22 August 2023

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Dear Matt

Aboriginal Heritage Constraints Assessment School Road, Forbes

Our Ref: Matter: 39273

Biosis Pty Ltd (Biosis) has been commissioned by Allera to provide Aboriginal due diligence advice for the proposed rezoning at School Road, Forbes, New South Wales (NSW) (Lots 375, 376, 386, 387, 388, 389, 830, 831, 1272 and 1273, DP 750158 (the study area) (Figure 1 and Figure 2). The project involves rezoning the study area to facilitate future residential development(Figure 3). The purpose of this advice is to assist the client in exercising due diligence in determining whether the project will involve activities that may harm Aboriginal objects and to determine whether consent in the form of an Aboriginal Heritage Impact Permit (AHIP) is required. The proposed development will be assessed against Part 3 of the *Environmental Planning and Assessment Act 1979 NSW* (EP&A Act) as a planning proposal.

The *National Parks and Wildlife Act 1974* (NPW Act) provides specific protection for Aboriginal objects and declared Aboriginal places by establishing offences of harm. Harm is defined to mean destroying, defacing, damaging or moving an object from the land. There are a number of defences and exemptions to the offence of harming an Aboriginal object or place. The NPW Act states that a person or organisation who exercises due diligence in determining that their actions will not harm Aboriginal objects has a defence against prosecution for the strict liability offence of unknowingly harming an object without an AHIP.

The NPW Act allowed for a generic code of practice to explain what due diligence means. As a result, the *National Parks and Wildlife Regulation 2009* (NPW Regulation) adopted the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW 2010a) (the Due Diligence Code). The Due Diligence Code sets out the reasonable and practicable steps which individuals and organisations need to take in order to:

- Identify whether or not Aboriginal objects are, or are likely to be, present in an area.
- Determine whether or not their activities are likely to harm Aboriginal objects (if present).
- Determine whether an AHIP application is required.

This advice includes a background review of documents and databases containing information relevant to the site and its surrounds, as well as an archaeological survey in accordance with the code, in order to adequately map areas of high, moderate and low archaeological sensitivity.

Step 1: Will the activity disturb the ground surface or any culturally modified trees?

Under the *Forbes Local Environment Plan 2013*, the study area is currently zoned RU1- Primary Production, R5- Large Lot Residential, and RE1 – Public Recreation. The study area has been identified by Forbes Shire Council (Council) for future residential development and is included within Council's *Draft Local Housing Strategy* (2021-2024) ((Draft LHS)). The Draft LHS indicates that the study area could facilitate the development of approximately 600 dwellings (including the R5 Large Lot Residential portion).

As the intention of rezoning is to allow for residential development, ground disturbance will occur during future development of the study area and therefore consideration of Steps 2a and 2b of the Due Diligence Code is required.

Step 2a. Search the Aboriginal Heritage Information Management System (AHIMS) database and use any other sources of information of which you are already aware

An extensive search of the AHIMS database was conducted on 26 June 2023 (Client service ID: 794639). The search identified 65 Aboriginal archaeological sites within a 10 by 10 kilometre search area, centred on the proposed study area (Table 1). None of these registered sites are located within the study area (Figure 4). The mapping coordinates recorded for these sites were checked for consistency with their descriptions and location on maps from Aboriginal heritage reports where available. These descriptions and maps were relied upon where notable discrepancies occurred.

It should be noted that the AHIMS database reflects Aboriginal sites that have been officially recorded and included on the list. Large areas of NSW have not been subject to systematic, archaeological survey; hence AHIMS listings may reflect previous survey patterns and should not be considered a complete list of Aboriginal sites within a given area. Some recorded sites consist of more than one element, for example artefacts and a modified tree, however for the purposes of this breakdown and the predictive modelling, all individual site types will be studied and compared. This explains why there are 68 results presented here, compared to the 65 sites identified in AHIMS.

