INSITE
TOWN PLANNING
MASTER PLANNING
APPROVALS MANAGEMENT

PLANNING PROPOSAL

AMENDMENT TO THE MID-WESTERN LEP 2012

Lot 2 DP1079362, 134 Lions Drive,
Burrundulla

August2020

Ref: 19034

Planning Proposal
Amend Mid-Western LEP 2012 with respect to 134 Lions Drive BURRUNDULLA
Version 2

Insite Planning Services Pty Ltd (ACN 109 684 648)

Address:
PO Box 93
Cessnock NSW 2325

Contact:
(ph) 4998 7496
email: stephen@insiteplan.com.au

QUALITY ASSURANCE
This document has been prepared, checked and released in accordance with the Quality Control Standards established by Insite Planning Services Pty Ltd.

Issue	Date	Description	By
1	31/12/2019	DRAFT	SL
2	13/01/2019	Review	PD
3	21/01/2020	Edit	SL
4	22/01/2020	QA	SL
5	05/05/2020	Amend	SL
6	21/08/2020	Amend	SL

Copyright © Insite Planning Services

This document has been authorised by _____
Date 21 August 2020

Disclaimer
This report has been prepared based on the information supplied by the client and investigation undertaken by Insite Planning Services Pty Ltd & other consultants. Recommendations are based on Insite Planning Services Pty Ltd professional judgement only and whilst every effort has been taken to provide accurate advice, Council and any other regulatory authorities may not concur with the recommendations expressed within this report. This document and the information are solely for the use of the authorised recipient and this document may not be used, copied or reproduced in whole or part for any purpose other than that for which it was supplied by Insite Planning Services Pty Ltd. Insite Planning Services Pty Ltd makes no representation, undertakes no duty and accepts no responsibility to any third party who may use or rely upon this document or the information.

Confidentiality Statement
All information, concepts, ideas, strategies, commercial date and all other information whatsoever contained within this document as well as any and all ideas and concepts described during the presentation are provided on a commercial in confidence basis and remain the intellectual property and Copyright of Insite Planning Services Pty Ltd and affiliated entities.
This document has been registered with our solicitors along with a copy of all previous materials.

TABLE OF CONTENTS

1 Introduction 1
1.1 Summary of Planning Proposal 2
1.2 Site Description 3
1.3 Bunnings Proposal 4
1.3.1 Supply of Additional B5 Business Development Land 5
2 Objectives and Intended Outcome 6
3 Explanation of Provisions 7
4 Justification for Proposed Rezoning 10
4.1 Need for the Planning Proposal 10
4.1.1 Is the Planning Proposal a result of any Strategic Study or Report? 10
4.1.2 Is the Planning Proposal the best means of achieving the objectives or intended outcomes, or is there a better way? 18
4.2 Relationship to the Strategic Planning Framework 19
4.2.1 Is the Planning Proposal consistent with the objectives and actions of the applicable regional, sub-regional or district plan or strategy (including any exhibited draft plans or strategies? 19
4.2.2 Is the Planning Proposal consistent with Council's Community Strategic Plan or other local strategic plan? 20
4.2.3 Is the Planning Proposal consistent with applicable State Environmental Planning Policies? 27
4.2.4 Is the Planning Proposal consistent with applicable Ministerial Directions? 29
4.3 Environmental, Social and Economic Impact 39
4.3.1 Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected as a result of the proposal? 39
4.3.2 Are there any other likely environmental effects as a result of the Planning Proposal and how are they proposed to be managed? 40
4.3.3 Has the planning proposal adequately addressed any social and economic effects? .. 42
4.4 State and Commonwealth Interests 42
4.4.1 Is there adequate public infrastructure for the Planning Proposal? 42
4.4.2 What are the views of State and Commonwealth public authorities consulted in accordance with the Gateway Determination? 43
5 Mapping 44
6 Community Consultation 45
7 Timeframes 46

FIGURES

Figure 1 - The Site and Existing Zone Boundaries 1
Figure 2: Subject Land Figure 2 3
Figure 3: Existing Zoning 7
Figure 4: Proposed Zoning 8
Figure 5: Existing Minimum Lots size map 8
Figure 6: Proposed Minimum Lot size map 9
Figure 7: Developed Land within Sydney Road Precinct (Ha) (Source: Ethos Urban August 2020) 15
Figure 8: Sydney Road Development Capacity Forecast 16
Figure 9: Mid-Western Regional Comprehensive Land Use Plan - Figure 3.1 22
Figure 10:Mudgee-Gulgong Urban Release Strategy 24
Figure 11: Development Approved and Proposed Adjoining site 26

TABLES

Table 1: Comparison between existing and proposed Bunnings stores 5
Table 2: Mudgee-Gulgong Urban Release Strategy - Recommendation Area 19 25
Table 3: Relevant State Environmental Planning Policies 27
Table 4: Ministerial Directions 29
Table 5: Timeframes 46

APPENDIX

Appendix 1 – Proposed New Land Zoning Map – Sheet LZN_006H 41
Appendix 2 – Proposed New Minimum Lot Size Map – Lot Size Map – LSZ_006H 43

ATTACHMENTS

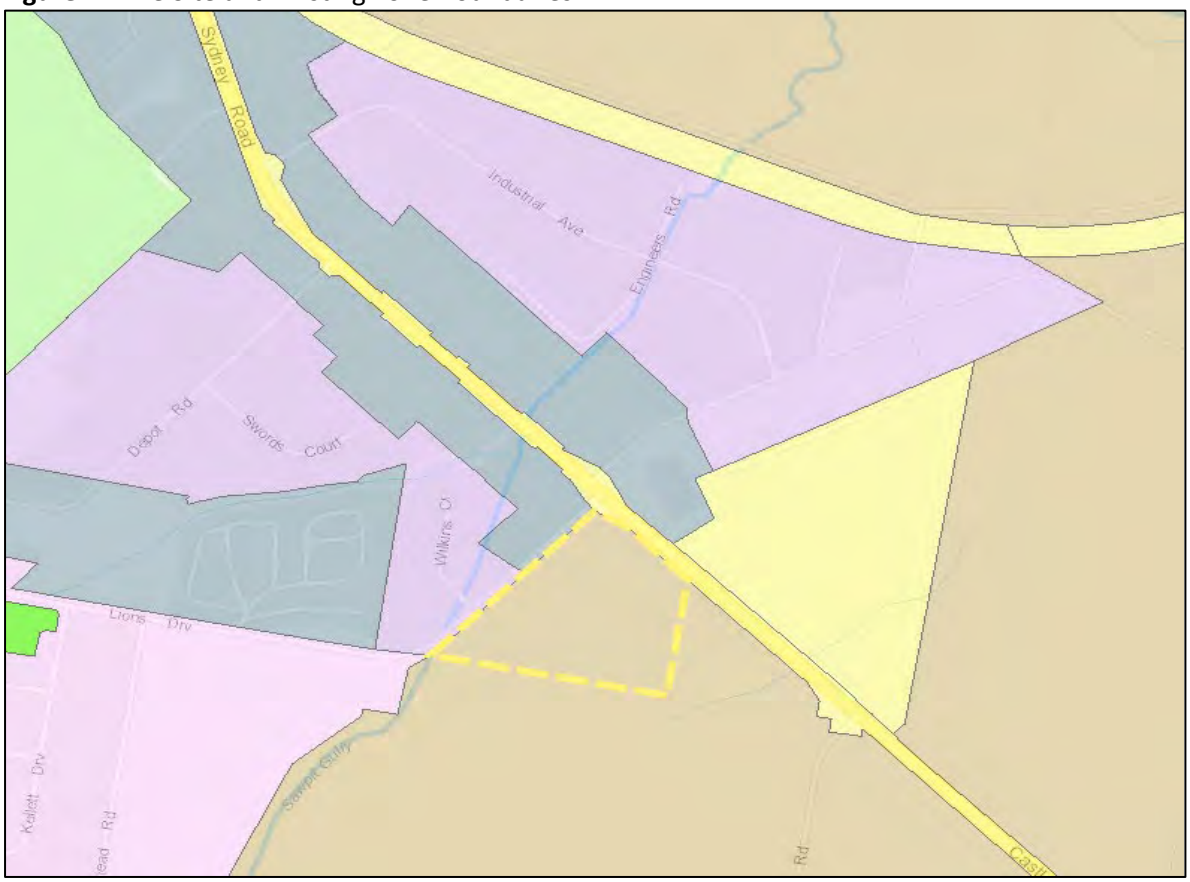
Attachment 1 – Proposed Bunnings Development Scheme
Attachment 2 - Environmental Due Diligence
Attachment 3 – Preliminary Acoustic Review
Attachment 4 – Traffic Impact Assessment
Attachment 5 – Preliminary Servicing Strategy
Attachment 6 - Preliminary Site Investigation
Attachment 7 - Flood Constraints Assessment
Attachment 8 - Economic Assessment
Attachment 9 – Visual Impact Assessment
Attachment 10 – Ethos Urban Letter – Demand for Additional B5 Land 7 July 2020
Attachment 11 – Ethos Urban Letter of Advice – Demand for Additional B5 Land 20 August 2020

1 Introduction

This Planning Proposal has been prepared in accordance with Section 3.33 of the *Environmental Planning and Assessment Act 1979* and the *Guide to Preparing Planning Proposals* (August 2016) which details the information required to be provided as part of an application for a Planning Proposal.

This Planning Proposal seeks to explain the intended effect of, and justification for the proposed amendment to the Mid-Western Local Environmental Plan 2012 (MWLEP 2012) to rezone Lot 2 DP1079362, 134 Lions Drive, Burrundulla (the subject land) from **RU4 Primary Production Small Lots** to **B5 Business Development.** Refer to **Figure 1** below for the location of the subject land and current zoning framework, and **Figure 2** for an aerial photo of the site subject to the rezoning, and immediate locality.

Figure 1 - The Site and Existing Zone Boundaries



The proposal also seeks an amendment to the MWLEP 2012 minimum lot size map to facilitate development of the subject land for large format retail purposes and complementary development so as to provide flexibility and facilitate this form of retail development and to provide additional supply of employment land. To achieve this intended outcome, it is proposed to alter the minimum Lot size map from a minimum lot size of 20ha to no minimum lot size.

The area subject to the rezoning (subject site/land) and amendment to the minimum lot size map is illustrated on **Figure 2**.

1.1 Summary of Planning Proposal

This Planning Proposal is being driven by the lack of available land zoned B5 Business Development in Mudgee to accommodate the economic need for an appropriate scale and range of large-format retail facilities to service the town and surrounding communities. This has been identified through a process that Bunnings has undertaken with its existing store, located on the corner of the Castlereagh Highway and Burrundulla Road at South Mudgee, in that it is no longer suitable for its corporate requirements and does not meet customer and operational expectations for a modern Bunnings store. Furthermore, the existing store size is not of sufficient size to service the retail catchment and as a consequence considerable escape expenditure is occurring and lost opportunity in terms of employment for Mudgee.

Detailed consideration, including obtaining development consent, has been given to expanding the existing Bunnings store, however this would result in a substandard outcome and is simply not a feasible option. Consequently, the business needs to move to a new site that will allow a larger commercial building to be constructed consistent with the modern Bunnings corporate store design so as to meet the market demand for the existing and growing retail catchment.

Consequently, Bunnings is seeking to relocate and expand the existing Mudgee store to the subject site immediately opposite the existing store site on the south-western corner of the Castlereagh Highway and Lions Drive. This would require the B5 Business Development zone to be extended across the site as a means of accommodating a new Bunnings store. This would enable a new Bunnings store to be provided that would be approximately 58% larger than the existing store, with significantly more space for the garden nursery and timber and trade sales relative to the existing store.

As will be outlined in this Planning Proposal, Councils strategic planning framework and Local Environmental Plan support a Bunnings style development in this location with land already zoned B5 Business Development and other large format retail development located adjacent to this site.

The Planning Proposal and resulting new Bunnings store (subject to DA approval) would result in not only better retail offering to the community and the construction industry, but also result in employment growth and help Mudgee capture escape expenditure in the building supplies and hardware category.

The proposal for the Subject Site includes land to ‘future proof’ any further improvements to the Bunnings store at an indefinite time in the future. Allowance is also made for other uses consistent with the operation of the B5 Business Development zone and which also responds to growing market demand and economic need in Mudgee for large-format retail and other complementary uses consistent with this zone.

The need for additional land zoned B5 has been established through extensive investigations and research by Planning Economists Ethos Urban with relevant supporting documentation accompanying this Planning Proposal (refer **Attachments 8, 10 & 11**). Current supply of employment land in the Sydney Road precinct is equivalent to between just 5 and 7 years of theoretical demand according to actual historical take up rates, well-below general policy objectives seeking at least 10 years and ideally 15 years of supply to ensure a competitive land market.

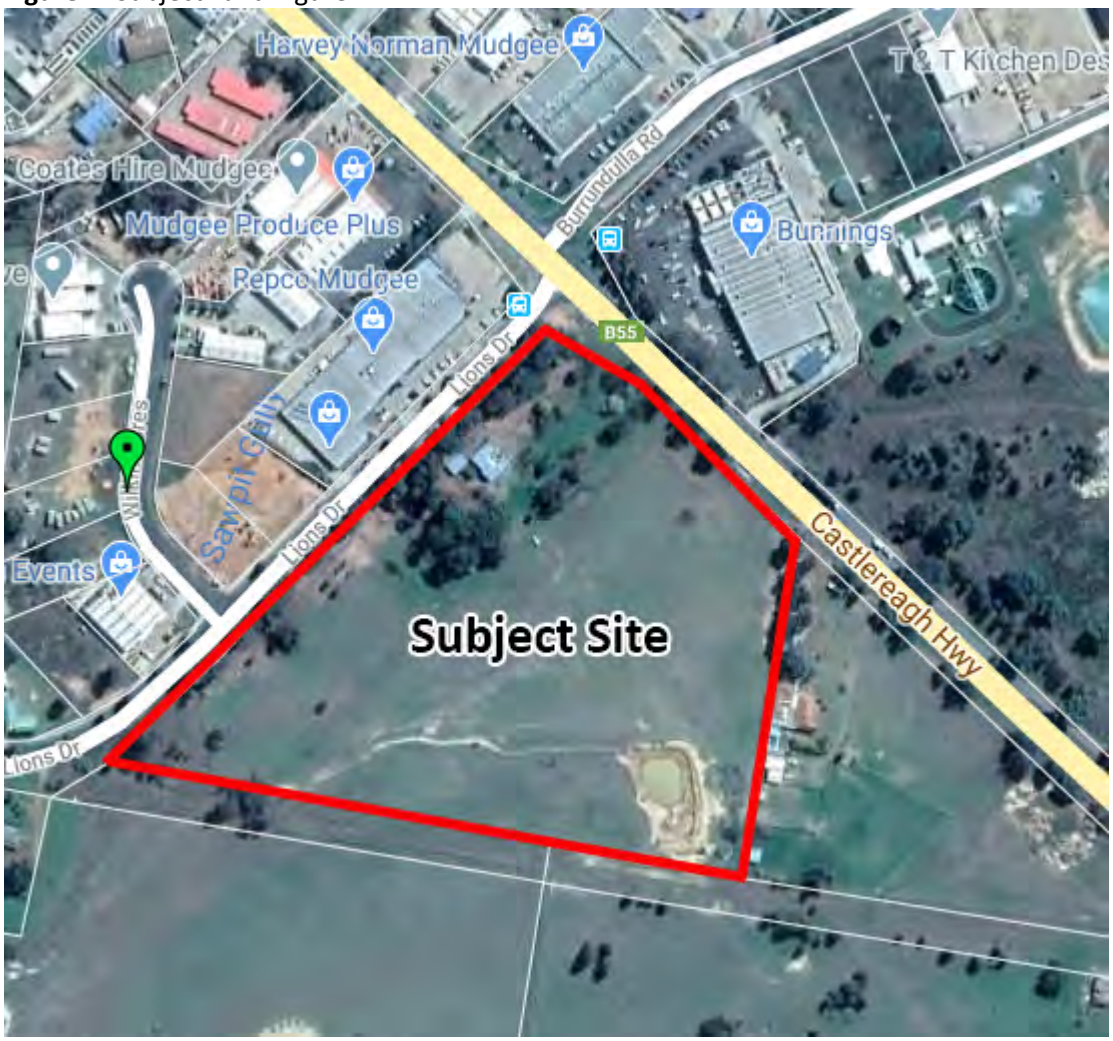
As this Planning Proposal will explain, there will be no environmental impacts and there are no infrastructure constraints to development. It should be considered a matter minor significance as it is proposing to extend an existing zoning to facilitate a development which Councils strategic framework supports.

In terms of the outcome of the existing Bunnings store site if the land the subject of this Planning Proposal is rezoned and Bunnings relocates, it is noted that it is also located at the gateway to Mudgee, is within an existing bulky goods precinct with good commercial exposure. Therefore, the existing building and site is capable being converted to a range of uses consistent with the landuse provisions applicable to the site including large format retail, trade supplies or showrooms. These uses will benefit from the high-profile location and existing infrastructure offered by the existing Bunnings Mudgee site.

1.2 Site Description

The subject site is a triangular shaped allotment and has an area of 5.37 hectares. It is located on the southern corner of Sydney Road/ Castlereagh Highway and Lions Drive adjacent to existing large retail format developments (refer to **Figure 2** below). The area is referred to variously as the Sydney Road or Mudgee Industrial area. As shown in **Figure 1** above, the current land use zoning is RU4 Primary Production Small Lots.

Figure 2: Subject Land Figure 2



1.3 Bunnings Proposal

The Planning Proposal will principally facilitate the development of a new Bunnings store in Mudgee and at the same time address a current under supply of land zoned for business development purposes in the Sydney Road precinct at South Mudgee. An existing Bunnings store operates at the eastern corner of the Castlereagh Hwy (Sydney Road), and Burrundulla Road on the south-east edge of the Mudgee urban area. Operating as part of a wider commercial and industrial precinct centred on Sydney Road (the Sydney Road Precinct), the Bunnings store is on a prominent gateway location to the town.

Opened in 2006, the existing Bunnings store has a total floorspace of approximately 4,870m^2. Although the store has traded successfully since opening nearly 15-years ago, the store is now relatively small to comparable outlets in other regional areas. Further, the outlet has an overall design and layout which no longer meets the contemporary expectations of hardware and home improvement customers, as well as the operational requirements of Bunnings.

Having previously considered options to expand and re-configure the existing Bunnings store at its current location, it became apparent that the existing site is too small and constrained to feasibly overcome the existing store deficiencies. As such, Bunnings are seeking to relocate and expand their Bunnings Mudgee store to the Subject Site opposite the existing site and on the southern corner of the Castlereagh Highway and Lions Drive (refer **Figure 2** above).

Closure of the existing Bunnings store would not occur until the new facility is constructed on the subject site. The outcome for the retail space currently occupied by the existing Bunnings store will be determined by market forces and the existing planning framework applying to the site. It is noted that the building is capable of being repurposed so that it can be easily reoccupied and used by alternative large format retail or showroom uses. Importantly, the financial incentive for Bunnings to re-lease - or to 'backfill' the existing store is informed by the existing lease on the property which will not expire until after the new Bunnings store would be operating. It should also be noted that existing Bunnings store site is located at the gateway to Mudgee, is within an existing bulky goods precinct with good commercial exposure. It is also relevant that re-use of large format commercial retail buildings has occurred successfully around Australia with a good example being the repurposing of Masters stores when that business closed.

The Subject Site has a total land area of some 5.37 hectares, and of this area 2.6 hectares would be required for the new Bunnings store. The subject site would also enable an expansion at some time in the future, with scope also provided for other land uses consistent with the operation of the B5 zone to occupy the balance of the site.

The subject site would accommodate a large-format Bunnings warehouse with a total area of some 7,700m^2. This is a size consistent with increasing demand and changing needs within the Mudgee region. The proposed floorspace mix of the new Bunnings Mudgee is shown in Table 1 and compared with the existing store. In total, the new store will increase floorspace by 2,850m^2 or 58% larger than the existing Bunnings Mudgee. The new store would be supported by 177 car parking spaces and propose entry into and out of the car park via Lions Drive, with a 'left in/left out' access point on Sydney Road. The new store would also provide a high-quality, purpose-built and modern format hardware warehouse which overcomes significant limitations for both customers and Bunnings associated with the existing store.

It is Bunnings objective to open the store by mid-2022.

Table 1: Comparison between existing and proposed Bunnings stores

Bunnings Facility	Existing Floor Area m^2	Proposed Floor Area	Increase Area
Main Warehouse	3,300m^2	3,960m^2	660m^2
Nursery & bagged goods	990m^2	1,620m^2	63 m^2
Timber trade area	580m^2	2,140m^2	1,560m^2
Total Retail	**4,870m^2**	**7,720m^2**	**2,850m^2**

The Bunnings proposal has been assessed by economists Ethos Urban, who note the site has the following advantages:

- ***Strategic location:*** *the site is located on Castlereagh Highway, which is the key north-south road connection through Mudgee, and which has a high degree of accessibility to the surrounding region.*
- ***Exposure****: the site has significant exposure to the large volume of passing traffic on the Castlereagh Highway, with strong sight lines to the site for this traffic and customers within the Sydney Road Precinct.*
- ***Serving trade customers****: the site is well-located with respect to potential local business customers given the proximity of trade and industry uses.*
- ***Accessibility****: the site is easily accessible with access to be provided via both Lions drive and Castlereagh Highway.*
- ***Land area****: the total size of the proposed site is approximately 4.9 hectares can easily accommodate the Bunnings warehouse building and car parking, access ways and landscaping that are required. Site depth and layout is also able to adequately accommodate the Bunnings store footprint.*

The site is also logically located in the context of well-established large format retailing developments in Mudgee with the opposite site on the western corner of the Lions Drive/ Castlereagh Highway intersection containing the Homemakers Centre, and the northern corner of the intersection containing a Harvey Norman's development.

1.3.1 Supply of Additional B5 Business Development Land

While this Planning Proposal is being driven by the Bunnings proposal to relocate and expand its offering to Mudgee, it also addresses a current under supply of B5 zoned land in Mudgee. The current local strategic planning framework has been informed by work undertaken as part of the *Mudgee Retail Study* which dates back to 2000, and was last updated in 2005. Consequently, the data that was relied upon to inform the *Mid-Western Regional Comprehensive Land Use Strategy* in regard to demand and supply of land for large format retailing is somewhat outdated. This Planning Proposal incorporates extensive investigations and research undertaken into the supply and take-up of B5 zoned land within the Sydney Road precinct. These investigations have concluded that the current supply of employment land in the Sydney Road precinct is equivalent to between just 5 and 7 years of theoretical demand which is well-below general policy objectives seeking at least 10 years and ideally 15 years of supply to ensure a competitive land market.

2 Objectives and Intended Outcome

The objective of this Planning Proposal is to amend the Mid-Western Local Environmental Plan 2012 so as to provide an appropriate supply of appropriately zoned land within the Sydney Road precinct at South Mudgee to facilitate large format retail development, including hardware and building supplies style businesses, and provide additional land supply for complementary employment generating activities

Extensive economic and land supply and demand analysis has been undertaken and it has established that there is inadequate supply of employment zoned land to support existing and projected demand for large format retail development. Further, the demographic characteristics of Mudgee and current escape expenditure support demand for further large format retail development, including hardware and building supplies style businesses.

As a consequence, growth in this retail sector is currently being restricted in Mudgee, which is identified as a strategic centre in the Central West and Orana Regional Plan 2036 which is limiting the available retail services and facilities to the local population and limiting employment and investment.

The intended outcome therefore of this Planning Proposal is to rezone additional land that will support large format retail development, and in particular hardware and building supplies style businesses, in a location that is consistent with Councils strategic planning framework namely its adopted Retail Study and Comprehensive Landuse Plan.

3 Explanation of Provisions

The intended outcome will be achieved by:

- Extending the current **B5 Business Development** zone, that exists along Sydney Road at Burrundulla (refer to **Figure 1**), over Lot 2 DP1079362, 134 Lions Drive (the subject land). This will result in the landuse zoning of the subject land changing from the **RU4 Primary Production Small Lots**, to the **B5 Business Development** zone.
- Amending the **minimum lot size map** to facilitate future retail development of the site. In order to provide flexibility for future uses, the proposal is to have no minimum lot size applying to the land.

This will involve amendments to the following MWLEP 2012 Maps:

- Land Zoning Map – Sheet LZN_006H; and
- Lot Size Map – LSZ_006H

Figures 3 & 4 show the existing and proposed zoning and **Figures 5 & 6** the existing and proposed minimum lot sizes for the subject land.

Figure 3: Existing Zoning

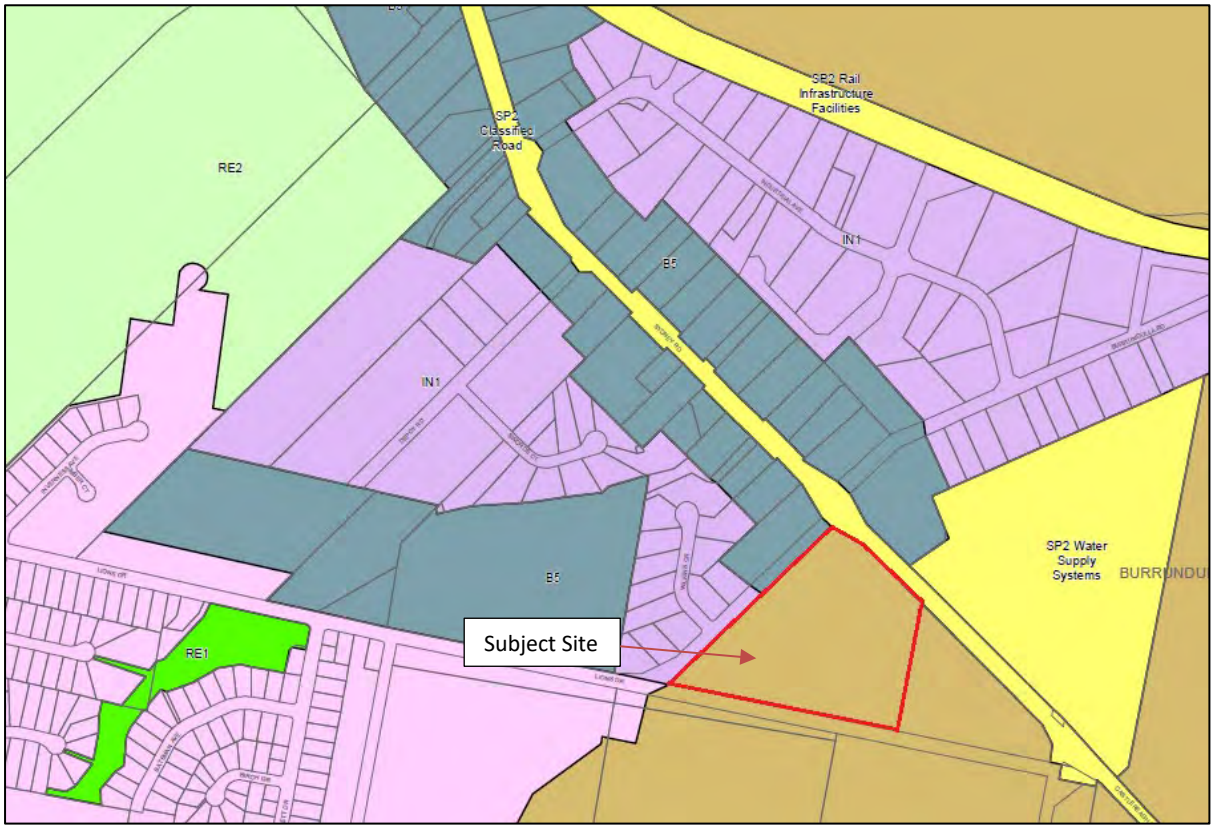


Figure 4: Proposed Zoning

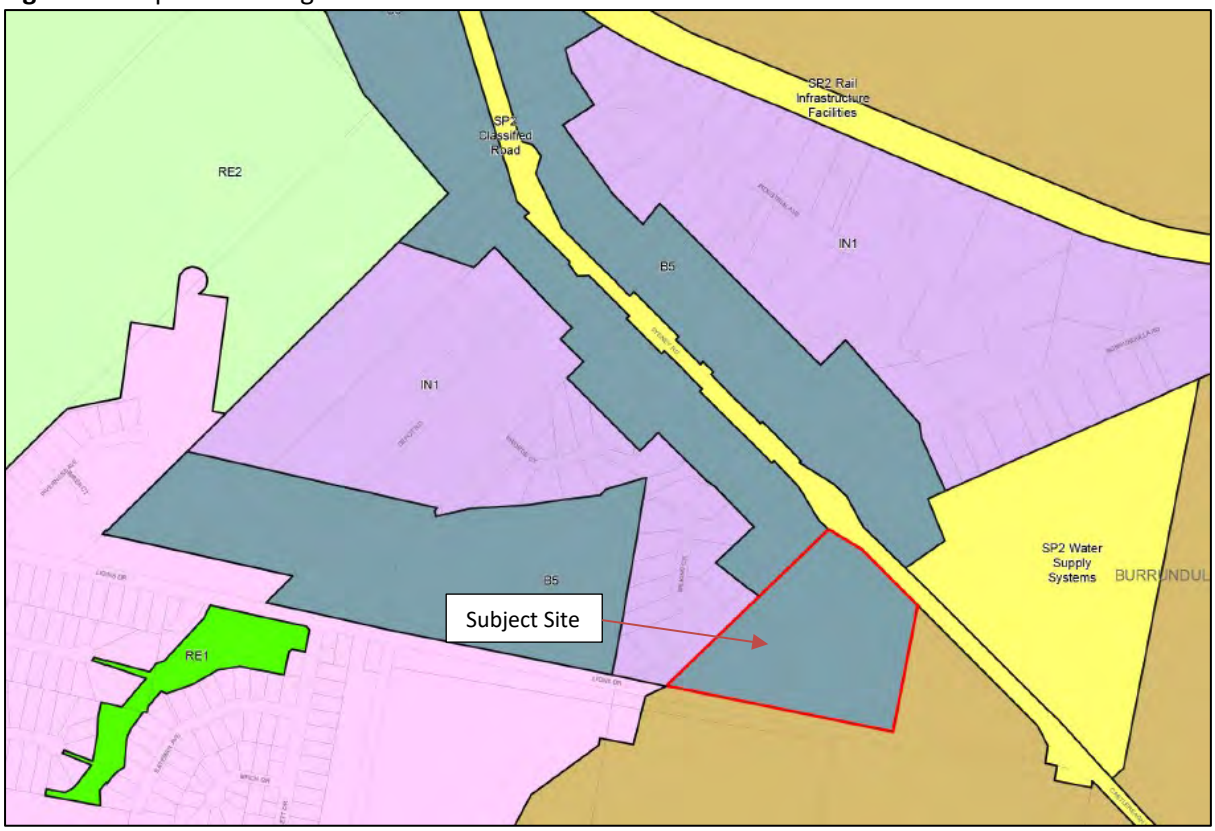


Figure 5: Existing Minimum Lots size map

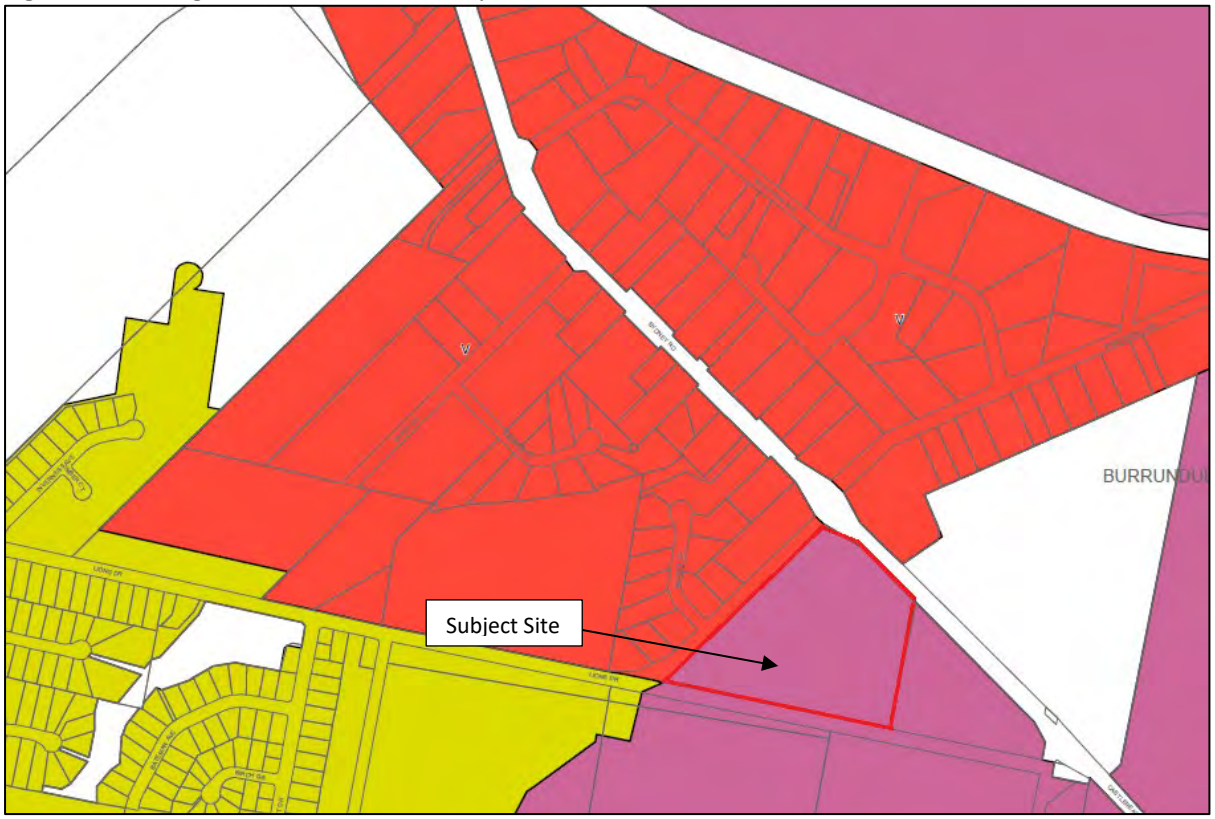
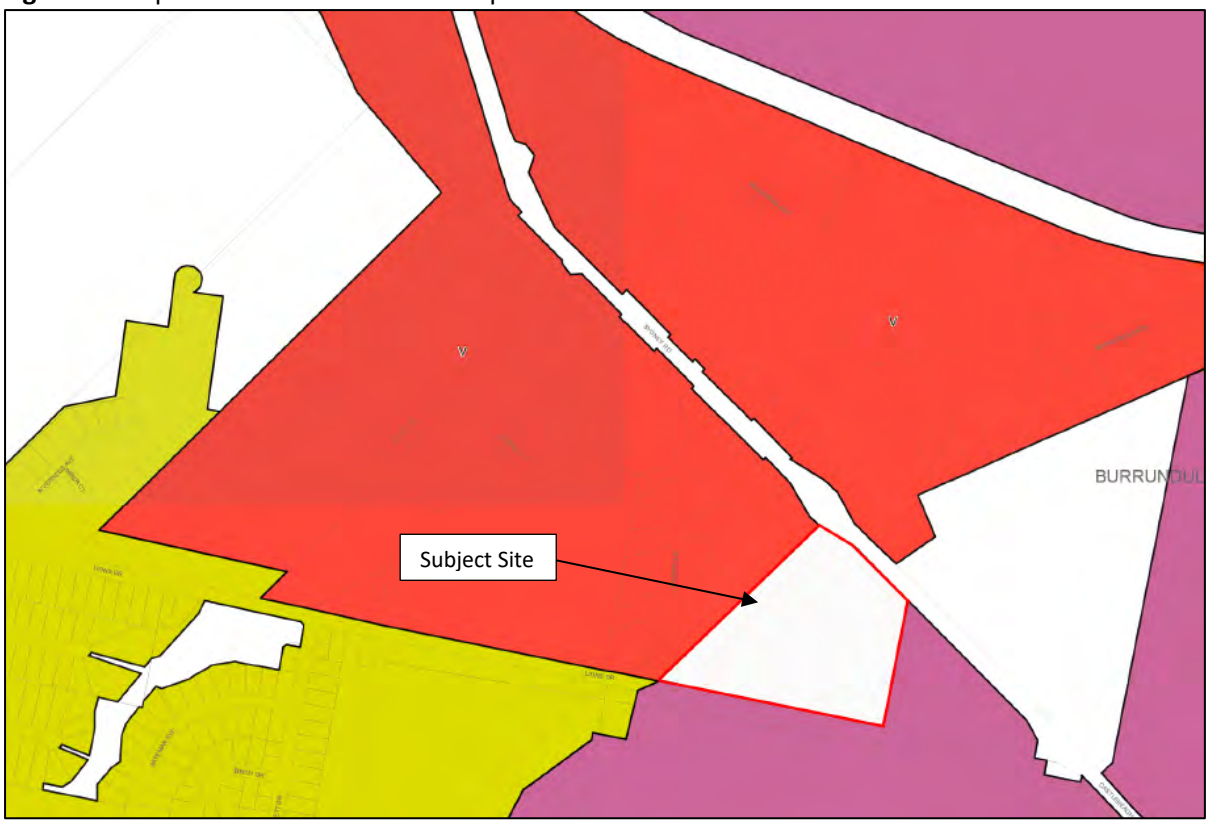


Figure 6: Proposed Minimum Lot size map



4 Justification for Proposed Rezoning

In accordance with the Department of Planning's *guide to Preparing Planning Proposals',* this section provides a response to the following issues:

- Need for the Planning Proposal;
- Relationship to the strategic planning framework;
- Environmental, social and economic impact; and
- State and Commonwealth Interests.

4.1 Need for the Planning Proposal

4.1.1 Is the Planning Proposal a result of any Strategic Study or Report?

The catalyst for this Planning Proposal is the need for a particular business, Bunnings, which is currently restricted on its current site, to relocate to a newer site so that a larger retail facility can be provided.

The relevant 'Strategic Study' and report that support this Planning Proposal are:

- Retail Study (Ratio Consultants; August 2005) prepared for the Mid-Western Regional Council, and
- Economic Assessment (Ethos Urban; January 2020; Letters of advice dated 7 July 2020 & 20 August 2020) prepared to support this Planning Proposal.

4.1.1.1 (Mudgee) Retail Study (Ratio Consultants; August 2005)

The purpose of the Mudgee Retail Study was "*to undertake a comprehensive review of retail and commercial requirements for the Mid-Western Regional Council*". Some of the commentary contained in this study that is relevant to this Planning Proposal is as follows:

- *Significantly, most of the retail commercial investment in the Mudgee and Rylstone SLAs over the past two decades has centred on the Mudgee CBD, and recently in the Mudgee Industrial area.*
- *The current development trends reflect a dynamic pattern of investment that has gathered pace over the last decade for new retail development (or redevelopment) to be either focused in the CBD or located in the Mudgee Industrial area. The 'drivers' that have continued to generate this pattern include the following:-*
    - *the emerging policy position of Council to provide for the growing bulky goods market in the Mudgee Industrial area;*
    - *market support for further significant bulky goods development investment in the Mudgee Industrial area, driven by the ongoing growth in Mudgee and its Regional Catchment Area and desire for traders to acquire additional market share.*
- *A significant increase in the supply of bulky goods floorspace of approximately 6,000 m2, or about 57%, during this period;*
- *Further significant growth in bulky goods floorspace in the Sydney Road precinct (Mudgee Industrial Area). The precinct showed an overall increase in retail and commercial floorspace of approximately 8,000 m2, or by about 23% over the five-year period.*
- *The Mudgee Industrial Area on Sydney Road provides for a range of building supplies and trade sales. An important issue for future policy development is the extent to which this area should be allowed or facilitated to develop as a major bulky goods precinct to meet the needs of the Shire and surrounding districts.*

- *This review has identified a future requirement for an additional 23,000 square metres (m2) gross leasable area (GLA) of retail goods and services floorspace over the period 2000-2021, broadly comprised as follows:*
    - *non-food retail goods floorspace (including discount department stores, clothing and household goods stores, other specialty non-food stores and bulky goods stores): 12,440m2 GLA over the 21-year period;*
- *The current projected demand for non-food retail goods floorspace for the period to 2021 is notably higher than originally indicated in the 2000 study (12,440m2 GLA compared to the original projection of 10,620m2 GLA, refer Table A.2). The higher requirement has arisen as a consequence of:*
    - *likely higher real demand for bulky goods;*
    - *the likelihood of significant reductions in escape expenditures being achieved over the next decade as new recognised traders locate in Mudgee.*
- *An important challenge for policy development is the role of bulky goods retailing to meet the growing needs of the Shire and its region. It is likely that there will be significant prospects for the future growth and consolidation of this sector in the Shire over the next ten years and beyond. An important challenge will be to provide a location and planning framework that:-*
    - *best meets the emerging and future needs of the Shire and surrounding districts;*
    - *best contributes to a sustained reduction in escape expenditures for retail goods and services;*
    - *reinforces the regional role, competitiveness and long-term sustainability of the Mudgee CBD.I*

  In relation to the bulky goods issue, it is likely that there are at least three strategies available to Council in relation to the location, establishment and management of a future bulky goods district. These are:-
    - *designation and facilitation of a bulky goods precinct to adjoin or as part of the Mudgee Industrial area focused around Sydney Road. It is recognised that this is the current direction of Council policy;*
    - *…*
    - *a strategy which provides for the higher value/more intensive bulky goods stores to be located in the Church Street South area (e.g. homewares and furnishings stores, music stores, sporting goods stores); and for the most space extensive stores/lower value bulky goods stores to be located in the Mudgee Industrial area focused around Sydney Road (e.g. hardware stores and builders' supplies, automotive parts supplies, boat supplies, agricultural equipment supplies, etc). This would constitute a further refinement to current Council policies, but it may well offer the best long term strategy to most effectively reinforce and add value to the Mudgee CBD and assist its development as a high quality regional attraction and service centre for the Shire and surrounding districts.*
- *This review has identified that significant demand for additional retail goods and services floorspace is likely to be required in the Mudgee CBD, and to a lesser extent in the Mudgee Industrial area. As indicated above, it is recommended that Council should as a matter of priority resolve its policy stance in relation to the future strategic direction and allocation of retail and commercial land, particularly in relation to the management of bulky goods floorspace requirements over the next two decades and beyond.*

Those outcomes from this study of relevance to this Planning Proposal are as follows:

> ***Mudgee Central Business District*** *is the principal town centre for Mudgee and its region; providing administrative and community services and serving as the major retail and commercial centre for the Shire and surrounding districts. Strategic objectives for the Mudgee CBD should be required to ensure the following:*
>
> - *that all regional level retail facilities, other than approved bulky goods stores and services, are located in the Mudgee CBD, or approved extension areas of the CBD;*
> - *Council consider a policy review of future bulky goods development in the Shire. The review should place emphasis on the extent to which the adopted strategy will add value, attraction and amenity to the Mudgee CBD as the pre-eminent regional activity and service centre in the Shire and its region.*

The Mudgee Retail Study provides the following direction in relation to large format retailing, or bulky goods retailing:

- The subject site lies adjacent to what is the Sydney Road or Mudgee Industrial Area, and it is this area that has been identified for future bulky goods retail along with a precinct in Church Street adjacent to the Mudgee CBD. However, the Church Street precinct is characterised by smaller lot sizes and is therefore more compatible for homewares and furnishings stores, music stores, sporting goods stores and other similar type retail activities, while the Sydney Road Industrial Area is nominated as being suitable for "*hardware stores and builders supplies*…".
- When this study was endorsed by Council in 2005, it sought to be proactive about rezoning additional land in the Sydney Road Industrial Area for additional bulky goods retail development.

4.1.1.2 2019 Economic Analysis of Large Format Retailing in Mudgee

Ethos Urban, who provide economic consultancy services, have undertaken an economic analysis of large format retailing in Mudgee and the Bunnings proposal. This analysis has examined the trade area for Bunnings Mudgee and analysed population trends and forecasts, housing development trends, and the socio-economic characteristics of the trade area population. As part of this process a land supply audit to determine the availability and location of appropriately zoned land for this form of development was also undertaken.

The land supply audit determined that the existing planning framework in Mudgee cannot accommodate a new Bunnings store as proposed. Further, the assessment identified a relatively low vacancy levels and overall strong demand for employment land in the Sydney Road Precinct by a range of potential users.

The Ethos Urban report identifies the trade area which describes the geographic area that would be served by the new and expanded Bunnings Mudgee store. This trade area reflects current trading patterns of Bunnings Mudgee, with an allowance for the regional appeal of a new and enhanced store.

The Ethos Urban reports states that "*in 2018, the population of the trade area was estimated at 26,840 residents. This represents total growth of +1,960 persons on the trade area population in 2011 or a growth rate of 280 persons per annum over the period. The population of the trade area is expected to be growing for at least the next 20 years. In 2036, a total population of 30,190 persons is forecast for the trade area, or an increase of +3,350 persons on the current level*."

In relation to per capita spending on Bunnings Type Merchandise by trade area residents, Ethos Urban report has a 2018 estimated of $1,850, which they note is 2% above the regional NSW benchmark. They go on to states that "*in 2018, total Bunnings Type Merchandise spending by trade area residents is estimated to be $49.0m. By 2033, total spending by trade area residents on Bunnings Type Merchandise is projected to increase to $66.5m per annum in constant 2018 dollars. Additional spending on Bunnings Type Merchandise will also be generated by the local business sector*."

The Ethos Urban report has forecast that the proposed expanded Bunnings Mudgee store will achieve a total turnover of approximately $22.9m in its first year of trading. They note that "*this represents an average trading level of approximately $2,970/m2 (2022). During the first year of trading, the store is forecast to capture approximately 29% of the retail market for Bunnings Type Merchandise in the trade area, some 6% higher than the 23% market share achieved by the existing Bunnings Mudgee*."

Notwithstanding the projected Bunnings trading figures in their first year, the Ethos Urban report estimates that "*the spending by trade area residents on Bunnings Type Merchandise that is available to all other retailers will still increase by $0.2m relative to existing levels. Thus, any trading impacts will be well within the bounds of a normal and competitive retail sector*."

From this analysis the report that the level of escape spending in the hardware category from the trade area is $12m which represents 35% of total spending by trade area residents. Therefore, it is reasonable to assume that the proposed new and enhanced Bunnings Mudgee will attract sales and visitation which otherwise might be directed to Bunnings stores at Dubbo and Bathurst.

From a Net Community Benefit perspective, the Ethos Urban report notes the following:

- That the development of a new Bunnings store at the subject site will require a capital investment of approximately $13.0m.
- That the construction of the new Bunnings store would support 32 FTE construction jobs and 50 flow-on jobs FTE during the construction phase and assuming a typical 12-month construction period.
- The number of people directly employed at a new Bunnings Mudgee would total an estimated 75 full-time, part-time and casual positions. This level of employment is a net increase of approximately 20 positions on the existing Bunnings Mudgee.
- Opportunity to backfill the existing Bunnings Mudgee with new tenants may provide for a further 50 net additional jobs.

4.1.1.3 Urban Ethos Letter of Advice – Demand for Additional B5 Land; 7 July & 20 August 2020

Urban Ethos have also undertaken further targeted analysis and research into the supply and demand of B5 Business Development zoned land in the Sydney Road precinct at South Mudgee with letters of advice being issued on 7 July and 20 August 2020 (refer **Attachments 10 & 11**). Specifically this work provides further analysis of:

- The historic and forecast demand for appropriately zoned land (most importantly in the B5Z) within the Sydney Road precinct.
- Reasonable market expectations for tenant demand in the precinct, as relevant to the releasing of the existing Bunnings store, and future leasing of the ancillary tenancies at the proposed Bunnings site.
- Other additional commentary of relevance to the proposed Bunnings and demand for uses envisaged within the Sydney Road precinct.

Although the B5 zone is generally intended to accommodate uses with a more commercial focus and which require exposure to passing traffic, in reality there is a significant overlap in terms of the scale and nature of allowable development with the other zones which are also located in this area, namely the IN1 General Industrial zone and the IN2 Light Industrial zone. The nature and scale of uses accommodated under the three zones is very diverse and can include businesses operating across a wide range of industries and with extremely different demand drivers. The range of industries accommodated include everything from childcare facilities (B5Z) through to funeral homes (INZ1) and timber yards (all three zones).

As such, the Urban Ethos report notes that "*any assessment of the future demand for land in the Sydney Road precinct can be considered a generalised assessment only. This is based on reasonable land development expectations, rather than a specific assessment of all the myriad of land uses able to be accommodated across the relevant zones*."

In relation to this issue Urban Ethos (August 2020) note:

> *"In regional towns such as Mudgee, which lack the scale and 'market depth' of major regional cities and metropolitan areas, the demand for employment land is often lumpy and unpredictable.*
>
> *As such, it is not uncommon in similar sized towns to Mudgee for a large land use, such as a Bunnings, to require land which otherwise is not identified in a traditional demand analysis using historical take up data. For this reason, many regional Council's allow for 15-years worth of supply of undeveloped industrial land so as to accommodate fluctuations in demand as and when they arise."*

In terms of the land supply analysis undertaken by Ethos Urban (August 2020, pgs 4 – 5) the key findings were:

- *Currently, 83.5 ha of land or 89.0% of all lots in the Sydney Road precinct are developed, or around 11.0% of the lots remain undeveloped.*
- *Of a total of 163 lots within the Sydney Road precinct, 139 have been developed with 24 lots classified as undeveloped.*
- *Although a small number of developed lots are underutilised, historical imagery shows that this utilisation can increase over time through more efficient use of land, more intensive*

development, or sub-dividing lots to respond to tenant demand (this has primarily occurred along Sydney Road).

- *The historical period with the fastest take up rate was between the years **2003 to 2010**, when the average annual take up rate was at an average of 5.3% per annum. This is equivalent to 3.4 Ha of land being developed each year, or an average of 6.8 lots developed annually during this period.*
- *Since 2010, the average take up rate has declined to an average of 1.1% per year between 2010 and 2015, and just 0.3% between 2015 to 2020. This slower take up rate co-incides with the occupancy rate approaching 90% (i.e available land at around 10% of total supply).*

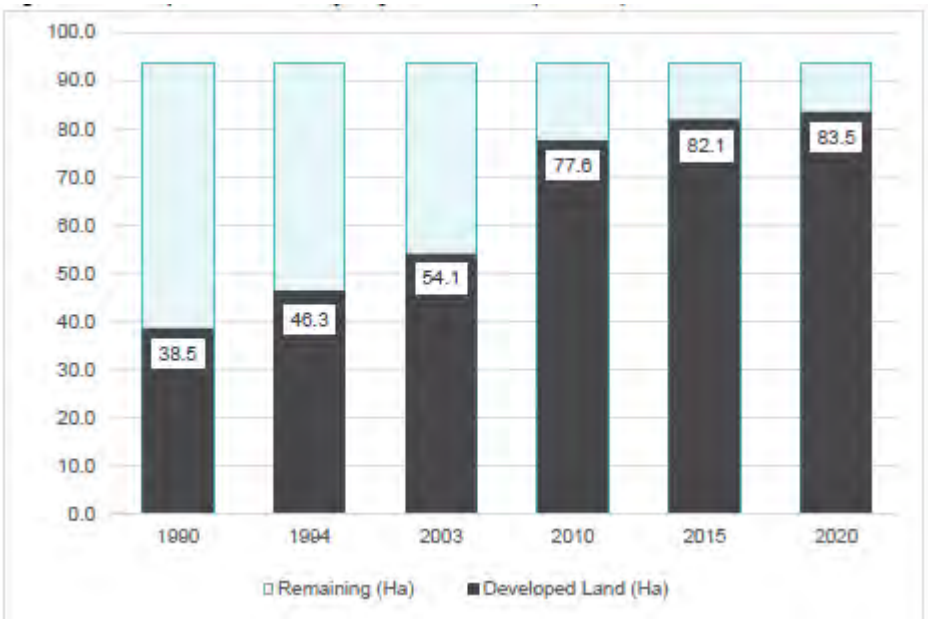


Figure 7: Developed Land within Sydney Road Precinct (Ha) (Source: Ethos Urban August 2020)

"As identified in Figure 7 above, since 2010 the rate of land development in the Sydney Road Precinct has declined as the share of developed land has approached 90% (i.e 10% undeveloped).

Since 2010, the rate of development in the Sydney Road precinct has been just 0.6 hectares per annum, well below the development rate of 2 hectares per annum experienced between 1990 and 2010. This slow down in development within the Sydney Road precinct does not appear to be associated with an increased take up of land at other locations in Mudgee.

Further, this slow down in demand for employment land in Mudgee since 2010 is not consistent with our analysis of employment land undertaken in other regional cities and areas of Australia. Indeed, demand for industrial land across Australia has grown relatively consistently over the past 25-years.

In addition, the rate of population growth in Mudgee has accelerated since 2010. This implies growing demand for service industry to meet the needs of the resident population, not a slowing of this demand as is identified in actual development rates in the Sydney Road precinct since 2010.

This indicates, at least anecdotally, the current availability of vacant sites is not consistent with the locational expectations of potential occupiers. In particular, those seeking exposure to Sydney Road.

As identified in the January 2020 Economic Assessment report, the current availability of appropriately zoned land does not accommodate the requirement for a new and larger Bunnings Mudgee. Thus a rezoning of the subject site on the south-west corner of Lion Drive and Sydney Road to the B5Z is now proposed."

The August 2020 Ethos Urban advice also provides a forecast of demand for employment land in the Sydney Road precinct using historical take up rates and applying this to current land availability and states as follows:

Two scenarios have been identified:

***High Scenario**: This scenario assumes the take up rate achieved between 1990 and 2010 of 2 hectares per annum is achieved from 2020 onwards. This scenario reflects demonstrated demand for employment land in the Sydney Road precinct in a 20-year period where a strong supply of available and appropriately located land was available.*

***Low Scenario**: Applies the more conservative take up rate of 1.5 hectares per annum achieved across the 30-year period from 1990 to 2020, including the more recent slow down in rates of development.*

As shown in Figure 8, under the High Scenario the Sydney Road precinct has a theoretical land supply of 93.8 hectares which reaches full capacity in 2025, while even under the Low scenario this is achieved in 2027.

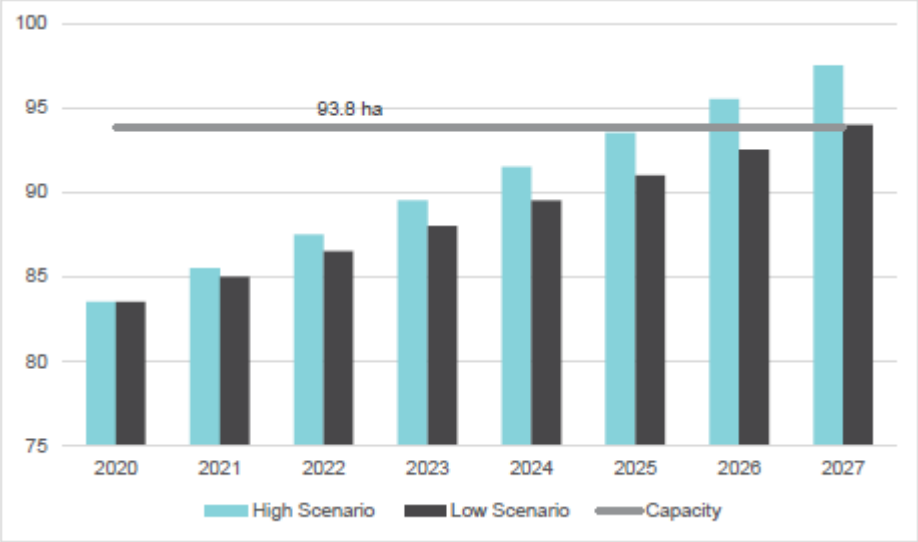


Figure 8: Sydney Road Development Capacity Forecast

This is well below the generally accepted requirement for at least 10 years, and preferably 15 years of available employment land supply which is recommended for a competitive land market.

In the context of the above, the proposed rezoning of 5.5 hectares of land to the B5Z at the corner of Lions Drive and Sydney Road would increase the available employment land supply to 99.3hectares. On this basis, theoretical capacity would be reached on the following timelines:

***High Scenario**: 2028*

***Low Scenario**: 2031 or just within the generally accepted 10 to 15 years of supply typically applied in a land use planning context.*

Note that of the 5.5 hectares proposed for rezoning, Bunnings itself requires approximately half. The balance will be developed over time for a mix of showroom, bulky goods, light industrial or other uses as appropriate for the B5Z (see also Table 1 of this letter).

On this basis, we continue to believe that the demand for the proposed expansion and relocation of Bunnings Mudgee:

- *The current Bunnings Mudgee store is located on land in the B5 Zone within the Sydney Road precinct that is unable to meet current and anticipated operator and customer requirements*
- *Other vacant land in the Sydney Road precinct is not appropriate or able to accommodate a new Bunnings store as currently proposed*
- *With the exception of a parcel of land adjacent to the railway corridor which has access and layout issues, land within the B5 Zone fronting Sydney Road is in strong demand and has a high occupancy rate (well over 90%)*
- *Both the existing Bunnings location and the pad sites at the proposed new Bunnings have exposure to Sydney Road and will be attractive to prospective tenants seeking to locate in Mudgee*
- *Notwithstanding the impacts of COVID-19, Mudgee is experiencing, and is forecast to continue experiencing, population growth that will increase demand for the mix of business and warehouse uses, and specialised retail premises that require a large floor area. That is the preferred development outcome in the B5 Zone, and more generally within the Sydney Road precinct.*

Further, our historic land supply analysis for the Sydney Road precinct specifically identifies an existing shortfall in vacant and available zoned land which is appropriate to accommodate new business development. This is such that the supply of developable employment land in the Sydney Road precinct is more restrictive than contemporary land use policy objectives which generally seek at least 10 years, and preferably 15 years of supply.

The summary and concluding comments provided in the August 2020 Ethos Urban advice is as follows:

- *The development rate of land in the Sydney Road precinct has historically been significantly higher than in recent years, and averaged 2 hectares per annum between 1990 and 2010 • Since around 2010 when the occpuancy of land in the Sydney Road precinct has approached 90%, and land with characteristics desirable for business occupants has become more rare, the rate of development in the precinct has slowed considerably to just 0.6 hectares per annum*
- *Historically demand for land in the Sydney Road precinct has been concentrated on lots fronting Sydney Road and within the B5Z*
- *Current supply of employment land in the Sydney Road precinct is equivalent to between just 5 and 7 years of theoretical demand according to actual historical take up rates, well-below general policy objectives seeking at least 10 years and ideally 15 years of supply to ensure a competitive land market*

- *This is reflected in relatively high rates of growth in the cost of land in the Sydney Road precinct which is then passed on to tenants*
- *The rezoning of land to the B5Z to accommodate an expanded and more modern Bunnings represents a sensible and incremental expansion to the Sydney Road precinct of approximately 5.5 hectares or 6%*
- *Even with this rezoning, the total supply of employment land in the Sydney Road precinct would be readily absorbed by theoretical demand in around a decade*
- *Discussions with agents and a site visit confirm that market conditions exist for the reasonable expectation of a prompt re-leasing of the current Bunnings Mudgee building, and subsequent leasing of ancillary tenancies adjacent to the new Bunnings Mudgee in subsequent years as demand allows*
- *That this would be achieved in a manner that does not undermine the vibrancy and economic sustainability of the balance of the Sydney Road precinct, and in fact is likely to attract additional visitation and businesses to the town.*
- *It remains our firm view that a strong economic need has been demonstrated for the proposed new Bunnings Mudgee, and that the proposed rezoning provides an important opportunity to enhance the economic performance and contribution of the wider Sydney Road precinct. This is to the achievement of a net community benefit to the residents of Mudgee, as is relevant to matters within our expertise."*

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

Having regard to the objects of the EP&A Act 1979, a Planning Proposal is considered to be the only means of achieving the intended outcomes. Hardware and building supplies businesses are currently prohibited in the RU4 Primary Production Small Lots zone that applies to the site, and the only means of enabling such development on the site is to either rezone the site to a zone that permits this landuse, or include the landuse as a permissible use in schedule 1 of the MWLEP 2012.

The B5 Business Development zone adjoins the subject land and permits hardware and building supplies businesses. Consequently, the most efficient way to achieve the intended outcome is to extend the B5 zone across the subject land.

Having previously considered options to expand and re-configure the existing Bunnings store at its current location, it became apparent that the existing site is too small and constrained to adequately overcome the existing store deficiencies. This was determined during the detail design phase following a development consent for the store expansion being issued in September 2018.

As such, Bunnings are seeking to relocate and expand their Bunnings Mudgee store to the Subject Site opposite the existing site and on the southern corner of the Castlereagh Highway and Lions Drive.

4.2 Relationship to the Strategic Planning Framework

4.2.1 Is the Planning Proposal consistent with the objectives and actions of the applicable regional, sub-regional or district plan or strategy (including any exhibited draft plans or strategies?

4.2.1.1 Central West and Orana Region Regional Plan 2036

The ***Central West and Orana Regional Plan 2036*** is the State governments 20-year blueprint for the future of the Central West and Orana region. The plan covers a vast area of the state from Condobolin and Nyngan in the west, to Forbes, Cowra, Blaney and Oberon in the south and Coonabarabran and Coonamble in the north and Rylstone, Mudgee, Kandos and Lithgow in the east.

Mudgee is identified in the plan as a 'strategic centre' meaning that Mudgee is seen as a major centre of regional strategic importance supporting the rural communities in that area.

Provisions within the Regional Plan relevant to this Planning Proposal are as follows:

Direction 10: Promote business and industrial activities in employment lands

- *"Regional cities and strategic centres will experience the highest take-up of employment land and will provide higher-order retail and business services for their surrounding areas."*

The proposed rezoning meets this statement as the rezoning of the site to the B5 zone will facilitate a new Bunnings hardware and buildings supplies business which is considered a "higher order retail service.

- *"New retail activity and small business growth should be located in or adjacent to main streets and existing commercial centres to capitalise on existing transport and community infrastructure, enhance public spaces and strengthen the role and function of the area. Any development proposed for land outside existing commercial centres will need to demonstrate the social and economic benefits of such a location."*
- *Action 10.6:* "*Accommodate future commercial and retail activity in existing commercial centres, unless there is a demonstrated need or social and economic benefits to locating this activity elsewhere."*

While the subject site is not located within the Mudgee CBD, a landuse supply audit concluded there was no land of sufficient size to accommodate a large new Bunnings store in the Mudgee CBD. In any case, there is existing large format retail developments, including a Bunnings store adjacent to the subject site and the Councils own strategic planning framework directs this form of development to this area of the town.

- *Action 10.7: "Require proposals for new retail development to demonstrate how they:*
  • respond to retail demand;
  • respond to innovations in the retail sector;
  • maximise public transport and community infrastructure commensurate with the scale of the proposal; and
  • enhance the quality of public areas."

In relation to the first two dot points, the Planning Proposal is supported by an Economic Assessment prepared by Ethos Urban which sets out the case for the Planning Proposal and the Bunnings development in particular. In relation to the third dot point regarding public transport and community infrastructure, the Planning Proposal will support an existing area that contains large format retail

development and therefore further support through demand based activity public transport in this area. In terms of enhancing the quality of public areas, the subject site is at the gateway to Mudgee and provides an opportunity for streetscape works to improve this entrance into what is an important tourist destination in the Central West.

Direction 15: Increase resilience to natural hazards and climate change

- *Action 15.1: Locate developments, including new urban release areas, away from areas of known high biodiversity value; areas with high risk of bushfire or flooding; contaminated land; and designated waterways.*

Studies have been undertaken supporting this Planning Proposal that have established that the site does not contain areas of known high biodiversity value, is not subject to a high risk of bushfire, is not contaminated land or part of a designated waterway. The site is subject to minor levels of flooding generally less than 25cm in a 1:100 year event. A flood constraints assessment undertaken by WMA Water concludes:

> *"The flow rates and volumes within the site for the 1% AEP are unlikely to present a major constraint in terms of minimum floor levels. Filling would likely be required for the main building footprint, together with provision of a managed flow path around the boundary of the site."*

Direction 16: Respect and protect Aboriginal heritage assets

- *Action 16.2: Undertake Aboriginal cultural heritage assessments to inform local land use strategies and to identify any appropriate heritage management mechanism.*

An online search of the NSW Aboriginal Heritage Information Management System (AHIMS) and extensive search has been undertaken. No Aboriginal places have been declared in the area; and no Aboriginal sites have been recorded within 200m of the proposed works area. An Aboriginal Cultural Due Diligence assessment was undertaken by Firebird ecoSultants Pty Ltd and found that the rezoning was unlikely to impact on any items of aboriginal cultural heritage significance.

4.2.2 Is the Planning Proposal consistent with Council's Community Strategic Plan or other local strategic plan?

There are two local strategic plans that have context in terms of the site, but only one deals with the proposal and these are the:

- Mid-Western Regional Comprehensive Land Use Strategy (endorsed by DPIE), and
- Mudgee and Gulgong Urban Release Strategy(not DPIE endorsed)

4.2.2.1 Mid-Western Regional Comprehensive Land Use Strategy

Both the Mid-Western Regional Council and the then Department of Planning have endorsed the *Mid-Western Regional Comprehensive Land Use Strategy* that provides direction and guides future change in the Mudgee LGA for the period to 2025 - 2030. In relation to large format retailing/ Bulky Goods retail development the strategy comments as follows:

3.2.3 Bulky goods retailing

The current policy direction, as reinforced under the Interim Local Environmental Plan 2008, is to locate bulky goods retail development (excluding mall developments) along Sydney Road within the current Sydney Road Industrial Area to the south-east of Mudgee. The Interim Local Environmental Plan 2008 attempts to consolidate land for bulky goods retail by encouraging this type of development in the Light Industrial zone fronting Sydney Road. However, the focus for the majority of commercial development should still remain in the Mudgee CBD.

All bulky goods retail developments should continue to be focused towards the Sydney Road area in Mudgee, predominantly fronting Sydney Road. While light industrial uses exist in this area they are to be clearly separated from the bulky goods retailing in the future. Inappropriate retail developments, such as supermarkets, are discouraged and should be prohibited in this area.

However, bulky goods retail development is also to be made permissible in Mudgee's commercial core CBD area.

This Strategy requires improvement to the attractiveness and visual appeal of the entry into Mudgee from the south-east. This will need to be achieved through strong design controls and streetscape enhancements may need to be jointly undertaken by Council and developers to ensure the desired outcomes are achieved.

The encouragement of bulky goods retail in the Sydney Road Area will require the identification of an alternative location for general and light industry in the medium to long term, which is dealt with below.

Defining a physical limit to Mudgee's future growth

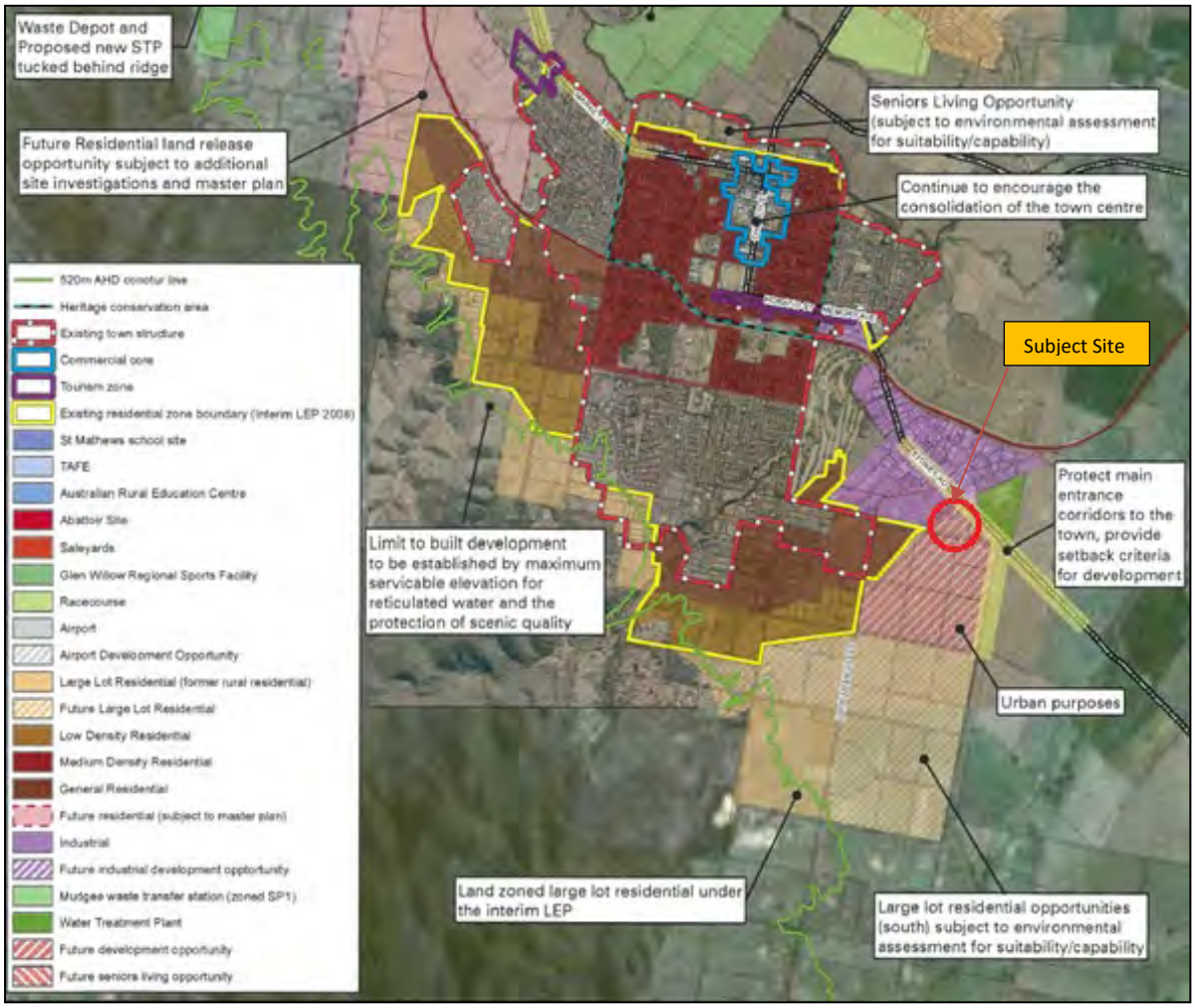
One of the key principles identified for Mudgee is to develop a 'hard edge' for the urban area. A 'hard edge' is representative of the future growth boundary of the urban area and effectively provides a limit to growth. The long term boundaries for urban growth (i.e. 'hard-edge') are shown on the Mudgee Structure Plan (Refer Figure 3-1).

- The Cudgegong River in the north as the river provides a natural boundary between urban and rural land
- Castlereagh Highway and Hill End Road in the north-west because of visual sensitivity and servicing implications
- The scenic hills and conservation area to the west because of visual sensitivity and servicing constraints.
- The railway line in the central east because it is a definitive man made boundary
- Broadhead/Spring Flat Road in the south-east because it provides a clear edge between urban and rural uses.

The last dot point above is of relevance as the subject land falls within what the strategy has defined as the "physical limit" for Mudgee's future growth.

The subject land is identified for "urban purposes" in this strategy as illustrated in **Figure 9** below.

Figure 9: Mid-Western Regional Comprehensive Land Use Plan - Figure 3.1



3.2.2 Commercial and retail development

The majority of retail/commercial floor space is to be focused in Mudgee. All regional level retail facilities (including bulky goods) should be permitted to be located in the Mudgee CBD and future growth and development should reinforce the existing historic retail core areas focused on Church and Market Streets. Development of larger bulky goods premises although not prohibited in the CBD, should continue to be encouraged to establish within the existing precinct along Sydney Road. It is to be noted that that stand alone retail activity in an industrial area will not be appropriate in the future.

As noted in the Ethos Urban report (**section 4.1.1.2**), there is very limited land supply available and certainly no vacant land available that would be suitable for bulky goods retailing including a new Bunnings Warehouse store style development. The land fronting the Sydney Road is specifically identified for large format retail development, and the subject site is consistent with this direct specification for the location of this land use within the Mudgee urban area.

Sydney Road

When considering future uses in the Sydney Road Industrial Area it is important that some retail uses are not just simply displaced from the outer parts of the CBD to the cheaper land located in the industrial area. There are a range of uses appropriate to each location which should be considered in any changes to landuse structures, objectives and permissible uses.

Short-term industrial development in Mudgee should occur in the Sydney Road Industrial Area offset from the Sydney Road frontage and should involve the use of vacant and under-utilised sites. Subdivision and redevelopment of older industrial sites and buildings is encouraged. There is up to 10 hectares of industrial zoned land with subdivision potential in this area including 9 vacant lots available for immediate development which would provide for approximately 4 years supply.

Reticulated water is available to this location, although it is likely that a new sewerage pump station may be required at significant cost to Council and the release of this land will be delayed until sewer is available.

Further streetscape improvements to the Sydney Road entry should be facilitated through Council-funded landscaping.

The strategy to locate bulky goods retail within the Sydney Road Industrial Area may result in further alienation of heavier industry from this precinct in the medium to long term. As a result a secondary site for heavy industry will need to be identified that is located so as to minimise land use conflicts.

4.2.2.2 Mudgee and Gulgong Urban Release Strategy

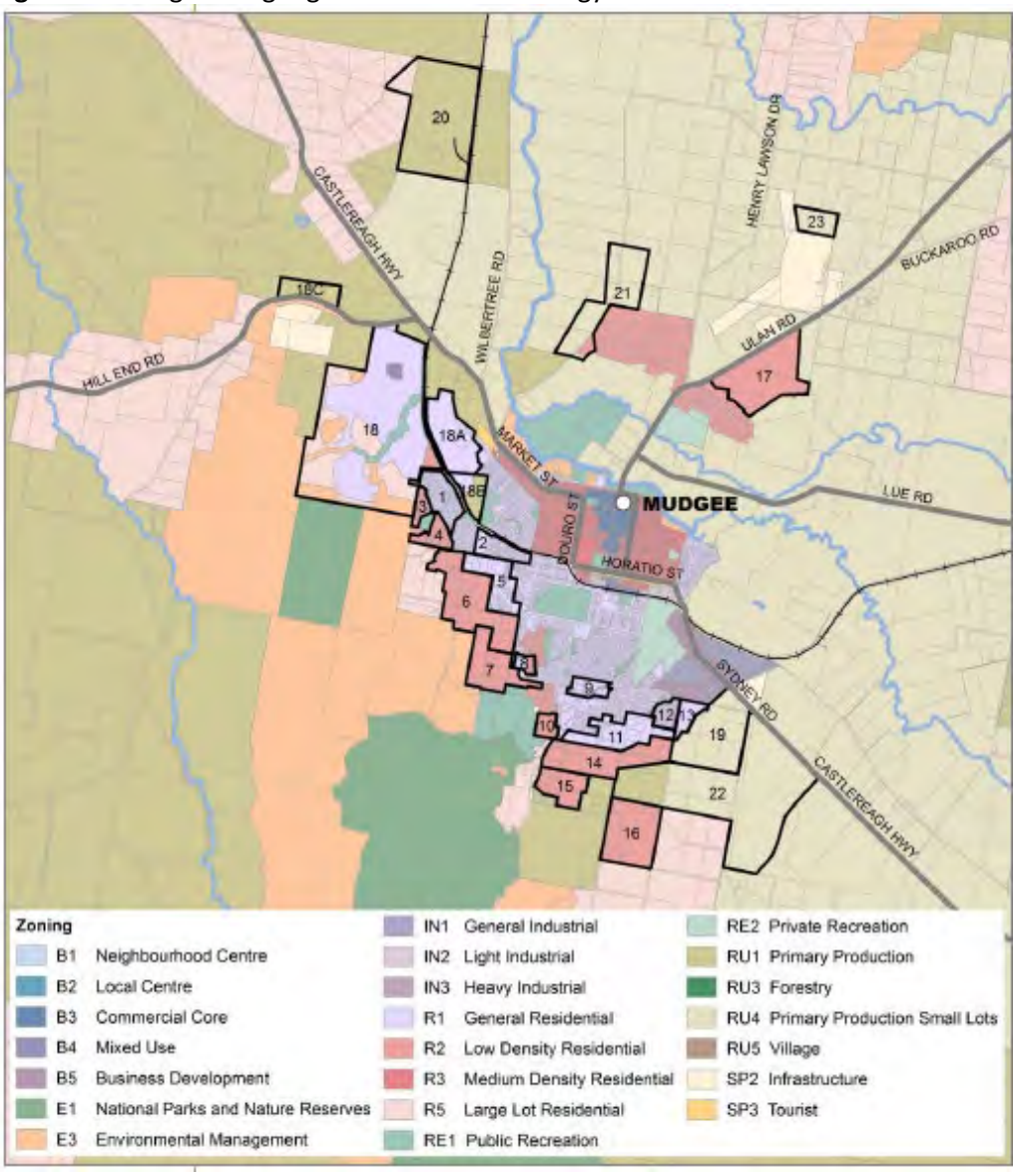
Following on from the *Comprehensive Landuse Strategy* detailed above, in December 2014 the Council adopted the *Mudgee and Gulgong Urban Release Strategy* (M-GURS). This strategy deals solely with residential growth and does not address the supply of land for other landuses such employment or retailing. Furthermore, it has not been endorsed by the Department of Planning.

The M-GUS is a result of strong population growth driven by the expansion of the local coal mining industry and sustained pressure for residential development placing considerable pressure on Mid-Western Regional Council (Council). Consequently, an Urban Release Strategy was prepared for the towns of Mudgee and Gulgong to guide decision making around the timing, location and type of future residential development. However, the M-GURS does not replace the broader strategic directions identified in the Mid-Western Regional Comprehensive Land Use Strategy which relate to employment land and economic development objectives.

Residential Release Strategy

Figure 10 below identifies the subject site within area 19 of the M-GURS:

Figure 10: Mudgee-Gulgong Urban Release Strategy



While the CLUS (section 4.1.1.3) nominated the Spring Flat precinct as suitable for future *urban purposes*, the M-GURS strategy recommendations are as illustrated in table 2 below.

Table 2: Mudgee-Gulgong Urban Release Strategy - Recommendation Area 19

Area/s Number	19
Area/s Name	Spring Flat
Constraints	Groundwater Vulnerability, Drainage
Total Size of Area (Ha)	74Ha
Size of Residential Zoned Land (Ha)	73.8Ha
Current Zoning	RU4 Primary Production Small Lots
Current Minimum Lot Size	20Ha
Remaining Potential	No development has occurred within area 19. There is approximately 73.8Ha of land zoned RU4 Primary Production that remains vacant.
Recommendations:	
Our recommendation for site	A seniors living development is proposed on 22.55ha of land within Area 19. The proposed development relates to the construction of a two hundred and five, serviced self-care dwellings seniors living development. The development also includes a club house and various recreational facilities. A Site Compatibility Certificate was issued by the DP&E pursuant to the State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004. Development consent was issued on the 29 April 2010. This development has the potential to meet the increasing demand for seniors living being generated by the district's aging population. These seniors living dwellings will also potentially free up other dwellings in and around Mudgee thus providing a broader supply benefit to Mudgee. If the aforementioned development does not proceed it is recommended the area remain RU4 Primary with a minimum lot size of 20ha for the term medium (10-15 years) in case the take up of new areas to Mudgee's north west (i.e. Caerleon) fail to meet market needs. Should Area 19 be rezoned it could accommodate standard lots or larger lots - depending on future needs in the medium term. Spring Flat extends from the edge of the existing residential zone and may provide an opportunity to provide 2,000sqm or larger lots once other areas have been exhausted.
Proposed Future Zoning	RU4 Primary Production Small Lots
Proposed Future Minimum Lot	2,000sqm
Number of Lots Area would yield in total	15
Recommended Availability of Lots	(2015+ for seniors living)

The subject site is located within precinct 19 and wedged between the approved seniors living development referenced in the table above, and which has established "physical commencement" to Councils satisfaction, and the existing B5 Business Development zone. The above comment that this seniors living project "*has the potential to meet the increasing demand for seniors living being generated by the district's aging population*" indicates that the project will proceed. Notwithstanding the M-GURS recommendations, there are two factors to take into consideration:

i. The M-GURS focuses on the residential property market and did not consider the suitability of this land for other "urban purposes", and

ii. Since the M-GURS was adopted in 2014, there has been more dense urban development proposed for land to the south of the subject site for a retirement village and school.

Residential Focus of M-GURS

As noted above, although the M-GURS identifies the potential for large lot rural residential activity on the Subject Site, as is consistent with the current zoning, the opportunity for the Subject Site to be used for "Urban Purposes" including employment land as foreshadowed in the endorsed Mid-Western Regional Comprehensive Land Use Strategy was not specifically tested.

Further, the potential overall contribution of the Subject Site to future housing supply identified in the Settlement Strategy is just 2 lots based on a 2 hectare minimum lot size, although an approval and physical commencement for a seniors living on land immediately south-east of the Subject Site is noted (see below).

On this basis, the proposed rezoning of the Subject Site for employment uses retains strong strategic policy support, notwithstanding that the M-GURS considers that areas in the RU4 Zone on the southern edge of urban Mudgee may have some future potential for rural living. This potential for rural living in this southern part of urban Mudgee is not compromised by the proposal.

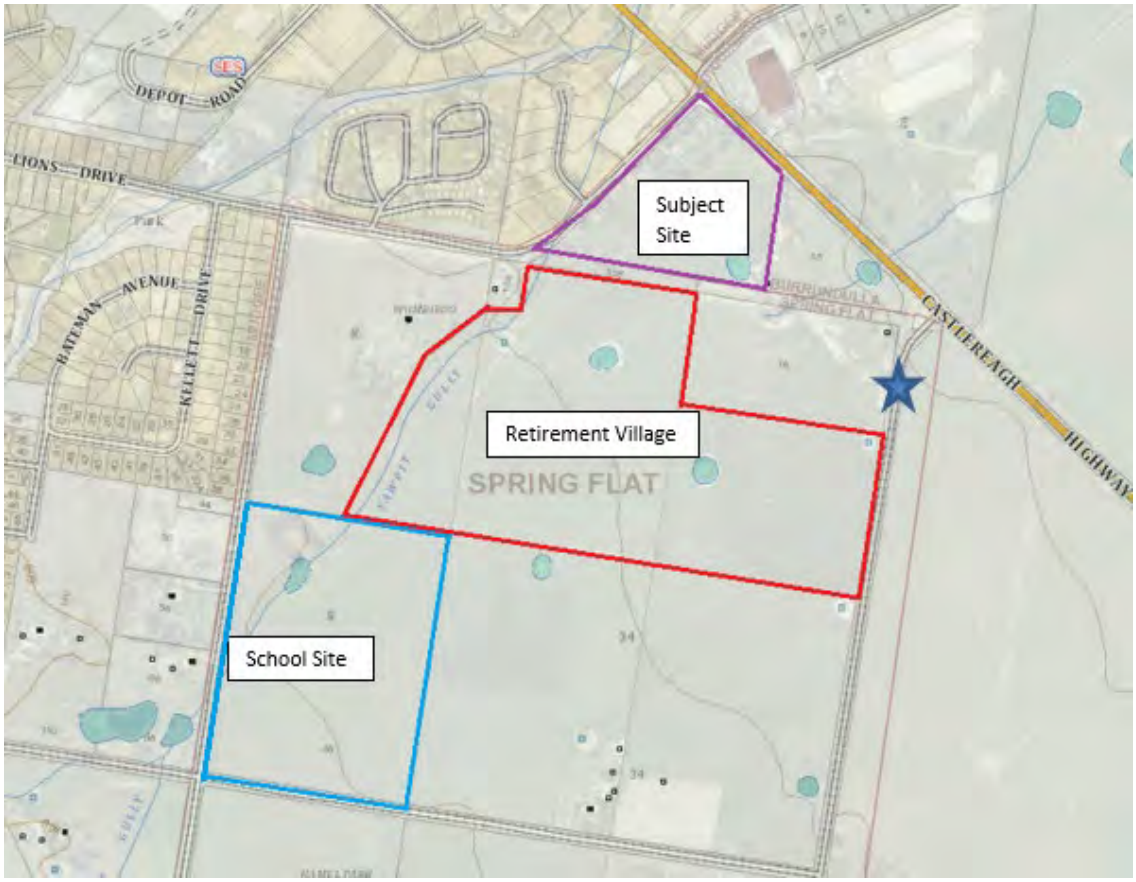
Future Character

The future character of the area is being driven by two development proposals on land to the south of the subject site that will make the M-GURS area 19 recommendations somewhat redundant:

1. Proposed Retirement Village – On the property immediately to the south of the subject site an approval has been granted for a 206 unit retirement village which has established to Councils satisfaction that it has commencement since the adoption of the M-GURS.
2. Proposed Catholic School – To the south west of the subject site on Broadhead Road , is a site that the Catholic Church have acquired and are in the design phase for a new school complex. The landowners have advised that a development application is currently being prepared for the site and will be lodged in 2020.

The location of the above two proposals is illustrated on **Figure 11** below.

Figure 11: Development Approved and Proposed Adjoining site



In the event these two projects proceed in the future, and it is likely they will, then area 19 will take on a distinctive urban character with two relatively high density urban developments. On that basis, an outcome as recommended for the subject site at 134 Lions Drive in the M-GURS would be an inefficient and illogical use of land being two 2ha rural residential lots effectively surrounded by light industrial and

large format retail developments to the north, east and west, and a medium density retirement village to the south and further south west, a school precinct. A mixed use Bunnings style development with further B5 zone style development would be a logical transition and use of the site. Furthermore, this outcome is supported somewhat indirectly by the MCLUS that states that the southern edge of Mudgee should be Spring Road, the location of which is marked with a star in figure 7 above.

4.2.3 Is the Planning Proposal consistent with applicable State Environmental Planning Policies?

Table 3 provides an assessment of the Planning Proposal against all relevant State Environmental Planning Policies.

Table 3: Relevant State Environmental Planning Policies

Policy	Relevance	Consistency and Implications
SEPP Koala Habitat Protection	This SEPP aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas.	An assessment was undertaken by environmental consultants Firebird ecoSultants in regard to SEPP 44 which concluded as follows: *"SEPP 44 defines "Potential" and "Core" koala habitat, in accordance with the proportion of feed tree species present in an area. No feed tree species listed under Schedule 2 of SEPP 44 occur in the study area. As such, no further provisions of the policy apply*."
SEPP No. 55 – Remediation of Land	SEPP No. 55 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 6 of SEPP No 55 requires that contamination and remediation is to be considered in the rezoning of land. Specifically, Clause 6 requires that: (a) the planning authority has considered whether the land is contaminated, and (b) if the land is contaminated, the planning authority is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for all the purposes for which land in the zone concerned is permitted to be used, and (c) if the land requires remediation to be made suitable for any purpose for which land in that zone	An assessment was undertaken by geotechnical consultants Valley Civilab in regard to SEPP 55 which concluded as follows: *"No indication of gross contamination has been identified which would constrain the development of the Site for its proposed land use."*

Policy	Relevance	Consistency and Implications
	is permitted to be used, the planning authority is satisfied that the land will be so remediated before the land is used for that purpose.	
SEPP No. 64 – Advertising and Signage		The Planning Proposal does not contain provisions that would be inconsistent with or hinder the application of the SEPP. This SEPP may apply to signage associated with any future development application.
SEPP Infrastructure 2007	Clause 101 of this SEPP relates to development with a frontage to a classified road and Clause 104 relates to assessment of traffic impacts of certain types of development, such as development with car parking supply in excess of 200 vehicles.	**Frontage to a Classified Road** Clause 101 of the Infrastructure SEPP sets out provisions relating to development with a frontage to a classified road. The Castlereagh Highway is a classified road. Any future development must ensure that there are no adverse impacts on the efficiency and ongoing operation of the road and ensure that it is appropriately located and designed to address potential traffic noise or vehicle emissions. This will be addressed at DA stage. **Traffic Generating Development** Clause 104 applies to developments of the relevant size or capacity that either: *a) has direct vehicular or pedestrian access to any road, or* *b) has direct vehicular or pedestrian access to a classified road or to a road that connects to a classified road where the access (measured along the alignment of the connecting road) is within 90m of the connection.* The site has a frontage to the Castlereagh Highway, a classified road. The development to which the provisions of Clause 104 applies is listed in Schedule 3 of the SEPP. Based on the concept scheme, the proposal may be required to be referred to the Roads and Maritime Service (RMS) for comment.

4.2.4 Is the Planning Proposal consistent with applicable Ministerial Directions?

The applicable Ministerial Directions are addressed below in **Table 4**.

Table 4: Ministerial Directions

Direction	Provision	Consistent	Justification
1.1 Business and Industrial Zones.	The objectives of this Direction are as follows: *a) encourage employment growth in suitable locations* *b) protect employment land in business and industrial zones, and* *c) support the viability of identified strategic centres.* A Planning Proposal must: *(a) give effect to the objectives of this direction,* *(b) retain the areas and locations of existing business and industrial zones,* *(c) not reduce the total potential floor space area for employment uses and related public services in business zones,* *(d) not reduce the total potential floor space area for industrial uses in industrial zones, and*	It is considered that the Planning Proposal is consistent with these objectives in that it: • Facilitates employment growth as an extension to the existing Sydney Road employment area; • Facilitates employment growth consistent with Council strategic direction for large format and hardware style business growth; • Does not adversely impact established business and industrial zones within Mudgee The Planning Proposal is consistent with this direction as it: • Will retain the areas and locations of existing business and industrial zones, • Will increase the total potential floor space area for employment uses and	The proposal is consistent with this direction, and therefore no justification is required.

Direction	Provision	Consistent	Justification
	(e) ensure that proposed new employment areas are in accordance with a strategy that is approved by the Secretary of the Department of Planning and Environment.	related public services in business zones, • Will not reduce the total potential floor space area for industrial uses in industrial zones, and • Is in accordance with MWCLUS that has been approved by the Secretary of the Department of Planning and Environment.	
1.2 Rural Zones	The objective of this direction is to protect the agricultural production value of rural land. This direction applies when a relevant planning authority prepares a planning proposal that will affect land within an existing or proposed rural zone. A planning proposal must: *(a) not rezone land from a rural zone to a residential, business, industrial, village or tourist zone.* *(b) not contain provisions that will increase the permissible density of land within a rural zone (other than land within an existing town or village).*	The proposal seeks to rezone land from a rural zone to a business zone so is not consistent with this objective. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Director-General of the Department of Planning (or an officer of the Department nominated by the Director-General) that the provisions of the planning proposal that are inconsistent are: *(a) justified by a strategy which:* *(i) gives consideration to the objectives of this direction,* *(ii) identifies the land which is the subject of the planning proposal (if the*	The inconsistency is justified as follows: a) The proposal is consistent with the MWCLUS that has identified the site for future urban purposes. b) The proposal is consistent with the Mudgee Retail Study that directs large format retailing including building supplies business to this area. c) The proposal is supported by an Economic Assessment that has found that there is no suitable land for further large format retailing businesses, including building supplies style businesses, and that the subject site is a logical

Direction	Provision	Consistent	Justification
		planning proposal relates to a particular site or sites),and *(iii) is approved by the Director-General of the Department of Planning, or* *(b) justified by a study prepared in support of the planning proposal which gives consideration to the objectives of this direction, or* *(c) in accordance with the relevant Regional Strategy, Regional Plan or Sub-Regional Strategy prepared by the Department of Planning which gives consideration to the objective of this direction, or* *(d) is of minor significance*	extension to the existing B5 zoned land in this area. d) Is not inconsistent with the Central West and Orana Region Regional Plan 2036. e) The site comprises approximately 5.4ha of land. Although the land is currently zoned RU4, it is not currently used for any productive agricultural use.
1.5 Rural Land	This direction applies when a relevant planning authority prepares a planning proposal that: *(a) will affect land within an existing or proposed rural or environment protection zone (including the alteration of any existing rural or environment protection zone boundary) or*	The proposal is consistent with this direction as it: a) Is consistent with the MWCLUS that has identified the site for future urban purposes and the Mudgee Retail Study that directs large format retailing including building supplies business to this area.	The proposal is consistent with this direction, and therefore no justification is required.

Direction	Provision	Consistent	Justification
	(b) changes the existing minimum lot size on land within a rural or environment protection zone. This Planning Proposal will affect land within an existing rural zone. Consequently, the Planning Proposal must: *(a) be consistent with any applicable strategic plan, including regional and district plans endorsed by the Secretary of the Department of Planning and Environment, and any applicable local strategic planning statement* *(b) consider the significance of agriculture and primary production to the State and rural communities* *(c) identify and protect environmental values, including but not limited to, maintaining biodiversity, the protection of native vegetation, cultural heritage, and the importance of water resources* *(d) consider the natural and physical constraints of the land, including but not limited to, topography, size, location, water availability and ground and soil conditions*	b) Is a relatively small site of some 5.4ha and consequently will not impact on agriculture and primary production. c) Is not going to impact on any environmental values of the site. d) Is consistent with the natural and physical characteristics of the site. e) Will not compromise opportunities for investment in productive, diversified, innovative and sustainable rural economic activities. f) Will not lead to landuse conflict with existing farming operations and effect farmers right to farm principles. g) Is not going to compromise State significant agricultural land. h) Will result in an efficient and economical use of the subject land consistent with the social, economic and environmental interests of the community.	

Direction	Provision	Consistent	Justification
	(e) promote opportunities for investment in productive, diversified, innovative and sustainable rural economic activities *(f) support farmers in exercising their right to farm* *(g) prioritise efforts and consider measures to minimise the fragmentation of rural land and reduce the risk of land use conflict, particularly between residential land uses and other rural land uses* *(h) consider State significant agricultural land identified in State Environmental Planning Policy (Primary Production and Rural Development) 2019 for the purpose of ensuring the ongoing viability of this land* *(i) consider the social, economic and environmental interests of the community.*		
3.4 Integrating Land Use and Transport.	The objective of this direction is to ensure that urban structures, building forms, land use locations, development designs, subdivision and street layouts achieve the following planning objectives:	The site has frontage to two roads and the intersection of Lions Drive and Castlereagh Highway and has been designed to cater for traffic generated from the future development of the	The proposal is consistent with this direction, and therefore no justification is required.

Direction	Provision	Consistent	Justification
	(a) improving access to housing, jobs and services by walking, cycling and public transport, and *(b) increasing the choice of available transport and reducing dependence on cars, and* *(c) reducing travel demand including the number of trips generated by development and the distances travelled, especially by car, and* *(d) supporting the efficient and viable operation of public transport services, and* *(e) providing for the efficient movement of freight.* This direction applies when a Planning Proposal will create, alter or remove a zone or a provision relating to urban land, including land zoned for residential, business, industrial, village or tourist purposes. As the proposal intends rezoning land for a business use, this Direction applies. The Planning Proposal must therefore apply the aims, objectives and principles of Guidelines	site. The site's access to Castlereagh Highway provides good road connections to the regional road network. A Traffic Impact Assessment has been prepared which demonstrates that the existing road network is capable of accommodating any potential increase in traffic generation from the rezoning. The Planning Proposal is considered consistent with the relevant guidelines published by the Department (of Urban Affairs & Planning) in 2001 in the context of the site and Mudgee as a regional town.	

Direction	Provision	Consistent	Justification
	published by the Department (of Urban Affairs & Planning) in 2001, entitled: • "Improving Transport Choice", and • "The Right Place for Business and Services".		
3.5 Development Near Regulated Airports and Defence Airfields	This direction applies when a relevant planning authority prepares a Planning Proposal that will create, alter or remove a zone or a provision relating to land near a regulated airport which includes a defence airfield.	The site is situated to the south of the Mudgee Airport. The site subject to this Planning Proposal is not identified any obstacle limitations surface map. There are no provisions within the MWLEP 2012 that seek to control height of development in relation to the airport.	The proposal is consistent with the objectives of this direction and therefore no justification is required.
4.3 Flood Prone Land.	This Direction applies when changing a zone or a provision of a LEP that applies to flood prone land is proposed. Consequently, the planning authority must: *(4) A draft LEP shall include provisions that give effect to and are consistent with the*	The subject land is identified as being flood prone by a Flood Study that has been undertaken in relation to this Planning Proposal.	The proposal is consistent with this direction and therefore no justification is required.

Direction	Provision	Consistent	Justification
	NSW Flood Prone Land Policy and the principles of the Floodplain Development Manual 2005 (including the Guideline on Development Controls on Low Flood Risk Areas). *(5) A draft LEP shall not rezone land within the flood planning areas from Special Use, Special Purpose, Recreation, Rural or Environmental Protection Zones to a Residential, Business, Industrial, Special Use or Special Purpose Zone.* *(6) A draft LEP shall not contain provisions that apply to the flood planning areas which:* *(a) permit development in floodway areas,* *(b) permit development that will result in significant flood impacts to other properties,* *(c) permit a significant increase in the development of that land,* *(d) are likely to result in a substantially increased requirement for government spending on flood mitigation measures, infrastructure or services, or* *(e) permit development to be carried out without development consent except for the purposes of agriculture (not including*	Direction 4.3(4) The MWLEP 2012 already includes provisions at Clause 6.2 that relate to flood prone land. This Planning Proposal does not propose to alter those provisions. Direction 4.3(5) – (6)– The subject site is not currently identified as being within a flood planning area.	

Direction	Provision	Consistent	Justification
	dams, drainage canals, levees, buildings or structures in floodway's or high hazard areas), roads or exempt development. *(7) A draft LEP must not impose flood related development controls above the residential flood planning level for residential development on land, unless a council provides adequate justification for those controls to the satisfaction of the Director-General (or an officer of the Department nominated by the Director-General).* *(8) For the purposes of a draft LEP, a council must not determine a flood planning level that is inconsistent with the Floodplain Development Manual 2005 (including the Guideline on Development Controls on Low Flood Risk Areas) unless a council provides adequate justification for the proposed departure from that Manual to the satisfaction of the Director-General (or an officer of the Department nominated by the Director-General).*	Direction 4.3(7) - The Planning Proposal is consistent with this element of Direction 4.3 as it does not relate to residential development. Direction 4.3(8) - The Planning Proposal is consistent with this element of Direction 4.3.	
5.10 Implementation of Regional Plans.	The Direction requires Planning Proposals to be consistent with the Central West and Orana Region Regional Plan 2036.	The proposal is consistent with the Central West and Orana Region Regional Plan	The proposal is consistent with this direction and therefore no justification is required.

Direction	Provision	Consistent	Justification
		2036 – refer to section 4.2.1.1 of this Planning Proposal.	
6.1 Approval and Referral Requirements.	A Planning Proposal must not include referral or concurrence requirements without approval of the pertinent Minister of public authority or identify development as 'designated' without approval of the Secretary of Planning & Environment.	To implement this proposal, a LEP to rezone the subject land would not require specific or additional referral, consultation or concurrence provisions. The proposal(s) is consistent with this direction.	The proposal is consistent with this direction and therefore no justification is required.

4.3 Environmental, Social and Economic Impact

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

The land subject to this Planning Proposal has been investigated for potential ecological impacts by **Firebird ecoSultants** who have commented as follows:

> *"This vegetation occurs around the existing dwelling and along Lions Road. This vegetation type was comprised of Eucalyptus sideroxylon (Red Ironbark), Eucalyptus blakelyi (Blakely's Red Gum) and Eucalyptus melliodora (Yellow Box) occurs occasionally. (refer to Photo 4). The current ecological condition of this vegetation is considered to be low. This vegetation may be considered a degraded variant of Box-Gum Woodland, due to the presence of Eucalyptus blakelyi (Blakely's Red Gum) and Eucalyptus melliodora. This vegetation type is considered a Threatened Ecological Community. Further analysis of this Woodland Vegetation in accordance with the Box-Gum Grassy Woodland Identification Flowchart in Appendix 2 of the National Recovery Plan: White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (DECCW 2011) will need to be undertaken to confirm this vegetation within the site would meet the DECCW definition. It is recommended that if possible the native vegetation within along the frontage of the site, is retained."*
>
> *"Habitat complexity across the site was considered to be low, due to a lack of notable habitat features, including tree hollows (noted 3 small – medium hollows), rocky features, and fully-structured native vegetation.*
>
> *The Eucalyptus blakelyi (Blakely's Red Gum) containing hollows, should be retained (if possible) as part of future development of the site."*

In relation to an assessment under the Biodiversity Conservation Act the Firebird ecoSultants advice states:

> *"Any future proposal to clear the site's vegetation is not likely to meet the Area Criteria; under the Area Criteria, the clearing threshold for land containing a minimum lot size of 20 ha is 0.5 ha and the area of native vegetation to be removed for future development is likely to be less than 0.5ha (refer to Vegetation Map with estimate area of Woodland vegetation within the site). Review of the BVM has shown that the site has not been mapped on the BVM. Furthermore, due to the disturbed nature of the site it is unlikely that assessment under the 5 Part Test would trigger a significant impact for threatened species. Therefore, it is unlikely that the BOS will apply for any future development of the site, and a 5 Part test (test of Significance) will need to be undertaken in accordance with the BC Act."*

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

4.3.2.1 Flooding

The land subject to this Planning Proposal has been investigated for potential flooding impacts by WMA Water who have commented as follows:

> "*In the 1% AEP event the flood levels onsite range from 476.0 mAHD in the western corner to 471.1 mAHD adjacent to Castlereagh Highway. On-site flood depths are generally less than 0.5 m for the 1% AEP event, with the majority of site is affected by shallow inundation. In the 1% AEP event the highway is overtopped with depths of 0.05 to 0.1 m.*
>
> *The flow rates and volumes within the site for the 1% AEP are unlikely to present a major constraint in terms of minimum floor levels. Filling would likely be required for the main building footprint, together with provision of a managed flow path around the boundary of the site.*
>
> *Placing a large warehouse development on the middle of the site would require the diffuse overland flow through the site to be collected along the upstream boundary, contained within an open vegetated swale/channel around the site boundary, and then discharged through the downstream culverts. The width of the required channel would depend on design factors, such as whether a grassed swale with shallow batters is used (relatively cheap to construct and maintain, but requiring more width), versus a more incised channel (e.g. sandstone banks, with managed landscaping on the overbank). Constructing a formal channel / swale would be a relatively significant change to the existing flow behaviour which could likely be engineered, but may present challenges for design and planning approval with regards to:*
>
> - *Demonstrating that collecting and concentrating the flow into a channel would not produce adverse flood impacts beyond the property boundary. This would require further flood modelling to demonstrate an effective design.*
> - *There may be ecological or environmental considerations for creating a more engineered watercourse through the site that would need to be addressed*."

4.3.2.2 Bushfire

Council records indicated that the site is not mapped as bushfire prone land.

4.3.2.3 Visual Impacts

The land subject to this Planning Proposal has been investigated for potential visual impacts by **Insite Planning Services** who have commented as follows:

> *The predominant visual impact of the proposal is reflected in the assessment of the extent of effect on the intrinsic character of the site, and compatibility with the existing site character. The site will be transformed from rural, to a large format retail landuse. The extent of the*

impacts assessed on these criteria reflects that transformation, rather than the significance of the impacts of the development that is proposed.

Moderate visual impacts are typical levels for a site transformed from one form to another, whether it is from rural to urban, or from low to high density, for example. As such, moderate impacts of the residual effects of the proposal (ie, those features that cannot be mitigated totally) are not intrinsically unacceptable.

In this case the change of landuse will occur in a desired future character context as set out in the Mid-Western Regional Comprehensive Land Use Strategy which identifies the site and rural landscape to the south for future urban development. Furthermore, Council has approved, and the development has commenced construction, for a retirement village on the land immediately adjacent the southern boundary of the site.

For an average viewer, the expectation of a site on the fringe of urban Mudgee is that it could undergo the same kind of change, as adjacent land has. A potential large format retail development on the site, consistent with adjoining development would have a similar effect on the present view compositions from the visual catchment.

The detailed assessment shows that the proposed rezoning to the B5 Business Development zone, and the likely resulting development, will be acceptable on visual impact grounds. In addition, there are no unreasonable visual and related amenity impacts of the proposal. As a result of the recommended strategies to further reduce visual impacts relating to modest landscaping around the southern boundary, retention of existing vegetation along the northern Lions Drive frontage and a mixture of low level landscaped open space and commercial activation on the Castlereagh Highway frontage, there is an adequate standard of protection and enhancement of the components of the visual setting and visual resources of the site.

For viewing locations within the visual catchment in both public and private domains, the main effect would be a change in the foreground views of parts of the subject site. This effect would not be accompanied by any other significant amenity effects and impacts such as privacy, view blocking or negative effect on scenic quality or visual character. Further, and as noted above, modest landscaping will act to soften the impact of the built structure in the existing rural setting adjoining the site which is likely to change also to an urban form in the future in line with Council strategies and existing development approvals and proposals.

It is considered that the measures taken as part of the proposal assist in mitigating any potential unreasonable visual impacts of the proposal, that there are only localised low visual impacts on some of the close range locations which are considered to be acceptable, and that there are no significant residual visual impacts.

Taken together, the visual impacts of the proposal are not significant and that it is supportable on those grounds.

Development of the site for large format speciality retailing is also aligns with Councils strategies with specific gateway treatments capable of being set at the Development Application stage.

4.3.3 Has the planning proposal adequately addressed any social and economic effects?

4.3.3.1 Aboriginal Archaeology

While heritage conservation is covered by a compulsory clause in the Standard Instrument (Local Environmental Plans) Order 2006, and the MWLEP 2012 has adopted the Standard Instrument provisions with respect to heritage conservation, an investigation has been undertaken in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW*. The purpose of the due diligence assessment (Firebird ecoSultants) was firstly to identify whether there are Aboriginal objects or places present in the Study Area and/or whether there are specific Aboriginal cultural constraints on the Study Area. The second aim was to identify whether the proposed activity will impact the Aboriginal heritage identified. The investigations undertaken included:

- Reviewing the Aboriginal Heritage Information Management System (AHIMS) database;
- Reviewing MWLEP Mapping;
- Consideration of the landscape features and environmental context of the site and surrounds;
- Inspection of the site.

The investigations found that there were no Aboriginal objects or places under the National Parks and Wildlife Act 1974 are present in the Study Area and found that there are no heritage constraints to rezoning the heritage area. In conclusion the report finds that the proposed rezoning will not affect the heritage significance of the area. In doing so, the report has fulfilled the requirements under the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW*.

4.3.3.2 Social and Economic Impacts

Refer to section 4.1.1.2 of this report for a summary of the economic impacts of the development including a Net Community Benefit analysis.

4.4 State and Commonwealth Interests

4.4.1 Is there adequate public infrastructure for the Planning Proposal?

4.4.1.1 Access, Transport and Traffic

To determine whether the road network can adequately serve the needs of the intended future development, a traffic impact assessment has been prepared by Transport and Traffic Planning Associates. The report considers the likely impacts of the envisaged access arrangements and potential traffic implications of the envisaged development on the local road network.

Based on the findings of this investigation it is evident that the existing public road network and public transport services can accommodate the predicted demands imposed by future development resulting from the Planning Proposal.

4.4.1.1 Infrastructure Services

A Preliminary Services Infrastructure Strategy has been investigated and reported on by High Definition Design in relation to servicing the site for water supply, sewerage, power and

communications. This investigation confirmed that all essential services are readily available to be connected to the subject site.

Notwithstanding, Clause 6.9 of the MWLEP 2012 requires that Council is satisfied that relevant services that are essential for any proposed development are available or that adequate arrangements have been made to make them available when required.

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

No formal consultation with State and Commonwealth public authorities has been undertaken at this stage for this Planning Proposal. Consultation will occur in accordance with the conditions outlined in the Gateway Determination to be issued for this Planning Proposal. It is anticipated that the NSW Natural Resources Access Regulator (NRAR) and NSW Roads and Maritime Services (RMS) would be consulted in relation to this Planning Proposal.

5 Mapping

The proposal will involve amendments to the following LEP maps:

- Land Zoning Map – Sheet LZN_006H; and
- Lot Size Map – LSZ_006H

Refer to **Appendix 1 & 2**.

6 Community Consultation

In accordance with Schedule 1, Part 1 (4) of the Environmental Planning and Assessment Act 1979, community consultation must be undertaken by the local authority prior to approval of the Planning Proposal.

Whilst the Gateway Determination will confirm the community consultation requirements, it is likely that if this Planning Proposal is supported, it would be classed as a "low impact" proposal in accordance with Section 5.5.2 of "A Guide to Preparing LEPs" that would require exhibition for a period of not less than 14 days.

A "low impact" proposal is defined as a "Planning Proposal that in the opinion of the planning authority making the Gateway determination is:

- consistent with the pattern of surrounding land use zones and/or land uses;
- consistent with the strategic planning framework;
- presents no issues with regard to infrastructure servicing;
- not a principal LEP; and
- does not reclassify public land.

It is evident in this report that the proposal satisfies the above criterion.

7 Timeframes

Table 5 provides a timeline which within the Planning Proposal could be completed:

Table 5: Timeframes

Project Timeline	**Date**
Anticipated commencement date (date of Gateway determination)	
Anticipated timeframe for the completion of required studies	
Timeframe for government agency consultation (pre and post exhibition as required by Gateway Determination) (21 days)	
Commencement and completion dates for public exhibition period	
Dates for public hearing (if required)	N/A
Timeframe for consideration of submissions	
Timeframe for the consideration of a proposal post exhibition	
Anticipated date RPA will forward the plan to the department to be made (if not delegated)	
Anticipated date RPA will make the plan (if delegated)	
Anticipated date RPA will forward to the department for notification (if delegated)	

Appendix 1 – Proposed New Land Zoning Map – Sheet LZN_006H

Mid-Western Regional Local Environmental Plan 2012

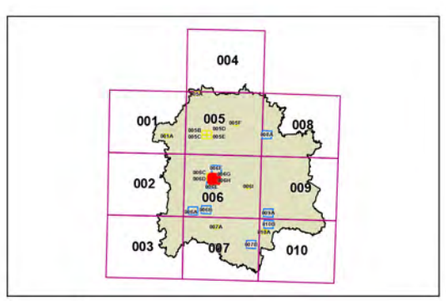
Land Zoning Map - Sheet LZN_006H

Zone

- B1 Neighbourhood Centre
- B2 Local Centre
- B3 Commercial Core
- B4 Mixed Use
- B5 Business Development
- E1 National Parks and Nature Reserves
- E3 Environmental Management
- IN1 General Industrial
- IN2 Light Industrial
- IN3 Heavy Industrial
- R1 General Residential
- R2 Low Density Residential
- R3 Medium Density Residential
- R5 Large Lot Residential
- RE1 Public Recreation
- RE2 Private Recreation
- RU1 Primary Production
- RU3 Forestry
- RU4 Primary Production Small Lots
- RU5 Village
- SP1 Special Activities
- SP2 Infrastructure
- SP3 Tourist

Cadastre

Cadastre 15/12/2010 Land and Property Information (LPI)



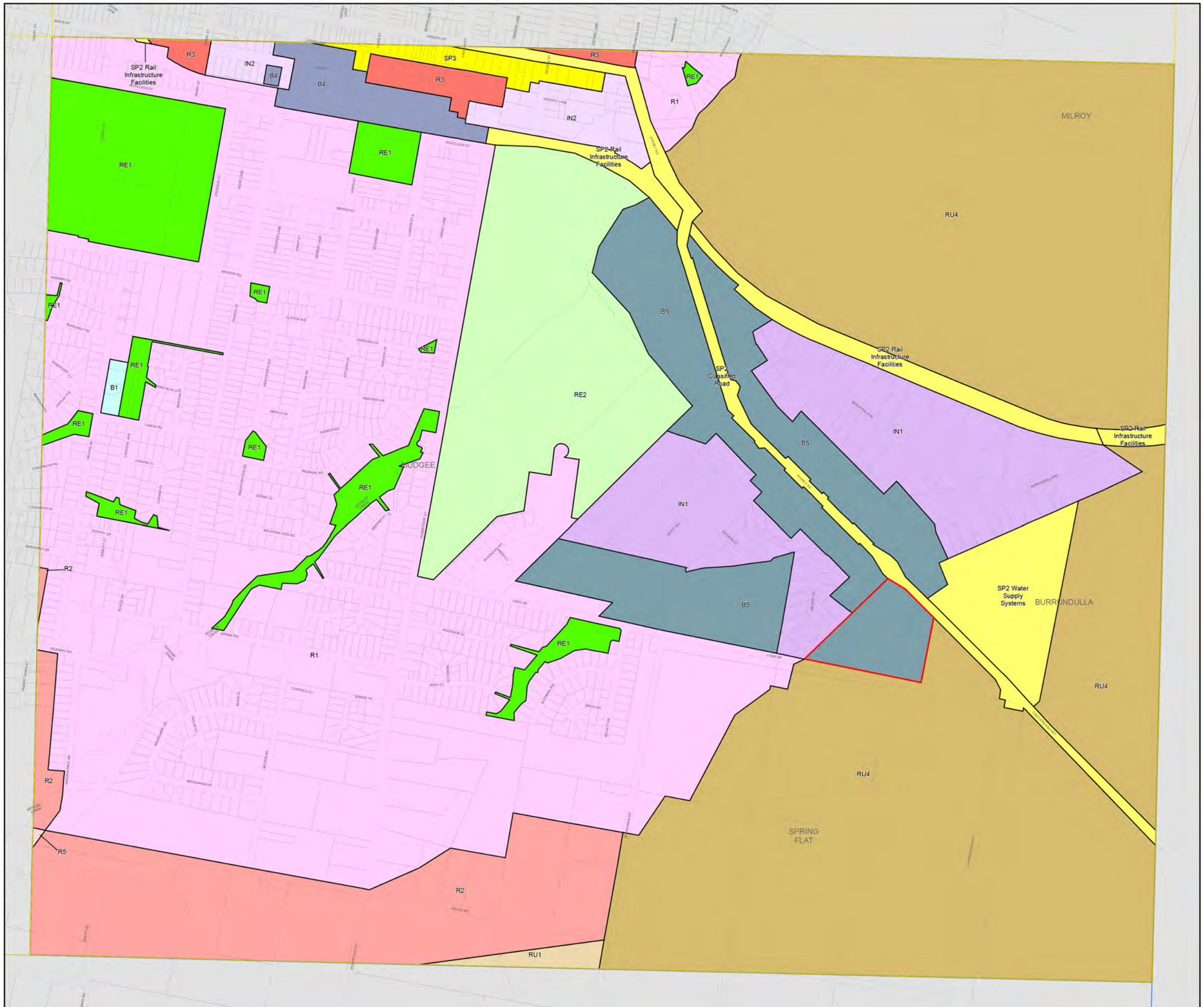
N

0 200 400 Metres

Scale:1:10,000 @ A3

Projection: GDA 1994
MGA Zone 55

Map identification number: 5270_COM_LZN_006H_010_20150501



Appendix 2 – Proposed New Minimum Lot Size Map – Lot Size Map – LSZ_006H

Mid-Western Regional Local Environmental Plan 2012

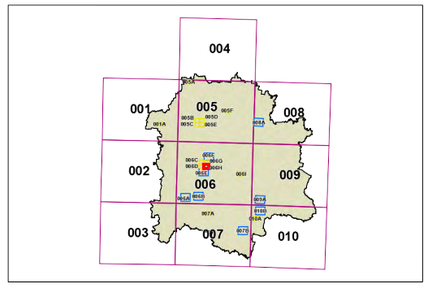
Lot Size Map - Sheet LSZ_006H

Minimum Lot Size (sq m)

M	600
U	1000
V	2000
W	4000
Z	2 ha
AB1	10 ha
AB2	12 ha
AB3	20 ha
AB4	40 ha
AD	100 ha
AF	400 ha
	Refer to Clause 4.1 (3A)

Cadastre

Cadastre 15/12/2010 Land and Property Information (LPI)



N

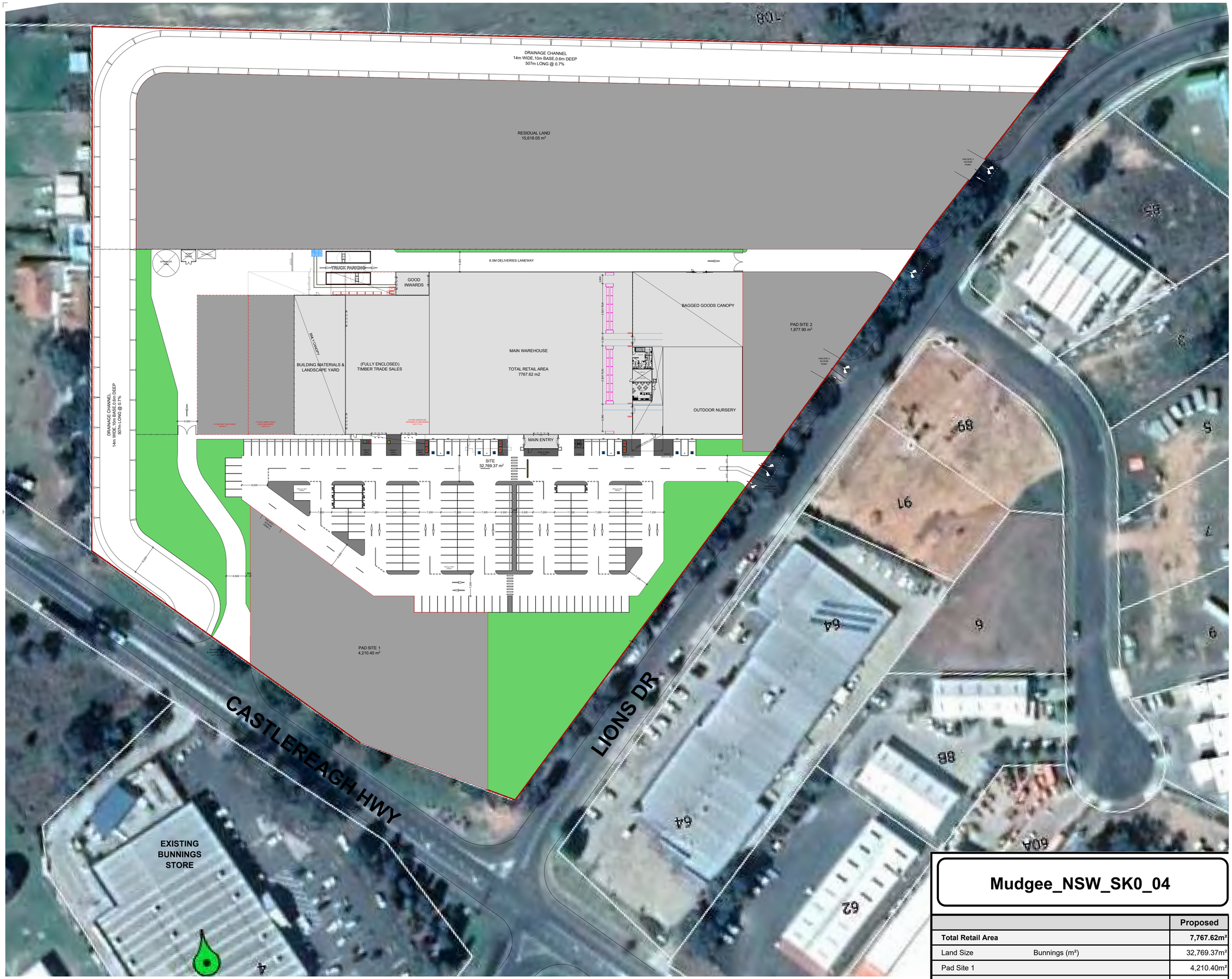
0 400 Metres

Scale: 1:10,000 @ A3

Projection: GDA 1994
MGA Zone 55

Map Identification Number: 5270_COM_LSZ_006H_010_20150501

Attachment 1 – Proposed Bunnings Development Scheme



PROPOSED SKETCH PLAN

SCALE: 1:600 @ A1

Mudgee_NSW_SK0_04

		Proposed
Total Retail Area		**7,767.62m²**
Land Size	Bunnings (m²)	32,769.37m²
Pad Site 1		4,210.40m²
Pad Site 2		1,877.90m²
Residual Bunnings Land		15,618.05m²
Total Land	**(m²)**	**54,475.72m²**

ALL DIMENSIONS ARE TO BE CONFIRMED ON SITE PRIOR TO MANUFACTURE AND CONSTRUCTION

STORE TYPE **SMALL**

FOR COMMENT

DRAFT

DATE:	REV:	AMENDMENT:	DWN:
27/12/19	C	PROPOSED SKETCH PLAN UPDATED AS PER PROPERTY FEEDBACK	JA
19/12/19	B	PROPOSED SKETCH PLAN UPDATED AS PER PROPERTY FEEDBACK	JA
03/12/19	A	UPDATED SKETCH PLAN: PROPOSED SMALL 3000 SERIES TO ACCOMMODATE FUTURE EXPANSION TO A MEDIUM 5000 SERIES	TK
19/11/19	-	INITIAL PROPOSED SKETCH PLAN - 5000 SERIES	TK

AUTHORISATION:

CUSTOMER COMMUNICATIONS MGR:.....DATE:.....

