A.**

The site is located to the east of the North Orange Shopping Centre and north of the Northern Distributor Road.

The site is generally flat with a minor fall from north to south. The site is devoid of significant trees, with only landscape planting occurring on site. An existing dwelling and sheds are located on site. Approval to demolish these has been granted by Orange City Council via DA 4/2015(2).

An overhead electricity transmission line traverses the site as reflected in **Figure 1**.

Figure 1: The subject site outlined in red (Source: Nearmap)

2.2 THE LOCALITY

The site is located in North Orange (depicted in **Figure 2**), approximately 3.5 kilometres from the Orange CBD. The characteristic of North Orange is predominantly residential, with areas of private recreation towards the centre of the suburb.

Located to the west of the subject site is the North Orange Shopping Centre, the Northern Distributor Road to the south and the Waratah Sporting Fields to the north. The land adjacent to the west is understood to be approved for a childcare centre.

The land directly to the southwest has recently been developed as residential dwellings. The adjacent lands to the south and to the north are currently vacant and are zoned R1 – General Residential and R2 – Low Density Residential respectively.

Figure 2: The subject site outlined red, shown in context (Source: Nearmap)

3. THE DEVELOPMENT

3.1 DEVELOPMENT DESCRIPTION

The proposed development involves a multi-unit dwelling development providing a mix of social and affordable housing. The project is part of the Social and Affordable Housing Fund (2) program, which seeks to provide 1,200 homes in NSW, around 250 of which are to be located in the Orange, Dubbo and Bathurst Council areas. The aim is to provide the housing by the end of 2020.

The development proposes the development of 19 self-contained stand alone dwellings, consisting of seven (7) x one-bedroom dwellings and 12 x two-bedroom dwellings.

18 of the 19 homes would be for affordable/social purposes, with the anticipated breakdown of affordable to social housing being 30/70.

All dwellings would be single-storey, each with an attached carport, parking for one or two vehicles (depending on the size of the dwelling) and private open space. All dwellings would have room for the storage of private waste bins and a communal area would be provided at the entrance to the property, which would temporarily store bins on waste collection day. A contractor of Housing Plus would collect bins and put them away on bin days.

Landscaping would be implemented throughout the site in order to improve the aesthetic.

The development would also include the installation and augmentation of appropriate services, including water, electricity, gas, telecommunications and sewage. An internal access road would be

constructed to provide access to each dwelling. The road would be built to the appropriate standards along with suitable integrated stormwater drainage.

The overhead ETL currently traversing the block would be decommissioned, subject to detailed design by a level 3 electrical designer.

4. STATUTORY PLANNING FRAMEWORK

4.1 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

4.1.1 AIMS & OBJECTIVES

In New South Wales (NSW), the relevant planning legislation is the *Environmental Planning and Assessment Act 1979* (EP&A Act). The EP&A Act instituted a system of environmental planning and assessment in NSW and is administered by the Department of Planning & Environment (DP&E). In 2017, the Act was amended to provide a range of updated objects. The objects of the EP&A Act are:

> *(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,*
>
> *(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,*
>
> *(c) to promote the orderly and economic use and development of land,*
>
> *(d) to promote the delivery and maintenance of affordable housing,*
>
> *(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,*
>
> *(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),*
>
> *(g) to promote good design and amenity of the built environment,*
>
> *(h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,*
>
> *(i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,*
>
> *(j) to provide increased opportunity for community participation in environmental planning and assessment.*

The proposed development is not considered to be antipathetic to the above objects.

4.1.2 SECTION 1.7

Section 1.7 of the EP&A Act requires consideration of Part 7 of the *Biodiversity Conservation Act 2016* (BC Act). Part 7 of the BC Act relates to an obligation to determine whether a proposal is likely to significantly affect threatened species. A development is considered to result in a significant impact in the following assessed circumstances:

Table 4.1 – Section 1.7

Test	Assessment
(a) it is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in section 7.3, or	A desktop assessment confirms that the site has previously been disturbed and there are no threatened species or ecological communities located on the site – refer **Section 5.13**

Table 4.1 – Section 1.7

Test	Assessment
(b) the development exceeds the biodiversity offsets scheme threshold if the biodiversity offsets scheme applies to the impacts of the development on biodiversity values, or	Clearing of the site is approved by extant approved DA 4/2015(2) and as such the consent for clearing in relation to this DA is not required. In any event, the development does not exceed the biodiversity offset threshold. No clearing of threatened species or ecological communities is anticipated.
(c) it is carried out in a declared area of outstanding biodiversity value	The site is not a declared area of outstanding biodiversity value.

Source: Environmental Planning and Assessment Act 1979

4.1.3 SUBORDINATE LEGISLATION

The EP&A Act facilitates the preparation of subordinate legislation, consisting of:

- Environmental Planning Instruments (EPIs) (including State Environmental Planning Policies (SEPP), Local Environmental Plans (LEP), and deemed EPIs); and
- Development Control Plans (DCP).

In relation to the proposed development, the relevant subordinate legislation includes:

- *State Environmental Planning Policy No. 44 – Koala Habitat Protection;*
- *State Environmental Planning Policy No. 55 – Remediation of Land;*
- *State Environmental Planning Policy (Vegetation in Non Rural Areas) 2017;*
- *State Environmental Planning Policy (Affordable Rental Housing) 2009;*
- *State Environmental Planning Policy (State and Regional Development) 2011;*
- *Orange Local Environmental Plan 2011; and*
- *Orange Development Control Plan 2004.*

The requirements of these are discussed in the following sections.

4.1.4 INTEGRATED DEVELOPMENT

Section 4.46 of the EP&A Act states that development requiring consent and another activity approval is defined as Integrated Development. The proposed development is not classified as Integrated Development on the basis that no other consents or approvals are required to facilitate the development.

4.2 ENVIRONMENTAL PLANNING INSTRUMENTS

4.2.1 ORANGE LOCAL ENVIRONMENTAL PLAN 2011

4.2.1.1 Introduction

The site is located within the Orange Local Government Area (LGA) and the *Orange Local Environmental Plan 2011* (LEP) is the appropriate environmental planning instrument applying to the site. The aims of the LEP are:

(1) This Plan aims to make local environmental planning provisions for land in Orange in accordance with the relevant standard environmental planning instrument under section 33A of the Act.

(2) The particular aims of this Plan are as follows:

(a) To encourage development that complements and enhances the unique character of Orange as a major regional centre boasting a diverse economy and offering an attractive regional lifestyle,

(b) to provide for a range of development opportunities that contribute to the social, economic and environmental resources of Orange in a way that allows the needs of present and future generations to be met by implementing the principles of ecologically sustainable development,

(c) To conserve and enhance the water resources on which Orange depends, particularly water supply catchments,

(d) To manage rural land as an environmental resource that provides economic and social benefits for Orange,

(e) To provide a range of housing choices in planned urban and rural locations to meet population growth,

(f) To recognise and manage valued environmental heritage, landscape and scenic features of Orange.

Any proposed development of the site must give consideration to these aims.

A review of mapping associated with the LEP identifies a number of constraints to be considered in the development of the site, together with relevant clauses of the LEP that require consideration. These are set out in the following sections.

4.2.1.2 Mapping

LEP mapped constraints are identified as per **Table 4.2**.

Table 4.2 – LEP Mapping Review

Map	Relevance	Section of Report Discussed
Land Application Map	The site is identified as located within the Orange LGA	No further discussion required
Land Zoning Map	The site is zoned R1 – General Residential	Refer **Section 4.2.1.3**
Lot Size Map	No minimum lot size applies.	No discussion required
Terrestrial Biodiversity Map, Watercourse Map, Groundwater Vulnerability Map	The site is identified as containing groundwater vulnerable land The site does not contain a sensitive watercourse The land does not contain land mapped as containing sensitivity terrestrial biodiversity	Refer **Section 4.2.1.7** No discussion required No discussion required
Urban Release Area	The subject site is not mapped as being located within an Urban Release Area (although noting the land to the north is so mapped)	No discussion required
Heritage	There are no mapped heritage items on or in the general vicinity of the site. The closest item is Item I308, located approximately 140 metres to the south of the site.	Refer **Section 4.2.1.4**

The above matters, together with relevant clauses within the LEP, are discussed in the following sections.

4.2.1.3 Zoning And Permissibility

Pursuant to the LEP, the site is zoned R1 – General Residential.

The objectives of the R1 zone are as follows:

- *To provide for the housing needs of the community.*
- *To provide for a variety of housing types and densities.*
- *To enable other land uses that provide facilities or services to meet the day to day needs of residents.*
- *To ensure development is ordered in such a way as to maximise public transport patronage and encourage walking and cycling in close proximity to settlement.*
- *To ensure that development along the Southern Link Road has an alternative access.*

The proposed development is consistent with the above objectives of the LEP.

The proposal is characterised from a land use planning perspective as multi-dwelling housing. Whilst the development proposes the provision of affordable housing, affordable housing is not in and of itself a land use for which development consent can be granted. The Department of Planning Note PN 11-003 *Preparing LEPs using the Standard Instrument: definitions* confirms this at Attachment 3 (**Appendix G**).

As such, specific consent for use as affordable housing is neither required nor sought via this application. The use as affordable housing does however has relevance in determining the appropriate consent authority and this is further discussed in **Section 4.2.2.4**.

A review of the LEP confirms the proposed development of the site for the purposes of multi-dwelling housing to be permissible within the R1 zone, subject to gaining Council consent.

Pursuant to the LEP, multi-dwelling housing is defined as follows:

> ***multi dwelling housing*** *means 3 or more dwellings (whether attached or detached) on one lot of land, each with access at ground level, but does not include a residential flat building.*
>
> ***Note.***
>
> *Multi dwelling housing is a type of* ***residential accommodation****—see the definition of that term in this Dictionary.*

Clause 4.1B of the LEP states with respect to multi-dwelling housing:

> *(1) The objective of this clause is to achieve planned residential density in certain zones.*
> *(2) Development consent may be granted to development on a lot in a zone shown in Column 2 of the Table to this clause for a purpose shown in Column 1 of the Table opposite that zone, if the area of the lot is equal to or greater than the area specified for that purpose and shown in Column 3 of the Table.*
> *(3) This clause does not apply to land in the Shiralee Urban Release Area.*
> *(4) In this clause,* ***Shiralee Urban Release Area*** *means the land in South Orange identified as "Area 1" on the Lot Size Map.*

Column 1	***Column 2***	***Column 3***
Dual occupancy	*Zone R1 General Residential*	*800 square metres*
Dual occupancy	*Zone R2 Low Density Residential*	*800 square metres in areas without a minimum lot size on the Lot Size Map*
Dual occupancy	*Zone R2 Low Density Residential*	*1,200 square metres in areas with a minimum lot size on the Lot Size Map*
Dual occupancy	*Zone R3 Medium Density Residential*	*600 square metres*
Multi dwelling housing	*Zone R1 General Residential*	*1,250 square metres*
Multi dwelling housing	*Zone R3 Medium Density Residential*	*800 square metres*

The subject site has an area of greater than 1,250 square metres and is therefore compliant with the requirements of clause 4.1B. The development is therefore permissible with consent.

4.2.1.4 Heritage

Clause 5.10 of the LEP relates to heritage and seeks to:

(a) to conserve the environmental heritage of Orange,

(b) to conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views,

(c) to conserve archaeological sites,

(d) to conserve Aboriginal objects and Aboriginal places of heritage significance.

By reference to **Figure 3** the site does not contain any local or state significant heritage items and is not located directly adjacent to any items. The closest item is mapped item I308 which is noted via Schedule 5 of the LEP as Emmaville, being located at 56 Farrell Road (Lot 11 DP1180604). The subject site once formed part of Lot 11 however the land was excised from Lot 11 via a historic development consent.

Figure 3: Heritage context of subject site (Source: NSW Department of Planning & Environment)

As the land is not affected by the mapped heritage item, consideration of clause 5.10 is not explicitly required. It is further noted that the mapped land has since been redeveloped and the historic values of the land removed. The proposed development would have further detrimental impacts on this site given the absence of retained heritage value.

4.2.1.5 Earthworks

The site is generally flat in nature and extensive earthworks are not expected to be required to facilitate the development. Council have confirmed via pre-DA discussions that on site stormwater detention is

not required given the arrangement of regional stormwater management systems in the locality, further minimising the need for extensive earthworks.

Notwithstanding, Clause 7.1 of the LEP may apply to any future development in the event earthworks are required as a result of detailed design. Clause 7.1(3) states that a consent authority must consider the following matters in the determination of an application for development consent involving earthworks:

> *(3) Before granting development consent for earthworks, the consent authority must consider the following matters:*
>
> *(a) the likely disruption of, or any detrimental effect on, existing drainage patterns and soil stability in the locality of the development,*
>
> *(b) the effect of the development on the likely future use or redevelopment of the land,*
>
> *(c) the quality of the fill or the soil to be excavated, or both,*
>
> *(d) the effect of the development on the existing and likely amenity of adjoining properties,*
>
> *(e) the source of any fill material and the destination of any excavated material,*
>
> *(f) the likelihood of disturbing relics,*
>
> *(g) the proximity to and potential for adverse impacts on any waterway, drinking water catchment or environmentally sensitive area,*
>
> *(h) any measures proposed to minimise or mitigate the impacts referred to in paragraph (g).*
>
> *Note. The National Parks and Wildlife Act 1974, particularly section 86, deals with disturbing or excavating land and Aboriginal objects.*

In the context of the above matters, the following is noted:

(a) Earthworks associated with the proposed development are limited to minor levelling works to provide for dwelling development. Minor earthworks associated with dwelling development is unlikely to lead to a detrimental impact on drainage patterns. Soil stability will be maintained during construction through the appropriate use of erosion and sediment control measures. Additional details of ESCP measures would be provided in conjunction with detailed design plans at construction certificate stage.

(b) The proposed development provides for the provision of 19 affordable and social residential dwellings, adding to the supply of this form of residential development in Orange. The proposed earthworks are necessary to facilitate the residential development of the land and are therefore considered positive.

(c) Cut and fill on the site would be balanced to ensure that removal of overburden off-site or the importation of fill from off-site is minimised. This is subject to detailed design. Given the flat nature of the site, quantities of either cut or fill would be minimal.

(d) The site is bounded by residential zoned land to the south, west and east. The very minor nature of required earthworks ensures that impacts to these neighbouring properties are unlikely.

(e) No fill is anticipated, and any excess cut (not expected) would be disposed of at an appropriate waste management facility – refer **Section 5.23**.

(f) Desktop investigations with respect to heritage have not identified any likelihood of the site containing any items of Aboriginal or non-Aboriginal heritage – refer **Section 5.6**.

(g) Stormwater management in the form of inter-allotment drainage forms part of this application and all proposed lots would drain to existing regional stormwater infrastructure within the overarching suburb.

(h) As above.

On the basis of the above, the provisions of clause 7.1 are satisfied.

4.2.1.6 Stormwater Management

Clause 7.3 of the LEP aims to minimise the impacts of urban stormwater on the land to which the development applies, adjoining properties, native bushland and receiving waters. Part (3) of clause 7.3 states *inter alia:*

> *(3) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development:*
>
> *(a) Is designed to maximise the use of water permeable surfaces on the land having regard to the soil characteristics affecting on-site infiltration of water, and*
>
> *(b) Includes, where practical, on-site stormwater retention for use as an alternative supply to mains water, groundwater or river water, and*
>
> *(c) Avoids any significant impacts of stormwater runoff on adjoining downstream properties, native bushland and receiving waters, or if that impact cannot be reasonably avoided, minimises and mitigates the impact.*

As a result of discussions with Council staff it is confirmed that on site stormwater detention measures are not required. Concept stormwater design is provided via **Premise Engineering Drawing C005** which confirms that the site can function appropriately in accordance with Council's requirements. Landscaping on the site has been maximised to ensure retention of stormwater on site where possible. Impermeable areas would drain off site at controlled rates to regional infrastructure.

On the above basis, the proposed development is consistent with the requirements of clause 7.3.

4.2.1.7 Groundwater Vulnerability

The site is mapped via the Groundwater Vulnerable Land via the LEP Groundwater Vulnerability Map.

Clause 7.6 of the LEP applies to land mapped as groundwater vulnerable.

Sub-clauses 7.6(3) and (4) state:

> *(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider:*
>
> *(a) whether or not the development (including any on-site storage or disposal of solid or liquid waste and chemicals) is likely to cause any groundwater contamination or have any adverse effect on groundwater dependent ecosystems, and*
>
> *(b) the cumulative impact (including the impact on nearby groundwater extraction for potable water supply or stock water supply) of the development and any other existing development on groundwater.*
>
> *(4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:*
>
> *(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or*
>
> *(b) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact,*
>
> *(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.*

Development of the site for multi-dwelling development purposes is unlikely to give rise to impacts to sensitive groundwater on the basis that all dwellings would be connected to reticulated sewer and no extraction of groundwater would occur.

Specific matters outlined in clause 7.6 are addressed as follows:

- the development would not entail any on-site storage or disposal of solid or liquid waste and chemicals and is therefore unlikely to cause any groundwater contamination or have any adverse effect on groundwater dependent ecosystems;
- the prevailing form of development in this locality is residential development, connected to Council's reticulated sewer network. Cumulative impacts associated with the proposed development and those surrounding it are not expected to be increased as a result of the proposal.
- The proposed development has been carefully designed, sited and would be managed to avoid any significant adverse environmental impact. This is achieved through the maximising of landscaping, the minimising of hard stand areas and the careful design of the development to effectively integrate it with the surrounding locality.
- Impacts are avoidable and any residual impacts are minimised.

On the basis of the above, the proposed development is acceptable in the context of clause 7.6.

4.2.1.8 Essential Services

Clause 7.11 of the LEP applies to the provision of essential services. It states:

> *Development consent must not be granted to development unless the consent authority is satisfied that any of the following services that are essential for the proposed development are available or that adequate arrangements have been made to make them available when required:*
>
> *(a) The supply of water,*
>
> *(b) The supply of electricity,*
>
> *(c) The disposal and management of sewage,*
>
> *(d) Storm water drainage or on-site conservation,*
>
> *(e) Suitable road access.*

All of these services are available to the site and would need to be extended and augmented to supply any proposed development – refer **Section 5.7**.

Proposed concept water and sewer connections are provided in **Premise Engineering Drawings C001-C006**.

4.2.2 STATE ENVIRONMENTAL PLANNING POLICY

4.2.2.1 State Environmental Planning Policy No. 44 – koala habitat protection

State Environmental Planning Policy 44 – Koala Habitat Protection aims to:

> *"...encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas, to ensure permanent free-living populations over the present range and to reverse the current trend of population decline..."*

This policy applies to all LGAs within the known state-wide distribution of the koala, including Orange LGA. SEPP 44 defines 'potential koala habitat' as vegetation that incorporates a minimum of 15 percent of tree species (listed in Schedule 2 of SEPP 44) in the 'upper or lower strata of the tree component'.

Species identified as occurring on site are not listed via Schedule 2 of SEPP44 and therefore are not koala feed tree spies. In any event, tree removal in relation to the site is approved by extant approval DA4/2015(2).

As such, a significant impact requiring preparation of a Koala management plan is not anticipated.

4.2.2.2 State Environmental Planning Policy No. 55 – Remediation of Land

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP55) provides a state-wide approach to remediation of contaminated land and aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment.

Clause 7 of the SEPP No. 55 states that a consent authority must not consent to the carrying of development unless it has considered, among other things, whether the land is contaminated.

A phase 1 contamination assessment has been prepared. by Premise (**Appendix B**). This report concludes that all the land is suitable for use for residential purposes, that no significant routes for exposure by current or future receptors to potential contamination sources and there is no requirement for any remediation.

4.2.2.3 State Environmental Planning Policy (Vegetation in Non Rural Areas) 2017

The objectives of the *State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017* (Vegetation SEPP) are:

> *(a) to protect the biodiversity values of trees and other vegetation in non-rural areas of the State, and*
>
> *(b) to preserve the amenity of non-rural areas of the State through the preservation of trees and other vegetation.*

Clause 9 of the Vegetation SEPP identifies that the SEPP applies where a Development Control Plan has been created that identifies species or types of trees for which consent is required prior to removal and which refers to the Vegetation SEPP. Chapter 0 of the Orange Development Control Plan 2004 (DCP) identifies tree types and species that require approval prior to removal, however, Chapter 0 does not specifically reference the SEPP.

The site appears to be significantly disturbed and does not significant contain remnant native vegetation.

There is no evidence of established native flora on site, while the existing flora on site appears to be planted and offers little in the way of biodiversity values or amenity. Additionally, the amount of clearing necessary to accommodate the proposed development is below that of the biodiversity offset threshold.

Finally, land clearing at the property is approved by extant approval DA4/2015(2) and therefore further consent is not sought or required for land clearing.

4.2.2.4 State Environmental Planning Policy (State and Regional Development) 2011

Clause 5 of Schedule 7 of the *State Environmental Planning Policy (State and Regional Development) 2011* (SR_SEPP) identifies that development with a capital investment value (CIV) exceeding $5 million for affordable housing represents regional development.

Pursuant to Section 4.5 of the EP&A Act, the consent authority for regionally significant development is the applicable regional planning panel, in this case the Western Regional Planning Panel.

Department of Planning Circular PS 10-008 provides a definition for capital investment value:

> *Capital investment value of a development or project includes all costs necessary to establish and operate the project, including the design and construction of buildings, structures, associated infrastructure and fixed or mobile plant and equipment, other than the following costs:*

(a) amounts payable, or the cost of land dedicated or any other benefit provided, under a condition imposed under Division 6 or 6A of Part 4 of the Environmental Planning and Assessment Act or a planning agreement under that Division

(b) costs relating to any part of the development or project that is the subject of a separate development consent or project approval

(c) land costs (including any costs of marketing and selling land)

(d) GST (as defined by A New Tax System (Goods and Services Tax) Act 1999 of the Commonwealth).

An estimate of the CIV has been prepared by a quantity surveyor (**Appendix C**) which confirms that the proposal CIV exceeds $5 million.

As such, the development represents regional development and the consent authority for the application would be the Western Regional Planning Panel.

4.2.2.5 State Environmental Planning Policy (Affordable Rental Housing) 2009

The aims of the State Environmental Planning Policy (Affordable Rental Housing) 2009 (Affordable Housing SEPP) are:

(a) to provide a consistent planning regime for the provision of affordable rental housing,

(b) to facilitate the effective delivery of new affordable rental housing by providing incentives by way of expanded zoning permissibility, floor space ratio bonuses and non-discretionary development standards,

(c) to facilitate the retention and mitigate the loss of existing affordable rental housing,

(d) to employ a balanced approach between obligations for retaining and mitigating the loss of existing affordable rental housing, and incentives for the development of new affordable rental housing,

(e) to facilitate an expanded role for not-for-profit-providers of affordable rental housing,

(f) to support local business centres by providing affordable rental housing for workers close to places of work,

(g) to facilitate the development of housing for the homeless and other disadvantaged people who may require support services, including group homes and supportive accommodation.

The policy applies to all of the state and is therefore applicable to the site.

Division 1 of Part 2 applies to new affordable rental housing, in-fill affordable housing. Division 1 applies to land in which:

- Multi-dwelling housing is permitted with consent under another environmental planning instrument; and
- Does not contain a heritage item.

Additionally, Division 1 does not apply unless, for land not in the Sydney region, the land is within 400 metres of land zoned B2 – Local Centre or B4 – Mixed Use zone, or an equivalent zone.

The subject site is located within the R1 zone via the Orange LEP and multi-dwelling housing is permitted with consent. The land does not contain a heritage item. As such, Division 1 applies on this basis.

The subject site is within 70 metres of land zoned B2 and therefore Division 1 remains applicable.

Clause 13 of Division 1 applies to development to which Division 1 applies, if:

'... the percentage of the gross floor area of the development that is to be used for the purposes of affordable housing is at least 20 per cent.'

The proposal entails 30% affordable housing, and therefore clause 13 applies.

Floor space ratio is defined as:

> *The* **floor space ratio** *of buildings on a site is the ratio of the gross floor area of all buildings within the site to the site area.*

Clause 13(2) states in part:

> *(2) The maximum floor space ratio for the development to which this clause applies is the existing maximum floor space ratio for any form of residential accommodation permitted on the land on which the development is to occur, plus:*
>
> *(a) if the existing maximum floor space ratio is 2.5:1 or less:*
>
> *(i) 0.5:1—if the percentage of the gross floor area of the development that is used for affordable housing is 50 per cent or higher, or*
>
> *(ii) Y:1—if the percentage of the gross floor area of the development that is used for affordable housing is less than 50 per cent,*
> *where:*
>
> ***AH** is the percentage of the gross floor area of the development that is used for affordable housing.*
>
> ***Y** = AH ÷ 100*

Clause 13(3) states:

> *(3) In this clause,* **gross floor area** *does not include any car parking (including any area used for car parking).*

As no FSR applies to the land via the LEP mapping, and the proportion of affordable housing is 30%, the applicable FSR is 0.3:1. As the site has an area of approximately 5,216 square metres, this enables development across the site of up to 1,565 square metres. The proposal, excluding car parking areas, provides a gross floor area of 1,285 square metres, or 0.24.6:1. The development therefore satisfies the FSR limitation provided via clause 13.

Clause 14 of the Affordable Housing SEPP provides standards that cannot be used to refuse consent. These are discussed below:

Table 4.3 – Affordable Housing SEPP – Clause 14 provision

Clause 14	Comment
(1) Site and solar access requirements A consent authority must not refuse consent to development to which this Division applies on any of the following grounds:	
(a) (Repealed)	
(b) **site area** if the site area on which it is proposed to carry out the development is at least 450 square metres,	The site area exceeds 450 square metres. The development therefore may not be refused on this basis.
(c) **landscaped area** if: (i) in the case of a development application made by a social housing provider—at least 35 square metres of landscaped area per dwelling is provided, or (ii) in any other case—at least 30 per cent of the site area is to be landscaped,	As Housing Plus is a registered community housing provider, it is therefore a social housing provider to which part (i) applies. A minimum of 35 square metres of open space per dwelling is provided to each dwelling by reference to the table provided on **Premise Architectural Drawing A05**. The development therefore may not be refused on this basis.
(d) **deep soil zones** if, in relation to that part of the site area (being the site, not only of that particular development, but also of any other associated development to which this Policy applies) that is not built on, paved or otherwise sealed:	A geotech report is provided as **Appendix F**. This confirms alluvial soils to a depth of at least 3 metres. The development therefore may not be refused on this basis.

Clause 14	Comment
(i) there is soil of a sufficient depth to support the growth of trees and shrubs on an area of not less than 15 per cent of the site area (the ***deep soil zone***), and (ii) each area forming part of the deep soil zone has a minimum dimension of 3 metres, and (iii) if practicable, at least two-thirds of the deep soil zone is located at the rear of the site area,	
(e) **solar access** if living rooms and private open spaces for a minimum of 70 per cent of the dwellings of the development receive a minimum of 3 hours direct sunlight between 9am and 3pm in mid-winter.	The design of the site permits 3 hours of direct sunlight to the living rooms and private open spaces of more than 70 percent of dwellings on site and therefore this requirement is satisfied. All dwellings achieve or exceed this requirement, with the exception of dwellings 11 and 15. This represents 89% of dwellings, thereby exceeding the 70% requirement. The development therefore may not be refused on this basis.
(2) **General** A consent authority must not refuse consent to development to which this Division applies on any of the following grounds:	
(a) **parking** if: (i) in the case of a development application made by a social housing provider for development on land in an accessible area—at least 0.4 parking spaces are provided for each dwelling containing 1 bedroom, at least 0.5 parking spaces are provided for each dwelling containing 2 bedrooms and at least 1 parking space is provided for each dwelling containing 3 or more bedrooms, or (ii) in any other case—at least 0.5 parking spaces are provided for each dwelling containing 1 bedroom, at least 1 parking space is provided for each dwelling containing 2 bedrooms and at least 1.5 parking spaces are provided for each dwelling containing 3 or more bedrooms,	As Housing Plus is a registered community housing provider, it is therefore a social housing provider to which part (i) applies. On the basis that part (i) applies, parking for 2-bedroom dwellings must be supplied on the basis of not less than 0.5 car parking spaces. For 19 dwellings, this would require the on-site provision of not less than 10 spaces (rounded up). As per the discussion in **Section 5.3**, this requirement is exceeded by the proposal and the development therefore may not be refused on this basis.
(b) **dwelling size** if each dwelling has a gross floor area of at least: (i) 35 square metres in the case of a bedsitter or studio, or (ii) 50 square metres in the case of a dwelling having 1 bedroom, or (iii) 70 square metres in the case of a dwelling having 2 bedrooms, or (iv) 95 square metres in the case of a dwelling having 3 or more bedrooms.	By reference to the proposed plans, the minimum stipulated dwellings sizes are met. The proposed 1-bedroom dwellings have a floor area of not less than 55 square metres and the proposed 2-bedroom dwellings have a floor area of not less than 75 square metres. The development therefore may not be refused on this basis.

Source: State Environmental Planning Policy (Affordable Rental Housing) 2009

Clause 15 of the Affordable Housing SEPP states:

> *(1) A consent authority must not consent to development to which this Division applies unless it has taken into consideration the provisions of the Seniors Living Policy: Urban Design Guidelines for Infill Development published by the Department of Infrastructure, Planning and Natural Resources in March 2004, to the extent that those provisions are consistent with this Policy.*
>
> *(2) This clause does not apply to development to which clause 4 of State Environmental Planning Policy No 65—Design Quality of Residential Apartment Development applies.*

By reference to clause 4 of SEPP 65, SEPP 65 does not apply to the development. As such, consideration of the Seniors Living Policy is required.

Seniors Living Policy: Urban design guidelines for infill development (SLP)

The SLP sets out a range of design principles to be considered in the assessment of developments for Seniors Living. The SLP is also relevant to infill development of affordable housing by reference to the provision of clause 15 of the Affordable Housing SEPP.

The SLP is split into five sections:

1. Improving neighbourhood fit
2. Improving site planning and design
3. Reducing impacts on streetscape
4. Reducing impacts on neighbouring properties
5. Improving internal site amenity

These matters are considered below:

Improving neighbourhood fit

Section 1 of the SLP seeks to ensure that infill development adequately responds to the context in which it is proposed to be located. The locality in which the proposal is to be developed is characterised by a range of development types, including single and double storey residential dwellings (constructed and approved), commercial land uses, recreation and open space land uses and a range of land uses that cross over between residential and commercial land uses, including a medical centre that is under construction and a child care centre that has been approved but not built.

The subject site has been the subject of an approved 14 unit, double storey community title development. The suitability of the site to accommodate this form of higher density land use is therefore demonstrated by its proximity to commercial and recreational uses land uses. By co-locating the facility with these other land uses, it enables higher levels of independence for future occupants of the dwelling and reduces reliance on private vehicles.

The proposed development provides 19 x single storey dwellings in a combination of 1 and 2 bedroom configurations. Arguably, the proposal is better suited to the locality by transitioning the design to a single storey arrangement, more similar to the predominant scale of residential development in the locality.

The proposal would feature extensive landscaping to better integrate the development with the natural environment. This has a positive outcome for not only future residents of the development but also the occupants of surrounding property.

The proposal is considered to be a good fit for the neighbourhood and consistent with the first section of the SLP in this regard.

Improving site planning and design

Careful consideration has been taken with respect to site design to maximise the efficiency of the site whilst minimising impacts to neighbouring properties.

Measures such as ensuring driveways are not adjacent to shared property boundaries, maximising landscaping, minimising shared bin storage areas and utilising a single storey design all effectively demonstrate this approach.

Housing Plus have conducted consultation with residents in the area to provide them with a preliminary opportunity to comment on the project and provide advice on the scale and nature of what is proposed. Consultation has included discussions with both directly adjacent neighbours and landowners along Emerald Street and Opal Street. In total approximately 25 residents and occupiers have been approached. A number of comments from neighbours have been adopted in terms of refinements to the plans to minimise impacts. These have included changes to treatments at the front boundary in terms of fencing and post boxes, and the incorporation of additional landscape screening on shared property boundaries.

Buildings are orientated as far as possible to ensure habitable rooms of dwellings enjoy good access to natural light and are not unreasonably impacted by overshadowing. Privacy between dwellings and to adjacent properties is ensured through the single storey design and the provision of internal and boundary fencing.

The nature of the site unfortunately limits the extent of active frontage but careful consideration of the design has achieved the best outcome for the site by ensuring the development presents as a residential development from the street, and thereby positively contributes to streetscape.

The site is conducive to the proposed design by virtue of the approved and operational non-residential uses to the north and west. This limits amenity impacts to surrounding land owners and residents.

Reducing impacts on streetscape

By adopting a single storey design, in preference to the currently approved two storey design, the proposed development is considered to be compatible with the prevailing streetscape and the character of the locality. By adopting a design for detached dwellings in favour of a residential flat building or boarding house, the arrangement is able to better integrate with the locality and minimise impacts.

The shape and topography of the site means that the proposed dwellings are largely tucked into the site with minimal visual impact on the streetscape and locality.

Materials adopted are consistent with prevailing building patters and this also assists to effectively integrate the development.

Extensive landscaping is proposed that would assist to soften the appearance of the development.

Parking areas are away from the street and close to dwellings, consistent with the residential nature of the locality. Internal driveways have been narrowed where possible to provide additional landscaping and reduce visual impacts.

Reducing impacts on neighbouring properties

Impacts to neighbouring properties are reduced via the adoption of single storey design and adoption of suitable setbacks to shared boundaries.

Notably, boundaries with adjacent residential dwellings is limited to the land to the south (currently) undeveloped and land to the east. Land to the north and north-west is open space and land to the west is approved for use as a child care centre.

Buildings are appropriately setback from boundaries to ensure visual and acoustic privacy to adjacent properties is maintained.

The proposed extensive landscaping will assist to soften the appearance of the development.

The single storey design of the dwelling and the setbacks to boundaries ensures that neighbouring properties are not impacted by overshadowing.

Improving internal site amenity

All proposed dwellings satisfy Council requirements with respect to private open space and all areas have direct accessibility from a habitable room to these open space areas. This ensures a high level of amenity for future occupants.

All proposed dwellings feature defined and safe points of entries, that are visible from the shared spaces of the site.

The shared areas of the site provide for safe and accessible vehicular and pedestrian access to dwellings. The integrated pathway links the site to Telopea Way in the west and provides onward pedestrian access to the North Orange Shopping Centre.

The majority of dwellings (excepting dwellings 11 and 15) feature direct sunlight into a north facing habitable room (being 89%) of proposed dwelling. This is well in exceed of the 70% target outlined in the Affordable Housing SEPP. All dwellings (including dwellings 11 and 15) feature areas of private open space that benefit from a direct north facing aspect, to ensure adequate provision of daylight access to open space areas.

The design of dwellings provides clear passive surveillance from front doors and habitable areas to the common areas of the site to ensure the safety of all occupants. Large areas of pavement have been broken up with areas of landscaping to improve the site appearance and an appropriate level of amenity for occupants. Screen planting is used to minimise any residual visual impacts associated with the development.

Through careful use of internal site fencing and appropriate landscaping species, opportunities for crime and concealment are minimised, thereby ensuring the safety of future occupants.

By reference to that assessment, the development is not antipathetic to the provisions of the policy and therefore satisfies the requirements of clause 15.

Clause 16 of the ARH SEPP states:

> *Nothing in this Policy affects the application of* State Environmental Planning Policy No 65—Design Quality of Residential Flat Development *to any development to which this Division applies.*

As residential flat buildings are not proposed, this clause is therefore not relevant to the proposal.

Clause 16A of the ARH SEPP states:

> *A consent authority must not consent to development to which this Division applies unless it has taken into consideration whether the design of the development is compatible with the character of the local area.*

Character is a subjective term and can be applied, by reference to the Land and Environment Court planning principles, to either the existing/prevailing character or by reference to emerging character. Consistency in planning terms can also be defined as compatibility. Compatible can be taken as '*capable as existing together in harmony*' (*Project Venture Developments v Pittwater Council [2005] NSWLEC 191*).

The proposed development provides 19 residential dwellings, being a mix of one and two bedroom dwellings. This is consistent with the prevailing residential character in the locality. The proposal makes use of a site already approved for multi-dwelling development and therefore is consistent with the

established character. Land to the south of the subject site is approved for development with small lots featuring double store dwellings. This approved development, together with the nearby Orange Shopping Centre and the approved medical centre, are all contributors to the overarching character of the locality. The proposed development adopts single storey dwellings set around communal spaces featuring driveways, landscaping and bin collection areas.

The proposed development is considered to be consistent with prevailing and emerging character of the locality is therefore consistent with the requirements of Clause 16A.

Clause 17 obligates the placement of conditions on any consent requiring any affordable housing to be used for a period of not less than 10 years, and this requirement being imposed via a Section 88b instrument attached to the land title. This obligation applies to the development.

Clause 18 states:

> *Land on which development has been carried out under this Division may be subdivided with the consent of the consent authority.*

Subdivision is not proposed via this application so this clause has no direct bearing.

By reference to the above, the development would be compatible with the requirements of the ARH SEPP.

4.2.3 DEEMED ENVIRONMENTAL PLANNING INSTRUMENTS

There are no deemed environmental planning instruments known to affect the site.

4.3 DRAFT ENVIRONMENTAL PLANNING INSTRUMENTS

There are currently 2 draft planning instruments that have received Gateway approval from the Department of Planning and Environment and that have been exhibited for public advertising.

A review confirms that neither of these draft EPI directly affect the subject site or propose a change to the LEP wording that would affect the proposed development.

4.4 ORANGE DEVELOPMENT CONTROL PLAN 2004

The *Orange Development Control Plan 2004* (DCP) applies to the site.

A review of the DCP identifies that the following sections may be relevant:

Chapter 0 - Administrative provisions

Chapter 2 – Natural Resource Management

Chapter 3 – General Considerations

Chapter 4 - Special Environmental Considerations

Chapter 5 – General Considerations for Zones and Development

Chapter 7 – Development in residential areas

Chapter 15 – Car parking

4.4.1 CHAPTER 0 - TRANSITIONAL PROVISIONS

Following the release of the standard instrument LEP format, and the gazettal of the 2011 LEP, the Development Control Plan was updated to provide transitional provisions for a number of matters.

Table 4.4 – Development Control Plan Chapter 0

Development Control Plan Requirement	Comment
Conversion of Zones	
1 Throughout this Plan any reference to a zone under Orange Local Environmental Plan 2000 is to be taken to be a reference to the corresponding zone(s) in the zone conversion table.	The R1 – General Residential zone is the equivalent of the 2a Urban Residential & 2d Urban Transition zones under the former LEP. Therefore, references throughout the DCP to the 2a or 2d zone are applicable to the subject site.
Conversion of definitions	
1 Throughout this Plan reference to any land use or development term is interpreted by reference to the dictionary of the LEP.	Noted
2 Where a term or land use referred to in this Plan is not defined by the LEP dictionary, the nearest equivalent term is deemed to have effect.	Noted
Scenic Areas	
1 Development blends into the landscape through the use of appropriate siting, design, external materials and colours, retention of trees including remnant vegetation, establishing of new trees, and enhancing the skyline when viewed either from the urban area of Orange or from public places in the vicinity of the land	The proposed development locality does not feature any significant scenic areas requiring protection. The proposed development adopts single storey dwelling design that is consistent with the prevailing character in the locality. This requirement is considered to be satisfied.
Tree Preservation	
1 Trees prescribed by this DCP must not be ringbarked, cut down, topped, lopped or willfully destroyed without the Council's approval and landowners' consent	Trees on the site already approved for removal via DA 4/2015.
2 This clause applies to Eucalypts of any size belonging to the White Box, Yellow Box and Blakely's Red Gum Endangered Ecological Communities, including species indicated as affected in the tree preservation table.	As above
3 This clause also applies to any tree, native or exotic, with a trunk diameter equal to or greater than 300mm at breast height (refer AS4970-2009 for measurement guidelines).	As above
4 Notwithstanding IPO-4(3) this clause does not apply to species indicated as exempt in the tree preservation table.	As above
5 An application for the Council's approval must be accompanied by an appropriately qualified specialist (i.e. Arborist) report outlining the following information • The location, size, species and condition (i.e. diseased, healthy, etc) • A statement that details any anticipated impacts on vegetation that may have derived from endangered ecological communities and/or that may be habitat for threatened species	As above

• The purpose of removal and whether the pruning of the tree would be a more practical and desirable alternative • Whether a replacement tree or trees should be planted • The location, size and species of any trees proposed to replace those intended for removal • The owner's consent to the application being lodged • Any other relevant information regarding the tree to be removed (i.e. photographs)	

4.4.2 CHAPTER 2 – NATURAL RESOURCE MANAGEMENT

Table 4.5 – Development Control Plan Chapter 2

Development Control Plan Requirement	Comment
Stormwater Quality	
Development is carried out in a manner that does not contribute to downstream erosion or sedimentation of waterways.	This will be achieved
Development complies with the Water and Soil Erosion Control requirements of the Development and Subdivision Code.	This will be achieved
On-site detention is carried out in accordance with the Development and Subdivision Code for all developments comprising buildings with a site coverage greater than 50m² or where site coverage exceeds the "percentage impervious" level listed in the Code applicable to that development.	As confirmed by Council staff during pre-application discussions, no onsite detention is required
Where on-site detention is not appropriate, contributions are made towards retarding basins and/or GPTs and associated drainage under the Contribution Plan that applies to the land.	This will be achieved
Development in the vicinity of natural watercourses is positioned away from the waterway and includes measures to minimise the impact of the development on the waterway such as the establishment of Creekside buffer zones and planting of native trees in a manner that enhances streambank stability.	No nearby natural watercourses
Groundwater Quality	
1 Development applications for development (excluding dwelling houses) that proposes to extract groundwater or involve on-site wastewater disposal identify potential risks to, and management of, groundwater resources.	No groundwater extraction is proposed
2 Development is carried out in a manner that does not adversely affect groundwater resources.	This will be achieved
3 Development considered by Council to have the potential to significantly affect groundwater quality incorporates a monitoring program and provides test results from a NATA-accredited laboratory to Council for review and for inclusion in the City SoE Reports.	Development would not be likely to affect groundwater

4 Development that requires or proposes the use of groundwater demonstrates that the groundwater extraction will meet the requirements of DLWC, where necessary.	No use of groundwater would be required
Soil Resource Management	
1 Development complies with the Water and Soil Erosion Control requirements of the Development and Subdivision Code.	This will be achieved for the site, with a detailed erosion and sediment control plan to be provided at CC stage.
2 Sites affected by soil degradation are restored in accordance with management strategies to be submitted with development proposals.	A review of available mapping confirms that soil degradation is known to affect the site
3 Agricultural practices apply conservation farming techniques particularly within the water supply catchments and in areas susceptible to significant erosion hazard.	Not applicable
4 A geotechnical investigation is carried out by a NATA-accredited laboratory that identifies and classifies all new residential lots for dwelling houses in accordance with AS 2870-1996 Residential Slabs and Footings Construction.	Geotechnical testing has been completed – refer **Appendix F**
5 A geotechnical investigation is undertaken that determines the suitability of land for on-site disposal of sewage effluent in accordance with Environmental and Health Protection Guidelines: On-site Sewage management for Single Households where appropriate.	Not applicable
6 Non-agricultural activities in rural areas are carried out on less -productive soils	The site is not located in a rural area.
Vegetation Management	
1 Compliance with the *Native Vegetation Conservation Act 1997.*	*Biodiversity Conservation Act 2016* is not applicable on the basis that clearing approval is not sought via this application. Trees and vegetation on the site already approved for removal via DA 4/2015(2).
2 Development is designed and constructed in a way that minimises the impact on existing vegetation.	As above
3 Particular attention is given to the effect of rural or urban residential release development on existing vegetation and scenic areas.	Not a scenic area
4 Development applications indicate on plans the location of all significant trees affected by or in the vicinity of development.	Trees on the site already approved for removal via DA 4/2015.
5 Applications demonstrate to Council's satisfaction that all practical measures have been made to retain trees that contribute to and embellish the Orange landscape.	Trees on the site have already been approved for removal via DA 4/2015. Refer to **Section 5.13**
6 Preservation of trees of specific species or were the trunk diameter is equal to or greater than 300 millimetres when measured at breast height.	No such trees exist on site. The trees on the site have already been approved for removal via DA 4/2015.

4.4.3 CHAPTER 3 – GENERAL CONSIDERATIONS

Table 4.6 – Development Control Plan Chapter 3

Development Control Plan Requirement	Comment
Cumulative Impact	
1 Applications for development demonstrate how the development relates to the character and use of land in the vicinity.	The development is classified as residential and is therefore consistent with the character of the surrounding land is largely residential. Refer **Section 5.2**.
2 The introduction of new development into a locality maintains environmental impacts within existing or community-accepted levels.	The proposed development has been carefully designed cognizant of environmental limits as discussed throughout Section 5. The development is acceptable in this regard.
3 Water conservation measures are implemented.	All dwellings would satisfy BASIX/NaTHERS requirements
Scenic, Landscape and Urban Areas	
1 Development incorporates landscaping that enhances the landscaped setting of the locality.	This will be achieved by reference to the attached **House of Manuela Landscape Drawings**
2 External finishes, materials and colour schemes of development complement its setting	This will be achieved by reference to **Premise Architectural Drawing A29**
Energy Efficiency	
1 Development is carried out in accordance with the principles from Council's Energy Smart Homes Code	The development would to comply with BASIX requirements
Waste Generation	
1 Applications involving demolition indicate measures that will be implemented for reuse and recycling of waste materials.	Demolition of buildings on site already approved via DA 4/215
2 Development involving demolition is carried out in a manner that optimises reuse and recycling of waste materials consistent with waste-minimisation principles (refer DCP table).	As above. Existing conditions apply to this aspect of the development which would need to be complied with

4.4.4 CHAPTER 4 - SPECIAL ENVIRONMENTAL CONSIDERATIONS

Table 4.7 – Development Control Plan Chapter 4

Development Control Plan Requirement	Comment
Sewage Disposal	
1 Development within the urban area of Orange as defined above is connected to sewerage facilities or arrangements to the satisfaction of Council have been made for the provision of sewerage services prior to occupation.	The proposed development is capable of being connected to the existing reticulated sewer network by reference to **Premise Engineering Drawings C001-C006**
2 Where sewerage services are not provided, on-site disposal of effluent is designed and implemented in accordance with the relevant guidelines for on-site sewage management systems.	Not applicable to this site
3 Suitable areas for on-site disposal of effluent are defined prior to: issue of a construction certificate for a building; or Issue of a subdivision certificate for new lots.	Not applicable to this site

4 Lots to be created by subdivision for residential purposes indicate an envelope defining an area suitable for on-site disposal of effluent that has been subject to geotechnical assessment.	Not applicable to this site
5 Rural or rural residential-zoned land is served by on-site sewage management systems unless the land is traversed by sewer mains with adequate planned capacity.	Not applicable to this site

4.4.5 CHAPTER 7 – DEVELOPMENT IN RESIDENTIAL AREAS

Table 4.8 – Development Control Plan Chapter 7

Development Control Plan Requirement	Comment
7.6 – SITE ANALYSIS A site analysis plan should be provided	Refer to **Premise Architectural Drawings A03**
7.7-1 - NEIGHBOURHOOD CHARACTER 1 Site layout and building design enables the: - creation of attractive residential environments with clear character and identity; - use of site features such as views, aspect, existing vegetation and landmarks. 2 Buildings are designed to complement the relevant features and built form that are identified as part of the desired neighbourhood character. 3 The streetscape is designed to encourage pedestrian access and use.	The proposed development is consistent with the residential character of the locality and the building design has been adopted to effectively integrate the development with this prevailing character The site features a pedestrian linkage to provide a direct connection onward to Telopea Way and the nearby shopping and medical centres, and the approved child care centre
7.7-2 – BUILDING APPEARANCE 1 The building design, detailing and finishes relate to the desired neighbourhood character, complement the residential scale of the area and add visual interest to the street. 2 The frontage of buildings and their entries address the street. 3 Garages and car parks are sited and designed so that they do not dominate the street frontage.	Due to the shape of the site, a design that directly provides dwelling addressing the street is difficult to achieve. However the design provide a pleasing and well landscaped entry way and is consistent with the approved design that currently relates to the site. In this regard, the development is considered to be consistent with prevailing and desired neighbourhood character. Vehicular features of the site do not dominate the streetscape.
7.7-3 – HERITAGE 1 Heritage buildings and structures are efficiently re-used. 2 New development complements and enhances the significance of a heritage item or place of heritage significance listed in the Orange Heritage Study. 3 Significant landscape features are retained including original period fences and period gardens.	No heritage buildings or structures affected
7.7-4 – SETBACKS 1 Street setbacks contribute to the desired neighbourhood character, assist with integration of new development and make efficient use of the site. 2 Street setbacks create an appropriate scale for the street considering all other streetscape components.	Setbacks from the street and from side and rear boundaries is consistent with the prevailing character of the area. The scale of the development as defined by the setbacks is consistent with surrounding properties.