Table 1 AHIMS sites within the vicinity of the study area

Site type	Occurrences	Frequency (%)
Artefact	29	42.65
Modified Tree (Carved or Scarred)	29	42.65
Hearth	5	7.35
Burial	4	5.88
Conflict	1	1.47
Total	68	100.00

A simple analysis of the Aboriginal sites registered within a 10 by 10 kilometre search centred on the study area indicates that the dominant site type is artefact sites and modified trees (carved or scarred), representing 42.65% each (n=29), with hearth sites representing 7.35% (n=5) and burial sites representing 5.88% (n=4). Conflict sites was the least represented site type in the vicinity of the study area at 1.47% (n=1).

A limited number of archaeological studies have been carried out in the Forbes locality in proximity to the study area. Further afield, larger studies have been conducted that provide predictive models relating to site patterning (Pearson, M. 1981, Koettig, M. 1985) in the landscape:

- Pearson (1981) conducted an assessment of the land use patterns and history of the Upper Macquarie River Valley. The assessment area spanned from Bathurst to Dubbo and Wellington to Mudgee and was at a minimum 60 kilometres from study area. The area occupied a total of 160 by 130 kilometres (20,800 sq km)(Pearson, M. 1981, pp. 87), and was divided into eight sub-regions according to terrain, hydrological resources, and climate. The study assembled data based on ethnohistorical records, historical research, and archaeological surveying. A sample of 148 Aboriginal sites were subject to assessment which could be divided into two main categories: occupation sites (artefact scatters and rock shelters) and non-occupation sites (inclusive of grinding grooves, scarred or carved trees, and ceremonial and burial sites). The following conclusions and observations were made:
  - Occupation sites varied from 10 to 500 metres distance to water, with larger sites occurring closer to water and lower elevations. Over half of the sites located at least 100 metres from water.
  - The preferential conditions for occupation sites included hilly areas situated upon dry, well-drained grounds, sheltered from prevailing winds with views over water resources.
  - Most sites were located in contexts which would originally have supported open woodlands.
  - Burial sites and grinding grooves were situated as close to habitation areas as geologically possible.
  - Ceremonial sites were located away from occupation sites.
  - Stone arrangements were located away from campsites in isolated places and were associated with small hills or knolls or on flat land.
  - Quarry sites were located where stone outcrops with desirable working qualities were recognised and accessible.
  - Rock shelter sites were on average182 metres from water sources and contained evidence of small group occupation.
  - Based on ethnohistoric information, it is suggested that Aboriginal campsites were seldom used for longer than three nights and that large archaeological sites probably represent accumulations of material over a series of short visits.
  - Sub-regions of harsh climate (subject to extreme cold and hot conditions) and containing poor resources, while not entirely unoccupied, were generally avoided in comparison to fertile and mild regions.
- Koettig (1985) undertook a comprehensive study of Aboriginal occupation of the Dubbo area (approximately 150 kilometres north of the study area), which included a desktop assessment followed by a systematic survey to target all topographic landform units and different stream orders. The field survey was divided up into five sample survey areas covering three major physiographic zones in the broader Dubbo area. As a result of the study, Koettig concluded that:
  - Aboriginal sites may be expected throughout all landscape units.
  - The most frequently occurring sites types were open artefact scatters, scarred trees, and grinding grooves.
  - The location of sites and their relative size were determined by a number of factors including environmental and social. Social factors could not be explained through archaeological research, however, environmental factors included:
  - The largest campsites were located close to permanent water and smaller sites were found all over the landscape including hills and ridges away from permanent water.

- Certain sites required specific conditions. For example, burials tend to be found in sandy sediments, grinding grooves were suitable rock outcrops occur, and quarries tend to be found where stone resources as accessible.
- The widest range of potential food resources were found along main watercourses due to the supply of permanent water, while some foods were seasonal and required foraging away from watercourses.

Koettig suggested that larger and more constantly occupied site are likely to occur along permanent water courses, while less intense and sporadic occupation evidence is seen along ridge tops and temporary water sources.