VISUAL MERCH MANAGER:.....DATE:.....

STORE DESIGN&STD MANAGER:.....DATE: .....

STORE PLANNING MANAGER:.....DATE: .....

STORE PLANNING COORDINATOR:.....DATE:.....

BUNNINGS

Bunnings Group Limited
16 - 18 Cato Street, Hawthorn East, VIC 3123
Locked Bag 3004, Hawthorn VIC 3122
Phone : (03) 8831 9777
Fax : (03) 8831 9837
Website : www.bunnings.com.au

PROJECT NAME
MUDGEE

SERIES SIZE
3000

PROJECT ADDRESS
CNR CASTLEREAGH HWY & LIONS DVE
MUDGEE NSW 2850

STORE NUMBER
N/A

STORE TYPE
SMALL

DRAWING STAGE:
DESIGN CONCEPT

DRAWING TITLE:
PROPOSED SKETCH PLAN

PLOT DATE: **31/12/2019 9:17 AM**

CHECKED BY:

DRAWN: **TK**

SCALE: **AS SHOWN**

DATE: **31/12/2019**

PROJECT NORTH: N

DRAWING NO: **SK0_04**

REVISION: **C**

DRAFT

FILE LOCATION:Q:\Store Planning\PLANNING SUPPORT TOOLS_Arch\CAD\Plotting Files\PLOTMAKER TEMPLATES\Store Planning Tiles Block 2017.plt

MUDGEE

Appendix 2 – Environmental Due Diligence

Firebird ecoSultants Pty Ltd
ABN-16 105 985 993

Due Diligence Assessment at 134 Lions Drive (Lot 2 DP 1079362), Mudgee, NSW

Table of Contents

Existing Environment 1
Aboriginal Cultural Heritage 1
Bushfire 5
Biodiversity 7
Vegetation Mapping 7
Database Searches 7
Literature Review 7
Desktop Research 8
Vegetation Mapping 8
BioNET Threatened Species Search 8
EPBC Act Protected Matters Report 9

EXISTING ENVIRONMENT

A Due Diligence Assessment for a proposed Bunnings Centre at 134 Lions Drive Mudgee (Lot 2 DP 107936) hereafter referred to as 'the site'. The site sits to the east-south east extremity of suburban Mudgee. Current land use is rural (zoned RU4 - Primary Production Small Lots). Groundwater status is 'Vulnerable'. SEPP 44 Koala Habitat Protection applies to the site. Avisford Nature Reserve lies to the south-west of Mudgee while further bushland ranges lie to the south-east. The Cudgegong River runs over a kilometre to the north-west of the site.

Aboriginal Cultural Heritage

An online search of the NSW Aboriginal Heritage Information Management System (AHIMS) and extensive search has been undertaken. No Aboriginal places have been declared in the area; and no Aboriginal sites have been recorded within 200m of the proposed works area. Refer to Figure 1-1 for Location and AHIMS results.

The following assessment was undertaken in accordance with the Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW ('The Code') (DECC 2010)

1. Would the Activity disturb the ground surface or any culturally modified trees?

One tree with a scar was sighted during the site inspection on 14 August 2019, the age of the scar will need to be determine to conclusively establish whether the scar was, or were not, cultural in origin. However, due to the shape and size of the scar it is unlikely to have been culturally modified, and more likely created from a wound or damage from machinery. Furthermore, the base of the scar was too close to the ground to be modified Aborigines. This was also the opinion of Joseph Pidutti (Consulting Arborist). Refer to Photo 1 below for scar tree.

Photo 1 Scar Tree within the front area of the site

It was noted that no other trees within the site had scars and the majority of the vegetation consists of previously cleared, regrowth (albeit a few remnants), and planted vegetation. Aboriginal and other historical scars in New South Wales will only exist on trees older than 75 years. This assumes that in most areas the last widespread bark removal activity occurred before c. 1950 on trees that were 10–15 years old at the time of scarring.

2. Are there any:

   a) ***Relevant confirmed site records or other associated landscape feature information on AHIMS?***

An online search of the NSW Aboriginal Heritage Information Management System (AHIMS) has been undertaken (see Appendix). No Aboriginal places have been declared in the area; and no Aboriginal sites have been recorded within 200m of the proposed works area.

b) Any source of information of which a person is already aware?

There are no other available sources of information relevant to the area.

c) Landscape features that are likely to indicate presence of Aboriginal objects?

According to The Code, landscape features that are likely to indicate the presence of Aboriginal objects include the following areas, but only if they are defined as undisturbed land:

- **areas within 200 m of waters; or**
- **areas located within a sand dune system; or**
- **areas located on a ridge top, ridge line or headland; or**
- **areas located within 200 m below or above a cliff face; or**
- **areas within 20 m of or in a cave, rock shelter, or a cave mouth.**

The proposed work site occurs within 50 m of waters (being a drainage line to the south of the proposed works).

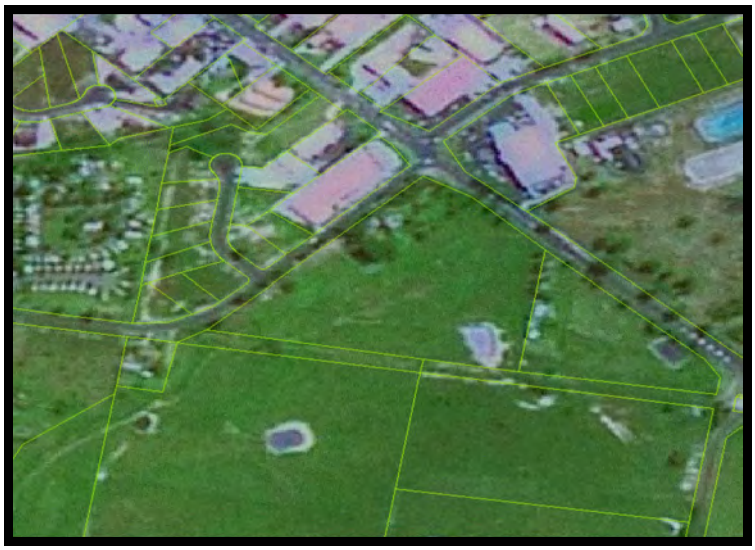
The land on which the proposed works would occur, would be defined as 'disturbed land' (as defined by The Code) (see photos below). The Code defines 'disturbed land' as follows:

"Land is disturbed if it has been the subject of a human activity that has changed the land's surface, being changes that remain clear and observable. Examples include ploughing, construction of rural infrastructure (such as dams and fences), construction of roads, trails and tracks (including fire trails and tracks and walking tracks), clearing vegetation, construction of buildings and the erection of other structures, construction or installation of utilities and other similar services (such as above or below ground electrical infrastructure, water or sewerage pipelines, stormwater drainage and other similar infrastructure) and construction of earthworks."

The following provides an explanation of why the land within the site is considered to be disturbed, in accordance with The Code's definition:

- Clearing of vegetation – The majority of the land has been previously cleared, with the vegetation comprising mostly pasture grasses.
- As discussed above one scar tree occurs within the site however, the age of the scar will need to be determine to conclusively establish whether the scar was, or were not, cultural in origin. However, given the age of the tree it is unlikely be a culturally modified tree as aboriginal and other historical scars in New South Wales will only exist on trees older than 75 years. This assumes that in most areas the last widespread bark removal activity occurred before c. 1950 on trees that were 10–15 years old at the time of scarring.

Figure 1-1 Location and AHIMS results (showing no documented Aboriginal Heritage sites).



Bushfire

The parcel of land selected is not identified as bush fire prone therefore no further bushfire management measures are required (i.e. APZs, access road design in accordance with PBP, water supply etc). However, as a precautionary measure if the grassland to the South is not managed in the future, then this land may be mapped as Bushfire Prone Land, and therefore a Bushfire Threat Assessment may be required. In accordance with PBP a nominal 10m APZ is usually recommended. Refer to APZ Map showing location of 10m APZ.

Note:
Boundaries are not survey accurate.
Although all reasonable care has been taken to ensure the information shown on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Please verify the accuracy of all information prior to use.

FIGURE 1-1: VEGETATION MAP

CLIENT	Client
SITE DETAILS	Cnr Castlereagh Highway and Lions Drive Mudgee
DATE	23 August 2019

Legend
- Subject Site
- 100m Buffer
- Precautionary 10m APZ

NORTH

0 25 50 100

SCALE 2000 @ A3

PIXELDRAFTING

Ref No 2537

Firebird ecoSultants Pty Ltd
ABN - 16 105 985 993
Level 1, 146 Hunter Street, Newcastle NSW 2300
P O Box 354 Newcastle NSW 2300

DISCLAIMER

This docment and the information shown shall remain the property of Firebird ecoSultants Pty Ltd. The document may only be used for the purpose for which it was supplied and in accordance with the terms of engagement for the commission. Unauthorised use of this document in any way is prohibited

Biodiversity

Methodology

The due diligence included a desktop based analysis of previous records of threatened species and a site inspection on the 14 August 2019.

Desktop Research

Vegetation Mapping

Vegetation mapping previously undertaken in the area was reviewed using:

- Office of Environment and Heritage (OEH) Vegetation Information System (VIS), Six Maps Vegetation Map Viewer; and
- OEH NSW VIS Classification 2.1 and the associated NSW plant community types (PCT) Plant Community Identification tool.

Database Searches

The following database searches were undertaken:

- Review of threatened fauna and flora records within a 10 km radius of the site, contained in the OEH Atlas of NSW Wildlife (NSW BioNet).
- Review of the MNES records within a 10 km radius of the site, using the Commonwealth DoE, EPBC Act Protected Matters Search Tool.

Literature Review

Information sources reviewed included:

- Relevant guidelines, including:
    - OEH *Threatened species assessment guidelines: The assessment of significance* (DECC, 2007)
    - OEH *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities* (DEC 2004)
    - *NSW Guide to Surveying Threatened Plants* (OEH 2016)
- OEH Threatened Species, Populations and Ecological Communities
- the site. Survey methods and data from RPS (2015) were analysed to obtain information for the current assessment and to determine whether any further surveys were required.

DESKTOP RESEARCH

Vegetation Mapping

Vegetation of the site and surrounding locality has been mapped as part of the *Combined Extant Vegetation for Central West Catchment, 2008 update* (OEH 2011) (which is based on an updated version of the extant vegetation dataset from the *Reconstructed and Extant Distribution of Native Vegetation in the Central West Catchment* (DEC 2006)). This mapping does not identify any native vegetation within the site boundaries. Several vegetation communities have been mapped in adjacent areas including Scribbly Gum Woodland, Sydney Sandstone Woodland / Open Forest, White Box – Red Gum – Rough-barked Apple Woodland and Mixed Box – Red Gum – Rough-barked Apple Woodlands of the Slopes.

Two separately required searches have been undertaken to ascertain biodiversity related matters for the site (both undertaken on the 7th August, 2019). Both reports are undertaken with a 10km minimum radius for the site, this ensures any potential threatened species/populations/ecological communities and other matters of environmental significance are captured for consideration. The results are detailed in the tables below.

BioNET Threatened Species Search

Scientific Name	Common Name	NSW status	Comm. status	Records
AVES				
Circus assimilis	Spotted Harrier	V,P		3
^Calyptorhynchus lathami	Glossy Black-Cockatoo	V,P,2		4
^Lophochroa leadbeateri	Major Mitchell's Cockatoo	V,P,2		1
Glossopsitta pusilla	Little Lorikeet	V,P		1
^^Polytelis swainsonii	Superb Parrot	V,P,3	V	1
^^Ninox connivens	Barking Owl	V,P,3		1
^^Ninox strenua	Powerful Owl	V,P,3		1
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V,P		3
Anthochaera phrygia	Regent Honeyeater	E4A,P	CE	6
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V,P		1

Daphoenositta chrysoptera	Varied Sittella	V,P		1
MAMMALS				
Dasyurus maculatus	Spotted-tailed Quoll	V,P	E	2
Phascolarctos cinereus	Koala	V,P	V	2
Petrogale penicillata	Brush-tailed Rock-wallaby	E1,P	V	1
Pteropus poliocephalus	Grey-headed Flying-fox	V,P	V	14
PLANTS				
Leucochrysum albicans var. tricolor	Hoary Sunray		E	19
Swainsona recta	Small Purple-pea	E1	E	24
Acacia ausfeldii	Ausfeld's Wattle	V		679
Eucalyptus cannonii	Capertee Stringybark	V		1
Dichanthium setosum	Bluegrass	V	V	2

EPBC Act Protected Matters Report

Additional Species for consideration

Common Name	Species Name	EPBC Status
AVES		
Painted Honeyeater	*Grantiella picta*	V
Swift Parrot	*Lathamus discolor*	CE
Superb Parrot	*Polytelis swainsonii*	V
MAMMALS		
Large-eared Pied Bat	*Chalinolobus dwyeri*	V
Corben's Long-eared Bat	*Nyctophilus corbeni*	V
Grey-headed Flying-fox	*Pteropus poliocephalus*	V
PLANTS		
	Euphrasia arguta	CE
	Ozothamnus tesselatus	V
Tarengo Leek Orchid	*Prasophyllum petilum*	E
a leek-orchid	*Prasophyllum sp. Wybong*	CE
Austral Toadflax,	*Thesium australe*	V
	Tylophora linearis	E

FIELD SURVEY

Vegetation Types

Two vegetation types were identified in the study area, these being;

- Exotic pasture and
- Woodland.

Refer to Vegetation Map showing distribution of Vegetation Types.

Exotic Pasture

Exotic pasture covers the majority of the site (refer to Photos 2). The groundlayer is dominated by exotic grasses and herbs such as *Anagallis arvensis* (Scarlet Pimpernel), *Briza minor* (Shivery Grass), *Trifolium repens* (White Clover), *Arctotheca calendula* (Capeweed). At the time of the site inspection the condition was so dry (drought), that the majority of the ground-layer vegetation had died, therefore the majority of the ground layer was bare ground (refer to Photo 3). Refer to Vegetation Map for Location of Exotic Pasture within the site.

Photo 2 Exotic Pasture

Photo 3 Exposed Soil

Woodland

This vegetation occurs around the existing dwelling and along Lions Road. This vegetation type was comprised of *Eucalyptus sideroxylon* (Red Ironbark), *Eucalyptus blakelyi* (Blakely's Red Gum) and *Eucalyptus melliodora* (Yellow Box) occurs occasionally. (refer to Photo 4). The current ecological condition of this vegetation is considered to be low. This vegetation may be considered a degraded variant of Box-Gum Woodland, due to the presence of *Eucalyptus blakelyi* (Blakely's Red Gum) and *Eucalyptus melliodora.* This vegetation type is considered a Threatened Ecological Community. Further analysis of this Woodland Vegetation in accordance with the Box-Gum Grassy Woodland Identification Flowchart in Appendix 2 of the National Recovery Plan: White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (DECCW 2011) will need to be undertaken to confirm this vegetation within the site would meet the DECCW definition. It is recommended that if possible the native vegetation within along the frontage of the site, is retained.

Planted gardens/ landscaping also occurred within this area. Refer to Vegetation Map.

Note:
Boundaries are not survey accurate.
Although all reasonable care has been taken to ensure the information shown on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Please verify the accuracy of all information prior to use.

FIGURE 3-1: VEGETATION MAP

CLIENT	Client
SITE DETAILS	Cnr Castlereagh Highway and Lions Drive Mudgee
DATE	22 August 2019

Legend
- Subject Site
- 100m Buffer
- Woodland / Planted Vegetation
- Exotic Pasture

NORTH

0 25 50 100

SCALE 2000 @ A3

PIXELDRAFTING

Ref No 2537

Firebird ecoSultants Pty Ltd
ABN - 16 105 985 993
Level 1, 146 Hunter Street, Newcastle NSW 2300
P O Box 354 Newcastle NSW 2300

firebird

DISCLAIMER

This docment and the information shown shall remain the property of Firebird ecoSultants Pty Ltd. The document may only be used for the purpose for which it was supplied and in accordance with the terms of engagement for the commission. Unauthorised use of this document in any way is prohibited

Photo 4 Woodland Vegetation around the existing dwelling

Fauna and Habitat Assessment

Habitat complexity across the site was considered to be low, due to a lack of notable habitat features, including tree hollows (noted 3 small – medium hollows), rocky features, and fully-structured native vegetation.

The *Eucalyptus blakelyi* (Blakely's Red Gum) containing hollows, should be retained (if possible) as part of future development of the site.

SEPP 44 Koala Habitat

SEPP 44 defines "Potential" and "Core" koala habitat, in accordance with the proportion of feed tree species present in an area. No feed tree species listed under Schedule 2 of SEPP 44 occur in the study area. As such, no further provisions of the policy apply.

Biodiversity Conservation Act (BC Act)

The BC Act sets out the Biodiversity Offsets Scheme (BOS) framework, which aims to avoid, minimise and offset impacts on biodiversity from development and clearing, and to ensure land that is used to offset impacts is secured in-perpetuity. The types of developments that the BOS applies to, include local development that is likely to significantly affect threatened species and threatened ecological communities, as determined by:

- The BOS development threshold, which has the following two elements:
    - Area Criteria – whether the amount of native vegetation being cleared exceeds a threshold area; and
    - Biodiversity Values Map (BVM) – whether the impacts occur on an area mapped on the BVM; or
- Assessments of Significance; or
- Development on Areas of Outstanding Biodiversity Value (AOBV) (note, at this stage AOBVs include areas of declared critical habitat under the old *Threatened Species Conservation Act 1995.* This site does not contain any such areas).

Any future proposal to clear the site's vegetation is not likely to meet the Area Criteria; under the Area Criteria, the clearing threshold for land containing a minimum lot size of 20 ha is 0.5 ha and the area of native vegetation to be removed for future development is likely to be less than 0.5ha (refer to Vegetation Map with estimate area of Woodland vegetation within the site). Review of the BVM has shown that the site has not been mapped on the BVM. Furthermore, due to the disturbed nature of the site it is unlikely that assessment under the 5 Part Test would trigger a significant impact for threatened species. Therefore, it is unlikely that the BOS will apply for any future development of the site, and a 5 Part test (test of Significance) will need to be undertaken in accordance with the BC Act.

Please Note: At the time of the site inspection the conditions were very dry and based on seasonality not all threatened species especially flora species would have been detected.

If you want to discuss any of the above matters further, please do not hesitate to contact the undersigned.

Yours faithfully
Firebird EcoSultants Pty Ltd

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

Sarah Jones
B.Env.Sc., G.DIP.DBPA (Design for Bushfire Prone Areas)
BAAS18020 Accredited Assessor, as required by the Biodiversity Conservation Regulation 2017 and accredited to apply the BAM
Ecologist / Bushfire Planner

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Mudgee

Client Service ID : 440319

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	Recorders						Permits		

There are no sites found for given search criteria.

Report generated by AHIMS Web Service on 07/08/2019 for Sarah Jones for the following area at Lot : 2, DP:DP1079362 with a Buffer of 200 meters. Additional Info : Due Diligence Report.

Number of Aboriginal sites and Aboriginal objects found is 0

This information is not guaranteed to be free from error omission. Office of Environment and Heritage (NSW) and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : Mudgee

Client Service ID : 440319

Firebird

Date: 07 August 2019

97 Scott Street
Newcastle New South Wales 2300
Attention: Sarah Jones

Email: sarah@firebirdeco.com.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 2, DP:DP1079362 with a Buffer of 200 meters. Additional Info : Due Diligence Report, conducted by Sarah Jones on 07 August 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

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

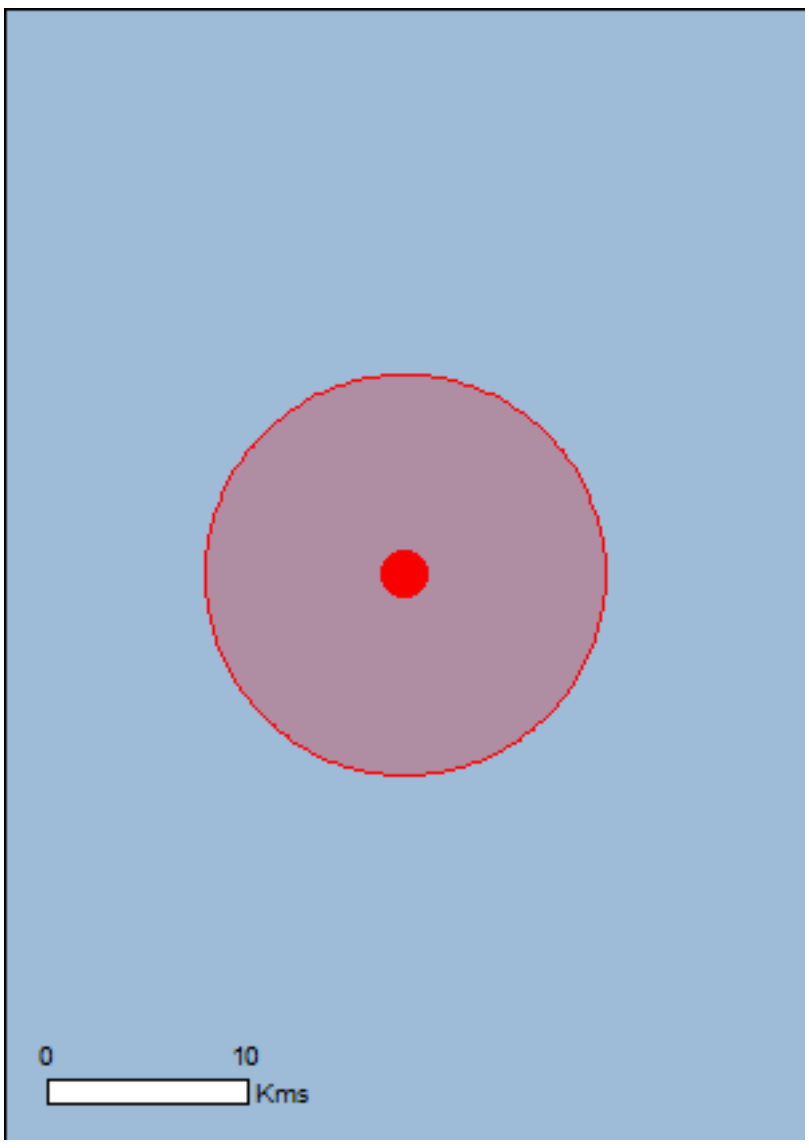
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 07/08/19 10:36:14

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

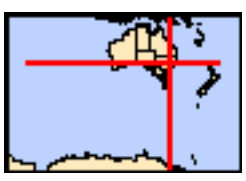
Caveat
Acknowledgements



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates

Buffer: 10.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	32
Listed Migratory Species:	11

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	3
Commonwealth Heritage Places:	1
Listed Marine Species:	18
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	26
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Banrock station wetland complex	800 - 900km upstream
Riverland	800 - 900km upstream
The coorong, and lakes alexandrina and albert wetland	900 - 1000km upstream
The macquarie marshes	200 - 300km upstream

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area
Natural Temperate Grassland of the South Eastern Highlands	Critically Endangered	Community may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat likely to occur within area
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Fish		
Galaxias rostratus Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat may occur within area
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat likely to occur within area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Frogs		
Litoria booroolongensis Booroolong Frog [1844]	Endangered	Species or species habitat likely to occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat may occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Plants		
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
Euphrasia arguta [4325]	Critically Endangered	Species or species habitat likely to occur within area
Leucochrysum albicans var. tricolor Hoary Sunray, Grassland Paper-daisy [56204]	Endangered	Species or species habitat known to occur within area
Ozothamnus tesselatus [56203]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Prasophyllum petilum		
Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area
Prasophyllum sp. Wybong (C.Phelps ORG 5269)		
a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area
Swainsona recta		
Small Purple-pea, Mountain Swainson-pea, Small Purple Pea [7580]	Endangered	Species or species habitat known to occur within area
Thesium australe		
Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Tylophora linearis		
[55231]	Endangered	Species or species habitat may occur within area
Reptiles		
Aprasia parapulchella		
Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area
Delma impar		
Striped Legless Lizard [1649]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus		
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat likely to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land - Australian Postal Commission
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Defence Service Homes Corporation

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Historic		
Mudgee Post Office	NSW	Listed place

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Avisford	NSW

Invasive Species	[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass		Species or species

Name	Status	Type of Presence
Tussock, Nassella Tussock (NZ) [18884]		habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-32.61422 149.60477

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

© Commonwealth of Australia
Department of the Environment
GPO Box 787
Canberra ACT 2601 Australia
+61 2 6274 1111

Appendix 3 – Preliminary Acoustic Review

7 November 2019

WM Project Number: 19469
Our Ref: PD 071119 bc.docx

Phillip Drew
Bunnings Group Limited
11 Shirley Street
ROSEHILL NSW 2128

Dear Phil

Re: Bunnings Mudgee- Preliminary Acoustic Review

Wilkinson Murray has conducted a preliminary review of proposed Bunnings to be located on the corner of Castlereagh Highway and Lions Drive Mudgee. The assessment has been conducted on based on the following:

- Proposed Site Layout
- Operation hours of 6am-9pm 7 days a week
- Likely Noise Criteria based on noise logging at Bunnings Lithgow (A similar type of area)
- Typical Noise Levels of equipment.

SITE LAYOUT

The attached figure shows the proposed site layout which is surrounded by industrial receivers with the exception of the single eastern residence on the boundary. In addition there are western residences approximately 140 metres from the boundary of the site.

NOISE CRITERIA

Derived criteria is detailed in the following table

Table 1 Project Noise Trigger Levels – Continuous Noise

Location	$L_{Aeq,15min}$ (dBA)			
	Daytime 7am-6pm	Evening 6pm-10pm	Night Time 10pm-7am	Morning Shoulder 6 am – 7 am
All residences	44	43	38	42

For maximum noise level events (night-time period only) the following screening noise levels apply:

Table 2 Sleep Disturbance Trigger Levels - dBA

Location	$L_{Aeq,15min}$	L_{AFmax}
All residences	42	52

BUNNINGS NOISE LEVELS

Typical Noise Levels associated with Bunnings Facilities are detailed in Tables 3 and 4.

Table 3 L_{Aeq} noise levels of operation & events – dBA

Noise Source	Sound Power Level	Sound Pressure Level at 3m
Truck loading / unloading with Forklift	95	77
Forklift working	89	71
Truck moving on site	104	86
Carpark (30 arrivals and departures)*	97	79
Roof Fans	94	76

* The $L_{Aeq(15\ minute)}$ noise level associated with one car searching for parking spot movement has been measured as 45 dBA at 7m. This level has been used and multiplied by the number of cars in the period by adding 10xlog(n) where n is the number of cars

Table 4 L_{Amax} Noise Levels of Operation & Events –dBA

Event	L_{Amax} Sound Power Level	Sound Pressure Level at 3m
Door closing	94	76
Forklift reversing alarm	77	59
Car starting	90	72
Truck Reversing	110	92
92Car accelerating	97	79

NOISE PREDICTIONS

Noise Level at residences to the east and west have been predicted based on distance attenuation to identified residences as follows:

Continuous Noise

Noise from Continuous Noise Sources is presented in Table 5.

Table 5 Predicted Noise to Residential Premises – $L_{Aeq,15min}$ dBA

Source	East	West	Shoulder Criteria
Truck loading / unloading with Forklift	50	27	43
Forklift working	26	21	43
Cleaning machine	19	14	43
Truck moving on site	51	34	43
Carpark (30 arrivals and departures)*	47	37	43
Roof Fans	39	33	43
Total	**55**	**40**	**43**

A review of the results indicates that a likely exceedance of criteria at the single residence to the east of the site. The main contributors are the loading dock and trucks entering the site. Therefore it would be prudent to allow for the following:

- A barrier / fence at least 3 -4 metres high between the site and the eastern residence.
- Sound absorption treatment in the loading dock.

Maximum Noise

In the case of sleep disturbance the following noise levels are predicted:

- Eastern Residences 65 dBA due to truck reversing alarms
- Western Residences 37 dBA due to forklift reversing alarms

Again a potential exceedance at the eastern residence is predicted. The measures recommended for continuous noise will also reduce the maximum noise levels due to truck reversing alarms.

Conclusion

A preliminary review of the proposed Bunnings at Mudgee has been conducted. The initial assessment indicates that treatment will be required on the eastern side of the site in the form of the following measures

- A barrier / fence at least 3 -4 metres high between the site and the eastern residence.
- Sound absorption treatment in the loading dock.

The adoption of the above measures will mitigate the potential for adverse acoustic impact at surrounding residences. It is noted that site specific noise criteria based on site monitoring, and computer modelling will further refine any potential noise mitigation.

I trust this information is sufficient. Please contact us if you have any further queries.

Yours faithfully
WILKINSON MURRAY PTY LIMITED

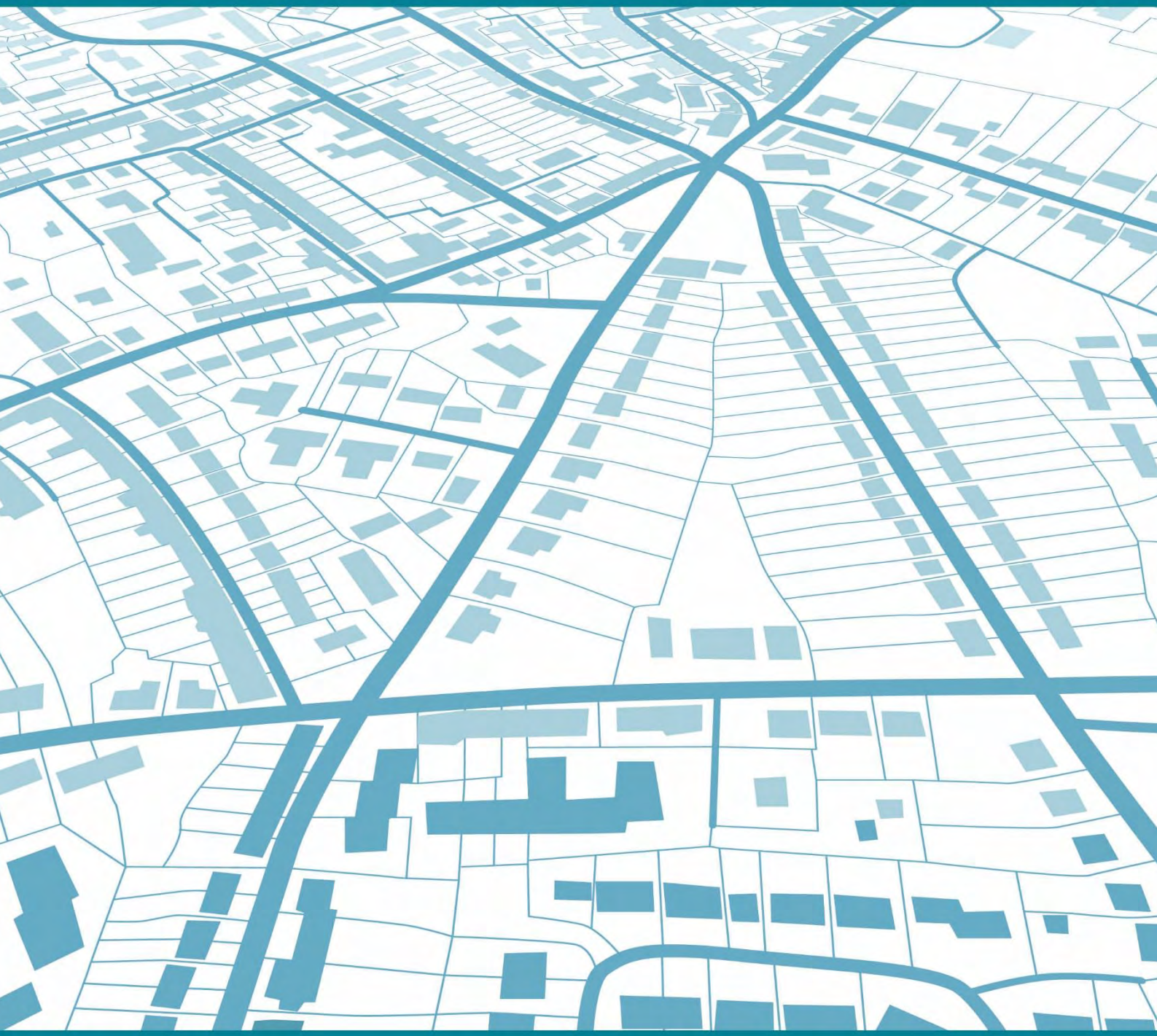
Brian Clarke
Senior Associate

Proposed Site Layout

Appendix 4 – Traffic Impact Assessment

ttpa TRANSPORT AND TRAFFIC PLANNING ASSOCIATES
Established 1994

Suite 502, Level 5, 282 Victoria Avenue
Chatswood NSW 2067
T (02) 9411 5660 | F (02) 9904 6622
E info@ttpa.com.au | ttpa.com.au



Planning Proposal for Envisaged Bunnings Development

Cnr Castlereagh Highway & Lions Drive, Mudgee

Ref: 19123
Date: January 2020
Issue: E

Table of Contents

1.0 INTRODUCTION 1

2.0 PLANNING PROPOSAL 2

2.1 Site, Context and Existing Circumstances 2
2.2 Envisaged Development 2

3.0 ROAD NETWORK AND TRAFFIC CONTROLS 4

3.1 Road Network 4
3.2 Road Geometry 4
3.3 Traffic Controls 6
3.4 Traffic Conditions 6

4.0 FUTURE CIRCUMSTANCES 9

4.1 St Matthew's Catholic School 9
4.2 Traffic Management Study 2014 9

5.0 TRAFFIC 11

6.0 PARKING 16

7.0 ACCESS, INTERNAL CIRCULATION & SERVICING 17

7.1 Access 17
7.2 Internal Circulation 17
7.3 Servicing 17

8.0 CONCLUSION 18

List of Illustrations

Figure 1 Location
Figure 2 Site
Figure 3 Road Network
Figure 4 Existing Peak Traffic Volumes
Figure 5 Projected Future Peak Traffic Volumes

List of Appendices

Appendix A Plan of Existing Bunnings
Appendix B Development Concept
Appendix C Traffic Survey Results
Appendix D SIDRA Results

1.0 Introduction

This report has been prepared to accompany a Planning Proposal to Mid-Western Regional Council for a proposed rezoning of Lot 2 DP1079362 from RU4 Primary Production small lots to B5 Business Development. The primary intention of this rezoning is to facilitate the development of a new Bunnings Warehouse with residue land available for other commercial development on the site on the south-west corner of Castlereagh Highway and Lions Drive at Mudgee (Figure 1).

Bunnings have an existing outlet in Mudgee (opposite the subject site), however this is a "small format store" which cannot provide a suitable range/quantity of goods although this store has a high level of trade for its size.

The envisaged development scheme, subject to the rezoning, would comprise 4 lots comprising:

- a mid size Bunnings warehouse of some 7,700m^2
- 2 pad lots of some 6,000m^2 total for bulky goods/auto services uses
- a residue lot with no envisaged development at this time

The purpose of this report is to:

- describe the site, the existing circumstances and the envisaged development scheme
- describe the road network serving the site and the traffic conditions on that network
- assess the envisaged vehicle access arrangements and potential traffic implications
- assess the adequacy of the envisaged parking provision
- assess the envisaged internal circulation and servicing arrangements

LOCATION

FIG 1

2.0 Planning Proposal

2.1 Site, Context and Existing Circumstances

The site (Figure 2) is Lot 2 of DP 1079362 which is a triangular shaped area of 5.37ha with frontages to the south-eastern side of Lions Drive and the south-western side of the Castlereagh Highway.

The site, which is located on the south-eastern edge of the Mudgee township, is currently occupied by a rural residential dwelling with vehicle access on Lions Drive. The site is a largely vacant "primary production" land extending between the highway and a right of way for a future road connection between Lions Drive and Spring Flat Road. There is a vacant land adjoining to the south and a rural residential dwelling adjoining to the east.

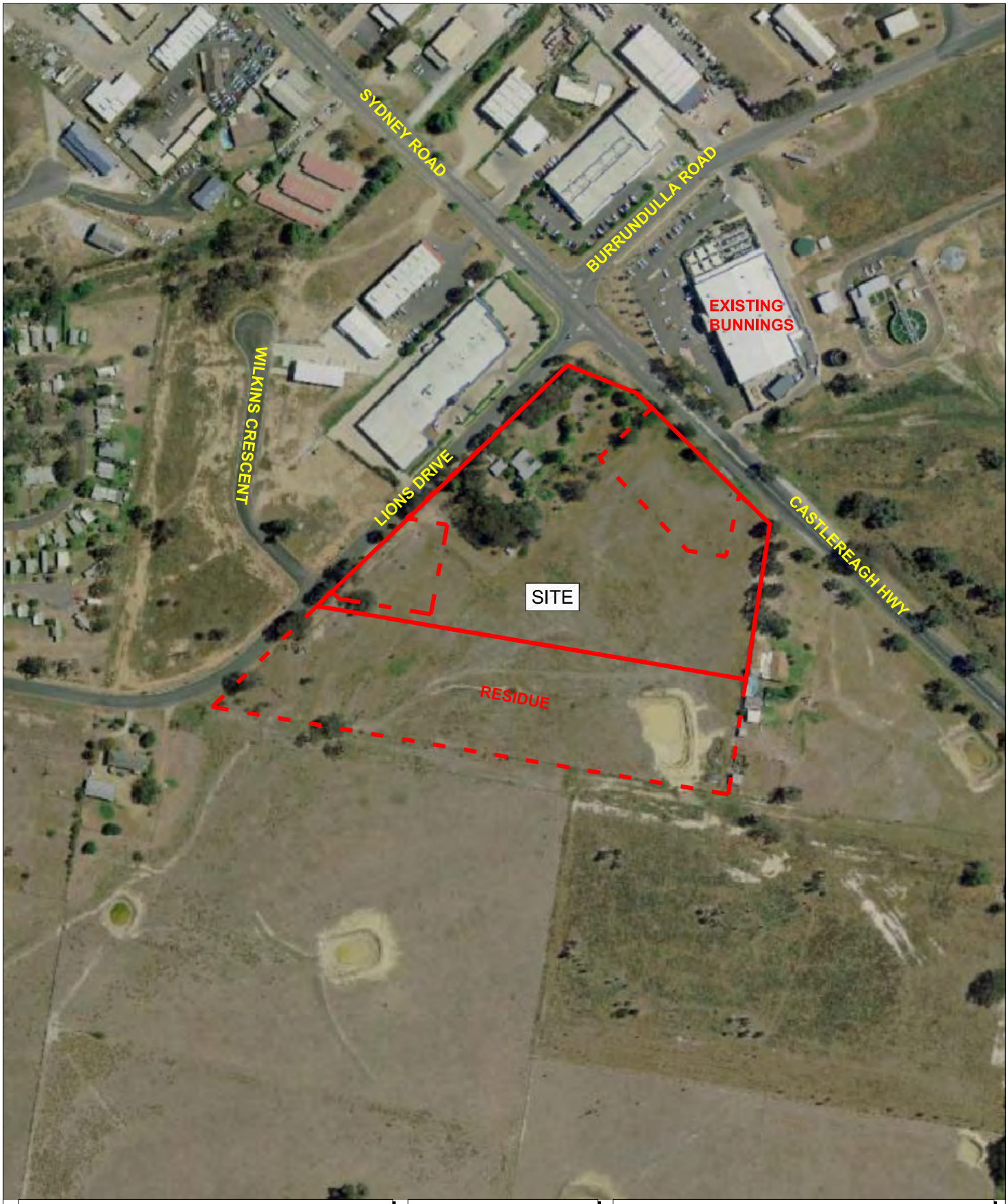
The existing Bunnings, of some 4,918m^2 with 107 parking spaces, is located on the north-eastern side of Castlereagh Highway while there are a number of bulky goods retail stores along the north-western side of Lions Drive.

2.2 Envisaged Development

The envisaged development outcome comprises:

Bunnings

A new single level building running along the southern part of the site with an open at-grade carpark on the central and northern part while goods delivery would occur along the southern side of the building.



LEGEND

N

SITE

FIG 2

The envisaged development comprises:

Warehouse	4,000m^2 approx.
TTS	1,400m^2 approx.
Nursery & BG's	1,630m^2 approx.
Total Retail	**7,030m^2** approx.
BM & LY	740m^2 * approx.

* *Does not represent retail floorspace*

It is envisaged that some 180 parking spaces would be provided with vehicle accesses comprising:

- a combined ingress/egress driveway for the carpark on the Lions Drive frontage
- an ingress driveway for trucks on Castlereagh Highway (left turn only) and egress on Lions Drive.

Details of the envisaged Bunnings development scheme are provided on the plan which accompanies the Planning Proposal and is reproduced in Appendix B.

Other Lots

It is envisaged that there will be 2 pad lots, one having frontage to Castlereagh Road and the other with frontage to Lions Drive. The envisaged development outcome for these lots is as follows:

Lot 1	–	4,210m^2	– 2,100m^2 GFA	Bulky Goods
Lot 2	–	1,878m^2	– 1,400m^2 GFA	Auto Services

The residue southern part of the subdivided land has no envisaged future development use at this time.

3.0 Road Network and Traffic Controls

3.1 Road Network

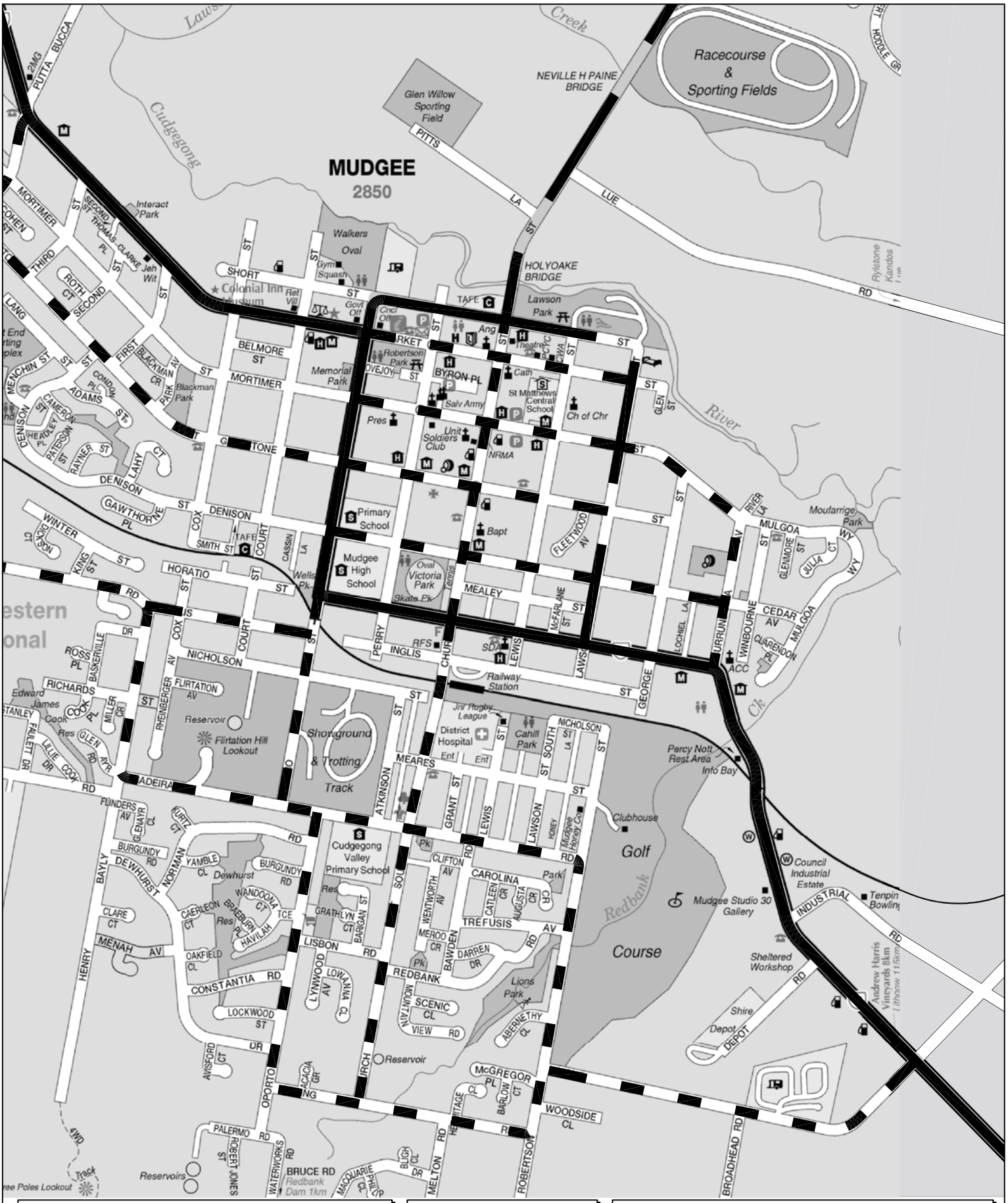
The road network in the vicinity of the development site (Figure 3) comprises:

- *Castlereagh Highway (Sydney Road)* – a State Road and arterial route which connects between the Great Western Highway at Marrangaroo and the Queensland border
- *Lions Drive* – a collector road connecting between Castlereagh Highway and Robertson Street
- *Robertson Road/Madera Street* – a collector road route connecting between Lions Drive and Henry Bayly Drive
- *Spring Road, Church Street and Oporto Road* – collector roads serving the South Mudgee area
- *Burrundulla Road* – a local access road connecting to Castlereagh Highway at the Lions Drive intersection.

3.2 Road Geometry

Castlereagh Highway and Lions Drive are relatively straight and level in the vicinity of the site with one travel lane in each direction plus supplementary turning lanes at the intersection (see details overleaf). There is a central “barrier” line along the Castlereagh Highway with section of a central median island across the existing Bunnings access driveway.

Burrundulla Road also has one travel lane in each direction which is offset somewhat from Lions Drive at the Castlereagh Highway intersection.



ROAD NETWORK

FIG 3

Intersection of Sydney Road-Castlereagh Highway/Lions Drive/Burrundulla Road

Left-turn bay from Castlereagh Highway into Lions Drive

Right-turn bay from Sydney Road into Lions Drive

3.3 Traffic Controls

The traffic controls which have been applied to the road system in the vicinity of the site comprise:

- the 50 kmph speed restriction on the Castlereagh Highway and Lions Drive
- the GIVE WAY signs on Lions Drive and Burrundulla Road at the Castlereagh Highway intersection
- B Double/Road Train route along the Castlereagh Highway as shown on the NHVR diagram overleaf

3.4 Traffic Conditions

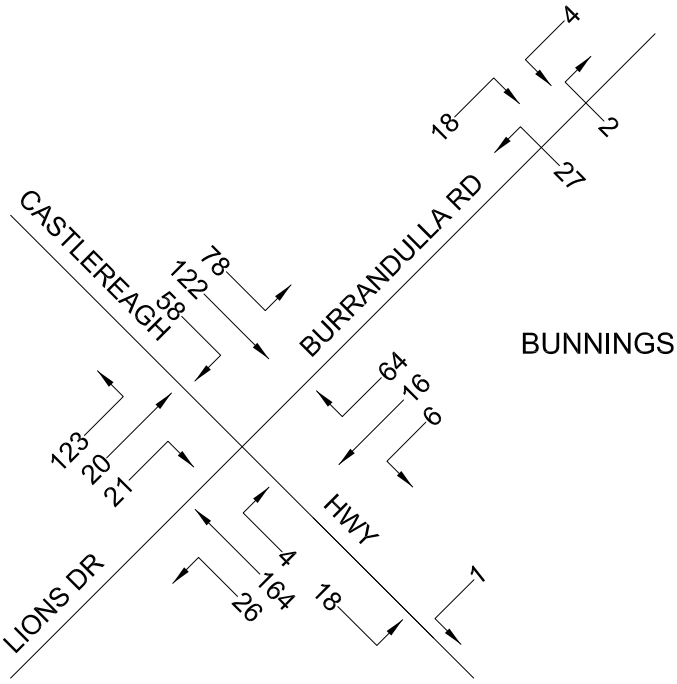
An indication of traffic conditions on the road network in the vicinity of the site is provided by RMS data and traffic surveys undertaken as part of this study. The RMS Data is expressed in terms of Annual Average Daily Traffic and the most recent available data is as follows:

	AADT
Sydney Road, south of rail crossing	6,577

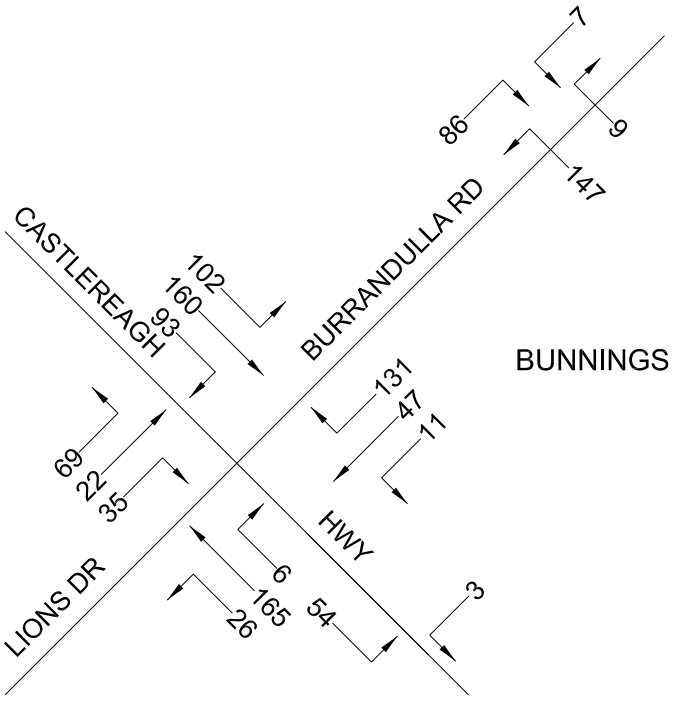
Traffic surveys have been undertaken at the Castlereagh Highway, Lions Drive and Burrundulla Road intersection and the existing Bunnings during the AM, PM and Sat MD peak periods. The results of these surveys are provided in Appendix C and the data summarised on Figure 5.

The operational performance of the intersection has been assessed using SIDRA. The results of this assessment indicating a good level of service (LOS A) are provided in Appendix D and summarised in the following, while a guide to interpreting the SIDRA results is provided overleaf.

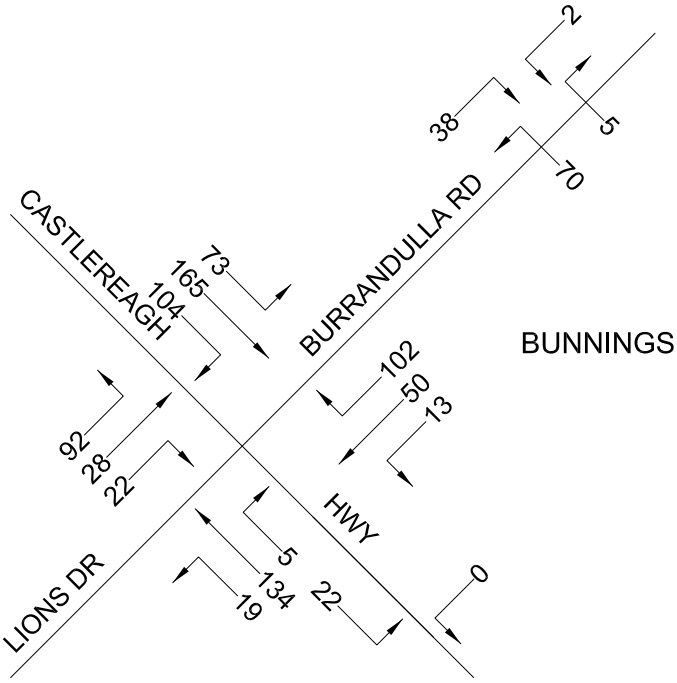
	AM		PM		Sat MD	
	LOS	**AVD**	**LOS**	**AVD**	**LOS**	**AVD**
Castlereagh / Lions / Burrundulla	A	3.9	A-B	5.1	A-B	5.7



AM
(8 - 9 AM)



SAT MD
(11.30 - 12.30 AM)



PM
(4.30 - 5.30 PM)

EXISTING TRAFFIC VOLUMES

FIG 4

Criteria for Interpreting Results of SIDRA Analysis

1. Level of Service (LOS)

LOS	Traffic Signals and Roundabouts	Give Way and Stop Signs
'A'	Good	Good
'B'	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
'C'	Satisfactory	Satisfactory but accident study required
'D'	Operating near capacity	Near capacity and Accident Study required
'E'	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode
'F'	Unsatisfactory and requires additional capacity	Unsatisfactory and requires other control mode

2. Average Vehicle Delay (AVD)

The AVD provides a measure of the operational performance of an intersection as indicated on the table below, which relates AVD to LOS. The AVD's listed in the table should be taken as a guide only as longer delays could be tolerated in some locations (ie inner city conditions) and on some roads (ie minor side street intersecting with a major arterial route).

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabouts	Give Way and Stop Signs
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode

3. Degree of Saturation (DS)

The DS is another measure of the operational performance of individual intersections.

For intersections controlled by **traffic signals**[1] both queue length and delay increase rapidly as DS approaches 1, and it is usual to attempt to keep DS to less than 0.9. Values of DS in the order of 0.7 generally represent satisfactory intersection operation. When DS exceeds 0.9 queues can be anticipated.

For intersections controlled by a **roundabout or GIVE WAY or STOP signs**, satisfactory intersection operation is indicated by a DS of 0.8 or less.

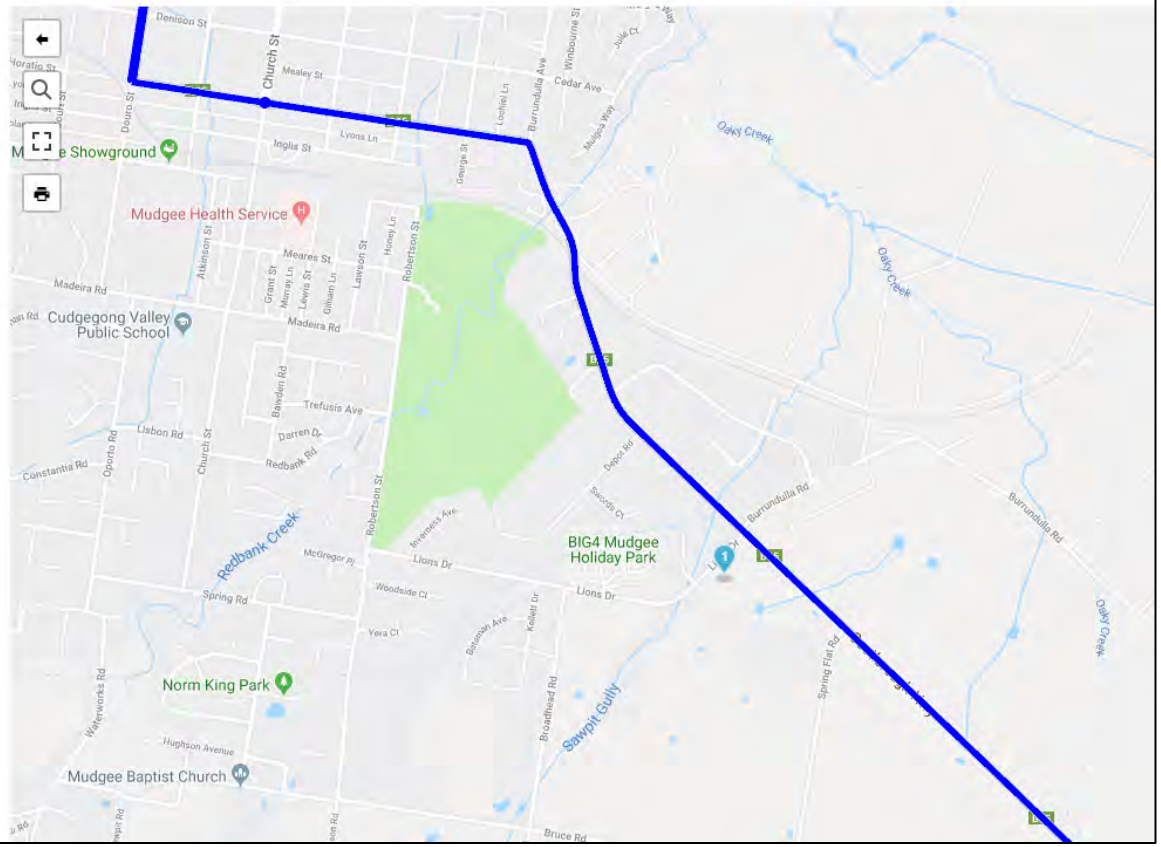
[1] *the values of DS for intersections under traffic signal control are only valid for cycle length of 120 secs*

NHVR Portal

Route planner tool

PLAN ROADS LAYERS SUMMARY

- [x] HML A-Double Road Train (NSW)
  - Restricted Structures
  - Restricted Intersections
  - Restricted Intersections with Conditional Access
  - Approved Routes
  - Approved Routes with Conditions
  - Approved Areas
- [ ] HML Road Train 32m Network (SA)
- [ ] HML Road Train 36.5m Network (SA)
- [ ] HML Road Train 53.5m Network (SA)
- [ ] HML AB-Triple Road Train (NSW)
- [ ] HML B-Triple Network (NSW)
- [ ] HML (VIC)
- [ ] HML B-Double 23m (SA)
- [ ] HML B-Double 23m Vehicle Carrier (SA)
- [x] HML B-Double 25/26m (NSW)
  - Restricted Structures
  - Restricted Intersections
  - Restricted Intersections with Conditional Access
  - Approved Routes



4.0 Future Circumstances

4.1 St Matthew's Catholic School

It is understood that a Development Application is being prepared in relation to the proposal to relocate the existing St Matthews Catholic School in Mudgee to a new site at the intersection of Bruce Street and Broadhead Road which will be in the near vicinity of the envisaged Bunnings development and therefore an issue for consideration in the Bunnings traffic assessment (see further discussion in Section 5).

4.2 Traffic Management Study 2014

Council commissioned a traffic study[1] to provide a Traffic Management Plan for Mudgee township and this study involved the following tasks:

- assess the current (at that time) traffic movements through the roads and intersections
- assess the future increased traffic movements resulting from the projected impending residential and industrial development
- identify the road infrastructure upgrades necessary to accommodate the projected future traffic circumstances (and existing shortcomings)
- prioritise the identified upgrades so that implementation is commensurate with development and for satisfactory levels of service to be maintained
- inform the Section 94 Developer Contributions Plan

1 *Mudgee Township*
Traffic Management Study 2014
Gennaoui Consulting Pty Ltd

The assessment undertaken was very detailed and in relation to the intersection of Castlereagh Highway, Lions Drive and Burrundulla Road the following was reported:

- The intersection operated satisfactorily at the present time (2014 peak traffic flows) LOS B PM peak
- There were 4 injury/tow away accidents at the intersection in the 4 years to 2012 resulting in 2 injuries
- The number of residential dwellings in Mudgee will increase by 2,025 (i.e. +47%) by 2022
- The number of trips generated by new industrial development would increase by some 200 vtph
- The traffic movements on Lions Drive will increase by some 69% as a result of the identified potential residential and industrial development
- The operational performance of the existing intersection would fall to LOS F (fail) due largely to the delays experienced by vehicles turning right from Burrundulla Road (N.B. only the PM peak circumstance was assessed)
- The identified total movements through the intersection during the PM peak in 2014 was 784 vph and the projected future total additional movements was 270 vph (+ 34%)
- It recommended the construction of a roundabout at the intersection with a priority for completion (5 to 10 years) i.e. 2019 – 2024 at an estimated cost of $950,000. It is understood that there are no current plans or program for the undertaking of this intersection upgrade.

5.0 Traffic

RMS released Technical Direction TDT 2013-4b which includes traffic generation criteria for "hardware" use. However, this data is significantly flawed in relation to application to a contemporary Bunnings due to the fact that the underlying surveys predominantly involved small Mitre 10 outlets (e.g., 1,600 to 2,000m^2).

The results of the traffic surveys at the existing Bunnings reveal that:

- The peak trade occurs at midday on Saturday when there are some 306 vtph
- The peak weekday trade occurs between 4.30 and 5.30pm when there are some 137 vtph
- The trade between 3.0 and 4.0pm on weekdays is some 80 vtph
- The trade between 8.0 and 9.0am on weekdays is some 70 vtph

The surveys were undertaken in late November 2019 and represent a 95th percentile level of trade for Bunnings.

It is envisaged that the large Pad lot will have a bulky goods use with the other having an automotive services use and that the replacement use in the existing Bunnings building will also be bulky goods. As noted in the recent RMS Bulky Goods landuse study bulky goods outlets do not trade in the morning peak period. It is also noted that the existing peak traffic movements at the access intersection also occur during the afternoon period (4.30 to 5.30pm). Hence, it is apparent that the weekday afternoon (4.30 to 5.30pm) and Saturday Midday periods will reflect the peak cumulative traffic circumstances in relation to the Bunnings related developments.

There is no reason for the envisaged new Bunnings to generate more traffic movements than the existing Bunnings (as indicated on Figure 4) apart from that resulting from future population growth in Mudgee. Rather the increased floorspace will be reflected in an increased "length of stay" and "spend" by customers as a result of the larger range of goods which can be accommodated for display and sale.

Council's Contributions Plan 2019 adopts the following LGA Population Forecast for 2017-2029:

	2017	2029	Change
Mudgee	12,500	13,800	10%
Outside Mudgee	12,315	13,015	6%
LGA	24,815	26,815	8%

For the purpose of this assessment, it is reasonable to assume that for a "10 year Design Horizon" the traffic generation of the envisaged new Bunnings will be some 10% more than the existing generation and a result of the increased population.

Application of this projected growth to the recently surveyed traffic generation would indicate the following 2029 peak traffic generation for the envisaged Bunnings:

WDAM	WDPM	WEMD
77 vtph	151 vtph	337 vtph

The other factors which need to be included in assessing the potential future traffic outcome at the access intersection are:

- the general background traffic growth
- the projected traffic generation of the new St Matthews Catholic School in the AM peak (the afternoon school peak will not overlap the Bunnings/intersection PM peak)
- the growth and redistribution of the Bunnings movements for the new site
- the traffic generation of development on the two envisaged Pad lots
- the traffic generation of the reuse of the existing Bunnings site

The general background traffic growth will comprise:

- residential growth
- commercial/industrial growth
- tourism growth
- intrastate highway growth

A factor of +2% p.a. is assessed to be an appropriate provision for a 10 year “design horizon” given the Council projected +1% p.a. population growth.

A preliminary traffic impact assessment for the proposed School relocation has indicated total traffic generation during the AM and PM school peak periods of some 380 vtph with some 17% - 18% travelling through the Castlereagh Highway and Lions Drive intersection (4% to/from the southwest).

The envisaged relocation of the existing Bunnings to the opposite side of the highway will result in:

- vehicles travelling to/from the west not passing through the intersection
- vehicles travelling to/from the north turning right into and left out of Lions Drive and not into/out of Burrundulla Road
- the negligible movements to/from the south and east also being redirected

Additional to the Bunnings traffic movements will be the movements generated by the uses on the 2 Pad lots. It is noted that the major fast food franchises are largely already provided in Mudgee and the site is located over 3km from the town centre. The most likely use outcome on these pad sites is “bulky goods” on the large lot and “automotive services” on the small lot.

The potential future development use on the residue southern lot is not known at this time; however given its location and nature, it would potentially have an industrial/warehouse use outcome with a minor traffic generation which would be part of the assessed “design horizon” outcome.

The RMS Study for Bulky Goods use included surveys of 3 “regional sites” and the average network peak traffic generation rates of the 3 sites were as follows:

AM	Not open
PM	1.51 vtph/100m^2
SAT	2.72 vtph/100m^2

The RMS traffic generation rate for auto services use is 0.7 to 1.0 vtph per 100m^2 and application of these factors would indicate:

	AM	PM	SAT
Lot 1 2,100m^2 @	Nil	32 vtph	57 vtph
Lot 2 1,400m^2 @	14 vtph	14 vtph	14 vtph
Total	**14 vtph**	**46 vtph**	**71 vtph**

Normally, there would be a “discount” applied to reflect a dual visitation factor (e.g. Bunnings/bulky goods/auto services); however, this will not be applied in order to present a robust assessment.

It is also necessary to consider the potential reuse of the existing Bunnings building and the most likely “high end” use would be bulky goods and the application of the RMS “regional” traffic generation rates to the building (less the yard area) of 4,004m^2 would indicate the following:

AM	Not open
PM	60 vtph
SAT	108 vtph

In order to establish the projected 2029 traffic outcome with the envisaged new Bunnings and the other related traffic changes a process has been undertaken involving:

- deducting the existing Bunnings traffic movements from the intersection movements
- increasing the main intersection movements by 20%
- adding the increased and redirected new Bunnings movements
- adding the projected school movements (AM peak)
- adding the movements resultant to a reuse of the existing Bunnings building
- adding the projected Pad lot traffic movements

The resultant 2029 peak traffic movements are shown on Figure 5 and the operational performance of the access intersection has been assessed using SIDRA. The results are provided in Appendix D and summarised in the following:

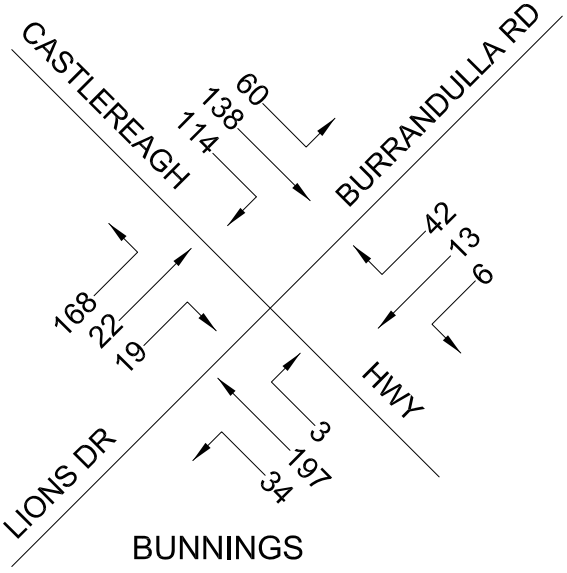
	AM		PM		SAT MD	
	LOS	AVD	LOS	AVD	LOS	AVD
Castlereagh / Lions / Burrundulla	A-B	4.0	A-B	5.1	A-B	5.6

The SIDRA results indicate that satisfactory levels of service will be maintained at the existing intersection, however, the right turn movement into Lions Drive and left turn movement out become significant (including during the afternoon school peak). There is only a single approach lane in Lions Drive at present, however, a separate left turn lane could be provided relatively easily. Also, the right turn bay for the turn into Lions Drive can be readily extended and a right turn bay created in Burrundulla Road (with modification of existing roadmarking as indicated on the diagram overleaf. It is considered that these potential changes to the intersection would assist in delaying the need for the eventual expensive roundabout construction and maintain a satisfactory LOS during the design horizon period and potentially beyond.

The operational performance with the projected 2029 traffic movements with these potential changes has also been assessed using SIDRA with the results provided in Appendix D and summarised in the following:

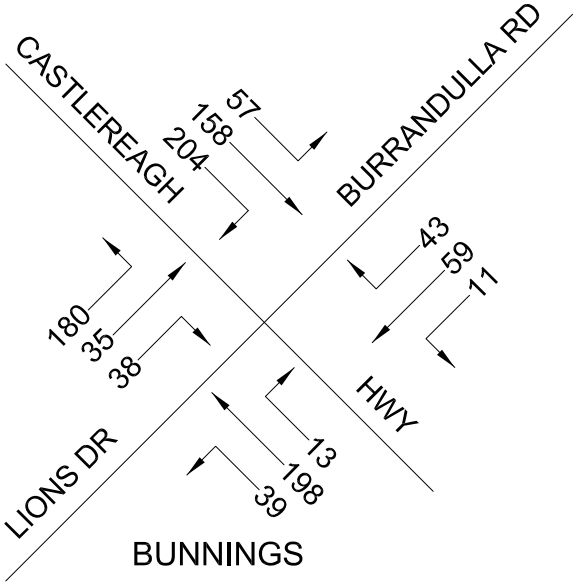
	AM		PM		SAT MD	
	LOS	AVD	LOS	AVD	LOS	AVD
Castlereagh / Lions / Burrundulla	A-B	3.9	A-B	4.8	A-B	5.0

Whilst the operational performance with these changes is very similar, there would be significant contingent provision in relation to potential queuing and conflict.



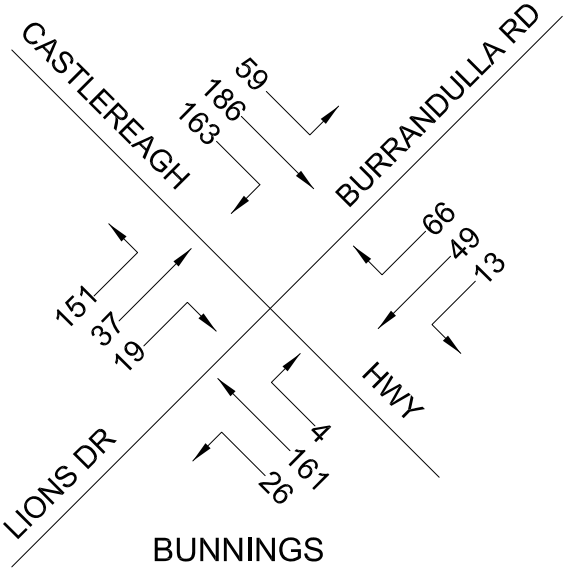
BUNNINGS

AM
(8 - 9 AM)



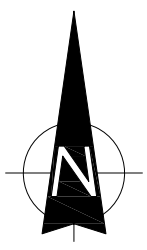
BUNNINGS

SAT MD
(11.30 - 12.30 AM)



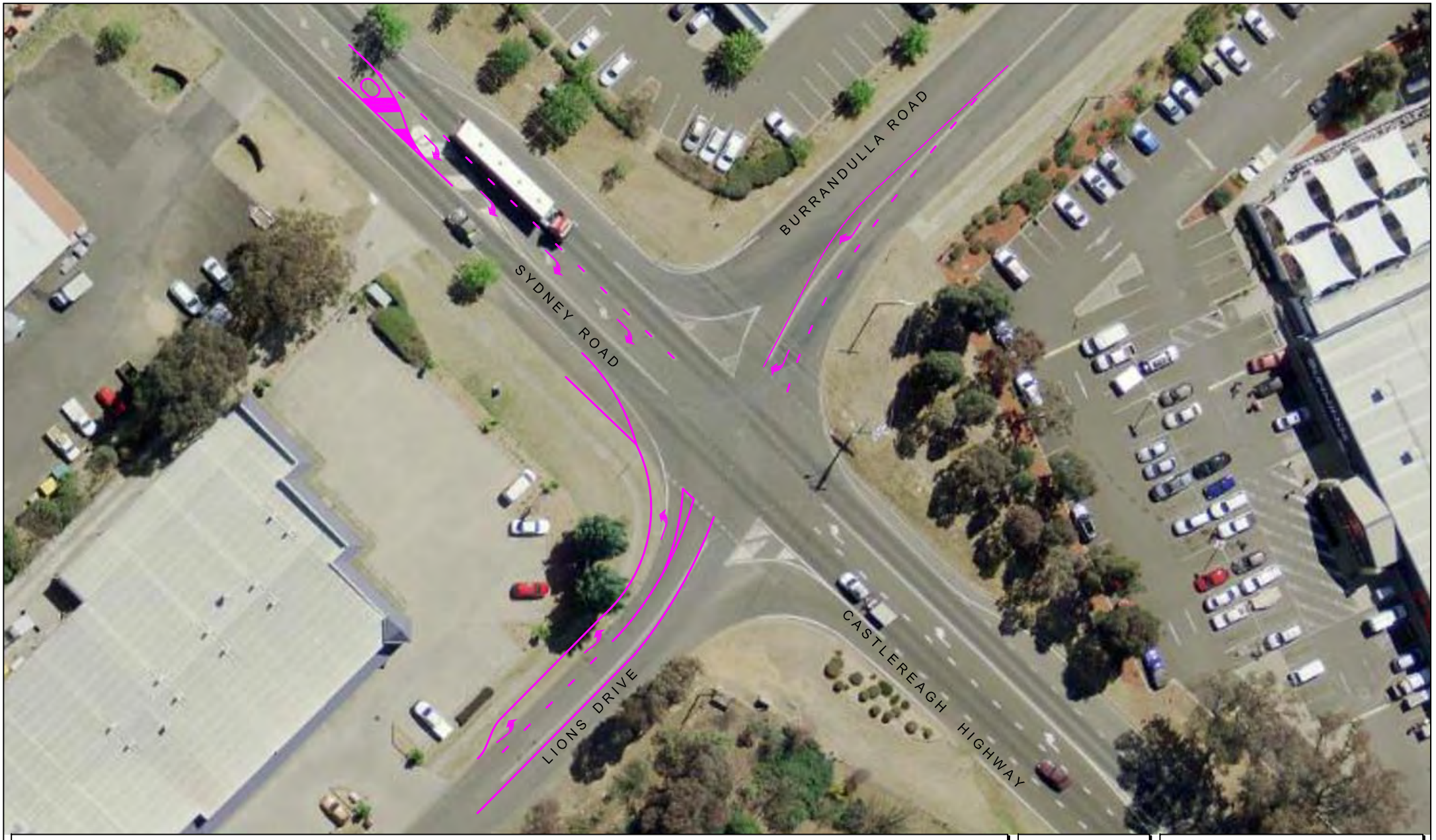
BUNNINGS

PM
(4.30 - 5.30 PM)



FUTURE TRAFFIC VOLUMES

FIG 5



LEGEND

ttpa TRANSPORT AND TRAFFIC PLANNING ASSOCIATES
Established 1994
Address: Level 5, Suite 502 / 282 Victoria Ave, Chatswood NSW 2067
P: (02) 9411 5660 F: (02) 9904 6622 W: www.ttpa.com.au

PROPOSED ACCESS ARRANGEMENT

6.0 Parking

Council's DCP specifies a parking provision requirement for Bulky Goods Retailing, Rural Supplies, Hardware and Building Supplies as follows:

1 space per 50m^2 GFA

There is no criteria specified for Auto Services use (e.g. Repco, Tyre, Parts sales).

It is envisaged that a total of some 180 parking spaces would be provided for the new Bunnings use and this would be more than adequate. Details of the envisaged parking on the 2 pad lots have not been resolved at this time; however, there is no apparent reason why adequate parking would not be provided for the envisaged uses on these sites.

7.0 Access, Internal Circulation & Servicing

7.1 Access

It is envisaged that the Bunnings carpark access will be provided by a combined ingress/ egress driveway on the Lions Drive frontage and that access for the Pad lots will be via the Bunnings site access.

The access for Bunnings delivery/service vehicles will involve an ingress from Castlereagh Highway (limited to left turn only by the existing median island) with a deceleration lane and egress to Lions Drive.

7.2 Internal Circulation

The design of the internal circulation and parking areas including the aisles and bays etc. accords with the design criteria of AS2890.1 & 6 and the circulation system will be very flexible due to the two-way traffic provisions.

7.3 Servicing

The trucks servicing with the proposed Bunnings will enter and exit the site separate to the carpark movements. The proposed design provisions for these service vehicles accords with the AS2890.2 criteria.

8.0 Conclusion

This assessment of the envisaged Bunnings development at Mudgee, subject to the proposed rezoning indicates that:

- There will be no adverse traffic implications and even with the projected 10 year 'design horizon' traffic demands, however minor upgrading works at the Castlereagh Highway access intersection would provide a preferable outcome which provides for contingencies
- The envisaged vehicle access, internal circulation and servicing arrangements will be quite satisfactory
- The envisaged parking provision will be quite adequate and appropriate

Appendix A

Plan of Existing Bunnings

EXISTING SITE PLAN
SCALE: 1:300 @ A1

ALL DIMENSIONS ARE TO BE CONFIRMED ON SITE PRIOR TO MANUFACTURE AND CONSTRUCTION

STORE TYPE **SFS**

FOR COMMENT

DATE:	REV.	AMENDMENT:	DWN
22/05/17	B	REMOVED/RELOCATED SPEED HUMPS	PG/DT
14/01/16	A	REMOVED/RELOCATED SPEED HUMPS	GS
-	-	INITIAL EXISTING SITE PLAN	

AUTHORISATION:

CHIEF OPERATING OFFICER:..... DATE:.....

GM MARKETING & MERCH:..... DATE:.....

NATIONAL MERCH MANAGER:..... DATE:.....

VISUAL MERCH MANAGER:..... DATE:.....

STORE PLANNING MANAGER:..... DATE:.....

BUNNINGS

Bunnings Group Limited
19 – 21 Cato Street, Hawthorn East, VIC 3123
Locked Bag 3004, Hawthorn VIC 3122
Phone (03) 9411 9111
Fax (03) 9411 9427
www.bunnings.com.au

PSO APPROVED
DRAWING NO: #### DATE OF PSO:####

CAPEX APPROVED
DRAWING NO: #### CAPEX NO: ####
DATE ISSUED:####

ISSUED FOR CAPEX FEASIBILITY
DATE ISSUED :#### DRAWING NO: ####

PROJECT NAME: **MUDGEE**
SERIES SIZE: **SFS**

PROJECT ADDRESS: **CNR CASTLEREAGH HWY & BURRUNDULLA RD MUDGEE NSW 2850**

STORE NUMBER: **7091**
STORE TYPE: **SFS**

DRAWING STAGE: **EXISTING**

DRAWING TITLE: **EXISTING SITE PLAN**

PLOT DATE: **5/22/2017 9:41 AM**

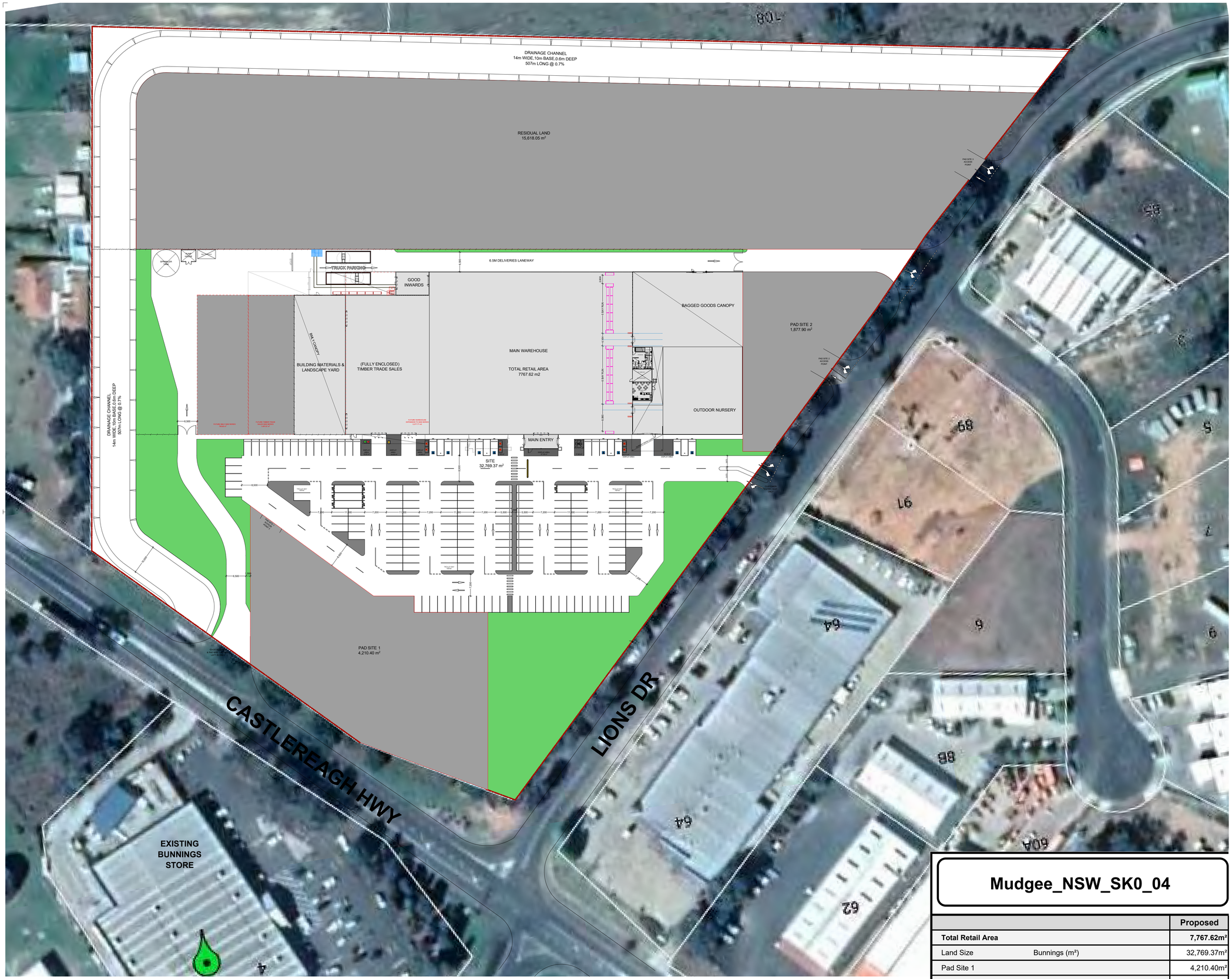
CHECKED BY:

DRAWN: KH	PROJECT NORTH:	DRAWING NO:	REVISION
SCALE: AS SHOWN		SP1_01	B
DATE: 22/01/13			

FILE LOCATION: \\ASSP42-DATA\JOB-CO-ordination\Assignment Work\PLANNING SUPPORT\100JL_Architect\Working Files\SD7-7091\SD7-7091_SP1_01_EXISTING SITE PLAN.dwg, 22/05/2017 9:41:26 AM

Appendix B

Development Concept



PROPOSED SKETCH PLAN

SCALE: 1:600 @ A1

Mudgee_NSW_SK0_04

		Proposed
Total Retail Area		**7,767.62m²**
Land Size	Bunnings (m²)	32,769.37m²
Pad Site 1		4,210.40m²
Pad Site 2		1,877.90m²
Residual Bunnings Land		15,618.05m²
Total Land	**(m²)**	**54,475.72m²**

ALL DIMENSIONS ARE TO BE CONFIRMED ON SITE PRIOR TO MANUFACTURE AND CONSTRUCTION

STORE TYPE **SMALL**

FOR COMMENT

DRAFT

DATE:	REV:	AMENDMENT:	DWN:
27/12/19	C	PROPOSED SKETCH PLAN UPDATED AS PER PROPERTY FEEDBACK	JA
19/12/19	B	PROPOSED SKETCH PLAN UPDATED AS PER PROPERTY FEEDBACK	JA
03/12/19	A	UPDATED SKETCH PLAN: PROPOSED SMALL 3000 SERIES TO ACCOMMODATE FUTURE EXPANSION TO A MEDIUM 5000 SERIES	TK
19/11/19	-	INITIAL PROPOSED SKETCH PLAN - 5000 SERIES	TK

AUTHORISATION:

CUSTOMER COMMUNICATIONS MGR:.....DATE:.....

VISUAL MERCH MANAGER:.....DATE:.....

STORE DESIGN&STD MANAGER:.....DATE: .....

STORE PLANNING MANAGER:.....DATE: .....

STORE PLANNING COORDINATOR:.....DATE:.....

BUNNINGS

Bunnings Group Limited
16 - 18 Cato Street, Hawthorn East, VIC 3123
Locked Bag 3004, Hawthorn VIC 3122
Phone : (03) 8831 9777
Fax : (03) 8831 9837
Website : www.bunnings.com.au

PROJECT NAME
MUDGEE

SERIES SIZE
3000

PROJECT ADDRESS
CNR CASTLEREAGH HWY & LIONS DVE
MUDGEE NSW 2850

STORE NUMBER
N/A

STORE TYPE
SMALL

DRAWING STAGE:
DESIGN CONCEPT

DRAWING TITLE:
PROPOSED SKETCH PLAN

PLOT DATE: **31/12/2019 9:17 AM**

CHECKED BY:

DRAWN: **TK**

SCALE: **AS SHOWN**

DATE: **31/12/2019**

PROJECT NORTH: N

DRAWING NO: **SK0_04**

REVISION: **C**

DRAFT

FILE LOCATION:Q:\Store Planning\PLANNING SUPPORT TOOLS_Arch\CAD\Plotting Files\PLOTMAKER TEMPLATES\Store Planning Tiles Block 2017.plt

MUDGEE

Appendix C

Traffic Survey Results

Traffic Informatio Specialist

Location: Burrundulla Road / Castlereagh Highway / Lion Drive / Castlereagh Highway
Suburb: MUDGEE

Duration: 7:00 - 9:00 / 15:00 - 18:00 / -
Day/Date: Thursday,28 November,2019
Weather: -

All Vehicles Time Per Hour	NORTH EAST Burrundulla Road										SOUTH EAST Castlereagh Highway										TOTAL		TOTAL
	L			T			R				L			T			R						
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	
7:00 - 8:00	4	1	5	8	2	10	25	12	37	52	9	1	10	78	16	94	4	1	5	109	420	61	481
7:15 - 8:15	4	1	5	6	2	8	31	8	39	52	13	1	14	96	16	112	3	1	4	130	471	62	533
7:30 - 8:30	2	0	2	7	2	9	41	5	46	57	16	2	18	125	11	136	2	0	2	156	532	50	582
7:45 - 8:45	3	0	3	12	3	15	46	3	49	67	20	2	22	139	10	149	2	0	2	173	585	52	637
8:00 - 9:00	5	1	6	14	2	16	57	7	64	86	24	2	26	152	12	164	4	0	4	194	635	67	702
Period End																							
15:00 - 16:00	6	1	7	26	8	34	97	12	109	150	19	1	20	116	8	124	2	2	4	148	685	61	746
15:15 - 16:15	5	2	7	27	0	27	90	7	97	131	18	1	19	116	13	129	3	1	4	152	711	54	765
15:30 - 16:30	4	2	6	25	0	25	94	7	101	132	17	1	18	113	12	125	4	1	5	148	727	50	777
15:45 - 16:45	5	2	7	30	0	30	91	6	97	134	14	0	14	117	15	132	5	0	5	151	737	46	783
16:00 - 17:00	5	1	6	35	0	35	96	4	100	141	18	0	18	130	12	142	5	0	5	165	759	46	805
16:15 - 17:15	12	0	12	44	0	44	95	4	99	155	15	0	15	128	9	137	3	0	3	155	762	41	803
16:30 - 17:30	13	0	13	50	0	50	97	5	102	165	19	0	19	126	8	134	4	1	5	158	765	42	807
16:45 - 17:45	11	0	11	44	0	44	99	2	101	156	23	0	23	132	6	138	8	1	9	170	757	34	791
17:00 - 18:00	11	0	11	45	0	45	93	2	95	151	21	0	21	123	7	130	7	1	8	159	695	26	721
Period End																							

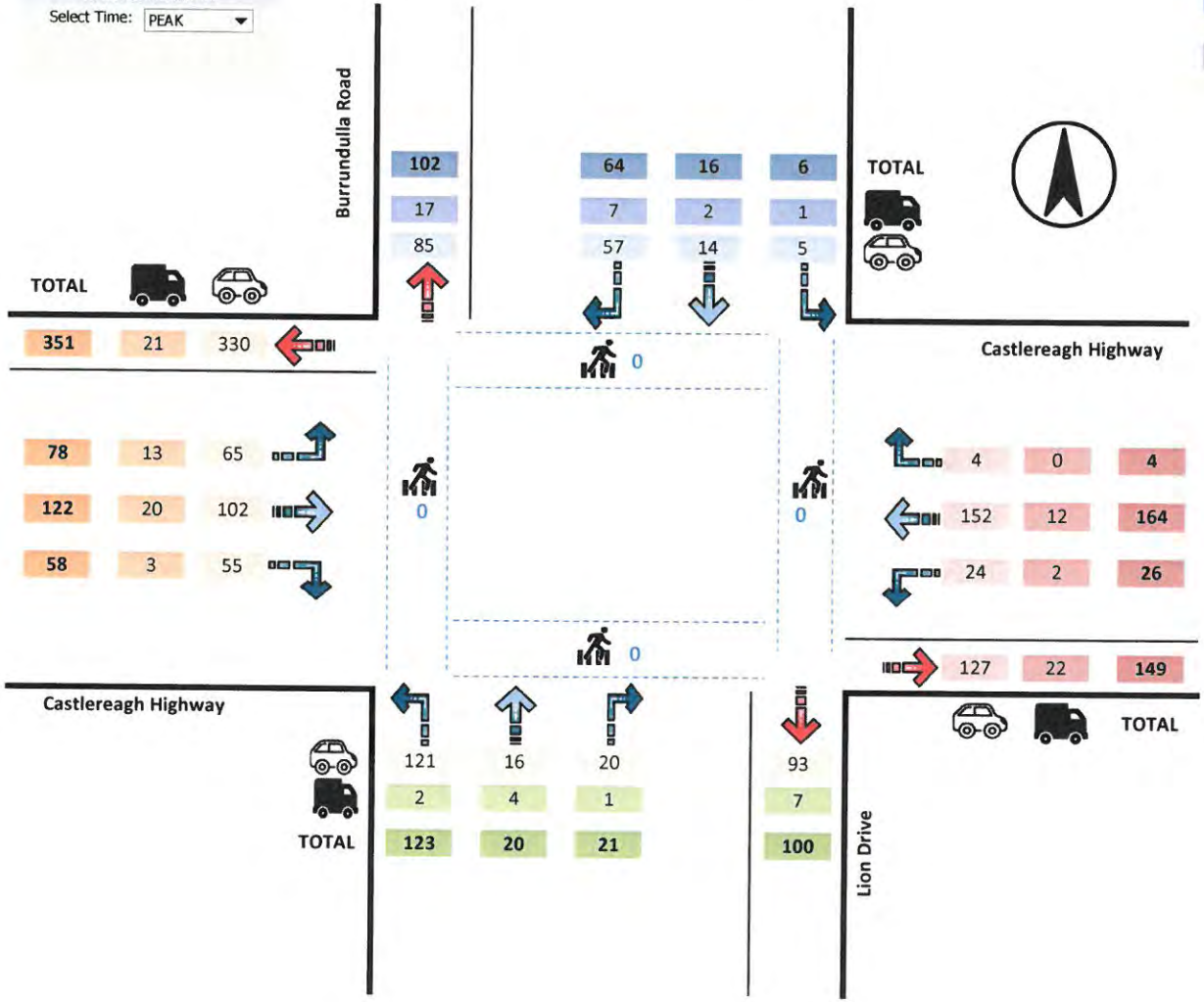
All Vehicles Time Per Hour	SOUTH WEST Lion Drive										NORTH WEST Castlereagh Highway										TOTAL		TOTAL
	L			T			R				L			T			R						
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	
7:00 - 8:00	77	1	78	21	2	23	11	0	11	112	41	4	45	92	19	111	50	2	52	208	420	61	481
7:15 - 8:15	92	1	93	16	2	18	13	0	13	124	48	4	52	96	23	119	53	3	56	227	471	62	533
7:30 - 8:30	105	0	105	13	1	14	17	0	17	136	52	5	57	96	22	118	56	2	58	233	532	50	582
7:45 - 8:45	111	2	113	17	1	18	20	1	21	152	63	6	69	97	20	117	55	4	59	245	585	52	637
8:00 - 9:00	121	2	123	16	4	20	20	1	21	164	65	13	78	102	20	122	55	3	58	258	635	67	702
Period End																							
15:00 - 16:00	88	4	92	24	0	24	19	1	20	136	58	5	63	137	12	149	93	7	100	312	685	61	746
15:15 - 16:15	91	4	95	31	1	32	18	1	19	146	55	4	59	151	14	165	106	6	112	336	711	54	765
15:30 - 16:30	90	2	92	29	1	30	22	1	23	145	63	7	70	155	13	168	111	3	114	352	727	50	777
15:45 - 16:45	103	2	105	29	1	30	21	1	22	157	60	7	67	158	12	170	104	0	104	341	737	46	783
16:00 - 17:00	96	2	98	28	1	29	26	0	26	153	63	14	77	151	11	162	106	1	107	346	759	46	805
16:15 - 17:15	90	2	92	30	0	30	26	0	26	148	59	14	73	153	11	164	107	1	108	345	762	41	803
16:30 - 17:30	90	2	92	28	0	28	21	1	22	142	58	15	73	156	9	165	103	1	104	342	765	42	807
16:45 - 17:45	82	1	83	26	0	26	23	1	24	133	48	13	61	156	9	165	105	1	106	332	757	34	791
17:00 - 18:00	84	1	85	24	0	24	15	1	16	125	33	5	38	158	8	166	81	1	82	286	695	26	721
Period End																							

Traffic Informatio Specialist

Location	Burrundulla Road	Duration	0 7:00 - 9:00
	Castlereagh Highway		0 15:00 - 18:00
	Lion Drive		-
	Castlereagh Highway	Day/Date	Thursday,28 November,2019
Suburb	MUDGEE	Weather	-

DATA SELECTION
Select Time: PEAK

TIME RANGE		
PEAK	-	AM
PEAK		
8:00	-	9:00

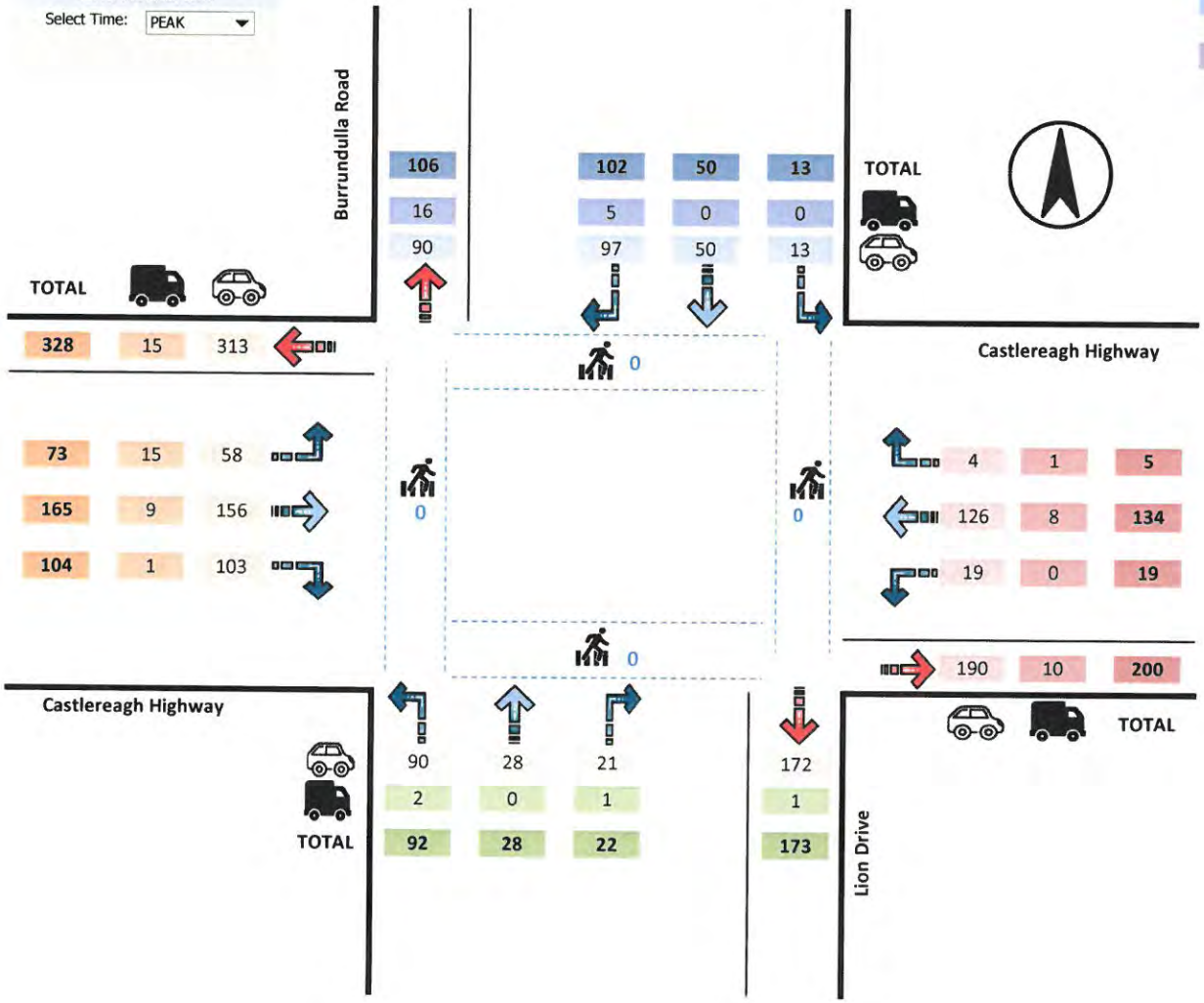


Traffic Information Specialist
ABN: 42 613 389 923
Email info@tistraffic.com.au

Location	Burrundulla Road	Duration	0 7:00 - 9:00
	Castlereagh Highway		0 15:00 - 18:00
	Lion Drive		-
	Castlereagh Highway	Day/Date	Thursday,28 November,2019
Suburb	MUDGEE	Weather	-

DATA SELECTION
Select Time: PEAK

TIME RANGE		
PEAK	-	PM
PEAK		
16:30	-	17:30



Traffic Information Specialist
ABN: 42 613 389 923
Email info@tistraffic.com.au

Location	MUDGEE BUNNINGS
Suburb	MUDGEE
Client	TTPA
Job No/Name	19143
Survey Duration	5 HOURS
Day/Date	Thursday, 28 November 2019

MOVEMENTS Time Per 15 Mins			1				2		3	Total MOVEMENTS		
			A	B	C	D	A	B	A	IN	OUT	TOTAL
7:00	-	7:15	3	2	2	2	0	4	0	8	5	13
7:15	-	7:30	8	0	6	0	0	6	0	12	8	20
7:30	-	7:45	6	2	2	0	0	1	0	3	8	11
7:45	-	8:00	6	0	7	1	0	1	1	9	7	16
8:00	-	8:15	6	1	2	2	0	4	0	8	7	15
8:15	-	8:30	5	1	4	0	0	3	0	7	6	13
8:30	-	8:45	6	0	5	0	0	6	0	11	6	17
8:45	-	9:00	10	0	7	2	1	5	3	14	14	28
Period End			50	6	35	7	1	30	4	72	61	133
15:00	-	15:15	10	3	10	2	0	2	0	14	13	27
15:15	-	15:30	10	2	5	1	0	4	0	10	12	22
15:30	-	15:45	10	3	4	1	0	3	0	8	13	21
15:45	-	16:00	6	0	3	1	0	2	0	6	6	12
16:00	-	16:15	10	1	5	1	0	3	0	9	11	20
16:15	-	16:30	12	0	8	1	0	5	0	14	12	26
16:30	-	16:45	19	1	14	1	0	8	0	23	20	43
16:45	-	17:00	19	2	9	0	0	4	0	13	21	34
17:00	-	17:15	14	2	7	0	0	5	0	12	16	28
17:15	-	17:30	18	0	8	1	0	5	0	14	18	32
17:30	-	17:45	10	0	8	1	1	3	0	12	11	23
17:45	-	18:00	19	2	3	1	0	3	0	7	21	28
Period End			157	16	84	11	1	47	0	142	174	316

MOVEMENTS Time Per Hour			1				2		3	Total MOVEMENTS		
			A	B	C	D	A	B	A	IN	OUT	TOTAL
7:00	-	8:00	23	4	17	3	0	12	1	40	19	59
7:15	-	8:15	26	3	17	3	0	12	1	43	18	61
7:30	-	8:30	23	4	15	3	0	9	1	38	16	54
7:45	-	8:45	23	2	18	3	0	14	1	41	19	60
8:00	-	9:00	27	2	18	4	1	18	3	46	24	70
Period End												
15:00	-	16:00	36	8	22	5	0	11	0	58	24	82
15:15	-	16:15	36	6	17	4	0	12	0	53	22	75
15:30	-	16:30	38	4	20	4	0	13	0	58	21	79
15:45	-	16:45	47	2	30	4	0	18	0	77	24	101
16:00	-	17:00	60	4	36	3	0	20	0	96	27	123
16:15	-	17:15	64	5	38	2	0	22	0	102	29	131
16:30	-	17:30	70	5	38	2	0	22	0	108	29	137
16:45	-	17:45	61	4	32	2	1	17	0	94	23	117
17:00	-	18:00	61	4	26	3	1	16	0	88	23	111
Period End												

Traffic Information Specialist

Location	Burrundulla Road	Duration	11:00 - 14:00
	Castlereagh Highway		0:00 - 0:00
	Lion Drive		-
	Castlereagh Highway	Day/Date	Saturday, 30 November 2019
Suburb	MUDGEE	Weather	-

All Vehicles Time Per Hour	NORTH EAST *Burrundulla Road*										SOUTH EAST *Castlereagh Highway*										TOTAL		TOTAL
	L			T			R				L			T			R						
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	
11:00 - 12:00	12	0	12	42	0	42	138	3	141	195	25	0	25	160	3	163	8	0	8	196	842	23	865
11:15 - 12:15	10	0	10	47	0	47	138	2	140	197	26	0	26	170	4	174	6	0	6	206	858	23	881
11:30 - 12:30	11	0	11	47	1	48	131	3	134	193	26	0	26	162	3	165	6	0	6	197	860	25	885
11:45 - 12:45	11	0	11	47	1	48	137	3	140	199	23	0	23	148	5	153	8	0	8	184	845	26	871
12:00 - 13:00	9	0	9	48	1	49	131	1	132	190	21	0	21	144	6	150	9	0	9	180	810	22	832
12:15 - 13:15	10	0	10	44	1	45	114	1	115	170	20	0	20	135	6	141	8	0	8	169	752	24	776
12:30 - 13:30	11	0	11	45	0	45	123	0	123	179	13	0	13	137	6	143	6	0	6	162	731	19	750
12:45 - 13:45	9	0	9	44	0	44	107	0	107	160	16	0	16	129	6	135	5	0	5	156	670	18	688
13:00 - 14:00	12	0	12	40	0	40	92	1	93	145	15	0	15	128	9	137	6	0	6	158	644	20	664
Period End																							

All Vehicles Time Per Hour	SOUTH WEST *Lion Drive*										NORTH WEST *Castlereagh Highway*										TOTAL		TOTAL
	L			T			R				L			T			R						
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	
11:00 - 12:00	68	2	70	20	0	20	27	0	27	117	107	2	109	157	12	169	78	1	79	357	842	23	865
11:15 - 12:15	67	1	68	19	0	19	33	0	33	120	101	3	104	160	10	170	81	3	84	358	858	23	881
11:30 - 12:30	68	1	69	22	0	22	35	0	35	126	102	2	104	160	12	172	90	3	93	369	860	25	885
11:45 - 12:45	59	0	59	23	0	23	34	1	35	117	103	2	105	165	11	176	87	3	90	371	845	26	871
12:00 - 13:00	60	1	61	26	0	26	30	1	31	118	89	2	91	157	8	165	86	2	88	344	810	22	832
12:15 - 13:15	64	1	65	23	0	23	23	1	24	112	91	3	94	146	11	157	74	0	74	325	752	24	776
12:30 - 13:30	60	1	61	27	0	27	16	1	17	105	82	3	85	144	8	152	67	0	67	304	731	19	750
12:45 - 13:45	55	2	57	26	0	26	19	0	19	102	66	3	69	132	7	139	62	0	62	270	670	18	688
13:00 - 14:00	50	1	51	25	0	25	23	0	23	99	59	2	61	126	7	133	68	0	68	262	644	20	664
Period End																							

Location	MUDGEE BUNNINGS
Suburb	MUDGEE
Client	TTPA
Job No/Name	19143
Survey Duration	3 HOURS
Day/Date	Saturday, 30 November 2019

Traffic Information Specialist

MOVEMENTS Time Per 15 Mins			1				2		3	Total MOVEMENTS		
			A	B	C	D	A	B	A	IN	OUT	TOTAL
11:00	-	11:15	39	1	26	1	0	18	0	45	40	**85**
11:15	-	11:30	35	0	22	0	0	6	0	28	35	**63**
11:30	-	11:45	35	3	17	1	0	16	0	34	38	**72**
11:45	-	12:00	36	0	29	2	3	13	0	44	39	**83**
12:00	-	12:15	38	2	18	3	0	14	0	35	40	**75**
12:15	-	12:30	24	5	22	0	0	11	0	33	29	**62**
12:30	-	12:45	49	2	17	2	0	12	0	31	51	**82**
12:45	-	13:00	24	0	18	1	0	6	0	25	24	**49**
13:00	-	13:15	26	1	15	1	0	13	0	29	27	**56**
13:15	-	13:30	35	3	14	0	0	9	0	23	38	**61**
13:30	-	13:45	25	2	10	0	0	12	0	22	27	**49**
13:45	-	14:00	17	0	14	1	0	3	0	18	17	**35**
Period End			**383**	**19**	**222**	**12**	**3**	**133**	**0**	**367**	**405**	**772**

MOVEMENTS Time Per Hour			1				2		3	Total MOVEMENTS		
			A	B	C	D	A	B	A	IN	OUT	TOTAL
11:00	-	12:00	145	4	94	4	3	53	0	242	206	**448**
11:15	-	12:15	144	5	86	6	3	49	0	233	204	**437**
11:30	-	12:30	133	10	86	6	3	54	0	222	203	**425**
11:45	-	12:45	147	9	86	7	3	50	0	236	213	**449**
12:00	-	13:00	135	9	75	6	0	43	0	210	193	**403**
12:15	-	13:15	123	8	72	4	0	42	0	195	177	**372**
12:30	-	13:30	134	6	64	4	0	40	0	198	184	**382**
12:45	-	13:45	110	6	57	2	0	40	0	167	158	**325**
13:00	-	14:00	103	6	53	2	0	37	0	156	148	**304**
Period End												

Traffic Information Specialist
ABN: 42 613 389 923
Email info@tistraffic.com.au

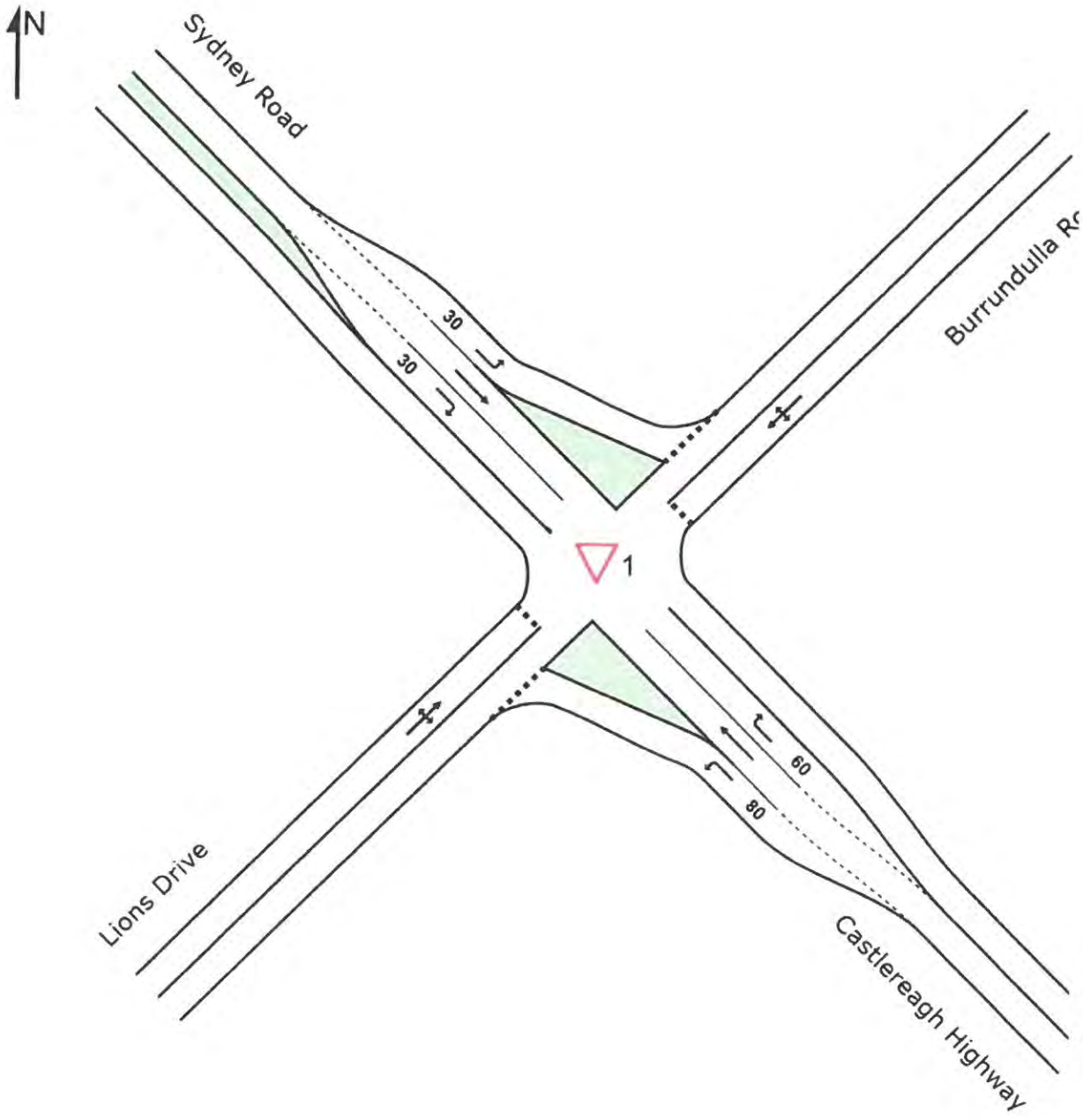
Appendix D

SIDRA Results

SITE LAYOUT

Site: 1 [Castlereagh Highway and Lions Drive EX]

Castlereagh Highway, Lions Drive, Burrundulla Road, Sydney Road
Site Category: BUNNINGS
Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

▽ Site: 1 [Castlereagh Highway and Lions Drive AM EX]

Castlereagh Highway, Lions Drive, Burrundulla Road, Sydney Road
Site Category: BUNNINGS
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Castlereagh Highway												
4	L2	27	5.0	0.018	4.8	LOS A	0.1	0.5	0.17	0.47	0.17	46.7
5	T1	173	5.0	0.091	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
6	R2	4	5.0	0.003	5.0	LOS A	0.0	0.1	0.23	0.50	0.23	45.6
Approach		204	5.0	0.091	0.7	LOS A	0.1	0.5	0.03	0.07	0.03	49.4
NorthEast: Burrundulla Road												
7	L2	6	5.0	0.200	5.2	LOS A	0.8	5.7	0.57	0.76	0.57	43.2
8	T1	17	5.0	0.200	7.7	LOS A	0.8	5.7	0.57	0.76	0.57	43.5
9	R2	67	5.0	0.200	12.1	LOS A	0.8	5.7	0.57	0.76	0.57	43.2
Approach		91	5.0	0.200	10.8	LOS A	0.8	5.7	0.57	0.76	0.57	43.2
NorthWest: Sydney Road												
10	L2	82	5.0	0.053	4.6	LOS A	0.2	1.6	0.09	0.47	0.09	46.9
11	T1	128	5.0	0.069	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
12	R2	61	5.0	0.041	5.2	LOS A	0.2	1.3	0.29	0.54	0.29	45.5
Approach		272	5.0	0.069	2.6	LOS A	0.2	1.6	0.09	0.26	0.09	48.0
SouthWest: Lions Drive												
1	L2	129	5.0	0.194	5.4	LOS A	0.8	5.7	0.35	0.58	0.35	45.6
2	T1	21	5.0	0.194	7.6	LOS A	0.8	5.7	0.35	0.58	0.35	45.9
3	R2	22	5.0	0.194	9.7	LOS A	0.8	5.7	0.35	0.58	0.35	45.7
Approach		173	5.0	0.194	6.2	LOS A	0.8	5.7	0.35	0.58	0.35	45.7
All Vehicles		739	5.0	0.200	3.9	NA	0.8	5.7	0.19	0.35	0.19	47.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 1 [Castlereagh Highway and Lions Drive PM EX]

Castlereagh Highway, Lions Drive, Burrundulla Road, Sydney Road
Site Category: BUNNINGS
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Castlereagh Highway												
4	L2	20	5.0	0.015	5.0	LOS A	0.1	0.4	0.25	0.48	0.25	46.5
5	T1	141	5.0	0.075	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
6	R2	5	5.0	0.004	5.1	LOS A	0.0	0.1	0.28	0.51	0.28	45.5
Approach		166	5.0	0.075	0.8	LOS A	0.1	0.4	0.04	0.07	0.04	49.4
NorthEast: Burrundulla Road												
7	L2	14	5.0	0.390	7.0	LOS A	2.0	14.8	0.64	0.89	0.86	41.9
8	T1	53	5.0	0.390	10.6	LOS A	2.0	14.8	0.64	0.89	0.86	42.2
9	R2	107	5.0	0.390	15.4	LOS B	2.0	14.8	0.64	0.89	0.86	42.0
Approach		174	5.0	0.390	13.3	LOS A	2.0	14.8	0.64	0.89	0.86	42.0
NorthWest: Sydney Road												
10	L2	77	5.0	0.050	4.6	LOS A	0.2	1.5	0.10	0.47	0.10	46.9
11	T1	174	5.0	0.093	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
12	R2	109	5.0	0.071	5.1	LOS A	0.3	2.4	0.26	0.54	0.26	45.6
Approach		360	5.0	0.093	2.5	LOS A	0.3	2.4	0.10	0.26	0.10	47.9
SouthWest: Lions Drive												
1	L2	97	5.0	0.188	5.3	LOS A	0.8	5.5	0.35	0.58	0.35	45.3
2	T1	29	5.0	0.188	8.3	LOS A	0.8	5.5	0.35	0.58	0.35	45.6
3	R2	23	5.0	0.188	11.4	LOS A	0.8	5.5	0.35	0.58	0.35	45.3
Approach		149	5.0	0.188	6.8	LOS A	0.8	5.5	0.35	0.58	0.35	45.4
All Vehicles		849	5.0	0.390	5.1	NA	2.0	14.8	0.24	0.41	0.29	46.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 1 [Castlereagh Highway and Lions Drive SAT EX]

Castlereagh Highway, Lions Drive, Burrundulla Road, Sydney Road
Site Category: BUNNINGS
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Castlereagh Highway												
4	L2	27	5.0	0.020	5.0	LOS A	0.1	0.6	0.24	0.48	0.24	46.5
5	T1	174	5.0	0.092	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
6	R2	6	5.0	0.004	5.1	LOS A	0.0	0.1	0.27	0.51	0.27	45.5
Approach		207	5.0	0.092	0.8	LOS A	0.1	0.6	0.04	0.08	0.04	49.4
NorthEast: Burrundulla Road												
7	L2	12	5.0	0.471	7.9	LOS A	2.7	19.7	0.69	0.96	1.03	41.0
8	T1	49	5.0	0.471	12.3	LOS A	2.7	19.7	0.69	0.96	1.03	41.3
9	R2	138	5.0	0.471	16.8	LOS B	2.7	19.7	0.69	0.96	1.03	41.1
Approach		199	5.0	0.471	15.2	LOS B	2.7	19.7	0.69	0.96	1.03	41.1
NorthWest: Sydney Road												
10	L2	107	5.0	0.069	4.6	LOS A	0.3	2.1	0.10	0.47	0.10	46.9
11	T1	168	5.0	0.090	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
12	R2	98	5.0	0.066	5.2	LOS A	0.3	2.2	0.29	0.54	0.29	45.5
Approach		374	5.0	0.090	2.7	LOS A	0.3	2.2	0.10	0.28	0.10	47.8
SouthWest: Lions Drive												
1	L2	73	5.0	0.193	5.4	LOS A	0.8	5.6	0.42	0.63	0.42	44.8
2	T1	23	5.0	0.193	8.5	LOS A	0.8	5.6	0.42	0.63	0.42	45.1
3	R2	37	5.0	0.193	11.6	LOS A	0.8	5.6	0.42	0.63	0.42	44.8
Approach		133	5.0	0.193	7.7	LOS A	0.8	5.6	0.42	0.63	0.42	44.9
All Vehicles		913	5.0	0.471	5.7	NA	2.7	19.7	0.26	0.43	0.34	46.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 1 [Castlereagh Highway and Lions Drive AM FUT]

Castlereagh Highway, Lions Drive, Burrundulla Road, Sydney Road
Site Category: BUNNINGS
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Castlereagh Highway												
4	L2	36	5.0	0.025	4.9	LOS A	0.1	0.7	0.23	0.48	0.23	46.6
5	T1	207	5.0	0.110	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
6	R2	3	5.0	0.002	5.0	LOS A	0.0	0.1	0.25	0.50	0.25	45.6
Approach		246	5.0	0.110	0.8	LOS A	0.1	0.7	0.04	0.08	0.04	49.4
NorthEast: Burrundulla Road												
7	L2	6	5.0	0.175	5.2	LOS A	0.6	4.7	0.61	0.78	0.61	42.1
8	T1	14	5.0	0.175	8.9	LOS A	0.6	4.7	0.61	0.78	0.61	42.4
9	R2	44	5.0	0.175	15.3	LOS B	0.6	4.7	0.61	0.78	0.61	42.1
Approach		64	5.0	0.175	13.0	LOS A	0.6	4.7	0.61	0.78	0.61	42.2
NorthWest: Sydney Road												
10	L2	63	5.0	0.040	4.6	LOS A	0.2	1.2	0.09	0.47	0.09	46.9
11	T1	145	5.0	0.077	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
12	R2	120	5.0	0.083	5.3	LOS A	0.4	2.8	0.33	0.56	0.33	45.4
Approach		328	5.0	0.083	2.8	LOS A	0.4	2.8	0.14	0.29	0.14	47.6
SouthWest: Lions Drive												
1	L2	177	5.0	0.257	5.7	LOS A	1.1	7.8	0.40	0.61	0.40	45.4
2	T1	23	5.0	0.257	9.6	LOS A	1.1	7.8	0.40	0.61	0.40	45.7
3	R2	20	5.0	0.257	12.2	LOS A	1.1	7.8	0.40	0.61	0.40	45.4
Approach		220	5.0	0.257	6.7	LOS A	1.1	7.8	0.40	0.61	0.40	45.4
All Vehicles		859	5.0	0.257	4.0	NA	1.1	7.8	0.21	0.35	0.21	47.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 1 [Castlereagh Highway and Lions Drive PM FUT]

Castlereagh Highway, Lions Drive, Burrundulla Road, Sydney Road
Site Category: BUNNINGS
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Castlereagh Highway												
4	L2	27	5.0	0.021	5.3	LOS A	0.1	0.6	0.31	0.50	0.31	46.4
5	T1	169	5.0	0.090	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
6	R2	4	5.0	0.003	5.2	LOS A	0.0	0.1	0.30	0.51	0.30	45.5
Approach		201	5.0	0.090	0.8	LOS A	0.1	0.6	0.05	0.08	0.05	49.4
NorthEast: Burrundulla Road												
7	L2	14	5.0	0.371	7.4	LOS A	1.8	12.8	0.69	0.90	0.91	40.8
8	T1	52	5.0	0.371	12.3	LOS A	1.8	12.8	0.69	0.90	0.91	41.0
9	R2	69	5.0	0.371	20.1	LOS B	1.8	12.8	0.69	0.90	0.91	40.8
Approach		135	5.0	0.371	15.8	LOS B	1.8	12.8	0.69	0.90	0.91	40.9
NorthWest: Sydney Road												
10	L2	62	5.0	0.040	4.7	LOS A	0.2	1.2	0.12	0.47	0.12	46.9
11	T1	196	5.0	0.104	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
12	R2	172	5.0	0.114	5.2	LOS A	0.5	3.9	0.30	0.55	0.30	45.5
Approach		429	5.0	0.114	2.8	LOS A	0.5	3.9	0.14	0.29	0.14	47.6
SouthWest: Lions Drive												
1	L2	159	5.0	0.278	5.5	LOS A	1.2	8.6	0.39	0.60	0.39	45.1
2	T1	39	5.0	0.278	10.6	LOS A	1.2	8.6	0.39	0.60	0.39	45.4
3	R2	20	5.0	0.278	14.6	LOS B	1.2	8.6	0.39	0.60	0.39	45.1
Approach		218	5.0	0.278	7.2	LOS A	1.2	8.6	0.39	0.60	0.39	45.1
All Vehicles		983	5.0	0.371	5.1	NA	1.8	12.8	0.25	0.40	0.28	46.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 1 [Castlereagh Highway and Lions Drive SAT FUT]

Castlereagh Highway, Lions Drive, Burrundulla Road, Sydney Road
Site Category: BUNNINGS
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

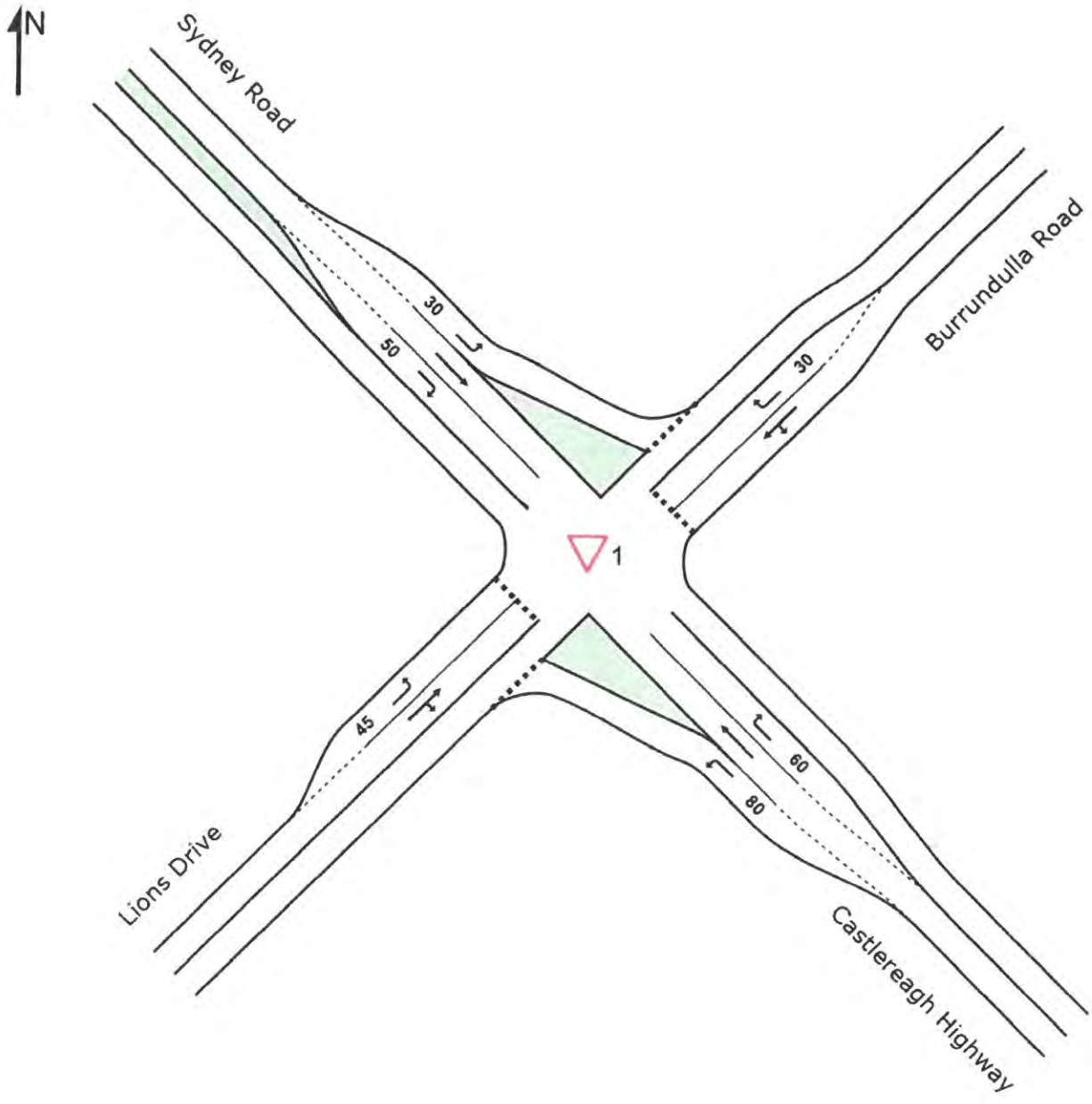
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Castlereagh Highway												
4	L2	41	5.0	0.033	5.5	LOS A	0.1	0.9	0.35	0.53	0.35	46.2
5	T1	208	5.0	0.110	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
6	R2	14	5.0	0.009	5.1	LOS A	0.0	0.3	0.27	0.52	0.27	45.5
Approach		263	5.0	0.110	1.1	LOS A	0.1	0.9	0.07	0.11	0.07	49.1
NorthEast: Burrundulla Road												
7	L2	12	5.0	0.347	7.1	LOS A	1.6	11.4	0.69	0.89	0.88	40.6
8	T1	62	5.0	0.347	13.1	LOS A	1.6	11.4	0.69	0.89	0.88	40.8
9	R2	45	5.0	0.347	22.8	LOS B	1.6	11.4	0.69	0.89	0.88	40.6
Approach		119	5.0	0.347	16.2	LOS B	1.6	11.4	0.69	0.89	0.88	40.7
NorthWest: Sydney Road												
10	L2	60	5.0	0.039	4.7	LOS A	0.2	1.2	0.13	0.47	0.13	46.8
11	T1	166	5.0	0.089	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
12	R2	215	5.0	0.149	5.4	LOS A	0.7	5.2	0.34	0.57	0.34	45.4
Approach		441	5.0	0.149	3.3	LOS A	0.7	5.2	0.19	0.34	0.19	47.2
SouthWest: Lions Drive												
1	L2	189	5.0	0.390	6.6	LOS A	2.1	15.7	0.48	0.71	0.60	43.9
2	T1	37	5.0	0.390	13.3	LOS A	2.1	15.7	0.48	0.71	0.60	44.3
3	R2	40	5.0	0.390	18.5	LOS B	2.1	15.7	0.48	0.71	0.60	44.0
Approach		266	5.0	0.390	9.3	LOS A	2.1	15.7	0.48	0.71	0.60	44.0
All Vehicles		1089	5.0	0.390	5.6	NA	2.1	15.7	0.29	0.43	0.33	46.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 1 [Castlereagh Highway and Lions Drive FUT DEV]

Castlereagh Highway, Lions Drive, Burrundulla Road, Sydney Road
Site Category: BUNNINGS
Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

▽ Site: 1 [Castlereagh Highway and Lions Drive AM FUT DEV]

Castlereagh Highway, Lions Drive, Burrundulla Road, Sydney Road
Site Category: BUNNINGS
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Castlereagh Highway												
4	L2	36	5.0	0.025	4.9	LOS A	0.1	0.7	0.23	0.48	0.23	46.6
5	T1	207	5.0	0.110	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
6	R2	3	5.0	0.002	5.0	LOS A	0.0	0.1	0.25	0.49	0.25	45.8
Approach		246	5.0	0.110	0.8	LOS A	0.1	0.7	0.04	0.08	0.04	49.4
NorthEast: Burrundulla Road												
7	L2	6	5.0	0.031	5.2	LOS A	0.1	0.9	0.42	0.57	0.42	44.9
8	T1	14	5.0	0.031	8.5	LOS A	0.1	0.9	0.42	0.57	0.42	45.3
9	R2	44	5.0	0.144	15.1	LOS B	0.5	3.7	0.71	0.86	0.71	41.1
Approach		64	5.0	0.144	12.7	LOS A	0.5	3.7	0.62	0.77	0.62	42.3
NorthWest: Sydney Road												
10	L2	63	5.0	0.040	4.6	LOS A	0.2	1.2	0.09	0.47	0.09	46.9
11	T1	145	5.0	0.077	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
12	R2	120	5.0	0.083	5.3	LOS A	0.4	2.8	0.33	0.55	0.33	45.6
Approach		328	5.0	0.083	2.8	LOS A	0.4	2.8	0.14	0.29	0.14	47.7
SouthWest: Lions Drive												
1	L2	177	5.0	0.167	5.6	LOS A	0.7	4.8	0.33	0.57	0.33	45.8
2	T1	23	5.0	0.089	8.5	LOS A	0.3	2.5	0.58	0.74	0.58	44.1
3	R2	20	5.0	0.089	10.8	LOS A	0.3	2.5	0.58	0.74	0.58	43.8
Approach		220	5.0	0.167	6.4	LOS A	0.7	4.8	0.38	0.61	0.38	45.4
All Vehicles		859	5.0	0.167	3.9	NA	0.7	4.8	0.21	0.35	0.21	47.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 1 [Castlereagh Highway and Lions Drive PM FUT DEV]

Castlereagh Highway, Lions Drive, Burrundulla Road, Sydney Road
Site Category: BUNNINGS
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Castlereagh Highway												
4	L2	27	5.0	0.021	5.3	LOS A	0.1	0.6	0.31	0.50	0.31	46.4
5	T1	169	5.0	0.090	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
6	R2	4	5.0	0.003	5.2	LOS A	0.0	0.1	0.30	0.50	0.30	45.7
Approach		201	5.0	0.090	0.8	LOS A	0.1	0.6	0.05	0.08	0.05	49.4
NorthEast: Burrundulla Road												
7	L2	14	5.0	0.120	5.5	LOS A	0.5	3.4	0.54	0.70	0.54	44.2
8	T1	52	5.0	0.120	9.8	LOS A	0.5	3.4	0.54	0.70	0.54	44.5
9	R2	69	5.0	0.252	18.1	LOS B	1.0	7.1	0.77	0.92	0.85	39.8
Approach		135	5.0	0.252	13.6	LOS A	1.0	7.1	0.65	0.81	0.70	41.9
NorthWest: Sydney Road												
10	L2	62	5.0	0.040	4.7	LOS A	0.2	1.2	0.12	0.47	0.12	46.9
11	T1	196	5.0	0.104	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
12	R2	172	5.0	0.114	5.2	LOS A	0.5	3.9	0.30	0.54	0.30	45.7
Approach		429	5.0	0.114	2.8	LOS A	0.5	3.9	0.14	0.28	0.14	47.7
SouthWest: Lions Drive												
1	L2	159	5.0	0.144	5.4	LOS A	0.6	4.1	0.29	0.55	0.29	45.9
2	T1	39	5.0	0.134	9.5	LOS A	0.5	3.7	0.61	0.78	0.61	43.5
3	R2	20	5.0	0.134	13.0	LOS A	0.5	3.7	0.61	0.78	0.61	43.3
Approach		218	5.0	0.144	6.8	LOS A	0.6	4.1	0.38	0.61	0.38	45.2
All Vehicles		983	5.0	0.252	4.8	NA	1.0	7.1	0.24	0.39	0.25	46.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 1 [Castlereagh Highway and Lions Drive SAT FUT DEV]

Castlereagh Highway, Lions Drive, Burrundulla Road, Sydney Road
Site Category: BUNNINGS
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Castlereagh Highway												
4	L2	41	5.0	0.033	5.5	LOS A	0.1	0.9	0.35	0.53	0.35	46.2
5	T1	208	5.0	0.110	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
6	R2	14	5.0	0.009	5.1	LOS A	0.0	0.3	0.27	0.50	0.27	45.7
Approach		263	5.0	0.110	1.1	LOS A	0.1	0.9	0.07	0.11	0.07	49.1
NorthEast: Burrundulla Road												
7	L2	12	5.0	0.153	5.3	LOS A	0.6	4.4	0.57	0.73	0.57	43.5
8	T1	62	5.0	0.153	10.9	LOS A	0.6	4.4	0.57	0.73	0.57	43.9
9	R2	45	5.0	0.194	19.9	LOS B	0.7	5.0	0.79	0.91	0.82	39.0
Approach		119	5.0	0.194	13.8	LOS A	0.7	5.0	0.65	0.80	0.66	41.9
NorthWest: Sydney Road												
10	L2	60	5.0	0.039	4.7	LOS A	0.2	1.2	0.13	0.47	0.13	46.8
11	T1	166	5.0	0.089	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
12	R2	215	5.0	0.149	5.4	LOS A	0.7	5.2	0.34	0.56	0.34	45.6
Approach		441	5.0	0.149	3.3	LOS A	0.7	5.2	0.19	0.34	0.19	47.3
SouthWest: Lions Drive												
1	L2	189	5.0	0.180	5.7	LOS A	0.7	5.2	0.33	0.58	0.33	45.8
2	T1	37	5.0	0.211	11.0	LOS A	0.8	5.9	0.69	0.85	0.71	42.2
3	R2	40	5.0	0.211	15.3	LOS B	0.8	5.9	0.69	0.85	0.71	42.0
Approach		266	5.0	0.211	7.8	LOS A	0.8	5.9	0.44	0.65	0.44	44.6
All Vehicles		1089	5.0	0.211	5.0	NA	0.8	5.9	0.27	0.41	0.27	46.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix 5 – Preliminary Servicing Strategy

11/11/2019 Our reference: HD259

Bunnings Group Ltd
Locked Bag 30
Granville NSW 2142

Att Phil Drew

Dear Phil,

Bunnings Mudgee – Preliminary Services infrastructure Strategy

High Definition Design (HDD) have been commissioned by Bunnings to looks at servicing option for the proposed development in Mudgee.

