Report

Cessnock Correctional Complex Access Road Option Analysis

Prepared for Department of Justice

By Beca Pty Ltd (Beca)
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13 December 2019

Revision History

Revision Nº	Prepared By	Description	Date
A		First draft	22/09/2017
B		Final	2/11/2017
C		Revised final incorporating client's comments	1/12/2017
D		Addition of Options 6A and 6B	25/06/2019
E		Final Report	13/12/2019

Document Acceptance

Action	Name	Signed	Date
Prepared by			13/12/2019
Reviewed by			13/12/2019
Approved by			13/12/2019
on behalf of			

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1 Background

The Department of Justice (DoJ) is proposing to expand the existing Cessnock Correctional Complex (the Complex) located on Lindsay Street, Nulkaba on the northern fringe of Cessnock, NSW. A REF has previously been prepared for these proposed works.

At present, the Complex is accessed via residential streets on Council maintained roads, primarily Lindsay St and Kerlew St and branching service roads. Current access is shown in Figure 1 below. The DoJ would like to determine alternative access options for the Complex so that Lindsay Street no longer needs to be used for access.

Beca has been commissioned to undertake the investigation, development and assessment of options and design of the new access road. As part of the investigation a site inspection was undertaken on 17 August 2017 with representatives from DoJ – Justice Infrastructure. The final version of the options report assessing Options 1, 2, 3A, 3B, 4 and 5, was submitted in December 2019.

Following stakeholder feedback on the initial options report, in May 2019 two additional route options have been put forward by the Department for assessment. These two options, 6A and 6B, were developed in discussion with DoJ.

The purpose of this report is to outline the options that have been considered, the approach taken to assessing these options and a summary for the outcomes of the assessment. This report should be read in conjunction with the Cessnock Correction Centre Access Road Optioneering Analysis (refer Appendix 2) which provides further detail about the specific criteria considered when assessing the options.

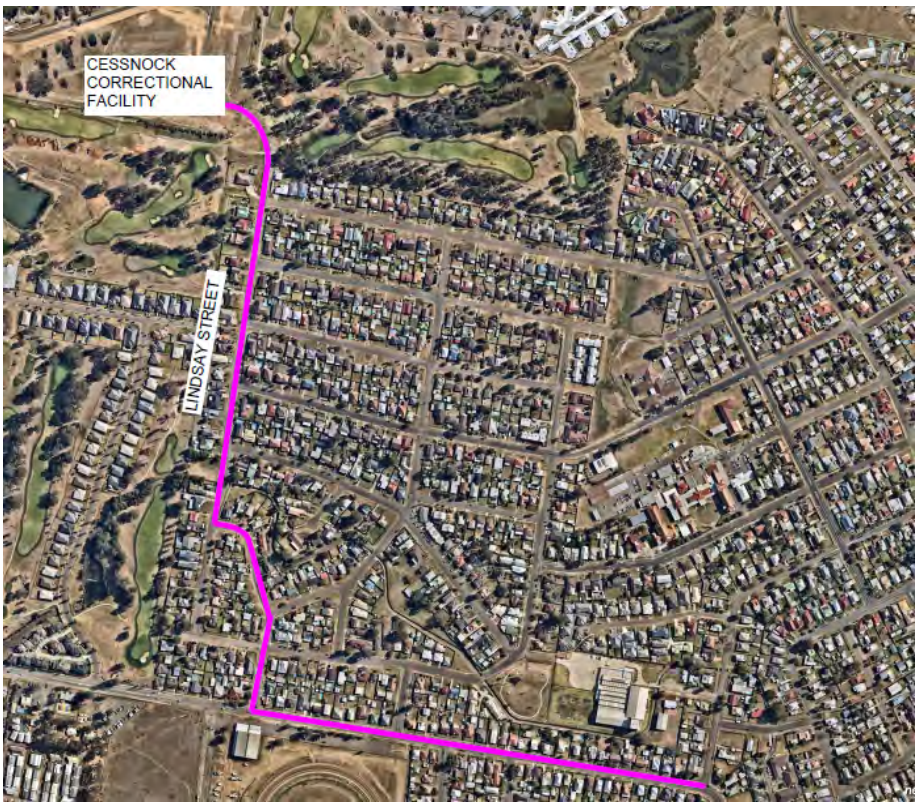

Figure 1: Current access to the Cessnock Correctional Complex via Lindsay St.

2 Description of Options

A total of eight alignment options have been investigated and developed by Beca for analysis of their suitability, constructability and potential risks/constraints. The preferred option will be determined by representatives from DoJ – Justice Infrastructure.

It is acknowledged that Nulkaba Public School has a petition against the access road works. Our understanding is that the impact on this school is equivalent for all Options described in this report. Figure 2 shows the location of Nulkaba Public School in relation to the Complex and the proposed access road works.

Figure 2: Nulkaba Public School in relation to the proposed access road works

Figure 3 shows the location of the options developed. These are described in further detail below and shown on Drawings SK00, SK01 Sheet 1 – SK01 Sheet 7 included in Appendix 1. All options, with the exception of Options 5, 6A and 6B, follow the existing access from Wine Country Drive on Kerlew Street.

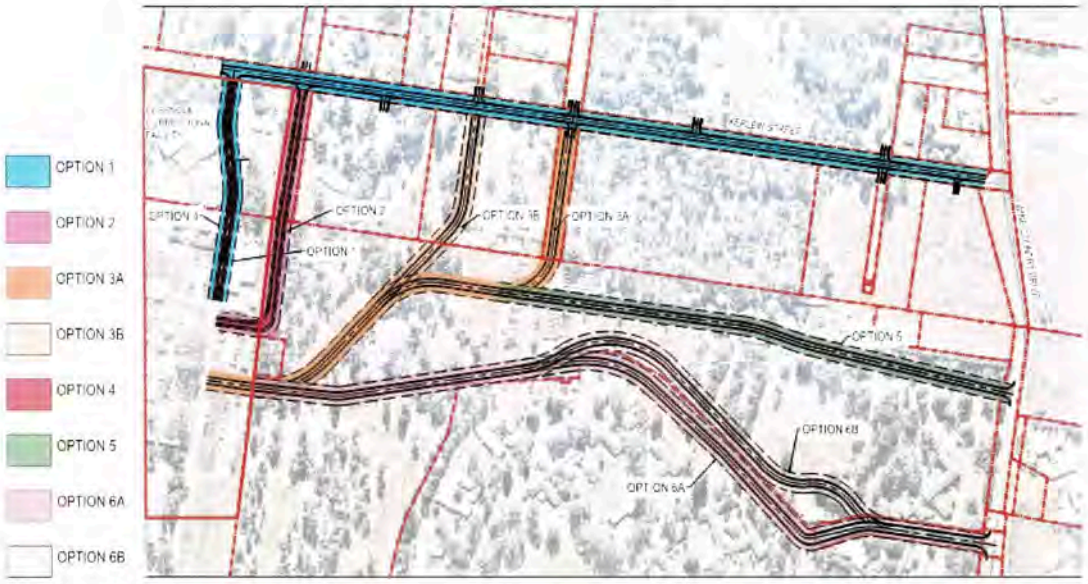

Figure 3: Access road alignment options

2.1 Option 1

Once on Kerlew Street, Option 1 continues west down Kerlew Street for approximately 820m. Connecting to the Complex via a proposed new section of road, generally following the existing construction access, linking Kerlew Street to the existing internal roads within the Complex. This option maximises the utilisation of existing road infrastructure, however, impacts on the operation of the Complex.

2.2 Option 2

Option 2 has a similar arrangement to Option 1, continuing down Kerlew Street from Wine Country Drive for approximately 755m. A new road would be constructed connecting Kerlew Street to the Complex, the alignment of which follows the western boundary of Lot 72 DP 755252 and then connects to existing internal roads within the Complex. This option maximises the utilisation of existing road infrastructure, however, has the most impact on Lot 72 DP 755252.

2.3 Option 3A

Option 3A follows Kerlew Street for approximately 460m before turning onto the southern-leg of Occident Street. The alignment then follows an existing internal road which traverses Lot 2 DP 1078864 before tying in with existing internal roads within the Complex. It is noted that the existing road through Lot 2 DP1078864 is classified as a road but it is expected that it would require upgrading to support the increased vehicle movements. This option disrupts fewer residents on Kerlew Street, however, requires vegetation removal and the demolition of operational structures.

2.4 Option 3B (Variation of Option 3A)

Option 3B follows a similar alignment to Option 3A, however, instead of accessing the Complex via Occident Street, Option 3B instead extends down Kerlew Street for 600m. A new road would be constructed ، ıd tie-in with the existing road on Lot 2 DP 1078864, following the same alignment as Option 3A to access the Complex. This option disrupts fewer residents on Kerlew Street, however, requires vegetation removal and purchase or

2.5 Option 4 (Variation of Options 1 and 2)

Option 4 is a combination of Options 1 and 2 creating a one-way loop road. Vehicles entering the Complex follow the same alignment as Option 1 while vehicles leaving the Complex follow the Option 2 alignment. This option maximises the utilisation of existing road infrastructure, however, has the same negative impacts as Options 1 and 2.

2.6 Option 5

Option 5 involves access from Wine Country Drive, however, instead of following Kerlew Street the access point would be a new road constructed approximately 200m south of the existing intersection with Kerlew Street and approximately 150m north of the retirement access. This alignment extends for approximately 530m along the north of Lot 2 DP 1078864 through land owned by the Department of Health before connecting to the existing road network on this site, following the same curved alignment as Options 3A and 3B to access the Complex. This Option limits the impact on the residents on Kerlew Street.

2.7 Option 6A

Option 6A utilises existing Calvary Cessnock Retirement Community access road from Wine Country Drive. This alignment follows this road for approximately 200m before turning right along an existing right of access within the northern boundary of Lot 11 DP 1169419 towards the Health Records building. The alignment bears left at the Health Records building, which will likely result in a relocation of this building, travelling along a new alignment within Lot 2 DP 1078864 before tying into existing internal roads within the Complex.

2.8 Option 6B (Variation of Option 6A)

Option 6B uses the same access road as in Option 6A; however, a new road will be constructed from the Storage building onwards to keep the alignment solely in Lot 2 DP 1078864 (land owned by the Department of Health). The new alignment will continue along the northern boundary of Lots 10 and 11 DP 1169419, and will likely require the relocation of the Health Records building. The road will then tie into the existing internal roads within the Complex. This option therefore eliminates the need to acquire land from the Calvary Cessnock Retirement Community.

3 Approach to Options Analysis

The Options Analysis is included in Appendix 2. A two-staged approach has been taken to assessing the eight different alignment options.

Firstly, a ranking of the different alignment options from 1 to 8 (a score of 1 being preferred / the least impact, a score of 8 being less-preferred) across a number of different criteria was applied. Where all options are equal for a given criteria they have all been given a ranking of 1. In the case where two are considered equal they are both given a ranking of 1 and the next criteria is given a ranking of 3 (and so on).

The ranking of criteria in the Options Analysis relied upon an assessment against the following factors - presence / absence of construction, environmental, social, planning and programming. These factors were identified by the DoJ and Beca as the key potential constraints and opportunities for the access road optioneering process.

Following the initial ranking of the options against the key criteria, weighting factors were applied to emphasise the options which best reflected the cost, social impacts and facility operations criteria

which are understood to be of most importance to DoJ. The weighting has been developed following a workshop discussion on 19/10/2017 and with reference to meeting minutes received from Robert McQueen, dated 27/10/2017 (refer Appendix 3 for attendees and meeting notes). Beca have assigned weightings to the best of our judgement based on these discussions.

A percentage approach was taken to weighting, with all criteria receiving a nominal 1% as a starting point. Six criteria relating to the features highlighted above then received additional weighting so that the overall weighting scores added up to 100%. The weighting factors were, therefore, entirely arbitrary and their only function was to differentiate the options rather than being considered as a performance scoring system. This ranking and weighting method is a typical approach used to support road optioneering studies [e.g. Multi Criteria Assessment used for Safe Roads Alliance project for NZTA] and aligns to the principles of the hazard likelihood component of Australian Risk Assessment Guidelines AS/NZS ISO 31000:2009. The six criteria in order of highest weighting first were: cost of construction (16%), cost of demolition (16%), cost of maintenance to DoJ (13 %), reconfiguration requirements (10 %), socio-economic impacts (10 %) and cost of maintenance to Cessnock City Council (6%).

An overall score is given to each options by multiplying the pre-weighted score by the weighted score for each sub-criteria. The scores are then added together to obtain the total score for each option. A lower overall score represents a preferred option.

We have used the LotSearch report (see Appendix 4) for the scoring of the environmental sub-criteria.

4 Option Analysis Outcomes

The following tables show overall ranking and a summary of the Options Analysis outcomes. Overall, across the criteria analysed, Option 2 has the lowest ranking indicating that it has fewer potential constraints with respect to the other options assessed. It is noted that the difference between the total scores for Option 2 and Option 3B is marginal, and thus these options may be deemed as equivalent. The two latest options, 6A and 6B, scored quite highly, and are thus the least preferable along with Option 5.

Option	Option 1	Option 2	Option 3A	Option 3B	Option 4	Option 5	Option 6A	Option 6B
Total Score	**237**	**225**	**370**	**226**	**380**	**492**	**490**	**558**
Overall Ranking	**3**	**1**	**4**	**2**	**5**	**7**	**6**	**8**

The table below provides a summary of the full Options Analysis provided in Appendix 2. This is broken down by the criteria assessed to give a snapshot of how each option performs.

Criteria	Summary of Option Analysis
Social	Option 3B has the lowest score indicating it is the preferred option for this criteria. This reflects the initial engagement that has been undertaken with the [illegible] property.

Criteria	Summary of Option Analysis
	Option 1 scores higher than option 3B as the road alignment passes more private properties along Kerlew Street. Option 3A follows due to its impact on the retirement village and property acquisition requirements. Option 2 and Option 4 score the same overall value for the social sub-criteria. This is reflective of the impacts on Kerlew Street properties. Options 5 and 6A are the least preferred options for this criteria, followed closely by 6B. They are considered to have the greatest impact as they result in the disruption of a community facility, which impacts the future use and development potential of the site.
Construction	Option 2 has the lowest overall score across the construction sub-criteria indicating that it is the preferred option for this criteria. Option 1 has the next lowest score due to the required demolition of a structure as well as potential access safety risks. This is followed by 3B which has a higher score due to a combination of new road construction and maintenance costs for DoJ. Option 3A and Option 4 have the fourth highest scores for construction. For Option 3A this reflects the required demolition of two structures and maintenance costs for DoJ. Option 4 has a high score due to the length of this option being 350 metres longer than the others and therefore costlier as well as the potential access safety risks. Option 6B has the highest score for construction as it requires the greatest length of new road construction which has higher construction costs, followed by Option 5. For Options 5, 6A and 6B, the increased length of road on private property will require both higher maintenance costs for DoJ and the demolition of buildings within the retirement village.
Environmental	Option 3B has the lowest overall score across the environmental sub-criteria, followed by Option 1. Option 2 has the third lowest score, by virtue of higher scores for bushfire prone land, ecological constraints and visual impacts. This is followed by Option 4 due to higher scoring for bushfire risk, ecological, sustainability and waste management sub-criteria. Option 3A and option 5 received high scores in regards to environmental factors. Both Options received high scores for air quality impacts and contaminated land associated with proximity to the retirement home facilities and the requirement to demolish a building which may contain asbestos. Option 3A also scored high for soil management issues while Option 5 received a high score for visual impacts. Options 6A and 6B were the least preferable options, scoring highly on a number of sub-criteria. Both options received high scores for air quality impacts and contaminated land associated with proximity to the retirement home facilities and the requirement to demolish a building which may contain asbestos. Both options also require the removal of substantial roadside

Criteria	Summary of Option Analysis
	vegetation, leading to a poor sustainability score, and will also have the greatest visual impact.
Planning Approvals	Options 1, 2 and 4 all have the same overall scores for the Planning Approvals sub-criteria, reflecting use of an existing road. These options are highly preferred in the Planning Approvals compared to the other options. Options 3A, 3B, 6A and 6B all scored very similarly, but significantly higher than Options 1, 2 and 4. Option 5 had the highest score across the Planning Approvals sub-criteria due to referrals for vegetation clearance and the presence of underground infrastructure.
Program	Option 3B has the lowest score across the program sub-criteria indicating it is the preferred option for this criteria. This is followed by Option 2 then Option 1. While both of these Options require some reconfiguration, this will be undertaken on DoJ land and is therefore considered to have a lesser impact on program consideration. Option 4 requires additional reconfiguration (as a combination of Options 1 and 2), however, is also on DoJ land. Options 5, 6A and 6B require significant reconfiguration of the retirement facility. Option 6A will also have complications regarding staging, and so has is the most undesirable of these options related to Program.

5 Risks and Assumptions

In addition to the risks and assumptions included in the Option Analysis (Appendix 2), we also note the following:

- It has been assumed that the intersection of Kerlew Street and Wine Country Drive is appropriate for the additional operational traffic volume. Refer to Appendix 5 for assessment undertaken in April 2018.
- The geotechnical assessment of options is based on a desktop analysis only. Further investigations will be undertaken once a preferred alignment is agreed.
- We have assumed that existing internal roads, parking and manoeuvring areas within the complex will remain unchanged. Any upgrades/alterations to these areas are understood to be out of scope and therefore have not been included in our option analysis.
- From a planning and approvals standpoint, the assessment provided of each of the options is based upon publicly available ecological mapping and data and the Cessnock LEP.
- It is assumed no new road reserve allocations will be created for any of the options.
- It is understood that initial (high level) consultation has been undertaken with the owner of DP7[illegible]. The Options Analysis has been undertaken on this basis. Note that Option 3B relies on the voluntary procurement of this private land; if this is not readily achievable for an acceptable value in accordance with Government Guidelines, Option 3B would not be viable.
- We have assumed that the Department of Health land can be acquired.
- Boundary titles have been acquired from GIS mapping data exported from NSW Spatial Service Portal (1 July 2016), which uses NSW Spatial Data Catalogue (NSDC).

Appendix 1 – Plans

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OPTION 1

OPTION 2

OPTION 3A

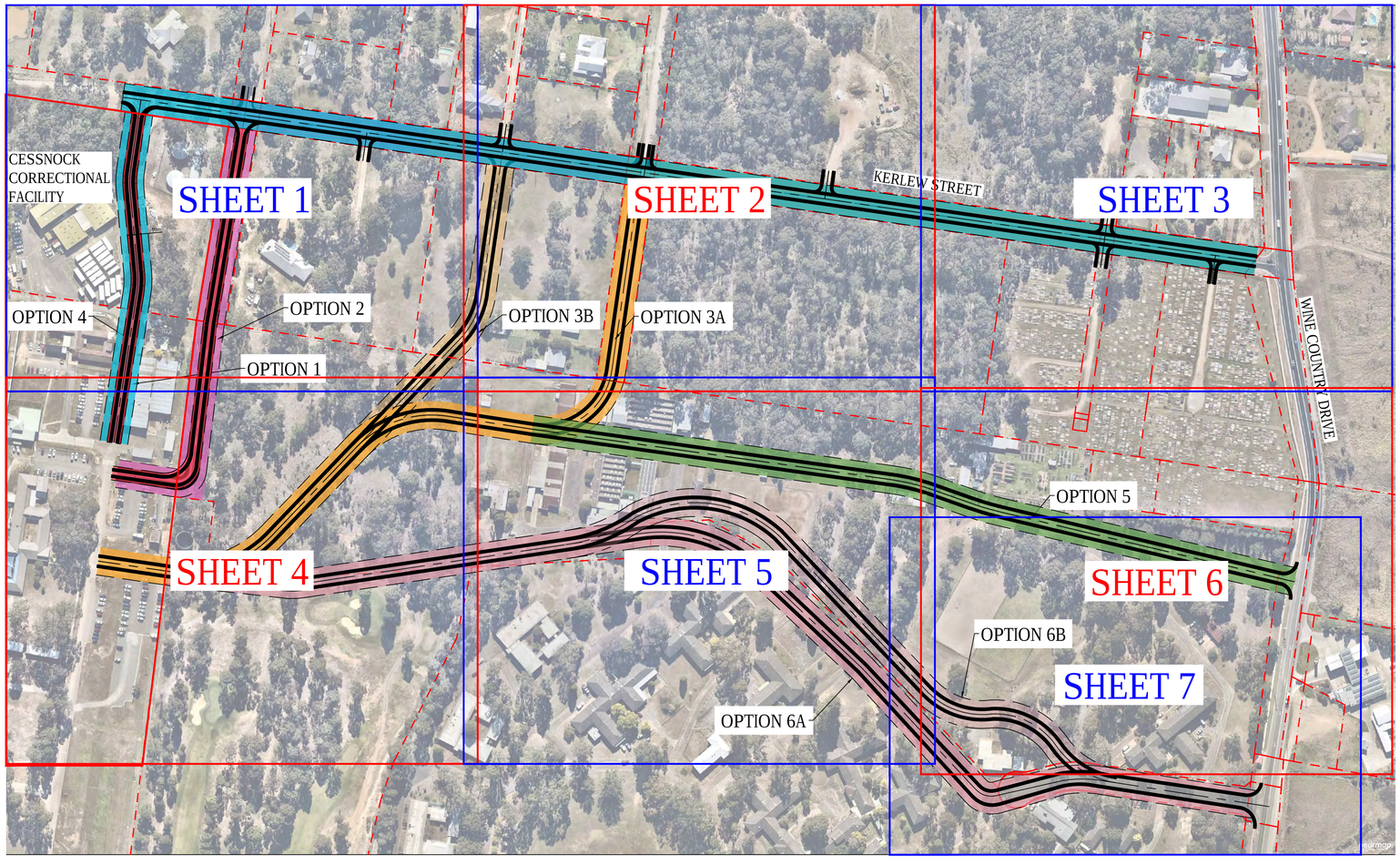
OPTION 3B

OPTION 4

OPTION 5

OPTION 6A

OPTION 6B



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A	UNDER REVISION	J.M	C.O	M.E	01.10.17

Original Scale (A1)	Design	A. SHIELDS	14.06.19	Approved For Consruction*
	Drawn	J. MURRAY	14.06.19	
Reduced Scale (A3)	Dsg Verifier	D. EVANS	14.06.19	
	Dwg Check	F. MIGUES	14.06.19	Date

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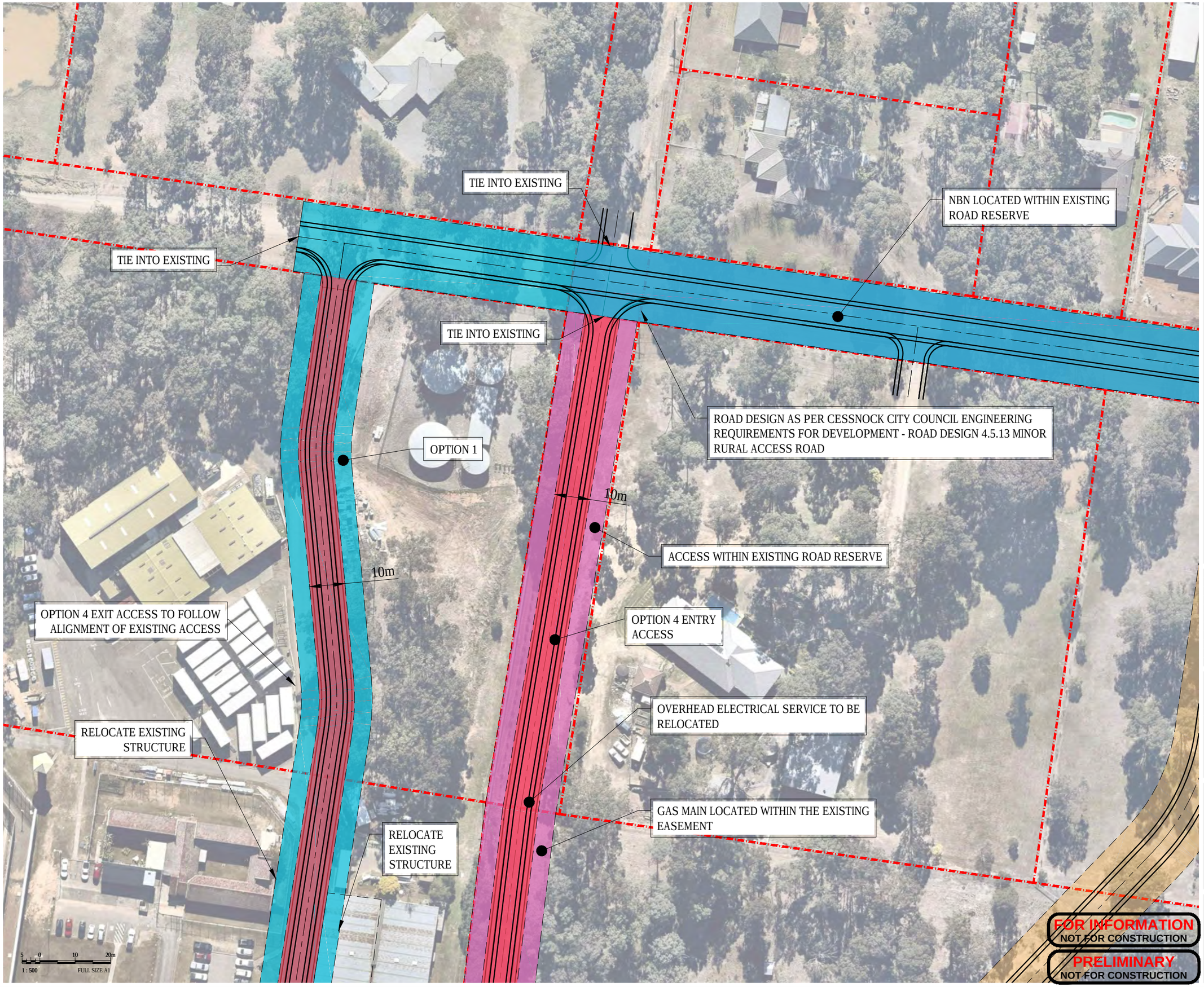

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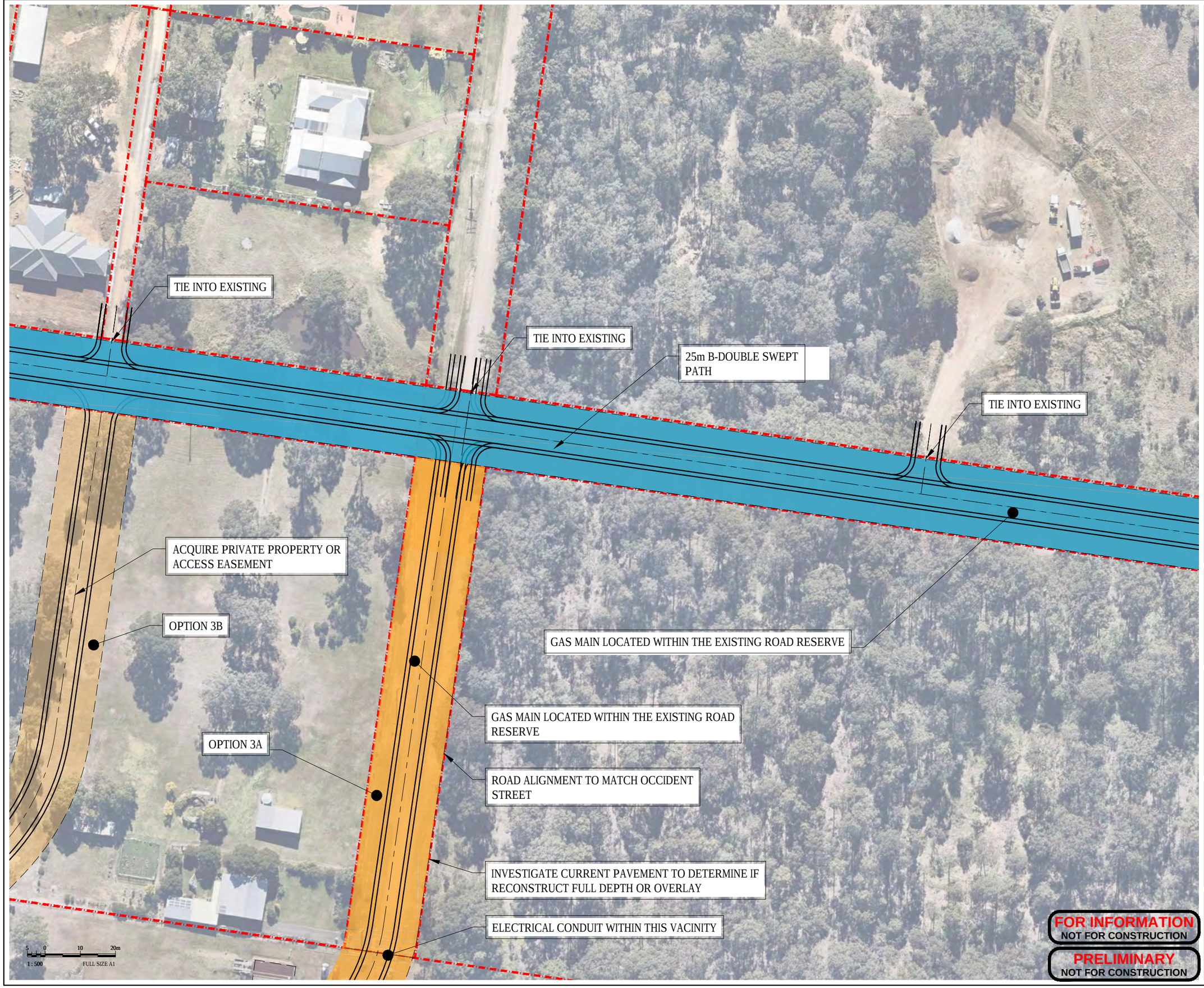