7.7-5 - FENCES AND WALLS 1 Front fences and walls: - assist in highlighting entrances and creating a sense of identity within the streetscape. - are constructed of materials compatible with associated housing and with fences visible from the site that positively contribute to the streetscape - provide for facilities in the street frontage area such as mail boxes.	No front fences or walls are proposed, given the shape of the site.
7.7-6 – VISUAL BULK 1 Built form accords with the desired neighbourhood character of the area with: - side and rear setbacks progressively increased to reduce bulk and overshadowing; - site coverage that retains the relatively low-density, landscaped character of residential areas; - building form and siting that relates to land form, with minimal land shaping (cut and fill); - building height at the street frontage that maintains a comparable scale with the predominant adjacent development form; - building to the boundary where appropriate.	- Proposed dwellings would be single storey, consistent with surrounding, to ensure overshadowing is minimized and visual privacy of adjacent properties is maintained. - Site coverage remains at an appropriate level for residential areas, being less than 30% of the site. - Building form and siting requires minimal cut and fill - No buildings are proposed to front the street -Buildings would not be located on the boundary
7.7-7 - WALLS AND BOUNDARIES 1 Building to the boundary is undertaken to provide for efficient use of the site taking, into account: - the privacy of neighbouring dwellings and private open space; - the access to daylight reaching adjoining properties; - the impact of boundary walls on neighbours.	Buildings would be setback from boundaries, permitting solar access to adjoining properties
7.7-8 - - DAYLIGHT AND SUNLIGHT Buildings are sited and designed to ensure: - daylight to habitable rooms in adjacent dwellings is not significantly reduced; - overshadowing of neighbouring secluded open spaces or main living-area windows is not significantly increased; - consideration of Council's Energy Efficiency Code	By reference to **Premise Architectural Drawing A10**, 89% of dwellings enjoy direct solar access to habitable rooms for more than 3 hours per day – refer **Section 5.5**
7.7-9 – VIEWS 1 Building form and design allow for residents from adjacent properties to share prominent views where possible. 2 Views including vistas of heritage items or landmarks, are not substantially affected by the bulk and scale of new development.	The proposed development would not hinder views and vistas in the immediate vicinity.
7.7-10 - VISUAL PRIVACY 1 Direct overlooking of principal living areas and private open spaces of other dwellings is minimised firstly by: - building siting and layout; - location of windows and balconies; and secondly by: - design of windows or use of screening devices and landscaping	The single storey design together with proposed fencing ensures that the proposed development would not impact visual privacy.

7.7-11 - ACOUSTIC PRIVACY 1 Site layout and building design: - protect habitable rooms from excessively high levels of external noise; - minimise the entry of external noise to private open space for dwellings close to major noise sources; - minimise transmission of sound through a building to affect other dwellings.	The site of the proposed development is located within a residential neighbourhood, free from major noise sources. The adjacent commercial developments have been designed and approved by Council in full recognition of the residential zoning of the subject and the development of the site for residential purposes. Setbacks ensure that dwellings are well clear of shared boundaries to minimize the potential for noise impacts.
7.7-12 – SECURITY 1 The site layout enhances personal safety and minimises the potential for crime, vandalism and fear. 2 The design of dwellings enables residents to survey streets, communal areas and approaches to dwelling entrances	Refer **Section 5.20**
7.7-13 - PUBLIC TRANSPORT 1 Residential unit development is accessible to public transport.	Bus services available to the site via the public walkway to the south and access to North Orange Shopping Centre.
7.7-14 - CIRCULATION DESIGN 1 Accessways and parking areas are designed to manage stormwater. 2 Accessways, driveways and open parking areas are suitably landscaped to enhance amenity while providing security and accessibility to residents and visitors. 3 The site layout allows people with a disability to travel to and within the site between car parks, buildings and communal open space.	Hardstand areas including driveways and open parking areas would manage stormwater flow – refer **Premise Engineering Drawing C005**. Landscaping details are provided in **House of Manuela Landscape Drawings**. The site would be suitable for people with disabilities to traverse due to the flat grades and the single storey design of dwellings.
7.7-15 – CAR PARKING 1 Parking facilities are provided, designed and located to: - enable the efficient and convenient use of car spaces and accessways within the site; - reduce the visual dominance of car-parking areas and accessways. 2 Car parking is provided with regard to the: - number and size of proposed dwellings; - requirements of people with limited mobility or disabilities.	Refer **Sections 4.4.6 and 5.3**
7.7-16 - PRIVATE OPEN SPACE 1 Private open space is clearly defined for private use. 2 Private open space areas are of a size, shape and slope to suit the reasonable requirements of residents, including some outdoor recreational needs and service functions. 3 Private open space is: - capable of being an extension of the dwelling for outdoor living, entertainment and recreation; - accessible from a living area of the dwelling; - located to take advantage of outlooks and to reduce adverse impacts of overshadowing or privacy from adjoining buildings; - orientated to optimise year-round use	All proposed dwellings feature a POS area having an area of least 50% of the floor area, with a minimum dimension of 3 m, at least one area of 5 m x 5 m and directly accessible from a habitable room. A number of the dwellings, due to their orientation, do not feature north or east facing POS areas, however this is limited to dwellings 8, 9, 10, 11 and 17 (or 26% of the dwellings). Of these, dwellings 10, 11 and 17 feature west facing POS, which is still very usable in afternoon hours. The site is very well placed with access to regional open spaces areas to offsite this minor inconsistency with the DCP requirements.

7.7-17 - OPEN SPACE AND LANDSCAPING 1 The site layout provides open space and landscaped areas which: - contribute to the character of the development by providing buildings in a landscaped setting; - provide for a range of uses and activities including stormwater management; - allow cost-effective management. 2 The landscape design specifies landscape themes consistent with the desired neighbourhood character and vegetation types and location, paving and lighting are provided for access and security. 3 Major existing trees are retained and protected in a viable condition whenever practicable through appropriate siting of buildings, accessways and parking areas. 4 Paving is applied sparingly and integrated in the landscape design	Open space and landscaping on site would be designed in a manner that is cost effective to maintain while contributing to stormwater management. The design and characteristics of the open spaces would be consistent with that of the surrounding neighbourhood. Refer **House of Manuela Landscaping Plans**
7.7-18 – STORMWATER 1 On-site drainage systems are designed to consider: - downstream capacity and the need for on-site stormwater retention, detention and re-use; - scope for on-site infiltration of water; - safety and convenience of pedestrians and vehicles; - overland-flow paths. 2 Provision is made for on-site drainage which does not cause damage or nuisance flows to adjoining properties.	Stormwater captured onsite would be collected using landscaping and open space design, along with council standard drainage systems to be connected with Council's reticulated stormwater system. No on site detention is required.
7.7-19 EROSION AND SEDIMENT CONTROL 1. Measures implemented during construction to ensure that the landform is stabilised and erosion is controlled.	This would be provided in accordance with the Blue Book

4.4.6 CHAPTER 15 – CAR PARKING

By reference to chapter 15 of the DCP, car parking associated with multi-dwelling house is to be provided on the basis of:

- 1.0 space per 1-bedroom dwelling
- 1.2 spaces per 2-bedroom dwelling
- 1.5 spaces per 3-bedroom dwelling; and
- 0.2 spaces per unit for visitor parking.

Parking is to be designed to satisfy the requirements of *Australian Standard 2890 Off Street Parking*.

The development entails 19 dwellings, being 12 x 2-bedroom and 7 x 1-bedroom. This therefore triggers the requirement for the following parking spaces on site:

- 1-bedroom dwellings – 7 spaces
- 2-bedroom dwellings – 14.4 spaces
- Visitor spaces – 3.8 spaces

This equates to 25.2 (26 rounded up) spaces.

The proposal provides one covered space per 1-bedroom dwelling (7 spaces) and therefore satisfies the DCP in this respect.

The proposal provides two double stacked car parking spaces (one covered) per 2-bedroom dwelling (24 spaces in total) and therefore exceeds the DCP requirements in this respect.

The DCP does not specifically identify that visitor parking must be in a designated area. It is logical to assume that visitor parking would be utilised by people visitor specific dwelling occupants, making the need for a separate designated area unnecessary. The 24 spaces provided in relation to the 2-bedroom dwellings therefore satisfies the DCP requirements for both visitor and 2-bedroom dwelling requirements.

The proposal provides in excess of the minimum and is therefore acceptable in this regard.

As noted in **Table 4.3**, as the proposal entails provision of at least 30% affordable housing by a social housing provider, the provisions of the Affordable Housing SEPP apply and Council may not refuse the development where parking is provided at a rate of 0.5 space per 2-bedroom dwelling and no obligation for visitor parking. This therefore triggers the need for 9.5 (10 rounded up) spaces. The development significantly exceeds this and therefore the development cannot be refused on the basis of parking.

5. IMPACTS

5.1 INTRODUCTION

Pursuant to Schedule 1 of the EP&A Regulation, this section of the report outlines the environmental impacts of the proposed development and any measures required to protect the environment or lessen the harm to the environment.

The impacts have been identified through an assessment of the proposed development against the provisions of section 4.15(1)(b) and the former NSW Department of Urban Affairs and Planning's (nd) *Guide to Section 79C*.

5.2 CONTEXT AND SETTING

The site is located in North Orange, approximately 250 metres from the North Orange Shopping Centre. The site is located approximately 3.5 kilometres from the Orange CBD.

The site is located on the fringes of urban development amongst a residential neighbourhood, and thus the proposed development would suit the characteristics of the setting. Public transport is available within walking distance from the site, allowing potential future residents to have access to public transport and minimising traffic on the roads.

The site is largely flat, falling slightly from the north to the south, with no significant flora located on the site. The proposed development will include both attached and detached dwellings on site. This approach breaks up the perceived appearance of the site, in turn, reducing the apparent bulk and scale. The site currently features approval for 14 double storey dwellings. The proposed development would have a reduced visual impact by comparison to the approved layout and is therefore preferable in this regard.

The siting and design of the proposed dwellings ensures no unreasonable overshadowing upon neighbouring dwellings and areas of private open space of the site, while also providing suitable visual and acoustic privacy for future residents of the site and occupants of adjacent dwellings.

As the site is relatively flat, there are limited views and vistas available to the site and adjoining properties.

5.3 ACCESS, TRANSPORT AND TRAFFIC

Access to the site is provided via Pearl Court and Emerald Street, providing linkages to the Northern Distributor Road, continuing onto the Orange.

Additionally, the site is located within walking distance to the North Orange Shopping Centre, allowing walking to be a viable option for everyday shopping trips. The North Orange Shopping Centre also acts as a public transport hub, having public transport readily available to the proposed development would decrease the amount of traffic on roads within the vicinity.

Parking would be facilitated within the proposed development as discussed in detail in **Section 4.4.6**. The proposal provides parking for 31 cars. The previous development approved on the site provided 14 3-bedroom dwellings, with parking for 2 cars per dwelling (or 28) with no dedicated visitor parking. The development therefore represents only a very minor increase over the currently approved arrangement.

The *RTA Guide to Traffic Generating Development* (2013) estimates vehicle movements per day of 7.6 per dwelling, equating to 144.4. It is however notable that this figure assumes a standard dwelling. The proposal entails a combination of one and two bedroom dwellings, with lower levels of occupancy and commensurate lower levels of traffic generation. The level of traffic generation is expected to be broadly consistent with the current approved layout of the site as 14 three bedroom dwellings. No significant change to the local traffic is therefore anticipated.

Arrangements with respect ensure all traffic, including rubbish trucks, can enter and leave the site in a forward direction, ensuring no safety impacts to the local traffic environment. The traffic area is separated from the footpath traversing the southern portion of the site, to ensure the safety of pedestrians.

Landscaping is provided to separate the access driveway from the footpath to ensure conflict between pedestrians and vehicles is minimised.

The proposed development is not anticipated to cause any negative impacts on transport systems.

5.4 VISUAL IMPACTS

The proposed development entails development of 19 single storey free standing residential dwellings. The subject site and surrounding land is generally flat and there are no elevated areas in the locality that overlook the site.

The proposal would not impact on any viewshafts or important vistas.

The approved use of the site is for the purposes of 14 double storey dwellings.

The proposed development entails single storey dwellings that are consistent with the prevailing character of the locality. The proposal also entails significant landscaping to assist in effectively integrating the development with the locality.

On the basis of the above, the proposal is not anticipated to result in any adverse visual impacts to the locality.

5.5 SOLAR ACCESS

By reference to solar access in the context of the *Orange Development Control Plan 2004*, residential development is to be designed to satisfy the following specific planning outcome:

Buildings are sited and designed to ensure:

- daylight to habitable rooms in adjacent dwellings is not significantly reduced;

- overshadowing of neighbouring secluded open spaces or main living-area windows is not significantly increased;

- consideration of Council's Energy Efficiency Code

The DCP also identifies a range of guidelines via which the planning outcome may be satisfied. The guidelines are not prescribed and other methods of compliance with the performance outcome may be provided. These guidelines are:

***a** Habitable rooms include windows that are:*

- facing private open space, courtyard, verandah, patio or the like, open to the sky;

- at least 1.8 metres from any adjoining building.

***b** Sunlight to at least 40% of the main area of private open space (on ground level) within the development and on adjoining land:*

- is not reduced to less than 3 hours between 9:00 and 3:00 pm on 21 June; or

- is not further reduced where existing overshadowing is greater than the above points.

***c** Sunlight to at least 75% of north-facing living-area windows within the development and on adjoining land:*

- is provided for a minimum of 4 hours on 21 June; or

- is not further reduced than existing where already less

In addition to the DCP, the ARH SEPP provides that, for affordable housing, a consent authority may not refuse a development where 70% or more of the dwellings achieve access to daylight to habitable rooms for at least 3 hours a day.

The phrase 'habitable room' is not defined in the DCP but the Australian Model Code for Residential Development (AMCORD) document, on which many modern DCP's are based, defines a habitable room as:

Habitable room means a room used for normal domestic activities that includes:

• a bedroom, living room, lounge room, music room, television room, kitchen, dining room, sewing room, study, playroom and sunroom, but excludes:

• a bathroom, laundry, water closet, food storage pantry, walk-in wardrobe, corridor, hallway, lobby, photographic darkroom, clothes drying room, and other spaces of a specialised nature occupied neither frequently nor for extended periods.

In relation to part (a) of the DCP guidelines, the recommendation to achieve a 1.8 metre setback to boundaries is generally achieved for all rooms, and all habitable rooms have windows open to the sky.

In relation to part (b) of the DCP guidelines, the provided architectural drawings demonstrate (at **Drawings A10-A14**) that compliance with this is achieved. In reality, boundary fencing has a greater shadowing impact to neighbouring properties than the proposed single storey dwellings due to the greater than 900 mm boundary setbacks proposed. Specifically, we note the specific levels of compliance for each of dwellings outlined in **Table 5.1**.

In relation to part (c) of the DCP guidelines, this only relates to north facing living areas. It does not stipulate that all living areas must face north or, for non-north facing windows, achieve this requirement. **Table 5.1** demonstrates compliance for all north facing windows.

Table 5.1 – Access to daylight

Dwelling	Sunlight to 40% of Private Open Space on site		Sunlight to 75 % of north facing windows into habitable rooms between the hours of 9 am – 3 p m	
	%	Complies	Access hours	Complies?
1	100%	Yes	Full access between 9 am and 3 pm	Yes
2	100%	Yes	Access between 11 am and 3 pm	Yes
3	100%	Yes	Access between 9 am and 1 pm	Yes
4	100%	Yes	Access between 11 am and 3 pm	Yes
5	100%	Yes	Access between 11 am and 3 pm	Yes
6	100%	Yes	Access between 9 am and 1 pm	Yes
7	100%	Yes	Full access between 9 am and 3 pm	Yes
8	25%	No	Full access between 9 am and 3 pm	Yes
9	25%	No	Full access between 9 am and 3 pm	Yes
10	100%	Yes	Access between 9 am and 2 pm	Yes
11	100%	Yes	No north facing habitable windows*	N/A
12	50%	Yes	Full access between 9 am and 3 pm	Yes
13	100%	Yes	Full access between 9 am and 3 pm	Yes
14	100%	Yes	Access between 11:30 am and 3 pm	Yes
15	100%	Yes	No north facing habitable windows*	N/A
16	100%	Yes	Access between 11:30 am and 3 pm	Yes
17	100%	Yes	Full access between 9 am and 3 pm	Yes
18	100%	Yes	Full access between 9 am and 3 pm	Yes
19	25%	No	Full access between 9 am and 3 pm	Yes

*** DCP 7.7-8 Guideline (c) does not apply to this dwelling.**

All dwellings achieve compliance with the DCP guideline 7-7.8(c) on the basis that all dwellings with north facing windows achieve full daylight access. Two dwellings (11 and 15) do not have north facing windows and therefore this requirement does not apply to them.

It is noted that a number of the dwellings (8, 9 & 19) do not achieve the 40% sunlight into open space. These dwellings are all north facing with unimpeded daylight into habitable rooms. Shadowing impacts associated with this design means that adjacent fencing shadows ground level areas, however at a standard person height, access to direct sunlight into these yards is still achieved for a few hours per day. Whilst not strictly compliant, it is notable that standard residential properties built on the southern side of a street within the Orange urban area would be similarly constrained. The site is very well placed with access to regional open spaces areas to offsite this minor inconsistency with the DCP requirements.

5.6 PUBLIC DOMAIN

The proposed development would not hinder opportunities for public recreational spaces. Open space is provided via walking tracks and reserves located close to the site. The site is also located close to Waratah Sports Club, which provides suitable open space areas. The site would have no significant impact on the public domain.

5.7 SERVICING

The site is already serviced by electricity, gas, sewer, water and telecommunications. These existing connections would be augmented to facilitate the proposed development as outlined on **Premise Engineering Drawings C001-C006**.

A single overhead powerline currently traverses the site. It is understood that the powerline provides power to a single shed to the west of the subject site. The overhead powerline connects to an underground powerline that services the larger area. This service would be decommissioned prior to the development proceeding, in accordance with Essential Energy requirements.

5.8 HERITAGE

A review of the *Orange Local Environmental Plan 2011* (LEP) confirms that the site does not accommodate any known heritage items.

A review of the Office of Environment and Heritage (OEH) Aboriginal Heritage Information Management System (AHIMS) confirms that there are no known instances of Aboriginal heritage on or within 200 metres of the site – search results attached as **Appendix A**.

5.9 OTHER LAND RESOURCES

The land has been zoned for residential land use by virtue of the LEP and as such full consideration for the appropriateness of the land use has been considered by Council. The site is suitable for the proposed purpose. The proposed development is consistent with the land use for the area and as such the site attributes are considered to be conducive for such development.

5.10 WATER

There are no mapped waterways located in or near the site that would be impacted by the proposed development. Overland flows through the site would be managed via proposed stormwater management, including inter allotment drainage.

5.11 SOILS

The site is located in the North Orange soil landscape– refer **Figure 4**. This landscape is characterised by undulating to rolling low hills north with red earths on upper slopes and shallow lithosols on crests and sideslopes. Yellow earths appear on lower slopes with brown solodic and yellow solodic soils in drainage depressions. Other soils include non-calcic brown soils red and brown podzolic, gravelly earths and yellow solonetzic soils. Elements of Towac (K-to) occur in this soil landscape.

The likelihood of encountering naturally occurring asbestos (NOA) is low – refer **Figure 5**. NOA is more typically found in the ultramafic cumulates formation, located to the east and south-east of the site, and in resulting shear zones.

The site is located within the Cabonne Group geologic formation - refer **Figure 6**. The Cabonne Group is described as containing Basalt, basaltic andesite, latite lava and intrusions; chert; volcaniclastic siltstone, sandstone; limestone, calcareous breccia.

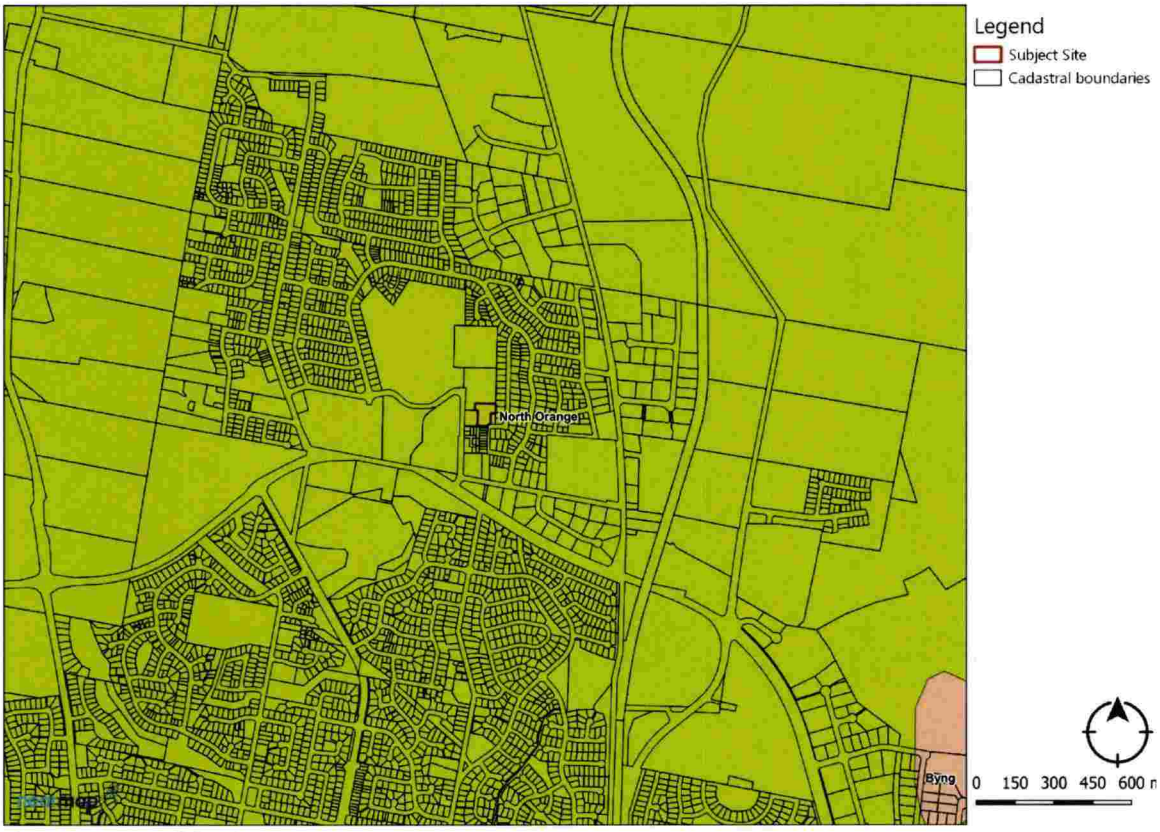


Figure 4: Soil landscape

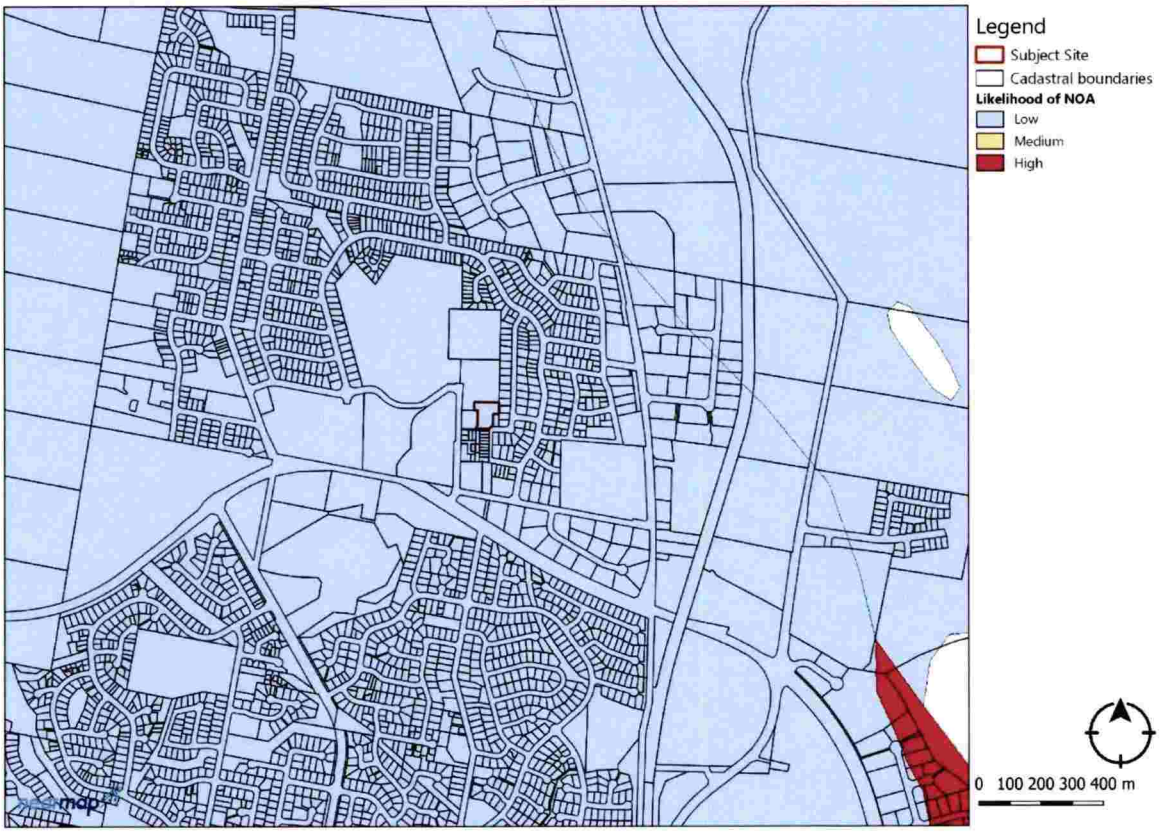


Figure 5: Naturally Occurring Asbestos

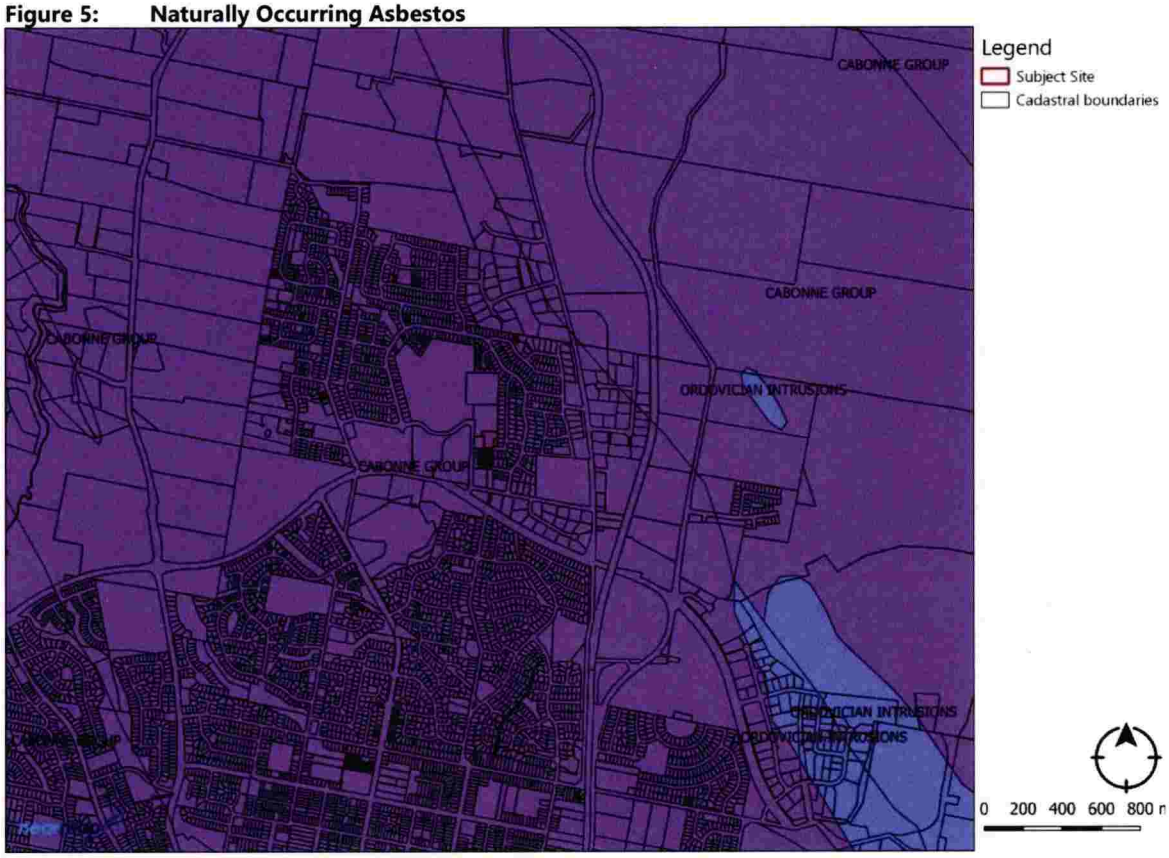


Figure 6: Geology

The site is not considered to be contaminated as a result of its previous use of an orchid – refer **Section 4.2.2.2 and Appendix B**. Minimal excavation is proposed for the development in order to facilitate service connections.

Standard erosion and sediment controls would be implemented throughout construction activities.

There are no anticipated negative impacts on soils in the area as a result of the proposed activity.

5.12 AIR AND MICROCLIMATE

The operative use of the site for residential purposes is not likely to lead to any air or microclimate impacts in the longer term. Short term air quality impacts are likely during construction phases – refer **Section 5.24** for proposed standard mitigation measures.

The existing air quality in the locality is currently considered good given the existing land use patterns and absence of any nearby noxious atmospheric discharges.

The effect of the proposal on air quality is considered minimal; the residential use is unlikely to give rise to any unusual or noxious air emissions with the limited impacts being limited to emissions from vehicles accessing the site.

5.13 FLORA AND FAUNA

The vegetation on site appeared to be highly disturbed and does not appear to be native or significant to the surrounding ecosystem.

A review of vegetation mapping for the Central Tablelands area identifies the site is mapped as containing non-native vegetation – refer **Figure 7**.

Figure 7: Plant Community Type mapping (Source: NSW SEED portal)

A search of the NSW OEH BioNet Atlas confirms that no threatened species listed under the *BC Act* have been recorded at the site. There are records of threatened species within a 1 km radius of the site, as summarised in **Table 5.2**.

Table 5.2 – Threatened species recorded within a 1 km radius

Common Name	Scientific Name	NSW Status	EPBC Act Listing Status
Superb parrot	*Polytelis swainsonii*	Vulnerable	Vulnerable

Source: BioNet Atlas

The closest recorded location of threatened species is the Super Parrot, being located approximately 300 metres to the north-west – refer **Figure 8**. As clearing of vegetation on the site is approved via extant DA 4/2015(2), further impacts to vegetation and ecological communities as a result of this DA are not predicted.

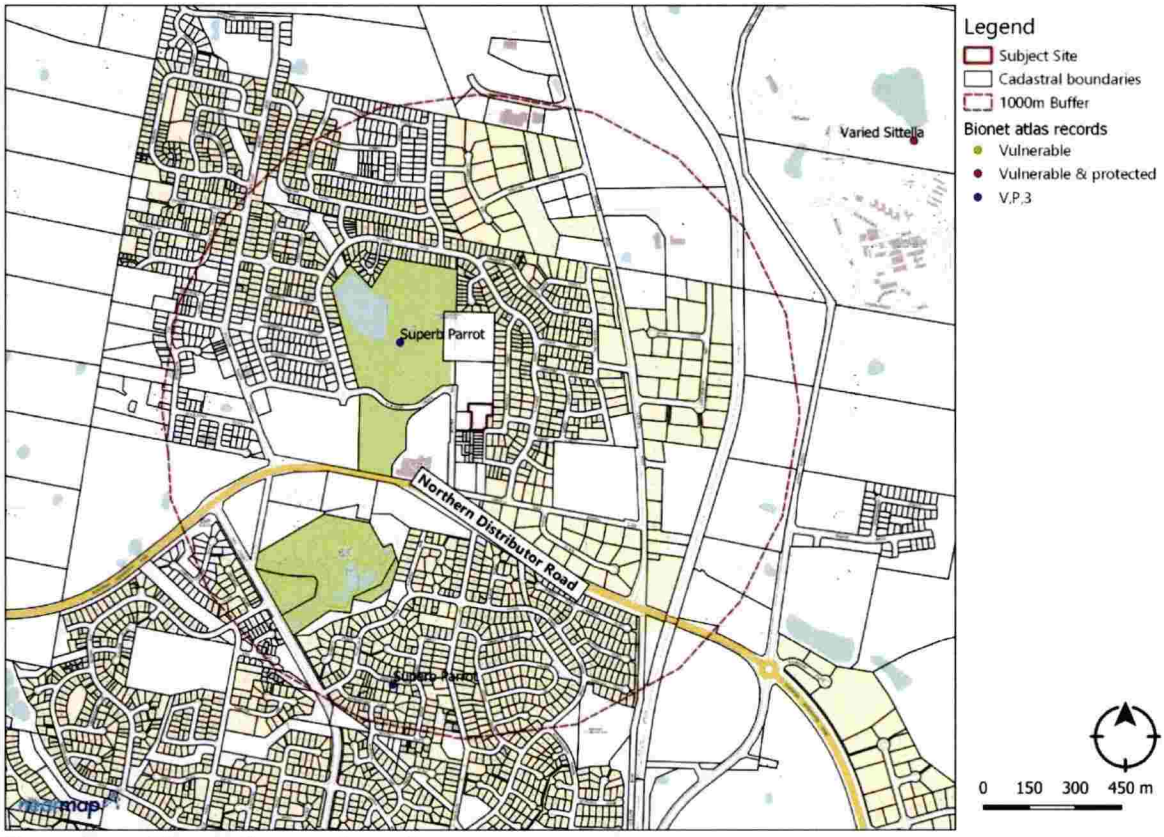


Figure 8: Bionet atlas search results

There are no mapped ecological communities within the 1 km of the site.

With regard to Schedule 3 of the BC Act, there are no extinct species recorded within 1 km of the site.

With regard to Part 3 of the BC Act, the site does not contain any Areas of Outstanding Biodiversity Value.

The site does not contain wilderness areas as defined by the *Wilderness Act 1987*.

A review of the Native Vegetation Regulatory Map confirms that the site is located on land that is excluded from the *Local Land Services Act 2013* (LLS Act).

A review of the Biodiversity Values Map confirms the site does not contain any land mapped as containing significant biodiversity values. The nearest mapped land is located north-west of the site – refer **Figure 9**.

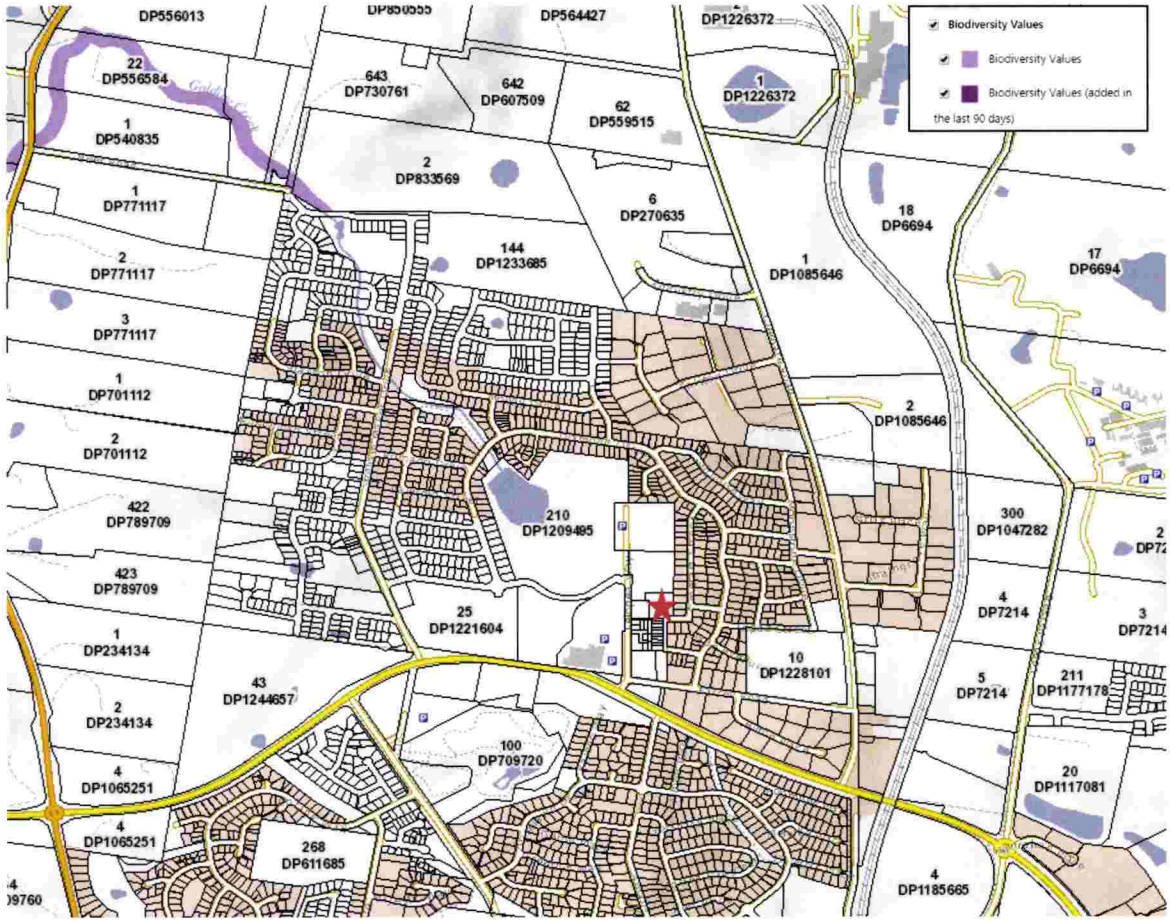


Figure 9: Biodiversity Values Map (site marked by red star)

On the basis of the above, the proposed clearing of vegetation is not expected to result in any significant impacts on threatened species or ecological communities, or their habitats.

5.14 WASTE

5.14.1 SOLID WASTE

Waste associated with the construction of the development would be disposed of at an appropriate waste disposal facility and in accordance with relevant requirements.

Proposed dwellings would benefit from Council's waste collection service. Adequate room is provided on site to ensure waste bins can be stored. The approach is for waste bins to be stored at the dwelling and then moved by a Housing Plus contractor to the bin collection area on bin collection day. These would then by moved back to the dwellings by the Housing Plus contractor after collection. This ensures bins are not left in the front of the site, potentially contributing to visual impacts.

Landscaping is provided around the bin collection area to minimise any residual visual impacts.

By reference to **Premise Architectural Drawing A06**, adequate room has been provided for a garbage collection vehicle to enter and leave the site in a forward direction, and to stand on the site while emptying bins with sufficient clearance for vehicles to enter and exit.

5.15 STORMWATER

Stormwater flow would be directed to existing council infrastructure. The permeability of the site would assist in the reduction of stormwater flows. The stormwater infrastructure would be installed to ensure compliance with Council's engineering and subdivision code as per the concept servicing plan – refer **Premise Engineering Drawings C001-C006**.

5.16 ENERGY

The proposed subdivision has been designed to reflect the principles of sustainability to ensure that building lots are orientated to maximise solar gain for future dwellings.

The attached BASIX/NaTHERS certificates (**Appendix E**) confirm that the proposed dwellings are consistent with sustainability provisions of the planning framework.

5.17 NOISE & VIBRATION

As a residential development, the proposed development is unlikely to generate offensive noise pollution or vibration.

The development would cause minor noise and vibration during construction phases of development. These would be managed through appropriate maintenance and usage of machinery and plant equipment along with working within designated working hours on weekdays and weekends – refer **Section 5.24**

5.18 NATURAL HAZARDS

The site is not mapped as being affected by any natural hazards such as bush fire or flooding.

5.19 TECHNOLOGICAL HAZARDS

No indications of potential contamination on the site have been identified. No specific remediation is therefore deemed to be required in relation to the site – refer **Section 4.2.2.2**.

The existing buildings and infrastructure on site is not known to contain any hazardous building materials.

Subject to the recommendations in the Phase 1 contamination (**Appendix B**) the development may proceed without presenting undue risk to future or surrounding occupants of the land.

5.20 SAFETY, SECURITY AND CRIME PREVENTION

5.20.1 INTRODUCTION

This section provides a Crime Risk Assessment (CRA) of the proposed development against the provisions of the NSW Police Guidelines Safer by Design and the Department of Planning and Infrastructure's Crime Prevention and the Assessment of Development Applications: Guidelines.

A CRA includes an evaluation of the potential for crime in an area, considers the risks associated with the types of crime identified and provides recommendations (where required) to address the risks. It

aims to provide an indication of both the likely magnitude of crime and likely crime type. The consideration of these dimensions will determine the choice and appropriate mix of Crime Prevention Through Environmental Design (CPTED) strategies.

The method for preparing the CRA includes:

1. Obtain an understanding of the crime risk of the area, and as required;
2. Apply (CPTED) treatments that correspond with levels of risk present in the area.

5.20.2 UNDERSTANDING CRIME RISK

5.20.2.1 SEIFA Index of Disadvantage

Socio-Economic Indexes for Areas (SEIFA) is a product developed by the Australian Bureau of Statistics that ranks areas in Australia according to relative socio-economic advantage and disadvantage, based on a range of Census characteristics. The Index is derived from attributes that reflect disadvantage such as low income, low educational attainment, high unemployment, and jobs in relatively unskilled occupations. A higher score on the Index means a lower level of disadvantage. A lower score on the Index means a higher level of disadvantage.

Based on the 2016 SEIFA, Orange (suburb) scored 968, indicating that it has a higher level of disadvantage than the NSW and Australia benchmarks (1,001.0 and 1,001.9 respectively) but a lower level than Regional NSW benchmark (971.0).

Logically, the development of additional social and affordable housing opportunities in the suburb, such as is proposed via this development, assists in improving the level of disadvantage. Given the current score, the development is therefore considered to be positive in this regard.

5.20.2.2 Local Crime Profile

Information published by the NSW Bureau of Crime Statistics between 2016 and 2018 has been gathered to provide a crime profile of the town of Orange (suburb). **Table 5.3** below identifies a range of offences, their incidence in the Orange suburb (per 100,000 persons) as well as the trends at a Local Government Area level (Orange LGA) and state level with respect to the occurrence of each offence. This data is relied on to determine the crime profile of the area.

Table 5.3 – Orange crime profile

Offence	Incidence per 100,000 in Orange suburb (2019)	Incidence per 100,000 in Orange LGA (2019)	Incidence per 100,000 in NSW (2019)	2 year trend in Orange	2 year trend in LGA	2 year trend in NSW
Domestic assault	667.6/100,000	594.9/100,000	360.7/1000,000	Stable	Stable	Up 6%/yr
Non Domestic assault	588.6/100,000	513.7/100,000	411.6/100,000	Stable	Stable	Stable
Robbery	35.7/100,000	30.7/100,000	31.8/100,000	No change	No change	Up 1.9%
Theft	3964.7/100,000	3644.3/100,000	2845.3/100,000	Up 32.8%	Up 32.8%	Stable

Source: NSW Bureau of Crime Statistics, 2019

5.20.2.3 Analysis of offences

As indicated in **Table 5.2**, Orange experiences higher levels of domestic assault, non-domestic violence, robbery and theft than the state average, with instances of domestic assault particularly being almost double the state level.

5.20.2.4 Analysis of trends

During the two year period, crime statistic in Orange remain stable with respect to assault and robbery, while instances of theft have spiked by over 32%. Orange is counter to the prevailing state trend which has seen a rise in domestic assault and robbery, with these remaining stable in Orange.

The fact that the very high levels of domestic violence in Orange have remained stable by comparison to state trends is highly relevant in the context of the need to provide adequate levels of social and affordable housing, to enable victims of domestic violence to find affordable alternative accommodation.

A review of crime hotspots mapping confirms that the incidence of theft in proximity to the subject site is low.

Figure 10 – Theft – 2019 – Crime hotspot (Source: BOCAS Crimetool, 2019)

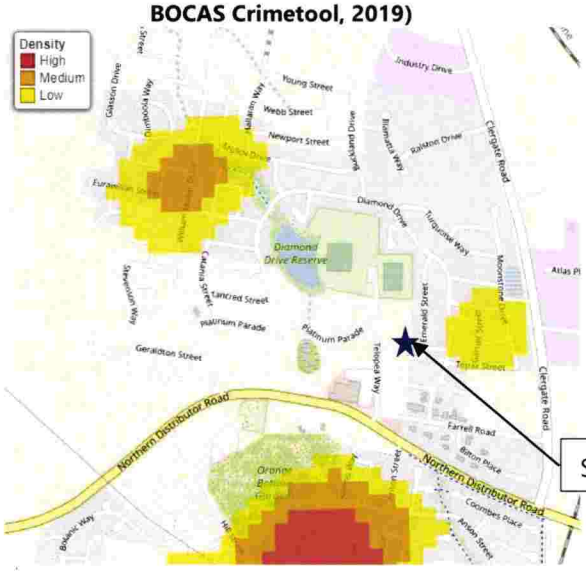
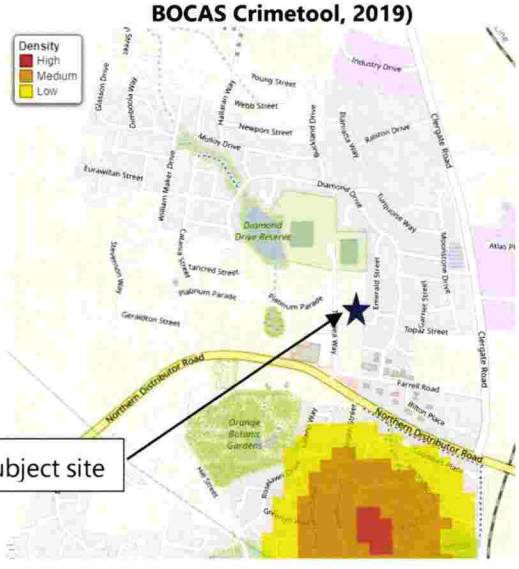


Figure 11 – Theft – 2018 – Crime hotspot (Source: BOCAS Crimetool, 2019)



5.20.3 CPTED PRINCIPLES

The guidelines prepared by the NSW Department of Urban Affairs and Planning (DUAP 2001) identify four (4) *Crime Prevention Through Environmental Design* (CPTED) principles to be considered in a Development Application to ensure developments do not create or exacerbate crime risk. These principles are discussed below in relation to the proposed development and include: surveillance, access control, territorial reinforcement, and space management. These matters are discussed below.

5.20.3.1 Surveillance

The attractiveness of crime targets can be reduced by providing opportunities for effective surveillance, both passive and technical. Good surveillance ensures that people can see what other people are doing. People feel safer in public areas when they can easily see and interact with others. Potential offenders are often deterred from committing crime in areas with high levels of surveillance. Deterrence can be achieved in good design via the following methods:

- Clear sightlines between public and private places;
- Effective lighting of public spaces; and
- Landscaping that makes a place attractive but does not provide offenders with opportunities for concealment to enable them to entrap victims.

The site has been designed to encourage passive surveillance of shared spaces and overlooking of the public domain. Landscaping has been carefully considered to ensure surveillance of these spaces is able to be achieved.

5.20.3.2 Access control

Physical and symbolic barriers can be used to attract, channel or restrict the movement of people. They minimise opportunities for crime and increase the effort required to commit crime.

By making it clear where people are permitted to go or not go, it becomes difficult for potential offenders to reach and victimise people and their property. Illegible boundary markers and confusing spatial definition make it easy for criminals to make excuses for being in restricted areas. However, care needs to be taken to ensure that the barriers are not tall or hostile, creating the effect of a compound.

Effective access control can be achieved by creating:

- landscapes and physical locations that channel and group pedestrians into target areas
- public spaces which attract, rather than discourage people from gathering
- restricted access to internal areas or high-risk areas (like car parks or other rarely visited areas).

There are two points of access to the site; via the pedestrian path in the south-west and via the driveway in the south. These two areas would be delineated by clear territorial reinforcement, in the form of landscaping and changes in material selection, to ensure no uncertainty about the private and public domain. Windows in the development would be lockable to prevent and restrict unauthorised access.

5.20.3.3 Territorial reinforcement

Community ownership of public space sends positive signals. People often feel comfortable in, and are more likely to visit, places which feel owned and cared for. Well used places also reduce opportunities for crime and increase risk to criminals. This is relevant in the context of the public/private transition in the site with respect to the pedestrian pathway linking Pearl Court to Telopea Way.

If people feel that they have some ownership of public space, they are more likely to gather and to enjoy that space. Community ownership also increases the likelihood that people who witness crime will respond by quickly reporting it or by attempting to prevent it. Territorial reinforcement can be achieved through:

- Design that encourages people to gather in public space and to feel some responsibility for its use and condition
- Design with clear transitions and boundaries between public and private space clear design cues on who is to use space and what it is to be used for. Care is needed to ensure that territorial reinforcement is not achieved by making public spaces private spaces, through gates and enclosures. As such, gates or enclosures are not proposed or recommended.

The differentiation between the public and private domains is unambiguous for the proposed development and is reinforced by the proposed landscaping and material selections.

5.20.3.4 Space management

Space management strategies include activity coordination, site cleanliness, rapid repair of vandalism and graffiti, replacement of burned out pedestrian and car park lighting and the removal or refurbishment of decayed physical elements.

Space management is ensured by the oversight of Housing Plus as the site manager and coordinator. In this way, site cleanliness, removal of bins after collection, maintenance of landscaping, removal of graffiti and regular cleaning of communal spaces is able to be effectively coordinated to ensure the space is effectively managed.

5.20.4 CONCLUSION

By reference to the above, the proposal is considered to be acceptable in the context of safety, security and crime prevention.

5.21 SOCIAL IMPACT

As defined by the NSW Government Office on Social Policy, social impacts are significant events experienced by people as changes in one or more of the following are experienced:

- peoples' way of life (how they live, work or play and interact with one another on a day-to-day basis);
- their culture (shared beliefs, customs and values); or
- their community (its cohesion, stability, character, services and facilities).

As a natural progression of the existing residential area, and given the consistency with the residential zoning, the proposed development is not likely to result in significant impacts on any of the above matters.

As discussed in **Section 6.2**, the development provides an important social resource that is in demand in the locality and the region. The development therefore has a positive social impact through the provision of much needed social and affordable housing. No detrimental impacts to surrounding residential land uses are predicted, given the residential nature of both the subject and adjacent land uses. The proximity of the site to approved retail, medical and childcare centres means

5.22 ECONOMIC IMPACT

During construction the development would provide economic benefits through the provision of employment and associated flow on effects. The development would also facilitate additional residential accommodation for the Orange region, thus facilitating an increased population base for the locality. The development is unlikely to have any adverse economic impacts.