The site is located on the corner of Lions Driver and Castlereagh Highway (Lot 2, DP1079362), Mudgee NSW. The site has an approximate area of 5.4 ha. It is proposed at the site to construct a bulky goods warehouse and carparking and create 3 Development lots, the existing land is predominantly vacant farmland with an existing dwelling in the North-Western corner of the site.

HDD have reviewed the existing services as part of their due diligence report and propose the following options for servicing the site in relation to water supply, sewerage, power and communications. Figure 1 shows the aerial view of the site.

Subject Site
WILKINS CRESCENT
CASTLEREAGH HIGHWAY
SPRWG FLAT

Figure 1

1. Water Supply

There are currently a number of water mains running along Lions Drive and Castlereagh Highway of the site. One running on opposite side of Lions Drive with a pipe diameter 100mm. Another two 50mm pipes running along and opposite the Castlereagh Highway respectively. Servicing of this site can be connected with the existing water main. Figure 2 shows the locations of existing water mains. Figure 7 shows the proposed connection of all lots

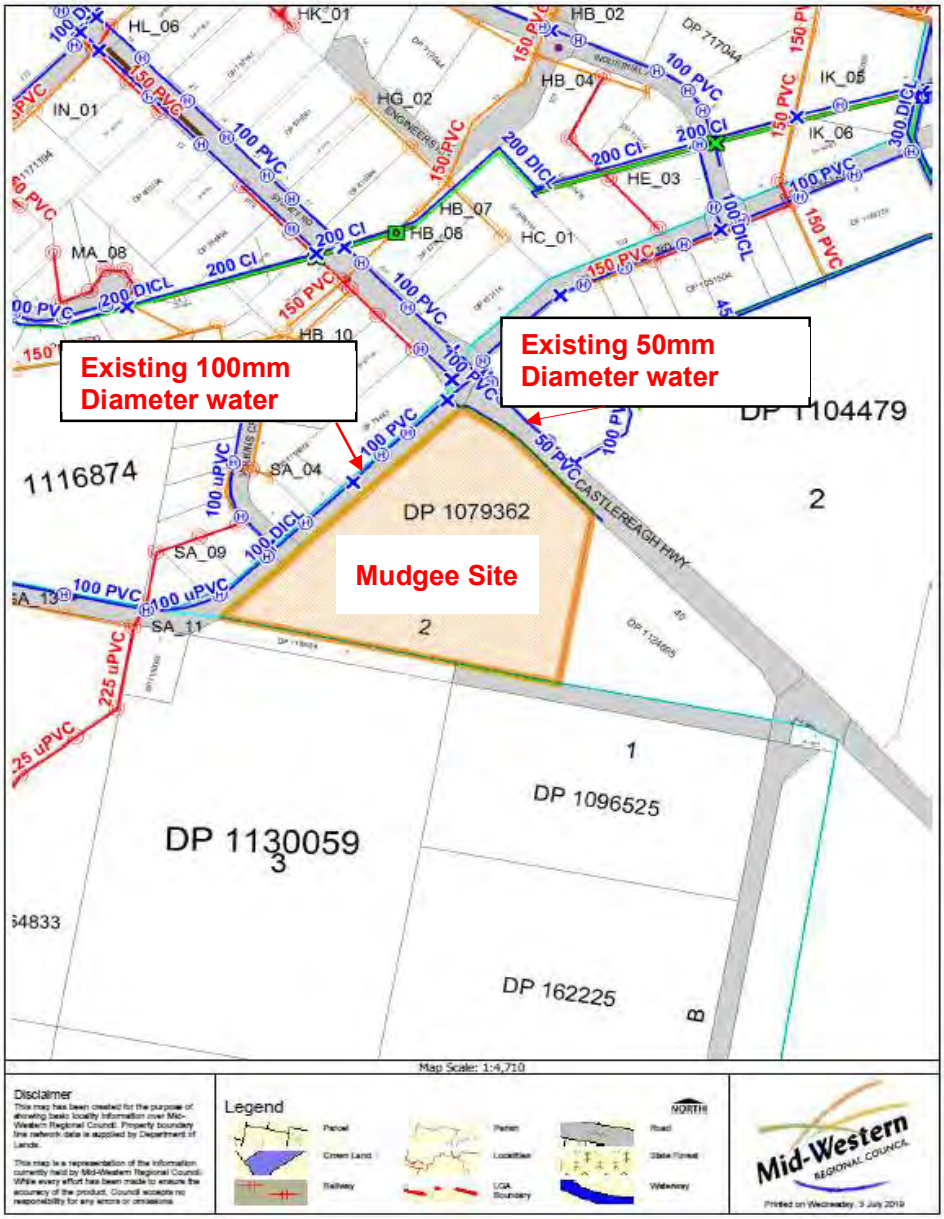


Figure 2

2. Sewer Supply

The site currently does not have a direct connection the sewerage system. There is currently a gravity sewer main running along Castlereagh Highway, this will need to be extended approximately 200m. Figure 3 shows the location of the sewer connection and proposed extension of the sewer main. Figure 7 shows the combined connection of all proposed lots.

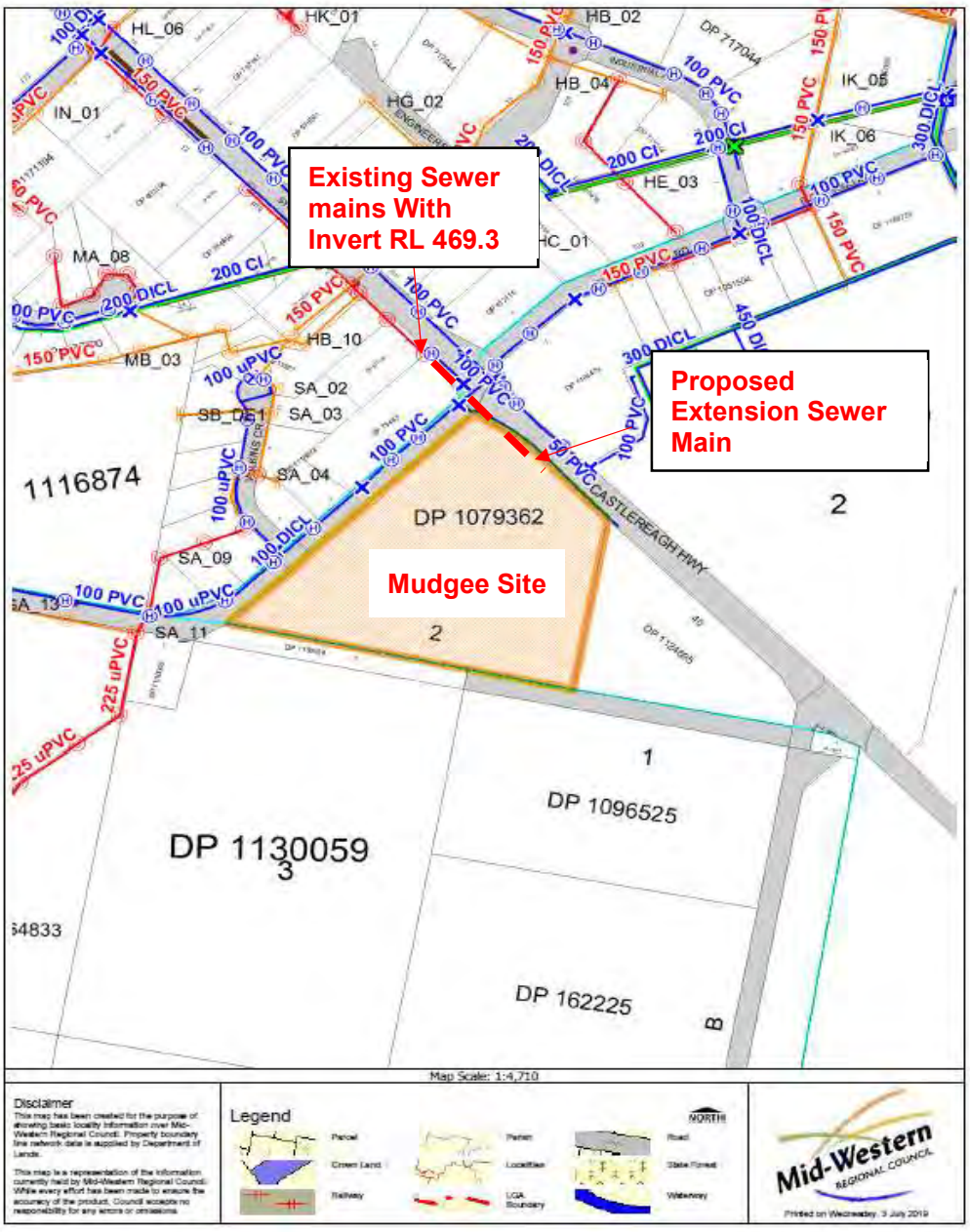


Figure 3

3. Electricity Supply

The proposed commercial development will require an 11kV feeder to supply an on-site kiosk substation as a standard subdivision electrical reticulation typically doesn't support a development of this nature. Plans forwarded by Essential Energy confirm that a low Voltage overhead powers with two poles are running along the north-west corner of the site as shown in Figure 7. High voltage is on corner of Castlereagh Highway and Lions Drive. Bunnings will require a substation and high voltage power which will be required to be brought across Castlereagh Highway Via aerial or underground.
Figure 4 shows the location of the power assets. Figure 7 shows all service connections.

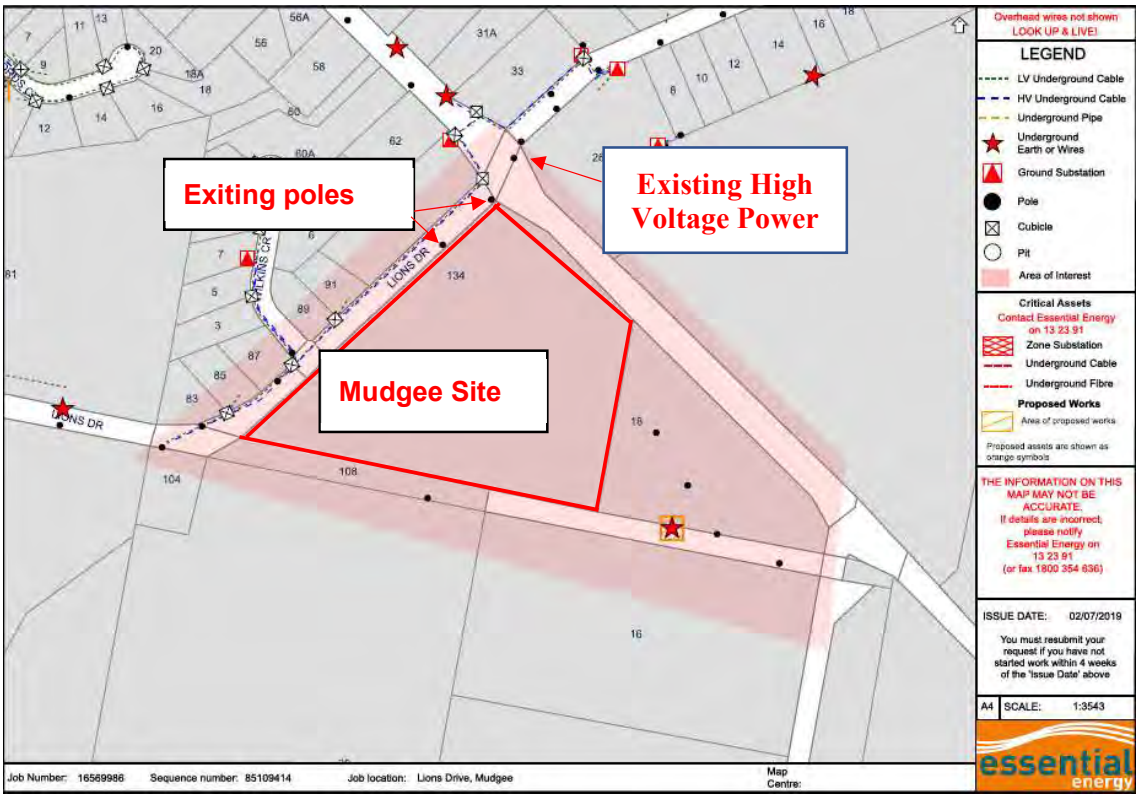


Figure 4

4. Communications

According to records obtained from Telstra, there is an existing local Telstra/NBN line located along north-west of the proposed site. Main cables are at the corner of the intersection between Lions Drive and Castlereagh Highway. The site can be serviced via existing network.
Refer to Figures 5 and 6 for existing Telstra pit and line locations. Figure 7 shows all service connections.

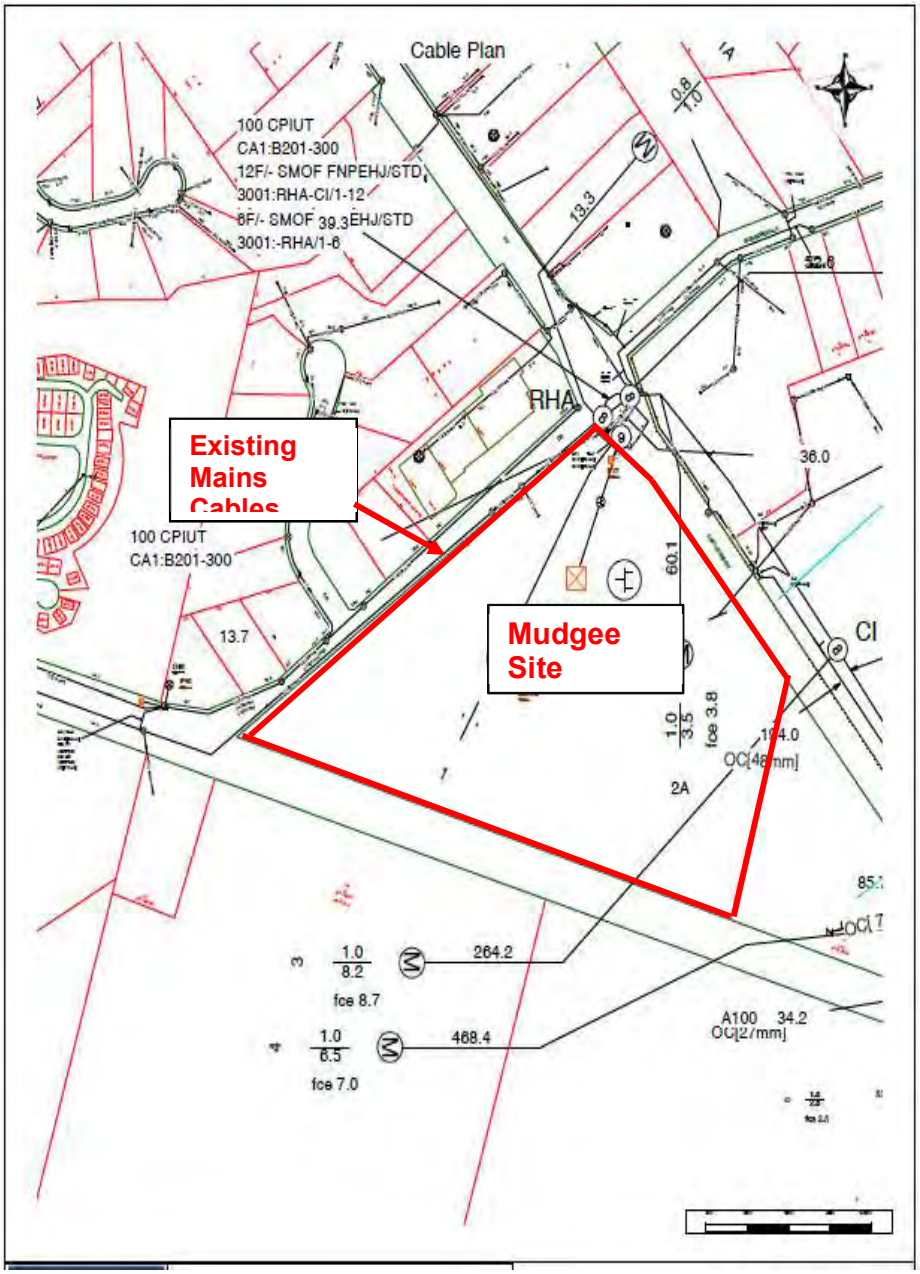


Figure 5

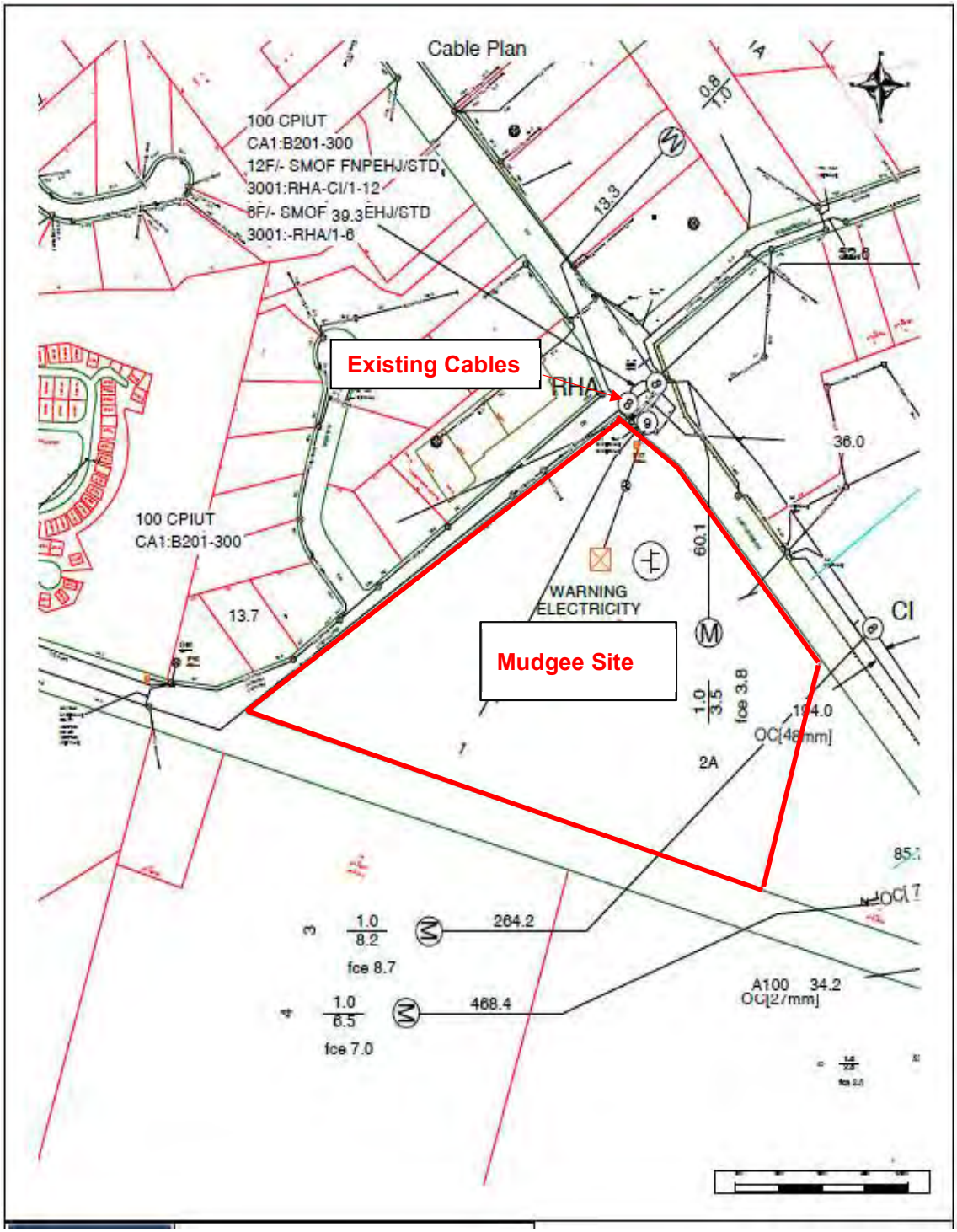
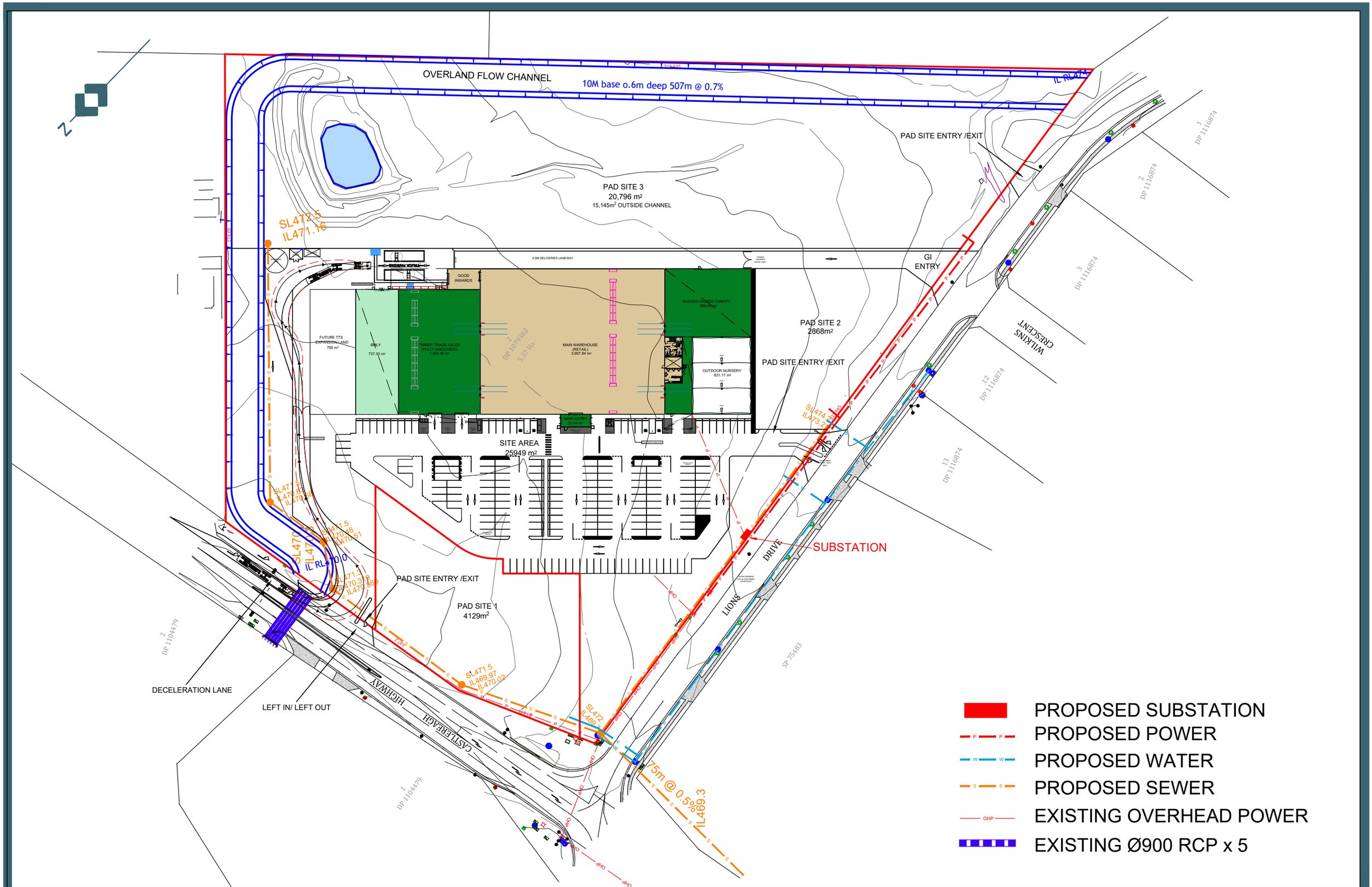

Cable Plan
100 CPIUT
CA1:B201-300
12F/- SMOF FNPEHJ/STD
3001:RHA-CI/1-12
6F/- SMOF EHJ/STD
3001:-RHA/1-6
Existing Cables
RHA
100 CPIUT
CA1:B201-300
WARNING
ELECTRICITY
Mudgee Site
36.0
13.7
60.1
CI
2A
264.2
fce 8.7
468.4
fce 7.0
A100 34.2

Figure 6

Figure 7



TITLE: PROPOSED BUNNINGS
No 132 LIONS DRIVE
MUDGEE

SITE PLAN PROPOSED SERVICES

High Definition Design Pty Ltd
KEVIN URANE 0412009891

BUNNINGS warehouse

Date: 24.07.19 Scale: 1:1250 A3 Designed: KU
Cad Ref: HD259 r3

No	Amendment	Drawn	Date
3	AMEND CONCEPT PLAN	KU	30.10.19
2	AMEND CONCEPT PLAN	KU	17.10.19
1	CONCEPT PLAN	KU	24.07.19

Project No HD259
Drawing No HD02
Revision 3

Conclusion

High Definition have investigated the above services and believe that the site and development can be serviced with all necessary infrastructure. Further detail design and necessary approval from the relevant authorities can be addressed via conditions of the development consent.

If you have any queries, please contact me on 0412 009 891

Yours sincerely,

Kevin Urane

High definition Design Pty Ltd

Appendix 6 – Preliminary Site Investigation

6/11/2019

132 Lions Drive, Mudgee, NSW

Preliminary Site Investigation

Ref: P1834-PSI-001-Rev1
Written by: Jake Duck (Environmental Scientist)
Reviewed by: Malcolm Adrien (Environmental Services Manager)
Approved by: Karl Dawes (General Manager)
Email: office@vclab.com.au
Client: Bunnings Group Limited

SUSTAINABLE CERTIFICATION
ISO 9001
AS/NZS 4801
ISO 14001

Prepared for:

Bunnings Group Limited
Level 8, 5 Rider Boulevard Rhodes
Locked Bag 3277
Rhodes NSW 2138
Ph: 02 9846 7264
Email: hbaker@bunnings.com.au
Web: www.bunnings.com.au

Prepared by:

Valley Civilab Pty Ltd
ABN 50 103 355 531
3/62 Sandringham Avenue
PO Box 3127
Thornton NSW 2322
Ph: (02) 4966 1844
Fax: (02) 4966 1855
Email: office@vclab.com.au
Web: www.valleycivilab.com.au

Project Details

Site Address:	132 Lions Drive, Mudgee, NSW	
Project Type:	Preliminary Site Investigation	
Project No.	**Report Type**	**Report No.**
P1834	PSI	1

We confirm that the following report has been produced for Bunnings Group Limited, based on the described methods and conditions within.

For and on behalf of **Valley Civilab Pty Ltd**,

Jake Duck
Environmental Scientist.

Malcolm Adrien
Environmental Services Manager

With Approval by:

Karl Dawes
General Manager

Executive Summary

Valley Civilab Pty Ltd (Valley Civilab) was engaged by Bunnings Group Limited to undertake a Preliminary Site Investigation (PSI) with limited sampling at the site located at 132 Lions Drive, Mudgee, NSW NSW (herein referred to as the site).

The site is currently proposed to be developed into a new commercial warehouse with associated carparks. The Preliminary Site Investigation is required for due diligence purposes as part of the development application.

This PSI includes the following elements:

- Review of historical aerial images of the site and surrounding area;
- Compilation of a historical title summary;
- Review of a Section 10.7 Planning Certificate;
- Review of publicly available environmental databases and legislative instruments;
- Site inspection and interview with knowledgeable site representative (if available);
- A preliminary Conceptual Site Model (CSM) with an assessment of source-pathway-receptor linkages; and
- Recommendations for further investigation, any management requirements and/or any ongoing management, monitoring or remedial works that may be required.

Limited soil sampling was also conducted to supplement the desktop assessment for contamination including

- Collection of 24 samples including two duplicate samples for QA/QC purposes
- A Trip Spike/Trip Blank sample as part of the QA/QC program

The detailed desktop review of available information and thorough site inspection including shallow soil investigation have enabled the development of a preliminary conceptual site model allowing assessment of potential health and environmental issues relating to the site. Key findings were:

1) Potential contamination sources at the site are limited based on historical land use;
2) Visible signs of gross contamination were not observed during the site inspection and intrusive works; and
3) Contamination in shallow soils was not identified at any of the sampling locations.

In summary, based on the desktop study and limited intrusive sampling conducted on the Site, no indication of gross contamination has been identified which would constrain the development of the Site for its proposed land use.

In regard to clause 6(1) of State Environmental Planning Policy No 55 – Remediation of Land, that the planning authority can be satisfied that the land is suitable for the intended purpose being a proposed change of land use zoning to B5 Business Development, and subsequent land uses permitted pursuant to that zone.

Table of Contents

1 Introduction 1
1.1 Background 1
1.2 Objectives 1
1.3 Scope of Works 1
1.3.1 Preliminary Site Investigation 1
1.3.2 Limited Sampling 2
2 Site Description 2
2.1 Site and Lot identification 3
2.2 Surrounding Land Use 3
3 Background Data Review and Database Searches 5
3.1 Summary of ownership and site use 5
3.2 Historical Photographs 6
3.3 Site Setting 7
3.3.1 Topography and hydrology 7
3.3.2 Lithology and Geology 7
3.3.3 Hydrogeology 8
3.4 Chemical storage and waste production / disposal 8
3.5 Environmental incident history / register 8
3.6 Environmental Significance 8
3.7 Online Database Searches 8
3.7.1 Environment Protection Licenses 8
3.7.2 Heritage 9
3.7.3 Contaminated Land Records 9
3.7.4 Unexploded Ordonnance (UXO) 9
3.7.1 Naturally Occurring Asbestos 9
4 Site Inspection 9
5 Soil Investigation 10
5.1 Soil sampling 10
5.2 Assessment Criteria 10

5.3 Field Observations 11
5.4 Analytical Results 11
6 Analytical Data Quality Assessment 12
6.1 Sample Collection, Storage, Transport and Analysis 12
6.1.1 General 12
6.1.2 Holding Times 12
6.1.3 Sample Transport and Storage temperature 12
6.2 Field Intra-Laboratory Duplicate Assessment 12
6.3 Laboratory Quality Assurance and Quality Control 13
6.4 Data Quality Summary 13
7 Preliminary Conceptual Site Model 14
7.1 Potential Sources and Associated Contaminants of Concern 14
7.2 Potential Receptors and Pathways 14
7.3 SPR Linkage Assessment 14
8 Conclusions 15

ANNEXES

Annex A – Figures

Annex B – S10.7 Planning Certificate

Annex C – Historical Title Documents

Annex D – Lotsearch Report

Annex E – Protected Matters Search Report

Annex F – Borelogs

Annex G – Soil Result Tables

Annex H – Laboratory Results

Annex I – Photographic Log

1 Introduction

1.1 Background

Valley Civilab Pty Ltd (Valley Civilab) was engaged by Bunnings Group Limited to undertake a Preliminary Site Investigation (PSI) with limited sampling at the site located at 132 Lions Drive, Mudgee, NSWNSW (herein referred to as the site).

The site is currently proposed to undergo the construction of a new Commercial Development – Replacement Store consisting of a warehouse with hardstand areas and pavement access areas/car parking (total site area of 54,377.11m^2). The Preliminary Site Investigation is required for due diligence purposes as part of the development application.

A Site Locality Plan and Site Features Plan are presented as *Figure 1* of *Annex A*.

1.2 Objectives

The objectives of this PSI were to investigate potential contaminant sources, pathways and receptors in relation to the site as well as inform preliminary consideration of potential risks to human health and/or the environment within the context of the proposed site land use. The Site is intended to have a new Commercial Development. For the purpose of the investigation, HIL D criteria have been adopted as the proposed site land use.

This report has been prepared in general accordance with provisions for a PSI as defined within the *National Environment Protection Measure* (NEPC 2013), *AS 4482.1-1997 Guide to the sampling and Investigation of potentially contaminated soil* and the *Guidelines for Consultants Reporting on Contaminated Sites* (NSW EPA 1997).

All information collected informed the development of the preliminary conceptual site model which provides a representation of potential contamination sources, receptors and exposure pathways between these sources and receptors.

1.3 Scope of Works

1.3.1 Preliminary Site Investigation

This PSI includes the following elements:

- Review of historical aerial images of the site and surrounding area;
- Compilation of a historical title summary;
- Review of a Section 10.7 Planning Certificate;
- Review of publicly available environmental databases and legislative instruments;
- Site inspection and interview with knowledgeable site representative (if available);
- A preliminary Conceptual Site Model (CSM) with an assessment of source-pathway-receptor linkages; and

- Recommendations for further investigation, any management requirements and/or any ongoing management, monitoring or remedial works that may be required

1.3.2 **Soil Sampling**

Soil sampling for contamination assessment including:

- Collection of 24 samples including two duplicate samples for QA/QC purposes
- A Trip Spike/Trip Blank sample as part of the QA/QC program

2 Site Description

2.1 Site and Lot identification

The site is located at 132 Lions Drive, Mudgee NSW, legally identified as Lot 2 on Deposited Plan (DP) 1079362. The site forms an irregular shaped block of approximately 54,377m² adjacent to Castlereagh Highway along the northernmost boundary (SIX Maps, 2019).

A summary of the site information is provided in ***Table 1*** below.

Table 1: *Site Identification*

Item	***Description***
Current Site Owner	Simon Vincent Rayner Jennifer Anne Freeman
Site Address	132 Lions Drive, Mudgee, NSW
Current Zoning	RU4 Primary Production Small Lots
Proposed Land Use	B5 Business Development
Legal Description	Lot 2 DP1079362
Local Government Authority	Mid-Western Regional Council
Site Area	54,377m²
Elevation	474m Above Sea Level (ASL)
Geographical Location (GDA94-MGA56)	149°36'16.72"E 32°36'50.84"S

Review of the Mid-Western Regional Local Environmental Plan (LEP) 2012 together with the Planning Certificate under Section 10.7 Part 2 and 5 of the Environmental Planning and Assessment Act 1979 (attached as *Annex B*) provides the following information:

1) The site is not affected by heritage items;
2) The site and/or adjacent lots are not affected by land reserved for acquisition;
3) The site is not affected by environmentally sensitive land or critical habitat;
4) The site and/or adjacent lots are not subject to flood planning constraints; and
5) There are no prescribed matters under section 59(2) of the Contaminated Land Management Act 1997 to be disclosed.

Review of the CSIRO Acid Sulfate Resource Information Service (ASRIS, 2008) identifies the site as being within an area of low probability acid sulfate occurrence.

2.2 Surrounding Land Use

The site is located predominantly within a commercial area of Mudgee. Review of satellite imagery identified surrounding land uses as summarised in ***Table 2*** below.

Table 2: *Summary of surrounding land uses*

Direction	Land Use	Distance
North	Residential dwelling Commercial Buildings	Adjacent 20m
East	Residential dwelling Vacant Land	Adjacent 45m
South	Vacant Land	Adjacent
West	Commercial Buildings Residential dwellings	15m 120m

3 Background Data Review and Database Searches

3.1 Summary of ownership and site use

Historical title searches completed for the site provide a summary of ownership as described in ***Table 3*** below.

Table 3: *Summary of site ownership*

	(Lot 2 DP 1079362)
2005 – to date	Simon Vincent Rayner Jennifer Anne Freeman
	(Lot D DP 164723 – Area 13 Acres 1 Rood 19 Perches – Conv Book 4449 No. 523)
2005 – 2005	Simon Vincent Rayner Jennifer Anne Freeman
2004 – 2005	Simon Vincent Rayner / executor Jennifer Anne Freeman/executor Alice Emily Rayner, estate
	(Lot D DP 164723 – Area 13 Acres 1 Rood 19 Perches – Conv Book 2852 No. 834)
1967 – 2004	Vincent Arthur Rayner, grazier Alice Emily Rayner, his wife
	(Lot D DP 164723 – Area 13 Acres 1 Rood 19 Perches – Conv Book 2662 No. 208)
1963 – 1967	Andrew Alexander Pirie, stock and station agent Melva Elaine Pirie, his wife
	(Lot D DP 164723 – Area 13 Acres 1 Rood 19 Perches – Conv Book 2447 No. 837)
1958 – 1963	Grace Broadhead, wife of Charles Andrew Broadhead
	(Part Portion 182 Parish Mudgee – Area 148 Acres – Conv Book 2101 No. 490)
1949 – 1958	Geoffrey Charles Cox, grazier

	(Part Portion 182 Parish Mudgee – Area 148 Acres – Acknowledgement Book 1745 No. 949)
1936 – 1949	William Jones, carrier/executor George Arthur Jones, carrier/executor Robert Percival Jones also known as Robert Jones, estate
	(Part Portion 182 Parish Mudgee – Area 148 Acres – Conv Book 1069 No. 532)
1915 – 1936	Robert Jones, carrier

Historical title supporting documents sourced as part of this assessment are presented as *Annex C.*

3.2 Historical Photographs

Historical aerials and satellite images dating 1964 – 2009 provide a summary of development at the site and within the surrounding area. Historical images are presented as part of *Annex D* and a summary of the review in ***Table 4*** below.

Table 4: *Historical Aerial Review*

Date	Summary
1964	The image dated 1964 is an excerpt from a low resolution black and white aerial photograph depicting the site and surrounding area. At this time, the site and surrounding area is unoccupied and consists of vacant land and some roads.
1971	The image dated 1971 is an excerpt from a low resolution black and white aerial photograph depicting the site and surrounding area. The residential dwelling that stands currently at the site is seen to be developed on the north-western boundary. A dam is also depicted to the south-east of the site. A residential dwelling is depicted immediately adjacent to the eastern site boundary.
1980	The image dated 1980 is an excerpt from a low resolution black and white aerial photograph depicting the site and surrounding area. Major features at the site and surrounding area remain consistent with the 1971 image with some further residential development adjacent to the south-western corner of the site boundary.
1988	The image dated 1988 is a low resolution black and white aerial image depicting the site and surrounding area. Major features at the site and surrounding area remain

Date	Summary
	consistent with the 1980 image. Development of the now Mudgee Holiday Park is seen to the far of the aerial image.
1994	The image dated 1994 is a high-resolution colour aerial image depicting the site and surrounding area. Site features appear consistent with those observed in the 1988 image. Some commercial development can be seen adjacent to the north-western site boundary.
2003	The image dated 2003 is a high-resolution colour satellite image depicting the site and surrounding area. Site features appear consistent with those observed in the 1994 image. Some further development to the commercial building to the north of the site boundary is visible along with the initial development of the Mudgee Water Treatment Plant to the north-east of the site. Castlereagh Highway appears to have been upgraded/ resurfaced.
2009	The image dated 2009 is a high-resolution colour satellite image depicting the site and surrounding area. Site features appear consistent with those observed in the 2003 image. The current Mudgee Bunnings Warehouse can be seen developed opposite to the northern site boundary across Lions Drive.

3.3 Site Setting

3.3.1 Topography and hydrology

The topography of the area is characterised by undulating low hills and rises and gently inclined side slopes. Review of Google Earth Pro (2019) indicates the site slightly slopes from 475m Above Sea Level (ASL) in the west to 474m ASL in the east. The closest surface water body identified is the Sawpit Gully located approximately 100m to the north-west of the site.

3.3.2 Lithology and Geology

Review of the NSW Office of Environment and Heritage soil-landscape database– indicates that the site falls within the Craigmore Soil Landscape.

Review of the Department of Finance, Services & Innovation 2019; Mudgee 1:250,000 Geological Sheet indicates that the site lies on the border of units of Carbonaceous siltstone, quartz-lithic sandstone, conglomerate, coal lenses and units of Alluvial silt, clay and sand.

3.3.3 Hydrogeology

Review of the NSW Department of Primary Industries – Office of Water / Water Administration Ministerial Corporation database identified three registered bores within 500m of the site. Bore details are presented in ***Table 5*** below.

Table 5: Groundwater Bore Details

Bore ID	Construction Date	Location	Depth (mbgl)	Purpose
GW053136	01/12/1980	241m South West	60.90	Irrigation
GW048444		263m South	28.40	Domestic, Stock
GW048537	01/05/1978	413m South	12.20	Not Known

Groundwater data for the identified bores were not available for review at the time of this report.

3.4 Chemical storage and waste production/disposal

The results of the SafeWork Dangerous Goods Search were not considered necessary. The review of historical aerial imagery indicates no significant infrastructure has ever been present on the site during its historical use. As the site has remained undeveloped, no licensed dangerous goods have been stored within the site.

3.5 Environmental incident history/register

Sources to inform consideration of potential environment incidents at the site were not identified as part of this investigation.

3.6 Environmental Significance

A search of the Australian Department of Environment Protected Matters Search Tool (PMST) was completed to inform consideration of environmental receptors at or surrounding the site. The PMST report identified three threatened ecological communities, twenty-seven threatened species and eleven listed migratory species that may be potentially applicable to the site. The PMST report is presented as *Annex E.*

3.7 Online Database Searches

3.7.1 Environment Protection Licenses

Review of the NSW EPA *Protection of the Environment Operation Act* Public Register completed 22nd July 2019 did not identify any Environment Protection Licenses applicable to the site or immediate surrounding areas. Environmental Protection Licences were found for railway systems activities for John Holland Rail Pty Ltd; operating 544m to the North.

3.7.2 Heritage

Review of the Heritage Data Source - Planning & Environment, indicates the site is not affected by heritage items. The closest registered heritage item is Burrundulla Station and homes situated 606m North of the Site. Registered heritage items within the area are described in ***Table 6*** below.

Table 6: *Heritage Item Summary*

Heritage Item Number	*Description*	*Approximate Distance from Site*
I402	Burrundulla Station and homes	606m North

A figure detailing locations of heritage items listed above is presented within Lotsearch Report in *Annex D*.

3.7.3 Contaminated Land Records

A review of the NSW EPA Contaminated Land Record of Notices was completed on 22nd July 2019. This review identified that the site is not subject to regulation by the NSW EPA under Section 60 of the *Contaminated Land Management (CLM) Act 1997* and similarly that there are no sites within the surrounding area subject to regulation under the *CLM Act 1997*.

A review of the NSW EPA List of Contaminated Sites was completed 8th July 2019. This review identified that the site has not been notified to the EPA as a contaminated site and similarly that there are no sites within the surrounding area that have been notified. The findings of these reviews indicate that the site is unlikely to be impacted by contamination known to the EPA.

3.7.4 Unexploded Ordonnance (UXO)

A review of the Department of Defence (DoD) UXO Map was completed on 3rd July 2019. This review indicates that the closest known location of UXO is located over 80km south of the site within Clear Vale where the DoD indicates the slight occurrence of UXO area.

3.7.5 Naturally Occurring Asbestos

NSW Department of Industry, Resources & Energy (2016) identifies that the site does not fall in an area known to contain naturally occurring asbestos.

4 Site Inspection

Two experienced Valley Civilab environmental scientists visited the site on the 10th of July 2019 to consolidate the desktop review described in the sections above. The site visit included a detailed visual inspection of the site surface and infrastructure. Key findings are presented below.

The site is adjacent to Castlereagh Highway to the north and Lions Drive to the west. One residential building is located within the site, and a dam to the south-eastern corner. Otherwise, the site is vacant undeveloped grass land.

Site topography was observed to be flat with a slight slope up to Lions drive along the western boundary.

5 Soil Investigation

As stated in Section 1.3, a soil investigation was commissioned following desktop review of information. The sampling density and analytical schedule generated as part of this intrusive investigation is only intended to supplement findings from the desktop review of information and is not intended to meet the minimum requirements of a Detailed Site Investigation (DSI) as outlined within the *NSW Office of Environment and Heritage: Guidelines for Consultants Reporting on Contaminated Sites (2011).*

All works were conducted in accordance with Valley Civilab's relevant Standard Operating Procedures (SOPs). Methodologies are outlined in the following sub-sections. Borelogs are presented in *Annex F*, respectively. Soil Investigation locations are presented in *Figure 1* of *Annex A*.

5.1 Soil sampling

Limited soil sampling for contamination assessment including;

- Collection of 24 soil samples including two duplicate samples for QA/QC purposes;
- A Trip Spike/Trip Blank sample as part of the QA/QC program.

5.2 Assessment Criteria

Tier 1 assessment criteria relevant to the proposed land use[1] have generally been adopted from the NEPM (NEPC, 2013). Specifically, this includes:

1) The CRC CARE (2011) health screening levels (HSLs) for petroleum hydrocarbons at 0 to <1m below ground level in clay, adopted to assess potential vapour risks to human receptors;
2) The ASC NEPM (2013) health investigation levels (HILs), adopted to evaluate potential direct contact risks associated with the presence of other contaminants of potential concern (CoPCs) in soil (i.e. metals and PAH);
3) The CRC CARE (2011) assessment criteria for direct contact with petroleum hydrocarbons by future receptors;
4) The ASC NEPM (1999) ecological investigation levels (EILs) for inorganics to assess risks to ecological receptors; and
5) The ASC NEPM (1999) ecological screening levels for coarse soil for hydrocarbon compounds to assess risks to ecological receptors.

All criteria adopted along with their associated values are displayed in *Tables 1 – 3* of *Annex G*.

5.3 Field Observations

Inspection of boreholes and soil cuttings across the investigation area infers the presence of natural silty sand/sandy silt followed by weathered sandstone. No visual or olfactory evidence of gross contamination were observed within any at any of the investigation locations.

Borelogs recorded during the intrusive investigation are provided as *Annex F*.

5.4 Analytical Results

A total of twenty-two (22) primary samples were submitted for chemical analysis for a range of Contaminants of Concern including Total Recoverable Hydrocarbons (TRH), Benzene, Toluene, Xylene and Ethylbenzene (BTEX), Polyaromatic Hydrocarbons (PAH) including Benzo(a)Pyrene (BaP), 8 Heavy Metals (Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel & Zinc), Organophosphorus Pesticides (OPP), Organochlorine Pesticides (OCP) and Polychlorinated Biphenyls (PCBs).

The results of the analysis of the twenty-two (22) primary soils samples indicate that all analytes were below the Limit of Reporting (LOR) for TRH, BTEX, PAH, OCP, OPP and PCB. All heavy metals results were below the HIL-D criteria.

Soil analytical results are included in *Tables 1 – 3* of *Annex G*. All samples returned results which were below applicable assessment criteria for site land use.

6 Analytical Data Quality Assessment

The quality of analytical data presented within this report has been assessed with reference to the following issues:

1) Sampling technique;
2) Preservation and storage of samples upon collection and transport to the laboratory;
3) Sample holding times;
4) Analytical procedures;
5) Laboratory limit of reporting (LOR);
6) Laboratory quality assurance (QA) procedures; and
7) The occurrence of apparently unusual or anomalous results.

A review of these items was conducted to assess data in terms of completeness, representativeness, comparability, accuracy and precision. A discussion of the data quality assessment related to the items listed above is provided in the subsections that follow.

6.1 Sample Collection, Storage, Transport and Analysis

6.1.1 General

Samples were collected, stored and transported to the laboratory in accordance with Valley Civilab's standard operating procedures which are consistent with guidelines provided in the ASC NEPM (2013). All samples were collected in appropriate containers provided by the laboratory.

6.1.2 Holding Times

Laboratory analysis was undertaken within specified holding times in accordance with Schedule B3 of the ASC NEPM (2013) and using NATA accepted analytical procedures.

6.1.3 Sample Transport and Storage temperature

In accordance with Schedule B3 of the ASC NEPM (2013), all samples were chilled during transport to the laboratory and evidence of chilling was recorded on the sample receipt documentation for the laboratory.

Trip Spike and Trip blank samples were submitted with primary samples as part of the field sampling program. The field trip blank sample returned no detections of any contaminants. The field trip spike sample was stored with the samples collected in the field and forwarded on to the laboratory for analysis. The recoveries were within the allowable range indicating transport of samples was adequate to maintain QA/QC.

6.2 Field Intra-Laboratory Duplicate Assessment

Relative Percentage Differences (RPDs) were calculated between the primary sample concentration and its corresponding intra-laboratory duplicate. As stipulated by the NEPM, the RPD acceptance criteria is 30% however it is noted that higher variations can be expected for organic analysis, samples with low

analyte concentrations or non-homogenous samples (NEPC, 2013). As such, the primary laboratory RPD acceptance criteria were used and are as follows:

1) Results <10 times the LOR: No Limit;
2) Results between 10-20 times the LOR: RPD must lie between 0-50%; and
3) Results >20 times the LOR: RPD must lie between 0-30%

One intra-laboratory duplicate sample was collected as part of this investigation. Given that the purpose of the sampling works was to provide preliminary indications as to the presence/absence of contamination, collection of 1 field duplicate per 10 primary samples was considered appropriate.

All RPD results were within the acceptable range. The field QA/QC is considered acceptable for the investigation. Sample and RPD results are included in *Table 3* of *Annex G*.

6.3 Laboratory Quality Assurance and Quality Control

Laboratory QA/QC procedures and results are detailed in the certified laboratory results contained in *Annex H*. The analytical methods implemented by the laboratories were reported to be consistent with the scope of their NATA accreditation and consistent with Schedule B3 of the ASC NEPM (2013). The laboratory generally reported an adequate range and frequency of data quality information (including laboratory duplicates and control samples).

The reported laboratory data quality was considered acceptable to meet the objectives of this assessment.

6.4 Data Quality Summary

Overall, the data from this investigation is considered to be of sufficient quality to serve as a basis for interpretation as part of this assessment.

7 Preliminary Conceptual Site Model

A CSM is a representation of site-related information regarding contaminant sources, exposure pathways and receptors. A CSM facilitates consideration of risks to human health and the environment associated with site contamination through assessment of source – pathway – receptor linkages. A preliminary CSM based on the understanding of site history and soil-landscape environmental setting is presented in the following sections.

7.1 Potential Sources and Associated Contaminants of Concern

Analytical results from the intrusive investigation did not indicate any Contaminants of Potential Concern (CoPC).

Off-site sources of contamination with the potential to affect the site were considered unlikely taking into consideration information discussed in Section 2.7 of this report.

7.2 Potential Receptors and Pathways

The following receptors have been identified based on current site setting and proposed future development:

1) Construction workers associated with the proposed development;
2) Current and future site users (including secondary students and workers);
3) Future on-site intrusive maintenance workers; and
4) Terrestrial flora and fauna.

Pathways by which the contamination may affect the receptors presented above includes:

1) Direct contact (dermal contact, incidental ingestion and dust inhalation);
2) Ecological uptake.

7.3 SPR Linkage Assessment

A source-pathway-receptor (SPR) linkage is present when a pathway links a source with a receptor. These linkages are considered complete where risk to the identified receptors may exist, now or in the future. Given that soil analytical results were reported below the adopted screening criteria (HIL/HSL A) for the identified receptors via the relevant pathway (direct contact), this SPR linkage is incomplete. Therefore, a potential exposure risk is considered unlikely.

8 Conclusions

The detailed desktop review of available information and thorough site inspection including shallow soil investigation have enabled the development of a preliminary conceptual site model allowing assessment of potential health and environmental issues relating to the site. Key findings were:

1) Potential contamination sources at the site are limited based on historical land use;
2) Visible signs of gross contamination were not observed during the site inspection and intrusive works; and
3) Contamination in shallow soils was not identified at any of the sampling locations.

In summary, based on the desktop study and limited intrusive sampling conducted on the Site, no indication of gross contamination has been identified which would constrain the development of the Site for its proposed land use.

In regard to clause 6(1) of State Environmental Planning Policy No 55 – Remediation of Land, that the planning authority can be satisfied that the land is suitable for the intended purpose being a proposed change of land use zoning to B5 Business Development, and subsequent land uses permitted pursuant to that zone.

If you have any further questions about this report, please contact the undersigned.

For and on behalf of

Valley Civilab Pty Ltd

Jake Duck
Environmental Scientist

Malcolm Adrien
Environmental Services Manager

REFERENCES

Australian Government Department of the Environment (2016) *Protected Matters Search Tool* *https://www.environment.gov.au/epbc/protected-matters-search-tool* accessed 25/7/18.

Australian Standard AS 4482.1-2005 (2005) *Guide to the Sampling and Investigation of Potentially Contaminated Soil. Part 1 – Non-volatile and Semi-Volatile Compounds.*

National Environment Protection Council (NEPC), (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999, NEPM, Canberra. Schedule B2: Guideline On-site Characterisation*.

NSW EPA (1997) *Guidelines for Consultants Reporting on Contaminated Sites*.

NSW EPA (1997). *Contaminated Land Management Act 1997.*

NSW EPA (2017) *Naturally Occurring Asbestos in NSW* https://trade.maps.arcgis.com/apps/PublicInformation/index.html?appid=87434b6ec7dd4aba8cb664d8e646fb06 accessed 25/7/19.

Lotsearch (2019) Enviro Professional, *Reference: LS007510 EP - 22 Jul 2019 16:10:07*

LIMITATIONS

This report was prepared in accordance with the scope of work outlined within this report and subject to the applicable cost, time and other constraints. Valley Civilab performed the services in a manner consistent with the normal level of care and expertise exercised by members of the environmental profession. Valley Civilab makes no warranty concerning the suitability of the site for any purpose or the possibility of any use, development or re-development of the site. Except as otherwise stated, Valley Civilab's assessment is limited strictly to identifying specified environmental conditions associated with the subject site and does not evaluate structural conditions of any buildings on the subject site. Lack of identification in the report of any hazardous or toxic materials on the subject site should not be interpreted as a guarantee that such materials do not exist on the site.

This assessment is based on site inspection conducted by Valley Civilab personnel, sampling and analysis described in the report, and information provided by Bunnings Group Limited or other people with knowledge of the site conditions. All conclusions and recommendations made in the report are the professional opinions of the Valley Civilab personnel involved with the project and, while normal checking of the accuracy of data has been conducted, Valley Civilab assumes no responsibility or liability for errors in data obtained from such sources, regulatory agencies or any other external sources, nor from occurrences outside the scope of this project.

Valley Civilab is not engaged in environmental consulting and reporting for the purpose of advertising, sales promoting, or endorsement of any client interests, including raising investment capital, recommending investment decisions, or other publicity or investment purposes.

VALLEY CIVILAB PREPARED THIS REPORT FOR THE SOLE AND EXCLUSIVE BENEFIT AND USE OF BUNNINGS GROUP LIMITED. NOTWITHSTANDING DELIVERY OF THIS REPORT BY VALLEY CIVILAB OR CDMN TO ANY THIRD PARTY, UNLESS OTHERWISE EXPRESSLY AGREED, ANY COPY OF THIS REPORT PROVIDED TO A THIRD PARTY IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY, WITHOUT THE RIGHT TO RELY AND VALLEY CIVILAB DISCLAIMS ALL LIABILITY TO SUCH THIRD PARTY TO THE EXTENT PERMITTED BY LAW. ANY USE OF THIS REPORT BY A THIRD PARTY IS DEEMED TO CONSTITUTE ACCEPTANCE OF THIS LIMITATION.

VALLEY/CIVILAB
Geotechnical & Environmental Services

Annex A

Note:
(1) The scale bar is approximate.
(2) Base layer sourced from Sixmap, Mudgee, NSW. Accessed 4th July 2019.

Figure 1 - Site Features Plan

Scale (m)
0 20 40 60

N
W E
S

VALLEY/CIVILAB
Geotechnical & Environmental Services

Annex B

MID-WESTERN REGIONAL COUNCIL
PO Box 156, MUDGEE NSW 2850
86 Market Street, Mudgee | 109 Herbert Street, Gulgong | 77 Louee Street, Rylstone
T 1300 765 002 or 02 6378 2850 | F 02 6378 2815
E council@midwestern.nsw.gov.au

Planning Certificate

made under *Section 149 Environmental Planning and Assessment Act 1979*

APPLICANT

Lotsearch Pty Ltd
Level 3
68 Alfred Street
MILSONS POINT NSW 2061

OWNER (as recorded by Council):

Ms JA Freeman & Mr SV Rayner
290 Burrundulla Road
BURRUNDULLA NSW 2850

Certificate No:	PC0055/2020
Receipt No:	425178
Date:	25 July 2019
Property No:	5989
Customer Ref:	LS007510
Property Address:	134 Lions Drive BURRUNDULLA NSW 2850
Property Description:	Lot 2 DP 1079362

The Environmental Planning and Assessment Act 1997 commenced operation on the 1 July 1998. As a consequence of this Act the information contained in this certificate needs to be read in conjunction with the provisions of the Environmental Planning and Assessment (Amendment) Regulation 1998, Environmental Planning and Assessment (Further Amendment) Regulation 1998 and Environmental Planning and Assessment (Savings and Transitional Regulation 1998).

SECTION A: INFORMATION PROVIDED PURSUANT TO SECTION 149(2) OF THE ACT:

MID-WESTERN REGIONAL LOCAL ENVIRONMENTAL PLAN 2012

This planning instrument was published 10 August 2012 on the NSW Legislation website and applies to all the land within Mid-Western Region Local Government Area.

AMENDMENTS TO MID-WESTERN REGIONAL LOCAL ENVIRONMENTAL PLAN 2012

Amendment No.1 - Temporary Workers' Accommodation - Published 10 August 2012 on the NSW Legislation website

Currently the land is zoned:

RU4 Primary Production Small Lots

Note: where two or more zones appear the property is affected in part by each zone.

Land use Zoning Table:

The following land use zoning table(s) apply to the land the subject of this Certificate.

Zone RU4 Primary Production Small Lots

2 Permitted without consent
Environmental protection works; Extensive agriculture; Home businesses; Home occupations; Intensive plant agriculture; Roads; Water reticulation systems.

3 Permitted with consent
Cellar door premises; Dwelling houses; Farm buildings; Home industries; Plant nurseries; Roadside stalls; Any other development not specified in item 2 or 4.

4 Prohibited
Air transport facilities; Amusement centres; Attached dwellings; Backpackers' accommodation; Boarding houses; Boat building and repair facilities; Boat launching ramps; Boat sheds; Car parks; Cemeteries; Charter and tourism boating facilities; Child care centres; Commercial premises; Crematoria; Exhibition homes; Exhibition villages; Freight transport facilities; Group homes; Heavy industrial storage establishments; Helipads; Highway service centres; Home occupations (sex services); Hostels; Hotel or motel accommodation; Industrial retail outlets; Industrial training facilities; Industries; Intensive livestock agriculture; Jetties; Livestock processing industries; Marinas; Mooring pens; Moorings; Mortuaries; Multi dwelling housing; Passenger transport facilities; Places of public worship; Public administration buildings; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Registered clubs; Residential flat buildings; Respite day care centres; Restricted premises; Sawmill or log processing works; Semi-detached dwellings; Seniors housing; Service stations; Sex services premises; Shop top housing; Signage; Stock and sale yards; Storage premises; Transport depots; Vehicle body repair workshops; Vehicle repair stations; Warehouse or distribution centres; Waste disposal facilities; Wholesale supplies.

SECTION B: OTHER PRESCRIBED INFORMATION PURSUANT TO SECTION 149(2) OF THE ACT:

As at the date of this Certificate the following State Environmental Planning Policies, Development Control Plans, Directions under Environmental Planning and Assessment Act and other Special Provisions apply.

State Environmental Planning Policy (Affordable Rental Housing) 2009

This policy aims 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.

State Environmental Planning Policy BASIX 2004

The purpose of the SEPP is to encourage sustainable residential development. An application for a development consent, complying development certificate or construction certificate in relation to certain kinds of residential development must be accompanied by a list of commitments by the applicant as to the manner in which the development will be carried out, and the carrying out of residential development pursuant to the resulting development consent, complying development certificate or construction certificate will be subject to a condition requiring such commitments to be fulfilled.

State Environmental Planning Policy (Exempt and Complying Development Codes) 2008

The aim of this policy is to provide streamlined development processes for development that complies with specific development standards.

It identifies exempt and complying development codes that have state wide application including the General Exempt Development Code, the General Housing Code, Housing Internal Alterations Code and General Commercial and Industrial Code.

State Environmental Planning Policy (Infrastructure) 2007

The aim of this policy is to facilitate the effective delivery of infrastructure across the state and repeals a number of other previous SEPP's.

It provides development controls related to air transport, correctional centres, educational establishments, electricity generating works, electricity transmission and distribution, flood mitigation, forestry, emergency services facilities, gas transmission or distribution, health services facilities, housing and group homes and many other facilities.

State Environmental Planning Policy (Miscellaneous Consent Provisions) 2007

This policy is to ensure that suitable provision is made for ensuring safety of persons using temporary structures and encourage the protection of the environment at such locations.

State Environmental Planning Policy (Rural Lands) 2008

The aim of this policy is to facilitate the orderly and economic use and development of rural lands for rural and related purposes.

It identifies rural planning principles and rural subdivision principles, will implement measures designed to reduce land use conflict, identifies state significant agricultural land and amends provisions of other environmental planning instruments relating to concessional lots in rural subdivisions.

SEPP (Mining, Petroleum Production and Extractive Industries) 2007

The SEPP consolidates and updates many existing planning provisions related to mining, petroleum production and extractive industries as well as introducing new provisions to ensure that potential environmental and social impacts are adequately addressed during the assessment and determination of development proposals.

State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004

This policy aims to increase availability and to provide a wider choice of residential accommodation for seniors or people with a disability. The policy establishes development standards and requirements for support services.

SEPP No 15 - 9 April 1998 - Rural Landsharing Communities

This Policy aims to encourage and facilitate development of rural landsharing communities to collectively manage land in an environmentally sensitive and sustainable manner and to provide for low cost housing. The Policy establishes criteria for rural landsharing community development, matters for Council consideration, environmental considerations, site analysis and management requirements for development proposed under the Policy.

SEPP No 21 - Caravan Parks

This Policy outlines requirements for development consent principally in relation to long term use of sites in caravan parks and for subdivision by long leases.

Development Consent is not required for installation or placement of moveable dwellings on sites in lawfully operating caravan parks.

SEPP No 30 - 8 December 1989, Amended 28 August 1993, 24 February 1995 and 11 June 1999 - Intensive Agriculture

This Policy requires development consent for cattle feedlots having a capacity of 50 or more head of cattle, piggeries having a capacity of 200 or more pigs or 20 or more breeding sows. This Policy also aims to extend the definition of the term "rural industry" where used in environmental planning instruments so as to include within the meaning of that term composting facilities and works, including facilities and works for the production of mushroom substrate.

SEPP No 33 - 13 March 1992 - Hazardous and Offensive Development

This Policy redefines hazardous and offensive developments and specifies that such proposals be advertised, be well documented and that Council consider any measures taken to mitigate their impact.

SEPP No 36 - 16 July 1993 - Manufactured Homes Estates

This Policy aims to facilitate the establishment of well designed and properly serviced manufactured home estates in suitable locations as an alternative to traditional housing.

SEPP No 44 - Koala Habitat Protection

This Policy aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas.

The Policy applies to all land with an area of more than one hectare to which a Development Application has been made.

SEPP No 55 - Remediation of Land

This Policy 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. The Policy applies to the whole state, to ensure that remediation is permissible development and is always carried out to a high standard. It specifies when consent is required for remediation and lists considerations that are relevant when rezoning land and determining development applications.

SEPP No 62 - Sustainable Aquaculture

The aims and objectives of this Policy are to encourage sustainable aquaculture, including sustainable oyster aquaculture, in the State, namely, aquaculture development which uses, conserves and enhances the community's resources so that the total quality of life now and in the future can be preserved and enhanced.

SEPP No 64 - Advertising Signage

This Policy provides controls which will improve the quality of outdoor advertising and our environment.

SEPP No 65 - 26 July 2002 - Design Quality of Residential Flat Development

This Policy aims to improve the design quality of residential flat developments in New South Wales.

State Environmental Planning Policy (State and Regional Development) 2011

The purpose of the SEPP is to identify development that is State significant development, State significant infrastructure and critical State significant infrastructure. It also confers functions on joint regional planning panels to determine development applications.

State Environmental Planning Policy (Major Development) 2005

The purpose of the SEPP is to facilitate the development, redevelopment or protection of important urban, coastal and regional sites of economic, environmental or social significance to the State so as to facilitate the orderly use, development or conservation of those State significant sites for the benefit of the State.

Mid-Western Regional Development Control Plan 2013

This plan provides guidelines for all types of development within the Mid-Western Regional Council Local Government Area. It replaces all of the separate Development Control Plans and includes standards for Residential, industrial, commercial, wind farm, temporary workers accommodation, signage and other forms of development.

Land Not Within Conservation Area

The land the subject of this Certificate is **not** within a Heritage Conservation Area as identified in the Mid-Western Regional LEP 2012.

Not an Item of Environmental Heritage

The land the subject of this certificate is **not** identified in Schedule 5 of the Mid-Western Regional LEP 2012 as an item of Environmental Heritage.

Dwelling Houses - RU4 Primary Production Small Lots Zone

Mid-Western Regional Local Environmental Plan 2012 specifies a minimum lot size of 20 hectares for the erection of a dwelling in this zone. Please note that there may be other provisions in the LEP that may apply if the land does not meet the minimum allotment size.

Approval must be obtained either through the Development Application or Complying Development Certificate process prior to the erection of a dwelling on this land.

The Land is Not Subject to Road Widening

Council's records indicate that the land the subject of this Certificate is NOT affected by any road widening or road re-alignment under:

1) Division 2 of the Roads Act, 1993;

2) Section 262 of the former Local Government Act, 1919;

3) Any Environmental Planning Instrument

4) Any resolution of Council.

Coastal Protection

Council has not been notified, by the Department of Public Works, that the land the subject of this Certificate is affected by the operation of Section 38 or 39 of the Coastal Protection Act, 1979.

Risk of Land Slip or Subsidence

No information available re land slip or subsidence. Land is not within a Proclaimed Mine Subsidence District.

Identified Critical Habitat

The land the subject of this Certificate does not contain any identified critical habitats.

No Acquisition by Public Authority

The land the subject of this certificate is NOT subject to acquisition by a public authority under a planning scheme or a draft planning instrument.

State Significant Development - Land is not Subject

The land the subject of this Certificate is not the subject of an order by the Minister for Planning and Infrastructure regarding State Significant development pursuant to Section 89C(3).

SEPP (Exempt & Complying Development Codes) 2008

Complying Development may be carried out on this land under the State Environmental Planning Policy SEPP (Exempt and Complying Development Codes) 2008.

Note: For land that is bushfire prone or a flood control lot MUST satisfy additional requirements of the SEPP (Exempt & Complying Development Codes) 2008. Please contact Council to discuss these requirements.

Section 94 Development Contributions Plan

Council's Section 94 Plan applies to future commercial/ retail/ industrial development within the Mudgee Town Centre and subdivision within the Mid-Western Regional Council Local Government Area. Contact Council's Planning Department for any queries regarding this matter.

Section 94A Development Contributions Plan

Council's Section 94A Plan applies to future commercial/ retail/ industrial/ tourism development outside of the Mudgee Town Centre and Residential Development within the Mid-Western Regional Council Local Government Area. Contact Council's Planning Department for any queries regarding this matter.

Land May be Subject to Flood Management Plan

The land the subject of this certificate is not within the Flood Risk Precincts identified by the Mudgee Floodplain Management Study. The provisions of the Floodplain Management Plan may also apply to land that is affected by localised flooding.

Land is Not Bushfire Prone

The land the subject of this certificate has not been identified as being bush fire prone in accordance with the Environmental Planning and Assessment Act 1979 and Mid-Western Regional LGA Bush Fire Prone Land map.

SECTION C: ADDITIONAL INFORMATION PURSUANT TO SECTION 149(5) OF THE ACT:

Development Consent Has Not Been Granted

Council's records indicate that Development Consent with respect to the land the subject of this Certificate has NOT been granted within the last five years.

Tree Preservation Order

The land the subject of this Certificate may be affected by a Tree Preservation Order. An application is required from Council for removal of trees that are listed on Council's significant tree register.

For further information please contact
Planning & Development Section

CUSTOMER SERVICE OFFICER

Certificate No. 1492 1342720

VALLEY/CIVILAB
Geotechnical & Environmental Services

Annex C

ADVANCE LEGAL SEARCHERS PTY LTD

(ACN 147 943 842)
ABN 82 147 943 842

18/36 Osborne Road,
Manly NSW 2095

Telephone: +612 9977 6713
Mobile: 0412 169 809
Email: search@alsearchers.com.au

19th July 2019

LOTSEARCH PTY LTD
Level 3, 68 Alfred Street,
MILSONS POINT, NSW 2061

Attention: Rosemary Hulak,

RE: **132 – 134 Lions Drive,**
Mudgee
Reference: LS007510_EP

Current Search

Folio Identifier 2/1079362 (title attached)
DP 1079362 (plan attached)
Dated 19th July 2019
Registered Proprietor:
SIMON VINCENT RAYNER
JENNIFER ANNE FREEMAN

Title Tree
Lot 2 DP 1079362

Folio Identifier 2/1079362

CA 91249

Conveyance Book 4449 No. 523

Declaration Book 2852 No. 834

Conveyance Book 2662 No. 208

Conveyance Book 2447 No. 837

Conveyance Book 2101 No. 490

Acknowledgement Book 1745 No. 949

Conveyance Book 1069 No. 532

****

Part Portion 182 Parish Mudgee
Granted to George Cox dated 8th April 1834

****

Summary of proprietor(s)
Lot 2 DP 1079362

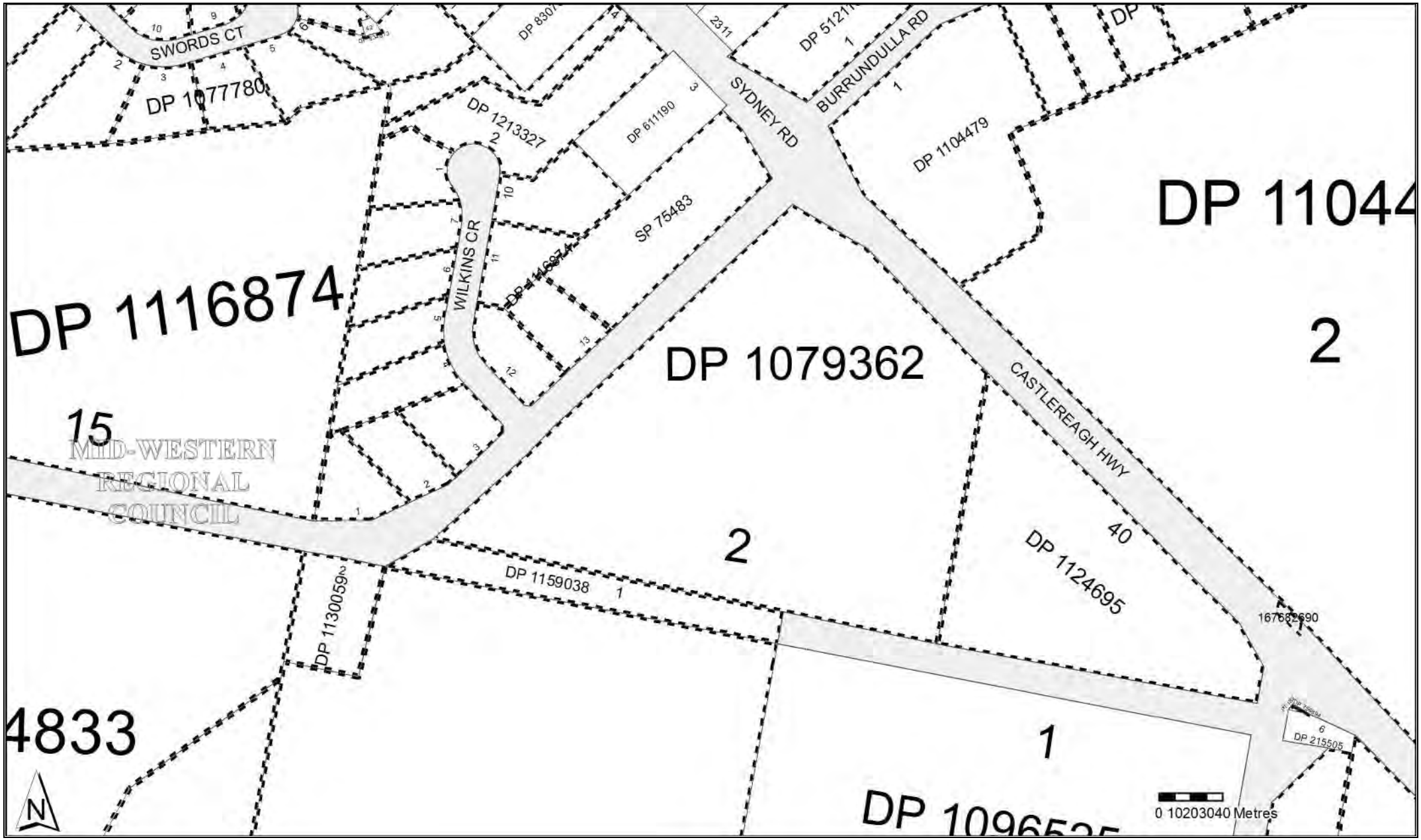
Year	Proprietor(s)
	(Lot 2 DP 1079362)
2005 – todate	Simon Vincent Rayner Jennifer Anne Freeman
	(Lot D DP 164723 – Area 13 Acres 1 Rood 19 Perches – Conv Book 4449 No. 523)
2005 – 2005	Simon Vincent Rayner Jennifer Anne Freeman
2004 – 2005	Simon Vincent Rayner / executor Jennifer Anne Freeman / executor Alice Emily Rayner, estate
	(Lot D DP 164723 – Area 13 Acres 1 Rood 19 Perches – Conv Book 2852 No. 834)
1967 – 2004	Vincent Arthur Rayner, grazier Alice Emily Rayner, his wife
	(Lot D DP 164723 – Area 13 Acres 1 Rood 19 Perches – Conv Book 2662 No. 208)
1963 – 1967	Andrew Alexander Pirie, stock and station agent Melva Elaine Pirie, his wife
	(Lot D DP 164723 – Area 13 Acres 1 Rood 19 Perches – Conv Book 2447 No. 837)
1958 – 1963	Grace Broadhead, wife of Charles Andrew Broadhead
	(Part Portion 182 Parish Mudgee – Area 148 Acres – Conv Book 2101 No. 490)
1949 – 1958	Geoffrey Charles Cox, grazier
	(Part Portion 182 Parish Mudgee – Area 148 Acres – Acknowledgement Book 1745 No. 949)
1936 – 1949	William Jones, carrier / executor George Arthur Jones, carrier / executor Robert Percival Jones also known as Robert Jones, estate
	(Part Portion 182 Parish Mudgee – Area 148 Acres – Conv Book 1069 No. 532)
1915 – 1936	Robert Jones, carrier

****

Cadastral Records Enquiry Report : Lot 2 DP 1079362

Ref : NOUSER

Locality : SPRING FLAT
Parish : MUDGEE
LGA : MID-WESTERN REGIONAL
County : WELLINGTON



Copyright © Crown in right of New South Wales, 2017

This information is provided as a searching aid only.Whilst every endeavour is made to ensure that current map, plan and titling information is accurately reflected, the Registrar General cannot guarantee the information provided. For ALL ACTIVITY PRIOR TO SEPTEMBER 2002 you must refer to the RGs Charting and Reference Maps

	Status	Surv/Comp	Purpose
DP512115			
Lot(s): 1			
DP1253651	REGISTERED	SURVEY	SUBDIVISION
DP756894			
Lot(s): 182			
UNCONVERTIBLE OLD SYSTEM RESIDUE. FEE APPEARS TO REMAIN IN CONVEYANCE BOOK 2423 NO. 761. CERTIFICATE OF TITLE CREATION WILL REQUIRE A DEPOSITED PLAN OF SURVEY AND A PRIMARY APPLICATION BASED UPON ADVERSE POSSESSION			
DP1051128			
Lot(s): 100, 101			
DP611190	HISTORICAL	SURVEY	SUBDIVISION
DP1051504			
Lot(s): 2			
DP1117044	REGISTERED	SURVEY	EASEMENT
Lot(s): 2, 3, 4, 5, 6, 7			
DP248983	HISTORICAL	SURVEY	OLD SYSTEM CONVERSION
DP1013363	HISTORICAL	SURVEY	RESUMPTION OR ACQUISITION
DP1031670	HISTORICAL	SURVEY	SUBDIVISION
DP1069441			
Lot(s): 3			
DP756894	HISTORICAL	COMPILATION	CROWN ADMIN NO.
Lot(s): 4			
DP445944	HISTORICAL	COMPILATION	UNRESEARCHED
DP1077780			
Lot(s): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11			
DP834613	HISTORICAL	SURVEY	SUBDIVISION
DP1077777	HISTORICAL	SURVEY	SUBDIVISION
DP1079362			
Lot(s): 2			
CA91249 - LOT 2 DP1079362			
DP1104479			
Lot(s): 1			
DP1117044	REGISTERED	SURVEY	EASEMENT
Lot(s): 1, 2			
DP248983	HISTORICAL	SURVEY	OLD SYSTEM CONVERSION
DP445944	HISTORICAL	COMPILATION	UNRESEARCHED
DP1013363	HISTORICAL	SURVEY	RESUMPTION OR ACQUISITION
DP1031670	HISTORICAL	SURVEY	SUBDIVISION
DP1051504	HISTORICAL	SURVEY	SUBDIVISION
DP1064045	HISTORICAL	SURVEY	SUBDIVISION
DP1116874			
Lot(s): 7			
DP1228039	REGISTERED	SURVEY	EASEMENT
Lot(s): 1, 2, 3, 4, 5, 6, 7, 10, 11, 12, 13, 14, 15			
DP834613	HISTORICAL	SURVEY	SUBDIVISION
DP1077777	HISTORICAL	SURVEY	SUBDIVISION
DP1124695			
Lot(s): 40			
CA119565 - LOT 40 DP1124695			
DP1130059			
Lot(s): 2, 3			
DP577656	HISTORICAL	COMPILATION	SUBDIVISION
DP756894	HISTORICAL	COMPILATION	CROWN ADMIN NO.
CA88303 - LOT 41 DP756894			
DP1159038			
Lot(s): 1			
NSW GAZ. 25-03-2011 Folio : 2289 CLOSED ROAD LOT 1 DP1159038. ERRATUM GAZ. 1-4-2011 FOL. 2398			

Caution: This information is provided as a searching aid only. Whilst every endeavour is made the ensure that current map, plan and titling information is accurately reflected, the Registrar General cannot guarantee the information provided. For **ALL ACTIVITY PRIOR TO SEPTEMBER 2002** you must refer to the RGs Charting and Reference Maps.

Copyright © Crown in right of New South Wales, 2017

	Status	Surv/Comp	Purpose
DP1164833			
Lot(s): 4, 5			
DP756894	HISTORICAL	COMPILATION	CROWN ADMIN NO.
Lot(s): 5			
DP577656	HISTORICAL	COMPILATION	SUBDIVISION
DP1171194			
Lot(s): 4, 5, 8			
DP731165	HISTORICAL	SURVEY	SUBDIVISION
DP1077777	HISTORICAL	SURVEY	SUBDIVISION
DP1213327			
Lot(s): 1			
DP1228039	REGISTERED	SURVEY	EASEMENT
Lot(s): 1, 2			
DP834613	HISTORICAL	SURVEY	SUBDIVISION
DP1077777	HISTORICAL	SURVEY	SUBDIVISION
DP1116874	HISTORICAL	SURVEY	SUBDIVISION
Road			
Polygon Id(s): 167682690			
CA110982 - LOT 3 DP1013363			
NSW GAZ. 01-06-2012 Folio : 2317 DEDICATED PUBLIC ROAD LOT 3 DP1013363			
SP75483			
DP831326	HISTORICAL	SURVEY	SUBDIVISION
SP95287	REGISTERED	COMPILATION	STRATA SUBDIVISION PLAN

Caution: This information is provided as a searching aid only. Whilst every endeavour is made the ensure that current map, plan and titling information is accurately reflected, the Registrar General cannot guarantee the information provided. For **ALL ACTIVITY PRIOR TO SEPTEMBER 2002** you must refer to the RGs Charting and Reference Maps.

Copyright © Crown in right of New South Wales, 2017

Plan	Surv/Comp	Purpose
DP164694	SURVEY	UNRESEARCHED
DP215505	SURVEY	ROAD OR MOTORWAY
DP512115	SURVEY	SUBDIVISION
DP611190	SURVEY	SUBDIVISION
DP756894	COMPILATION	CROWN ADMIN NO.
DP830762	SURVEY	SUBDIVISION
DP834613	SURVEY	SUBDIVISION
DP868161	SURVEY	SUBDIVISION
DP873477	SURVEY	SUBDIVISION
DP1051128	SURVEY	SUBDIVISION
DP1051504	SURVEY	SUBDIVISION
DP1069441	SURVEY	SUBDIVISION
DP1077780	SURVEY	SUBDIVISION
DP1079362	COMPILATION	LIMITED FOLIO CREATION
DP1096525	SURVEY	CONSOLIDATION
DP1104479	SURVEY	SUBDIVISION
DP1116874	SURVEY	SUBDIVISION
DP1124695	COMPILATION	LIMITED FOLIO CREATION
DP1130059	SURVEY	SUBDIVISION
DP1159038	SURVEY	ROADS ACT, 1993
DP1164833	SURVEY	SUBDIVISION
DP1171194	SURVEY	SUBDIVISION
DP1213327	SURVEY	SUBDIVISION
SP75483	COMPILATION	STRATA PLAN

Caution: This information is provided as a searching aid only. Whilst every endeavour is made the ensure that current map, plan and titling information is accurately reflected, the Registrar General cannot guarantee the information provided. For **ALL ACTIVITY PRIOR TO SEPTEMBER 2002** you must refer to the RGs Charting and Reference Maps.

Copyright © Crown in right of New South Wales, 2017

Req:R677868 /Doc:BK 4449-523 NO /Rev:10-Feb-2005 /NSW LRS /Pgs:ALL /Prt:19-Jul-2019 07:53 /Seq:1 of 3
© Office of the Registrar-General /Src:GLOBALX /Ref:advlegs

LAND AND PROPERTY INFORMATION New South Wales
1 Prince Albert Road, Queens Square, Sydney 2000
Telephone 02 9228 6877

BK 4449 NO 523

CA NUMBER
91249

DEEDS INDEX PARTICULARS

PRIVACY NOTE: this information is legally required and will become part of the public record

(A)

Delivery Box	Name, Address/DX
28A	LLPN: 124247U THOMSON LAWPOINT GALLOWAYS Phone: (02) 9233 1011 DX 340 SYDNEY
	Telephone no
	Reference DEAR RAYNER

(B)

Nature of Instrument	Date of Instrument
DEED OF ACKNOWLEDGEMENT	20 December 2004

(C)

Locality of the land	LINK CONVEYANCE-for old system land			PRINCIPAL DEED
	Book	Number	Whole/Part	
Mudgee	2852	834	Whole	Conveyance

LOCAL GOVT. AREA	PARISH	COUNTY
Mid-Western Regional	Mudgee	Wellington

NOTING (Office use only)	

(D)

Entry	GIVEN NAMES/COMPANY NAME	FAMILY NAME
V	SIMON VINCENT	RAYNER
V	JENNIFER ANNE	FREEMAN
P	SIMON VINCENT	RAYNER
P	JENNIFER ANNE	FREEMAN
V	ALICE EMILY	RAYNER (DECEASED)

(E)

I,.....Geoffrey..Keith..Dear..... of .....70..Market..Street,...Mudgee.....

.....

certify that for the purposes of section 184D(3) of the Conveyancing Act 1919 that:

1. the registration copy is a true copy of the original and
2. the above index particulars of the original instrument [and on the annexure(s)] are complete and correct.

Signed..... Date ..24..January..2005.....

Entered: Verified:

Req:R677868 /Doc:BK 4449-523 NO /Rev:10-Feb-2005 /NSW LRS /Pgs:ALL /Prt:19-Jul-2019 07:53 /Seq:2 of 3
© Office of the Registrar-General /Src:GLOBALX /Ref:advlegs

N.S.W. STAMP DUTY $10 — PAID

ACKNOWLEDGMENT made this 20th day of December Two Thousand and Four under the Wills Probate & Administration Act 1898 between SIMON VINCENT RAYNER of 290 Burrundulla Road Mudgee in the State of New South Wales and JENNIFER ANNE FREEMAN of 146 Cherry Road, Eleebana in the said State Executors of the duly proved Will of ALICE EMILY RAYNER late of 66 Castlereagh Highway, Mudgee in the said State, Widow, deceased of the One Part AND the said SIMON VINCENT RAYNER and JENNIFER ANNE FREEMAN Devisees under the Will of the Other Part

WHEREAS the said Deceased by her Will dated 25 May, 1993 gave devised and bequeathed the whole of her estate both real and personal of whatsoever nature and wheresoever situate unto her Executors upon trust for her said son and her said daughter as should survive her in equal shares

AND WHEREAS the said son and said daughter did not predecease the Deceased

AND WHEREAS Probate thereof Number 112149/04 was granted to the Executors by the Supreme Court of New South Wales on 28 July, 2004

AND WHEREAS the Deceased was seised of an estate in fee simple in the land set out in the Schedule hereto

AND WHEREAS the Executors have completed their executorial duties

NOW THIS DEED WITNESSETH and acknowledges that the said Devisees now hold the said lands in equal shares as tenants in common

THE SCHEDULE HEREINBEFORE REFERRED TO

ALL THAT piece or parcel of land situate in the Mid-Western Regional Local Government Area and State of New South Wales containing by

Req:R677868 /Doc:BK 4449-523 NO /Rev:10-Feb-2005 /NSW LRS /Pgs:ALL /Prt:19-Jul-2019 07:53 /Seq:3 of 3
© Office of the Registrar-General /Src:GLOBALX /Ref:advlegs

admeasurement THIRTEEN ACRES ONE ROOD NINETEEN PERCHES being part of Portion 182 Parish of Mudgee and County of Wellington and being Lot D in Plan registered number 62835(L) COMMENCING on the southwestern side of Trunk Road No. 55 from Mudgee to Sydney at the northeastern corner of the land comprised in Conveyance Registered No. 490 Book 2101 and bounded thence on the east by the eastern side of the land comprised in the said Conveyance bearing 179°51' for 865.1 links bounded thence on the south by the northern side of a road of variable widths bearing 270°54'20" for 1607.4 links bounded thence on the northwest by the southeastern side of a proposed road 100 links wide and variable bearing 36°23' for 1619.3 links bounded thence on the northeast by part of the said south western side of Trunk Road No. 55 bearing 125°45' for 793.3 links to the point of commencement EXCEPTING THEREOUT land resumed for Main Roads purposes under the Public Works Act 1912 and the Main Roads Act 1924-1960 described as Lot 3 in Deposited Plan No. 215505.

IN WITNESS WHEREOF the said SIMON VINCENT RAYNER and JENNIFER ANNE FREEMAN have hereunto affixed their hands and seals on the day and year first hereinbefore written.

SIGNED SEALED AND DELIVERED) by the said SIMON VINCENT RAYNER in the presence of:

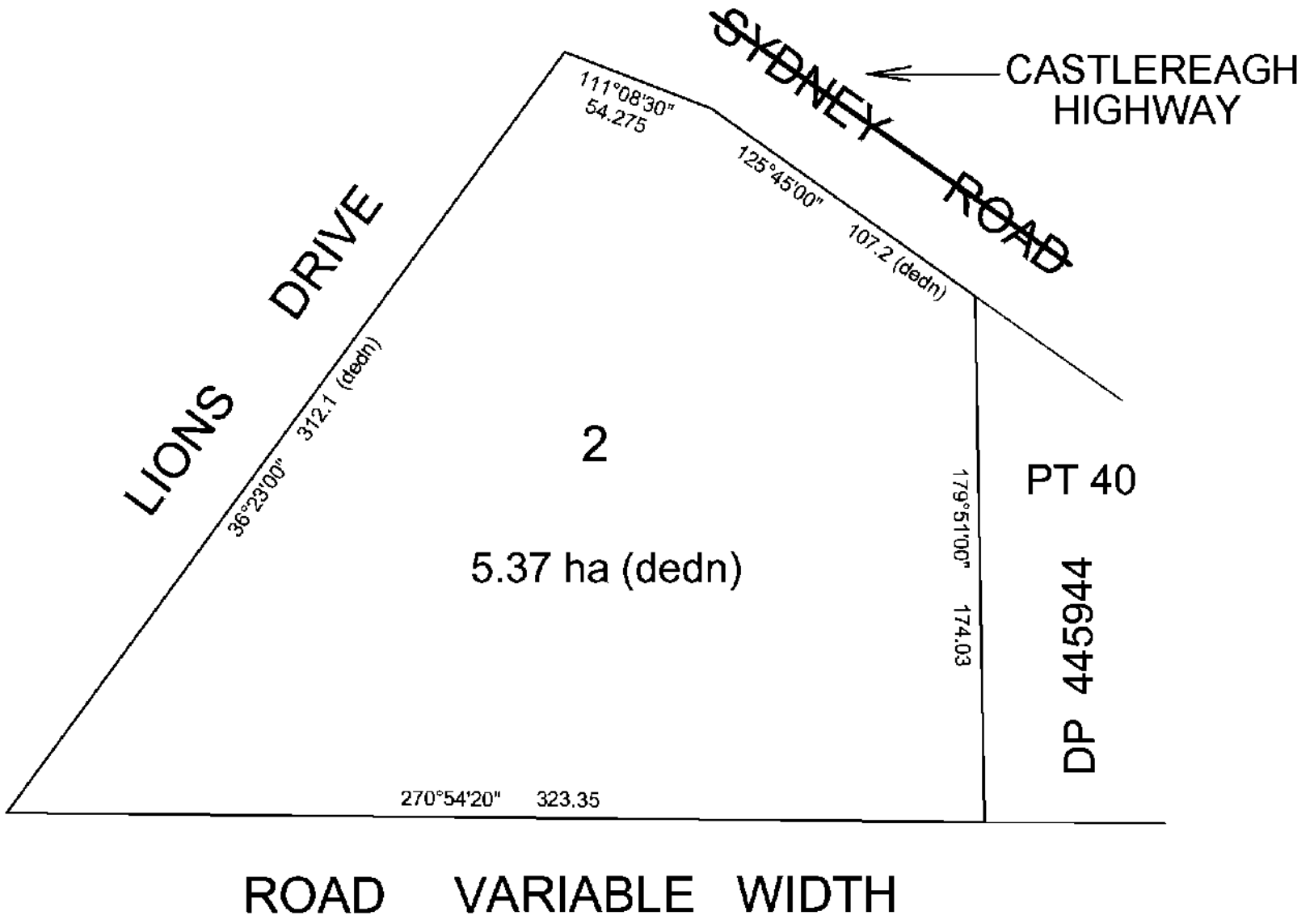
Geoffrey Keith Dean 70 Market St Mudgee

SIGNED SEALED AND DELIVERED by the said JENNIFER ANNE FREEMAN in the presence of:

Mary Ann Newton (witness)
A.D. Newton
150 Cherry Rd, Eleebana 2282

REGISTERED
-7 FEB 2005
BOOK 4449 No. 523

e-departmental



ROAD VARIABLE WIDTH

DP 1079362 (E)

Registered: 16.2.2005

Title System: OLD SYSTEM

Purpose: LIMITED TITLE CREATION

Ref. Map: P5487-44; PARISH #

Last Plan: DP 164723

C.A. 91249

PLAN OF LAND COMPRISED IN

DEED BK. 4449 NO. 523

BEING PART OF LOT D IN DP 164723 AFTER ROAD ACTION

Lengths are in metres. Reduction Ratio - NTS

Sheet 1 of 1 sheet(s)

L.G.A. MID-WESTERN REGIONAL

LOCALITY: BURRUNDULLA

PARISH: MUDGEE

COUNTY: WELLINGTON (32)

THIS PLAN WAS PREPARED SOLELY TO IDENTIFY THE LAND IN THE ABOVE DEED AND THE BOUNDARIES HAVE NOT BEEN INVESTIGATED BY THE REGISTRAR GENERAL

THIS PLAN IS NOT A CURRENT PLAN IN TERMS OF S.7A CONVEYANCING ACT 1919.

PLAN USED FOR COMPILATION:

DP 215505

LPI Ref. : TCB13/12

19.5.2008

ROAD NAME AMENDED VIDE 2008/659

Req:R677850 /Doc:DP 1079362 P /Rev:29-May-2008 /NSW LRS /Pgs:ALL /Prt:19-Jul-2019 07:43 /Seq:1 of 1
© Office of the Registrar-General /Src:GLOBALX /Ref:advlegs

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
19/7/2019 7:53AM

FOLIO: 2/1079362

First Title(s): OLD SYSTEM
Prior Title(s): BK 4449 NO 523

Recorded	Number	Type of Instrument	C.T. Issue
16/2/2005	DP1079362	DEPOSITED PLAN	FOLIO CREATED EDITION 1
16/2/2005	CA91249	CONVERSION ACTION	
27/2/2017	AM189622	DEPARTMENTAL DEALING	

*** END OF SEARCH ***

advlegs PRINTED ON 19/7/2019

Obtained from NSW LRS on 19 July 2019 07:53 AM AEST

© Office of the Registrar-General 2019

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 2/1079362

SEARCH DATE	TIME	EDITION NO	DATE
19/7/2019	7:43 AM	1	16/2/2005

LAND

LOT 2 IN DEPOSITED PLAN 1079362
AT BURRUNDULLA
LOCAL GOVERNMENT AREA MID-WESTERN REGIONAL
PARISH OF MUDGEE COUNTY OF WELLINGTON
TITLE DIAGRAM DP1079362

FIRST SCHEDULE

SIMON VINCENT RAYNER
JENNIFER ANNE FREEMAN
AS TENANTS IN COMMON IN EQUAL SHARES (CA91249)

SECOND SCHEDULE (2 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 LIMITED TITLE. LIMITATION PURSUANT TO SECTION 28T(4) OF THE REAL PROPERTY ACT, 1900. THE BOUNDARIES OF THE LAND COMPRISED HEREIN HAVE NOT BEEN INVESTIGATED BY THE REGISTRAR GENERAL.

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

advlegs PRINTED ON 19/7/2019

Obtained from NSW LRS on 19 July 2019 07:43 AM AEST © Office of the Registrar-General 2019
* Any entries preceded by an asterisk do not appear on the current edition of the Certificate of Title. Warning: the information appearing under notations has not been formally recorded in the Register. GlobalX hereby certifies that the information contained in this document has been provided electronically by the Registrar General in accordance with Section 96B(2) of the Real Property Act 1900. Note: Information contained in this document is provided by GlobalX Pty Ltd, ABN 35 099 032 596, www.globalx.com.au an approved NSW Information Broker.