A review of the reports held by AHIMS identified several archaeological studies have been undertaken in the surrounding localities, particularly in the Parkes Shire Council area, the nearest extent of which is approximately 15 kilometres north of the study area. These reports have been summarised below:

- Moore (1977) (as summarised in OzArk Environmental and Heritage Management 2011, p.40) conducted an assessment for a proposed electricity easement from the northern edge of Parkes, 33 kilometres north of the study area, to Peak Hill approximately 81 kilometres further north to the study area. One site near Trewilga was recorded as part of the assessment: a basalt quarry site (AHIMS: 35-6-0002/Trewilga; Ten Mile Creek) which contained bi-facial choppers as well as numerous broken choppers and flakes.
- Witter (1987) conducted an archaeological assessment of the London-Victoria gold project, located approximately 25 kilometres north east of the study area. No artefact sites were located within the 0.5 square kilometre assessment via vehicular surveying and Witter noted that high levels of quartz contamination from the associated mining activities made it difficult to locate camp sites. Witter recommended that the seven scarred trees in the area should be subject to further investigation. Following from this survey, Mary Dallas Consulting Archaeology (1987) conducted a follow up investigation based on Witters recommendation. Ten scarred trees were located (inclusive of those located by Witter) within the London-Victoria gold project study area (AHIMS 43-3-0008-17, LV1-LV9 and LV11). The species of all scarred tree were not recorded though Bimble box *Eucalyptus populnea* was amongst them.
- Brayshaw (1993) undertook an archaeological survey for the proposed water supply pipe line to North Parkes Mine. The pipeline started 50 kilometres north of the study area, along Bogan Road, and finished 15 kilometres west of Forbes. The survey identified two open camps sites and one isolated find. One campsite contained a quartz flaked piece with retouch and use wear that was located within a disturbed context adjacent to an unnamed ephemeral drainage line. The second camp site was located 700 metres south of the first camp site, and contained an isolated find of a mudstone flake, also within a disturbed context.
- Appleton (2003)(as summarised in OzArk Environmental and Heritage Management 2011, pp. 41) located four modified trees along the Newell Highway, approximately 38 kilometres north east of the study area during a survey for the realignment of the Newell Highway (AHIMS 43-3-0065/PST-3 and AHIMS 43-3-0066/PST-4). Both modified tree sites were recorded as apple box *Eucalyptus bridgesiana* and fuzzy box *Eucalyptus conica*.
- Australian Archaeological Survey Consultants Pty Ltd (2006) were commissioned by R.W. Corkery & Co. Pty Limited on behalf of North Mining Limited, to carry out the ACHA component at the North Parkes mine approximately 49 kilometres north of the study area. During the archaeological survey, a total of three newly recorded Aboriginal archaeological sites were identified (Sites AHIMS 35-6-

0153/A1 Alectown, AHIMS 35-6-0154/A2 Alectown and AHIMS 35-6-0155/A3 Alectown). The sites consist of two isolated finds and one small artefact scatter.. It was recommended that the artefacts be recovered as part of a salvage project to be undertaken with the Peak Hill Local Aboriginal Land Council.

- OzArk (2011) was commissioned to determine the presence and distribution of Aboriginal and European sites within areas of potential future disturbance associated with the Tomingley Gold Project. The predictive model of the study area consisted of those outlined in the above Koettig, M. (1985) and Pearson, M. (1981) summaries. The project involved the establishment of mining, gold processing and waste management operations across an area of 776 hectares south of the township of Tomingley, approximately 99 kilometres north of the study area. The following predictive statements were generated based on a synthesis of desktop research((OzArk Environmental and Heritage Management 2011, pp. 47):
  - Second order creeks were likely to be the focus of smaller scale activities, such as transitory tool production or one-off camp sites.
  - Flat plains over 200 metres from water sources are unlikely to contain archaeological material.
  - Modified trees are highly likely to occur where remnant vegetation is present.
  - Open campsites are likely to occur within 150 metres of waterways
  - IsolattedIsolated finds may occurs on any landform though the likelihood of detection increases within disturbed locations in proximity to waterways.