5.23 SITE DESIGN AND INTERNAL DESIGN

The proposed development represents a good use of a portion of land that has been underutilised for many years, despite the residential zoning. The design is not dissimilar to the scale of development in the locality, or the scale of development currently approved at the site and would not give rise to any unacceptable impacts to the occupants of the site or the occupants or owners of surrounding land.

The development would not unreasonably impose on the capacity of adjacent and neighbouring land owners to quietly enjoy their land. The building arrangement and setback pays appropriate regard for the prevailing design and streetscape, with the proposed dwelling fronting Pearl Street and Emerald Street adopting a consistent setback with adjacent buildings. In this regard, the development is considered to appropriately integrate with the existing pattern of urban development.

5.24 CONSTRUCTION IMPACTS

Construction activities have the potential to generate adverse impacts through construction traffic noise, building noise, surface water, land degradation and dust. In this regard, the following mitigation measures are required to ameliorate any adverse impacts:

- Preparation of a Sediment and Erosion Plan in accordance with the *Blue Book*, and implementation of the Plan throughout all phases of construction activity;
- All equipment would be operated and maintained in accordance with the manufacturer's specifications;
- Works would be undertaken in accordance with the standard daytime hours recommended by the Department of Environment & Climate Change: that is, 0700-1800 Monday to Friday and 0800-1300 on Saturday, with no works on Sunday or Public Holidays. Any variation to these hours would first be negotiated in consultation with adjoining landowners; and
- The proposed development would be appropriately managed to ensure construction impacts are internalised as much as possible, thus not adversely impacting on the amenity of the locality.

5.25 CUMULATIVE IMPACTS

It is unlikely that the proposed development would result in adverse cumulative impacts. The proposal is a residential development in a predominantly residential area. Use of the proposed dwellings for an approved residential purpose is unlikely to act in concert with other land uses to result in an unreasonable cumulative impact.

6. CONCLUSION

6.1 SUITABILITY OF THE SITE

The proposed development is acceptable in the context of Council's planning framework and demonstrates consistency with Council's planning framework. Furthermore the development would be successfully integrated with council's urban services system for the area.

The proposed development is consistent with the land use for the area and as such the site attributes are considered to be conducive for such development.

6.2 PUBLIC INTEREST

Public interest is served by considering the needs and requirements of the broader general public. In the context of the proposed development, this includes ensuring that people of all socio-economic backgrounds have the capacity to access affordable housing.

By providing a form of housing that is in demand in the region and City of Orange, the development responds to the public interest.

Public interest may be served by both social and economic development as well as environmental protection. The proposal amounts to a form of development that would promote social development and is therefore demonstrated to be in the public interest.

The proposed development has been designed with careful consideration of the site parameters to ensure that off-site impacts are effectively minimised and that impacts to developments on surrounding land are reduced to an acceptable level.

On the balance of the above, it is considered that the development is in the public interest and should be supported.

6.3 CONCLUSION

The development application subject to which this statement of environmental effects relates involves the development of a 19 unit, multi-dwelling development of land at Pearl Court, Orange (Lot 99 DP1234441) for the purposes of providing social and affordable housing.

The proposed development is permissible with consent in the R1 zone pursuant to the Orange LEP 2011. The development is not antipathetic to the LEP zone objectives and is consistent with the provisions of the Orange LEP and the Orange DCP 2004. The development would not have any adverse environmental, social or economic impacts on the locality. In this regard, the subject site is considered to be suitable for the proposed development.

7. REFERENCES

Department of Urban Affairs and Planning (DUAP). nd, *Guide to Section 79C*, NSW Department of Urban Affairs and Planning, Sydney.
Department of Urban Affairs and Planning (DUAP). 2001, *Crime Prevention and the Assessment of Development Applications: Guidelines under section 79C of the Environmental Planning and Assessment Act 1979*, DUAP, Sydney.
Crimetool.bocsar.nsw.gov.au. 2019. Crime Maps | BOCSAR. [online] Available at: http://crimetool.bocsar.nsw.gov.au/bocsar/ [Accessed 28 Aug. 2019].
Stat.data.abs.gov.au. 2019. SEIFA by Local Government Area (LGA). [online] Available at: http://stat.data.abs.gov.au/Index.aspx?DataSetCode=ABS_SEIFA_LGA# [Accessed 28 Aug. 2019].

Plate 1: Existing dwelling on site – approved for demolition via separate consent

Plate 2: Western portion of the site

Plate 3: Northern portion of the site

Plate 4: Eastern portion of the site

Appendix A

Deposited Plan

LAND REGISTRY SERVICES Title Search

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 99/1234441

SEARCH DATE	TIME	EDITION NO	DATE
16/4/2019	4:26 PM	1	11/10/2017

LAND

LOT 99 IN DEPOSITED PLAN 1234441
AT ORANGE
LOCAL GOVERNMENT AREA ORANGE
PARISH OF ORANGE COUNTY OF WELLINGTON
TITLE DIAGRAM DP1234441

FIRST SCHEDULE

ORANGE NORTH PTY LTD

SECOND SCHEDULE (13 NOTIFICATIONS)

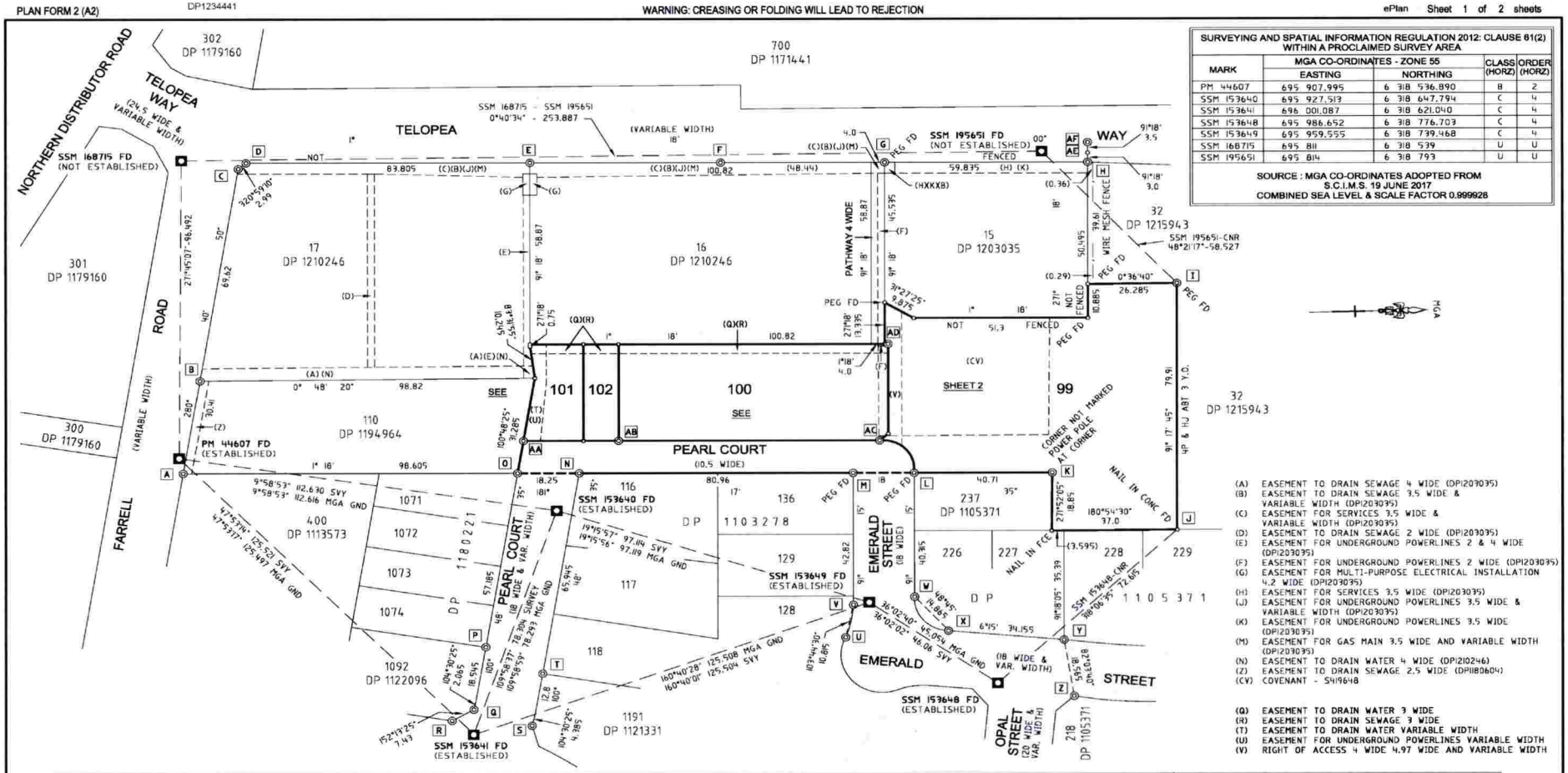
1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 S419648 COVENANT AFFECTING THE PART SHOWN SO BURDENED IN THE TITLE DIAGRAM.
3 Z736542 COVENANT
4 DP1165298 POSITIVE COVENANT REFERRED TO AND NUMBERED (1) IN THE S.88B INSTRUMENT
5 DP1165298 POSITIVE COVENANT REFERRED TO AND NUMBERED (3) IN THE S.88B INSTRUMENT
6 DP1210246 EASEMENT TO DRAIN WATER 4 METRE(S) WIDE APPURTENANT TO THE LAND ABOVE DESCRIBED
7 DP1210246 RESTRICTION(S) ON THE USE OF LAND
8 AJ916163 MORTGAGE TO MICHAEL HARRIS HALL
9 DP1234441 EASEMENT TO DRAIN WATER 3 METRE(S) WIDE APPURTENANT TO THE LAND ABOVE DESCRIBED
10 DP1234441 EASEMENT TO DRAIN WATER VARIABLE WIDTH APPURTENANT TO THE LAND ABOVE DESCRIBED
11 DP1234441 RIGHT OF ACCESS 4, 4.97 METRE(S) WIDE AND VARIABLE WIDTH AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
12 DP1234441 RESTRICTION(S) ON THE USE OF LAND REFERRED TO AND NUMBERED (7) IN THE S.88B INSTRUMENT
13 DP1234441 RESTRICTION(S) ON THE USE OF LAND REFERRED TO AND NUMBERED (8) IN THE S.88B INSTRUMENT
* AN780747 VARIATION OF RESTRICTION DP1234441

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

4158797 PRINTED ON 16/4/2019



SURVEYING AND SPATIAL INFORMATION REGULATION 2012: CLAUSE 61(2) WITHIN A PROCLAIMED SURVEY AREA				
MARK	MGA CO-ORDINATES - ZONE 55		CLASS (HORZ)	ORDER (HORZ)
	EASTING	NORTHING		
PM 44607	695 907.995	6 318 536.890	B	Z
SSM 153640	695 927.513	6 318 647.794	C	4
SSM 153641	696 001.087	6 318 621.040	C	4
SSM 153648	695 986.652	6 318 776.703	C	4
SSM 153649	695 959.555	6 318 739.468	C	4
SSM 168715	695 811	6 318 539	U	U
SSM 195651	695 814	6 318 793	U	U

SOURCE : MGA CO-ORDINATES ADOPTED FROM S.C.I.M.S. 19 JUNE 2017
COMBINED SEA LEVEL & SCALE FACTOR 0.999926

(A) EASEMENT TO DRAIN SEWAGE 4 WIDE (DP1203035)
(B) EASEMENT TO DRAIN SEWAGE 3.5 WIDE & VARIABLE WIDTH (DP1203035)
(C) EASEMENT FOR SERVICES 3.5 WIDE & VARIABLE WIDTH (DP1203035)
(D) EASEMENT TO DRAIN SEWAGE 2 WIDE (DP1203035)
(E) EASEMENT FOR UNDERGROUND POWERLINES 2 & 4 WIDE (DP1203035)
(F) EASEMENT FOR UNDERGROUND POWERLINES 2 WIDE (DP1203035)
(G) EASEMENT FOR MULTI-PURPOSE ELECTRICAL INSTALLATION 4.2 WIDE (DP1203035)
(H) EASEMENT FOR SERVICES 3.5 WIDE (DP1203035)
(J) EASEMENT FOR UNDERGROUND POWERLINES 3.5 WIDE & VARIABLE WIDTH (DP1203035)
(K) EASEMENT FOR UNDERGROUND POWERLINES 3.5 WIDE (DP1203035)
(M) EASEMENT FOR GAS MAIN 3.5 WIDE AND VARIABLE WIDTH (DP1203035)
(N) EASEMENT TO DRAIN WATER 4 WIDE (DP1210246)
(Z) EASEMENT TO DRAIN SEWAGE 2.5 WIDE (DP1180604)
(CV) COVENANT - 5419648

(Q) EASEMENT TO DRAIN WATER 3 WIDE
(R) EASEMENT TO DRAIN SEWAGE 3 WIDE
(T) EASEMENT TO DRAIN WATER VARIABLE WIDTH
(U) EASEMENT FOR UNDERGROUND POWERLINES VARIABLE WIDTH
(V) RIGHT OF ACCESS 4 WIDE 4.97 WIDE AND VARIABLE WIDTH

REFERENCE MARKS				
CORNER	BEARING	DISTANCE	REFERENCE	ORIGIN
A	77°51'25"	5.06	PM 44607 FD	DP 803746
B	6°25'20"	4.395	DH&W FD	DP 1180604
C	308°52'20"	9.275	DH&W FD	DP 1180604
D	3°40'05"	19.016	RM SSM 168715 FD	DP 1180604
	150°49'05"	6.645	DH&W FD	DP 1180604
E	65°55'55"	3.705	DH&W FD	DP 1210246
F	157°08'05"	8.235	DH&W FD	DP 1194964
G	103°24'55"	3.51	DH&W FD	DP 1210246
H	22°55'15"	9.065	DH&W FD	DP 1194964
	-	-	GIP GONE	DP 1180604
I	91°18'	1.0	GIP FD	DP 806106
J	-	-	GIP GONE	DP 803746
K	250°05'40"	2.28	GIP FD	DP 1194964
L	0°54'50"	4.22	DH&W PLACED	ME
	335°15'15"	4.895	DH&W IN NEW KERB	ME
	335°28'	4.88	DH&W GONE	DP 1103278

REFERENCE MARKS				
CORNER	BEARING	DISTANCE	REFERENCE	ORIGIN
M	214°33'35"	5.135	DH&W PLACED	ME
	35°15'25"	1.665	DH&W PLACED	ME
	-	-	DH&W GONE	DP 1103278
N	300°17'10"	13.815	RM SSM 153640 FD	DP 1210246
	-	-	DH&W GONE	DP 1103278
	333°11'10"	5.395	DH&W PLACED	ME
O	198°43'	4.395	DH&W FD	DP 1194964
P	190°58'40"	4.365	DH&W FD	DP 1122096
Q	226°12'25"	4.83	DH&W FD	DP 1103278
R	226°16'	8.42 BY ME	RM SSM 153641 FD	DP 1103278

REFERENCE MARKS				
CORNER	BEARING	DISTANCE	REFERENCE	ORIGIN
S	331°18'05"	6.445	DH&W FD	DP 1103278
T	9°47'	4.36	DH&W FD	DP 1121331
U	232°33'15"	5.205	DH&W FD	DP 1103278
V	171°57'	4.755	RM SSM 153649 FD	DP 1103278
W	3°29'	4.305	DH&W FD	DP 1103278
X	268°08'	4.415	DH&W FD	DP 1103278
Y	277°13'	4.225 BY ME	DH&W FD	DP 1103278
Z	98°08'	4.2	DH&W FD	DP 1103278
AA	197°02'15"	8.645	DH&W PLACED	ME
	222°34'45"	6.125	DH&W PLACED	ME

REFERENCE MARKS				
CORNER	BEARING	DISTANCE	REFERENCE	ORIGIN
AB	270°57'00"	2.33	DH&W PLACED	ME
	271°10'55"	9.535	DH&W PLACED	ME
AC	185°09'15"	2.85	DH&W PLACED	ME
	280°08'	2.175	DH&W PLACED	ME
AD	291°44'45"	0.995	DH&W PLACED	ME
	68°07'35"	9.885	DH&W PLACED	ME
AE	-	-	GIP GONE	DP 1165298
AF	351°48'55"	18.71	DH&W FD	DP 1215943

10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 Table of mm

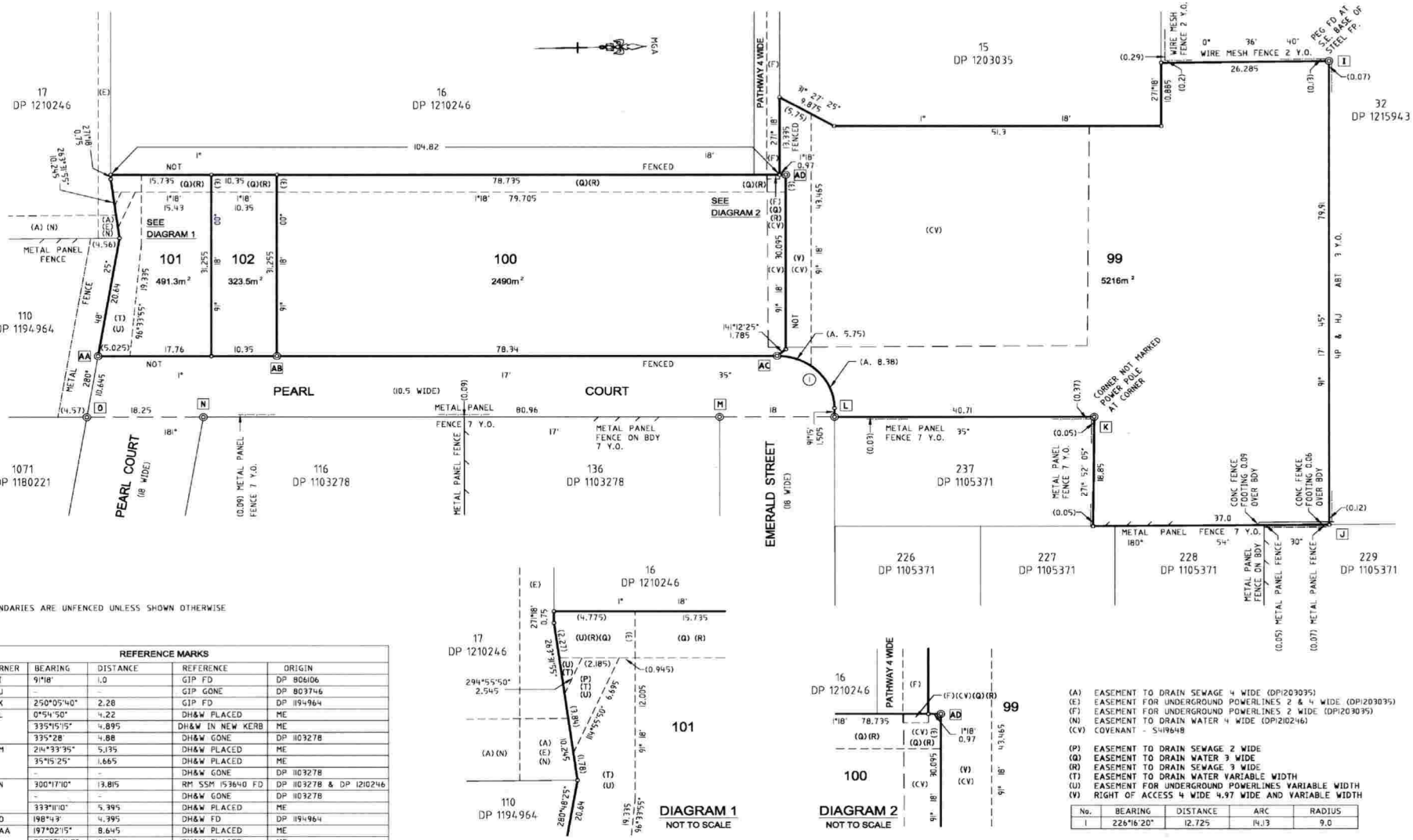
Surveyor: ANDREW FRANK USHER
Date of Survey: 25-07-2017
Surveyor's Ref: 8254

PLAN OF SUBDIVISION OF LOT 18 IN DP 1210246

LGA: ORANGE
Locality: ORANGE
Subdivision No: 5263
Lengths are in metres. Reduction Ratio 1: 800

Registered 11.10.2017

DP1234441



BOUNDARIES ARE UNFENCED UNLESS SHOWN OTHERWISE

REFERENCE MARKS				
CORNER	BEARING	DISTANCE	REFERENCE	ORIGIN
I	91°18'	1.0	GIP FD	DP 806106
J	-	-	GIP GONE	DP 803746
K	250°05'40"	2.28	GIP FD	DP 1194964
L	0°54'50"	4.22	DH&W PLACED	ME
	335°15'15"	4.895	DH&W IN NEW KERB	ME
	335°28'	4.88	DH&W GONE	DP 1103278
M	214°33'35"	5.135	DH&W PLACED	ME
	35°15'25"	1.665	DH&W PLACED	ME
	-	-	DH&W GONE	DP 1103278
N	300°17'10"	13.815	RM SSM 153640 FD	DP 1103278 & DP 1210246
	-	-	DH&W GONE	DP 1103278
	333°11'10"	5.395	DH&W PLACED	ME
O	198°49'	4.395	DH&W FD	DP 1194964
AA	197°02'15"	8.645	DH&W PLACED	ME
	222°34'45"	6.125	DH&W PLACED	ME
AB	270°57'00"	2.33	DH&W PLACED	ME
	271°10'55"	9.535	DH&W PLACED	ME
AC	185°09'15"	2.85	DH&W PLACED	ME
	280°08'	2.175	DH&W PLACED	ME
AD	291°44'45"	0.995	DH&W PLACED	ME
	68°07'35"	9.885	DH&W PLACED	ME

(A) EASEMENT TO DRAIN SEWAGE 4 WIDE (DP1203035)
(E) EASEMENT FOR UNDERGROUND POWERLINES 2 & 4 WIDE (DP1203035)
(F) EASEMENT FOR UNDERGROUND POWERLINES 2 WIDE (DP1203035)
(N) EASEMENT TO DRAIN WATER 4 WIDE (DP1210246)
(CV) COVENANT - SA19648

(P) EASEMENT TO DRAIN SEWAGE 2 WIDE
(Q) EASEMENT TO DRAIN WATER 3 WIDE
(R) EASEMENT TO DRAIN SEWAGE 3 WIDE
(T) EASEMENT TO DRAIN WATER VARIABLE WIDTH
(U) EASEMENT FOR UNDERGROUND POWERLINES VARIABLE WIDTH
(V) RIGHT OF ACCESS 4 WIDE 4.97 WIDE AND VARIABLE WIDTH

No.	BEARING	DISTANCE	ARC	RADIUS
1	226°16'20"	12.725	14.13	9.0

Surveyor: ANDREW FRANK USHER Date of Survey: 25-07-2017 Surveyor's Ref: 8254	PLAN OF SUBDIVISION OF LOT 18 IN DP 1210246	LGA: ORANGE Locality: ORANGE Subdivision No: 5263 Lengths are in metres. Reduction Ratio 1: 400	Registered 11.10.2017	DP1234441

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PLAN FORM 6 (2012) WARNING: Creasing or folding will lead to rejection ePlan

DEPOSITED PLAN ADMINISTRATION SHEET

Sheet 1 of 4 sheet(s)

Office Use Only

Registered: 11.10.2017

Title System: TORRENS

Purpose: SUBDIVISION

Office Use Only

DP1234441

PLAN OF SUBDIVISION OF LOT 18 IN DP1210246

LGA: ORANGE

Locality: ORANGE

Parish: ORANGE

County: WELLINGTON

Crown Lands NSW/Western Lands Office Approval

I, ... (Authorised Officer) in approving this plan certify that all necessary approvals in regard to the allocation of the land shown herein have been given.

Signature: .....

Date: .....

File Number: .....

Office: .....

Subdivision Certificate

I, DAVID WADDELL

*Authorised Person/*General Manager/*Accredited Certifier, certify that the provisions of s.109J of the *Environmental Planning and Assessment Act 1979* have been satisfied in relation to the proposed subdivision, new road or reserve set out herein.

Signature: .....

Accreditation number: .....

Consent Authority: Orange City Council

Date of endorsement: 21/9/17

Subdivision Certificate number: 5063

File number: PR27088

*Strike through if inapplicable.

Survey Certificate

I, ANDREW FRANK USHER

of USHER & COMPANY PTY LIMITED
PO BOX 8069 ORANGE NSW 2800

a surveyor registered under the *Surveying and Spatial Information Act 2002*, certify that:

*(a) The land shown in the plan was surveyed in accordance with the *Surveying and Spatial Information Regulation 2012*, is accurate and the survey was completed on 25/07/2017

~~*(b) The part of the land shown in the plan (*being/*excluding ^ ..... was surveyed in accordance with the *Surveying and Spatial Information Regulation 2012*, is accurate and the survey was completed on, ... the part not surveyed was compiled in accordance with that Regulation.~~

*(c) The land shown in this plan was compiled in accordance with the *Surveying and Spatial Information Regulation 2012*.

Signature: ..... Dated: 25/07/2017

Surveyor ID: 2127

Datum Line: PM 44607 – SSM 153640

Type: *Urban

The terrain is *Level-~~Undulating~~

*Strike through if inapplicable.

^Specify the land actually surveyed or specify any land shown in the plan that is not the subject of the survey.

Statements of intention to dedicate public roads, public reserves and drainage reserves.

IT IS INTENDED TO DEDICATE PEARL COURT TO THE PUBLIC AS ROAD

Plans used in the preparation of ~~survey~~/compilation.

DP608423 DP803746 DP806106 DP1103278 DP1105371 DP1113573 DP1121331 DP1125237 DP1122096 DP1180604 DP1180221 DP1165298 DP1194964 DP1210246 DP1215943

If space is insufficient continue on PLAN FORM 6A

Signatures, Seals and Section 88B Statements should appear on PLAN FORM 6A

Surveyor's Reference: 8254

PLAN FORM 6A (2012) WARNING: Creasing or folding will lead to rejection ePlan

DEPOSITED PLAN ADMINISTRATION SHEET

Office Use Only

Registered: 11.10.2017

Office Use Only

DP1234441

PLAN OF SUBDIVISION OF LOT 18 IN DP1210246

Subdivision Certificate number: 5263

Date of Endorsement: 2/9/17

This sheet is for the provision of the following information as required:

- A schedule of lots and addresses - See 60(c) *SSI Regulation 2012*
- Statements of intention to create and release affecting interests in accordance with section 88B *Conveyancing Act 1919*
- Signatures and seals- see 195D *Conveyancing Act 1919*
- Any information which cannot fit in the appropriate panel of sheet 1 of the administration sheets.

LOT	STREET No.	STEET NAME	STREET TYPE	LOCALITY
99	Not available	Not available	Not available	Not available
100	9	PEARL	COURT	ORANGE
101	7	PEARL	COURT	ORANGE
102	8	PEARL	COURT	ORANGE

PURSUANT TO SECTION 88B OF THE CONVEYANCING ACT 1919
IT IS INTENDED TO CREATE;

1. EASEMENT TO DRAIN SEWAGE 2 WIDE.
2. EASEMENT TO DRAIN WATER 3 WIDE.
3. EASEMENT TO DRAIN SEWAGE 3 WIDE
4. EASEMENT TO DRAIN WATER VARIABLE WIDTH.
5. EASEMENT FOR UNDERGROUND POWERLINES VARIABLE WIDTH.
6. RIGHT OF ACCESS 4 WIDE 4.97 WIDE AND VARIABLE WIDTH
7. RESTRICTION ON THE USE OF LAND
8. RESTRICTION ON THE USE OF LAND

DP1234441

If space is insufficient use additional annexure sheet

Surveyor's Reference: 8254

ePlan

PLAN FORM 6A (2012) WARNING: Creasing or folding will lead to rejection

DEPOSITED PLAN ADMINISTRATION SHEET

Sheet 3 of 4 sheet(s)

Office Use Only

Registered: 11.10.2017

Office Use Only

DP1234441

PLAN OF SUBDIVISION OF LOT 18 IN DP1210246

This sheet is for the provision of the following information as required:

- A schedule of lots and addresses - See 60(c) *SSI Regulation 2012*
- Statements of intention to create and release affecting interests in accordance with section 88B *Conveyancing Act 1919*
- Signatures and seals- see 195D *Conveyancing Act 1919*
- Any information which cannot fit in the appropriate panel of sheet 1 of the administration sheets.

Subdivision Certificate number: 5263

Date of Endorsement: 21/9/17

EXECUTED BY MICHAEL HARRIS HALL

MICHAEL HARRIS HALL

WITNESS:

Geoffrey Anthony Wockner 15.9.2017
Solicitor

SIGNATURE OF WITNESS

GEOFFREY ANTHONY WOCKNER

PRINT NAME OF WITNESS

10 NEPTUNE COURT, SURFERS PARADISE QLD 4217

ADDRESS OF WITNESS

DP1234441

If space is insufficient use additional annexure sheet

Surveyor's Reference: 8254

PLAN FORM 6A (2012) WARNING: Creasing or folding will lead to rejection ePlan

DEPOSITED PLAN ADMINISTRATION SHEET

Office Use Only

Registered: 11.10.2017

Office Use Only

DP1234441

PLAN OF SUBDIVISION OF LOT 18 IN DP1210246

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- Signatures and seals- see 195D *Conveyancing Act 1919*
- Any information which cannot fit in the appropriate panel of sheet 1 of the administration sheets.

Subdivision Certificate number: 5263

Date of Endorsement: 29/9/17

EXECUTED BY ORANGE NORTH PTY. LTD.
ACN 169 197 068 in accordance with Section 127 of the Corporations Act 2001

D R Cherry

David Leon Cherry
Sole Director and Secretary

If space is insufficient use additional annexure sheet

Surveyor's Reference: 8254

DP1234441

Appendix B

Phase 1 Contamination Assessment

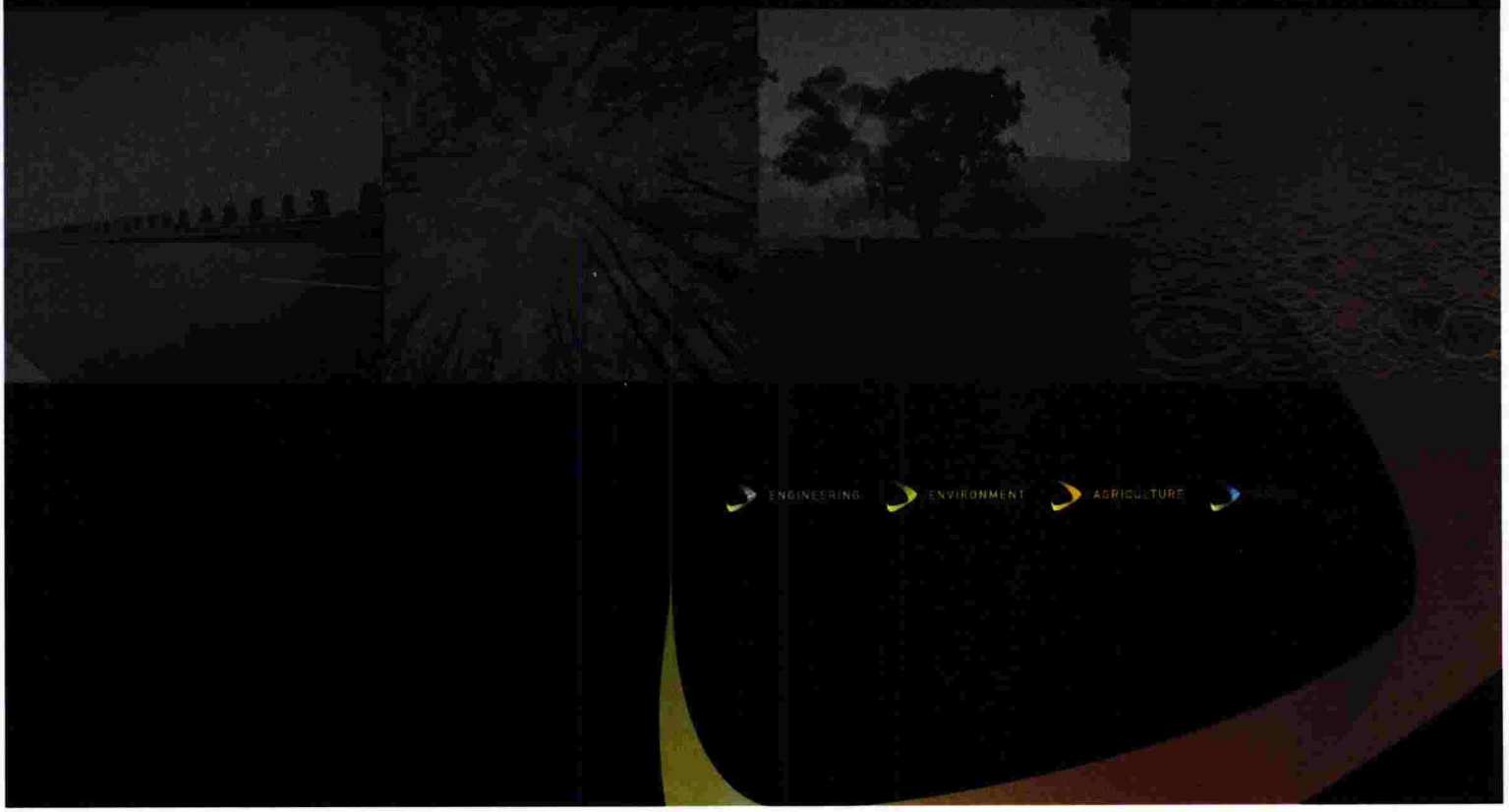
Premise

Housing Plus

Phase 1 Preliminary Site Investigation to inform Due Diligence

Lot 99 DP1234441, Emerald Street, Orange

Report No: 219391_REP_001A
Rev: A
Date: 7 May 2019



PHASE 1 PRELIMINARY SITE INVESTIGATION

PROPOSED MULTI-DWELLING HOUSING DEVELOPMENT

LOT 99 DP1234441, EMERALD STREET, ORANGE

PREPARED FOR:

HOUSING PLUS

MAY 2019

POSTAL ADDRESS PO BOX 1963 ORANGE NSW 2800
LOCATION 154 PEISLEY STREET ORANGE NSW 2800
TELEPHONE 02 6393 5000 **FACSIMILE** 02 6393 5050
EMAIL ORANGE@PREMISE.COM **WEB SITE** WWW.PREMISE.COM

Report Title:	*Phase 1 Preliminary Site Investigation*
Project:	*Proposed Multi-Dwelling Housing Development*
Client:	*Housing Plus*
Report Ref.:	*219391_REP_002A.docx*
Status:	*Final*
Issued:	*7 May 2019*

Premise Australia Pty Ltd (**Premise**) and the authors responsible for the preparation and compilation of this report declare that we do not have, nor expect to have a beneficial interest in the study area of this project and will not benefit from any of the recommendations outlined in this report.

The preparation of this report has been in accordance with the project brief provided by the client and has relied upon the information, data and results provided or collected from the sources and under the conditions outlined in the report.

All information contained within this report is prepared for the exclusive use of Housing Plus to accompany this report for the land described herein and are not to be used for any other purpose or by any other person or entity. No reliance should be placed on the information contained in this report for any purposes apart from those stated therein.

Premise accepts no responsibility for any loss, damage suffered or inconveniences arising from, any person or entity using the plans or information in this study for purposes other than those stated above.

TABLE OF CONTENTS

APPENDICES

APPENDIX A
Registered Groundwater Bore Records

APPENDIX B
Previous Title Records

APPENDIX C
Historic Aerial Photography

APPENDIX D
Analytical Tables and Reports

APPENDIX E
Analytical Laboratory QA/QC & Chain of Custody Documents

TABLES

Introduction

1.1 BACKGROUND

Premise was engaged by Housing Plus to conduct a Phase 1 Preliminary Site Investigation (P1 PSI) for a property located in Orange NSW 2800 to assist with due diligence prior to property purchase. An existing development consent issued by Orange City Council (OCC) reference DA 4/2015(2) applies to the land.

The site is located at Emerald Street, Orange NSW, and is identified as Lot 99 in deposited plan (DP) 1234441. The subject site is currently owned by 'Orange North Pty Ltd' and it is conceptually proposed to develop the site as a multi-dwelling housing development, providing a mix of social and community housing.

This P1 PSI has been prepared with reference to the requirements of the *Managing Land Contamination – Planning Guidelines* 1998 under the NSW State *Environmental Planning Policy (SEPP) No 55 – Remediation of Land* 1998, and consideration of the *Contaminated Land Management Act* 1997.

Condition 36 of DA 4/2015(2) requires the following be undertaken prior to the issue of a subdivision certificate:

> *Soil sampling for analysing chemical residue is to be carried out within the proposed lots 101 – 111 in a manner and frequency as determined by an appropriately qualified and experienced consultant giving consideration to previous specific uses and on-site characteristics of the site. A NATA-registered laboratory is required to carry out such testing. Reference is made to the* Contaminated Land Management Act *1997 and State Environmental Planning Policy No 55 – "Remediation of Land". The results of testing are to be provided to the Principal Certifying Authority and are to demonstrate that the land is suitable for residential use, to enable a subdivision certificate to be issued.*

On the approved DA plans, the subject site is marked as approved Lot 111. As such, condition 36 applies to Lot 99 despite it not being listed in the wording of condition 36.

This report has been prepared in general accordance with the NSW EPA publication Contaminated Sites: *Guidelines for Consultants Reporting on Contaminated Sites* (EPA, November 1997). The overall objective is to identify the potential for land contamination to have occurred at the site from past activities.

Lot 99 DP 1234441 has an area of approximately 5,200 m^2. The site is unoccupied, however a derelict dwelling and a number of sheds are present on the site.

The site area is presented below on **Figure 1**.

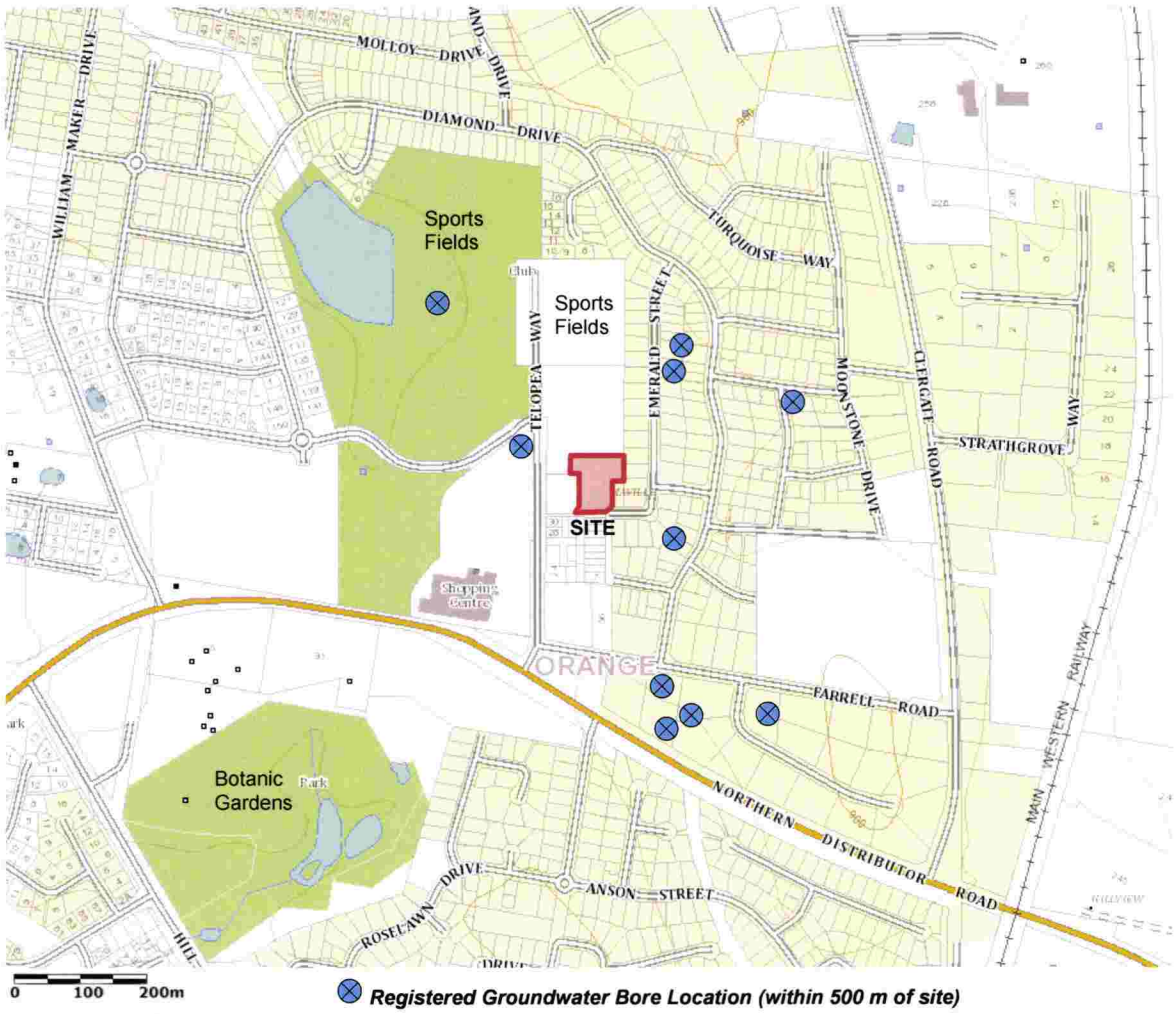


Figure 1: Site Locality

1.2 SCOPE OF WORK

The scope of work for this assessment consisted of the following components:

- Review of the following third party documents:
  - Published topographical, geological and soil maps of the area;
  - Details of groundwater bores located within 500 m of the site and registered on the groundwater bore database, maintained by the NSW Office of Water (https://realtimedata.waternsw.com.au/water.stm);
  - The public register managed by the NSW EPA for information on scheduled activities and penalty notices issued under the Protection of the Environment Operations Act;
  - The database managed by the NSW Environment Protection Authority (EPA) for information on notices issued under the Contaminated Land Management Act 1997;
  - Aerial photographs – selected historical aerial photographs of the site available for review to provide evidence of the history of development of the site and indications of potential sources of contamination;
  - Review title folio documentation to provide details of historic ownership and land use(s) for nominated properties;

  - Review of site records, where available.
- Site inspection – A site inspection by Premise personnel of the site and surrounding areas was undertaken to provide further information, via visual inspection, of potential sources and areas of significant environmental liability. The site inspection focused on the following:
  - Areas of operational processes including waste management, water management, the condition of the site surfaces and buildings, and the presence of electrical transformers on site.
  - Areas of potential landfilling.
  - Potential impacts of neighbouring land uses.
  - Sensitivity of the receiving environment.
  - Other relevant information which could be provided by the site operator.
- Collection of samples from surface soils at the site, and laboratory analysis for chemicals of potential concern (COPC) to establish potential for residual chemical impacts.
- Collection of soil samples from waste stockpiles identified to have originated from off-site, and laboratory analysis for COPC to establish potential for residual chemical impacts.
- Preparation of this factual report detailing the assessment findings in accordance with the NSW EPA publication *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites* (EPA, November 1997).

An overview of neighbouring properties was also conducted to identify the presence and proximity of sensitive receptors which could be significantly impacted upon by the site, and off-site operations which could have a significant impact on land contamination at the site.

Site Description

2.1 SITE DEFINITION

Table 2.1 – Summary of Property Description Details

Feature	Details
Site Address[1]	Emerald Street, Orange NSW 2800
Title Identification Details[1]	Lot 99 in DP 1234441
Current Ownership	Orange North Pty Ltd
Current Site Use and Zoning[2]	Land Use: Unoccupied Residence Zoning: General Residential (R1)
Proposed Future Site Use	Multi-Dwelling Housing
Previous Reports	• Nil
Site Area[1]	5,200 m^2

Sources:
1: SIX Maps Website developed by NSW Government, Land and Property Information. http://maps.six.nsw.gov.au/ (accessed March 2019).
2: Orange Local Environmental Plan, 2011, under the Environmental Planning and Assessment Act 1979.

2.2 SITE SETTING

2.2.1 REGIONAL SETTING

The site is located on Emerald Street, Orange NSW. The site is approximately 3.5 km north of Orange central business district (CBD), 200 m north-east of the North Orange Shopping Centre, and 800 m west of the Main Western Railway line. Residential and recreational land-uses largely surround the site.

The following sensitive receptors are located in the proximal area of the site:

- Residential areas are located in close proximity to the site to the east and south, and within 450 m to the north and west of the site;
- Surface water features associated with the botanic gardens and Waratahs sports fields are respectively located 530 m south-west and 390 m north-west of the site;
- A childcare centre is located on Farrell Road approximately 100 m south of the site; and
- Groundwater present in aquifer(s) underlying the site.

2.2.2 LOCAL SETTING

The following structures are currently located on the site:

- Dwelling (unoccupied and derelict)
- Large shed, approximate area 145 m^2
- Two small sheds, approximate area 10 m^2 (each)

The site generally slopes towards the west.

Land uses and properties adjacent to the site, including those across adjacent roads were obtained from the site inspection conducted by Premise personnel in April 2019. The local area surrounding the site is displayed in **Figure 1**. Identified adjacent land uses are summarised in **Table 2.2**:

Table 2.2 – Adjacent Properties Descriptions

Direction From Site	Site Use (Nature of Activity)
North	Sports fields of Waratahs Sports Club, with residential dwellings beyond
South	Construction site (residential dwellings)
East	Residential dwellings
West	Sports fields of Waratahs Sports Club, with residential dwellings beyond

A detailed presentation of the surrounding area is attached as **Figure 1**.

2.3 TOPOGRAPHY

Topographical site information was obtained from the:

- Orange 8731-3N, 1:25,000 Scale, Topographic Map, Third Edition (New South Wales Land and Property Information, 2011); and
- Site visit in April 2019.

The site is generally flat with a slight slope from east to west.

2.4 SURFACE WATER RECEPTORS

No drainage features were identified to transect the site. The site slope would indicate surface water flow to the west.

The catchment of surface waters at the site may include portions of properties to the east. Some flow originating from these properties is anticipated.

2.5 REGIONAL AND SITE GEOLOGY

Mapped soil landscapes around the site indicate the site lies on the 'North Orange' soil landscape, and during the site inspection the soils were identified to be 'yellow earths'.

Yellow earths of the North Orange soil landscape consist of "*Dark to dull brown fine sandy loam with weak structure; friable when moist; pH 5.0–5.5. Dull brown or yellow-orange bleached (dry) fine sandy loam to silt loam which is massive or is weakly structured; pH 5.5; to 25–30 cm depth*".

The Orange 8731 Geological 1 : 100,000 Series Sheet (Geological Survey of NSW, 1997) indicates the underlying geology comprises the Ordovician Oakdale Formation from the Cabonne Group, consisting of mafic volcanic sandstone, basalt, siltstone, black shale, chert, breccia and conglomerate.

The *Australian Soil Resource Information System* (ASRIS) on-line database, maintained by CSIRO Land and Water, indicates there is an extremely low probability of occurrence of acid sulphate soils in the area of the site (compiled 2010, accessed May 2019).

The NSW Heads of Asbestos Coordination Authorities (HACA) *Mapping of Naturally Occurring Asbestos in NSW* (2015) has assessed the area surrounding the site as having low potential for naturally occurring asbestos (NOA). The site is located approximately 1.4 km west of the closest mapped area corresponding to a geological unit with high potential for NOA.

2.6 REGIONAL HYDROGEOLOGY

A search for registered groundwater users located within a 500 m radius of the site was undertaken using the NSW Office of Water on-line database (http://realtimedata.water.nsw.gov.au/water.stm), in May 2019. The results indicated that there are no groundwater bores registered at the site, and 10 bores are registered to locations within 500 m of the site, as shown on **Figure 1**.

The closest registered groundwater bore to the site, reference GW801946 and registered for domestic purposes, is located approximately 130 m north-west of the site and was installed to a depth of 38 metres below ground level (mbgl). The standing water level was recorded to be 18 mbgl.

Registration details of the above groundwater bore is included in **Appendix A**.

Premise has considered the surrounding recreational, residential and former agricultural land uses (refer **Section 3**) and notes the potential for unregistered bores for irrigation and/or domestic purposes proximal to the site.

Site Historical Review

A review of the site history was undertaken to assess historical use of the site, and in particular to identify activities with the potential to contaminate soil and/or groundwater at the site.

3.1 NSW EPA RECORDS

3.1.1 SCHEDULED ACTIVITIES AND/OR ENVIRONMENTAL NOTICES

A search of the NSW EPA on-line register (http://www.epa.nsw.gov.au/prpoeoapp/) was undertaken in May 2019 for environment protection licenses and/or penalty notices issued under the Protection of the Environment Operations Act (POEO) 1997. The search indicated that no licenses have been issued for any of the titles comprising the site or properties located within 500 m of the site.

No clean-up notices relating to the site or surrounding properties have been issued by the NSW EPA.

3.1.2 CONTAMINATED SITES REGISTER

A search of the NSW EPA on-line register (http://www.environment.nsw.gov.au/prclmapp/) was undertaken in May 2019 for contaminated land notices issued or regulated under the Contaminated Land Management Act 1997. The search indicated that the NSW EPA holds no contaminated land records relating to the site or properties within 500 m of the site.

3.2 PREVIOUS TITLE INFORMATION

Historic title information was sought for Lot 99 DP 1234441.

Previous title ownership for these titles is attached in **Appendix B** and summarised in **Table 3.2**.