VALLEY/CIVILAB
Geotechnical & Environmental Services

Annex D

LOTSEARCH

LOTSEARCH ENVIRO PROFESSIONAL

Date: 22 Jul 2019 16:10:07

Reference: LS007510 EP

Address: 132-134 Lions Drive, Mudgee, NSW 2850

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

Table of Contents

Location Confidences 2
Dataset Listings 3
Site Location Aerial 5
Contaminated Land & Waste Management Facilities 6
PFAS Investigation Programs 8
Defence Sites 9
EPA Other Sites with Contamination Issues 10
EPA Current Licensed Activities 11
EPA Delicensed & Former Licensed Activities 13
UPSS Sensitive Zones 15
Historical Business Activities 16
Historical Aerial Imagery & Maps 31
Topographic Features 40
Elevation Contours 44
Hydrogeology & Groundwater 45
Geology 57
Naturally Occurring Asbestos Potential 59
Soils 60
Acid Sulfate Soils 64
Dryland Salinity 67
Mining Subsidence Districts 69
State Environmental Planning 70
Environmental Planning Instruments 71
Heritage 73
Natural Hazards 75
Ecological Constraints 76
Terms & Conditions 83

Location Confidences

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

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

Dataset Listing

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

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Cadastre Boundaries	NSW Department of Finance, Services & Innovation	22/07/2019	22/07/2019	Daily	-	-	-	-
Topographic Data	NSW Department of Finance, Services & Innovation	11/04/2019	10/04/2019	As required	-	-	-	-
List of NSW contaminated sites notified to EPA	Environment Protection Authority	17/07/2019	09/07/2019	Monthly	1000	0	0	0
Contaminated Land Records of Notice	Environment Protection Authority	10/07/2019	10/07/2019	Monthly	1000	0	0	0
Former Gasworks	Environment Protection Authority	01/07/2019	11/10/2017	Monthly	1000	0	0	0
National Waste Management Facilities Database	Geoscience Australia	07/05/2019	07/03/2017	Quarterly	1000	0	0	0
EPA PFAS Investigation Program	Environment Protection Authority	01/07/2019	01/07/2019	Monthly	2000	0	0	0
Defence PFAS Investigation & Management Program	Department of Defence	01/07/2019	01/07/2019	Monthly	2000	0	0	0
Airservices Australia National PFAS Management Program	Airservices Australia	01/07/2019	01/07/2019	Monthly	2000	0	0	0
Defence 3 Year Regional Contamination Investigation Program	Department of Defence	01/07/2019	01/07/2019	Monthly	2000	0	0	0
EPA Other Sites with Contamination Issues	Environment Protection Authority	13/12/2018	13/12/2018	Annually	1000	0	0	0
Licensed Activities under the POEO Act 1997	Environment Protection Authority	27/06/2019	27/06/2019	Monthly	1000	0	0	1
Delicensed POEO Activities still regulated by the EPA	Environment Protection Authority	27/06/2019	27/06/2019	Monthly	1000	0	0	0
Former POEO Licensed Activities now revoked or surrendered	Environment Protection Authority	27/06/2019	27/06/2019	Monthly	1000	3	3	5
UPSS Environmentally Sensitive Zones	Environment Protection Authority	14/04/2015	12/01/2010	As required	1000	1	1	1
UBD Business to Business Directory 1991 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	1	1
UBD Business to Business Directory 1991 (Road & Area Matches)	Hardie Grant			Not required	150	-	19	19
UBD Business Directory 1982 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1982 (Road & Area Matches)	Hardie Grant			Not required	150	-	16	16
UBD Business Directory 1970 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1970 (Road & Area Matches)	Hardie Grant			Not required	150	-	5	5
UBD Business Directory 1961 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1961 (Road & Area Matches)	Hardie Grant			Not required	150	-	4	4
UBD Business Directory 1950 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1950 (Road & Area Matches)	Hardie Grant			Not required	150	-	1	1
UBD Business Directory Drycleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant			Not required	500	0	0	4
UBD Business Directory Drycleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant			Not required	500	-	3	4
Points of Interest	NSW Department of Finance, Services & Innovation	11/04/2019	10/04/2019	Quarterly	1000	0	0	9
Tanks (Areas)	NSW Department of Finance, Services & Innovation	11/04/2019	11/04/2019	Quarterly	1000	0	0	0

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Tanks (Points)	NSW Department of Finance, Services & Innovation	11/04/2019	10/04/2019	Quarterly	1000	0	0	0
Major Easements	NSW Department of Finance, Services & Innovation	11/04/2019	11/04/2019	Quarterly	1000	0	0	1
State Forest	NSW Department of Finance, Services & Innovation	18/01/2018	18/01/2018	As required	1000	0	0	0
NSW National Parks and Wildlife Service Reserves	NSW Office of Environment & Heritage	16/01/2019	14/11/2018	Annually	1000	0	0	0
Hydrogeology Map of Australia	Commonwealth of Australia (Geoscience Australia)	08/10/2014	17/03/2000	As required	1000	1	1	1
Botany Groundwater Management Zones	NSW Department of Primary Industries	15/03/2018	01/10/2005	As required	1000	0	0	0
Groundwater Boreholes	NSW Dept. of Primary Industries - Water NSW; Commonwealth of Australia (Bureau of Meteorology)	24/07/2018	23/07/2018	Annually	2000	0	0	88
Geological Units 1:250,000	NSW Dept. of Industry, Resources & Energy	20/08/2014		None planned	1000	2	-	4
Geological Structures 1:250,000	NSW Dept. of Industry, Resources & Energy	20/08/2014		None planned	1000	0	-	0
Naturally Occurring Asbestos Potential	NSW Dept. of Industry, Resources & Energy	04/12/2015	24/09/2015	Unknown	1000	0	0	0
Soil Landscapes	NSW Office of Environment & Heritage	12/08/2014		None planned	1000	1	-	2
Atlas of Australian Soils	CSIRO	19/05/2017	17/02/2011	As required	1000	1	1	2
Environmental Planning Instrument Acid Sulfate Soils	NSW Department of Planning and Environment	22/07/2019	28/06/2019	Weekly	500	0	-	-
Atlas of Australian Acid Sulfate Soils	CSIRO	19/01/2017	21/02/2013	As required	1000	1	1	1
Dryland Salinity - National Assessment	National Land and Water Resources Audit	18/07/2014	12/05/2013	None planned	1000	1	1	2
Dryland Salinity Potential of Western Sydney	NSW Office of Environment & Heritage	12/05/2017	01/01/2002	None planned	1000	-	-	-
Mining Subsidence Districts	NSW Department of Finance, Services & Innovation	11/04/2019	11/04/2019	Quarterly	1000	0	0	0
Environmental Planning Instrument SEPP State Significant Precincts	NSW Department of Planning and Environment	22/07/2019	07/12/2018	Weekly	1000	0	0	0
Environmental Planning Instrument Land Zoning	NSW Department of Planning and Environment	22/07/2019	05/07/2019	Weekly	1000	1	8	17
Commonwealth Heritage List	Australian Government Department of the Environment and Energy - Heritage Branch	16/01/2019	31/07/2018	Unknown	1000	0	0	0
National Heritage List	Australian Government Department of the Environment and Energy - Heritage Branch	16/01/2019	28/09/2018	Unknown	1000	0	0	0
State Heritage Register - Curtilages	NSW Office of Environment & Heritage	15/07/2019	09/11/2018	Quarterly	1000	0	0	0
Environmental Planning Instrument Heritage	NSW Department of Planning and Environment	22/07/2019	28/06/2019	Weekly	1000	0	0	1
Bush Fire Prone Land	NSW Rural Fire Service	28/05/2019	05/04/2019	Quarterly	1000	0	0	0
Central Tablelands Vegetation	NSW Office of Environment & Heritage	21/11/2015	31/10/2010	Unknown	1000	0	0	0
Ramsar Wetlands of Australia	Commonwealth of Australia Department of the Environment	08/10/2014	24/06/2011	As required	1000	0	0	0
Groundwater Dependent Ecosystems	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000	2	2	3
Inflow Dependent Ecosystems Likelihood	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000	2	2	11
NSW BioNet Species Sightings	NSW Office of Environment & Heritage	22/07/2019	22/07/2019	Weekly	10000	-	-	-

Aerial Imagery 2018

132-134 Lions Drive, Mudgee, NSW 2850

Scale:
0 25 50 100
Meters

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

Coordinate System:
GDA 1994 MGA Zone 56

Date: 19 July, 2019

Contaminated Land & Waste Management Facilities

132-134 Lions Drive, Mudgee, NSW 2850

List of NSW contaminated sites notified to EPA

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

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

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

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

NSW EPA Contaminated Land List Data Source: Environment Protection Authority

© State of New South Wales through the Environment Protection Authority

Contaminated Land & Waste Management Facilities

132-134 Lions Drive, Mudgee, NSW 2850

Contaminated Land: Records of Notice

Record of Notices within the dataset buffer:

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

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

Former Gasworks

Former Gasworks within the dataset buffer:

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

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

National Waste Management Site Database

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

Site Id	Owner	Name	Address	Suburb	Class	Landfill	Reprocess	Transfer	Comments	Loc Conf	Dist (m)	Direction
N/A	No records in buffer											

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

PFAS Investigation Sites

132-134 Lions Drive, Mudgee, NSW 2850

EPA PFAS Investigation Program

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

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

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

Defence PFAS Investigation & Management Program

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

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

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

Airservices Australia National PFAS Management Program

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

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

Airservices Australia National PFAS Management Program Data Custodian: Airservices Australia

Defence Sites

132-134 Lions Drive, Mudgee, NSW 2850

Defence 3 Year Regional Contamination Investigation Program

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

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

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

EPA Other Sites with Contamination Issues

132-134 Lions Drive, Mudgee, NSW 2850

EPA Other Sites with Contamination Issues

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

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

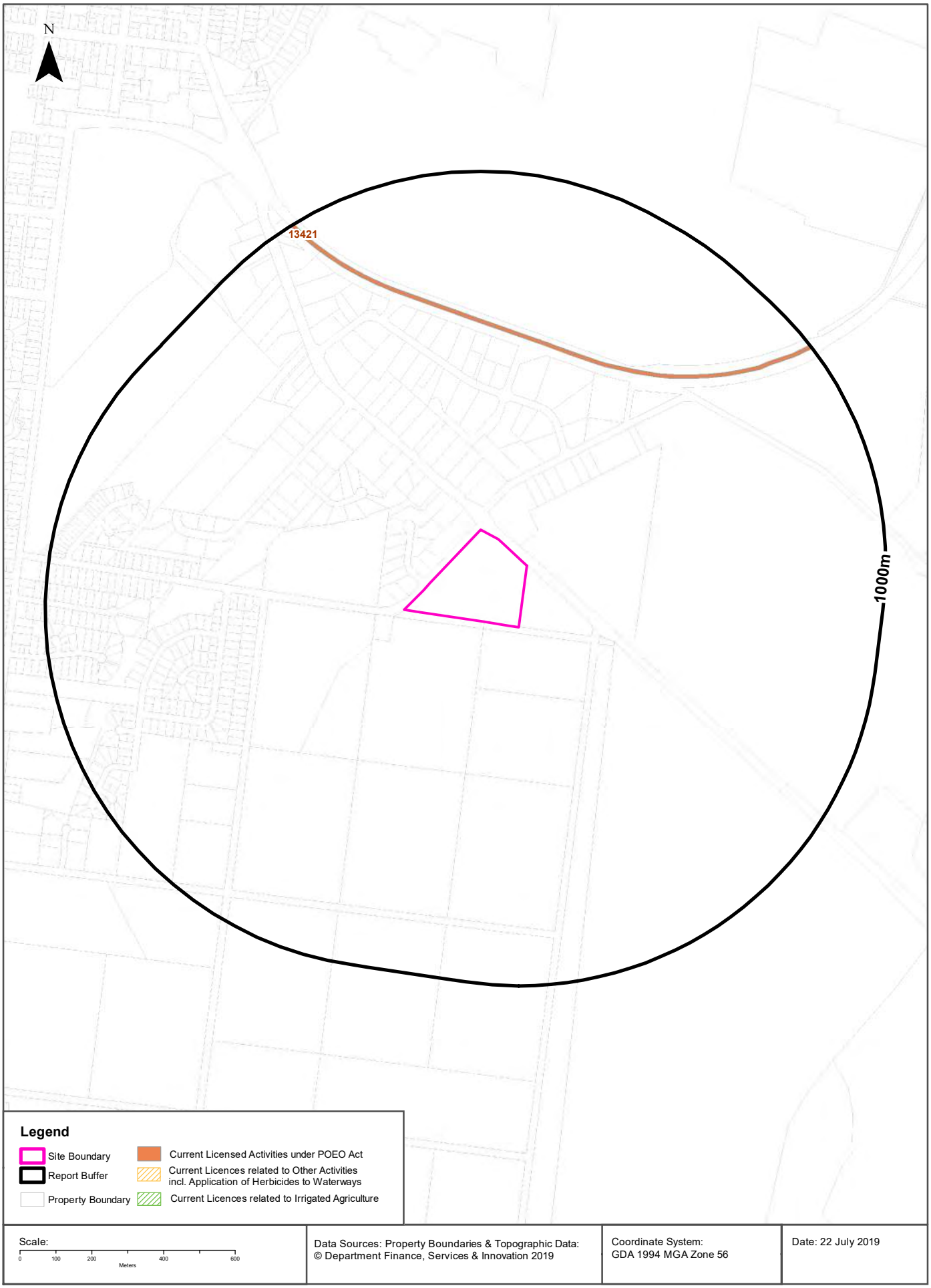
Sites within the dataset buffer:

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

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

Current EPA Licensed Activities

132-134 Lions Drive, Mudgee, NSW 2850



EPA Activities

132-134 Lions Drive, Mudgee, NSW 2850

Licensed Activities under the POEO Act 1997

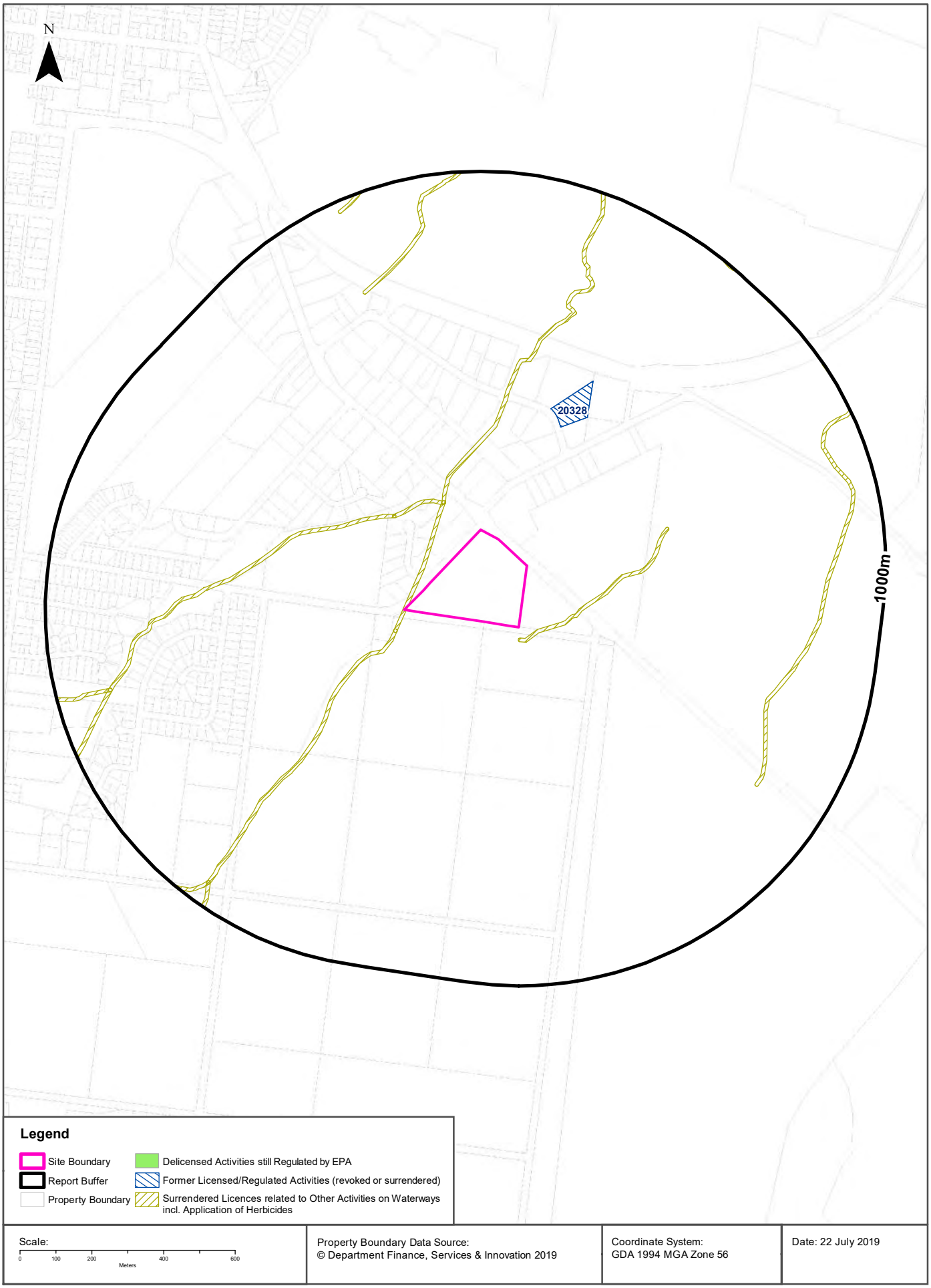
Licensed activities under the Protection of the Environment Operations Act 1997, within the dataset buffer:

EPL	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
13421	JOHN HOLLAND RAIL PTY LTD		PO Box 215 , PARRAMATTA, NSW 2124		Railway systems activities	Network of Features	544m	North

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

Delicensed & Former Licensed EPA Activities

132-134 Lions Drive, Mudgee, NSW 2850



EPA Activities

132-134 Lions Drive, Mudgee, NSW 2850

Delicensed Activities still regulated by the EPA

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

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

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

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

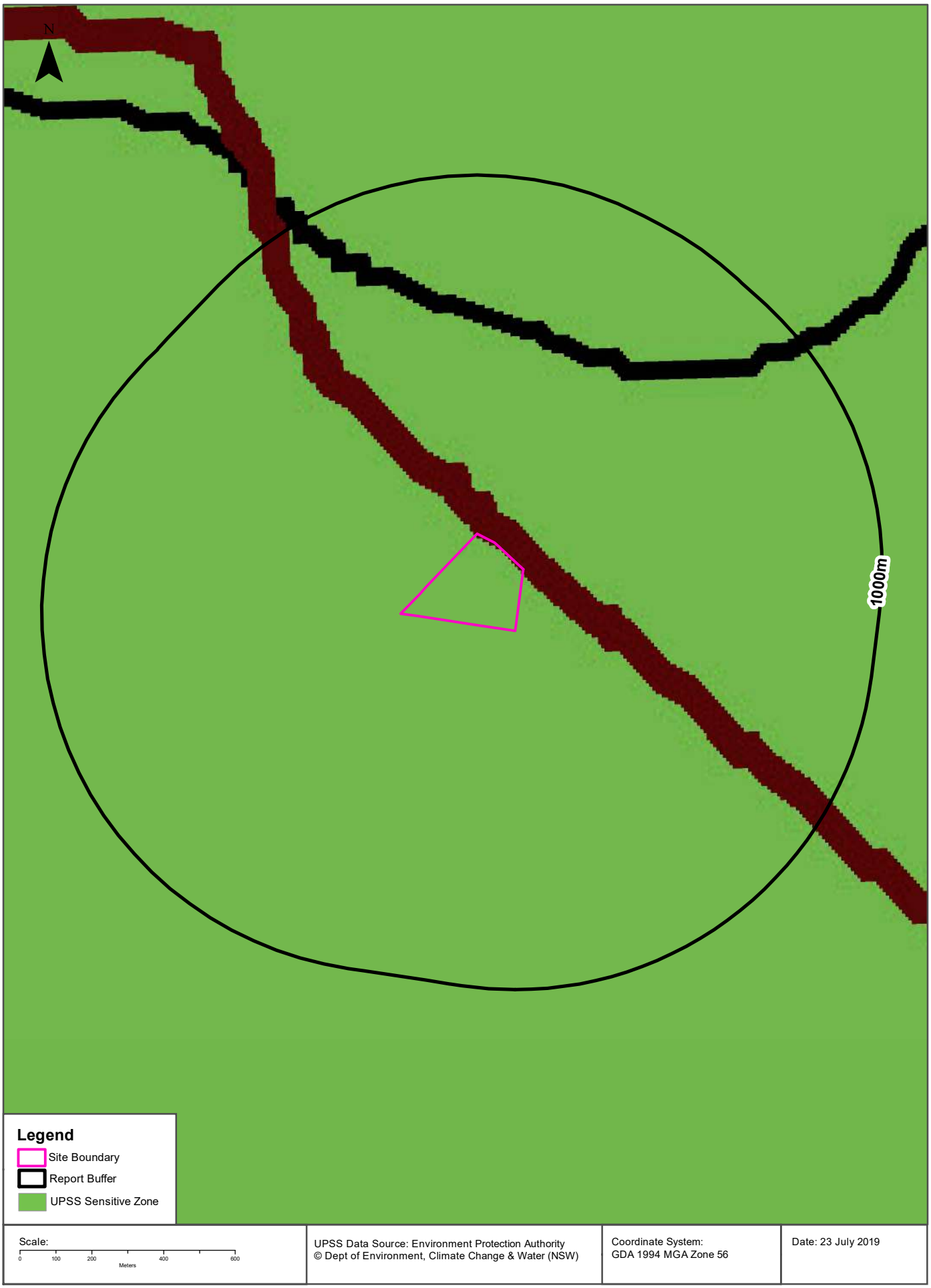
Former Licensed activities under the Protection of the Environment Operations Act 1997, now revoked or surrendered, within the dataset buffer:

Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
4653	LUHRMANN ENVIRONMENT MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW	Surrendered		Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	0m	Onsite
4838	Robert Orchard	Various Waterways throughout New South Wales - SYDNEY NSW 2000	Surrendered		Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	0m	Onsite
6630	SYDNEY WEED & PEST MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW - PROSPECT, NSW, 2148	Surrendered		Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	0m	Onsite
20328	COUNTRY SCRAP & STEEL PTY LIMITED	Country Scrap & Steel, 30 Industrial Avenue, MUDGEE	Surrendered	11/09/2013	Non-thermal treatment of general waste	Premise Match	357m	North East
20328	COUNTRY SCRAP & STEEL PTY LIMITED	Country Scrap & Steel, 30 Industrial Avenue, MUDGEE	Surrendered	11/09/2013	Waste storage - other types of waste	Premise Match	357m	North East

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

UPSS Sensitive Zones

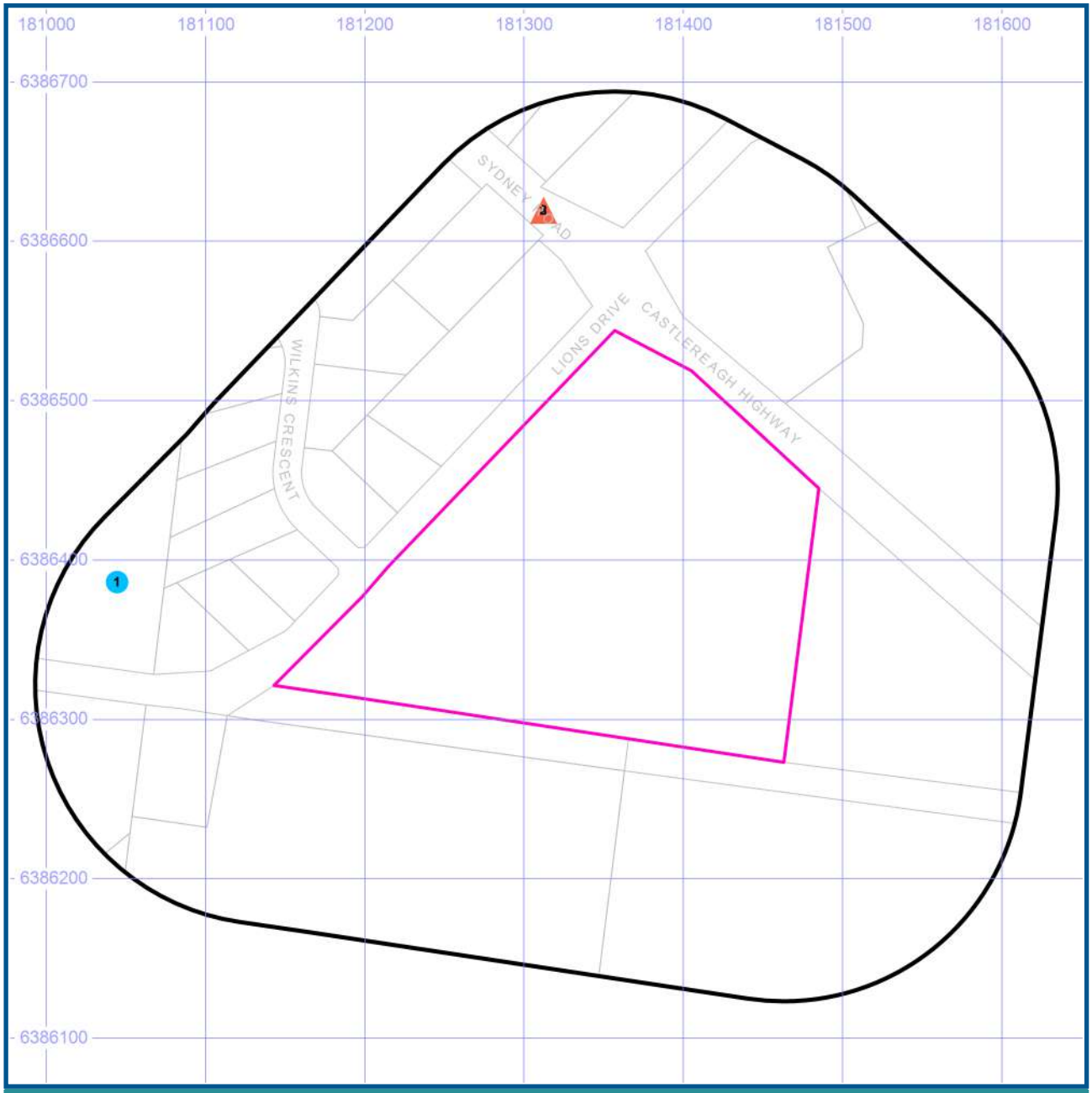
132-134 Lions Drive, Mudgee, NSW 2850



Historical Business Directories

132-134 Lions Drive, Mudgee, NSW 2850

1991 Business to Business Directory Records



Site Boundary

Buffer 150m

Property Boundaries

Business directory records mapped to a specific premise

Business directory records mapped to a road intersection

Business directory records mapped to a road corridor

Business directory records mapped to a general area

N

Projected Coordinate System:
GDA94 MGA Zone 56

Data Sources: Universal Business Directories (UBD), derived data, licensed from Hardie Grant.
Property Boundaries © NSW Department Finance, Services & Innovation 2019

Historical Business Directories

132-134 Lions Drive, Mudgee, NSW 2850

1991 Business to Business Directory Records Premise or Road Intersection Matches

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

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
1	CARAVAN SALES, SERVICE &/OR HIRERS	Mudgee Caravan Centre., 64 Sydney Rd	121586	Premise Match	76m	West

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

1991 Business to Business Directory Records Road or Area Matches

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

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
2	AUTO ELECTRICIANS	Bartolo Auto-Electrical Repairs., 33 Sydney Rd	121513	Road Match	21m
3	BUILDERS &/OR BUILDING CONTRACTORS	Bennett K. W, Sydney Rd	121541	Road Match	21m
	RESTAURANTS	Henry Lawson Restaurant., The Sydney Rd	128569	Road Match	21m
	CARRIERS &/OR CARTAGE CONTRACTORS	Jonas R. & Co. Transport., Sydney Rd	121593	Road Match	21m
	BRICK MFRS. &/OR DISTS	Jones R. & Co. Transport., Sydney Rd	121535	Road Match	21m
	WEIGHBRIDGES	Jones R. & Co. Transport., Sydney Rd	128668	Road Match	21m
	ROAD TRANSPORT SERVICES - INTRASTATE	Jones. R. & Co. Transport., Sydney Rd	128575	Road Match	21m
	MOTOR CAR DEALERS-NEW &/OR USED	Langdon & Bartley., Sydney Rd	128445	Road Match	21m
	MOTOR ACCESSORIES-RETAIL	Lengdon & Bartley., Sydney Rd	128432	Road Match	21m
	LOCAL BODIES	Mudgee Branch Aid-Retarded Persons N S W., Sydney Rd	128394	Road Match	21m
	ASSOCIATIONS &/OR SOCIETIES	Mudgee Branch Aid-Retarded Persons N.S.W., Sydney Rd	121471	Road Match	21m
	BRICK MFRS. &/OR DISTS	Mudgee Brick & Tile Supplies., Sydney Rd	121536	Road Match	21m
	GRAVEL, SAND &/OR SOIL SUPPLIES	Mudgee Brick & Tile Supplies., Sydney Rd	128299	Road Match	21m
	TILE - FLOOR &/OR WALL - MFRS. &/OR IMPS. &/OR MERCHANTS	Mudgee Brick & Tile Supplies., Sydney Rd	128629	Road Match	21m
	MOTELS	New Mudgee Motel., Sydney Rd	128427	Road Match	21m
	MIXED BUSINESSES	Rynsco Pty Ltd. Service Station., Sydney Rd	128418	Road Match	21m

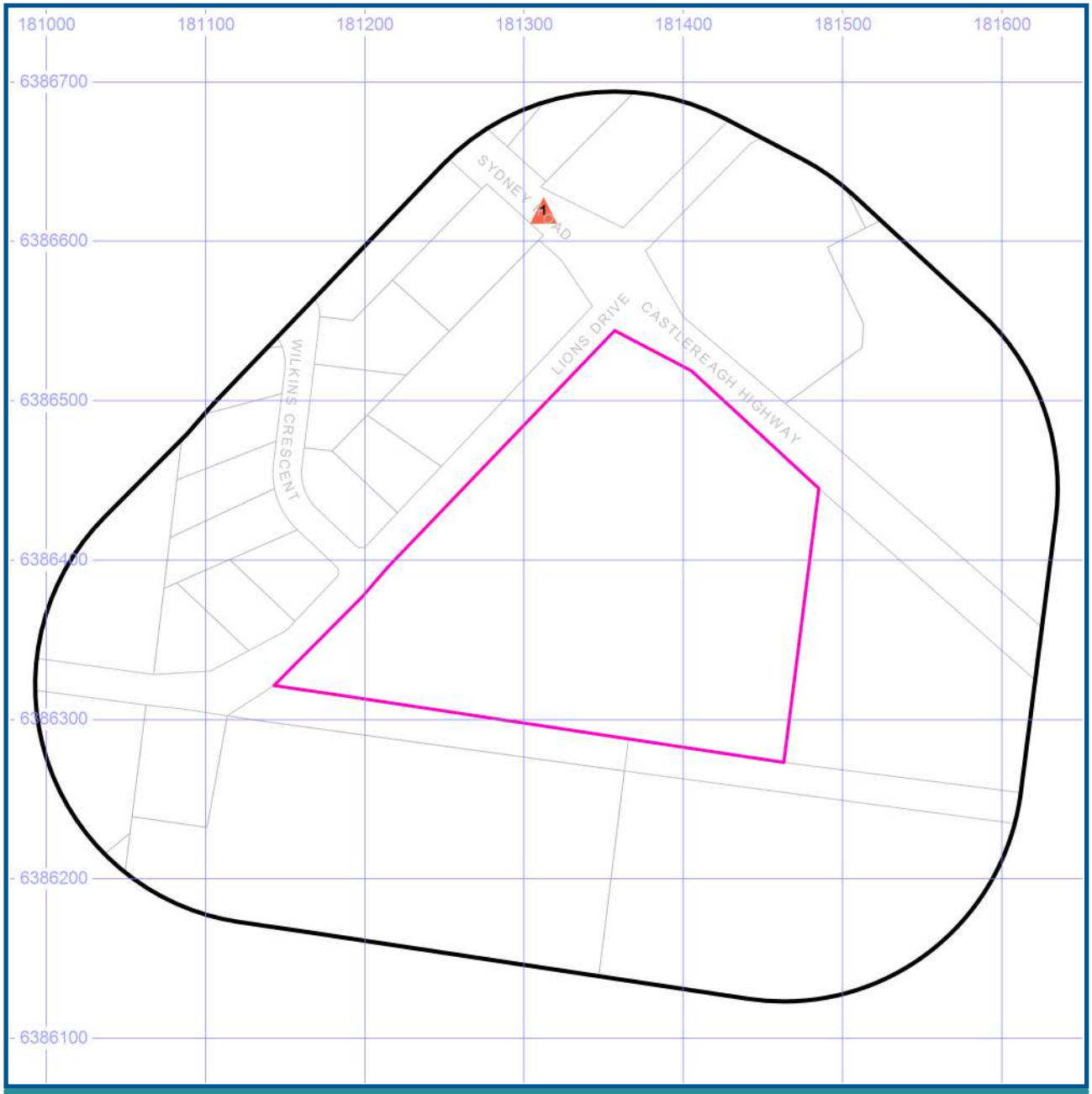
Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
3	MOTOR GARAGES & SERVICE STATIONS	Rynsco Pty. Ltd Service Station., Sydney Rd	128475	Road Match	21m
	HIRE SERVICES	Town & Country Seivice Station., Sydney Rd	128333	Road Match	21m
	MOTOR GARAGES & SERVICE STATIONS	Town & Country Service Station., Sydney Rd	128478	Road Match	21m

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

Historical Business Directories

132-134 Lions Drive, Mudgee, NSW 2850

1982 Business Directory Records



Site Boundary

Buffer 150m

Property Boundaries

Business directory records mapped to a specific premise

Business directory records mapped to a road intersection

Business directory records mapped to a road corridor

Business directory records mapped to a general area

N

Projected Coordinate System:
GDA94 MGA Zone 56

Data Sources: Universal Business Directories (UBD), derived data, licensed from Hardie Grant.
Property Boundaries © NSW Department Finance, Services & Innovation 2019

Historical Business Directories

132-134 Lions Drive, Mudgee, NSW 2850

1982 Business Directory Records
Premise or Road Intersection Matches

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

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

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

1982 Business Directory Records
Road or Area Matches

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

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
1	CARAVAN SALES, SERVICE &/OR FIRERS.	Bennetts Caravan Centre., Sydney Rd. Mudgee	185067	Road Match	21m
	FOODS FROZEN MFRS. &/OR DISTS.	Colless Frozen Foods., Sydney Rd. Mudgee	185123	Road Match	21m
	MOTELS.	Gate House Motel., The., Sydney Rd. Mudgee	185219	Road Match	21m
	HONEY MERCHANTS,	Glenrock Honey Co., Sydney Rd. Mudgee	185164	Road Match	21m
	CARRIERS &/OR CARTAGE CONTRACTORS.	Jones, R. & Co. Sydney Rd. Mudgee	185072	Road Match	21m
	ROAD TRANSPORT SERVICES - INTRASTATE.	Jones, R., & Co. Sydney Rd. Mudgee	185349	Road Match	21m
	REFRIGERATED TRANSPORT SERVICES.	K & B Refrigerated Transport, Sydney Rd. Mudgee	185345	Road Match	21m
	ENGINEERS - DIESEL.	Mudgee Diesel Service., Sydney Rd. Mudgee	185110	Road Match	21m
	QUARRY PROPRIETORS.	Mudgee Stone Products, Sydney Rd. Mudgee	185330	Road Match	21m
	SHELTERED WORKSHOPS.	Orana Sheltered Workshop., Sydney Rd. Mudgee	185357	Road Match	21m
	MOTOR ENGINE RECONDITIONERS.	Stewart, B. A. Engineering Pty. Ltd. Sydney Rd. Mudgee	185257	Road Match	21m
	CAFES, TEA ROOMS &/OR COFFEE LOUNGES.	Town & Country Service Station., Sydney Rd. Mudgee	185063	Road Match	21m
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Town & Country Service Station., Sydney Rd. Mudgee	185277	Road Match	21m
	ENGINEERS - GENERAL &/OR MANUFACTURING &/OR MECHANICAL.	Wilkinson, K. E. & G. L, Sydney Rd. Mudgee	185113	Road Match	21m
	AGRICULTURAL MACHINERY REPAIRS.	Winknon, K. E. & G. L, Sydney Rd. Mudgee	184965	Road Match	21m

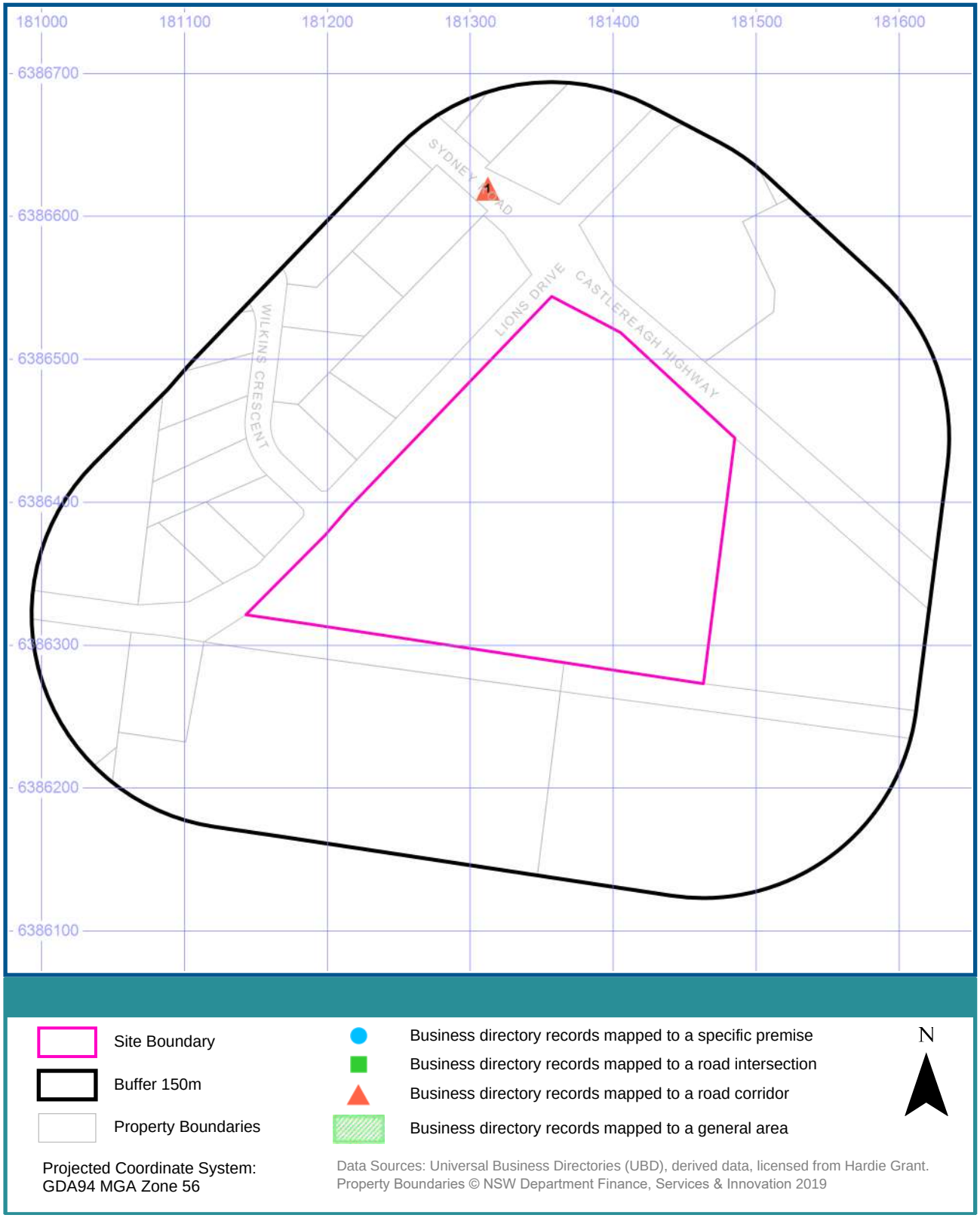
Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
1	MOTELS.	Zebra Mudgee Motel, Sydney Rd. Mudgee	185225	Road Match	21m

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

Historical Business Directories

132-134 Lions Drive, Mudgee, NSW 2850

1970 Business Directory Records



Historical Business Directories

132-134 Lions Drive, Mudgee, NSW 2850

1970 Business Directory Records
Premise or Road Intersection Matches

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

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

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

1970 Business Directory Records
Road or Area Matches

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

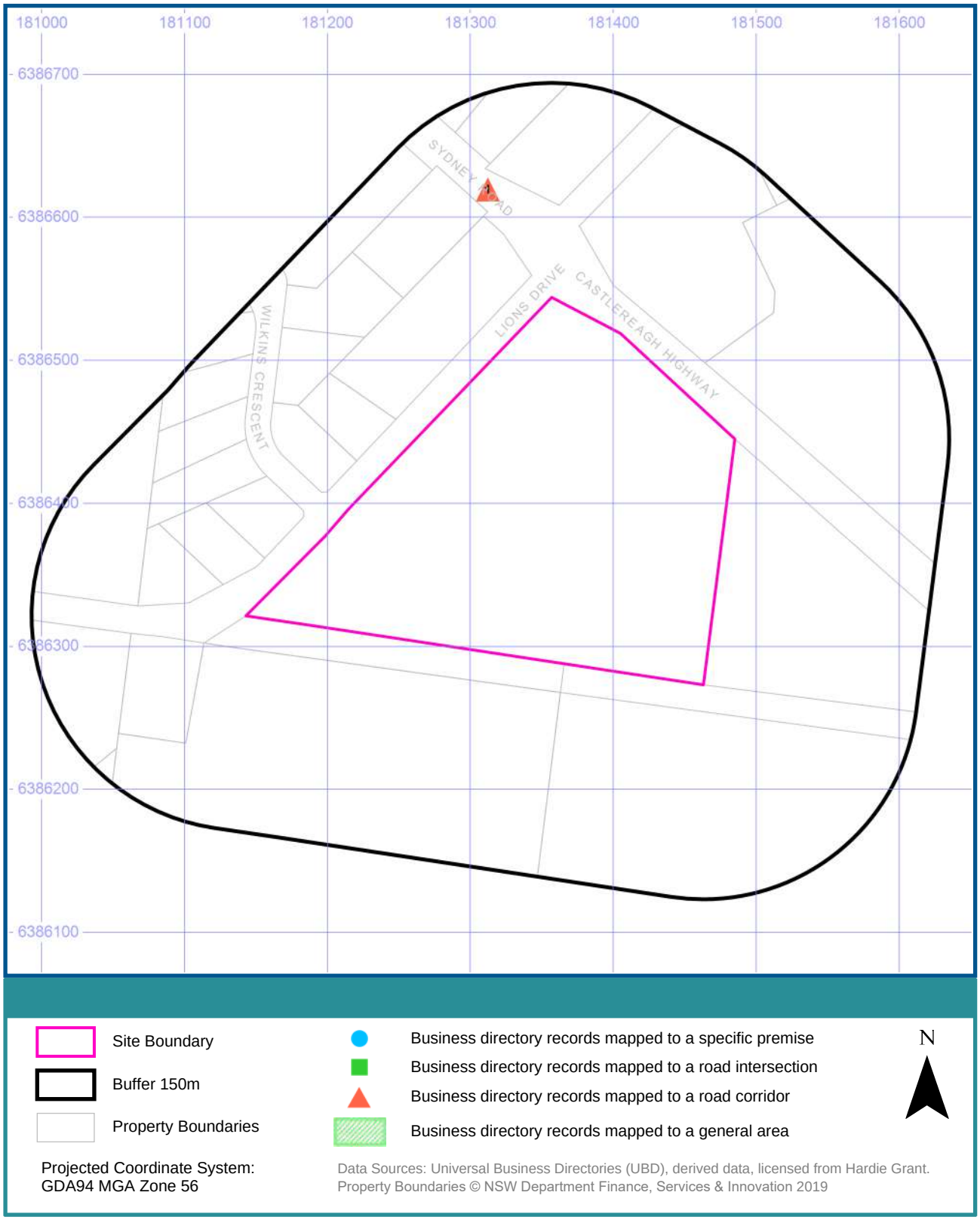
Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
1	APIARISTS	Bennett, S. R., Sydney Rd. Mudgee	543992	Road Match	21m
	HONEY MERCHANTS	Bennett, S. R., Sydney Rd. Mudgee	544227	Road Match	21m
	MOTELS	Gatehouse Motel (The), Sydney Rd. Mudgee	544341	Road Match	21m
	MOTELS	Mudgee Motel, Sydney Rd. Mudgee	544344	Road Match	21m
	QUARRY PROPRIETORS	Mudgee Stone Products, Sydney Rd. Mudgee	544452	Road Match	21m

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

Historical Business Directories

132-134 Lions Drive, Mudgee, NSW 2850

1961 Business Directory Records



Historical Business Directories

132-134 Lions Drive, Mudgee, NSW 2850

1961 Business Directory Records
Premise or Road Intersection Matches

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

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

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

1961 Business Directory Records
Road or Area Matches

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

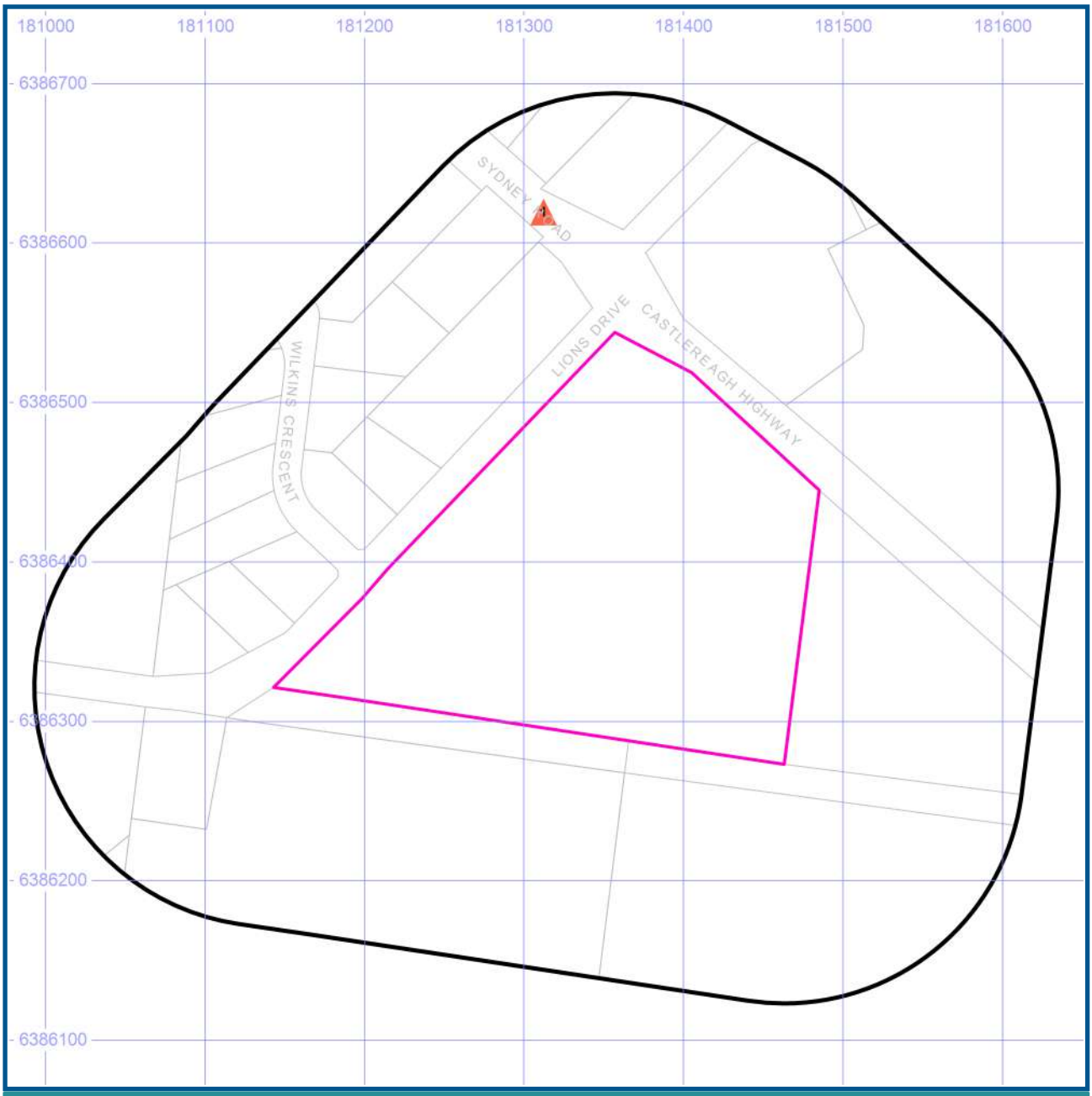
Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
1	APIARISTS	Bennett, S. R., Sydney Rd., Mudgee	215723	Road Match	21m
	SCHOOLS & COLLEGES-PRIVATE & PUBLIC	Mudgee Technical College, Short St., Phone 366, Mudgee	216094	Road Match	21m
	CARRIERS & CARTAGE CONTRACTORS	Murdock, W. J., Sydney Rd., Mudgee	215798	Road Match	21m
	QUARRY PROPRIETORS	Murdock, W. J., Sydney Rd., Mudgee	216076	Road Match	21m

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

Historical Business Directories

132-134 Lions Drive, Mudgee, NSW 2850

1950 Business Directory Records



Site Boundary

Buffer 150m

Property Boundaries

Business directory records mapped to a specific premise

Business directory records mapped to a road intersection

Business directory records mapped to a road corridor

Business directory records mapped to a general area

N

Projected Coordinate System:
GDA94 MGA Zone 56

Data Sources: Universal Business Directories (UBD), derived data, licensed from Hardie Grant.
Property Boundaries © NSW Department Finance, Services & Innovation 2019

Historical Business Directories

132-134 Lions Drive, Mudgee, NSW 2850

1950 Business Directory Records
Premise or Road Intersection Matches

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

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

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

1950 Business Directory Records
Road or Area Matches

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

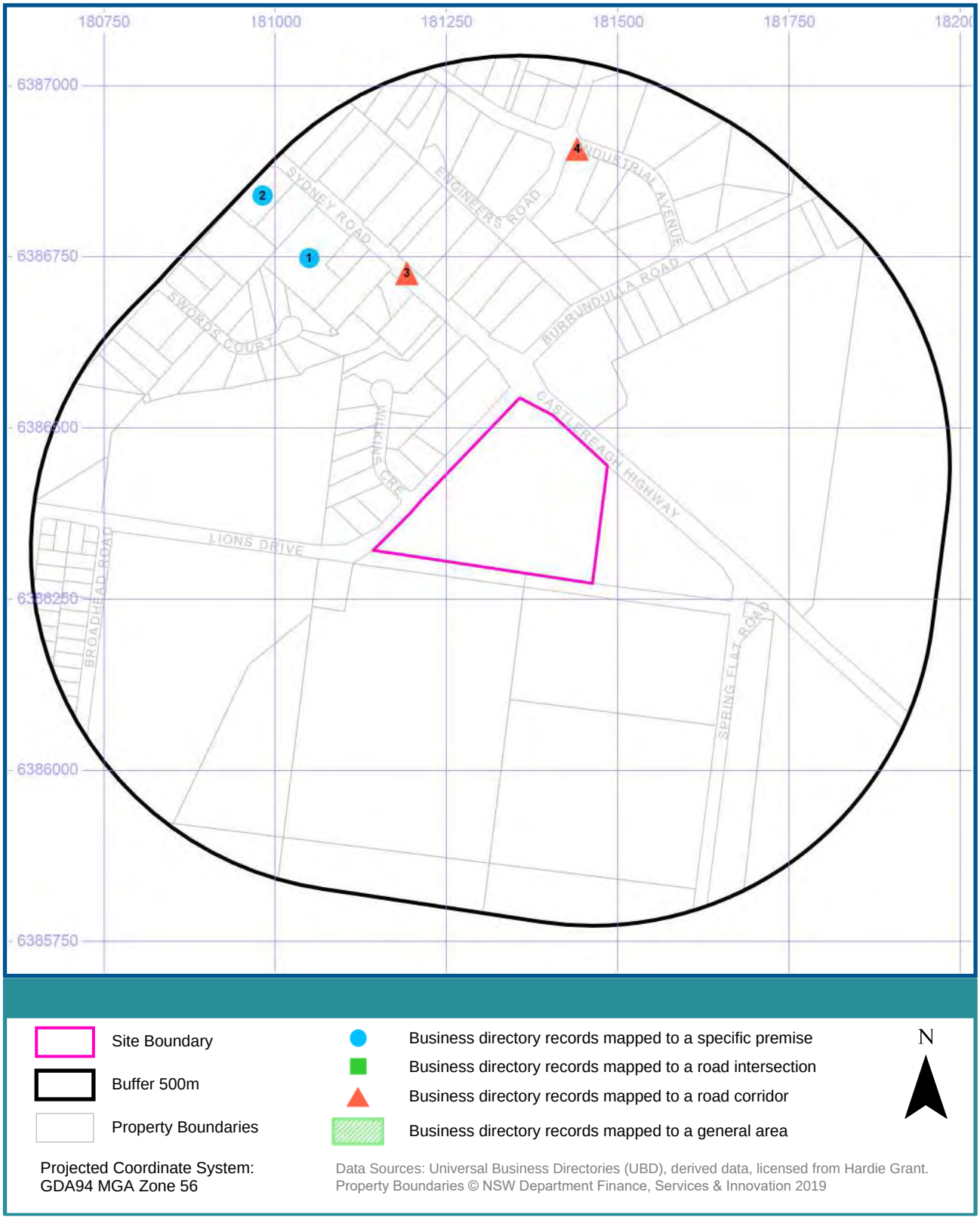
Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
1	APIARISTS	Bennett, S. R., Sydney Rd. Mudgee	133439	Road Match	21m

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

Historical Business Directories

132-134 Lions Drive, Mudgee, NSW 2850

Dry Cleaners, Motor Garages & Service Stations



Historical Business Directories

132-134 Lions Drive, Mudgee, NSW 2850

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

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

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
1	MOTOR GARAGES & SERVICE STATIONS	Busy Bee Gsrage., 50 Sydney Rd	128462	1991	Premise Match	305m	North West
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Busy Bee Service Station., Sydney Rd. Mudgee	185262	1982	Premise Match	305m	North West
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Busy Bee Service Station, Sydney Rd. Mudgee	544400	1970	Premise Match	305m	North West
2	MOTOR GARAGES & SERVICE STATIONS	Grag'T Tyre. & Mechanical Services., 46 Sydney Rd	128467	1991	Premise Match	452m	North West

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

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

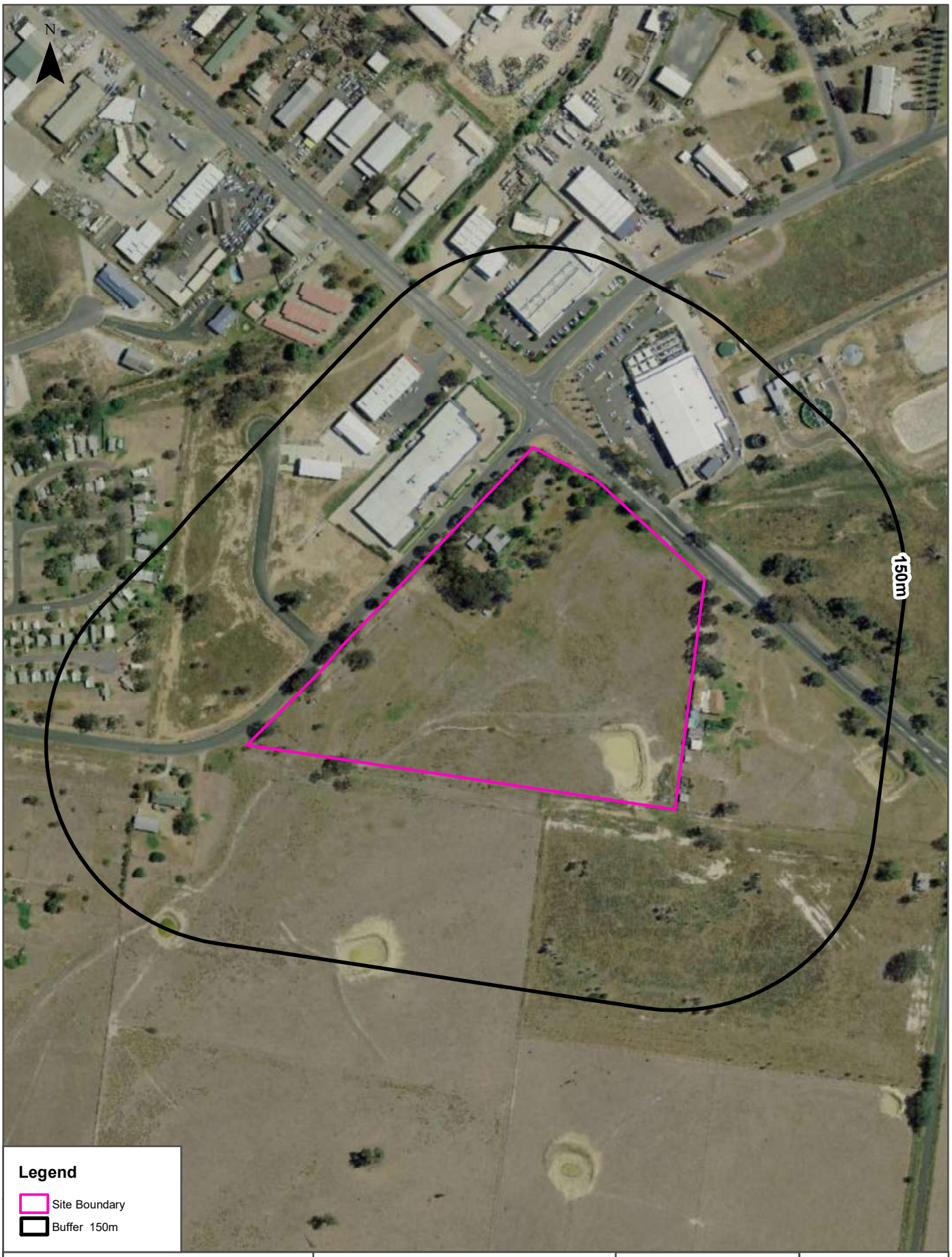
Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
3	MOTOR GARAGES & SERVICE STATIONS	Rynsco Pty. Ltd Service Station., Sydney Rd	128475	1991	Road Match	21m
	MOTOR GARAGES & SERVICE STATIONS	Town & Country Service Station., Sydney Rd	128478	1991	Road Match	21m
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Town & Country Service Station., Sydney Rd. Mudgee	185277	1982	Road Match	21m
4	MOTOR GARAGES & SERVICE STATIONS	Redpath Services., Industrial Av	128474	1991	Road Match	301m

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

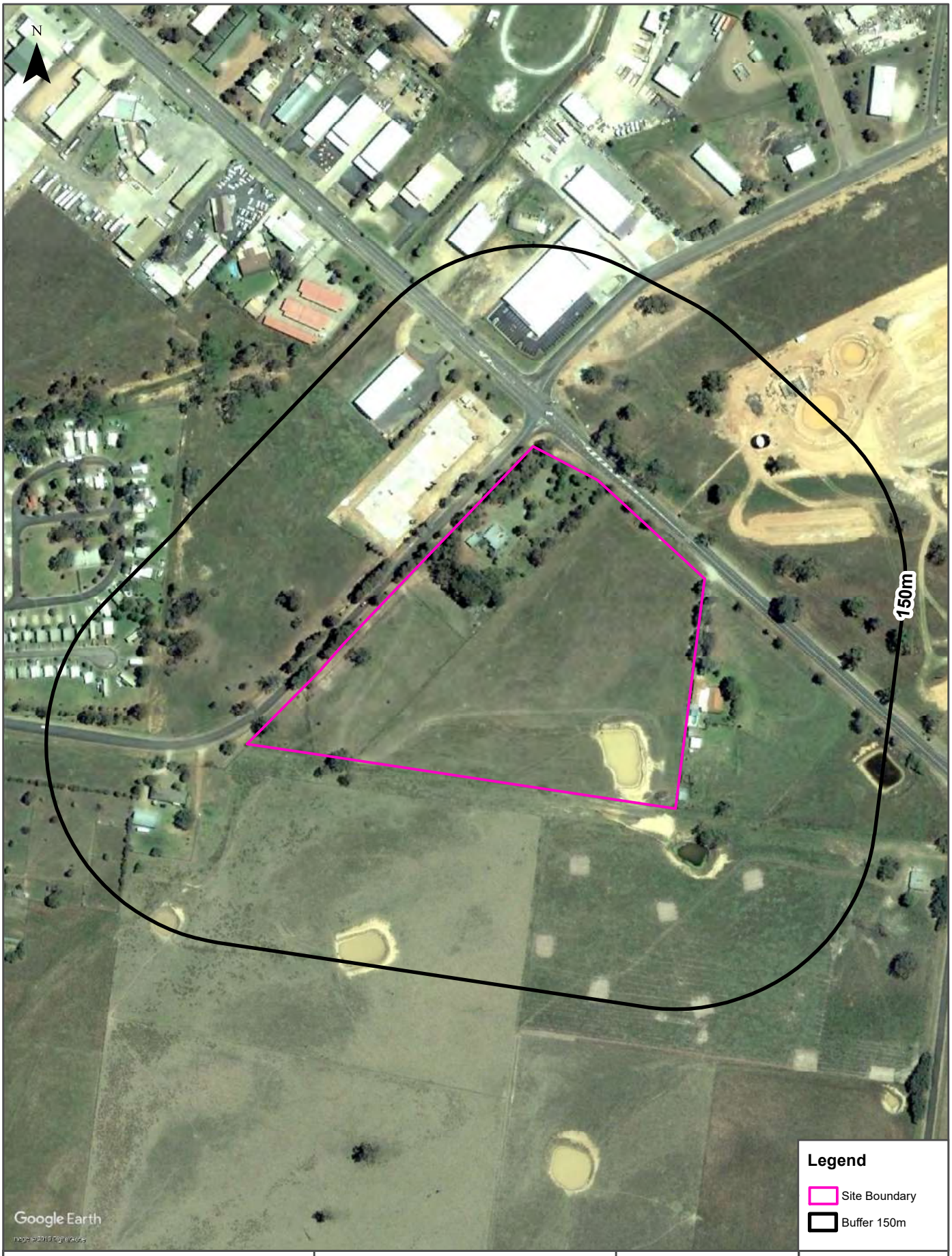
Aerial Imagery 2009

132-134 Lions Drive, Mudgee, NSW 2850



Aerial Imagery 2003

132-134 Lions Drive, Mudgee, NSW 2850



Scale:
0 25 50 100
Meters

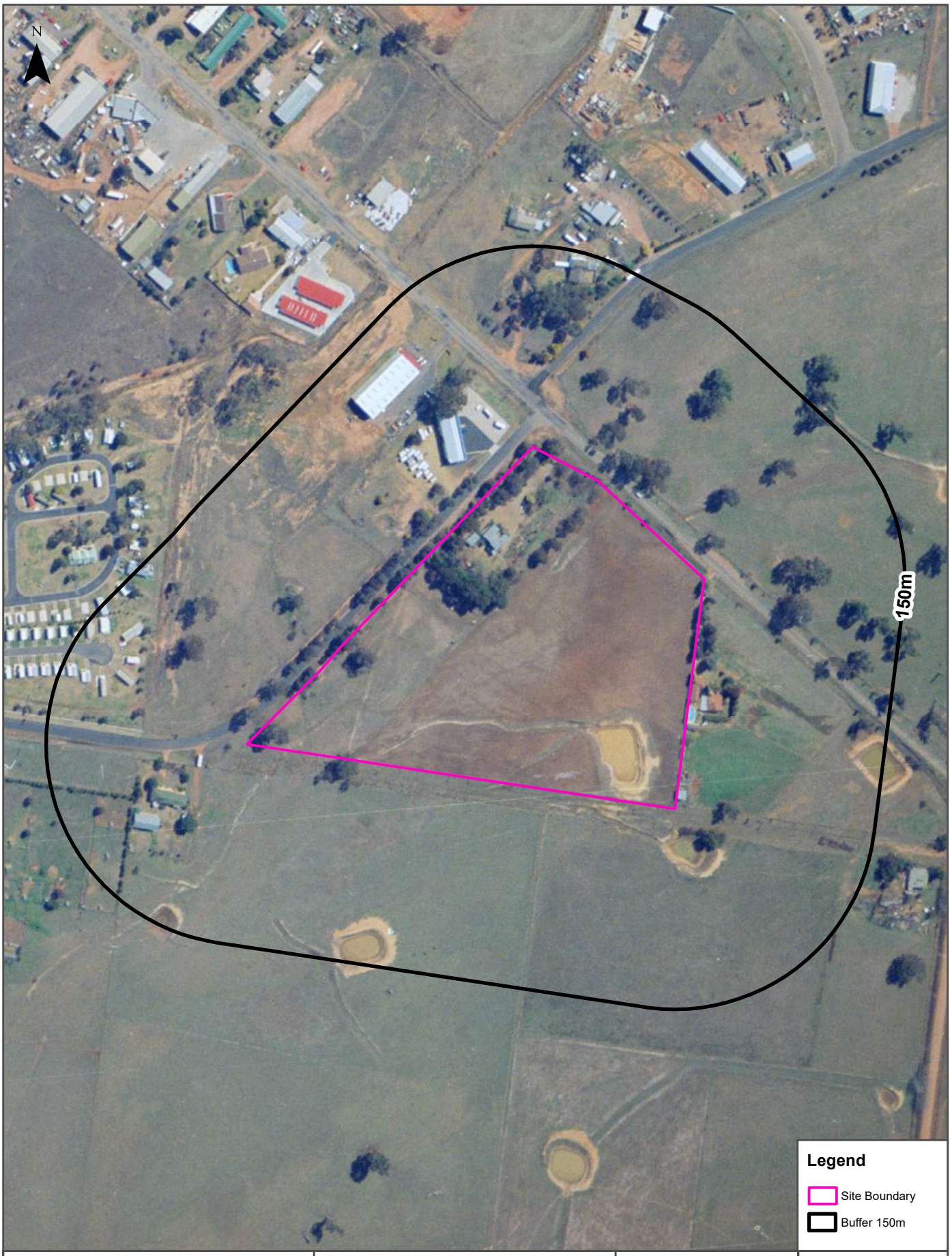
Data Source Aerial Imagery: © 2019 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.

Coordinate System:
GDA 1994 MGA Zone 56

Date: 19 July, 2019

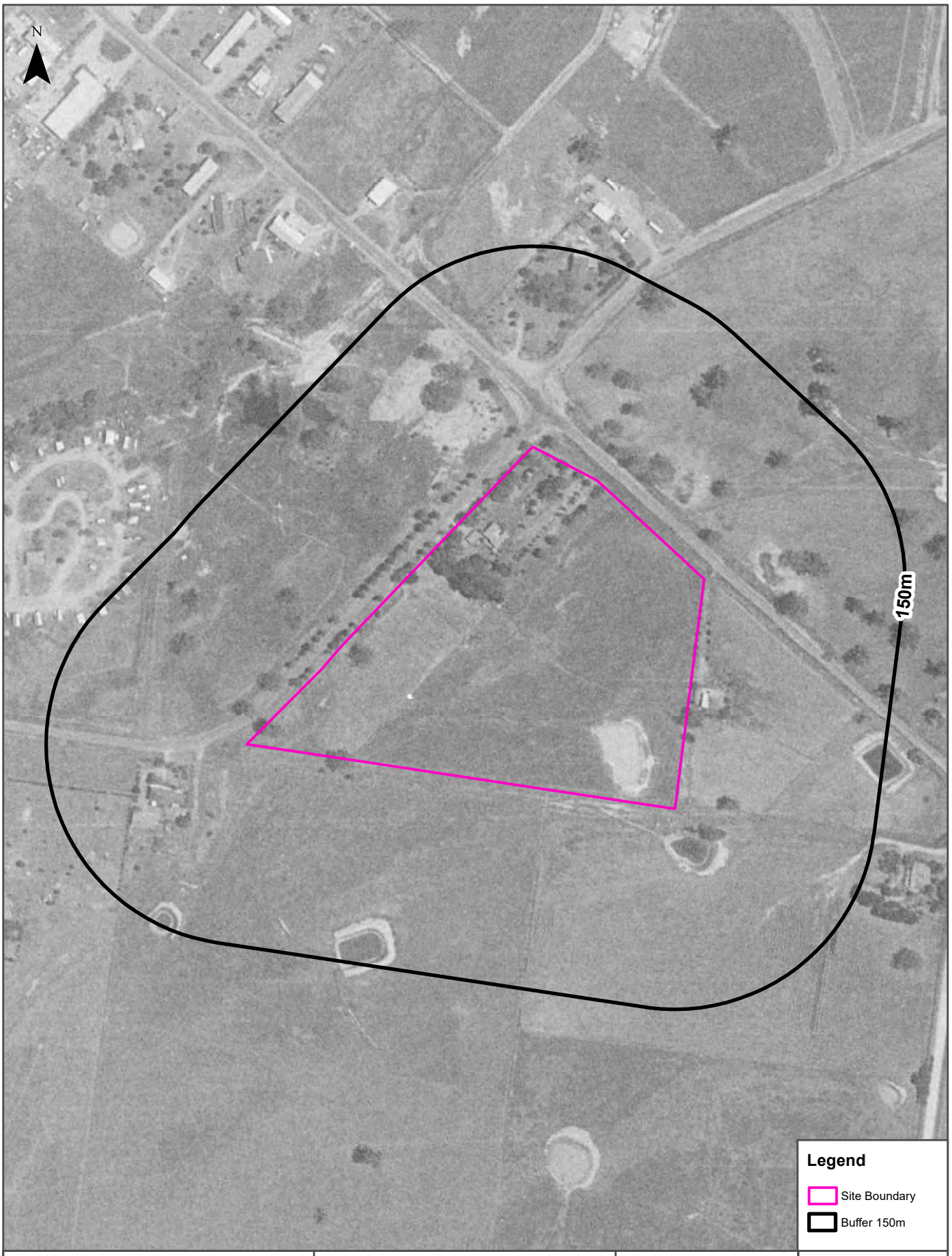
Aerial Imagery 1994

132-134 Lions Drive, Mudgee, NSW 2850



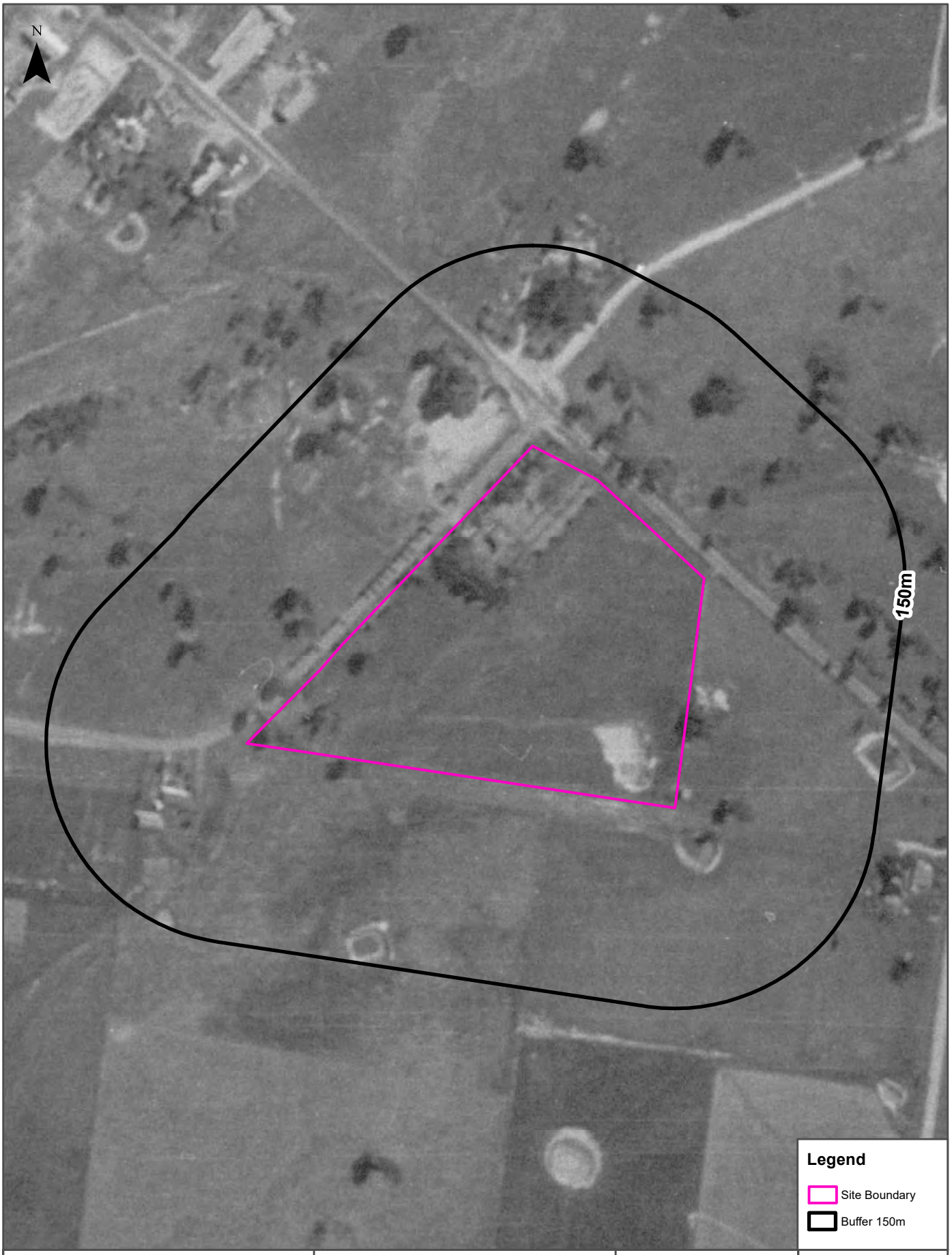
Aerial Imagery 1988

132-134 Lions Drive, Mudgee, NSW 2850



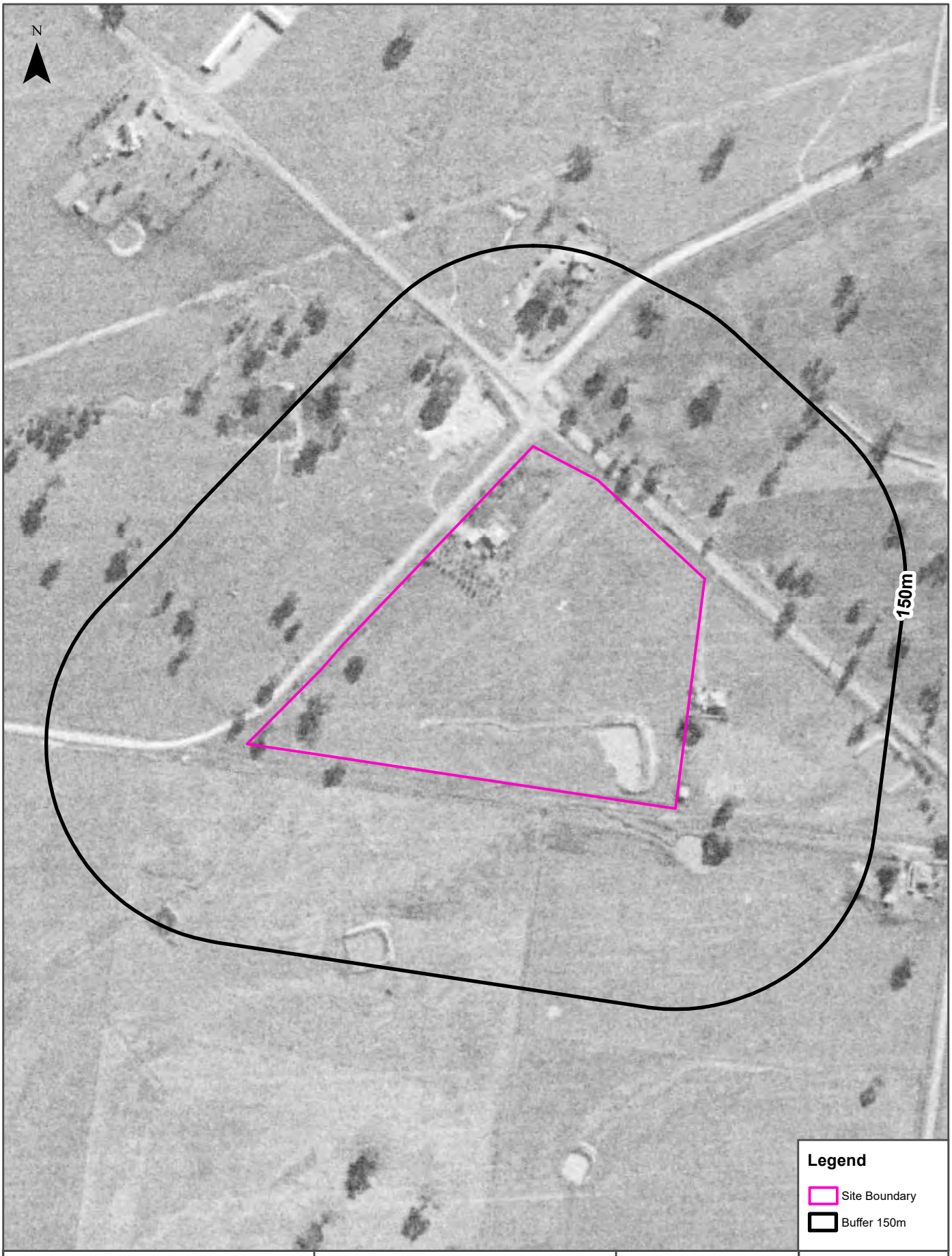
Aerial Imagery 1980

132-134 Lions Drive, Mudgee, NSW 2850



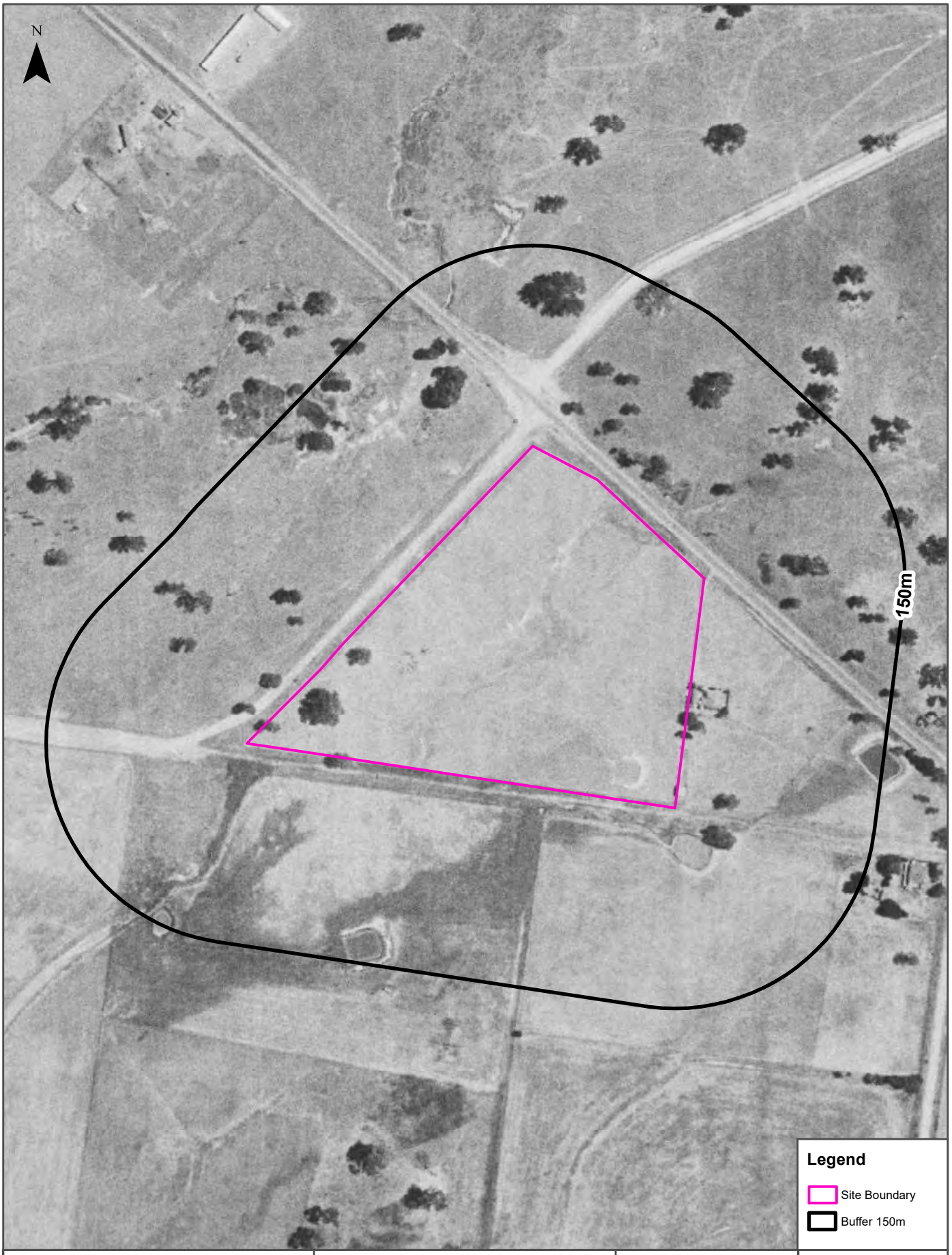
Aerial Imagery 1971

132-134 Lions Drive, Mudgee, NSW 2850



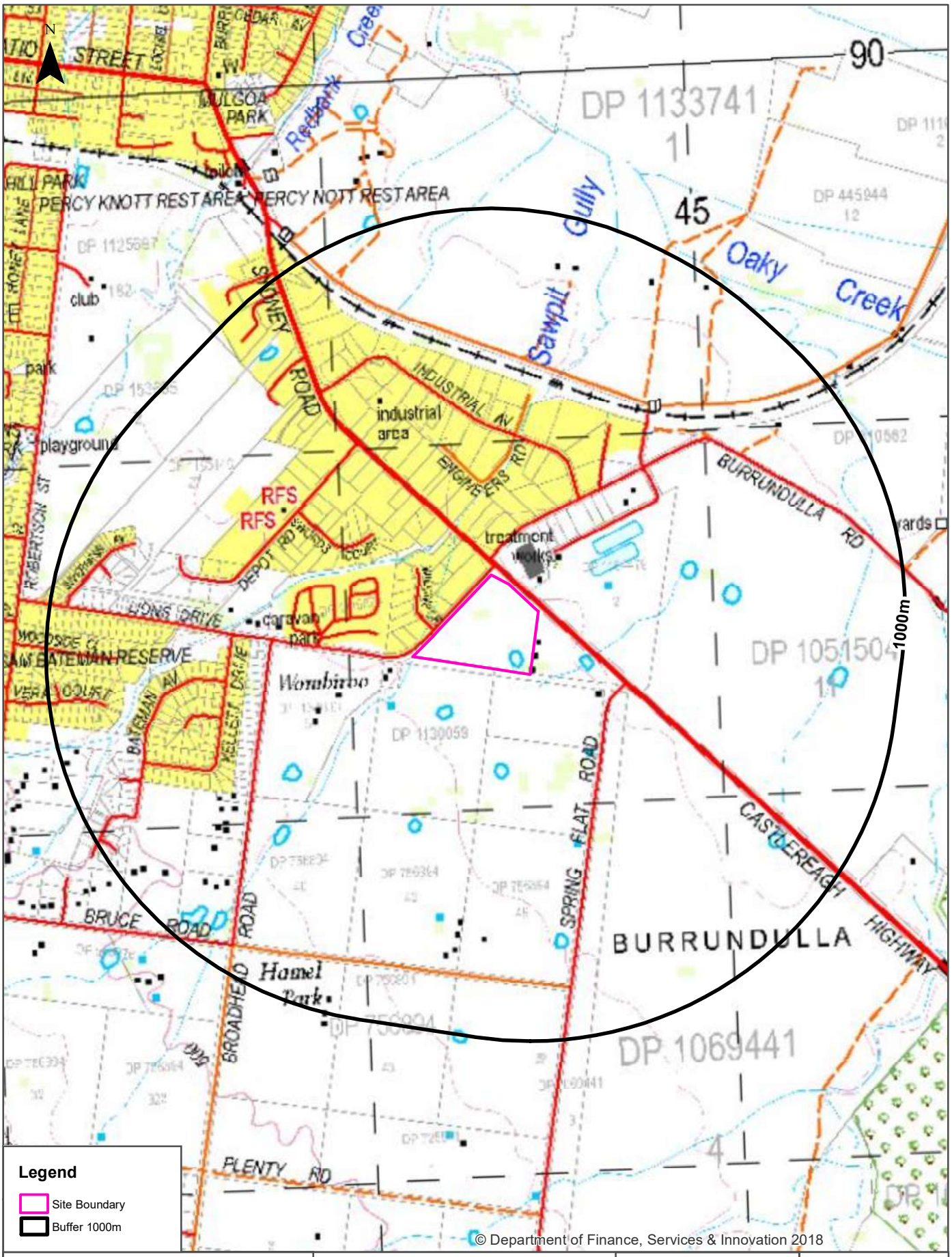
Aerial Imagery 1964

132-134 Lions Drive, Mudgee, NSW 2850



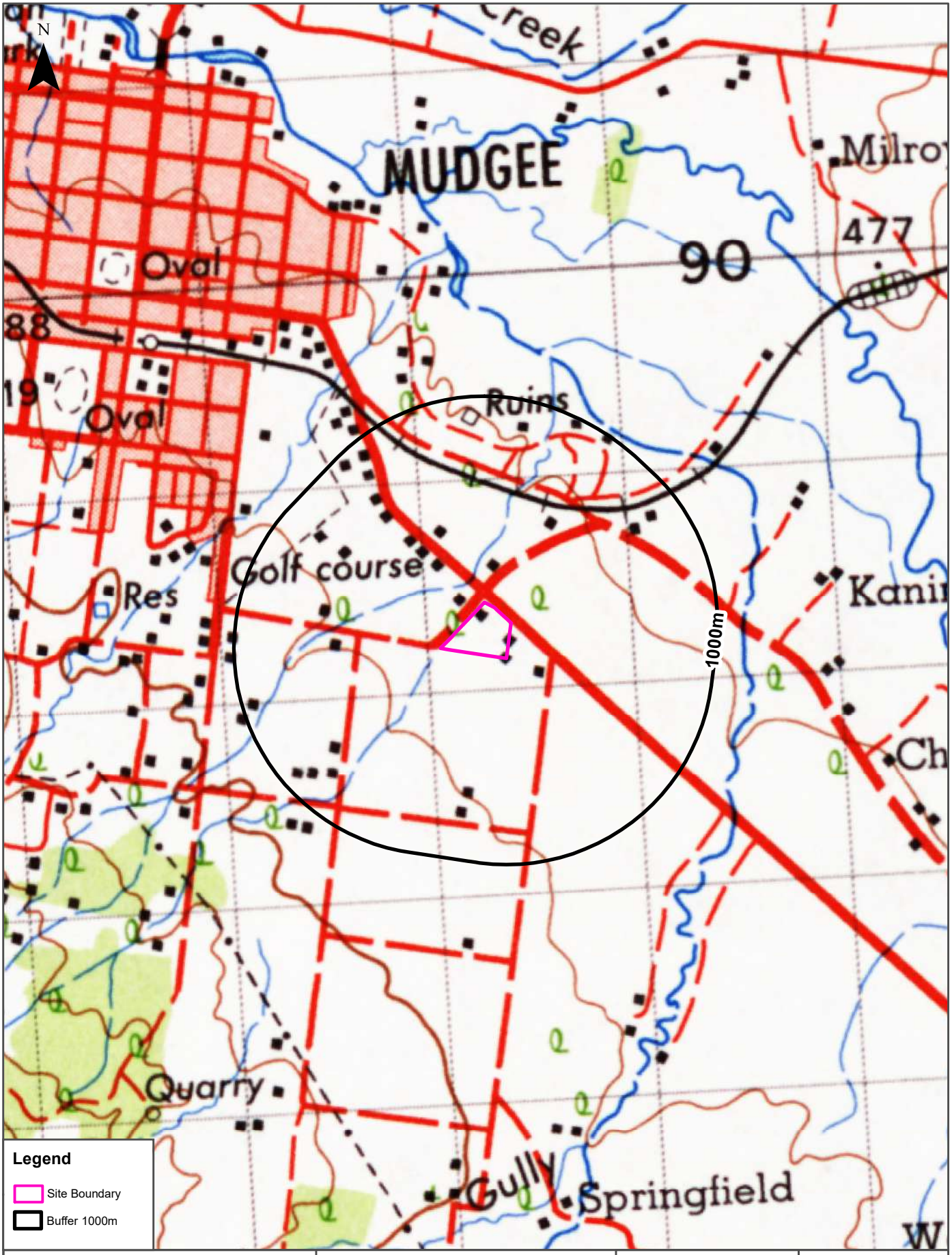
Topographic Map 2015

132-134 Lions Drive, Mudgee, NSW 2850



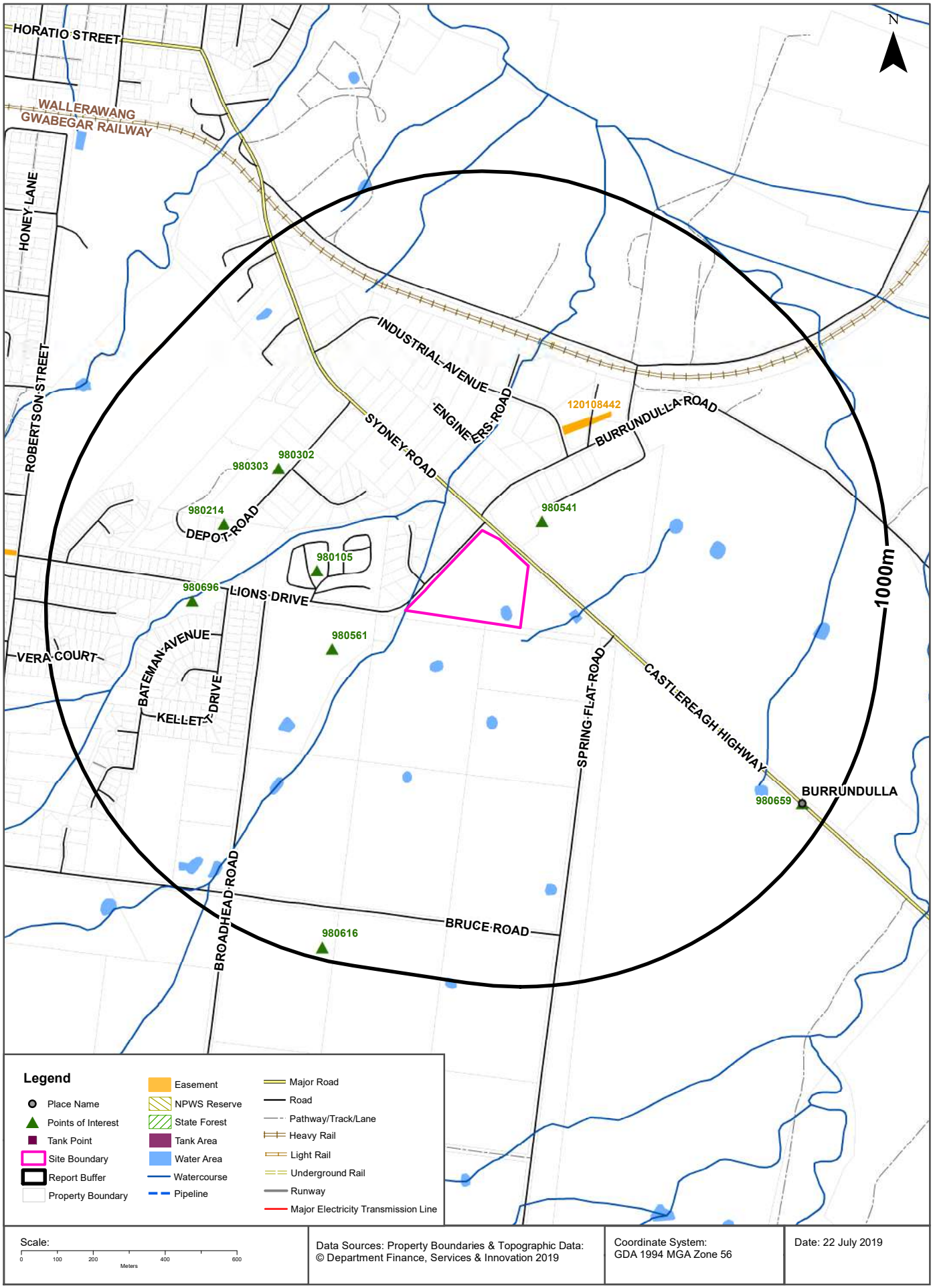
Historical Map 1975

132-134 Lions Drive, Mudgee, NSW 2850



Topographic Features

132-134 Lions Drive, Mudgee, NSW 2850



Topographic Features

132-134 Lions Drive, Mudgee, NSW 2850

Points of Interest

What Points of Interest exist within the dataset buffer?

Map Id	Feature Type	Label	Distance	Direction
980541	Filtration Plant	Filtration Plant	116m	North East
980561	Homestead	WOMBIROO	230m	South West
980105	Tourist Park / Home Village	MUDGEE TOURIST AND VAN RESORT	269m	West
980302	Firestation - Bush	CUDGEGONG FIRE CONTROL CENTRE	529m	North West
980303	Firestation - Bush	MUDGEE HEADQUARTERS RFB	529m	North West
980214	SES Facility	MUDGEE SES	558m	West
980696	Park	SAM BATEMAN RESERVE	593m	West
980659	Locality	BURRUNDULLA	923m	South East
980616	Homestead	HAMEL PARK	966m	South West

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

Topographic Features

132-134 Lions Drive, Mudgee, NSW 2850

Tanks (Areas)

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

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

Tanks (Points)

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

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

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

Major Easements

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

Map Id	Easement Class	Easement Type	Easement Width	Distance	Direction
120108442	Primary	Undefined		345m	North East

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

Topographic Features

132-134 Lions Drive, Mudgee, NSW 2850

State Forest

What State Forest exist within the dataset buffer?

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

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

National Parks and Wildlife Service Reserves

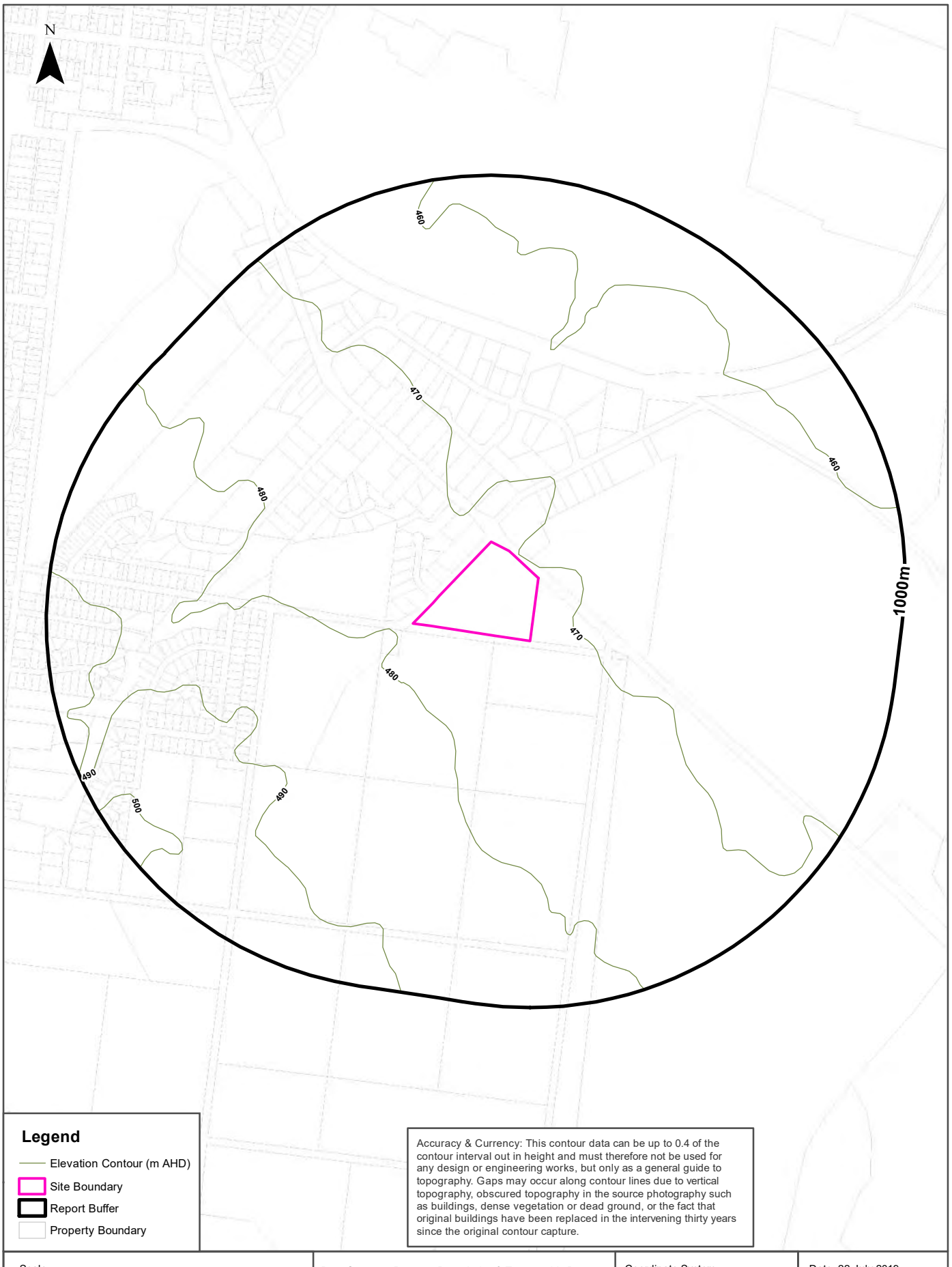
What NPWS Reserves exist within the dataset buffer?

Reserve Number	Reserve Type	Reserve Name	Gazetted Date	Distance	Direction
N/A	No records in buffer				

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

Elevation Contours (m AHD)

132-134 Lions Drive, Mudgee, NSW 2850



Hydrogeology & Groundwater

132-134 Lions Drive, Mudgee, NSW 2850

Hydrogeology

Description of aquifers on-site:

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

Description of aquifers within the dataset buffer:

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

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

Botany Groundwater Management Zones

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

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

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

Groundwater Boreholes

132-134 Lions Drive, Mudgee, NSW 2850

Hydrogeology & Groundwater

132-134 Lions Drive, Mudgee, NSW 2850

Groundwater Boreholes

Boreholes within the dataset buffer:

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW053136	80BL118267, 80BL134346, 80WA711496	Bore	Private	Domestic, Irrigation, Stock	Irrigation		01/12/1980	60.90	60.90	501-1000 ppm				241m	South West
GW048444	80BL105012, 80WA710202	Bore	Private	Domestic, Stock	Domestic, Stock			28.40	28.40					263m	South
GW048537	80BL108825, 80WA710419	Bore	Private	Stock	Not Known		01/05/1978	12.20	12.50	Good				413m	South
GW804348	80BL245990	Bore	Local Govt	Monitoring Bore	Monitoring Bore		21/07/2010	6.30	6.30					526m	North West
GW804349	80BL245990	Bore	Local Govt	Monitoring Bore	Monitoring Bore		21/07/2010	7.70	7.70					553m	North West
GW804350	80BL245990	Bore	Local Govt	Monitoring Bore	Monitoring Bore		21/07/2010	6.30	6.30					572m	North West
GW804113	80BL245445	Bore	Private	Domestic	Domestic		08/12/2009							602m	South West
GW800529	80BL238026, 80WA712471	Bore		Domestic, Stock	Domestic, Stock		18/03/1998	27.40	27.40					628m	North West
GW803725	80BL245090	Bore	Private	Monitoring Bore	Monitoring Bore		22/09/2008	7.50	7.50	972.8	4.74			687m	South West
GW800667	80BL238471, 80WA712585	Bore	Private	Domestic, Stock	Domestic, Stock		06/02/1999	53.00	53.00	Good	3.00	1.510		715m	West
GW031392	80BL023816, 80WA709780	Bore	Private	Stock	Stock		01/11/1968	28.90	29.00					864m	East
GW062235	80BL136012	Bore	Local Govt	Town Water Supply	Town Water Supply		01/01/1982	7.90						916m	North East
GW062236	80BL136013	Bore	Local Govt	Town Water Supply	Town Water Supply		01/01/1982	7.80						976m	North East
GW062237	80BL136014	Bore	Local Govt	Town Water Supply	Town Water Supply		01/01/1982	7.70						1040m	North East
GW055061	80BL119009, 80BL130968, 80WA715899	Bore	Private	Recreation (groundwater), Test Bore	Recreation (groundwater)		01/06/1981	43.00	43.00	0-500 ppm				1060m	West
GW803825	80BL236908	Bore	Private	Domestic, Stock	Domestic, Stock		28/01/1996	39.00	39.00	Good	11.00	3.000		1062m	North West
GW047519	80BL111677, 80CA715061	Bore	Private	Domestic, Irrigation, Stock	Irrigation		01/06/1980	31.00	31.00	Fresh				1070m	West
GW062238	80BL136015	Bore	Local Govt	Town Water Supply	Town Water Supply		01/01/1982	7.60						1089m	North East

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW055050	80BL118974, 80WA710968	Bore open thru rock	Private	Domestic, Stock	Domestic, Stock		01/02/1981	47.00	47.00	Fresh				1100m	North West
GW010400	80BL003042, 80WA708876	(Unknown)	Private	Recreation (groundwater)	Irrigation		01/01/1952	27.40		0-500 ppm				1107m	North West
GW062239	80BL136016	Bore	Local Govt	Town Water Supply	Town Water Supply		01/01/1982	7.60						1121m	North East
GW800662	80BL238096	Bore	Private	Domestic, Stock	Domestic, Stock		05/04/1998	60.90	60.90		10.90	2.520		1141m	North East
GW032068	80BL023774	Well	Local Govt	Town Water Supply	Town Water Supply			7.10						1153m	North East
GW016394	80BL007412, 80WA709046	Bore	Private	Domestic	Irrigation		01/10/1957	43.80	43.90	1001-3000 ppm				1182m	West
GW055555	80BL116250, 80WA710841	Bore	Private	Domestic	General Use		01/09/1980	53.80	53.80					1207m	West
GW032067	80BL023773	Well	Local Govt	Town Water Supply	Town Water Supply			6.60						1217m	North East
GW800454	80BL133035	Well	Private	Irrigation	Irrigation		01/01/1956	7.90	7.90					1222m	North East
GW800480	80BL133044	Well	Private	Irrigation	Irrigation		01/01/1982	11.30	11.30		4.90			1222m	North East
GW052966	80BL109671, 80WA710458	Bore	Private	Domestic	Domestic		01/06/1980	21.30	21.40					1225m	South East
GW055554	80BL116244, 80WA710838	Bore	Private	Domestic	Domestic, Stock		01/01/1981	45.50	45.50	Fresh				1231m	West
GW030994		Bore	Local Govt		Public/municipl		01/02/1982	0.00	14.50					1267m	East
GW059089	80BL115166, 80BL133773, 80WA711464	Well	Private	Domestic, Irrigation, Stock	Irrigation		01/01/1980	13.70						1272m	South East
GW052035	80BL116291, 80WA710854	Bore open thru rock	Private	Domestic	General Use		01/02/1981	21.00	21.00					1288m	North
GW016390	80BL007002	Bore	Private	Irrigation	Irrigation			41.10		0-500 ppm				1302m	West
GW032066	80BL022985	Well	Local Govt	Town Water Supply	Town Water Supply		01/11/1968	7.40	7.50					1305m	North East
GW051722	80BL113168, 80WA710697	Bore	Private	Domestic	General Use		01/08/1980	36.90	36.90	Fresh				1333m	West
GW060384	80BL134795	Bore	Local Govt	Town Water Supply				60.96	60.96		14.80	8.841		1352m	West
GW032065	80BL023772	Well	Local Govt	Town Water Supply	Town Water Supply		01/11/1968	7.50	7.50					1363m	North East
GW054479	80BL116212, 80WA710825	Bore	Private	Domestic, Stock	Domestic, Stock		01/02/1981	47.00	47.00	Fresh				1365m	West
GW032064	80BL022983	Well	Local Govt	Town Water Supply	Town Water Supply		01/11/1968	7.90	8.00					1409m	North East
GW019988	80BL012543, 80WA709251	Bore	Private	Recreation (groundwater)	Recreation (groundwater)		01/09/1962	38.10	38.10					1420m	North West
GW030985		Bore	Local Govt		Public/municipl		01/02/1982	16.30	20.00	0-500 ppm				1423m	East

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW054102	80BL113135, 80WA710689	Bore	Private	Domestic	Domestic		01/06/1981	31.40	31.40	Fresh				1424m	North West
GW052778	80BL115305, 80WA710785	Bore	Private	Domestic	Domestic		01/07/1980	31.60	31.60	Fresh				1446m	North West
GW060382	80BL134794	Bore	Local Govt	Town Water Supply				53.30	53.34		15.00			1454m	West
GW032063	80BL022984	Well	Local Govt	Town Water Supply	Town Water Supply		01/11/1968	8.20	8.20					1485m	North East
GW062240	80BL136018	Well	Local Govt	Town Water Supply	Town Water Supply		01/01/1982	7.50						1515m	North East
GW800270	80BL236717, 80WA712224	Bore	Private	Domestic, Stock	Domestic, Stock		09/10/1995	38.00	38.00	Good				1554m	South West
GW055556	80BL116325, 80WA710858	Bore	Private	Domestic	General Use		01/03/1981	17.70	17.70	0-500 ppm				1561m	North
GW032062	80BL022981	Well	Local Govt	Town Water Supply	Town Water Supply		01/10/1968	7.10	7.20					1578m	North East
GW052243	80BL116245, 80WA710839	Bore	Private	Domestic	General Use		01/08/1980	44.40	44.40	501-1000 ppm				1587m	West
GW039336		Bore	Local Govt		Public/municipl		01/02/1984	14.40	15.00					1597m	East
GW032070	80BL022987	Bore	Local Govt	Town Water Supply	Public/municipl		01/07/1968	9.10	9.20					1609m	North
GW800462	80BL133034	Well	Private	Irrigation	Irrigation		01/01/1954	7.90	7.90					1613m	North East
GW030982		Bore	Local Govt		Public/municipl		01/12/1981	14.50	15.00	0-500 ppm				1616m	East
GW062241	80BL136019	Well	Local Govt	Town Water Supply	Town Water Supply		01/01/1982	9.30						1619m	North East
GW039320	80BL128001	Bore	Local Govt	Town Water Supply	Town Water Supply		01/07/1983	14.00	14.00					1619m	East
GW032073	80BL022988	Bore	Local Govt	Town Water Supply	Public/municipl		01/07/1968	10.30	10.40					1635m	North
GW032071	80BL022986	Well	Local Govt	Town Water Supply	Public/municipl		01/08/1968	7.00	7.00					1635m	North
GW032072	80BL022980	Bore	Local Govt	Town Water Supply	G/water Xplore		01/07/1968	12.20	12.30					1645m	North
GW032061	80BL022982	Well	Local Govt	Town Water Supply	Town Water Supply		01/10/1968	7.80	7.90					1650m	North East
GW064841	80BL136605	Bore	Private	Farming, Stock	Farming, Stock		01/01/1989	22.80						1653m	South West
GW052829	80BL113097, 80BL135274	Well	Private	Domestic, Irrigation, Stock	Domestic, Stock		01/08/1980	11.60						1653m	East
GW804059	80BL242432	Bore	Private	Domestic, Stock	Domestic, Stock		01/04/2005	66.00	66.00		40.00	1.400		1691m	South
GW060169	80BL113153, 80BL131537	Well	Private	Domestic, Irrigation, Stock	Domestic, Stock		01/02/1983	10.00						1701m	East
GW051755	80BL113616, 80WA710720	Bore open thru rock	Private	Domestic	Not Known		01/09/1980	32.60	32.60	Fresh				1729m	North West
GW802744	80BL241958, 80WA713365	Bore	Private	Domestic, Stock	Domestic, Stock		27/01/2004	54.00	54.00		24.00	2.000		1748m	West
GW020315	80BL008177	Bore	Local Govt	Town Water Supply	Public/municipl		01/10/1948	9.10	9.10	Hard				1754m	North East

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW801479	80BL238674, 80WA712630	Bore	Private	Domestic, Stock	Domestic, Stock		08/07/1999	56.00	56.00			1.000		1756m	South
GW801561	80BL238664, 80WA712627	Bore	Private	Domestic, Stock	Domestic, Stock		29/06/1999	60.00	185.00			3.780		1758m	South
GW030974		Bore	Local Govt		Public/municipl		01/12/1981	0.00	19.50	501-1000 ppm				1774m	East
GW057117	80BL124722, 80WA711177	Bore	Private	Domestic	Domestic		01/03/1983	24.00	24.00	Fresh				1784m	North West
GW801121	80BL238924, 80WA712686	Bore	Private	Domestic, Stock	Domestic, Stock		30/08/1999	42.00	42.00		20.00	1.500		1788m	West
GW801217	80BL238659, 80BL239415, 80CA715490	Bore	Private	Domestic, Irrigation, Stock	Domestic, Irrigation, Stock		25/06/1999	56.00	56.00		20.00	4.000		1789m	South
GW020314	80BL008176	Bore	Local Govt	Town Water Supply	Public/municipl		01/01/1952	9.10	9.10	Hard				1834m	North East
GW020320	80BL012519	Well	Local Govt	Town Water Supply	Public/municipl		01/09/1960	9.70						1834m	North East
GW055401	80BL116457, 80WA710885	Bore	Private	Domestic	Domestic		01/09/1981	12.40	12.40					1848m	North
GW800663	80BL238472, 80WA712586	Bore	Private	Domestic, Stock	Domestic, Stock		06/02/1999	46.00	46.00	Good	6.00	0.631		1851m	West
GW024224	80BL017906, 80WA709512	Bore	Private	Recreation (groundwater)	Recreation (groundwater)		01/05/1966	30.40	30.50					1852m	North West
GW032069	80BL022979	Bore	Local Govt	Town Water Supply	G/water Xplore		01/07/1968	8.80	8.80					1863m	North
GW053011	80BL116865	Well	Private	Domestic, Irrigation, Stock	Domestic, Irrigation, Stock			8.00	8.00					1881m	North East
GW030975		Bore	Local Govt		Public/municipl		01/12/1981	12.50		0-500 ppm				1886m	East
GW802273	80BL242325, 80WA713513	Bore	Private	Domestic	Domestic		05/07/2004	48.00	48.00		16.00	0.378		1899m	West
GW036118		Bore	NSW Office of Water		Monitoring Bore		01/04/1975	9.00	13.50	0-500 ppm			450.52	1905m	North
GW036120		Bore - Nested (2)	NSW Office of Water		Monitoring Bore		01/05/1975	16.60	16.60		0.00		456.06	1941m	North East
GW030991		Bore	Local Govt		Public/municipl		01/02/1982	0.00	12.00					1943m	North
GW051650	80BL112365, 80WA710622	Bore	Private	Domestic	General Use		01/05/1980	18.90	18.90	Fresh				1955m	North
GW005072		Bore	Private		Domestic, Stock	TIMOLEAGUE	01/01/1914	24.00	24.10	Hard				1978m	West

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

Hydrogeology & Groundwater

132-134 Lions Drive, Mudgee, NSW 2850

Driller's Logs

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

Groundwater No	Drillers Log	Distance	Direction
GW053136	0.00m-0.60m Clay 0.60m-37.50m Shale Decomposed Water Supply 37.50m-60.90m Shale Black Decomposed Water Supply	241m	South West
GW048444	0.00m-11.00m Clay Red 11.00m-28.00m Clay Dark Brown 28.00m-28.40m Limestone	263m	South
GW048537	0.00m-3.00m Clay Red Some Stones 3.00m-7.00m Clay Grey Gravel 7.00m-12.50m Shale Water Supply	413m	South
GW804348	0.00m-1.00m Gravel, sandy, grey brown 1.00m-1.60m Gravel, clayey, dark brown 1.60m-4.00m Silty Clay, yellow brown 4.00m-6.30m Silty Clay, brown, with alluvial Gravel - Drill refusal on rock @ 6.3m.	526m	North West
GW804349	0.00m-1.40m Gravel, sandy, brown 1.40m-4.00m Silty Clay, yellow brown 4.00m-6.00m Silty Clay, grey, with alluvial Gravel 6.00m-7.70m Silty Clay, brownish yellow. Drill refusal on rock @ 7.7m	553m	North West
GW804350	0.00m-0.60m Clayey Sand, grey brown 0.60m-2.00m Sandy Clay, grey brown 2.00m-4.00m Silty Clay, yellow brown 4.00m-6.30m Silty Clay, yellow brown, with alluvial Gravel. Drill refusal on rock @ 6.3m	572m	North West
GW800529	0.00m-0.90m Topsoil 0.90m-27.40m Sandy Gravel	628m	North West
GW803725	0.00m-2.40m Sandy Clay, brown 2.40m-3.10m Gravel, clayey, brown 3.10m-5.60m Sandy Clay, brown grey mottles 5.60m-7.50m Clay, gravelly, grey/yellow brown	687m	South West
GW800667	0.00m-21.00m Shale, weathered 21.00m-22.00m Shale, blue 22.00m-25.00m Shale, grey 25.00m-53.00m Shale, blue	715m	West
GW031392	0.00m-0.30m Topsoil Clay 0.30m-7.62m Clay 7.62m-28.96m Clay Gravel	864m	East
GW055061	0.00m-1.00m Topsoil 1.00m-3.00m Clay Red 3.00m-43.00m Shale Water Supply	1060m	West
GW803825	0.00m-0.50m Topsoil 0.50m-3.00m Clay 3.00m-15.00m Shale, soft 15.00m-20.00m Shale, grey 20.00m-39.00m Shale, black	1062m	North West
GW047519	0.00m-0.30m Topsoil 0.30m-14.10m Clay 14.10m-16.60m Gravel Claybound 16.60m-24.90m Sandstone Decomposed Water Supply 24.90m-31.00m Sandstone	1070m	West
GW055050	0.00m-0.30m Topsoil 0.30m-1.80m Clay Yellow 1.80m-7.00m Shale Decomposed 7.00m-16.60m Shale Some Broken Bands 16.60m-22.40m Shale Purple Some Weathered Bands 22.40m-47.00m Shale Black Some Broken Bands Water Supply	1100m	North West

Groundwater No	Drillers Log	Distance	Direction
GW800662	0.00m-6.10m Gravel, sandy 6.10m-21.90m Clay, sandy 21.90m-53.90m Limestone, hard 53.90m-60.90m Basalt	1141m	North East
GW016394	0.00m-3.05m Soil 3.05m-3.66m Clay Gravel 3.66m-7.92m Clay White Yellow 7.92m-22.25m Clay Yellow Water Supply 22.25m-35.05m Clay Yellow 22.25m-35.05m Slate 35.05m-43.89m Slate Water Supply	1182m	West
GW055555	0.00m-0.60m Topsoil 0.60m-23.30m Clay Coloured 23.30m-28.90m Shale Broken Water Supply 28.90m-53.80m Shale Black Water Supply	1207m	West
GW052966	0.00m-21.34m Water Bearing 21.34m-21.35m Limestone	1225m	South East
GW055554	0.00m-0.30m Made Ground 0.30m-9.20m Clay 9.20m-45.50m Shale Decomposed Water Supply	1231m	West
GW030994	0.00m-1.00m Topsoil 1.00m-5.00m Clay 5.00m-6.00m Clay Gravel 6.00m-8.00m Clay Grey Yellow 8.00m-14.00m Clay Gravel 14.00m-14.50m Limestone Rock	1267m	East
GW052035	0.00m-12.00m Clay Water Supply 12.00m-21.00m Rock Rotten Water Supply	1288m	North
GW032066	0.00m-2.29m Loam Grey 2.29m-4.42m Loam Reddish Yellow Gritty 4.42m-5.03m Clay Grey Moist Sandy Water Supply 5.03m-5.49m Gravel Clayey Fine-medium Water Supply 5.49m-5.74m Gravel Small Fatty Water Supply 5.49m-5.74m Sand 5.74m-5.94m Sand 5.74m-5.94m Gravel Small Slightly Fatty Water Supply 5.94m-6.81m Gravel Fine-medium Water Supply 5.94m-6.81m Sand Coarse 6.81m-7.47m Gravel Very Clayey Medium Water Supply	1305m	North East
GW051722	0.00m-0.60m Topsoil 0.60m-22.60m Clay Multicoloured 22.60m-31.30m Shale Broken Bands Water Supply 31.30m-33.20m Shale Black Broken 33.20m-36.90m Shale Black	1333m	West
GW060384	0.00m-3.66m SANDY CLAY 3.66m-24.08m CLAY 24.08m-51.51m SHALE - WATER SUPPLY 51.51m-60.05m QUARTZITE - WATER SUPPLY 60.05m-60.96m SHALE	1352m	West
GW032065	0.00m-1.98m Loam Dark Grey 1.98m-4.11m Clay Reddish Yellow Gritty 4.11m-4.42m Sand Wet Clayey Water Supply 4.11m-4.42m Gravel 4.42m-5.18m Sand Grey Silty Water Supply 5.18m-6.71m Sand Clean Coarse Water Supply 5.18m-6.71m Large Gravel 6.71m-7.54m Gravel Large Clayey Water Supply	1363m	North East
GW054479	0.00m-0.30m Topsoil 0.30m-3.60m Clay 3.60m-38.10m Shale 38.10m-47.00m Shale Black Water Supply	1365m	West
GW032064	0.00m-2.13m Loam Grey 2.13m-3.05m Clay Reddish Yellow Gritty 3.05m-3.81m Clay Dry 3.05m-3.81m Gravel Medium-coarse 3.81m-4.11m Clay Grey Sandy Moist 4.11m-4.67m Gravel Small Sand Water Supply 4.11m-4.67m Slightly Fatty 4.67m-5.31m Gravel Small 4.67m-5.31m Sand Clean Coarse Water Supply 5.31m-7.32m Sand Clean Coarse Water Supply 5.31m-7.32m Gravel Medium 7.32m-7.98m Gravel Clayey Sand Water Supply	1409m	North East

Groundwater No	Drillers Log	Distance	Direction
GW019988	0.00m-0.61m Soil 0.61m-3.05m Clay Slate 3.05m-6.10m Slate Yellow 6.10m-6.71m Mudstone Red 6.71m-12.80m Slate Yellow 12.80m-25.91m Slate Water Supply 25.91m-38.10m Slate Black Water Supply	1420m	North West
GW030985	0.00m-1.00m Topsoil 1.00m-3.00m Clay Red 3.00m-8.00m Clay Red Gravel 8.00m-12.50m Gravel Large Water Bearing 12.50m-13.00m Clay Bands 13.00m-15.00m Gravel Large Water Supply 15.00m-16.00m Clay Yellow White Shaley 16.00m-17.00m Clay Large Stoney Shaley 17.00m-18.00m Clay Yellow White Shaley 18.00m-20.00m Clay Black Coal	1423m	East
GW054102	0.00m-0.30m Topsoil 0.30m-18.80m Clay Coloured 18.80m-23.60m Shale Decomposed 23.60m-31.40m Shale Black	1424m	North West
GW052778	0.00m-0.30m Topsoil 0.30m-0.90m Clay Topsoil 0.90m-12.90m Clay Coloured 12.90m-25.20m Shale Decomposed 25.20m-31.60m Shale Water Supply	1446m	North West
GW060382	0.00m-4.57m SANDY CLAY 4.57m-19.81m CLAY 19.81m-21.34m GRAVEL 21.34m-53.34m SHALE WATER SUPPLY	1454m	West
GW032063	0.00m-1.52m Loam 1.52m-1.83m Granite Decomposed 1.83m-3.05m Clay Gritty 3.05m-3.96m Gravel Dry Tight Coarse 3.96m-5.18m Gravel Wet Sand Coarse Water Supply 5.18m-5.43m Gravel Sand Water Supply 5.43m-5.54m Sand Clayey Gravel Water Supply 5.54m-5.87m Sand Clean Water Supply 5.54m-5.87m Gravel Medium 5.87m-5.94m Gravel Medium 5.87m-5.94m Sand Clayey Water Supply 5.94m-6.30m Sand Clean Water Supply 5.94m-6.30m Gravel Medium 6.30m-6.35m Gravel Medium 6.30m-6.35m Sand Clayey Water Supply 6.35m-7.09m Sand Clean Water Supply 6.35m-7.09m Gravel Medium 7.09m-7.19m Gravel Medium 7.09m-7.19m Sand Clayey Water Supply 7.19m-7.52m Sand Clean Water Supply 7.19m-7.52m Gravel Medium Water Supply 7.52m-8.23m Gravel Very Clayey Water Supply	1485m	North East
GW800270	0.00m-0.50m TOPSOIL 0.50m-5.90m GRAVEL & CLAY 5.90m-23.00m DECOMPOSED SHALE 23.00m-38.00m BLUE SHALE	1554m	South West
GW055556	0.00m-0.30m Topsoil 0.30m-3.05m Clay 3.05m-8.53m Shale Decomposed 8.53m-17.68m Shale Black	1561m	North
GW032062	0.00m-2.13m Loam Grey 2.13m-3.35m Clay Reddish Yellow Gritty 3.35m-3.81m Sand Dry Clayey 3.81m-3.96m Sand Clayey Moist 3.96m-4.27m Sand Clayey Wet Water Supply 4.27m-4.72m Gravel Clayey Pebbles/pebbly Water Supply 4.27m-4.72m Sand 4.72m-5.03m Sand 4.72m-5.03m Gravel Clean Small Water Supply 5.03m-5.09m Clay Grey Puggy Water Supply 5.09m-5.18m Gravel Clean Small Water Supply 5.09m-5.18m Sand 5.18m-6.49m Sand 5.18m-6.49m Gravel Clean Fine-medium Water Supply 6.49m-7.16m Gravel Very Clayey Medium Water Supply	1578m	North East

Groundwater No	Drillers Log	Distance	Direction
GW052243	0.00m-0.60m Topsoil 0.60m-25.70m Clay Coloured 25.70m-38.00m Shale Decomposed Water Supply 38.00m-44.40m Shale Water Supply	1587m	West
GW039336	0.00m-3.00m Topsoil Water Supply 3.00m-12.00m Gravel Clay Water Supply 12.00m-13.00m Gravel Large Clay Bands Water Supply 13.00m-14.00m Clay Grey 14.00m-15.00m Driller	1597m	East
GW032070	0.00m-1.52m Loam Grey 1.52m-2.44m Clay Yellow Grey 2.44m-3.51m Sand Clayey 3.51m-3.96m Sand Clean Gravel Water Supply Some Pebbles/pebbly 3.96m-6.89m Sand Clayey Gravel 6.89m-7.62m Gravel Clayey Coarse 7.62m-8.14m Gravel Clean Medium Water Supply 8.14m-9.07m Gravel Clean Water Supply Some Large Cobbles 9.07m-9.14m Clay White 9.14m-9.15m Rock	1609m	North
GW030982	0.00m-0.30m Topsoil 0.00m-0.30m Gravel Clay 0.30m-5.50m Gravel Dry Band 0.30m-5.50m Clay Red Sandy 5.50m-12.00m Gravel Dirty Large Water Supply 12.00m-13.00m Gravel Large Some Clay Bands Water Supply 13.00m-15.00m Shale Grey Sandy 13.00m-15.00m Some Large Stones	1616m	East
GW039320	0.00m-3.00m Topsoil 3.00m-12.00m Gravel Clay Water Supply 12.00m-13.00m Gravel Large Clay Bands Water Supply 13.00m-14.00m Clay Grey	1619m	East
GW032071	0.00m-1.52m Loam Grey 1.52m-2.74m Clay 2.74m-3.35m Sand Clayey Water Supply 3.35m-5.94m Sand Clean Gravel Water Supply 5.94m-6.55m Gravel Clayey Water Supply 6.55m-7.01m Clay Gravel Water Supply	1635m	North
GW032073	0.00m-1.52m Loam Grey 1.52m-2.74m Clay 2.74m-3.35m Sand Silty Water Supply 3.35m-3.96m Gravel Clean Sandy Water Supply 3.96m-4.50m Gravel Clean Sand Fine Water Supply 4.50m-5.97m Gravel Clean Sand Water Supply 4.50m-5.97m Some Small Cobbles 5.97m-6.55m Some Small Cobbles 5.97m-6.55m Gravel Clayey 6.55m-6.92m Clay Gravel 6.92m-7.56m Sand Clayey 7.56m-9.66m Sand Clayey Gravel 9.66m-10.36m Sand Yellow Clayey	1635m	North
GW032072	0.00m-1.22m Loam Grey 1.22m-2.44m Clay 2.44m-3.05m Sand Fine 3.05m-3.56m Sand Gravel Fine Water Supply 3.56m-5.61m Gravel Sand Medium Water Supply 5.61m-6.20m Gravel Clayey Sand 6.20m-7.14m Gravel Clayey Sand Medium 7.14m-8.84m Gravel Clayey 8.84m-9.14m Gravel Slightly Clayey 9.14m-9.75m Sand Yellow Clayey Coarse 9.75m-10.42m Sand Yellow Clayey Coarse Gravel Coarse 10.42m-11.05m Sand Yellow Clayey Coarse Clay Seams 11.05m-11.66m Gravel Clayey Coarse 11.66m-12.24m Clay White 12.24m-12.25m Rock	1645m	North
GW032061	0.00m-2.29m Loam Grey 2.29m-3.35m Clay Reddish Yellow Gritty 3.35m-3.66m Sand Wet Clayey 3.66m-4.04m Gravel Clayey Wet Water Supply 3.66m-4.04m Sand Water Supply 4.04m-4.63m Gravel Small Water Supply 4.04m-4.63m Sand Clean Fine Water Supply 4.63m-4.82m Sand Gravel Water Supply 4.63m-4.82m Slightly Clayey 4.82m-5.49m Gravel Small Clean Water Supply 5.49m-7.16m Gravel Clean Medium Water Supply 7.16m-7.85m Gravel Very Clayey Medium	1650m	North East

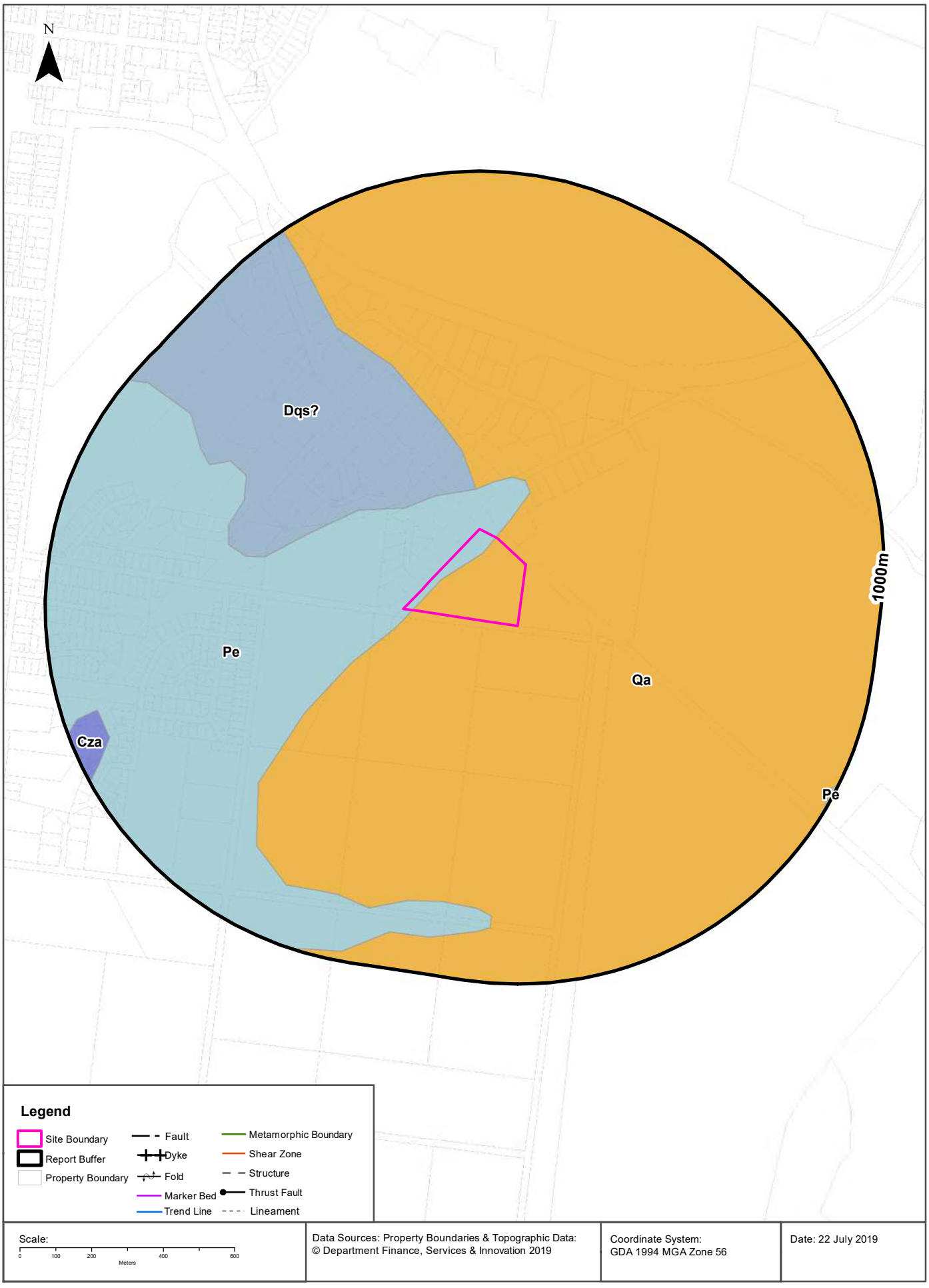
Groundwater No	Drillers Log	Distance	Direction
GW804059	0.00m-0.50m Topsoil 0.50m-12.00m Clay 12.00m-66.00m Shale	1691m	South
GW051755	0.00m-0.30m Topsoil 0.30m-23.30m Clay Coloured 23.30m-25.80m Shale Broken Water Supply 25.80m-32.60m Shale Black Broken Water Supply	1729m	North West
GW802744	0.00m-0.50m Topsoil 0.50m-1.50m Clay 1.50m-54.00m Shale	1748m	West
GW020315	0.00m-1.52m Soil 1.52m-3.05m Clay 3.05m-4.57m Clay Stones 4.57m-6.10m Gravel Sand 6.10m-9.14m Gravel Sand Angular	1754m	North East
GW801479	0.00m-1.00m Topsoil 1.00m-6.00m Clay 6.00m-26.00m Soft Shale 26.00m-56.00m Limestone	1756m	South
GW801561	0.00m-0.30m Topsoil 0.30m-1.00m Clay 1.00m-18.29m Shale 18.29m-56.39m Limestone	1758m	South
GW030974	0.00m-1.00m Topsoil 1.00m-3.00m Clay Grey 3.00m-5.50m Clay Grey Yellow 5.50m-10.00m Gravel Large Water Supply 10.00m-12.00m Clay Grey 12.00m-17.00m Clay Grey Yellow 17.00m-18.00m Clay Black Sandy 18.00m-19.50m Clay Weathered Dry Gravel	1774m	East
GW057117	0.00m-0.30m Topsoil 0.30m-4.30m Clay Gravel 4.30m-8.00m Clay 8.00m-22.10m Shale Weathered Water Supply 22.10m-24.00m Shale	1784m	North West
GW801121	0.00m-1.00m Topsoil 1.00m-42.00m Shale	1788m	West
GW801217	0.00m-1.00m Topsoil 1.00m-2.00m Clay 2.00m-18.00m Shale, brown 18.00m-56.00m Limestone	1789m	South
GW020314	0.00m-1.52m Soil 1.52m-3.05m Clay Stones 3.05m-6.10m Gravel 6.10m-9.14m Gravel Sand	1834m	North East
GW055401	0.00m-0.30m Topsoil 0.30m-5.80m Clay 5.80m-8.90m Gravel Water Supply 8.90m-12.35m Clay Black	1848m	North
GW800663	0.00m-2.00m Clay, brown, and shale 2.00m-3.00m Clay, white, and shale 3.00m-7.00m Clay, brown and shale 7.00m-11.00m Shale, black 11.00m-16.00m Shale, brown 16.00m-39.00m Shale, blue 39.00m-42.00m Slate, black 42.00m-46.00m Slate, blue/black	1851m	West
GW024224	0.00m-0.61m Topsoil 0.61m-7.01m Clay 7.01m-24.38m Sandstone Soft Water Supply 24.38m-30.48m Shale	1852m	North West
GW032069	0.00m-1.22m Loam Grey 1.22m-3.05m Clay 3.05m-4.27m Sand Gravel Fine Water Supply 4.27m-4.80m Sand Gravel Water Supply 4.80m-5.11m Sand Fatty 4.80m-5.11m Gravel Coarse 5.11m-6.61m Gravel Medium 5.11m-6.61m Sand Clayey 6.61m-7.16m Clay Some Gravel 7.16m-7.62m Gravel Clayey Fine 7.62m-8.74m Gravel Clayey Medium 8.74m-8.84m Clay Yellow	1863m	North

Groundwater No	Drillers Log	Distance	Direction
GW802273	0.00m-0.50m Topsoil 0.50m-16.00m Shale, brown 16.00m-30.00m Shale, grey 30.00m-36.00m Slate, grey 36.00m-48.00m Shale, grey	1899m	West
GW036118	0.00m-1.00m Topsoil 1.00m-2.00m Clay Grey 2.00m-4.00m Clay Grey Some Gravel 4.00m-7.00m Sand Gravel Water Supply 7.00m-13.00m Clay Multicoloured 13.00m-13.50m Slate Hard	1905m	North
GW036120	0.00m-1.00m Topsoil 1.00m-3.00m Clay 3.00m-3.50m Clay Multicoloured 3.50m-5.00m Clay Multicoloured Gravel 5.00m-7.00m Sand Clay Gravel 7.00m-12.00m Sand Gravel Water Supply 12.00m-13.00m Sand Gravel clay 13.00m-16.10m Clay Grey Some Stones 16.10m-16.60m Slate Grey	1941m	North East
GW030991	0.00m-1.00m Clay Dark Brown Silty 1.00m-2.50m Clay Gravel Silty 2.50m-3.50m Clay Hard Gravel Silty 3.50m-7.00m Gravel Sandy Some Boulder 7.00m-11.50m Shale Grey 11.50m-12.00m Shale Grey Firm Some Gritty	1943m	North
GW051650	0.00m-0.60m Topsoil 0.60m-3.00m Clay 3.00m-12.00m Clay Red 12.00m-13.10m Gravel Water Supply 13.10m-18.90m Slate	1955m	North
GW005072	0.00m-12.19m Soil 12.19m-22.86m Slate Grey Soft 22.86m-24.08m Slate Hard Water Supply	1978m	West

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

Geology 1:250,000

132-134 Lions Drive, Mudgee, NSW 2850



Geology

132-134 Lions Drive, Mudgee, NSW 2850

Geological Units

What are the Geological Units onsite?