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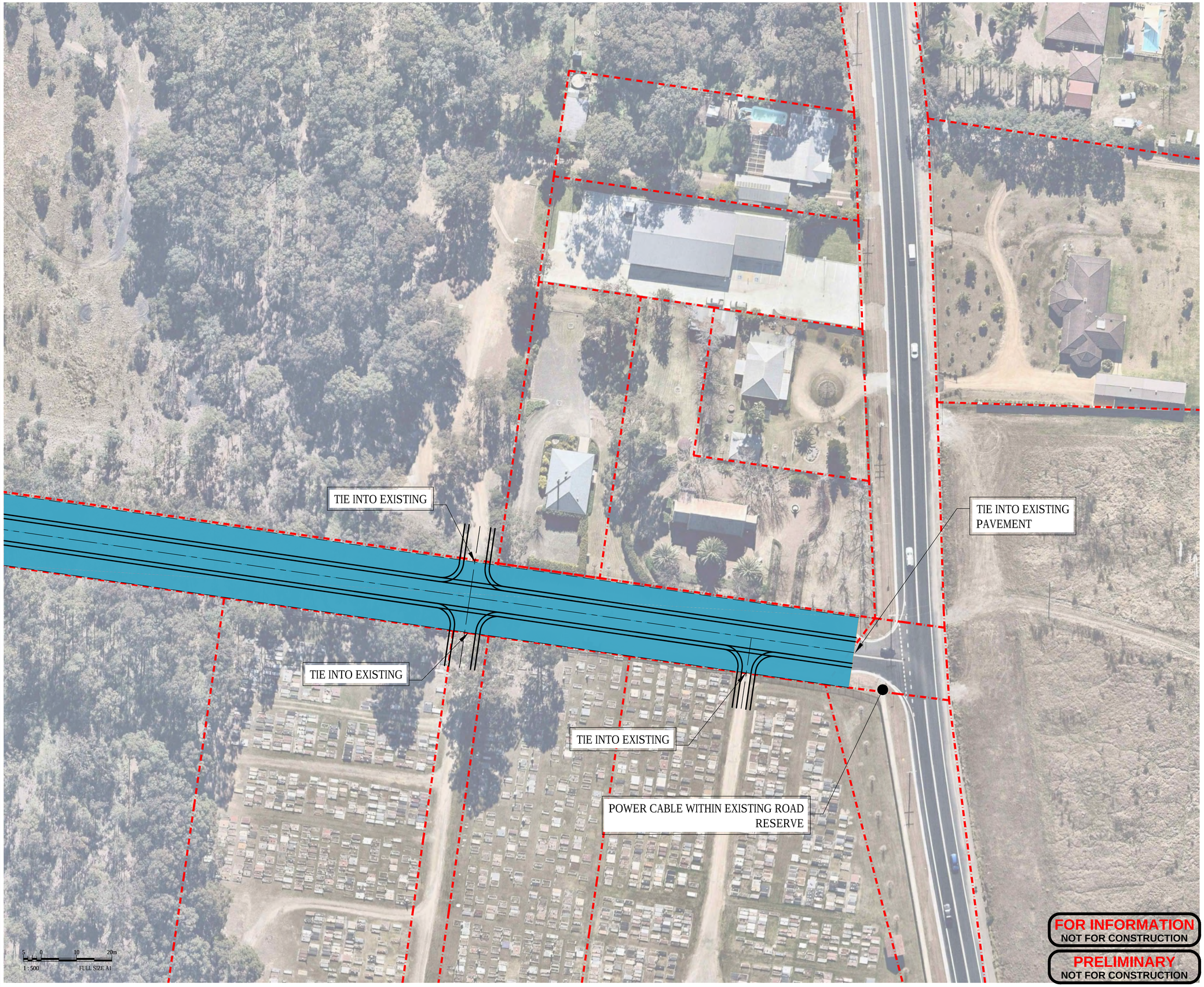

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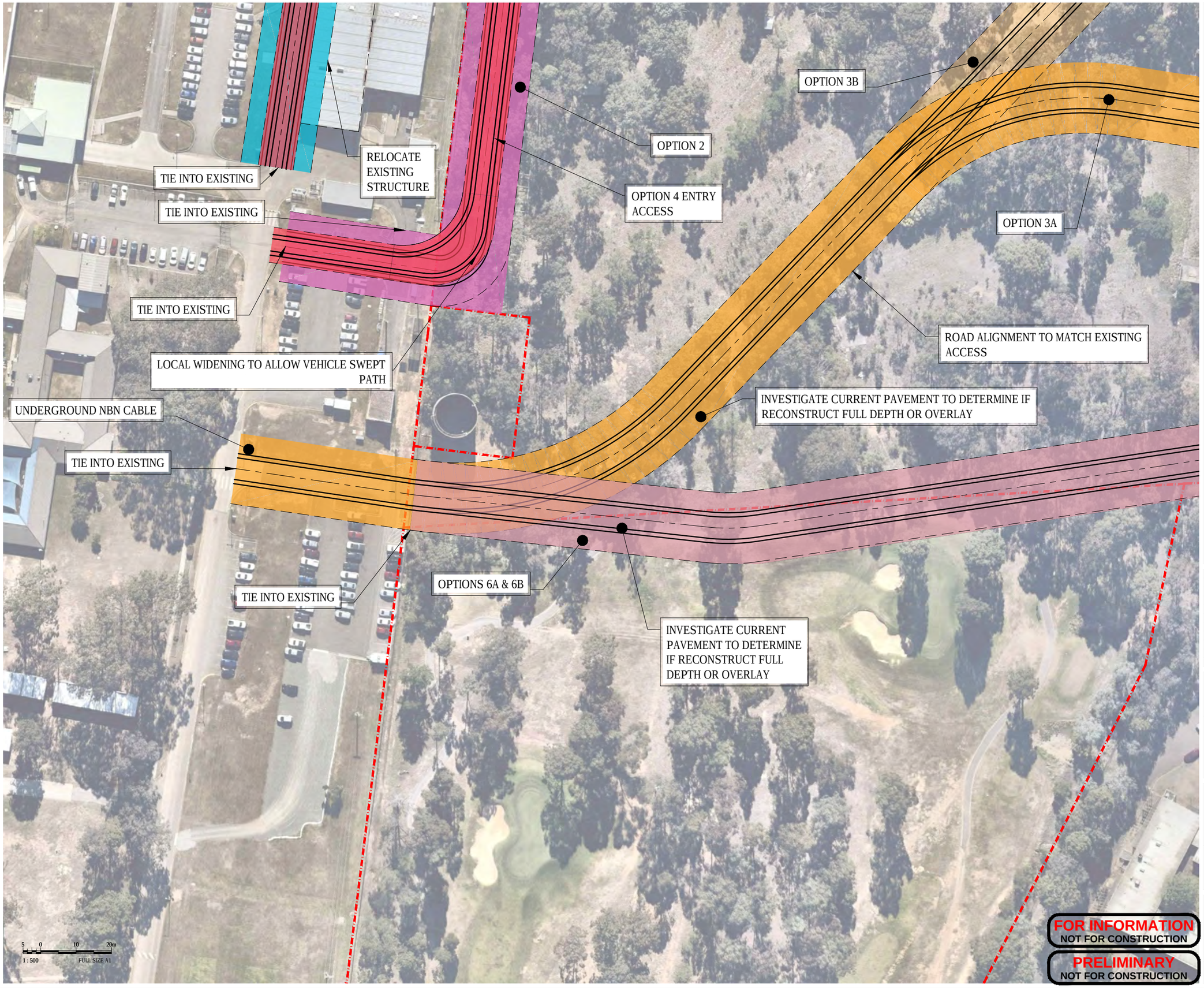

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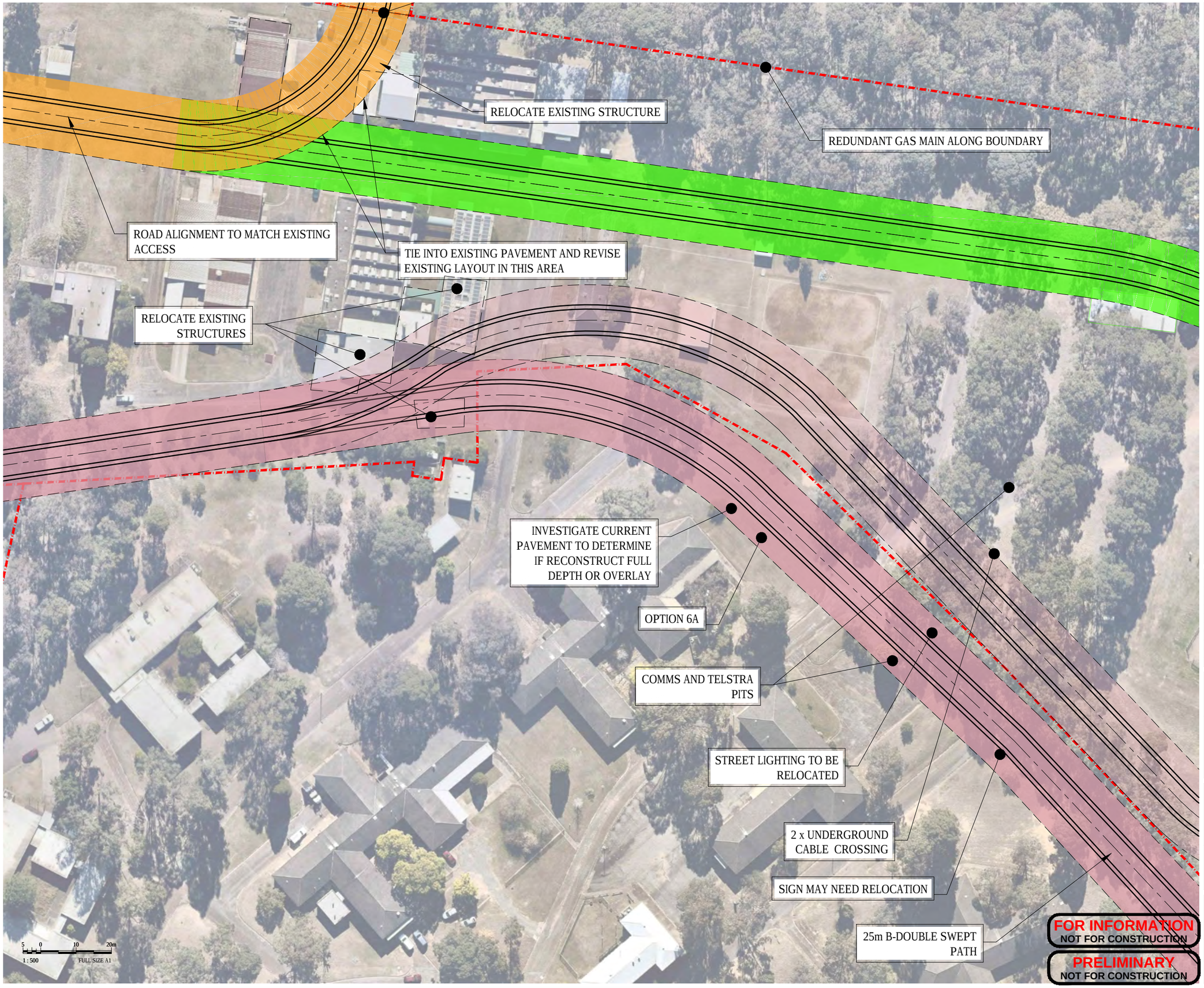

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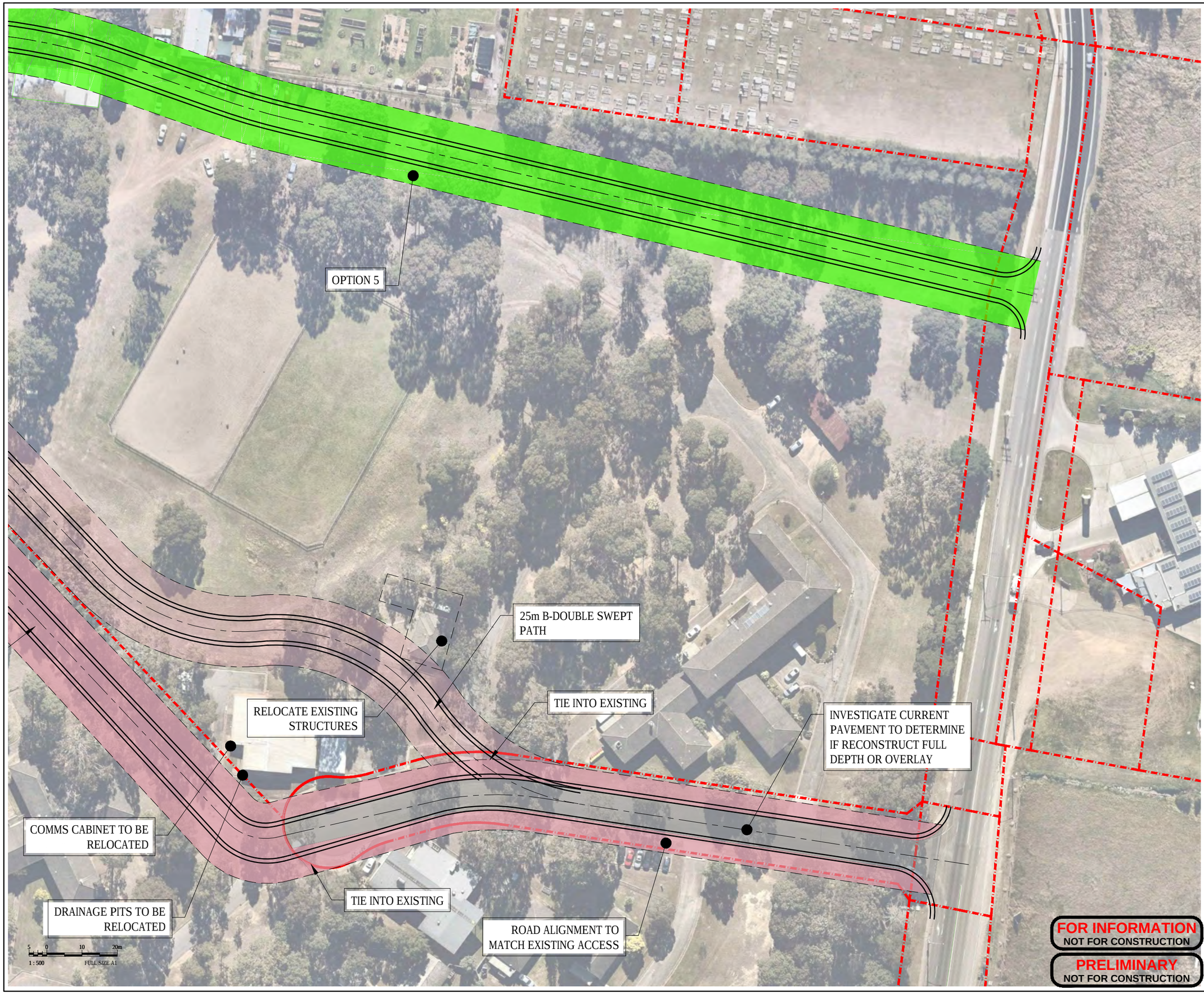

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Appendix 2 – Option Analysis

Cessnock Correction Centre Access Road

Stage 1 - Optioneering

			Option 1 (Blue)			Option 2 (Purple)			Option 3a (Dark orange)			Option 3b (Light Orange)			Option 4 (Red)			Option 5 (Green)			Option 6A			Option 6B			
Criteria type	Sub-criteria	Sub-criteria	Pre-weighted ranking	Weighting (%)	Score	Pre-weighted ranking	Weighting (%)	Score	Pre-weighted ranking	Weighting (%)	Score	Pre-weighted ranking	Weighting (%)	Score	Pre-weighted ranking	Weighting (%)	Score	Pre-weighted ranking	Weighting (%)	Score	Pre-weighted ranking	Weighting (%)	Score	Pre-weighted ranking	Weighting (%)	Score	Justification
Construction	Access Engineering (safety)	N/A	5	1	5	1	1	1	1	1	1	1	1	1	6	1	6	1	1	1	1	1	1	1	1	1	The internal alignment of Options 1 and 4 have been identified by the facility staff as a potential safety risk. All other options are equal.
Construction	Cost of construction	N/A	1	16	16	1	16	16	3	16	48	4	16	64	6	16	96	7	16	112	4	16	64	8	16	128	The six options require a mix of overlay works on existing roads and the construction of full-depth new roads. In both cases, a greater length of works increases costs, however, new road construction is more costly than overlay works on an existing road. Option 6B requires the most full-depth new road construction which has a higher cost, followed by Option 5 . Options 1 and 2 have the least amount of full-depth new road construction required, followed by Options 3A ,3B and 6A respectively. As Option 4 would require a greater length of works (as it is a combination of Options 1 and 2) it is also assessed as having high construction costs.
Construction	Cost of maintenance (required by DoJ)	N/A	1	13	13	2	13	26	3	13	39	3	13	39	5	13	65	6	13	78	6	13	78	6	13	78	Increasing lengths of road on private land means additional maintenance costs to DoJ as local road authority will not be responsible for maintenance. Option 5, 6A and 6B would have the highest maintenance costs as the whole alignment would need to be maintained by DoJ.
Construction	Maintenance required by Cessnock City Council	N/A	6	6	36	7	6	42	5	6	30	4	6	24	8	6	48	1	6	6	1	6	6	1	6	6	Cessnock City Council is responsible for the maintenance of Kerlew Street, Occident Street and the unformed road reserve opposite Pinchen Street. Option 1 and 4 require the most maintenance by Council as they utilise the greatest length of Kerlew Street with Option 2 requiring slightly less. Option 3A follows both Kerlew Street and Occident Street and therefore requires more maintenance by Council than Option 3B which extends slightly further down Kerlew Street. Council would not be responsible for maintaining any of the proposed alignment of Option 5, 6A or 6B.
Construction	Demolition of structures required	N/A	4	16	64	1	16	16	6	16	96	1	16	16	1	16	16	5	16	80	6	16	96	8	16	128	Option 1 results in the demolition of one structure (a gaol operational structure), option 3A results in the demolition of two structures (DoH operational structure), Option 5 requires the demolition of one structure (kitchens). Options 2, 3B and 4 are not expected to require demolition of any structures. Option 6A results in the demolition of one building (the Health Records building), while Option 6B impacts 2 additional buildings and sport field/ lawn.
Construction	Drainage	N/A	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	All options have an equal ranking as there are no major drainage structures/issues differentiating the options.
Construction	Geotechnical issues	N/A	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	On the basis of the available geotechnical information and geological mapping, our desktop level geotechnical study reveals that there is a low geotechnical risk involved for all options considered. Please note: geotechnical assessment was based on a desktop level study rather than actual geotechnical investigation results. A geotechnical investigation will be undertaken for the preferred option to confirm this. Site investigations have been performed for Option 3B in 2018 and a draft factual report has been prepared, but no interpretive work has been completed.
Environmental	Air quality	N/A	1	1	1	1	1	1	5	1	5	1	1	1	1	1	1	5	1	5	7	1	7	7	1	7	All options are adjacent to other property. Option 3a, 5, 6a and 6b are adjacent to the Calvary Retirement Community which has a higher density of sensitive end-receptors (e.g. bronchial / asthma issues in elderly residents from inhaling airborne particulates). Options 6A and 6B are closest to the Calvary Retirement Community, and hence are scored the lowest.
Environmental	Bushfire hazard	N/A	5	1	5	6	1	6	4	1	4	3	1	3	7	1	7	1	1	1	1	1	7	1	1	6	All options lie within bushfire prone land. Option 2 and 4 contain the highest overall length of bushfire prone land and the highest Vegetation Category 1 lengths (660 and 700m, respectively. This compares to 440m for Option 3B, 500m for Option 3A and 480m for Option 1. However, Option 1 also contains 240m Vegetation Category 2, compared to only 40m for Option 3A . Option 5 has the least bordering vegetation. Options 6A and 6B mainly lie within Vegetation Category 2 and Vegetation Buffer, along with a minimal length of 81 metres lying in the Vegetation Category 1 land for both 6A and 6B. Hence these are the most preferred options.
Environmental	Contaminated land	N/A	1	1	1	1	1	1	5	1	5	1	1	1	1	1	1	5	1	5	5	1	5	5	1	5	It is understood that Options 3A, 5, 6A and 6B require the removal of buildings that may contain asbestos. The services support building was built in 1963, prior to phasing out of asbestos use in the 1980's and commercial building use regulations in 2003. Further testing of the building by a competent specialised service provider and analysis in accredited laboratories would be required. Due to the risk associated with this, these options have received a lower ranking. None of the following features were recorded for any of the road options, therefore all options are considered equal for this aspect: NSW Contaminated Sites Notified to the EPA Contaminated Land: Records of Notice, Former Gasworks, National Waste Management Site Database, EPA PFAS Investigation Program, Licensed Activities under the POEP Act 1997, Delicensed Activities Still Regulated by the EPA, Underground Petroleum Storage Systems Sensitive Zones, Historic business's using potentially contaminating materials under the 1970 UBD Business Directory
Environmental	Ecological constraints	N/A	4	1	4	5	1	5	1	1	1	2	1	2	6	1	6	3	1	3	6	1	6	6	1	6	Option 4 contains 1,080m roadside vegetation, classified under the Lower Hunter and Central Coast Regional Vegetation Survey, compared to 940m for Option 2 and 840m for Option 1. This compares to only 650m for Option 5, 640m for Option 3B and 620m for Option 3A. The 1,000m buffer area around the access roads potentially contains 49 Vulnerable, 7 Endangered and 1 Critically Endangered species. The majority of these are either birds or mammals and thus are mobile. It is unlikely that these are present in the low connectivity and low land size parcels of habitat present adjacent to the road options. However, 9 Vulnerable and 3 Endangered Flora species could also be present. Options 6A and 6B require vegetation clearance along 245 metres and approximately 200 metres of roadside vegetation along their footprint. The vegetation mainly consists of Lower Hunter Spotted Gum - Ironbark Forest. The canopy cover is sparse (woodland) with 20–50% cover. The species include C. maculata, E. fibrosa and E. punctata. Hence these options are ranked lowest. The mobile population dynamics of the species and LotSearch data resolution mean it is not possible to differentiate between the road options and a site-specific biodiversity survey is recommended.
Environmental	Groundwater impacts	N/A	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Two groundwater bores are located within the 1,000m buffer but these are test bores rather than water supply bores. Furthermore, they are located at 800m plus away from all road options. Data from these sites record water level at 1.52 - 4.45m below ground level. Based on this information, all options are considered equal.
Environmental	Heritage issues	N/A	3	1	3	3	1	3	3	1	3	3	1	3	3	1	3	3	1	3	1	1	1	1	1	1	No records of State Heritage Items were found with the 1,000m buffer zone. The Cessnock General Cemetery is listed as a Local Heritage Item and all road options run alongside this except Options 6A and 6B, which lie further away. Option 5 requires the construction of a new road along the southern boundary of the Cemetery. This would need to be managed to avoid impacting the cemetery. Options 1-4 are expected to require intersection upgrades at the Kerlew St - Wine Country Drive intersection which may necessitate a slip-lane off Wine Country Drive. This would also need to be managed to avoid impacting the cemetery. As such, Options 6A and 6B are preferred.
Environmental	Noise & vibration issues	N/A	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	All options are adjacent to residential property / activity. In addition, Option 3A, 5, 6A and 6B are adjacent to the Calvary Retirement Community. All of these are classified as sensitive end-receptors and as such all options are considered equal.
Environmental	Soil management issues	N/A	4	1	4	4	1	4	8	1	8	4	1	4	4	1	4	1	1	1	1	1	4	1	1	4	There is no recorded Acid Sulfate Soil Class in Local Environment Plan nor any Naturally Occurring Asbestos Potential. Yellow Podzolic Soils are recorded throughout the six road options footprint - these are known to have moderate to high erosion potential. Dryland salinity risk is classified as 'high' for 740m of the Option 3A access road compared to 600m for Options 1, 2, 3B and 4 and 500m for Option 5. Options 6A and 6B consist of land having 'high' Dryland Salinity for 410m and 420m, respectively. Therefore, Options 6A and 6B are most preferred due to lowest Dryland Salinity occurrence within their footprint.
Environmental	Subsidence likelihood	N/A	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	None of the access road footprints are within known Mining Subsidence Districts.