Table 3.1 – Title History, Lot 99 DP 1234441

Date Range	Ownership
1843 – 1915	**Parish Orange Portion 55** John Henry Black / Davis Ramsey / Prosper de Mastre / Francis Lord / Edward Lord / Thomas Lord, 1920 Acres, Grant Serial 61 Page 164
1915 – 1916	Part title transferred to **Vol 2597 Fol 150** George Price Thirkell, Grazier
1916 – 1952	Part title transferred to **Vol 2647 Fol 206 & 207, Lot 1 DP 8221** Robert Farrell / John Thomas Farrell, Farmers
1952 – 1955	Title reference amended to **Vol 6495 Fol 203** Robert Kevin Farrell, Orchardist **Vol 6495 Fol 204** Helen Farrell, Widow **Vol 6496 Fol 245** Margaret Mary Farrell, Spinster **Vol 7073 Fol 18** James Joseph Farrell, Orchardist
1955 – 1980	Title reference amended to **Vol 12957 Fol 238** Bathurst-Orange Development Corporation
1980 – 1990	Title reference amended to **Lots 1 and 2 DP 608423**
1990 – 1991	Title reference amended to **Lot 59 DP 803746**
1991 – 1995	Title reference amended to **Lot 61 DP 806106**

Table 3.1 – Title History, Lot 99 DP 1234441

Date Range	Ownership
1995 – 2011	Title reference amended to **Lot 72 DP 851029**
2011 – 2013	Title reference amended to **Lots 40 & 41 DP 1165298**
2013 – 2014	Title reference amended to **Lot 11 DP 1180604**
2014 – 2015	Title reference amended to **Lot 111 DP 1194964**
2015	Title reference amended to **Lot 16 DP 1203035**
2015 – 2017	Title reference amended to **Lot 18 DP 1210246**
2017 – present	Title reference amended to **Lot 99 DP 1234441** Orange North Pty Ltd

3.3 HISTORICAL AERIAL PHOTOGRAPHY SURVEY

An historical aerial photography survey was undertaken for the site, with a total of six (6) photographs identified and reviewed. The historical aerial photographs that were reviewed spanned a period of approximately 65 years, with the most recent from 2019, to the earliest in 1954. Aerial photographs, as attached in **Appendix C**, were reviewed to track changes in use of the site and surrounding properties over time. Key observations made during the review of aerial photos are summarised in **Table 3.3** as follows:

Table 3.2 – Summary of Aerial Photo Information

Date	Site Activity	Surrounding Land Use
1954	The site is generally utilised for agricultural purposes (orcharding). A single dwelling is present.	The land adjacent to the site to the north and east is generally utilised for orcharding The land adjacent to the site to the west and south is generally utilised for agricultural purposes (presumed to be grazing pasture).
1973	Additional structures are present on the site to the north of the dwelling	Land uses of the surrounding area do not appear to have been significantly altered.
1989	The area encompassing the site is generally unchanged.	Additional orchards are present to the south of the site. Structures of the Waratahs Sports Club are present to the north of the site. Other land uses of the surrounding area do not appear to have been significantly altered.
1998	The area encompassing the site is generally unchanged.	Orchards have been removed to the north, south and east of the site. Additional farm dams are present to the east of the site. Other land uses of the surrounding area do not appear to have been significantly altered.
2005	The area encompassing the site is generally unchanged.	Construction has commenced at the Northern Distributor Road to the south of the site. Other land uses of the surrounding area do not appear to have been significantly altered.

Table 3.2 – Summary of Aerial Photo Information

Date	Site Activity	Surrounding Land Use
2019	A structure on the site to the north of the dwelling is no longer present.	Sports fields of the Waratahs Sports Club are present to the north and north-west of the site. Residential dwellings are present to the north-east, east and south-east of the site. Construction is underway for development to the south of the site. The North Orange shopping centre is present to the south-west of the site

3.4 SUMMARY OF SITE HISTORY INFORMATION

Crown grants incorporating the site commenced in 1843, which has been subject to private ownership through to the present. Based on historical aerial photographs, structures including a dwelling and numerous other sheds have been present at the site, with one structure being demolished in the period between 2005 and 2019. Orcharding appears to be the predominant agricultural land use at and near the site. The surrounds have predominantly been utilised for rural / agricultural purposes, until residential developments commenced subsequent to 2005.

Potential exists for historic agricultural land uses associated with orcharding to have impacted the site, however such uses are considered to be limited to storage and application of pesticides, and unlikely to have resulted in burial of wastes at the site.

Site Reconnaissance

Observations from the site inspection are presented on **Figure 2**, attached. Refer to **Plates 1** to **3** for photography of the general site layout.

4.1 WASTE MANAGEMENT

A septic wastewater system is considered likely to be present at the site.

Soil stockpiles and other wastes were observed at the site. Refer to **Plates 4** to **6** and **Figure 2**. The specific source(s) of this material was not established, however was considered to be consistent with illegal dumping.

4.2 STORMWATER

Site stormwater would consist of surface flows and would drain in a westerly direction.

Potential exists for runoff and sediments containing contaminants from off-site sources to have passed across the site, however stormwater controls have largely been in place since 2005 to divert such flows away from the site.

4.3 CHEMICAL AND FUEL STORAGE / SPILLS

No specific evidence of fuel, oils or other chemical storage was observed at the site, however storage sheds may have housed pesticides at some point in time, based on the previous land uses.

No findings of the historic aerial photography review (refer to **Section 3.3**) indicate the presence (historic or otherwise) of bulk chemical storage infrastructure at the site.

No sheep dips or cattle dips were observed at the site. No evidence of stressed vegetation, which may be indicative of soil and/or groundwater contamination, was observed during the site inspection.

4.4 ASBESTOS

Premise did not conduct an asbestos survey during the site inspection. Premise notes that waste stockpiles observed on the site, as described in **Section 4.1**, are comprised of demolition waste of unknown origin and therefore there is the potential that they include asbestos containing materials.

From review of aerial photography it is noted that a structure of unknown construction was formerly present at the site to the north of the dwelling. No bulk or residual demolition waste associated with the removal of the structure was identified at the site.

4.5 LANDFILLING

No landfilling currently occurs on the site. Based on the site topography there is minimal potential for other 'cut-and-fill' civil works to have occurred at the site.

Illegally dumped waste was identified on the site, however no excavation or filling of these wastes was identified.

Environmental Investigation

5.1 POTENTIAL CONTAMINATION ISSUES

5.1.1 POTENTIAL SOURCES

Based on the historic and predominantly agricultural uses of the site, activities that are considered to have the potential to adversely impact the soil environment are limited to waste from storage / application of agricultural chemicals and illegal dumping.

5.1.2 CHEMICALS OF POTENTIAL CONCERN (COPC)

COPC associated with previous uses of the site and considered to have the potential to adversely impact the underlying soil and groundwater environments include:

- Heavy metals, (including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc); and
- Organochlorine pesticides (OCPs);
- Organophosphorus pesticides (OPPs);
- Total recoverable / petroleum hydrocarbons (TRH/TPH);
- Benzene, toluene, ethylbenzene, xylene and naphthalene (BTEXN);
- Polycyclic aromatic hydrocarbons (PAHs);
- Phenolic compounds;
- Polychlorinated biphenyls (PCBs); and
- Asbestos (stockpile samples only).

5.2 INVESTIGATION CRITERIA

The soil investigation levels utilised for this investigation are consistent with those described within the National Environment Protection Council (NEPC), *Amended National Environment Protection (Assessment of Site Contamination) Measure 1999* (Amended ASC NEPM) 2013. A summary of these investigation levels is provided below.

- Health Investigation Levels (HIL) A – Residential;
- Health Screening Levels (HSL) C – Residential;
- Management Limits for Petroleum Hydrocarbons – Residential, Parkland and Open Space;
- Aesthetic issues generally relate to the presence of materials with a negligible risk or non-hazardous inert foreign material in soil or fill resulting from human activity. In particular, soils on site should not exhibit discolouration (staining), a malodorous nature (odours) or abnormal consistency (rubble and asbestos).

5.3 METHODOLOGY

The following table outlines the scope and method of the assessment.

Table 5.1 – Assessment Scope Summary

Activity / Item	Details
Date of Field Activities	26 April 2019
Samples Collected	Sample locations are shown on **Figure 2** 6 soil samples were collected from various locations at the site where impacts may have occurred based on observations and the known site history. 3 samples were collected from stockpiles comprised primarily of soil.
Methodology	Soil samples were collected directly by hand auger. All samples were placed in clean, laboratory-supplied acid washed solvent rinsed glass jars with Teflon® lids.
Sample Preservation	Samples were stored on ice in an esky whilst on-site and in transit to the laboratory.
Decontamination	Re-usable equipment was decontaminated before each use using decontamination solution, then rinsed in potable water. Dedicated single-use items were not decontaminated, but were disposed following use. Nitrile gloves used for sampling were changed between each sample.

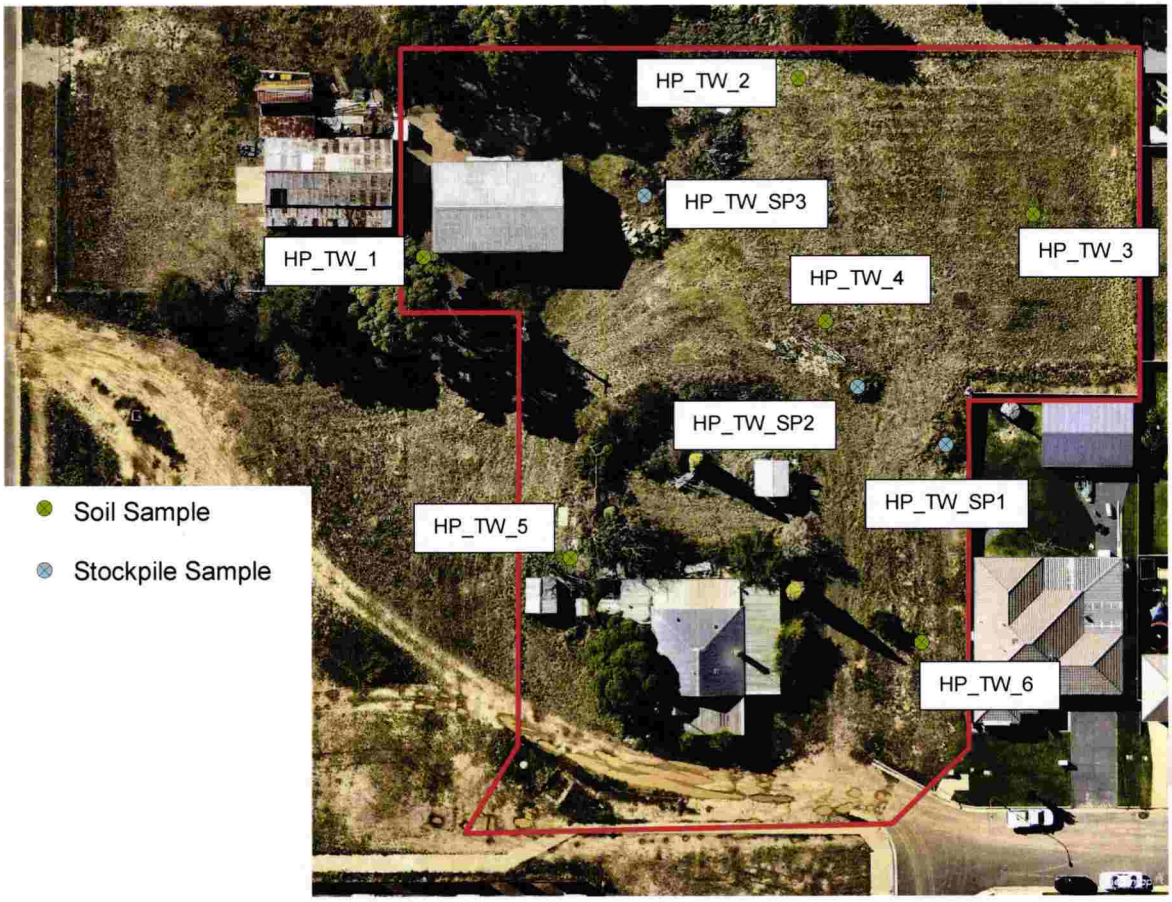


Figure 2: Soil Sample Locations

5.4 SAMPLE ANALYSIS

All samples were submitted to ALS Laboratories (ALS) for analysis. ALS is NATA (National Association of Testing Authorities) certified for the analyses performed.

All soil samples collected were analysed for the COPC described in **Section 5.1.2**.

5.5 ANALYTICAL RESULTS

Soils descriptions were logged as follows:

Table 5.2 – Soil Sample Descriptions

Sample(s)	Description
HP-TW-1	Gravelly SAND and ROCK (sandstone fill), brown to orange, loose, dry to moist
HP-TW-2	Loamy CLAY, light grey, some sand and gravel, dry
HP-TW-3	Loamy CLAY, grey, some sand and gravel, dry
HP-TW-4	Sandy CLAY, light grey to brown dry
HP-TW-5	Loamy CLAY, brown, some sand and gravel, dry to moist
HP-TW-6	Loamy CLAY, light grey, some sand and gravel, dry
HP-TW-SP1	Clayey SAND, grey, loose, dry
HP-TW-SP2	Clayey SAND, grey, loose, dry
HP-TW-SP3	Clayey SAND, grey, loose, dry

Soil analytical results are presented in the laboratory certificates in **Appendix D** and summarised in **Table 1** (attached). All samples reported concentrations below the adopted soil investigation levels.

Analytical results of collected soil samples are presented in **Table 1**, attached. Laboratory analytical results and chain of custody (COC) documentation are provided in **Appendix E**.

All soil samples met the investigation criteria for the respective analytes (refer to **Section 5.2**).

Samples analysed for heavy metals, TPH/TRH, BTEXN, Total PAHs, phenolics, OCPs, OPPs and PCBs did not record concentrations of these analytes above the adopted human health criteria.

No respirable asbestos fibres were detected in any soil sample collected from stockpiles.

5.6 DISCUSSION

No contamination impacts were identified at the site which may present an exposure risk to receptors during or following construction at the site.

Heavy metal concentrations were below guideline criteria for residential land uses, indicative of background concentrations. Trace concentrations of TPH/TRH and OCPs were also recorded to be significantly below the adopted guideline criteria.

Other organic compounds were not recorded to be present at concentrations above the laboratory limit of detection.

Conclusions

Premise make the following conclusions regarding the potential for land contamination at the site, based on a desktop review of available information, a review of historical records, site walkover reconnaissance, and analytical results of collected samples.

- The area of the site appears to have predominantly been historically utilised for rural / agricultural purposes including orcharding. In the period of the early 2000s the surrounding land uses shifted to residential and recreations.
- An uninhabited dwelling structure is present on the site, along with a number of unused sheds.
- Three soil stockpiles comprised primarily of soil are present on the site and are considered to have resulted from illegal dumping. Other stockpiles comprised of waste material (e.g. concrete, metal) were observed at the site.
- Three (3) stockpile samples were collected from observed stockpiles across the site. All soil samples met the investigation criteria for the respective analytes.

No significant routes for exposure by receptors (current or future) to potential contamination sources have been identified, due to negligible impacts identified. Residual contamination risks, if identified, may be adequately managed by conducting works in accordance with appropriate construction industry standards.

Having assessed the site against the investigation criteria documented in **Section 5.2** of this P1 PSI report, and with respect to identified historic land uses, Premise considers the suitability of the site to be consistent with the proposed land use (multi-dwelling housing), within the requirements of the NSW State Environmental Planning Policy No 55 – Remediation of Land (1998).

Plates

Plate 1: Derelict Dwelling

Plate 2: Site South-East

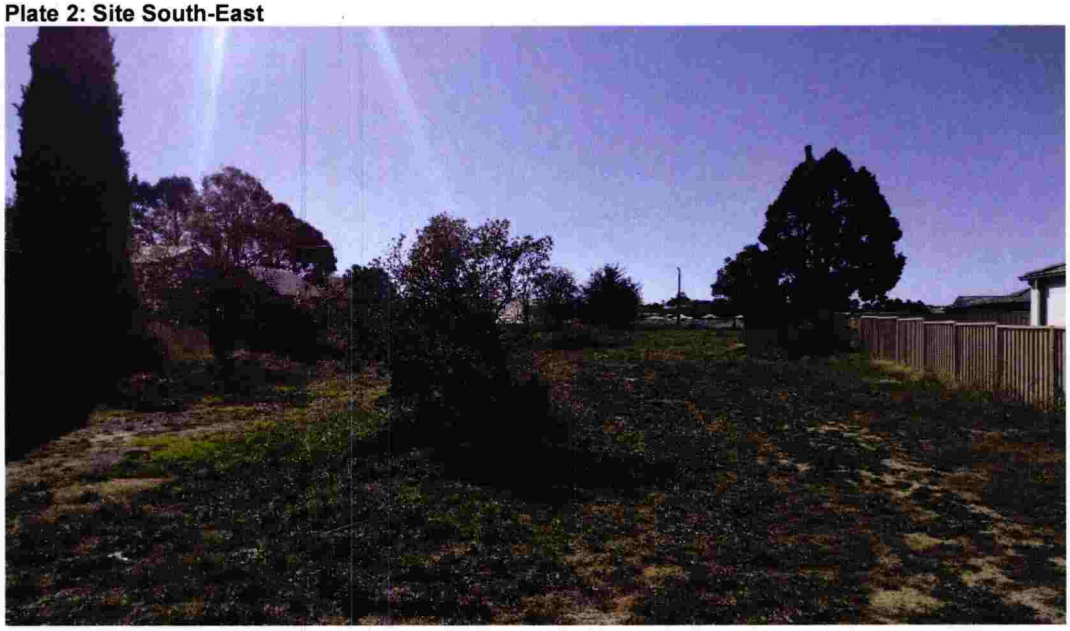


Plate 3: Northern Yard of Site

Plate 4: Stockpile SP1

Plate 5: Stockpile SP2

Plate 6: Stockpile SP3

Appendix A

Registered Groundwater Bore Records

WaterNSW
Work Summary

GW801946

Licence: **Licence Status:**

Authorised Purpose(s):
Intended Purpose(s): DOMESTIC

Work Type: Bore
Work Status: Supply Obtained
Construct.Method: Rotary - Percussion (Down Hole Hammer)
Owner Type: Private

Commenced Date: **Final Depth:** 38.00 m
Completion Date: 04/09/2003 **Drilled Depth:** 38.00 m

Contractor Name: Central West Water Drillers
Driller: Morrie Meagher
Assistant Driller:

Property: **Standing Water Level (m):** 14.000
GWMA: **Salinity Description:**
GW Zone: **Yield (L/s):** 0.563

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	WELLINGTON	ORANGE	70//851029
Licensed:			

Region: 80 - Macquarie-Western **CMA Map:** 8731-3N
River Basin: 421 - MACQUARIE RIVER **Grid Zone:** **Scale:**
Area/District:

Elevation: 0.00 m (A.H.D.) **Northing:** 6318827.000 **Latitude:** 33°15'06.5"S
Elevation Source: Unknown **Easting:** 695791.000 **Longitude:** 149°06'06.1"E

GS Map: - **MGA Zone:** 55 **Coordinate Source:** GPS - Global

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	38.00	200			Rotary - Percussion (Down Hole Hammer)
1	1	Casing	Pvc Class 9	-0.30	38.00	164	150		Driven into Hole, Other, Glued
1	1	Opening	Slots - Vertical	18.00	34.00	164		0	Casing - Bridge Slot, PVC Class 9, SL: 200.0mm, A: 2.00mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
18.00	20.00	2.00	Unknown	14.00		0.25			
22.00	22.10	0.10	Unknown	14.00		0.38			
31.00	31.10	0.10	Unknown	14.00		0.56			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.50	0.50	Top Soil	Topsoil	
0.50	4.00	3.50	Clay	Clay	
4.00	14.00	10.00	Shale - soft yellow	Shale	
14.00	24.00	10.00	Basalt - frac	Basalt	
24.00	38.00	14.00	Basalt	Basalt	

Remarks

04/09/2003: Form A Remarks:
Open end casing bottom.
Sump installed from 31.1 to 38m.
Assistant Driller - B Dunkley

***** End of GW801946 *****

Appendix B

PREVIOUS TITLE RECORDS

GRANT OF LAND.—B. App^n 15424 pt 164.

John Henry Black, David Ramsay, Prosper De Mestre, Francis Lord, Edward Lord
GRANTEES and Thomas Lord
DATE, 19th June 1843.
COUNTY, Bathurst and Wellington
ACRES, 1920.

Victoria, by the Grace of God of the United Kingdom of Great Britain and Ireland, Queen, Defender of the Faith, and so forth:

To all to whom these Presents shall come Greeting; KNOW YE, That in order to promote the due Settlement of Our Territory of NEW SOUTH WALES, And in fulfilment of a promise made on or before the Eighteenth day of April One thousand eight hundred and twenty eight by His Excellency Sir Ralph Darling as Governor thereof, And in consideration of the Quit-Rent hereinafter reserved, and of the Price of the redemption of the same, WE, of Our Special Grace, HAVE GRANTED, and for Us, Our Heirs and Successors, DO HEREBY GRANT unto John Henry Black of Sydney, David Ramsay of Dobroyd near Sydney, Prosper de Mestre of Sydney, Francis Lord of Bathurst, Edward Lord of Sydney and Thomas Lord of Sydney in trust as hereinafter mentioned their Heirs and Assigns, Subject to the Conditions, Reservations, and Provisos hereinafter mentioned, ALL THAT Piece or Parcel of Land, in Our said Territory, containing by Admeasurement one thousand nine hundred and twenty Acres, be the same more or less, situated in the Counties of Bathurst and Wellington and Parish of Marsh at the Junction of Frederick's Valley Creek with Blackman's Swamp Commencing on Frederick's Valley Creek at the South East corner of George Blackett's one thousand two hundred and eighty acres additional Grant and bounded on the North by a line West two hundred and twelve chains dividing it from that additional Grant and Crown Land on the West by a line South eighty chains on the South by a line East two hundred and seventy eight chains to Frederick's Valley Creek and South East and East by that Creek downwards to the South East corner of George Blackett's one thousand two hundred and eighty acres as aforesaid. Being the residue of Twenty thousand one hundred and thirteen acres of land awarded to the late Simeon Lord in compensation for certain land and premises in Macquarie Place Sydney surrendered by him to the Crown and now granted in accordance with the report on case No. 1193 made on the Eighteenth day of May one thousand eight hundred and forty three by the Commissioners appointed under the Act of the Colonial Legislature 5th William IV No. 21 unto the said John Henry Black, David Ramsay, Prosper de Mestre, Francis Lord, Edward Lord and Thomas Lord and to their respective heirs upon the Trusts mentioned in the Will of the aforesaid Simeon Lord to be called with all the Rights and Appurtenances whatsoever thereto belonging; **To Hold** unto the said John Henry Black, David Ramsay, Prosper de Mestre, Francis Lord, Edward Lord and Thomas Lord in trust as herein [before] mentioned their Heirs and Assigns for ever, YIELDING and Paying therefor Yearly unto Us, Our Heirs and Successors, the Quit-Rent or Sum of one farthing if demanded Sterling, for ever, from the First Day of January, One thousand eight hundred and forty four unless the same shall be redeemed by the said Grantees, their Heirs or Assigns, within Twenty Years from that date, at the rate of Twenty Years Purchase; **Provided Nevertheless,** AND WE DO HEREBY RESERVE Unto Us, Our Heirs and Successors, all such parts and so much of the said Land as may hereafter be required for a Public Way or Public Ways, in, over, and through the same, to be set out by the Governor for the time-being of Our said Territory, or some Person by Him authorised in that respect; AND ALSO, all Stone and Gravel, all indigenous Timber, and all other Materials, the produce of the said Land, which may be required at any time or times hereafter, for the construction and repair of Ways and Bridges, for Naval Purposes, and for Public Works, together with the right of taking and removing the same; AND ALSO, all Land within One hundred feet of high water mark on the Sea Coast, and on every Creek, Harbour, and Inlet of the Sea; AND ALSO, all Mines of Gold, of Silver, and of Coals, with full and free liberty and power to search for, dig, and take away the same; AND ALSO, the right of full and free ingress, egress, and regress, into, out of, and upon the said Land, for the several purposes aforesaid; AND WE DO FURTHER RESERVE unto Us, Our Heirs and Successors, full power for Us, or Them, or for the Governor for the time-being of Our said Territory, to resume and take possession of all or any part of the said Land not hereinbefore reserved, which may be required at any time or times hereafter for any Public Purpose whatsoever, the value of the said Land not hereinbefore reserved, or of so much thereof as shall be so required, and of any Building standing on the said required Land, being paid by the Government to the party entitled thereto, at a Valuation fixed by Arbitrators chosen as hereinafter mentioned, in which valuation the benefit to accrue to the said Party from any such Public Purpose, shall be allowed by way of Set-off; AND WE DO HEREBY DECLARE, that in every case of Arbitration, which shall arise under and by Virtue hereof, One Arbitrator shall be chosen by the Governor for the time-being of Our said Territory, and One by the then Owner or Owners of the said Land, or of such part thereof as may be thereby affected, which two Arbitrators (before they proceed to the said Arbitration) shall elect an Umpire, who shall determine any disagreement between the Two said Arbitrators; BUT if the said Owner or Owners shall refuse or neglect to choose an Arbitrator on his, her, or their part, within One Calendar Month after being required so to do, by Public Advertisement in the *Government Gazette*, or otherwise, OR, if such Arbitrator, being chosen, shall refuse or neglect to act and within One Calendar Month determine the matter to him referred, then both Arbitrators shall be chosen by the Governor for the time-being of Our said Territory, which said last-mentioned Arbitrators shall also elect an Umpire in the manner and for the purpose above mentioned; AND if any Umpire shall refuse or neglect to act and within One Calendar Month determine the matter to him referred, the Arbitrators for the time-being, whether chosen One by each party or both by the Governor of Our said Territory, shall in every such case forthwith elect another Umpire, in the same manner, for the same purpose, and subject to the same condition, as the Umpire first elected as aforesaid; **Provided Always,** THAT if the aforesaid Quit-Rent shall be at any time unpaid for the space of Twenty Days after the same shall become due (although no formal demand shall have been made thereof) it shall be lawful for Us, Our Heirs and Successors, by Our Governor for the time-being of Our said Territory, or some person by Him authorised in that behalf, to re-enter upon the said Land, or any part thereof, with its Appurtenances, and thence to remove the said Grantees, their Heirs and Assigns, and to hold the same, and the Rents, Issues, and Profits thereof, to have, receive, and take to and for the use of Us, Our Heirs and Successors, until We or They shall therewith and thereby be fully paid and satisfied the Quit-Rent due thereon, and every part thereof, and all arrears of the same due at the time of Our said Entry, or which shall accrue due during the time of Our Possession by Virtue thereof, together with all costs and charges attending the non-payment of the said Quit-Rent and Our Entry upon the said Land; **Provided Also,** THAT if the Conditions, Reservations, and Provisos herein contained, or any part thereof, be not duly observed and performed by the said Grantees, their Heirs and Assigns, then the said Land shall be forfeited, and revert unto Us, Our Heirs and Successors; And these Presents, and every matter and thing herein contained, shall cease and determine, and become absolutely void to all intents and purposes; And it shall be lawful for Us, Our Heirs and Successors, by Our Governor for the time-being of Our said Territory, Or some Person by Him authorised in that behalf, to re-enter upon the said Land, or any part thereof, and the said Grantees, their Heirs and Assigns, and all Occupiers thereof, therefrom wholly to remove; **In Testimony Whereof,** WE have caused this Our Grant to be Sealed with the Seal of Our said Territory.

WITNESS Our Trusty and Well-beloved Sir George Gipps, Knight *Our Captain-General and Governor-in-Chief of Our said Territory, and its Dependencies, at Government House, Sydney, in New South Wales aforesaid, this* Nineteenth *day of* June *, in the* Sixth *Year of Our Reign; And in the Year of Our Lord, One Thousand eight hundred and forty-* three

L. S. *(Signed)* Geo. Gipps

in the Register of Grants of Land No. 71 Page 327

ENTERED on Record by me, this Fourth *day of* July *One Thousand eight hundred and forty-* three

E. Deas Thomson
COLONIAL SECRETARY AND REGISTRAR.

[margin:] amended bearing date the thirteenth day of January one thousand eight hundred and forty.

Sydney:—W. J. Row, Government Printer,

Execution in Supreme Court of New South Wales
this Seventh day of September 1843.

CERTIFICATE OF TITLE.

(C.)

New South Wales.

[Appⁿ No. 19574]

REGISTER BOOK,

Vol. 2597 Folio 150

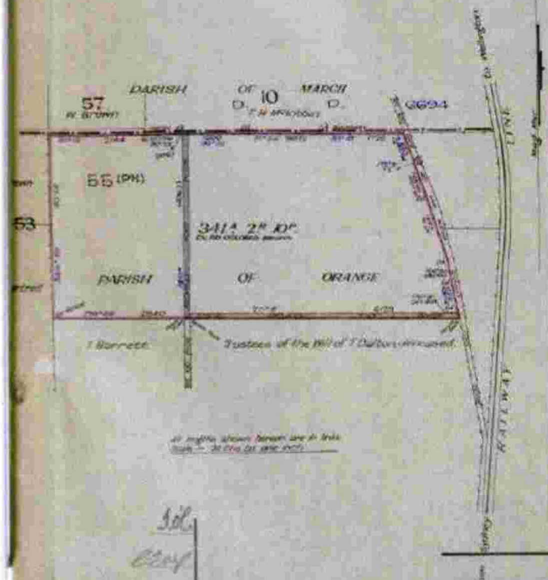
George Price Thirkell of Cudal, Grazier, Applicant in primary Application No 19574 is now the proprietor of an estate in fee simple subject nevertheless to the reservations and conditions if any contained in the Grant hereinafter referred to and Also subject to such encumbrances liens and interests as are notified hereon in That piece of land situated in the Shire of Canobolas Parish of Orange and County of Wellington containing Three hundred and forty one acres two roods ten perches or thereabouts as shown in the plan hereon and thereon edged red and also shown in the plan lodged with said Application No 19574 being part of the Narrambla Estate and also part of One thousand nine hundred and twenty acres (Portion 55 of Parish) delineated in the Public Map of the said Parish in the Department of Lands originally granted to John Henry Black David Ramsay Fraser de Mestre Francis Lord Edward Lord and Thomas Lord by Crown Grant dated the nineteenth day of June one thousand eight hundred and forty three

In witness whereof, I have hereunto signed my name and affixed my Seal, this Fourteenth day of August one thousand nine hundred and fifteen

Signed the 14th day of August 1915, in the presence of [signature]

[signature]
Deputy Registrar General.

NOTIFICATION REFERRED TO.



Amongst the reservations and conditions contained in the Grant above referred to are the following namely: Reservations of all mines of Gold and of Silver

[signature]
Deputy Registrar General

Excepting thereout the Road 1 chain wide coloured brown in plan hereon the area of which is not included in the above mentioned area of 341 acres 2 roods 10 perches

[signature]
Deputy Registrar General

This Certificate of Title is issued subject to all existing rights of way or other rights (if any) over the Road 1 chain wide coloured blue in plan hereon

[signature]
Deputy Registrar General

No. A 168496 CAVEAT dated 7th April 1915
by the Registrar General. Produced and entered
17th August 1915
at 4 o'clock in the after noon

[illegible signature]
REGISTRAR GENERAL

No. A 228444 TRANSFER dated 20th December 1915
from the said George Bruce Thirkell To Robert
Farrell and John Thomas Farrell as tenants
in common - Lot 1 DP 8271.
15th February 1916 of the land within described
Produced and entered 21st February 1916
at 3½ o'clock in the a noon

Cancelled & Certificate of Title issued
Vol. 2647 Fol. 206
207

[illegible signature]
REGISTRAR GENERAL

No. A [illegible] TRANSFER dated [illegible] 191
from the said George Bruce Thirkell to
Samuel [illegible]
Lots 2 & 3 DP [illegible]
[illegible] of the land within described
Produced and entered [illegible] 1916
at [illegible] o'clock in the [illegible] noon

Cancelled & Certificate of Title issued
Vol. 2666 Fol. 206

[illegible signature]
REGISTRAR GENERAL

No. A 491820 TRANSFER dated 16th [illegible] 1917
from the said George Bruce Thirkell To
Samuel Lewellyn Hassall
of Part
[illegible] of the land within described
Produced and entered [illegible] December 1919
at [illegible] o'clock in the noon.

Cancelled & Certificate of Title issued
Vol. 3002 Fol. [illegible]

[illegible signature]
REGISTRAR GENERAL

CERTIFICATE OF TITLE.

(C.)

(Tenancy in Common)
(cf. of Transfer A 765444)

New South Wales.

[App^{n} No. 1656/14
[Reference to last Certificate
[Vol. 2647 Folio 206

REGISTER BOOK.
Vol. 2647 Folio 206

CANCELLED

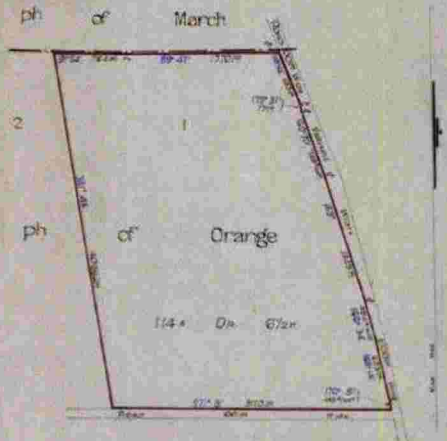
Robert Parnell of Orange, Farmer, Transferee under Instrument of Transfer from George Price Yorkett A 765444 is now the proprietor of an Estate in Fee Simple in an undivided moiety or half share subject nevertheless to the reservations and conditions, if any, contained in the Grant hereinafter referred to, and also subject to such encumbrances, liens, and interests as are notified hereon, in That piece of land situated in the State of Carrottas, Parish of Orange, and County of Wellington containing One hundred and fourteen acres six and one half perches, or thereabouts, as shown in the Plan hereon, and therein edged red, being Lot 1 on a plan deposited in the Land Titles Office Sydney No 9221 and part of One thousand nine hundred and twenty acres (Portion 55 of Parish) delineated on the public map of the said Parish in the Department of Lands originally granted to John Henry Black, David Ramsay, Prosper de Mestre, Thomas Lord, Edward Lord and Thomas Lord by Crown Grant dated the nineteenth day of June one thousand eight hundred and forty three.

In witness whereof, I have hereunto signed my name and affixed my Seal, this twenty eighth day of February one thousand nine hundred and sixteen.

Signed the 28th day of February 1916,
in the presence of Albert J

Deputy Registrar General.

REGISTRAR GENERAL NEW SOUTH WALES



SCALE: 400m to one inch.

NOTIFICATION REFERRED TO

Amongst the reservations and conditions contained in the Grant above referred to are the following namely:- Reservations of all mines of Gold and of Coal

Deputy Registrar General

REGISTRAR GENERAL NEW SOUTH WALES

228/1916 MORTGAGE dated 15th February 1916 from said Robert Parnell and also John Thomas Parnell to The Commissioners of the Government Savings Bank of New South Wales

produced 15th February 1916 and entered 2nd March 1916 at 12 o'clock in the noon

Bx Fellows

REGISTRAR GENERAL

Bitows

No. B 871080 MORTGAGE dated 18th June 19 [illegible]
from the said Helen Farrell and also John Thomas Farrell to Commissioners of the Government Savings Bank of New South Wales
Produced and entered 2nd April 19 [illegible]
at [illegible] o'clock in the after noon.
[signature]
REGISTRAR GENERAL

No. D367425 DISCHARGE of within mortgage
No. A221845 dated 19th July 1943
Produced and entered 16th April 1945
at quarter past [illegible] o'clock in the after noon.
[signature]
REGISTRAR GENERAL

No. D367426 DISCHARGE of within mortgage
No. B370035 dated 23rd March 1945
Produced and entered 16th April 1945
at quarter past [illegible] o'clock in the after noon.
[signature]
REGISTRAR GENERAL

No. F459906 APPLICATION BY TRANSMISSION
Edward Farrell of Orange storekeeper and Helen Farrell of Orange widow as joint tenants of [illegible] one eighth share in the are now the registered Proprietors of the land within described in pursuance of the above Application Produced 28th May 1951 and entered 26th February 1952
at 12 o'clock in the noon.
T. Wells
REGISTRAR GENERAL

No. F459907 TRANSFER dated 24th October 1950
from the said Edward Farrell and Helen Farrell to Margaret Mary Farrell of Orange Spinster of an undivided one eighth share in of the land within described
Produced 28th May 1951 and entered 26th February 1952
at 12 o'clock in the noon.
As to land in this transfer this Certificate is cancelled and new Certificate issued
Vol. [illegible] Fol. [illegible]
T. Wells
REGISTRAR GENERAL

No. F459908 TRANSFER dated 24th October 1950
from the said Edward Farrell and Helen Farrell to Robert Kevin Farrell of Orange [illegible] of an undivided one eighth share in of the land within described
Produced 28th May 1951 and entered 26th February 1952
at 12 o'clock in the noon.
As to land in this transfer this Certificate is cancelled and new Certificate issued
Vol. [illegible] Fol. [illegible]
T. Wells
REGISTRAR GENERAL

No. F459909 TRANSFER dated 24th October 1950
from the said Edward Farrell and Helen Farrell to Helen Farrell of Orange widow of an undivided one eighth share in of the land within described
Produced 28th May 1951 and entered 26th February 1952
at 12 o'clock in the noon.
As to land in this transfer this Certificate is cancelled and new Certificate issued
Vol. [illegible] Fol. [illegible]
T. Wells
REGISTRAR GENERAL

No. F619206 CAVEAT dated 1st February 1952
by the Registrar General.
Produced 18th February 1952 and
entered 26th February 1952.
at 12 o'clock in the noon.
as regards the remaining undivided one eighth share
T. Wells
REGISTRAR GENERAL

No. G[illegible] NOTICE OF DEATH. Proof having been furnished to me of the death of the said Edward Farrell the surviving Joint Tenant Helen Farrell is now registered sole proprietor of the land within described
[illegible] 12th March 19[illegible]
Produced [illegible] 6th September 19[illegible]
at 12 o'clock in the noon.
T. Wells
REGISTRAR GENERAL

The within Caveat No. [illegible] is hereby withdrawn
Dated 6th September 19[illegible]
T. Wells
REGISTRAR GENERAL

No. G[illegible] TRANSFER dated 6th September 19[illegible]
from the said Helen Farrell to James Joseph Farrell of the [illegible]
of the land within described
Produced 12th March 19[illegible] and entered 6th September 19[illegible]
at 12 o'clock in the noon.
As to land in this transfer this Certificate is cancelled and new Certificate issued
Vol. 1073 Fol. 14
T. Wells
REGISTRAR GENERAL

202

Primary Appn. No. 19574

Reference to Last Title *

Vol. 2647 Fol. 206

" 6495 " 204

New South Wales.

[CERTIFICATE OF TITLE.]

TENANCY IN COMMON

Register Book.

Vol. 7073 Fol. 18

MA Issued on Transfers Nos.0360655 and 0360656.

CANCELLED

JAMES JOSEPH FARRELL, of Orange, Orchardist, is now the proprietor of an Estate in Fee Simple in an undivided one fourth share,

subject nevertheless to the reservations and conditions, if any, contained in the Grant hereinafter referred to, and also subject to such encumbrances, liens, and interests as are notified hereon, in that piece of land situated in the Shire of Canobolas Parish of Orange , and County of Wellington shown in the plan hereon and therein edged red being Lot 1 in Deposited Plan No.8221 and being part of Portion 55 granted to John Henry Black, David Ramsay, Prosper de Mestre, Francis Lord, Edward Lord and Thomas Lord on 19th June 1843.

In witness whereof I have hereunto signed my name and affixed my Seal, this Thirty-first day of January , 19 56.

Signed in the presence of G. W. Moss

J. Wells

Registrar-General

Area 114 ac. 0 rd. 6½ per.

Scale 10 chains to one inch

C360655
C360656

NOTIFICATION REFERRED TO

No.F755431 Mortgage dated 29th September 1952 from Helen Farrell to Australia and New Zealand Bank Limited of a one half share of the said undivided one fourth share in the land above described. Produced and entered 30th October 1952 at 56 minutes past 11 o'clock in the forenoon.

J. Wells

Registrar General.

No. G500463 MORTGAGE dated 8th May 56 from the said James Joseph Farrell to Australia and New Zealand Bank Limited

Produced and entered [illegible] May 56 [illegible]

J. Wells

REGISTRAR GENERAL

H822957 CAVEAT Produced [illegible] October 1960 and [illegible] 1st November 1960

J. Watson

Registrar General

No. H850344 Caveat Produced [illegible] August, 1961 and entered [illegible] August 1961

J. Watson

Registrar General

MORTGAGE No. [illegible] has been discharged.

See [illegible] Entered 1st [illegible] 19[illegible]

J. Watson

REGISTRAR GENERAL

MORTGAGE No. F755431 has been discharged.

See L557124 Entered [illegible] 19[illegible]

J. Watson

REGISTRAR GENERAL

Persons are cautioned against altering or adding to this Certificate or any notification thereon.

CAVEAT No. A850244 has been withdrawn

See L774584 Entered 25th March 1970.

REGISTRAR GENERAL

CAVEAT No. H628857 has been withdrawn

See L774585 Entered 25th March 1970

REGISTRAR GENERAL

No. L774586 MORTGAGE dated 9th December 1969

to Australia and New Zealand Bank Limited

Entered 25th March 1970

REGISTRAR GENERAL

No. [illegible] MORTGAGE dated 30th August 19[illegible]

to Australia and New Zealand Banking Group Limited

Entered [illegible] June 1972

REGISTRAR GENERAL

No. [illegible] MORTGAGE dated [illegible] May 1972

to Rural Bank of New South Wales

Entered [illegible] June 1972

REGISTRAR GENERAL

MORTGAGE No. L774586 has been discharged.

See N174358 Entered [illegible] December 1972

REGISTRAR GENERAL

No. P[illegible] TRANSFER dated [illegible] June 1972

to Bathurst-Orange Development Corporation

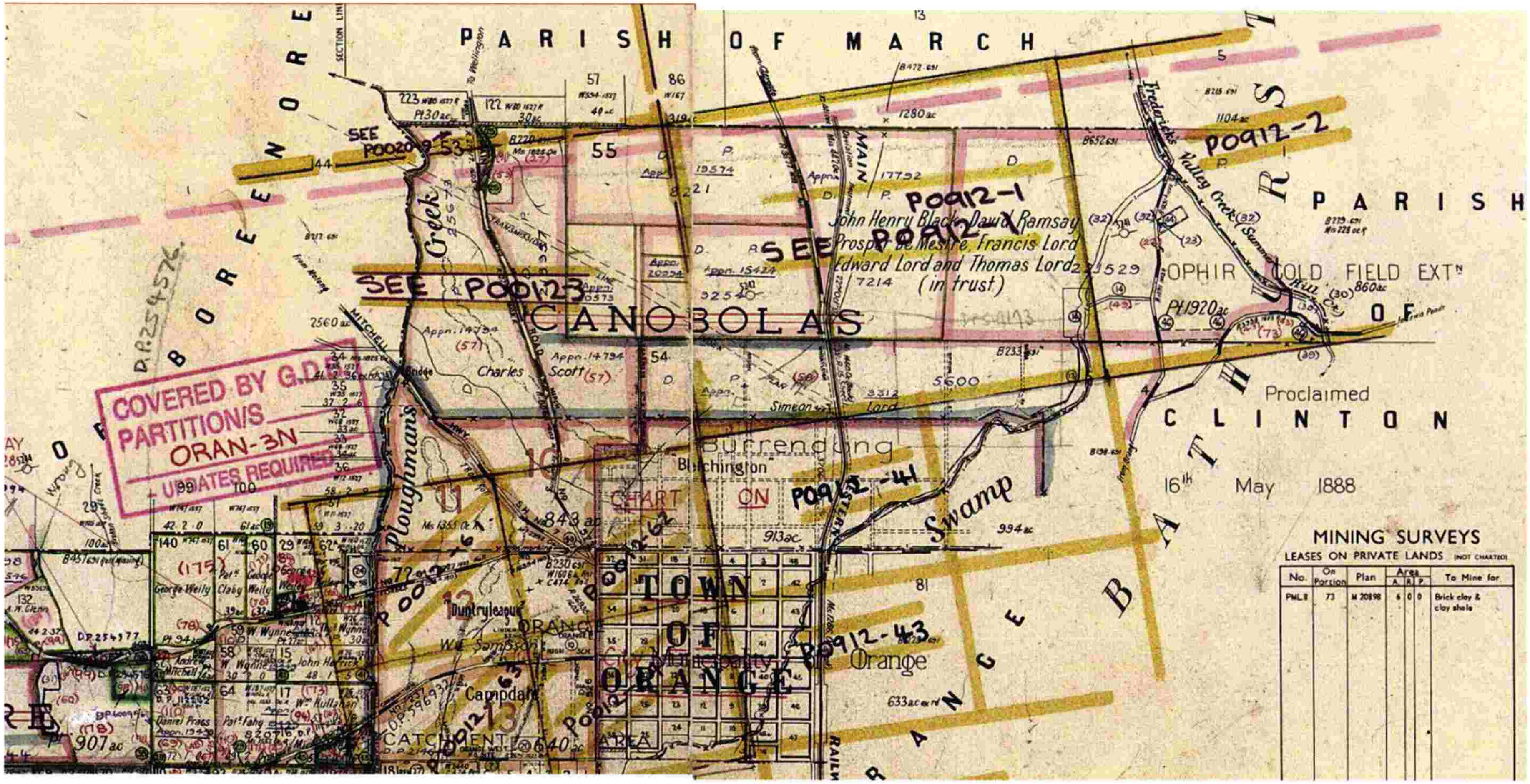
P 515807

of the land within described

Entered [illegible] December 1972

As to land in this transfer title dealt is cancelled and new certificate issued Vol. 12459 Fol. 238

REGISTRAR GENERAL


PARISH OF MARCH
PARISH OF BOREENORE
CANOBOLAS
PARISH OF CLINTON
BATHURST
SEE P0020953
SEE P00123
SEE P0912
P0912-1
P0912-2
P0912-41
P0912-43
COVERED BY G.D.P.
PARTITION/S
ORAN-3N
UPDATES REQUIRED
John Henry Black, David Ramsay, Prosper de Mestre, Francis Lord, Edward Lord and Thomas Lord (in trust)
OPHIR GOLD FIELD EXTN
Proclaimed 16th May 1888
Ploughmans Creek
Charles Scott
Simeon Lord
Swamp
Burrendong
Blechington
TOWN OF ORANGE
Municipality of Orange
Campdale
Catchment Area
Frederick's Valley Creek
MINING SURVEYS
LEASES ON PRIVATE LANDS (NOT CHARTED)
No. | On Portion | Plan | Area A R P | To Mine for
PML 8 | 73 | M 20898 | 6 0 0 | Brick clay & clay shale

86
13
67298 H
1008854
808555
826448
67792 H
851 029
826441
835576
55
872593
790515
9
655813
1012206
801719
54
5600
WITHIN PROCLAIMED SURVEY AREA

PLAN FORM 2

Plan Drawing only to appear in this space

*OFFICE USE ONLY

SIGNATURE AND SEALS ONLY.

R Farrell

Virginia Ann C...

JOHN ARTHUR R...