Symbol	Description	Unit Name	Group	Sub Group	Age	Dom Lith	Map Sheet	Dataset
Pe	Carbonaceous siltstone, quartz-lithic sandstone, conglomerate and coal lenses, rare varves				Palaeozoic			1:250,000
Qa	Alluvial silt, clay and sand, variable humic content, sporadic pebble- to cobble-sized unconsolidated conglomeratic lenses				Cainozoic			1:250,000

What are the Geological Units within the dataset buffer?

Symbol	Description	Unit Name	Group	Sub Group	Age	Dom Lith	Map Sheet	Dataset
Cza	Unconsolidated quartz and quartz-lithic gravel, sand, silt and clay	undifferentiated			Cainozoic			1:250,000
Dqs?	Lithic sandstone, pebbly mudstone, allodapic and allochthonous limestone	Sutchers Creek Formation	Queens Pinch Group		Palaeozoic			1:250,000
Pe	Carbonaceous siltstone, quartz-lithic sandstone, conglomerate and coal lenses, rare varves				Palaeozoic			1:250,000
Qa	Alluvial silt, clay and sand, variable humic content, sporadic pebble- to cobble-sized unconsolidated conglomeratic lenses				Cainozoic			1:250,000

Geological Structures

What are the Geological Structures onsite?

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

What are the Geological Structures within the dataset buffer?

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

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

Naturally Occurring Asbestos Potential

132-134 Lions Drive, Mudgee, NSW 2850

Naturally Occurring Asbestos Potential

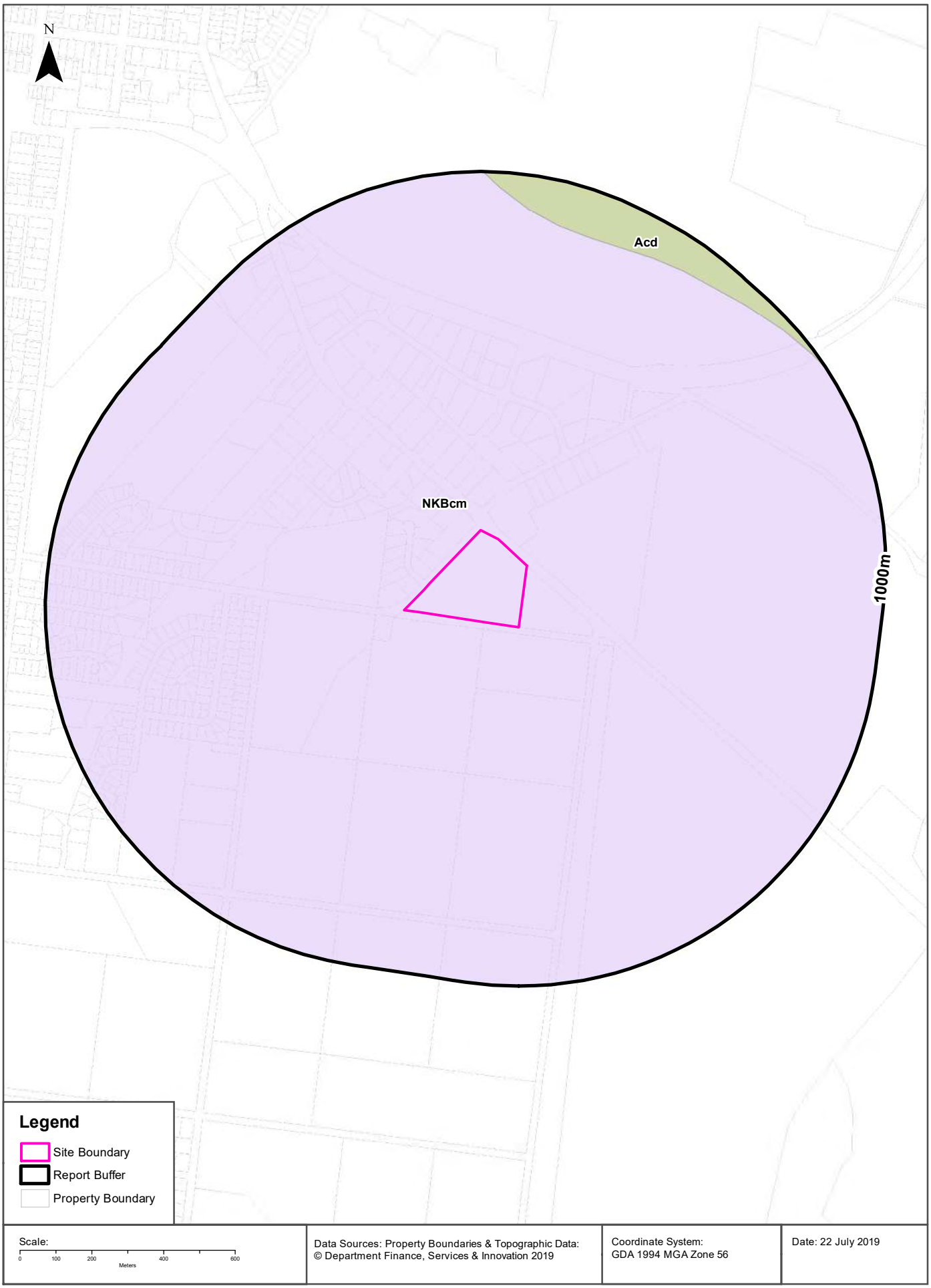
Naturally Occurring Asbestos Potential within the dataset buffer:

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

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

Soil Landscapes

132-134 Lions Drive, Mudgee, NSW 2850



Soils

132-134 Lions Drive, Mudgee, NSW 2850

Soil Landscapes

What are the onsite Soil Landscapes?

Soil Code	Name	Group	Process	Map Sheet	Scale
NKBcm	CRAIGMORE	NON-CALCIC BROWN SOILS		Dubbo	1:250,000

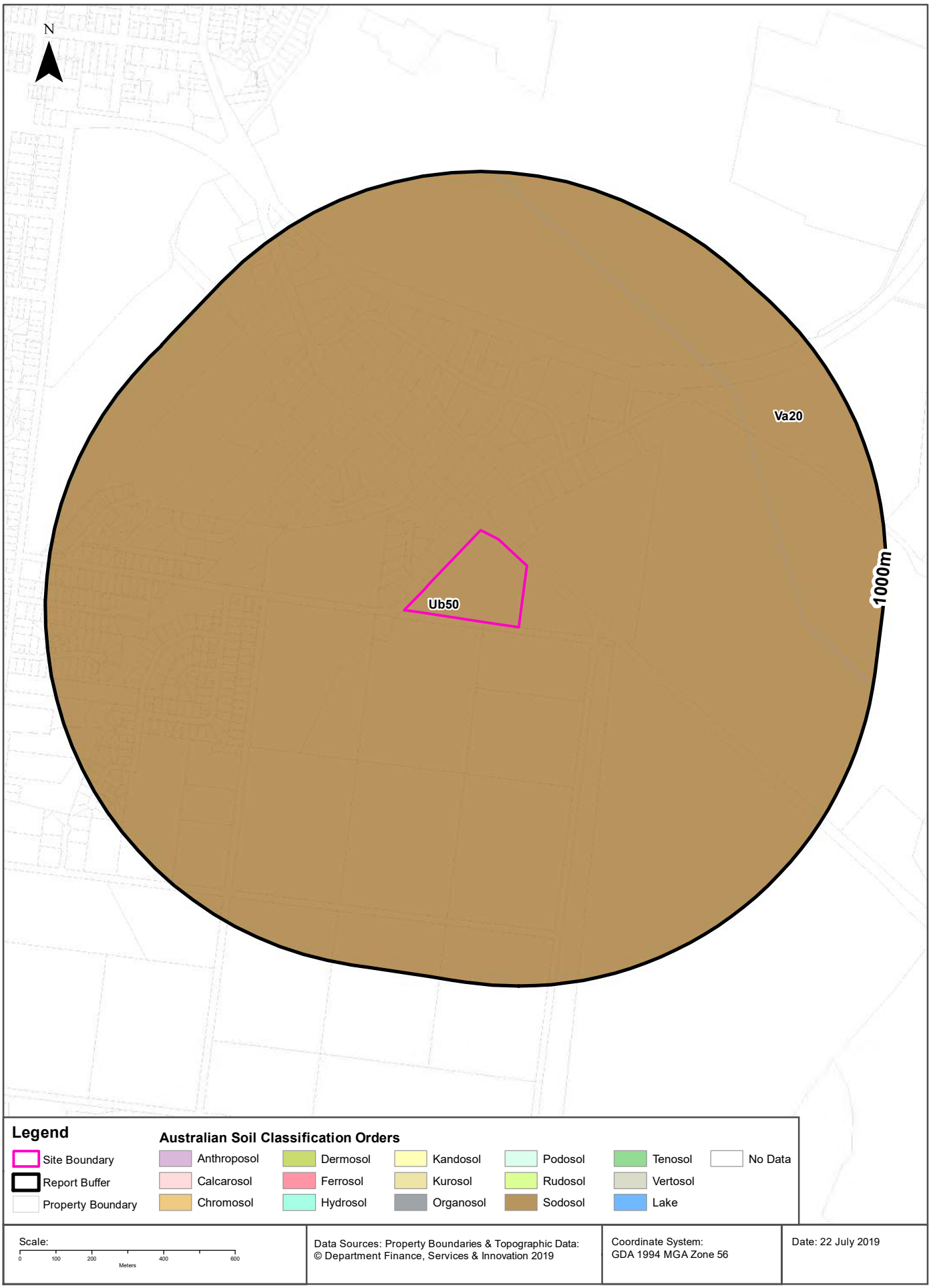
What are the Soil Landscapes within the dataset buffer?

Soil Code	Name	Group	Process	Map Sheet	Scale
Acd	CUDGEGONG	ALLUVIAL SOILS		Dubbo	1:250,000
NKBcm	CRAIGMORE	NON-CALCIC BROWN SOILS		Dubbo	1:250,000

Soils Landscapes Data Source : NSW Office of Environment and Heritage
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Atlas of Australian Soils

132-134 Lions Drive, Mudgee, NSW 2850



Soils

132-134 Lions Drive, Mudgee, NSW 2850

Atlas of Australian Soils

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

Map Unit Code	Soil Order	Map Unit Description	Distance
Ub50	Sodosol	Gently undulating to hilly country of hard neutral yellow mottled soils (Dy3.42) with hard neutral red soils (Dr2.42 and Dr2.22). Associated are red earths (Gn2.15) and possibly other (Gn2) soils; and small areas of other soils, including (Ug5.1) and (Gn3.1). As mapped, areas of unit Va20 are included along the larger streams. Data are limited.	0m
Va20	Sodosol	Valley plain and terraces of hard alkaline yellow mottled soils (Dy3 .43), red earths (Gn2. 15), and possibly other (Gn2) soils. Associated are younger terraces of (Um6.11) soils and flood-plains of (Um) and (Uc) soils. Compare units Ub47, Gb6, and X9. Data are limited.	696m

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

Acid Sulfate Soils

132-134 Lions Drive, Mudgee, NSW 2850

Environmental Planning Instrument - Acid Sulfate Soils

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

Soil Class	Description	EPI Name
N/A		

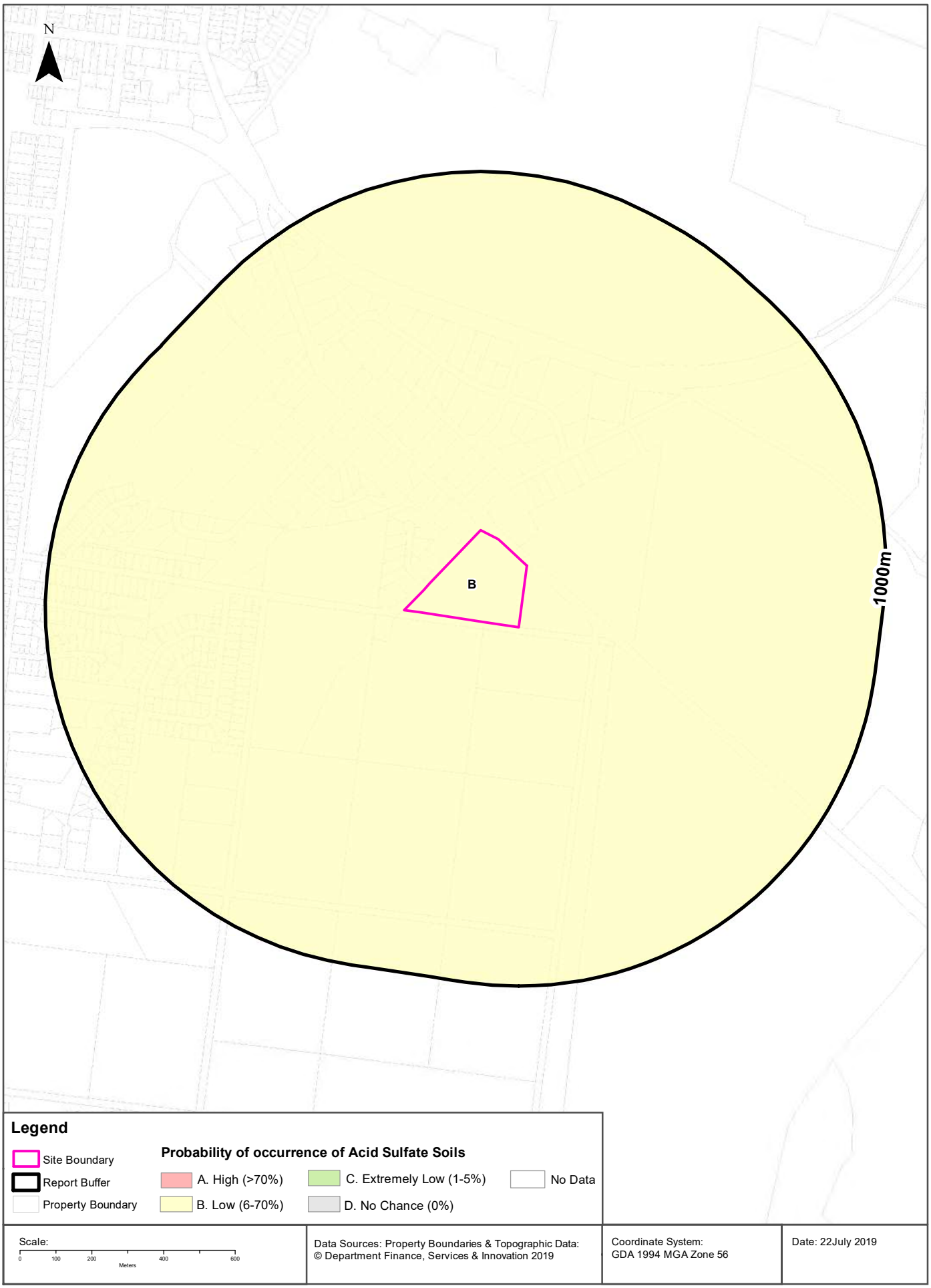
If the on-site Soil Class is 5, what other soil classes exist within 500m?

Soil Class	Description	EPI Name	Distance	Direction
N/A				

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

Atlas of Australian Acid Sulfate Soils

132-134 Lions Drive, Mudgee, NSW 2850



Acid Sulfate Soils

132-134 Lions Drive, Mudgee, NSW 2850

Atlas of Australian Acid Sulfate Soils

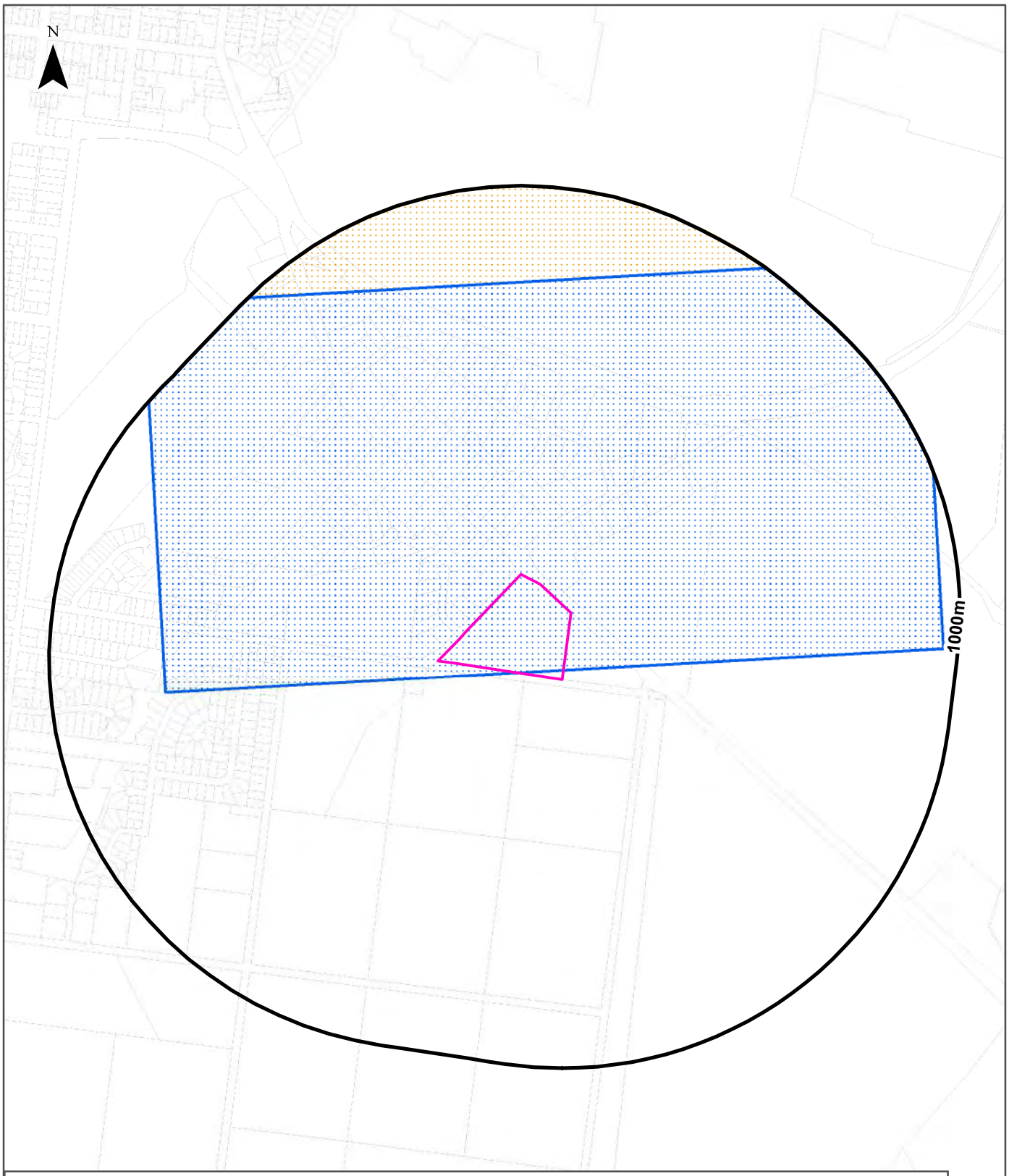
Atlas of Australian Acid Sulfate Soil categories within the dataset buffer:

Class	Description	Distance
B	Low Probability of occurrence. 6-70% chance of occurrence.	0m

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

Dryland Salinity

132-134 Lions Drive, Mudgee, NSW 2850



Legend

- Site Boundary
- Report Buffer
- Property Boundary

Dryland Salinity - National Assessment

- Delineated risk area but no high hazard or risk rating for either 2000, 2020, 2050
- High hazard or risk in 2050 only
- High hazard or risk defined for 2050, but no assessment made for 2000 or 2020
- High hazard or risk in 2020 and 2050
- High hazard or risk in 2000 and 2050. 2020 not defined as high hazard
- High hazard or risk defined for all years: 2000, 2020, 2050

Salinity Potential of Western Sydney

- Area of Known Salinity
- Area of High Salinity Potential
- Area of Moderate Salinity Potential
- Area of Very Low Salinity Potential
- Area of Water

Scale: 0 100 200 400 600 Meters

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

Coordinate System: GDA 1994 MGA Zone 56

Date: 22 July 2019

Dryland Salinity

132-134 Lions Drive, Mudgee, NSW 2850

Dryland Salinity - National Assessment

Is there Dryland Salinity - National Assessment data onsite?

Yes

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

Yes

What Dryland Salinity assessments are given?

Assessment 2000	Assessment 2020	Assessment 2050	Distance	Direction
-	-	High hazard or risk	0m	Onsite
-	High hazard or risk	High hazard or risk	750m	North West

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

Dryland Salinity Potential of Western Sydney

Dryland Salinity Potential of Western Sydney within the dataset buffer?

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

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

Mining Subsidence Districts

132-134 Lions Drive, Mudgee, NSW 2850

Mining Subsidence Districts

Mining Subsidence Districts within the dataset buffer:

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

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

State Environmental Planning Policy

132-134 Lions Drive, Mudgee, NSW 2850

State Significant Precincts

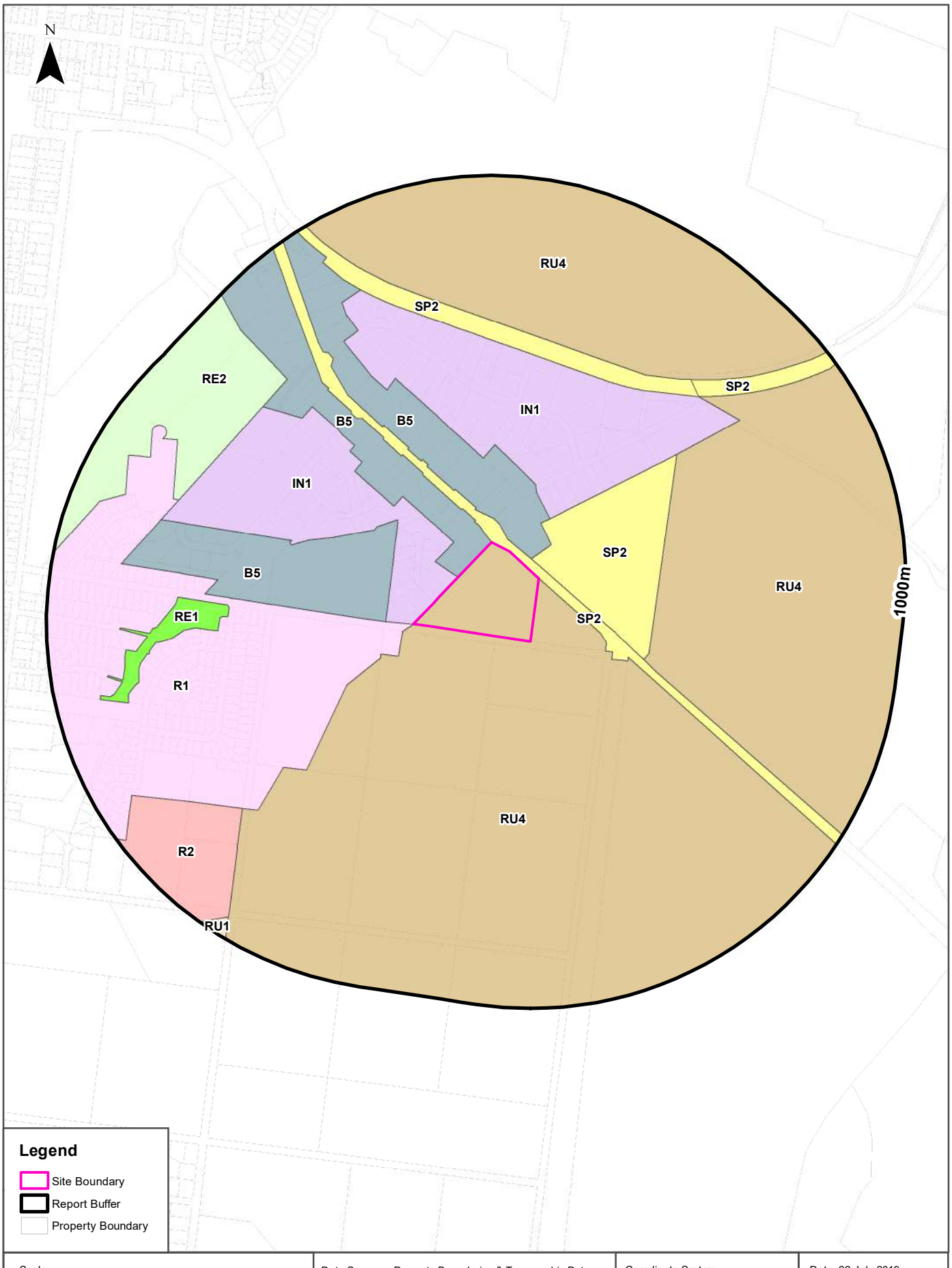
What SEPP State Significant Precincts exist within the dataset buffer?

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

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

EPI Planning Zones

132-134 Lions Drive, Mudgee, NSW 2850



Environmental Planning Instrument

132-134 Lions Drive, Mudgee, NSW 2850

Land Zoning

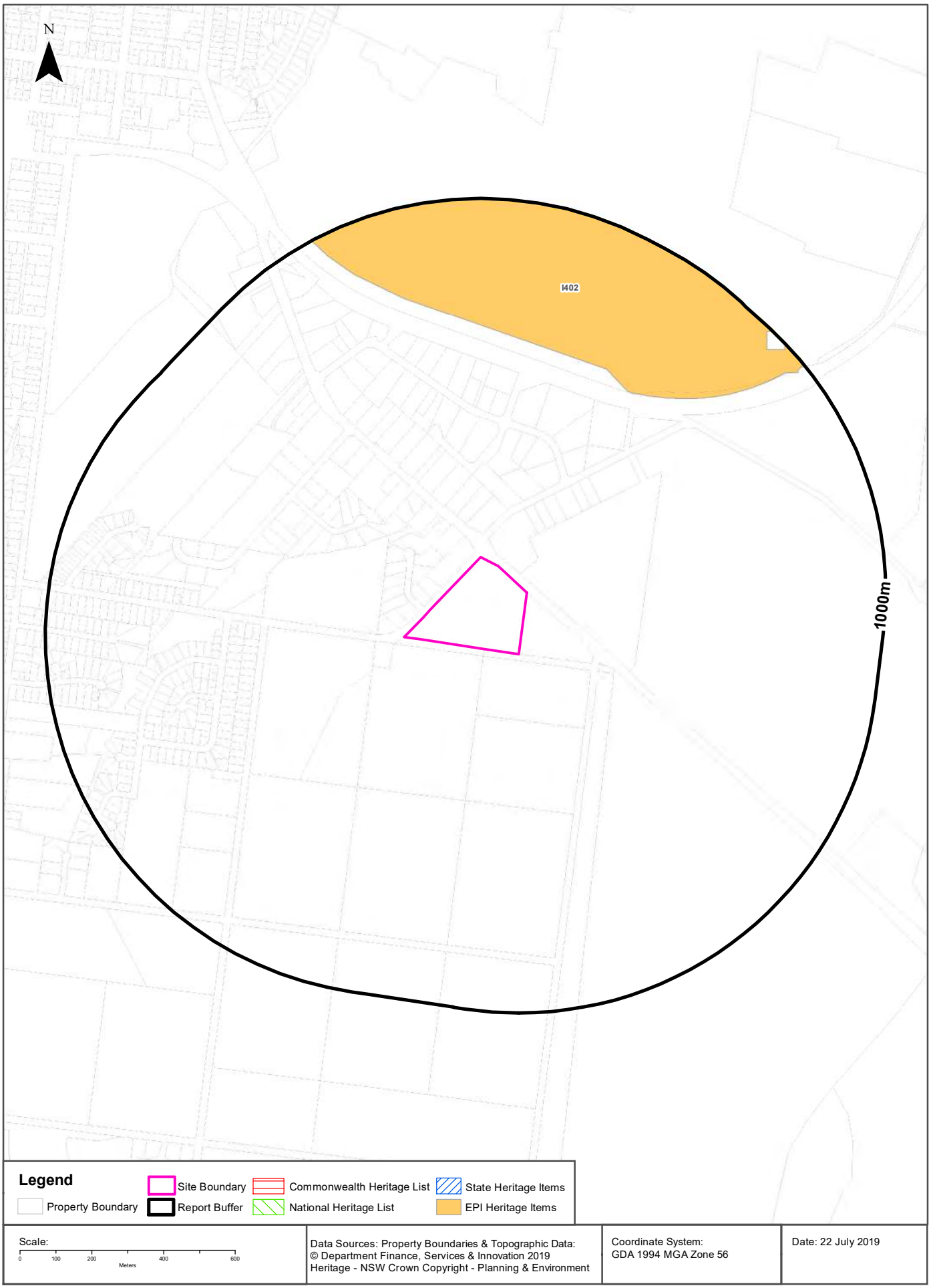
What EPI Land Zones exist within the dataset buffer?

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
RU4	Primary Production Small Lots		Mid-Western Regional Local Environmental Plan 2012	09/08/2018	09/08/2018	14/12/2018	Amendment No 18	0m	Onsite
B5	Business Development		Mid-Western Regional Local Environmental Plan 2012	10/08/2012	10/08/2012	14/12/2018		0m	North West
IN1	General Industrial		Mid-Western Regional Local Environmental Plan 2012	10/08/2012	10/08/2012	14/12/2018		0m	North West
R1	General Residential		Mid-Western Regional Local Environmental Plan 2012	10/08/2012	10/08/2012	14/12/2018		0m	West
SP2	Infrastructure	Classified Road	Mid-Western Regional Local Environmental Plan 2012	10/08/2012	10/08/2012	14/12/2018		0m	South East
B5	Business Development		Mid-Western Regional Local Environmental Plan 2012	10/08/2012	10/08/2012	14/12/2018		23m	North
SP2	Infrastructure	Water Supply System	Mid-Western Regional Local Environmental Plan 2012	10/08/2012	10/08/2012	14/12/2018		25m	East
B5	Business Development		Mid-Western Regional Local Environmental Plan 2012	10/08/2012	10/08/2012	14/12/2018		76m	West
IN1	General Industrial		Mid-Western Regional Local Environmental Plan 2012	10/08/2012	10/08/2012	14/12/2018		140m	North
RU4	Primary Production Small Lots		Mid-Western Regional Local Environmental Plan 2012	10/08/2012	10/08/2012	14/12/2018		311m	South East
RE1	Public Recreation		Mid-Western Regional Local Environmental Plan 2012	10/08/2012	10/08/2012	14/12/2018		505m	West
SP2	Infrastructure	Rail Infrastructure	Mid-Western Regional Local Environmental Plan 2012	10/08/2012	10/08/2012	14/12/2018		519m	North
RU4	Primary Production Small Lots		Mid-Western Regional Local Environmental Plan 2012	10/08/2012	10/08/2012	14/12/2018		569m	North
SP2	Infrastructure	Rail Infrastructure	Mid-Western Regional Local Environmental Plan 2012	10/08/2012	10/08/2012	14/12/2018		659m	East
R2	Low Density Residential		Mid-Western Regional Local Environmental Plan 2012	10/08/2012	10/08/2012	14/12/2018		687m	South West
RE2	Private Recreation		Mid-Western Regional Local Environmental Plan 2012	10/08/2012	10/08/2012	14/12/2018		702m	North West
RU1	Primary Production		Mid-Western Regional Local Environmental Plan 2012	10/08/2012	10/08/2012	14/12/2018		945m	South West

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

Heritage Items

132-134 Lions Drive, Mudgee, NSW 2850



Heritage

132-134 Lions Drive, Mudgee, NSW 2850

Commonwealth Heritage List

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

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

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

National Heritage List

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

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

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

State Heritage Register - Curtilages

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

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

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

Environmental Planning Instrument - Heritage

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

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I402	Burrundulla Station and homes	Item - General	Local	Mid-Western Regional Local Environmental Plan 2012	10/08/2012	10/08/2012	10/08/2012	606m	North

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

Natural Hazards

132-134 Lions Drive, Mudgee, NSW 2850

Bush Fire Prone Land

What are the nearest Bush Fire Prone Land Categories that exist within the dataset buffer?

Bush Fire Prone Land Category	Distance	Direction
No records within buffer		

NSW Bush Fire Prone Land - © NSW Rural Fire Service under Creative Commons 4.0 International Licence

Ecological Constraints

132-134 Lions Drive, Mudgee, NSW 2850

Vegetation of the Central Tablelands

What Vegetation of the Central Tablelands exists within the dataset buffer?

Vegetation Code	Vegetation Type	Description	Class	Formation	Crown Cover	Disturbance	Confidence	Distance	Direction
N/A	No records within buffer								

Vegetation of the Central Tablelands Data Source: NSW Office of Environment and Heritage
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Ramsar Wetlands

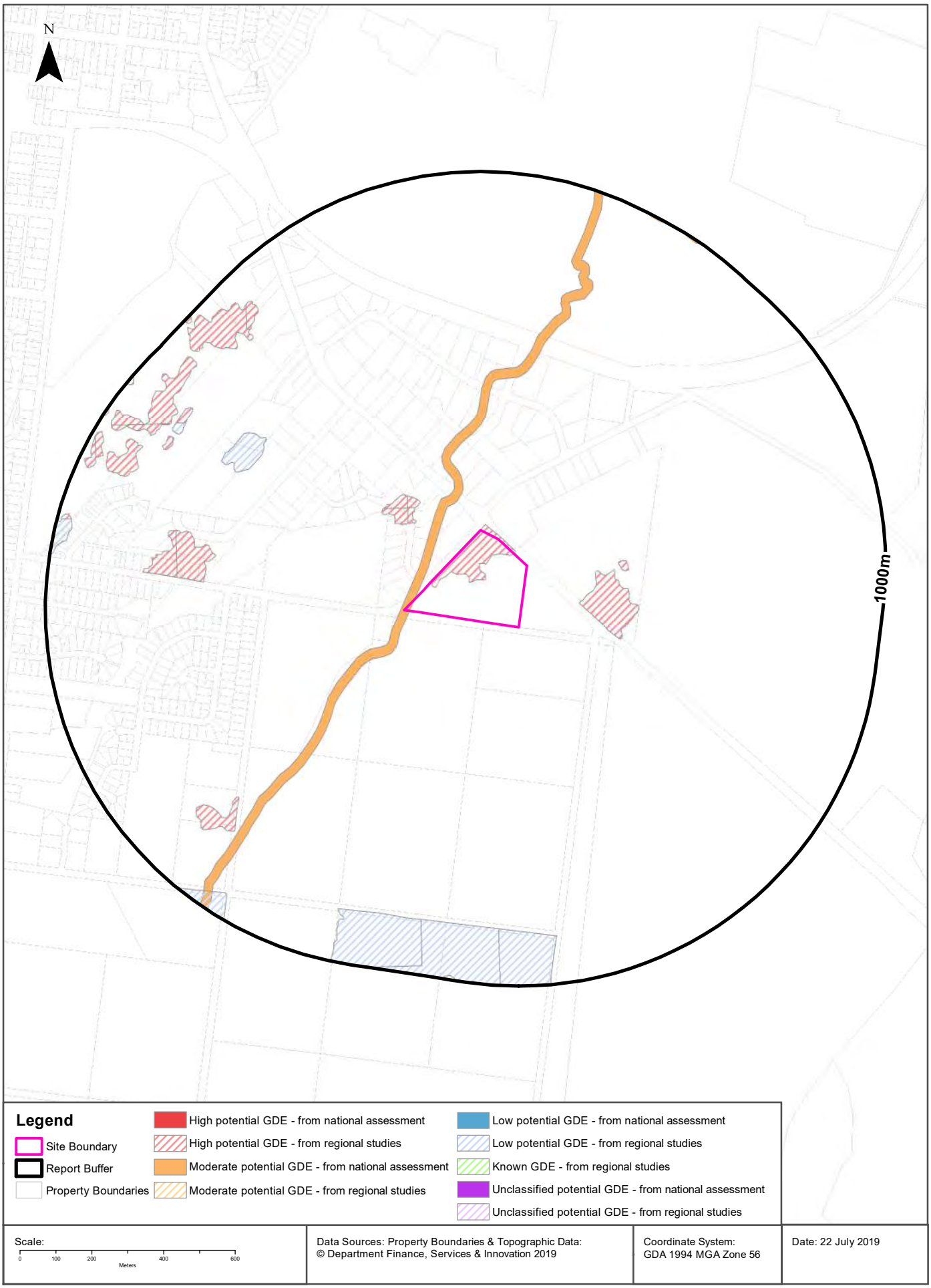
What Ramsar Wetland areas exist within the dataset buffer?

Map Id	Ramsar Name	Wetland Name	Designation Date	Source	Distance	Direction
N/A	No records in buffer					

Ramsar Wetlands Data Source: © Commonwealth of Australia - Department of Environment

Ecological Constraints - Groundwater Dependent Ecosystems Atlas

132-134 Lions Drive, Mudgee, NSW 2850



Ecological Constraints

132-134 Lions Drive, Mudgee, NSW 2850

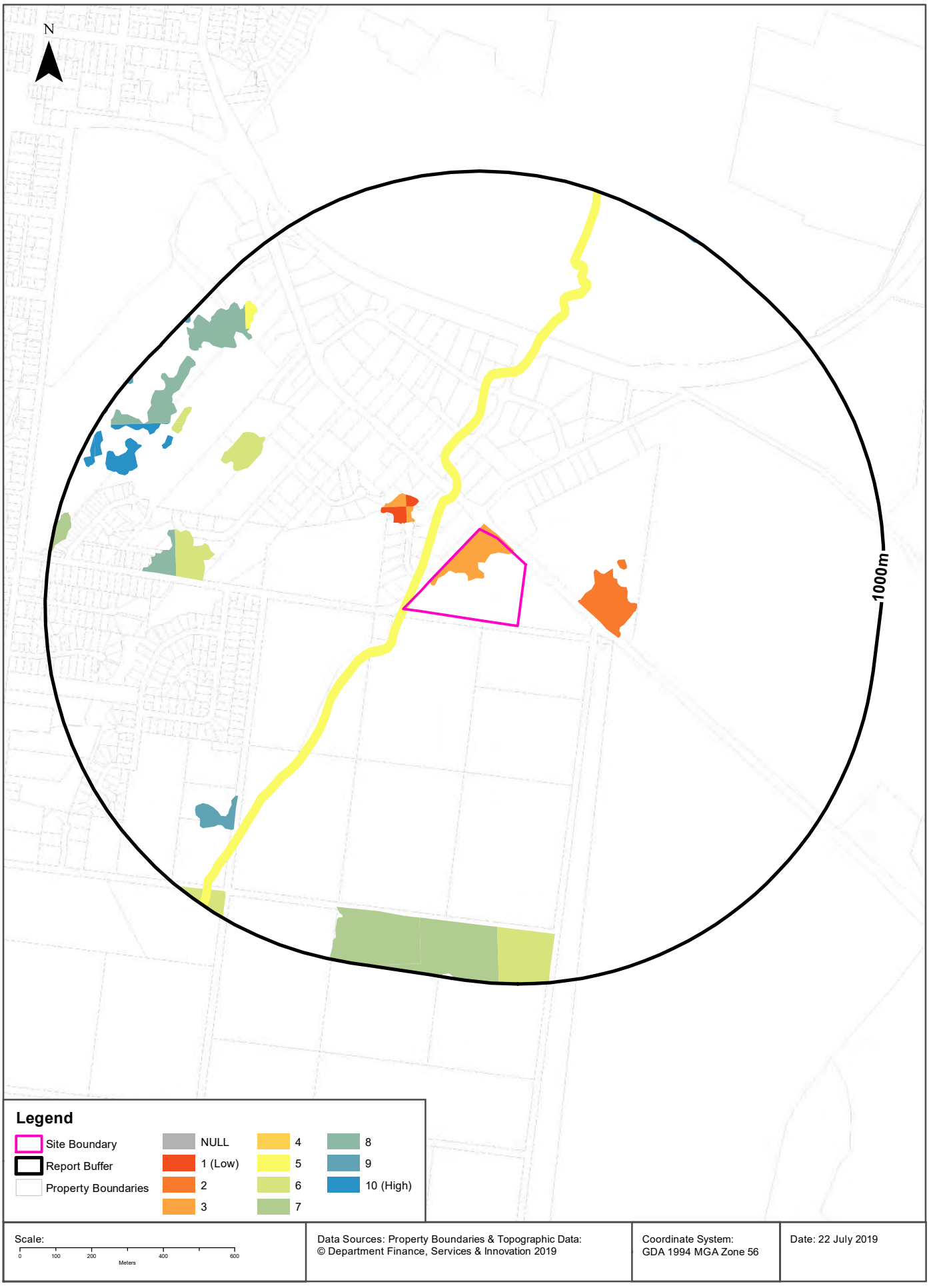
Groundwater Dependent Ecosystems Atlas

Type	GDE Potential	Geomorphology	Ecosystem Type	Aquifer Geology	Distance
Aquatic	Moderate potential GDE - from national assessment	Granitic and basaltic tablelands and minor lowlands; includes the Canobolas dissected volcanic pile.	River		0m
Terrestrial	High potential GDE - from regional studies	Granitic and basaltic tablelands and minor lowlands; includes the Canobolas dissected volcanic pile.	Vegetation		0m
Terrestrial	Low potential GDE - from regional studies	Granitic and basaltic tablelands and minor lowlands; includes the Canobolas dissected volcanic pile.	Vegetation		584m

Groundwater Dependent Ecosystems Atlas Data Source: The Bureau of Meteorology
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Ecological Constraints - Inflow Dependent Ecosystems Likelihood

132-134 Lions Drive, Mudgee, NSW 2850



Ecological Constraints

132-134 Lions Drive, Mudgee, NSW 2850

Inflow Dependent Ecosystems Likelihood

Type	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance
Aquatic	5	Granitic and basaltic tablelands and minor lowlands; includes the Canobolas dissected volcanic pile.	River		0m
Terrestrial	3	Granitic and basaltic tablelands and minor lowlands; includes the Canobolas dissected volcanic pile.	Vegetation		0m
Terrestrial	2	Granitic and basaltic tablelands and minor lowlands; includes the Canobolas dissected volcanic pile.	Vegetation		157m
Terrestrial	1	Granitic and basaltic tablelands and minor lowlands; includes the Canobolas dissected volcanic pile.	Vegetation		159m
Terrestrial	6	Granitic and basaltic tablelands and minor lowlands; includes the Canobolas dissected volcanic pile.	Vegetation		547m
Terrestrial	8	Granitic and basaltic tablelands and minor lowlands; includes the Canobolas dissected volcanic pile.	Vegetation		639m
Terrestrial	9	Granitic and basaltic tablelands and minor lowlands; includes the Canobolas dissected volcanic pile.	Vegetation		696m
Terrestrial	10	Granitic and basaltic tablelands and minor lowlands; includes the Canobolas dissected volcanic pile.	Vegetation		793m
Terrestrial	7	Granitic and basaltic tablelands and minor lowlands; includes the Canobolas dissected volcanic pile.	Vegetation		840m
Terrestrial	5	Granitic and basaltic tablelands and minor lowlands; includes the Canobolas dissected volcanic pile.	Vegetation		850m
Aquatic	10	Granitic and basaltic tablelands and minor lowlands; includes the Canobolas dissected volcanic pile.	River		991m

Inflow Dependent Ecosystems Likelihood Data Source: The Bureau of Meteorology
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Ecological Constraints

132-134 Lions Drive, Mudgee, NSW 2850

NSW BioNet Atlas

Species on the NSW BioNet Atlas that have a NSW or federal conservation status, a NSW sensitivity status, or are listed under a migratory species agreement, and are within 10km of the site?

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Anthochaera phrygia	Regent Honeyeater	Critically Endangered	Not Sensitive	Critically Endangered	
Animalia	Aves	Apus pacificus	Fork-tailed Swift	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Ardea ibis	Cattle Egret	Not Listed	Not Sensitive	Not Listed	CAMBA;JAMBA
Animalia	Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Calyptorhynchus lathami	Glossy Black-Cockatoo	Vulnerable	Category 2	Not Listed	
Animalia	Aves	Circus assimilis	Spotted Harrier	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Daphoenositta chrysoptera	Varied Sittella	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Glossopsitta pusilla	Little Lorikeet	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Grus rubicunda	Brolga	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Hirundapus caudacutus	White-throated Needletail	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Lophochroa leadbeateri	Major Mitchell's Cockatoo	Vulnerable	Category 2	Not Listed	
Animalia	Aves	Merops ornatus	Rainbow Bee-eater	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Ninox connivens	Barking Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Ninox strenua	Powerful Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Petroica boodang	Scarlet Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Plegadis falcinellus	Glossy Ibis	Not Listed	Not Sensitive	Not Listed	CAMBA
Animalia	Aves	Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Dasyurus maculatus	Spotted-tailed Quoll	Vulnerable	Not Sensitive	Endangered	
Animalia	Mammalia	Petrogale penicillata	Brush-tailed Rock-wallaby	Endangered	Not Sensitive	Vulnerable	
Animalia	Mammalia	Phascolarctos cinereus	Koala	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Acacia ausfeldii	Ausfeld's Wattle	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Dichanthium setosum	Bluegrass	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Eucalyptus cannonii	Capertee Stringybark	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Lepidium hyssopifolium	Aromatic Peppercress	Endangered	Not Sensitive	Endangered	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Plantae	Flora	Leucochrysum albicans var. tricolor	Hoary Sunray	Not Listed	Not Sensitive	Endangered	
Plantae	Flora	Ozothamnus tesselatus		Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Swainsona recta	Small Purple-pea	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Swainsona sericea	Silky Swainson-pea	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Veronica blakelyi		Vulnerable	Not Sensitive	Not Listed	

Data does not include NSW category 1 sensitive species.
NSW BioNet: © State of NSW and Office of Environment and Heritage
Data obtained 22/07/2019

USE OF REPORT - APPLICABLE TERMS

The following terms apply to any person (End User) who is given the Report by the person who purchased the Report from Lotsearch Pty Ltd (ABN: 89 600 168 018) (Lotsearch) or who otherwise has access to the Report (Terms). The contract terms that apply between Lotsearch and the purchaser of the Report are specified in the order form pursuant to which the Report was ordered and the terms set out below are of no effect as between Lotsearch and the purchaser of the Report.

1. End User acknowledges and agrees that:
   (a) the Report is compiled from or using content (**Third Party Content**) which is comprised of:
      (i) content provided to Lotsearch by third party content suppliers with whom Lotsearch has contractual arrangements or content which is freely available or methodologies licensed to Lotsearch by third parties with whom Lotsearch has contractual arrangements (**Third Party Content Suppliers**); and
      (ii) content which is derived from content described in paragraph (i);
   (b) Neither Lotsearch nor Third Party Content Suppliers takes any responsibility for or give any warranty in relation to the accuracy or completeness of any Third Party Content included in the Report including any contaminated land assessment or other assessment included as part of a Report;
   (c) the Third Party Content Suppliers do not constitute an exhaustive set of all repositories or sources of information available in relation to the property which is the subject of the Report (**Property**) and accordingly neither Lotsearch nor Third Party Content Suppliers gives any warranty in relation to the accuracy or completeness of the Third Party Content incorporated into the report including any contaminated land assessment or other assessment included as part of a Report;
   (d) Reports are generated at a point in time (as specified by the date/time stamp appearing on the Report) and accordingly the Report is based on the information available at that point in time and Lotsearch is not obliged to undertake any additional reporting to take into consideration any information that may become available between the point in time specified by the date/time stamp and the date on which the Report was provided by Lotsearch to the purchaser of the Report;
   (e) Reports must be used or reproduced in their entirety and End User must not reproduce or make available to other persons only parts of the Report;
   (f) Lotsearch has not undertaken any physical inspection of the property;
   (g) neither Lotsearch nor Third Party Content Suppliers warrants that all land uses or features whether past or current are identified in the Report;
   (h) the Report does not include any information relating to the actual state or condition of the Property;
   (i) the Report should not be used or taken to indicate or exclude actual fitness or unfitness of Land or Property for any particular purpose
   (j) the Report should not be relied upon for determining saleability or value or making any other decisions in relation to the Property and in particular should not be taken to be a rating or assessment of the desirability or market value of the property or its features; and
   (k) the End User should undertake its own inspections of the Land or Property to satisfy itself that there are no defects or failures
2. The End User may not make the Report or any copies or extracts of the report or any part of it available to any other person. If End User wishes to provide the Report to any other person or make extracts or copies of the Report, it must contact the purchaser of the Report before doing so to ensure the proposed use is consistent with the contract terms between Lotsearch and the purchaser.
3. Neither Lotsearch (nor any of its officers, employees or agents) nor any of its Third Party Content Suppliers will have any liability to End User or any person to whom End User provides the Report and End User must not represent that Lotsearch or any of its Third Party Content Suppliers accepts liability to any such person or make any other representation to any such person on behalf of Lotsearch or any Third Party Content Supplier.
4. The End User hereby to the maximum extent permitted by law:
   (a) acknowledges that the Lotsearch (nor any of its officers, employees or agents), nor any of its Third Party Content Supplier have any liability to it under or in connection with the

Report or these Terms;

(b) waives any right it may have to claim against Third Party Content Supplier in connection with the Report, or the negotiation of, entry into, performance of, or termination of these Terms; and

(c) releases each Third Party Content Supplier from any claim it may have otherwise had in connection with the Report, or the negotiation of, entry into, performance of, or termination of these Terms.

5. The End User acknowledges that any Third Party Supplier shall be entitled to plead the benefits conferred on it under clause 4, despite not being a party to these terms.
6. End User must not remove any copyright notices, trade marks, digital rights management information, other embedded information, disclaimers or limitations from the Report or authorise any person to do so.
7. End User acknowledges and agrees that Lotsearch and Third Party Content Suppliers retain ownership of all copyright, patent, design right (registered or unregistered), trade marks (registered or unregistered), database right or other data right, moral right or know how or any other intellectual property right in any Report or any other item, information or data included in or provided as part of a Report.
8. To the extent permitted by law and subject to paragraph 9, all implied terms, representations and warranties whether statutory or otherwise relating to the subject matter of these Terms other than as expressly set out in these Terms are excluded.
9. Subject to paragraph 6, Lotsearch excludes liability to End User for loss or damage of any kind, however caused, due to Lotsearch's negligence, breach of contract, breach of any law, in equity, under indemnities or otherwise, arising out of all acts, omissions and events whenever occurring.
10. Lotsearch acknowledges that if, under applicable State, Territory or Commonwealth law, End User is a consumer certain rights may be conferred on End User which cannot be excluded, restricted or modified. If so, and if that law applies to Lotsearch, then, Lotsearch's liability is limited to the greater of an amount equal to the cost of resupplying the Report and the maximum extent permitted under applicable laws.
11. Subject to paragraph 9, neither Lotsearch nor the End User is liable to the other for:
    (a) any indirect, incidental, consequential, special or exemplary damages arising out of or in relation to the Report or these Terms; or
    (b) any loss of profit, loss of revenue, loss of interest, loss of data, loss of goodwill or loss of business opportunities, business interruption arising directly or indirectly out of or in relation to the Report or these Terms,

    irrespective of how that liability arises including in contract or tort, liability under indemnity or for any other common law, equitable or statutory cause of action or otherwise.
12. These Terms are subject to New South Wales law.

VALLEY/CIVILAB
Geotechnical & Environmental Services

Annex E

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

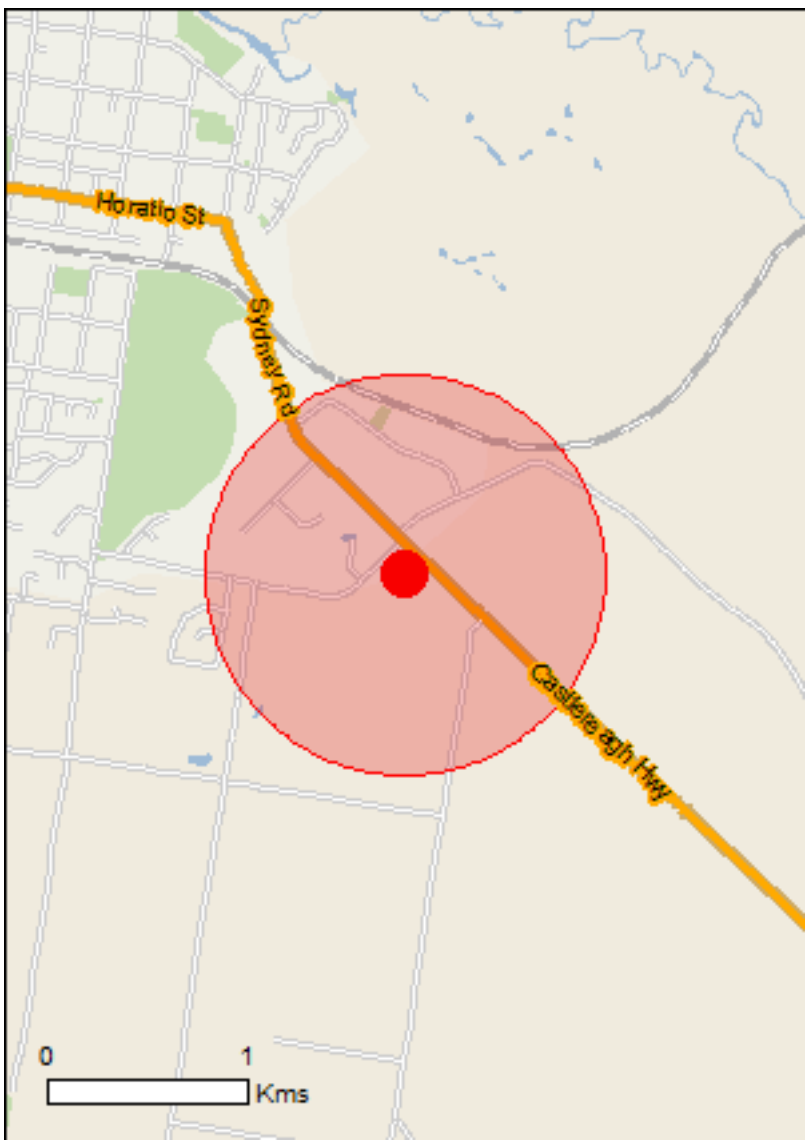
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 25/07/19 10:08:52

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

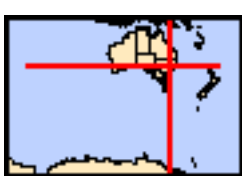
Caveat
Acknowledgements



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates

Buffer: 1.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	27
Listed Migratory Species:	11

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	17
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	26
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Banrock station wetland complex	800 - 900km upstream
Riverland	800 - 900km upstream
The coorong, and lakes alexandrina and albert wetland	900 - 1000km upstream
The macquarie marshes	200 - 300km upstream

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community may occur within area
Natural Temperate Grassland of the South Eastern Highlands	Critically Endangered	Community may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Rostratula australis		
Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Fish		
Galaxias rostratus		
Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat may occur within area
Macquaria australasica		
Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Frogs		
Litoria booroolongensis		
Booroolong Frog [1844]	Endangered	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Nyctophilus corbeni		
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Plants		
Dichanthium setosum		
bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
Euphrasia arguta		
[4325]	Critically Endangered	Species or species habitat likely to occur within area
Leucochrysum albicans var. tricolor		
Hoary Sunray, Grassland Paper-daisy [56204]	Endangered	Species or species habitat known to occur within area
Ozothamnus tesselatus		
[56203]	Vulnerable	Species or species habitat likely to occur within area
Prasophyllum petilum		
Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area
Prasophyllum sp. Wybong (C.Phelps ORG 5269)		
a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area
Swainsona recta		
Small Purple-pea, Mountain Swainson-pea, Small Purple Pea [7580]	Endangered	Species or species habitat likely to occur within area
Reptiles		

Name	Status	Type of Presence
Aprasia parapulchella		
Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area
Delma impar		
Striped Legless Lizard [1649]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus		
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat likely to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Rostratula benghalensis (sensu lato)		
Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis		
Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos		
Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis		
European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia		
Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus		
House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis		
Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris		
Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula		
Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus		
Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris		
Domestic Dog [82654]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-32.61394 149.60485

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

© Commonwealth of Australia
Department of the Environment
GPO Box 787
Canberra ACT 2601 Australia
+61 2 6274 1111

VALLEY/CIVILAB
Geotechnical & Environmental Services

Annex F

BOREHOLE LOG REPORT

HOLE NO: BH1
FILE / JOB NO: P1834
SHEET: 1 OF 1

CLIENT : Bunnings Group Limited
PROJECT : Preliminary Site Investigation
LOCATION : 132 Lions Drive, Mudgee

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Trailer Mounted Drill Rig	CONTRACTOR:	DRILLER: RB
DATE LOGGED: 10/07/2019 DATE SAMPLED: 10/07/2019	LOGGED BY: ML	CHECKED BY: NWR

TESTING & SAMPLING

Water	DCP AS 1289.6.3.2-1997 Depth (m)	DCP Blows	Field Tests	Samples
	1.0 - 1.1	4		
	1.1 - 1.2	8		
	1.2 - 1.3	13		
	1.3 - 1.4	8		
	1.4 - 1.5	7		
	1.5 - 1.6	15		
	1.6 - 1.7	Refusal		
				ES 0.20-0.30
				D 2.00-2.10

MATERIAL

Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
		SM	Silty SAND / Sandy SILT, fine grained, low plasticity, light brown		MD	ALLUVIUM
0.30m			Weathered SANDSTONE, fine grained, light brown / orange, inferred very low strength			ROCK
1.00m			Becoming with fine to medium gravel	D		
1.80m			Extremely Weathered SANDSTONE, fine grained, grey / brown			
2.40m			Becoming grey / red / brown			
4.00m			Becoming grey / mottled red	D to M		
6.00m			Terminated at 6.00 m			

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table

Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
ES	-	Environmental Sample
B	-	Bulk Disturbed Sample
MC	-	Moisture Content
PP	-	Pocket Penetrometer
SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
LL	-	Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

VCL 3.03 LIBRARY.GLB | VCL - BOREHOLE AND TESTPIT LOG | P1834 _ BOREHOLE LOGS.GPJ | 02/08/2019 | DS

BOREHOLE LOG REPORT

HOLE NO: BH2
FILE / JOB NO: P1834
SHEET: 1 OF 1

CLIENT : Bunnings Group Limited
PROJECT : Preliminary Site Investigation
LOCATION : 132 Lions Drive, Mudgee

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Trailer Mounted Drill Rig	CONTRACTOR:	DRILLER: RB
DATE LOGGED: 10/07/2019 DATE SAMPLED: 10/07/2019	LOGGED BY: ML	CHECKED BY: NWR

TESTING & SAMPLING				MATERIAL						
Water	DCP AS 1289.6.3.2-1997 Depth (m)	DCP AS 1289.6.3.2-1997 Blows	Field Tests	Samples	Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
	0.0 - 0.1	4					SM	0.20m Silty SAND / Sandy SILT, fine grained, low plasticity, light brown		MD	ALLUVIUM
	0.1 - 0.2	8									
	0.2 - 0.3	10						Weathered SANDSTONE, fine grained, light brown / yellow, inferred very low strength			ROCK
	0.3 - 0.4	Refusal		ES 0.40-0.50							
					1.0			1.00m Becoming trace fine to medium gravel	D		
					2.0			2.00m Becoming brown			
				D 3.00-3.20	3.0				D to M		
								3.50m Becoming red / brown			
								3.80m Extremely Weathered Clayey SANDSTONE, fine grained, grey / mottled red, medium plasticity clay, inferred very low strength			
				D 4.00-4.20	4.0						
					5.0				M		
					6.0			6.00m Terminated at 6.00 m			
					7.0						
					8.0						
					9.0						

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table
Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
ES	-	Environmental Sample
B	-	Bulk Disturbed Sample
MC	-	Moisture Content
PP	-	Pocket Penetrometer
SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
LL	-	Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

VCL 3.03 LIBRARY.GLB | VCL - BOREHOLE AND TESTPIT LOG | P1834 _ BOREHOLE LOGS.GPJ | 02/08/2019 | DS

BOREHOLE LOG REPORT

HOLE NO: BH4
FILE / JOB NO: P1834
SHEET: 1 OF 1

CLIENT : Bunnings Group Limited
PROJECT : Preliminary Site Investigation
LOCATION : 132 Lions Drive, Mudgee

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Trailer Mounted Drill Rig	CONTRACTOR:	DRILLER: RB
DATE LOGGED: 10/07/2019 DATE SAMPLED: 10/07/2019	LOGGED BY: ML	CHECKED BY: NWR

TESTING & SAMPLING				MATERIAL						
Water	DCP AS 1289.6.3.2-1997 Depth (m)	DCP AS 1289.6.3.2-1997 Blows	Field Tests	Samples	Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
	0.0 - 0.1	6					SM	Silty SAND / Sandy SILT, fine grained, low plasticity, light brown		MD	ALLUVIUM
	0.1 - 0.2	7						0.30m			
	0.2 - 0.3	10		ES 0.20-0.30				Weathered SANDSTONE, fine grained, brown / yellow, inferred very low strength			ROCK
	0.3 - 0.4	9									
	0.4 - 0.5	10									
	0.5 - 0.6	Refusal		ES 0.70-0.80	1.0				D		
					2.0				D to M		
					3.0			3.50m			
								Becoming Extremely Weathered SANDSTONE, fine grained, brown / red/ orange, inferred very low strength			
				D 4.00-4.30	4.0				M		
								4.50m			
								Becoming grey / red / yellow / brown			
								4.80m			
					5.0			Becoming with fine to medium gravel	M to W		
								6.00m			
					6.0			Terminated at 6.00 m			
					7.0						
					8.0						
					9.0						

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table

Water inflow

SAMPLES & FIELD TESTS

U - Undisturbed Sample
D - Disturbed Sample
ES - Environmental Sample
B - Bulk Disturbed Sample

MC - Moisture Content
PP - Pocket Penetrometer
SPT - Standard Penetration Test
VS - Vane Shear

MOISTURE

D - Dry
M - Moist
W - Wet
<PL - Moist, below PL
~PL - Moist, approx. PL
>PL - Moist, above PL
~LL - Wet, approx. LL
>LL - Wet, above LL

PL - Plastic Limit
LL - Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

VCL 3.03 LIBRARY.GLB | VCL - BOREHOLE AND TESTPIT LOG | P1834 _ BOREHOLE LOGS.GPJ | 02/08/2019 | DS

BOREHOLE LOG REPORT

HOLE NO: BH5
FILE / JOB NO: P1834
SHEET: 1 OF 1

CLIENT : Bunnings Group Limited
PROJECT : Preliminary Site Investigation
LOCATION : 132 Lions Drive, Mudgee

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Trailer Mounted Drill Rig	CONTRACTOR:	DRILLER: RB
DATE LOGGED: 10/07/2019 DATE SAMPLED: 10/07/2019	LOGGED BY: ML	CHECKED BY: NWR

TESTING & SAMPLING				MATERIAL						
Water	DCP AS 1289.6.3.2-1997 Depth (m)	DCP AS 1289.6.3.2-1997 Blows	Field Tests	Samples	Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
	0.0 - 0.1	6					SM	Silty SAND / Sandy SILT, fine grained, low plasticity, light brown		MD	ALLUVIUM
	0.1 - 0.2	8		ES 0.20-0.30				0.30m			
	0.2 - 0.3	11						Weathered SANDSTONE, fine grained, brown / orange / yellow, inferred very low to low strength			ROCK
	0.3 - 0.4	15		ES 0.70-0.80	1.0						
	0.4 - 0.5	Refusal		ES 1.40-1.50	2.0				D		
					3.0						
					4.0				D to M		
								4.80m			
				D 5.00-5.50	5.0		CH	Silty Sandy Gravelly CLAY, high plasticity, brown / red, fine grained sand, medium to coarse gravel	>PL	St to VSt	RESIDUAL SOIL
					6.0			6.00m			
								Terminated at 6.00 m			
					7.0						
					8.0						
					9.0						

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table
Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
ES	-	Environmental Sample
B	-	Bulk Disturbed Sample
MC	-	Moisture Content
PP	-	Pocket Penetrometer
SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
LL	-	Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

VCL 3.03 LIBRARY.GLB | VCL - BOREHOLE AND TESTPIT LOG | P1834 _ BOREHOLE LOGS.GPJ | 02/08/2019 | DS

BOREHOLE LOG REPORT

HOLE NO: BH6
FILE / JOB NO: P1834
SHEET: 1 OF 1

CLIENT : Bunnings Group Limited
PROJECT : Preliminary Site Investigation
LOCATION : 132 Lions Drive, Mudgee

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Trailer Mounted Drill Rig	CONTRACTOR:	DRILLER: RB
DATE LOGGED: 10/07/2019 DATE SAMPLED: 10/07/2019	LOGGED BY: ML	CHECKED BY: NWR

TESTING & SAMPLING				MATERIAL						
Water	DCP AS 1289.6.3.2-1997 Depth (m)	DCP AS 1289.6.3.2-1997 Blows	Field Tests	Samples	Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
	0.0 - 0.1	5					SM	Silty SAND / Sandy SILT, fine grained, low plasticity, light brown		MD	ALLUVIUM
	0.1 - 0.2	10		ES 0.20-0.30				0.30m			
	0.2 - 0.3	10						Weathered SANDSTONE, fine grained, orange / red, inferred very low strength			ROCK
	0.3 - 0.4	18		ES 0.70-0.80							
	0.4 - 0.5	Refusal		D 1.00-1.10	1.0			1.50m			
								Becoming with fine to medium gravel	D		
				D 2.00-2.20	2.0			2.30m			
								Becoming without gravel			
					3.0			3.50m			
								Becoming grey / red			
					4.0				M		
					5.0			5.00m			
								Becoming yellow / brown			
					6.0			6.00m			
								Terminated at 6.00 m			
					7.0						
					8.0						
					9.0						

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table

Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
ES	-	Environmental Sample
B	-	Bulk Disturbed Sample
MC	-	Moisture Content
PP	-	Pocket Penetrometer
SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
LL	-	Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

VCL 3.03 LIBRARY.GLB | VCL - BOREHOLE AND TESTPIT LOG | P1834 _ BOREHOLE LOGS.GPJ | 02/08/2019 | DS

BOREHOLE LOG REPORT

HOLE NO: BH7
FILE / JOB NO: P1834
SHEET: 1 OF 1

CLIENT : Bunnings Group Limited
PROJECT : Preliminary Site Investigation
LOCATION : 132 Lions Drive, Mudgee

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Trailer Mounted Drill Rig	CONTRACTOR:	DRILLER: RB
DATE LOGGED: 10/07/2019 DATE SAMPLED: 10/07/2019	LOGGED BY: ML	CHECKED BY: NWR

TESTING & SAMPLING				MATERIAL						
Water	DCP AS 1289.6.3.2-1997 Depth (m)	DCP Blows	Field Tests	Samples	Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
	0.0 - 0.1	4					SM	Silty SAND / Sandy SILT, fine grained, low plasticity, light brown		MD	ALLUVIUM
	0.1 - 0.2	6		ES + DUP1 0.20-0.30				0.30m			
	0.2 - 0.3	10						Weathered SANDSTONE, fine grained, brown / orange, inferred very low to low strength			ROCK
	0.3 - 0.4	15		ES 0.70-0.80							
	0.4 - 0.5	Refusal		D 1.00-1.10	1.0			1.20m			
								Becoming with fine to medium gravel			
				ES 1.50-1.60	2.0				D		
					3.0						
					4.0			4.30m			
								Silty Sandy CLAY, high plasticity, grey / mottled red, medium to coarse grained sand			RESIDUAL SOIL
					5.0		CH		>PL	St	
								6.00m			
					6.0			Terminated at 6.00 m			
					7.0						
					8.0						
					9.0						

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table
Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
ES	-	Environmental Sample
B	-	Bulk Disturbed Sample
MC	-	Moisture Content
PP	-	Pocket Penetrometer
SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
LL	-	Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

VCL 3.03 LIBRARY.GLB | VCL - BOREHOLE AND TESTPIT LOG | P1834 _ BOREHOLE LOGS.GPJ | 02/08/2019 | DS

BOREHOLE LOG REPORT

HOLE NO: BH8
FILE / JOB NO: P1834
SHEET: 1 OF 1

CLIENT : Bunnings Group Limited
PROJECT : Preliminary Site Investigation
LOCATION : 132 Lions Drive, Mudgee

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Trailer Mounted Drill Rig	CONTRACTOR:	DRILLER: RB
DATE LOGGED: 10/07/2019 DATE SAMPLED: 10/07/2019	LOGGED BY: ML	CHECKED BY: NWR

TESTING & SAMPLING

Water	DCP AS 1289.6.3.2-1997 Depth (m)	DCP Blows	Field Tests	Samples
	0.0 - 0.1	7		
	0.1 - 0.2	10		
	0.2 - 0.3	10		ES 0.20-0.30
	0.3 - 0.4	13		
	0.4 - 0.5	Refusal		

MATERIAL

Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
0.00		SM	Silty SAND / Sandy SILT, fine grained, low plasticity, light brown		MD	ALLUVIUM
0.30m			Weathered SANDSTONE, fine grained, llght brown / orange, with fine to medium gravel, inferred very low strength			ROCK
1.0						
				D		
2.00m			Becoming brown			
2.0						
3.0						
3.50m			Becoming orange / brown			
4.0						
4.50m			Becoming brown / pink / white			
				D to M		
5.0						
6.00m			Terminated at 6.00 m			
6.0						
7.0						
8.0						
9.0						

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table

Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
ES	-	Environmental Sample
B	-	Bulk Disturbed Sample
MC	-	Moisture Content
PP	-	Pocket Penetrometer
SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
LL	-	Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

VCL 3.03 LIBRARY.GLB | VCL - BOREHOLE AND TESTPIT LOG | P1834 _ BOREHOLE LOGS.GPJ | 02/08/2019 | DS

BOREHOLE LOG REPORT

HOLE NO: BH10
FILE / JOB NO: P1834
SHEET: 1 OF 1

CLIENT : Bunnings Group Limited
PROJECT : Preliminary Site Investigation
LOCATION : 132 Lions Drive, Mudgee

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Trailer Mounted Drill Rig	CONTRACTOR:	DRILLER: LB
DATE LOGGED: 10/07/2019 DATE SAMPLED: 10/07/2019	LOGGED BY: NWR	CHECKED BY: ML

TESTING & SAMPLING

Water	DCP AS 1289.6.3.2-1997 Depth (m)	DCP Blows	Field Tests	Samples
	0.0 - 0.1	6		
	0.1 - 0.2	5		
	0.2 - 0.3	6		
	0.3 - 0.4	8		ES + DUP2 0.30-0.40
	0.4 - 0.5	12		ES 0.60-0.70
	0.5 - 0.6	Refusal		D 0.80-1.20
				D 2.00-2.10
				D 3.00-3.20

MATERIAL

Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
		SC	Silty Clayey SAND / Sandy CLAY, fine to medium grained sand, low to medium plasticity clay, pale brown	M	MD	SLOPE WASH / RESIDUAL SOIL
			0.40m			
			Weathered SANDSTONE, fine to medium grained sand, pale brown / orange, inferred very low strength			ROCK
1.0				D		
2.0						
			2.50m			
			Extremely Weathered Clayey SANDSTONE, fine to meidum grained, pale grey / orange, medium to high plasticity clay, inferred very low strength			
3.0						
4.0						
			4.30m	M		
			Extremely Weathered SILTSTONE / CLAYSTONE, white / red, inferred extremely low strength			
5.0						
			6.00m			
6.0			Terminated at 6.00 m			
7.0						
8.0						
9.0						

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table

Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
ES	-	Environmental Sample
B	-	Bulk Disturbed Sample
MC	-	Moisture Content
PP	-	Pocket Penetrometer
SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
LL	-	Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

VCL 3.03 LIBRARY.GLB | VCL - BOREHOLE AND TESTPIT LOG | P1834 _ BOREHOLE LOGS.GPJ | 02/08/2019 | DS

BOREHOLE LOG REPORT

HOLE NO: BH15
FILE / JOB NO: P1834
SHEET: 1 OF 1

CLIENT : Bunnings Group Limited
PROJECT : Preliminary Site Investigation
LOCATION : 132 Lions Drive, Mudgee

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Trailer Mounted Drill Rig	CONTRACTOR:	DRILLER: LB
DATE LOGGED: 10/07/2019 DATE SAMPLED: 10/07/2019	LOGGED BY: NWR	CHECKED BY: ML

TESTING & SAMPLING					MATERIAL						
Water	Penetrometer Testing Depth (m)	Penetrometer Testing Blows	Field Tests	Samples	Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
				ES 0.30-0.40			SM	0.30m Silty SAND / Sandy SILT, fine grained sand, low plasticity silt, brown / light brown	D	MD	ALLUVIUM
							ML	0.45m Clayey SILT (Silty LOAM), low plasticity, pale brown, with fine grained sand			SLOPE WASH
				ES 0.70-0.80							RESIDUAL SOIL
				B 0.80-1.20			CI-CH	Silty CLAY, medium to high plasticity, dark orange, with fine grained sand, with weathered inclusions (becoming extremely weathered sandstone)	~PL	VSt to H	
					1.0			1.20m			
							CI-CH	1.30m Becoming with fine to medium gravel			
								Practical Refusal at 1.30 m			
					2.0						
					3.0						
					4.0						
					5.0						
					6.0						
					7.0						
					8.0						
					9.0						

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table

Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
ES	-	Environmental Sample
B	-	Bulk Disturbed Sample
MC	-	Moisture Content
PP	-	Pocket Penetrometer
SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
LL	-	Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

VCL 3.03 LIBRARY.GLB | VCL - BOREHOLE AND TESTPIT LOG | P1834 _ BOREHOLE LOGS.GPJ | 02/08/2019 | DS

BOREHOLE LOG REPORT

HOLE NO: BH16
FILE / JOB NO: P1834
SHEET: 1 OF 1

CLIENT : Bunnings Group Limited
PROJECT : Preliminary Site Investigation
LOCATION : 132 Lions Drive, Mudgee

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Trailer Mounted Drill Rig	CONTRACTOR:	DRILLER: RB
DATE LOGGED: 10/07/2019 DATE SAMPLED: 10/07/2019	LOGGED BY: ML	CHECKED BY: NWR

TESTING & SAMPLING

Water	DCP AS 1289.6.3.2-1997 Depth (m)	DCP Blows	Field Tests	Samples
	0.0 - 0.1	4		
	0.1 - 0.2	10		
	0.2 - 0.3	12		ES 0.20-0.30
	0.3 - 0.4	Terminated		ES 0.70-0.80
				D 1.50-1.70
				D 7.00-7.50

MATERIAL

Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
		SM	Silty SAND / Sandy SILT, fine grained sand, low plasticity silt, brown / light brown		MD	ALLUVIUM
0.40m			Weathered SANDSTONE, fine grained, brown / orange, with fine to medium gravel, inferred very low strength	D		ROCK
1.0						
2.0						
2.50m			Becoming brown / red			
3.0						
3.20m			Extremely Weathered SANDSTONE, fine grained, red / brown / grey, low plasticity, inferred very low strength	M		
4.0						
4.50m			Silty CLAY, high plasticity, grey / mottled red			RESIDUAL SOIL
5.0						
6.0		CH		>PL	F to St	
7.0						
8.00m			Becoming with fine to medium gravel			
8.0		CH				
9.00m			Terminated at 9.00 m			
9.0						

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table

Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
ES	-	Environmental Sample
B	-	Bulk Disturbed Sample
MC	-	Moisture Content
PP	-	Pocket Penetrometer
SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
LL	-	Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

VCL 3.03 LIBRARY.GLB | VCL - BOREHOLE AND TESTPIT LOG | P1834 _ BOREHOLE LOGS.GPJ | 02/08/2019 | DS

BOREHOLE LOG REPORT

HOLE NO: BH17
FILE / JOB NO: P1834
SHEET: 1 OF 1

CLIENT : Bunnings Group Limited
PROJECT : Preliminary Site Investigation
LOCATION : 132 Lions Drive, Mudgee

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Trailer Mounted Drill Rig	CONTRACTOR:	DRILLER: RB
DATE LOGGED: 11/07/2019 DATE SAMPLED: 11/07/2019	LOGGED BY: ML	CHECKED BY: NWR

TESTING & SAMPLING				MATERIAL						
Water	DCP AS 1289.6.3.2-1997 Depth (m)	DCP AS 1289.6.3.2-1997 Blows	Field Tests	Samples	Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
	0.0 - 0.1	5			0		SM	Silty SAND / Sandy SILT, fine grained sand, low plasticity		MD	ALLUVIUM
	0.1 - 0.2	8						silt, brown / light brown			
	0.2 - 0.3	10						0.30m			
	0.3 - 0.4	16						Weathered SANDSTONE, fine grained, light brown / brown / orange, with fine to medium gravel, inferred very low strength			ROCK
	0.4 - 0.5	Refusal			1.0						
					2.0						
					3.0				D		
					4.0			4.00m			
								Extremely Weathered SANDSTONE, fine grained, brown / orange, inferred very low strength			
								4.30m			
								Becoming with fine to medium gravel			
					5.0						
								5.70m			
								Silty CLAY, high plasticity, grey			RESIDUAL SOIL
					6.0		CH				
								6.50m			
								Becoming red / brown / grey			
					7.0				>PL	St	
							CH				
					8.0						
								9.00m			
					9.0			Terminated at 9.00 m			

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table

Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
ES	-	Environmental Sample
B	-	Bulk Disturbed Sample
MC	-	Moisture Content
PP	-	Pocket Penetrometer
SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
LL	-	Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

VCL 3.03 LIBRARY.GLB | VCL - BOREHOLE AND TESTPIT LOG | P1834 _ BOREHOLE LOGS.GPJ | 02/08/2019 | DS

BOREHOLE LOG REPORT

HOLE NO: BH20
FILE / JOB NO: P1834
SHEET: 1 OF 1

CLIENT : Bunnings Group Limited
PROJECT : Preliminary Site Investigation
LOCATION : 132 Lions Drive, Mudgee

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Trailer Mounted Drill Rig	CONTRACTOR:	DRILLER: LB
DATE LOGGED: 10/07/2019 DATE SAMPLED: 10/07/2019	LOGGED BY: NWR	CHECKED BY: ML

TESTING & SAMPLING					MATERIAL						
Water	Penetrometer Testing Depth (m)	Penetrometer Testing Blows	Field Tests	Samples	Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
				ES 0.20-0.30			ML	0.20m TOPSOIL: Sandy SILT, low plasticity, pale grey, fine grained sand	D	MD	TOPSOIL
							CI	Sandy CLAY, medium plasticity, pale brown / orange / mottled white			RESIDUAL SOIL
				ES 0.70-0.80				0.80m Becoming with weathered inclusions	>PL	St	
					1.0		CI	1.50m			
								Terminated at 1.50 m			
					2.0						
					3.0						
					4.0						
					5.0						
					6.0						
					7.0						
					8.0						
					9.0						

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table

Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
ES	-	Environmental Sample
B	-	Bulk Disturbed Sample
MC	-	Moisture Content
PP	-	Pocket Penetrometer
SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
LL	-	Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

VCL 3.03 LIBRARY.GLB | VCL - BOREHOLE AND TESTPIT LOG | P1834 _ BOREHOLE LOGS.GPJ | 02/08/2019 | DS

BOREHOLE LOG REPORT

HOLE NO: BH22
FILE / JOB NO: P1834
SHEET: 1 OF 1

CLIENT : Bunnings Group Limited
PROJECT : Preliminary Site Investigation
LOCATION : 132 Lions Drive, Mudgee

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Trailer Mounted Drill Rig	CONTRACTOR:	DRILLER: LB
DATE LOGGED: 10/07/2019 DATE SAMPLED: 10/07/2019	LOGGED BY: NWR	CHECKED BY: ML

TESTING & SAMPLING				MATERIAL						
Water	DCP AS 1289.6.3.2-1997 Depth (m)	DCP AS 1289.6.3.2-1997 Blows	Field Tests	Samples	Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
	0.0 - 0.1	10		D 0.10-0.30			ML	TOPSOIL: Sandy SILT, low plasticity, pale grey, fine grained sand	D	MD	TOPSOIL
	0.1 - 0.2	14		ES 0.20-0.30				0.30m			
	0.2 - 0.3	11					CI-CH	Sandy CLAY, medium to high plasticity, pale grey / orange, fine to medium grained sand	~PL to >PL	St	RESIDUAL SOIL
	0.3 - 0.4	10		B 0.40-0.70				0.80m			
	0.4 - 0.5	Terminated		ES 0.70-0.80	1.0			Weathered SANDSTONE, fine to medium graind, pale brown, inferred very low to low strength			ROCK
								1.20m			
								Practical Refusal at 1.20 m			
					2.0						
					3.0						
					4.0						
					5.0						
					6.0						
					7.0						
					8.0						
					9.0						

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table

Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
ES	-	Environmental Sample
B	-	Bulk Disturbed Sample
MC	-	Moisture Content
PP	-	Pocket Penetrometer
SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
LL	-	Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

VCL 3.03 LIBRARY.GLB | VCL - BOREHOLE AND TESTPIT LOG | P1834 _ BOREHOLE LOGS.GPJ | 02/08/2019 | DS

BOREHOLE LOG REPORT

HOLE NO: BH23
FILE / JOB NO: P1834
SHEET: 1 OF 1

CLIENT : Bunnings Group Limited
PROJECT : Preliminary Site Investigation
LOCATION : 132 Lions Drive, Mudgee

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Trailer Mounted Drill Rig	CONTRACTOR:	DRILLER: RB
DATE LOGGED: 10/07/2019 DATE SAMPLED: 10/07/2019	LOGGED BY: ML	CHECKED BY: NWR

TESTING & SAMPLING					MATERIAL						
Water	Penetrometer Testing Depth (m)	Penetrometer Testing Blows	Field Tests	Samples	Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
				ES 0.20-0.30	0.00		SM	Silty SAND / Sandy SILT, fine grained sand, low plasticity silt, brown / light brown		MD	ALLUVIUM
				D 0.50-0.60	0.40m			Weathered SANDSTONE, fine grained, brown / light brown / orange, with fine to medium gravel, inferred very low to low strength	D		ROCK
				ES+ D 0.70-0.80	1.0						
					1.80m		CH		>PL	F to St	RESIDUAL SOIL
					2.00m			Silty Sandy CLAY, high plasticity, brown / grey, fine grained sand, with fine to coarse gravel			
					2.0			Terminated at 2.00 m			
					3.0						
					4.0						
					5.0						
					6.0						
					7.0						
					8.0						
					9.0						

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table
Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
ES	-	Environmental Sample
B	-	Bulk Disturbed Sample
MC	-	Moisture Content
PP	-	Pocket Penetrometer
SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
LL	-	Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

VCL 3.03 LIBRARY.GLB | VCL - BOREHOLE AND TESTPIT LOG | P1834 _ BOREHOLE LOGS.GPJ | 02/08/2019 | DS

BOREHOLE LOG REPORT

HOLE NO: BH24
FILE / JOB NO: P1834
SHEET: 1 OF 1

CLIENT : Bunnings Group Limited
PROJECT : Preliminary Site Investigation
LOCATION : 132 Lions Drive, Mudgee

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Trailer Mounted Drill Rig	CONTRACTOR:	DRILLER: RB
DATE LOGGED: 10/07/2019 DATE SAMPLED: 10/07/2019	LOGGED BY: ML	CHECKED BY: NWR

TESTING & SAMPLING					MATERIAL						
Water	Penetrometer Testing Depth (m)	Penetrometer Testing Blows	Field Tests	Samples	Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
				ES 0.20-0.30	0.00		SM	Silty SAND / Sandy SILT, fine grained sand, low plasticity silt, brown / light brown		MD	ALLUVIUM
				ES 0.70-0.80	0.40m			Weathered SANDSTONE, fine grained, light brown / orange, inferred very low strength			ROCK
					1.00m			Becoming with medium gravel	D		
					1.30m			Becoming red / brown			
					1.70m			Becoming grey / red / brown			
					2.00m			Terminated at 2.00 m			
					2.0						
					3.0						
					4.0						
					5.0						
					6.0						
					7.0						
					8.0						
					9.0						

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table

Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
ES	-	Environmental Sample
B	-	Bulk Disturbed Sample
MC	-	Moisture Content
PP	-	Pocket Penetrometer
SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
LL	-	Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

VCL 3.03 LIBRARY.GLB | VCL - BOREHOLE AND TESTPIT LOG | P1834 _ BOREHOLE LOGS.GPJ | 02/08/2019 | DS

BOREHOLE LOG REPORT

HOLE NO: BH27
FILE / JOB NO: P1834
SHEET: 1 OF 1

CLIENT : Bunnings Group Limited
PROJECT : Preliminary Site Investigation
LOCATION : 132 Lions Drive, Mudgee

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Trailer Mounted Drill Rig	CONTRACTOR:	DRILLER: LB
DATE LOGGED: 10/07/2019 DATE SAMPLED: 10/07/2019	LOGGED BY: NWR	CHECKED BY: ML

TESTING & SAMPLING				MATERIAL						
Water	Penetrometer Testing Depth (m)	Penetrometer Testing Blows	Field Tests	Samples	Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
					0.10m		ML	TOPSOIL: Sandy SILT, low plasticity, pale grey, fine grained sand	D	MD to D	TOPSOIL SLOPE WASH
				ES 0.30-0.40	0.40m		ML	Sandy SILT, low plasticity, pale grey, fine grained sand			ROCK
				ES 0.70-0.80	1.0			Weathered SANDSTONE, fine to medium grained, pale brown, inferred low strength	D to M		
					1.50m			Becoming with fine to medium sub-rounded to rounded gravel			
					2.0						
				D 2.50-2.80	2.50m		CI-CH	Sandy Clayey GRAVEL / Gravelly CLAY, medium to high plasticity, fine to medium sub-rounded gravel, dark orange / white, fine to medium grained sand	>PL	St	RESIDUAL SOIL
					3.0						
					3.20m			Extremely Weathered SILTSTONE / CLAYSTONE / SANDSTONE, fine grained, pale orange / white, inferred very low strength (clay like properties)			ROCK
					4.0						
					5.0						
					6.00m						
					6.0			Terminated at 6.00 m			
					7.0						
					8.0						
					9.0						

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table
Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
ES	-	Environmental Sample
B	-	Bulk Disturbed Sample
MC	-	Moisture Content
PP	-	Pocket Penetrometer
SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
LL	-	Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

VCL 3.03 LIBRARY.GLB | VCL - BOREHOLE AND TESTPIT LOG | P1834 _ BOREHOLE LOGS.GPJ | 02/08/2019 | DS

BOREHOLE LOG REPORT

HOLE NO: BH31
FILE / JOB NO: P1834
SHEET: 1 OF 1

CLIENT : Bunnings Group Limited
PROJECT : Preliminary Site Investigation
LOCATION : 132 Lions Drive, Mudgee

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Hand Auger	CONTRACTOR:	DRILLER: JD
DATE LOGGED: 10/07/2019 DATE SAMPLED: 10/07/2019	LOGGED BY: JD	CHECKED BY: MA

TESTING & SAMPLING					MATERIAL						
Water	Penetrometer Testing Depth (m)	Penetrometer Testing Blows	Field Tests	Samples	Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
				ES 0.20-0.30			ML	Grass overlying Sandy SILT, dark brown, fine to medium sand	M	S	
								0.50m Terminated at 0.50 m			

1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table

Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
ES	-	Environmental Sample
B	-	Bulk Disturbed Sample
MC	-	Moisture Content
PP	-	Pocket Penetrometer
SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
LL	-	Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

VCL 3.03 LIBRARY.GLB | VCL - BOREHOLE AND TESTPIT LOG | P1834 _ BOREHOLE LOGS.GPJ | 02/08/2019 | DS

VALLEY/CIVILAB
Geotechnical & Environmental Services

Annex G

	Metals								TRH NEPM (2013)							BTEX			
	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc	Mercury	TRH C6-C10 Fraction	TRH C6-C10 minus BTEX (F1)	TRH >C10-C16 Fraction	TRH >C10-C16 - Naphthalene (F2)	TRH >C16-C34 (F3)	TRH >C34-C40 (F4)	Napthalene	Benzene	Toluene	Ethylbenzene	Xylene Total
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Limit of Reporting	1	0.3	0.5	0.5	1	0.5	2	0.05	25	25	25	25	90	120	0.1	0.1	0.1	0.1	0.3
EILs (NEPM 2013)	160				1800										370				
ESLs - Fine (NEPM 2013)										215		170	2500	6600		95	135	185	180
ESLs - Coarse (NEPM 2013)										215		170	1700	3300		75	135	165	95
HIL D (NEPM 2013)	3000	900	3600	240000	1500	6000	400000	730											
HSL D - Soil Vapour Sand 0 - <1m (NEPM 2013)										260		NL			NL	3	NL	NL	230
HSL D - Soil Vapour Sand 1 - <2m (NEPM 2013)										370		NL			NL	3	NL	NL	NL
HSL D - Soil Vapour Sand 2 - <4m (NEPM 2013)										630		NL			NL	3	NL	NL	NL
HSL D - Soil Vapour Sand 4m+ (NEPM 2013)										NL		NL			NL	3	NL	NL	NL
HSL D - Soil Vapour Silt 0 - <1m (NEPM 2013)										250		NL			NL	4	NL	NL	NL
HSL D - Soil Vapour Silt 1 - <2m (NEPM 2013)										360		NL			NL	4	NL	NL	NL
HSL D - Soil Vapour Silt 2 - <4m (NEPM 2013)										590		NL			NL	6	NL	NL	NL
HSL D - Soil Vapour Silt 4m+ (NEPM 2013)										NL		NL			NL	10	NL	NL	NL
HSL D - Soil Vapour Clay 0 - <1m (NEPM 2013)										310		NL			NL	4	NL	NL	NL
HSL D - Soil Vapour Clay 1 - <2m (NEPM 2013)										480		NL			NL	6	NL	NL	NL
HSL D - Soil Vapour Clay 2 - <4m (NEPM 2013)										NL		NL			NL	9	NL	NL	NL
HSL D - Soil Vapour Clay 4m+ (NEPM 2013)										NL		NL			NL	20	NL	NL	NL
Management Limits - Fine Soil (NEPM 2013)									*800*		*1,000*		*5,000*	*10,000*					
Management Limits - Coarse Soil (NEPM 2013)									*700*		*1,000*		*3,500*	*10,000*					
HSL D - Direct Contact (CRC Care 2011)									**26,000**		**20,000**		**27,000**	**38,000**	**11,000**	**430**	**99,000**	**27,000**	**81,000**
Sample ID	**Sampled Date**																		
BH1 0.2-0.3	10/7/2019	**3**	<0.3	**4.6**	**3.2**	**4**	**2.6**	**9.9**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH2 0.4-0.5	10/7/2019	**17**	<0.3	**16**	**17**	**16**	**11**	**26**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH4 0.2-0.3	10/7/2019	**8**	<0.3	**7.1**	**4.8**	**7**	**2.6**	**12**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH4 0.7-0.8	10/7/2019	**19**	<0.3	**17**	**23**	**15**	**19**	**31**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH5 0.2-0.3	10/7/2019	**4**	<0.3	**5.0**	**3.1**	**5**	**2.3**	**11**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH5 0.7-0.8	10/7/2019	**13**	<0.3	**16**	**18**	**12**	**9.3**	**27**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH6 0.2-0.3	10/7/2019	**6**	<0.3	**7.3**	**5.9**	**7**	**4.9**	**21**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH6 0.7-0.8	10/7/2019	**15**	<0.3	**15**	**17**	**12**	**9.7**	**28**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH7 0.2-0.3	10/7/2019	**7**	<0.3	**6.8**	**6.1**	**8**	**3.2**	**16**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH7 0.7-0.8	10/7/2019	**13**	<0.3	**16**	**15**	**12**	**11**	**25**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH8 0.2-0.3	10/7/2019	**5**	<0.3	**5.8**	**2.5**	**5**	**2.7**	**11**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH10 0.3-0.4	10/7/2019	**2**	<0.3	**4.5**	**2.8**	**5**	**2.3**	**15**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH10 0.6-0.7	10/7/2019	**13**	<0.3	**16**	**14**	**10**	**11**	**23**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH15 0.3-0.4	10/7/2019	**3**	<0.3	**4.5**	**2.7**	**4**	**1.8**	**12**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH15 0.7-0.8	10/7/2019	**14**	<0.3	**15**	**17**	**12**	**9.1**	**27**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH17 0.2-0.3	10/7/2019	**9**	<0.3	**11**	**8.8**	**11**	**8.6**	**22**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH20 0.2-0.3	10/7/2019	**4**	<0.3	**5.6**	**3.0**	**7**	**2.5**	**13**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH20 0.7-0.8	10/7/2019	**16**	<0.3	**14**	**10**	**9**	**10**	**25**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH24 0.2-0.3	10/7/2019	**3**	<0.3	**6.5**	**4.5**	**7**	**3.3**	**17**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH24 0.7-0.8	10/7/2019	**8**	<0.3	**13**	**14**	**9**	**9.3**	**21**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH27 0.3-0.4	10/7/2019	**2**	<0.3	**4.5**	**3.6**	**5**	**2.6**	**9.7**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH27 0.7-0.8	10/7/2019	**15**	<0.3	**11**	**11**	**8**	**8.6**	**23**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
Statistical Summary																			
Number of Results		22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Number of Detects		22	0	22	22	22	22	22	0	0	0	0	0	0	0	0	0	0	0
Minimum Detect		2	0	4.5	2.5	4	1.8	9.7	0	0	0	0	0	0	0	0	0	0	0
Maximum Detect		19	0	17	23	16	19	31	0	0	0	0	0	0	0	0	0	0	0
Average Concentration		9.045455	-	10.1	9.409091	8.636364	6.7	19.34545	-	-	-	-	-	-	-	-	-	-	-
Number of Guideline Exceedances		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	PAH						OCP													OPP	PCB
	Naphthalene	Benzo(a)pyrene	Carcinogenic PAHs, BaP TEQ <LOR=0	Carcinogenic PAHs, BaP TEQ <LOR=LOR	Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	Total PAH	Aldrin	o,p'-DDE	o,p'-DDD	o,p'-DDT	Gamma Chlordane	Alpha Chlordane	Dieldrin	Alpha Endosulfan	Beta Endosulfan	Endrin	Heptachlor	Hexachlorobenzene (HCB)	Methoxychlor	Chlorpyrifos (Chlorpyrifos Ethyl)	Total PCBs (Arochlors)
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Limit of Reporting	0.1	0.1	0.2	0.3	0.2	0.8	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.2	1
EILs (NEPM 2013)	370									640											
ESLs - Coarse/Fine (NEPM 2013)		0.7																			
HIL D (NEPM 2013)			40	40	40	4000	45	3600	3600	3600	530	530	45	2000	2000	100	50	80	2500	2000	7
HSL B - Direct Contact (CRC Care 2011)	**11,000**																				
Sample ID	**Sampled Date**																				
BH1 0.2-0.3	10/7/2019	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.2	<1
BH2 0.4-0.5	10/7/2019	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.2	<1
BH4 0.2-0.3	10/7/2019	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.2	<1
BH4 0.7-0.8	10/7/2019	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
BH5 0.2-0.3	10/7/2019	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.2	<1
BH5 0.7-0.8	10/7/2019	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
BH6 0.2-0.3	10/7/2019	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.2	<1
BH6 0.7-0.8	10/7/2019	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
BH7 0.2-0.3	10/7/2019	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.2	<1
BH7 0.7-0.8	10/7/2019	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
BH8 0.2-0.3	10/7/2019	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.2	<1
BH10 0.3-0.4	10/7/2019	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.2	<1
BH10 0.6-0.7	10/7/2019	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
BH15 0.3-0.4	10/7/2019	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.2	<1
BH15 0.7-0.8	10/7/2019	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
BH17 0.2-0.3	10/7/2019	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.2	<1
BH20 0.2-0.3	10/7/2019	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.2	<1
BH20 0.7-0.8	10/7/2019	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
BH24 0.2-0.3	10/7/2019	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.2	<1
BH24 0.7-0.8	10/7/2019	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
BH27 0.3-0.4	10/7/2019	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.2	<1
BH27 0.7-0.8	10/7/2019	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Statistical Summary																					
Number of Results	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Detect	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum Detect	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average Concentration	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note:

[1] The NEPM presents a cumulative HIL for DDD, DDE and DDT (240 mg/kg). Concentrations for each of these compounds are presented separately above and conservatively assessed against the HIL.

[2] The NEPM presents a cumulative HIL for Aldrin and Dieldrin (6 mg/kg). Concentrations for each of these compounds are presented separately above and conservatively assessed against the HIL.

[3] The NEPM presents onee HIL for Endosulfan (270 mg/kg). Concentrations for Alpha Endosulfan and Beta Endosulfan are presented separately above and conservatively assessed against the HIL.

VALLEY/CIVILAB Geotechnical & Environmental Services	LOR	Unit	Primary Sample	QA Sample	RPD	Primary Sample	QA Sample	RPD
			BH7-0.2-0.3	DUP1		BH10 0.3-0.4	DUP2	
TRH								
TRH C6-C10	20	mg/kg	12.5	12.5	0.0	12.5	12.5	0.0
TRH C6-C10 minus BTEX (F1)	20	mg/kg	12.5	12.5	0.0	12.5	12.5	0.0
TRH >C10-C16	50	mg/kg	12.5	12.5	0.0	12.5	12.5	0.0
TRH >C10-C16 - Naphthalene (F2)	50	mg/kg	12.5	12.5	0.0	12.5	12.5	0.0
TRH >C16-C34 (F3)	100	mg/kg	45	45	0.0	45	45	0.0
TRH >C34-C40 (F4)	100	mg/kg	60	60	0.0	60	60	0.0
Naphthalene	0.5	mg/kg	0.05	0.05	0.0	0.05	0.05	0.0
BTEX								
Benzene	0.1	mg/kg	0.05	0.05	0.0	0.05	0.05	0.0
Ethylbenzene	0.1	mg/kg	0.05	0.05	0.0	0.05	0.05	0.0
m&p-Xylenes	0.2	mg/kg	0.1	0.1	0.0	0.1	0.1	0.0
o-Xylene	0.1	mg/kg	0.05	0.05	0.0	0.05	0.05	0.0
Toluene	0.1	mg/kg	0.05	0.05	0.0	0.05	0.05	0.0
Xylenes - Total	0.3	mg/kg	0.15	0.15	0.0	0.15	0.15	0.0
Metals								
Arsenic	2	mg/kg	**7**	**7**	0.0	**2**	**2**	0.0
Cadmium	0.3	mg/kg	0.15	0.15	0.0	0.15	0.15	0.0
Chromium	0.3	mg/kg	**6.8**	**7.1**	**4.3**	**4.5**	**6.4**	**34.9**
Copper	0.5	mg/kg	**6.1**	**6.2**	**1.6**	**2.8**	**4.5**	**46.6**
Lead	1	mg/kg	**8**	**7**	**13.3**	**5**	**6**	**18.2**
Mercury	0.05	mg/kg	0.025	0.025	0.0	0.025	0.025	0.0
Nickel	0.5	mg/kg	**3.2**	**3.5**	**9.0**	**2.3**	**3.5**	**41.4**
Zinc	2	mg/kg	**16**	**16**	0.0	**15**	**14**	**6.9**
PAH								
Acenaphthene	1	mg/kg	0.05	0.05	0.0	0.05	0.05	0.0
Acenaphthylene	1	mg/kg	0.05	0.05	0.0	0.05	0.05	0.0
Anthracene	0.5	mg/kg	0.05	0.05	0.0	0.05	0.05	0.0
Benz(a)anthracene	0.5	mg/kg	0.05	0.05	0.0	0.05	0.05	0.0
Benzo(a)pyrene	5	mg/kg	0.05	0.05	0.0	0.05	0.05	0.0
Benzo(a)pyrene TEQ (lower bound)	0.5	mg/kg	0.1	0.1	0.0	0.1	0.1	0.0
Benzo(a)pyrene TEQ (medium bound)	0.5	mg/kg	0.15	0.15	0.0	0.15	0.15	0.0
Benzo(a)pyrene TEQ (upper bound)	0.2	mg/kg	0.1	0.1	0.0	0.1	0.1	0.0
Benzo(b&j)fluoranthene	1	mg/kg	0.05	0.05	0.0	0.05	0.05	0.0
Benzo(g.h.i)perylene	0.4	mg/kg	0.05	0.05	0.0	0.05	0.05	0.0
Benzo(k)fluoranthene	5	mg/kg	0.05	0.05	0.0	0.05	0.05	0.0
Chrysene	1	mg/kg	0.05	0.05	0.0	0.05	0.05	0.0
Dibenz(a.h)anthracene	5	mg/kg	0.05	0.05	0.0	0.05	0.05	0.0
Fluoranthene	0.5	mg/kg	0.05	0.05	0.0	0.05	0.05	0.0
Fluorene	0.5	mg/kg	0.05	0.05	0.0	0.05	0.05	0.0
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	0.05	0.05	0.0	0.05	0.05	0.0
Naphthalene	0.5	mg/kg	0.05	0.05	0.0	0.05	0.05	0.0
Phenanthrene	0.5	mg/kg	0.05	0.05	0.0	0.05	0.05	0.0
Pyrene	0.5	mg/kg	0.05	0.05	0.0	0.05	0.05	0.0
Total PAH	0.5	mg/kg	0.4	0.4	0.0	0.4	0.4	0.0

Notes

RPD = Relative Percentage Difference.

RPD assessment criteria were adopted in general accordance with NEPM Schedule B3 Section 3.5 (NEPC 2013). RPDs where both primary and duplicate results were < 2.5 times the LOR were not considered. RPDs where primary and/or duplicate results were >2.5 times the LOR were assessed based on a threshold of +/- 30%. Exceedence of this trheshold triggered consideration of associated data quality.