  Over the course of the survey, 60 Aboriginal heritage sites were identified, including 54 modified trees, three artefact sites, two isolated finds and one ceremonial site (OzArk Environmental and Heritage Management 2011, pp. 51). The following conclusions were made with regards to site distribution:

  - 90% of the recorded sites were scarred trees potentially reflecting post-colonial efforts to maintain remnant vegetation as a means of protecting against the elements. The density of scarred trees indicates the assessment area was a heavily populated location in which the practice of cultural scarring was frequently utilised.
  - Modified tree tend to be located in proximity to drainage lines with 60-63% recorded within 100 metres of water sources. The largest site, AHIMS 35-3-0159/TNWP-OS1 with PAD (n=121, 76.5 artefacts per square metre), was located in proximity to the Macquarie River paleochannel. Smaller sites such as TGP-OS1(n=3) and OS2 (n=18) were located in proximity to what has been estimated to be a prehistoric spring (OzArk Environmental and Heritage Management 2011, pp. 80)
  - A notable lack of sites in proximity to water course was observed in the mining portion of the study area, determined to be a result of post-colonial influences on hydrological structures. Higher densities of scarred trees were used to estimate the location of the original channels.
- Biosis (2013) conducted an ACHA of approximately 11.73 hectares of land within Lot 550 DP 750179 and a portion of Lot 7313 DP 1147330 in Parkes approximately 30 kilometres north-west of the study area. The field assessment involved surveying of a flat landform containing erosional soils approximately 1.5 kilometres south of a permanent water source, Goobang Creek (fourth order stream). No Aboriginal sites were identified within the study area. It was concluded that the lack of available freshwater and geological resources, and poor soils contributed to both a reduced likelihood of occupation and poor environmental conditions that would have reduced the likelihood of artefact and site preservation (Biosis 2013, pp. 30).

- Umwelt (2017) prepared an Aboriginal Cultural Heritage and Archaeological Assessment for the Parkes to Narromine inland rail on behalf of Australian Rail Track Corporation (ARTC). During the preliminary archaeological inspection of the existing railway corridor and the proposed connection route, site AHIMS 43-3-0111/P2N IA1 was identified. The site consisted of a single silcrete flake located upon an access track on the northern bank of a tributary of Ridgey Creek, less than 10 meters from the rail line. Site predictions for the proposed area indicated that stone artefacts and scarred trees were the most likely site types. Stone artefacts sites were commonly associated with areas close to reliable sources of water. It was noted that a number of reliable water sources were located close to the proposed corridor, however the reliability of these water sources has been impacted by post-contact land use and artificial modifications. It was concluded that the Ridgey Creek Tributary where site AHIMS 43-3-0111/P2N IA1 was located, possessed low archaeological potential within the corridor and moderate potential outside the rail corridor and level crossing. Various mitigation and management options were provided to ensure no harm would come to any identified site or areas of archaeological potential. It was recommended that prior to commencing construction, site AHIMS 43-3-0111/P2N IA1 be collected and salvaged.
- Biosis (2018) conducted an Aboriginal and non-Aboriginal cultural heritage archaeological survey report for the proposed expansion of an existing hard rock quarry at 1105 Bogan Road, Goonumbla, NSW, approximately 50 kilometres north of the study area. The assessment area was situated within a gently sloping landscape approximately 10 kilometres east of Gooboang Creek (fourth order stream). Though background research indicated the presence of 72 Aboriginal sites within 10 kilometres of the assessment area, no sites were located within it. Biosis determined this to be related to the lack of well drained landforms and limited freshwater supply, and the significant level of vehicular disturbance, ploughing and clearing that had occurred throughout the assessment area (Biosis 2018, pp. 38).

Step 2b. Activities in areas where landscape features indicate the presence of Aboriginal objects

In order to determine whether the activity within landscape features likely to contain Aboriginal objects, a review of information pertaining to ethnohistories, soils, geology, landform, disturbance and potential resources has been undertaken.

Ethnohistory

Early contact between Aboriginal and European cultures occurred sporadically within the Lachlan Valley, approximately 129 kilometres south of the study area, and were documented by Surveyor General John Oxley and explorer Allan Cummingham in 1817 (Whitehead, J. 2003). On the return journey from their explorations of the Lachlan Valley, Oxley and Cunningham moved north of Lake Cargelligo and Condobolin to the west of Parkes (approximately 33 kilometres north of the study area). Relating to their travels Oxley (1817, cited by Whitehead, J. 2003: 298) writes:

> *We have hitherto seen no other signs of this being inhabited country than the marks usually made by the natives in ascending the rees, and none of these were very recent. It is probable that they may see us without discovering themselves…*

While Cunningham (1817, cited by Whitehead, J. 2003: 299) reported that:

> *…we halted and pitched our tent on the stie of an old native encampment. Here we saw quantities of horse-mussel shells with which the creek had furnished them and some stones on which they had been sharpening some weapons or instruments, perhaps hir mogos or stone hatches.*

Further along the journey as they attempted to find passage towards Macquarie River, Oxley and Cunningham made camp north of Gundong Creek near Tomingley Creek (approximately 106 kilometres north of the study area) where Oxley (1817, cited by Whitehead, J. 2003: 303) wrote:

> *On the banks of that burn (Scottishfor creek), many heaps of the pearl muscle-shells were found, and marks of flood about eight feet. We have for several days past seen no signs of any native being recently in this part of the country: the marks on the trees, which were the only marks we saw, being several months old, and never seen except in the vicinity of water. Marks of the natives' tomahawks were to us certain signs of approaching water.*

The expedition led by Surveyor General Sir Thomas Mitchell, set out in 1835 to explore the Bogan river (approximately 168 kilometres north of the study area) (Kass, T. 2003). Following a meeting with a group of local Aboriginal men, Mitchell learned that the area named the Hervey Range by Oxley during their 1817 expedition was known to locals as 'Goobang', which meant 'place of many wattles'. Mitchell's group camped within earshot of an Aboriginal camp and is quoted (Unger, L.A. 1963):

> *The Natives who we met here were fine looking men, enjoying contentment and happiness within the precincts of their native woods. Their enjoyment seemed so derived from nature, that it almost excited a feeling of regret, that civilised men, enervated by luxury and all its concomitant diseases, should ever disturb the haunts of these rude happy beings. The countenance of the first man who came up to me, was a fine specimen of man in an independent state of nature. He had nothing artificial about him, save the badge of mourning for the dead, a white band (his was very white), round his brow. His manner was grave, his eye keen and intelligent, and, as our people were encamping, he seemed to watch the moment when they wanted fire, when he took a burning stick, which one of the natives had brought, and presented it in a manner expressive of welcome and an unaffected wish to contribute to our wants. Sat a distance, their gins sat at fires, and we heard the domestic sounds of squalling children.*

Mitchell's party would leave their camping spot followed by several of the Aboriginal men who reportedly extracted honey from tree branches using tomahawks, while another speared a large kangaroo. This would continue for four days before the group retreated at the sight of another group of Aboriginal people; this was interpreted as a tribal boundary by Mitchell (Unger, L.A. 1963).

Once the Mitchell expedition reached the Bogan headwaters they encountered a group of Aboriginal people who referred to themselves as the 'Bultje' tribe, composed of up to 120 people who were capable of speaking minor amounts of English. The group was described as removing one of two front teeth of males aged over 14 years. Mitchell described this group as relying on possums, kangaroo and emus as well as freshwater mussels for sustenance, while the children ate the root of the 'tao' plant (1835, cited by Unger, L.A. 1963).(Unger, L.A. 1963).

Geology, soils and hydrology

The study area is located within the NSW South Western Slopes bioregion (New South Wales National Parks and Wildlife Service 2003). It is within the Lower Slopes Subregion which consists of undulating and hilly ranges and isolated peaks set in wide valleys at the apices of the Riverina alluvial fans. The entirety of the study area is encompassed by a gently sloping landform, defined by relatively level surfaces stretching between study area boundaries.

The geological formations associated with the study area are identified within Figure 5 and include the Calarie Sandstone unit occupying the north-western corner of the study area encompassed by colluvial and residual deposits. The Calarie Sandstone contains cross bedded to planar bedded medium grained sandstone, the outcrops of which may have historically been utilised as grinding surfaces in proximity to creek banks, art surfaces, and rock shelters where appropriate overhangs may be present (Pearson, M. 1981, pp. 90, 102). Colluvial and residual deposits comprise a majority of the study area, this geological formation is the result of loose sediments washed towards the base of hillslopes. Thick accumulations of colluvium have been known

to contain well preserved and deeply buried archaeological deposits (Steve Parry 2011). The remaining geological feature, Mixed colluvial, alluvial and aeolian deposits, occupies minimal space towards the southernmost boundary of the study area. It is an amalgamation of the previously mentioned Colluvial deposit, along with alluvial sediments, loose clay, silt, sand or gravel deposited by running water in a stream bed or similar setting (Jackson, Julia, A. 1997), the aeolian deposit is defined as sediment transported by erosional forces, such as the wind.