			Option 1 (Blue)			Option 2 (Purple)			Option 3a (Dark orange)			Option 3b (Light Orange)			Option 4 (Red)			Option 5 (Green)			Option 6A			Option 6B			
Criteria type	Sub-criteria	Sub-criteria	Pre-weighted ranking	Weighting (%)	Score	Pre-weighted ranking	Weighting (%)	Score	Pre-weighted ranking	Weighting (%)	Score	Pre-weighted ranking	Weighting (%)	Score	Pre-weighted ranking	Weighting (%)	Score	Pre-weighted ranking	Weighting (%)	Score	Pre-weighted ranking	Weighting (%)	Score	Pre-weighted ranking	Weighting (%)	Score	Justification
Environmental	Surface water impacts	N/A	5	1	5	5	1	5	1	1	1	5	1	5	5	1	5	1	1	1	1	1	1	1	1	1	There are no RAMSAR wetlands within 1,000m buffer of the road options and no options intersect any blue line drainage network features. There are ponds / water storage features either side of Kerlew Street of 250m² and 115m² immediately up gradient (south) downgradient (north) from Options 1, 2, 3B and 4 footprint. Topography trends north-easterly so Option 3A and 5 stormwater would be unlikely to flow into either pond, as such they are they preferred Options. Options 6A and 6B do not intersect any blue line drainage networks however they lie approximately 200 metres north-west of a blue line drainage network. If typical good sedimentation and erosion control measures are implemented, it is unlikely that stormwater from these options would be discharged into the surface water system, hence these are scored lower than other options.
Environmental	Sustainability considerations	N/A	3	1	3	1	1	1	4	1	4	1	1	1	4	1	4	4	1	4	4	1	4	8	1	8	The sustainability impacts during operation of the road are considered to be even across all Options. As such, it is the differences during construction that are relevant. Ranking is based on length of road requiring construction, full-depth construction vs overlay on existing road and demolition of structures, all of which have implications on water consumption, energy use and material volumes. While 6A requires some full-depth construction and some overlay, 6B requires mostly full depth construction and hence is least preferred. Both 6A and 6B will require demolition of at least 2 buildings. However, these options have the least overall lengths of 745m and 775 m respectively. 6B is least preferred because most of the road requires full-depth construction, as well as demolition and vegetation clearance.
Environmental	Visual impacts	N/A	1	1	1	5	1	5	1	1	1	1	1	1	1	1	1	6	1	6	7	1	7	7	1	7	All options will result in short-term visual impacts to local residents during construction. During operation, it is considered that Options 1, 3A, 3B and 4 are equal. Option 2 follows the entire side boundary of Lot 72 DP 755252 resulting in a greater impact on the resident of this site. Option 5 is considered to have greater visual impact initially as it requires a new road alignment and intersection, however, this is anticipated to lessen over time as local residents adjust to the new road. Both 6A and 6B will have most impact on the Cessnock Calvary Retirement Community on a long term basis, since they run adjacent to the community. Hence 6A and 6b are least preferred.
Environmental	Waste management	N/A	3	1	3	1	1	1	4	1	4	1	1	1	4	1	4	4	1	4	7	1	7	7	1	7	Ranking is based on length of road requiring construction, full-depth construction vs overlay on existing road and demolition of structures, all of which have implications on water consumption, energy use and material volumes. 6A requires some full-depth construction and some overlay, 6B requires mostly full depth construction hence is least preferred. Both Options will require demolition of at least 2 buildings. However, these options have the least length. Due to demolition required and potential asbestos associated with the demolition, these options are least preferred even though they have least length.
Planning / approval	Additional assessment/ approvals implications	N/A	1	1	1	1	1	1	5	1	5	4	1	4	1	1	1	5	1	5	5	1	5	5	1	5	Options 3A, 3B, 6A , 6B and 5 traverse vegetated areas. If vegetation impacted by the works is listed as threatened or significant it may require additional assessment by a specialist consultant to confirm/identify species as well as referral to State or Commonwealth departments. The alignment of Options 1, 2 and 4 require a lesser amount of vegetation alteration/removal. As identified in the Contaminated Land sub-criteria, Options 3A, 6A, 6B and 5 require the removal of buildings that may contain asbestos. Further testing of the building by a competent specialised service provider and analysis only in accredited laboratories would therefore be required.
Planning / approval	Approval pathway	Who approving?	1	1	1	1	1	1	4	1	4	4	1	4	1	1	1	6	1	6	6	1	6	6	1	6	Approvals for each option (including development consent, vegetation removal and works within Council road reserves) are to Cessnock Local Government Authority. Options 3A, 3B, 5, 6A and 6B may require referral to State or Federal Departments for vegetation removal if identified by specialist assessments. Approval from RMS will be required for intersection works with Wine Country Drive. This will be required for all options, however, Option 5 is considered to be a greater risk as it may not be supported by RMS due to proximity to the existing Kerlew - Wine Country Drive intersection.
		Time implications	1	1	1	1	1	1	4	1	4	4	1	4	1	1	1	6	1	6	6	1	6	6	1	6	Options 3A, 3B, 5, 6A and 6B have a greater likelihood of impacting vegetation. If mitigation / offsetting is required then this may require third party involvement thereby increasing project timeframes. Options 1, 2 and 4 follow existing road footprints / cleared pathways and are less likely to require vegetation clearance than option 3A, 3B, 5, 6A and 6B. The new intersection required by option 5 may have project timeframe implications to obtain RMS approval.
Planning / approval	Approval required to relocate / work near existing services	Power	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Ausgrid underground infrastructure is located at Kerlew Street and Wine Country Drive intersection which Options 1-4 transect. In addition, underground infrastructure is located on Lot 72 DP755252 which Option 2 is in the vicinity of. In addition, there is underground infrastructure on the southern end of Occident Street and through the retirement village with Options 3A and 5 intersect. The unnamed street consisting of Options 6A and 6B also intersects Ausgrid infrastructure. As all options intersect the infrastructure at some point they are all considered equal.
		Communications	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	All Options transect NBN underground infrastructure. All Options transect Telstra underground infrastructure.
		Gas	1	1	1	1	1	1	5	1	5	5	1	5	1	1	1	5	1	5	1	1	1	1	1	1	Jemena gas has mains along Kerlew Street and Occident Street which Options 1-4 intersect. In addition, a main line is located along the northern boundary of Lot 230 DP 755252 which Options 3A and 3B intersect and Option 5 is in the vicinity of. Other Options including 1, 2, 4, 6A and 6B do not intersect Jemena infrastructure hence are preferred over others.
		Water	3	1	3	3	1	3	3	1	3	3	1	3	3	1	3	3	1	3	1	1	1	1	1	1	Hunter Water has underground water infrastructure located along the full length of Kerlew Street and Wine Country Drive which all Options transect except 6A and 6B, hence these are most preferred.
Planning / approval	Time implications (in addition to the REF minimum requirements)	N/A	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Sensitive habitat, flora and fauna impacts will require additional assessment in addition to basic REF requirements (OEH) and therefore potentially extending project timeframes.
Program	Reconfiguration of layouts / roadways to tie into new access	N/A	2	10	20	2	10	20	5	10	50	1	10	10	4	10	40	6	10	60	6	10	60	6	10	60	Option 3B is not expected to require any reconfiguration works. Options 1 and 2 will require some reconfiguration, however, this is on DoJ land and therefore considered to have a lesser impact. Option 4 requires additional reconfiguration (as a combination of Options 1 and 2), however, is also on DoJ land. Options 3A and 5 require reconfiguration of the retirement facility with Option 5 requiring the most reconfiguration works. Options 6A and 6B make use of the existing Calvary Retirement Facility access, which would require some reconfiguration, and is not on DoJ Land (Affects Calvary and Dept of Health).
Program	Staging Works	Staging to access gaol as per usual	7	1	7	6	1	6	1	1	1	1	1	1	6	1	6	1	1	1	1	1	1	1	1	1	Option 1 interrupts the existing gaol access during the construction period. Option 2 will interfere with access at the current carpark during the construction period. Option 4 is a combination of both of these access impacts. Options 3A, 3B, 5, 6A and 6B enter the site utilising an existing access and will have minimal impact on the carpark access during the construction period.
		Staging to access private properties	6	1	6	5	1	5	3	1	3	4	1	4	7	1	7	1	1	1	8	1	8	2	1	2	Ranking is based on the number of private driveway access roads directly connected to the proposed gaol access. For the purposes of this ranking, impacts on internal access in the retirement village and in the Health facilities has also been considered.

			Option 1 (Blue)			Option 2 (Purple)			Option 3a (Dark orange)			Option 3b (Light Orange)			Option 4 (Red)			Option 5 (Green)			Option 6A			Option 6B			
Criteria type	Sub-criteria	Sub-criteria	Pre-weighted ranking	Weighting (%)	Score	Pre-weighted ranking	Weighting (%)	Score	Pre-weighted ranking	Weighting (%)	Score	Pre-weighted ranking	Weighting (%)	Score	Pre-weighted ranking	Weighting (%)	Score	Pre-weighted ranking	Weighting (%)	Score	Pre-weighted ranking	Weighting (%)	Score	Pre-weighted ranking	Weighting (%)	Score	Justification
Social	Access and disruption (during construction works)	N/A	3	1	3	3	1	3	2	1	2	1	1	1	3	1	3	3	1	3	6	1	6	3	1	3	Options 1, 2 and 4 will require construction activities for the whole of Kerlew Street, thus impacting most of the residents of Kerlew Street. Option 6A and 6B will result in disruption to retirement village residents and potentially impact delivery vehicles' access to existing kitchen facilities who would need to use an alternative route, and 6A will also permanently disrupt the sports field and Dept of Health records facility. Options 5 and 3A will also disrupt access in the area, but to a lesser extent.
Social	Property acquisition	N/A	1	1	1	2	1	2	4	1	4	5	1	5	2	1	2	6	1	6	8	1	8	6	1	6	Ranking based on the amount of property acquisition required. No assumptions have been made about cost. Option 1 does not require additional property acquisition. All proposed works would be within existing property held by Department of Justice. Option 2 and 4 require some property acquisition (part of lot 2,DP1078864) south of lot 72. Option 3a has less property acquisition than 3b. Option 6A requires the most property acquisition , where there is an existing right of access, followed by Options 6B and 5 which require some property acquisition in Dept of Health land.
Social	Socio-economic considerations	N/A	2	10	20	4	10	40	3	10	30	1	10	10	4	10	40	7	10	70	8	10	80	6	10	60	Considerations include impacts on community facilities, development potential of sites, nuisance and people's way of life. Option 6A is considered to have a major impact on the Calvary Retirement facility during construction, and introduces external traffic on their land. Option 5 is considered to have the greatest impact as it results in the disruption of a community facility which impacts the future use and development potential of the site. Option 3A also impacts the community facility in this way but to a lesser extent. Option 2 has nuisance impacts on a large number of Kerlew St properties as well as being in close proximity to the dwelling on Lot 72, the occupant of which is understood to be an active and vocal community member who objects to the access passing her residence. Option 6B will affect the sports field, which is a community gathering place. Options 1 and 4 are considered equal as both Options pass the greatest number of private properties. Option 3B is considered to have the least socio-economic impact. While there is a direct impact on the owner of Lot 230, it is understood that initial engagement has been undertaken with the owner who is open to selling his property. This Option also impacts fewer residences along Kerlew Street.
Social	Traffic & transport management	N/A	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	8	1	8	6	1	6	6	1	6	Options 1-4 are considered equal as they all use the Kerlew Street - Wine Country Drive intersection. Option 6A and 6B make use of an existing intersection with Wine Country Drive, but it is currently a dedicated access to the retirement facility (not a through road). Option 5 is an unknown risk as it requires the construction of a new intersection which RMS may not be supportive of (due to proximity to the existing Kerlew Street - Wine Country Drive intersection).

TOTAL SCORE	237	225	370	226	380	492	490	558
OVERALL RANKING	3	1	4	2	5	7	6	8

Disclaimer: The ranking of criteria in the Options Analysis only indicates the presence / absence of construction, environmental, social, planning and program features identified by Department of Justice and Beca as potential constraints for the access road optioneering process. Following the initial ranking of criteria, weighting factors were applied to the criteria in the Options Analysis. The intention of applying weighting is was to emphasise the options which best reflected the criteria that are understood to be of most importance to DoJ. This weighting has been developed following a workshop discussion on 19/10/2017, and with reference to meeting minutes received from Robert McQueen, dated 27/10/2017 (refer to Appendix 3 for attendees and minutes). We have assigned the weightings to the best of our judgement based on these discussions.

Appendix 4 – LotSearch Report

Lotsearch

Environmental Risk and Planning Report

Lindsay Street, Cessnock, NSW 2325

Report Date: 30 Aug 2017 13:21:19

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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
1	Georeferenced to the site location / premise or part of site
2	Georeferenced with the confidence of the general/approximate area
3	Georeferenced to the road or rail
4	Georeferenced to the road intersection
5	Feature is a buffered point
6	Land adjacent to Georeferenced Site
7	Georeferenced to a network of features

Dataset Listing

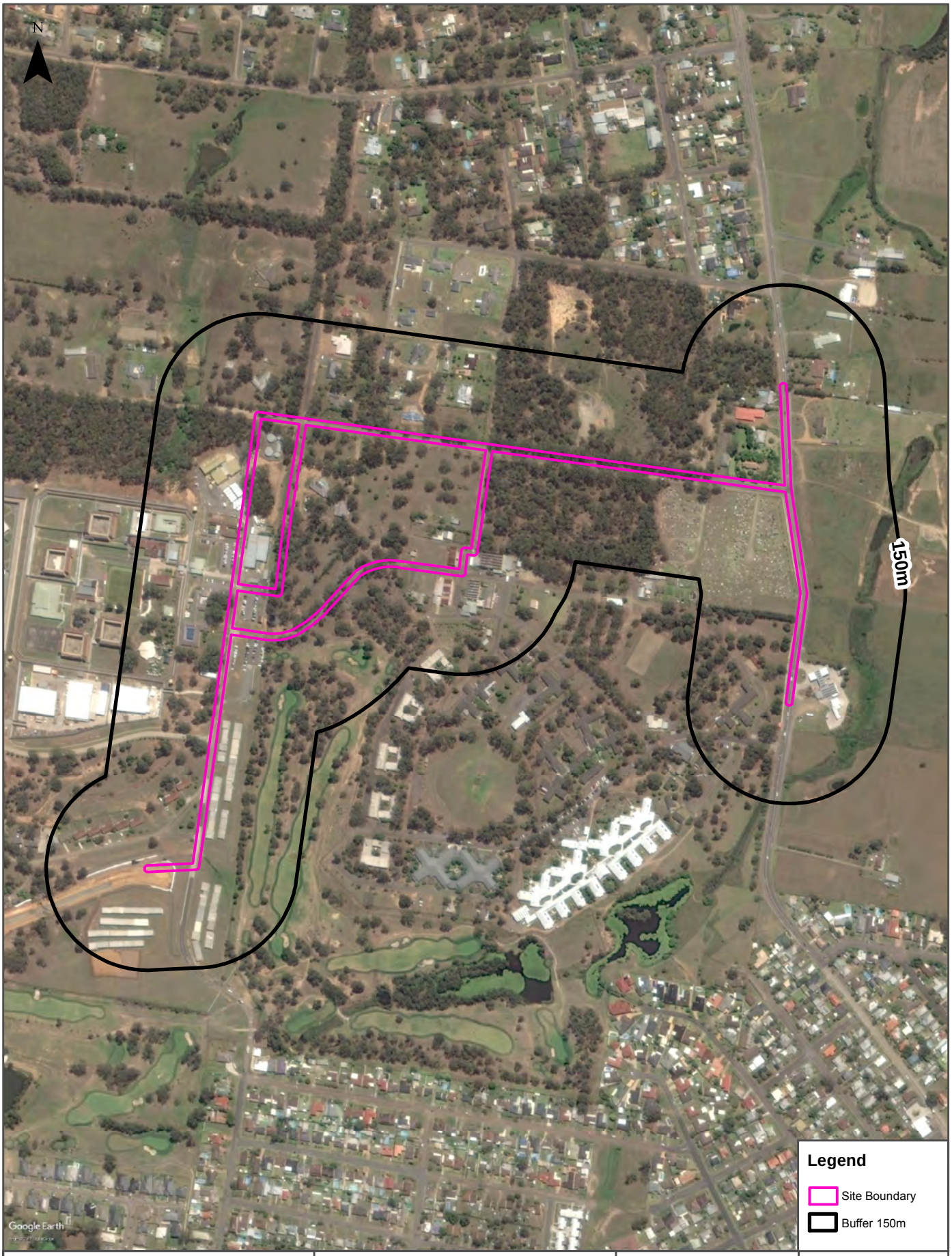
Datasets contained within this report, detailing their source and data currency:

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	Department Finance, Services & Innovation	30/08/2017	30/08/2017	Daily	-	-	-	-
Topographic Data	Department Finance, Services & Innovation	10/04/2015	01/04/2015	As required	-	-	-	-
List of NSW contaminated sites notified to EPA	Environment Protection Authority	28/08/2017	10/08/2017	Monthly	1000	0	0	0
Contaminated Land: Records of Notice	Environment Protection Authority	28/08/2017	28/08/2017	Monthly	1000	0	0	0
Former Gasworks	Environment Protection Authority	28/08/2017	16/01/2017	Monthly	1000	0	0	0
National Waste Management Site Database	Geoscience Australia	07/03/2017	15/11/2012	Quarterly	1000	0	0	0
EPA PFAS Investigation Program	Environment Protection Authority	28/08/2017	28/08/2017	Monthly	2000	0	0	0
EPA Other Sites with Contamination Issues	Environment Protection Authority	22/06/2017	22/06/2017	Quarterly	1000	0	0	0
Licensed Activities under the POEO Act 1997	Environment Protection Authority	14/07/2017	14/07/2017	Monthly	1000	0	1	2
Delicensed POEO Activities still Regulated by the EPA	Environment Protection Authority	14/07/2017	14/07/2017	Monthly	1000	0	0	1
Former POEO Licensed Activities now revoked or surrendered	Environment Protection Authority	14/07/2017	14/07/2017	Monthly	1000	0	3	3
UPSS Environmentally Sensitive Zones	Department of Environment, Climate Change and Water (NSW)	14/04/2015	12/01/2010	As required	1000	0	0	1
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	-	15	15
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	-	9	9
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	-	12	12
UBD Business Directory Drycleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant			Not required	1000	0	0	2
UBD Business Directory Drycleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant			Not required	1000	-	6	6
Points of Interest	Department Finance, Services & Innovation	01/02/2017	01/02/2017	Annually	1000	0	3	27
Tanks (Areas)	Department Finance, Services & Innovation	01/02/2017	01/02/2017	Annually	1000	0	0	0
Tanks (Points)	Department Finance, Services & Innovation	01/02/2017	01/02/2017	Annually	1000	0	0	0
Major Easements	Department Finance, Services & Innovation	01/02/2017	01/02/2017	As required	1000	0	1	3
State Forest	Department Finance, Services & Innovation	01/02/2017	29/06/2016	As required	1000	0	0	0
NSW National Parks and Wildlife Service Reserves	NSW Office of Environment and Heritage	01/02/2017	31/12/2016	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
Groundwater Boreholes	NSW Department of Primary Industries - Office of Water / Water Administration Ministerial Corporation; Commonwealth of Australia (Bureau of Meteorology) 2015	21/03/2016	01/12/2015	Annually	2000	0	0	2
Geological Units 1:250,000	NSW Department of Industry, Resources & Energy	20/08/2014		None planned	1000	2	-	3
Geological Structures 1:250,000	NSW Department of Industry, Resources & Energy	20/08/2014		None planned	1000	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
Naturally Occurring Asbestos Potential	NSW Department of Industry, Resources & Energy	04/12/2015	24/09/2015	Unknown	1000	0	0	0
Soil Landscapes	NSW Office of Environment and Heritage	12/08/2014		None planned	1000	2	-	2
Standard Local Environmental Plan Acid Sulfate Soils	NSW Planning and Environment	07/10/2016	07/10/2016	As required	500	0	-	-
Dryland Salinity - National Assessment	National Land and Water Resources Audit	18/07/2014	12/05/2013	None planned	1000	1	1	1
Dryland Salinity Potential of Western Sydney	NSW Office of Environment and Heritage	12/05/2017	01/01/2002	None planned	1000	-	-	-
Mining Subsidence Districts	Department Finance, Services & Innovation	13/07/2017	01/07/2017	As required	1000	0	0	0
SEPP 14 - Coastal Wetlands	NSW Planning and Environment	17/12/2015	24/10/2008	Annually	1000	0	0	0
SEPP 26 - Littoral Rainforest	NSW Planning and Environment	17/12/2015	05/02/1988	Annually	1000	0	0	0
SEPP 71 - Coastal Protection	NSW Planning and Environment	17/12/2015	01/08/2003	Annually	1000	0	0	0
SEPP Major Developments 2005	NSW Planning and Environment	09/03/2013	25/05/2005	Under Review	1000	0	0	0
SEPP Strategic Land Use Areas	NSW Planning and Environment	01/08/2017	28/01/2014	Annually	1000	1	1	2
Local Environmental Plan - Land Zoning	NSW Planning and Environment	30/06/2017	23/06/2017	Quarterly	1000	5	9	36
Local Environmental Plan - Minimum Subdivision Lot Size	NSW Planning and Environment	30/06/2017	23/06/2017	Quarterly	0	2	-	-
Local Environmental Plan - Height of Building	NSW Planning and Environment	30/06/2017	23/06/2017	Quarterly	0	0	-	-
Local Environmental Plan - Floor Space Ratio	NSW Planning and Environment	30/06/2017	23/06/2017	Quarterly	0	0	-	-
Local Environmental Plan - Land Application	NSW Planning and Environment	30/06/2017	13/04/2017	Quarterly	0	1	-	-
Local Environmental Plan - Land Reservation Acquisition	NSW Planning and Environment	30/06/2017	23/06/2017	Quarterly	0	0	-	-
State Heritage Items	NSW Office of Environment and Heritage	01/08/2017	27/05/2016	Quarterly	1000	0	0	0
Local Heritage Items	NSW Planning and Environment	30/06/2017	16/06/2017	Monthly	1000	0	2	5
Bush Fire Prone Land	NSW Rural Fire Service	01/08/2017	09/06/2017	Quarterly	1000	3	3	3
Lower Hunter and Central Coast Regional Vegetation Survey	NSW Office of Environment and Heritage	28/02/2015	16/11/2009	As required	1000	6	6	9
RAMSAR Wetlands	Commonwealth of Australia Department of the Environment	08/10/2014	24/06/2011	As required	1000	0	0	0
ATLAS of NSW Wildlife	NSW Office of Environment and Heritage	30/08/2017	30/08/2017	Daily	10000	-	-	-

Aerial Imagery 2016

Lindsay Street, Cessnock, NSW 2325



Scale:
0 75 150 300
Meters

Data Sources: Aerial Imagery © 2017 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.

Coordinate System:
GDA 1994 MGA Zone 56

Date: 28 August, 2017

Contaminated Land & Waste Management Facilities

Lindsay Street, Cessnock, NSW 2325

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

Contaminated Land & Waste Management Facilities

Lindsay Street, Cessnock, NSW 2325

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

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

National Waste Management Site Database

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

Site Id	Owner	Name	Address	Suburb	Landfill	Reprocess	Transfer	Location Confidence	Distance	Direction
N/A	No records in buffer									

Wate Management Facilities Data Source: Australian Governement Geoscience Australia

EPA PFAS Investigation Program

Lindsay Street, Cessnock, NSW 2325

EPA PFAS Investigation Program

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

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

EPA PFAS Investigation Program: Environment Protection Authority

EPA Other Sites with Contamination Issues

Lindsay Street, Cessnock, NSW 2325

EPA Other SIte s 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

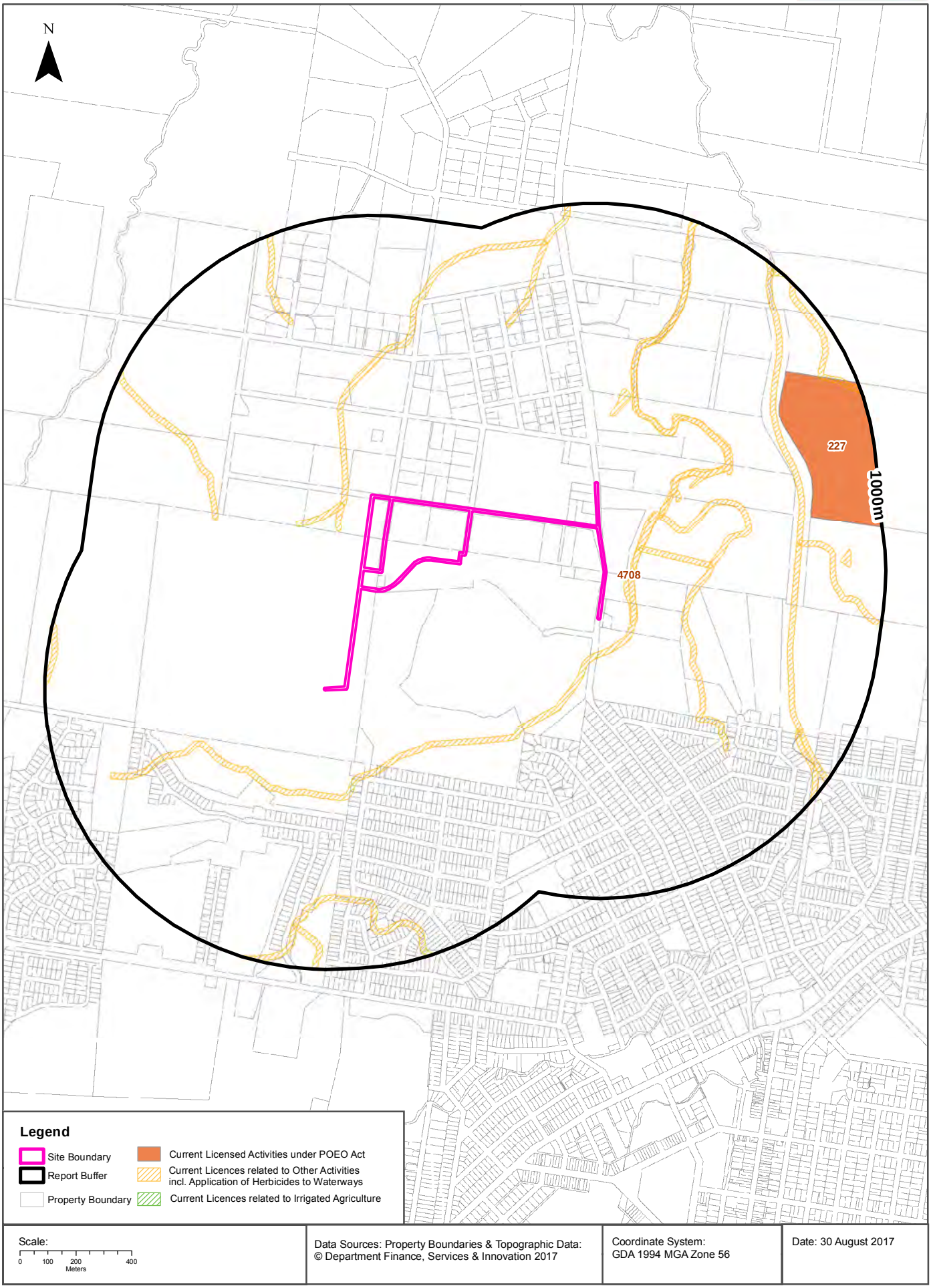
Sites within the dataset buffer:

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

Current EPA Licensed Activities

Lindsay Street, Cessnock, NSW 2325



EPA Activities

Lindsay Street, Cessnock, NSW 2325

Licensed Activities under the POEO Act 1997

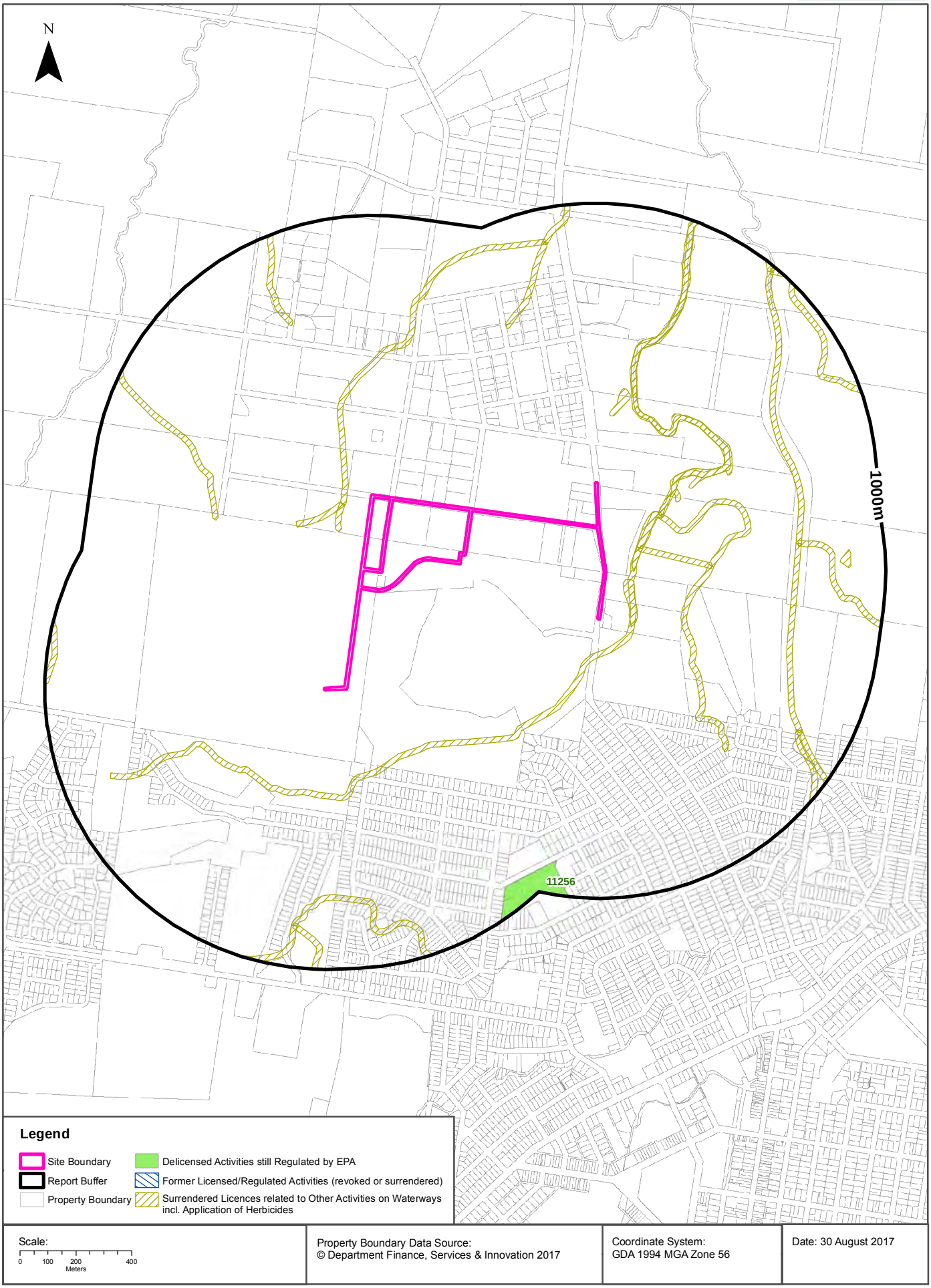
Licensed activities under the Protection of the Environment Operations Act 1997, within the dataset buffer:

EPL	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
4708	CESSNOCK CITY COUNCIL	-	-	CESSNOCK	Other activities	7	64m	East
227	HUNTER WATER CORPORATION	CESSNOCK WASTEWATER TREATMENT WORKS	OFF GOVERNMENT ROAD	CESSNOCK	Sewage treatment processing by small plants	1	693m	East

POEO Licence Data Source: Environment Protection Authority

Delicensed & Former Licensed EPA Activities

Lindsay Street, Cessnock, NSW 2325



EPA Activities

Lindsay Street, Cessnock, NSW 2325

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
11256	HUNTER AND NEW ENGLAND AREA HEALTH SERVICE	CESSNOCK DISTRICT HOSPITAL	View St	CESSNOCK	Hazardous, Industrial or Group A Waste Generation or Storage	1	878m	South

Delicensed Activities Data Source: Environment Protection Authority

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

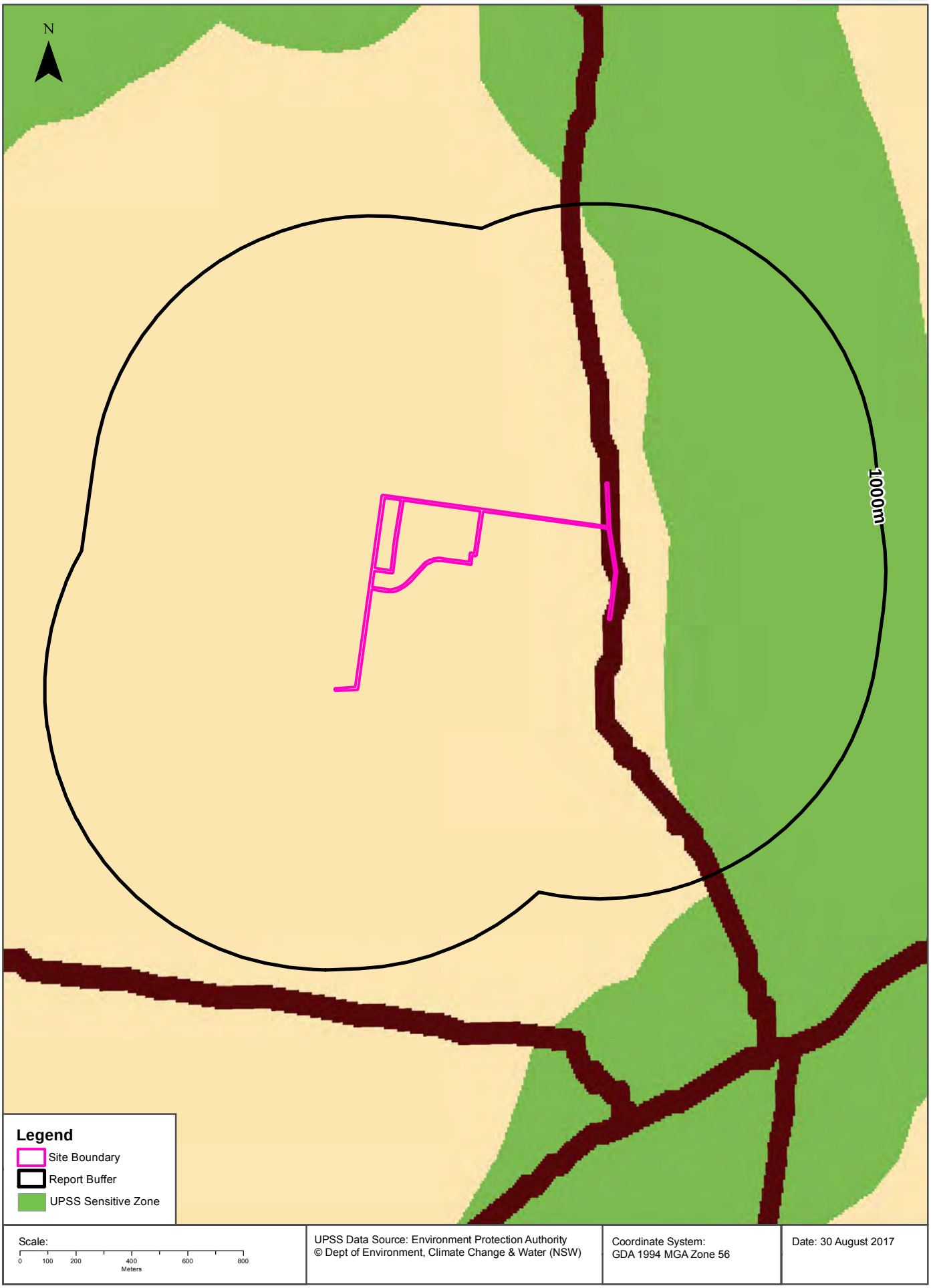
Former Licensed activities under the Protection of the Environment Operations Act 1997, now revoked or surrendered, within the dataset buffer:

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	7	64m	-
4838	Robert Orchard	Various Waterways throughout New South Wales - SYDNEY NSW 2000	Surrendered		Other Activities / Non Scheduled Activity - Application of Herbicides	7	64m	-
6630	SYDNEY WEED & PEST MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW - PROSPECT, NSW, 2148	Surrendered		Other Activities / Non Scheduled Activity - Application of Herbicides	7	64m	-

Former Licensed Activities Data Source: Environment Protection Authority

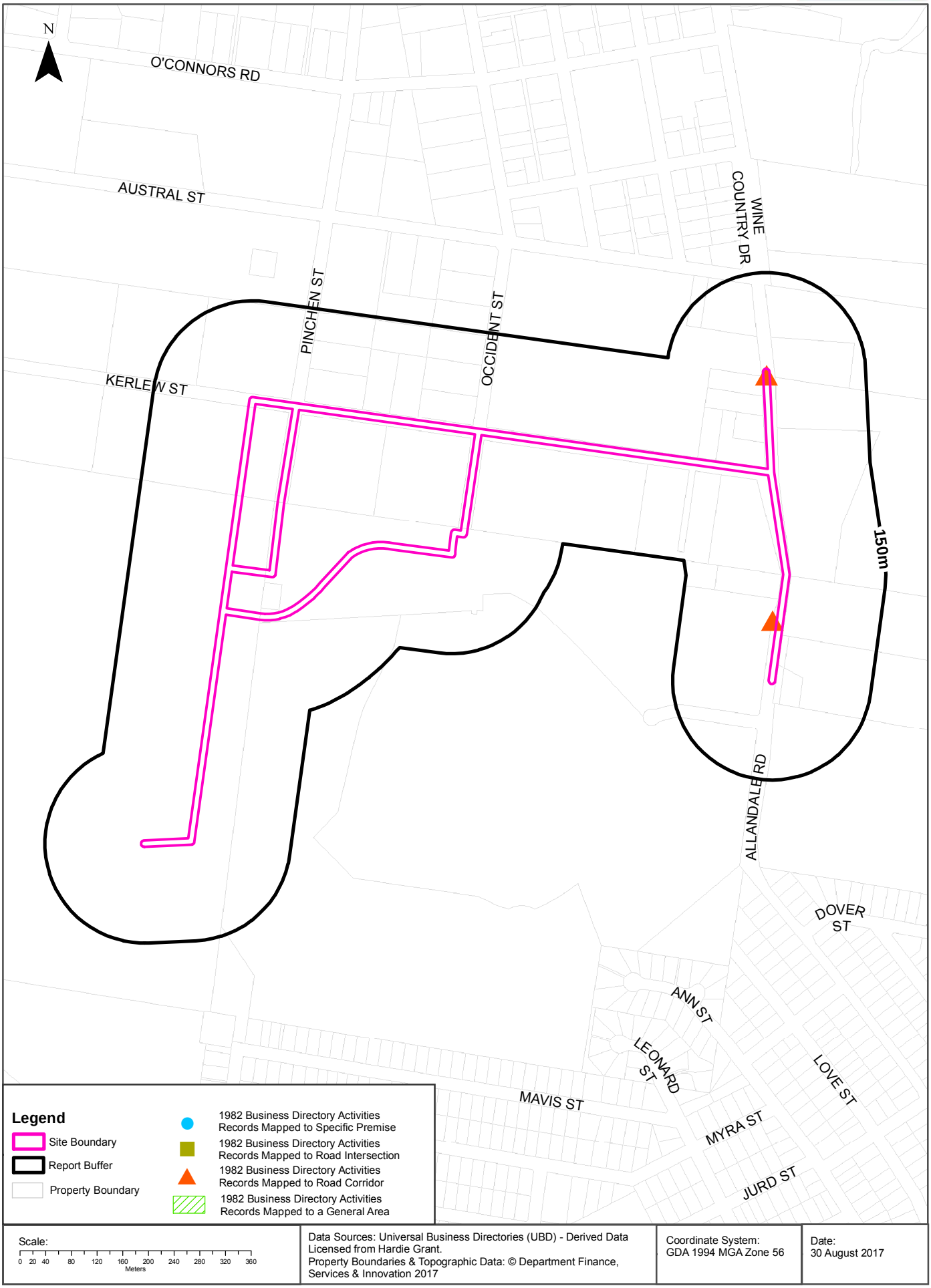
UPSS Sensitive Zones

Lindsay Street, Cessnock, NSW 2325



1982 Historical Business Directory Records

Lindsay Street, Cessnock, NSW 2325



Historical Business Directories

Lindsay Street, Cessnock, NSW 2325

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:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Feature Point	Direction
N/A	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

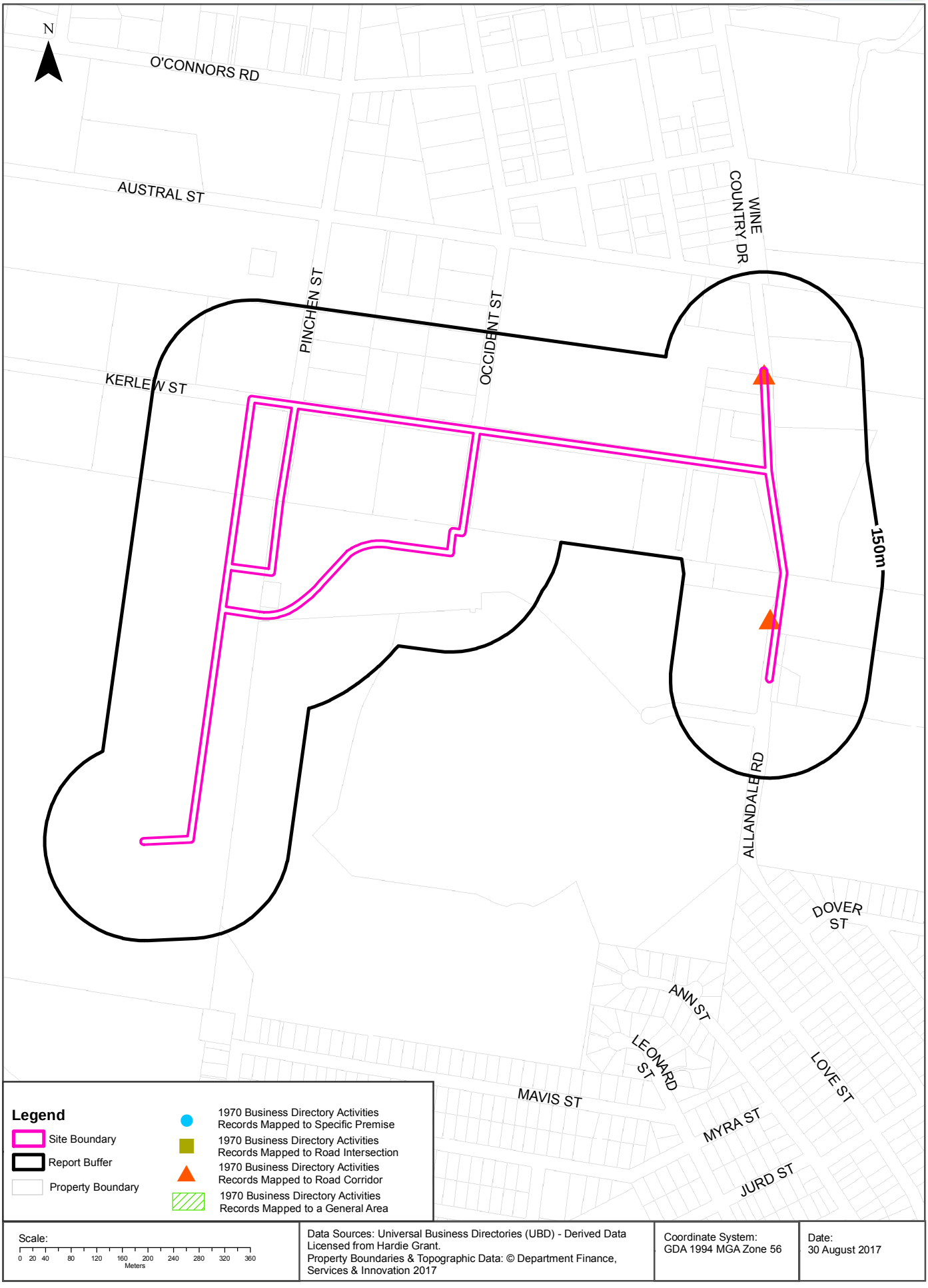
Records from the 1982 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
HOSPITALS &/OR HEALTH CENTRES.	Allendale Hospital, 121 Allendale Rd Cessnock	165920	Road Match	0m
MOTOR ACCESSORIES &/OR SPARE PARTS - RETAIL	Allendale Service Station, 120 Allendale Rd Cessnock	166000	Road Match	0m
MOTOR BRAKE SPECIALISTS.	Allendale Service Station, 120 Allendale Rd Cessnock	166018	Road Match	0m
MOTOR CLUTCH SPECIALISTS.	Allendale Service Station, 120 Allendale Rd Cessnock	166041	Road Match	0m
MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Allendale Service Station, 120 Allendale Rd Cessnock	166052	Road Match	0m
MOTOR RADIATOR SPECIALISTS &/OR REPAIRERS.	Allendale Service Station, 120 Allendale Rd Cessnock	166091	Road Match	0m
MOTOR STEERING SPECIALISTS.	Allendale Service Station, 120 Allendale Rd Cessnock	166098	Road Match	0m
MOTOR TRANSMISSION SPECIALISTS.	Allendale Service Station, 120 Allendale Rd Cessnock	166107	Road Match	0m
MOTOR TUNING SPECIALISTS.	Allendale Service Station, 120 Allendale Rd Cessnock	166110	Road Match	0m
CAMPING GROUNDS &/OR CARAVAN PARKS.	Cessnock Caravan Park, Allandale Rd., Nulkaba Cessnock	165754	Road Match	0m
PIPE &/OR PIPE FITTINGS MFRS. &/OR DISTS.	Cessnock Potteries Pty..Ltd., Allandale Rd Cessnock	166142	Road Match	0m
MIXED BUSINESSES.	Clifford, E. H. & H. M., Allendale Rd., Nulkaba Cessnock	165977	Road Match	0m
MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Clifford, E. H. & H. M., Allendale Rd., Nulkaba Cessnock	166065	Road Match	0m
CONCRETE READY MIXED SUPPLIERS.	Mitchell's Cement Products Pty. Ltd., Allandale Rd Cessnock	165800	Road Match	0m
GOVERNMENT DEPARTMENTS.	Post Office, Allandale Rd., Nulkaba Cessnock	165878	Road Match	0m

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

1970 Historical Business Directory Records

Lindsay Street, Cessnock, NSW 2325



Historical Business Directories

Lindsay Street, Cessnock, NSW 2325

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:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Feature Point	Direction
N/A	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

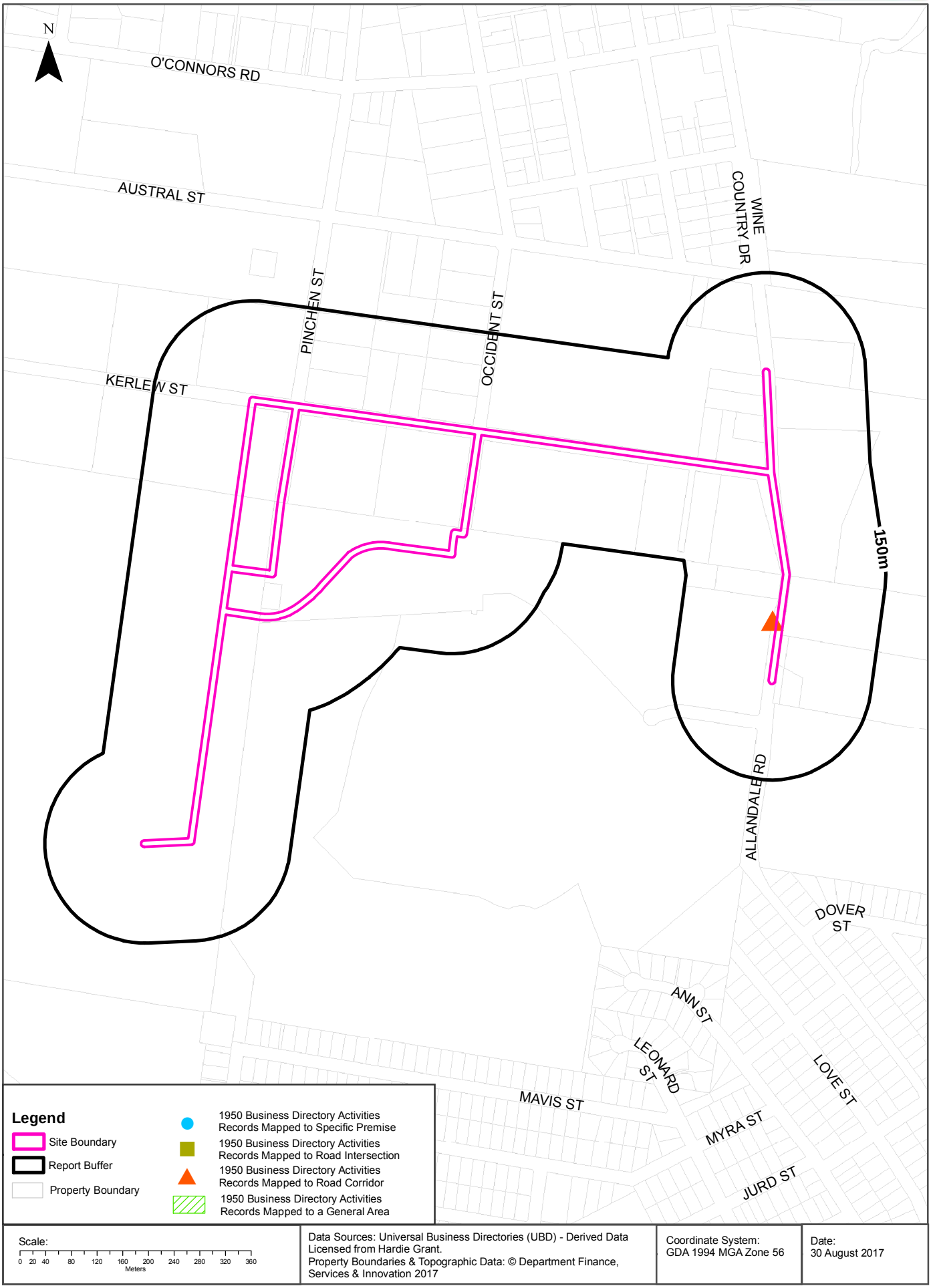
Records from the 1970 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
MOTOR SERVICE STATIONS-PETROL, OILS, ETC.	Allandale Distributing Co., Allandale Rd., Greater Cessnock	639867	Road Match	0m
POULTRY DEALERS &/OR W'SALE &/OR RETAILERS	Allandale Distributing Co., Allandale Rd., Greater Cessnock	639926	Road Match	0m
HOSPITALS & HEALTH CENTRES	Allendale Hospital, Allendale Rd., Greater Cessnock	639690	Road Match	0m
CAMPING GROUNDS &/OR CARAVAN PARKS	Cessnock Caravan Park, Allandale Rd., Greater Cessnock	639514	Road Match	0m
PIPE BENDERS/FABRICATORS	Cessnock Potteries Pty. Ltd. Allandale Road, Cessnock, Newcastle	633037	Road Match	0m
PIPES & PIPE FITTINGS-MFRS. &/OR DISTS.	Cessnock Potteries Pty. Ltd., Allandale Rd., Greater Cessnock	639917	Road Match	0m
MOTOR SERVICE STATIONS-PETROL, OILS, ETC.	Clifford, E. H. & H. M., Allandale Rd., Nulkaba, Greater Cessnock	639872	Road Match	0m
MIXED BUSINESSES	Clifford, E. H. & H. M., Allendale Rd., Nulkaba, Greater Cessnock	639778	Road Match	0m
GOVERNMENT DEPARTMENTS	Post Office, Allendale Rd., Nulkaba, Greater Cessnock	639656	Road Match	0m

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

1950 Historical Business Directory Records

Lindsay Street, Cessnock, NSW 2325



Historical Business Directories

Lindsay Street, Cessnock, NSW 2325

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:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Feature Point	Direction
N/A	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:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
MOTOR GARAGES & ENGINEERS	Bradstreet, T. J. and Sons, Allendale Rd., Cessnock	161441	Road Match	0m
PIPE MANUFACTURERS	Cessnock Potteries Pty. Ltd. Allondale Rd. , Cessnock	161490	Road Match	0m
BUTCHERS-RETAIL	Davies, R. and Sons, Allandale Rd., Cessnock	161103	Road Match	0m
AERATED WATER & CORDIAL MANUFACTURERS	Ellis, J., Allandale Rd., Cessnock	161035	Road Match	0m
ENGINEE MECHANIRS-GENERAL &/OR MANUFACTURING &/OR MECHANICAL	Hancock, J. W., Allendale Rd., Cessnock	161236	Road Match	0m
MOTOR GARAGES & ENGINEERS	Hancock, J. W., Allendale Rd., Cessnock	161445	Road Match	0m
WELDERS-ELECTRIC &/OR OXY	Hancock, J. W., Allendale Rd., Cessnock	161603	Road Match	0m
GROCERS & GENERAL STOREKEEPERS	Harcher, W. A., Allendale Rd., Cessnock	161308	Road Match	0m
GROCERS & GENERAL STOREKEEPERS	Heslop, T. H., Allendale Rd., Cessnock	161309	Road Match	0m
GROCERS & GENERAL STOREKEEPERS	Olympic Cafe, Allendale Rd., Cessnock	161322	Road Match	0m
MONUMENTAL MASONS	Roberts, E. B., Allendale Rd., Cessnock	161423	Road Match	0m
BEAUTY SALONS & LADIES' HAIRDRESSERS	Thompson, M., Allandale Rd., Cessnock	161075	Road Match	0m

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

Historical Business Directories

Lindsay Street, Cessnock, NSW 2325

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:

Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Feature Point	Direction
MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Heslop, T. & Sons, 73 Allandale Rd Cessnock	166075	1982	Premise Match	671m	South East
MOTOR SERVICE STATIONS-PETROL, OILS, ETC.	Heslop, T. H. & M. M., 73 Allandale Rd., Greater Cessnock	639878	1970	Premise Match	671m	South East

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

Historical Business Directories

Lindsay Street, Cessnock, NSW 2325

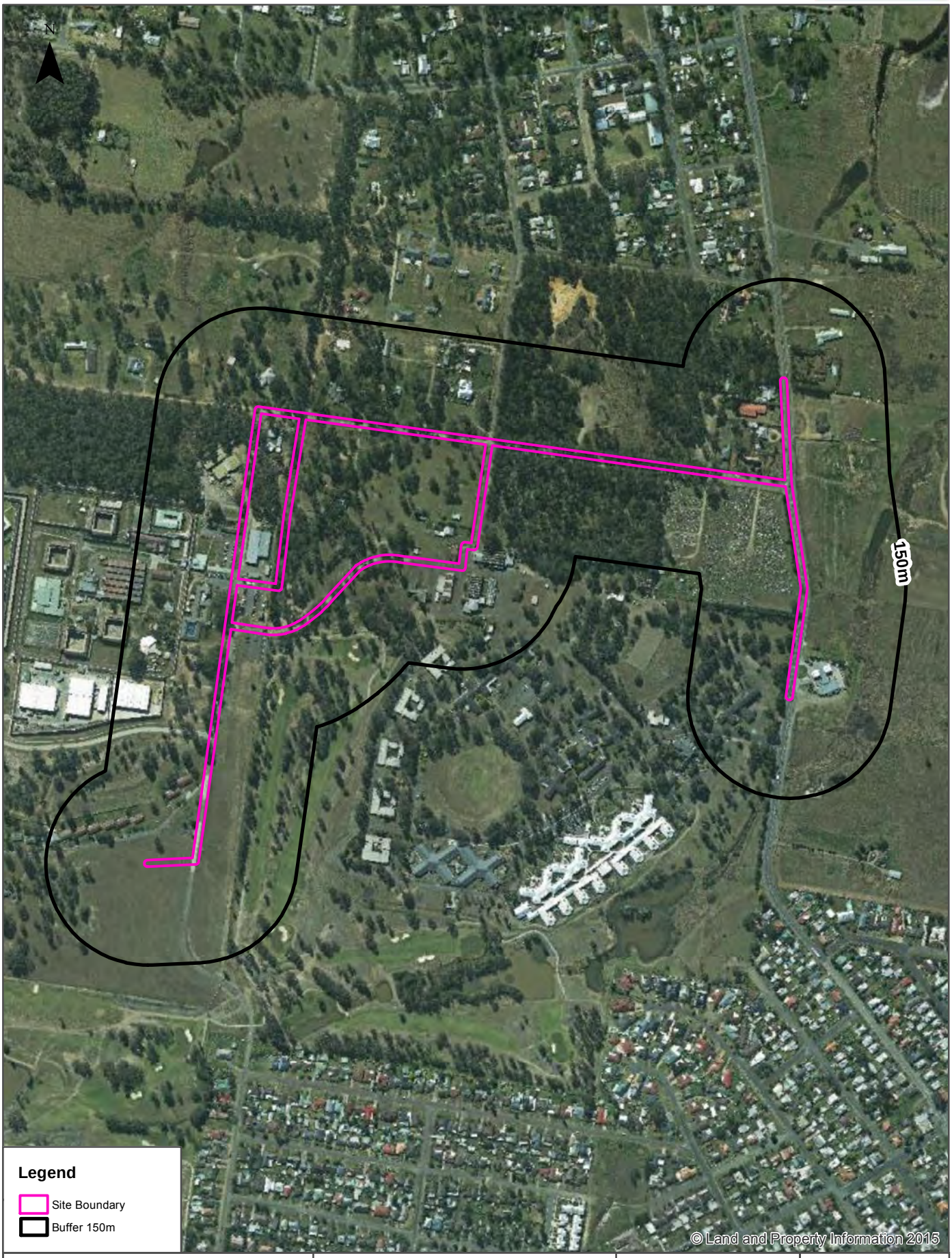
Dry Cleaners, Motor Garages & Service Stations Road or Area Matches

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:

Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
MOTOR SERVICE STATIONS-PETROL, OILS, ETC.	Allandale Distributing Co., Allandale Rd., Greater Cessnock	639867	**1970**	Road Match	0m
MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Allendale Service Station, 120 Allendale Rd Cessnock	166052	**1982**	Road Match	0m
MOTOR GARAGES & ENGINEERS	Bradstreet, T. J. and Sons, Allendale Rd., Cessnock	161441	**1950**	Road Match	0m
MOTOR SERVICE STATIONS-PETROL, OILS, ETC.	Clifford, E. H. & H. M., Allandale Rd., Nulkaba, Greater Cessnock	639872	**1970**	Road Match	0m
MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Clifford, E. H. & H. M., Allendale Rd., Nulkaba Cessnock	166065	**1982**	Road Match	0m
MOTOR GARAGES & ENGINEERS	Hancock, J. W., Allendale Rd., Cessnock	161445	**1950**	Road Match	0m