VALLEY/CIVILAB	LOR	Trip Spike Soil	Trip Blank Soil	Rinsate RIN
Unit of Measure	mg/kg	% Recovery	mg/kg	µg/L
BTEX				
Benzene	0.1	[97.78%]	<0.1	-
Toluene	0.1	[94.40%]	<0.1	-
Ethylbenzene	0.1	[96.66%]	<0.1	-
m&p-Xylenes	0.2	[96.20%]	<0.2	-
o-Xylene	0.1	[97.39%]	<0.1	-
Xylenes - Total	0.3	N.A.	<0.3	-
Metals				
Unit of Measure	µg/L	-	-	µg/L
Arsenic	1	-	-	<1
Cadmium	0.1	-	-	<0.1
Chromium	1	-	-	<1
Copper	1	-	-	<1
Lead	1	-	-	<1
Mercury - mg/L	0.0001	-	-	<0.0001
Nickel	1	-	-	<1
Zinc	5	-	-	<5

VALLEY CIVILAB
Geotechnical & Environmental Services

Annex H

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Jake Duck	Manager	Huong Crawford
Client	VALLEY CIVILAB PTY LTD	Laboratory	SGS Alexandria Environmental
Address	PO BOX 3127 THORNTON NSW 2322	Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	61 2 4966 1844	Telephone	+61 2 8594 0400
Facsimile	(Not specified)	Facsimile	+61 2 8594 0499
Email	jake.duck@vclab.com.au	Email	au.environmental.sydney@sgs.com
Project	**P1834**	SGS Reference	**SE195298 R0**
Order Number	**VC: 04343**	Date Received	12 Jul 2019
Samples	27	Date Reported	22 Jul 2019

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES

Akheeqar Beniameen
Chemist

Dong Liang
Metals/Inorganics Team Leader

Kamrul Ahsan
Senior Chemist

Ly Kim Ha
Organic Section Head

Parameter	Units	LOR	Sample Number: SE195298.001 Sample Matrix: Soil Sample Date: 10 Jul 2019 Sample Name: BH1 0.2-0.3	SE195298.002 Soil 10 Jul 2019 BH2 0.4-0.5	SE195298.003 Soil 10 Jul 2019 BH4 0.2-0.3	SE195298.004 Soil 10 Jul 2019 BH4 0.7-0.8
VOC's in Soil Method: AN433 Tested: 16/7/2019						
Monocyclic Aromatic Hydrocarbons						
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Polycyclic VOCs						
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Surrogates						
Dibromofluoromethane (Surrogate)	%	-	**94**	**86**	**90**	**83**
d4-1,2-dichloroethane (Surrogate)	%	-	**100**	**92**	**92**	**87**
d8-toluene (Surrogate)	%	-	**98**	**89**	**90**	**86**
Bromofluorobenzene (Surrogate)	%	-	**96**	**88**	**87**	**83**
Totals						
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 16/7/2019						
TRH C6-C10	mg/kg	25	<25	<25	<25	<25
TRH C6-C9	mg/kg	20	<20	<20	<20	<20
Surrogates						
Dibromofluoromethane (Surrogate)	%	-	**94**	**86**	**90**	**83**
d4-1,2-dichloroethane (Surrogate)	%	-	**100**	**92**	**92**	**87**
d8-toluene (Surrogate)	%	-	**98**	**89**	**90**	**86**
Bromofluorobenzene (Surrogate)	%	-	**96**	**88**	**87**	**83**
VPH F Bands						
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25

Parameter	Units	LOR	Sample Number: SE195298.001 Sample Matrix: Soil Sample Date: 10 Jul 2019 Sample Name: BH1 0.2-0.3	SE195298.002 Soil 10 Jul 2019 BH2 0.4-0.5	SE195298.003 Soil 10 Jul 2019 BH4 0.2-0.3	SE195298.004 Soil 10 Jul 2019 BH4 0.7-0.8
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403 Tested: 16/7/2019						
TRH C10-C14	mg/kg	20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110
TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210
TRH F Bands						
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 16/7/2019						
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8
Surrogates						
d5-nitrobenzene (Surrogate)	%	-	**78**	**76**	**86**	**82**
2-fluorobiphenyl (Surrogate)	%	-	**86**	**80**	**88**	**84**
d14-p-terphenyl (Surrogate)	%	-	**94**	**86**	**96**	**94**
OC Pesticides in Soil Method: AN420 Tested: 16/7/2019						
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	-
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	-
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	-
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	-
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	-
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	-
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	-
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	-
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	-
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	-
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	-
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	-
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	-
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	-
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	-
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	-

Parameter	Units	LOR	Sample Number: SE195298.001 Sample Matrix: Soil Sample Date: 10 Jul 2019 Sample Name: BH1 0.2-0.3	SE195298.002 Soil 10 Jul 2019 BH2 0.4-0.5	SE195298.003 Soil 10 Jul 2019 BH4 0.2-0.3	SE195298.004 Soil 10 Jul 2019 BH4 0.7-0.8
OC Pesticides in Soil Method: AN420 Tested: 16/7/2019 (continued)						
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	-
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	-
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	-
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	-
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	-
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	-
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	-
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	-
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	-
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	-
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	-
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	-
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**94**	**94**	**97**	-
OP Pesticides in Soil Method: AN420 Tested: 16/7/2019						
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	-
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	-
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	-
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	-
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	-
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	-
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	-
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	-
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	-
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	-
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	-
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	-
Surrogates						
2-fluorobiphenyl (Surrogate)	%	-	**86**	**80**	**88**	-
d14-p-terphenyl (Surrogate)	%	-	**94**	**86**	**96**	-
PCBs in Soil Method: AN420 Tested: 16/7/2019						
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	-
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	-
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	-
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	-
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	-
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	-
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	-
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	-
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	-
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	-
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**94**	**94**	**97**	-

Parameter	Units	LOR	Sample Number: SE195298.001 Sample Matrix: Soil Sample Date: 10 Jul 2019 Sample Name: BH1 0.2-0.3	SE195298.002 Soil 10 Jul 2019 BH2 0.4-0.5	SE195298.003 Soil 10 Jul 2019 BH4 0.2-0.3	SE195298.004 Soil 10 Jul 2019 BH4 0.7-0.8
Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 17/7/2019						
Arsenic, As	mg/kg	1	**3**	**17**	**8**	**19**
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	**4.6**	**16**	**7.1**	**17**
Copper, Cu	mg/kg	0.5	**3.2**	**17**	**4.8**	**23**
Nickel, Ni	mg/kg	0.5	**2.6**	**11**	**2.6**	**19**
Lead, Pb	mg/kg	1	**4**	**16**	**7**	**15**
Zinc, Zn	mg/kg	2	**9.9**	**26**	**12**	**31**
Mercury in Soil Method: AN312 Tested: 17/7/2019						
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content Method: AN002 Tested: 16/7/2019						
% Moisture	%w/w	0.5	**5.6**	**7.5**	**5.8**	**11**
Trace Metals (Total) in Water by ICPMS Method: AN022/AN318 Tested: 17/7/2019						
Total Arsenic	µg/L	1	-	-	-	-
Total Cadmium	µg/L	0.1	-	-	-	-
Total Chromium	µg/L	1	-	-	-	-
Total Copper	µg/L	1	-	-	-	-
Total Lead	µg/L	1	-	-	-	-
Total Nickel	µg/L	1	-	-	-	-
Total Zinc	µg/L	5	-	-	-	-
Mercury (total) in Water Method: AN311(Perth) /AN312 Tested: 16/7/2019						
Total Mercury	mg/L	0.0001	-	-	-	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE195298.005 Soil 10 Jul 2019 BH5 0.2-0.3	SE195298.006 Soil 10 Jul 2019 BH5 0.7-0.8	SE195298.007 Soil 10 Jul 2019 BH6 0.2-0.3	SE195298.008 Soil 10 Jul 2019 BH6 0.7-0.8
VOC's in Soil Method: AN433 Tested: 16/7/2019							
Monocyclic Aromatic Hydrocarbons							
Benzene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2		<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Polycyclic VOCs							
Naphthalene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Surrogates							
Dibromofluoromethane (Surrogate)	%	-		**84**	**85**	**87**	**89**
d4-1,2-dichloroethane (Surrogate)	%	-		**92**	**88**	**93**	**93**
d8-toluene (Surrogate)	%	-		**89**	**87**	**91**	**91**
Bromofluorobenzene (Surrogate)	%	-		**85**	**83**	**87**	**88**
Totals							
Total Xylenes	mg/kg	0.3		<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6		<0.6	<0.6	<0.6	<0.6
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 16/7/2019							
TRH C6-C10	mg/kg	25		<25	<25	<25	<25
TRH C6-C9	mg/kg	20		<20	<20	<20	<20
Surrogates							
Dibromofluoromethane (Surrogate)	%	-		**84**	**85**	**87**	**89**
d4-1,2-dichloroethane (Surrogate)	%	-		**92**	**88**	**93**	**93**
d8-toluene (Surrogate)	%	-		**89**	**87**	**91**	**91**
Bromofluorobenzene (Surrogate)	%	-		**85**	**83**	**87**	**88**
VPH F Bands							
Benzene (F0)	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25		<25	<25	<25	<25

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE195298.005 Soil 10 Jul 2019 BH5 0.2-0.3	SE195298.006 Soil 10 Jul 2019 BH5 0.7-0.8	SE195298.007 Soil 10 Jul 2019 BH6 0.2-0.3	SE195298.008 Soil 10 Jul 2019 BH6 0.7-0.8
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403 Tested: 16/7/2019							
TRH C10-C14	mg/kg	20		<20	<20	<20	<20
TRH C15-C28	mg/kg	45		<45	<45	<45	<45
TRH C29-C36	mg/kg	45		<45	<45	<45	<45
TRH C37-C40	mg/kg	100		<100	<100	<100	<100
TRH C10-C36 Total	mg/kg	110		<110	<110	<110	<110
TRH C10-C40 Total (F bands)	mg/kg	210		<210	<210	<210	<210
TRH F Bands							
TRH >C10-C16	mg/kg	25		<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25		<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90		<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120		<120	<120	<120	<120
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 16/7/2019							
Naphthalene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2		<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3		<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2		<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8		<0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8		<0.8	<0.8	<0.8	<0.8
Surrogates							
d5-nitrobenzene (Surrogate)	%	-		**94**	**86**	**86**	**84**
2-fluorobiphenyl (Surrogate)	%	-		**86**	**86**	**84**	**86**
d14-p-terphenyl (Surrogate)	%	-		**96**	**92**	**90**	**94**
OC Pesticides in Soil Method: AN420 Tested: 16/7/2019							
Hexachlorobenzene (HCB)	mg/kg	0.1		<0.1	-	<0.1	-
Alpha BHC	mg/kg	0.1		<0.1	-	<0.1	-
Lindane	mg/kg	0.1		<0.1	-	<0.1	-
Heptachlor	mg/kg	0.1		<0.1	-	<0.1	-
Aldrin	mg/kg	0.1		<0.1	-	<0.1	-
Beta BHC	mg/kg	0.1		<0.1	-	<0.1	-
Delta BHC	mg/kg	0.1		<0.1	-	<0.1	-
Heptachlor epoxide	mg/kg	0.1		<0.1	-	<0.1	-
o,p'-DDE	mg/kg	0.1		<0.1	-	<0.1	-
Alpha Endosulfan	mg/kg	0.2		<0.2	-	<0.2	-
Gamma Chlordane	mg/kg	0.1		<0.1	-	<0.1	-
Alpha Chlordane	mg/kg	0.1		<0.1	-	<0.1	-
trans-Nonachlor	mg/kg	0.1		<0.1	-	<0.1	-
p,p'-DDE	mg/kg	0.1		<0.1	-	<0.1	-
Dieldrin	mg/kg	0.2		<0.2	-	<0.2	-
Endrin	mg/kg	0.2		<0.2	-	<0.2	-

Parameter	Units	LOR	Sample Number: SE195298.005 Sample Matrix: Soil Sample Date: 10 Jul 2019 Sample Name: BH5 0.2-0.3	SE195298.006 Soil 10 Jul 2019 BH5 0.7-0.8	SE195298.007 Soil 10 Jul 2019 BH6 0.2-0.3	SE195298.008 Soil 10 Jul 2019 BH6 0.7-0.8
OC Pesticides in Soil Method: AN420 Tested: 16/7/2019 (continued)						
o,p'-DDD	mg/kg	0.1	<0.1	-	<0.1	-
o,p'-DDT	mg/kg	0.1	<0.1	-	<0.1	-
Beta Endosulfan	mg/kg	0.2	<0.2	-	<0.2	-
p,p'-DDD	mg/kg	0.1	<0.1	-	<0.1	-
p,p'-DDT	mg/kg	0.1	<0.1	-	<0.1	-
Endosulfan sulphate	mg/kg	0.1	<0.1	-	<0.1	-
Endrin Aldehyde	mg/kg	0.1	<0.1	-	<0.1	-
Methoxychlor	mg/kg	0.1	<0.1	-	<0.1	-
Endrin Ketone	mg/kg	0.1	<0.1	-	<0.1	-
Isodrin	mg/kg	0.1	<0.1	-	<0.1	-
Mirex	mg/kg	0.1	<0.1	-	<0.1	-
Total CLP OC Pesticides	mg/kg	1	<1	-	<1	-
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**101**	-	**100**	-
OP Pesticides in Soil Method: AN420 Tested: 16/7/2019						
Dichlorvos	mg/kg	0.5	<0.5	-	<0.5	-
Dimethoate	mg/kg	0.5	<0.5	-	<0.5	-
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	-	<0.5	-
Fenitrothion	mg/kg	0.2	<0.2	-	<0.2	-
Malathion	mg/kg	0.2	<0.2	-	<0.2	-
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	-	<0.2	-
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	-	<0.2	-
Bromophos Ethyl	mg/kg	0.2	<0.2	-	<0.2	-
Methidathion	mg/kg	0.5	<0.5	-	<0.5	-
Ethion	mg/kg	0.2	<0.2	-	<0.2	-
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	-	<0.2	-
Total OP Pesticides*	mg/kg	1.7	<1.7	-	<1.7	-
Surrogates						
2-fluorobiphenyl (Surrogate)	%	-	**86**	-	**84**	-
d14-p-terphenyl (Surrogate)	%	-	**96**	-	**90**	-
PCBs in Soil Method: AN420 Tested: 16/7/2019						
Arochlor 1016	mg/kg	0.2	<0.2	-	<0.2	-
Arochlor 1221	mg/kg	0.2	<0.2	-	<0.2	-
Arochlor 1232	mg/kg	0.2	<0.2	-	<0.2	-
Arochlor 1242	mg/kg	0.2	<0.2	-	<0.2	-
Arochlor 1248	mg/kg	0.2	<0.2	-	<0.2	-
Arochlor 1254	mg/kg	0.2	<0.2	-	<0.2	-
Arochlor 1260	mg/kg	0.2	<0.2	-	<0.2	-
Arochlor 1262	mg/kg	0.2	<0.2	-	<0.2	-
Arochlor 1268	mg/kg	0.2	<0.2	-	<0.2	-
Total PCBs (Arochlors)	mg/kg	1	<1	-	<1	-
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**101**	-	**100**	-

Parameter	Units	LOR	Sample Number: SE195298.005 Sample Matrix: Soil Sample Date: 10 Jul 2019 Sample Name: BH5 0.2-0.3	SE195298.006 Soil 10 Jul 2019 BH5 0.7-0.8	SE195298.007 Soil 10 Jul 2019 BH6 0.2-0.3	SE195298.008 Soil 10 Jul 2019 BH6 0.7-0.8
Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 17/7/2019						
Arsenic, As	mg/kg	1	**4**	**13**	**6**	**15**
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	**5.0**	**16**	**7.3**	**15**
Copper, Cu	mg/kg	0.5	**3.1**	**18**	**5.9**	**17**
Nickel, Ni	mg/kg	0.5	**2.3**	**9.3**	**4.9**	**9.7**
Lead, Pb	mg/kg	1	**5**	**12**	**7**	**12**
Zinc, Zn	mg/kg	2	**11**	**27**	**21**	**28**
Mercury in Soil Method: AN312 Tested: 17/7/2019						
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content Method: AN002 Tested: 16/7/2019						
% Moisture	%w/w	0.5	**2.8**	**12**	**3.7**	**7.7**
Trace Metals (Total) in Water by ICPMS Method: AN022/AN318 Tested: 17/7/2019						
Total Arsenic	µg/L	1	-	-	-	-
Total Cadmium	µg/L	0.1	-	-	-	-
Total Chromium	µg/L	1	-	-	-	-
Total Copper	µg/L	1	-	-	-	-
Total Lead	µg/L	1	-	-	-	-
Total Nickel	µg/L	1	-	-	-	-
Total Zinc	µg/L	5	-	-	-	-
Mercury (total) in Water Method: AN311(Perth) /AN312 Tested: 16/7/2019						
Total Mercury	mg/L	0.0001	-	-	-	-

Parameter	Units	LOR	Sample Number: SE195298.009 Sample Matrix: Soil Sample Date: 10 Jul 2019 Sample Name: BH7 0.2-0.3	SE195298.010 Soil 10 Jul 2019 BH7 0.7-0.8	SE195298.011 Soil 10 Jul 2019 BH8 0.2-0.3	SE195298.012 Soil 10 Jul 2019 BH10 0.3-0.4
VOC's in Soil Method: AN433 Tested: 16/7/2019						
Monocyclic Aromatic Hydrocarbons						
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Polycyclic VOCs						
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Surrogates						
Dibromofluoromethane (Surrogate)	%	-	**88**	**84**	**89**	**86**
d4-1,2-dichloroethane (Surrogate)	%	-	**95**	**96**	**91**	**90**
d8-toluene (Surrogate)	%	-	**91**	**92**	**88**	**86**
Bromofluorobenzene (Surrogate)	%	-	**87**	**88**	**83**	**82**
Totals						
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 16/7/2019						
TRH C6-C10	mg/kg	25	<25	<25	<25	<25
TRH C6-C9	mg/kg	20	<20	<20	<20	<20
Surrogates						
Dibromofluoromethane (Surrogate)	%	-	**88**	**84**	**89**	**86**
d4-1,2-dichloroethane (Surrogate)	%	-	**95**	**96**	**91**	**90**
d8-toluene (Surrogate)	%	-	**91**	**92**	**88**	**86**
Bromofluorobenzene (Surrogate)	%	-	**87**	**88**	**83**	**82**
VPH F Bands						
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25

Parameter	Units	LOR	Sample Number: SE195298.009 Sample Matrix: Soil Sample Date: 10 Jul 2019 Sample Name: BH7 0.2-0.3	SE195298.010 Soil 10 Jul 2019 BH7 0.7-0.8	SE195298.011 Soil 10 Jul 2019 BH8 0.2-0.3	SE195298.012 Soil 10 Jul 2019 BH10 0.3-0.4
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403 Tested: 16/7/2019						
TRH C10-C14	mg/kg	20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110
TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210
TRH F Bands						
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 16/7/2019						
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8
Surrogates						
d5-nitrobenzene (Surrogate)	%	-	**84**	**84**	**84**	**82**
2-fluorobiphenyl (Surrogate)	%	-	**90**	**86**	**84**	**84**
d14-p-terphenyl (Surrogate)	%	-	**98**	**88**	**98**	**86**
OC Pesticides in Soil Method: AN420 Tested: 16/7/2019						
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	-	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	-	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	-	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	-	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	-	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	-	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	-	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	-	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	-	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	-	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	-	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	-	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	-	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	-	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	-	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	-	<0.2	<0.2

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE195298.009 Soil 10 Jul 2019 BH7 0.2-0.3	SE195298.010 Soil 10 Jul 2019 BH7 0.7-0.8	SE195298.011 Soil 10 Jul 2019 BH8 0.2-0.3	SE195298.012 Soil 10 Jul 2019 BH10 0.3-0.4
OC Pesticides in Soil Method: AN420 Tested: 16/7/2019 (continued)							
o,p'-DDD	mg/kg	0.1		<0.1	-	<0.1	<0.1
o,p'-DDT	mg/kg	0.1		<0.1	-	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2		<0.2	-	<0.2	<0.2
p,p'-DDD	mg/kg	0.1		<0.1	-	<0.1	<0.1
p,p'-DDT	mg/kg	0.1		<0.1	-	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1		<0.1	-	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1		<0.1	-	<0.1	<0.1
Methoxychlor	mg/kg	0.1		<0.1	-	<0.1	<0.1
Endrin Ketone	mg/kg	0.1		<0.1	-	<0.1	<0.1
Isodrin	mg/kg	0.1		<0.1	-	<0.1	<0.1
Mirex	mg/kg	0.1		<0.1	-	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1		<1	-	<1	<1
Surrogates							
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-		**95**	-	**95**	**97**
OP Pesticides in Soil Method: AN420 Tested: 16/7/2019							
Dichlorvos	mg/kg	0.5		<0.5	-	<0.5	<0.5
Dimethoate	mg/kg	0.5		<0.5	-	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5		<0.5	-	<0.5	<0.5
Fenitrothion	mg/kg	0.2		<0.2	-	<0.2	<0.2
Malathion	mg/kg	0.2		<0.2	-	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2		<0.2	-	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2		<0.2	-	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2		<0.2	-	<0.2	<0.2
Methidathion	mg/kg	0.5		<0.5	-	<0.5	<0.5
Ethion	mg/kg	0.2		<0.2	-	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2		<0.2	-	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7		<1.7	-	<1.7	<1.7
Surrogates							
2-fluorobiphenyl (Surrogate)	%	-		**90**	-	**84**	**84**
d14-p-terphenyl (Surrogate)	%	-		**98**	-	**98**	**86**
PCBs in Soil Method: AN420 Tested: 16/7/2019							
Arochlor 1016	mg/kg	0.2		<0.2	-	<0.2	<0.2
Arochlor 1221	mg/kg	0.2		<0.2	-	<0.2	<0.2
Arochlor 1232	mg/kg	0.2		<0.2	-	<0.2	<0.2
Arochlor 1242	mg/kg	0.2		<0.2	-	<0.2	<0.2
Arochlor 1248	mg/kg	0.2		<0.2	-	<0.2	<0.2
Arochlor 1254	mg/kg	0.2		<0.2	-	<0.2	<0.2
Arochlor 1260	mg/kg	0.2		<0.2	-	<0.2	<0.2
Arochlor 1262	mg/kg	0.2		<0.2	-	<0.2	<0.2
Arochlor 1268	mg/kg	0.2		<0.2	-	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1		<1	-	<1	<1
Surrogates							
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-		**95**	-	**95**	**97**

Parameter	Units	LOR	Sample Number: SE195298.009 Sample Matrix: Soil Sample Date: 10 Jul 2019 Sample Name: BH7 0.2-0.3	SE195298.010 Soil 10 Jul 2019 BH7 0.7-0.8	SE195298.011 Soil 10 Jul 2019 BH8 0.2-0.3	SE195298.012 Soil 10 Jul 2019 BH10 0.3-0.4
Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 17/7/2019						
Arsenic, As	mg/kg	1	**7**	**13**	**5**	**2**
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	**6.8**	**16**	**5.8**	**4.5**
Copper, Cu	mg/kg	0.5	**6.1**	**15**	**2.5**	**2.8**
Nickel, Ni	mg/kg	0.5	**3.2**	**11**	**2.7**	**2.3**
Lead, Pb	mg/kg	1	**8**	**12**	**5**	**5**
Zinc, Zn	mg/kg	2	**16**	**25**	**11**	**15**
Mercury in Soil Method: AN312 Tested: 17/7/2019						
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content Method: AN002 Tested: 16/7/2019						
% Moisture	%w/w	0.5	**5.6**	**6.3**	**3.2**	**6.4**
Trace Metals (Total) in Water by ICPMS Method: AN022/AN318 Tested: 17/7/2019						
Total Arsenic	µg/L	1	-	-	-	-
Total Cadmium	µg/L	0.1	-	-	-	-
Total Chromium	µg/L	1	-	-	-	-
Total Copper	µg/L	1	-	-	-	-
Total Lead	µg/L	1	-	-	-	-
Total Nickel	µg/L	1	-	-	-	-
Total Zinc	µg/L	5	-	-	-	-
Mercury (total) in Water Method: AN311(Perth) /AN312 Tested: 16/7/2019						
Total Mercury	mg/L	0.0001	-	-	-	-

Parameter	Units	LOR	Sample Number: SE195298.013 Sample Matrix: Soil Sample Date: 10 Jul 2019 Sample Name: BH10 0.6-0.7	SE195298.014 Soil 10 Jul 2019 BH15 0.3-0.4	SE195298.015 Soil 10 Jul 2019 BH15 0.7-0.8	SE195298.016 Soil 10 Jul 2019 BH17 0.2-0.3
VOC's in Soil Method: AN433 Tested: 16/7/2019						
Monocyclic Aromatic Hydrocarbons						
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Polycyclic VOCs						
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Surrogates						
Dibromofluoromethane (Surrogate)	%	-	**87**	**85**	**88**	**86**
d4-1,2-dichloroethane (Surrogate)	%	-	**91**	**93**	**96**	**95**
d8-toluene (Surrogate)	%	-	**87**	**89**	**90**	**91**
Bromofluorobenzene (Surrogate)	%	-	**85**	**86**	**88**	**88**
Totals						
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 16/7/2019						
TRH C6-C10	mg/kg	25	<25	<25	<25	<25
TRH C6-C9	mg/kg	20	<20	<20	<20	<20
Surrogates						
Dibromofluoromethane (Surrogate)	%	-	**87**	**85**	**88**	**86**
d4-1,2-dichloroethane (Surrogate)	%	-	**91**	**93**	**96**	**95**
d8-toluene (Surrogate)	%	-	**87**	**89**	**90**	**91**
Bromofluorobenzene (Surrogate)	%	-	**85**	**86**	**88**	**88**
VPH F Bands						
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE195298.013 Soil 10 Jul 2019 BH10 0.6-0.7	SE195298.014 Soil 10 Jul 2019 BH15 0.3-0.4	SE195298.015 Soil 10 Jul 2019 BH15 0.7-0.8	SE195298.016 Soil 10 Jul 2019 BH17 0.2-0.3
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403 Tested: 16/7/2019							
TRH C10-C14	mg/kg	20		<20	<20	<20	<20
TRH C15-C28	mg/kg	45		<45	<45	<45	<45
TRH C29-C36	mg/kg	45		<45	<45	<45	<45
TRH C37-C40	mg/kg	100		<100	<100	<100	<100
TRH C10-C36 Total	mg/kg	110		<110	<110	<110	<110
TRH C10-C40 Total (F bands)	mg/kg	210		<210	<210	<210	<210
TRH F Bands							
TRH >C10-C16	mg/kg	25		<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25		<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90		<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120		<120	<120	<120	<120
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 16/7/2019							
Naphthalene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2		<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3		<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2		<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8		<0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8		<0.8	<0.8	<0.8	<0.8
Surrogates							
d5-nitrobenzene (Surrogate)	%	-		**86**	**80**	**92**	**88**
2-fluorobiphenyl (Surrogate)	%	-		**88**	**86**	**94**	**90**
d14-p-terphenyl (Surrogate)	%	-		**88**	**100**	**88**	**92**
OC Pesticides in Soil Method: AN420 Tested: 16/7/2019							
Hexachlorobenzene (HCB)	mg/kg	0.1		-	<0.1	-	<0.1
Alpha BHC	mg/kg	0.1		-	<0.1	-	<0.1
Lindane	mg/kg	0.1		-	<0.1	-	<0.1
Heptachlor	mg/kg	0.1		-	<0.1	-	<0.1
Aldrin	mg/kg	0.1		-	<0.1	-	<0.1
Beta BHC	mg/kg	0.1		-	<0.1	-	<0.1
Delta BHC	mg/kg	0.1		-	<0.1	-	<0.1
Heptachlor epoxide	mg/kg	0.1		-	<0.1	-	<0.1
o,p'-DDE	mg/kg	0.1		-	<0.1	-	<0.1
Alpha Endosulfan	mg/kg	0.2		-	<0.2	-	<0.2
Gamma Chlordane	mg/kg	0.1		-	<0.1	-	<0.1
Alpha Chlordane	mg/kg	0.1		-	<0.1	-	<0.1
trans-Nonachlor	mg/kg	0.1		-	<0.1	-	<0.1
p,p'-DDE	mg/kg	0.1		-	<0.1	-	<0.1
Dieldrin	mg/kg	0.2		-	<0.2	-	<0.2
Endrin	mg/kg	0.2		-	<0.2	-	<0.2

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE195298.013 Soil 10 Jul 2019 BH10 0.6-0.7	SE195298.014 Soil 10 Jul 2019 BH15 0.3-0.4	SE195298.015 Soil 10 Jul 2019 BH15 0.7-0.8	SE195298.016 Soil 10 Jul 2019 BH17 0.2-0.3
OC Pesticides in Soil Method: AN420 Tested: 16/7/2019 (continued)							
o,p'-DDD	mg/kg	0.1		-	<0.1	-	<0.1
o,p'-DDT	mg/kg	0.1		-	<0.1	-	<0.1
Beta Endosulfan	mg/kg	0.2		-	<0.2	-	<0.2
p,p'-DDD	mg/kg	0.1		-	<0.1	-	<0.1
p,p'-DDT	mg/kg	0.1		-	<0.1	-	<0.1
Endosulfan sulphate	mg/kg	0.1		-	<0.1	-	<0.1
Endrin Aldehyde	mg/kg	0.1		-	<0.1	-	<0.1
Methoxychlor	mg/kg	0.1		-	<0.1	-	<0.1
Endrin Ketone	mg/kg	0.1		-	<0.1	-	<0.1
Isodrin	mg/kg	0.1		-	<0.1	-	<0.1
Mirex	mg/kg	0.1		-	<0.1	-	<0.1
Total CLP OC Pesticides	mg/kg	1		-	<1	-	<1
Surrogates							
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-		-	**94**	-	**92**
OP Pesticides in Soil Method: AN420 Tested: 16/7/2019							
Dichlorvos	mg/kg	0.5		-	<0.5	-	<0.5
Dimethoate	mg/kg	0.5		-	<0.5	-	<0.5
Diazinon (Dimpylate)	mg/kg	0.5		-	<0.5	-	<0.5
Fenitrothion	mg/kg	0.2		-	<0.2	-	<0.2
Malathion	mg/kg	0.2		-	<0.2	-	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2		-	<0.2	-	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2		-	<0.2	-	<0.2
Bromophos Ethyl	mg/kg	0.2		-	<0.2	-	<0.2
Methidathion	mg/kg	0.5		-	<0.5	-	<0.5
Ethion	mg/kg	0.2		-	<0.2	-	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2		-	<0.2	-	<0.2
Total OP Pesticides*	mg/kg	1.7		-	<1.7	-	<1.7
Surrogates							
2-fluorobiphenyl (Surrogate)	%	-		-	**86**	-	**90**
d14-p-terphenyl (Surrogate)	%	-		-	**100**	-	**92**
PCBs in Soil Method: AN420 Tested: 16/7/2019							
Arochlor 1016	mg/kg	0.2		-	<0.2	-	<0.2
Arochlor 1221	mg/kg	0.2		-	<0.2	-	<0.2
Arochlor 1232	mg/kg	0.2		-	<0.2	-	<0.2
Arochlor 1242	mg/kg	0.2		-	<0.2	-	<0.2
Arochlor 1248	mg/kg	0.2		-	<0.2	-	<0.2
Arochlor 1254	mg/kg	0.2		-	<0.2	-	<0.2
Arochlor 1260	mg/kg	0.2		-	<0.2	-	<0.2
Arochlor 1262	mg/kg	0.2		-	<0.2	-	<0.2
Arochlor 1268	mg/kg	0.2		-	<0.2	-	<0.2
Total PCBs (Arochlors)	mg/kg	1		-	<1	-	<1
Surrogates							
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-		-	**94**	-	**92**

Parameter	Units	LOR	Sample Number: SE195298.013 Sample Matrix: Soil Sample Date: 10 Jul 2019 Sample Name: BH10 0.6-0.7	SE195298.014 Soil 10 Jul 2019 BH15 0.3-0.4	SE195298.015 Soil 10 Jul 2019 BH15 0.7-0.8	SE195298.016 Soil 10 Jul 2019 BH17 0.2-0.3
Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 17/7/2019						
Arsenic, As	mg/kg	1	**13**	**3**	**14**	**9**
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	**16**	**4.5**	**15**	**11**
Copper, Cu	mg/kg	0.5	**14**	**2.7**	**17**	**8.8**
Nickel, Ni	mg/kg	0.5	**11**	**1.8**	**9.1**	**8.6**
Lead, Pb	mg/kg	1	**10**	**4**	**12**	**11**
Zinc, Zn	mg/kg	2	**23**	**12**	**27**	**22**
Mercury in Soil Method: AN312 Tested: 17/7/2019						
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content Method: AN002 Tested: 16/7/2019						
% Moisture	%w/w	0.5	**8.4**	**2.1**	**9.9**	**4.4**
Trace Metals (Total) in Water by ICPMS Method: AN022/AN318 Tested: 17/7/2019						
Total Arsenic	µg/L	1	-	-	-	-
Total Cadmium	µg/L	0.1	-	-	-	-
Total Chromium	µg/L	1	-	-	-	-
Total Copper	µg/L	1	-	-	-	-
Total Lead	µg/L	1	-	-	-	-
Total Nickel	µg/L	1	-	-	-	-
Total Zinc	µg/L	5	-	-	-	-
Mercury (total) in Water Method: AN311(Perth) /AN312 Tested: 16/7/2019						
Total Mercury	mg/L	0.0001	-	-	-	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE195298.017 Soil 10 Jul 2019 BH20 0.2-0.3	SE195298.018 Soil 10 Jul 2019 BH20 0.7-0.8	SE195298.019 Soil 10 Jul 2019 BH24 0.2-0.3	SE195298.020 Soil 10 Jul 2019 BH24 0.7-0.8
VOC's in Soil Method: AN433 Tested: 16/7/2019							
Monocyclic Aromatic Hydrocarbons							
Benzene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2		<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Polycyclic VOCs							
Naphthalene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Surrogates							
Dibromofluoromethane (Surrogate)	%	-		**88**	**85**	**90**	**90**
d4-1,2-dichloroethane (Surrogate)	%	-		**90**	**96**	**96**	**91**
d8-toluene (Surrogate)	%	-		**85**	**90**	**91**	**91**
Bromofluorobenzene (Surrogate)	%	-		**82**	**89**	**87**	**95**
Totals							
Total Xylenes	mg/kg	0.3		<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6		<0.6	<0.6	<0.6	<0.6
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 16/7/2019							
TRH C6-C10	mg/kg	25		<25	<25	<25	<25
TRH C6-C9	mg/kg	20		<20	<20	<20	<20
Surrogates							
Dibromofluoromethane (Surrogate)	%	-		**88**	**85**	**90**	**90**
d4-1,2-dichloroethane (Surrogate)	%	-		**90**	**96**	**96**	**91**
d8-toluene (Surrogate)	%	-		**85**	**90**	**91**	**91**
Bromofluorobenzene (Surrogate)	%	-		**82**	**89**	**87**	**95**
VPH F Bands							
Benzene (F0)	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25		<25	<25	<25	<25

Parameter	Units	LOR	Sample Number: SE195298.017 Sample Matrix: Soil Sample Date: 10 Jul 2019 Sample Name: BH20 0.2-0.3	SE195298.018 Soil 10 Jul 2019 BH20 0.7-0.8	SE195298.019 Soil 10 Jul 2019 BH24 0.2-0.3	SE195298.020 Soil 10 Jul 2019 BH24 0.7-0.8
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403 Tested: 16/7/2019						
TRH C10-C14	mg/kg	20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110
TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210
TRH F Bands						
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 16/7/2019						
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8
Surrogates						
d5-nitrobenzene (Surrogate)	%	-	**82**	**80**	**86**	**94**
2-fluorobiphenyl (Surrogate)	%	-	**78**	**88**	**92**	**90**
d14-p-terphenyl (Surrogate)	%	-	**102**	**88**	**92**	**94**
OC Pesticides in Soil Method: AN420 Tested: 16/7/2019						
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	-	<0.1	-
Alpha BHC	mg/kg	0.1	<0.1	-	<0.1	-
Lindane	mg/kg	0.1	<0.1	-	<0.1	-
Heptachlor	mg/kg	0.1	<0.1	-	<0.1	-
Aldrin	mg/kg	0.1	<0.1	-	<0.1	-
Beta BHC	mg/kg	0.1	<0.1	-	<0.1	-
Delta BHC	mg/kg	0.1	<0.1	-	<0.1	-
Heptachlor epoxide	mg/kg	0.1	<0.1	-	<0.1	-
o,p'-DDE	mg/kg	0.1	<0.1	-	<0.1	-
Alpha Endosulfan	mg/kg	0.2	<0.2	-	<0.2	-
Gamma Chlordane	mg/kg	0.1	<0.1	-	<0.1	-
Alpha Chlordane	mg/kg	0.1	<0.1	-	<0.1	-
trans-Nonachlor	mg/kg	0.1	<0.1	-	<0.1	-
p,p'-DDE	mg/kg	0.1	<0.1	-	<0.1	-
Dieldrin	mg/kg	0.2	<0.2	-	<0.2	-
Endrin	mg/kg	0.2	<0.2	-	<0.2	-

Parameter	Units	LOR	Sample Number: SE195298.017 Sample Matrix: Soil Sample Date: 10 Jul 2019 Sample Name: BH20 0.2-0.3		Sample Number: SE195298.018 Sample Matrix: Soil Sample Date: 10 Jul 2019 Sample Name: BH20 0.7-0.8		Sample Number: SE195298.019 Sample Matrix: Soil Sample Date: 10 Jul 2019 Sample Name: BH24 0.2-0.3		Sample Number: SE195298.020 Sample Matrix: Soil Sample Date: 10 Jul 2019 Sample Name: BH24 0.7-0.8	
OC Pesticides in Soil Method: AN420 Tested: 16/7/2019 (continued)										
o,p'-DDD	mg/kg	0.1	<0.1		-		<0.1		-	
o,p'-DDT	mg/kg	0.1	<0.1		-		<0.1		-	
Beta Endosulfan	mg/kg	0.2	<0.2		-		<0.2		-	
p,p'-DDD	mg/kg	0.1	<0.1		-		<0.1		-	
p,p'-DDT	mg/kg	0.1	<0.1		-		<0.1		-	
Endosulfan sulphate	mg/kg	0.1	<0.1		-		<0.1		-	
Endrin Aldehyde	mg/kg	0.1	<0.1		-		<0.1		-	
Methoxychlor	mg/kg	0.1	<0.1		-		<0.1		-	
Endrin Ketone	mg/kg	0.1	<0.1		-		<0.1		-	
Isodrin	mg/kg	0.1	<0.1		-		<0.1		-	
Mirex	mg/kg	0.1	<0.1		-		<0.1		-	
Total CLP OC Pesticides	mg/kg	1	<1		-		<1		-	
Surrogates										
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**97**		-		**95**		-	
OP Pesticides in Soil Method: AN420 Tested: 16/7/2019										
Dichlorvos	mg/kg	0.5	<0.5		-		<0.5		-	
Dimethoate	mg/kg	0.5	<0.5		-		<0.5		-	
Diazinon (Dimpylate)	mg/kg	0.5	<0.5		-		<0.5		-	
Fenitrothion	mg/kg	0.2	<0.2		-		<0.2		-	
Malathion	mg/kg	0.2	<0.2		-		<0.2		-	
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2		-		<0.2		-	
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2		-		<0.2		-	
Bromophos Ethyl	mg/kg	0.2	<0.2		-		<0.2		-	
Methidathion	mg/kg	0.5	<0.5		-		<0.5		-	
Ethion	mg/kg	0.2	<0.2		-		<0.2		-	
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2		-		<0.2		-	
Total OP Pesticides*	mg/kg	1.7	<1.7		-		<1.7		-	
Surrogates										
2-fluorobiphenyl (Surrogate)	%	-	**78**		-		**92**		-	
d14-p-terphenyl (Surrogate)	%	-	**102**		-		**92**		-	
PCBs in Soil Method: AN420 Tested: 16/7/2019										
Arochlor 1016	mg/kg	0.2	<0.2		-		<0.2		-	
Arochlor 1221	mg/kg	0.2	<0.2		-		<0.2		-	
Arochlor 1232	mg/kg	0.2	<0.2		-		<0.2		-	
Arochlor 1242	mg/kg	0.2	<0.2		-		<0.2		-	
Arochlor 1248	mg/kg	0.2	<0.2		-		<0.2		-	
Arochlor 1254	mg/kg	0.2	<0.2		-		<0.2		-	
Arochlor 1260	mg/kg	0.2	<0.2		-		<0.2		-	
Arochlor 1262	mg/kg	0.2	<0.2		-		<0.2		-	
Arochlor 1268	mg/kg	0.2	<0.2		-		<0.2		-	
Total PCBs (Arochlors)	mg/kg	1	<1		-		<1		-	
Surrogates										
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**97**		-		**95**		-	

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE195298.017 Soil 10 Jul 2019 BH20 0.2-0.3	SE195298.018 Soil 10 Jul 2019 BH20 0.7-0.8	SE195298.019 Soil 10 Jul 2019 BH24 0.2-0.3	SE195298.020 Soil 10 Jul 2019 BH24 0.7-0.8
Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 17/7/2019							
Arsenic, As	mg/kg	1		**4**	**16**	**3**	**8**
Cadmium, Cd	mg/kg	0.3		<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3		**5.6**	**14**	**6.5**	**13**
Copper, Cu	mg/kg	0.5		**3.0**	**10**	**4.5**	**14**
Nickel, Ni	mg/kg	0.5		**2.5**	**10**	**3.3**	**9.3**
Lead, Pb	mg/kg	1		**7**	**9**	**7**	**9**
Zinc, Zn	mg/kg	2		**13**	**25**	**17**	**21**
Mercury in Soil Method: AN312 Tested: 17/7/2019							
Mercury	mg/kg	0.05		<0.05	<0.05	<0.05	<0.05
Moisture Content Method: AN002 Tested: 16/7/2019							
% Moisture	%w/w	0.5		**8.7**	**8.4**	**5.2**	**6.1**
Trace Metals (Total) in Water by ICPMS Method: AN022/AN318 Tested: 17/7/2019							
Total Arsenic	µg/L	1		-	-	-	-
Total Cadmium	µg/L	0.1		-	-	-	-
Total Chromium	µg/L	1		-	-	-	-
Total Copper	µg/L	1		-	-	-	-
Total Lead	µg/L	1		-	-	-	-
Total Nickel	µg/L	1		-	-	-	-
Total Zinc	µg/L	5		-	-	-	-
Mercury (total) in Water Method: AN311(Perth) /AN312 Tested: 16/7/2019							
Total Mercury	mg/L	0.0001		-	-	-	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE195298.021 Soil 10 Jul 2019 BH27 0.3-0.4	SE195298.022 Soil 10 Jul 2019 BH27 0.7-0.8	SE195298.023 Soil 10 Jul 2019 DUP1	SE195298.024 Soil 10 Jul 2019 DUP2
VOC's in Soil Method: AN433 Tested: 16/7/2019							
Monocyclic Aromatic Hydrocarbons							
Benzene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2		<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Polycyclic VOCs							
Naphthalene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Surrogates							
Dibromofluoromethane (Surrogate)	%	-		**91**	**86**	**90**	**90**
d4-1,2-dichloroethane (Surrogate)	%	-		**91**	**89**	**94**	**95**
d8-toluene (Surrogate)	%	-		**92**	**89**	**95**	**95**
Bromofluorobenzene (Surrogate)	%	-		**94**	**93**	**97**	**98**
Totals							
Total Xylenes	mg/kg	0.3		<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6		<0.6	<0.6	<0.6	<0.6
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 16/7/2019							
TRH C6-C10	mg/kg	25		<25	<25	<25	<25
TRH C6-C9	mg/kg	20		<20	<20	<20	<20
Surrogates							
Dibromofluoromethane (Surrogate)	%	-		**91**	**86**	**90**	**90**
d4-1,2-dichloroethane (Surrogate)	%	-		**91**	**89**	**94**	**95**
d8-toluene (Surrogate)	%	-		**92**	**89**	**95**	**95**
Bromofluorobenzene (Surrogate)	%	-		**94**	**93**	**97**	**98**
VPH F Bands							
Benzene (F0)	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25		<25	<25	<25	<25

Parameter	Units	LOR	Sample Number: SE195298.021 Sample Matrix: Soil Sample Date: 10 Jul 2019 Sample Name: BH27 0.3-0.4	SE195298.022 Soil 10 Jul 2019 BH27 0.7-0.8	SE195298.023 Soil 10 Jul 2019 DUP1	SE195298.024 Soil 10 Jul 2019 DUP2
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403 Tested: 16/7/2019						
TRH C10-C14	mg/kg	20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110
TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210
TRH F Bands						
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 16/7/2019						
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8
Surrogates						
d5-nitrobenzene (Surrogate)	%	-	**88**	**86**	**98**	**84**
2-fluorobiphenyl (Surrogate)	%	-	**94**	**92**	**98**	**90**
d14-p-terphenyl (Surrogate)	%	-	**88**	**90**	**94**	**86**
OC Pesticides in Soil Method: AN420 Tested: 16/7/2019						
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	-	-	-
Alpha BHC	mg/kg	0.1	<0.1	-	-	-
Lindane	mg/kg	0.1	<0.1	-	-	-
Heptachlor	mg/kg	0.1	<0.1	-	-	-
Aldrin	mg/kg	0.1	<0.1	-	-	-
Beta BHC	mg/kg	0.1	<0.1	-	-	-
Delta BHC	mg/kg	0.1	<0.1	-	-	-
Heptachlor epoxide	mg/kg	0.1	<0.1	-	-	-
o,p'-DDE	mg/kg	0.1	<0.1	-	-	-
Alpha Endosulfan	mg/kg	0.2	<0.2	-	-	-
Gamma Chlordane	mg/kg	0.1	<0.1	-	-	-
Alpha Chlordane	mg/kg	0.1	<0.1	-	-	-
trans-Nonachlor	mg/kg	0.1	<0.1	-	-	-
p,p'-DDE	mg/kg	0.1	<0.1	-	-	-
Dieldrin	mg/kg	0.2	<0.2	-	-	-
Endrin	mg/kg	0.2	<0.2	-	-	-

Parameter	Units	LOR	Sample Number: SE195298.021 Sample Matrix: Soil Sample Date: 10 Jul 2019 Sample Name: BH27 0.3-0.4	SE195298.022 Soil 10 Jul 2019 BH27 0.7-0.8	SE195298.023 Soil 10 Jul 2019 DUP1	SE195298.024 Soil 10 Jul 2019 DUP2
OC Pesticides in Soil Method: AN420 Tested: 16/7/2019 (continued)						
o,p'-DDD	mg/kg	0.1	<0.1	-	-	-
o,p'-DDT	mg/kg	0.1	<0.1	-	-	-
Beta Endosulfan	mg/kg	0.2	<0.2	-	-	-
p,p'-DDD	mg/kg	0.1	<0.1	-	-	-
p,p'-DDT	mg/kg	0.1	<0.1	-	-	-
Endosulfan sulphate	mg/kg	0.1	<0.1	-	-	-
Endrin Aldehyde	mg/kg	0.1	<0.1	-	-	-
Methoxychlor	mg/kg	0.1	<0.1	-	-	-
Endrin Ketone	mg/kg	0.1	<0.1	-	-	-
Isodrin	mg/kg	0.1	<0.1	-	-	-
Mirex	mg/kg	0.1	<0.1	-	-	-
Total CLP OC Pesticides	mg/kg	1	<1	-	-	-
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**94**	-	-	-
OP Pesticides in Soil Method: AN420 Tested: 16/7/2019						
Dichlorvos	mg/kg	0.5	<0.5	-	-	-
Dimethoate	mg/kg	0.5	<0.5	-	-	-
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	-	-	-
Fenitrothion	mg/kg	0.2	<0.2	-	-	-
Malathion	mg/kg	0.2	<0.2	-	-	-
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	-	-	-
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	-	-	-
Bromophos Ethyl	mg/kg	0.2	<0.2	-	-	-
Methidathion	mg/kg	0.5	<0.5	-	-	-
Ethion	mg/kg	0.2	<0.2	-	-	-
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	-	-	-
Total OP Pesticides*	mg/kg	1.7	<1.7	-	-	-
Surrogates						
2-fluorobiphenyl (Surrogate)	%	-	**94**	-	-	-
d14-p-terphenyl (Surrogate)	%	-	**88**	-	-	-
PCBs in Soil Method: AN420 Tested: 16/7/2019						
Arochlor 1016	mg/kg	0.2	<0.2	-	-	-
Arochlor 1221	mg/kg	0.2	<0.2	-	-	-
Arochlor 1232	mg/kg	0.2	<0.2	-	-	-
Arochlor 1242	mg/kg	0.2	<0.2	-	-	-
Arochlor 1248	mg/kg	0.2	<0.2	-	-	-
Arochlor 1254	mg/kg	0.2	<0.2	-	-	-
Arochlor 1260	mg/kg	0.2	<0.2	-	-	-
Arochlor 1262	mg/kg	0.2	<0.2	-	-	-
Arochlor 1268	mg/kg	0.2	<0.2	-	-	-
Total PCBs (Arochlors)	mg/kg	1	<1	-	-	-
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**94**	-	-	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE195298.021 Soil 10 Jul 2019 BH27 0.3-0.4	SE195298.022 Soil 10 Jul 2019 BH27 0.7-0.8	SE195298.023 Soil 10 Jul 2019 DUP1	SE195298.024 Soil 10 Jul 2019 DUP2
Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 17/7/2019							
Arsenic, As	mg/kg	1		**2**	**15**	**7**	**2**
Cadmium, Cd	mg/kg	0.3		<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3		**4.5**	**11**	**7.1**	**6.4**
Copper, Cu	mg/kg	0.5		**3.6**	**11**	**6.2**	**4.5**
Nickel, Ni	mg/kg	0.5		**2.6**	**8.6**	**3.5**	**3.5**
Lead, Pb	mg/kg	1		**5**	**8**	**7**	**6**
Zinc, Zn	mg/kg	2		**9.7**	**23**	**16**	**14**
Mercury in Soil Method: AN312 Tested: 17/7/2019							
Mercury	mg/kg	0.05		<0.05	<0.05	<0.05	<0.05
Moisture Content Method: AN002 Tested: 16/7/2019							
% Moisture	%w/w	0.5		**5.7**	**5.5**	**5.1**	**5.2**
Trace Metals (Total) in Water by ICPMS Method: AN022/AN318 Tested: 17/7/2019							
Total Arsenic	µg/L	1		-	-	-	-
Total Cadmium	µg/L	0.1		-	-	-	-
Total Chromium	µg/L	1		-	-	-	-
Total Copper	µg/L	1		-	-	-	-
Total Lead	µg/L	1		-	-	-	-
Total Nickel	µg/L	1		-	-	-	-
Total Zinc	µg/L	5		-	-	-	-
Mercury (total) in Water Method: AN311(Perth) /AN312 Tested: 16/7/2019							
Total Mercury	mg/L	0.0001		-	-	-	-

Parameter	Units	LOR	Sample Number: SE195298.025 Sample Matrix: Water Sample Date: 10 Jul 2019 Sample Name: RINS	SE195298.026 Soil 10 Jul 2019 Trip Spike	SE195298.027 Soil 10 Jul 2019 Trip Blank
VOC's in Soil Method: AN433 Tested: 19/7/2019					
Monocyclic Aromatic Hydrocarbons					
Benzene	mg/kg	0.1	-	[97.78%]	<0.1
Toluene	mg/kg	0.1	-	[94.40%]	<0.1
Ethylbenzene	mg/kg	0.1	-	[96.66%]	<0.1
m/p-xylene	mg/kg	0.2	-	[96.20%]	<0.2
o-xylene	mg/kg	0.1	-	[97.39%]	<0.1
Polycyclic VOCs					
Naphthalene	mg/kg	0.1	-	-	<0.1
Surrogates					
Dibromofluoromethane (Surrogate)	%	-	-	**80**	**86**
d4-1,2-dichloroethane (Surrogate)	%	-	-	**84**	**93**
d8-toluene (Surrogate)	%	-	-	**83**	**92**
Bromofluorobenzene (Surrogate)	%	-	-	**83**	**94**
Totals					
Total Xylenes	mg/kg	0.3	-	-	<0.3
Total BTEX	mg/kg	0.6	-	-	<0.6
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 19/7/2019					
TRH C6-C10	mg/kg	25	-	-	-
TRH C6-C9	mg/kg	20	-	-	-
Surrogates					
Dibromofluoromethane (Surrogate)	%	-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	-
d8-toluene (Surrogate)	%	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-	-
VPH F Bands					
Benzene (F0)	mg/kg	0.1	-	-	-
TRH C6-C10 minus BTEX (F1)	mg/kg	25	-	-	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE195298.025 Water 10 Jul 2019 RINS	SE195298.026 Soil 10 Jul 2019 Trip Spike	SE195298.027 Soil 10 Jul 2019 Trip Blank
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403 Tested: 18/7/2019					
TRH C10-C14	mg/kg	20	-	-	<20
TRH C15-C28	mg/kg	45	-	-	<45
TRH C29-C36	mg/kg	45	-	-	<45
TRH C37-C40	mg/kg	100	-	-	<100
TRH C10-C36 Total	mg/kg	110	-	-	<110
TRH C10-C40 Total (F bands)	mg/kg	210	-	-	<210
TRH F Bands					
TRH >C10-C16	mg/kg	25	-	-	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	-	-	<25
TRH >C16-C34 (F3)	mg/kg	90	-	-	<90
TRH >C34-C40 (F4)	mg/kg	120	-	-	<120
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 18/7/2019					
Naphthalene	mg/kg	0.1	-	-	-
2-methylnaphthalene	mg/kg	0.1	-	-	-
1-methylnaphthalene	mg/kg	0.1	-	-	-
Acenaphthylene	mg/kg	0.1	-	-	-
Acenaphthene	mg/kg	0.1	-	-	-
Fluorene	mg/kg	0.1	-	-	-
Phenanthrene	mg/kg	0.1	-	-	-
Anthracene	mg/kg	0.1	-	-	-
Fluoranthene	mg/kg	0.1	-	-	-
Pyrene	mg/kg	0.1	-	-	-
Benzo(a)anthracene	mg/kg	0.1	-	-	-
Chrysene	mg/kg	0.1	-	-	-
Benzo(b&j)fluoranthene	mg/kg	0.1	-	-	-
Benzo(k)fluoranthene	mg/kg	0.1	-	-	-
Benzo(a)pyrene	mg/kg	0.1	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	-	-	-
Dibenzo(ah)anthracene	mg/kg	0.1	-	-	-
Benzo(ghi)perylene	mg/kg	0.1	-	-	-
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	-	-	-
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	-	-	-
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	-	-	-
Total PAH (18)	mg/kg	0.8	-	-	-
Total PAH (NEPM/WHO 16)	mg/kg	0.8	-	-	-
Surrogates					
d5-nitrobenzene (Surrogate)	%	-	-	-	-
2-fluorobiphenyl (Surrogate)	%	-	-	-	-
d14-p-terphenyl (Surrogate)	%	-	-	-	-
OC Pesticides in Soil Method: AN420 Tested: 19/7/2019					
Hexachlorobenzene (HCB)	mg/kg	0.1	-	-	-
Alpha BHC	mg/kg	0.1	-	-	-
Lindane	mg/kg	0.1	-	-	-
Heptachlor	mg/kg	0.1	-	-	-
Aldrin	mg/kg	0.1	-	-	-
Beta BHC	mg/kg	0.1	-	-	-
Delta BHC	mg/kg	0.1	-	-	-
Heptachlor epoxide	mg/kg	0.1	-	-	-
o,p'-DDE	mg/kg	0.1	-	-	-
Alpha Endosulfan	mg/kg	0.2	-	-	-
Gamma Chlordane	mg/kg	0.1	-	-	-
Alpha Chlordane	mg/kg	0.1	-	-	-
trans-Nonachlor	mg/kg	0.1	-	-	-
p,p'-DDE	mg/kg	0.1	-	-	-
Dieldrin	mg/kg	0.2	-	-	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE195298.025 Water 10 Jul 2019 RINS	SE195298.026 Soil 10 Jul 2019 Trip Spike	SE195298.027 Soil 10 Jul 2019 Trip Blank
OC Pesticides in Soil Method: AN420 Tested: 16/7/2019 (continued)						
Endrin	mg/kg	0.2		-	-	-
o,p'-DDD	mg/kg	0.1		-	-	-
o,p'-DDT	mg/kg	0.1		-	-	-
Beta Endosulfan	mg/kg	0.2		-	-	-
p,p'-DDD	mg/kg	0.1		-	-	-
p,p'-DDT	mg/kg	0.1		-	-	-
Endosulfan sulphate	mg/kg	0.1		-	-	-
Endrin Aldehyde	mg/kg	0.1		-	-	-
Methoxychlor	mg/kg	0.1		-	-	-
Endrin Ketone	mg/kg	0.1		-	-	-
Isodrin	mg/kg	0.1		-	-	-
Mirex	mg/kg	0.1		-	-	-
Total CLP OC Pesticides	mg/kg	1		-	-	-
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-		-	-	-
OP Pesticides in Soil Method: AN420 Tested: 18/7/2019						
Dichlorvos	mg/kg	0.5		-	-	-
Dimethoate	mg/kg	0.5		-	-	-
Diazinon (Dimpylate)	mg/kg	0.5		-	-	-
Fenitrothion	mg/kg	0.2		-	-	-
Malathion	mg/kg	0.2		-	-	-
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2		-	-	-
Parathion-ethyl (Parathion)	mg/kg	0.2		-	-	-
Bromophos Ethyl	mg/kg	0.2		-	-	-
Methidathion	mg/kg	0.5		-	-	-
Ethion	mg/kg	0.2		-	-	-
Azinphos-methyl (Guthion)	mg/kg	0.2		-	-	-
Total OP Pesticides*	mg/kg	1.7		-	-	-
Surrogates						
2-fluorobiphenyl (Surrogate)	%	-		-	-	-
d14-p-terphenyl (Surrogate)	%	-		-	-	-
PCBs in Soil Method: AN420 Tested: 19/7/2019						
Arochlor 1016	mg/kg	0.2		-	-	-
Arochlor 1221	mg/kg	0.2		-	-	-
Arochlor 1232	mg/kg	0.2		-	-	-
Arochlor 1242	mg/kg	0.2		-	-	-
Arochlor 1248	mg/kg	0.2		-	-	-
Arochlor 1254	mg/kg	0.2		-	-	-
Arochlor 1260	mg/kg	0.2		-	-	-
Arochlor 1262	mg/kg	0.2		-	-	-
Arochlor 1268	mg/kg	0.2		-	-	-
Total PCBs (Arochlors)	mg/kg	1		-	-	-

Parameter	Units	LOR	Sample Number: SE195298.025 Sample Matrix: Water Sample Date: 10 Jul 2019 Sample Name: RINS	SE195298.026 Soil 10 Jul 2019 Trip Spike	SE195298.027 Soil 10 Jul 2019 Trip Blank
PCBs in Soil Method: AN420 Tested: 19/7/2019 (continued)					
Surrogates					
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-	-
Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 18/7/2019					
Arsenic, As	mg/kg	1	-	-	-
Cadmium, Cd	mg/kg	0.3	-	-	-
Chromium, Cr	mg/kg	0.3	-	-	-
Copper, Cu	mg/kg	0.5	-	-	-
Nickel, Ni	mg/kg	0.5	-	-	-
Lead, Pb	mg/kg	1	-	-	-
Zinc, Zn	mg/kg	2	-	-	-
Mercury in Soil Method: AN312 Tested: 18/7/2019					
Mercury	mg/kg	0.05	-	-	-
Moisture Content Method: AN002 Tested: 17/7/2019					
% Moisture	%w/w	0.5	-	-	<0.5
Trace Metals (Total) in Water by ICPMS Method: AN022/AN318 Tested: 16/7/2019					
Total Arsenic	µg/L	1	-	-	-
Total Cadmium	µg/L	0.1	-	-	-
Total Chromium	µg/L	1	-	-	-
Total Copper	µg/L	1	-	-	-
Total Lead	µg/L	1	-	-	-
Total Nickel	µg/L	1	-	-	-
Total Zinc	µg/L	5	-	-	-
Mercury (total) in Water Method: AN311(Perth) /AN312 Tested: 16/7/2019					
Total Mercury	mg/L	0.0001	<0.0001	-	-

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Mercury (total) in Water **Method: ME-(AU)-[ENV]AN311(Perth) /AN312**

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Total Mercury	LB178511	mg/L	0.0001	<0.0001	NA

Mercury in Soil **Method: ME-(AU)-[ENV]AN312**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Mercury	LB178676	mg/kg	0.05	<0.05	0%	110%	104%
	LB178677	mg/kg	0.05	<0.05	0%	101%	91%

Moisture Content **Method: ME-(AU)-[ENV]AN002**

Parameter	QC Reference	Units	LOR	DUP %RPD
% Moisture	LB178555	%w/w	0.5	1%
	LB178564	%w/w	0.5	0 - 15%

OC Pesticides in Soil **Method: ME-(AU)-[ENV]AN420**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Hexachlorobenzene (HCB)	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1		NA	
Alpha BHC	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1		NA	
Lindane	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1		NA	
Heptachlor	LB178547	mg/kg	0.1	<0.1	0%	79%	90%
	LB178549	mg/kg	0.1	<0.1		82%	
Aldrin	LB178547	mg/kg	0.1	<0.1	0%	90%	93%
	LB178549	mg/kg	0.1	<0.1		95%	
Beta BHC	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1		NA	
Delta BHC	LB178547	mg/kg	0.1	<0.1	0%	81%	81%
	LB178549	mg/kg	0.1	<0.1		76%	
Heptachlor epoxide	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1		NA	
o,p'-DDE	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1		NA	
Alpha Endosulfan	LB178547	mg/kg	0.2	<0.2	0%	NA	NA
	LB178549	mg/kg	0.2	<0.2		NA	
Gamma Chlordane	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1		NA	
Alpha Chlordane	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1		NA	
trans-Nonachlor	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1		NA	
p,p'-DDE	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1		NA	
Dieldrin	LB178547	mg/kg	0.2	<0.2	0%	88%	92%
	LB178549	mg/kg	0.2	<0.2		92%	
Endrin	LB178547	mg/kg	0.2	<0.2	0%	85%	90%
	LB178549	mg/kg	0.2	<0.2		86%	
o,p'-DDD	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1		NA	
o,p'-DDT	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1		NA	
Beta Endosulfan	LB178547	mg/kg	0.2	<0.2	0%	NA	NA
	LB178549	mg/kg	0.2	<0.2		NA	
p,p'-DDD	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1		NA	
p,p'-DDT	LB178547	mg/kg	0.1	<0.1	0%	78%	76%

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

OC Pesticides in Soil **Method: ME-(AU)-[ENV]AN420 (continued)**

				MB	DUP %RPD	LCS %Recovery	MS %Recovery
p,p'-DDT	LB178549	mg/kg	0.1	<0.1		77%	
Endosulfan sulphate	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1		NA	
Endrin Aldehyde	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1		NA	
Methoxychlor	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1		NA	
Endrin Ketone	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1		NA	
Isodrin	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1		NA	
Mirex	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1		NA	
Total CLP OC Pesticides	LB178547	mg/kg	1	<1	0%	NA	NA
	LB178549	mg/kg	1	<1		NA	

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Tetrachloro-m-xylene (TCMX) (Surrogate)	LB178547	%	-	94%	4%	97%	97%
	LB178549	%	-	95%		97%	

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

OP Pesticides in Soil **Method: ME-(AU)-[ENV]AN420**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Dichlorvos	LB178547	mg/kg	0.5	<0.5	0%	125%	105%
	LB178549	mg/kg	0.5	<0.5		108%	
Dimethoate	LB178547	mg/kg	0.5	<0.5	0%	NA	NA
	LB178549	mg/kg	0.5	<0.5		NA	
Diazinon (Dimpylate)	LB178547	mg/kg	0.5	<0.5	0%	112%	108%
	LB178549	mg/kg	0.5	<0.5		100%	
Fenitrothion	LB178547	mg/kg	0.2	<0.2	0%	NA	NA
	LB178549	mg/kg	0.2	<0.2		NA	
Malathion	LB178547	mg/kg	0.2	<0.2	0%	NA	NA
	LB178549	mg/kg	0.2	<0.2		NA	
Chlorpyrifos (Chlorpyrifos Ethyl)	LB178547	mg/kg	0.2	<0.2	0%	108%	107%
	LB178549	mg/kg	0.2	<0.2		88%	
Parathion-ethyl (Parathion)	LB178547	mg/kg	0.2	<0.2	0%	NA	NA
	LB178549	mg/kg	0.2	<0.2		NA	
Bromophos Ethyl	LB178547	mg/kg	0.2	<0.2	0%	NA	NA
	LB178549	mg/kg	0.2	<0.2		NA	
Methidathion	LB178547	mg/kg	0.5	<0.5	0%	NA	NA
	LB178549	mg/kg	0.5	<0.5		NA	
Ethion	LB178547	mg/kg	0.2	<0.2	0%	107%	106%
	LB178549	mg/kg	0.2	<0.2		90%	
Azinphos-methyl (Guthion)	LB178547	mg/kg	0.2	<0.2	0%	NA	NA
	LB178549	mg/kg	0.2	<0.2		NA	
Total OP Pesticides*	LB178547	mg/kg	1.7	<1.7	0%	NA	NA
	LB178549	mg/kg	1.7	<1.7		NA	

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
2-fluorobiphenyl (Surrogate)	LB178547	%	-	90%	5 - 7%	86%	88%
	LB178549	%	-	88%		84%	
d14-p-terphenyl (Surrogate)	LB178547	%	-	96%	4 - 16%	90%	86%
	LB178549	%	-	82%		84%	

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Naphthalene	LB178547	mg/kg	0.1	<0.1	0%	99%	106%
	LB178549	mg/kg	0.1	<0.1	0%	105%	99%
2-methylnaphthalene	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1	0%	NA	NA
1-methylnaphthalene	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1	0%	NA	NA
Acenaphthylene	LB178547	mg/kg	0.1	<0.1	0%	107%	115%
	LB178549	mg/kg	0.1	<0.1	0%	110%	101%
Acenaphthene	LB178547	mg/kg	0.1	<0.1	0%	104%	104%
	LB178549	mg/kg	0.1	<0.1	0%	109%	105%
Fluorene	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1	0%	NA	NA
Phenanthrene	LB178547	mg/kg	0.1	<0.1	0%	105%	113%
	LB178549	mg/kg	0.1	<0.1	0%	113%	103%
Anthracene	LB178547	mg/kg	0.1	<0.1	0%	99%	108%
	LB178549	mg/kg	0.1	<0.1	0%	105%	95%
Fluoranthene	LB178547	mg/kg	0.1	<0.1	0%	97%	105%
	LB178549	mg/kg	0.1	<0.1	0%	104%	97%
Pyrene	LB178547	mg/kg	0.1	<0.1	0%	100%	110%
	LB178549	mg/kg	0.1	<0.1	3%	110%	101%
Benzo(a)anthracene	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1	0%	NA	NA
Chrysene	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1	0%	NA	NA
Benzo(b&j)fluoranthene	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1	0%	NA	NA
Benzo(k)fluoranthene	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1	0%	NA	NA
Benzo(a)pyrene	LB178547	mg/kg	0.1	<0.1	0%	109%	118%
	LB178549	mg/kg	0.1	<0.1	0%	110%	107%
Indeno(1,2,3-cd)pyrene	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1	0%	NA	NA
Dibenzo(ah)anthracene	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1	0%	NA	NA
Benzo(ghi)perylene	LB178547	mg/kg	0.1	<0.1	0%	NA	NA
	LB178549	mg/kg	0.1	<0.1	0%	NA	NA
Carcinogenic PAHs, BaP TEQ <LOR=0	LB178547	TEQ (mg/kg)	0.2	<0.2	0%	NA	NA
	LB178549	TEQ (mg/kg)	0.2	<0.2	0%	NA	NA
Carcinogenic PAHs, BaP TEQ <LOR=LOR	LB178547	TEQ (mg/kg)	0.3	<0.3	0%	NA	NA
	LB178549	TEQ (mg/kg)	0.3	<0.3	0%	NA	NA
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	LB178547	TEQ (mg/kg)	0.2	<0.2	0%	NA	NA
	LB178549	TEQ (mg/kg)	0.2	<0.2	0%	NA	NA
Total PAH (18)	LB178547	mg/kg	0.8	<0.8	0%	NA	NA
	LB178549	mg/kg	0.8	<0.8	0%	NA	NA
Total PAH (NEPM/WHO 16)	LB178547	mg/kg	0.8	<0.8			
	LB178549	mg/kg	0.8	<0.8			

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
d5-nitrobenzene (Surrogate)	LB178547	%	-	84%	2 - 5%	88%	94%
	LB178549	%	-	86%	4%	90%	86%
2-fluorobiphenyl (Surrogate)	LB178547	%	-	90%	5 - 7%	86%	88%
	LB178549	%	-	88%	2%	84%	84%
d14-p-terphenyl (Surrogate)	LB178547	%	-	96%	4 - 16%	90%	86%
	LB178549	%	-	82%	7%	84%	88%

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

PCBs in Soil **Method: ME-(AU)-[ENV]AN420**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Arochlor 1016	LB178547	mg/kg	0.2	<0.2	0%	NA	NA
	LB178549	mg/kg	0.2	<0.2		NA	
Arochlor 1221	LB178547	mg/kg	0.2	<0.2	0%	NA	NA
	LB178549	mg/kg	0.2	<0.2		NA	
Arochlor 1232	LB178547	mg/kg	0.2	<0.2	0%	NA	NA
	LB178549	mg/kg	0.2	<0.2		NA	
Arochlor 1242	LB178547	mg/kg	0.2	<0.2	0%	NA	NA
	LB178549	mg/kg	0.2	<0.2		NA	
Arochlor 1248	LB178547	mg/kg	0.2	<0.2	0%	NA	NA
	LB178549	mg/kg	0.2	<0.2		NA	
Arochlor 1254	LB178547	mg/kg	0.2	<0.2	0%	NA	NA
	LB178549	mg/kg	0.2	<0.2		NA	
Arochlor 1260	LB178547	mg/kg	0.2	<0.2	0%	103%	105%
	LB178549	mg/kg	0.2	<0.2		108%	
Arochlor 1262	LB178547	mg/kg	0.2	<0.2	0%	NA	NA
	LB178549	mg/kg	0.2	<0.2		NA	
Arochlor 1268	LB178547	mg/kg	0.2	<0.2	0%	NA	NA
	LB178549	mg/kg	0.2	<0.2		NA	
Total PCBs (Arochlors)	LB178547	mg/kg	1	<1	0%	NA	NA
	LB178549	mg/kg	1	<1		NA	

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Tetrachloro-m-xylene (TCMX) (Surrogate)	LB178547	%	-	97%	4%	95%	97%
	LB178549	%	-	95%		95%	

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES **Method: ME-(AU)-[ENV]AN040/AN320**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Arsenic, As	LB178671	mg/kg	1	<1	2 - 17%	102%	90%
	LB178672	mg/kg	1	<1	5%	96%	90%
Cadmium, Cd	LB178671	mg/kg	0.3	<0.3	0%	103%	94%
	LB178672	mg/kg	0.3	<0.3	0%	102%	94%
Chromium, Cr	LB178671	mg/kg	0.3	<0.3	5 - 18%	107%	94%
	LB178672	mg/kg	0.3	<0.3	35%	97%	95%
Copper, Cu	LB178671	mg/kg	0.5	<0.5	1 - 18%	87%	99%
	LB178672	mg/kg	0.5	<0.5	2%	84%	101%
Nickel, Ni	LB178671	mg/kg	0.5	<0.5	0 - 22%	88%	95%
	LB178672	mg/kg	0.5	<0.5	7%	85%	94%
Lead, Pb	LB178671	mg/kg	1	<1	6 - 11%	84%	92%
	LB178672	mg/kg	1	<1	20%	82%	91%
Zinc, Zn	LB178671	mg/kg	2	<2.0	2 - 11%	95%	94%
	LB178672	mg/kg	2	<2.0	8%	91%	96%

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

TRH (Total Recoverable Hydrocarbons) in Soil Method: ME-(AU)-[ENV]AN403

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
TRH C10-C14	LB178547	mg/kg	20	<20	0%	113%	105%
	LB178549	mg/kg	20	<20	0%	113%	65%
TRH C15-C28	LB178547	mg/kg	45	<45	0%	100%	103%
	LB178549	mg/kg	45	<45	7%	105%	83%
TRH C29-C36	LB178547	mg/kg	45	<45	0%	78%	95%
	LB178549	mg/kg	45	<45	0%	105%	100%
TRH C37-C40	LB178547	mg/kg	100	<100	0%	NA	NA
	LB178549	mg/kg	100	<100	0%	NA	NA
TRH C10-C36 Total	LB178547	mg/kg	110	<110	0%	NA	NA
	LB178549	mg/kg	110	<110	6%	NA	NA
TRH C10-C40 Total (F bands)	LB178547	mg/kg	210	<210	0%	NA	NA
	LB178549	mg/kg	210	<210	6%	NA	NA

TRH F Bands

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
TRH >C10-C16	LB178547	mg/kg	25	<25	0%	108%	103%
	LB178549	mg/kg	25	<25	3%	110%	78%
TRH >C10-C16 - Naphthalene (F2)	LB178547	mg/kg	25	<25	0%	NA	NA
	LB178549	mg/kg	25	<25	3%	NA	NA
TRH >C16-C34 (F3)	LB178547	mg/kg	90	<90	0%	90%	108%
	LB178549	mg/kg	90	<90	7%	98%	93%
TRH >C34-C40 (F4)	LB178547	mg/kg	120	<120	0%	70%	NA
	LB178549	mg/kg	120	<120	0%	120%	NA

VOC's in Soil Method: ME-(AU)-[ENV]AN433

Monocyclic Aromatic Hydrocarbons

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Benzene	LB178536	mg/kg	0.1	<0.1	0%	74%	73%
	LB178537	mg/kg	0.1	<0.1	0%	70%	71%
Toluene	LB178536	mg/kg	0.1	<0.1	0%	76%	73%
	LB178537	mg/kg	0.1	<0.1	0%	63%	74%
Ethylbenzene	LB178536	mg/kg	0.1	<0.1	0%	76%	73%
	LB178537	mg/kg	0.1	<0.1	0%	69%	75%
m/p-xylene	LB178536	mg/kg	0.2	<0.2	0%	78%	75%
	LB178537	mg/kg	0.2	<0.2	0%	69%	76%
o-xylene	LB178536	mg/kg	0.1	<0.1	0%	76%	73%
	LB178537	mg/kg	0.1	<0.1	0%	68%	76%

Polycyclic VOCs

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Naphthalene	LB178536	mg/kg	0.1	<0.1	0%	NA	NA
	LB178537	mg/kg	0.1	<0.1	0%	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Dibromofluoromethane (Surrogate)	LB178536	%	-	90%	7 - 9%	89%	91%
	LB178537	%	-	98%	2%	84%	90%
d4-1,2-dichloroethane (Surrogate)	LB178536	%	-	90%	8 - 9%	94%	97%
	LB178537	%	-	99%	2%	93%	91%
d8-toluene (Surrogate)	LB178536	%	-	89%	1 - 7%	92%	93%
	LB178537	%	-	100%	4%	85%	91%
Bromofluorobenzene (Surrogate)	LB178536	%	-	85%	0 - 8%	88%	90%
	LB178537	%	-	101%	25%	98%	91%

Totals

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

VOC's in Soil Method: ME-(AU)-[ENV]AN433 (continued)

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Total Xylenes	LB178536	mg/kg	0.3	<0.3	0%	NA	NA
	LB178537	mg/kg	0.3	<0.3	0%	NA	NA
Total BTEX	LB178536	mg/kg	0.6	<0.6	0%	NA	NA
	LB178537	mg/kg	0.6	<0.6	0%	NA	NA

Volatile Petroleum Hydrocarbons in Soil Method: ME-(AU)-[ENV]AN433

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
TRH C6-C10	LB178536	mg/kg	25	<25	0%	91%	91%
	LB178537	mg/kg	25	<25	0%	77%	93%
TRH C6-C9	LB178536	mg/kg	20	<20	0%	92%	91%
	LB178537	mg/kg	20	<20	0%	79%	96%

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Dibromofluoromethane (Surrogate)	LB178536	%	-	90%	7 - 9%	89%	91%
	LB178537	%	-	98%	2%	84%	90%
d4-1,2-dichloroethane (Surrogate)	LB178536	%	-	90%	8 - 9%	94%	97%
	LB178537	%	-	99%	2%	93%	91%
d8-toluene (Surrogate)	LB178536	%	-	89%	1 - 7%	92%	93%
	LB178537	%	-	100%	4%	85%	91%
Bromofluorobenzene (Surrogate)	LB178536	%	-	85%	0 - 8%	88%	90%
	LB178537	%	-	101%	25%	98%	91%

VPH F Bands

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Benzene (F0)	LB178536	mg/kg	0.1	<0.1	0%	NA	NA
	LB178537	mg/kg	0.1	<0.1	0%	NA	NA
TRH C6-C10 minus BTEX (F1)	LB178536	mg/kg	25	<25	0%	127%	131%
	LB178537	mg/kg	25	<25	0%	99%	135%

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN022	The water sample is digested with Nitric Acid and made up to the original volume similar to APHA3030E.
AN022/AN318	Following acid digestion of un filtered sample, determination of elements at trace level in waters by ICP-MS technique, in accordance with USEPA 6020A.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN311(Perth) /AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions taken from unfiltered sample are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is reported directly and also corrected by subtracting Naphthalene (from VOC method AN433) where available.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Recoverable Hydrocarbons - Silica (TRH-Si) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents .
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	NATA accreditation does not cover the performance of this service.	QFH	QC result is above the upper tolerance
		QFL	QC result is below the lower tolerance
**	Indicative data, theoretical holding time exceeded.	-	The sample was not analysed for this analyte
		NVL	Not Validated

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calcuated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au.pv.sgsvr/en-gb/environment.

This document is issued by the Company under its General Conditions of Service accessible at www.sgs.com/en/Terms-and-Conditions.aspx. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client only. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law .

This report must not be reproduced, except in full.

STATEMENT OF QA/QC PERFORMANCE

SE195298 R0

CLIENT DETAILS

Contact	Jake Duck
Client	VALLEY CIVILAB PTY LTD
Address	PO BOX 3127 THORNTON NSW 2322
Telephone	61 2 4966 1844
Facsimile	(Not specified)
Email	jake.duck@vclab.com.au
Project	**P1834**
Order Number	**VC: 04343**
Samples	27

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE195298 R0**
Date Received	12 Jul 2019
Date Reported	22 Jul 2019

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Duplicate	Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES	1 item

SAMPLE SUMMARY

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	26 Soil, 1 Water
Date documentation received	12/7/2019	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	15°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

HOLDING TIME SUMMARY

SE195298 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Mercury (total) in Water

Method: ME-(AU)-[ENV]AN311(Perth) /AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
RINS	SE195298.025	LB178511	10 Jul 2019	12 Jul 2019	07 Aug 2019	16 Jul 2019	07 Aug 2019	16 Jul 2019

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0.2-0.3	SE195298.001	LB178676	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019
BH2 0.4-0.5	SE195298.002	LB178676	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019
BH4 0.2-0.3	SE195298.003	LB178676	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019
BH4 0.7-0.8	SE195298.004	LB178676	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019
BH5 0.2-0.3	SE195298.005	LB178676	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019
BH5 0.7-0.8	SE195298.006	LB178676	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019
BH6 0.2-0.3	SE195298.007	LB178676	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019
BH6 0.7-0.8	SE195298.008	LB178676	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019
BH7 0.2-0.3	SE195298.009	LB178677	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019
BH7 0.7-0.8	SE195298.010	LB178677	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019
BH8 0.2-0.3	SE195298.011	LB178677	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019
BH10 0.3-0.4	SE195298.012	LB178677	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019
BH10 0.6-0.7	SE195298.013	LB178677	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019
BH15 0.3-0.4	SE195298.014	LB178677	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019
BH15 0.7-0.8	SE195298.015	LB178677	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019
BH17 0.2-0.3	SE195298.016	LB178677	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019
BH20 0.2-0.3	SE195298.017	LB178677	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019
BH20 0.7-0.8	SE195298.018	LB178677	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019
BH24 0.2-0.3	SE195298.019	LB178677	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019
BH24 0.7-0.8	SE195298.020	LB178677	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019
BH27 0.3-0.4	SE195298.021	LB178677	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019
BH27 0.7-0.8	SE195298.022	LB178677	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019
DUP1	SE195298.023	LB178677	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019
DUP2	SE195298.024	LB178677	10 Jul 2019	12 Jul 2019	07 Aug 2019	17 Jul 2019	07 Aug 2019	19 Jul 2019

Moisture Content

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0.2-0.3	SE195298.001	LB178555	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
BH2 0.4-0.5	SE195298.002	LB178555	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
BH4 0.2-0.3	SE195298.003	LB178555	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
BH4 0.7-0.8	SE195298.004	LB178555	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
BH5 0.2-0.3	SE195298.005	LB178555	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
BH5 0.7-0.8	SE195298.006	LB178555	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
BH6 0.2-0.3	SE195298.007	LB178555	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
BH6 0.7-0.8	SE195298.008	LB178555	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
BH7 0.2-0.3	SE195298.009	LB178555	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
BH7 0.7-0.8	SE195298.010	LB178555	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
BH8 0.2-0.3	SE195298.011	LB178555	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
BH10 0.3-0.4	SE195298.012	LB178555	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
BH10 0.6-0.7	SE195298.013	LB178555	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
BH15 0.3-0.4	SE195298.014	LB178555	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
BH15 0.7-0.8	SE195298.015	LB178555	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
BH17 0.2-0.3	SE195298.016	LB178555	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
BH20 0.2-0.3	SE195298.017	LB178555	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
BH20 0.7-0.8	SE195298.018	LB178555	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
BH24 0.2-0.3	SE195298.019	LB178555	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
BH24 0.7-0.8	SE195298.020	LB178564	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
BH27 0.3-0.4	SE195298.021	LB178564	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
BH27 0.7-0.8	SE195298.022	LB178564	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
DUP1	SE195298.023	LB178564	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
DUP2	SE195298.024	LB178564	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019
Trip Blank	SE195298.027	LB178564	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	21 Jul 2019	18 Jul 2019

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref

HOLDING TIME SUMMARY

SE195298 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

OC Pesticides in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0.2-0.3	SE195298.001	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH2 0.4-0.5	SE195298.002	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH4 0.2-0.3	SE195298.003	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH4 0.7-0.8	SE195298.004	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH5 0.2-0.3	SE195298.005	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH5 0.7-0.8	SE195298.006	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH6 0.2-0.3	SE195298.007	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH6 0.7-0.8	SE195298.008	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH7 0.2-0.3	SE195298.009	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH7 0.7-0.8	SE195298.010	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH8 0.2-0.3	SE195298.011	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH10 0.3-0.4	SE195298.012	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH10 0.6-0.7	SE195298.013	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH15 0.3-0.4	SE195298.014	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH15 0.7-0.8	SE195298.015	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH17 0.2-0.3	SE195298.016	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH20 0.2-0.3	SE195298.017	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH20 0.7-0.8	SE195298.018	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH24 0.2-0.3	SE195298.019	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH24 0.7-0.8	SE195298.020	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH27 0.3-0.4	SE195298.021	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH27 0.7-0.8	SE195298.022	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
DUP1	SE195298.023	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
DUP2	SE195298.024	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
Trip Blank	SE195298.027	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0.2-0.3	SE195298.001	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH2 0.4-0.5	SE195298.002	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH4 0.2-0.3	SE195298.003	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH4 0.7-0.8	SE195298.004	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH5 0.2-0.3	SE195298.005	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH5 0.7-0.8	SE195298.006	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH6 0.2-0.3	SE195298.007	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH6 0.7-0.8	SE195298.008	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH7 0.2-0.3	SE195298.009	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH7 0.7-0.8	SE195298.010	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH8 0.2-0.3	SE195298.011	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH10 0.3-0.4	SE195298.012	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH10 0.6-0.7	SE195298.013	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH15 0.3-0.4	SE195298.014	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH15 0.7-0.8	SE195298.015	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH17 0.2-0.3	SE195298.016	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH20 0.2-0.3	SE195298.017	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH20 0.7-0.8	SE195298.018	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH24 0.2-0.3	SE195298.019	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH24 0.7-0.8	SE195298.020	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH27 0.3-0.4	SE195298.021	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH27 0.7-0.8	SE195298.022	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
DUP1	SE195298.023	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
DUP2	SE195298.024	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
Trip Blank	SE195298.027	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0.2-0.3	SE195298.001	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH2 0.4-0.5	SE195298.002	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH4 0.2-0.3	SE195298.003	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH4 0.7-0.8	SE195298.004	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH5 0.2-0.3	SE195298.005	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019

HOLDING TIME SUMMARY

SE195298 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH5 0.7-0.8	SE195298.006	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH6 0.2-0.3	SE195298.007	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH6 0.7-0.8	SE195298.008	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH7 0.2-0.3	SE195298.009	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH7 0.7-0.8	SE195298.010	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH8 0.2-0.3	SE195298.011	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH10 0.3-0.4	SE195298.012	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH10 0.6-0.7	SE195298.013	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH15 0.3-0.4	SE195298.014	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH15 0.7-0.8	SE195298.015	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH17 0.2-0.3	SE195298.016	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH20 0.2-0.3	SE195298.017	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH20 0.7-0.8	SE195298.018	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH24 0.2-0.3	SE195298.019	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH24 0.7-0.8	SE195298.020	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH27 0.3-0.4	SE195298.021	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH27 0.7-0.8	SE195298.022	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
DUP1	SE195298.023	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
DUP2	SE195298.024	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
Trip Blank	SE195298.027	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0.2-0.3	SE195298.001	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH2 0.4-0.5	SE195298.002	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH4 0.2-0.3	SE195298.003	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH4 0.7-0.8	SE195298.004	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH5 0.2-0.3	SE195298.005	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH5 0.7-0.8	SE195298.006	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH6 0.2-0.3	SE195298.007	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH6 0.7-0.8	SE195298.008	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH7 0.2-0.3	SE195298.009	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH7 0.7-0.8	SE195298.010	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH8 0.2-0.3	SE195298.011	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH10 0.3-0.4	SE195298.012	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH10 0.6-0.7	SE195298.013	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH15 0.3-0.4	SE195298.014	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH15 0.7-0.8	SE195298.015	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH17 0.2-0.3	SE195298.016	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH20 0.2-0.3	SE195298.017	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH20 0.7-0.8	SE195298.018	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH24 0.2-0.3	SE195298.019	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH24 0.7-0.8	SE195298.020	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH27 0.3-0.4	SE195298.021	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH27 0.7-0.8	SE195298.022	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
DUP1	SE195298.023	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
DUP2	SE195298.024	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
Trip Blank	SE195298.027	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0.2-0.3	SE195298.001	LB178671	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019
BH2 0.4-0.5	SE195298.002	LB178671	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019
BH4 0.2-0.3	SE195298.003	LB178671	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019
BH4 0.7-0.8	SE195298.004	LB178671	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019
BH5 0.2-0.3	SE195298.005	LB178671	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019
BH5 0.7-0.8	SE195298.006	LB178671	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019
BH6 0.2-0.3	SE195298.007	LB178671	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019
BH6 0.7-0.8	SE195298.008	LB178671	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019
BH7 0.2-0.3	SE195298.009	LB178672	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019
BH7 0.7-0.8	SE195298.010	LB178672	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019

HOLDING TIME SUMMARY

SE195298 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES (continued)

Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH8 0.2-0.3	SE195298.011	LB178672	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019
BH10 0.3-0.4	SE195298.012	LB178672	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019
BH10 0.6-0.7	SE195298.013	LB178672	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019
BH15 0.3-0.4	SE195298.014	LB178672	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019
BH15 0.7-0.8	SE195298.015	LB178672	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019
BH17 0.2-0.3	SE195298.016	LB178672	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019
BH20 0.2-0.3	SE195298.017	LB178672	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019
BH20 0.7-0.8	SE195298.018	LB178672	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019
BH24 0.2-0.3	SE195298.019	LB178672	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019
BH24 0.7-0.8	SE195298.020	LB178672	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019
BH27 0.3-0.4	SE195298.021	LB178672	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019
BH27 0.7-0.8	SE195298.022	LB178672	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019
DUP1	SE195298.023	LB178672	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019
DUP2	SE195298.024	LB178672	10 Jul 2019	12 Jul 2019	06 Jan 2020	17 Jul 2019	06 Jan 2020	18 Jul 2019

Trace Metals (Total) in Water by ICPMS

Method: ME-(AU)-[ENV]AN022/AN318

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
RINS	SE195298.025	LB178506	10 Jul 2019	12 Jul 2019	06 Jan 2020	16 Jul 2019	06 Jan 2020	17 Jul 2019

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0.2-0.3	SE195298.001	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH2 0.4-0.5	SE195298.002	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH4 0.2-0.3	SE195298.003	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH4 0.7-0.8	SE195298.004	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH5 0.2-0.3	SE195298.005	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH5 0.7-0.8	SE195298.006	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH6 0.2-0.3	SE195298.007	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH6 0.7-0.8	SE195298.008	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH7 0.2-0.3	SE195298.009	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH7 0.7-0.8	SE195298.010	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH8 0.2-0.3	SE195298.011	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH10 0.3-0.4	SE195298.012	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH10 0.6-0.7	SE195298.013	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH15 0.3-0.4	SE195298.014	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH15 0.7-0.8	SE195298.015	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH17 0.2-0.3	SE195298.016	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH20 0.2-0.3	SE195298.017	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH20 0.7-0.8	SE195298.018	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH24 0.2-0.3	SE195298.019	LB178547	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH24 0.7-0.8	SE195298.020	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH27 0.3-0.4	SE195298.021	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
BH27 0.7-0.8	SE195298.022	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
DUP1	SE195298.023	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
DUP2	SE195298.024	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019
Trip Blank	SE195298.027	LB178549	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	18 Jul 2019

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0.2-0.3	SE195298.001	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	20 Jul 2019
BH2 0.4-0.5	SE195298.002	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	20 Jul 2019
BH4 0.2-0.3	SE195298.003	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	20 Jul 2019
BH4 0.7-0.8	SE195298.004	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	20 Jul 2019
BH5 0.2-0.3	SE195298.005	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	20 Jul 2019
BH5 0.7-0.8	SE195298.006	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	20 Jul 2019
BH6 0.2-0.3	SE195298.007	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	20 Jul 2019
BH6 0.7-0.8	SE195298.008	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	20 Jul 2019
BH7 0.2-0.3	SE195298.009	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	22 Jul 2019
BH7 0.7-0.8	SE195298.010	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	22 Jul 2019
BH8 0.2-0.3	SE195298.011	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	22 Jul 2019

HOLDING TIME SUMMARY

SE195298 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH10 0.3-0.4	SE195298.012	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	22 Jul 2019
BH10 0.6-0.7	SE195298.013	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	22 Jul 2019
BH15 0.3-0.4	SE195298.014	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	22 Jul 2019
BH15 0.7-0.8	SE195298.015	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	22 Jul 2019
BH17 0.2-0.3	SE195298.016	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	22 Jul 2019
BH20 0.2-0.3	SE195298.017	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	22 Jul 2019
BH20 0.7-0.8	SE195298.018	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	22 Jul 2019
BH24 0.2-0.3	SE195298.019	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	22 Jul 2019
BH24 0.7-0.8	SE195298.020	LB178537	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH27 0.3-0.4	SE195298.021	LB178537	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH27 0.7-0.8	SE195298.022	LB178537	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
DUP1	SE195298.023	LB178537	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
DUP2	SE195298.024	LB178537	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
Trip Spike	SE195298.026	LB178537	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
Trip Blank	SE195298.027	LB178537	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0.2-0.3	SE195298.001	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	20 Jul 2019
BH2 0.4-0.5	SE195298.002	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	20 Jul 2019
BH4 0.2-0.3	SE195298.003	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	20 Jul 2019
BH4 0.7-0.8	SE195298.004	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	20 Jul 2019
BH5 0.2-0.3	SE195298.005	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	20 Jul 2019
BH5 0.7-0.8	SE195298.006	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	20 Jul 2019
BH6 0.2-0.3	SE195298.007	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	20 Jul 2019
BH6 0.7-0.8	SE195298.008	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	20 Jul 2019
BH7 0.2-0.3	SE195298.009	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	22 Jul 2019
BH7 0.7-0.8	SE195298.010	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	22 Jul 2019
BH8 0.2-0.3	SE195298.011	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	22 Jul 2019
BH10 0.3-0.4	SE195298.012	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	22 Jul 2019
BH10 0.6-0.7	SE195298.013	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	22 Jul 2019
BH15 0.3-0.4	SE195298.014	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	22 Jul 2019
BH15 0.7-0.8	SE195298.015	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	22 Jul 2019
BH17 0.2-0.3	SE195298.016	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	22 Jul 2019
BH20 0.2-0.3	SE195298.017	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	22 Jul 2019
BH20 0.7-0.8	SE195298.018	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	22 Jul 2019
BH24 0.2-0.3	SE195298.019	LB178536	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	22 Jul 2019
BH24 0.7-0.8	SE195298.020	LB178537	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH27 0.3-0.4	SE195298.021	LB178537	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
BH27 0.7-0.8	SE195298.022	LB178537	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
DUP1	SE195298.023	LB178537	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
DUP2	SE195298.024	LB178537	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019
Trip Spike	SE195298.026	LB178537	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	22 Jul 2019
Trip Blank	SE195298.027	LB178537	10 Jul 2019	12 Jul 2019	24 Jul 2019	16 Jul 2019	25 Aug 2019	19 Jul 2019

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH1 0.2-0.3	SE195298.001	%	60 - 130%	94
	BH2 0.4-0.5	SE195298.002	%	60 - 130%	94
	BH4 0.2-0.3	SE195298.003	%	60 - 130%	97
	BH5 0.2-0.3	SE195298.005	%	60 - 130%	101
	BH6 0.2-0.3	SE195298.007	%	60 - 130%	100
	BH7 0.2-0.3	SE195298.009	%	60 - 130%	95
	BH8 0.2-0.3	SE195298.011	%	60 - 130%	95
	BH10 0.3-0.4	SE195298.012	%	60 - 130%	97
	BH15 0.3-0.4	SE195298.014	%	60 - 130%	94
	BH17 0.2-0.3	SE195298.016	%	60 - 130%	92
	BH20 0.2-0.3	SE195298.017	%	60 - 130%	97
	BH24 0.2-0.3	SE195298.019	%	60 - 130%	95
	BH27 0.3-0.4	SE195298.021	%	60 - 130%	94

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH1 0.2-0.3	SE195298.001	%	60 - 130%	86
	BH2 0.4-0.5	SE195298.002	%	60 - 130%	80
	BH4 0.2-0.3	SE195298.003	%	60 - 130%	88
	BH5 0.2-0.3	SE195298.005	%	60 - 130%	86
	BH6 0.2-0.3	SE195298.007	%	60 - 130%	84
	BH7 0.2-0.3	SE195298.009	%	60 - 130%	90
	BH8 0.2-0.3	SE195298.011	%	60 - 130%	84
	BH10 0.3-0.4	SE195298.012	%	60 - 130%	84
	BH15 0.3-0.4	SE195298.014	%	60 - 130%	86
	BH17 0.2-0.3	SE195298.016	%	60 - 130%	90
	BH20 0.2-0.3	SE195298.017	%	60 - 130%	78
	BH24 0.2-0.3	SE195298.019	%	60 - 130%	92
	BH27 0.3-0.4	SE195298.021	%	60 - 130%	94
d14-p-terphenyl (Surrogate)	BH1 0.2-0.3	SE195298.001	%	60 - 130%	94
	BH2 0.4-0.5	SE195298.002	%	60 - 130%	86
	BH4 0.2-0.3	SE195298.003	%	60 - 130%	96
	BH5 0.2-0.3	SE195298.005	%	60 - 130%	96
	BH6 0.2-0.3	SE195298.007	%	60 - 130%	90
	BH7 0.2-0.3	SE195298.009	%	60 - 130%	98
	BH8 0.2-0.3	SE195298.011	%	60 - 130%	98
	BH10 0.3-0.4	SE195298.012	%	60 - 130%	86
	BH15 0.3-0.4	SE195298.014	%	60 - 130%	100
	BH17 0.2-0.3	SE195298.016	%	60 - 130%	92
	BH20 0.2-0.3	SE195298.017	%	60 - 130%	102
	BH24 0.2-0.3	SE195298.019	%	60 - 130%	92
	BH27 0.3-0.4	SE195298.021	%	60 - 130%	88

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH1 0.2-0.3	SE195298.001	%	70 - 130%	86
	BH2 0.4-0.5	SE195298.002	%	70 - 130%	80
	BH4 0.2-0.3	SE195298.003	%	70 - 130%	88
	BH4 0.7-0.8	SE195298.004	%	70 - 130%	84
	BH5 0.2-0.3	SE195298.005	%	70 - 130%	86
	BH5 0.7-0.8	SE195298.006	%	70 - 130%	86
	BH6 0.2-0.3	SE195298.007	%	70 - 130%	84
	BH6 0.7-0.8	SE195298.008	%	70 - 130%	86
	BH7 0.2-0.3	SE195298.009	%	70 - 130%	90
	BH7 0.7-0.8	SE195298.010	%	70 - 130%	86
	BH8 0.2-0.3	SE195298.011	%	70 - 130%	84
	BH10 0.3-0.4	SE195298.012	%	70 - 130%	84
	BH10 0.6-0.7	SE195298.013	%	70 - 130%	88
	BH15 0.3-0.4	SE195298.014	%	70 - 130%	86
	BH15 0.7-0.8	SE195298.015	%	70 - 130%	94
	BH17 0.2-0.3	SE195298.016	%	70 - 130%	90
	BH20 0.2-0.3	SE195298.017	%	70 - 130%	78

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued) — Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH20 0.7-0.8	SE195298.018	%	70 - 130%	88
	BH24 0.2-0.3	SE195298.019	%	70 - 130%	92
	BH24 0.7-0.8	SE195298.020	%	70 - 130%	90
	BH27 0.3-0.4	SE195298.021	%	70 - 130%	94
	BH27 0.7-0.8	SE195298.022	%	70 - 130%	92
	DUP1	SE195298.023	%	70 - 130%	98
	DUP2	SE195298.024	%	70 - 130%	90
d14-p-terphenyl (Surrogate)	BH1 0.2-0.3	SE195298.001	%	70 - 130%	94
	BH2 0.4-0.5	SE195298.002	%	70 - 130%	86
	BH4 0.2-0.3	SE195298.003	%	70 - 130%	96
	BH4 0.7-0.8	SE195298.004	%	70 - 130%	94
	BH5 0.2-0.3	SE195298.005	%	70 - 130%	96
	BH5 0.7-0.8	SE195298.006	%	70 - 130%	92
	BH6 0.2-0.3	SE195298.007	%	70 - 130%	90
	BH6 0.7-0.8	SE195298.008	%	70 - 130%	94
	BH7 0.2-0.3	SE195298.009	%	70 - 130%	98
	BH7 0.7-0.8	SE195298.010	%	70 - 130%	88
	BH8 0.2-0.3	SE195298.011	%	70 - 130%	98
	BH10 0.3-0.4	SE195298.012	%	70 - 130%	86
	BH10 0.6-0.7	SE195298.013	%	70 - 130%	88
	BH15 0.3-0.4	SE195298.014	%	70 - 130%	100
	BH15 0.7-0.8	SE195298.015	%	70 - 130%	88
	BH17 0.2-0.3	SE195298.016	%	70 - 130%	92
	BH20 0.2-0.3	SE195298.017	%	70 - 130%	102
	BH20 0.7-0.8	SE195298.018	%	70 - 130%	88
	BH24 0.2-0.3	SE195298.019	%	70 - 130%	92
	BH24 0.7-0.8	SE195298.020	%	70 - 130%	94
	BH27 0.3-0.4	SE195298.021	%	70 - 130%	88
	BH27 0.7-0.8	SE195298.022	%	70 - 130%	90
	DUP1	SE195298.023	%	70 - 130%	94
	DUP2	SE195298.024	%	70 - 130%	86
d5-nitrobenzene (Surrogate)	BH1 0.2-0.3	SE195298.001	%	70 - 130%	78
	BH2 0.4-0.5	SE195298.002	%	70 - 130%	76
	BH4 0.2-0.3	SE195298.003	%	70 - 130%	86
	BH4 0.7-0.8	SE195298.004	%	70 - 130%	82
	BH5 0.2-0.3	SE195298.005	%	70 - 130%	94
	BH5 0.7-0.8	SE195298.006	%	70 - 130%	86
	BH6 0.2-0.3	SE195298.007	%	70 - 130%	86
	BH6 0.7-0.8	SE195298.008	%	70 - 130%	84
	BH7 0.2-0.3	SE195298.009	%	70 - 130%	84
	BH7 0.7-0.8	SE195298.010	%	70 - 130%	84
	BH8 0.2-0.3	SE195298.011	%	70 - 130%	84
	BH10 0.3-0.4	SE195298.012	%	70 - 130%	82
	BH10 0.6-0.7	SE195298.013	%	70 - 130%	86
	BH15 0.3-0.4	SE195298.014	%	70 - 130%	80
	BH15 0.7-0.8	SE195298.015	%	70 - 130%	92
	BH17 0.2-0.3	SE195298.016	%	70 - 130%	88
	BH20 0.2-0.3	SE195298.017	%	70 - 130%	82
	BH20 0.7-0.8	SE195298.018	%	70 - 130%	80
	BH24 0.2-0.3	SE195298.019	%	70 - 130%	86
	BH24 0.7-0.8	SE195298.020	%	70 - 130%	94
	BH27 0.3-0.4	SE195298.021	%	70 - 130%	88
	BH27 0.7-0.8	SE195298.022	%	70 - 130%	86
	DUP1	SE195298.023	%	70 - 130%	98
	DUP2	SE195298.024	%	70 - 130%	84

PCBs in Soil — Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH1 0.2-0.3	SE195298.001	%	60 - 130%	94
	BH2 0.4-0.5	SE195298.002	%	60 - 130%	94
	BH4 0.2-0.3	SE195298.003	%	60 - 130%	97

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PCBs in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH5 0.2-0.3	SE195298.005	%	60 - 130%	101
	BH6 0.2-0.3	SE195298.007	%	60 - 130%	100
	BH7 0.2-0.3	SE195298.009	%	60 - 130%	95
	BH8 0.2-0.3	SE195298.011	%	60 - 130%	95
	BH10 0.3-0.4	SE195298.012	%	60 - 130%	97
	BH15 0.3-0.4	SE195298.014	%	60 - 130%	94
	BH17 0.2-0.3	SE195298.016	%	60 - 130%	92
	BH20 0.2-0.3	SE195298.017	%	60 - 130%	97
	BH24 0.2-0.3	SE195298.019	%	60 - 130%	95
	BH27 0.3-0.4	SE195298.021	%	60 - 130%	94

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH1 0.2-0.3	SE195298.001	%	60 - 130%	96
	BH2 0.4-0.5	SE195298.002	%	60 - 130%	88
	BH4 0.2-0.3	SE195298.003	%	60 - 130%	87
	BH4 0.7-0.8	SE195298.004	%	60 - 130%	83
	BH5 0.2-0.3	SE195298.005	%	60 - 130%	85
	BH5 0.7-0.8	SE195298.006	%	60 - 130%	83
	BH6 0.2-0.3	SE195298.007	%	60 - 130%	87
	BH6 0.7-0.8	SE195298.008	%	60 - 130%	88
	BH7 0.2-0.3	SE195298.009	%	60 - 130%	87
	BH7 0.7-0.8	SE195298.010	%	60 - 130%	88
	BH8 0.2-0.3	SE195298.011	%	60 - 130%	83
	BH10 0.3-0.4	SE195298.012	%	60 - 130%	82
	BH10 0.6-0.7	SE195298.013	%	60 - 130%	85
	BH15 0.3-0.4	SE195298.014	%	60 - 130%	86
	BH15 0.7-0.8	SE195298.015	%	60 - 130%	88
	BH17 0.2-0.3	SE195298.016	%	60 - 130%	88
	BH20 0.2-0.3	SE195298.017	%	60 - 130%	82
	BH20 0.7-0.8	SE195298.018	%	60 - 130%	89
	BH24 0.2-0.3	SE195298.019	%	60 - 130%	87
	BH24 0.7-0.8	SE195298.020	%	60 - 130%	95
	BH27 0.3-0.4	SE195298.021	%	60 - 130%	94
	BH27 0.7-0.8	SE195298.022	%	60 - 130%	93
	DUP1	SE195298.023	%	60 - 130%	97
	DUP2	SE195298.024	%	60 - 130%	98
	Trip Spike	SE195298.026	%	60 - 130%	83
	Trip Blank	SE195298.027	%	60 - 130%	94
d4-1,2-dichloroethane (Surrogate)	BH1 0.2-0.3	SE195298.001	%	60 - 130%	100
	BH2 0.4-0.5	SE195298.002	%	60 - 130%	92
	BH4 0.2-0.3	SE195298.003	%	60 - 130%	92
	BH4 0.7-0.8	SE195298.004	%	60 - 130%	87
	BH5 0.2-0.3	SE195298.005	%	60 - 130%	92
	BH5 0.7-0.8	SE195298.006	%	60 - 130%	88
	BH6 0.2-0.3	SE195298.007	%	60 - 130%	93
	BH6 0.7-0.8	SE195298.008	%	60 - 130%	93
	BH7 0.2-0.3	SE195298.009	%	60 - 130%	95
	BH7 0.7-0.8	SE195298.010	%	60 - 130%	96
	BH8 0.2-0.3	SE195298.011	%	60 - 130%	91
	BH10 0.3-0.4	SE195298.012	%	60 - 130%	90
	BH10 0.6-0.7	SE195298.013	%	60 - 130%	91
	BH15 0.3-0.4	SE195298.014	%	60 - 130%	93
	BH15 0.7-0.8	SE195298.015	%	60 - 130%	96
	BH17 0.2-0.3	SE195298.016	%	60 - 130%	95
	BH20 0.2-0.3	SE195298.017	%	60 - 130%	90
	BH20 0.7-0.8	SE195298.018	%	60 - 130%	96
	BH24 0.2-0.3	SE195298.019	%	60 - 130%	96
	BH24 0.7-0.8	SE195298.020	%	60 - 130%	91
	BH27 0.3-0.4	SE195298.021	%	60 - 130%	91
	BH27 0.7-0.8	SE195298.022	%	60 - 130%	89

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d4-1,2-dichloroethane (Surrogate)	DUP1	SE195298.023	%	60 - 130%	94
	DUP2	SE195298.024	%	60 - 130%	95
	Trip Spike	SE195298.026	%	60 - 130%	84
	Trip Blank	SE195298.027	%	60 - 130%	93
d8-toluene (Surrogate)	BH1 0.2-0.3	SE195298.001	%	60 - 130%	98
	BH2 0.4-0.5	SE195298.002	%	60 - 130%	89
	BH4 0.2-0.3	SE195298.003	%	60 - 130%	90
	BH4 0.7-0.8	SE195298.004	%	60 - 130%	86
	BH5 0.2-0.3	SE195298.005	%	60 - 130%	89
	BH5 0.7-0.8	SE195298.006	%	60 - 130%	87
	BH6 0.2-0.3	SE195298.007	%	60 - 130%	91
	BH6 0.7-0.8	SE195298.008	%	60 - 130%	91
	BH7 0.2-0.3	SE195298.009	%	60 - 130%	91
	BH7 0.7-0.8	SE195298.010	%	60 - 130%	92
	BH8 0.2-0.3	SE195298.011	%	60 - 130%	88
	BH10 0.3-0.4	SE195298.012	%	60 - 130%	86
	BH10 0.6-0.7	SE195298.013	%	60 - 130%	87
	BH15 0.3-0.4	SE195298.014	%	60 - 130%	89
	BH15 0.7-0.8	SE195298.015	%	60 - 130%	90
	BH17 0.2-0.3	SE195298.016	%	60 - 130%	91
	BH20 0.2-0.3	SE195298.017	%	60 - 130%	85
	BH20 0.7-0.8	SE195298.018	%	60 - 130%	90
	BH24 0.2-0.3	SE195298.019	%	60 - 130%	91
	BH24 0.7-0.8	SE195298.020	%	60 - 130%	91
	BH27 0.3-0.4	SE195298.021	%	60 - 130%	92
	BH27 0.7-0.8	SE195298.022	%	60 - 130%	89
	DUP1	SE195298.023	%	60 - 130%	95
	DUP2	SE195298.024	%	60 - 130%	95
	Trip Spike	SE195298.026	%	60 - 130%	83
	Trip Blank	SE195298.027	%	60 - 130%	92
Dibromofluoromethane (Surrogate)	BH1 0.2-0.3	SE195298.001	%	60 - 130%	94
	BH2 0.4-0.5	SE195298.002	%	60 - 130%	86
	BH4 0.2-0.3	SE195298.003	%	60 - 130%	90
	BH4 0.7-0.8	SE195298.004	%	60 - 130%	83
	BH5 0.2-0.3	SE195298.005	%	60 - 130%	84
	BH5 0.7-0.8	SE195298.006	%	60 - 130%	85
	BH6 0.2-0.3	SE195298.007	%	60 - 130%	87
	BH6 0.7-0.8	SE195298.008	%	60 - 130%	89
	BH7 0.2-0.3	SE195298.009	%	60 - 130%	88
	BH7 0.7-0.8	SE195298.010	%	60 - 130%	84
	BH8 0.2-0.3	SE195298.011	%	60 - 130%	89
	BH10 0.3-0.4	SE195298.012	%	60 - 130%	86
	BH10 0.6-0.7	SE195298.013	%	60 - 130%	87
	BH15 0.3-0.4	SE195298.014	%	60 - 130%	85
	BH15 0.7-0.8	SE195298.015	%	60 - 130%	88
	BH17 0.2-0.3	SE195298.016	%	60 - 130%	86
	BH20 0.2-0.3	SE195298.017	%	60 - 130%	88
	BH20 0.7-0.8	SE195298.018	%	60 - 130%	85
	BH24 0.2-0.3	SE195298.019	%	60 - 130%	90
	BH24 0.7-0.8	SE195298.020	%	60 - 130%	90
	BH27 0.3-0.4	SE195298.021	%	60 - 130%	91
	BH27 0.7-0.8	SE195298.022	%	60 - 130%	86
	DUP1	SE195298.023	%	60 - 130%	90
	DUP2	SE195298.024	%	60 - 130%	90
	Trip Spike	SE195298.026	%	60 - 130%	80
	Trip Blank	SE195298.027	%	60 - 130%	86

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH1 0.2-0.3	SE195298.001	%	60 - 130%	96
	BH2 0.4-0.5	SE195298.002	%	60 - 130%	88

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Volatile Petroleum Hydrocarbons in Soil (continued) — **Method: ME-(AU)-[ENV]AN433**

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH4 0.2-0.3	SE195298.003	%	60 - 130%	87
	BH4 0.7-0.8	SE195298.004	%	60 - 130%	83
	BH5 0.2-0.3	SE195298.005	%	60 - 130%	85
	BH5 0.7-0.8	SE195298.006	%	60 - 130%	83
	BH6 0.2-0.3	SE195298.007	%	60 - 130%	87
	BH6 0.7-0.8	SE195298.008	%	60 - 130%	88
	BH7 0.2-0.3	SE195298.009	%	60 - 130%	87
	BH7 0.7-0.8	SE195298.010	%	60 - 130%	88
	BH8 0.2-0.3	SE195298.011	%	60 - 130%	83
	BH10 0.3-0.4	SE195298.012	%	60 - 130%	82
	BH10 0.6-0.7	SE195298.013	%	60 - 130%	85
	BH15 0.3-0.4	SE195298.014	%	60 - 130%	86
	BH15 0.7-0.8	SE195298.015	%	60 - 130%	88
	BH17 0.2-0.3	SE195298.016	%	60 - 130%	88
	BH20 0.2-0.3	SE195298.017	%	60 - 130%	82
	BH20 0.7-0.8	SE195298.018	%	60 - 130%	89
	BH24 0.2-0.3	SE195298.019	%	60 - 130%	87
	BH24 0.7-0.8	SE195298.020	%	60 - 130%	95
	BH27 0.3-0.4	SE195298.021	%	60 - 130%	94
	BH27 0.7-0.8	SE195298.022	%	60 - 130%	93
	DUP1	SE195298.023	%	60 - 130%	97
	DUP2	SE195298.024	%	60 - 130%	98
d4-1,2-dichloroethane (Surrogate)	BH1 0.2-0.3	SE195298.001	%	60 - 130%	100
	BH2 0.4-0.5	SE195298.002	%	60 - 130%	92
	BH4 0.2-0.3	SE195298.003	%	60 - 130%	92
	BH4 0.7-0.8	SE195298.004	%	60 - 130%	87
	BH5 0.2-0.3	SE195298.005	%	60 - 130%	92
	BH5 0.7-0.8	SE195298.006	%	60 - 130%	88
	BH6 0.2-0.3	SE195298.007	%	60 - 130%	93
	BH6 0.7-0.8	SE195298.008	%	60 - 130%	93
	BH7 0.2-0.3	SE195298.009	%	60 - 130%	95
	BH7 0.7-0.8	SE195298.010	%	60 - 130%	96
	BH8 0.2-0.3	SE195298.011	%	60 - 130%	91
	BH10 0.3-0.4	SE195298.012	%	60 - 130%	90
	BH10 0.6-0.7	SE195298.013	%	60 - 130%	91
	BH15 0.3-0.4	SE195298.014	%	60 - 130%	93
	BH15 0.7-0.8	SE195298.015	%	60 - 130%	96
	BH17 0.2-0.3	SE195298.016	%	60 - 130%	95
	BH20 0.2-0.3	SE195298.017	%	60 - 130%	90
	BH20 0.7-0.8	SE195298.018	%	60 - 130%	96
	BH24 0.2-0.3	SE195298.019	%	60 - 130%	96
	BH24 0.7-0.8	SE195298.020	%	60 - 130%	91
	BH27 0.3-0.4	SE195298.021	%	60 - 130%	91
	BH27 0.7-0.8	SE195298.022	%	60 - 130%	89
	DUP1	SE195298.023	%	60 - 130%	94
	DUP2	SE195298.024	%	60 - 130%	95
d8-toluene (Surrogate)	BH1 0.2-0.3	SE195298.001	%	60 - 130%	98
	BH2 0.4-0.5	SE195298.002	%	60 - 130%	89
	BH4 0.2-0.3	SE195298.003	%	60 - 130%	90
	BH4 0.7-0.8	SE195298.004	%	60 - 130%	86
	BH5 0.2-0.3	SE195298.005	%	60 - 130%	89
	BH5 0.7-0.8	SE195298.006	%	60 - 130%	87
	BH6 0.2-0.3	SE195298.007	%	60 - 130%	91
	BH6 0.7-0.8	SE195298.008	%	60 - 130%	91
	BH7 0.2-0.3	SE195298.009	%	60 - 130%	91
	BH7 0.7-0.8	SE195298.010	%	60 - 130%	92
	BH8 0.2-0.3	SE195298.011	%	60 - 130%	88
	BH10 0.3-0.4	SE195298.012	%	60 - 130%	86
	BH10 0.6-0.7	SE195298.013	%	60 - 130%	87
	BH15 0.3-0.4	SE195298.014	%	60 - 130%	89
	BH15 0.7-0.8	SE195298.015	%	60 - 130%	90

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Volatile Petroleum Hydrocarbons in Soil (continued) — **Method: ME-(AU)-[ENV]AN433**

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d8-toluene (Surrogate)	BH17 0.2-0.3	SE195298.016	%	60 - 130%	91
	BH20 0.2-0.3	SE195298.017	%	60 - 130%	85
	BH20 0.7-0.8	SE195298.018	%	60 - 130%	90
	BH24 0.2-0.3	SE195298.019	%	60 - 130%	91
	BH24 0.7-0.8	SE195298.020	%	60 - 130%	91
	BH27 0.3-0.4	SE195298.021	%	60 - 130%	92
	BH27 0.7-0.8	SE195298.022	%	60 - 130%	89
	DUP1	SE195298.023	%	60 - 130%	95
	DUP2	SE195298.024	%	60 - 130%	95
Dibromofluoromethane (Surrogate)	BH1 0.2-0.3	SE195298.001	%	60 - 130%	94
	BH2 0.4-0.5	SE195298.002	%	60 - 130%	86
	BH4 0.2-0.3	SE195298.003	%	60 - 130%	90
	BH4 0.7-0.8	SE195298.004	%	60 - 130%	83
	BH5 0.2-0.3	SE195298.005	%	60 - 130%	84
	BH5 0.7-0.8	SE195298.006	%	60 - 130%	85
	BH6 0.2-0.3	SE195298.007	%	60 - 130%	87
	BH6 0.7-0.8	SE195298.008	%	60 - 130%	89
	BH7 0.2-0.3	SE195298.009	%	60 - 130%	88
	BH7 0.7-0.8	SE195298.010	%	60 - 130%	84
	BH8 0.2-0.3	SE195298.011	%	60 - 130%	89
	BH10 0.3-0.4	SE195298.012	%	60 - 130%	86
	BH10 0.6-0.7	SE195298.013	%	60 - 130%	87
	BH15 0.3-0.4	SE195298.014	%	60 - 130%	85
	BH15 0.7-0.8	SE195298.015	%	60 - 130%	88
	BH17 0.2-0.3	SE195298.016	%	60 - 130%	86
	BH20 0.2-0.3	SE195298.017	%	60 - 130%	88
	BH20 0.7-0.8	SE195298.018	%	60 - 130%	85
	BH24 0.2-0.3	SE195298.019	%	60 - 130%	90
	BH24 0.7-0.8	SE195298.020	%	60 - 130%	90
	BH27 0.3-0.4	SE195298.021	%	60 - 130%	91
	BH27 0.7-0.8	SE195298.022	%	60 - 130%	86
	DUP1	SE195298.023	%	60 - 130%	90
	DUP2	SE195298.024	%	60 - 130%	90

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result
LB178676.001	Mercury	mg/kg	0.05	<0.05
LB178677.001	Mercury	mg/kg	0.05	<0.05

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB178547.001		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
		Alpha BHC	mg/kg	0.1	<0.1
		Lindane	mg/kg	0.1	<0.1
		Heptachlor	mg/kg	0.1	<0.1
		Aldrin	mg/kg	0.1	<0.1
		Beta BHC	mg/kg	0.1	<0.1
		Delta BHC	mg/kg	0.1	<0.1
		Heptachlor epoxide	mg/kg	0.1	<0.1
		Alpha Endosulfan	mg/kg	0.2	<0.2
		Gamma Chlordane	mg/kg	0.1	<0.1
		Alpha Chlordane	mg/kg	0.1	<0.1
		p,p'-DDE	mg/kg	0.1	<0.1
		Dieldrin	mg/kg	0.2	<0.2
		Endrin	mg/kg	0.2	<0.2
		Beta Endosulfan	mg/kg	0.2	<0.2
		p,p'-DDD	mg/kg	0.1	<0.1
		p,p'-DDT	mg/kg	0.1	<0.1
		Endosulfan sulphate	mg/kg	0.1	<0.1
		Endrin Aldehyde	mg/kg	0.1	<0.1
		Methoxychlor	mg/kg	0.1	<0.1
		Endrin Ketone	mg/kg	0.1	<0.1
		Isodrin	mg/kg	0.1	<0.1
		Mirex	mg/kg	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	94
LB178549.001		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
		Alpha BHC	mg/kg	0.1	<0.1
		Lindane	mg/kg	0.1	<0.1
		Heptachlor	mg/kg	0.1	<0.1
		Aldrin	mg/kg	0.1	<0.1
		Beta BHC	mg/kg	0.1	<0.1
		Delta BHC	mg/kg	0.1	<0.1
		Heptachlor epoxide	mg/kg	0.1	<0.1
		Alpha Endosulfan	mg/kg	0.2	<0.2
		Gamma Chlordane	mg/kg	0.1	<0.1
		Alpha Chlordane	mg/kg	0.1	<0.1
		p,p'-DDE	mg/kg	0.1	<0.1
		Dieldrin	mg/kg	0.2	<0.2
		Endrin	mg/kg	0.2	<0.2
		Beta Endosulfan	mg/kg	0.2	<0.2
		p,p'-DDD	mg/kg	0.1	<0.1
		p,p'-DDT	mg/kg	0.1	<0.1
		Endosulfan sulphate	mg/kg	0.1	<0.1
		Endrin Aldehyde	mg/kg	0.1	<0.1
		Methoxychlor	mg/kg	0.1	<0.1
		Endrin Ketone	mg/kg	0.1	<0.1
		Isodrin	mg/kg	0.1	<0.1
		Mirex	mg/kg	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	95

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result
LB178547.001	Dichlorvos	mg/kg	0.5	<0.5
	Dimethoate	mg/kg	0.5	<0.5
	Diazinon (Dimpylate)	mg/kg	0.5	<0.5
	Fenitrothion	mg/kg	0.2	<0.2
	Malathion	mg/kg	0.2	<0.2

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

OP Pesticides in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB178547.001		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2
		Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2
		Bromophos Ethyl	mg/kg	0.2	<0.2
		Methidathion	mg/kg	0.5	<0.5
		Ethion	mg/kg	0.2	<0.2
		Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	90
		d14-p-terphenyl (Surrogate)	%	-	96
LB178549.001		Dichlorvos	mg/kg	0.5	<0.5
		Dimethoate	mg/kg	0.5	<0.5
		Diazinon (Dimpylate)	mg/kg	0.5	<0.5
		Fenitrothion	mg/kg	0.2	<0.2
		Malathion	mg/kg	0.2	<0.2
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2
		Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2
		Bromophos Ethyl	mg/kg	0.2	<0.2
		Methidathion	mg/kg	0.5	<0.5
		Ethion	mg/kg	0.2	<0.2
		Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	88
		d14-p-terphenyl (Surrogate)	%	-	82

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB178547.001		Naphthalene	mg/kg	0.1	<0.1
		2-methylnaphthalene	mg/kg	0.1	<0.1
		1-methylnaphthalene	mg/kg	0.1	<0.1
		Acenaphthylene	mg/kg	0.1	<0.1
		Acenaphthene	mg/kg	0.1	<0.1
		Fluorene	mg/kg	0.1	<0.1
		Phenanthrene	mg/kg	0.1	<0.1
		Anthracene	mg/kg	0.1	<0.1
		Fluoranthene	mg/kg	0.1	<0.1
		Pyrene	mg/kg	0.1	<0.1
		Benzo(a)anthracene	mg/kg	0.1	<0.1
		Chrysene	mg/kg	0.1	<0.1
		Benzo(a)pyrene	mg/kg	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
		Dibenzo(ah)anthracene	mg/kg	0.1	<0.1
		Benzo(ghi)perylene	mg/kg	0.1	<0.1
		Total PAH (18)	mg/kg	0.8	<0.8
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	84
		2-fluorobiphenyl (Surrogate)	%	-	90
		d14-p-terphenyl (Surrogate)	%	-	96
LB178549.001		Naphthalene	mg/kg	0.1	<0.1
		2-methylnaphthalene	mg/kg	0.1	<0.1
		1-methylnaphthalene	mg/kg	0.1	<0.1
		Acenaphthylene	mg/kg	0.1	<0.1
		Acenaphthene	mg/kg	0.1	<0.1
		Fluorene	mg/kg	0.1	<0.1
		Phenanthrene	mg/kg	0.1	<0.1
		Anthracene	mg/kg	0.1	<0.1
		Fluoranthene	mg/kg	0.1	<0.1
		Pyrene	mg/kg	0.1	<0.1
		Benzo(a)anthracene	mg/kg	0.1	<0.1
		Chrysene	mg/kg	0.1	<0.1
		Benzo(a)pyrene	mg/kg	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
		Dibenzo(ah)anthracene	mg/kg	0.1	<0.1
		Benzo(ghi)perylene	mg/kg	0.1	<0.1
		Total PAH (18)	mg/kg	0.8	<0.8

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB178549.001	Surrogates	d5-nitrobenzene (Surrogate)	%	-	86
		2-fluorobiphenyl (Surrogate)	%	-	88
		d14-p-terphenyl (Surrogate)	%	-	82

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB178547.001		Arochlor 1016	mg/kg	0.2	<0.2
		Arochlor 1221	mg/kg	0.2	<0.2
		Arochlor 1232	mg/kg	0.2	<0.2
		Arochlor 1242	mg/kg	0.2	<0.2
		Arochlor 1248	mg/kg	0.2	<0.2
		Arochlor 1254	mg/kg	0.2	<0.2
		Arochlor 1260	mg/kg	0.2	<0.2
		Arochlor 1262	mg/kg	0.2	<0.2
		Arochlor 1268	mg/kg	0.2	<0.2
		Total PCBs (Arochlors)	mg/kg	1	<1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	97
LB178549.001		Arochlor 1016	mg/kg	0.2	<0.2
		Arochlor 1221	mg/kg	0.2	<0.2
		Arochlor 1232	mg/kg	0.2	<0.2
		Arochlor 1242	mg/kg	0.2	<0.2
		Arochlor 1248	mg/kg	0.2	<0.2
		Arochlor 1254	mg/kg	0.2	<0.2
		Arochlor 1260	mg/kg	0.2	<0.2
		Arochlor 1262	mg/kg	0.2	<0.2
		Arochlor 1268	mg/kg	0.2	<0.2
		Total PCBs (Arochlors)	mg/kg	1	<1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	95

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result
LB178671.001	Arsenic, As	mg/kg	1	<1
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Nickel, Ni	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Zinc, Zn	mg/kg	2	<2.0
LB178672.001	Arsenic, As	mg/kg	1	<1
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Nickel, Ni	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Zinc, Zn	mg/kg	2	<2.0

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB178547.001	TRH C10-C14	mg/kg	20	<20
	TRH C15-C28	mg/kg	45	<45
	TRH C29-C36	mg/kg	45	<45
	TRH C37-C40	mg/kg	100	<100
	TRH C10-C36 Total	mg/kg	110	<110
LB178549.001	TRH C10-C14	mg/kg	20	<20
	TRH C15-C28	mg/kg	45	<45
	TRH C29-C36	mg/kg	45	<45
	TRH C37-C40	mg/kg	100	<100
	TRH C10-C36 Total	mg/kg	110	<110

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number	Parameter	Units	LOR

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB178536.001	Monocyclic Aromatic	Benzene	mg/kg	0.1	<0.1
	Hydrocarbons	Toluene	mg/kg	0.1	<0.1
		Ethylbenzene	mg/kg	0.1	<0.1
		m/p-xylene	mg/kg	0.2	<0.2
		o-xylene	mg/kg	0.1	<0.1
	Polycyclic VOCs	Naphthalene	mg/kg	0.1	<0.1
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	90
		d4-1,2-dichloroethane (Surrogate)	%	-	90
		d8-toluene (Surrogate)	%	-	89
		Bromofluorobenzene (Surrogate)	%	-	85
	Totals	Total BTEX	mg/kg	0.6	<0.6
LB178537.001	Monocyclic Aromatic	Benzene	mg/kg	0.1	<0.1
	Hydrocarbons	Toluene	mg/kg	0.1	<0.1
		Ethylbenzene	mg/kg	0.1	<0.1
		m/p-xylene	mg/kg	0.2	<0.2
		o-xylene	mg/kg	0.1	<0.1
	Polycyclic VOCs	Naphthalene	mg/kg	0.1	<0.1
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	98
		d4-1,2-dichloroethane (Surrogate)	%	-	99
		d8-toluene (Surrogate)	%	-	100
		Bromofluorobenzene (Surrogate)	%	-	101
	Totals	Total BTEX	mg/kg	0.6	<0.6

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB178536.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	90
		d4-1,2-dichloroethane (Surrogate)	%	-	90
		d8-toluene (Surrogate)	%	-	89
LB178537.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	98
		d4-1,2-dichloroethane (Surrogate)	%	-	99
		d8-toluene (Surrogate)	%	-	100

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE195242.010	LB178676.014	Mercury	mg/kg	0.05	<0.05	<0.05	200	0
SE195298.008	LB178676.024	Mercury	mg/kg	0.05	<0.05	<0.05	200	0
SE195298.018	LB178677.014	Mercury	mg/kg	0.05	<0.05	<0.05	200	0

Moisture Content

Method: ME-(AU)-[ENV]AN002

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE195242.010	LB178564.011	% Moisture	%w/w	0.5	8.8	10	40	15
SE195298.010	LB178555.011	% Moisture	%w/w	0.5	6.3	6.3	46	1
SE195298.019	LB178555.021	% Moisture	%w/w	0.5	5.2	5.2	49	1
SE195298.027	LB178564.019	% Moisture	%w/w	0.5	<0.5	<0.5	200	0

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE195298.009	LB178547.026		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Lindane	mg/kg	0.1	<0.1	<0.1	200	0
			Heptachlor	mg/kg	0.1	<0.1	<0.1	200	0
			Aldrin	mg/kg	0.1	<0.1	<0.1	200	0
			Beta BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Delta BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	200	0
			o,p'-DDE	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
			Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
			trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	200	0
			p,p'-DDE	mg/kg	0.1	<0.1	<0.1	200	0
			Dieldrin	mg/kg	0.2	<0.2	<0.2	200	0
			Endrin	mg/kg	0.2	<0.2	<0.2	200	0
			o,p'-DDD	mg/kg	0.1	<0.1	<0.1	200	0
			o,p'-DDT	mg/kg	0.1	<0.1	<0.1	200	0
			Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
			p,p'-DDD	mg/kg	0.1	<0.1	<0.1	200	0
			p,p'-DDT	mg/kg	0.1	<0.1	<0.1	200	0
			Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	200	0
			Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	200	0
			Methoxychlor	mg/kg	0.1	<0.1	<0.1	200	0
			Endrin Ketone	mg/kg	0.1	<0.1	<0.1	200	0
			Isodrin	mg/kg	0.1	<0.1	<0.1	200	0
			Mirex	mg/kg	0.1	<0.1	<0.1	200	0
			Total CLP OC Pesticides	mg/kg	1	<1	<1	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.14	0.15	30	4

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE195298.009	LB178547.026		Dichlorvos	mg/kg	0.5	<0.5	<0.5	200	0
			Dimethoate	mg/kg	0.5	<0.5	<0.5	200	0
			Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	200	0
			Fenitrothion	mg/kg	0.2	<0.2	<0.2	200	0
			Malathion	mg/kg	0.2	<0.2	<0.2	200	0
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	200	0
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	200	0
			Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	200	0
			Methidathion	mg/kg	0.5	<0.5	<0.5	200	0
			Ethion	mg/kg	0.2	<0.2	<0.2	200	0
			Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	200	0
			Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	200	0
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.4	30	7
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	4
SE195298.016	LB178547.027		Dichlorvos	mg/kg	0.5	<0.5	<0.5	200	0
			Dimethoate	mg/kg	0.5	<0.5	<0.5	200	0
			Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OP Pesticides in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE195298.016	LB178547.027		Fenitrothion	mg/kg	0.2	<0.2	<0.2	200	0
			Malathion	mg/kg	0.2	<0.2	<0.2	200	0
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	200	0
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	200	0
			Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	200	0
			Methidathion	mg/kg	0.5	<0.5	<0.5	200	0
			Ethion	mg/kg	0.2	<0.2	<0.2	200	0
			Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	200	0
			Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	200	0
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.4	30	5
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.4	30	16