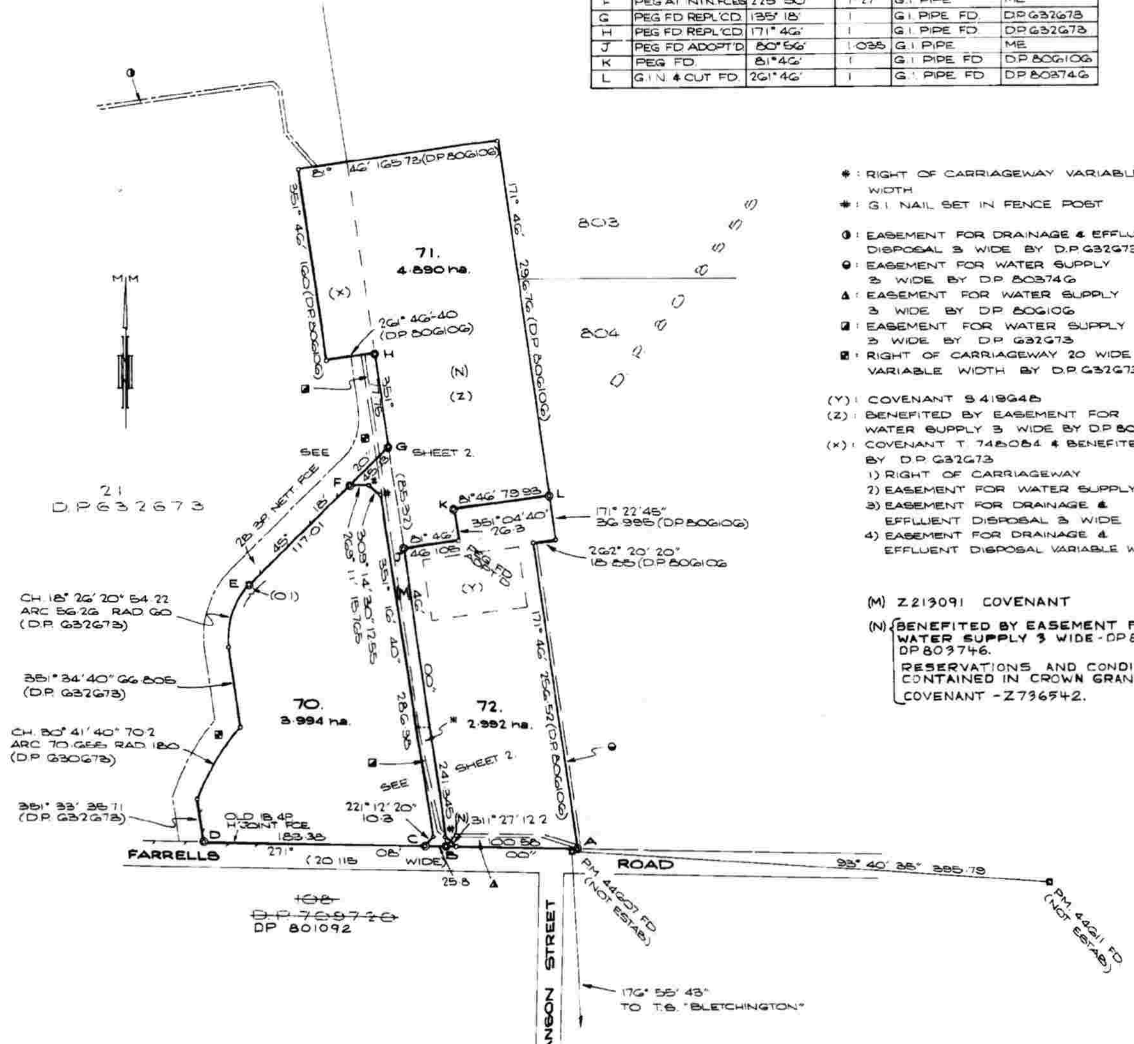
PLAN OF SUBDIVISION

MANAGER

* NOTE
PARTIAL SURVEY ONLY
PARTS LOTS 70, 71 & 72
COMPILED FROM DP 632673
& DP 806106

REFERENCE MARKS

COR	MARK	BEARING	DIST	FROM	BY
A	PEG FD	68° 19'	5.06	PM 44607 FD	DP 803746
B	—	351° 46'	1	G.I. PIPE FD	DP 632673
C	PEG	40° 04'	1.33	G.I. PIPE	ME
D	ORP AT COR.	351° 38'	1.14	G.I. PIPE FD	DP 632673
E	—	135° 18'	1	G.I. PIPE FD	DP 632673
F	PEG AT INTN.FCES	225° 50'	1.27	G.I. PIPE	ME
G	PEG FD REPL'CD	135° 18'	1	G.I. PIPE FD	DP 632678
H	PEG FD REPL'CD	171° 46'	1	G.I. PIPE FD	DP 632673
J	PEG FD ADOPT'D	80° 56'	1.035	G.I. PIPE	ME
K	PEG FD	81° 46'	1	G.I. PIPE FD	DP 806106
L	G.I.N. & CUT FD	261° 46'	1	G.I. PIPE FD	DP 803746



\# : RIGHT OF CARRIAGEWAY VARIABLE WIDTH

* : G.I. NAIL SET IN FENCE POST

◐ : EASEMENT FOR DRAINAGE & EFFLUENT DISPOSAL 3 WIDE BY D.P. 632673

◉ : EASEMENT FOR WATER SUPPLY 3 WIDE BY DP 803746

▲ : EASEMENT FOR WATER SUPPLY 3 WIDE BY DP 806106

◪ : EASEMENT FOR WATER SUPPLY 3 WIDE BY DP 632673

◩ : RIGHT OF CARRIAGEWAY 20 WIDE & VARIABLE WIDTH BY D.P. 632673

(Y) : COVENANT S 418648

(Z) : BENEFITED BY EASEMENT FOR WATER SUPPLY 3 WIDE BY D.P. 803746

(X) : COVENANT T 748084 & BENEFITED BY D.P. 632673
1) RIGHT OF CARRIAGEWAY
2) EASEMENT FOR WATER SUPPLY
3) EASEMENT FOR DRAINAGE & EFFLUENT DISPOSAL 3 WIDE
4) EASEMENT FOR DRAINAGE & EFFLUENT DISPOSAL VARIABLE WIDTH

(M) Z213091 COVENANT

(N) BENEFITED BY EASEMENT FOR WATER SUPPLY 3 WIDE - DP 806106, DP 803746.

RESERVATIONS AND CONDITIONS CONTAINED IN CROWN GRANT.

COVENANT - Z736542.

DP 851029

Registered: 2.8.1995

C.A. N° 3697 OF 3.3.1995

Title System: TORRENS

Purpose: SUBDIVISION

Ref. Map: P 0812 - 1

Last Plan: D.P. 632673 & D.P. 803746

PLAN OF SUBDIVISION OF LOT 19 IN D.P. 632673 & LOTS 61 & 62 IN D.P. 806106

Lengths are in metres. Reduction Ratio 1: 2600

LGA: ORANGE

Locality: BLETCHINGTON

Parish: ORANGE

County: WELLINGTON

This is sheet 1 of my plan in 2 sheets. (Delete if inapplicable)

I, TIMOTHY COLLINS of CARPENTER DUMBRELL & CO. D.X. 3019 ORANGE, a surveyor registered under the Surveyors Act 1929 hereby certify that the survey represented in this plan is accurate, has been made in accordance with the Survey Practice Regulation 1990 and was completed on 24TH FEBRUARY, 1995.

Signature: Timothy Collins
Surveyor registered under Surveyors Act 1929

AZIMUTH: A-D (DP 806106)

Plans used in preparation of survey/compilation:
D.P. 605423
D.P. 632673
D.P. 803746
D.P. 806106
D.P. 808555

PANEL FOR USE ONLY for statements of intention to dedicate public roads, to create public reserves, drainage reserves, easements, restrictions on the use of land or positive covenants.

PURSUANT TO SECTION 88B OF THE CONVEYANCING ACT 1919 - 1964 IT IS INTENDED TO CREATE:
1) RIGHT OF CARRIAGEWAY VARIABLE WIDTH

10.7.1995

Y O O 3 A 2 A

ORAN - 3N

Crown Lands Office Approval

PLAN APPROVED ....
Authorised Officer
Land District ....
Paper No. ....
Field Book .... pages ....

Council's Certificate

I hereby certify that —
(a) the requirements of the Local Government Act, 1919 (other than the requirements for the registration of plans), and
~~(b) the requirements of *Part 3 Division 2 of the Water Board Act 1987, or *Part 5 Division 7 of the Hunter Water Board (Corporatisation) Act 1991~~
have been complied with by the applicant in relation to the proposed SUBDIVISION
(insert 'new road', 'subdivision' or 'consolidated lot') set out herein
Subdivision No. 3697
Date 3.3.1995
(Signature) ....
General Manager/Authorised Person
Council File No. ....

* This part of certificate to be deleted where the application is only for a consolidated lot or the opening of a new road or where the land to be subdivided is wholly outside the areas of operations of the Water Board and the Hunter Water Corporation Ltd.
† Delete if inapplicable

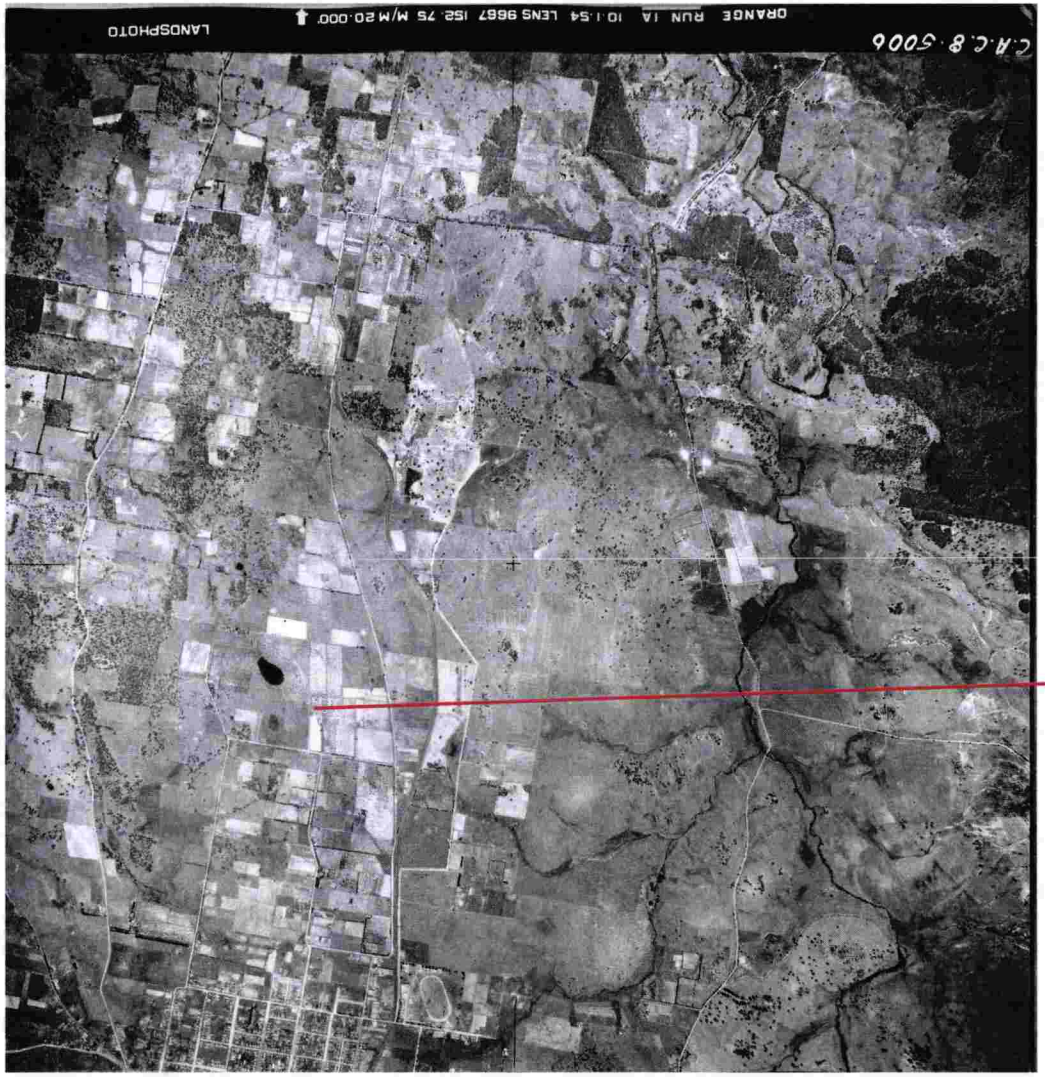
SURVEYOR'S REFERENCE: G01817/Checklist

10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	Table of mm	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390

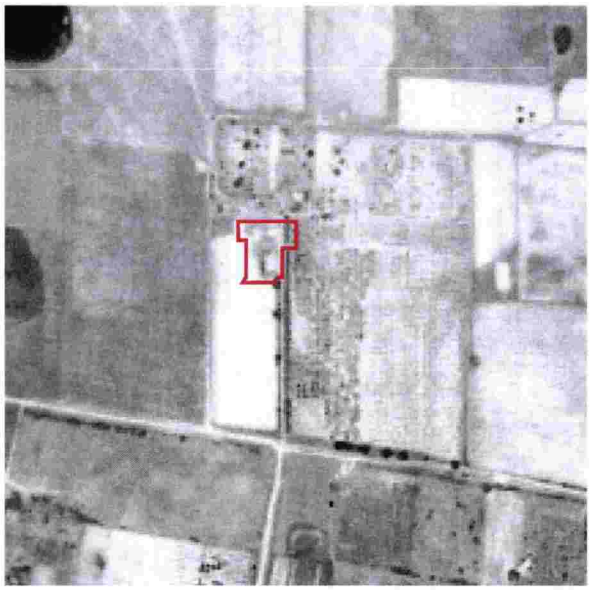
WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

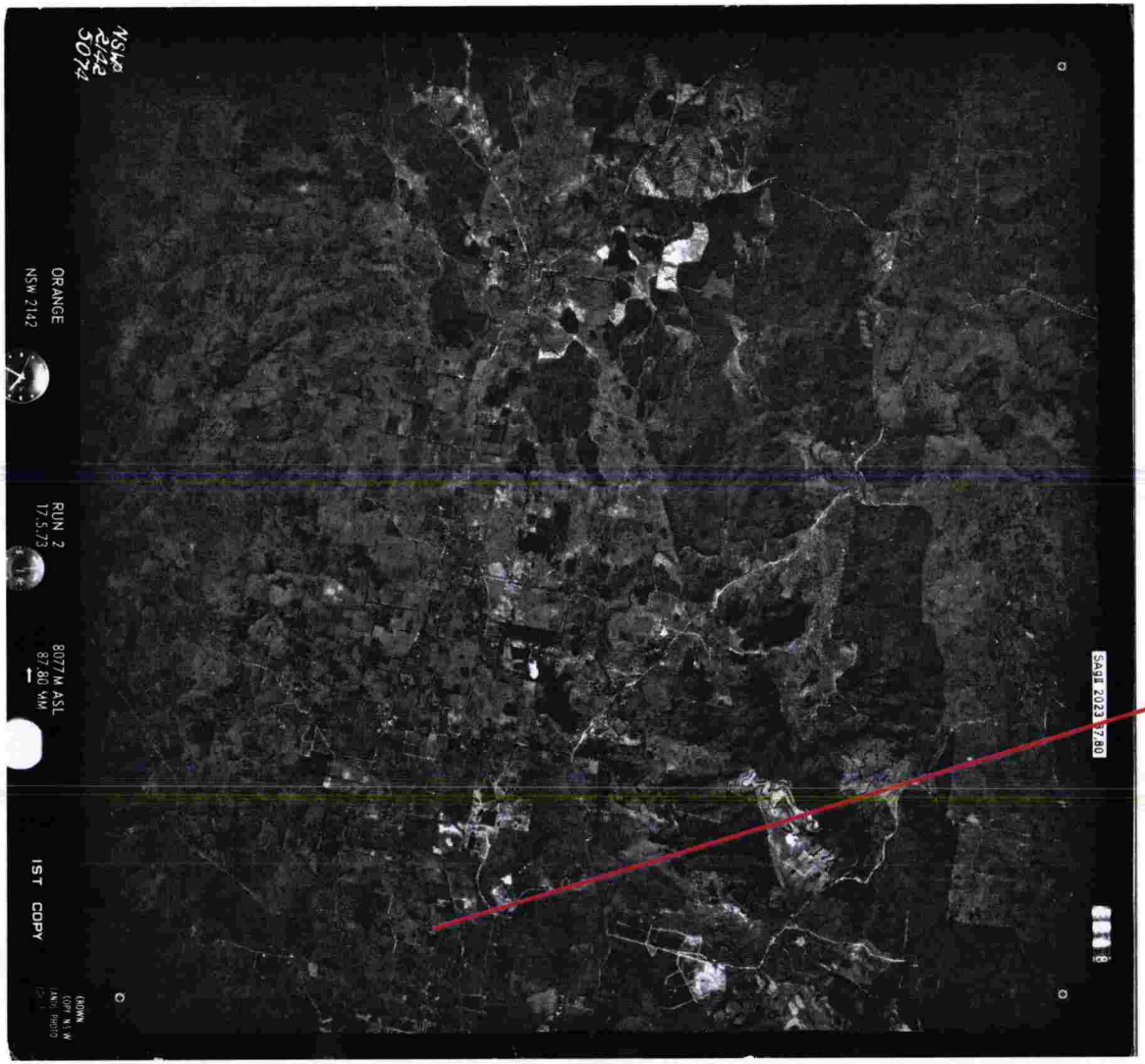
Appendix C

HISTORIC AERIAL PHOTOGRAPHY



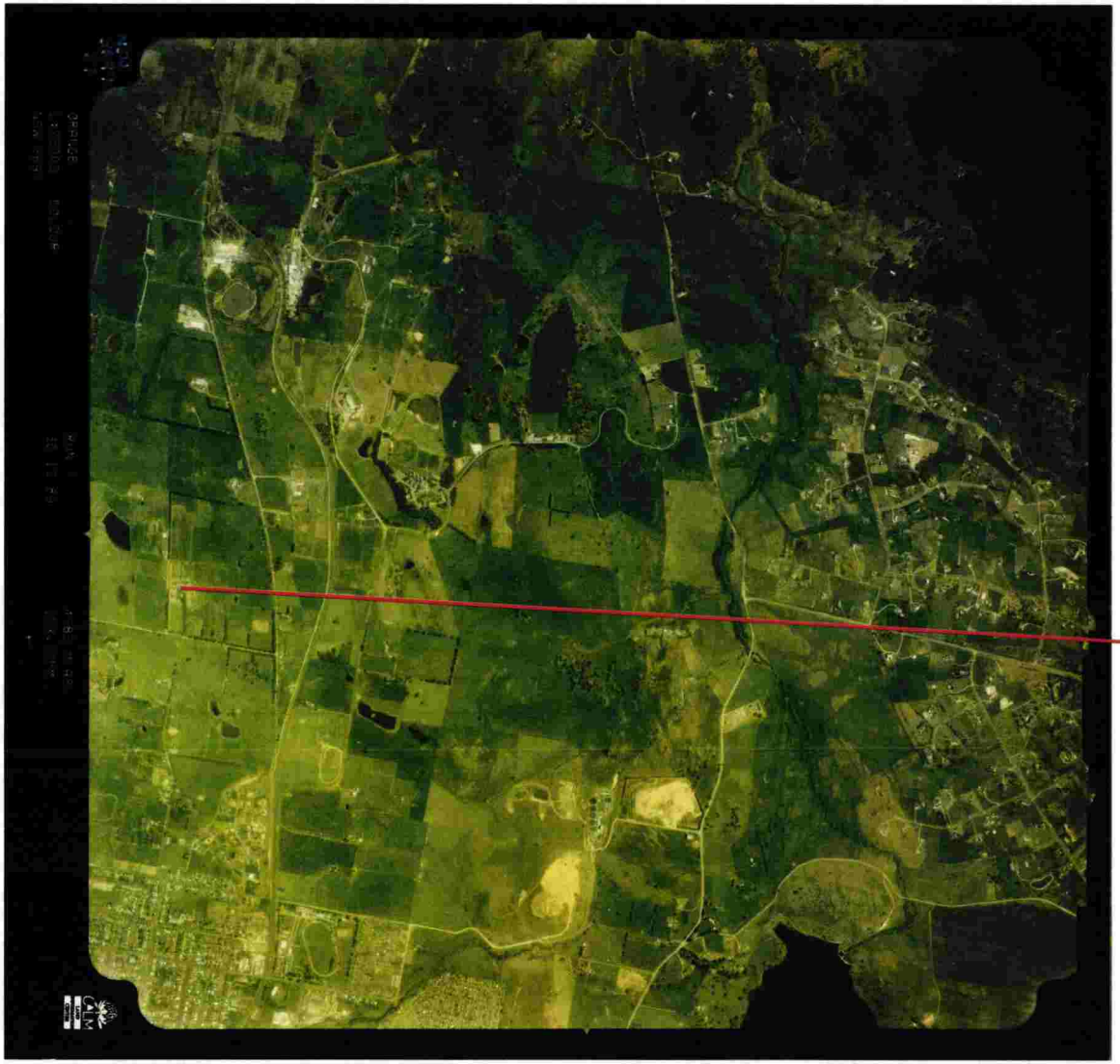
1954 Aerial Photography



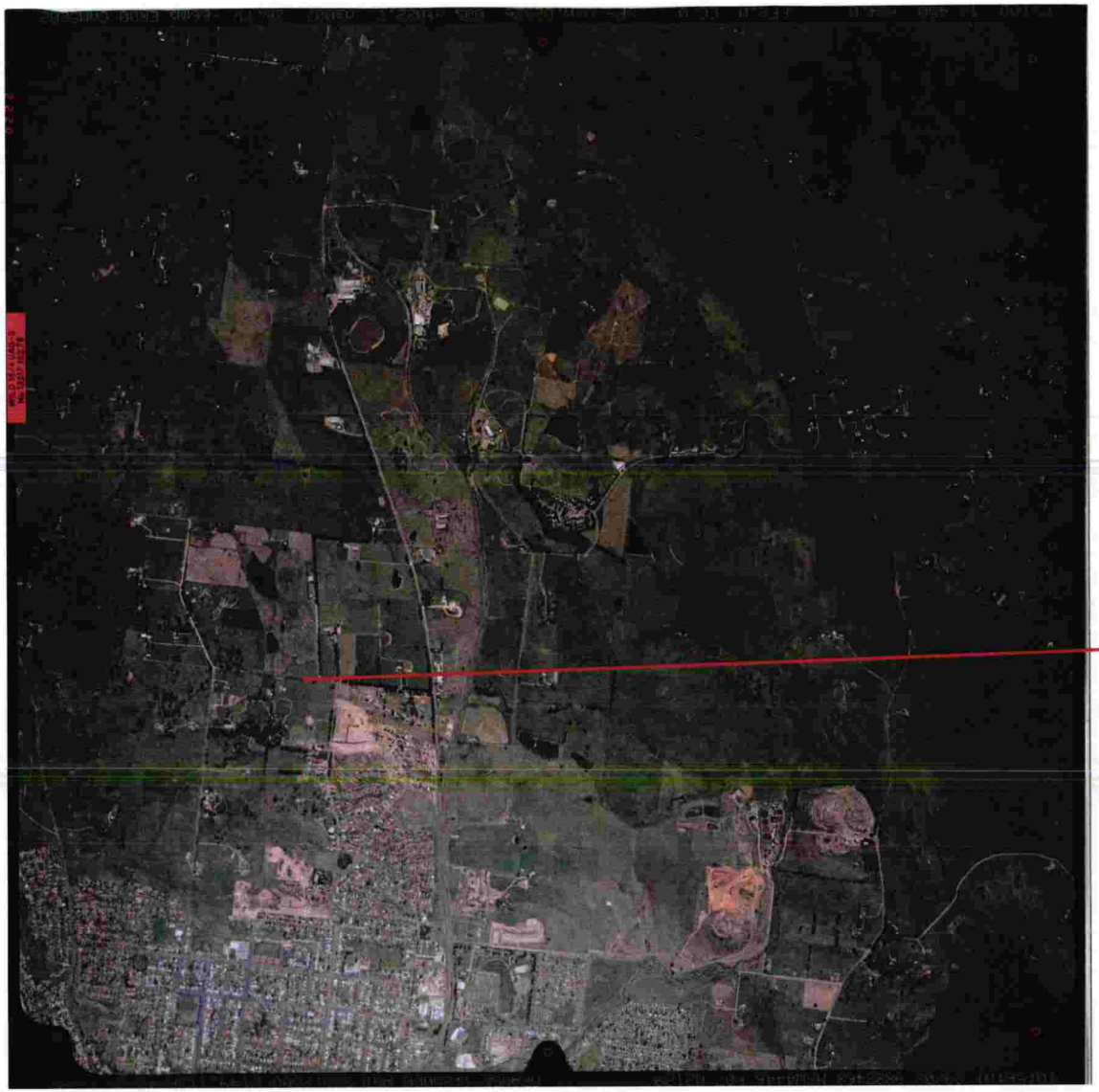


1973 Aerial Photography

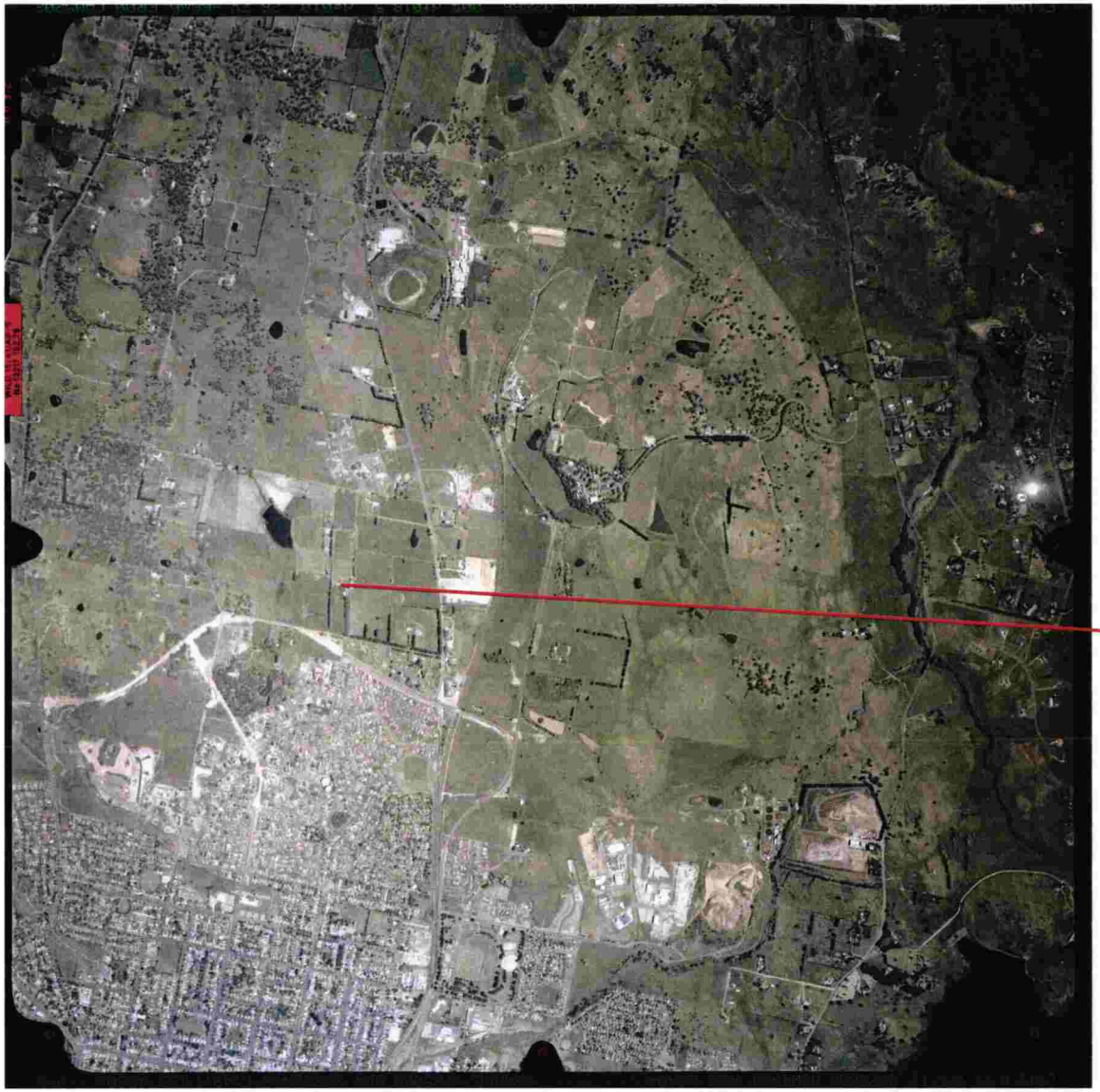
1989 Aerial Photography

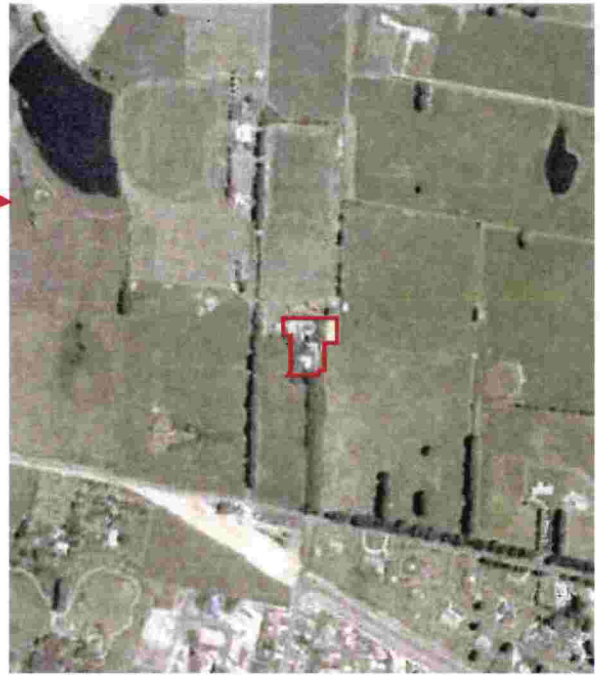


1998 Aerial Photography

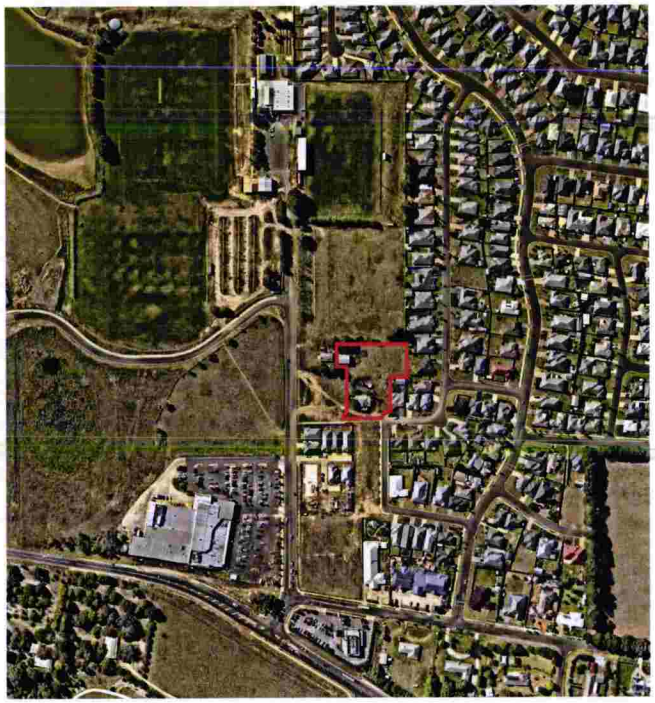


2005 Aerial Photography





2019 Aerial Photography



Appendix D

ANALYTICAL TABLES AND REPORTS

TABLE 1: Emerald Street - RESULTS OF LABORATORY ANALYSIS (SOIL)
APRIL 2019

Premise

				Sample ID	HP_TW_1	HP_TW_2	HP_TW_3	HP_TW_4	HP_TW_5	HP_TW_6	HP_TW_SP1	HP_TW_SP2	HP_TW_SP3
				Sample Date	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019
Group	**Analyte**	**LOR**	**Units**	**Criteria**	PS	PS	PS	PS	PS	PS	FD	PS	PS
Physical Parameters	Moisture Content	1	%	-	**4.3**	**4.8**	**3.7**	**4**	**7.5**	**3.2**	**5.2**	**3.3**	**3.4**
	pH (Lab)	0.1	pH Unit		**6.3**	**7.7**	**6.4**	**6.5**	**6.1**	**6.8**	-	-	-
	Electrical Conductivity (Lab)	1	µS/cm		**13**	**92**	**117**	**294**	**106**	**20**	-	-	-
Trace Metals	Arsenic (As)	5	mg/kg	100	**5**	**6**	**6**	< 5	**30**	< 5	**8**	**6**	< 5
	Cadmium (Cd)	1	mg/kg	20	**1**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
	Chromium (Cr)	2	mg/kg	100	**15**	**18**	**10**	**17**	**16**	**21**	**18**	**11**	**21**
	Copper (Cu)	5	mg/kg	6000	**46**	**214**	**42**	**28**	**53**	**21**	**40**	**22**	**20**
	Lead (Pb)	5	mg/kg	300	**62**	**54**	**30**	**32**	**125**	**21**	**54**	**26**	**7**
	Zinc (Zn)	5	mg/kg	7400	**422**	**46**	**48**	**49**	**56**	**34**	**84**	**50**	**29**
	Mercury (Hg)	0.1	mg/kg	40	**0.2**	**0.2**	< 0.1	**0.2**	**0.4**	**0.2**	**0.3**	**0.1**	< 0.1
	Nickel (Ni)	2	mg/kg	400	**6**	**5**	**3**	**5**	**8**	**6**	**5**	**3**	**11**
Phenolics	Total Phenols	0.5	mg/kg	3000	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	2-Chlorophenol	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	2-Methylphenol (o-Cresol)	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	3&4-Methylphenol (m&p-Cresol)	1	mg/kg	-	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
	2-Nitrophenol	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	2.4-Dimethylphenol	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	2.4-Dichlorophenol	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	2.6-Dichlorophenol	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	4-Chloro-3-methylphenol	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	2.4.6-Trichlorophenol	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	2.4.5-Trichlorophenol	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Pentachlorophenol	2	mg/kg	100	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Total Recoverable Hydrocarbons	TRH C6-C10	10	mg/kg	700	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
	TRH C6-C10 less BTEX (F1)	10	mg/kg	45	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
	TRH C10-C40	50	mg/kg	-	**130**	< 50	< 50	**120**	< 50	< 50	< 50	< 50	< 50
	TRH >C10-C16 (F2)	50	mg/kg	1000	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
	TRH >C10-C16 less Naphthalene (F2)	50	mg/kg	110	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
	TRH >C16-C34 (F3)	100	mg/kg	2500	**130**	< 100	< 100	**120**	< 100	< 100	< 100	< 100	< 100
	TRH >C34-C40 (F4)	100	mg/kg	10000	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
Total Petroleum Hydrocarbons	TRH C6-C9	10	mg/kg	-	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
	TRH C10-C14	50	mg/kg	-	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
	TRH C15-C28	100	mg/kg	-	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
	TRH C29-C36	100	mg/kg	-	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
	TRH C10-C36	50	mg/kg	-	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
BTEXN Analytes	Benzene (F0)	0.2	mg/kg	0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	Toluene	0.5	mg/kg	160	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Ethylbenzene	0.5	mg/kg	55	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	meta- & para-Xylene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	ortho-Xylene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Total Xylenes	0.5	mg/kg	40	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Sum of BTEX	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	Naphthalene	1	mg/kg	3	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1

TABLE 1: Emerald Street - RESULTS OF LABORATORY ANALYSIS (SOIL)
APRIL 2019

Premise

				Sample ID	HP_TW_1	HP_TW_2	HP_TW_3	HP_TW_4	HP_TW_5	HP_TW_6	HP_TW_SP1	HP_TW_SP2	HP_TW_SP3
				Sample Date	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019
Group	**Analyte**	**LOR**	**Units**	**Criteria**	PS	PS	PS	PS	PS	PS	FD	PS	PS
Polynuclear Aromatic Hydrocarbons	Naphthalene	0.5	mg/kg	3	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Acenaphthylene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Acenaphthene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Fluorene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Phenanthrene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Anthracene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Fluoranthene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Pyrene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzo(a)anthracene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Chrysene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzo(b&j)fluoranthene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzo(k)fluoranthene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzo(a)pyrene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Indeno(1,2,3-cd)pyrene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Dibenzo(ah)anthracene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzo(ghi)perylene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Total PAHs	0.5	mg/kg	300	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzo(a)pyrene TEQ (zero)	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzo(a)pyrene TEQ (half LOR)	0.5	mg/kg	3	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
	Benzo(a)pyrene TEQ (LOR)	0.5	mg/kg	-	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
Polychlorinated Biphenyls	Total Polychlorinated biphenyls	0.1	mg/kg	1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
OC Pesticides	Alpha BHC	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Hexachlorobenzene (HCB)	0.05	mg/kg	10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Beta BHC	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Lindane (gamma BHC)	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Delta BHC	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Heptachlor	0.05	mg/kg	6	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Aldrin	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Heptachlor epoxide	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Alpha Chlordane	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Alpha Endosulfan	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	p,p'-DDE	0.05	mg/kg	-	**0.76**	**0.23**	**0.14**	**0.14**	**0.38**	**0.06**	**0.43**	< 0.05	**0.17**
	Dieldrin	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Endrin	0.05	mg/kg	10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Beta Endosulfan	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	p,p'-DDD	0.05	mg/kg	-	**0.1**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Endosulfan sulphate	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	p,p'-DDT	0.2	mg/kg	-	**0.3**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	Endrin ketone	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Methoxychlor	0.2	mg/kg	300	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	Endrin aldehyde	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Total Chlordane (sum)	0.05	mg/kg	50	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	trans-Chlordane	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Endosulfan (sum)	0.05	mg/kg	270	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Sum of DDD + DDE + DDT	0.05	mg/kg	240	**1.16**	**0.23**	**0.14**	**0.14**	**0.38**	**0.06**	**0.43**	< 0.05	**0.17**
	Sum of Aldrin + Dieldrin	0.05	mg/kg	6	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

TABLE 1: Emerald Street - RESULTS OF LABORATORY ANALYSIS (SOIL)
APRIL 2019

				Sample ID	HP_TW_1	HP_TW_2	HP_TW_3	HP_TW_4	HP_TW_5	HP_TW_6	HP_TW_SP1	HP_TW_SP2	HP_TW_SP3
				Sample Date	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019
Group	**Analyte**	**LOR**	**Units**	**Criteria**	PS	PS	PS	PS	PS	PS	FD	PS	PS
OP Pesticides	Dichlorvos	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Dimethoate	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Diazinon (Dimpylate)	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Malathion	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Chlorpyrifos (Chlorpyrifos Ethyl)	0.05	mg/kg	160	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Parathion-ethyl (Parathion)	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	Bromophos Ethyl	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Ethion	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Azinphos-methyl	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Demeton-S-methyl	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Monocrotophos	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	Chlorpyrifos-methyl	0.05	mg/kg	160	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Parathion-methyl	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	Fenthion	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Pirimphos-ethyl	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Chlorfenvinphos	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Fenamiphos	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Prothiofos	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Carbophenothion	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

mg/kg	milligrams per kilogram
LOR	limit of reporting
PS	primary sample
FD	field duplicate
Criteria	Criteria adopted from *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPC 2013)

within criteria
criteria exceeded

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1912858**	Page	: 1 of 13
Client	: **PREMISE NSW Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: BRENDAN STUART	Contact	: Customer Services ES
Address	: TOOWOOMBA	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 0263935000	Telephone	: +61-2-8784 8555
Project	: 219391	Date Samples Received	: 30-Apr-2019 08:15
Order number	:	Date Analysis Commenced	: 30-Apr-2019
C-O-C number	: ----	Issue Date	: 06-May-2019 15:12
Sampler	: BRENDAN STUART		
Site	: ----		
Quote number	: EN/333		
No. of samples received	: 9		
No. of samples analysed	: 9		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero
- **EA200: As only one sample container was submitted for multiple tests, sub sampling was conducted prior to Asbestos analysis. As this has the potential to understate detection, results should be scrutinised accordingly.**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	HP_TW_1	HP_TW_2	HP_TW_3	HP_TW_4	HP_TW_5
			Client sampling date / time	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00
Compound	CAS Number	LOR	Unit	ES1912858-001	ES1912858-002	ES1912858-003	ES1912858-004	ES1912858-005
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	6.3	7.7	6.4	6.5	6.1
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	13	92	117	294	106
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	4.3	4.8	3.7	4.0	7.5
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	5	6	6	<5	30
Cadmium	7440-43-9	1	mg/kg	1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	15	18	10	17	16
Copper	7440-50-8	5	mg/kg	46	214	42	28	53
Lead	7439-92-1	5	mg/kg	62	54	30	32	125
Nickel	7440-02-0	2	mg/kg	6	5	3	5	8
Zinc	7440-66-6	5	mg/kg	422	46	48	49	56
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	0.2	0.2	<0.1	0.2	0.4
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	0.76	0.23	0.14	0.14	0.38
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	HP_TW_1	HP_TW_2	HP_TW_3	HP_TW_4	HP_TW_5
				Client sampling date / time	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00
Compound	CAS Number	LOR	Unit		ES1912858-001	ES1912858-002	ES1912858-003	ES1912858-004	ES1912858-005
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		**0.10**	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg		**0.3**	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		**1.16**	**0.23**	**0.14**	**0.14**	**0.38**
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg		<1	<1	<1	<1	<1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	HP_TW_1	HP_TW_2	HP_TW_3	HP_TW_4	HP_TW_5
				Client sampling date / time	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00
Compound	CAS Number	LOR	Unit		ES1912858-001	ES1912858-002	ES1912858-003	ES1912858-004	ES1912858-005
					Result	Result	Result	Result	Result
EP075(SIM)A: Phenolic Compounds - Continued									
2-Nitrophenol	88-75-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dimethylphenol	105-67-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dichlorophenol	120-83-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.6-Dichlorophenol	87-65-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pentachlorophenol	87-86-5	2	mg/kg		<2	<2	<2	<2	<2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	HP_TW_1	HP_TW_2	HP_TW_3	HP_TW_4	HP_TW_5
				Client sampling date / time	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00
Compound	CAS Number	LOR	Unit		ES1912858-001	ES1912858-002	ES1912858-003	ES1912858-004	ES1912858-005
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		130	<100	<100	120	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		130	<50	<50	120	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		117	116	114	122	99.4
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		94.9	129	104	110	94.0
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		70.9	72.4	63.0	72.0	61.6
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		78.3	79.1	80.6	75.7	77.2
2-Chlorophenol-D4	93951-73-6	0.5	%		80.0	83.6	86.5	81.3	82.2
2.4.6-Tribromophenol	118-79-6	0.5	%		98.6	101	108	100	89.6
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		85.1	91.0	93.3	89.5	95.8
Anthracene-d10	1719-06-8	0.5	%		78.4	92.4	92.5	89.1	92.8
4-Terphenyl-d14	1718-51-0	0.5	%		87.4	98.5	99.9	94.6	99.2

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)				Client sample ID	HP_TW_1	HP_TW_2	HP_TW_3	HP_TW_4	HP_TW_5
				Client sampling date / time	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00
Compound	*CAS Number*	*LOR*	*Unit*		**ES1912858-001**	**ES1912858-002**	**ES1912858-003**	**ES1912858-004**	**ES1912858-005**
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**103**	**124**	**123**	**128**	**118**
Toluene-D8	2037-26-5	0.2	%		**126**	**119**	**120**	**123**	**113**
4-Bromofluorobenzene	460-00-4	0.2	%		**127**	**115**	**116**	**118**	**108**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	HP_TW_6	HP_TW_SP1	HP_TW_SP2	HP_TW_SP3	----
			Client sampling date / time	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00	----
Compound	CAS Number	LOR	Unit	ES1912858-006	ES1912858-007	ES1912858-008	ES1912858-009	--------
				Result	Result	Result	Result	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**6.8**	----	----	----	----
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**20**	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**3.2**	**5.2**	**3.3**	**3.4**	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	**8**	**6**	<5	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	----
Chromium	7440-47-3	2	mg/kg	**21**	**18**	**11**	**21**	----
Copper	7440-50-8	5	mg/kg	**21**	**40**	**22**	**20**	----
Lead	7439-92-1	5	mg/kg	**21**	**54**	**26**	**7**	----
Nickel	7440-02-0	2	mg/kg	**6**	**5**	**3**	**11**	----
Zinc	7440-66-6	5	mg/kg	**34**	**84**	**50**	**29**	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	**0.2**	**0.3**	**0.1**	<0.1	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
4.4`-DDE	72-55-9	0.05	mg/kg	**0.06**	**0.43**	<0.05	**0.17**	----
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	HP_TW_6	HP_TW_SP1	HP_TW_SP2	HP_TW_SP3	----
				Client sampling date / time	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00	----
Compound	CAS Number	LOR	Unit		ES1912858-006	ES1912858-007	ES1912858-008	ES1912858-009	--------
					Result	Result	Result	Result	----
EP068A: Organochlorine Pesticides (OC) - Continued									
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	----
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		**0.06**	**0.43**	<0.05	**0.17**	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	----
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	----
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
2-Chlorophenol	95-57-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
2-Methylphenol	95-48-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
3- & 4-Methylphenol	1319-77-3	1	mg/kg		<1	<1	<1	<1	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	HP_TW_6	HP_TW_SP1	HP_TW_SP2	HP_TW_SP3	----
				Client sampling date / time	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00	----
Compound	CAS Number	LOR	Unit		ES1912858-006	ES1912858-007	ES1912858-008	ES1912858-009	--------
					Result	Result	Result	Result	----
EP075(SIM)A: Phenolic Compounds - Continued									
2-Nitrophenol	88-75-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
2.4-Dimethylphenol	105-67-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
2.4-Dichlorophenol	120-83-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
2.6-Dichlorophenol	87-65-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Pentachlorophenol	87-86-5	2	mg/kg		<2	<2	<2	<2	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	0.6	0.6	0.6	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	1.2	1.2	1.2	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	----
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	----
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	HP_TW_6	HP_TW_SP1	HP_TW_SP2	HP_TW_SP3	----
				Client sampling date / time	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00	----
Compound	CAS Number	LOR	Unit		ES1912858-006	ES1912858-007	ES1912858-008	ES1912858-009	--------
					Result	Result	Result	Result	----
EP080/071: Total Petroleum Hydrocarbons - Continued									
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	----
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	----
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	----
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	----
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		100	115	115	122	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		102	121	115	110	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		61.9	71.4	60.1	65.2	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		77.0	75.9	75.1	77.4	----
2-Chlorophenol-D4	93951-73-6	0.5	%		83.1	82.6	82.9	85.3	----
2.4.6-Tribromophenol	118-79-6	0.5	%		97.9	96.8	90.8	95.5	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		94.3	92.9	94.0	96.3	----
Anthracene-d10	1719-06-8	0.5	%		90.1	90.0	88.7	91.6	----
4-Terphenyl-d14	1718-51-0	0.5	%		96.9	96.4	94.9	97.7	----

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)				Client sample ID	HP_TW_6	HP_TW_SP1	HP_TW_SP2	HP_TW_SP3	----
				Client sampling date / time	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00	26-Apr-2019 00:00	----
Compound	*CAS Number*	*LOR*	*Unit*		**ES1912858-006**	**ES1912858-007**	**ES1912858-008**	**ES1912858-009**	--------
					Result	Result	Result	Result	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**103**	**120**	**127**	**121**	----
Toluene-D8	2037-26-5	0.2	%		**96.8**	**116**	**119**	**112**	----
4-Bromofluorobenzene	460-00-4	0.2	%		**92.3**	**111**	**115**	**115**	----

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

Appendix E

Analytical Laboratory QA/QC & Chain of Custody Documents

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1912858**	Page	: 1 of 7
Client	: **PREMISE NSW Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: BRENDAN STUART	Telephone	: +61-2-8784 8555
Project	: 219391	Date Samples Received	: 30-Apr-2019
Site	: ----	Issue Date	: 06-May-2019
Sampler	: BRENDAN STUART	No. of samples received	: 9
Order number	:	No. of samples analysed	: 9

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Matrix Spike outliers occur.**
- **Laboratory Control outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EP075(SIM)A: Phenolic Compounds	QC-2320168-002	----	**Pentachlorophenol**	87-86-5	62.3 %	10-57%	**Recovery greater than upper control limit**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002: pH 1:5 (Soils)								
Soil Glass Jar - Unpreserved (EA002)								
HP_TW_1,	HP_TW_2,	**26-Apr-2019**	**03-May-2019**	03-May-2019	✓	**03-May-2019**	03-May-2019	✓
HP_TW_3,	HP_TW_4,							
HP_TW_5,	HP_TW_6							
EA010: Conductivity (1:5)								
Soil Glass Jar - Unpreserved (EA010)								
HP_TW_1,	HP_TW_2,	**26-Apr-2019**	**03-May-2019**	03-May-2019	✓	**03-May-2019**	31-May-2019	✓
HP_TW_3,	HP_TW_4,							
HP_TW_5,	HP_TW_6							
EA055: Moisture Content (Dried @ 105-110°C)								
Soil Glass Jar - Unpreserved (EA055)								
HP_TW_1,	HP_TW_2,	**26-Apr-2019**	----	----	----	**01-May-2019**	10-May-2019	✓
HP_TW_3,	HP_TW_4,							
HP_TW_5,	HP_TW_6,							
HP_TW_SP1,	HP_TW_SP2,							
HP_TW_SP3								
EG005(ED093)T: Total Metals by ICP-AES								
Soil Glass Jar - Unpreserved (EG005T)								
HP_TW_1,	HP_TW_2,	**26-Apr-2019**	**30-Apr-2019**	23-Oct-2019	✓	**30-Apr-2019**	23-Oct-2019	✓
HP_TW_3,	HP_TW_4,							
HP_TW_5,	HP_TW_6,							
HP_TW_SP1,	HP_TW_SP2,							
HP_TW_SP3								

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
HP_TW_1, HP_TW_2, HP_TW_3, HP_TW_4, HP_TW_5, HP_TW_6, HP_TW_SP1, HP_TW_SP2, HP_TW_SP3	**26-Apr-2019**	**30-Apr-2019**	24-May-2019	✓	**02-May-2019**	24-May-2019	✓
EP066: Polychlorinated Biphenyls (PCB)							
Soil Glass Jar - Unpreserved (EP066)							
HP_TW_1, HP_TW_2, HP_TW_3, HP_TW_4, HP_TW_5, HP_TW_6, HP_TW_SP1, HP_TW_SP2, HP_TW_SP3	**26-Apr-2019**	**01-May-2019**	10-May-2019	✓	**02-May-2019**	10-Jun-2019	✓
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068)							
HP_TW_1, HP_TW_2, HP_TW_3, HP_TW_4, HP_TW_5, HP_TW_6, HP_TW_SP1, HP_TW_SP2, HP_TW_SP3	**26-Apr-2019**	**01-May-2019**	10-May-2019	✓	**02-May-2019**	10-Jun-2019	✓
EP068B: Organophosphorus Pesticides (OP)							
Soil Glass Jar - Unpreserved (EP068)							
HP_TW_1, HP_TW_2, HP_TW_3, HP_TW_4, HP_TW_5, HP_TW_6, HP_TW_SP1, HP_TW_SP2, HP_TW_SP3	**26-Apr-2019**	**01-May-2019**	10-May-2019	✓	**02-May-2019**	10-Jun-2019	✓
EP075(SIM)A: Phenolic Compounds							
Soil Glass Jar - Unpreserved (EP075(SIM))							
HP_TW_1, HP_TW_2, HP_TW_3, HP_TW_4, HP_TW_5, HP_TW_6, HP_TW_SP1, HP_TW_SP2, HP_TW_SP3	**26-Apr-2019**	**01-May-2019**	10-May-2019	✓	**02-May-2019**	10-Jun-2019	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
HP_TW_1, HP_TW_2, HP_TW_3, HP_TW_4, HP_TW_5, HP_TW_6, HP_TW_SP1, HP_TW_SP2, HP_TW_SP3	**26-Apr-2019**	**01-May-2019**	10-May-2019	✓	**02-May-2019**	10-Jun-2019	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
HP_TW_1, HP_TW_2, HP_TW_3, HP_TW_4, HP_TW_5, HP_TW_6, HP_TW_SP1, HP_TW_SP2, HP_TW_SP3	**26-Apr-2019**	**01-May-2019**	10-May-2019	✓	**01-May-2019**	10-May-2019	✓
Soil Glass Jar - Unpreserved (EP071)							
HP_TW_1, HP_TW_2, HP_TW_3, HP_TW_4, HP_TW_5, HP_TW_6, HP_TW_SP1, HP_TW_SP2, HP_TW_SP3	**26-Apr-2019**	**01-May-2019**	10-May-2019	✓	**02-May-2019**	10-Jun-2019	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080)							
HP_TW_1, HP_TW_2, HP_TW_3, HP_TW_4, HP_TW_5, HP_TW_6, HP_TW_SP1, HP_TW_SP2, HP_TW_SP3	**26-Apr-2019**	**01-May-2019**	10-May-2019	✓	**01-May-2019**	10-May-2019	✓
Soil Glass Jar - Unpreserved (EP071)							
HP_TW_1, HP_TW_2, HP_TW_3, HP_TW_4, HP_TW_5, HP_TW_6, HP_TW_SP1, HP_TW_SP2, HP_TW_SP3	**26-Apr-2019**	**01-May-2019**	10-May-2019	✓	**02-May-2019**	10-Jun-2019	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
HP_TW_1, HP_TW_2, HP_TW_3, HP_TW_4, HP_TW_5, HP_TW_6, HP_TW_SP1, HP_TW_SP2, HP_TW_SP3	**26-Apr-2019**	**01-May-2019**	10-May-2019	✓	**01-May-2019**	10-May-2019	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Electrical Conductivity (1:5)	EA010	1	6	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	10	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	10	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	1	10	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	10	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Electrical Conductivity (1:5)	EA010	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Electrical Conductivity (1:5)	EA010	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	In house: Referenced to Rayment and Lyons 4A1 and APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3)
Electrical Conductivity (1:5)	EA010	SOIL	In house: Referenced to Rayment and Lyons 3A1 and APHA 2510. Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3)
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 504)
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (2013) Schedule B(3) (Method 504,505)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM amended 2013.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260B. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM amended 2013.