Aerial Imagery 2012

Lindsay Street, Cessnock, NSW 2325



Scale:	Data Sources: Historical Aerials: © Department Finance, Services & Innovation	Coordinate System: GDA 1994 MGA Zone 56	Date: 30 August 2017

0 25 50 100 150 200 250 300 350 400
Meters

Aerial Imagery 2010

Lindsay Street, Cessnock, NSW 2325

Scale:
0 75 150 300
Meters

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Coordinate System:
GDA 1994 MGA Zone 56

Date: 28 August, 2017

Aerial Imagery 2005

Lindsay Street, Cessnock, NSW 2325

Scale:	Data Sources: Aerial Imagery © 2017 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 56	Date: 28 August, 2017

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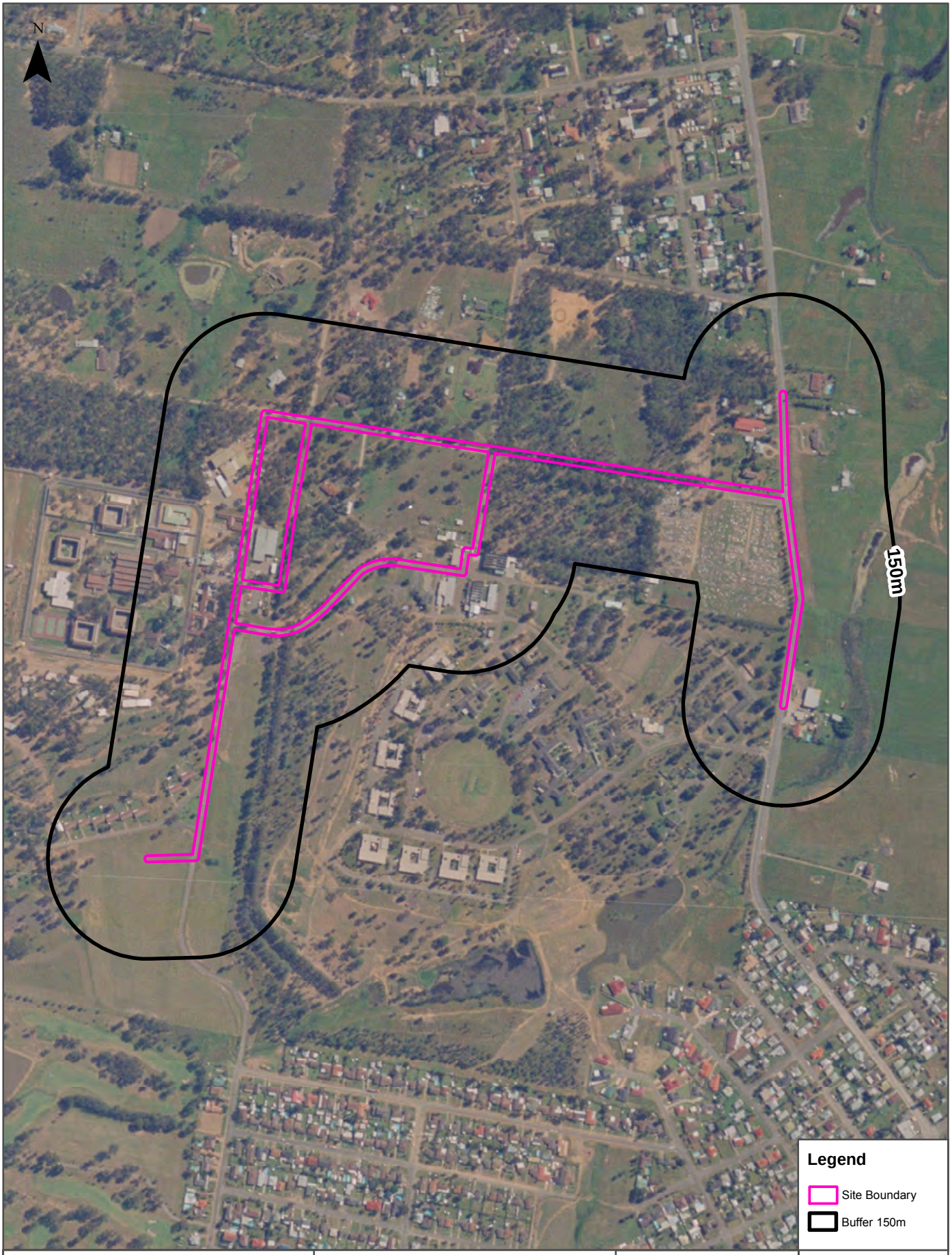
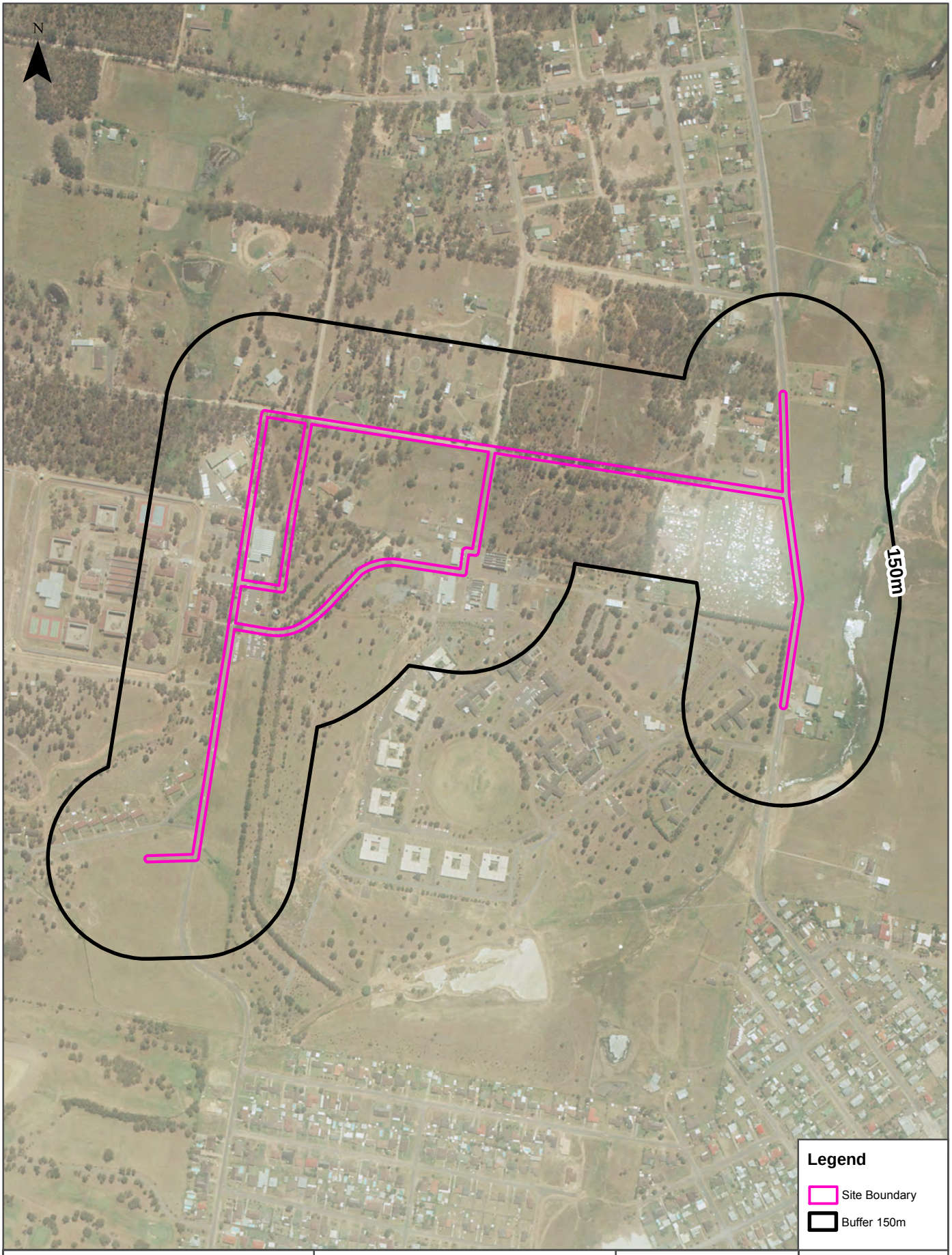
Aerial Imagery 1998