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE195242.010	LB178549.014		Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthylene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
			Phenanthrene	mg/kg	0.1	<0.1	<0.1	200	0
			Anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Pyrene	mg/kg	0.1	0.6	0.6	46	3
			Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Chrysene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=0	mg/kg	0.2	<0.2	<0.2	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	mg/kg	0.3	<0.3	<0.3	134	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	mg/kg	0.2	<0.2	<0.2	175	0
			Total PAH (18)	mg/kg	0.8	<0.8	<0.8	159	0
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	30	4
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	2
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.6	30	7
SE195298.009	LB178547.026		Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthylene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
			Phenanthrene	mg/kg	0.1	<0.1	<0.1	200	0
			Anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Chrysene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=0	mg/kg	0.2	<0.2	<0.2	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	mg/kg	0.3	<0.3	<0.3	134	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	mg/kg	0.2	<0.2	<0.2	175	0
			Total PAH (18)	mg/kg	0.8	<0.8	<0.8	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE195298.009	LB178547.026	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.4	30	2
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.4	30	7
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	4
SE195298.016	LB178547.027		Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthylene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
			Phenanthrene	mg/kg	0.1	<0.1	<0.1	200	0
			Anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Chrysene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=0	mg/kg	0.2	<0.2	<0.2	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	mg/kg	0.3	<0.3	<0.3	134	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	mg/kg	0.2	<0.2	<0.2	175	0
			Total PAH (18)	mg/kg	0.8	<0.8	<0.8	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.4	30	5
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.4	30	5
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.4	30	16

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE195298.009	LB178547.026		Arochlor 1016	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1221	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1232	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1242	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1248	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1254	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1260	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1262	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1268	mg/kg	0.2	<0.2	<0.2	200	0
			Total PCBs (Arochlors)	mg/kg	1	<1	<1	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	0	30	4

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE195242.010	LB178671.014	Arsenic, As	mg/kg	1	3	3	66	17
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
		Chromium, Cr	mg/kg	0.3	9.3	11	35	18
		Copper, Cu	mg/kg	0.5	4.6	5.5	40	18
		Nickel, Ni	mg/kg	0.5	4.6	5.7	40	22
		Lead, Pb	mg/kg	1	8	9	42	11
		Zinc, Zn	mg/kg	2	26	29	37	11
SE195298.008	LB178671.024	Arsenic, As	mg/kg	1	15	15	37	2
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
		Chromium, Cr	mg/kg	0.3	15	15	33	5
		Copper, Cu	mg/kg	0.5	17	17	33	1
		Nickel, Ni	mg/kg	0.5	9.7	9.7	35	0
		Lead, Pb	mg/kg	1	12	13	38	6
		Zinc, Zn	mg/kg	2	28	29	37	2
SE195298.018	LB178672.014	Arsenic, As	mg/kg	1	16	15	36	5
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
		Chromium, Cr	mg/kg	0.3	14	20	33	35 ②

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES (continued)

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE195298.018	LB178672.014		Copper, Cu	mg/kg	0.5	10	10	35	2
			Nickel, Ni	mg/kg	0.5	10	11	35	7
			Lead, Pb	mg/kg	1	9	11	40	20
			Zinc, Zn	mg/kg	2	25	27	38	8

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE195242.010	LB178549.014		TRH C10-C14	mg/kg	20	100	100	50	0
			TRH C15-C28	mg/kg	45	1900	2000	32	7
			TRH C29-C36	mg/kg	45	<45	<45	200	0
			TRH C37-C40	mg/kg	100	<100	<100	200	0
			TRH C10-C36 Total	mg/kg	110	2000	2100	35	6
			TRH C10-C40 Total (F bands)	mg/kg	210	2000	2100	40	6
		TRH F Bands	TRH >C10-C16	mg/kg	25	340	350	37	3
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	340	350	37	3
			TRH >C16-C34 (F3)	mg/kg	90	1700	1800	35	7
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	0
SE195298.009	LB178547.026		TRH C10-C14	mg/kg	20	<20	<20	200	0
			TRH C15-C28	mg/kg	45	<45	<45	200	0
			TRH C29-C36	mg/kg	45	<45	<45	200	0
			TRH C37-C40	mg/kg	100	<100	<100	200	0
			TRH C10-C36 Total	mg/kg	110	<110	<110	200	0
			TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	200	0
		TRH F Bands	TRH >C10-C16	mg/kg	25	<25	<25	200	0
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	0
SE195298.016	LB178547.027		TRH C10-C14	mg/kg	20	<20	<20	200	0
			TRH C15-C28	mg/kg	45	<45	<45	200	0
			TRH C29-C36	mg/kg	45	<45	<45	200	0
			TRH C37-C40	mg/kg	100	<100	<100	200	0
			TRH C10-C36 Total	mg/kg	110	<110	<110	200	0
			TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	200	0
		TRH F Bands	TRH >C10-C16	mg/kg	25	<25	<25	200	0
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	0

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE195242.010	LB178537.014	Monocyclic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
		Aromatic	Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.2	5.3	50	2
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.9	5.0	50	2
			d8-toluene (Surrogate)	mg/kg	-	4.8	5.0	50	4
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.8	6.2	50	25
		Totals	Total Xylenes	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX	mg/kg	0.6	<0.6	<0.6	200	0
SE195298.010	LB178536.014	Monocyclic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
		Aromatic	Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.2	4.5	50	7
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.8	5.3	50	9
			d8-toluene (Surrogate)	mg/kg	-	4.6	4.7	50	1
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.4	4.4	50	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE195298.010	LB178536.014	Totals	Total Xylenes	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX	mg/kg	0.6	<0.6	<0.6	200	0
SE195298.019	LB178536.024	Monocyclic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
		Aromatic	Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.5	4.9	50	9
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.8	5.2	50	8
			d8-toluene (Surrogate)	mg/kg	-	4.6	4.9	50	7
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.4	4.7	50	8
		Totals	Total Xylenes	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX	mg/kg	0.6	<0.6	<0.6	200	0

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE195242.010	LB178537.014		TRH C6-C10	mg/kg	25	<25	<25	200	0
			TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.2	5.3	30	2
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.9	5.0	30	2
			d8-toluene (Surrogate)	mg/kg	-	4.8	5.0	30	4
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.8	6.2	30	25
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	200	0
SE195298.010	LB178536.014		TRH C6-C10	mg/kg	25	<25	<25	200	0
			TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.2	4.5	30	7
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.8	5.3	30	9
			d8-toluene (Surrogate)	mg/kg	-	4.6	4.7	30	1
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.4	4.4	30	0
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	200	0
SE195298.019	LB178536.024		TRH C6-C10	mg/kg	25	<25	<25	200	0
			TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.5	4.9	30	9
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.8	5.2	30	8
			d8-toluene (Surrogate)	mg/kg	-	4.6	4.9	30	7
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.4	4.7	30	8
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	200	0

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB178676.002	Mercury	mg/kg	0.05	0.22	0.2	70 - 130	110
LB178677.002	Mercury	mg/kg	0.05	0.20	0.2	70 - 130	101

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB178547.002		Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	79
		Aldrin	mg/kg	0.1	0.2	0.2	60 - 140	90
		Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	81
		Dieldrin	mg/kg	0.2	<0.2	0.2	60 - 140	88
		Endrin	mg/kg	0.2	<0.2	0.2	60 - 140	85
		p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	78
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.15	0.15	40 - 130	97
LB178549.002		Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	82
		Aldrin	mg/kg	0.1	0.2	0.2	60 - 140	95
		Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	76
		Dieldrin	mg/kg	0.2	<0.2	0.2	60 - 140	92
		Endrin	mg/kg	0.2	<0.2	0.2	60 - 140	86
		p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	77
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.15	0.15	40 - 130	97

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB178547.002		Dichlorvos	mg/kg	0.5	2.5	2	60 - 140	125
		Diazinon (Dimpylate)	mg/kg	0.5	2.2	2	60 - 140	112
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	2.2	2	60 - 140	108
		Ethion	mg/kg	0.2	2.1	2	60 - 140	107
	Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	86
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	90
LB178549.002		Dichlorvos	mg/kg	0.5	2.2	2	60 - 140	108
		Diazinon (Dimpylate)	mg/kg	0.5	2.0	2	60 - 140	100
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	1.8	2	60 - 140	88
		Ethion	mg/kg	0.2	1.8	2	60 - 140	90
	Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	84
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	84

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB178547.002		Naphthalene	mg/kg	0.1	3.9	4	60 - 140	99
		Acenaphthylene	mg/kg	0.1	4.3	4	60 - 140	107
		Acenaphthene	mg/kg	0.1	4.2	4	60 - 140	104
		Phenanthrene	mg/kg	0.1	4.2	4	60 - 140	105
		Anthracene	mg/kg	0.1	4.0	4	60 - 140	99
		Fluoranthene	mg/kg	0.1	3.9	4	60 - 140	97
		Pyrene	mg/kg	0.1	4.0	4	60 - 140	100
		Benzo(a)pyrene	mg/kg	0.1	4.4	4	60 - 140	109
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	88
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	86
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	90
LB178549.002		Naphthalene	mg/kg	0.1	4.2	4	60 - 140	105
		Acenaphthylene	mg/kg	0.1	4.4	4	60 - 140	110
		Acenaphthene	mg/kg	0.1	4.4	4	60 - 140	109
		Phenanthrene	mg/kg	0.1	4.5	4	60 - 140	113
		Anthracene	mg/kg	0.1	4.2	4	60 - 140	105
		Fluoranthene	mg/kg	0.1	4.2	4	60 - 140	104
		Pyrene	mg/kg	0.1	4.4	4	60 - 140	110
		Benzo(a)pyrene	mg/kg	0.1	4.4	4	60 - 140	110
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	90
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	84
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	84

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

PCBs in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB178547.002	Arochlor 1260	mg/kg	0.2	0.4	0.4	60 - 140	103
LB178549.002	Arochlor 1260	mg/kg	0.2	0.4	0.4	60 - 140	108

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB178671.002	Arsenic, As	mg/kg	1	340	336.32	79 - 120	102
	Cadmium, Cd	mg/kg	0.3	430	416.6	69 - 131	103
	Chromium, Cr	mg/kg	0.3	38	35.2	80 - 120	107
	Copper, Cu	mg/kg	0.5	320	370.46	80 - 120	87
	Nickel, Ni	mg/kg	0.5	190	210.88	79 - 120	88
	Lead, Pb	mg/kg	1	91	107.87	79 - 120	84
	Zinc, Zn	mg/kg	2	290	301.27	80 - 121	95
LB178672.002	Arsenic, As	mg/kg	1	320	336.32	79 - 120	96
	Cadmium, Cd	mg/kg	0.3	420	416.6	69 - 131	102
	Chromium, Cr	mg/kg	0.3	34	35.2	80 - 120	97
	Copper, Cu	mg/kg	0.5	310	370.46	80 - 120	84
	Nickel, Ni	mg/kg	0.5	180	210.88	79 - 120	85
	Lead, Pb	mg/kg	1	88	107.87	79 - 120	82
	Zinc, Zn	mg/kg	2	270	301.27	80 - 121	91

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB178547.002		TRH C10-C14	mg/kg	20	45	40	60 - 140	113
		TRH C15-C28	mg/kg	45	<45	40	60 - 140	100
		TRH C29-C36	mg/kg	45	<45	40	60 - 140	78
	TRH F Bands	TRH >C10-C16	mg/kg	25	43	40	60 - 140	108
		TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	90
		TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	70
LB178549.002		TRH C10-C14	mg/kg	20	45	40	60 - 140	113
		TRH C15-C28	mg/kg	45	<45	40	60 - 140	105
		TRH C29-C36	mg/kg	45	<45	40	60 - 140	105
	TRH F Bands	TRH >C10-C16	mg/kg	25	44	40	60 - 140	110
		TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	98
		TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	120

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB178536.002	Monocyclic	Benzene	mg/kg	0.1	2.2	2.9	60 - 140	74
	Aromatic	Toluene	mg/kg	0.1	2.2	2.9	60 - 140	76
		Ethylbenzene	mg/kg	0.1	2.2	2.9	60 - 140	76
		m/p-xylene	mg/kg	0.2	4.5	5.8	60 - 140	78
		o-xylene	mg/kg	0.1	2.2	2.9	60 - 140	76
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.5	5	60 - 140	89
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.7	5	60 - 140	94
		d8-toluene (Surrogate)	mg/kg	-	4.6	5	60 - 140	92
		Bromofluorobenzene (Surrogate)	mg/kg	-	4.4	5	60 - 140	88
LB178537.002	Monocyclic	Benzene	mg/kg	0.1	2.0	2.9	60 - 140	70
	Aromatic	Toluene	mg/kg	0.1	1.8	2.9	60 - 140	63
		Ethylbenzene	mg/kg	0.1	2.0	2.9	60 - 140	69
		m/p-xylene	mg/kg	0.2	4.0	5.8	60 - 140	69
		o-xylene	mg/kg	0.1	2.0	2.9	60 - 140	68
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.2	5	60 - 140	84
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.7	5	60 - 140	93
		d8-toluene (Surrogate)	mg/kg	-	4.3	5	60 - 140	85
		Bromofluorobenzene (Surrogate)	mg/kg	-	4.9	5	60 - 140	98

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB178536.002		TRH C6-C10	mg/kg	25	<25	24.65	60 - 140	91
		TRH C6-C9	mg/kg	20	21	23.2	60 - 140	92
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.5	5	60 - 140	89
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.7	5	60 - 140	94

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Volatile Petroleum Hydrocarbons in Soil (continued) — **Method: ME-(AU)-[ENV]AN433**

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB178536.002	Surrogates	d8-toluene (Surrogate)	mg/kg	-	4.6	5	60 - 140	92
		Bromofluorobenzene (Surrogate)	mg/kg	-	4.4	5	60 - 140	88
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	7.25	60 - 140	127
LB178537.002		TRH C6-C10	mg/kg	25	<25	24.65	60 - 140	77
		TRH C6-C9	mg/kg	20	<20	23.2	60 - 140	79
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.2	5	60 - 140	84
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.7	5	60 - 140	93
		d8-toluene (Surrogate)	mg/kg	-	4.3	5	60 - 140	85
		Bromofluorobenzene (Surrogate)	mg/kg	-	4.9	5	60 - 140	98
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	7.25	60 - 140	99

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE195242.001	LB178676.004	Mercury	mg/kg	0.05	0.22	<0.05	0.2	104
SE195298.009	LB178677.004	Mercury	mg/kg	0.05	0.19	<0.05	0.2	91

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE195298.001	LB178547.025		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	-	-
			Alpha BHC	mg/kg	0.1	<0.1	<0.1	-	-
			Lindane	mg/kg	0.1	<0.1	<0.1	-	-
			Heptachlor	mg/kg	0.1	0.2	<0.1	0.2	90
			Aldrin	mg/kg	0.1	0.2	<0.1	0.2	93
			Beta BHC	mg/kg	0.1	<0.1	<0.1	-	-
			Delta BHC	mg/kg	0.1	0.2	<0.1	0.2	81
			Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	-	-
			o,p'-DDE	mg/kg	0.1	<0.1	<0.1	-	-
			Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	-	-
			Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	-	-
			Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	-	-
			trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	-	-
			p,p'-DDE	mg/kg	0.1	<0.1	<0.1	-	-
			Dieldrin	mg/kg	0.2	<0.2	<0.2	0.2	92
			Endrin	mg/kg	0.2	<0.2	<0.2	0.2	90
			o,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	-
			o,p'-DDT	mg/kg	0.1	<0.1	<0.1	-	-
			Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	-	-
			p,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	-
			p,p'-DDT	mg/kg	0.1	0.2	<0.1	0.2	76
			Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	-	-
			Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	-	-
			Methoxychlor	mg/kg	0.1	<0.1	<0.1	-	-
			Endrin Ketone	mg/kg	0.1	<0.1	<0.1	-	-
			Isodrin	mg/kg	0.1	<0.1	<0.1	-	-
			Mirex	mg/kg	0.1	<0.1	<0.1	-	-
			Total CLP OC Pesticides	mg/kg	1	1	<1	-	-
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.15	0.14	-	97

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE195298.001	LB178547.025		Dichlorvos	mg/kg	0.5	2.1	<0.5	2	105
			Dimethoate	mg/kg	0.5	<0.5	<0.5	-	-
			Diazinon (Dimpylate)	mg/kg	0.5	2.2	<0.5	2	108
			Fenitrothion	mg/kg	0.2	<0.2	<0.2	-	-
			Malathion	mg/kg	0.2	<0.2	<0.2	-	-
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	2.1	<0.2	2	107
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	-	-
			Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	-	-
			Methidathion	mg/kg	0.5	<0.5	<0.5	-	-
			Ethion	mg/kg	0.2	2.1	<0.2	2	106
			Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	-	-
			Total OP Pesticides*	mg/kg	1.7	8.5	<1.7	-	-
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.4	-	88
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.5	-	86

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE195242.001	LB178549.023	Naphthalene	mg/kg	0.1	3.9	<0.1	4	99
		2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Acenaphthylene	mg/kg	0.1	4.0	<0.1	4	101
		Acenaphthene	mg/kg	0.1	4.2	<0.1	4	105
		Fluorene	mg/kg	0.1	<0.1	<0.1	-	-
		Phenanthrene	mg/kg	0.1	4.1	<0.1	4	103

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE195242.001	LB178549.023		Anthracene	mg/kg	0.1	3.8	<0.1	4	95
			Fluoranthene	mg/kg	0.1	3.9	<0.1	4	97
			Pyrene	mg/kg	0.1	4.1	<0.1	4	101
			Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
			Chrysene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(a)pyrene	mg/kg	0.1	4.3	<0.1	4	107
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	-	-
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	4.3	<0.2	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	4.4	<0.3	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	4.3	<0.2	-	-
			Total PAH (18)	mg/kg	0.8	32	<0.8	-	-
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.4	-	86
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	-	84
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.4	-	88
SE195298.001	LB178547.025		Naphthalene	mg/kg	0.1	4.3	<0.1	4	106
			2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
			Acenaphthylene	mg/kg	0.1	4.6	<0.1	4	115
			Acenaphthene	mg/kg	0.1	4.2	<0.1	4	104
			Fluorene	mg/kg	0.1	<0.1	<0.1	-	-
			Phenanthrene	mg/kg	0.1	4.5	<0.1	4	113
			Anthracene	mg/kg	0.1	4.3	<0.1	4	108
			Fluoranthene	mg/kg	0.1	4.2	<0.1	4	105
			Pyrene	mg/kg	0.1	4.4	<0.1	4	110
			Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
			Chrysene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(a)pyrene	mg/kg	0.1	4.7	<0.1	4	118
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	-	-
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	4.7	<0.2	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	4.9	<0.3	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	4.8	<0.2	-	-
			Total PAH (18)	mg/kg	0.8	35	<0.8	-	-
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.4	-	94
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.4	-	88
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.5	-	86

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE195298.001	LB178547.025		Arochlor 1016	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1221	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1232	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1242	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1248	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1254	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1260	mg/kg	0.2	0.4	<0.2	0.4	105
			Arochlor 1262	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1268	mg/kg	0.2	<0.2	<0.2	-	-
			Total PCBs (Arochlors)	mg/kg	1	<1	<1	-	-
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	0	-	97

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number	Parameter	Units	LOR

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES (continued)

Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE195242.001	LB178671.004	Arsenic, As	mg/kg	1	49	4	50	90
		Cadmium, Cd	mg/kg	0.3	47	<0.3	50	94
		Chromium, Cr	mg/kg	0.3	59	12	50	94
		Copper, Cu	mg/kg	0.5	56	6.3	50	99
		Nickel, Ni	mg/kg	0.5	54	6.6	50	95
		Lead, Pb	mg/kg	1	55	9	50	92
		Zinc, Zn	mg/kg	2	67	21	50	94
SE195298.009	LB178672.004	Arsenic, As	mg/kg	1	52	7	50	90
		Cadmium, Cd	mg/kg	0.3	47	<0.3	50	94
		Chromium, Cr	mg/kg	0.3	54	6.8	50	95
		Copper, Cu	mg/kg	0.5	56	6.1	50	101
		Nickel, Ni	mg/kg	0.5	50	3.2	50	94
		Lead, Pb	mg/kg	1	53	8	50	91
		Zinc, Zn	mg/kg	2	65	16	50	96

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE195242.001	LB178549.023		TRH C10-C14	mg/kg	20	26	<20	40	65
			TRH C15-C28	mg/kg	45	<45	<45	40	83
			TRH C29-C36	mg/kg	45	<45	<45	40	100
			TRH C37-C40	mg/kg	100	<100	<100	-	-
			TRH C10-C36 Total	mg/kg	110	<110	<110	-	-
			TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	-	-
		TRH F Bands	TRH >C10-C16	mg/kg	25	31	<25	40	78
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	31	<25	-	-
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	40	93
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	-	-
SE195298.001	LB178547.025		TRH C10-C14	mg/kg	20	42	<20	40	105
			TRH C15-C28	mg/kg	45	<45	<45	40	103
			TRH C29-C36	mg/kg	45	<45	<45	40	95
			TRH C37-C40	mg/kg	100	<100	<100	-	-
			TRH C10-C36 Total	mg/kg	110	<110	<110	-	-
			TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	-	-
		TRH F Bands	TRH >C10-C16	mg/kg	25	41	<25	40	103
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	41	<25	-	-
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	40	108
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	-	-

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE195242.001	LB178537.004	Monocyclic Aromatic	Benzene	mg/kg	0.1	2.1	<0.1	2.9	71
			Toluene	mg/kg	0.1	2.2	<0.1	2.9	74
			Ethylbenzene	mg/kg	0.1	2.2	<0.1	2.9	75
			m/p-xylene	mg/kg	0.2	4.4	<0.2	5.8	76
			o-xylene	mg/kg	0.1	2.2	<0.1	2.9	76
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.5	4.1	-	90
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.6	4.2	-	91
			d8-toluene (Surrogate)	mg/kg	-	4.6	4.2	-	91
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.6	4.3	-	91
		Totals	Total Xylenes	mg/kg	0.3	6.7	<0.3	-	-
			Total BTEX	mg/kg	0.6	13	<0.6	-	-
SE195298.001	LB178536.004	Monocyclic Aromatic	Benzene	mg/kg	0.1	2.1	<0.1	2.9	73
			Toluene	mg/kg	0.1	2.1	<0.1	2.9	73
			Ethylbenzene	mg/kg	0.1	2.1	<0.1	2.9	73
			m/p-xylene	mg/kg	0.2	4.4	<0.2	5.8	75
			o-xylene	mg/kg	0.1	2.1	<0.1	2.9	73
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.5	4.7	-	91
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.9	5.0	-	97
			d8-toluene (Surrogate)	mg/kg	-	4.7	4.9	-	93
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.5	4.8	-	90

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE195298.001	LB178536.004	Totals	Total Xylenes	mg/kg	0.3	6.5	<0.3	-	-
			Total BTEX	mg/kg	0.6	13	<0.6	-	-

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE195242.001	LB178537.004		TRH C6-C10	mg/kg	25	<25	<25	24.65	93
			TRH C6-C9	mg/kg	20	22	<20	23.2	96
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.5	4.1	-	90
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.6	4.2	-	91
			d8-toluene (Surrogate)	mg/kg	-	4.6	4.2	-	91
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.6	4.3	-	91
		VPH F	Benzene (F0)	mg/kg	0.1	2.1	<0.1	-	-
		Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	7.25	135
SE195298.001	LB178536.004		TRH C6-C10	mg/kg	25	<25	<25	24.65	91
			TRH C6-C9	mg/kg	20	21	<20	23.2	91
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.5	4.7	-	91
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.9	5.0	-	97
			d8-toluene (Surrogate)	mg/kg	-	4.7	4.9	-	93
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.5	4.8	-	90
		VPH F	Benzene (F0)	mg/kg	0.1	2.1	<0.1	-	-
		Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	7.25	131

MATRIX SPIKE DUPLICATES

SE195298 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: https://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover the performance of this service.
**	Indicative data, theoretical holding time exceeded.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to Analytical Report comments for further information.

This document is issued by the Company under its General Conditions of Service accessible at www.sgs.com/en/Terms-and-Conditions.aspx. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client only. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

This test report shall not be reproduced, except in full.

source: [Untitled].pdf page: 1 SGS Ref: SE195298_COC

SGS

CHAIN OF CUSTODY & ANALYSIS REQUEST

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email: au.samplereceipt.sydney@sgs.com

Company Name:	Valley Civilab	Project Name/No:	P1834
Address:	3/62 Sandringham Avenue Thornton 2322	Purchase Order No:	VC: 04343
		Results Required By:	5 day TAT
		Telephone:	0499 151 225
Contact Name:	Malcolm Adrien	Facsimile:	
		Email Results:	malcolm.adrien@vclab.com.au; jake.duck@vclab.com.au; monica.esposito@vclab.com.au

Client Sample ID	Date Sampled	Lab Sample ID	WATER	SOIL	PRESERVATIVE	NO OF CONTAINERS	CL17	CL10	HOLD
BH1 0.2-0.3	10/7/2019	1		X		1	X		
BH2 0.4-0.5	10/7/2019	2		X		1	X		
BH4 0.2-0.3	10/7/2019	3		X		1	X		
BH4 0.7-0.8	10/7/2019	4		X		1		X	
BH5 0.2-0.3	10/7/2019	5		X		1	X		
BH5 0.7-0.8	10/7/2019	6		X		1		X	
BH5 1.4-1.5	10/7/2019			X		1			X
BH6 0.2-0.3	10/7/2019	7		X		1	X		
BH6 0.7-0.8	10/7/2019	8		X		1		X	
BH7 0.2-0.3	10/7/2019	9		X		1	X		

SGS EHS Alexandria Laboratory

SE195298 COC
Received: 12–Jul–2019

Relinquished By:	Date/Time: 11/7/19	Received By:	Date/Time 12/7 11 am
Relinquished By:	Date/Time:	Received By:	Date/Time
Samples Intact: (Yes)/ No	Temperature: Ambient / (Chilled)	Sample Cooler Sealed: (Yes)/ No	Laboratory Quotation No:
	Comments:		

SGS

CHAIN OF CUSTODY & ANALYSIS REQUEST

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email: au.samplereceipt.sydney@sgs.com

Company Name:	Valley Civilab	Project Name/No:	P1834
Address:	3/62 Sandringham Avenue Thornton 2322	Purchase Order No:	VC: 04343
		Results Required By:	5 day TAT
		Telephone:	0499 151 225
Contact Name:	Malcolm Adrien	Facsimile:	
		Email Results:	malcolm.adrien@vclab.com.au; jake.duck@vclab.com.au; monica.esposito@vclab.com.au

Client Sample ID	Date Sampled	Lab Sample ID	WATER	SOIL	PRESERVATIVE	NO OF CONTAINERS	CL17	CL10	HOLD
BH7 0.7-0.8	10/7/2019	10		X		1		X	
BH7 1.5-1.6	10/7/2019			X		1			X
BH8 0.2-0.3	10/7/2019	11		X		1	X		
BH10 0.3-0.4	10/7/2019	12		X		1	X		
BH10 0.6-0.7	10/7/2019	13		X		1		X	
BH15 0.3-0.4	10/7/2019	14		X		1	X		
BH15 0.7-0.8	10/7/2019	15		X		1		X	
BH16 0.2-0.3	10/7/2019			X		1			X
BH16 0.7-0.8	10/7/2019			X		1			X
BH17 0.2-0.3	10/7/2019	16		X		1	X		

Relinquished By:	Date/Time: 11/7/19	Received By: EMILY	Date/Time 12/7 11am
Relinquished By:	Date/Time:	Received By:	Date/Time
Samples Intact: (Yes)/ No	Temperature: Ambient / (Chilled)	Sample Cooler Sealed: (Yes)/ No	Laboratory Quotation No:
	Comments:		

CHAIN OF CUSTODY & ANALYSIS REQUEST

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email: au.samplereceipt.sydney@sgs.com

Company Name:	Valley Civilab	Project Name/No:	P1834
Address:	3/62 Sandringham Avenue Thornton 2322	Purchase Order No:	VC: 04343
		Results Required By:	5 day TAT
		Telephone:	0499 151 225
Contact Name:	Malcolm Adrien	Facsimile:	
		Email Results:	malcolm.adrien@vclab.com.au; jake.duck@vclab.com.au; monica.esposito@vclab.com.au

Client Sample ID	Date Sampled	Lab Sample ID	WATER	SOIL	PRESERVATIVE	NO OF CONTAINERS	CL17	CL10	HOLD												
BH20 0.2-0.3	10/7/2019	17		X		1	X														
BH20 0.7-0.8	10/7/2019	18		X		1		X													
BH22 0.2-0.3	10/7/2019			X		1			X												
BH22 0.7-0.8	10/7/2019			X		1			X												
BH23 0.2-0.3	10/7/2019			X		1			X												
BH23 0.7-0.8	10/7/2019			X		1			X												
BH24 0.2-0.3	10/7/2019	19		X		1	X														
BH24 0.7-0.8	10/7/2019	20		X		1		X													
BH27 0.3-0.4	10/7/2019	21		X		1	X														
BH27 0.7-0.8	10/7/2019	22		X		1		X													

Relinquished By:	Date/Time: 11/7/19	Received By: Emily	Date/Time 12/7 11am
Relinquished By:	Date/Time:	Received By:	Date/Time
Samples Intact: (Yes) / No	Temperature: Ambient / (Chilled)	Sample Cooler Sealed: (Yes) / No	Laboratory Quotation No:
	Comments:		

CHAIN OF CUSTODY & ANALYSIS REQUEST

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email: au.samplereceipt.sydney@sgs.com

Company Name:	Valley Civilab	Project Name/No:	P1834
Address:	3/62 Sandringham Avenue Thornton 2322	Purchase Order No:	VC: 04343
		Results Required By:	5 day TAT
		Telephone:	0499 151 225
Contact Name:	Malcolm Adrien	Facsimile:	
		Email Results:	malcolm.adrien@vclab.com.au; jake.duck@vclab.com.au; monica.esposito@vclab.com.au

Client Sample ID	Date Sampled	Lab Sample ID	WATER	SOIL	PRESERVATIVE	NO OF CONTAINERS	CL17	CL10	Metals	TRH/BTEX	Lead											
BH31 0.2-0.3	10/7/2019			x		1					x											
DUP1	10/7/2019	23		x		1		x														
DUP2	10/7/2019	24		x		1		x														
RINS	10/7/2019	25	x			1			x													
Trip Spike		26		x		1				x												
Trip Blank		27		x		1				x												

Relinquished By:	Date/Time: 11/7/19	Received By: Emily	Date/Time 12/7 11am
Relinquished By:	Date/Time:	Received By:	Date/Time
Samples Intact: (Yes) No	Temperature: Ambient / (Chilled)	Sample Cooler Sealed: (Yes) No	Laboratory Quotation No:
	Comments:		

VALLEY CIVILAB
Geotechnical & Environmental Services

Annex I

Photograph 1: Site looking North

Photograph 2: Site looking Northwest

Photograph 3: Dam located south eastern corner of site.

Photograph 4: Eastern Site boundary adjacent to residential.

Appendix 7 – Flood Constraints Assessment

Bunnings Group Ltd.
Level 8, 5 Rider Boulevard
Rhodes
Locked Bag 3277, Rhodes
NSW 2138

119073/L191001_Bunnings_Mudgee_Flood_Constraints_Assessment

18 October 2019

Attention: Hannah Baker – Assistant Property Development Manager

Re: Bunnings Mudgee Relocation – Flood Constraints Assessment

1. INTRODUCTION

WMAwater was engaged by Bunnings Group Ltd. to undertake a preliminary flood assessment of 134 Lions Dr, Burrundulla (Lot 2 DP1079362), herein referred to as the site. The site is located approximately 3 km south of Mudgee town centre along the Castlereagh Highway, opposite an existing Bunnings Warehouse. The location of the site is presented in Figure 1.

The objective of this study is to assess the waterways and flow path through the potential development site, to identify flood-related planning constraints for a new Bunnings Warehouse on the site. The assessment includes estimates of the 1% AEP flood and the PMF flood to provide an understanding of the flooding characteristics and likely flood planning levels for the lot.

2. CATCHMENT DESCRIPTION

There is a reasonably large upstream catchment area (Figure 2) upstream. In the vicinity of the site there are a series of braided ephemeral watercourses that cross the Castlereagh Highway via several cross-drainage culverts. In larger flood events the flow from upstream through and surrounding the site is primarily overland sheet flow spanning the braided watercourses. There is an existing farm dam that is present upstream of the site on an old gully (Sawpit Gully). Historically this gully ran north of the site through what is now development (north of Lions Road). Due to the presence of the farm dam and the development, this gully is now undefined, resulting in diverted overland flow through the site.

The site is bounded downstream by the Castlereagh Highway. Allowing flow to exit the site under the highway is a bank of 5 x 750 mm RCPs which transfer flow from the site through the roadway and into a formed drain which is located to the east of the current Bunnings development.

WMAwater Pty Ltd

DIRECTORS
M K Babister, RPEQ
R W Dewar
E J Askew
F L Ling, RPEQ

SENIOR ASSOCIATES
R Hardwick Jones, RPEQ
M E Retallick, RPEQ

ABN 14 600 315 053

Level 2, 160 Clarence Street, Sydney, NSW 2000
Phone: 02 9299 2855 Fax: 02 9262 6208
Email: enquiry@wmawater.com.au
Website: wmawater.com.au

3. HYDROLOGY

For the purposes of this assessment, WMAwater have used a draft version of the Mudgee Regional Flood Study model, which is currently in its final stages of development and not formally adopted by Council. The model has been reviewed for suitability for a local assessment and where required additional detail (such as the culverts under Castlereagh Highway) has been incorporated. The following sections provide a summary of the analysis undertaken for the site.

The catchment contributing flow to the site was determined using catchment delineation from Mudgee Flood Study regional hydrology model. A review of the model identified the catchment delineation was not sufficiently detailed to enable a local assessment to be undertaken. The upstream area was refined into several sub-catchments for this assessment. The sub-catchment breakup was undertaken based on the topographic information from a digital elevation model to allow for adequate representation upstream of the site. The catchment and sub-catchment delineation for the study area is shown Figure 2.

As the upstream area is predominantly rural, the effective fraction impervious of the upstream catchment is assumed to be zero. Table 1 provides a summary of the catchment area upstream of the site.

Table 1: Catchment Details

Name	Area (Hectares)
B61	117.12
B62	131.05
C61	26.08
C62	52.06
C63	7.22
C64	18.77

It should be noted that there is a distinct lack of channelised flow upstream of the site, where catchment runoff predominately consists of overland sheet flow. Much of this sheet flow crosses the Castlereagh Highway via alternative drainage lines further east of the site. Therefore that not all of the area presented in Table 1 contributes to the peak flow at the site.

The parameters utilised within the hydrology model are the same parameters adopted in the Mudgee Flood Study. These parameters were calibrated to three flood events - February 2003, December 2010, and September 2016. The events were selected based on the magnitude of the event and the availability of data.

In the Mudgee Flood Study a joint calibration of the hydrologic and hydraulic model was undertaken. This calibration adjusted the rainfall loss parameter and the stream routing parameter in the WBNM (hydrologic) model and the Manning's 'n' roughness values in the TUFLOW hydraulic model. Multiple combinations of these parameters were considered until the best fit to the recorded water levels in the study area could be achieved across the whole range of calibration events.

Based on the calibration of the Mudgee Flood Study a pervious initial loss rate of 10 mm and a continuing loss rate of 2.8 mm/hr was selected. This study utilises the same losses for the 1% AEP event.

The study also assesses the PMF event for the site. The PMF estimate is based upon the Generalised Short-Duration Method and is consistent with the approach within the Mudgee Flood Study for short duration PMF events. An initial and continuing loss of zero has been utilised within the PMF flood assessment.

4. HYDRAULIC MODELLING

A hydraulic model was established using the Mudgee Flood Study model as a basis. The TUFLOW model used a Digital Elevation Model based on LiDAR extracted from NSW Government Spatial Services with a grid size of 2 m. A cell size of 3 m was used, consistent with the regional flood model resolution.

5. BOUNDARY LOCATIONS

5.1. Inflows

The inflow hydrographs for the design events were taken from the calibrated WBNM model. The inflows were applied at the downstream end of each relevant sub-catchments within the 2D domain of the TUFLOW model (see Figure 3).

5.2. Downstream Boundary

The hydraulic model has one downstream boundary condition used in Mudgee Flood Study. This is located downstream of Wilbertree Road gauge on Cudgegong River. This has been set as a constant slope boundary based on the gradient of the River at this location. The location is set sufficiently far downstream of the gauge ensuring no impact to the calibration (at the gauge location).

5.3. Manning's 'n' Roughness

The Manning's 'n' values adopted for the investigation area are shown in Table 2. These values have been adopted from the Mudgee Flood Study model. Note buildings are considered as individual blockage elements within the model.

Table 2: Adopted Manning's 'n' Values

Surface	Mannings 'n'
Road	0.02
Town	0.04
Farmland	0.04
River	0.04
Riparian Vegetation	0.08
Forest	0.10

5.4. Local Hydraulic Structures

As stated previously, the site is bounded downstream by Castlereagh Highway. To manage flow from the site under the highway are 5 x 750 RCPs. These culverts discharge under the road into a man-made channel that runs alongside the current Bunnings location. The culvert location is shown in Figure 3. These culverts are not located at the low point of the road, which is further south.

6. RESULTS

The calibrated flood models were run for the 1% AEP design storm event using design storm information from Australian Rainfall and Runoff 2019 (Reference XX). Storm durations of 120, 180 and 270 minutes were considered and the 180 minute duration was determined to be the critical duration. A representative storm temporal pattern (TP2279) giving a median catchment flow response was selected as the representative design storm. Figure 4 and Figure 5 present the peak flood depths and levels for critical 1% AEP and PMF storms respectively.

The flow interactions upstream and around the site are complex and highly dependent on local topographic features such as roads and farm dams. While the extents of flooding and flows provided are considered appropriate to estimate the flood risk present onsite, detailed survey of the site and properties upstream of the site is recommended prior to detailed design of any hydraulic system or development of the site.

The estimated peak flow through the site is summarised in Table 3.

Table 3: Design Peak Flows

Design Peak Flow Estimate 1% AEP (m^3/sec)	Design Peak Flow Estimate PMF (m^3/sec)
4.5	51.8

In the 1% AEP event the flood levels onsite range from 476.0 mAHD in the western corner to 471.1 mAHD adjacent to Castlereagh Highway. On-site flood depths are generally less than 0.5 m for the 1% AEP event, with the majority of site is affected by shallow inundation. In the 1% AEP event the highway is overtopped with depths of 0.05 to 0.1 m.

In the PMF event flood levels onsite range from 476.3 mAHD in the western corner to 470.5 mAHD adjacent to Castlereagh Highway. In the PMF event the highway is overtopped with depths of up to 0.5 m present on the roadway.

7. DEVELOPMENT CONSTRAINTS AND SOLUTIONS

The flow rates and volumes within the site for the 1% AEP are unlikely to present a major constraint in terms of minimum floor levels. Filling would likely be required for the main building footprint, together with provision of a managed flow path around the boundary of the site.

Placing a large warehouse development on the middle of the site would require the diffuse overland flow through the site to be collected along the upstream boundary, contained within an open vegetated swale/channel around the site boundary, and then discharged through the downstream culverts. The width of the required channel would depend on design factors, such as whether a grassed swale with shallow batters is used (relatively cheap to construct and maintain, but requiring more width), versus a more incised channel (e.g. sandstone banks, with managed landscaping on the overbank). Constructing a formal channel / swale would be a relatively significant change to the existing flow behaviour which could likely be engineered, but may present challenges for design and planning approval with regards to:

- Demonstrating that collecting and concentrating the flow into a channel would not produce adverse flood impacts beyond the property boundary. This would require further flood modelling to demonstrate an effective design.
- There may be ecological or environmental considerations for creating a more engineered watercourse through the site that would need to be addressed.

WMAwater would not recommend placing pipes under the building to manage the flow through the site. Pipes require an overland flow path to convey water during major events when flow exceeds the pipe capacity, or in case of blockage. Any proposal involving pipes should also consider how maintenance and replacement of the pipes will be undertaken – placing buildings over the pipes is not good practice for this reason.

We trust the assessment provides sufficient preliminary understanding of the flood risks and planning constraints associated within the site. If you have any queries please do not hesitate to contact the undersigned.

Yours Sincerely,

WMAwater

Daniel Wood

Associate

Figure 1: Study Area

Figure 2: Hydrologic Model Layout

Figure 3: Hydraulic Model Layout

Figure 4: Peak Flood Depths and Levels – 1% AEP event

Figure 5: Peak Flood Depths and Levels – PMF event

FIGURE 1
STUDY AREA

Industrial Ave
Depot Rd
Swords Ct
Burrundulla Rd
Wilkins Cres
Lions Dr
Kellett Dr
Broadhead Rd
Castlereagh Hwy

N

Cadastre
Study Area

0 0.125 0.25 0.5
km

J:\Jobs\119073\ArcGIS\ArcMap\Figure01_Study_Area.mxd

FIGURE 2
HYDROLOGIC MODEL LAYOUT

ERUDGERE
MILROY
MOUNT FROME
MUDGEE
BURRUNDULLA
GRATTAI
SPRING FLAT
MADEIRA RD
CHURCH ST
SYDNEY RD
SPRING RD
WATERWORKS RD
BRUCE RD
OLD GRATTAI RD
BLACK SOIL RD
ROBERTSON RD
SPRING FLAT RD
CASTLEREAGH HWY
QUEENS PINCH RD

N

Cadastre
Study Area
Catchment Boundary

0 0.5 1 2 km

J:\Jobs\1190731\ArcGIS\ArcMap\Figure02_Hydrologic_Model_Layout.mxd

FIGURE 3
HYDRAULIC MODEL LAYOUT

Industrial Ave
Depot Rd
Swords Ct
Burrundulla Rd
Wilkins Cres
Lions Dr
Kellett Dr
Broadhead Rd
Castlereagh Hwy

Culvert Details: 5 x 750 RCPS

N

Pipes
Cadastre
2D Inflow
Study Area

0 0.125 0.25 0.5 km

J:\Jobs\119073\ArcGIS\ArcMap\Figure03_Hydraulic_Model_Layout.mxd

FIGURE 4
PEAK FLOOD DEPTHS AND LEVELS
1% AEP EVENT

Industrial Ave
Depot Rd
Swords Ct
Wilkins Cres
Burrundulla Rd
Lions Dr
Kellett Dr
Broadhead Rd
Castlereagh Hwy
458
459
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487

N

Cadastre
Study Area
Flood Level Contours (1m interval)

Depth (m)
< 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 0.75
0.75 - 1.0
> 1.0

0 0.125 0.25 0.5 km

J:\Jobs\119073\ArcGIS\ArcMap\Figure04_Peak_Flood_Depths_and_Levels_1%_AEP.mxd

FIGURE 5
PEAK FLOOD DEPTHS AND LEVELS
PMF EVENT

Industrial Ave
Depot Rd
Swords Ct
Wilkins Cres
Burrundulla Rd
Lions Dr
Kellett Dr
Broadhead Rd
Castlereagh Hwy

460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487

N

Cadastre
Study Area
Flood Level Contours (1m interval)

Depth (m)
< 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 0.75
0.75 - 1.0
> 1.0

0 0.125 0.25 0.5
km

J:\Jobs\119073\ArcGIS\ArcMap\Figure05_Peak_Flood_Depths_and_Levels_PMF_Event.mxd

Appendix 8 – Economic Assessment

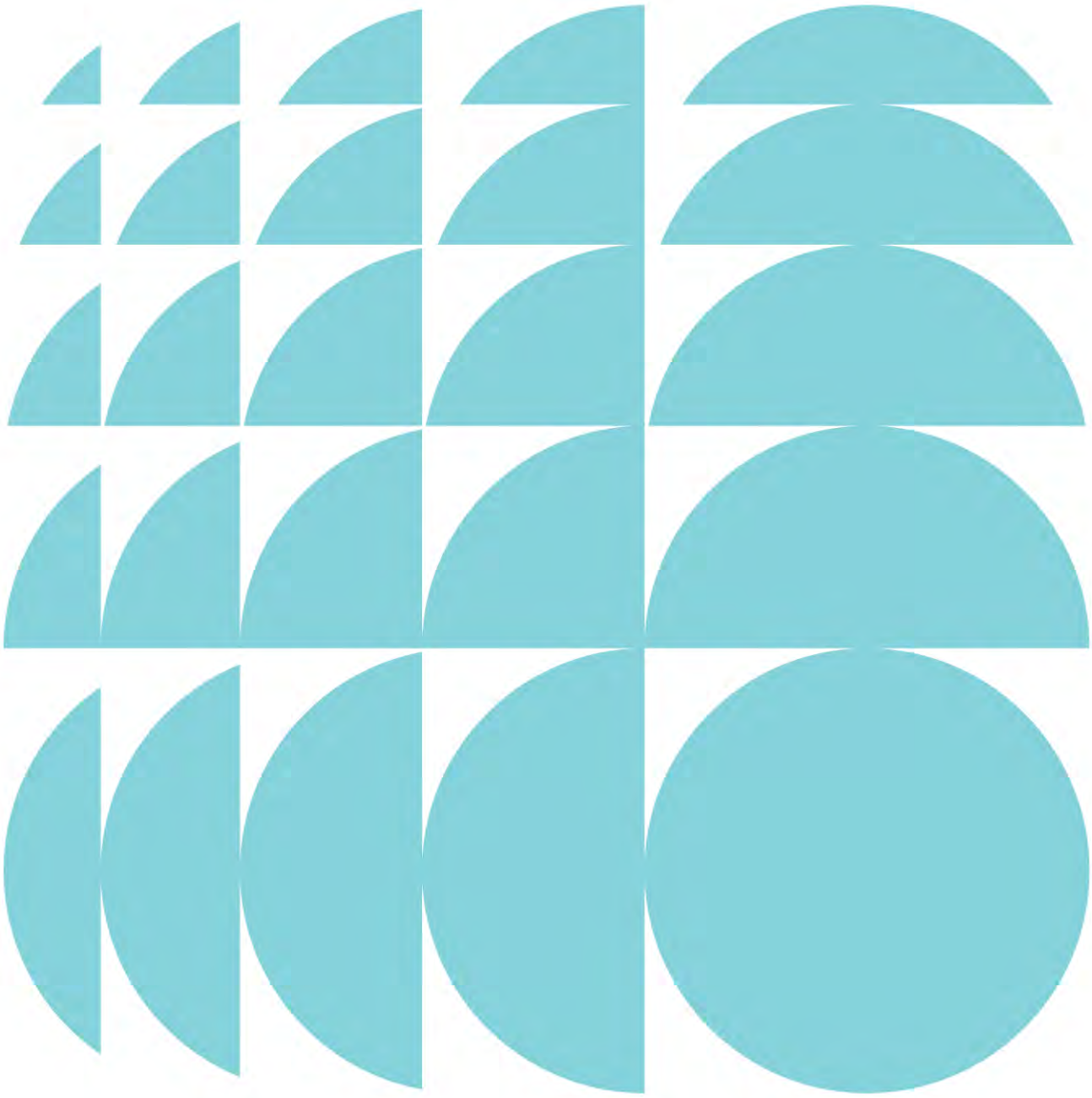
ETHOS URBAN

Proposed Expansion of B5Z Land Supply in Mudgee

Economic Assessment

On behalf of Bunnings Group Ltd

January 2020 | 3190360



Authorship

Report stage	Author	Date	Review	Date
Draft report	Mark McManus	25 October 2019	Sean Stephens	30 October 2019
Final report	Sean Stephens	22 January 2020		

Disclaimer
Every effort has been made to ensure the accuracy of the material and the integrity of the analysis presented in this report. However, Ethos Urban Pty Ltd accepts no liability for any actions taken on the basis of report contents.

Contact details
For further details please contact Ethos Urban Pty Ltd at one of our offices:

Ethos Urban Pty Ltd

ABN 13 615 087 931.

Level 8, 30 Collins Street
Melbourne VIC 3000
(03) 9419 7226
economics@ethosurban.com
www.ethosurban.com

173 Sussex Street
Sydney NSW 2000
(02) 9956 6962

Level 1, 356 St Pauls Terrace
Brisbane QLD 4006
(07) 3852 1822

Our Reference: 3190360

Contents

Executive Summary 1

Introduction 3

1. Details of the Proposal 4

1.1 About Bunnings 4
1.2 Project Location 4
1.3 Project Description 6
1.4 Site Attributes 7

2. Strategic Policy Context 9

2.1. Policy Review 9
2.2. Existing Constraints Associated with Bunnings Mudgee Site 10
2.3. Comparative Sites Assessment 11
2.4. Strategic Review of Subject Site 12

3. Trade Area Analysis 14

3.1. Trade Area Definition 14
3.2. Population Trends and Forecasts 15
3.3. Socio-Economic Characteristics 16
3.4. Retail Spending 17
3.5. Escape Spending 19

4. Economic Need and Impact 21

4.1. Projected Bunnings Mudgee Sales 21
4.2. Projected Sales 21
4.3. Trading Impacts Assessment 22
4.4. Consideration of Demand for Other B5Z Uses 23
4.5. Costs of Continued Shortage of Appropriate Business 5 Zoned Land 24
4.6. Other Benefits of Proposed Rezoning of Subject Site 25

Executive Summary

Proposal

1 At present, the available supply of land in the Business 5 Zone (B5Z) is not able to accommodate economic need for an appropriate scale and range of large-format retail facilities in Mudgee. This has been identified through the fact that the existing Bunnings Mudgee is no longer suitable for modern requirements, and does not meet customer and operational expectations for a modern hardware store. Expansion of Bunnings on the current site is in Mudgee not a viable option given physical constraints.

2 After a detailed review of potential sites, Bunnings is now seeking to relocate and expand the existing Mudgee store to the Subject Site immediately opposite on the south-west corner of Sydney Road and Lions Drive. This would require the B5Z to be applied as a means of accommodating a new Bunnings Mudgee approximately 58% larger than the existing store, with significantly more space for the garden nursery and timber and trade sales relative to the existing store.

3 The proposal for the Subject Site includes land to 'future proof' any further improvements to the Bunnings store at an indefinite time in the future. Allowance is also made for other uses consistent with the operation of the Business 5 Zone (B5Z) and which also responds to growing market demand and economic need in Mudgee for large-format retail and other complementary uses consistent with the B5Z.

4 Future use of the existing Bunnings Mudgee site involves reconfiguring the site to allow leasing or 'backfill' of the building for uses such as large format retail, trade supplies or showrooms. These uses will benefit from the high-profile location and existing infrastructure offered by the existing Bunnings Mudgee site.

Policy

5 The guiding policy for planning decisions in Mid-Western Regional Council is the *Mid-Western Regional Council LEP 2012*. Under the LEP the Subject Site is identified as falling in the RU4 Zone. A rezoning to the B5Z is required, noting this zone applies to much of the adjacent Sydney Road Precinct which includes the existing Bunnings Mudgee.

6 The strategic direction outlined in the Mid-Western Regional Comprehensive Land Use Strategy both envisages and allows for the delivery of additional employment land, including in the Sydney Road Precinct where the Subject Site is identified for future "Urban Purposes" (Page 42).

7 A detailed comparative sites analysis has determined the existing planning framework in Mudgee cannot accommodate the proposed Bunnings Mudgee expansion. Further, the assessment has identified relatively low vacancy levels and overall strong demand for employment land in the Sydney Road Precinct by a range of potential users also seeking land in the B5Z. As such, the proposed rezoning of the Subject Site responds both to the need to accommodate the evolving needs of an important large-format retail anchor (Bunnings) in Mudgee, and broader growth in demand for other complementary large-format retail and other uses also suited to the B5Z.

Trade Area

8 A trade area has been defined which describes the geographic area that would be served by the new and expanded Bunnings Mudgee store. This trade area reflects current trading patterns of Bunnings Mudgee, with an allowance for the regional appeal of a new and enhanced store. This trade area is also consistent with the expected trading patterns

generated by other large-format retail in Mudgee including other major businesses such as Harvey Norman.

9 In 2018, the population of the trade area was estimated at 26,840 residents. This represents total growth of +1,960 persons on the trade area population in 2011 or a growth rate of 280 persons per annum over the period. The population of the trade area is expected to be growing for at least the next 20 years. In 2036, a total population of 30,190 persons is forecast for the trade area, or an increase of +3,350 persons on the current level.

Need and Impact

10 The proposed expanded Bunnings Mudgee store is forecast to achieve total turnover of approximately $22.9m in its first year of trading. This represents an average trading level of approximately $2,970/m^2. For the purposes of this analysis, the first full year of trading is assumed to be 2022 (year to June). During the first year of trading, the store is forecast to capture approximately 29% of the retail market for Bunnings Type Merchandise in the trade area, some 6% higher than the 23% market share achieved by the existing Bunnings Mudgee.

11 As a result of the proposed relocation and expansion of Bunnings Mudgee, in 2022 the spending by trade area residents on Bunnings Type Merchandise that is available to all other retailers will still increase by $0.2m relative to existing levels.

12 Given the levels of escape spending in hardware spending from the trade area, it is reasonable to assume that the proposed new and enhanced Bunnings Mudgee will attract sales and visitation which otherwise might be directed to Bunnings stores at Dubbo and Bathurst. Thus, the provision of additional land in the B5Z associated with the proposal will generate a significant local economic and community benefit.

13 The potential for existing large-format retail, showroom and light industrial uses to grow in Mudgee is positively impacted by the proposed expansion to land in the B5Z. Further, an expanded Bunnings and the availability of high-quality land in the B5Z is likely to attract businesses to Mudgee which would otherwise not locate in the town under a business as usual outcome. For this reason, the proposed rezoning of additional land to the B5Z will have an ongoing economic benefit to Mudgee beyond that specifically associated with the Bunnings relocation and expansion.

Net Community Benefit

14 The development of a new Bunnings store at the subject site will require a capital investment of approximately $13.0m, excluding purchase of the land, but including all demolition and building works.

15 Construction of the new Bunnings Mudgee would support 32 FTE construction jobs, assuming a 12-month construction period. 50 flow-on jobs FTE would also be supported by development during the construction phase.

16 The number of people directly employed at a new Bunnings Mudgee would total an estimated 75 full-time, part-time and casual positions. This level of employment is a net increase of approximately 20 positions on the existing Bunnings Mudgee. Backfill of the existing Bunnings Mudgee with new tenants will create an estimated further 50 net additional jobs.

17 Once all of the additional B5Z land at the Subject Site is occupied (80 further jobs), the total net impact on employment in Mudgee will be 150 additional jobs. As a result, the proposed rezoning represents a sensible policy response to current and emerging economic need which delivers significant benefits to Mudgee in terms of employment and investment.

Introduction

This report, prepared on behalf of Bunnings Group Ltd, assesses the economic implications of the proposal to relocate and expand the existing Bunnings store in Mudgee.

Bunnings is proposing to create a new and enhanced store in Mudgee as part of its national network strategy. The existing Bunnings Mudgee has been a highly successful outlet. However, the store no longer meets the requirements its customer base, and is not consistent with modern consumer and operational requirements for large-format hardware and home improvements retailing.

As such, Bunnings have identified an opportunity to re-locate and expand the Bunnings Mudgee store on a location (the Subject Site) immediately opposite the existing outlet which will require a rezoning of this land to the Business 5 Zone (B5Z). This location has been chosen after a detailed site analysis, and is consistent with strategic policy objectives seeking to expand employment and economic opportunities in the region.

Although the proposed rezoning of the Subject Site to the B5Z is being initiated as a result of the specific requirements of Bunnings, the proposal also provides the opportunity for other complementary uses including large-format retail, showrooms and light industry to expand in Mudgee. This is either through the adaptive re-use of the existing Bunnings Mudgee site, or future development of surplus land at the Subject Site also well-suited to these uses. Without the proposed rezoning these new business opportunities would not be available in the town.

1. Details of the Proposal

This Chapter describes the Bunnings brand and the location and nature of the proposed new Bunnings Mudgee.

1.1 About Bunnings

Bunnings is an Australian-owned hardware, trade and home improvement company which has been in operation for over 130 years. Part of the ASX-listed Wesfarmers Group, Bunnings currently employs over 43,000 team members across 375 Australian and New Zealand stores.

The Bunnings store network includes a strong representation in regional areas of Australia, with approximately half of all Bunnings stores in New South Wales located outside of metropolitan Sydney.

In addition to meeting the hardware and home improvement needs of the typical consumer, Bunnings is also closely connected to the business community. In particular, Bunnings serves project builders, general tradespeople, and the housing industry.

The pricing structure at Bunnings is highly competitive and this is reflected in the 'Price Guarantee' to beat any competitor's reasonable price on stocked items.

The extensive Bunnings product range includes Tools, Building Materials and Hardware, Garden, Outdoor living, Kitchen, Bathroom and Plumbing, Lighting and Electrical, DIY workshops, and a range of in-home services including kitchen design and carpet installation.

1.2 Project Location

Mudgee is a town located approximately 260km north-west of Sydney. The town is within the Cudgegong River valley and is famous for its colonial buildings and location in the increasingly prominent Mudgee Wine Region. Mudgee is the seat of the Mid-Western Regional Council local government area and the urban population of the town exceeds 11,000 people.

An existing Bunnings store operates at the south-east corner of the Castlereagh Hwy (Sydney Road), and Burrundulla Rd on the south-east edge of the Mudgee urban area. Operating as part of a wider commercial and industrial precinct centred on Sydney Road (the Sydney Road Precinct), the Bunnings store is on a prominent gateway location to the town.

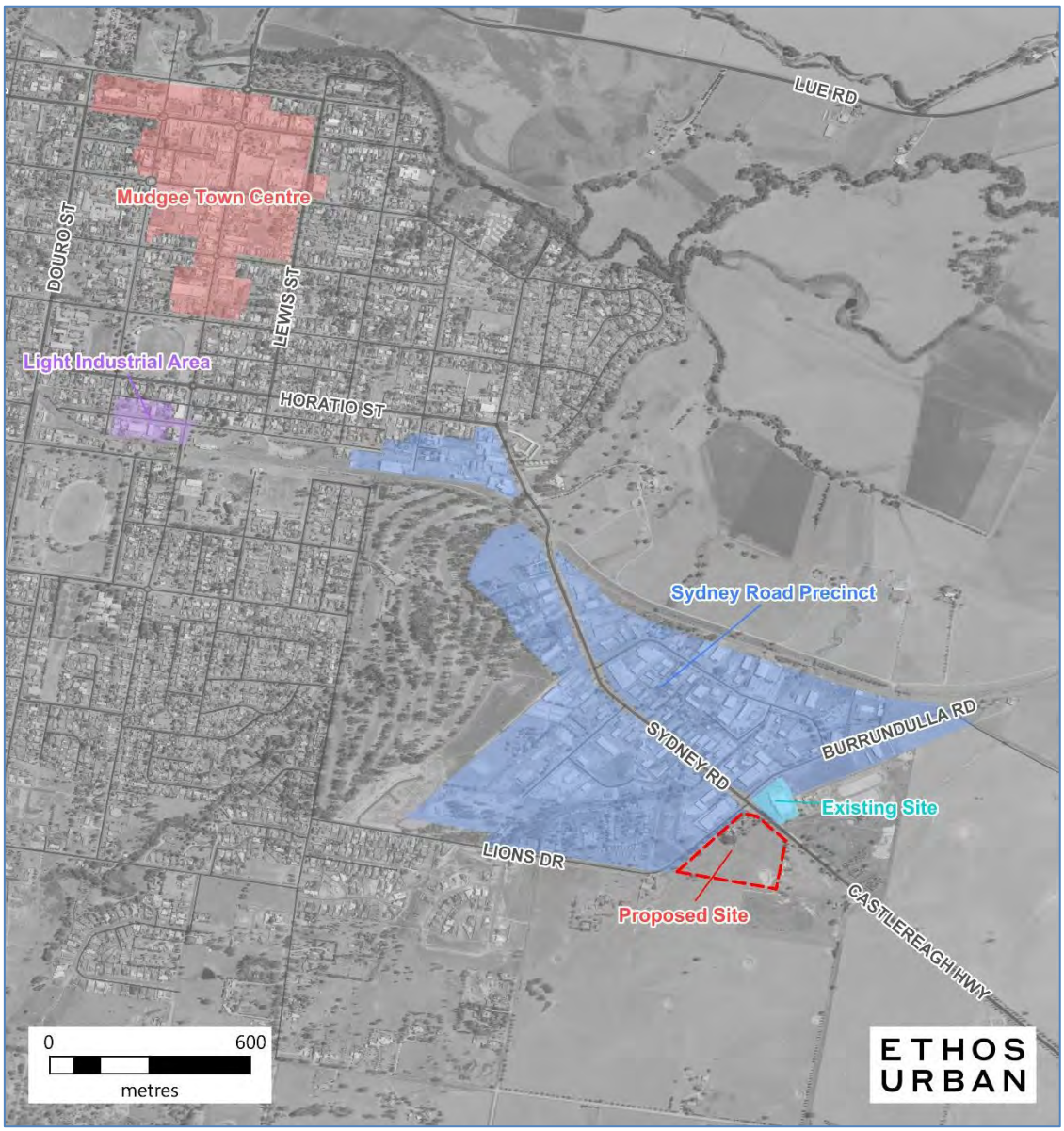
Opened in 2006, Bunnings Mudgee has a total floorspace of approximately 4,870m^2. Although the store has traded successfully since opening nearly 15-years ago, the store is now relatively small relative to comparable outlets in regional areas. Further, the outlet has an overall design and layout which no longer meets the contemporary expectations of hardware and home improvement customers, as well as the operational requirements of Bunnings.

Having previously considered options to expand and re-configure the existing Bunnings store at its current location, it became apparent that the existing site is too small and constrained to adequately overcome the existing store deficiencies.

As such, after a comparative sites analysis Bunnings are now seeking to relocate and expand their Bunnings Mudgee store to the Subject Site opposite the existing site and on the south-west corner of the Castlereagh Highway and Lions Drive. This site and the locational context is shown in Map 1.1.

The Subject Site is currently zoned RU4 Primary Production Small lots where hardware and building supplies retail outlets are prohibited. Consequently, to enable the new Bunnings store to proceed a rezoning of the site to the B5 Business Development zone is required.

Map 1.1 Locational Context



Source: MapInfo

The Sydney Road Precinct, in which the existing and proposed Bunnings are located, is primarily composed of large-format retail, showrooms, light industry and general business activity. This includes land within both the B5Z for sites primarily fronting Sydney Road, and the IN1Z for land located further east and west which does not have main road access and exposure.

Bunnings itself is located on land in the B5Z at a prominent gateway entry to the town which includes a cluster of large-format retailers including Harvey Norman. As such, the proposed new Bunnings represents an expansion and enhancement of an existing key bulky goods retailing precinct in Mudgee.

From a land use planning perspective, the proposed rezoning to the B5Z represents a logical and timely expansion of employment land in the Sydney Road precinct. Further, the proposed rezoning allows the expansion of Bunnings as a key regional shopping destination for both household and trade customers, which is to the benefit of the general community.

1.3 Project Description

The project involves the closure of the existing Bunnings Mudgee store and relocation to a new purpose-built Bunnings Warehouse at the Subject Site.

Closure of the existing Bunnings will not occur until the new facility is finished, at which time Bunnings propose to repurpose the existing Mudgee store so that it can be used by alternative large format retail or showroom uses. Importantly, the financial incentive for Bunnings to re-lease - or to use the industry term 'backfill' - the existing store is informed by the existing lease on the property which will not expire until sometime after the new Bunnings store is operating.

The Subject Site has a total land area of 5.4 hectares. However, at least initially just 2.6 hectares of the site will be required by Bunnings for the proposed store, as well as ancillary areas such as parking, landscaping, deliveries and access. An allowance has been made to 'future proof' the store with a modest expansion at some time in the future, with scope also provided for other land uses consistent with the operation of the B5Z to occupy the balance of the site.

A large-format Bunnings warehouse is proposed with a total area of approximately 7,720m^2, encompassing the main warehouse, nursery and bagged goods area, and timber trade area. This is a size consistent with increasing demand and changing needs within the Mudgee region, while recognising that the proposed store is the small warehouse format currently operated by Bunnings.

As such, despite an increase in size and enhanced amenity for customers, the proposed Bunnings Mudgee will still be significantly smaller than larger format stores in locations such as Dubbo and Bathurst.

The proposed floorspace mix of the new Bunnings Mudgee is shown in Table 1.1 and compared with the existing store. In total, the new store will increase floorspace by +2,850m^2, or is 58% larger than the existing Bunnings Mudgee.

Table 1.1: Proposed Bunnings Mudgee Floorspace Schedule

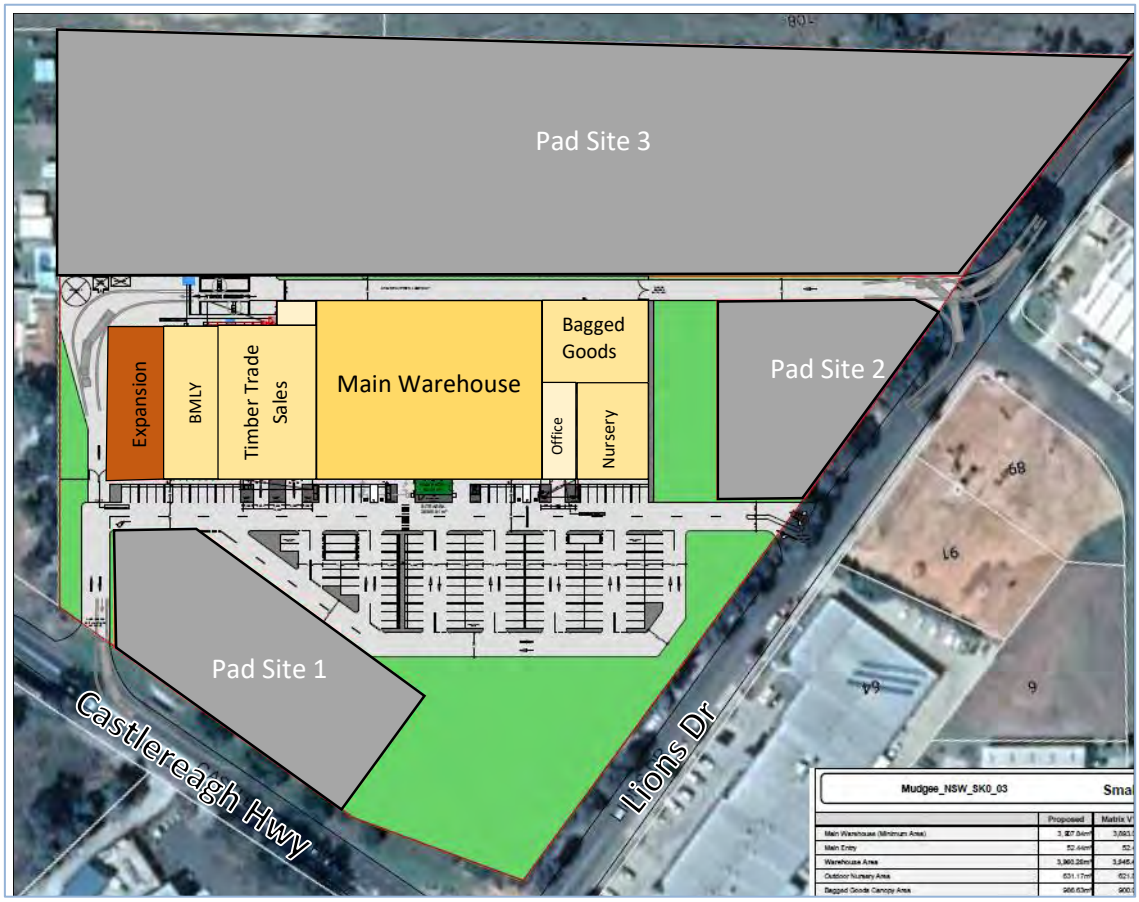
Component	Existing Floorspace	Approximate Floorspace	Difference
Main warehouse and entry	3,300m^2	3,960m^2	+660m^2
Nursery and bagged goods canopy	990m^2	1,620m^2	+630m^2
Timber trade	580m^2	2,140m^2	+1,560m^2
Total Retail Area	**4,870m^2**	**7,720m^2**	**+2,850**m^2

Source: Bunnings

Further to the proposed expansion in floorspace, the new store will also provide a high-quality, purpose-built and modern format hardware warehouse which overcomes significant limitations for both customers and Bunnings associated with the existing store.

An indicative site layout for the proposed Bunnings Mudgee is shown in Map 1.2.

Figure 1.1: Bunnings Mudgee Indicative Site Layout



Source: Bunnings
Produced by Ethos Urban with MapInfo and NearMap

Assuming a relatively timely approval process, the store is expected to open by December 2021 and will be supported by 177 car parking spaces. Entry into and out of the car park will be via Lions Drive, with a 'left in/left out' access point on Sydney Road.

Subsequent to the opening of the new Bunnings store, three pad sites will be available for future development and occupation by other uses also consistent with the B5Z. As such, the proposed Bunnings unlocks the potential for future business growth and development in Mudgee beyond simply the expanded new Bunnings hardware and home improvement store.

1.4 Site Attributes

Any site for a new Bunnings store needs to meet certain locational criteria including:

- Competitive development costs (unencumbered and easily developable land)
- A strategic location able to serve customers living across the surrounding region
- Proximity and accessibility to trade and business customers
- Excellent site accessibility and exposure to customers.

The proposed location for the Bunnings Mudgee store has a number of specific advantages which can be summarised as follows:

- **Strategic location:** the site is located on Castlereagh Highway, which is the key north-south road connection through Mudgee and which has a high degree of accessibility to the surrounding region.
- **Exposure:** the site has significant exposure to the large volume of passing traffic on the Castlereagh Highway, with strong sight lines to the site for this traffic and customers within the Sydney Road Precinct.
- **Serving trade customers:** the site is well-located with respect to potential local business customers given the proximity of trade and industry uses.
- **Accessibility:** the site is easily accessible with access to be provided via both Lions drive and Castlereagh Highway.
- **Land area**: the total size of the proposed site is approximately 4.9 hectares can easily accommodate the Bunnings warehouse building and car parking, access ways and landscaping that are required. Site depth and layout is also able to adequately accommodate the Bunnings store footprint.

The overall advantages of the site are reflected in the interest of Bunnings to develop a store at this location.

These attributes are also a positive for other uses which will also locate on the pad sites at the Subject Site in the future. Overall, the Subject Site has attributes well-suited to the broader suite of land uses accommodated in the B5Z, not simply the proposed Bunnings. This reflects the suitability of the Subject Site more broadly as a natural extension of the Sydney Road employment precinct, and in particular for the additional supply of land in the B5Z.

2. Strategic Policy Context

This Chapter explores the relevant strategic land use policies relevant to the proposed relocation and development of the Subject Site for a Bunnings store with the potential for future additional complementary uses. Note that the commentary in this Chapter is contextual to the preparation of the economic assessment, and does not represent formal town planning advice. Specific town planning advice in relation to the proposal is provided separately to this report.

2.1. Policy Review

Mid-Western Council Local Environmental Plan 2012

Local Environmental Plans (LEPs) are the guiding policy for planning decisions in NSW local government areas. These policies identify planning zones and development controls which apply to land in the local government area, and provide a framework for the way land can be used.

Under the *Mid-Western Local Environmental Plan 2012* the Subject Site is identified in the RU4 zone, being for small scale primary production.

A change to the B5Z is being sought for the Subject Site which allows hardware and building supplies, garden centres, landscaping material supplies, timber yards, warehouse or distribution centres, as well as a range of other uses subject to approval by Council. Based on this zoning a Bunnings store would be a use which is permitted with consent on the Subject Site, while the B5Z also allows for a range of complementary uses to Bunnings to co-locate on the Subject Site over time.

Mid-Western Regional Comprehensive Land Use Strategy

This is the endorsed overarching strategic document land use planning and development for the Mid-Western Regional Council area. Originally prepared in 2007 and endorsed by the State Government in 2010, the Strategy has been subject of multiple revisions to reflect responses to emerging requirements. In strategic terms, the Strategy notes the following issues of broad relevance to the proposal (Page 8):

- Population growth means that additional residential and employment land will be required
- The area has above average unemployment rates, and a lack of local employment opportunities is potentially resulting in people (including young people) leaving the area.

As a result of these issues, the objectives of the Strategy include the following elements relevant to consideration of the proposal (1.4 Objectives):

- Promote and encourage the establishment of new business and industry by providing adequate land for future employment requirements
- Foster the location of bulky goods showrooms in Mudgee without undermining the retail dominance of the Mudgee CBD
- Providing new employment land within Mudgee to cater for industrial and employment growth, as well as the smaller towns.

On this basis, the strategic direction outlined in the Strategy both envisages and allows for the delivery of additional employment land, including in the Sydney Road Precinct where the Subject Site is identified for future “Urban Purposes” (Page 42).

Mudgee-Gulgong Urban Settlement Strategy (2014)

The Urban Settlement Strategy was a response to emerging economic opportunities in the Mid-Western region of New South Wales which were creating population and housing growth pressures. As such, the Strategy is focussed on the residential market and, as such, proposes possible policy responses specific to housing and population pressures. As such, the Settlement Strategy does not replace the broader strategic directions identified in the Mid-Western Regional Comprehensive Land Use Strategy which relate to employment land and economic development objectives.

As such, although the Settlement Strategy identifies the potential for large lot rural residential activity on the Subject Site, as is consistent with the current zoning, the opportunity for the Subject Site to be used for "Urban Purposes" including employment land as foreshadowed in the endorsed Mid-Western Regional Comprehensive Land Use Strategy was not specifically tested.

Further, the potential overall contribution of the Subject Site to future housing supply identified in the Settlement Strategy is just 2 lots based on a 2 hectare minimum lot size, although an historic and as yet un-actioned approval for seniors living on land immediately south-east of the Subject Site is noted.

On this basis, the proposed rezoning of the Subject Site for employment uses retains strong strategic policy support, notwithstanding that the Settlement Strategy considers that areas in the RU4 Zone on the southern edge of urban Mudgee may have some future potential for rural living. This potential for rural living in this southern part of urban Mudgee is not compromised by the proposal.

2.2. Existing Constraints Associated with Bunnings Mudgee Site

The Bunnings Mudgee store was established in 2006 and since that time has traded strongly.

Observed levels of customer traffic are strong, with the carpark often at or near capacity, and the store experiencing high customer demand.

We understand from discussions with Bunnings that in recent years, strong sales growth has been experienced and the store is now effectively 'overtrading' or experiencing levels of customer demand above the ability of existing facility to deliver preferred standards of service.

In addition, the customer experience and how customers interact with Bunnings store has changed since 2006. Customers now seek more convenience by way of pickup and delivery facilities. In recent times the ability to purchase and order online for in-store pickup has been implemented, with so called 'click and collect' facilities now being incorporated into new store design.

Some of the other key constraints specific to the existing Bunnings Mudgee store are:

- **Poor vehicle entry and exit.** The current primary access point is a driveway off Burrundulla Road which is shared between customer traffic and delivery vehicles. During peak period, this driveway can become congested and lead to access issues when cars and large delivery vehicles are using the entrance simultaneously. In addition, freight delivery facilities are generally sub-optimal and access for freight overly complicated.
- **No drive thru trade for timber sales area**. The ability of timber and trade customers to use a convenient drive thru facility is not met by the current Bunnings Mudgee store. This capability has become a standard feature across most Bunnings stores, and allows for ease of access and product pick-up for customers, particular tradesmen, who are generally purchasing large and/or heavy items.
- **Limited storage**. The current layout and size of the Bunnings Mudgee store provides only limited storage areas. This reduces the available stock-on-hand for customers, as well as inhibiting the ability of Bunnings Mudgee to serve online and 'click and collect' customers.

- **No Capability to Expand to Meet Requirements**. Bunnings have previously tested numerous options for the re-configuration or expansion of the Bunnings Mudgee store at its existing location. Although some limited expansion may be possible, this would still result in a sub-optimal outcome for both Bunnings and customers. It has been recognised that the long-term future of Bunnings at the current site is limited by the ability to expand and future proof the store to meet emerging customer and operational needs.
- **Low ceiling heights**. The internal dimensions of the store include low ceiling heights, particularly at the rear of the store, which limit the storage and display of merchandise and compromise forklift access.
- **Other.** Numerous other operational and customer constraints exist in the store, including a lack of display areas for pre-fabricated bathroom and kitchen fittings and appliances, as well as limitations to product display and customer flow in the nursery area.

As a result of the above, despite its relative popularity with local consumers and business customers, Bunnings Mudgee delivers a poorer overall customer experience relative to larger and more modern Bunnings stores. This includes Bunnings outlets at Bathurst and Dubbo which are alternative locations to Bunnings Mudgee for many local customers.

2.3. Comparative Sites Assessment

In order to assess and help determine suitable sites within Mudgee for a new and expanded Bunnings store, a land use audit was conducted by Insite Planning Services in July 2019 with the details made available to inform this economic assessment report. Subsequently in October 2019 the audit was reviewed and tested by our own field visit, and subsequently we endorse the results of the Insite Planning Services audit.

The land use audit identified land in the mixed use, business development and industrial zones within Mudgee. The primary purpose is to determine if the existing planning framework can accommodate a modern format Bunnings.

A total of 177 individual lots were surveyed, with none deemed suitable for Bunnings.

A summary of the survey results has been extracted from the Insite Planning Services report (August 2019) and is highlighted below in Table 2.1.

Table 1.1 Comparison of Zoned Employment Land - Mudgee

Land Zoning	Total Lots	Total Area m^2	Undeveloped Lots
B4 Mixed use zone	11	14,200	0
B5 Business Development Zone	64	296,726	5
IN1 General Industrial zone	70	333,400	14
IN2 Light Industrial zone	32	95,450	2

Source: Insite Planning Services (August 2019)

No undeveloped and available sites were identified in the B4Z, while 5 of 64 parcels of land in the B5Z were identified as undeveloped and/or potentially available. Of these 5 sites in the B5Z, none were identified as suitable for Bunnings on the basis of factors including:

- Insufficient site size
- Inappropriate access arrangements
- Conflicts with adjacent or nearby land uses.

Although the overall vacancy rate for the B5Z land is relatively high (25.5%), this includes land that is effectively unsuitable for development for land uses supported by the zone due to access, exposure or other issues, and as such does not represent ‘effective supply’ of land to the market. We agree

with the conclusion of the Insite Planning Services audit that at least some of this vacant land in the B5Z is more appropriately in an industrial zone.

Overall, we are of the view that a thorough review of the existing planning framework in Mudgee indicates no available and appropriate site is available for the relocation and expansion of the existing Bunnings store. As such, it is appropriate to consider options for rezoning which are consistent with strategic policy objectives (most notably the Mid-Western Regional Comprehensive Land Use Strategy).

2.4. Strategic Review of Subject Site

Sydney Road

The Subject site is located on the southern edge of the Sydney Road Precinct, the primary general business area within Mudgee (see Map 2.1).

A range of businesses are located within the Sydney Road Precinct ranging from large format retail, showroom, light industry, urban services and other low impact general business activities (automotive, rural and trades related business are well represented). These businesses cater to both the households and business sectors within Mudgee and the surrounding region, as well as functioning as an important employment centre.

High levels of activity are present in the Sydney Road Precinct, with minimal vacant tenancies. Just two vacant tenancies were observed with frontage to Sydney Road during a field visit in October 2019. The businesses in the precinct include a mix of national brand tenants, as well as independent local operators

Where vacancies do exist in the precinct, they have historically been associated with either buildings no longer meeting contemporary requirements, or special purpose buildings suited to a specific use which are more difficult to lease

Discussions with local agents indicate that overall tenant demand in the Sydney Road Precinct is strong, with this reflected in relatively strong rental levels. All agents contacted agreed that the precinct has the ability to accommodate additional businesses, subject to appropriate land and building stock being available.

At present, the Sydney Road Precinct is the only feasible location in Mudgee for businesses seeking relatively large sites with main road exposure.

Subject Site

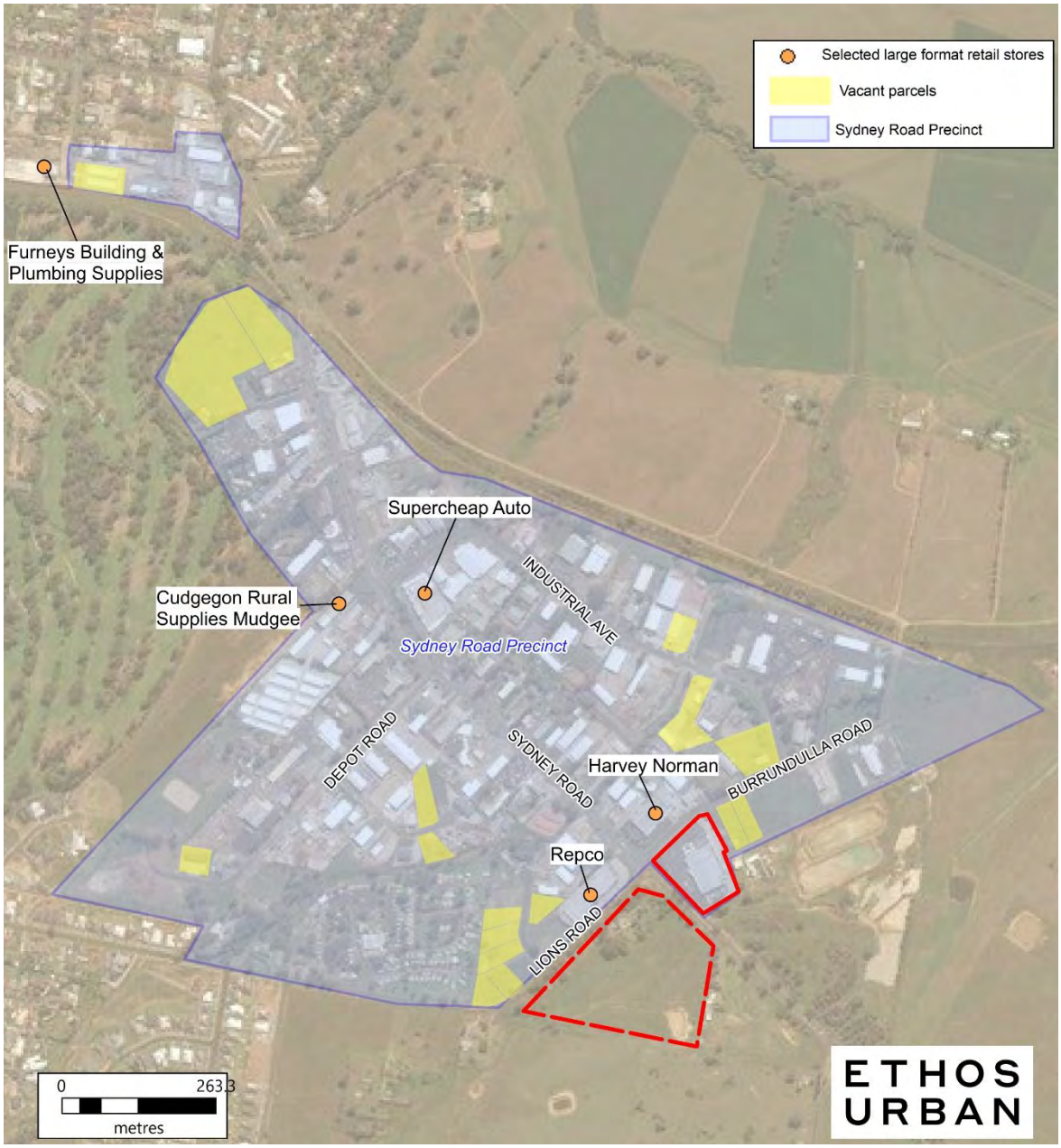
The Subject Site represents a sensible and natural extension to the Sydney Road Precinct. This is in view of the specific need for Bunnings to relocate to a more appropriate site, as well as the strategic policy need to ensure that sufficient employment land remains available to accommodate business and employment growth. Further, the Subject Site is the only corner of Burundulla Road/Lions Drive and the Castlereagh Highway which is not part of the Sydney Road Precinct.

Given the requirement of most uses in the B5Z for access and exposure from passing traffic, the Subject Site effectively represents the only feasible extension of the Sydney Road Precinct to accommodate uses such as the proposed new and expanded Bunnings Mudgee. This is with reference to the treatment works located on the north-east side of Castlereagh Highway which limits the expansion of the Sydney Road Precinct on the northern side of the highway.

Although the Subject Site is at a gateway location to Mudgee, the proposed Bunnings will be appropriately landscaped and provide an appropriate entry point to the town. Bunnings operate stores at gateway locations to many regional towns and apply appropriate design and visual amenity responses.

Overall, the Subject Site is appropriate for the proposed Bunnings store, and with the potential to accommodate future expansion of the Sydney Road Precinct.

Figure 1 Overview of Sydney Road Business Precinct



Source: MapInfo with BingMaps

3. Trade Area Analysis

This Chapter identifies the trade area for Bunnings Mudgee and analyses population trends and forecasts, housing development trends, and the socio-economic characteristics of the trade area population. The per capita retail spending of trade area residents and total available spending is also determined.

3.1. Trade Area Definition

A trade area describes the geographic area that is served by an existing or proposed store or retail centre. Trade areas tailored to specific local circumstances and the trading patterns of the relevant retail outlet are a widely-adopted technique favoured by retail analysts.

In this instance, a trade area for Bunnings Mudgee is defined by taking into account:

- The road network and the accessibility of the site from the surrounding region.
- The location of other hardware stores and relevant trade supplies outlets.
- Physical features (rivers, mountains, coastline etc) that may create a barrier to movement
- The offer of Bunnings as a well-known and successful national-brand retailer.

An important consideration in defining a trade area for Bunnings is the large product range, competitive pricing, popularity with consumers and active marketing which generates strong drawing power from a relatively broad geographic area.

Given the regional service role of Mudgee, it is also considered that the trade area for Bunnings Mudgee is broadly the same as is served by other businesses in the Sydney Road Precinct.

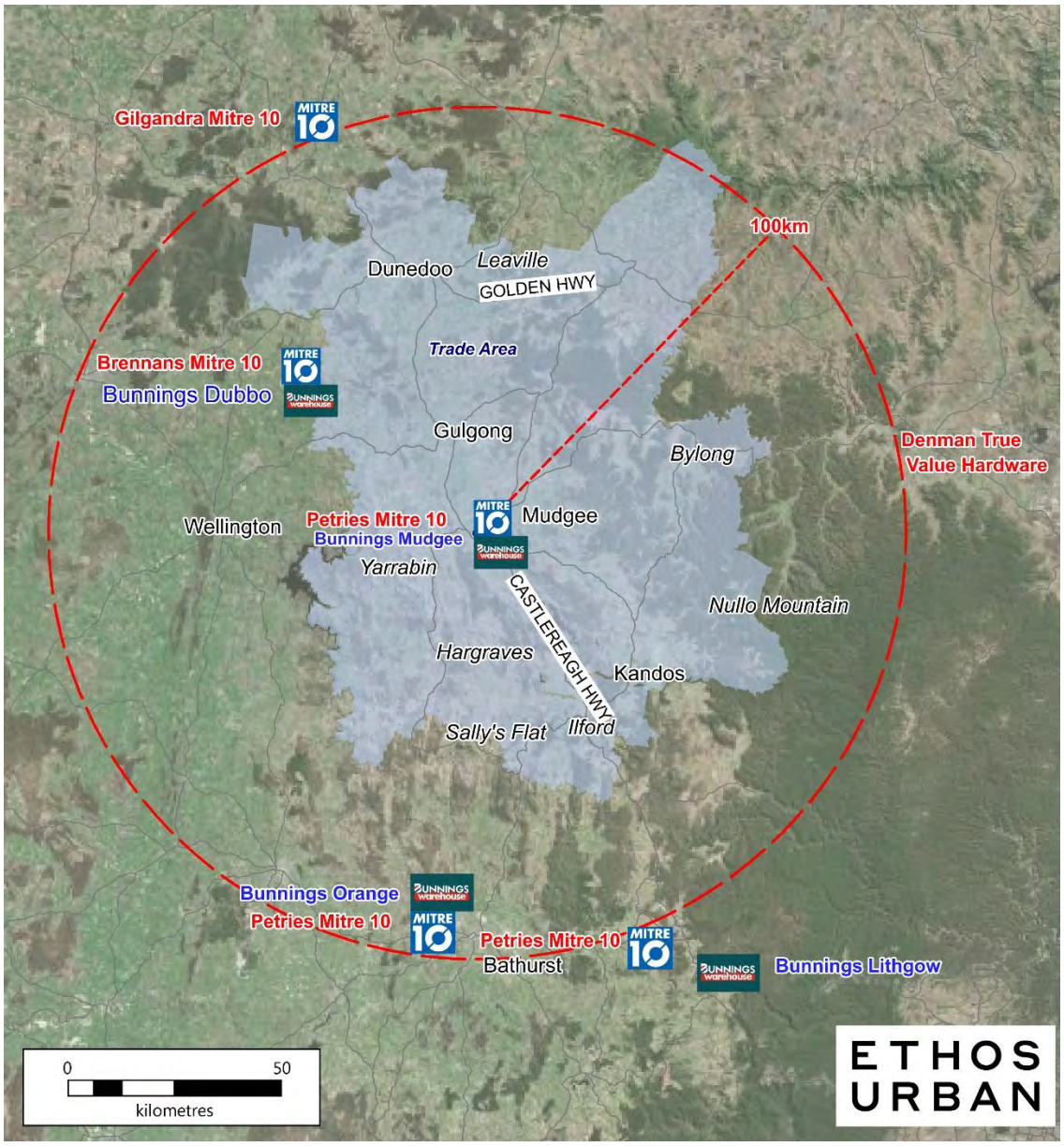
Taking the above into account, the trade area has been defined as illustrated in Map 3.1. The trade area boundaries are determined by SA1 definitions as defined by the ABS.

The trade area is elongated in a north-south direction and extends as far as Dunedoo in the north and Ilford in the south, Yarrabin and Hargraves to the west, Leadville to the north and Bylong and Nullo Mountain to the east.

The trade area is specifically defined taking into account:

- The presence of other major regional centres including Dubbo, Orange and Bathurst
- Regional transport networks, noting the north-south alignment of the Castlereagh Highway
- The presence of hills and mountains to the east and west (Mudgee sits in the Cudgegong River Valley)
- General expectations of the regional service role served by Mudgee to nearby towns and rural areas.

Map 3.1 Mudgee Trade Area



Source: MapInfo with Bing Maps
Produced by: Ethos Urban

3.2. Population Trends and Forecasts

In 2018, the population of the trade area was estimated at 26,840 residents (ERP, 2019). This represents total growth of +1,960 persons on the trade area population in 2011 or a growth rate of 280 persons per annum over the period. As such, in recent times the population of the trade area has been increasing by 1.1% per annum which is relatively strong in the context of regional New South Wales, and in particular for areas west of the Great Dividing Range.

Recent population growth in the trade area in turn reflects reflecting increased demand for a range of retail, hardware and home improvement uses. This includes both Bunnings and other businesses able to accommodate land in the B5Z.

Population projections for the trade area have been derived taking into account historical trends and official State Government projections.

According to these projections shown in Table 3.1, the population of the trade area is expected to be growing for at least the next 20 years. In 2036, a total population of 30,190 persons is forecast for the trade area, or an increase of +3,350 persons on the current level.

Table 3.1 Mudgee Trade Area Population, 2011 to 2036

	2011	2018	2022	2028	2033	2036
Population (No.)	24,880	26,840	27,670	28,800	29,680	30,190
Average Annual Growth (%)		+0.9%	+0.8%	+0.7%	+0.6%	+0.6%
Average Annual Growth (No.)		+240	+210	+190	+180	+170

Source: ABS, Estimated Residential Population; NSW Government, NSW Population Projections, 2016; Ethos Urban

3.3. Socio-Economic Characteristics

The socio-economic features of the trade area population from the 2016 ABS Census of Population and Housing are summarised in Table 3.2 and compared with the regional NSW average.

The main points relevant to the proposed Bunnings Mudgee include:

- **Income**. The median household income of the trade area is slightly below (-4.9%) the median household income of Regional NSW.
- **Country of Birth**. The trade area is characterised by a high share of the population (93.2%) which is Australian-born relative to the Regional NSW benchmark.
- **Age**. In 2016, the median age of the trade area was 41.9 years which was comparable to the median age of 42.0 in Regional NSW. This relatively high median age was driven in part due to the high share of residents aged 35 and over. However, the trade area had slightly greater share of residents aged 0 to 4 years, suggesting the trade area is an attractive place for younger families.
- **Dwelling structure**. In 2016, the trade area the significant majority of dwellings (92.9%) were separate houses, which is well above the share in Regional NSW (82.9%). This housing format is typical of regional areas and is associated with higher levels of spending on hardware and DIY building products such as those sold at Bunnings.
- **Tenure type.** Higher levels of dwellings owned outright indicate a higher relative level of disposable income and greater spending on ‘discretionary’ items, including hardware and home improvements.

Overall, the socio-economic characteristics of trade area residents suggest that spending on hardware, home improvement and homemaker retail items likely to be relatively similar to the average.

Importantly, a higher than average share of the population aged under 5 -years strongly suggests that the population forecasts for the trade area identified in Table 3.1 are highly achievable and may prove conservative if the natural rate of population growth in the region accelerates.

Table 3.2 Socio-Economic Characteristics by Trade Area, 2016

Category	Trade Area	Regional NSW
Income		
Median individual income (annual)	$28,070	**$30,420**
Variation from Regional NSW median	-7.7%	**na**
% of persons (15 years or older) earning $1,000pw or more	26.6%	**27.3%**
Median household income (annual)	$58,190	**$61,200**
Variation from Rest of NSW median	-4.9%	**na**
% of Households earning $2,500pw or more	16.0%	**16.2%**
Median Age (years)	41.9	**42.0**
Country of Birth		
Australia	93.2%	**89.3%**
Other Major English Speaking Countries	4.4%	**5.5%**
Other Overseas Born	2.5%	**5.2%**
% speak English only at home	*97.2%*	***93.8%***
Dwelling Structure (Occupied Private Dwellings)		
Separate house	92.9%	**82.9%**
Semi-detached, row or terrace house, townhouse etc.	3.5%	**9.2%**
Flat, unit or apartment	2.5%	**6.4%**
Other dwelling	1.2%	**1.4%**
Occupancy rate	*83.5%*	***86.8%***
Average household size	2.4	**2.4**
Tenure Type (Occupied Private Dwellings)		
Owned outright	39.9%	**38.7%**
Owned with a mortgage	30.7%	**31.6%**
Rented	28.7%	**28.9%**
Other tenure type	0.6%	**0.8%**
Housing Costs		
Median monthly mortgage repayment	$1,660	**$1,600**
Variation from Rest of NSW median	3.8%	**0.0%**
Median mortgage as a share of median household income	34.2%	**31.4%**
Median weekly rents	$260	**$280**
Variation from Rest of NSW median	-7.1%	**0.0%**

Source: ABS, Census of Population and Housing, 2016

3.4. Retail Spending

The MarketInfo micro-simulation model of household spending propensity uses data from a number of sources including the ABS Census of Population and Housing, the Household Expenditure Survey and the Australian National Accounts. Output from MarketInfo can be used to derive small area estimates of propensity to spend by detailed commodity groups.

Per capita spending estimates by trade area residents are shown in Table 3.3 for the following categories:

- **Bunnings Type Merchandise**: includes the individual retail commodity items normally stocked at a typical Bunnings store, focussing on hardware although including some gardening, electrical, furniture and ancillary items. This range of products is similar to that sold at other hardware retailers in Australia (notwithstanding individual differences by operator and store).
- **Homemaker Merchandise**: the spending on the full range of homewares and bulky merchandise typically sold at bulky goods and homemaker type retailers (including Bunnings but also including other major retailers such as Harvey Norman, Snooze, Anaconda etc). These are all retailers which can operate in the B5Z and the Sydney Road Precinct.
- **Total Retail**: includes all food and non-food retail spending categories.

All figures are expressed in constant 2018 dollars (i.e. excluding the effects of inflation) and include GST.

Note that Bunnings Type Merchandise covers product lines that account for approximately 80% of the goods sold by large-format hardware retailers. Specific omissions from this market definition include:

- Nursery items and garden supplies, for example plants, seeds, and bulk fertilizers
- Timber retail and trade supplies, for example building materials, mouldings, structural and non-structural timbers.

These product lines are not generally included within definitions of hardware retail adopted by the ABS and retail analysts, as they are generally considered wholesale items or construction inputs.

Across the trade area, per capita spending on Bunnings Type Merchandise is estimated to be $1,850 in 2018, which is above the regional NSW benchmark by +1.8%. This suggests a slightly higher propensity for local residents to spend on hardware and home improvement merchandise of the type sold at Bunnings.

Per capita spending for trade area residents is shown in Table 3.3.

Table 3.3 Per Capita Spending by Trade Area Residents, 2018 ($2018)

Trade Area	Bunnings Type Merchandise	Homemaker Merchandise	Total Retail
Per Capita Spending ($2019)			
Trade Area	$1,850	$2,560	$14,270
Regional NSW	$1,820	$2,560	$14,200
Variation from Regional NSW average			
Trade Area	*+1.8%*	*+0.1%*	*+0.5%*

Source: MarketInfo; Ethos Urban

Combining current and future population projections from Table 3.1, with per capita category spending estimates from Table 3.3, reveals the total available trade area spending on Bunnings Type Merchandise as shown in Table 3.4.

Note that figures in Table 3.4 exclude the effects of price inflation and are expressed in constant $2018 terms. An allowance has also been made for real growth in spending per capita based on long-term ABS Australian National Accounts historical data.

In 2018, total Bunnings Type Merchandise spending in the trade area is estimated to be $49.0m. By 2036, total spending by trade area residents on Bunnings Type Merchandise is projected to increase to $70.5m or total annual growth of +$1.2m in real terms.

Table 3.4 Total Spending by Trade Area Residents, 2018 to 2033 ($2018)

Retail Category	2018	2022	2028	2033	2036
Trade Area					
Bunnings Type Merchandise	$49.0m	$53.4m	$60.3m	$66.5m	$70.5m
Homemaker Merchandise	$67.8m	$74.2m	$84.5m	$93.8m	$99.7m
Total Retail	**$379.7m**	**$405.2m**	**$444.7m**	**$479.6m**	**$501.5m**

Source: MarketInfo; Ethos Urban

In addition to Bunnings Type Merchandise, the spending analysis identifies significant growth in overall homemaker merchandise spending. This includes product categories sold by many businesses able to be accommodated in the B5Z.

Significant spending growth in the trade area highlights the position of Mudgee as a key service centre to the surrounding region, with the ability of the proposed new Bunnings Mudgee and other businesses able to be accommodated in the B5Z to generate local investment and employment.

Overall, continued growth in spending by trade area residents on hardware and home improvement products is expected over coming years. Given current land constraints in Mudgee, this demand can only be effectively delivered through provision of additional employment land. This includes through rezoning of the Subject Site.

3.5. Escape Spending

At present, the total provision of hardware floorspace in the trade area is estimated at approximately 7,000m^2. This excludes dedicated garden, trade and timber supplies areas, whilst rural supplies are also excluded.

Of total Bunnings Type Merchandise spending by trade area residents of $49.0 million, an estimated $34.3 million or 70% would usually be expected to be directed to hardware and home improvement retailers. The balance of this spending is directed to a range of traditional retailers (such as discount department stores) and trade supplies outlets.

Applying a sales productivity benchmark of $3,750/m^{2,} which is relatively strong and reflects observed trading levels, to the 7,000m^2 of hardware floorspace in the trade area suggests that total hardware sales are in the order of $26.3 million. Given that a share of sales at stores such as Dunedoo Thrifty Link will be to residents living outside the trade area, an estimated $22.3 million or 85% of total hardware sales are estimated to be from trade area residents.

Given that $34.3 million of spending by trade area residents is directed to hardware stores, yet just $22.3 million of this is directed to hardware stores in the trade area, this indicates that at the present time $12.0 million ($34.3 million less $22.3 million) of hardware spending is ‘escaping’ the region to other hardware retailers, including Bunnings stores in locations such as Dubbo and Bathurst. This represents 35% of total spending by trade area residents at hardware retailers.

The analysis is summarised in Table 3.5.

Table 3.5 Escape Spending of Bunnings Type Merchandise, 2018 ($2018)

Item	Measure
Bunnings Type Merchandise Spending	$49.0m
Share to Hardware Stores (@70%)	$34.3m
Current Trade Area Hardware Floorspace	7,000m^2
Trading Level	$3,750/m^2
Total Trade Area Hardware Store Sales	$26.3m
Hardware Store Sales to TA Residents (@85%)	$22.3m
Escape Spending of Hardware Store Sales from Trade Area	**$12.0m**
Share of Escape Spending of Hardware Store Sales from Trade Area	**35%**

Source: Ethos Urban

In effect, of every dollar of hardware spending generated by trade area residents, 35 cents is leaving the region. This is at an economic cost in terms of local employment and service delivery.

4. Economic Need and Impact

This Chapter assesses the economic need and demand for an expansion to Bunnings Mudgee, including consideration of other B5Z uses in the Sydney Road Precinct.

4.1. Projected Bunnings Mudgee Sales

The proposed Bunnings Mudgee store is forecast to achieve total turnover of approximately $22.9m in its first year of trading. This represents an average trading level of approximately $2,970/m^2, as shown in Table 4.1. For the purposes of this analysis, the first full year of trading is assumed to be 2022.

Forecast turnover is based on expected trading levels in each component of the store, and reflects factors such as the size of the surrounding market (population and spending), the location of competing stores, the site's access and exposure, store floorspace, and other relevant issues likely to influence trading levels.

Table 4.1 Bunnings Mudgee Projected Turnover, 2022 ($2018)

Component	Approximate Floorspace	Trading Level	Total Turnover
Main warehouse	3,960m^2	$4,350/m^2	$17.2m
Outdoor nursery and landscaping	1,620m^2	$1,600/m^2	$2.6m
Timber and trade sales	2,140m^2	$1,450/m^2	$3.1m
Total Bunnings	**7,720m^2**	**$2,970/m^2**	**$22.9m**

Source: Ethos Urban

Trading levels at Bunnings Mudgee are expected to increase over time in line with growth associated with expenditure on hardware and homemaker merchandise, and the growth of the business sector in the region.

The proposed new Bunnings store is expected to generate sales approximately 25% higher than would otherwise be achieved by the existing Bunnings Mudgee store.

Total employment generated by the expanded Bunnings will be approximately 70 jobs, or 20 additional jobs relative to current employment at Bunnings Mudgee.

4.2. Projected Sales

During the first year of trading, the new an expanded Bunnings Mudgee store is forecast to capture approximately 29% of the retail market for Bunnings Type Merchandise in the trade area.

This analysis, which is shown in Table 5.2, is based on the following considerations:

- Total turnover of $22.1m, with an estimated 75% (or $17.2m) of sales to retail or household customers. The remaining $5.8m of sales will be derived from trade or business customers (including contractors and others in the construction industry) and non-retail merchandise (timber, trees and shrubs, plasterboard, building supplies etc.).
- An estimated $17.2m of retail sales generated at the store, of which approximately $15.6m (or 90%) would be derived from spending by trade area residents. The remaining $1.6m of turnover would be derived from people living beyond the trade area.
- Total expenditure by trade area residents on Bunnings Type Merchandise in 2022 is forecast to be $53.4m, as also shown in Table 4.2.

- The turnover at Bunnings Mudgee attributable to retail customers in the trade area ($17.2m) represents a 29% market share of total available spending by trade area residents on Bunnings Type Merchandise.

Table 4.2 Bunnings Mudgee Market Share Analysis, 2022 ($2018)

Component	Turnover	Turnover Distribution	Bunnings Type Merchandise Spending	Retail Market Share
Trade Area	**$15.6m**	**68%**	**$53.4m**	**29%**
Beyond Trade Area	$1.6	7%		
Total Retail Sales	**$17.2m**	**75%**		
Non-Retail Sales	$5.8m	25%		
Total Bunnings Mudgee	**$22.9m**	**100%**		

Source: Ethos Urban

At present, Bunnings Mudgee is generating a market share of approximately 23% of spending on Bunnings Type Merchandise by trade area residents. As such, the expanded Bunnings Mudgee will attract an additional 6% of total spending on Bunnings Type Merchandise by trade area residents. This additional market share will primarily comprise of spending currently leaving the trade area to locations such as Dubbo and Bathurst.

4.3. Trading Impacts Assessment

Any competitive trading impacts arising from the proposed new and expanded Bunnings Mudgee store will be due to the potential for the spending of consumers to be diverted from alternative shopping destinations.

It is not the role of planning policy to facilitate outcomes that ensure existing retailers retain current sales levels (particularly where these current sales are above relevant industry benchmarks) at the expense of new development that responds to community choice and need.

The expected broad regional impact of the new and expanded Bunnings Mudgee store is shown in Table 4.3. Note that this impact is limited only to the additional sales which will be generated by Bunnings Mudgee relative to those sales which would otherwise be generated by the existing Bunnings Mudgee store.

Table 4.3: General Impacts of Bunnings Mudgee, 2018 to 2033 ($2018)

	2018	2022	2028	2033
Bunnings Turnover from Trade Area	$11.4m	$15.6m	$17.6m	$19.4m
Trade Area Bunnings Type Merchandise Spending	$49.0m	$53.4m	$60.3m	$66.5m
Trade Area Turnover to Other Stores	$37.6m	$37.8m	$42.7m	$47.1m
Change in Turnover to Other Stores Relative to 2018 ($m)		**+$0.2m**	**+$5.0m**	**+$9.5m**

Source: Ethos Urban
Note: In constant 2018 dollars and including GST
Assumes constant market share for 2022 and beyond

Trade Area residents will generate approximately $49.0m of Bunnings Type Merchandise retail spending in 2018, of which $37.6 million is directed to stores other than Bunnings Mudgee including a range of existing retailers and retail centres.

Over the period to 2022, spending by trade area residents is forecast to increase to $53.4m and the new and expanded Bunnings Mudgee is forecast to attract $15.6m of trade area retail spending (refer Table 4.2). As a result, the spending by trade area residents on Bunnings Type Merchandise that is available to all other retailers will be $37.8m in 2022 ($53.4m less $15.6m – figures subject to rounding).

Therefore, the total spending by trade area residents on Bunnings Type Merchandise being directed to all other traders will actually marginally increase by $0.2m in 2022 relative to existing levels.

What is clear is that the additional retail sales generated by the expanded Bunnings Mudgee is insufficient to exceed expected overall spending growth in the market generated by population growth and increased real spending on Bunnings Type Merchandise. As such, any trading impacts associated with the new Bunnings Mudgee will be within the normal bounds of a dynamic and competitive retail environment, and allow for overall growth in sales by other traders over time.

Beyond 2022, continuing growth in spending by trade area residents and through additional trade sales means that other retailers will be generating sales from trade area residents +$9.5 million above current levels.

4.4. Consideration of Demand for Other B5Z Uses

In addition to the proposed relocation and expansion of Bunnings Mudgee, it is appropriate to consider:

- The potential for other uses consistent with the B5Z to locate in a re-purposed former Bunnings Mudgee building
- The future potential for take up of surplus land on the new Bunnings Mudgee site for other complementary land uses consistent with the B5Z.

Existing Bunnings Mudgee Site

The existing Bunnings Mudgee location and store is well-suited to re-configuration for an alternative land use. Experience across Australia demonstrates the ability to repurpose hardware stores (in particular those in a warehouse format) for other alternative land uses including, although not limited to:

- Showrooms
- Large-format retail stores
- Gyms and other sports/leisure uses
- Trade supplies
- Warehousing and logistics.

This adaptability reflects the fact that a hardware warehouse store is serviced (power, water etc), has supporting operational and customer infrastructure; and is constructed in a manner which is easily and cost effectively re-purposed for another use.

At the current time it is impossible to identify a specific tenant mix for the existing Bunnings Mudgee site given the diversity of uses and tenant types which are potential occupants. However, overall market conditions supporting a successful re-leasing program for the existing Bunnings Mudgee building appear strong. This includes:

- Recent population growth and expectations of ongoing growth in Mudgee and the surrounding region for the foreseeable future

- A current lack of sites in Mudgee available for showroom, large-format retail and other large uses requiring high levels of main road exposure
- Attractive rental levels being achieved by existing landlords
- Observed strong levels of tenant demand by local commercial agents
- The potential to co-locate with a range of national brand tenants, including the proposed new expanded Bunnings Mudgee
- Relatively low vacancy rates in both the Mudgee CBD and Sydney Road Precinct.

On this basis, it is reasonable to expect that the relocation of Bunnings Mudgee away from its existing site is likely to result in a successful repurposing of the building for another use consistent with the operation of the B5Z.

The commercial incentive for this outcome is reinforced by the fact that Bunnings will retain a leasehold over the site and building during the initial trading period for the new and expanded Bunnings Mudgee store. As such, the financial incentive is with Bunnings to find new tenants for the former store.

Once fully occupied, tenants in the former Bunnings Mudgee are expected to employ approximately 50 people.

Complementary Uses on Subject Site

Over time, opportunities will arise for the development of complementary uses on the available pad sites at the Subject Site.

As previously identified in Chapter 1, three pad sites are available for future development. This includes land with frontage to Sydney Road suitable for showroom, large format retail or another use requiring main road exposure. Other surplus land is available to the west of the proposed Bunnings and fronting Lions Drive which is more likely going to be used by trade supplies, light industry and rural supplies.

Importantly, the Subject Site provides scope for expansion of employment uses in the Sydney Road Precinct, as supported by strategic policy, at a scale which is proportionate to overall market growth in the Mudgee region.

On an indicative basis, and subject to the final scale and nature of development at each pad site, an additional 80 jobs could be generated by complementary development at the Subject Site.

4.5. Costs of Continued Shortage of Appropriate Business 5 Zoned Land

Without an expansion to the B5Z as proposed for the Subject Site, the potential for growth in Mudgee for large format retail, showroom, light industry, urban services and other low impact general business activities suited to the zone will be constrained. This is reflected in the currently very low vacancy levels, as well as the expectations for future demand growth associated with population growth and retained spending arising from an improved Bunnings store.

In effect, the implications for Mudgee of not proceeding with the rezoning of the Subject Site will include:

- No improvement to the range and quality of hardware and home improvement retailing to residents and businesses in Mudgee

- A shortage of suitable locations within the B5Z areas of the Sydney Road precinct to accommodate businesses seeking main road exposure
- Reduced opportunities for existing businesses in the town to expand and enhance their own capability through relocation to larger sites
- Continued high levels of escape spending in hardware and home improvement spending, also leading to spending leakage in other complementary spending categories
- Reduced employment growth associated with more limited business opportunity.

4.6. Other Benefits of Proposed Rezoning of Subject Site

In addition to contributing to investment and supporting job creation, the proposed Bunnings Mudgee expansion and rezoning of the Subject Site to the B5Z would be expected to generate the following benefits:

- Improved access to an affordable, larger scale, hardware and homemaker retailer for residents in the trade area.
- Improved access for local residents and trade customers to a wide range of well-priced hardware and homeware goods.
- New jobs for the local labour force.
- Introduction enhanced building/hardware supplies at a location convenient for business and trade customers within the region.
- Improved access for trade and business customers to hardware and trade supplies
- Enhancing the regional service role of Mudgee in a manner consistent with the economic development objectives of Council
- A demonstrated major investment in Mudgee by a high profile ASX listed entity (Wesfarmers Group)
- Additional employment land able to accommodate economic development supporting population growth and prosperity in Mudgee and the wider region.

Once full occupancy of the repurposed existing Bunnings Mudgee building, and development of the pad sites is achieved, a total of 200 jobs will be accommodated. This is 150 additional jobs relative to the current Business As Usual outcome, and highlights the potential economic opportunity to Mudgee associated with increasing the supply of land in the Business 5 Zone as proposed for the Subject Site.

Table 4.4 Comparison of Potential Employment Outcomes

	Business As Usual	Subject Site Rezoned to B5Z
Bunnings Mudgee Employment	50 jobs	70 jobs
Other Employment at Existing Bunnings Site (Indicative)	-	50 jobs
Employment on Subject Site Pad Sites (Indicative)	-	80 jobs
Total Employment	**50 jobs**	**200 jobs**

Source: Ethos Urban

Appendix 9 – Visual Impact Assessment

INSITE
TOWN PLANNING
MASTER PLANNING
APPROVALS MANAGEMENT

VISUAL IMPACT ASSESSMENT

PLANNING PROPOSAL

Lot 2 DP1079362, 134 Lions Drive,

Burrundulla

April 2020

Ref: 19034

VISUAL IMPACT ASSESSMENT
Planning Proposal

Lot 2 DP1079362, 134 Lions Drive, Burrundulla

Insite Planning Services Pty Ltd (ACN 109 684 648)

Address:
PO Box 93, Cessnock NSW 2325

Contact:
(ph.) 4998 7496
email: stephen@insiteplan.com.au

QUALITY ASSURANCE
This document has been prepared, checked and released in accordance with the Quality Control Standards established by Insite Planning Services Pty Ltd.

Issue	Date	Description	By
1	21/04/2020	Draft	SL
2	23/04/2020	DTP	BL
3	24/04/2020	Review Draft	SL
4	05/05/2020	Client Review	PD
5	28/04/2020	Edit & QA	SL

Copyright © Insite Planning Services

This document has been authorised by _____

Date 5 May 2020

Disclaimer

This report has been prepared based on the information supplied by the client and investigation undertaken by Insite Planning Services Pty Ltd & other consultants. Recommendations are based on Insite Planning Services Pty Ltd professional judgement only and whilst every effort has been taken to provide accurate advice, Council and any other regulatory authorities may not concur with the recommendations expressed within this report. This document and the information are solely for the use of the authorised recipient and this document may not be used, copied or reproduced in whole or part for any purpose other than that for which it was supplied by Insite Planning Services Pty Ltd. Insite Planning Services Pty Ltd makes no representation, undertakes no duty and accepts no responsibility to any third party who may use or rely upon this document or the information.

Confidentiality Statement
All information, concepts, ideas, strategies, commercial date and all other information whatsoever contained within this document as well as any and all ideas and concepts described during the presentation are provided on a commercial in confidence basis and remain the intellectual property and Copyright of Insite Planning Services Pty Ltd and affiliated entities.
This document has been registered with our solicitors along with a copy of all previous materials.

TABLE OF CONTENTS

1 Introduction 1
1.1 Objectives 1
1.2 Documents Consulted 2
1.3 Methodology 2
2 Visual Character, Exposure and Resources Analysis 5
2.1 Visual Character of the site 5
2.2 Visual Character of the Surrounding Area 6
2.3 Scenic Quality 9
2.3.1 Photos of the Subject site 9
2.4 Visual Exposure of the Subject Site 10
2.4.1 Photos of Subject Site Visual Exposure 11
2.5 Visual Opportunities and Constraints 14
3 Proposal Details 16
3.1 Potential Development Outcome 17
4 Strategic Planning Context 18
4.1 Mid-Western Regional Comprehensive Land Use Strategy 18
5 Visual Effects Analysis 21
5.1 Potential visual exposure of the proposed development 21
5.2 Viewing sequence 21
5.2.1 Fixed viewing positions 21
5.2.2 Sequence of views and cameo views 22
5.3 Potential change in the intrinsic character of the subject site and the surroundings 23
5.4 Potential effect on intrinsic scenic quality 23
5.5 Visual sensitivity 23
5.5.1 View place sensitivity 24
5.5.2 Viewer Sensitivity 25
5.6 Residential amenity effects 25
5.7 Overall potential visual effects 25
6 Visual Impacts Assessment 26
6.1 Physical Absorption Capacity 26
6.2 Compatibility with the character of the Site 27
6.3 Compatibility with the character of the surrounding Context 27

6.4 Overall visual impacts 28
7 Significance of visual impacts 29
7.1 6.1 Summary of strategies to mitigate residual visual impacts 29
7.2 Summary and significance of residual visual impacts 29
8 Conclusion 31

FIGURES

Figure 1: Subject Site and Adjoining Landuses 1
Figure 2: Visual Impact Assessment Methodology Flowchart 4
Figure 3: Visual Catchment 6
Figure 4: Visual Character of Surrounding Land 7
Figure 5: Future Character of Surrounding Land 8
Figure 6: Photograph locations and Directions 11
Figure 7: Photographic Locations and Directions - Subject Site 12
Figure 8: Recommendation for Supplementary Roadside Plantings 15
Figure 9: Existing Zones 16
Figure 10: Proposed Zonings 17
Figure 11: Mid-Western Regional Comprehensive Landuse Plan - Figure 3.1 19

1 Introduction

Mid-Western Regional Council have requested that a Visual Impact Assessment (VIA) be prepared for consideration as part of an assessment of a Planning Proposal which seeks to rezone Lot 2 DP1079362, 134 Lions Drive, Burrundulla (the subject land) from **RU4 Primary Production Small Lots** to **B5 Business Development.**

This assessment is based on a site inspections carried out on the 19th June 2019 and 30th March 2020 using key viewpoints and locations with potential views towards the site. The report details the results of the field work, documents the assessment of the landscape character and visual setting, and potential visual impacts.

This assessment aims to identify the landscape character, and dominant features of the relevant visual catchments that the site lies within. The purpose of this report is to provide a qualitative and quantitative assessment of the visibility and potential visual impacts of the proposal.

Figure 1: Subject Site and Adjoining Landuses

1.1 Objectives

The objectives of this report are as follows:

- To identify and describe the existing visual/landscape environment and to evaluate its current qualities.
- To determine the likely impacts development will have on the visual/landscape quality of the area.

1.2 Documents Consulted

In undertaking this assessment, the following documents have been referenced:

- Planning Proposal prepared by Insite Planning Services for 134 Lions Drive, Burrundulla.
- Mid-Western Regional Comprehensive Land Use Strategy
- Environmental Due Diligence report.
- SixViewer website – aerial photo's and cadastral imagery

1.3 Methodology

Insite Planning Services uses the visual impact assessment methodology developed by renowned landscape assessment expert Dr Richard Lamb.

Dr Lamb's methodology addresses important aspects related to visual impact assessment as required by the relevant planning framework, namely "what is the nature and extent of the activity that causes visual effects on the environment and what is its importance (ie. the impact) of the effects." He describes his assessment methodology as follows:

"The assessment of visual impacts is a field that requires a degree of subjective judgement and cannot be made fully objective. It is therefore necessary to limit the subjectivity of the work by adopting a systematic, explicit and comprehensive approach. This has the aim of separating aspects that can be more objective, for example the physical setting, visual character, visibility and visual qualities of a proposal, from more subjective aspects, such as attractiveness and compatibility of the proposal with the setting.

The basic methodology used is partly related to the methods developed in the USA described as the Visual Management System (VMS) and still current in landscape assessment practice in the USA (USDA Forest Service, 1995; Visual Resource Management Manual USDA (1991)) and in Australia (eg. Scenic Spectrums Pty Ltd (Victoria), Visual Evaluation Model). Dr Lamb has modified these methods based on his own knowledge and experience of empirical research concerning environmental perception and cognition, incorporating visual impact assessment."

A flow chart which describes the components of the method used in this assessment and the logic of connection between them can be seen at **Figure 1**.

The first part is the view analysis which describes the existing and desired future character of the site and the surrounding context, its scenic quality and identifies the existing and potential visual resources of the development site. It then describes the features of the proposed development and how it responds to the identified visual resources of the development site.