Preparation Methods	Method	Matrix	Method Descriptions
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

Friday

CHAIN OF CUSTODY

ALS Environmental

ALS Laboratory: please tick →

☐ ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

☐ BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

☐ GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com

☐ MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com

☐ MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

☐ MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee mail@alsglobal.com

☐ NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com

☐ NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com

☐ PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

☐ SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

☐ TOWNSVILLE 14-16 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville environmental@alsglobal.com

☐ WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: Premise Australia	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☐ ~~Standard TAT (List due date):~~	
OFFICE: Orange		☑ Non Standard or urgent TAT (List due date): 3 - May - 2019	
PROJECT: 219391	ALS QUOTE NO.: SYBQ/316/15	COC SEQUENCE NUMBER (Circle)	
ORDER NUMBER:		COC: (1) 2 3 4 5 6 7	
PROJECT MANAGER: D. WALKER	CONTACT PH: 02 6393 5000	OF: (1) 2 3 4 5 6 7	
SAMPLER: B.STUART	SAMPLER MOBILE: 0418 607 830	RELINQUISHED BY: PREMISE AUST.	RECEIVED BY:
COC emailed to ALS? (YES / ~~NO~~)	EDD FORMAT (or default): ESDAT	DATE/TIME: 29/4/19 14:00	DATE/TIME:
Email Reports to (will default to PM if no other addresses are listed): brendan.stuart@premise.com.au		RELINQUISHED BY:	RECEIVED BY:
Email Invoice to (will default to PM if no other addresses are listed): brendan.stuart@premise.com.au		DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price)
Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	S-19	Asbestos (pres / abs)						Additional Information
1	HP_TW_1	26/04/2019	S	Jar	1	X							Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
2	HP_TW_2	26/04/2019	S	Jar	1	X							
3	HP_TW_3	26/04/2019	S	Jar	1	X							
4	HP_TW_4	26/04/2019	S	Jar	1	X							
5	HP_TW_5	26/04/2019	S	Jar	1	X							
6	HP_TW_6	26/04/2019	S	Jar	1	X							
7	HP_TW_SP1	26/04/2019	S	Jar	1	X	X						
8	HP_TW_SP2	26/04/2019	S	Jar	1	X	X						
9	HP_TW_SP3	26/04/2019	S	Jar	1	X	X						
				TOTAL									

Subcon / Forward Lab / Split WO
Lab / Analysis: Asset
Organised By / Date:
Relinquished By / Date:
Connote / Courier:
WO No.
Attached By PO / Internal Sheet:

TA

Environmental Division Sydney
Work Order Reference
ES1912858

Telephone : +61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved P
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = S
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

Appendix C

CIV Estimate

Overall Cost of Development

Job Name : HOUSING PLUS-EMERALD
Client's Name: Premise

Job Description
DA Estimate [CIV Value] - Non Bank Use
Proposed 19 Unit Development
Emerald Street - Orange

Trd No.	Trade Description	Trade %	Cost/m2	Trade Total
1	Demolition	1	25	39,470
2	Site Preparation	1	27	42,525
3	Builder's Preliminaries & Overheads	0	13	20,000
4	Subtotal - Site Preparation			*101,995*
5	Hydraulic Services	5	179	280,390
6	Fire Services	0	10	15,000
7	Electrical Services	4	147	230,000
8	Builder's Preliminaries & Overheads	1	42	65,000
9	Subtotal - Site Services & Infrastructure			*590,390*
10	Unit Construction	51	1,740	2,725,054
11	Blinds	0	16	25,100
12	Carports	2	55	86,450
13	Builder's Preliminaries & Overheads	7	220	345,000
14	Subtotal - Unit Construction [19 Off]			*3,181,604*
15	External Works & Fencing	3	93	145,730
16	Footpaths	0	9	13,800
17	Garbage Bin Structure	0	14	22,300
18	Roadworks & Car Parking	4	126	196,776
19	Soft Landscaping	2	74	115,925
20	Builder's Preliminaries & Overheads	1	45	70,000
21	Subtotal - Site & External Works			*564,531*
22	DA/CC Fees & Charges	1	48	75,000
23	Design Consultant Fees - TBC	6	211	330,000
24	Subtotal - Design & Consultant Fees			*405,000*
25	Design Contingency	5	160	250,000
26	Construction Contingency	3	96	150,000
27	Locality Index			
28	Cost Escalation	1	38	60,000
29	Subtotal - Contingencies			*460,000*
30	NB - Estimate Notes & Exclusions			
GFA: 1,566 m2.		**100**	**3,387**	**5,303,520**

Final Total : $ **5,303,520**

Appendix D

Aboriginal Heritage Information Management System Search Results

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : 219391

Client Service ID : 418504

Geolyse Pty Ltd

Date: 03 May 2019

PO Box 1842 62 Wingewarra Street
Dubbo New South Wales 2830

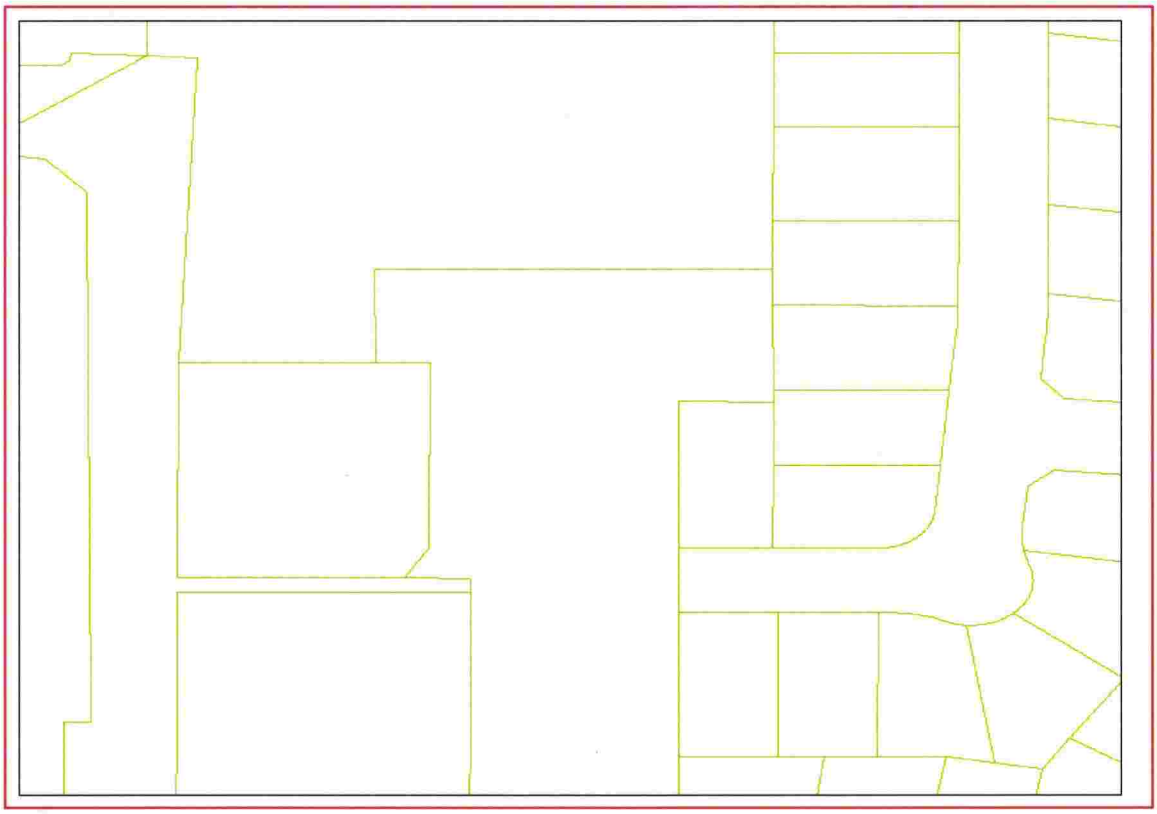
Attention: David Walker

Email: dwalker@geolyse.com

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -33.2525, 149.1022 - Lat, Long To : -33.2517, 149.1035 with a Buffer of 50 meters, conducted by David Walker on 03 May 2019.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

3 Marist Place, Parramatta NSW 2150
Locked Bag 5020 Parramatta NSW 2220
Tel: (02) 9585 6380 Fax: (02) 9873 8599

ABN 30 841 387 271
Email: ahims@environment.nsw.gov.au
Web: www.environment.nsw.gov.au

Appendix E

BASIX/NaTHERS

BASIX® Certificate

Building Sustainability Index www.basix.nsw.gov.au

Multi Dwelling

Certificate number: 1040468M

This certificate confirms that the proposed development will meet the NSW government's requirements for sustainability, if it is built in accordance with the commitments set out below. Terms used in this certificate, or in the commitments, have the meaning given by the document entitled "BASIX Definitions" dated 06/10/2017 published by the Department. This document is available at www.basix.nsw.gov.au

Secretary
Date of issue: Monday, 02 September 2019
To be valid, this certificate must be lodged within 3 months of the date of issue.

NSW GOVERNMENT Planning & Environment

Project summary	
Project name	Emerald Street
Street address	Emerald Street Orange 2800
Local Government Area	Orange City Council
Plan type and plan number	deposited 1234441
Lot no.	99
Section no.	-
No. of residential flat buildings	0
No. of units in residential flat buildings	0
No. of multi-dwelling houses	19
No. of single dwelling houses	0

Project score		
Water	✔ 42	Target 40
Thermal Comfort	✔ Pass	Target Pass
Energy	✔ 39	Target 35

Certificate Prepared by
Name / Company Name: Northrop Consulting Engineers Pty Ltd
ABN (if applicable): 81094433100

Description of project

Project address	
Project name	Emerald Street
Street address	Emerald Street Orange 2800
Local Government Area	Orange City Council
Plan type and plan number	deposited 1234441
Lot no.	99
Section no.	-

Project type	
No. of residential flat buildings	0
No. of units in residential flat buildings	0
No. of multi-dwelling houses	19
No. of single dwelling houses	0

Site details	
Site area (m²)	5216
Roof area (m²)	1534.55
Non-residential floor area (m²)	0.0
Residential car spaces	19
Non-residential car spaces	12

Common area landscape	
Common area lawn (m²)	470.0
Common area garden (m²)	150.0
Area of indigenous or low water use species (m²)	150.0

Assessor details	
Assessor number	20579
Certificate number	0004178850
Climate zone	65

Project score		
Water	✔ 42	Target 40
Thermal Comfort	✔ Pass	Target Pass
Energy	✔ 39	Target 35

Description of project

The tables below describe the dwellings and common areas within the project

Multi-dwelling houses

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
EU1	2	61.2	7.9	116.0	58.0
EU5	2	69.1	0.0	45.0	22.0
EU9	2	61.2	7.9	65.0	32.0
EU13	1	42.8	7.3	55.0	27.0
EU17	1	42.8	7.3	45.0	22.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
EU2	2	69.1	0.0	45.0	22.0
EU6	2	69.1	0.0	45.0	22.0
EU10	2	69.1	0.0	55.0	27.0
EU14	1	42.8	7.3	40.0	20.0
EU18	1	42.8	7.3	60.0	30.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
EU3	2	69.1	0.0	45.0	22.0
EU7	2	61.2	7.9	110.0	55.0
EU11	2	69.1	0.0	45.0	22.0
EU15	1	42.8	7.3	40.0	20.0
EU19	2	61.2	7.9	85.0	42.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
EU4	2	61.2	7.9	45.0	22.0
EU8	2	61.2	7.9	60.0	30.0
EU12	1	42.8	7.3	95.0	47.0
EU16	1	42.8	7.3	55.0	27.0

No common areas specified.

Schedule of BASIX commitments

1. Commitments for multi-dwelling houses
    (a) Dwellings
        (i) Water
        (ii) Energy
        (iii) Thermal Comfort

2. Commitments for single dwelling houses

3. Commitments for common areas and central systems/facilities for the development (non-building specific)
        (i) Water
        (ii) Energy

Schedule of BASIX commitments

The commitments set out below regulate how the proposed development is to be carried out. It is a condition of any development consent granted, or complying development certificate issued, for the proposed development, that BASIX commitments be complied with.

1. Commitments for multi-dwelling houses

(a) Dwellings

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must plant indigenous or low water use species of vegetation throughout the area of land specified for the dwelling in the "Indigenous species" column of the table below, as private landscaping for that dwelling. (This area of indigenous vegetation is to be contained within the "Area of garden and lawn" for the dwelling specified in the "Description of Project" table).	✔	✔	
(c) If a rating is specified in the table below for a fixture or appliance to be installed in the dwelling, the applicant must ensure that each such fixture and appliance meets the rating specified for it.		✔	✔
(d) The applicant must install an on demand hot water recirculation system which regulates all hot water use throughout the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below.		✔	✔
(e) The applicant must install: (aa) a hot water diversion system to all showers, kitchen sinks and all basins in the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below; and (bb) a separate diversion tank (or tanks) connected to the hot water diversion systems of at least 100 litres. The applicant must connect the hot water diversion tank to all toilets in the dwelling.		✔ ✔	✔ ✔
(e) The applicant must not install a private swimming pool or spa for the dwelling, with a volume exceeding that specified for it in the table below.	✔	✔	
(f) If specified in the table, that pool or spa (or both) must have a pool cover or shading (or both).		✔	
(g) The pool or spa must be located as specified in the table.	✔	✔	
(h) The applicant must install, for the dwelling, each alternative water supply system, with the specified size, listed for that dwelling in the table below. Each system must be configured to collect run-off from the areas specified (excluding any area which supplies any other alternative water supply system), and to divert overflow as specified. Each system must be connected as specified.	✔	✔	✔

	Fixtures					Appliances		Individual pool				Individual spa		
Dwelling no.	All shower-heads	All toilet flushing systems	All kitchen taps	All bathroom taps	HW recirculation or diversion	All clothes washers	All dish-washers	Volume (max volume)	Pool cover	Pool location	Pool shaded	Volume (max volume)	Spa cover	Spa shaded
All dwellings	3 star (> 6 but <= 7.5 L/min)	4 star	6 star	6 star	no	-	-	-	-	-	-	-	-	-

	Alternative water source						
Dwelling no.	Alternative water supply systems	Size	Configuration	Landscape connection	Toilet connection (s)	Laundry connection	Pool top-up	Spa top-up
EU14, EU15	individual water tank (no. 1)	Tank size (min) 3000.0 litres	To collect run-off from at least: 67.0 square metres of roof area;	yes	yes	no	no	no
EU12, EU13, EU17, EU18	individual water tank (no. 1)	Tank size (min) 3000.0 litres	To collect run-off from at least: 70.0 square metres of roof area;	yes	yes	no	no	no
EU2, EU3, EU5, EU6, EU10, EU11	individual water tank (no. 1)	Tank size (min) 3000.0 litres	To collect run-off from at least: 80.0 square metres of roof area;	yes	yes	no	no	no
All other dwellings	individual water tank (no. 1)	Tank size (min) 3000.0 litres	To collect run-off from at least: 90.0 square metres of roof area;	yes	yes	no	no	no

(ii) Energy	**Show on DA plans**	**Show on CC/CDC plans & specs**	**Certifier check**
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must install each hot water system specified for the dwelling in the table below, so that the dwelling's hot water is supplied by that system. If the table specifies a central hot water system for the dwelling, then the applicant must connect that central system to the dwelling, so that the dwelling's hot water is supplied by that central system.	✔	✔	✔
(c) The applicant must install, in each bathroom, kitchen and laundry of the dwelling, the ventilation system specified for that room in the table below. Each such ventilation system must have the operation control specified for it in the table.		✔	✔

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(d) The applicant must install the cooling and heating system/s specified for the dwelling under the "Living areas" and "Bedroom areas" headings of the "Cooling" and "Heating" columns in the table below, in/for at least 1 living/bedroom area of the dwelling. If no cooling or heating system is specified in the table for "Living areas" or "Bedroom areas", then no systems may be installed in any such areas. If the term "zoned" is specified beside an air conditioning system, then the system must provide for day/night zoning between living areas and bedrooms.		✔	✔
(e) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Artificial lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that the "primary type of artificial lighting" for each such room in the dwelling is fluorescent lighting or light emitting diode (LED) lighting. If the term "dedicated" is specified for a particular room or area, then the light fittings in that room or area must only be capable of being used for fluorescent lighting or light emitting diode (LED) lighting.		✔	✔
(f) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Natural lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that each such room or area is fitted with a window and/or skylight.	✔	✔	✔
(g) This commitment applies if the applicant installs a water heating system for the dwelling's pool or spa. The applicant must: (aa) install the system specified for the pool in the "Individual Pool" column of the table below (or alternatively must not install any system for the pool). If specified, the applicant must install a timer, to control the pool's pump; and (bb) install the system specified for the spa in the "Individual Spa" column of the table below (or alternatively must not install any system for the spa). If specified, the applicant must install a timer to control the spa's pump.		✔ ✔	
(h) The applicant must install in the dwelling: (aa) the kitchen cook-top and oven specified for that dwelling in the "Appliances & other efficiency measures" column of the table below; (bb) each appliance for which a rating is specified for that dwelling in the "Appliances & other efficiency measures" column of the table, and ensure that the appliance has that minimum rating; and (cc) any clothes drying line specified for the dwelling in the "Appliances & other efficiency measures" column of the table.		✔ ✔ ✔	✔
(i) If specified in the table, the applicant must carry out the development so that each refrigerator space in the dwelling is "well ventilated".		✔	
(j) The applicant must install the photovoltaic system specified for the dwelling under the "Photovoltaic system" heading of the "Alternative energy" column of the table below, and connect the system to that dwelling's electrical system.	✔	✔	✔

	Hot water	Bathroom ventilation system		Kitchen ventilation system		Laundry ventilation system	
Dwelling no.	Hot water system	Each bathroom	Operation control	Each kitchen	Operation control	Each laundry	Operation control
EU2, EU3, EU5, EU6, EU10, EU11	gas instantaneous 5.5 star	individual fan, ducted to façade or roof	manual switch on/off	individual fan, ducted to façade or roof	manual switch on/off	individual fan, ducted to façade or roof	manual switch on/off
All other dwellings	gas instantaneous 5.5 star	no mechanical ventilation (ie. natural)	-	individual fan, ducted to façade or roof	manual switch on/off	natural ventilation only, or no laundry	-

	Cooling		Heating		Artificial lighting						Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/ toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen
EU1, EU4, EU7, EU8, EU9, EU19	1-phase airconditioning 3.5 Star	-	1-phase airconditioning 3.5 Star	-	2 (dedicated)	2 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	1	no
EU2, EU3, EU5, EU6, EU10, EU11	1-phase airconditioning 3.5 Star	-	1-phase airconditioning 3.5 Star	-	2 (dedicated)	2 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	no
All other dwellings	1-phase airconditioning 3.5 Star	-	1-phase airconditioning 3.5 Star	-	1 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	1	yes

	Individual pool		Individual spa		Appliances & other efficiency measures							
Dwelling no.	Pool heating system	Timer	Spa heating system	Timer	Kitchen cooktop/oven	Refrigerator	Well ventilated fridge space	Dishwasher	Clothes washer	Clothes dryer	Indoor or sheltered clothes drying line	Private outdoor or unsheltered clothes drying line
All dwellings	-	-	-	-	gas cooktop & electric oven	-	no	-	-	-	no	yes

	Alternative energy
Dwelling no.	Photovoltaic system (min rated electrical output in peak kW)
All dwellings	-

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must attach the certificate referred to under "Assessor details" on the front page of this BASIX certificate (the "Assessor Certificate") to the development application and construction certificate application for the proposed development (or, if the applicant is applying for a complying development certificate for the proposed development, to that application). The applicant must also attach the Assessor Certificate to the application for a final occupation certificate for the proposed development.			
(b) The Assessor Certificate must have been issued by an Accredited Assessor in accordance with the Thermal Comfort Protocol.			
(c) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the "Thermal Loads" table below.			
(d) The applicant must show on the plans accompanying the development application for the proposed development, all matters which the Thermal Comfort Protocol requires to be shown on those plans. Those plans must bear a stamp of endorsement from the Accredited Assessor, to certify that this is the case.	✔		
(e) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all thermal performance specifications set out in the Assessor Certificate, and all aspects of the proposed development which were used to calculate those specifications.		✔	
(f) The applicant must construct the development in accordance with all thermal performance specifications set out in the Assessor Certificate, and in accordance with those aspects of the development application or application for a complying development certificate which were used to calculate those specifications.		✔	✔
(g) Where there is an in-slab heating or cooling system, the applicant must:	✔	✔	✔

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(aa) Install insulation with an R-value of not less than 1.0 around the vertical edges of the perimeter of the slab; or (bb) On a suspended floor, install insulation with an R-value of not less than 1.0 underneath the slab and around the vertical edges of the perimeter of the slab.			
(h) The applicant must construct the floors and walls of the development in accordance with the specifications listed in the table below.	✔	✔	✔

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
EU1	150.6	3.0
EU4	154.7	2.8
EU7	149.3	3.1
EU8	140.1	3.2
EU9	146.3	3.5
EU10	115.2	4.1
EU11	128.6	4.1
EU12	143.8	6.9
EU13	139.1	7.7
EU14	137.4	8.2
EU15	143.9	8.4
EU16	150.1	7.6
EU17	141.2	6.7
EU18	153.1	5.4
EU19	147.5	3.5
EU2, EU5	130.1	2.6
All other dwellings	129.3	2.5

	Construction of floors and walls				
Dwelling no.	Concrete slab on ground(m²)	Suspended floor with open subfloor (m²)	Suspended floor with endclosed subfloor (m²)	Suspended floor above garage (m²)	Primarily rammed earth or mudbrick walls
EU12,EU13,EU14,EU15,EU16,EU17,EU18	60	-	-	-	No
All other dwellings	69	-	-	-	No

3. Commitments for common areas and central systems/facilities for the development (non-building specific)

(b) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✔	✔
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✔	✔	✔
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✔	✔	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✔	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✔	✔
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✔	✔

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	no common facility	no common facility	5 star	no common laundry facility

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✔	✔
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✔	✔
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✔	✔	✔

Notes

1. In these commitments, "applicant" means the person carrying out the development.
2. The applicant must identify each dwelling, building and common area listed in this certificate, on the plans accompanying any development application, and on the plans and specifications accompanying the application for a construction certificate / complying development certificate, for the proposed development, using the same identifying letter or reference as is given to that dwelling, building or common area in this certificate.
3. This note applies if the proposed development involves the erection of a building for both residential and non-residential purposes (or the change of use of a building for both residential and non-residential purposes). Commitments in this certificate which are specified to apply to a "common area" of a building or the development, apply only to that part of the building or development to be used for residential purposes.
4. If this certificate lists a central system as a commitment for a dwelling or building, and that system will also service any other dwelling or building within the development, then that system need only be installed once (even if it is separately listed as a commitment for that other dwelling or building).
5. If a star or other rating is specified in a commitment, this is a minimum rating.
6. All alternative water systems to be installed under these commitments (if any), must be installed in accordance with the requirements of all applicable regulatory authorities. NOTE: NSW Health does not recommend that stormwater, recycled water or private dam water be used to irrigate edible plants which are consumed raw, or that rainwater be used for human consumption in areas with potable water supply.

Legend

1. Commitments identified with a "✔" in the "Show on DA plans" column must be shown on the plans accompanying the development application for the proposed development (if a development application is to be lodged for the proposed development).
2. Commitments identified with a "✔" in the "Show on CC/CDC plans and specs" column must be shown in the plans and specifications accompanying the application for a construction certificate / complying development certificate for the proposed development.
3. Commitments identified with a "✔" in the "Certifier check" column must be certified by a certifying authority as having been fulfilled. (Note: a certifying authority must not issue an occupation certificate (either interim or final) for a building listed in this certificate, or for any part of such a building, unless it is satisfied that each of the commitments whose fulfilment it is required to monitor in relation to the building or part, has been fulfilled).

Nationwide House Energy Rating Scheme* — Multiple-dwelling summary

Certificate number: **0004178850** Certificate Date: **02 Sep 2019** ★Average Star rating: **7.3**

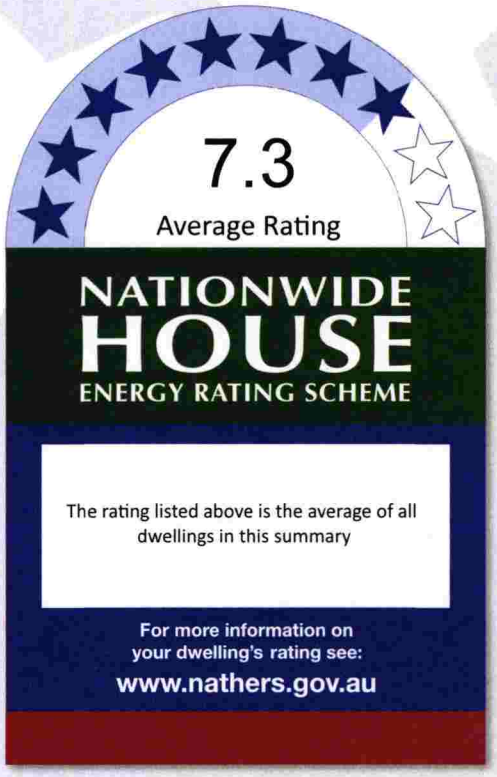
Assessor details

Accreditation number:	**20579**
Name:	**Amir Girgis**
Organisation:	**Northrop Consulting Engineers**
Email:	**amir.girgis@sydney.northrop.com.au**
Phone:	**(02)92414188**
Declaration of interest:	**The Assessor has provided design advice to the Applicant**
Software:	**BERS Pro v4.3.0.2d (3.13)**
AAO:	**ABSA**

Dwelling details

Street:	**Emerald St**
Suburb:	**Orange**
State:	**NSW**
Postcode:	**2800**

Scan to access this certificate online and confirm this is valid.



Summary of all dwellings

Certificate Details

Certificate number	Dwelling/Unit number	Heating load	Cooling load	Total load	Star Rating
0004178414	EU1	150.6	3.0	153.6	7.1
0004178463	EU2	130.1	2.6	132.7	7.4
0004178471	EU3	129.3	2.5	131.9	7.4
0004178505	EU4	154.7	2.8	157.5	7.1
0004178539	EU5	130.1	2.6	132.7	7.4
0004178562	EU6	129.3	2.5	131.9	7.4
0004178398	EU7	149.3	3.1	152.4	7.2
0004178430	EU8	140.1	3.2	143.3	7.3
0004178448	EU9	146.3	3.5	149.8	7.2
0004178489	EU10	115.2	4.1	119.3	7.7
0004178513	EU11	128.6	4.1	132.7	7.4
0004178547	EU12	143.8	6.9	150.7	7.2
0004178570	EU13	139.1	7.7	146.7	7.3
0004178406	EU14	137.4	8.2	145.5	7.3
0004178422	EU15	143.9	8.4	152.3	7.2

* Nationwide House Energy Rating Scheme (NatHERS) is an initiative of the Australian, state and territory governments. For more details see www.nathers.gov.au

Nationwide House Energy Rating Scheme* - Multiple Dwelling Summary

Certificate number: **0004178850** Certificate Date: **02 Sep 2019** ★ Average Star rating: **7.3**

Summary of all dwellings continued

Certificate Details

Certificate number	Dwelling/Unit number	Heating load	Cooling load	Total load	Star Rating
0004178455	EU16	150.1	7.6	157.7	7
0004178497	EU17	141.2	6.7	148.0	7.2
0004178521	EU18	153.1	5.4	158.5	7
0004178554	EU19	147.5	3.5	151.0	7.2

* Nationwide House Energy Rating Scheme (NatHERS) is an initiative of the Australian, state and territory governments. For more details see www.nathers.gov.au

NORTHROP

Level 11, 345 George Street, Sydney NSW 2000
T (02) 9241 4188 F (02) 9241 4324
E sydney@northrop.com.au ABN 81 094 433 100

3 September 2019

Ref: SY181794 - 00

Housing Plus Ltd
8/113 Byng St
Orange NSW 2800

Re: Housing Plus – Emerald Street (19 Dwellings)

BASIX Final Pathway

The following summary is a BASIX pathway that is approved for use with the development application of Emerald Street, Orange.

Water Efficiency

Water score required: 40%
Current score: 42%

- Common Facilities:
  - Nil common area facilities.
  - Common Area lawn 470m2
  - Common Area garden 150m2; 150m2 of this area is native low water-use species
- Dwellings:
  - Individual minimum 3000L rainwater tank, supplying private landscape irrigation and toilets
  - Showerheads: 3 star WELS rated (>6 but <=7.5 L/min)
  - Kitchen Taps & Bathroom Taps: 6 star WELS rated
  - Toilets: 4 star WELS rated
  - Min 50% private lawn/garden area is to feature native low-water vegetation.
  - Clothes Washers: Not Provided
  - Dishwashers: Not Provided

Energy Efficiency

Energy score required: 35%
Current Score: 39%

- Common Facilities:
  - Nil common area facilities.
- Dwellings:
  - Domestic Hot Water: Individual gas instantaneous systems – 5.5 star energy rating.
  - Individual fan ducted to façade or roof for all kitchens and bathrooms of Units 2, 3, 5, 6, 10, 11 only, all other units have naturally ventilated bathrooms. Exhausts are controlled by individual switch.
  - Dedicated fluorescent or LED fittings for all internal areas.
  - Gas cooktop & electric oven
  - Outdoor private clothes drying line
  - Refrigerator: Not provided
  - Air-conditioning: single phase reverse cycle (3.5 Star Energy Star rating) bulkhead type to living rooms only; all dwellings.

Date	Rev	Issue	Author	Verifier
02/03/2019	1	Final	J. Caparrotta	E. Chan

Thermal Comfort – 7 star NatHERS pathway

The following thermal comfort pathway achieves at least 7 stars NatHERS for each dwelling and is subject to the following construction detail.

Element	Construction/Detail
External wall construction	Brick veneer envelope & Weatherboard Cladding
External wall solar absorptance (0<absorptance<1)	Solar Absorptance All units 0.5 - 0.8 (Dark coloured brick) and <0.35 (light coloured board) to front façade of Units 1-11 & 19 only.
Internal wall	Plasterboard on stud
Party wall	Plasterboard on double stud with shaft liner
Ceiling	Plasterboard
Roof	Sheet metal cladding
Roof solar absorptance (0<absorptance<1)	Solar absorptance 0.5-0.8 (darkcoloured)
Floor construction	375mm waffle slab
Floor coverings	Carpet in bedrooms, vinyl in kitchen/living/dining Tiles in wet areas.
Window type and openness	Aluminium framed double glazed window with, 90% openess to awning windows and 45% openness for all sliding windows/doors

The advice below is based on the preliminary plans and sections drawings received so far.

Unit	Glazing		External wall bulk insulation	Ceiling bulk insulation	Slab/Floor min total R value	Comments
	Awning	Sliding + Fixed				
1,4,7,8,9,19	U value 4.1 SHGC 0.47	U Value 4.1 SHGC 0.52	R2.5	R6.0	Rt 0.97	* Dark brick * Light board * Dark roof
2,3,5,6,10,11	U value 4.1 SHGC 0.47	U Value 4.1 SHGC 0.52	R2.5*	R6.0	Rt 0.97	* Dark brick * Light board * Dark roof
12,13,16,17,18,	U value 4.1 SHGC 0.47	U Value 4.1 SHGC 0.52	R2.5	R4.0	Rt 0.97	* Dark brick * Dark roof
14-15	U value 4.1 SHGC 0.47	U Value 4.1 SHGC 0.52	R2.5*	R4.0	Rt 0.97	* Dark brick * Dark roof

*Nil insulation to party walls (shaft liner only)

Appendix F

GEOTECHNICAL REPORT

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Geotechnical Investigation Report

Assessment Site: Lot 99 Emerald Street, Orange NSW

Client: Housing Plus

Address: P.O. 968, Orange NSW 2800

(Our Reference: 31463-GR01a)

barnson
DESIGN . PLAN . MANAGE

LIST OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

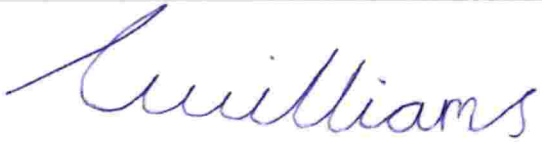
APPENDICES

Disclaimer

This report has been prepared solely for Housing Plus in accordance with the scope provided by the client and for the purpose(s) as outlined throughout this report.

Barnson Pty Ltd accepts no liability or responsibility for or in respect of any use or reliance upon this report and its supporting material by anyone other than the client.

Project Name:	Lot 99 Emerald Street, Orange NSW
Client:	Housing Plus
Project No.	31463
Report Reference	31463-GR01a
Date:	29.05.2019
Revision:	A

Prepared by:	**Reviewed by:**
	
Gareth Williams Geotechnical Technician	Richard Noonan BE (Hons) ME FIE Aust CPEng Director

1.0 INTRODUCTION

The following is a report on the geotechnical assessment of a site in accordance with AS1726-2017 "Geotechnical Site Investigations".

Reference will also be made to AS2870-2011 regarding site classification assessment data and foundation recommendations.

The site investigation was carried out by Barnson Pty Ltd, on behalf of Housing Plus of Orange NSW.

Plate 1 – Proposed Development Area

Housing Plus is proposing to build 11 units and internal roads within Lot 99 Emerald Street, Orange NSW. The proposed site features that are covered by this investigation are as follows;

- Proposed units
- Proposed Roads

The investigation comprised of fifteen (15) boreholes together with field mapping near the site. Details of the field work and laboratory testing are given in the report together with comments relevant to design and construction practice.

1.1 Terminology

The methods used in this report to describe the soil profiles, including visual classification of material types encountered, are in accordance with Australian standard AS1726-1993 "Geotechnical Site Investigations".

1.2 Limitations

The geotechnical section of Barnson Pty Ltd has conducted this investigation and prepared this report in response to specific instructions from the client to whom this report is addressed. This report is intended for the sole use of the client, and only for the purpose which it is prepared. Any third party who relies on the report or any representation contained in it does so at their own risk.

1.3 Geotechnical Testing

Representative samples from the site were subjected to the following range of tests in accordance with relevant method of Australian Standard AS1289:

- Linear Shrinkage
- Maximum Dry Density
- CBR Testing
- PH Determination

NATA reports are attached in ***Appendix D***.

2.0 SITE DESCRIPTION

2.1 General Site Description

The site is in a developed residential area of North Orange NSW. The surrounding land is reserved for residential purposes with existing sporting fields north of the block.

The site is sloping slightly to the south and has an existing dwelling and sheds on the block.

There are small to medium trees scattered over the site.

Any trees noted to be within the building zone, should be removed and the excavation remaining should be backfilled with natural material and reinstated in layers to a minimum of 95% Standard Maximum Dry Density.

Plate 2 – General view of site facing north.

Plate 3 – General view of site facing south.

Plate 4 – General view of site facing southwest.

3.0 METHOD OF INVESTIGATION

On the 17th of May 2019, a geotechnical investigation was carried out at the site of the above-mentioned development site. The field drilling was carried out by a geotechnical technician who logged the boreholes on site and undertook geological mapping of the nearby area. A drilling rig with a 90mm auger and tungsten tip was used to excavate eleven (11) boreholes for the proposed units to a depth of 3m within the proposed building areas. These are identified as boreholes 1 through 11. Additionally, a 300mm auger and tungsten tip was also used to excavate another four (4) boreholes to a depth of 1.5m within the proposed road areas. These are identified as boreholes 12 through 15.

3.1 GPS Co-Ordinates

The boreholes were drilled as close as possible to the anticipated location of the proposed structures. GPS Co-ordinates of these were recorded on site to enable plotting of the borehole locations. The following Table 1 shows these co-ordinates.

Table 1: GPS Co-Ordinates of Boreholes

Location	Longitude	Latitude	Proposed Structure
Borehole 1	149.102581	-33.252445	Proposed Units
Borehole 2	149.102840	-33.252435	Proposed Units
Borehole 3	149.102545	-33.252253	Proposed Units
Borehole 4	149.102876	-33.252235	Proposed Units
Borehole 5	149.102593	-33.252067	Proposed Units
Borehole 6	149.102805	-33.252064	Proposed Units
Borehole 7	149.102597	-33.251874	Proposed Units
Borehole 8	149.102771	-33.251883	Proposed Units
Borehole 9	149.102986	-33.251844	Proposed Units
Borehole 10	149.103215	-33.251823	Proposed Units
Borehole 11	149.103207	-33.252053	Proposed Units
Borehole 12	149.102874	-33.252345	Proposed Roads
Borehole 13	149.102990	-33.252175	Proposed Roads
Borehole 14	149.103067	-33.251968	Proposed Roads
Borehole 15	149.102712	-33.251997	Proposed Roads

The boreholes were recorded on site with a Garmin Oregon 550 handheld GPS, using GDA94 Datum. The co-ordinates have an accuracy of +/- 5m. These locations are also shown on site plan in ***Appendix B***. A site plan is attached in ***Appendix B*** showing the borehole locations. The borehole logs of sub-surface profiles are attached in ***Appendix C***.

Disturbed samples (Ds <3kg) were sampled from all relevant boreholes and returned to the Laboratory where Linear Shrinkage testing was conducted on the samples to correlate the material's Shrink Swell index in accordance with AS2870-2011.

Bulk Samples (Bs >15kg) were also sampled from all relevant boreholes to determine the California Bearing Ratio (CBR) value of the soil. This CBR results will be used in the design of the pavement areas. Dynamic Cone Penetrometer (DCP) testing was also performed on the site to evaluate the strength and consistency of the natural material present.

4.0 GENERAL SUB-SURFACE CONDITIONS

4.1 Topsoil

Topsoil was encountered at all borehole locations. The topsoil encountered was silt and was generally to a depth of 0.4m. This layer is normally removed prior to construction.

4.2 Alluvial Soils

Alluvial soils were encountered at all borehole locations at depths greater than 0.4m. The alluvial soils generally comprised of slightly moist sandy silts and silty clays to depths of 3.0m. The soils were noted to be of a low to medium plasticity during the field investigation, which was confirmed through subsequent laboratory testing.

4.3 Regional Geology

Reference to the New South Wales 1:1,000,000 Geological Map indicates the surrounding area consists of *"Andesite, andesitic tuff, spilite, conglomerate, greywacke siltstone, limestone, shale."*.

Rock was not encountered during this investigation.

5.0 NATA LABORATORY TESTING

Disturbed and bulk samples were taken during the field investigation. Laboratory testing was carried out on selected samples of all different material types, with details of the sampling and testing shown below:

5.1 Soil Index Properties

Soil Index Properties testing were carried out on samples to aid in classification of the soils encountered and to assist in determining design parameters.

This testing included:

- California Bearing Ratio (C.B.R)
- Maximum Dry Density (M.D.D)
- Linear Shrinkage (L.S)
- pH Determination

The test results are shown below:

5.1.1 Linear Shrinkage Testing (L.S)

The shrinkage results are summarised in the below table:

Table 2: Linear Shrinkage Results

Borehole No.	Depth (m)	Proposed Structure	Linear Shrinkage (%)
Borehole 1	0.8	Proposed Units	7.0
Borehole 1	2.0	Proposed Units	8.0
Borehole 2	0.8	Proposed Units	7.5
Borehole 2	2.0	Proposed Units	8.5
Borehole 3	0.8	Proposed Units	4.0
Borehole 3	2.0	Proposed Units	9.0
Borehole 4	0.8	Proposed Units	5.5

Borehole 4	2.0	Proposed Units	13.5
Borehole 5	0.8	Proposed Units	8.0
Borehole 5	2.0	Proposed Units	9.0
Borehole 6	0.8	Proposed Units	7.0
Borehole 6	2.0	Proposed Units	14.0
Borehole 7	0.8	Proposed Units	6.0
Borehole 7	2.0	Proposed Units	9.5
Borehole 8	0.8	Proposed Units	8.0
Borehole 8	2.0	Proposed Units	9.0
Borehole 9	0.8	Proposed Units	7.5
Borehole 9	2.0	Proposed Units	8.0
Borehole 10	0.8	Proposed Units	6.0
Borehole 10	2.0	Proposed Units	13.0
Borehole 11	0.8	Proposed Units	8.0
Borehole 11	2.0	Proposed Units	10.0

The above test results confirm the material as medium plasticity

5.1.2 California Bearing Ratio (CBR) Testing

CBR testing was conducted on the samples across the site to determine the soaked CBR values. The results are shown below:

Table 3: Maximum Dry Density Results

Borehole No.	Location	Maximum Dry Density (t/m)	Optimum Moisture Content (%)
Borehole 12	Proposed Roads	1.80	16.0
Borehole 13	Proposed Roads	1.81	12.5
Borehole 14	Proposed Roads	1.85	14.0
Borehole 15	Proposed Roads	1.77	14.0

The samples were then tested to determine soaked CBR values at a Density Ratio of 95%, with the results shown in the below table.

Table 4: CBR Testing Results

Borehole No.	Location	Compaction Effort	Density Ratio (%)	CBR Value (%)
Borehole 12	Proposed Roads	Standard	95	2.5
Borehole 13	Proposed Roads	Standard	95	3.5
Borehole 14	Proposed Roads	Standard	95	6.0
Borehole 15	Proposed Roads	Standard	95	2.0

See ***Appendix D*** for all complete test reports.

5.2 Acid Sulphates

Acidic ground conditions can be caused by dissolved "aggressive" carbon dioxide, pure and very soft waters, organic and mineral acids and bacterial activity. PH testing was conducted on the site samples to determine if any acidic conditions were present in the soils encountered.

Table 5: PH Testing Results

Borehole No.	Sample Depth (m)	Proposed Structure	PH	Exposure Classification
Borehole 1	0.8	Proposed Units	4.3	B1
Borehole 2	0.8	Proposed Units	4.1	B1
Borehole 3	0.8	Proposed Units	5.6	A1
Borehole 4	0.8	Proposed Units	4.2	B1
Borehole 5	0.8	Proposed Units	6.0	A1
Borehole 6	0.8	Proposed Units	3.9	B2
Borehole 7	0.8	Proposed Units	4.7	A2
Borehole 8	0.8	Proposed Units	4.1	B1
Borehole 9	0.8	Proposed Units	4.0	B1
Borehole 10	0.8	Proposed Units	4.4	B1
Borehole 11	0.8	Proposed Units	4.4	B1

These results show the exposure classification as per Table 5.2 AS2870-2011. Groundwater was not encountered during this investigation.

5.3 Additional Material Properties

Below are correlated soil properties for the natural soil, which have been determined by correlation with CBR and index tests.

Table 6: Additional Material Properties

Material Strata	Depth (m)	Modulus E_k (MPa)	Undrained Cohesion C_{uk} (kPa)
Very Stiff Silts	See borehole logs	20	50
Hard Silts and Clays	See borehole logs	50	120

5.4 Seasonal Surface Movement

From the laboratory test results, as shown attached, an estimated ground surface movement (Ys) was calculated in accordance with AS2870-2011 (using a change in suction at the soil surface $\Delta\mu$ = 1.5pF and a depth of design suction change, Hs = 2.3m) being:

Ys = 40-45mm

Since the site has no other known extraordinary features, it is our opinion that a **Site Classification of 'H1'** should be adopted for the site in its present condition.

6.0 EARTHWORKS RECOMMENDATIONS

6.1 Excavations

Excavations within the natural clays will be achievable using conventional earthmoving equipment. The civil contractor should be responsible for selecting excavation equipment based on the proposed excavation depths and equipment capabilities.

6.2 General Construction Filling

All earthworks performed on site must be undertaken in a controlled manner, in accordance with a suitable earthworks specification. Filling should be placed, compacted, inspected and tested in accordance with the Level 2 requirements of AS3798-2007.

The following conditions should also be satisfied:

- General filling must be compacted to a minimum dry density ratio of 98-100% relative to standard compaction at a moisture content of -2% to +2% of standard optimum moisture content.
- Filling should proceed in layers of 300mm maximum loose thicknesses.
- Layers of filling should be horizontal or benched to suit the surrounding topography.
- The existing subgrade should NOT be used as bulk fill.

6.3 Site Construction Batters

6.3.1 Temporary batter slopes

In soil should be graded no steeper than 2 Horizontal (H) in 1 Vertical (V), and protected from erosion by re-directing any surface water flows from the batter face, revegetating etc.

6.3.2 Permanent batter slopes

Batter slopes in with clay should be no steeper than 3 Horizontal (H) in 1 Vertical (V) and protected from erosion. Alternatively, fill embankments may be retained with properly designed and constructed retaining walls.

6.4 In-situ Bearing Capacities

From the Dynamic Cone Penetrometer (DCP's) testing carried out across the site the soil strength encountered to the test end was as follows:

Table 7: In-situ Bearing Capacities

Borehole No.	Soil Strata	Proposed Structure	Depth of Strata (m)	Estimated Ultimate Limit State Base Bearing Capacity (kPa)	Factored Limit State Ø = 0.52 (kPa)
Borehole 1	Very Stiff SILT	Proposed Units	0.4-0.75	300	156
Borehole 1	Hard SILTS and CLAYS	Proposed Units	0.75-3.0	>500	260
Borehole 2	Very Stiff SILT	Proposed Units	0.4-0.75	300	156
Borehole 2	Hard SILTS and CLAYS	Proposed Units	0.75-3.0	>500	260
Borehole 3	Very Stiff SILT	Proposed Units	0.4-0.9	300	156
Borehole 3	Hard SILTS and CLAYS	Proposed Units	0.9-3.0	>500	260
Borehole 4	Very Stiff SILT	Proposed Units	0.4-0.75	300	156
Borehole 4	Hard SILTS and CLAYS	Proposed Units	0.75-3.0	>500	260
Borehole 5	Very Stiff SILT	Proposed Units	0.4-0.75	300	156
Borehole 5	Hard SILTS and CLAYS	Proposed Units	0.75-3.0	>500	260
Borehole 6	Very Stiff SILT	Proposed Units	0.4-0.75	300	156
Borehole 6	Hard SILTS and CLAYS	Proposed Units	0.75-3.0	>500	260
Borehole 7	Very Stiff SILT	Proposed Units	0.4-0.75	300	156
Borehole 7	Hard SILTS and CLAYS	Proposed Units	0.75-3.0	>500	260
Borehole 8	Very Stiff SILT	Proposed Units	0.4-0.75	300	156

Borehole 8	Hard SILTS and CLAYS	Proposed Units	0.75-3.0	>500	260
Borehole 9	Very Stiff SILT	Proposed Units	0.4-0.75	300	156
Borehole 9	Hard SILTS and CLAYS	Proposed Units	0.75-3.0	>500	260
Borehole 10	Very Stiff SILT	Proposed Units	0.4-0.75	300	156
Borehole 10	Hard SILTS and CLAYS	Proposed Units	0.75-3.0	>500	260
Borehole 11	Very Stiff SILT	Proposed Units	0.4-0.75	300	156
Borehole 11	Hard SILTS and CLAYS	Proposed Units	0.75-3.0	>500	260

All the above bearing capacities are applicable to the site conditions at the time of the investigation 17/5/2019. Elevation of moisture content will cause a marked decrease in bearing capacity with soil types listed.

7.0 DESIGN PARAMETERS DISCUSSIONS

7.1 Single Storey Building Foundations

All foundations for buildings that are similar in size and structure to large residential buildings should be designed with guidance from AS2870-2011 for the site classification provided in section 5.4.

7.2 Stiffened Raft Slabs

Raft slabs should be designed by engineering principles with guidance from AS2870-2011 for the site classification noted. The factored ultimate bearing capacity at depths less than 800mm is Øg Qu = 100kPa. No natural soil material shall be used as fill under any proposed buildings.

7.3 Foundations General

The possibility of other abnormal and localised moisture changes must be minimised by adherence to general design and site management practises. These recommendations assume that all footings will be founded in the natural soil or controlled fill, and that no topsoil or poor and uncompacted fill occurs beneath the footing beams or slab.

Finally, it must be emphasised that the recommended design approach accepts that minor aesthetic cracking may occur. The design philosophy is thus a compromise between economy and performance.