Lindsay Street, Cessnock, NSW 2325



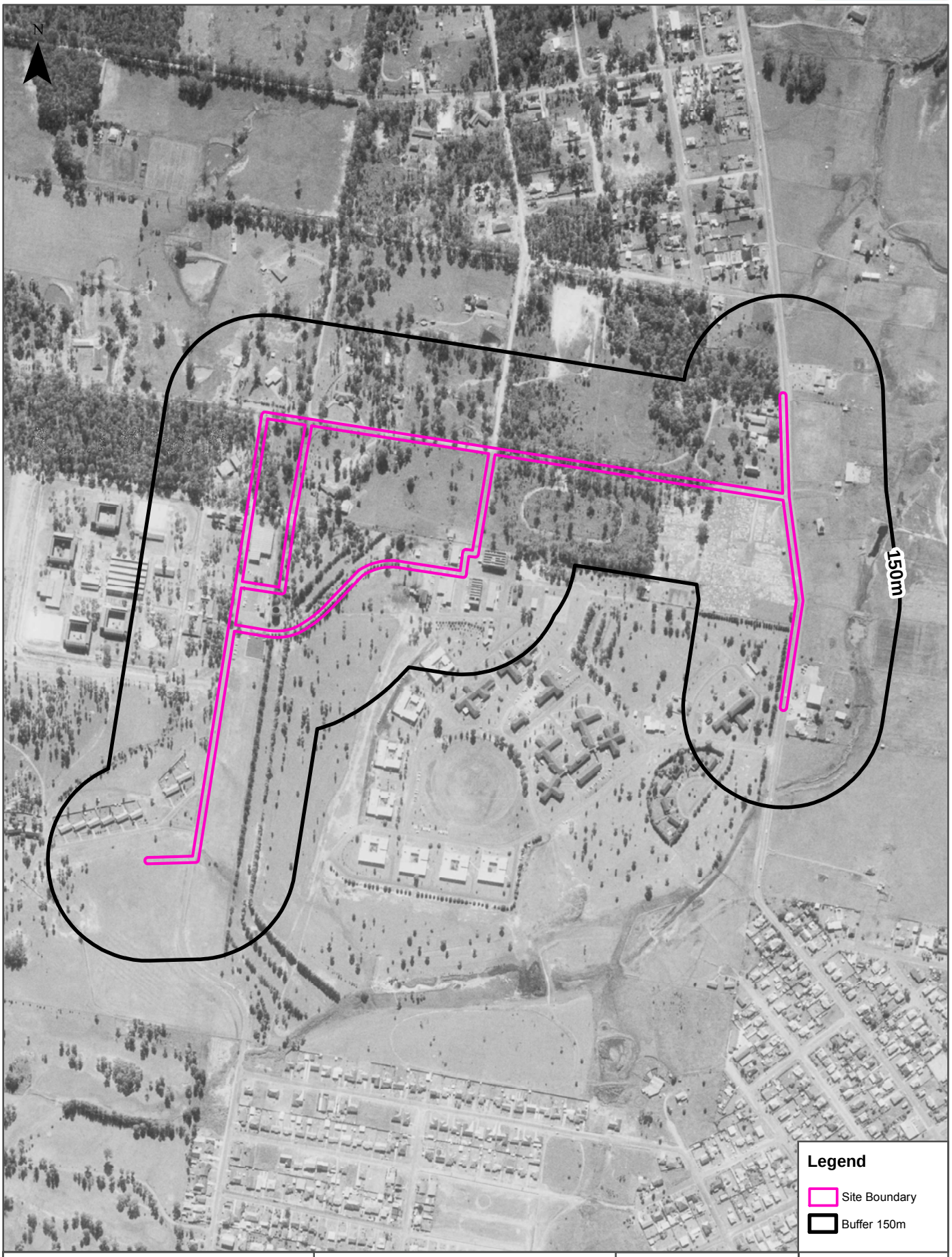
Aerial Imagery 1990

Lindsay Street, Cessnock, NSW 2325



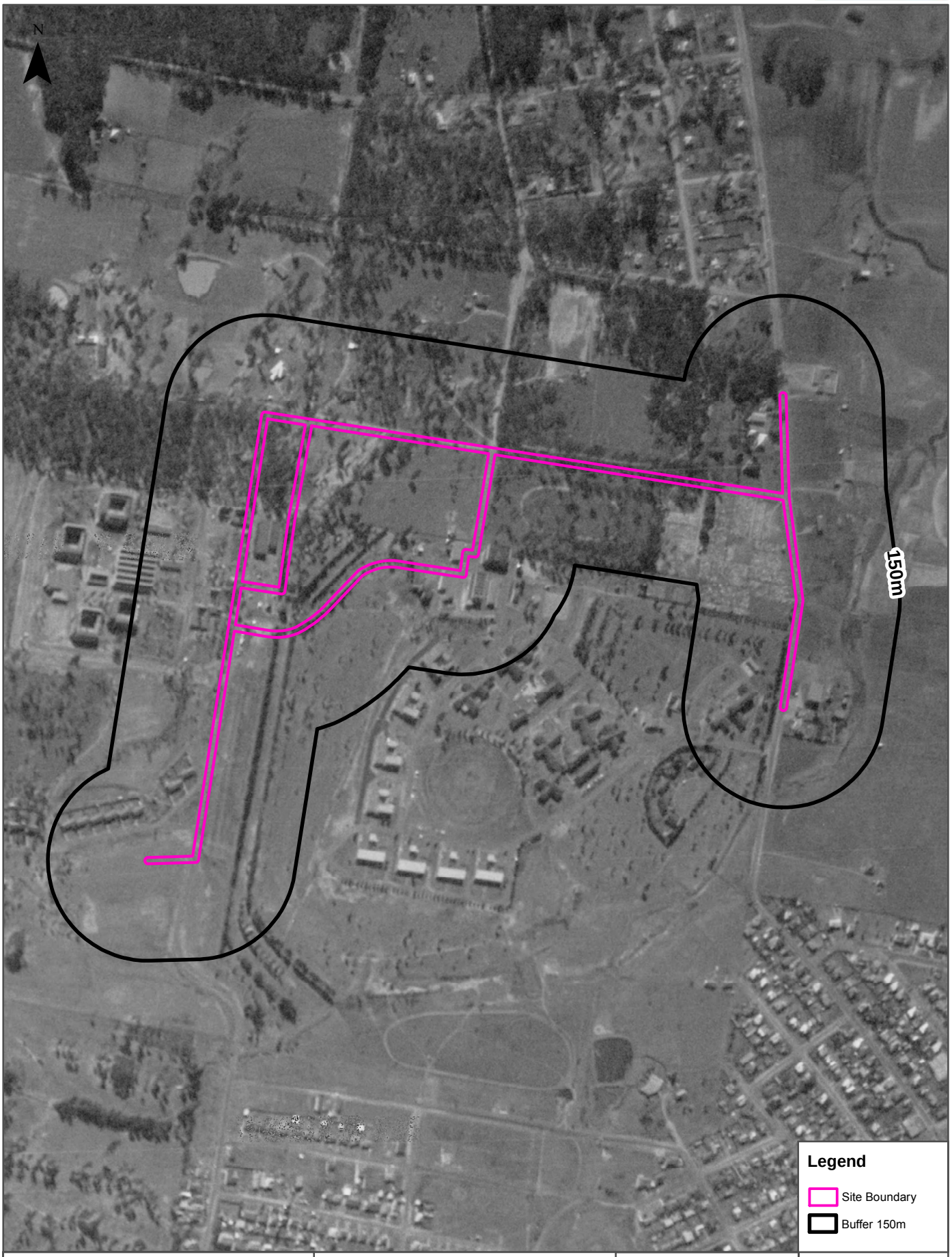
Aerial Imagery 1984

Lindsay Street, Cessnock, NSW 2325



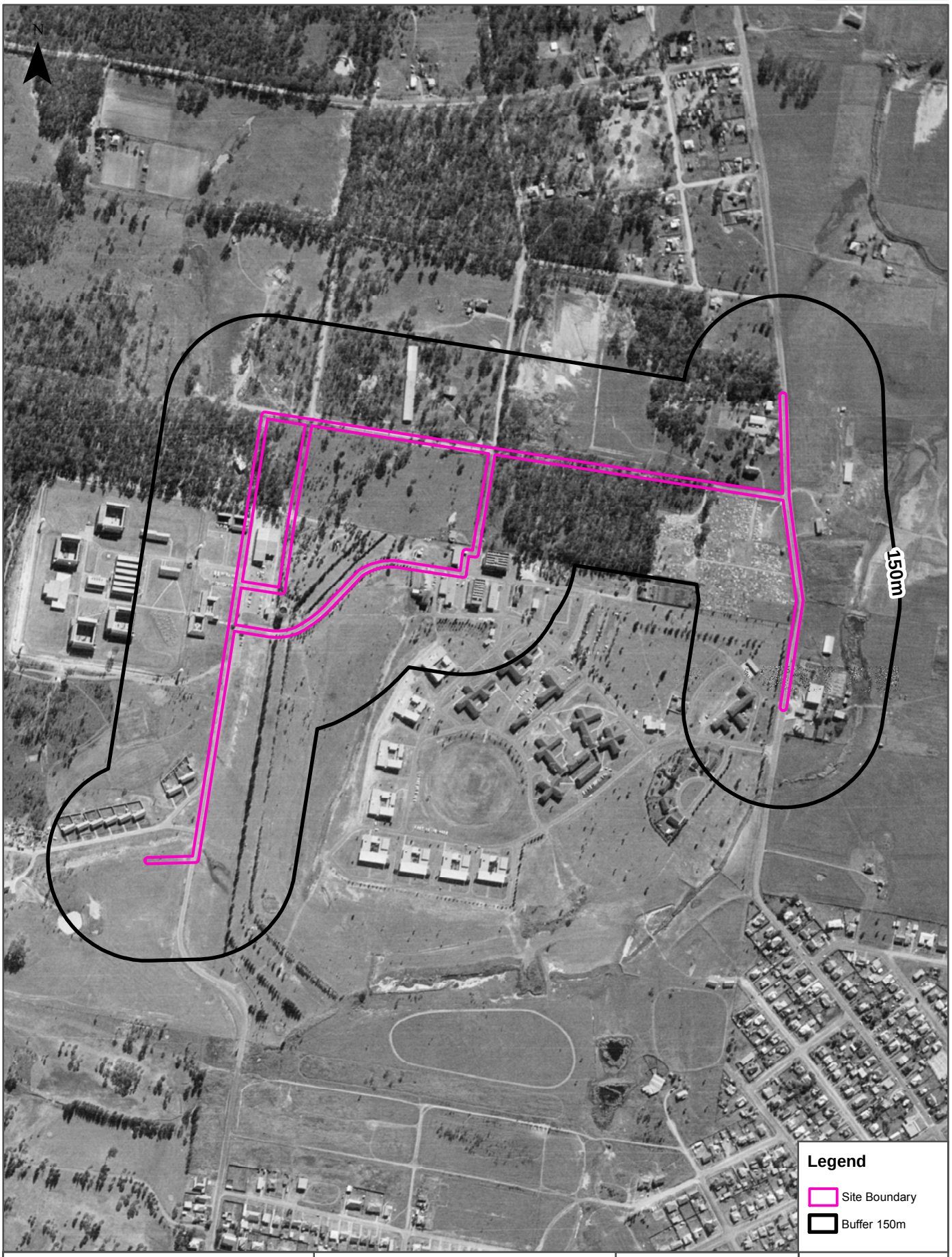
Aerial Imagery 1980

Lindsay Street, Cessnock, NSW 2325



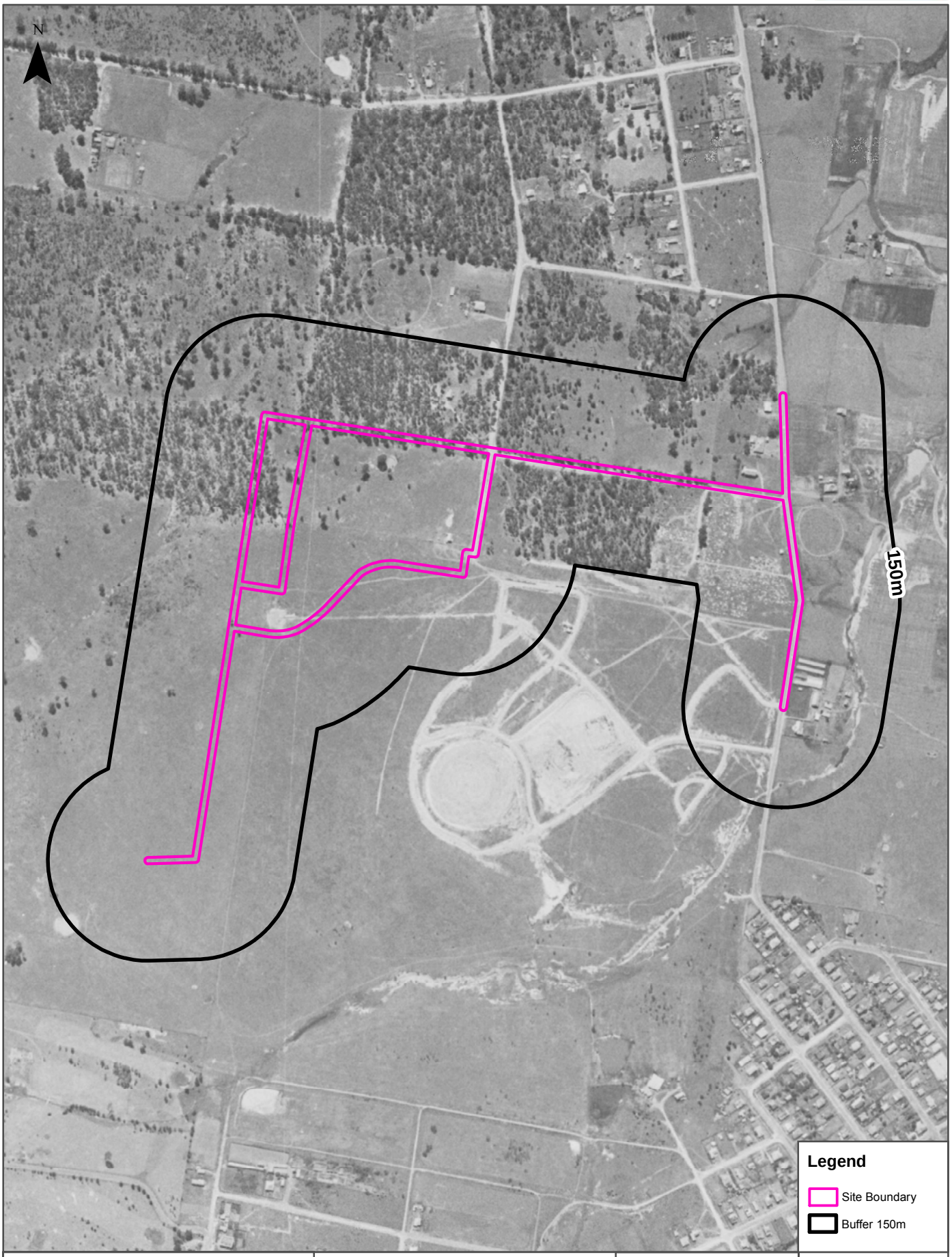
Aerial Imagery 1975

Lindsay Street, Cessnock, NSW 2325



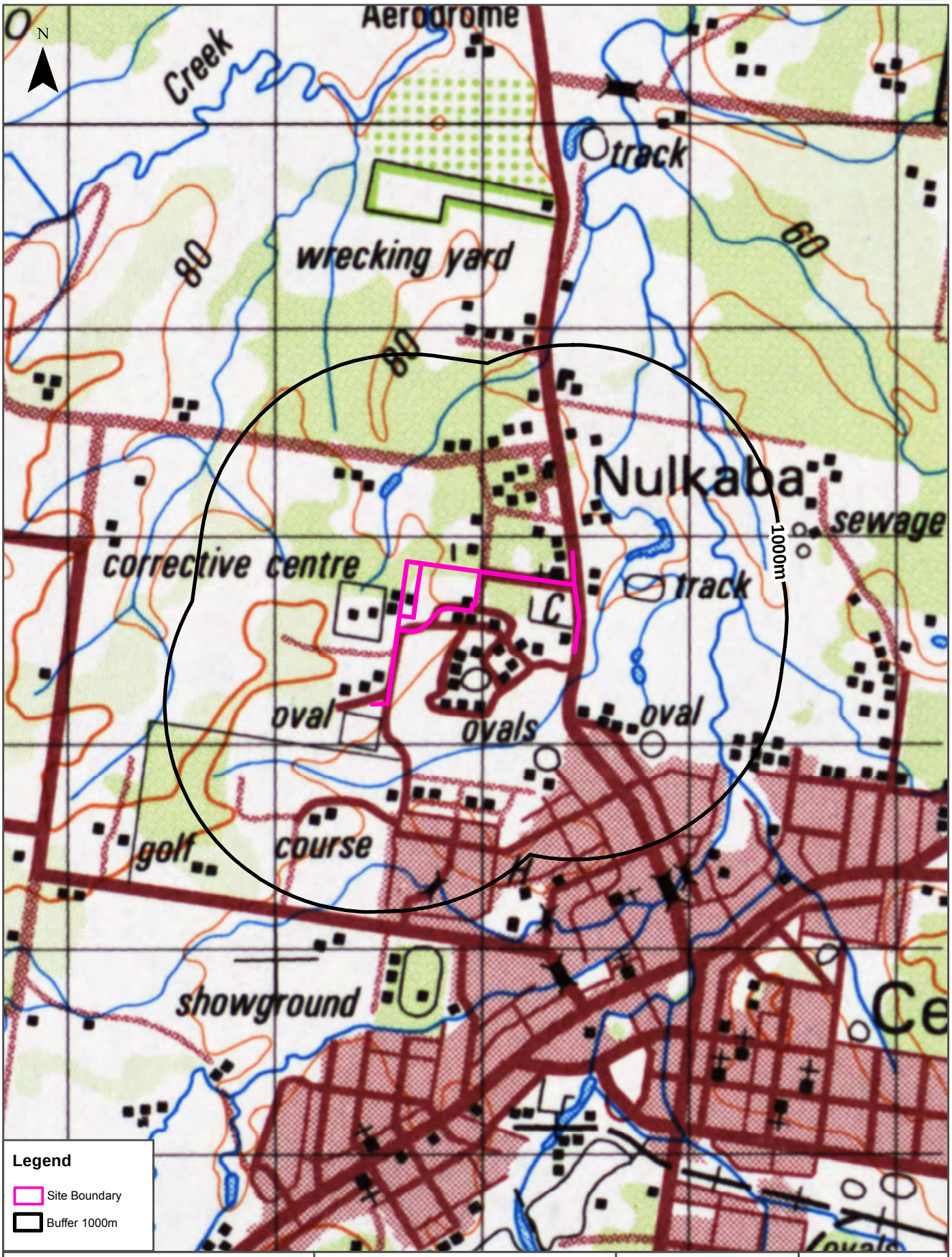
Aerial Imagery 1961

Lindsay Street, Cessnock, NSW 2325



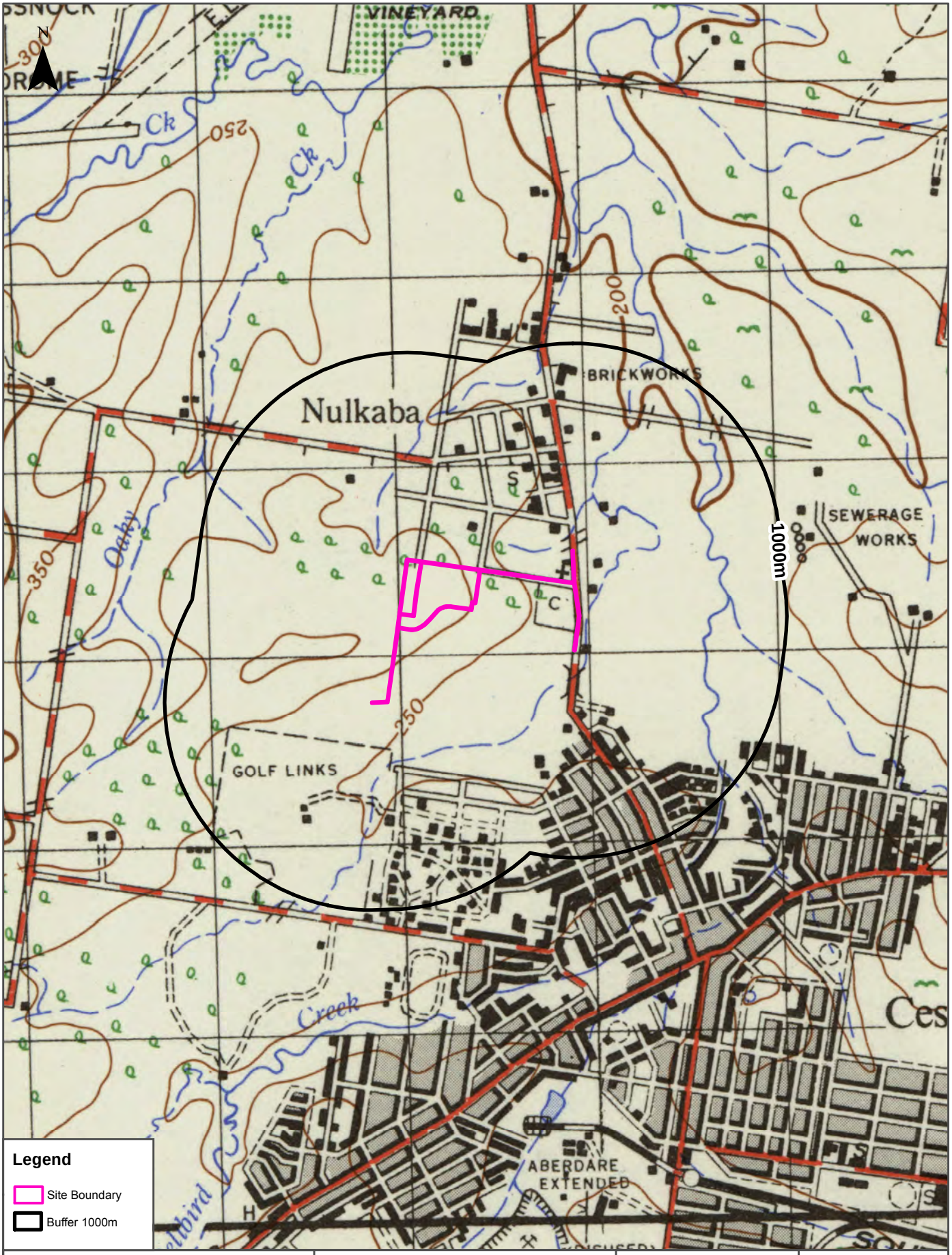
Historical Map 1982

Lindsay Street, Cessnock, NSW 2325



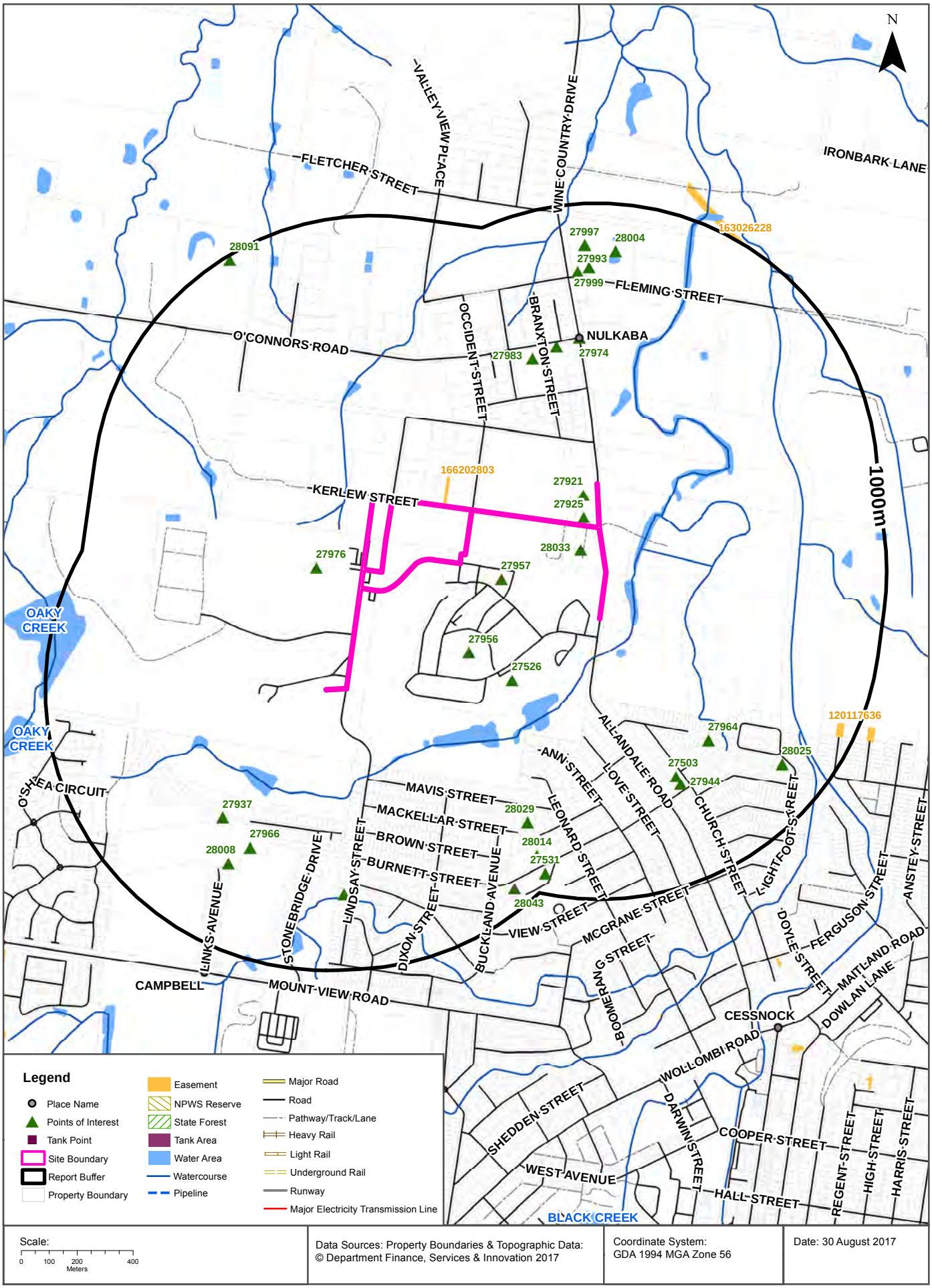
Historical Map 1954

Lindsay Street, Cessnock, NSW 2325



Topographic Features

Lindsay Street, Cessnock, NSW 2325



Topographic Features

Lindsay Street, Cessnock, NSW 2325

Points of Interest

What Points of Interest exist within the dataset buffer?

Map Id	Feature Type	Label	Distance	Direction
27925	Place Of Worship	Place Of Worship	24m	East
27921	Place Of Worship	JEHOVAHS WITNESSES CHURCH	48m	North East
28033	Cemetery	CESSNOCK CEMETERY	74m	East
27957	Sports Field	Sports Field	151m	South East
27976	Gaol	CESSNOCK CORRECTIONAL CENTRE	162m	West
27956	Sports Field	OVAL	315m	South
27526	Nursing Home	CALVARY CESSNOCK RETIREMENT COMMUNITY	379m	South East
27983	Primary School	NULKABA PUBLIC SCHOOL	501m	North East
27530	Tourist Park / Home Village	CESSNOCK WINE COUNTRY CARAVAN PARK	506m	North East
27974	Village	NULKABA	521m	North East
27964	Sports Field	DRAIN OVAL	579m	South East
27937	Golf Course	THE OAKS GOLF COURSE	584m	South West
27966	Sports Field	BOWLING GREEN	623m	South West
27503	Community Facility	NORTH CESSNOCK COMMUNITY HALL	623m	South East
27944	Park	NORTH END PARK	655m	South East
28008	Club	CESSNOCK GOLF CLUB T/AS STONEBRIDGE GOLF CLUB	710m	South West
28026	Park	LINDSAY STREET PARK	731m	South
27993	Historic Site	POTTERY KILNS	756m	North East
27999	Historic Site	POTTERY KILNS	770m	North East
28029	Park	MAVIS STREET PARK	770m	South
28004	Sports Court	TENNIS COURT	829m	North East
28025	Park	LEE-ANN CRESCENT PARK	830m	South East
27997	Tourist Attraction	POTTERS HOTEL BREWERY RESORT	850m	North East
28014	Community Home	MOUNTAIN VIEW LODGE HOSTEL	873m	South
27531	Helipad	Helipad	928m	South
28043	Ambulance Station	CESSNOCK AMBULANCE STATION	929m	South
28091	Homestead	CHIMBU PARK	984m	North West

Topographic Features

Lindsay Street, Cessnock, NSW 2325

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					

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
166202803	Primary	Right of way	6m	4m	North
120117636	Primary	Undefined		927m	South East
163026228	Primary	Electricity	20m	991m	North East

Topographic Features

Lindsay Street, Cessnock, NSW 2325

State Forest

What State Forest exist within the dataset buffer?

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

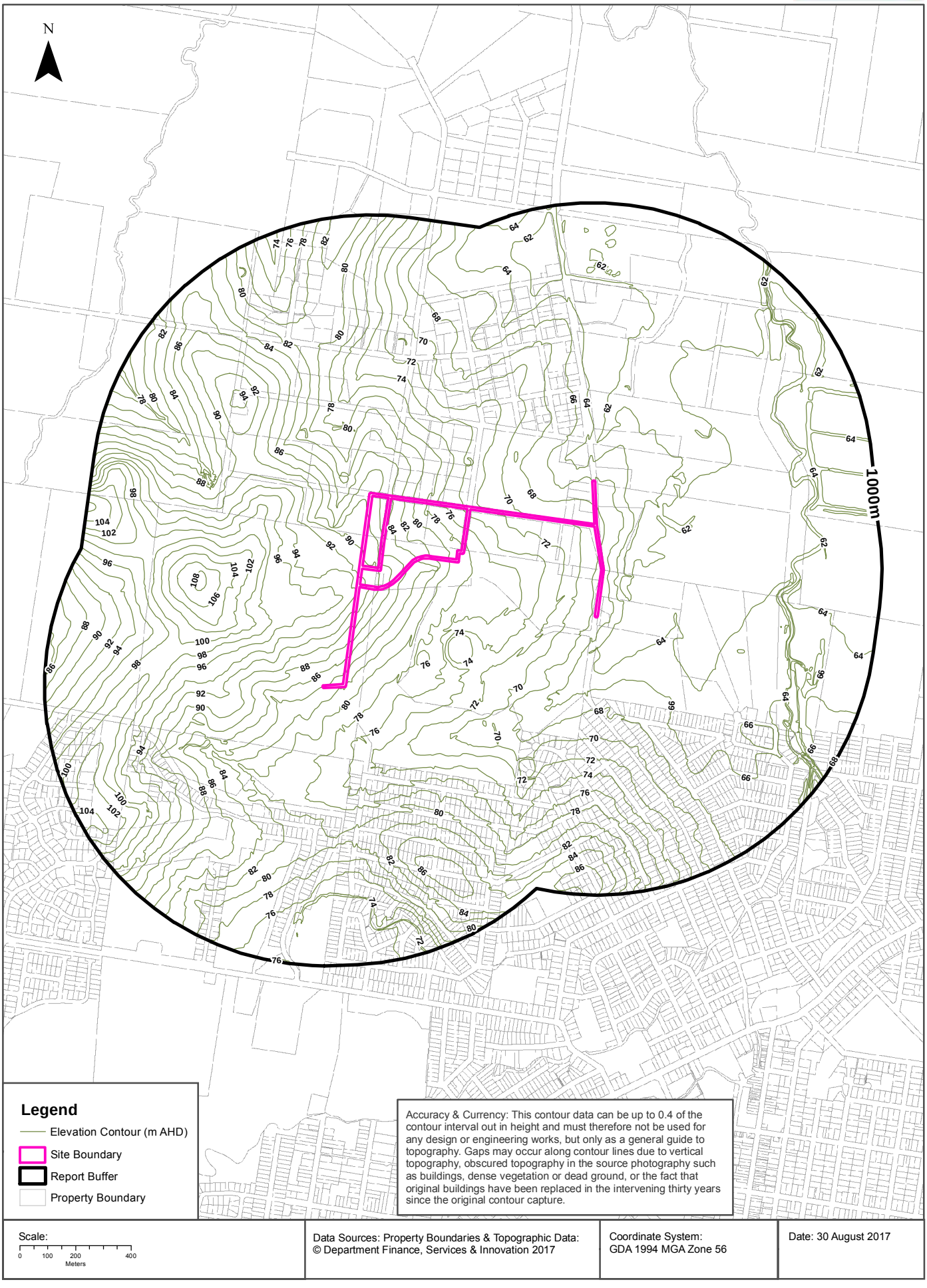
National Parks and Wildlife Service Reserves

What NPWS Reserves exist within the dataset buffer?

Reserve Number	Reserve Type	Reserve Name	Gazetted Date	Distance	Direction
N/A	No records in buffer				

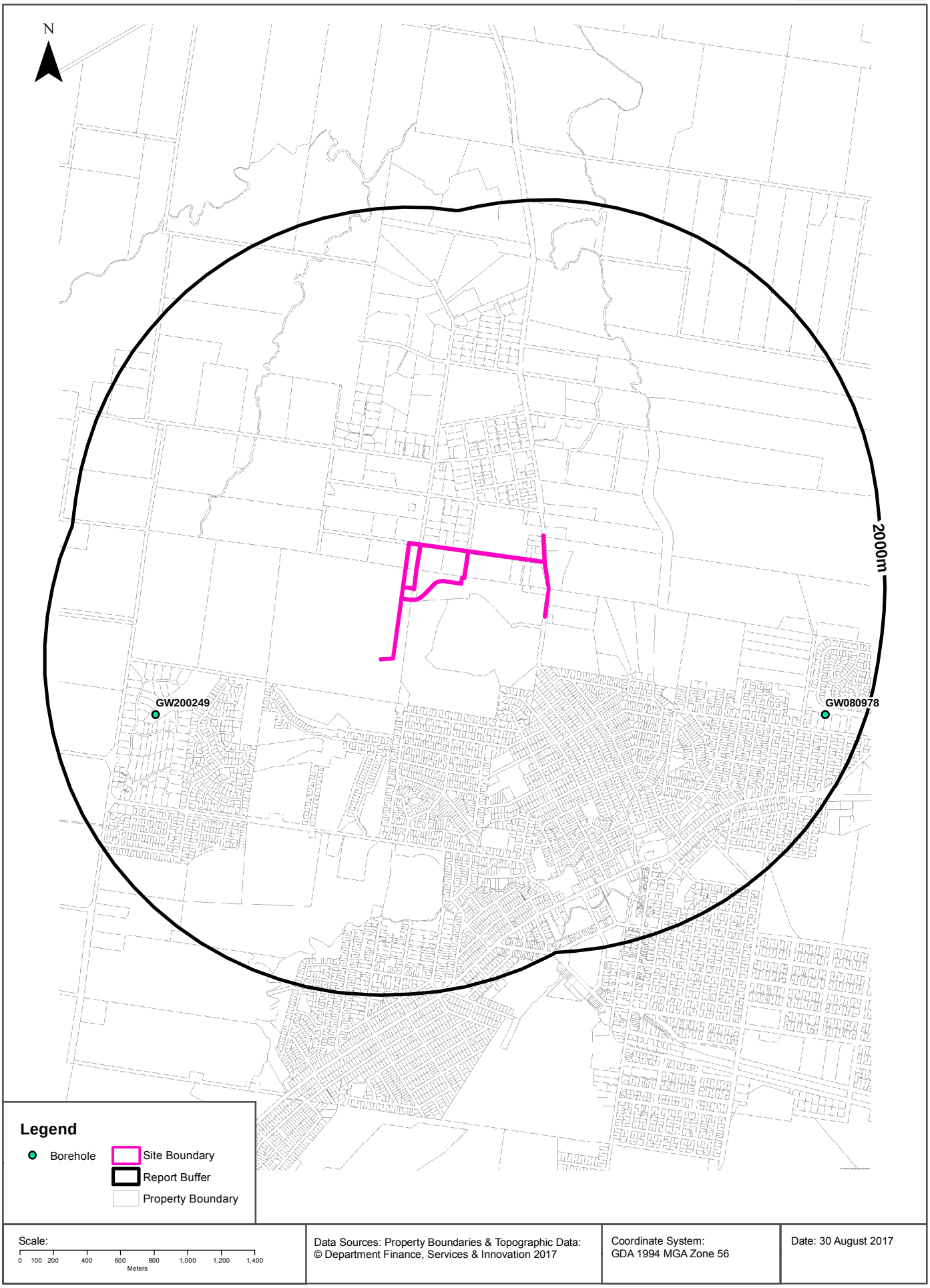
Elevation Contours (m AHD)

Lindsay Street, Cessnock, NSW 2325



Groundwater Boreholes

Lindsay Street, Cessnock, NSW 2325



Hydrogeology & Groundwater

Lindsay Street, Cessnock, NSW 2325

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)

Groundwater Boreholes

Boreholes within the dataset buffer:

GW No.	Licence No	Work Type	Owner Type	Purpose	Contractor	Complete Date	Final Depth	Drilled Depth	Salinity	SWL	Yield	Elev	Dist	Dir
GW200249	20BL168525	Bore		Test Bore	Slade Drilling	06/12/2002	18.00	18.00			1.200		1377m	South West
GW080978	20BL170112	Bore	NSW Office of Water	Monitoring	Central West Water Drillers	07/12/2005	30.00	30.00		6.00	0.450	67.50	1768m	East

Borehole Data Source : NSW Department of Primary Industries - Office of Water / Water Administration Ministerial Corporation for all bores prefixed with GW. All other bores

Hydrogeology & Groundwater

Lindsay Street, Cessnock, NSW 2325

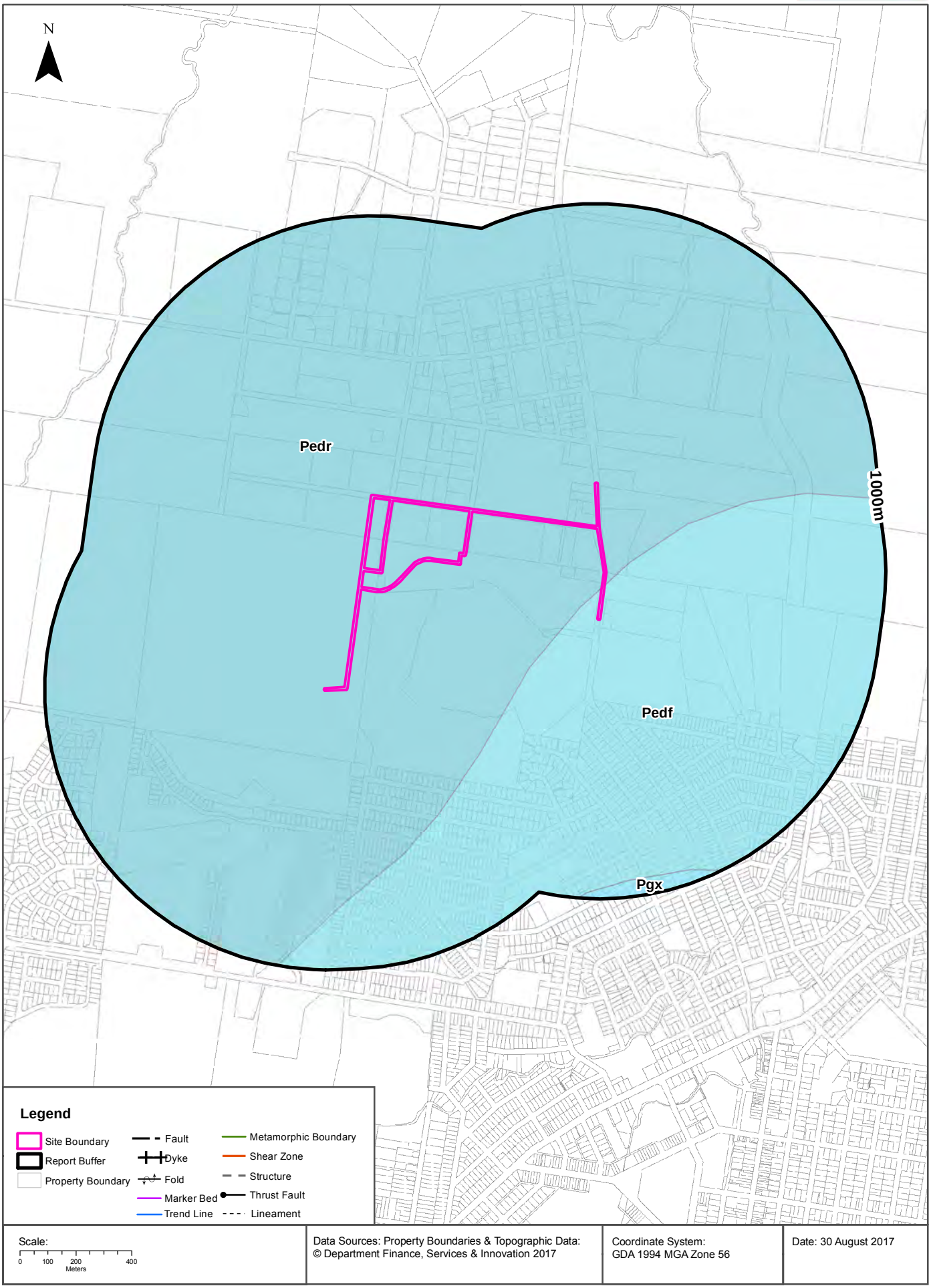
Driller's Logs

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

Groundwater No	Drillers Log	Distance	Direction
GW200249	0.00m-0.40m Topsoil 0.40m-6.00m clay 6.00m-18.00m silt	1377m	South West
GW080978	0.00m-0.10m Topsoil 0.10m-6.00m Clay 6.00m-10.00m Shale, brown 10.00m-30.00m Pyroclastics, grey tuff	1768m	East

Geology 1:250,000

Lindsay Street, Cessnock, NSW 2325



Geology

Lindsay Street, Cessnock, NSW 2325

Geological Units

What are the Geological Units onsite?

Symbol	Description	Unit Name	Group	Sub Group	Age	Dom Lith	Map Sheet	Dataset
Pedf	Silty sandstone	Farley Formation	Dalwood Group		Palaeozoic			1:250,000
Pedr	Siltstone, marl and minor sandstone	Rutherford Formation	Dalwood Group		Palaeozoic			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
Pedf	Silty sandstone	Farley Formation	Dalwood Group		Palaeozoic			1:250,000
Pedr	Siltstone, marl and minor sandstone	Rutherford Formation	Dalwood Group		Palaeozoic			1:250,000
Pgx	Coal seams, siltstone, sandstone, conglomerate	Greta Coal Measures			Palaeozoic			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

Naturally Occurring Asbestos Potential

Lindsay Street, Cessnock, NSW 2325

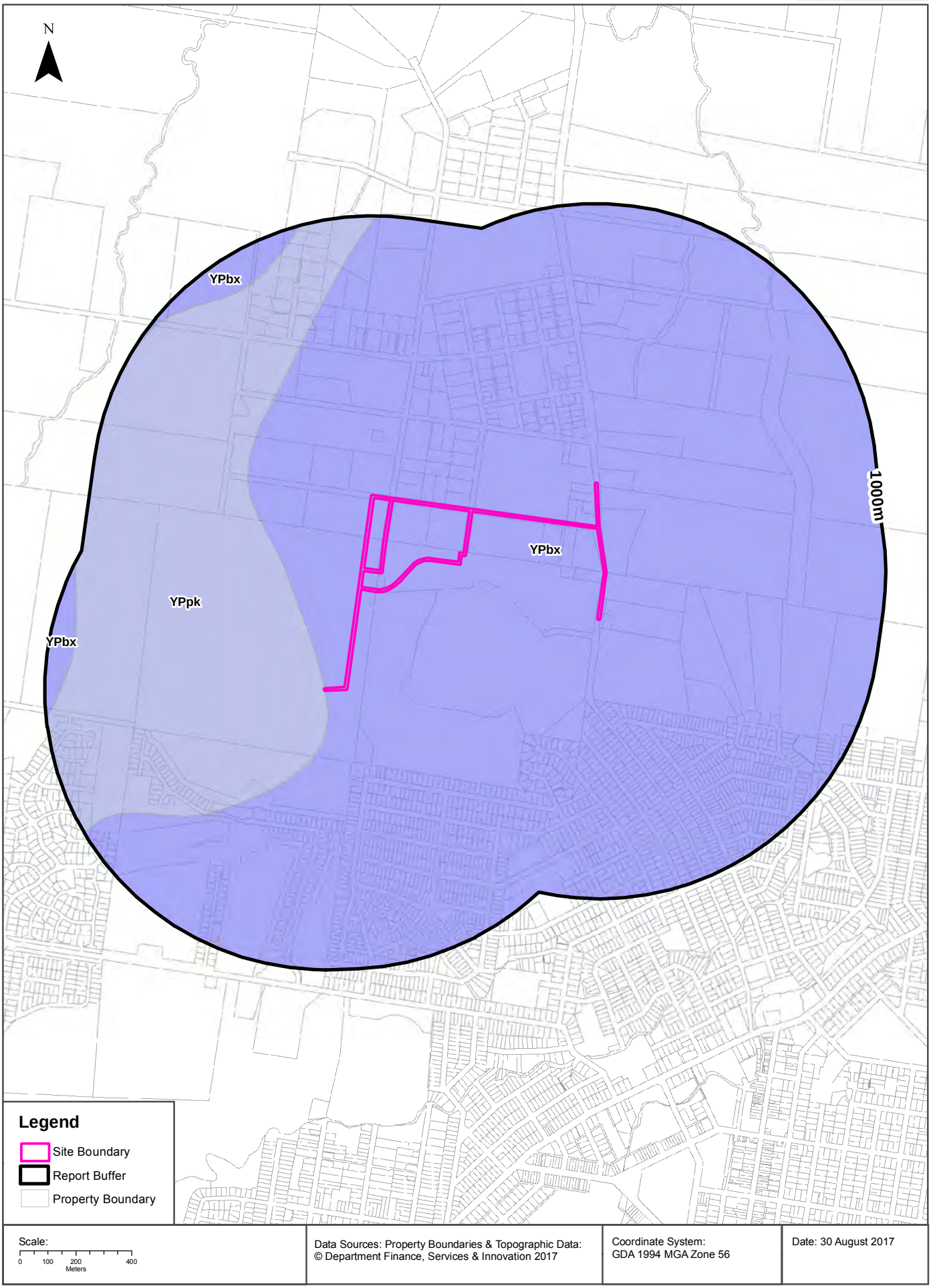
Naturally Occurring Asbestos Potential

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												

Soil Landscapes

Lindsay Street, Cessnock, NSW 2325



Soils

Lindsay Street, Cessnock, NSW 2325

Soil Landscapes

What are the onsite Soil Landscapes?

Soil Code	Name	Group	Process	Map Sheet	Scale
YPbx	BRANXTON	YELLOW PODZOLIC SOILS		Singleton	1:250,000
YPpk	POKOLBIN	YELLOW PODZOLIC SOILS		Singleton	1:250,000

What are the Soil Landscapes within the dataset buffer?