Soil landscapes have distinct morphological and topological characteristics that result in specific archaeological potential. Because they are defined by a combination of soils, topography, vegetation and weathering conditions, soil landscapes are essentially terrain units that provide a useful way to summarise archaeological potential and exposure. The Bald Hill and Parkes soil landscapes are present within the study area. Bald Hill soil landscape is an erosional soil landscape which covers the north-western, south-western and south-eastern portions of the study area. It consists of narrow, convex elongated crests and ridges and gently inclined side slopes on predominantly sandstones (3-8%). The Parkes soil landscape, covering the north-eastern portion of the study area, is also an erosional soil landscape which consists of narrow crests and gently inclined side slopes on Ordovician metasediments. Erosional soils are generally subject to movement events which lead to poor preservation of archaeological materials, this can be an indication of low probability for the occurrence of Aboriginal sites and objects The soil landscapes associated with the study area are identified within Figure 7.

Stream order is recognised as a factor which helps the development of predictive modelling in Aboriginal archaeology in NSW. The stream order system used for this assessment was originally developed by Strahler (1952). It functions by adding two streams of equal order at their confluence to form a higher order stream, as shown in Photo 1. As stream order increases, so does the likelihood that the stream would be a perennial source of water. Predictive models which have been developed for the region have a tendency to favour permanent water courses as the locations of campsites as they would have been more likely to provide a stable source of water and by extension other resources which would have been used by Aboriginal groups (Koettig, M. 1985, Pearson, M. 1981).

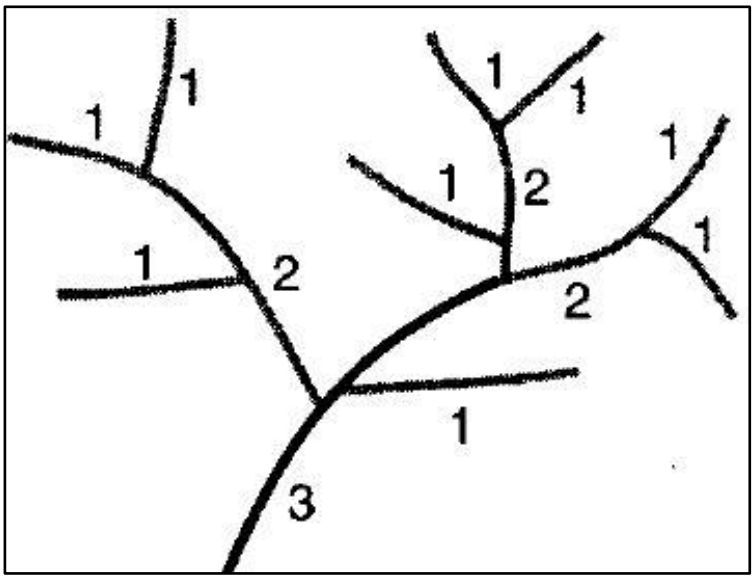

Photo 1 Diagram showing Strahler stream order (Ritter, Kochel, & Miller 1995, pp. 151)

The study area contains the northern extent of one first order stream originating from Lake Forbes and three dams. The first dam is in Lot 386, DP 750158 in proximity to the north-eastern border of the study area, the second is in the central portion of the study area at the southern boundary of Lot 387/DP750158, and the

third is located at the southern boundary of the study area in Lot 375/DP750158 . These dams track north to south of the study area indicating the streams drainge pathway historically followed the lower lying terrain but has since been modified to accommodate for agriculatural activities. Further to this the action of damming this stream indicates it was likely a non-perennial watercourse. Beyond this the surrounding locality contains an ample network of lower order streams stemming from the major sources of the Forbes Lake, Lachlan River and Bocobidgle Creek. The nearest of these is Forbes Lake located approximately 2.1 kilometres souther-west of the study area at its nearest point. When exploring trends between hydrology and occupation, Pearson, M. 1981 and Koettig, M. 1985 each determined that preference was given to permanent water courses in the central west region given their correlation to high resource availiability, this suggests sites are less lilely to occur within the study area due to the lack of permanent water resources. Hydrological features associated with the study area are identified in Figure 5

Resources

The South Western Slopes is the traditional home of the Wiradjuri people, the largest Aboriginal language group in NSW. The Wiradjuri people travelled to the alpine regions of the South Eastern Highlands and Australian Alps bioregions for the annual summer feasts of bogong moths (Heritage Office and Department of Urban Affairs and Planning 1996).