7.4 Flexible Pavement Areas

In-situ CBR values have confirmed a CBR range of 2.0-6.0% for the natural silts and clays. Any sealed asphalt or bitumen areas with commercial traffic are to incorporate gravel pavement layers of an overall thickness of ***450mm*** thick, having two equal layers. A design ESA value of 3.0xE3 has been adopted for these areas for commercial traffic as per Austroads specifications.

The pavement layers should consist of suitable local gravel having a CBR value not less than 80% for base layers and 60% for sub-base layers. All imported gravel layers should be placed and tested to the requirements set out in AS3798-2007. It is essential that all pavement areas are well drained so that moisture is not stored in this layer that would affect the strength of the sub-grade soil.

7.5 General Pavement Notes

All pavement areas are required to be sealed and well drained to prevent moisture affecting the sub-grade. All pavement areas should be removed of any other deleterious material then compacted to a minimum of 100% standard compaction. The pavement should be placed, compacted and tested in accordance with AS3798-2007.

8.0 CONCLUSION

The testing methods adopted are indicative of the site's sub-surface conditions to the depths excavated and to specific sampling and/or testing locations in this investigation, and only at the time the work was carried out.

The accuracy of geotechnical engineering advice provided in this report may be limited by unobserved variations in ground conditions across the site in areas between and beyond test locations and by any restrictions in the sampling and testing which was able to be carried out, as well as by the amount of data that could be collected given the project and site constraints.

These factors may lead to the possibility that actual ground conditions and materials behaviour observed at the test locations may differ from those which may be encountered elsewhere on the site.

If the sub-surface conditions are found to differ from those described in this report, we should be informed immediately to evaluate whether recommendations should be reviewed and amended if necessary.

Appendix A - General Notes

GEOTECHNICAL INVESTIGATION GENERAL NOTES

This report contains the results of a geotechnical investigation conducted for a specific purpose and client. The results should not be used by other parties, or for other purposes, as they may contain neither adequate nor appropriate information. The investigation does not cover contamination issues unless specifically required to do so by the client.

TEST HOLE LOGGING

The information on the test hole logs (boreholes, test pits, exposures etc.) is based on a visual and tactile assessment, except at the discrete locations where the test information is available (field and/or laboratory results). The borehole logs include both factual data and inferred information. Reference should be made to the relevant sheets for the explanation of logging procedures (Soil and Rock Descriptions, Core Log Sheet Notes etc.).

GROUNDWATER

Unless otherwise indicated, the water levels presented on the borehole logs are the levels of free water or seepage in the test hole recorded at the given time of measuring. The actual groundwater level may differ from this recorded level depending on material permeability's (i.e. depending on response time of the measuring instrument). Further, variations of this level could occur with time due to such effects as seasonal, environmental and tidal fluctuations or construction activities. Confirmation of groundwater levels, phreatic surfaces or piezo metric pressures can only be made by appropriate instrumentation techniques and monitoring programmes.

INTERPRETATION OF RESULTS

The discussion or recommendations contained within this report normally are based on a site evaluation from discrete borehole area. Generalised, idealised or inferred subsurface conditions (including any geotechnical cross-sections) have been assumed or prepared by interpolation and/or extrapolation of these data. As such these conditions are an interpretation and must be considered as a guide only.

CHANGE IN CONDITIONS

Local variations or anomalies in the generalised ground conditions do occur in the natural environment, particularly between discrete borehole locations. Additionally, certain design or construction procedures may have been assumed in assessing the soil-structure interaction behaviour of the site. Furthermore, conditions may change at the site from those encountered at the time of the geotechnical investigation through construction activities and constantly changing natural forces.

Any change in design, in construction methods, or in ground conditions as noted during construction, from those assumed or reported should be referred to this firm for appropriate assessment and comment.

GEOTECHNICAL VERIFICATION

Verification of the geotechnical assumptions and/or model is an integral part of the design process – investigation, construction verification and performance monitoring. Variability is a feature of the natural environment and, in many instances, verification of soil or rock quality, or foundation levels are required. There may be a requirement to extend foundation depths to modify a foundation system or to conduct monitoring because of this natural variability. Allowance for verification by geotechnical personnel accordingly should be recognised and programmed during construction.

FOUNDATIONS

Where referred to in the report, the soil or rock quality, or the recommendation depth of any foundation (piles, caissons footings etc.) is an engineering estimate. The estimate is influenced and perhaps limited, by the fieldwork method and testing carried out in connection with the site investigation, and other pertinent information as has been made available. The material quality and/or foundation depth remains, however, an estimate and therefore liable to variation. Foundation drawings, designs and specifications should provide for variations in the final depth, depending upon the ground conditions at each point of support, and allow for geotechnical verification.

REPRODUCTION OF REPORTS

Where it is desired to reproduce the information contained in our geotechnical report, or other technical information, for the inclusion in contract documents or engineering specification of the subject development, such reproductions should include at least all the relevant test hole and test data, together with the appropriate standard description sheets and remarks made in the written report of a factual or descriptive nature.

ROCK

Rock Strength

Rock strength is a scale of strength, based on point load index testing, or field testing.

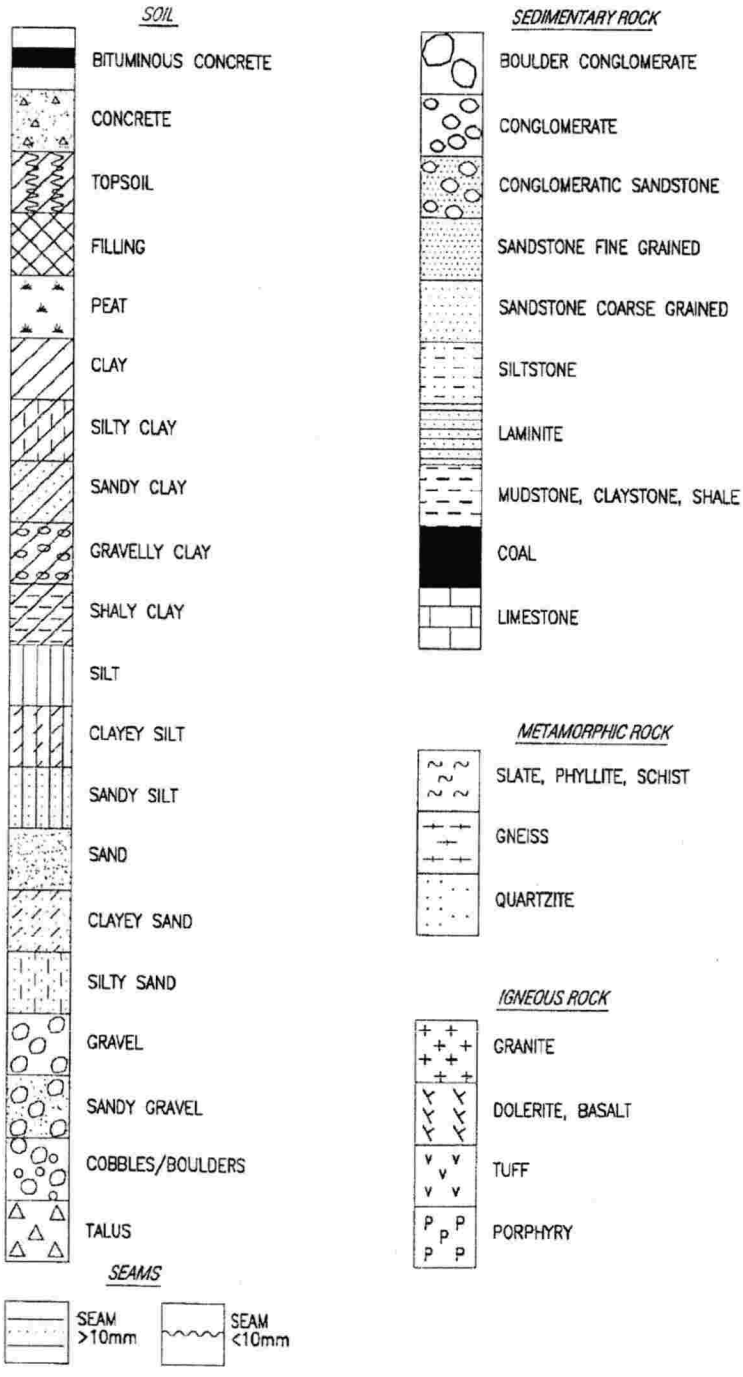
Term	Letter Symbol	Point load index (Mpa) Is (50)	Field guide to strength
Extremely low	EL	< 0.03	Easily remoulded by hand to a material with soil properties.
Very low	VL	0.03 – 0.1	Material crumbles under firm blows with sharp end of pick.
Low	L	0.1 – 0.3	Easily scored by knife, has dull sound under hammer.
Medium	M	0.3 – 1.0	Readily scored with knife, core pieces broken by hand with difficulty
High	H	1 – 3	Rock rings under hammer, core piece broken by pick only.
Very high	VH	3 – 10	Hand specimen breaks with pick after more than one blow.
Extremely high	EH	> 10	Hand specimen breaks with pick after several than one blow.

Rock Weathering

Rock weathering is the degree of rock weathering, determined in the field.

Term	Letter Symbol	Definition
Residual soil	RS	Soil developed on extremely weathered rock.
Extremely weathered rock	XW	Soil is weathered to such an extent that it has soil properties, i.e. it disintegrates or can be remoulded in water.
Distinctly weathered rock	DW	Rock strength usually changed by weathering. The rock may be discoloured, usually by iron staining, porosity is increased.
Slightly weathered rock	SW	Rock is slightly discoloured but shows little or no change of strength from fresh rock.
Fresh rock	FR	Rock shows no sign of decomposition or staining.

GRAPHIC SYMBOLS FOR SOIL & ROCK



Appendix B - Site Plan with Borehole Locations


BH7
BH8
BH10
BH9
BH15
BH14
BH5
BH6
BH11
BH13
BH3
BH4
BH12
BH1
BH2

Appendix C - Borehole Logs

Barnson Pty Ltd
1/36 Darling Street
Dubbo NSW 2830
Telephone: 1300227676

BOREHOLE NUMBER 1

CLIENT Housing Plus Orange
PROJECT NAME Geotechnical Investigation
PROJECT NUMBER 31463
PROJECT LOCATION Lot 99 Emerald Street, Orange NSW

DATE STARTED 17/5/19 **COMPLETED** 17/5/19 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Barnson **SLOPE** 90° **BEARING** ---
EQUIPMENT GT-10 Drill Rig **HOLE LOCATION** Borehole 1
HOLE SIZE 90mm **LOGGED BY** GW **CHECKED BY** NR
NOTES

Method: Flight Auger & Tungsten Carbide (T.C) Bit

Samples	Depth (m)	Classification Symbol	Material Description	Additional Observations
	0.0		SILT: grey	TOPSOIL
	0.4	ML	Sandy Clayey SILT: pale brown: slightly moist: very stiff to hard: low to medium plasticity	ALLUVIAL
Disturbed Sample LS = 7.0%	0.5			
	1.0			
	1.5			
Disturbed Sample LS = 8.0%	2.0			
	2.4	CL	Silty CLAY: brown-orange: slightly moist: hard: medium plasticity	ALLUVIAL
	2.5			
	3.0			

Dynamic Cone Penetrometer Blows / 150mm

Borehole 1 terminated at 3m

BOREHOLE / TEST PIT WITH DCP 31463-G01A-G15A.GPJ GINT STD AUSTRALIA.GDT 27/5/19

Barnson Pty Ltd
1/36 Darling Street
Dubbo NSW 2830
Telephone: 1300227676

BOREHOLE NUMBER 2

CLIENT Housing Plus Orange
PROJECT NAME Geotechnical Investigation
PROJECT NUMBER 31463
PROJECT LOCATION Lot 99 Emerald Street, Orange NSW

DATE STARTED 17/5/19 **COMPLETED** 17/5/19 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Barnson **SLOPE** 90° **BEARING** ---
EQUIPMENT GT-10 Drill Rig **HOLE LOCATION** Borehole 2
HOLE SIZE 90mm **LOGGED BY** GW **CHECKED BY** NR
NOTES

Method	Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Dynamic Cone Penetrometer Blows / 150mm	Additional Observations
Flight Auger & Tungsten Carbide (T.C) Bit		0			SILT: grey	0 4 8 12 16 20 24 28 32	TOPSOIL
		0.4		ML	Sandy Clayey SILT: pale brown: slightly moist: very stiff to hard: low to medium plasticity		ALLUVIAL
	Disturbed Sample LS = 7.5%	0.5					
		1.0					
	Disturbed Sample LS = 8.5%	1.5					
		2.0					
		2.4		CL	Silty CLAY: brown-orange: slightly moist: hard: medium plasticity		ALLUVIAL
		2.5					
		3.0					

Borehole 2 terminated at 3m

Barnson Pty Ltd
1/36 Darling Street
Dubbo NSW 2830
Telephone: 1300227676

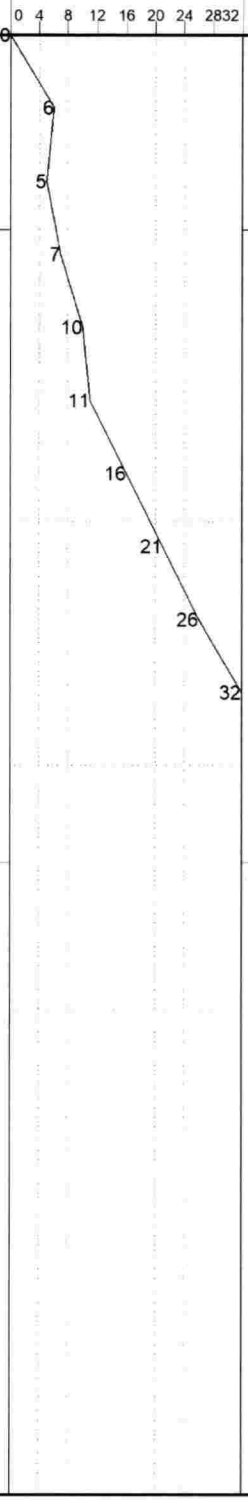
BOREHOLE NUMBER 3

CLIENT Housing Plus Orange
PROJECT NAME Geotechnical Investigation
PROJECT NUMBER 31463
PROJECT LOCATION Lot 99 Emerald Street, Orange NSW

DATE STARTED 17/5/19 **COMPLETED** 17/5/19 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Barnson **SLOPE** 90° **BEARING** ---
EQUIPMENT GT-10 Drill Rig **HOLE LOCATION** Borehole 3
HOLE SIZE 90mm **LOGGED BY** GW **CHECKED BY** NR
NOTES

Method	Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Additional Observations
Flight Auger & Tungsten Carbide (T.C) Bit		0.0			SILT: brown	TOPSOIL
		0.4		ML	Sandy SILT: orange-red: slightly moist: very stiff to hard: low plasticity	ALLUVIAL
	Disturbed Sample LS = 4.0%	0.5				
		1.0				
		1.5				
		1.7		CL	Silty CLAY: red: slightly moist: hard: medium plasticity	ALLUVIAL
	Disturbed Sample LS = 9.0%	2.0				
		2.5				
		3.0				

Dynamic Cone Penetrometer Blows / 150mm



Borehole 3 terminated at 3m

BOREHOLE / TEST PIT WITH DCP 31463-G01A-G15A.GPJ GINT STD AUSTRALIA.GDT 27/5/19

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BOREHOLE NUMBER 4

CLIENT Housing Plus Orange
PROJECT NAME Geotechnical Investigation
PROJECT NUMBER 31463
PROJECT LOCATION Lot 99 Emerald Street, Orange NSW

DATE STARTED 17/5/19 **COMPLETED** 17/5/19 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Barnson **SLOPE** 90° **BEARING** ---
EQUIPMENT GT-10 Drill Rig **HOLE LOCATION** Borehole 4
HOLE SIZE 90mm **LOGGED BY** GW **CHECKED BY** NR
NOTES

Method	Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Additional Observations
Flight Auger & Tungsten Carbide (T.C) Bit		0			SILT: grey	TOPSOIL
		0.4		ML	Sandy SILT: pale brown: slightly moist: very stiff to hard: low plasticity	ALLUVIAL
	Disturbed Sample LS = 5.5%	0.5				
		1.0				
		1.5				
		1.6		CL	Silty CLAY: orange-grey: slightly moist: hard: medium plasticity	ALLUVIAL
	Disturbed Sample LS = 13.5%	2.0				
		2.5				
		3.0				

Dynamic Cone Penetrometer Blows / 150mm

Borehole 4 terminated at 3m

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Telephone: 1300227676

BOREHOLE NUMBER 5

CLIENT Housing Plus Orange
PROJECT NAME Geotechnical Investigation
PROJECT NUMBER 31463
PROJECT LOCATION Lot 99 Emerald Street, Orange NSW

DATE STARTED 17/5/19 **COMPLETED** 17/5/19 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Barnson **SLOPE** 90° **BEARING** ---
EQUIPMENT GT-10 Drill Rig **HOLE LOCATION** Borehole 5
HOLE SIZE 90mm **LOGGED BY** GW **CHECKED BY** NR
NOTES

Method: Flight Auger & Tungsten Carbide (T.C) Bit

Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Additional Observations
	0.4			SILT: brown	TOPSOIL
Disturbed Sample LS = 8.0%	1.7		ML	Sandy SILT: orange-red: slightly moist: very stiff to hard: low plasticity	ALLUVIAL
Disturbed Sample LS = 9.0%	3.0		CL	Silty CLAY: red: slightly moist: hard: medium plasticity	ALLUVIAL

Dynamic Cone Penetrometer Blows / 150mm

Depth (m)	Blows / 150mm
0	6
0.5	5
1.0	7
1.5	9
2.0	9
2.5	14
3.0	18
	24
	32

Borehole 5 terminated at 3m

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Telephone: 1300227676

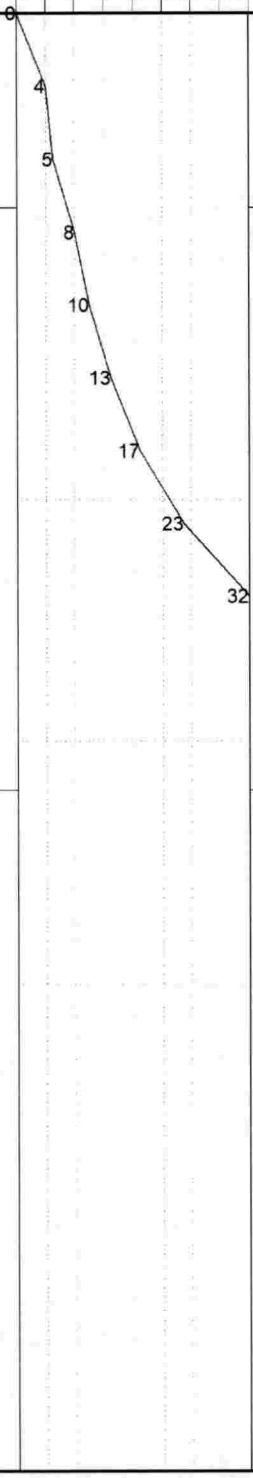
BOREHOLE NUMBER 6

CLIENT Housing Plus Orange
PROJECT NAME Geotechnical Investigation
PROJECT NUMBER 31463
PROJECT LOCATION Lot 99 Emerald Street, Orange NSW

DATE STARTED 17/5/19 **COMPLETED** 17/5/19 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Barnson **SLOPE** 90° **BEARING** ---
EQUIPMENT GT-10 Drill Rig **HOLE LOCATION** Borehole 6
HOLE SIZE 90mm **LOGGED BY** GW **CHECKED BY** NR
NOTES

Method	Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Additional Observations
Flight Auger & Tungsten Carbide (T.C) Bit		0			SILT: grey	TOPSOIL
		0.4		ML	Sandy SILT: pale brown: slightly moist: very stiff to hard: low plasticity	ALLUVIAL
	Disturbed Sample LS = 7.0%	0.5				
		1.0				
		1.5				
		1.6		CL	Silty CLAY: orange-grey: slightly moist: hard: medium plasticity	ALLUVIAL
	Disturbed Sample LS = 14.0%	2.0				
		2.5				
		3.0				

Dynamic Cone Penetrometer Blows / 150mm



Borehole 6 terminated at 3m

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BOREHOLE NUMBER 7

CLIENT Housing Plus Orange
PROJECT NAME Geotechnical Investigation
PROJECT NUMBER 31463
PROJECT LOCATION Lot 99 Emerald Street, Orange NSW

DATE STARTED 17/5/19 **COMPLETED** 17/5/19 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Barnson **SLOPE** 90° **BEARING** ---
EQUIPMENT GT-10 Drill Rig **HOLE LOCATION** Borehole 7
HOLE SIZE 90mm **LOGGED BY** GW **CHECKED BY** NR
NOTES

Method	Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Dynamic Cone Penetrometer Blows / 150mm	Additional Observations
Flight Auger & Tungsten Carbide (T.C) Bit		0.0			SILT: brown	0 4 8 12 16 20 24 2832	TOPSOIL
		0.4		ML	Sandy SILT: orange-red: slightly moist: very stiff to hard: low plasticity	5 6 7 9 15 23 32	ALLUVIAL
	Disturbed Sample LS = 6.0%	0.5					
		1.0					
		1.5					
	Disturbed Sample LS = 9.5%	2.0					
		2.3		CL	Silty CLAY: red mottled grey: slightly moist: hard: medium plasticity		ALLUVIAL
		2.5					
		3.0					

Borehole 7 terminated at 3m

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BOREHOLE NUMBER 8

CLIENT Housing Plus Orange
PROJECT NAME Geotechnical Investigation
PROJECT NUMBER 31463
PROJECT LOCATION Lot 99 Emerald Street, Orange NSW

DATE STARTED 17/5/19 **COMPLETED** 17/5/19 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Barnson **SLOPE** 90° **BEARING** ---
EQUIPMENT GT-10 Drill Rig **HOLE LOCATION** Borehole 8
HOLE SIZE 90mm **LOGGED BY** GW **CHECKED BY** NR
NOTES

Method	Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Dynamic Cone Penetrometer Blows / 150mm	Additional Observations
Flight Auger & Tungsten Carbide (T.C) Bit		0			SILT: brown	0 4 8 12 16 20 24 2832	TOPSOIL
		0.4		ML	Sandy SILT: orange-red: slightly moist: very stiff to hard: low plasticity	7, 5, 7, 9, 13, 17, 22, 32	ALLUVIAL
	Disturbed Sample LS = 8.0%	0.5					
		1.0					
		1.5					
	Disturbed Sample LS = 9.0%	2.0					
		2.3		CL	Silty CLAY: red mottled grey: slightly moist: hard: medium plasticity		ALLUVIAL
		2.5					
		3.0					

Borehole 8 terminated at 3m

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BOREHOLE NUMBER 9

CLIENT Housing Plus Orange
PROJECT NAME Geotechnical Investigation
PROJECT NUMBER 31463
PROJECT LOCATION Lot 99 Emerald Street, Orange NSW

DATE STARTED 17/5/19 **COMPLETED** 17/5/19 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Barnson **SLOPE** 90° **BEARING** ---
EQUIPMENT GT-10 Drill Rig **HOLE LOCATION** Borehole 9
HOLE SIZE 90mm **LOGGED BY** GW **CHECKED BY** NR
NOTES

Method	Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Dynamic Cone Penetrometer Blows / 150mm	Additional Observations
Flight Auger & Tungsten Carbide (T.C) Bit		0			SILT: brown	0 4 8 12 16 20 24 2832	TOPSOIL
		0.4		ML	Sandy SILT: orange-red: slightly moist: very stiff to hard: low plasticity	5 5 8 8 12 15 19 23 32	ALLUVIAL
	Disturbed Sample LS = 7.5%	0.5					
		1.0					
		1.5					
		1.9		CL	Silty CLAY: red mottled grey: slightly moist: hard: medium plasticity		ALLUVIAL
	Disturbed Sample LS = 8.0%	2.0					
		2.5					
		3.0					

Borehole 9 terminated at 3m

BOREHOLE / TEST PIT WITH DCP 31463-G01A-G15A.GPJ GINT STD AUSTRALIA.GDT 27/5/19

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BOREHOLE NUMBER 10

CLIENT Housing Plus Orange
PROJECT NAME Geotechnical Investigation
PROJECT NUMBER 31463
PROJECT LOCATION Lot 99 Emerald Street, Orange NSW

DATE STARTED 17/5/19 **COMPLETED** 17/5/19 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Barnson **SLOPE** 90° **BEARING** ---
EQUIPMENT GT-10 Drill Rig **HOLE LOCATION** Borehole 10
HOLE SIZE 90mm **LOGGED BY** GW **CHECKED BY** NR
NOTES

Method	Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Additional Observations
Flight Auger & Tungsten Carbide (T.C) Bit		0			SILT: brown	TOPSOIL
		0.4		ML	Sandy SILT: orange-red: slightly moist: very stiff to hard: low plasticity	ALLUVIAL
	Disturbed Sample LS = 6.0%	0.5				
		1.0				
		1.5				
		1.7		CL	Silty CLAY: red mottled grey: slightly moist: hard: medium plasticity	ALLUVIAL
	Disturbed Sample LS = 13.0%	2.0				
		2.5				
		3.0				

Dynamic Cone Penetrometer Blows / 150mm

0 4 8 12 16 20 24 28 32

0, 5, 8, 10, 10, 14, 21, 26, 32

Borehole 10 terminated at 3m

BOREHOLE / TEST PIT WITH DCP 31463-G01A-G15A.GPJ GINT STD AUSTRALIA.GDT 27/5/19

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BOREHOLE NUMBER 11

CLIENT Housing Plus Orange
PROJECT NAME Geotechnical Investigation
PROJECT NUMBER 31463
PROJECT LOCATION Lot 99 Emerald Street, Orange NSW

DATE STARTED 17/5/19 **COMPLETED** 17/5/19 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Barnson **SLOPE** 90° **BEARING** ---
EQUIPMENT GT-10 Drill Rig **HOLE LOCATION** Borehole 11
HOLE SIZE 90mm **LOGGED BY** GW **CHECKED BY** NR
NOTES

Method	Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Dynamic Cone Penetrometer Blows / 150mm (0 4 8 12 16 20 24 28 32)	Additional Observations
Flight Auger & Tungsten Carbide (T.C) Bit		0.4			SILT: brown		TOPSOIL
	Disturbed Sample LS = 8.0%	0.5		ML	Sandy SILT: orange: slightly moist: very stiff to hard: low plasticity		ALLUVIAL
		1.0					
		1.5					
		1.6		CL	Silty CLAY: orange mottled grey: slightly moist: hard: medium plasticity		ALLUVIAL
	Disturbed Sample LS = 10.0%	2.0					
		2.5					
		3.0					

Borehole 11 terminated at 3m

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BOREHOLE NUMBER 12

CLIENT Housing Plus Orange
PROJECT NAME Geotechnical Investigation
PROJECT NUMBER 31463
PROJECT LOCATION Lot 99 Emerald Street, Orange NSW

DATE STARTED 17/5/19 **COMPLETED** 17/5/19 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Barnson **SLOPE** 90° **BEARING** ---
EQUIPMENT GT-10 Drill Rig **HOLE LOCATION** Borehole 12
HOLE SIZE 90mm **LOGGED BY** GW **CHECKED BY** NR
NOTES

Method	Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Dynamic Cone Penetrometer Blows / 150mm (0 4 8 12 16 20 24 2832)	Additional Observations
Flight Auger & Tungsten Carbide (T.C) Bit		0.4			SILT: grey		TOPSOIL
	Disturbed Sample CBR = 2.5%	0.5		ML	Sandy Clayey SILT: pale brown: slightly moist: very stiff to hard: low to medium plasticity		ALLUVIAL
		1.0					
		1.5			Borehole 12 terminated at 1.5m		
		2.0					
		2.5					
		3.0					

BOREHOLE / TEST PIT WITH DCP 31463-G01A-G15A.GPJ GINT STD AUSTRALIA.GDT 27/5/19

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BOREHOLE NUMBER 13

CLIENT Housing Plus Orange **PROJECT NAME** Geotechnical Investigation

PROJECT NUMBER 31463 **PROJECT LOCATION** Lot 99 Emerald Street, Orange NSW

DATE STARTED 17/5/19 **COMPLETED** 17/5/19 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR Barnson **SLOPE** 90° **BEARING** ---

EQUIPMENT GT-10 Drill Rig **HOLE LOCATION** Borehole 13

HOLE SIZE 90mm **LOGGED BY** GW **CHECKED BY** NR

NOTES

Method	Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Dynamic Cone Penetrometer Blows / 150mm (0 4 8 12 16 20 24 2832)	Additional Observations
Flight Auger & Tungsten Carbide (T.C) Bit		0.0			SILT: grey		TOPSOIL
		0.4		ML	Sandy SILT: pale brown: slightly moist: very stiff to hard: low plasticity		ALLUVIAL
	Disturbed Sample CBR = 3.5%	0.5					
		1.0					
		1.5			Borehole 13 terminated at 1.5m		
		2.0					
		2.5					
		3.0					

BOREHOLE / TEST PIT WITH DCP 31463-G01A-G15A.GPJ GINT STD AUSTRALIA.GDT 27/5/19

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Dubbo NSW 2830
Telephone: 1300227676

BOREHOLE NUMBER 14

CLIENT Housing Plus Orange
PROJECT NAME Geotechnical Investigation
PROJECT NUMBER 31463
PROJECT LOCATION Lot 99 Emerald Street, Orange NSW

DATE STARTED 17/5/19 **COMPLETED** 17/5/19 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Barnson **SLOPE** 90° **BEARING** ---
EQUIPMENT GT-10 Drill Rig **HOLE LOCATION** Borehole 14
HOLE SIZE 90mm **LOGGED BY** GW **CHECKED BY** NR
NOTES

Method	Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Dynamic Cone Penetrometer Blows / 150mm (0 4 8 12 16 20 24 28 32)	Additional Observations
Flight Auger & Tungsten Carbide (T.C) Bit		0.4			SILT: brown		TOPSOIL
	Disturbed Sample CBR = 6.0%	0.5		ML	Sandy SILT: orange-red: slightly moist: very stiff to hard: low plasticity		ALLUVIAL
		1.0					
		1.5			Borehole 14 terminated at 1.5m		
		2.0					
		2.5					
		3.0					

BOREHOLE / TEST PIT WITH DCP 31463-G01A-G15A.GPJ GINT STD AUSTRALIA.GDT 27/5/19

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Telephone: 1300227676

BOREHOLE NUMBER 15

CLIENT Housing Plus Orange
PROJECT NAME Geotechnical Investigation
PROJECT NUMBER 31463
PROJECT LOCATION Lot 99 Emerald Street, Orange NSW

DATE STARTED 17/5/19 **COMPLETED** 17/5/19 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Barnson **SLOPE** 90° **BEARING** ---
EQUIPMENT GT-10 Drill Rig **HOLE LOCATION** Borehole 15
HOLE SIZE 90mm **LOGGED BY** GW **CHECKED BY** NR
NOTES

Method	Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Dynamic Cone Penetrometer Blows / 150mm (0 4 8 12 16 20 24 2832)	Additional Observations
Flight Auger & Tungsten Carbide (T.C) Bit		0.0			SILT: brown		TOPSOIL
		0.4		ML	Sandy SILT: orange-red: slightly moist: very stiff to hard: low plasticity		ALLUVIAL
	Disturbed Sample CBR = 2.0%	0.5					
		1.0					
		1.5			Borehole 15 terminated at 1.5m		
		2.0					
		2.5					
		3.0					

Appendix D - NATA Laboratory Reports

Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373A
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 1 (800mm)**
Material: Pale Brown Sandy Clayey SILT

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	7.0		
Cracking Crumbling Curling	None		

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NATA
WORLD RECOGNISED ACCREDITATION

Approved Signatory: Nick Reardon
Laboratory Manager
NATA Accredited Laboratory Number: 9605

Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373B
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 1 (2.0m)**
Material: Pale Brown Sandy Clayey SILT

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	8.0		
Cracking Crumbling Curling	None		

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NATA
WORLD RECOGNISED ACCREDITATION

Approved Signatory: Nick Reardon
Laboratory Manager
NATA Accredited Laboratory Number: 9605

Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373C
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 2 (800mm)**
Material: Pale Brown Sandy Clayey SILT

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	7.5		
Cracking Crumbling Curling	None		

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WORLD RECOGNISED ACCREDITATION

Approved Signatory: Nick Reardon
Laboratory Manager
NATA Accredited Laboratory Number: 9605

Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373D
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 2 (2.0m)**
Material: Pale Brown Sandy Clayey SILT

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	8.5		
Cracking Crumbling Curling	None		

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NATA Accredited Laboratory Number: 9605

Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373E
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 3 (800mm)**
Material: Orange-Red Sandy SILT

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	4.0		
Cracking Crumbling Curling	None		

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Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373F
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 3 (2.0m)**
Material: Red Silty CLAY

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	9.0		
Cracking Crumbling Curling	None		

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Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373G
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 4 (800mm)**
Material: Pale Brown Sandy SILT

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	5.5		
Cracking Crumbling Curling	None		

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WORLD RECOGNISED ACCREDITATION

Approved Signatory: Nick Reardon
Laboratory Manager
NATA Accredited Laboratory Number: 9605

Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373H
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 4 (2.0m)**
Material: Orange-Grey Silty CLAY

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	13.5		
Cracking Crumbling Curling	None		

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Approved Signatory: Nick Reardon
Laboratory Manager
NATA Accredited Laboratory Number: 9605

Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373I
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 5 (800mm)**
Material: Orange-Red Sandy SILT

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	8.0		
Cracking Crumbling Curling	Cracking		

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Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373J
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 5 (2.0m)**
Material: Red Silty CLAY

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	9.0		
Cracking Crumbling Curling	Cracking		

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Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373K
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 6 (800mm)**
Material: Pale Brown Sandy SILT

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	7.0		
Cracking Crumbling Curling	Cracking		

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Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373L
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 6 (2.0m)**
Material: Orange-Grey Silty CLAY

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	14.0		
Cracking Crumbling Curling	Cracking		

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Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373M
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 7 (800mm)**
Material: Orange-Red Sandy SILT

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	6.0		
Cracking Crumbling Curling	Cracking		

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Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373N
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 7 (2.0m)**
Material: Orange-Red Sandy SILT

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	9.5		
Cracking Crumbling Curling	Curling		

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Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373O
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 8 (800mm)**
Material: Orange-Red Sandy SILT

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	8.0		
Cracking Crumbling Curling	Cracking		

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Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373P
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 8 (2.0m)**
Material: Orange-Red Sandy SILT

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	9.0		
Cracking Crumbling Curling	None		

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Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373Q
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 9 (800mm)**
Material: Orange-Red Sandy SILT

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	7.5		
Cracking Crumbling Curling	Cracking		

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Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373R
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 9 (2.0m)**
Material: Red Mottled Grey Silty CLAY

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	8.0		
Cracking Crumbling Curling	Cracking		

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Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373S
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 10 (800mm)**
Material: Orange-Red Sandy SILT

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	6.0		
Cracking Crumbling Curling	Cracking		

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Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373T
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 10 (2.0m)**
Material: Red Mottled Grey Silty CLAY

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	13.0		
Cracking Crumbling Curling	Cracking		

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Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373U
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 21/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 11 (800mm)**
Material: Oange Sandy SILT

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	8.0		
Cracking Crumbling Curling	None		

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Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373V
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 11 (2.0m)**
Material: Orange Mottled Grey Silty CLAY

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	10.0		
Cracking Crumbling Curling	Curling		

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Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373W
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 12 (600mm)**
Material: Pale Brown Sandy Clayey SILT

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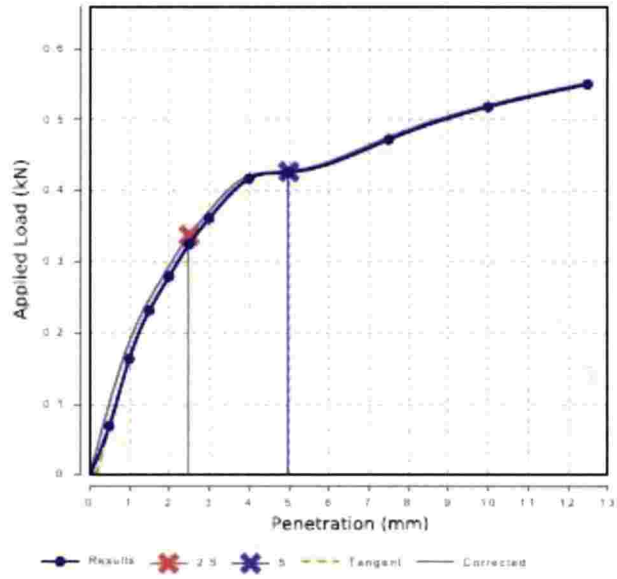
NATA Accredited Laboratory Number: 9605

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	**2.5**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual		
Maximum Dry Density (t/m^3)	1.80		
Optimum Moisture Content (%)	16.0		
Laboratory Density Ratio (%)	95.0		
Laboratory Moisture Ratio (%)	100.0		
Moisture Content at Placement (%)	16.2		
Moisture Content Top 30mm (%)	16.9		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	2		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)			

California Bearing Ratio



Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373X
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 13 (600mm)**
Material: Pale Brown Sandy SILT

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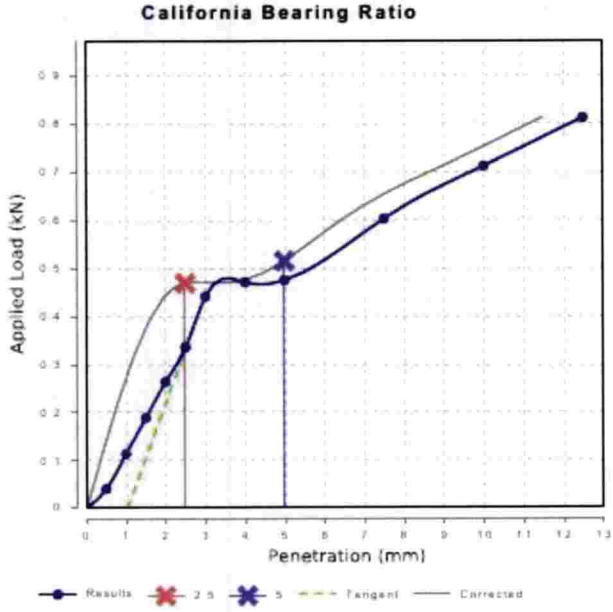
California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	**3.5**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual		
Maximum Dry Density (t/m^3)	1.81		
Optimum Moisture Content (%)	12.5		
Laboratory Density Ratio (%)	95.5		
Laboratory Moisture Ratio (%)	96.0		
Moisture Content at Placement (%)	11.9		
Moisture Content Top 30mm (%)	19.0		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	2		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)			



Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373Y
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 14 (600mm)**
Material: Orange-Red Sandy SILT

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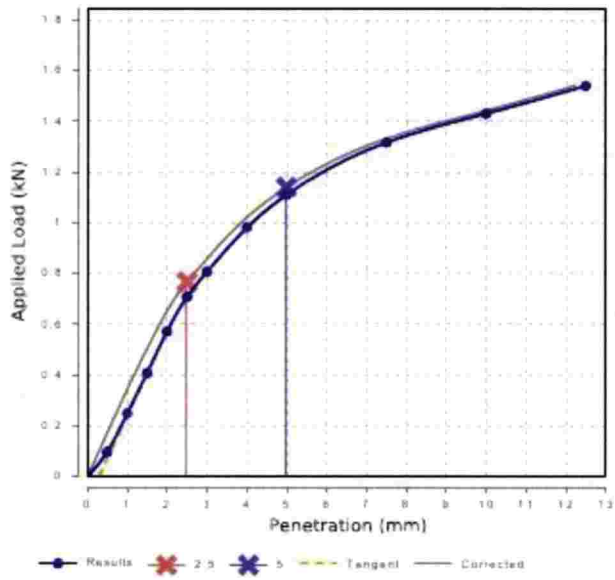
California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	**6**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual		
Maximum Dry Density (t/m^3)	1.85		
Optimum Moisture Content (%)	14.0		
Laboratory Density Ratio (%)	95.0		
Laboratory Moisture Ratio (%)	100.0		
Moisture Content at Placement (%)	14.2		
Moisture Content Top 30mm (%)	18.7		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	2		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)			

California Bearing Ratio



Material Test Report

Report Number: **31463-1**
Issue Number: 1
Date Issued: 27/05/2019
Client: Housing Plus
PO Box 968, Orange NSW 2800
Contact: David Standley
Project Number: 31463
Project Name: Site Classification and Geotechnical Investigation
Project Location: Lot 99 Emerald Street, Orange NSW
Work Request: 1373
Sample Number: D19-1373Z
Date Sampled: 17/05/2019
Dates Tested: 17/05/2019 - 20/05/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **Borehole 15 (600mm)**
Material: Orange-Red Sandy SILT

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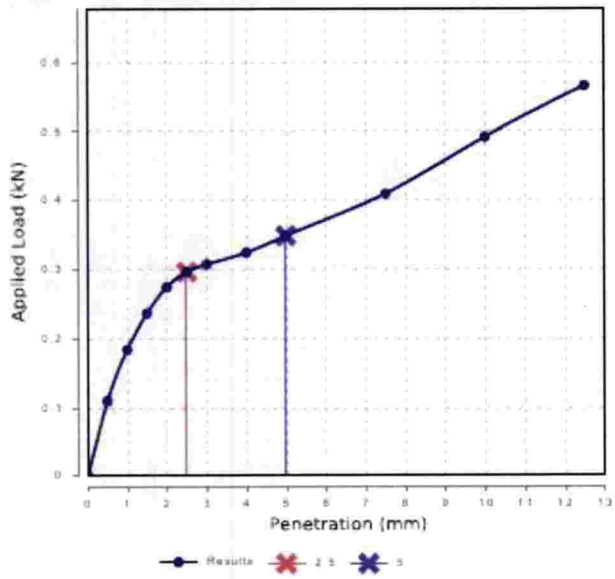
California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	**2.0**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual		
Maximum Dry Density (t/m^3)	1.77		
Optimum Moisture Content (%)	14.0		
Laboratory Density Ratio (%)	94.5		
Laboratory Moisture Ratio (%)	103.5		
Moisture Content at Placement (%)	14.5		
Moisture Content Top 30mm (%)	19.0		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	2		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)			

California Bearing Ratio



Appendix G

PLANNING NOTE PN 11-003

NSW GOVERNMENT | Planning

LEP practice note

PLANNING SYSTEM

Local Planning

Ref No.	PN 11-003
Issued	10 March 2011 (supersedes and **replaces** PN06-003)
Related	LEP PN 11-001; 11-002; PS 11-011

Preparing LEPs using the Standard Instrument: definitions

The purpose of this practice note is to provide a general overview of the definitions used in the Standard Instrument (Local Environmental Plans) Order 2006 after the 2011 amendments. It should be noted that the explanatory material set out in this practice note is for information purposes only and does not comprise a legal interpretation of any of the definitions in the Standard Instrument.

Introduction

The Standard Instrument for preparing local environmental plans (LEPs) includes a Dictionary of standard definitions relating to land uses and other terms relevant to the interpretation and application of LEPs.

This means that all LEPs across NSW will soon use the same planning language, including the same definitions for developments such as 'business premises', 'industry' and 'shops'.

The Dictionary is a mandatory provision and will be included in its entirety in all LEPs. To maintain consistency in planning language across the State, councils are not able to alter the standard definitions or directly add definitions to the Dictionary.

Definitions are divided into terms that describe land uses or activities that may be included in Land Use Tables ('land use terms'), and 'explanatory terms' which describe technical, administrative or other land uses that are important to the interpretation of LEPs, but which are not to be included in the Land Use Tables.

However all definitions will appear together in alphabetical order as part of a single Dictionary in each council's LEP.

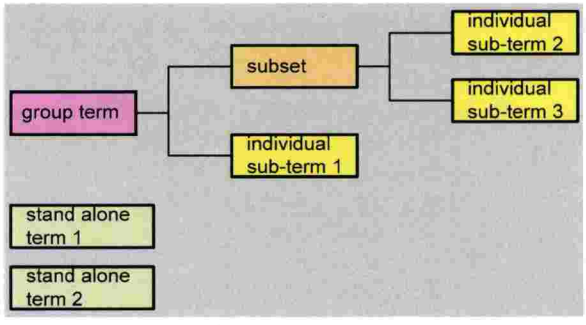
Land use terms

Approximately half of the standard definitions can be included in the Land Use Table, e.g. 'dwelling house,' 'restaurant or café,' 'hospital' and 'horticulture.' These are the terms used to describe development that is permitted or prohibited in the different zones used by councils.

Direction 5 of the Land Use Table contains a list of all types of development ('land use terms') that can be included in Land Use Tables. For ease of reference, this list is included in Attachment 1 of this practice note.

Group terms

The Dictionary includes a number of 'groups' of land use terms that are broadly related by type of use.



These land uses are included in a 'group term' definition. The intent of these 'group terms' is to minimise the length of Land Use Tables by

enabling LEP Land Use Tables or other provisions to easily refer to a number of land uses without needing to list them individually.

Each group term definition lists the uses it covers (and in some instances, uses it does not cover). For example:

> ***industry*** means any of the following:
> (a) general industry,
> (b) heavy industry,
> (c) light industry,
> but does not include:
> (d) rural industry, or
> (e) extractive industry, or
> (f) mining.

For example if the term 'industry' is used in the Land Use Tables, it includes 'general industry', 'heavy industry' and 'light industry'. If the term 'rural industry' is used, it includes all types of rural industrial land uses, avoiding the need to specifically list 'agricultural produce industry', 'livestock processing industry', 'sawmill or log processing works' etc.

Group terms are as follows:

- agriculture
- air transport facility
- commercial premises
- educational establishment
- health services facility
- heavy industrial storage premises
- industry
- residential accommodation
- rural industry
- sewerage system
- signage
- storage premises
- tourist and visitor accommodation
- waste or resource management facility
- water supply system.

Some defined land uses need to be read in the context of the group term to understand their full meaning. For example, a 'market' falls under the group term 'retail premises' as it specifically refers to that term in its notation:

> ***market*** means an open-air area, or an existing building, that is used for the purpose of selling, exposing or offering goods, merchandise or materials for sale by independent stall holders, and includes temporary structures and existing permanent structures used for that purpose on an intermittent or occasional basis.
>
> **Note.** A market is a type of retail premises (see the definition of that term in this Dictionary).

Retail premises are in turn defined as:

> ***retail premises*** means a building or place used for the purpose of selling items by retail, or hiring or displaying items for the purpose of selling them or hiring them out, whether the items are goods or materials (or whether also sold by wholesale), and includes any of the following;
> (a) bulky goods premises,
> (b) cellar door premises,
> (c) food and drink premises,
> (d) garden centres,
> (e) hardware and building supplies,
> (f) kiosks,
> (g) landscaping material supplies,
> (h) markets,
> (i) plant nurseries,
> (j) roadside stalls,
> (k) rural supplies,
> (l) shops,
> (m) timber yards,
> (n) vehicle sales or hire premises,
> but does not include a highway service centre, service station, industrial retail outlet or restricted premises.
>
> **Note.** Retail premises are a type of commercial premises (see the definition of that term in this Dictionary).

Therefore, to be defined as a 'market,' the proposal must satisfy the criteria in *both* definitions. This ensures that there is consistency in definitions relating to retail land uses, and avoids the need for repetition in each of the defined individual retail terms.

Some group terms also contain one or more 'subset terms' that themselves cover other defined land use terms. For example, the term 'food and drink premises' (which falls under the group term 'commercial premises' and its subset 'retail premises') includes the defined terms 'restaurant or cafes', 'take away food and drink premises' and 'pub':

> ***food and drink premises*** means premises that are used for the preparation and retail sale of food or drink for immediate consumption on or off the premises, and includes any of the following:
> (a) a restaurant or cafe,
> (b) take away food premises,
> (c) a pub.
>
> **Note.** Food and drink premises are a type of retail premises (see the definition of that term in this Dictionary).

Attached for information purposes are diagrams that show the general relationships between land use terms associated with each group term (Attachment 2). These diagrams are not a legal

interpretation of the definitions, but rather an information tool to assist council planners in developing their LEPs. The exact definition in the Standard Instrument must always be used when interpreting any defined term.

Group terms and Clause 2.3(3)

Clause 2.3(3) of the Standard Instrument states that, with respect to the Land Use Table for zones:

(b) a reference to a type of building or other thing does not include (despite any definition in this Plan) a reference to a type of building or other thing referred to separately in the Land Use Table in relation to the same zone.

Councils should also be aware that this provision relates only to types of buildings or things that are specifically referred to in the Land Use Table **in the same zone**. It means that a group term may cover a different range of land uses from zone to zone.

Councils should be mindful that this provision cannot be used to vary the mandated land uses. For example, where 'tourist and visitor accommodation' is mandated as permitted with consent in a zone, an LEP cannot list any component of the group term e.g. 'serviced apartments' as prohibited development in that zone.

Using terms to make zones 'open' or 'closed'

An **open zone** is one where a broad variety of land use can be considered allowing greater flexibility and minimizing the need to undertake 'spot rezonings'.

A **closed zone** is one where the diversity of land uses is more restrictive, meaning development types are chosen primarily from only one or two key 'group' terms.

See LEP PN 11-002 *Preparing LEPs using the Standard Instrument: standard zones* for further information on which zones should generally be open and which should be closed.

Ancillary uses

A use is ancillary to another use if it is incidental or subservient. If a use is ancillary, then it is to be characterised as being for the dominant purpose.

Some definitions refer to examples of ancillary services or facilities to assist readers. For instance, the definition of 'service station' refers to the ancillary sale by retail of spare parts and accessories for motor vehicles.

Ancillary uses don't need to be separately included in the Land Use Table.