Soil Code	Name	Group	Process	Map Sheet	Scale
YPbx	BRANXTON	YELLOW PODZOLIC SOILS		Singleton	1:250,000
YPpk	POKOLBIN	YELLOW PODZOLIC SOILS		Singleton	1:250,000

Standard Local Environmental Plan Acid Sulfate Soils

Lindsay Street, Cessnock, NSW 2325

Standard Local Environmental Plan Acid Sulfate Soils

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

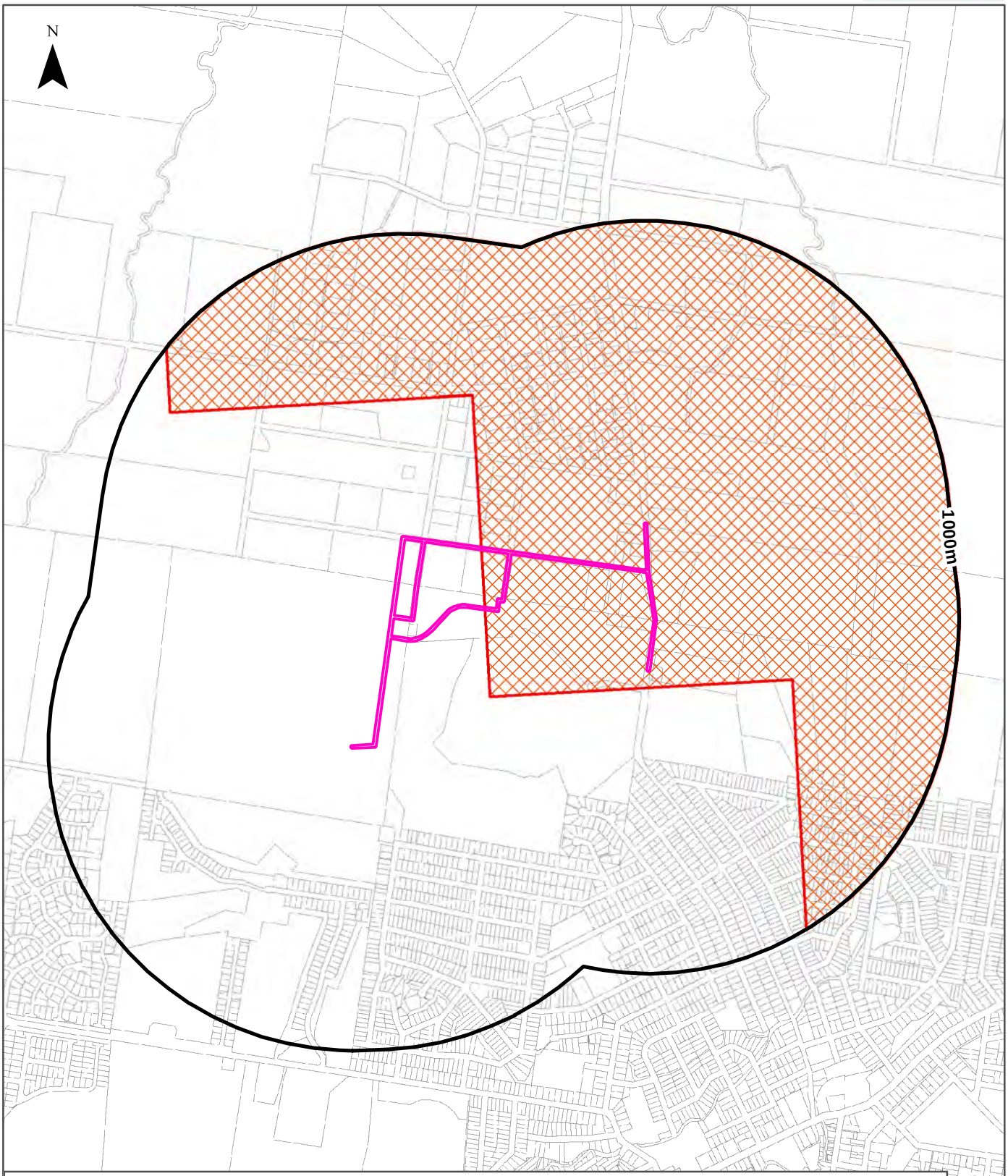
Soil Class	Description	LEP
N/A		

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

Soil Class	Description	LEP	Distance	Direction
N/A				

Dryland Salinity

Lindsay Street, Cessnock, NSW 2325



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 Meters

Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2017

Coordinate System: GDA 1994 MGA Zone 56

Date: 30 August 2017

Dryland Salinity

Lindsay Street, Cessnock, NSW 2325

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	High hazard or risk	High hazard or risk	0m	Onsite

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

Mining Subsidence Districts

Lindsay Street, Cessnock, NSW 2325

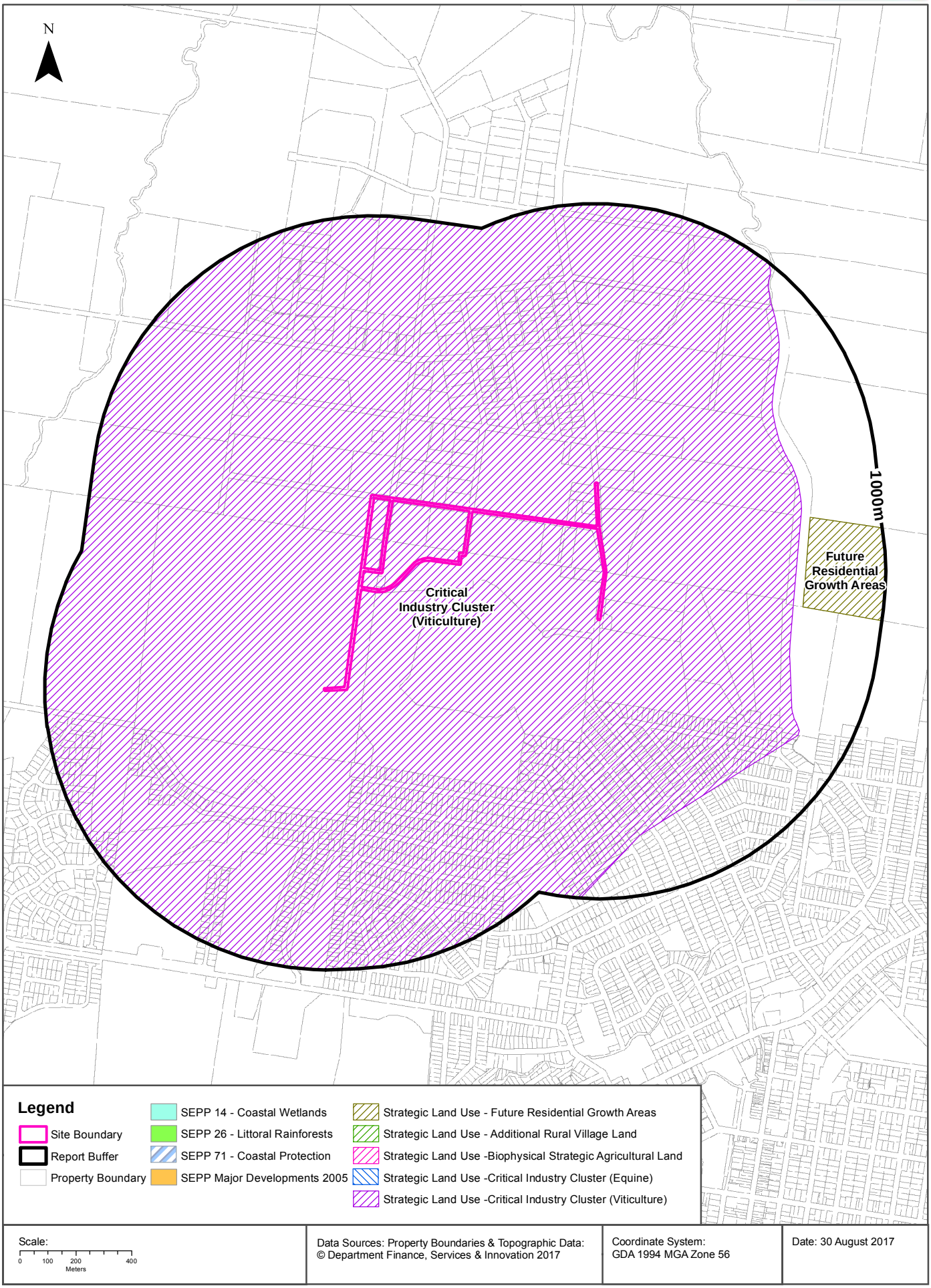
Mining Subsidence Districts

Mining Subsidence Districts within the dataset buffer:

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

State Environmental Planning Policy

Lindsay Street, Cessnock, NSW 2325



Environmental Zoning

Lindsay Street, Cessnock, NSW 2325

State Environmental Planning Policy Protected Areas

Are there any State Environmental Planning Policy Protected Areas onsite or within the dataset buffer?

Dataset	Onsite	Within Site Buffer	Distance
SEPP14 - Coastal Wetlands	No	No	N/A
SEPP26 - Littoral Rainforests	No	No	N/A
SEPP71 - Coastal Protection Zone	No	No	N/A

SEPP Protected Areas Data Source: NSW Department of Planning & Environment

State Environmental Planning Policy Major Developments (2005)

State Environmental Planning Policy Major Developments within the dataset buffer:

Map Id	Feature	Effective Date	Distance	Direction
N/A	No records within buffer			

SEPP Major Development Data Source: NSW Department of Planning & Environment

State Environmental Planning Policy Strategic Land Use Areas

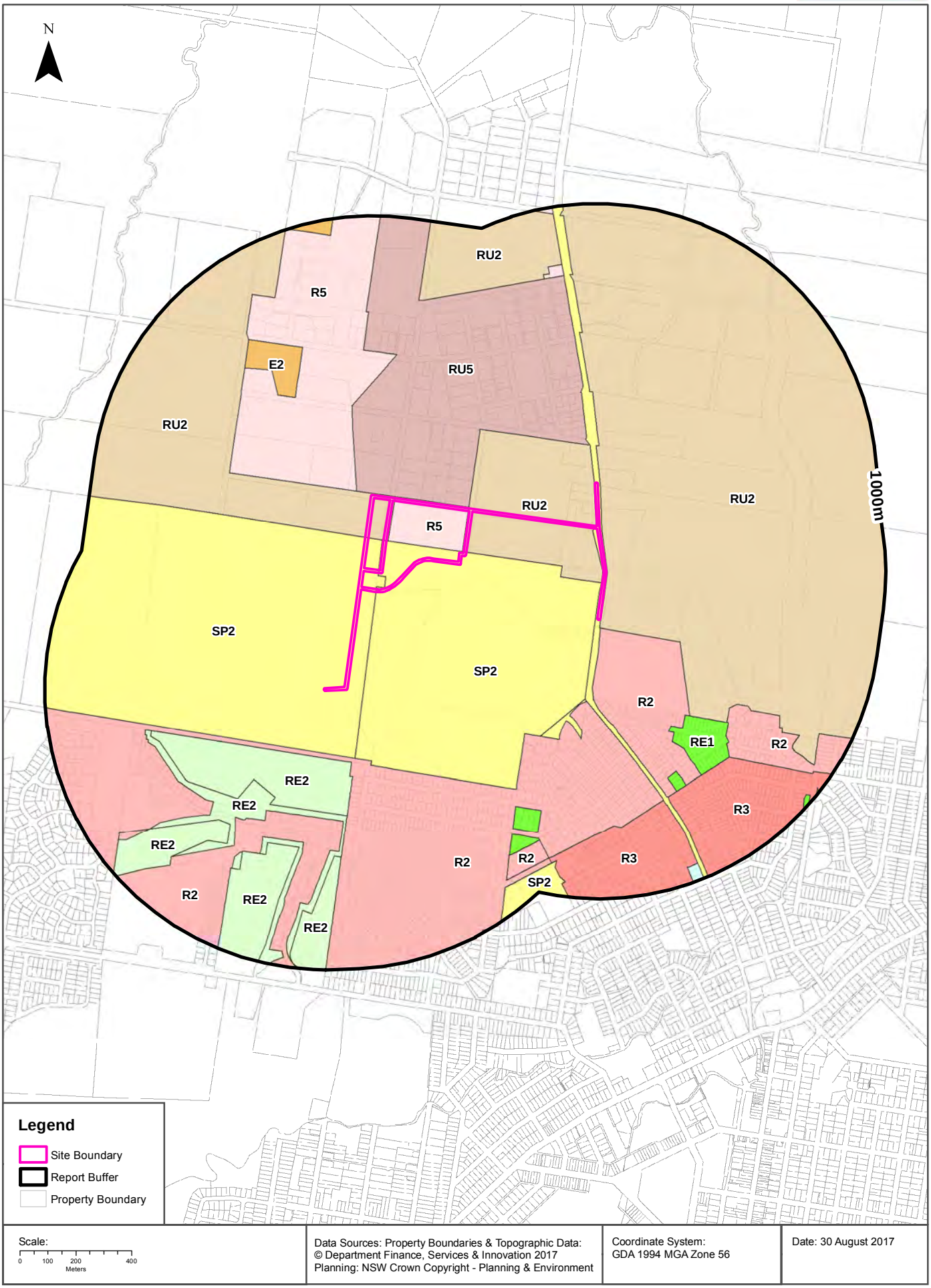
State Environmental Planning Policy Strategic Land Use Areas onsite or within the dataset buffer:

Strategic Land Use	SEPPNo	Effective Date	Amendment	Amendment Year	Distance	Direction
Critical Industry Cluster (Viticulture)	2007	28/01/2014	Coal Seam Gas	2014	0m	Onsite
Future Residential Growth Areas	2007	28/01/2014	Coal Seam Gas	2014	711m	East

SEPP Strategic Land Use Data Source: NSW Department of Planning & Environment

LEP Planning Zones

Lindsay Street, Cessnock, NSW 2325



Local Environmental Plan

Lindsay Street, Cessnock, NSW 2325

Land Zoning

What Local Environmental Plan Land Zones exist within the dataset buffer?

Zone	Description	Purpose	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
RU2	Rural Landscape		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		0m	Onsite
SP2	Infrastructure	Correctional Centre	Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		0m	Onsite
SP2	Infrastructure	Aged Care Facility	Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		0m	Onsite
SP2	Infrastructure	Classified Road	Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		0m	Onsite
R5	Large Lot Residential		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		0m	Onsite
RU2	Rural Landscape		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		1m	North East
RU5	Village		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		3m	North
R2	Low Density Residential		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		30m	South East
R5	Large Lot Residential		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		56m	North
R2	Low Density Residential		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		222m	South West
RE2	Private Recreation		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		239m	South West
SP2	Infrastructure	Correctional Centre	Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		288m	South East
RE2	Private Recreation		Cessnock Local Environmental Plan 2011	09/05/2014	09/05/2014	13/04/2017	Amendment No 9	407m	South West
E2	Environmental Conservation		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		445m	North West
RE1	Public Recreation		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		458m	South East
RE2	Private Recreation		Cessnock Local Environmental Plan 2011	09/05/2014	09/05/2014	13/04/2017	Amendment No 9	550m	South West
R2	Low Density Residential		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		560m	East
RE2	Private Recreation		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		570m	South West
RE2	Private Recreation		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		586m	South West
RE2	Private Recreation		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		594m	South
RE1	Public Recreation		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		608m	South East
RE2	Private Recreation		Cessnock Local Environmental Plan 2011	09/05/2014	09/05/2014	13/04/2017	Amendment No 9	652m	South West
R3	Medium Density Residential		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		665m	South East
R3	Medium Density Residential		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		685m	South
RE1	Public Recreation		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		714m	South
RU2	Rural Landscape		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		714m	North
R5	Large Lot Residential		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		752m	North
RE1	Public Recreation		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		786m	South
R2	Low Density Residential		Cessnock Local Environmental Plan 2011	09/05/2014	09/05/2014	13/04/2017	Amendment No 9	799m	South West
R2	Low Density Residential		Cessnock Local Environmental Plan 2011	08/04/2016	08/04/2016	13/04/2017	Amendment No 20	819m	South

Zone	Description	Purpose	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
SP2	Infrastructure	Cessnock Hospital	Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		878m	South
E2	Environmental Conservation		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		940m	North
B1	Neighbourhood Centre		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		942m	South East
RE1	Public Recreation		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		968m	South East
RE1	Public Recreation		Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		983m	South East
RE2	Private Recreation		Cessnock Local Environmental Plan 2011	09/05/2014	09/05/2014	13/04/2017	Amendment No 9	993m	South

Local Environmental Plan

Lindsay Street, Cessnock, NSW 2325

Minimum Subdivision Lot Size

What are the onsite Local Environmental Plan Minimum Subdivision Lot Sizes?

Symbol	Minimum Lot Size	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Percentage of Site Area
AB	40 ha	Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		32.63
V	2000 m²	Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	13/04/2017		8.9

Maximum Height of Building

What are the onsite Local Environmental Plan Maximum Height of Buildings?

Symbol	Maximum Height of Building	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Percentage of Site Area
No Data							

Floor Space Ratio

What are the onsite Local Environmental Plan Floor Space Ratios?

Symbol	Floor Space Ratio	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Percentage of Site Area
No Data							

Land Application

What are the onsite Local Environmental Plan Land Applications?

Application Type	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Percentage of Site Area
Included	Cessnock Local Environmental Plan 2011	01/04/2016	01/04/2016	01/04/2016	Amendment No 16	100

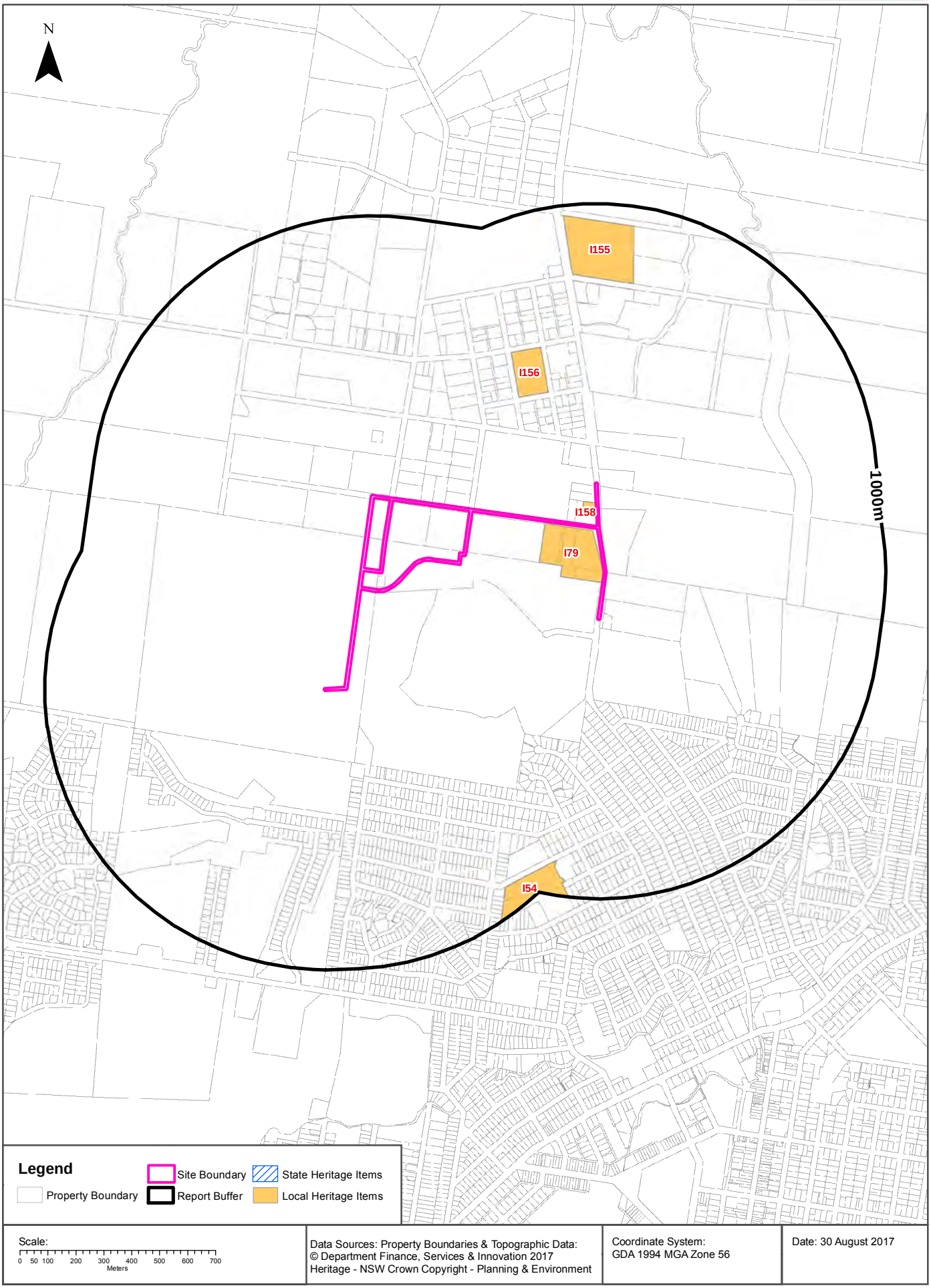
Land Reservation Acquisition

What are the onsite Local Environmental Plan Land Reservation Acquisitions?

Reservation	LEP	Published Date	Commenced Date	Currency Date	Amendment	Comments	Percentage of Site Area
No Data							

Heritage Items

Lindsay Street, Cessnock, NSW 2325



Heritage

Lindsay Street, Cessnock, NSW 2325

State Heritage Items

What are the State Heritage 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							

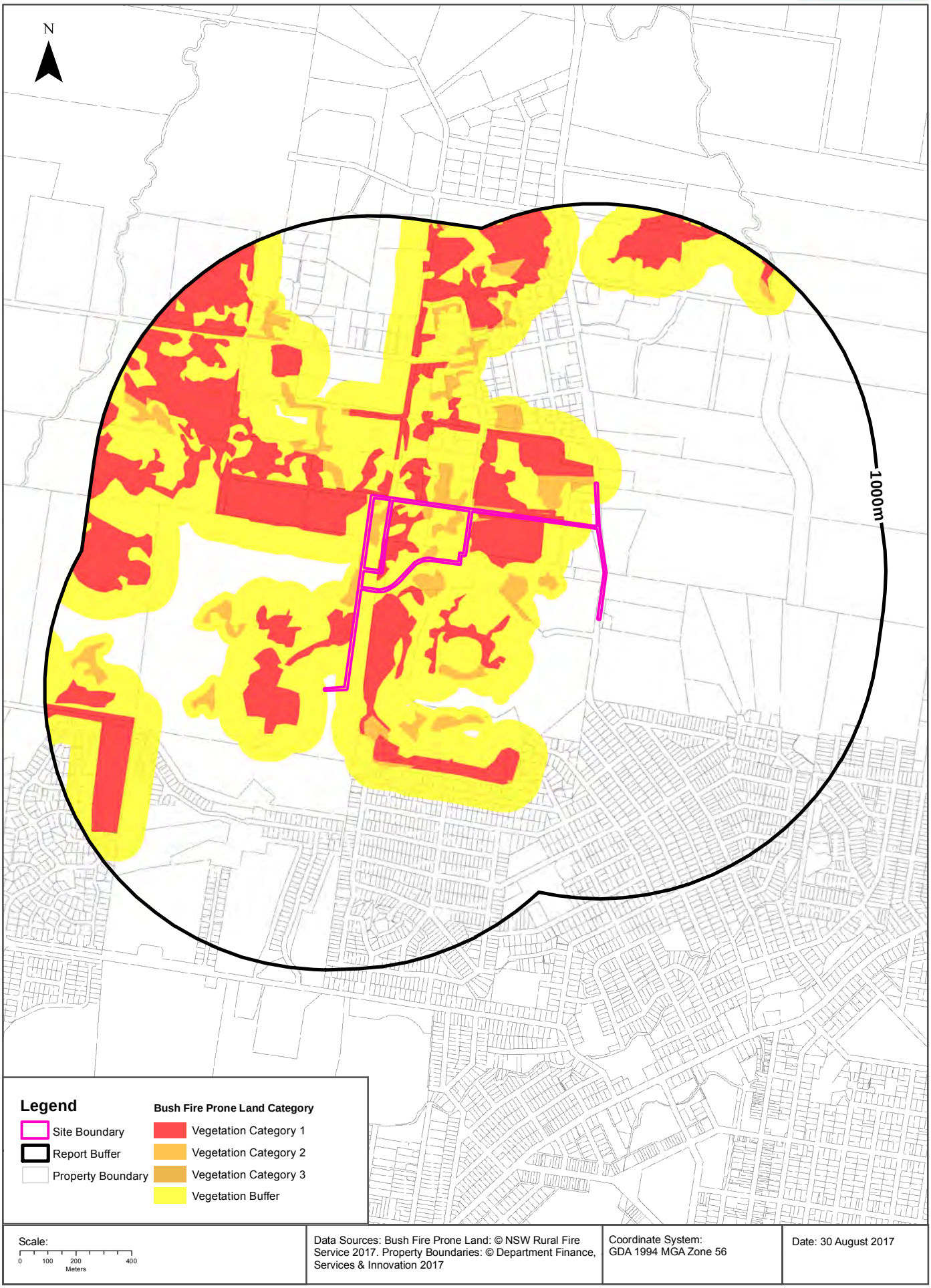
Local Heritage Items

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

Map Id	Name	Classification	Significance	LEP or Act	Published Date	Commenced Date	Currency Date	Distance	Direction
I158	St Patrick's Roman Catholic Church Group	Item - General	Local	Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	08/04/2016	2m	East
I79	Cessnock General Cemetary	Item - General	Local	Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	08/04/2016	3m	East
I156	Nulkaba Public School	Item - General	Local	Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	08/04/2016	368m	North East
I155	Potters Brewery	Item - General	Local	Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	08/04/2016	726m	North East
I54	Cessnock Hospital	Item - General	Local	Cessnock Local Environmental Plan 2011	23/12/2011	23/12/2011	08/04/2016	877m	South

Natural Hazards - Bush Fire Prone Land

Lindsay Street, Cessnock, NSW 2325



Data Sources: Bush Fire Prone Land: © NSW Rural Fire Service 2017. Property Boundaries: © Department Finance, Services & Innovation 2017

Coordinate System: GDA 1994 MGA Zone 56

Date: 30 August 2017

Natural Hazards

Lindsay Street, Cessnock, NSW 2325

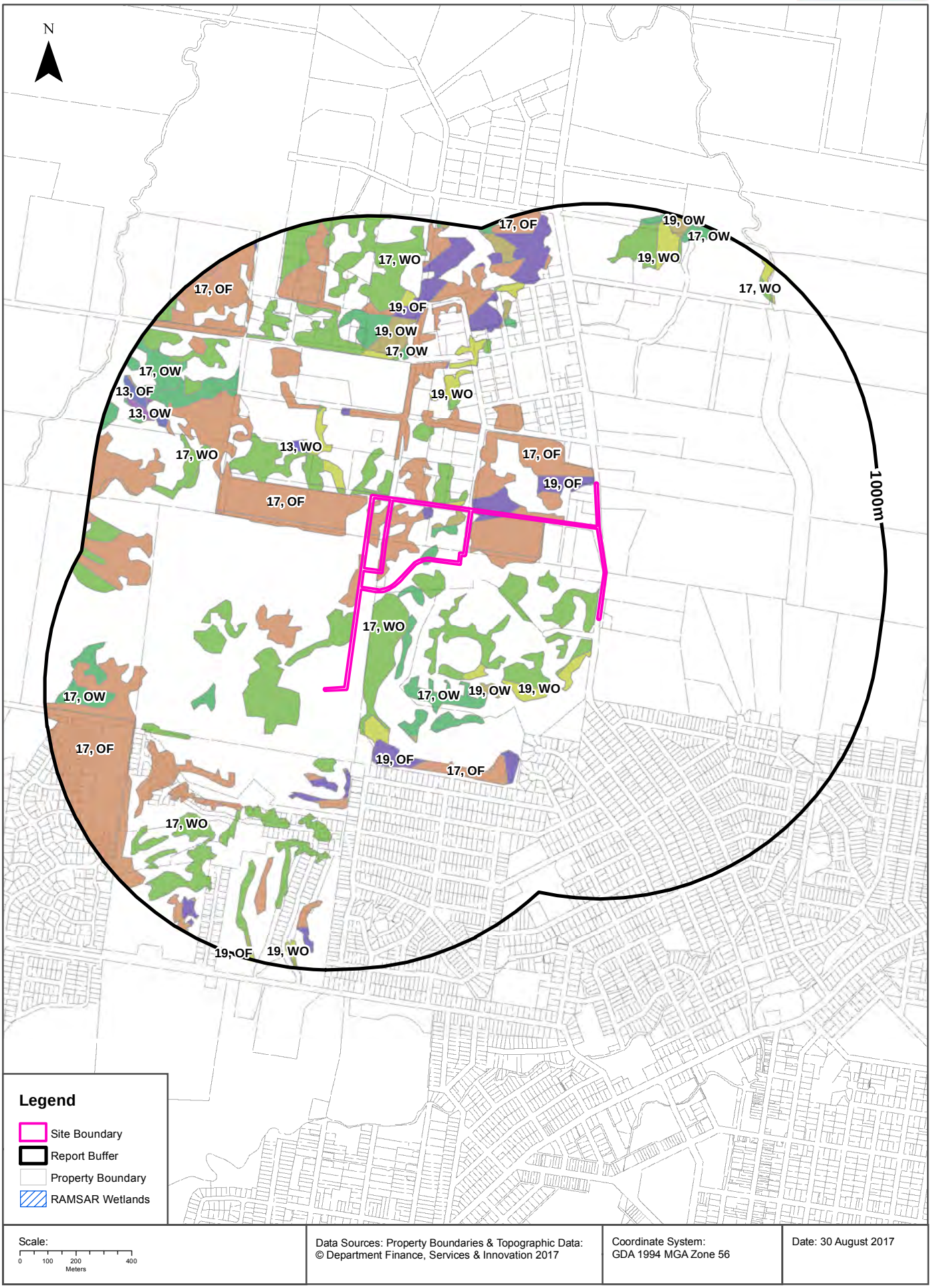
Bush Fire Prone Land

What are the nearest Bush Fire Prone Land Categories that exist within the dataset buffer?