The second part of the method consists of an objective analysis of the visual effects of the proposal. The analytical section of the report is intended to identify and document the objective visual effects which will occur as a result of the construction of the likely future development that will result from the rezoning, and also the relative size or magnitude of those effects (what effects and how much). It starts with an analysis of the area in which the proposal would be visible (its visual catchment) and

the factors which condition its visibility. An analysis is then made of the extent of visual change that would occur in the catchment as a result of the construction of the development.

Change is considered in relation firstly to the existing, emerging and desired future character of the site itself and secondly to the existing, emerging and desired future character of the surrounding context. Finally, an analysis of the factors which either increase or decrease a viewer's sensitivity to the potential change to the site and locality is made. Specific visual effects are also considered to include potential view loss effects, interruption of predominant view lines including those to and from heritage items and in general terms the likely effects on visual privacy and visual amenity of the existing and future residents.

The third main component of the method comprises the visual impact assessment. It considers the appropriateness and impacts on scenic quality, landscape character and on specific views and items of significance by assessing factors such as the physical absorption capacity and the compatibility of the proposal with the existing and desired future character of the development site and the surroundings. The impact assessment also includes consideration of the strategies incorporated into the proposal to mitigate potential visual impacts and an assessment of the significance of visual impacts and whether there are significant residual visual impacts.

A six point qualitative scale is used throughout the assessment with regard to explaining the relative visual effects or potential impacts of the proposal. The scale values range from negligible, through low, low-moderate, moderate, moderate-high to high, ie, moderate is the mid-range value where there is a measurable effect. The ratings in the visual impact factors (ie, the Physical Absorption Capacity and Compatibility) work in the reverse order compared to visual effects rating. For example, a High level of Physical Absorption Capacity means Low level of visual impact.

A six point scale is used throughout the report with regard to explaining the relative visual effects or potential impacts of the proposal. The scale values and the qualities which are equivalent to each are described by way of an example showing ratings of the extent of the visual effects parameters in Table 1 below."

Extent of effect	*Qualities*
Negligible	The proposal has no visual effect on the landscape
Low	The proposal is evident but is subordinate to other elements in the scene by virtue of its small scale, screening by intervening elements, or difficulty of being identified
Low-Moderate	The proposal is evident and identifiable in the scene, but is less prominent, makes a smaller contribution to the overall scene, or does not contrast substantially with other elements
Moderate	The proposal is a substantial element, but is equivalent in prominence to other elements and landscape alterations in the scene.
Moderate-high	The proposal is more prominent than other elements in the scene, by virtue of its size, character, location or a combination of these.
High	The proposal visually dominates the scene due to its relative size, isolation, location in a focal point, contrast of form, colour or line, or a combination of these

Table 1: Six Point Evaluation Scale

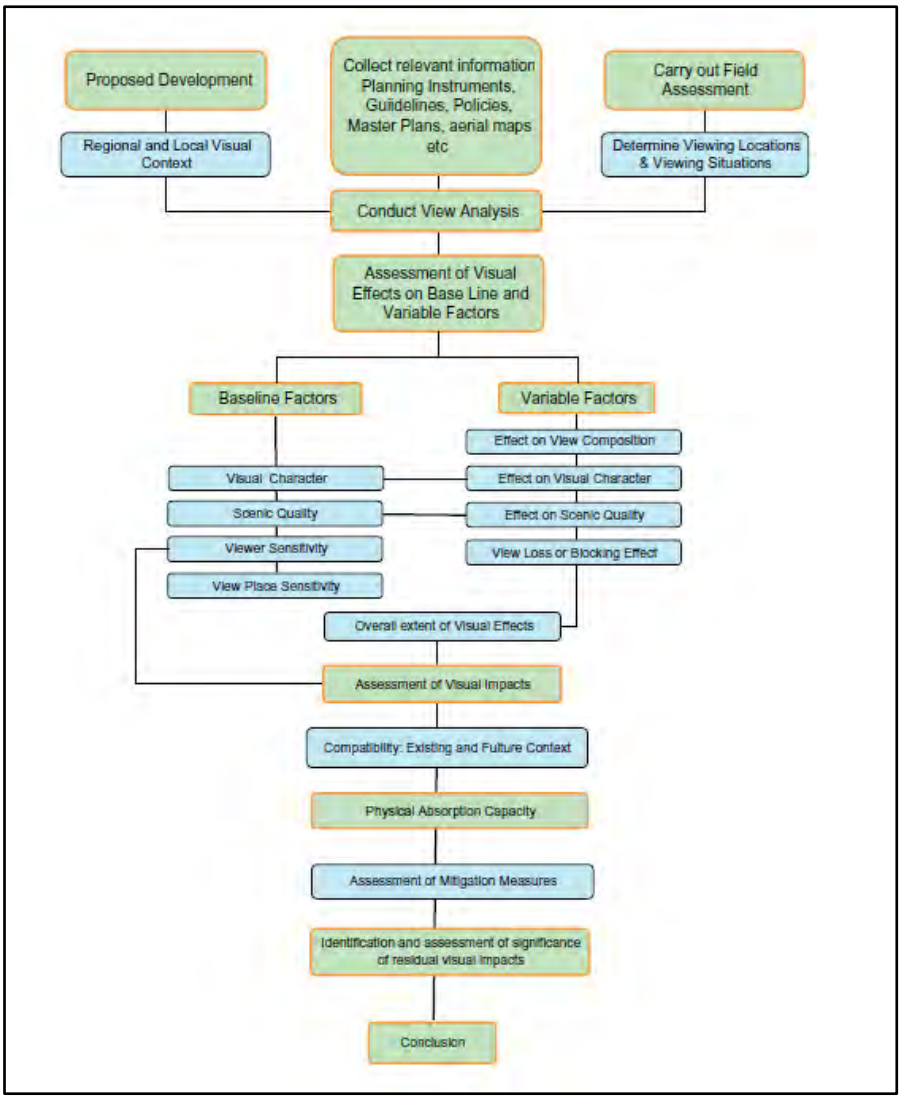


Figure 2: Visual Impact Assessment Methodology Flowchart

Visual assessment was undertaken on 30 March 2020 and resources from previous inspections of the site from 19 June 2019 have also been used in this assessment.

Photo 1 – Lions Drive/ Castlereagh Highway intersection; subject site to left of photo. Note existing Homemakers Centre

2 Visual Character, Exposure and Resources Analysis

2.1 Visual Character of the site

The subject site is located at Burrundulla, on the border with, and urban rural edge of Mudgee, approximately 3km south of the Mudgee town centre. This location is the prominent southern gateway to the town, on the Castlereagh Highway. The town itself is located approximately 260km north-west of Sydney within the Cudgegong River valley. It is famous for its colonial buildings and location in the increasingly prominent Mudgee Wine Region. Mudgee is the seat of the Mid-Western Regional Council local government area and the urban population of the town exceeds 11,000 people.

The property address of the subject site is 132 Lions Drive, Burrundulla NSW, legally identified as Lot 2 on Deposited Plan (DP) 1079362. The site forms an irregular shaped block of approximately 54,377m² adjacent to Castlereagh Highway along the eastern boundary (SIX Maps, 2019), and Lions Drive along the northern boundary as illustrated in **Figure 1**. As noted, the site is located on the fringe of Burrundulla with the site boundaries bordering Mudgee (western) and Spring Flat (southern).

The visual character of the site is determined by the site attributes as follows:

- The site is largely cleared and open in the eastern, western and southern portions of the site. Along northern boundary of Lions Drive, vegetation is located around an existing rural dwelling as well as the boundary and within the adjoining road reserve. The Ecological Assessment of the site that accompanies the Planning Proposal describes this vegetation as “a degraded variant of Box-Gum Woodland”. This report recommends that “if possible the native vegetation within along the frontage of the site, is retained.”

- The topography of the site is flat. Review of Google Earth Pro (2019) indicates the site slightly slopes from 475m Above Sea Level (ASL) in the west to 474m ASL in the east.

- There is a rural dwelling located on the site along with a number of outbuildings with access from Lions Drive. The only other physical features on the site are a number of advertising structures along the eastern Castlereagh Highway frontage and fencing along the property boundaries. There is also a dam in the south eastern corner of the site.

The site is otherwise generally consistent with the character of rural land to the south.

Review of the Mid-Western Regional Local Environmental Plan (LEP) 2012 together with the Planning Certificate under Section 10.7 Part 2 and 5 of the Environmental Planning and Assessment Act 1979 provides the following information:

1. The site is not listed as a heritage item;
2. The site and/or adjacent lots are not affected by land reserved for acquisition; and
3. The site is not affected by environmentally sensitive land or critical habitat.

The Planning Certificate also identifies that the subject site is currently zoned RU4 Primary Production Small lots.

2.2 Visual Character of the Surrounding Area

From a scenic resource perspective, like the town of Mudgee itself, the site lies between the foothills of a mountain range that ring the south western fringe of Mudgee containing the Avisford Nature Reserve, and the flood plains of the Cudgegong River.

The subject site is located on the south western fringe of what is referred to as the Sydney Road Precinct. This precinct is primarily composed of large-format retail, showrooms, light industry and general business activity. This includes land within both the B5 Business Development zone for sites primarily fronting Sydney Road, and the IN1 Light Industrial zone for land located further east and west which does not have main road access and exposure.

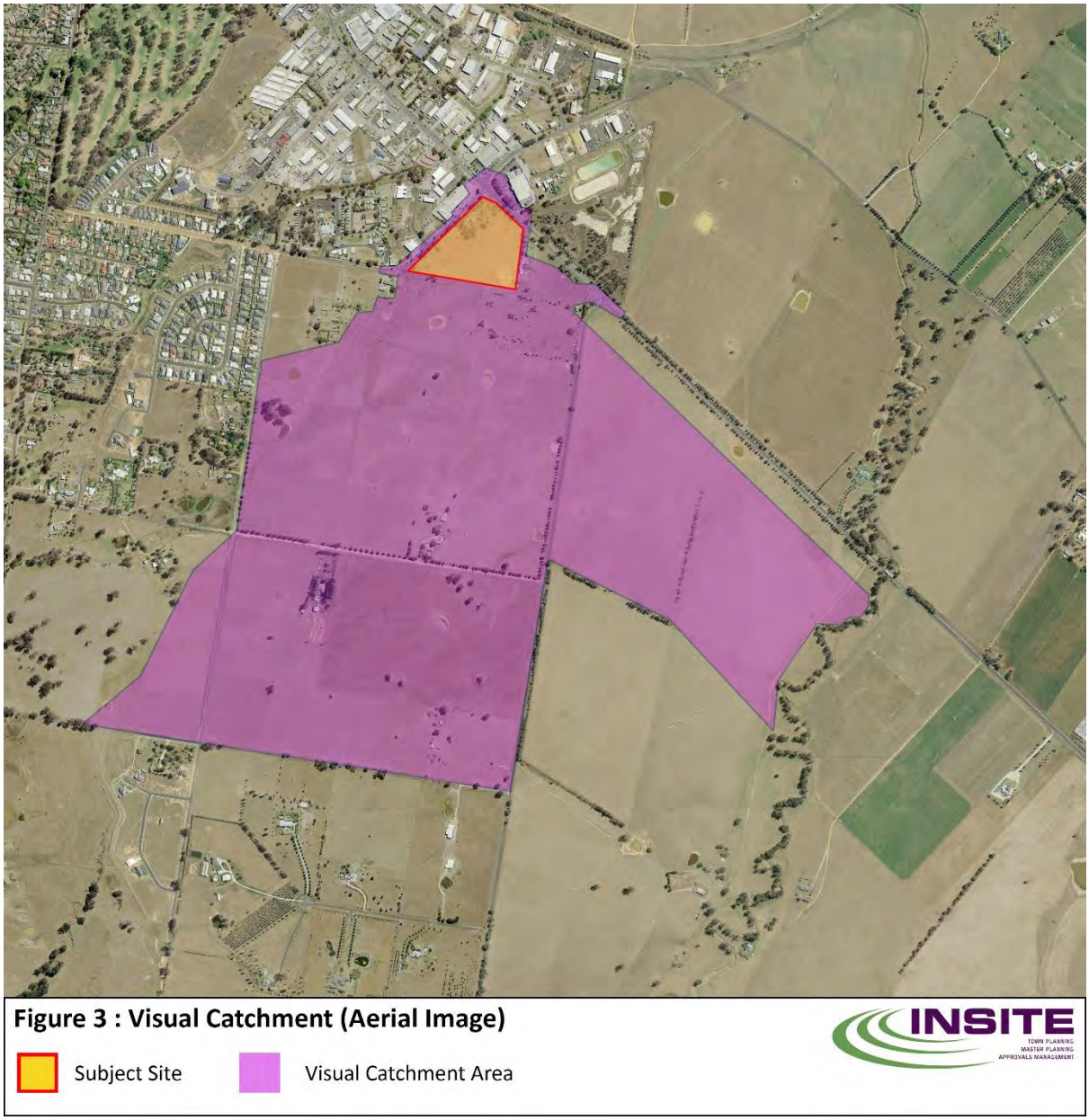


Figure 3: Visual Catchment

The Planning Proposal seeks to rezone the subject site so as to facilitate the relocation of the Bunnings hardware business. The existing Bunnings store operates at the south-eastern corner of the Castlereagh Hwy (Sydney Road), and Burrundulla Road on the south-east edge of the Mudgee urban area, and adjacent to the subject site. Operating as part of a wider commercial and industrial precinct centred on Sydney Road (the Sydney Road Precinct), the Bunnings store is also located on the same prominent gateway location to the town as the subject site.

The existing Bunnings store is located on land in the B5 Business Development zone at a location which includes a cluster of large-format retailers including Harvey Norman. As such, the Planning Proposal states that the proposed rezoning of the subject site "represents an expansion and enhancement of an existing key bulky goods retailing precinct in Mudgee, and from a land use planning perspective, the proposed rezoning represents a logical and timely expansion of employment land in the Sydney Road precinct".

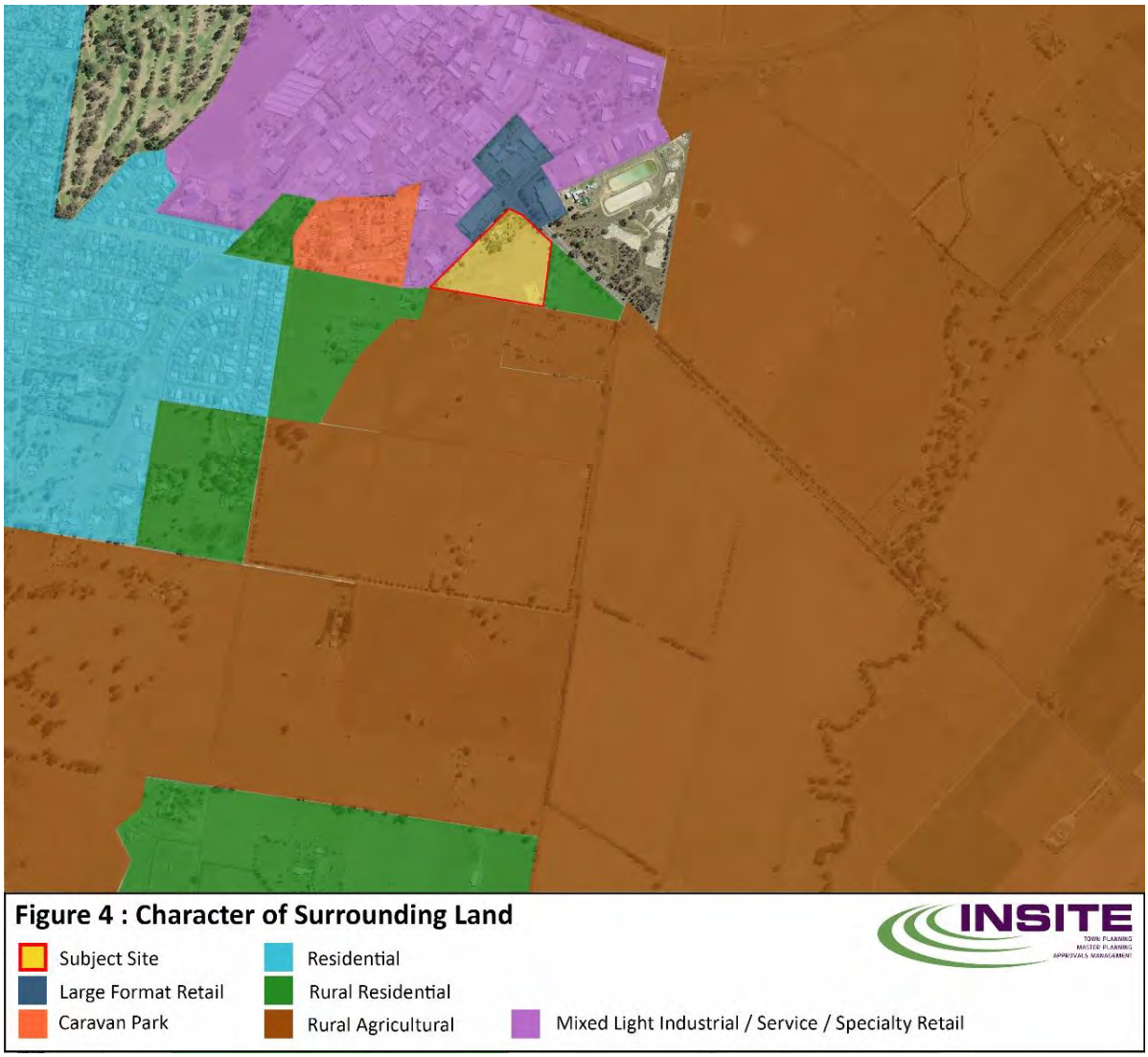


Figure 4: Visual Character of Surrounding Land

The topography of the area is characterised by undulating low hills and rises and gently inclined side slopes. The closest surface water body identified is Sawpit Gully located approximately 100m to the north-west of the site.

To the south and east of the site the landscape is characterised by rural residential properties and agricultural holdings, while to the north and west the site adjoins the urban compact of Mudgee including residential, bulky goods retail and light industry style land uses as illustrated in **Figure 3**.

The Planning Proposal also notes that the future character of the area is being driven by two development proposals on land to the south of the subject site, namely:

1. Proposed Retirement Village – On the property immediately to the south of the subject site an approval has been granted for a 206 unit retirement village which has established to Councils satisfaction that it has commencement.
2. Proposed Catholic School – To the south west of the subject site on Broadhead Road, is a site that the Catholic Church have acquired and are in the design phase for a new school complex. The landowners have advised that a development application is currently being prepared for the site and will be lodged in 2020.

The location of the above two proposals is illustrated on **Figure 5** below.

Consequently, when these two developments are complete, the site will be surrounded on all sides by some form of urban development.

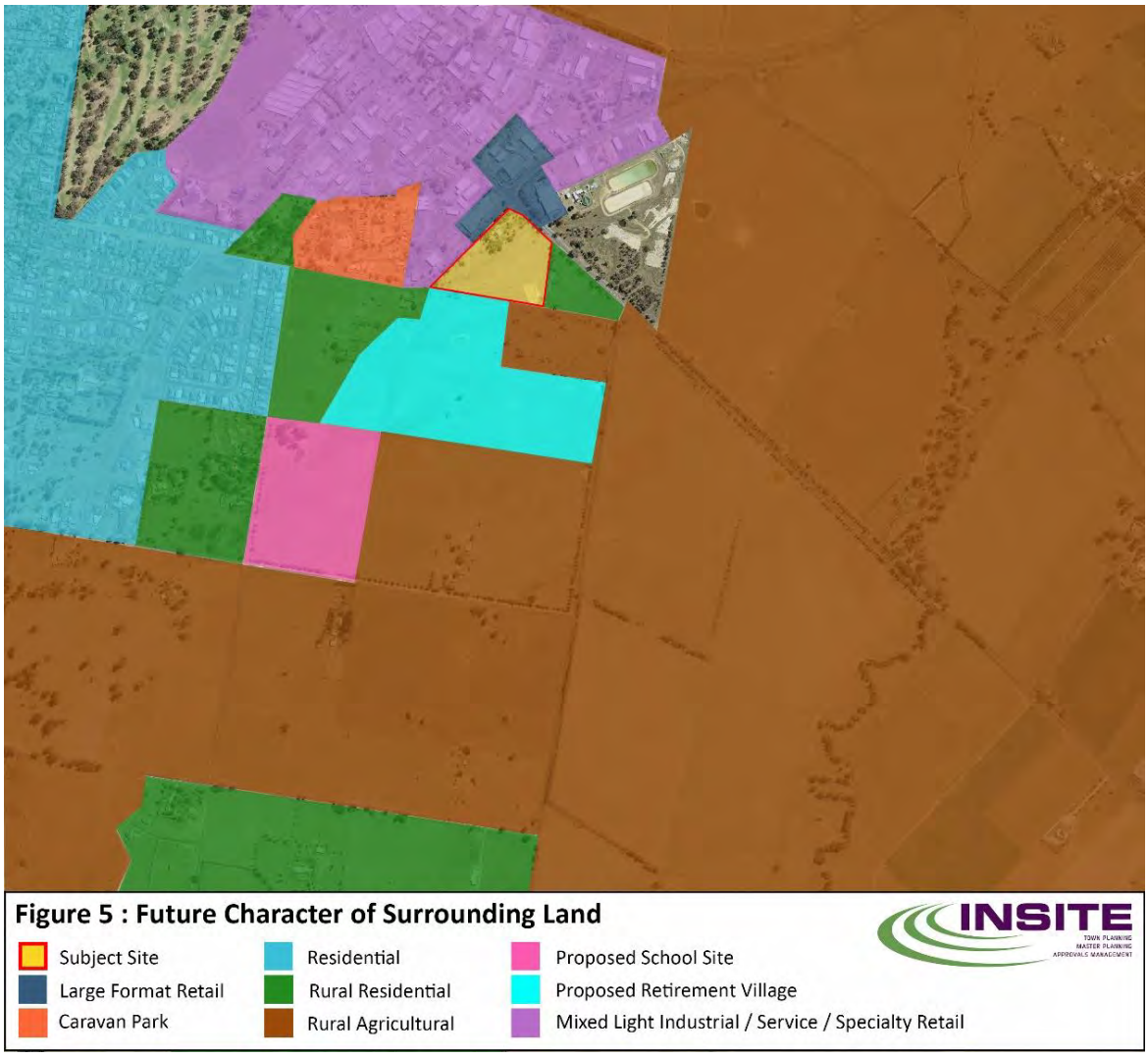


Figure 5: Future Character of Surrounding Land

2.3 Scenic Quality

As noted in the last section, the subject site lies in an area between the foothills of a mountain range that ring the south western fringe of Mudgee, Burrundulla and Spring Flat containing the Avisford Nature Reserve, and the flood plains of the Cudgegong River. The scenic quality of the site compared to the other elements within the broader landscape is unremarkable. Consequently, the intrinsic scenic quality of the subject site is overall low to moderate. It does not feature any significant scenic resources.

The locality contains no lookouts, promoted scenic areas or formalised recreational infrastructure however, notable features that are likely to be valued for their visual character include:

- Views of the forested ranges and hill tops of the Avisford Nature Reserve which cover an area of some 2,940.83ha. This mountain range hems the alluvial landscape of the Cudgegong Valley; occurring to the west and south of the subject site, between 2.3km west (Colliers Hill) and 13km south from the subject site.
- The Cudgegong Valley containing riparian corridors such as Oaky Creek (1.5km south) and Cudgegong River (2.2km east).
- Historic Mudgee town centre.

The Sydney Road precinct, which generally lies to the north of the subject site, is considered to have low scenic quality and detracts from the entry experience into Mudgee.

2.3.1 Photos of the Subject site

Photo 2 – Intersection Castlereagh Highway/ Lions Drive

Photo 3 – Subject site from Castlereagh Highway looking south west

Photo 4 – Subject site from Castlereagh Highway looking north west

Photo 5 – Looking south across site from Lions Drive

Photo 6 – Looking east along southern boundary of site

Photo 7 – Existing dwelling on property

Photo 8 – Dam located in south eastern corner of site

Photo 9 - Looking east across site to Castlereagh Hwy

2.4 Visual Exposure of the Subject Site

As part of the field assessment, the visual exposure of the subject site was analysed by visiting a number of viewing locations and making observations. The visual exposure from the private domain was determined by making observations from the surrounding road network. Photographic plates are shown throughout this report representing the visual exposure, with the viewing locations illustrated on **Figure 6** and **7**.

The visual catchment of the subject site was identified. It is relatively small due to the following:

- **Southern approach to site along Castlereagh Highway** – This is the gateway entrance into Mudgee and therefore the most visually sensitive. However, the site cannot be seen along this route into Mudgee because of roadside vegetation and riparian vegetation along Oaky Creek. It is not until the Spring Flat Road intersection located approximately 300m south of the site that the site can be viewed, and the view is restricted at this point to the rear of the subject site. The site is then obscured again from view until the site frontage again because of roadside vegetation and vegetation located on the boundary of the adjoining property to the south (refer to photo plates 13 - 18).
- **Southern extent of visual catchment across Spring Flat** – The rural areas to the south of the subject site across Spring Flat are within the visual catchment of the subject site extending all the way to the northern boundary of the properties fronting Hill Sixty Drive and Oaky Creek where topography and vegetation obscure views. It should also be noted that views into the site south of Bruce Road are restricted by roadside/ boundary tree planting along Bruce Road.
- **South West to Broadhead Road** – The visual catchment extends along Broadhead Road to the Plenty Road intersection with views interrupted due to vegetation in various locations (refer to photo plates 21 - 23). However, the backdrop of the site from these areas is existing large format retailing stores consistent with the proposed site zoning.

- **Western approach along Lions Drive** – The subject site does not come into view from the west on Lions Drive until on approaching the western boundary where there is a 45 degree radius turn in Lions Drive (refer photo plates 24 & 25).
- **Northern and Eastern views into the site** – These views are restricted to the immediate adjacent properties. Views into the site on approach from the north/ Mudgee town centre are restricted to approximately 40m north of the Burrundulla/ Castlereagh Highway intersection (refer to photo plates 10 - 12 & 26 -27).

The subject site does not lie within any significant visual corridors or vistas.

It is also of relevance to note that once the retirement village adjacent to the site is constructed, views into the site will be restricted from the south and south west to the extent that the subject site will only visible from properties immediately adjoining the site.

2.4.1 Photos of Subject Site Visual Exposure

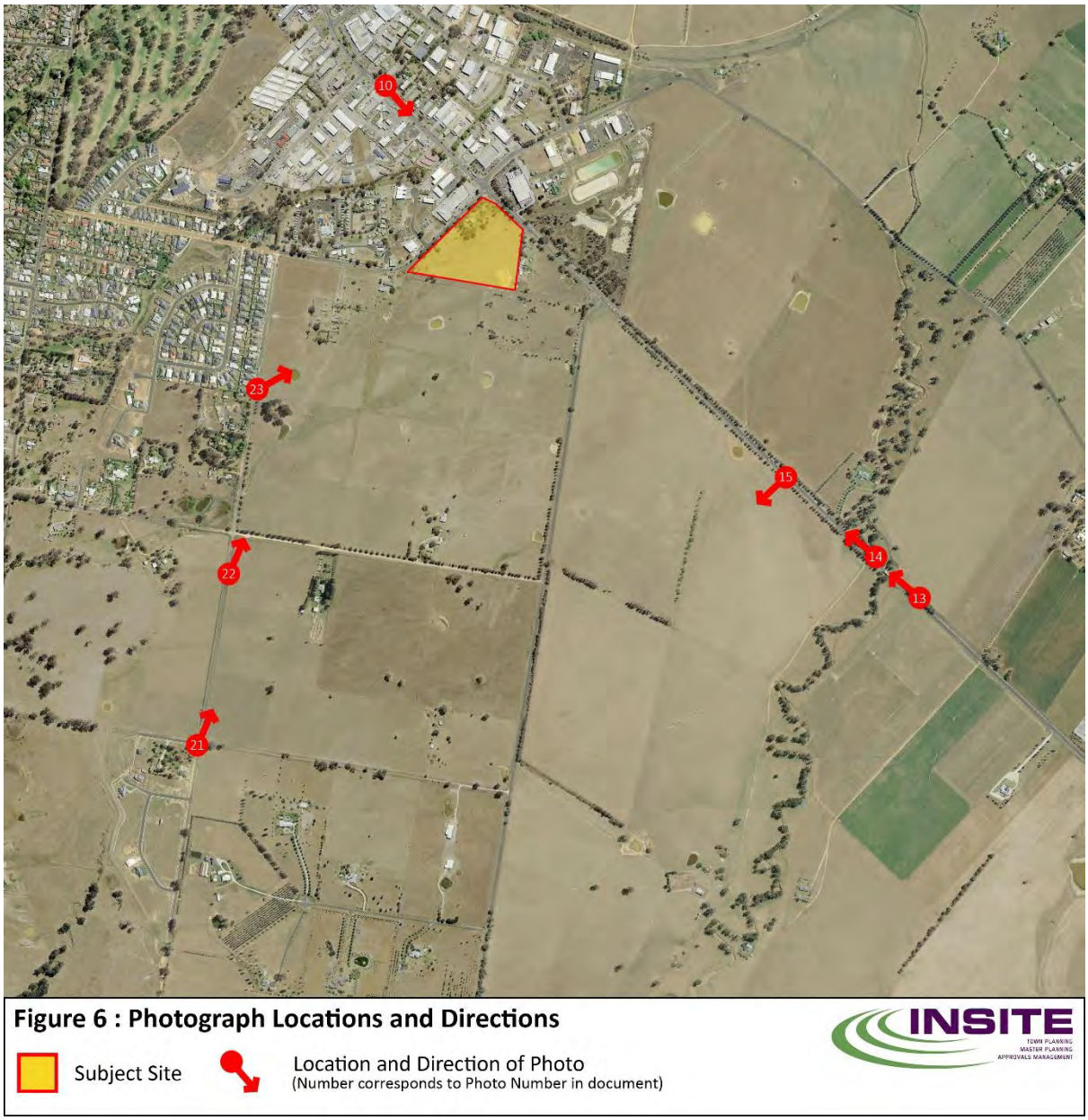


Figure 6: Photograph locations and Directions

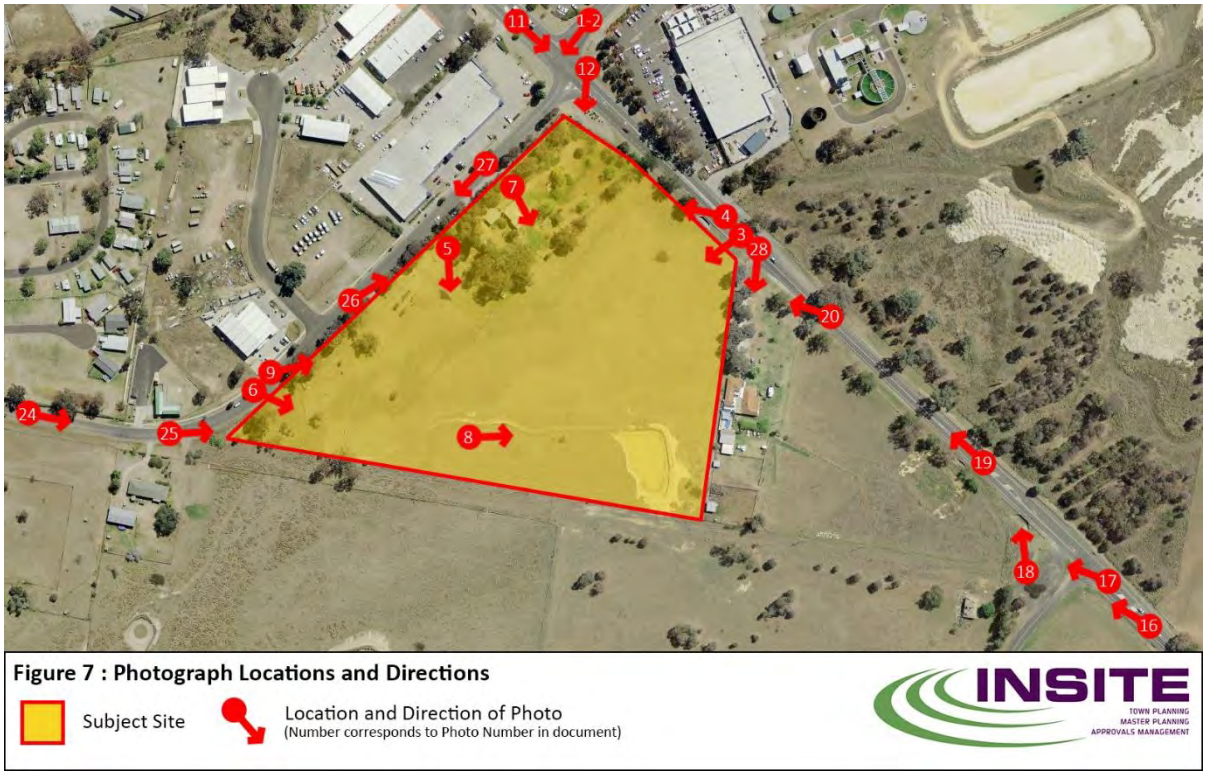


Figure 7: Photographic Locations and Directions - Subject Site

Photo 10 – Looking South from 23 Sydney Road along Castlereagh Highway; site cannot be seen.

Photo 11 – Castlereagh Highway/ Lions Drive intersection – views obscured by roadside vegetation

Photo 12 – From Burrundulla Road looking south west at subject site

Photo 13 – Castlereagh Highway looking north with riparian vegetation on Oaky Creek crossing photo

Photo 14 – Entrance into Mudgee along Castlereagh Highway looking north with roadside vegetation a landscape character statement

Photo 15 typical rural landscape character east of Hill Sixty Drive – taken from Castlereagh Highway

Photo 16 – Looking north across Spring Flat Rd intersection.

Photo 17 - Looking north across Spring Flat Road intersection. Clear view of rear of subject site.

Photo 18 - Area recommended for tree planting to reinforce roadside vegetation corridor and screen rear of site from view along Castlereagh Highway

Photo 19 – Castlereagh Highway on southern entrance into tow just past Spring Flat Road. Note site is not visible.

Photo 20 – view from Castlereagh Highway across property to south of subject site. Note view obscured by not only roadside vegetation, but also boundary vegetation.

Photo 21 – Corner Broadhead & Plenty Roads; southern extent of visual catchment at 1.6km distance view.

Photo 22 – Corner Broadhead & Bruce Roads; 1.2km distance view.

Photo 23 – Broadhead Road north of Bruce Road intersection in front of new residential area looking east; view blocked by existing rural residential development.

Photo 24 – Driving east along Lions Drive 300m from site.

Photo 25 – Lions Drive corner on where site can be viewed.

Photo 26 – Looking south east into site from Lions Drive

Photo 27 – Looking west along Lions Drive; note Homemakers Centre and roadside vegetation.

2.5 Visual Opportunities and Constraints

Based on the above analysis of the visual character of the subject site, its surroundings and the visual exposure, the following visual opportunities and constraints have been identified in relation to the site in the context of a proposed rural integrated tourist facility.

1. The subject site does not lie within any significant view corridor or vista.

2. The subject site is visually sensitive from the perspective that it is at the gateway into the Mudgee town centre.

3. Views into the site from the west (Lions Drive), north and east (existing large format retail development sites) is restricted to the immediate adjacent properties.

4. Views into the site are available from the south and south west across Spring Flat although that view is broken by scatter paddock trees and clumps of trees as well as roadside vegetation, especially along Bruce Road.

5. The site sits within a landscape from the southern view corridor of an existing large format retailing urban form (ie the Homemakers Centre and the existing Bunnings store as well as adjoining retail and light industrial development). Consequently, development of the site as proposed by the rezoning would not introduce a new landuse character form into the view corridor from the south and south west.

6. The view corridor into the site from 4 & 5 above will be eliminated when the approved retirement village is constructed and should the Catholic School on Broadhead Road proceed.

7. The most sensitive view into the site is from the Spring Flat Road intersection with the Castlereagh Highway. This view would be into the rear of the subject site. In order to ameliorate any impact at this location, roadside vegetation should be considered as outlined in **figure 8** below.

8. Given the subject site is obscured from view on entry into Mudgee due to roadside vegetation, it is recommended that there be a mixture of commercial activation and open space/ landscaping at the frontage of the site to provide a 'sense of arrival' into the town.

Figure 8: Recommendation for Supplementary Roadside Plantings

3 Proposal Details

The Planning Proposal document outlines the rezoning of 134 Lions Drive Burrundulla as follows:

- *"Extending the current **B5 Business Development** zone, that exists along Sydney Road at Burrundulla (refer to **Figure 6**), over Lot 2 DP1079362, 134 Lions Drive (the subject land). This will result in the landuse zoning of the subject land changing from the **RU4 Primary Production Small Lots**, to the **B5 Business Development** zone.*

- *Amending the **minimum lot size map** to facilitate future retail development of the site. In order to provide flexibility for future uses, the proposal is to have no minimum lot size applying to the land."*

Figures 9 and **10** show the existing and proposed zoning.

The Planning Proposal is being driven by the lack of available land zoned B5 Business Development in Mudgee to accommodate the economic need for an appropriate scale and range of large-format retail facilities to service the town and surrounding communities. This has been identified through a process that Bunnings has gone through with its existing store, located on the corner of the Castlereagh Highway and Burrundulla Road at South Mudgee, in that it is no longer suitable for its corporate requirements and does not meet customer and operational expectations for a modern Bunnings store. Furthermore, the existing store size is not sufficient to service the retail catchment and as a consequence considerable escape expenditure is occurring and lost opportunity in terms of employment for Mudgee.

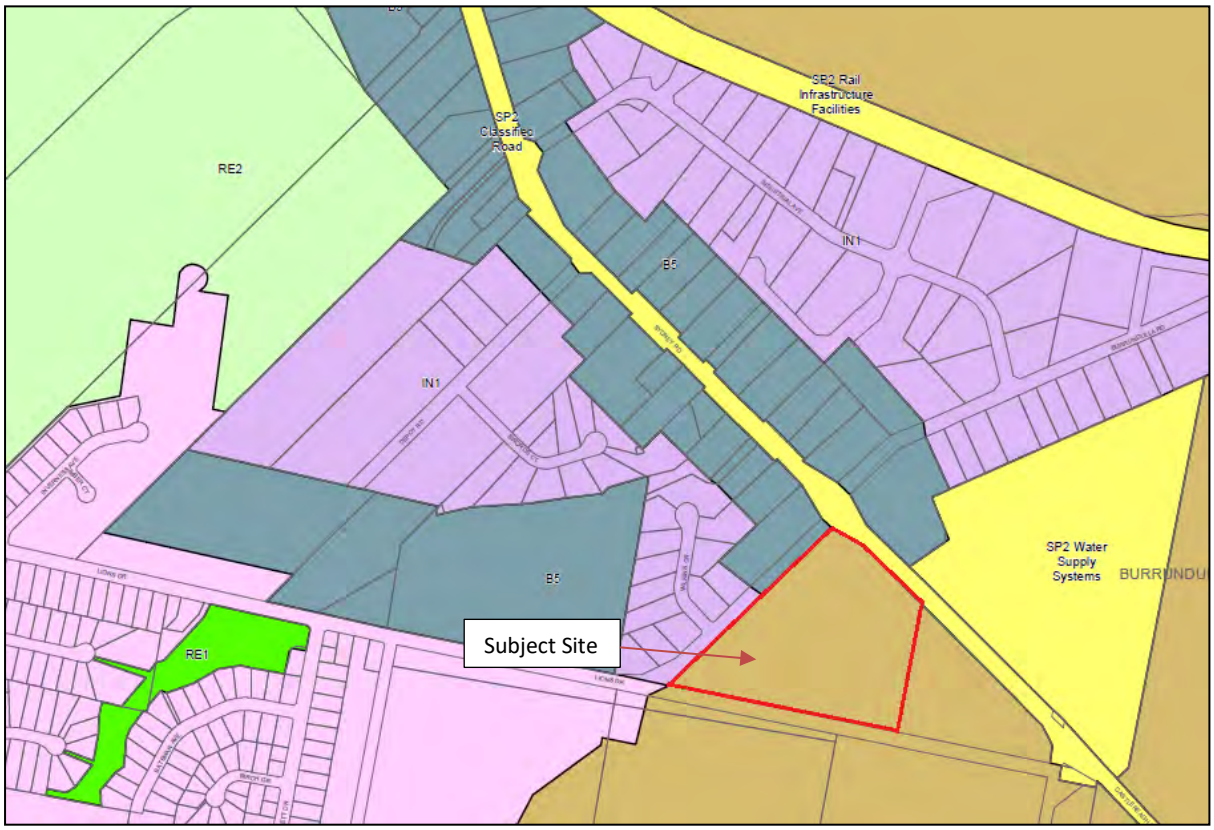


Figure 9: Existing Zones

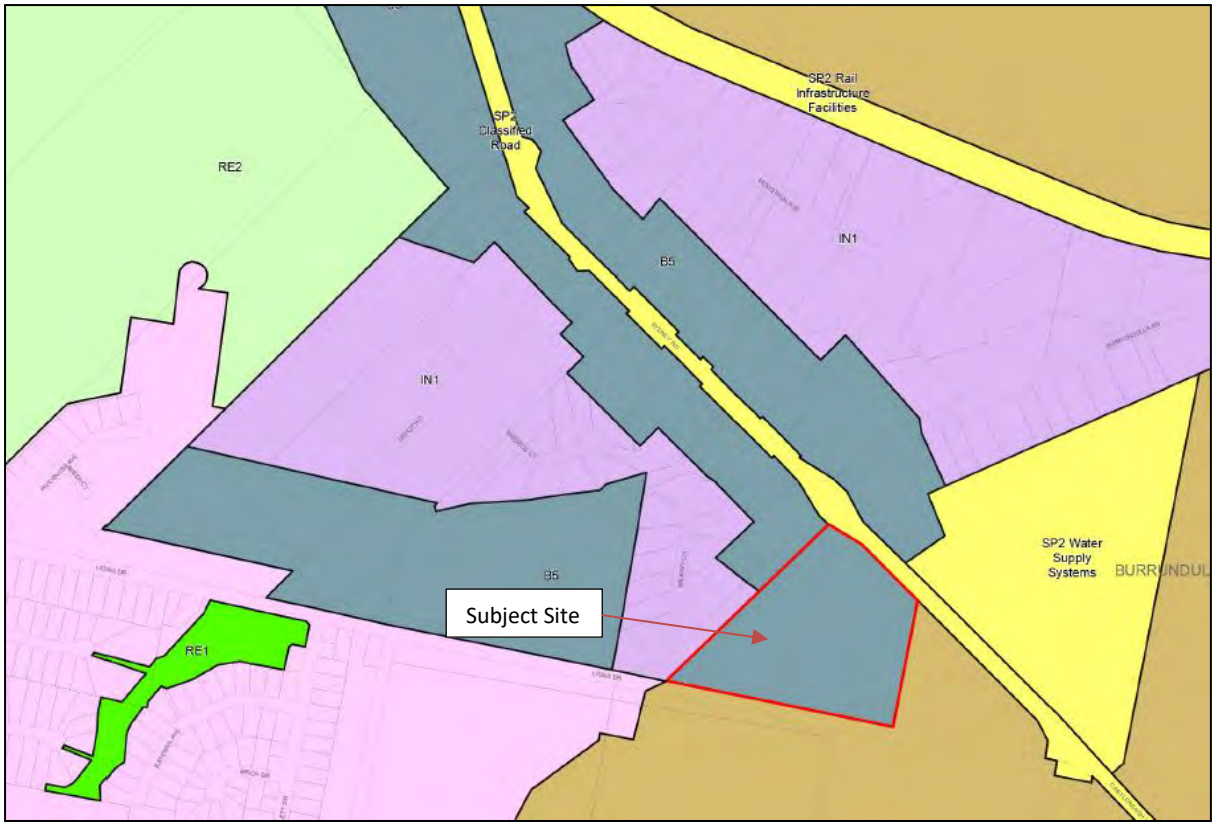


Figure 10: Proposed Zonings

3.1 Potential Development Outcome

While the Planning Proposal is being instigated by Bunnings so that they can relocate their store onto the new site at 134 Lions Drive, it is of relevance to consider all likely outcomes in terms of a development scenario for the site. To understand potential site development, and hence undertake a visual analysis, it is necessary to consider the permissible uses within the B5 Business Development zone of the Mid-Western Regional LEP 2012 which are as follows:

> *Agricultural produce industries; Centre-based child care facilities; Garden centres; Hardware and building supplies; Kiosks; Landscaping material supplies; Light industries; Oyster aquaculture; Passenger transport facilities; Plant nurseries; Respite day care centres; Roadside stalls; Rural supplies; Specialised retail premises; Take away food and drink premises; Tank-based aquaculture; Timber yards; Vehicle sales or hire premises; Warehouse or distribution centres; Any other development not specified in item 2 or 4*

In order to consider the maximum visual impact from development on the site, the largest form of development possible under the B5 Business Development zone needs to be determined. That would be a large Bunnings store (Hardware and building supplies), a large industrial building containing a *light industry* or a *warehouse or distribution centre*. This Visual Impact Assessment is then based on the potential development outcome.

4 Strategic Planning Context

There are a number of strategic planning documents that provide context for the future development of the subject site. The document of particular relevance to this Visual Impact Assessment is the *Mid-Western Regional Comprehensive Land Use Strategy*.

4.1 Mid-Western Regional Comprehensive Land Use Strategy

Both the Mid-Western Regional Council and the then Department of Planning have endorsed the *Mid-Western Regional Comprehensive Land Use Strategy* that provides direction and guides future change in the Mudgee LGA for the period to 2025 - 2030. In relation to the subject site and surrounding area, this strategy makes the following observations and recommendations that are of relevance to this Visual Impact Assessment:

> ***Defining a Physical Limit to Mudgee's future Growth***
> *One of the key principles identified for Mudgee is to develop a 'hard edge' for the urban area. A 'hard edge' is representative of the future growth boundary of the urban area and effectively provides a limit to growth. The long term boundaries for urban growth (i.e. 'hard edge') are shown on the Mudgee Structure Plan (Figure 3.1/11).*
>
> - *The Cudgegong River in the north as the river provides a natural boundary between urban and rural land.*
> - *Castlereagh Highway and Hill End Road in the north-west because of visual sensitivity and servicing implications.*
> - *The scenic hills and conservation area to the west because of visual sensitivity and servicing implications.*
> - *The railway line in the central east because it is a definitive man-made boundary.*
> - ***Broadhead/ Spring Flat Road in the south-east because it provides a clear edge between urban and rural uses.***

The last dot point above is of relevance as the subject land falls within what the strategy has defined as the "physical limit" for Mudgee's future growth to the south east of the town. Spring Flat Road is located to the south of the subject site and Broadhead Road to the south west. The subject site therefore falls within the landscape catchment which is envisaged to be urban development into the future (refer **Figure 10**).

This strategy also includes commentary on the gateways into the town, with it already being established that the subject site is at the southern gateway. The strategy states as follows:

> ***2.2.2 Town Gateways***
> *Gateway treatment was identified by the community as being a significant issue for the towns of Mudgee, Rylstone, Gulgong and Kandos and the principles for improvements to town entries are as follows:*
>
> - *Future development should provide for a substantial vegetated buffer along major roadways and incorporate gateway treatments including vegetation, fencing and signage.*

- *Gateway planting and treatments should commence, where possible, well in advance of any urban development in newly developing areas. To facilitate the strategy identifies split use of the parcels fronting Castlereagh Highway such as part infrastructure, part urban (industrial, residential or whatever the case may be) within 50m of the Castlereagh Highway.*

As can be seen on Figure 3, and as shown on photos 14, 19 & 20 on page 13, roadside planting begin at Oaky Creek, 1.5km south of the town.

The subject land is identified for "urban purposes" in this strategy as illustrated in **Figure 11** below.

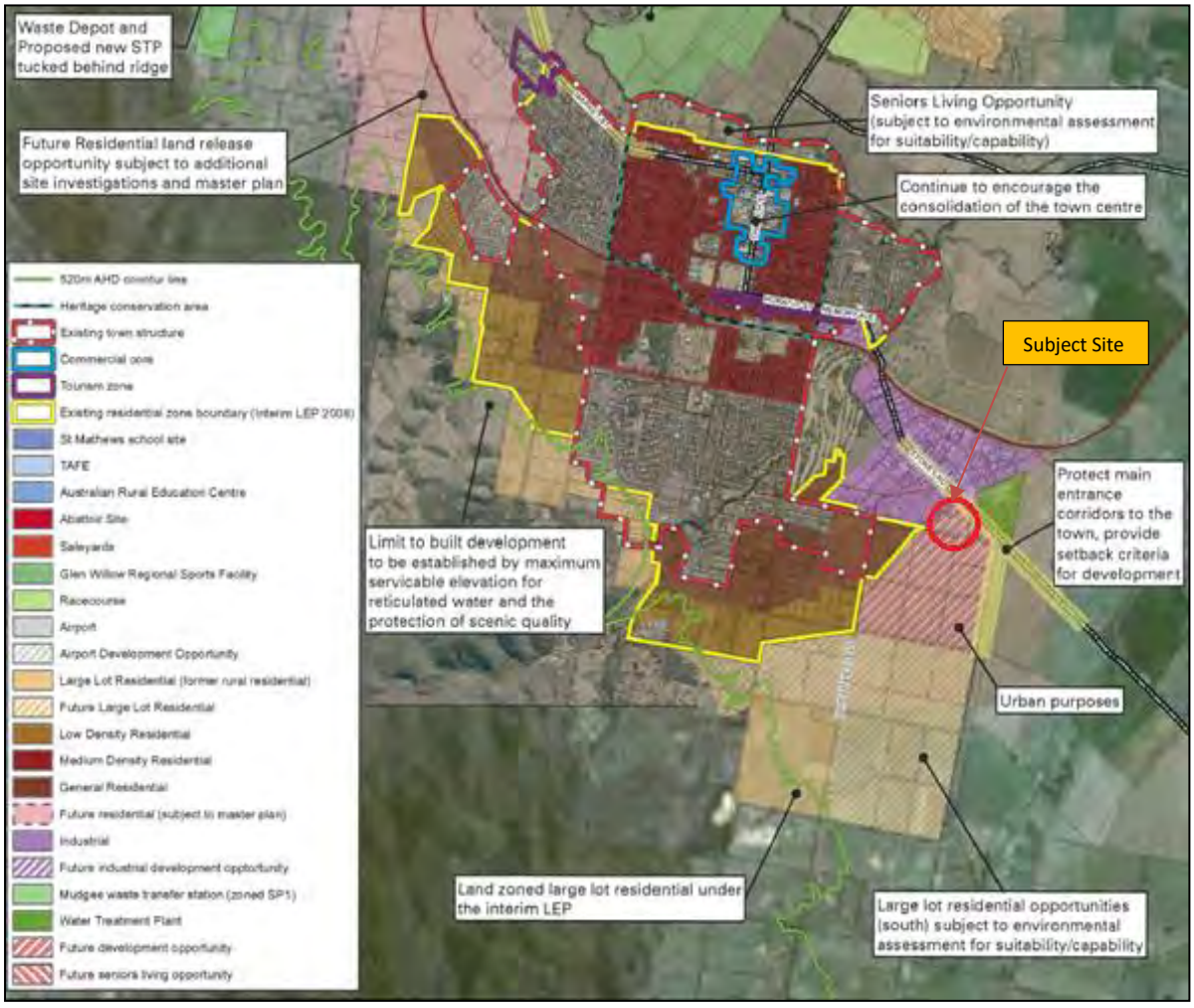


Figure 11: Mid-Western Regional Comprehensive Landuse Plan - Figure 3.1

3.2.2 Commercial and Retail Development

The majority of retail/commercial floor space is to be focused in Mudgee. All regional level retail facilities (including bulky goods) should be permitted to be located in the Mudgee CBD and future growth and development shouldreinforce the existing historic retail core areas focussed on Church and Market Streets. ***Development of larger bulky goods premises although not prohibited in the CBD, should continue to be encouraged to establish within the existing precinct along Sydney Road.*** *It is to be noted that stand alone retail activity in an industrial area will not be supported in the future.*

The land fronting the Sydney Road is specifically identified for large format retail development, and the subject site is consistent with this direct specification for the location of this land use within the Mudgee urban area.

> ***Sydney Road***
> *When considering future uses in the Sydney Road Industrial Area it is important that some retail uses are not just simply displaced from the outer parts of the CBD to the cheaper land located in the industrial area. There are a range of uses appropriate to each location which should be considered in any changes to landuse structures, objectives and permissible uses.*
>
> *Short term industrial development in Mudgee should occur in the Sydney Road industrial area offset from the Sydney Road frontage and should involve the use of vacant land and under utilised sites. Subdivision and redevelopment of older industrial sites and buildings is encouraged. There is up to 10 ha of industrial land with subdivision potential in this area including 9 vacant lots available for immediate development which would provide for approximately 4 years supply.*
>
> *Reticulated water is available to this location, although it is likely that a new sewerage pump station may be required at significant cost to Council and the release of this land will be delayed until sewer is available.*
>
> *Further streetscape improvements to the Sydney Road entry should be funded through Council funded landscaping.*
>
> *The strategy to locate bulky goods to the Sydney Road Industrial Area may result in further alienation of heavier industry from this precinct in the medium to long term. As a result, a secondary site for heavy industry will need to be identified that is located so as to minimise landuse conflicts.*

As is noted in the commentary above, "*further streetscape improvements to the Sydney Road entry should be facilitated through Council-funded landscaping*".

5 Visual Effects Analysis

5.1 Potential visual exposure of the proposed development

The resulting development from the proposed rezoning will make no significant difference to the extent of the visual catchment of the subject site; that is to say, the size and heights of any resulting development would likely be consistent with adjoining development and will not increase the area over which it will be seen.

As was noted in section 2 of this report, the visual catchment is limited on the main entry from the south into the town by roadside and riparian vegetation, and views are limited to the north and east by existing development adjoining the development site. The only landscape in which the subject site will be visible is from the south, however future development of the subject site will not be seen from any additional areas in this view corridor.

Future development on the site as a result of the proposed rezoning will only have close views from those sites located on the northern side of Lions Drive, the Lions Drive/ Burrundulla Road/ Castlereagh Highway intersection, the existing Bunnings store and the rural dwellings on the properties immediately adjoining the property to the south and west. The views of the subject site and any future development on the subject site from these locations are close views. Hence, parts of the future development will be seen in the foreground views from only part of its visual catchment.

There are also middle distance and distant viewing locations from which the subject site can be seen from the south out along Broadhead Road generally south of the residential development at its northern end. The view corridor then extends east over the the rural properties out to area generally on the northern boundary of the rural residential properties located on Sixty Hill Road, Spring Flat. However, given the similar nature of adjoining development to the north (Homemakers Centre) and east (existing Bunnings store), future development of the subject site in line with the B5 Business Development zone will not impact on existing views from these locations.

5.2 Viewing sequence

5.2.1 Fixed viewing positions

These are the locations from which there are views for a longer period of time from fixed positions. These are considered to be of particular importance because people can have the opportunity to concentrate on the view and notice the change and activities in detail.

The only public domain fixed location within the visual catchment for the subject site is the pedestrian footpath located along the frontage of the Homemakers Centre on Lions Drive. There are fixed viewing positions into the site from adjoining residences, particularly 18 Castlereagh Highway and 90 Lions Drive, as well as the existing Homemakers Centre and Bunnings properties oppositive the subject site.

Photo 28 – Boundary vegetation on southern side of subject site screening views into the site on arrival along Castlereagh Highway from the south.

5.2.2 Sequence of views and cameo views

Sequences of views are important because the viewer can construct a three dimensional understanding of the development if it is significantly exposed to view, particularly over substantial distances. The development site cannot be viewed from significant lengths of the Castlereagh Highway either to the north or south of the site, it is only in view at the site frontages. The same is true for Lions Drive where the site is only in view along the site frontage, and a short distance to the west.

Both of these roads provide then only limited opportunity for sequential views from the public domain. These would be repeated regularly by the local people and less so by visitors and occasional viewers. The sequential views are all of short duration because of the limited extent of the site frontage. Thus, the sequential views will provide a low level of exposure of the development to view.

In terms of the Castlereagh Highway, the existing roadside vegetation and the boundary vegetation along the adjoining southern boundary (refer to photo 29) mean that the subject site is not particularly visible with the sight line drawn to the north down along Sydney Road.

5.3 Potential change in the intrinsic character of the subject site and the surroundings

Change in the intrinsic character of the site is a description of the extent and nature of visual changes when considered in relation to the site's present character before the intended development is constructed.

The visual character of the site and the surroundings is explained in Section 2.1 & 2.2 of the Report. There would be significant change in the intrinsic visual character of the site due to the landuse changing from a rural landscape to a large format retail development. Also, the likely future size of the footprint of any development being approximately 1.8ha to 2ha when compared against the size of the property at some 5.4ha. Consequently, the footprint of any future development is likely to represents approximately 35% of the total site area.

However, while the intrinsic character of the site will change, there would not be any significant negative change to the intrinsic visual character of the wider surroundings of the site; that is, the development will have no significant impact on the resources of landscape of a similar character that is extremely widespread in the locality to the south.

A change to the visual character of a site can be positive, neutral or negative and does not directly lead to visual impacts. The more important question to be investigated is the compatibility of the proposed development with the visual character of the site and the surroundings. This has been considered at Sections 6.2 and 6.3 of this Report.

5.4 Potential effect on intrinsic scenic quality

The intrinsic scenic quality of the site is judged to be low to moderate on a scale from low to high as explained in Section 2.2 of this report. In general, it is considered that the proposed development will not have a significant negative effect on the existing intrinsic scenic quality of the locality, which will remain low to moderate.

It is also considered that any future development of the site in line with the proposed zoning will not have a significant effect on the moderate scenic quality of its surrounding setting, given that the site is visually enclosed from the main sensitive viewing corridor along the Castlereagh Highway entrance to Mudgee. This assessment considers that future development would be compatible, and even complimentary to the adjoining commercial development to the north and east of the site.

5.5 Visual sensitivity

Sensitivity relates to the number of viewers who would be likely to see the subject site, and potential future development that would result due to the rezoning, and their likely expectations for visual quality. It is usually considered that a visual impact on a sensitive location in the public domain is considered more important than one of similar quality on a less sensitive site or seen from a private viewing place.

5.5.1 View place sensitivity

View place sensitivity means a measure of the public interest in the view and relates to the distance of the viewer from the site, the part of the total extent and composition of the view which the development would occupy and the likely expectations for visual quality of the viewer. It is conventionally considered that a visual impact on a sensitive location in the public domain is more important than one of similar quality on a less sensitive site or seen from a private viewing place.

The measure of the relative sensitivity of a viewing place is rated using a scale from low to high. The description of the associated sensitivity of the viewing places is described in Table 2 below by Dr Lamb.

The main sensitivity is in the nature of the site at a 'gateway' location into Mudgee. It is assessed in this case that all the public domain locations are at close distance and provide foreground views of the proposed development. The locations include the Castlereagh frontage of the subject site and to a lesser extent the Lions Drive frontage. Hence, the view place sensitivity overall is judged to be high.

Table 2: Sensitivity Rating Table (Dr Richard Lamb)

Factor	Low	Medium	High
View Place Sensitivity (Public Domain Locations)	Public domain viewing places such as reserves, waterway and roads at great distance providing highly distant views. The development often forms a very small part of the expansive to panoramic view, situated in the backdrop or horizon to the view. Overall shape, line and silhouette of buildings/development and details are not discernible.	Views from roads, recreation areas and waterways where the development forms part of the view at a medium range distance providing the immediate setting behind the foreground and closer than the background. Detail is less prominent. The form, shape, character and overall colours and textures of buildings, forms and shapes of street walls, their width and character is a middle ground feature and not very prominent. Spatial relationships between individual buildings are clearly evident.	Close distance range views from roads, recreation areas and waterways with development forming a significant part of the view close to the viewer. High levels of details are visible, such as fine details of buildings, their style, age, materials, surfaces, features and textures, etc. In the foreground, the spatial relationships between buildings are not discernible due to narrower cone view available to the viewer.
Viewer Sensitivity (Private Domain Locations)	Residences providing distant views of the proposed development in which details are not discernible.	Residences located at medium range from the proposed development site with middle ground views of the development in which the details are not very prominent.	Residences located at close distances from the site with foreground views of the development in which form and scale of parts of development that are visible are prominent.

5.5.2 Viewer Sensitivity

Viewer sensitivity relates to private domain views. Overall, there is only a small number of residential properties with exposure of the development to private views. The viewer sensitivity is assessed to be moderate (90 Lions Drive) to high (18 Castlereagh Highway) as the views of the site are foreground views in both instances although neither the internal nor external living areas appear to face the subject site.

5.6 Residential amenity effects

Given this is a rezoning and there is no detail development proposed at this stage, it is not possible to determine residential amenity effects. Any development of the site will need to be designed so that it does not impact on the visual privacy or have overlooking effects on adjacent rural residential properties.

5.7 Overall potential visual effects

Based on the analysis above at sections 5.1 to 5.6, it is considered that the overall potential visual effects of any future development of the site in line with the proposed rezoning set out in the Planning Proposal would range from moderate to high.

6 Visual Impacts Assessment

The previous chapter of this report analysed the extent of the visual effects of the proposal on its visual catchment. The extent of the visual effects is the baseline assessment against which to judge the visual impacts. The visual effects analysis represents the objective facts and the potential consequences of the construction of a development resulting from the proposed rezoning.

Whether or not a visual effect is an impact of potential significance is not directly proportional to the extent of the visual effect. For example, a high visual effect can be quite acceptable, whereas a small one can be unacceptable in some circumstances. As a result, it is necessary to give a weighting to the assessed levels of effects to arrive at an assessment of the impact.

Using the methodology developed by Dr Lamb, this chapter assesses how significant these potential effects are and if they result in visual impacts of any significance. Due to the nature of the proposed rezoning and its surrounding visual context, it is considered that the impacts would be significant if it would lead to unreasonable and unacceptable impacts on the criterion:

a) its physical absorption capacity,
b) compatibility with the character of the site and
c) compatibility with the surrounding context.

As explained in the methodology at Section 1.3, a high level of physical absorption capacity and compatibility means low visual impact.

6.1 Physical Absorption Capacity

Physical Absorption Capacity (PAC) means the extent to which the existing or future visual environment can reduce or eliminate the perception of the visibility of the proposed development. PAC includes the ability of existing elements of the landscape to physically hide, screen or disguise the proposal. It also includes the extent to which the colours, material and finishes of buildings, the scale and bulk allows them to blend with or reduce contrast with others of the same or closely similar kinds to the extent that they cannot easily be distinguished as new features of the environment. In this case the proposal is a rezoning, so as noted earlier in this report, we are assuming a large retail format development consistent with the adjoining Homemakers Centre or Bunnings store.

Prominence is also an attribute with relevance to PAC. It is assumed in this assessment that higher PAC can only occur where there is low to moderate prominence of the proposal in the scene.

The subject site and its visual catchment provides moderate to high physical absorption capacity to accommodate potential future development. As noted previously, in terms of the Castlereagh Highway, the site is only visible at the site frontage and the Spring Flat Road intersection due to roadside and riparian vegetation that screens the site from short to long distance views. From the south and south west the site is set against a backdrop that is the existing bulky goods retail precinct as well as pockets of vegetation and trees lined along property boundaries meaning the site is not fully exposed.

The above assessment is in respect to the site itself. In terms of any potential future development that would result due to the rezoning, it is considered that there is a moderate level of physical absorption capacity given the nature of adjoining development being of the same format, and provided there is appropriate landscaping, especially in the vicinity of the Castlereagh Highway Spring Flat Road intersection and the western rear boundary of the site, so as to filter views into the rear of the site.

Furthermore, there is a proposed retirement village to be constructed to the south of the subject site. When this proceeds, the site will be effectively ringed by high density urban development and the proposal would fit seamlessly from a visual absorption perspective into the landscape as it would have a low prominence in the scene.

Rezoning of the site for Business Development will be consistent with the character of adjoining land and given the physical nature of the visual catchment, the site has a high absorption capacity for any likely future development consistent with the proposed zoning.

6.2 Compatibility with the character of the Site

Compatibility with the existing character of the site is a measure of how the proposed development responds to the natural and built features such as vegetation, topography, scenic features and existing developments within the site as well as its potential impact on the visibility of those features from external viewing locations. It is also an assessment of how the proposed development takes into consideration the future retention, management and conservation of such natural features.

The proposed development will fundamentally change the character of the site itself from one that is currently rural, to a commercial retail character. The Ecological assessment has recommended that the Box-Gum Woodland located along the Lions Drive frontage be retained. This vegetation is the only natural attribute on the site as it is otherwise largely cleared.

The topography of the site is relatively flat meaning that there will be minimal earthworks required for any future large format retail development, so the site is suitable for the rezoning from that perspective, and that will mean less visual impact

It is recommended that the vegetation along the Lions Drive frontage be retained as far as practically possible. It is also recommended that there be low level landscaped open space at the front of the site along with commercial activation which is considered an important cue at this significant gateway location.

6.3 Compatibility with the character of the surrounding Context

Visual compatibility with the surrounding environment is an assessment considered over its total visual catchment. Compatibility is different from change. While change is objective, the measure of visual compatibility is intended to evaluate the extent to which the change conforms with or acceptably fits into the future visual context of the site and its surroundings. Compatibility also means that the development responds appropriately to the desired future character determined by strategic planning instruments or polices and guidelines.

The proposed development is considered to have moderate to high compatibility with the character of the surrounding locality. The rezoning will result in an extension of the B5 Business Development zone, so any future development of the site will merely be an extension of the existing urban form to the north and east of the site and will be compatible with that built form. This is also relevant in terms of the view corridor into the site from the south across the rural landscape of Spring Flat as the extension of the B5 zone will be set against an existing back drop of industrial and retail development. Provided existing boundary vegetation is retained and a landscape buffer incorporated along the southern boundary to soften the rural/urban edge, the development should fit seamlessly into the landscape character of the area.

It is also relevant to note in terms of 'future' character, the site will be surrounded by urban development as a retirement village has been approved, and has commenced construction, on the southern boundary of the site which borders with the rural landscape of Spring Flat. In the context of that development proceeding, the surrounding character of the site will be urban and consequently the future development of the site in line with the rezoning will be compatible with the surrounding character.

The area to the south of the site has also been identified for urban development in the *Mid-Western Regional Comprehensive Land Use Strategy* (refer to section 4.1). Consequently, the subject rezoning is consistent with the emerging and desired future character of the locality and appropriate for the location of the subject site.

6.4 Overall visual impacts

The overall visual impacts of the proposed development on its visual catchment, considering the weightings of each of the criteria above in 6.1 – 6.3 are assessed to be of **low significance**.

The final step of the method of assessment is to determine whether a low extent of impact makes the development acceptable or unacceptable. The way in which this was determined is explained in the following section of this report.

7 Significance of visual impacts

7.1 6.1 Summary of strategies to mitigate residual visual impacts

The likely future development of the site that would result from the rezoning is compatible with the abstract qualities of the surrounding landscape, i.e. the dominance of space over form, arrangement of elements in relation to each other, dominance of horizontal over vertical elements, the simplicity of forms and presence of repeated elements. Appropriate use of colours, materials and details will also be of relevance and these would be addressed in the future design process. As noted in the previous section, the visual setting of the site would benefit from the vegetation along the Lions Drive frontage being retained as far as practically possible, and low level landscaped open space at the front of the site along with commercial activation being incorporated into any resulting site plan.

The fact that the site is flat, meaning minimal earthworks would be required to facilitate any large format retail development, will minimise visual impact. Furthermore, the site will in future be surrounded by urban development so has a high absorption capacity for the intended outcome of the rezoning.

The rezoning of the site will also align with Council strategies in the short to medium term providing a hard edge between rural and urban landuses until urban development extends south of the site. There is also adequate area at the front of the site to enable reinforcement of any gateway treatments as part of the future development of the land.

The following is a summary of strategies that can be incorporated into the design of any future proposed development on the site that would result from the rezoning so as to minimise visual impacts on the visual catchment:

a) Appropriate side boundary setbacks, buffer zones and landscape treatments would be recommended to filter and soften views into the site. While Council planning strategies are to provide a 'hard rural/urban interface', large retail and industrial style buildings without landscaping would provide a stark contrast and impact on the landscape, however these landscaping strategies can soften this impact and still provide the hard edge treatment Council strategies seek as an outcome.
b) Retention of the existing mature eucalyptus vegetation along the Lions Drive frontage. This will not only provide visual relief along this frontage but will also provide important 'green cover' with elevation which is important in reducing any stark contrast of large buildings especially from distant views.
c) The site masterplan should incorporate a mixture of open space and commercial activation at the site's frontage with the Castlereagh Highway.
d) Planting of roadside vegetation at the Spring Flat Road intersection, consistent with existing roadside vegetation in the vicinity so as to screen views into the rear of the site and fit with the character of the locality.

7.2 Summary and significance of residual visual impacts

The predominant visual impact of the proposal is reflected in the assessment of the extent of effect on the intrinsic character of the site at section 5.3 of this report, and compatibility with the existing site character at 6.2. The site will be transformed from rural, to a large format retail landuse. The

extent of the impacts assessed on these criteria reflects that transformation, rather than the significance of the impacts of the development that is proposed.

Moderate visual impacts are typical levels for a site transformed from one form to another, whether it is from rural to urban, or from low to high density, for example. As such, moderate impacts of the residual effects of the proposal (ie, those features that cannot be mitigated totally) are not intrinsically unacceptable.

In this case the change of landuse will occur in a desired future character context as set out in the *Mid-Western Regional Comprehensive Land Use Strategy* which identifies the site and rural landscape to the south for future urban development. Furthermore, Council has approved, and the development has commenced construction, for a retirement village on the land immediately adjacent the southern boundary of the site.

For an average viewer, the expectation of a site on the fringe of urban Mudgee is that it could undergo the same kind of change, as adjacent land has. A potential large format retail development on the site, consistent with adjoining development would have a similar effect on the present view compositions from the visual catchment.

The detailed assessment above shows that the proposed rezoning to the B5 Business Development zone, and the likely resulting development, will be acceptable on visual impact grounds. In addition, there are no unreasonable visual and related amenity impacts of the proposal. As a result of the recommended strategies to further reduce visual impacts relating to modest landscaping around the southern boundary, retention of existing vegetation along the northern Lions Drive frontage and a mixture of low level landscaped open space and commercial activation on the Castlereagh Highway frontage, there is an adequate standard of protection and enhancement of the components of the visual setting and visual resources of the site.

For viewing locations within the visual catchment in both public and private domains, the main effect would be a change in the foreground views of parts of the subject site. This effect would not be accompanied by any other significant amenity effects and impacts such as privacy, view blocking or negative effect on scenic quality or visual character. Further, and as noted above, modest landscaping will act to soften the impact of the built structure in the existing rural setting adjoining the site which is likely to change also to an urban form in the future in line with Council strategies and existing development approvals and proposals.

It is considered that the measures taken as part of the proposal assist in mitigating any potential unreasonable visual impacts of the proposal, that there are only localised low visual impacts on some of the close range locations which are considered to be acceptable, and that there are no significant residual visual impacts.

Taken together, the visual impacts of the proposal are not significant and that it is supportable on those grounds.

Development of the site for large format speciality retailing is also aligns with Councils strategies with specific gateway treatments capable of being set at the Development Application stage.

8 Conclusion

On the basis of the detailed assessment presented in this report, it is concluded that there are no unacceptable visual, streetscape or related amenity effects that are likely to occur from the proposed rezoning of the site from the current RU4 Primary Production Small Lots to the B5 Business Development zone.

The assessment has found that while the rezoning would fundamentally change the character of the site itself from rural to urban, the site presents a high level of physical absorption capacity, would have a low prominence provided setbacks and landscaping is provided to soften the urban/rural interface, and would be compatibility with adjoining development to the north and east, is consistent with the planning strategies for the area and consequent will have a **low/acceptable visual impact**

There would be a minor change in part of the foreground of the view from some of the close range public domain locations within the visual catchment. However, this is not considered to be a significant impact consequence as any future development resulting from the rezoning would appear to have a medium to high compatibility with the streetscape and existing character, and desired future character of the locality.

A future large format retail facility can respond positively to the low density rural character of parts of the surroundings of the site provided the architecture, articulation, form, materials, colours and in particular landscaping recommended are appropriate within the context in which it would be located.

The proposal is consistent with the character of the immediate and wider visual context of the site and is assessed to be consistent with the desired future character context as set out in the *Mid-Western Regional Comprehensive Land Use Strategy* which identifies the site and rural landscape to the south for future urban development. The site is also located at the southern gateway to Mudgee with existing tree line Castlereagh Highway extending south of the town. There is opportunity for Council to set further landscape and gateway treatments at the DA stage.

Appendix 10 – Ethos Urban Letter – Demand for Additional B5 Land 7 July 2020

ETHOS URBAN

7 July 2020

Project Number 3190360

Mr Stephen Leathley
Planning Director
Insite
PO Box 93, Cessnock NSW 2325

Via email: stephen@insiteplan.com.au

Dear Stephen,

RE: Mudgee Demand for Additional B5 Land

Thankyou for the discussion relating to feedback from Council on the demand for B5 land and implications for the existing Bunnings site, as well as Pad sites 1 to 3 at the proposed new Bunnings Mudgee location.

As per the Economic Assessment report prepared in January 2020, ongoing growth in demand for the wide variety of land uses suited to the B5 zone can be anticipated over coming years.

In any normal circumstance, providing specific timing on the expected take-up of individual tenancies is difficult in that it is impossible to identify all of the location metrics of all prospective tenants. Any assessment of demand for land in the B5 Zone (or any other zoned land) is made on the basis of forecast 'market demand' for land take-up at a holistic level rather than down to individual tenancies.

With the economic disruption associated with COVID-19, providing guidance on the specific timing of the take-up of the land and tenancies is even more difficult. However, given the new Bunnings store opening will be some 18-months plus away, it is reasonable to assume a sense of normalcy will return to economic conditions by that time.

In relation to the market demand for land in the B5 Zone in Mudgee, it is useful to consider the following:

- The current Bunnings Mudgee store is located on land in the B5 Zone that is unable to meet current and anticipated operator and customer requirements
- Other vacant land in the B5 Zone is not appropriate or able to accommodate a new Bunnings store as currently proposed
- With the exception of land adjacent to the railway corridor which has access and layout issues, land within the B5 Zone fronting Sydney Road is in strong demand and has a high occupancy rate
- Some land in the B5 Zone has low levels of exposure and is more suited to an industrial zone

- Both the existing Bunnings location and the pad sites at the proposed new Bunnings have exposure to Sydney Road and will be attractive to prospective tenants seeking to locate in Mudgee
- It is also possible that some existing businesses in Mudgee may seek to locate at either the current or proposed Bunnings locations as a means of expanding their operations
- The current Bunnings store is easily re-purposed for alternative uses and the warehouse built-form is adaptable to accommodate single or mutliple tenancies, as determined by the individual business requirements of new tenants
- Notwithstanding the impacts of COVID-19, Mudgee is experiencing, and is forecast to continue experiencing, population growth that will increase demand for the mix of business and warehouse uses, and specialised retail premises that require a large floor area which is the preferred development outcome in the B5 Zone.

As also informed by discussions with local commercial real estate agents undertaken during preparation of the Economic Assessment report, we remain confident that the market conditions exist for a relatively prompt take-up of the existing Bunnings store.

Until the timing of the relocation of Bunnings is confirmed, it is impossible for a marketing and leasing program for the existing tenancy to proceed. However, we consider it a reasonable expectation that a tenant will be found within 6 to 12 months of Bunnings' relocation, if not earlier. Ultimately, this situation is beyond the control of Bunnings, as the leasing program will be the responsibility of the current site owner.

Further, once the new Bunnings store is operating the pad sites will also be attractive to potential tenants; this is the experience with pad sites located adjacent to Bunnings stores across Australia. We expect that the pad sites will not be developed simultaneously, rather that their development and occupancy will be staged according to tenant demand.

From an economic development perspective, this would be a preferred outcome, as it ensures that Mudgee has a supply of high-quality sites available for occupancy by mixed businesses, warehouses and large-format retail. Importantly, these sites will be serviced and benefit from co-location with the exposure and complementary infrastructure proved by an adjacent Bunnings store.

***

We trust this letter of advice addresses your requirement. Please feel free to call and discuss any aspect.

Sean Stephens
Group Director, Economics
0415 361 784
sstephens@ethosurban.com

Appendix 11 – Ethos Urban Letter of Advice – Demand for Additional b5 Land 20 August 2020

ETHOS URBAN

20 August 2020

Project Number: 3190360

Mr Stephen Leathley
Planning Director
Insite Plan

Via email: stephen@insiteplan.com.au

Dear Stephen,

RE: Bunnings Mudgee Further Response to Council Feedback

Thank you for the briefing in relation to further feedback from Mid-Western Regional Council on the Bunnings Mudgee application, and in particular matters related to the economic need and demand for additional zoned land in the so-called 'Sydney Road precinct'.

Note that I also had a conversation with Sarah Armstrong at Council. Sarah has also indicated a more detailed assessment of land demand and supply in Sydney Road precinct in which the current and proposed Bunnings sites are located would assist Council decision-making.

In response to the feedback, this Letter of Advice provides further analysis of:

- The historic and forecast demand for appropriately zoned land (most importantly in the B5Z) within the Sydney Road precinct.
- Reasonable market expectations for tenant demand in the precinct, as relevant to the re-leasing of the existing Bunnings store, and future leasing of the ancillary tenancies at the proposed Bunnings site.
- Other additional commentary of relevance to the proposed Bunnings and demand for uses envisaged within the Sydney Road precinct.

Note that this current Letter of Advice should be read in combination with:

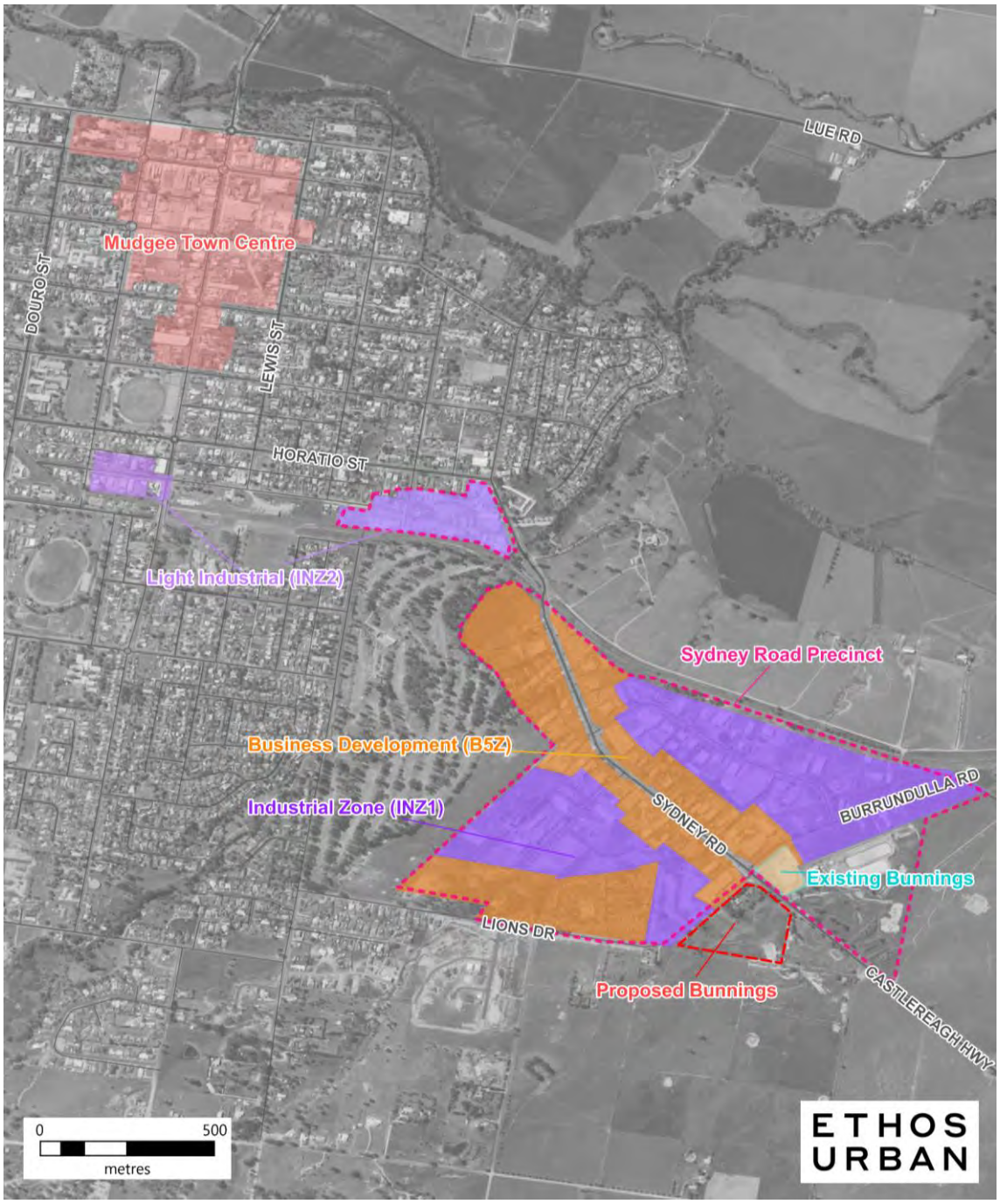
- The Economic Assessment report provided with the original planning application dated January 2020 which undertakes an economic impact assessment of the Bunnings proposal and identifies the shortcomings of the current Bunnings Mudgee store.
- A supplementary letter provided in July 2020 which provides additional context on the market opportunities to lease the existing Bunnings building and other ancillary tenancies proposed on the new Bunnings site.

In combination, we believe that all three documents provide a sufficiently detailed economic assessment of the proposed Bunnings Mudgee to appropriately inform Council decision-making.

Sydney Road Precinct Take Up Rate Analysis

The Sydney Road precinct is located on the south-eastern entry to Mudgee and is primarily composed of large-format retail, showrooms, light industry and general business activity. The precinct is primarily located south of the former railway corridor, although does include a small amount of land immediately north. An overview of the Sydney Road precinct and its relationship to the balance of Mudgee is shown in Map 1.

Map 1 Sydney Road Precinct Locational Context (including Existing and Proposed Bunnings)



Source: Mapinfo; Ethos Urban

Within the Sydney Road precinct, the land north of the former railway corridor is in the IN2Z.

Immediately south of the railway corridor, land is in the B5Z for sites primarily fronting Sydney Road, and in the IN1Z for land located further east and west which does not have main road access and exposure. Some land in the B5Z is also located adjacent to Lions Drive in the south of precinct, without exposure to Sydney Road.

The existing Bunnings Mudgee is itself is located on land in the B5Z at a prominent gateway entry to the town, in proximity to a cluster of large-format retailers including Harvey Norman.

In considering the demand for land across the Sydney Road precinct, it is relevant to consider the nature of the uses envisaged by the B5Z, IN1Z and IN2Z planning zones which predominantly apply in the area.

Although the B5Z is generally intended to accommodate uses with a more commercial focus and which require exposure to passing traffic, in reality all three zones support significant overlap in terms of the scale and nature of allowable development. This is summarised in Table 1 which identifies uses permitted with consent in the zones, as identified in the Mid-Western LEP 2012.

Table 1 Comparison of Uses Permitted with Consent, B5Z, I1Z and I2Z

B5Z	IN1Z	IN2Z	All Three Zones
Agricultural produce industries	Depots	Agricultural produce industries	Garden Centres
Centre-based child care facilities	Freight transport facilities	Depots	Hardware and building supplies
Kiosks	Funeral homes	Food and drink premises	Landscaping material supplies
Passenger transport facilities	General industries	Industrial training facilities	Light industries
Respite day care centres	Industrial training facilities	Kiosks	Oyster aquaculture
Roadside stalls	Liquid fuel depots	Liquid fuel depots	Plant nurseries
Specialised retail premises	Neighbourhood shops	Neighbourhood shops	Rural supplies
Take away food and drink premises	Offensive storage establishments	Places of public worship	Tank-based aquaculture
	Places of public worship	Roadside stalls	Timber yards
	Take away food and drink premises		Vehicle sales or hire premises
			Warehouse or distribution centres

Source: Mid-Western Regional LEP 2012

As identified in Table 1, the nature and scale of uses accommodated under all three zones is very diverse and can include businesses operating across a wide range of industries and with extremely different demand drivers. The range of industries accommodated include everything from child care facilities (B5Z) through to funeral homes (INZ1) and timber yards (all three zones).

As such, any assessment of the future demand for land in the Sydney Road precinct can be considered a generalised assessment only. This is based on reasonable land development expectations, rather than a specific assessment of all the myriad of land uses able to be accommodated across the relevant zones.

This is in contrast to the January 2020 Economic Assessment report provided to Council which specifically considers the economic need and impacts of the proposed Bunnings and associated showroom/bulky goods uses.

In regional towns such as Mudgee, which lack the scale and 'market depth' of major regional cities and metropolitan areas, the demand for employment land is often lumpy and unpredictable.

As such, it is not uncommon in similar sized towns to Mudgee for a large land use, such as a Bunnings, to require land which otherwise is not identified in a traditional demand analysis using historical take up data. For this reason, many regional Council's allow for 15-years worth of supply of undeveloped industrial land so as to accommodate fluctuations in demand as and when they arise.

Sydney Road Precinct Land Supply

The Sydney Road precinct contains a total of approximately 94 hectares of available zoned land.

We have undertaken a review of land supply and take up rates for the Sydney Road precinct via the Six Maps 'clip & ship' tool and historical satellite imagery for the years 1990, 1994, 2003, 2010, 2015, and 2020 obtained via Lot Search (these images shown as Appendix A).

From this information, lots are classified as either being 'developed' or 'undeveloped'. A developed lot is defined when the following two conditions are both met:

1. Has a structure and indications of activity on the lot, **and**
2. At least 80% of the lot has been developed, is activated or otherwise improved.

This criteria excludes large lots that otherwise have a building on them but are not substantively, or fully, developed.

Overall, the methodology applied is a conservative assessment of lot demand relative to some similar land use studies which count any improvement on a lot as indicating a developed site, even if that improvement covers only a very small proportion of the overall site.

A summary of the take up rates of land in the Sydney Road precinct in the 30-year period between 1990 and 2020 is provided in Table 2.

Table 2 Sydney Road Precinct Developed Land Trends, 1990 to 2020

Category	1990	1994	2003	2010	2015	2020
Developed Land	38.5ha	46.3ha	54.1ha	77.6ha	82.1ha	83.5ha
Share developed	41.0%	49.4%	57.6%	82.7%	87.5%	89.0%
Number of developed Lots	65	79	92	119	134	139
Undeveloped Land	55.3ha	47.5ha	39.7ha	16.2ha	11.7ha	10.3ha
Share undeveloped	59.0%	50.6%	42.4%	17.3%	12.5%	11.0%
Number of undeveloped lots	98	84	71	44	29	24
Average annual take up rate (%)		4.7%	1.7%	5.3%	1.1%	0.3%
Average annual take up rate		2.0ha	0.9ha	3.4ha	0.9ha	0.3ha
Annual lot consumption rate		3.5	3.3	6.8	3.8	1.3
Base Area (2020)	93.8ha	93.8ha	93.8ha	93.8ha	93.8ha	93.8ha
Total Lots (2020)	163	163	163	163	163	163

Source: Ethos Urban; Sixmaps; Lotsearch

Key findings of the analysis summarised in Table 2 are as follows:

- Currently, 83.5 ha of land or 89.0% of all lots in the Sydney Road precinct are developed, or around 11.0% of the lots remain undeveloped.
- Of a total of 163 lots within the Sydney Road precinct, 139 have been developed with 24 lots classified as undeveloped.
- Although a small number of developed lots are underutilised, historical imagery shows that this utilisation can increase over time through more efficient use of land, more intensive development, or sub-dividing lots to respond to tenant demand (this has primarily occurred along Sydney Road).
- The historical period with the fastest take up rate was between the years **2003 to 2010**, when the average annual take up rate was at an average of 5.3% per annum. This is equivalent to 3.4 Ha of land being developed each year, or an average of 6.8 lots developed annually during this period.
- Since 2010, the average take up rate has declined to an average of 1.1% per year between 2010 and 2015, and just 0.3% between 2015 to 2020. This slower take up rate co-incides with the occupancy rate approaching 90% (i.e available land at around 10% of total supply).

The changing mix of developed and undeveloped land within the Sydney Road precinct over time is highlighted in Figure 1.**Figure** 2 Price of Vacant Land in Sydney Road Precinct, 1994 to 2020

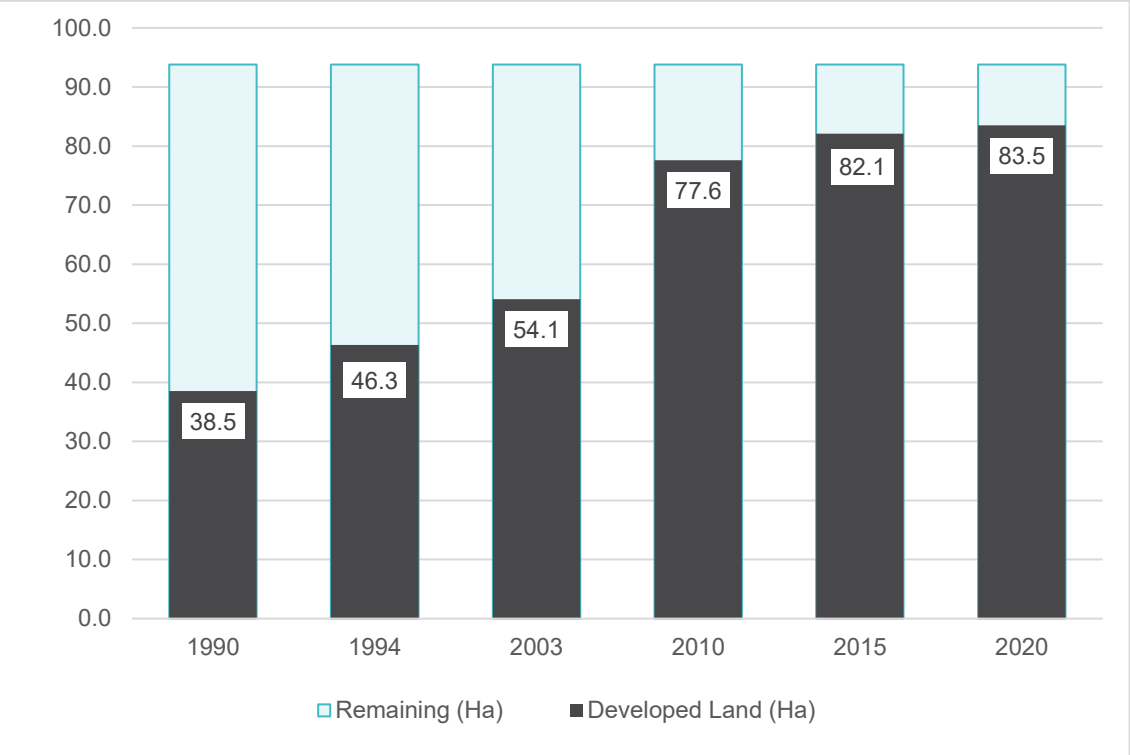
Source: Ethos urban; Pricefinder

Notes: this data is extracted from pricefinder for the Sydney Precinct area it contains only those sales that are identified as 'vacant land' and zoned as either 'businesses', 'industrial' or 'special purpose'. An examination of uncategorised sales was made to ensure all available sales data was used.

An extract of vacant land sales from Pricefinder from 1994 to 2020 summarised in Figure 2 shows that the average price per sqm of vacant land has been steadily increasing.

Evidence of a lack of available supply is apparent looking at the price of vacant land in the Sydney Road precinct.

Figure 1 Developed Land within Sydney Road Precinct (Hectares)



Source: Lotsearch; Ethos Urban; Sixmaps

As identified in Figure 1, since 2010 the rate of land development in the Sydney Road Precinct has declined as the share of developed land has approached 90% (i.e 10% undeveloped).

Since 2010, the rate of development in the Sydney Road precinct has been just 0.6 hectares per annum, well below the development rate of 2 hectares per annum experienced between 1990 and 2010. This slow down in development within the Sydney Road precinct does not appear to be associated with an increased take up of land at other locations in Mudgee.

Further, this slow down in demand for employment land in Mudgee since 2010 is not consistent with our analysis of employment land undertaken in other regional cities and areas of Australia. Indeed, demand for industrial land across Australia has grown relatively consistently over the past 25-years.

In addition, the rate of population growth in Mudgee has accelerated since 2010. This implies growing demand for service industry to meet the needs of the resident population, not a slowing of this demand as is identified in actual development rates in the Sydney Road precinct since 2010.

This indicates, at least anecdotally, the current availability of vacant sites is not consistent with the locational expectations of potential occupiers. In particular, those seeking exposure to Sydney Road.

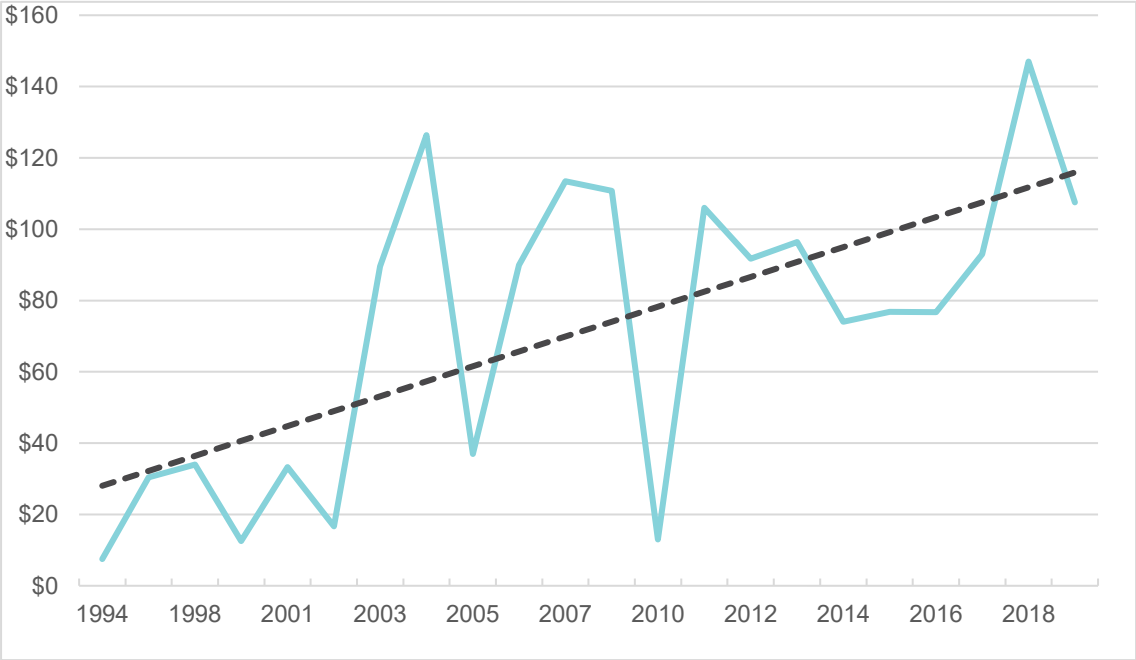
As identified in the January 2020 Economic Assessment report, the current availability of appropriately zoned land does not accommodate the requirement for a new and larger Bunnings Mudgee. Thus a rezoning of the subject site on the south-west corner of Lion Drive and Sydney Road to the B5Z is now proposed.

Land Price Trends

In general terms, a functioning and competitive land market exists where *'land with appropriate attributes is available to a range of potential occupants at a competitive price'*.

Where this is achieved for employment land such as the Sydney Road precinct, a regional town such as Mudgee should be able to accommodate both the growth of existing businesses, and the attraction of new businesses. This is consistent with business development and the creation of economic opportunity for the community.

Figure 2 Price of Vacant Land in Sydney Road Precinct, 1994 to 2020



Source: Ethos urban; Pricefinder

Notes: this data is extracted from pricefinder for the Sydney Precinct area it contains only those sales that are identified as 'vacant land' and zoned as either 'businesses', 'industrial' or 'special purpose'. An examination of uncategorised sales was made to ensure all available sales data was used.

An extract of vacant land sales from Pricefinder from 1994 to 2020 summarised in Figure 2 shows that the average price per sqm of vacant land has been steadily increasing.

Evidence of a lack of available supply is apparent looking at the price of vacant land in the Sydney Road precinct.

In 1994, the trend adjusted sales price of vacant land in the Sydney Road precinct was around $28 per sqm. This has subsequently increased to a trend adjusted average of $115 per sqm in 2020, acknowledging that most of this land is located in non-preferred locations away from Sydney Road and thus undercounts the true increase in land values in the precinct.

As such, over the period 1994 to now the value of land in the Sydney Road precinct has increased by an average of 5.6% per annum.

Such a rate of capital growth for industrial land is very strong for a regional area, and well exceeds the CPI rate of 2.4% over the period. For many industrial land developers, an assumed rate of capital growth is CPI +1%, which would imply an average growth rate for vacant land of 3.4% over the comparable period. This is well below the price growth of 5.6% actually achieved in the Sydney Road precinct, and indicates strong demand for land (even on a speculative basis for vacant blocks) and the potential for additional land supply to support more moderate price growth that benefits tenants (i.e. local businesses).

A high-level comparison of vacant land sales in Dubbo and Orange indicates that the Sydney Road precinct has land values significantly higher than for employment land in these other regional centres.

Historic Distribution of Development in in Sydney Road Precinct

In spatial terms, the historic take up of land in the Sydney Road precinct is summarised in Map 2.

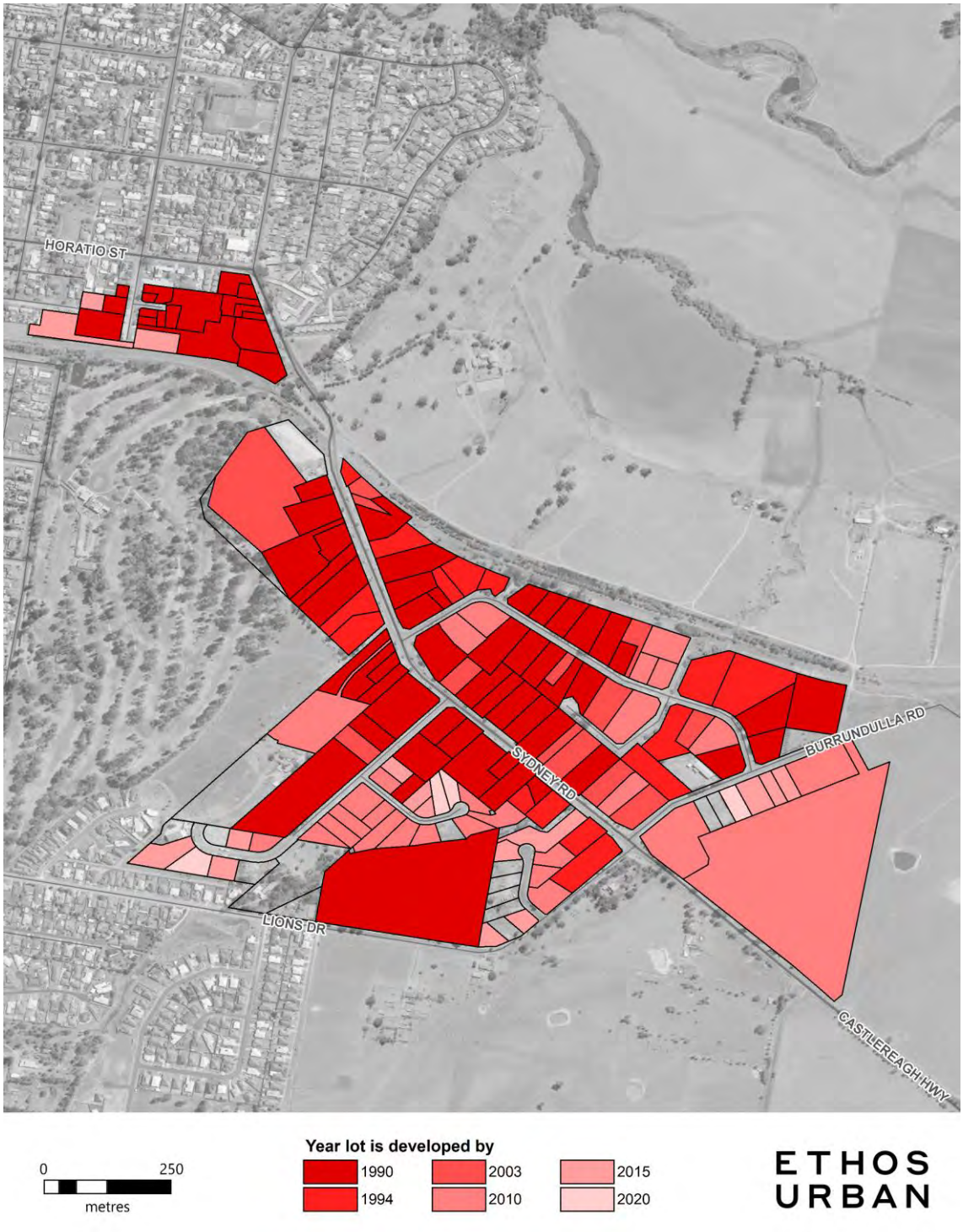
The key features of the historic patterns of development in the Sydney Road precinct are as follows:

- Lots with good exposure to Sydney Road have tended to be developed earlier than lots away from Sydney Road with less exposure to passing trade.
- This pattern of development is most pronounced for land within the B5Z, where B5Z lots fronting Sydney Road have been developed significantly earlier than the B5Z lots in the south-west pocket of the precinct fronting Lions Drive.
- Slower take up rates are observed for land in the IN1Z, such as along Depot Road, Wilkins Crescent and Industrial Avenue.

This again emphasises the market preference for exposure to Sydney Road, and that in particular demand for land in the B5Z has a clear preference for main road visibility and access.

We note that other areas of land in the IN1Z and IN2Z are identified in Mudgee, although these sites are either fully occupied (Inglis Street) or un-serviced and at a low exposure location (Hill End Road). Neither location represents a feasible alternative for the proposed Bunnings Mudgee.

Map 2 Historic pattern of land development in Sydney Road Precinct



Source: Ethos Urban; Sixmaps

Forecast Demand for Land in Sydney Road Precinct

A forecast of demand for employment land in the Sydney Road precinct has been prepared using historical take up rates and applying this to current land availability.

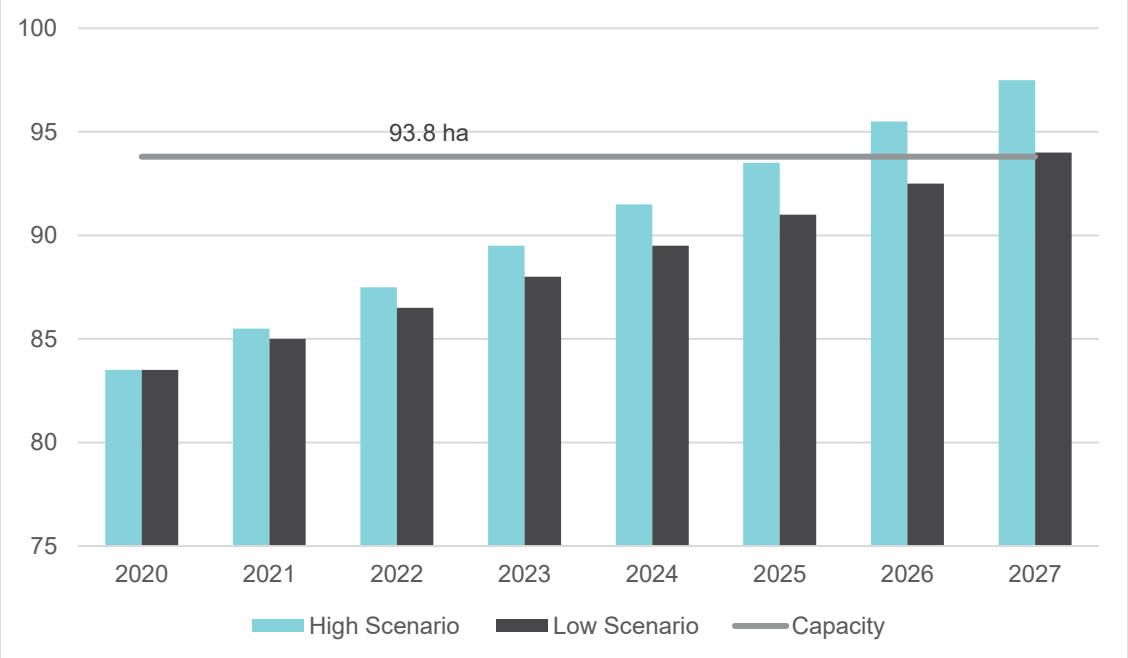
Specifically, two scenarios have been identified:

- **High Scenario**: This scenario assumes the take up rate achieved between 1990 and 2010 of 2 hectares per annum is achieved from 2020 onwards. This scenario reflects demonstrated demand for employment land in the Sydney Road precinct in a 20-year period where a strong supply of available and appropriately located land was available.
- **Low Scenario**: Applies the more conservative take up rate of 1.5 hectares per annum achieved across the 30-year period from 1990 to 2020, including the more recent slow down in rates of development.

As shown in Figure 2, under the High Scenario the Sydney Road precinct has a theoretical land supply of 93.8 hectares which reaches full capacity in 2025, while even under the Low scenario this is achieved in 2027.

This is well below the generally accepted requirement for at least 10 years, and preferably 15 years of available employment land supply which is recommended for a competitive land market.

Figure 2 Sydney Road Precinct Development Capacity Forecast



Source: Ethos Urban

In the context of the above, the proposed rezoning of 5.5 hectares of land to the B5Z at the corner of Lions Drive and Sydney Road would increase the available employment land supply to 99.3 hectares. On this basis, theoretical capacity would be reached on the following timelines:

- **High Scenario**: 2028
- **Low Scenario**: 2031 or just within the generally accepted 10 to 15 years of supply typically applied in a land use planning context.

Note that of the 5.5 hectares proposed for rezoning, Bunnings itself requires approximately half. The balance will be developed over time for a mix of showroom, bulky goods, light industrial or other uses as appropriate for the B5Z (see also Table 1 of this letter).

On this basis, we continue to believe that (as per previous advice to Council) the demand for the proposed expansion and relocation of Bunnings Mudgee:

- The current Bunnings Mudgee store is located on land in the B5 Zone within the Sydney Road precinct that is unable to meet current and anticipated operator and customer requirements
- Other vacant land in the Sydney Road precinct is not appropriate or able to accommodate a new Bunnings store as currently proposed
- With the exception of a parcel of land adjacent to the railway corridor which has access and layout issues, land within the B5 Zone fronting Sydney Road is in strong demand and has a high occupancy rate (well over 90%)
- Both the existing Bunnings location and the pad sites at the proposed new Bunnings have exposure to Sydney Road and will be attractive to prospective tenants seeking to locate in Mudgee
- Notwithstanding the impacts of COVID-19, Mudgee is experiencing, and is forecast to continue experiencing, population growth that will increase demand for the mix of business and warehouse uses, and specialised retail premises that require a large floor area. That is the preferred development outcome in the B5 Zone, and more generally within the Sydney Road precinct.

Further, our historic land supply analysis for the Sydney Road precinct specifically identifies an existing shortfall in vacant and available zoned land which is appropriate to accommodate new business development. This is such that the supply of developable employment land in the Sydney Road precinct is more restrictive than contemporary land use policy objectives which generally seek at least 10 years, and preferably 15 years of supply.

Current Market Conditions

Commercial Agent Feedback

In order to understand current insights into the current leasing market for business premises in the Sydney Road precinct, further consultation was undertaken with local commercial agents. Phone interviews with three agents were conducted over the period 3 August to 7 August, 2020. All discussions were undertaken on the basis that feedback was to be confidential, as a means of ensuring more accurate market insights.

A selection of relevant feedback is as follows:

- **Lumpy Demand.** Demand within the Sydney Road Precinct can come in waves. Although the precinct is still not completely full after forty or so years, the remaining sites are primarily in secondary rather than prime locations.
- **Mining.** Mining activity is an important although not dominant part of demand, with mining firms tending to be particular about the types of sites they're after.
- **Covid-19**. Market interest has dropped since Covid-19. However, the Sydney Road precinct delivers good returns and is a quality business location that will recover in due course.
- **Tenant Requirements.** The most often quoted requirement for tenants is visibility and the ability to get truck movements in and out of the site easily.

- **Sydney Road.** The market places a significant premium on lots with good exposure to Sydney Road.

> *"The [existing] Bunnings Site is in a good location that doesn't come up often"*

- **Existing Bunnings Site**. Some interest in the existing Bunnings site is expected once the store relocates. It is likely the existing building would be split into smaller tenancies. However, it is also possible another anchor tenant may express interest given the prominent location and existing site improvements.

Site Visit

Further to discussions with agents, a site visit was undertaken to identify any vacancies and changes in the market and tenancy mix within the Sydney Road precinct since the previous site visit in late 2019.

According to this visit, no major changes to the overall tenancy mix was identified which are of relevance to the Bunnings Mudgee application and understanding the overall performance of employment land in the Sydney Road precinct.

The formerly vacant and large tenancy at 5b Sydney Road is now occupied by Stripes Industrial Supplies. We note this tenancy was identified previously by Council as a potential concern when it was vacant. However, a new tenant has been found within approximately 12-months.

A number of smaller vacant tenancies were also identified at 9 Sydney Road and 38 Sydney Road. These are older buildings suited to a small office or service business. One of the commercial agents who was consulted indicated that these tenancies turned over to new tenants relatively regularly.

The Gracie's accommodation business at 18 Sydney Road is also for sale, although would be difficult to repurpose for another use other than hospitality.

It is vital to remember that Council's role is not to ensure the commercial viability of businesses and full occupancy of all tenancies within employment areas such as the Sydney Road precinct. Any employment area will always have vacancies associated with a wide range of factors including the turnover of tenants, redundant building stock, unrealistic leasing conditions by landlords, insufficient rent expectations of potential tenants etc.

What is of relevance to Council is whether the strategic policy settings are appropriate to provide the opportunity for the business sector in Mudgee too grow and evolve in a manner that supports community need and economic prosperity.

Given the Sydney Road precinct accommodates nearly half of the total jobs located in Mudgee (approximately 2,500 jobs out of over 5,200 jobs in the town), the ability of the Sydney Road precinct to continue to make a significant contribution to economic development must be a relevant consideration for Council.

Summary and Conclusions

Overall, our assessment of land demand and supply for the Sydney Road precinct has identified:

- The development rate of land in the Sydney Road precinct has historically been significantly higher than in recent years, and averaged 2 hectares per annum between 1990 and 2010
- Since around 2010 when the occpuancy of land in the Sydney Road precinct has approached 90%, and land with characteristics desirable for business occupants has become more rare,

the rate of development in the precinct has slowed considerably to just 0.6 hectares per annum

- Historically demand for land in the Sydney Road precinct has been concentrated on lots fronting Sydney Road and within the B5Z
- Current supply of employment land in the Sydney Road precinct is equivalent to between just 5 and 7 years of theoretical demand according to actual historical take up rates, well-below general policy objectives seeking at least 10 years and ideally 15 years of supply to ensure a competitive land market
- This is reflected in relatively high rates of growth in the cost of land in the Sydney Road precinct which is then passed on to tenants
- The rezoning of land to the B5Z to accommodate an expanded and more modern Bunnings represents a sensible and incremental expansion to the Sydney Road precinct of approximately 5.5 hectares or 6%
- Even with this rezoning, the total supply of employment land in the Sydney Road precinct would be readily absorbed by theoretical demand in around a decade
- Discussions with agents and a site visit confirm that market conditions exist for the reasonable expectation of a prompt re-leasing of the current Bunnings Mudgee building, and subsequent leasing of ancillary tenancies adjacent to the new Bunnings Mudgee in subsequent years as demand allows
- That this would be achieved in a manner that does not undermine the vibrancy and economic sustainability of the balance of the Sydney Road precinct, and in fact is likely to attract additional visitation and businesses to the town.

It remains our firm view that a strong economic need has been demonstrated for the proposed new Bunnings Mudgee, and that the proposed rezoning provides an important opportunity to enhance the economic performance and contribution of the wider Sydney Road precinct. This is to the achievement of a net communioty benefit to the residents of Mudgee, as is relevant to matters within our our expertise.

***

I trust this letter of advice is of assistance. Please don't hesitate to contact me at your convenience to discuss further.

Sean Stephens
Group Director, Economics
(03) 9419 7226 and 0415 361784
sstephens@ethosurban.com

Date: 06 Aug 2020

Reference: LS013914 EA

Address: Mudgee, NSW 2850

Aerial Imagery 2020

Mudgee, NSW 2850

Scale:
0 125 250 375 500
Meters

Data Source Aerial Imagery: © 2020 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.

Coordinate System:
GDA 1994 MGA Zone 56

Date: 05 August 2020

Aerial Imagery 2015

Mudgee, NSW 2850

Scale: 0 125 250 375 500 Meters	Data Source Aerial Imagery: © 2020 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 56	Date: 05 August 2020

Aerial Imagery 2010

Mudgee, NSW 2850

Scale: 0 125 250 375 500 Meters	Data Source Aerial Imagery: © 2020 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 56	Date: 05 August 2020

Aerial Imagery 2003

Mudgee, NSW 2850

Scale:
0 125 250 375 500
Meters

Data Source Aerial Imagery: © 2020 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.

Coordinate System:
GDA 1994 MGA Zone 56

Date: 05 August 2020

Aerial Imagery 2000

Mudgee, NSW 2850

Scale:	Data Source Aerial Imagery:	Coordinate System:	Date: 07 August 2020
0 125 250 375 500 Meters	© NSW Department of Customer Service	GDA 1994 MGA Zone 56	

Aerial Imagery 1994

Mudgee, NSW 2850

Aerial Imagery 1990

Mudgee, NSW 2850

USE OF REPORT - APPLICABLE TERMS

The following terms apply to any person (End User) who is given the Report by the person who purchased the Report from Lotsearch Pty Ltd (ABN: 89 600 168 018) (Lotsearch) or who otherwise has access to the Report (Terms). The contract terms that apply between Lotsearch and the purchaser of the Report are specified in the order form pursuant to which the Report was ordered and the terms set out below are of no effect as between Lotsearch and the purchaser of the Report.

1. End User acknowledges and agrees that:
   (a) the Report is compiled from or using content (**Third Party Content**) which is comprised of:
      (i) content provided to Lotsearch by third party content suppliers with whom Lotsearch has contractual arrangements or content which is freely available or methodologies licensed to Lotsearch by third parties with whom Lotsearch has contractual arrangements (**Third Party Content Suppliers**); and
      (ii) content which is derived from content described in paragraph (i);
   (b) Neither Lotsearch nor Third Party Content Suppliers takes any responsibility for or give any warranty in relation to the accuracy or completeness of any Third Party Content included in the Report including any contaminated land assessment or other assessment included as part of a Report;
   (c) the Third Party Content Suppliers do not constitute an exhaustive set of all repositories or sources of information available in relation to the property which is the subject of the Report (**Property**) and accordingly neither Lotsearch nor Third Party Content Suppliers gives any warranty in relation to the accuracy or completeness of the Third Party Content incorporated into the report including any contaminated land assessment or other assessment included as part of a Report;
   (d) Reports are generated at a point in time (as specified by the date/time stamp appearing on the Report) and accordingly the Report is based on the information available at that point in time and Lotsearch is not obliged to undertake any additional reporting to take into consideration any information that may become available between the point in time specified by the date/time stamp and the date on which the Report was provided by Lotsearch to the purchaser of the Report;
   (e) Reports must be used or reproduced in their entirety and End User must not reproduce or make available to other persons only parts of the Report;
   (f) Lotsearch has not undertaken any physical inspection of the property;
   (g) neither Lotsearch nor Third Party Content Suppliers warrants that all land uses or features whether past or current are identified in the Report;
   (h) the Report does not include any information relating to the actual state or condition of the Property;
   (i) the Report should not be used or taken to indicate or exclude actual fitness or unfitness of Land or Property for any particular purpose
   (j) the Report should not be relied upon for determining saleability or value or making any other decisions in relation to the Property and in particular should not be taken to be a rating or assessment of the desirability or market value of the property or its features; and
   (k) the End User should undertake its own inspections of the Land or Property to satisfy itself that there are no defects or failures
2. The End User may not make the Report or any copies or extracts of the report or any part of it available to any other person. If End User wishes to provide the Report to any other person or make extracts or copies of the Report, it must contact the purchaser of the Report before doing so to ensure the proposed use is consistent with the contract terms between Lotsearch and the purchaser.
3. Neither Lotsearch (nor any of its officers, employees or agents) nor any of its Third Party Content Suppliers will have any liability to End User or any person to whom End User provides the Report and End User must not represent that Lotsearch or any of its Third Party Content Suppliers accepts liability to any such person or make any other representation to any such person on behalf of Lotsearch or any Third Party Content Supplier.
4. The End User hereby to the maximum extent permitted by law:
   (a) acknowledges that the Lotsearch (nor any of its officers, employees or agents), nor any of its Third Party Content Supplier have any liability to it under or in connection with the

Report or these Terms;

(b) waives any right it may have to claim against Third Party Content Supplier in connection with the Report, or the negotiation of, entry into, performance of, or termination of these Terms; and

(c) releases each Third Party Content Supplier from any claim it may have otherwise had in connection with the Report, or the negotiation of, entry into, performance of, or termination of these Terms.

5. The End User acknowledges that any Third Party Supplier shall be entitled to plead the benefits conferred on it under clause 4, despite not being a party to these terms.
6. End User must not remove any copyright notices, trade marks, digital rights management information, other embedded information, disclaimers or limitations from the Report or authorise any person to do so.
7. End User acknowledges and agrees that Lotsearch and Third Party Content Suppliers retain ownership of all copyright, patent, design right (registered or unregistered), trade marks (registered or unregistered), database right or other data right, moral right or know how or any other intellectual property right in any Report or any other item, information or data included in or provided as part of a Report.
8. To the extent permitted by law and subject to paragraph 9, all implied terms, representations and warranties whether statutory or otherwise relating to the subject matter of these Terms other than as expressly set out in these Terms are excluded.
9. Subject to paragraph 6, Lotsearch excludes liability to End User for loss or damage of any kind, however caused, due to Lotsearch's negligence, breach of contract, breach of any law, in equity, under indemnities or otherwise, arising out of all acts, omissions and events whenever occurring.
10. Lotsearch acknowledges that if, under applicable State, Territory or Commonwealth law, End User is a consumer certain rights may be conferred on End User which cannot be excluded, restricted or modified. If so, and if that law applies to Lotsearch, then, Lotsearch's liability is limited to the greater of an amount equal to the cost of resupplying the Report and the maximum extent permitted under applicable laws.
11. Subject to paragraph 9, neither Lotsearch nor the End User is liable to the other for:
    (a) any indirect, incidental, consequential, special or exemplary damages arising out of or in relation to the Report or these Terms; or
    (b) any loss of profit, loss of revenue, loss of interest, loss of data, loss of goodwill or loss of business opportunities, business interruption arising directly or indirectly out of or in relation to the Report or these Terms,

    irrespective of how that liability arises including in contract or tort, liability under indemnity or for any other common law, equitable or statutory cause of action or otherwise.
12. These Terms are subject to New South Wales law.