Terms not to be used in Land Use Tables

The Standard Instrument contains a number of miscellaneous terms that are essential to the operation and clarity of the Standard Instrument and LEPs. These terms are not to be used in Land Use Tables. These include:

- administrative terms (e.g. 'the Act')
- environmental and hazard terms (e.g. 'biodiversity' and 'bush fire prone land')
- heritage terms (e.g. 'heritage conservation area')
- maps (e.g. 'Land Application Map')
- measurement terms (e.g. 'building height')
- waterways (e.g. 'coastal lake'), and
- other miscellaneous terms to assist in interpretation of clauses or land use definitions (e.g. 'affordable housing' and 'basement').
- Certain SEPP terms (e.g. 'canal estate development').

For information purposes, a list of these terms is set out in Attachment 3.

Terms not defined in the Dictionary

Many terms used in the Standard Instrument are not separately defined in the Dictionary. In these cases, the ordinary meaning of the word is to be used, which can usually be ascertained by referring to the Macquarie Dictionary.

Some definitions also refer to land uses that are not specifically defined. For example, the definition of an 'information and education facility' refers to 'library', 'art gallery' and 'museum' which are not defined in the Dictionary. These terms have their common meanings, and are included to clarify beyond doubt that these activities are a form of 'information and education facility'.

Terms requiring "inserted" information

A small number of definitions require councils to insert information such as the name of the local government area. Examples include the definitions of 'Heritage Map' and 'Lot Size Map'. Councils are to replace the words in [*bracketed italics*] with the relevant information.

Additional standard definitions

To maintain consistency across the State, LEPs may not alter the standard definitions or directly add definitions to the Dictionary. However councils may suggest new terms to the Department of Planning to be included in the Dictionary for all councils to use. The reasons why a definition is required should be clearly articulated.

If there is sufficient justification that the existing standard definitions will not adequately address a particular matter and that the common dictionary meaning of the word is insufficient, the definition may be added in a future amendment to the Standard Instrument. Until the term is added to the dictionary, it cannot be included in the Land Use Tables.

Defining terms in local provisions

If a council considers it desirable to clarify the interpretation of a term (other than a term defined in the Dictionary) that is used in a local provision by including a specific definition, then the council should discuss the matter with the Department as part of the preliminary discussions on the draft plan.

Depending on the circumstances, it may be considered appropriate to define a term within the locally prepared clause. However, in most instances it will usually be possible to draft a local provision using common language terms. Terms in the Dictionary are not affected by local provision definitions.

Key changes in the 2011 Amendments

The Standard Instrument (Local Environmental Plans) Amendment Order 2011 was published on 25 February 2011. It amends the Standard Instrument (Local Environmental Plans) Order 2006 including the Standard Instrument—Principal Local Environmental Plan (the standard LEP).

The primary objective of the amending order is to improve the efficiency of delivery of standard LEPs. It aims to ensure existing land use terms do not overlap across definitions and the relationship between definitions is clearer, through the inclusion of new terms, amendments to existing terms, and cross referencing the group term/sub-term relationships.

Key changes to dictionary terms are identified in Attachment 4. These include:

Commercial related terms

- ***commercial premises*** is a new group term including 'retail,' 'office' and 'business premises.' This provides an efficient term to describe the mix of uses in centres;
- ***retail premises*** has now been amended to specifically list retail premises including 'bulky goods premises,' 'cellar door premises,' 'food and drink premises.' 'garden centres,' 'hardware and building supplies,' 'kiosks,' 'landscaping material supplies,' 'markets,' 'plant nurseries,' 'roadside stalls,' 'rural supplies,' 'shops,' 'timber yards' and 'vehicle sales or hire premises';
- ***shop*** now refers to the broader term 'merchandise' rather than 'general merchandise,' and the hiring of this merchandise. It also includes a 'neighbourhood shop';
- ***neighbourhood shop*** has been amended to clarify that general (as opposed to specialist) merchandise can be sold where this provides for the day-to-day needs of people in the area. It is also confirmed as a type of 'shop.'

Landscaping related terms

New terms have been introduced to separate components previously covered in the old definition '*landscape and garden supplies.*' This enables uses to be considered individually in different zones providing more flexibility for councils and proponents.

- ***garden centre*** covers the sale of plants, garden and landscaping supplies and equipment. It also includes ancillary uses such as a 'restaurant of café,' and the sale of fresh produce, pets and pet supplies, outdoor furniture and furnishings, barbeques, shading and awnings, pools, spas and associated supplies, and items associated with the construction and maintenance of outdoor areas;
- ***plant nursery*** covers the growing and retail sale of plants (whether or not also by wholesale), and may also include the sale of landscaping supplies and equipment and storage of these items;
- ***horticulture*** covers the growing and wholesaling of plants for gardens or landscaping;
- ***landscaping material supplies*** covers the storage and sale of landscaping supplies such as soil, gravel, potting mix, mulch, sand, railway sleepers, screenings, rock and the like.

Building related terms

The previous '*timber and building supplies*' definition has been split in two. This enables more flexibility in the location of timber yards and hardware shops.

- ***hardware and building supplies*** covers the sale or hire of goods or materials, such as household fixtures, timber, tools, paint, wallpaper, plumbing supplies and the like, that are used in the construction and maintenance of buildings and adjacent outdoor areas;
- ***timber yard*** is a stand alone land use enabling councils to consider permitting it in certain industrial or other zones if suited. It covers the sale of timber, wood fibre boards or similar timber products. It may include the cutting of such timber, boards or products to order and the sale of hardware, paint, tools and materials. It is a 'retail premises';
- ***sawmill or log processing works*** covers the handling, cutting, chipping, pulping or otherwise processing of logs, baulks, branches or stumps, principally derived from surrounding

districts, into timber or other products derived from wood. It is a 'rural industry.'

Industry related terms

To provide greater certainty, there was a need to clarify the different types of 'industry.' The previous definition of *'industry'* which defined the processes and activities undertaken by any industry has now been redefined as the interpretative term ***industrial activity***.

'Industry' is now a group term with 'general industry' introduced to describe industry which is not a 'light industry' or 'heavy industry.' The following changes have been made to the industry related terms:

- ***industry*** is a group term which has been revised to clarify that it includes 'light industry,' 'general industry' and 'heavy industry,' but does not include 'rural' or 'extractive industries' or 'mining';
- ***general industry*** is to be used for industrial uses that aren't considered to be 'light' or 'heavy industry';
- ***light industry*** now includes 'high technology industry' and 'home industries';
- ***industrial training facility*** provides for vocational training associated with 'industry', 'rural industry', 'extractive industry' and 'mining';
- ***industrial retail outlet*** provides for display and sale of goods manufactured on site including 'industries' and 'rural industries'.

Further information

A copy of this practice note, the Standard Instrument, and other specific practice notes and planning circulars on using the Standard Instrument, can be accessed on the Department's website http://www.planning.nsw.gov.au/LocalPlanning/tabid/246/language/en-US/Default.aspx

An updated version of the standard instrument is available on the NSW Parliamentary Counsel's office website: www.legislation.nsw.gov.au under 'Browse A-Z In Force'.

If you have further enquiries, please phone the Planning Information Centre 02 9228 6333 or email information@planning.nsw.gov.au.

List of attachments

Attachment 1 – Direction 5 of the Land Use Table
Attachment 2 – General relationship between land use terms
Attachment 3 – Defined terms not to be used in Land Use Table
Attachment 4 – Key changes to dictionary terms made through the SI Amendment Order 2011

Authorised by:

Sam Haddad
Director General

ATTACHMENT 1:

Direction 5 of the Land Use Table

Only the following types of development may be included in the Land Use Table:

Advertising structures; Agricultural produce industries; Agriculture; Air transport facilities; Airports; Airstrips; Amusement centres; Animal boarding or training establishments; Aquaculture; Attached dwellings

Backpackers' accommodation; Bed and breakfast accommodation; Bee keeping; Biosolids treatment facilities; Boarding houses; Boat launching ramps; Boat building and repair facilities; Boat sheds; Building identification signs; Bulky goods premises; Business identification signs; Business premises

Camping grounds; Car parks; Caravan parks; Cellar door premises; Cemeteries; Charter and tourism boating facilities; Child care centres; Commercial premises; Community facilities; Correctional centres; Crematoria

Dairies (pasture-based); Dairies (restricted); Depots; Dual occupancies; Dual occupancies (attached); Dual occupancies (detached); Dwelling houses

Eco-tourist facilities; Educational establishments; Electricity generating works; Emergency services facilities; Entertainment facilities; Environmental facilities; Environmental protection works; Exhibition homes; Exhibition villages; Extensive agriculture; Extractive industries

Farm buildings; Farm stay accommodation; Feedlots; Flood mitigation works; Food and drink premises; Forestry; Freight transport facilities; Function centres; Funeral homes

Garden centres; General industries; Group homes; Group homes (permanent) or permanent group homes; Group homes (transitional) or transitional group homes

Hardware and building supplies; Hazardous industries; Hazardous storage establishments; Health consulting rooms; Health services facilities; Heavy industrial storage establishments; Heavy industries; Helipads; Heliports; High technology industries; Highway service centres; Home-based child care; Home businesses; Home industries; Home occupations; Home occupations (sex services); Horticulture; Hospitals; Hostels; Hotel or motel accommodation

Industrial retail outlets; Industrial training facilities; Industries; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture

Jetties

Kiosks

Landscaping material supplies; Light industries; Liquid fuel depots; Livestock processing industries

Marinas; Markets; Medical centres; Mooring pens; Moorings; Mortuaries; Multi dwelling housing

Neighbourhood shops

Offensive industries; Offensive storage establishments; Office premises; Open cut mining

Passenger transport facilities; Places of public worship; Plant nurseries; Port facilities; Public administration buildings; Pubs

Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Registered clubs; Research stations; Residential accommodation; Residential care facilities; Residential flat buildings; Resource recovery facilities; Respite day care centres; Restaurants or cafes; Restricted premises; Retail premises; Roads; Roadside stalls; Rural industries; Rural supplies; Rural workers' dwellings

Sawmill or log processing works; Schools; Secondary dwellings; Self-storage units; Semi-detached dwellings; Seniors housing; Service stations; Serviced apartments; Sewage reticulation systems; Sewage treatment plants; Sewerage systems; Sex services premises; Shops; Shop top housing; Signage; Stock and sale yards; Storage premises

Take away food and drink premises; Timber yards; Tourist and visitor accommodation; Transport depots; Truck depots; Turf farming

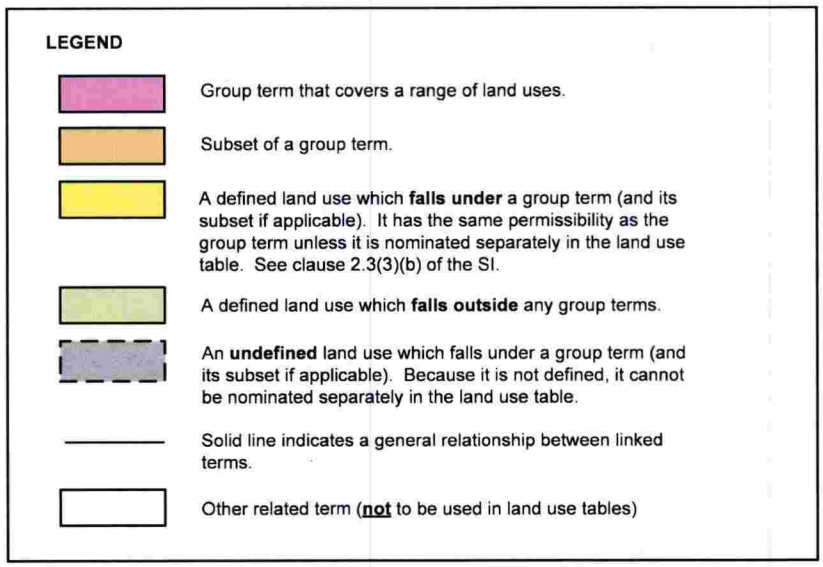
Vehicle body repair workshops; Vehicle repair stations; Vehicle sales or hire premises; Veterinary hospitals; Viticulture

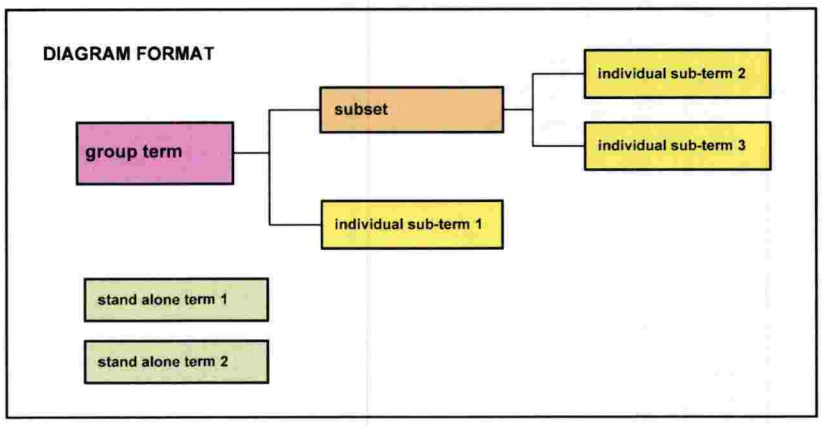
Warehouse or distribution centres; Waste disposal facilities; Waste or resource management facilities; Waste or resource transfer stations; Water recreation structures; Water recycling facilities; Water reticulation systems; Water storage facilities; Water supply systems; Water treatment facilities; Wharf or boating facilities; Wholesale supplies

ATTACHMENT 2:

General relationship between land use terms

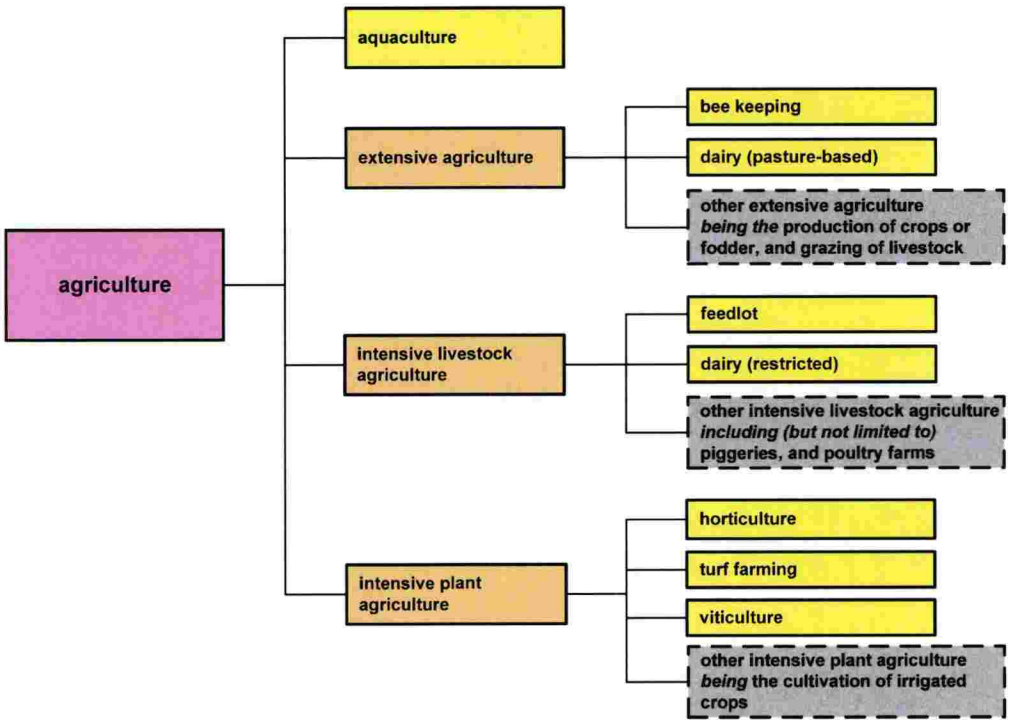
INDEX: **Page**





AGRICULTURE

LAND USE terms WITHIN **agriculture** group term:



LAND USE terms OUTSIDE **agriculture** group term

Examples:

- animal boarding or training establishment
- farm building
- forestry

Any sub-terms WITHIN **residential accommodation** group term:

Examples:

- rural worker's dwelling

Any sub-terms WITHIN **tourist and visitor accommodation** group term:

Examples:

- farm stay accommodation

Any sub-terms WITHIN **commercial premises** group term:

Examples:

- cellar door premises
- roadside stall

Any sub-terms WITHIN **rural industry** group term:

Examples:

- agricultural produce industry
- livestock processing industry

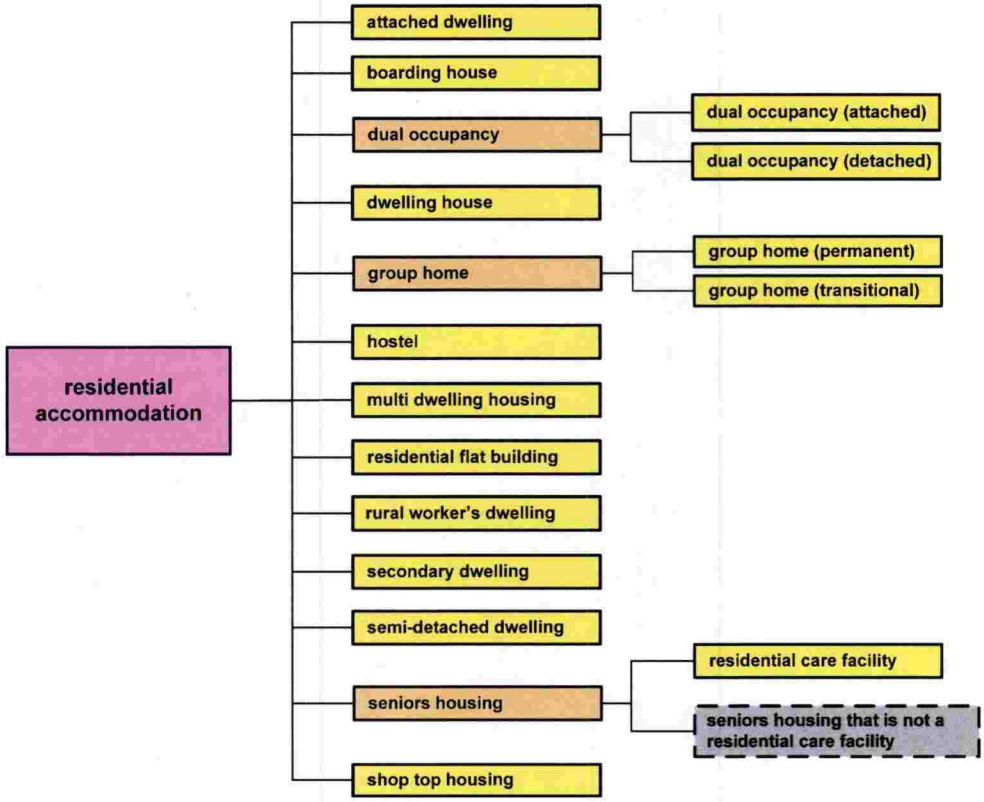
Other related terms NOT to be used in LAND USE TABLES

Examples:

- restriction facilities

RESIDENTIAL ACCOMMODATION

LAND USE terms WITHIN **residential accommodation** group term:



LAND USE terms OUTSIDE **residential accommodation** group term

Examples:

- camping ground
- caravan park
- exhibition home
- exhibition village
- home-based child care

Any sub-terms WITHIN **health services facility** group term:

Examples:

- health consulting rooms

- home business
- home occupation
- home occupation (sex services)

Any sub-terms WITHIN **industry** group term:

Examples:

- home industry

Any sub-terms WITHIN **tourist and visitor accommodation** group term:

Examples:

- bed and breakfast accommodation
- serviced apartment

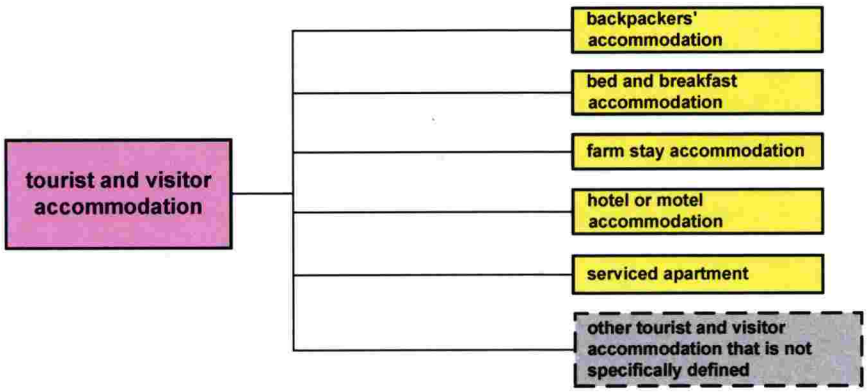
Other related terms NOT to be used in LAND USE TABLES

Examples:

- affordable housing
- dwelling
- mixed use development
- moveable dwelling

TOURIST AND VISITOR ACCOMMODATION

LAND USE terms WITHIN **tourist and visitor accommodation** group term:



LAND USE terms OUTSIDE **tourist and visitor accommodation** group term

Examples:

- camping ground
- caravan park
- eco-tourist facility

Any sub-terms WITHIN **residential accommodation** group term:

Examples:

- boarding house
- dwelling house
- residential flat building

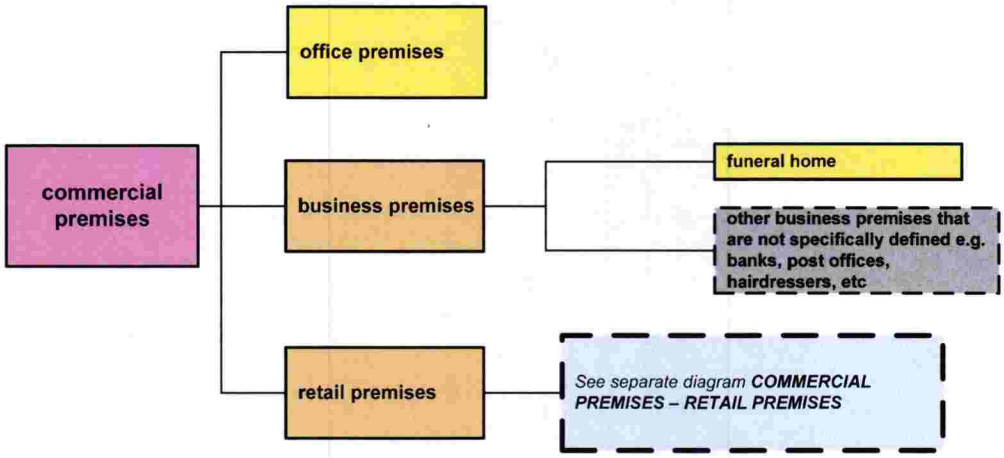
Other related terms NOT to be used in LAND USE TABLES

Examples:

- mixed use development

COMMERCIAL PREMISES

LAND USE terms WITHIN **commercial premises** group term:



LAND USE terms OUTSIDE **commercial premises** group term

Examples:

- amusement centre
- animal boarding or training establishments
- boat building or repair facility
- entertainment facility
- function centre
- highway service centre
- home-based child care
- home business
- home occupation
- home occupation (sex services)
- industrial retail outlet
- industrial training facility
- registered club
- restricted premises
- service station
- sex services premises
- vehicle body repair workshop
- vehicle repair station
- veterinary hospital
- wholesale supplies

Any sub-terms WITHIN **health services facility** group term:

Examples:

- medical centre
- health consulting rooms

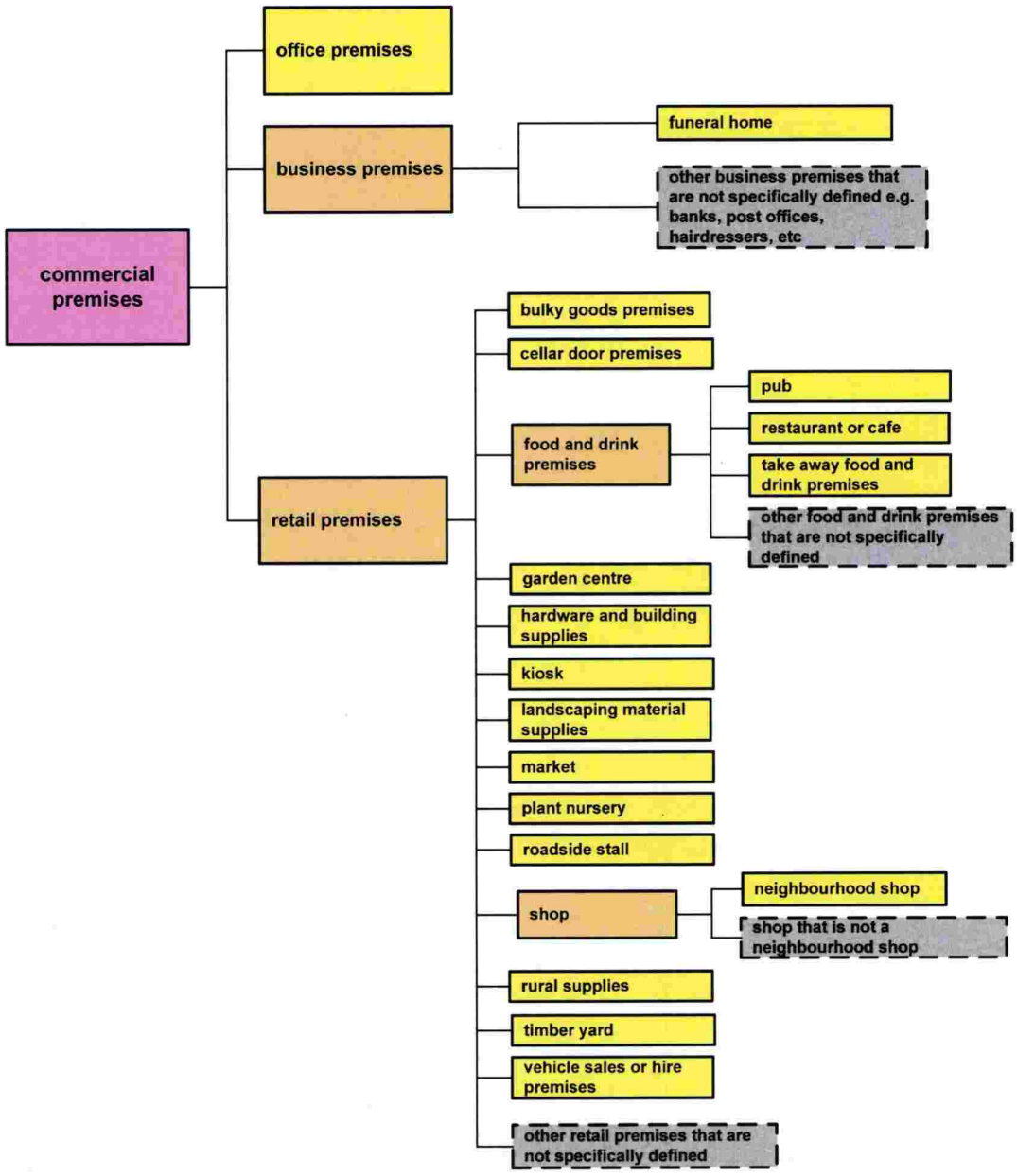
Other related terms NOT to be used in LAND USE TABLES

Examples:

- brothel
- mixed use development

COMMERCIAL PREMISES – RETAIL

LAND USE terms WITHIN **commercial premises** group term:



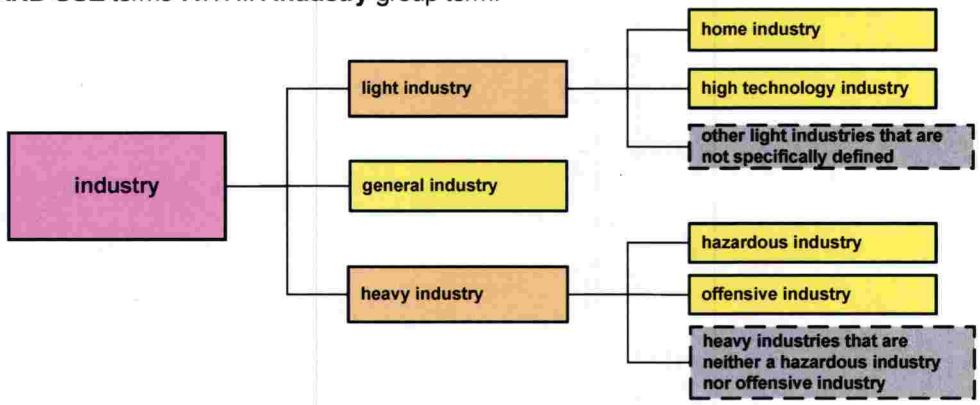
LAND USE terms OUTSIDE **commercial premises** group term

Examples:

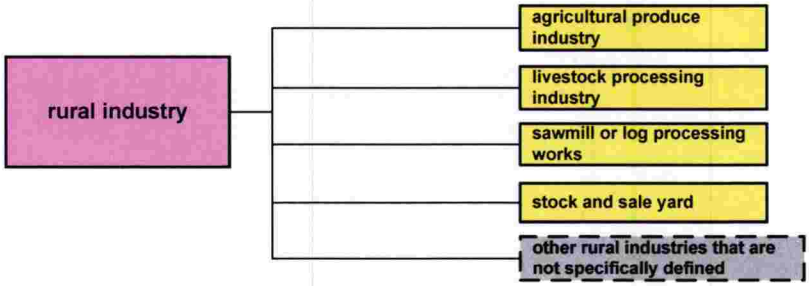
- highway service centre
- industrial retail outlet
- restricted premises
- service station

INDUSTRY & RURAL INDUSTRY

LAND USE terms WITHIN **industry** group term:



LAND USE terms WITHIN **rural industry** group term:



LAND USE terms OUTSIDE BOTH **industry** & **rural industry** group terms

Examples:

- boat building or repair facility
- depot
- extractive industry
- industrial retail outlet
- industrial training facility
- open cut mining
- vehicle body repair workshop
- vehicle repair station
- warehouse or distribution centre
- wholesale supplies

Miscellaneous **related group term**:

Examples:

- storage premises
- heavy industrial storage establishment

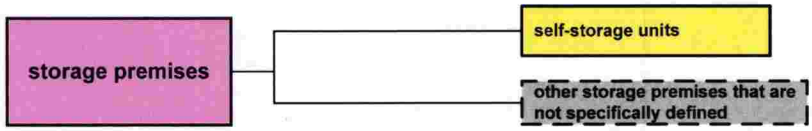
Other related terms NOT to be used in LAND USE TABLES

Examples:

- industrial activity
- mining
- underground mining

STORAGE LAND USES

LAND USE terms WITHIN **storage premises** group term:



LAND USE terms WITHIN **heavy industrial storage establishment** group term:

LAND USE terms OUTSIDE BOTH **storage premises** & **heavy industrial storage establishment** group terms

Examples:

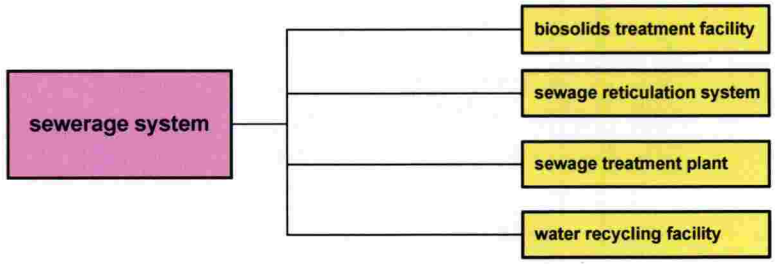
- depot
- industrial retail outlet
- warehouse or distribution centre
- wholesale supplies

Miscellaneous **related group term**:
Examples only:

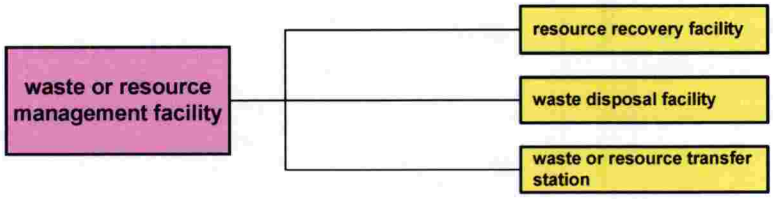
- industry
- rural industry

INFRASTRUCTURE – WATER & WASTE

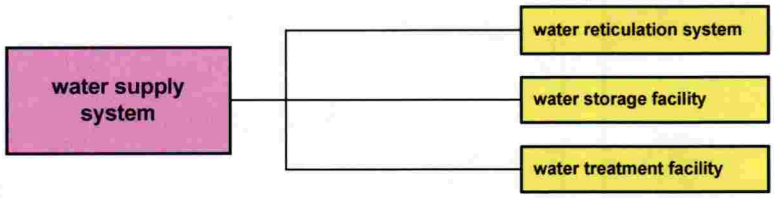
LAND USE terms WITHIN **sewerage system** group term:



LAND USE terms WITHIN **waste or resource management facility** group term:



LAND USE terms WITHIN **water supply system** group term:



Other **LAND USE** terms relating to public utility infrastructure

Examples:

- electricity generating works

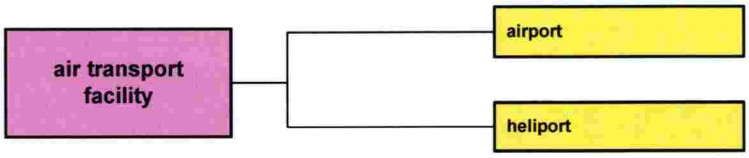
Other related terms NOT to be used in LAND USE TABLES

Examples:

- public utility undertaking
- telecommunications facility
- telecommunications network

INFRASTRUCTURE – TRANSPORT

LAND USE terms WITHIN **air transport facility** group term:



LAND USE terms OUTSIDE **air transport facility** group term

Examples:

- airstrip
- helipad

Other **LAND USE** terms relating to transport infrastructure

Examples:

- boat shed
- car park
- freight transport facility
- passenger transport facility
- port facilities
- road
- transport depot
- truck depot
- wharf or boating facilities

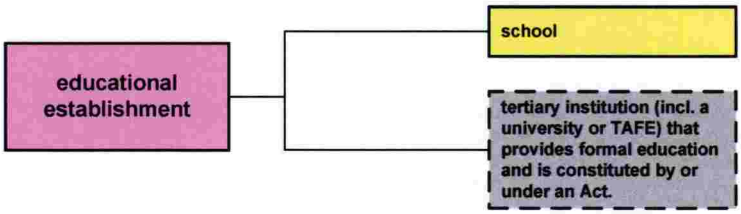
Other related terms NOT to be used in LAND USE TABLES

Examples:

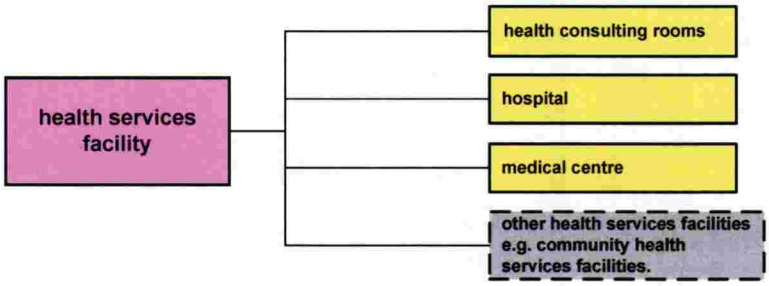
- classified road
- parking space
- navigable waterway
- public utility undertaking
- waterbody (artificial)
- waterway

INFRASTRUCTURE – COMMUNITY

LAND USE terms WITHIN **educational establishment** group term:



LAND USE terms WITHIN **health services facility** group term:



Other **LAND USE** terms relating to community infrastructure

Examples:

- child care centre
- community facility
- correctional centre
- emergency services facility
- home-based child care
- industrial training facility
- information and education facility
- places of public worship
- public administration building
- research station
- respite day care centre

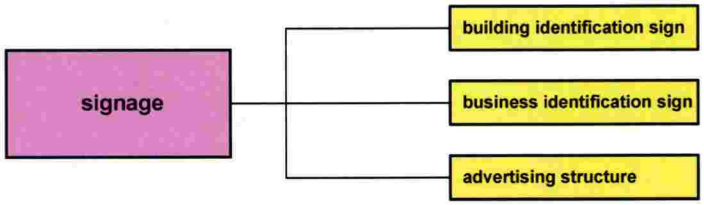
Other related terms NOT to be used in LAND USE TABLES

Examples:

- clearing native vegetation
- community land
- public reserve

OTHER MISCELLANEOUS LAND USES

LAND USE terms WITHIN **signage** group term:



LAND USE terms relating to recreation

Examples:

- boat launching ramp
- boat shed
- charter and tourism boating facility
- environmental facility
- jetty
- marina
- mooring
- mooring pen
- recreation area
- recreation facility (indoor)
- recreation facility (major)
- recreation facility (outdoor)
- water recreation structure

Other miscellaneous **LAND USE** terms

Examples:

- cemetery
- crematorium
- environmental protection works
- flood mitigation works
- mortuary

Other related terms NOT to be used in LAND USE TABLES

Examples:

- advertisement
- clearing native vegetation
- coastal protection works
- drainage
- earthworks
- ecologically sustainable development
- waterbody (artificial)

ATTACHMENT 3:

Defined terms not to be used in Land Use Tables

Administrative terms

Council
community land
Crown reserve
operational land
public authority
public land
public reserve
the Act

Environment and hazards

acid sulfate soils
Acid Sulfate Soils Manual
biodiversity
biological diversity
bush fire hazard reduction work
bush fire prone land
bush fire risk management plan
catchment action plan
clearing native vegetation
ecologically sustainable development
extractive material
fish
mine subsidence district
native fauna
native flora
native vegetation
property vegetation plan

Heritage

Aboriginal object
Aboriginal place of heritage significance
archaeological site
curtilage (in relation to heritage)
demolish (in relation to heritage)
heritage conservation area
heritage conservation management plan
heritage impact statement
heritage item
heritage management document
heritage significance
maintenance (in relation to heritage)
nominated State heritage item
relic

Maps

Floor Space Ratio Map
Height of Buildings Map
Heritage Map
Land Application Map
Land Reservation Acquisition Map
Land Zoning Map
Lot Size Map

Measurement

building height
building line or setback
floor space ratio
gross floor area
ground level (existing)
ground level (finished)
ground level (mean)
Reduced Level (RL)
site area
site coverage
storey

Water and Coastal

coastal foreshore
coastal hazard
coastal lake
coastal protection works
coastal waters of the State
coastal zone
estuary
headland
mean high water mark
navigable waterway
non-potable water
NSW Coastal Policy
potable water
waterbody
waterbody (artificial)
waterbody (natural)
watercourse
waterway
wetland

Other terms

advertisement
affordable housing
attic
basement
brothel
building
classified road
drainage
dwelling
earthworks
emergency services organisation
excavation
fill
filming
health care professional

industrial activity
landscaped area
mezzanine
mixed use development
moveable dwelling
parking space
private open space
public utility undertaking
rainwater tank
restriction facilities
sex services
spa pool
swimming pool
temporary structure

SEPP terms

canal estate development
mine
mining
telecommunications facility
telecommunications network
underground mining

Note. These types of development are regulated by State Environmental Planning Policies.

ATTACHMENT 4:

Key changes to dictionary terms made through the SI Amendment Order 2011

The Standard Instrument (Local Environmental Plans) Amendment Order 2011 was published on 25 February 2011. It amends the *Standard Instrument (Local Environmental Plans) Order 2006* including the *Standard Instrument—Principal Local Environmental Plan (the standard LEP)*.

The primary objective of the amending order is to improve the efficiency of delivery of Standard LEPs and it aims to ensure existing land use terms do not overlap across definitions and the relationship between definitions is clearer, through the inclusion of new terms, amendments to existing terms, and cross referencing the group term/sub-term relationships. Group terms all contain the sub-terms they encompass. Each sub-term now includes a note confirming which group term they are a type of. It has now also been clarified which terms can be used in the Land Use Table and which terms can not (see Direction 5 at the beginning of the Land Use Table).

New, renamed and amended definitions

- ***Aboriginal place of heritage significance*** has been renamed from *place of Aboriginal significance* to cluster related Aboriginal heritage terms in the Dictionary for ease of use;
- ***agricultural produce industry*** now includes reference to *wineries* in its definition;
- ***attached dwelling***, ***dual occupancy***, ***multi dwelling housing***, ***secondary dwelling and semi-detached dwelling*** no longer contain the wording '(not being an individual lot in a strata plan or community title scheme).' This enables councils to approve attached dwellings on such lots if deemed appropriate for their council area. A new optional clause 4.4AA has been included in the Order for councils who wish to retain control over community title lot size for certain residential accommodation;
- ***archaeological site*** is now the same as the definition in the *Heritage Act*, and no longer makes reference to the Heritage Map or listing in Schedule 5;
- ***bed and breakfast accommodation*** now includes a reference that this use can only be considered where there is an *existing* dwelling. This is to avoid situations where, for example, a development application is lodged for a *bed and breakfast accommodation* in zones where dwelling houses may no longer be permitted;
- ***beekeeping*** already exists as part of *extensive agriculture* but is now to be defined as a new stand alone land use, so it can be permitted if appropriate in areas not suited to broader agricultural activities such as in forestry areas;
- ***boat building or repair facilities*** has been renamed to clarify it covers more than 'repair', by specifically referencing 'boat building';
- ***brothel*** now provides a note directing readers to the definitions of *home occupation (sex services)* and *sex services premises*;
- ***building height*** (or ***height of building***) has been amended to be consistent with the Codes SEPP, removing the words 'at any point.' The definition of *ground level (existing)* which *building height* references means the existing level of a site at any point;
- ***bulky goods premises*** is included in the group term 'retail premises' and now requires applicants to meet *both* parts (a) and (b). It also includes some examples of what might constitute bulky goods including floor and window supplies, swimming pools and equestrian supplies;
- ***business premises*** now clarifies that it includes a *funeral home* and excludes *entertainment facilities*, *restricted premises, medical centres* and other land uses;
- ***camping ground*** exists as part of the definition of *caravan park* but is now to be clearly provided as a stand alone use, so it can be permitted if appropriate in areas of environmental sensitivity where *caravan parks* may not be suitable;
- ***cellar door premises*** has been amended to change the requirement that *all* of the wine offered for sale is produced in a winery situated on that land or produced predominantly from grapes grown in the local area, to *most* to enable greater flexibility;
- ***cemetery*** now includes provision for pets and clarifies it can contain an associated building for conducting memorial services;
- ***coastal hazard*** is included to assist in the application of a new subclause included in Clause 5.5 *Development within the coastal zone*;
- ***coastal protection works*** is not a Land Use Table term, but is separated from the definition of *environmental protection works* as its permissibility is covered through the Infrastructure SEPP;

- ***commercial premises*** is a new group term including *retail*, *office* and *business premises*;
- ***crematorium*** clarifies it could contain an associated building for conducting memorial services;
- ***dairy (restricted)*** has been renamed from restricted dairy in order to cluster related uses in the Dictionary for ease of use. Clarification has also been provided that it is a type of *intensive livestock agriculture*. The term has been renamed wherever it occurs, such as in the definition of *intensive livestock agriculture*;
- ***demolish*** in relation to heritage matters specifically includes *Aboriginal objects* which previously were considered through the term *heritage item* (now amended);
- ***dual occupancy*** is a new group term including ***dual occupancy (attached)*** and ***dual occupancy (detached)***. This change confirms that the two types of *dual occupancy* can be separately applied;
- ***eco-tourist facility*** is a new term that caters for low impact tourist use located in or adjacent to an area with special ecological or cultural features . A number of non-Standard Instrument LEPs contain a similar use;
- ***emergency service organisation*** is amended to replace *New South Wales Fire Brigades* with *Fire and Rescue NSW* to reflect the change in name of the emergency service organisation. Note that the change in name will also occur in *Clause 5.8 Conversion of Fire Alarms*;
- ***extensive agriculture*** now has the addition of *dairy (pasture-based)* in its grouping;
- ***feedlot*** now includes the addition of 'fibre products';
- ***food and drink premises*** no longer refers to "milk bar" and references *restaurant and café* which was renamed from *restaurant*;
- ***funeral home*** has been amended to include facilities for memorial services, removing the need for *funeral chapel*;
- ***garden centre***, ***landscaping material supplies*** and ***plant nursery*** are new terms which separate the growing component from supplies and garden centres that were in the superseded definition *landscape and garden supplies*. This enables them to be considered individually in different zones providing more flexibility for councils and proponents;
- ***general industry*** is to be used for industrial uses that are not considered to be light or heavy industry;
- ***hardware and building supplies*** is a renamed and amended term based on the previous *timber and building supplies* definition. ***timber yards*** is a stand alone land use enabling councils to consider permitting it in certain industrial or other zones if suited;
- ***health consulting rooms*** has been amended, removing the partnership requirements, and enabling more flexibility by having more than three health care professionals in the practice, provided only three are working at any one time to ensure impacts are in keeping with residential amenity;
- ***heavy industrial storage establishment*** is a new group term including *hazardous storage establishments*, *offensive storage establishments* and *liquid fuel depots*;
- ***heritage conservation area*** deletes the reference to *Aboriginal place of heritage significance* as Aboriginal heritage is now dealt with separately;
- ***heritage item*** has been amended to remove the compulsory nature of having to be identified in three places correctly in order to fulfil the criteria. The key location for heritage items is now Schedule 5, although they may still be mapped. Reference is also made to the council inventory which informed the listing;
- ***heritage management document*** is provided to inform users that there will be more flexibility to determine the level of analysis required to support an application where heritage is involved, and reduce costs to the applicant wherever possible;
- ***high technology industry*** provides for certain types of established and emerging sectors that rely on technologies that are non-polluting, meaning they may be considered suitable in a variety of zones;
- ***home business***, ***home industry***, ***home occupation*** and ***home occupation (sex services)*** now refer to *signage* (other than a *business identification sign* for a *home business*) rather than listing types of signs individually;
- ***hospital*** is amended to remove the term *refreshment room* and replace it with *kiosks*, *restaurant or café* and *take-away food or drink premises*;
- ***industrial activity*** assists in interpreting industrial related definitions. It explains the processes and activities that constitute an *industry*;
- ***industrial retail outlet*** now clarifies that the provisions also apply to a *rural industry*;
- ***industrial training facility*** is a new land use term to cover vocational training in an activity (such as forklift or truck driving) associated

with an *industry*, *rural industry*, *extractive industry* or *mining*;

- ***industry*** is a group term which has been revised to clarify that it includes *light industry, general industry* and *heavy industry*, but does not include *rural* or *extractive industries* or *mining*;
- ***light industry*** has been revised to clarify that it covers both a *high technology industry* and *home industry*;
- ***maintenance*** in relation to heritage matters now makes specific reference to *Aboriginal objects* and *Aboriginal place of heritage significance* given these terms are no longer covered by *heritage item* so they do not have to be mapped and their location detailed;
- ***marina*** has been amended to refer to berthing or mooring facilities, rather than any associated single mooring;
- ***medical centre*** has been clarified as a type of *health services facility*;
- ***mooring pen*** is a new land use definition to provide for the mooring or berthing of a boat, and can be used outside the application of a *marina*;
- ***neighbourhood shop*** has been amended to clarify that general (as opposed to specialist) merchandise can be sold where items provide for the day-to-day needs of people in the area. It is also confirmed as a type of *shop*;
- ***nominated State heritage item*** is a new term to assist in the interpretation of Clause 5.10(9);
- ***open cut mining*** and ***underground mining*** are new definitions recognising these different forms of mining. *open cut mining* can be used in the Land Use Table;
- ***registered club*** has been amended to reflect the fact clubs are now issued club licences under the *Liquor Act 2007*;
- ***relic*** now refers to the definition in the *Heritage Act 1977*;
- ***residential accommodation*** as a group term has been clarified to detail which land use terms it covers;
- ***residential care facility*** has been amended to clarify is does not include a *hostel*;
- ***resource recovery facility*** now includes composting in its definition, aligning it with that in the Infrastructure SEPP;
- ***respite day care centre*** is a new land use term that has been added to ensure this important use is permissible in a wide variety of zones, to provide short-term, temporary relief for carers of people with a disability or the elderly, who might otherwise require permanent placement in a facility outside the home;
- ***restaurant or cafe*** has been renamed from *restaurant* and its principal purpose clarified to be the preparation and serving of food and drink on premises, to avoid confusion with *pub*. Other definitions such as *food and drink premises*, *highway service centres* and *hospitals*, which previously referenced *restaurant* have been amended to reflect this name change;
- ***restricted premises*** has been removed from the previous link to *business premises* and *retail premises* to avoid confusion;
- ***retail premises*** remains a group term but more land uses have been prescribed than was previously the case. This provides greater flexibility and opportunity for competition. It now clarifies that a *service station* is not part of the group term;
- ***rural worker's dwelling*** has been amended to capture a 'building or place' that is 'additional' to a dwelling house on the 'same lot' of land where *agricultural* or *rural industry* employees live, whether for short or term periods;
- ***shop*** now refers to the broader term 'merchandise' rather than 'general merchandise', and the hiring of this merchandise. It also includes a *neighbourhood shop*;
- ***shop top housing*** has had the previous wording 'or otherwise attached to' removed;
- ***storage premises*** now clarifies it includes *self-storage units*, but not *heavy industrial storage premises* or a *warehouse or distribution centre*;
- ***telecommunications facility*** has been expanded to be consistent with the Infrastructure SEPP;
- ***tourist and visitor accommodation*** has been clarified to specifically include *farm stay accommodation*, and exclude *camping grounds*, *caravan parks* and *eco-tourist facilities*;
- ***wharf or boating facilities*** is a new term that enables councils to permit facilities associated with a wharf or boating outside designated ports.

Terms consolidated or removed

- ***biosolid waste application*** has been removed as it is ancillary to other uses;
- ***funeral chapel*** has been included in the definitions of *funeral home, cemetery and crematorium;*

- ***natural water based aquaculture, pond based aquaculture*** and ***tank-based aquaculture*** have been consolidated under the definition of *aquaculture;*
- ***waste management facility*** is removed as it is included in the definition of *waste and resource management facility*.