Bush Fire Prone Land Category	Distance	Direction
Vegetation Buffer	0m	Onsite
Vegetation Category 1	0m	Onsite
Vegetation Category 2	0m	Onsite

Ecological Constraints - Vegetation & RAMSAR Wetlands

Lindsay Street, Cessnock, NSW 2325



Ecological Constraints

Lindsay Street, Cessnock, NSW 2325

Lower Hunter and Central Coast Regional Vegetation Survey

What vegetation from the Lower Hunter and Central Coast Regional Survey exists within the dataset buffer?

Map id	Unit Desc	Canopy Code	Canopy Cover	Species	Distance	Direction
17	Lower Hunter Spotted Gum - Ironbark Forest	OF	Mid Dense (Open Forest) 50-<100% cover	C. maculata / E. fibrosa / E. punctata	0m	Onsite
19	Hunter Lowland Redgum Forest	OF	Mid Dense (Open Forest) 50-<100% cover	E. tereticornis / E. punctata / E. crebra / A. floribunda / C. maculata	0m	Onsite
17	Lower Hunter Spotted Gum - Ironbark Forest	OW	Very Sparse (Open Woodland) 10-20% cover	C. maculata / E. fibrosa / E. punctata	0m	Onsite
19	Hunter Lowland Redgum Forest	WO	Sparse (Woodland) 20-<50% cover	E. tereticornis / E. punctata / E. crebra / A. floribunda / C. maculata	0m	Onsite
19	Hunter Lowland Redgum Forest	OW	Very Sparse (Open Woodland) 10-20% cover	E. tereticornis / E. punctata / E. crebra / A. floribunda / C. maculata	0m	Onsite
17	Lower Hunter Spotted Gum - Ironbark Forest	WO	Sparse (Woodland) 20-<50% cover	C. maculata / E. fibrosa / E. punctata	0m	Onsite
13	Central Hunter Riparian Forest	WO	Sparse (Woodland) 20-<50% cover	E. tereticornis / C. glauca / A. floribunda	272m	North West
13	Central Hunter Riparian Forest	OF	Mid Dense (Open Forest) 50-<100% cover	E. tereticornis / C. glauca / A. floribunda	773m	North West
13	Central Hunter Riparian Forest	OW	Very Sparse (Open Woodland) 10-20% cover	E. tereticornis / C. glauca / A. floribunda	820m	North West

Lower Hunter and Central Coast Regional Vegetation Survey: NSW Office of Environment and Heritage

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

Lindsay Street, Cessnock, NSW 2325

ATLAS of NSW Wildlife

Endangered &Vulnerable Species on the ATLAS of NSW Wildlife database, within 10km of the site?

Class	Family	Scientific	Common	Exotic	NSW Status	Commonwealth Status
Aves	Acanthizidae	Chthonicola sagittata	Speckled Warbler	No	Vulnerable, Protected	
Aves	Accipitridae	Haliaeetus leucogaster	White-bellied Sea-Eagle	No	Vulnerable, Protected	CAMBA
Aves	Accipitridae	Hamirostra melanosternon	Black-breasted Buzzard	No	Vulnerable, Protected, Category 3 Sensitive Species	
Aves	Accipitridae	Hieraaetus morphnoides	Little Eagle	No	Vulnerable, Protected	
Aves	Accipitridae	Lophoictinia isura	Square-tailed Kite	No	Vulnerable, Protected, Category 3 Sensitive Species	
Aves	Ardeidae	Botaurus poiciloptilus	Australasian Bittern	No	Endangered, Protected	Endangered
Aves	Ardeidae	Ixobrychus flavicollis	Black Bittern	No	Vulnerable, Protected	
Aves	Artamidae	Artamus cyanopterus cyanopterus	Dusky Woodswallow	No	Vulnerable, Protected	
Aves	Cacatuidae	Callocephalon fimbriatum	Gang-gang Cockatoo	No	Vulnerable, Protected, Category 3 Sensitive Species	
Aves	Cacatuidae	Calyptorhynchus lathami	Glossy Black-Cockatoo	No	Vulnerable, Protected, Category 2 Sensitive Species	
Aves	Ciconiidae	Ephippiorhynchus asiaticus	Black-necked Stork	No	Endangered, Protected	
Aves	Climacteridae	Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	No	Vulnerable, Protected	
Aves	Estrildidae	Stagonopleura guttata	Diamond Firetail	No	Vulnerable, Protected	
Aves	Falconidae	Falco subniger	Black Falcon	No	Vulnerable, Protected	
Aves	Meliphagidae	Anthochaera phrygia	Regent Honeyeater	No	Critically Endangered Species, Protected	Critically Endangered
Aves	Meliphagidae	Epthianura albifrons	White-fronted Chat	No	Vulnerable, Protected	
Aves	Meliphagidae	Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	No	Vulnerable, Protected	
Aves	Neosittidae	Daphoenositta chrysoptera	Varied Sittella	No	Vulnerable, Protected	
Aves	Petroicidae	Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	No	Vulnerable, Protected	
Aves	Petroicidae	Petroica boodang	Scarlet Robin	No	Vulnerable, Protected	
Aves	Petroicidae	Petroica phoenicea	Flame Robin	No	Vulnerable, Protected	
Aves	Pomatostomidae	Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	No	Vulnerable, Protected	
Aves	Psittacidae	Glossopsitta pusilla	Little Lorikeet	No	Vulnerable, Protected	
Aves	Psittacidae	Lathamus discolor	Swift Parrot	No	Endangered, Protected, Category 3 Sensitive Species	Critically Endangered
Aves	Psittacidae	Neophema pulchella	Turquoise Parrot	No	Vulnerable, Protected, Category 3 Sensitive Species	
Aves	Strigidae	Ninox connivens	Barking Owl	No	Vulnerable, Protected, Category 3 Sensitive Species	
Aves	Strigidae	Ninox strenua	Powerful Owl	No	Vulnerable, Protected, Category 3 Sensitive Species	
Aves	Tytonidae	Tyto novaehollandiae	Masked Owl	No	Vulnerable, Protected, Category 3 Sensitive Species	

Class	Family	Scientific	Common	Exotic	NSW Status	Commonwealth Status
Aves	Tytonidae	Tyto tenebricosa	Sooty Owl	No	Vulnerable, Protected, Category 3 Sensitive Species	
Mammalia	Burramyidae	Cercartetus nanus	Eastern Pygmy-possum	No	Vulnerable, Protected	
Mammalia	Dasyuridae	Dasyurus maculatus	Spotted-tailed Quoll	No	Vulnerable, Protected	Endangered
Mammalia	Emballonuridae	Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	No	Vulnerable, Protected	
Mammalia	Macropodidae	Petrogale penicillata	Brush-tailed Rock-wallaby	No	Endangered, Protected	Vulnerable
Mammalia	Molossidae	Mormopterus norfolkensis	Eastern Freetail-bat	No	Vulnerable, Protected	
Mammalia	Petauridae	Petaurus australis	Yellow-bellied Glider	No	Vulnerable, Protected	
Mammalia	Petauridae	Petaurus norfolcensis	Squirrel Glider	No	Vulnerable, Protected	
Mammalia	Phascolarctidae	Phascolarctos cinereus	Koala	No	Vulnerable, Protected	Vulnerable
Mammalia	Pteropodidae	Pteropus poliocephalus	Grey-headed Flying-fox	No	Vulnerable, Protected	Vulnerable
Mammalia	Vespertilionidae	Chalinolobus dwyeri	Large-eared Pied Bat	No	Vulnerable, Protected	Vulnerable
Mammalia	Vespertilionidae	Falsistrellus tasmaniensis	Eastern False Pipistrelle	No	Vulnerable, Protected	
Mammalia	Vespertilionidae	Miniopterus australis	Little Bentwing-bat	No	Vulnerable, Protected	
Mammalia	Vespertilionidae	Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	No	Vulnerable, Protected	
Mammalia	Vespertilionidae	Myotis macropus	Southern Myotis	No	Vulnerable, Protected	
Mammalia	Vespertilionidae	Scoteanax rueppellii	Greater Broad-nosed Bat	No	Vulnerable, Protected	
Mammalia	Vespertilionidae	Vespadelus troughtoni	Eastern Cave Bat	No	Vulnerable, Protected	
Flora	Asteraceae	Rutidosis heterogama	Heath Wrinklewort	No	Vulnerable, Protected	Vulnerable
Flora	Elaeocarpaceae	Tetratheca juncea	Black-eyed Susan	No	Vulnerable, Protected	Vulnerable
Flora	Fabaceae (Mimosoideae)	Acacia bynoeana	Bynoe's Wattle	No	Endangered, Protected	Vulnerable
Flora	Lamiaceae	Prostanthera cineolifera	Singleton Mint Bush	No	Vulnerable, Protected	Vulnerable
Flora	Myrtaceae	Callistemon linearifolius	Netted Bottle Brush	No	Vulnerable, Protected, Category 3 Sensitive Species	
Flora	Myrtaceae	Eucalyptus glaucina	Slaty Red Gum	No	Vulnerable, Protected	Vulnerable
Flora	Myrtaceae	Eucalyptus parramattensis subsp. decadens		No	Vulnerable, Protected	Vulnerable
Flora	Myrtaceae	Eucalyptus pumila	Pokolbin Mallee	No	Vulnerable, Protected	Vulnerable
Flora	Myrtaceae	Melaleuca groveana	Grove's Paperbark	No	Vulnerable, Protected	
Flora	Orchidaceae	Cymbidium canaliculatum	Cymbidium canaliculatum population in the Hunter Catchment	No	Endangered Population, Protected, Category 2 Sensitive Species	
Flora	Proteaceae	Grevillea parviflora subsp. parviflora	Small-flower Grevillea	No	Vulnerable, Protected	Vulnerable
Flora	Zannichelliaceae	Zannichellia palustris		No	Endangered, Protected	

Data does not include records not defined as either endangered or vulnerable, and category 1 sensitive species are also excluded. NSW Office of Environment and Heritage's Atlas of NSW Wildlife, which holds data from a number of custodians. Data obtained 30/08/2017

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Appendix 5 – SIDRA Modelling Report

Technical Note

By:	Maselusi Amiatu	**Date:**	21 June 2019
Subject:	Cessnock Correctional Complex Variation 1 - SIDRA modelling	**Our Ref:**	3493709
Reviewer:	Christopher Morley		

1 Introduction

1.1 Background/Purpose

The Department of Justice (DOJ) are considering alternative access options to the Cessnock Correction Centre. The complex is currently accessed via residential streets on Council maintained roads, primarily Lindsay and Kerlew St and branching service roads.

Beca has been commissioned to undertake the investigation, development and assessment of options and design of the new access road. Based on discussions taking place in May 2019, two additional options have been developed which both directs travel towards the intersection of Wine Country Drive and Calvary Access.

Hence, the purpose of this Technical Note is to document the assumptions, methodology and the results from the traffic modelling undertaken for the intersection of Wine Country Drive and Calvary Access.

1.2 Technical Note Structure

The remainder of this File Note is structured around the following sections:

Section 2 Discusses the current traffic counts and intersection layout

Section 3 discusses the trip generation, distribution, modelling assumptions and methodology

Section 4 discusses the results from the SIDRA traffic modelling

Section 5 provides the summary as well as recommendations based on this assessment

2 Existing conditions

2.1 Traffic counts

Beca authorised traffic counts on the intersection of Wine Country Drive and Calvary Access on 18 June 2019 for a duration of 13 hours (5am to 6pm). The summary of the traffic counts is presented in **Appendix A**.

The peak hour for traffic at the intersection is identified as being between 8:00 to 9:00am in the morning and between 14:45 to 15:45pm in the afternoon. The proportion of heavy vehicles in the morning and afternoon peaks are 5% and 4% respectively.

Figure 1 shows the existing traffic profile at Calvary Access and Wine Country Drive intersection.

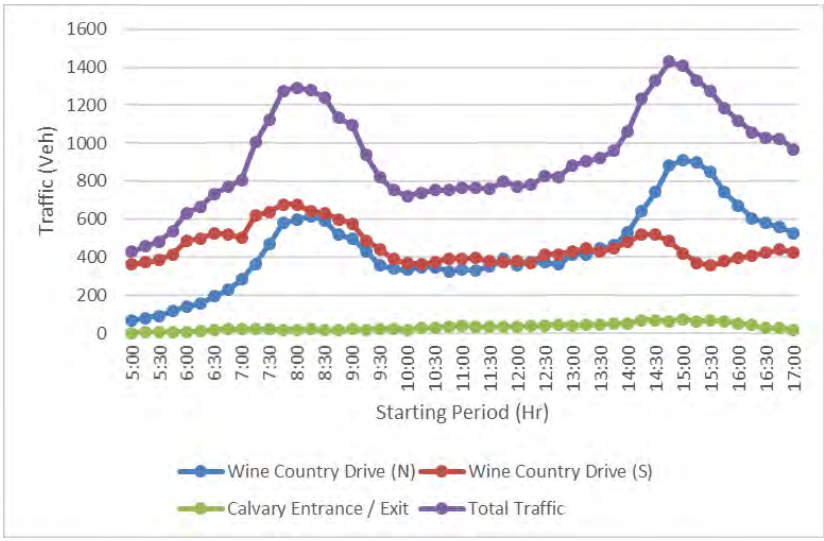
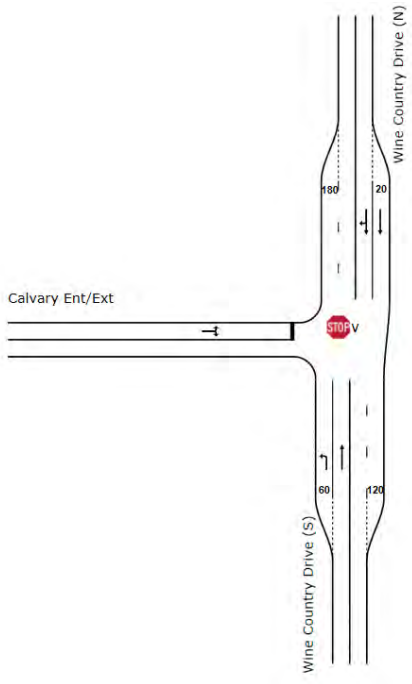


Figure 1: Existing Traffic Profile

2.2 Intersection Layout

The intersection of Wine Country Drive and Calvary Access is a three arm stop controlled intersection with additional turning lanes on both the south and north approaches. **Figure 2** shows the intersection layout.

Figure 2 : Intersection Layout



3 Traffic assessment

3.1 Trip generation

The trips generated by the proposed development are presented in the Traffic Assessment of the REF submitted on 12 October 2016. A summary of the proposed trip generation is given in **Table 1** below.

Table 1 : Traffic from Development

Typical Shifts	Existing	Existing + Proposed*
6am-4pm	245	501
2pm-10pm	39	98
10pm-6am	20	65

Source: REF – Traffic, Transport and Access (Review of Environmental Factors – Traffic, Transport and Access, JACOBS 2016)

* Proposed traffic includes both for RBP and new 600 Bed facility

3.2 Trip distribution

For the purpose of this assessment, it is assumed that all traffic will access the facility via Calvary Access. The existing connection via Lindsay Street will remain as it currently is but will be used for emergency access only and not for any daily operational purposes.

3.3 Modelling assumptions

The following assumptions are made in the modelling for this assessment:

- The impacts from worst case scenario are only assessed, which, as per Table 1 is the 6am to 4pm shift;
- All employees are assumed to come by their own car i.e. one car for each employee;
- The employees come to the facility between 5am and 6am and leave the facility between 4pm and 5pm i.e. 501 cars coming in morning and leaving in afternoon;
- Morning and afternoon peak time periods of 8:00-9:00 and 14:45-15:45 respectively;
- The north-south distribution of the proposed traffic to/from Wine Country Drive has been assumed to be same as the existing traffic movements; and
- Project opening year of 2019 only, has been modelled.

3.4 Traffic Scenarios

The following traffic scenarios was adopted for this assessment:

- Scenario 1 – Existing traffic volumes for the same time periods as the shift pattern (5:00-6:00 and 16:00-17:00),
- Scenario 2 – Existing traffic volumes for the morning and afternoon peak time periods as requested by RMS (8:00-9:00 and 14:45-15:45); and
- Scenario 3 – Existing traffic volumes plus proposed traffic from the facility with the distribution explained above (5:00-6:00 and 16:00-17:00).

3.5 Methodology

The methodology which was adopted to complete this traffic modelling is as follows:

1. Using SIDRA 8.0 to model the existing layout (intersection of Wine Country Drive and Calvary Access);
2. Assessing the existing layout with the traffic scenarios described in Section 3.4 above;
3. Assess the modelling results particularly on degree of saturation, worst delay and level of service;
4. Report and document the results.

4 SIDRA Analysis

This section details out the findings of the model. The complete movement summaries are presented in 'Appendix A – '.

Table 2 : Existing intersection outputs

Traffic Scenario	Time of Day	Deg. Of Saturation	Worst Delay in seconds (Movement)	Level of Service
1	5:00-6:00	19%	13.0s (West Approach - left turn)	A
	16:00-17:00	22%	12.1s (West Approach - right turn)	A
2	8:00-9:00	34%	17.1s (West Approach - right turn)	B
	14:45-15:45	29%	15.4s (West Approach - right turn)	B
3	5:00-6:00	24%	13.0s (West Approach - left turn)	A
	16:00-17:00	95%	39.0s (West Approach - right turn)	C

Based on the above results:

- For both Traffic Scenarios 1 and 2, the intersection at worse is currently operating below 35% of its capacity;
- For Traffic Scenario 3, the intersection is predicted to operate at 95% during the PM peak;
- It is still operating at an acceptable level of service (LoS), however it is very close to capacity particularly under Traffic Scenario 3 in year 1 (2019). That is, the additional traffic from the Correction Centre is expected to reduce operational performance of this intersection.

5 Summary / Recommendations

Based on the modelling exercise conducted above, the intersection is predicted to perform at 95% of its capacity due to the additional traffic from the correction centre (16:00-17:00) in 2019. That is, the intersection is expected to operate above capacity in the near future, and hence an upgrade is likely required at this location in order to cater for the additional demand from the correction centre.

Appendix A – Existing Traffic Counts

Period	Wine Country (South)	Wine Country (North)	Calvary Access (West)	Period	Wine Country (South)	Wine Country (North)	Calvary Access (West)
5:00-6:00	65	363	2	1:30-2:30	446	430	47
5:15-6:15	81	372	4	1:45-2:45	463	448	50
5:30-6:30	91	385	5	2:00-3:00	533	479	53
5:45-6:45	115	415	7	2:15-3:15	645	520	68
6:00-7:00	140	485	8	2:30-3:30	741	519	68
6:15-7:15	154	499	11	2:45-3:45	882	486	62
6:30-7:30	195	523	17	3:00-4:00	912	421	74
6:45-7:45	228	522	20	3:15-4:15	899	371	63
7:00-8:00	283	501	22	3:30-4:30	849	356	67
7:15-8:15	366	619	20	3:45-4:45	742	380	63
7:30-8:30	467	639	20	4:00-5:00	673	396	51
7:45-8:45	579	679	18	4:15-5:15	604	410	43
8:00-9:00	597	677	18	4:30-5:30	580	424	27
8:15-9:15	617	642	20	4:45-5:45	559	439	26
8:30-9:30	594	633	15	5:00-6:00	527	425	17
8:45-9:45	519	600	15				
9:00-10:00	498	578	20				
9:15-10:15	431	489	19				
9:30-10:30	359	442	23				
9:45-10:45	341	390	23				
10:00-11:00	334	369	19				
10:15-11:15	348	365	26				
10:30-11:30	349	373	30				
10:45-11:45	325	393	35				
11:00-12:00	333	392	41				
11:15-12:15	332	396	36				
11:30-12:30	350	379	32				
11:45-12:45	391	374	34				
12:00-1:00	360	378	36				
12:15-1:15	375	370	37				
12:30-1:30	372	415	42				
12:45-1:45	362	415	45				
1:00-2:00	415	431	40				
1:15-2:15	416	446	43				

Appendix B – Sidra Results

MOVEMENT SUMMARY

Site: v [8:00-9:00]

Wine Country Drive and Kerlew Street
Site Category: (None)
Stop (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
South: Wine Country Drive (S)												
1	L2	38	5.3	0.021	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	50.7
2	T1	639	4.1	0.336	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		677	4.1	0.336	0.4	NA	0.0	0.0	0.00	0.03	0.00	59.5
North: Wine Country Drive (N)												
8	T1	589	4.2	0.198	0.1	LOS A	0.1	1.1	0.03	0.01	0.03	59.7
9	R2	8	12.5	0.198	10.2	LOS A	0.1	1.1	0.05	0.01	0.05	54.6
Approach		597	4.4	0.198	0.3	NA	0.1	1.1	0.03	0.01	0.03	59.7
West: Calvary Ent/Ext												
10	L2	3	66.7	0.056	18.0	LOS B	0.2	1.4	0.74	1.01	0.74	39.3
12	R2	15	20.0	0.056	17.1	LOS B	0.2	1.4	0.74	1.01	0.74	40.6
Approach		18	27.8	0.056	17.2	LOS B	0.2	1.4	0.74	1.01	0.74	40.4
All Vehicles		1292	4.6	0.336	0.6	NA	0.2	1.4	0.02	0.03	0.02	59.3

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: v [2:45-3:45]

Wine Country Drive and Kerlew Street
Site Category: (None)
Stop (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
South: Wine Country Drive (S)												
1	L2	27	0.0	0.015	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	51.3
2	T1	458	5.9	0.244	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		485	5.6	0.244	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.5
North: Wine Country Drive (N)												
8	T1	877	4.2	0.288	0.0	LOS A	0.1	0.5	0.01	0.00	0.01	59.9
9	R2	5	0.0	0.288	8.2	LOS A	0.1	0.5	0.02	0.01	0.02	55.4
Approach		882	4.2	0.288	0.1	NA	0.1	0.5	0.01	0.00	0.01	59.9
West: Calvary Ent/Ext												
10	L2	13	0.0	0.148	9.8	LOS A	0.4	3.1	0.69	0.99	0.69	42.9
12	R2	49	0.0	0.148	15.4	LOS B	0.4	3.1	0.69	0.99	0.69	42.7
Approach		62	0.0	0.148	14.2	LOS A	0.4	3.1	0.69	0.99	0.69	42.7
All Vehicles		1429	4.5	0.288	0.8	NA	0.4	3.1	0.04	0.06	0.04	59.0

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.

MOVEMENT SUMMARY

Site: v [5:00-6:00]

Wine Country Drive and Kerlew Street
Site Category: (None)
Stop (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
South: Wine Country Drive (S)												
1	L2	9	22.2	0.006	5.8	LOS A	0.0	0.0	0.00	0.57	0.00	48.8
2	T1	354	2.5	0.185	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		363	3.0	0.185	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.7
North: Wine Country Drive (N)												
8	T1	64	7.8	0.022	0.0	LOS A	0.0	0.1	0.02	0.01	0.02	59.8
9	R2	1	0.0	0.022	6.7	LOS A	0.0	0.1	0.03	0.02	0.03	55.2
Approach		65	7.7	0.022	0.1	NA	0.0	0.1	0.02	0.01	0.02	59.8
West: Calvary Ent/Ext												
10	L2	2	100.0	0.005	13.0	LOS A	0.0	0.2	0.43	0.89	0.43	43.4
12	R2	1	0.0	0.005	8.5	LOS A	0.0	0.2	0.43	0.89	0.43	45.3
Approach		3	66.7	0.005	11.8	LOS A	0.0	0.2	0.43	0.89	0.43	44.0
All Vehicles		431	4.2	0.185	0.2	NA	0.0	0.2	0.01	0.02	0.01	59.6

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: v [4:00-5:00]

Wine Country Drive and Kerlew Street
Site Category: (None)
Stop (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
South: Wine Country Drive (S)												
1	L2	16	0.0	0.009	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	51.3
2	T1	380	1.8	0.197	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		396	1.8	0.197	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7
North: Wine Country Drive (N)												
8	T1	673	2.7	0.217	0.0	LOS A	0.0	0.1	0.00	0.00	0.00	60.0
9	R2	1	0.0	0.217	7.3	LOS A	0.0	0.1	0.00	0.00	0.00	55.5
Approach		674	2.7	0.217	0.0	NA	0.0	0.1	0.00	0.00	0.00	60.0
West: Calvary Ent/Ext												
10	L2	10	0.0	0.088	9.2	LOS A	0.3	1.9	0.56	0.98	0.56	44.7
12	R2	41	0.0	0.088	12.1	LOS A	0.3	1.9	0.56	0.98	0.56	44.5
Approach		51	0.0	0.088	11.5	LOS A	0.3	1.9	0.56	0.98	0.56	44.5
All Vehicles		1121	2.2	0.217	0.6	NA	0.3	1.9	0.03	0.05	0.03	59.2

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: v [5:00-6:00_plus_FacilityTraffic]

Wine Country Drive and Kerlew Street
Site Category: (None)
Stop (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
South: Wine Country Drive (S)												
1	L2	447	0.4	0.241	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	51.3
2	T1	354	2.5	0.185	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		801	1.4	0.241	3.1	NA	0.0	0.0	0.00	0.32	0.00	55.5
North: Wine Country Drive (N)												
8	T1	64	7.8	0.034	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	64	0.0	0.081	9.2	LOS A	0.3	2.3	0.61	0.79	0.61	46.3
Approach		128	3.9	0.081	4.6	NA	0.3	2.3	0.31	0.39	0.31	53.5
West: Calvary Ent/Ext												
10	L2	2	100.0	0.006	13.0	LOS A	0.0	0.2	0.45	0.90	0.45	43.2
12	R2	1	0.0	0.006	9.6	LOS A	0.0	0.2	0.45	0.90	0.45	45.0
Approach		3	66.7	0.006	12.2	LOS A	0.0	0.2	0.45	0.90	0.45	43.8
All Vehicles		932	1.9	0.241	3.3	NA	0.3	2.3	0.04	0.33	0.04	55.2

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.
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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: v [4:00-5:00_plus_FacilityTraffic]

Wine Country Drive and Kerlew Street
Site Category: (None)
Stop (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
South: Wine Country Drive (S)												
1	L2	16	0.0	0.009	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	51.3
2	T1	380	1.8	0.197	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		396	1.8	0.197	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7
North: Wine Country Drive (N)												
8	T1	673	2.7	0.217	0.0	LOS A	0.0	0.1	0.00	0.00	0.00	60.0
9	R2	1	0.0	0.217	7.3	LOS A	0.0	0.1	0.00	0.00	0.00	55.5
Approach		674	2.7	0.217	0.0	NA	0.0	0.1	0.00	0.00	0.00	60.0
West: Calvary Ent/Ext												
10	L2	108	0.0	0.954	33.7	LOS C	17.5	122.7	0.92	2.48	5.22	30.9
12	R2	444	0.0	0.954	39.0	LOS C	17.5	122.7	0.92	2.48	5.22	30.8
Approach		552	0.0	0.954	37.9	LOS C	17.5	122.7	0.92	2.48	5.22	30.8
All Vehicles		1622	1.5	0.954	13.0	NA	17.5	122.7	0.31	0.85	1.78	47.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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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.