Wiradjuri means "people of the three rivers". the rivers being referred to are the Macquarie, Lachlan and Murrumbidgee (Heritage Office and Department of Urban Affairs and Planning 1996). For the Wiradjuri people, the three rivers were their livelihood and supplied a variety of consistent and abundant food provisions including shellfish and fish such as Murray cod *Maccullochella peelii* (Heritage Office and Department of Urban Affairs and Planning 1996). In dry seasons aquatic resources from the rivers were supplemented with kangaroos and emus, hunted for their meat, as well as flora gathered from the land between the rivers, including fruit, nuts, yam daisies, wattle seeds and orchid tubers (Heritage Office and Department of Urban Affairs and Planning 1996).

Plant resources were used in a variety of ways. Fibres were twisted into string, which was used for many purposes, including the weaving of nets, baskets and fishing lines. String was also used for personal adornment(Attenbrow 2002). Pearson's summary of ethnographic data indicates that bark was utilised in the manufacture of shelters in cold and wet conditions, and bough and leaf wind breakers and shelters, referred to as 'gungah' were constructed for hot, dry weather (Pearson, M. 1981, pp. 373). Eucalyptus bark was also was observed in the manufacture of canoes utilised for long distance travel and crossing bodies of water. Pearson ((1981, pp. 374) notes the level of ingenuity employed by local populations with all manner of resources in the stating:

> *Stone sources were located and utilized, all forms of timber were converted into tools and weapons, bark, animal tendons and fur were converted into string and then into netting, sap was utilized as halting gum, skins were made into cloaks and bags, and all were finished with artistic decoration.*

Further examples of the items manufactured using faunal and floral resources include belts of kangaroo skin, possum hair and grass, kangaroo tendon head pieces with cockatoo feather plumes, woven grass and kurrajong bark string nets, and bone and reed ornaments (Pearson, M. 1981, pp. 367–369).

Native mammalian species most commonly recorded within the Forbes locality include Rakali *Hydromys chrysogaster*, Eastern Grey Kangaroo *Macropus giganteus,* Swamp Wallaby *Wallabia bicolor,* Common Wallaroo *Osphranter robustus* and Little Red Flying-fox *Pteropus scapulatus.* Galah *Eolophus roseicapilla,* Australian Magpie *Gymnorhina tibicen,* Magpie-lark *Grallina cyanoleuca,* Crested Pigeon *Ocyphaps lophotes,* Eastern Rosella *Platycercus (Violania) eximius,* and Australian Wood Duckmaned Goose *Chenonetta jubata* are amongst the most commonly observed avian species.

Disturbances

Land has been disturbed if it has been the subject of a human activity that has changed the land's surfaces, being changes that remain clear and observable. The study area has been subject to varying levels of disturbance, with crop and pastoral and grazing evident across the study area, as well as extensive vegetative clearing. Historic aerials from 1965 (

Photo 2 **1965 aerial photograph, with the study area outlined in orange (Source: NSW Spatial Services accessed 2023)**

), which is the earliest date with aerials available, display the study area widely cleared of vegetation and separated into fields for agricultural purposes. No structures are visible within the study area at this time. Further aerial imagery dating to 1974 (

Photo 3) show a minor change in that a track is now visible extending from the northern boundary of the study area towards what may be a small structure or potentially an access gate to paddocks to the south. The structure which is present in modern aerials of the study area was constructed post-1974 and pre- 1983 as indicated by

Photo 4 indicating that some site work has taken place which would likely cause sub-surface disturbance.

Photo 2 **1965 aerial photograph, with the study area outlined in orange (Source: NSW Spatial Services accessed 2023)**

Photo 3 **1974 aerial photograph, with the study area outlined in orange (Source: NSW Spatial Services accessed 2023)**

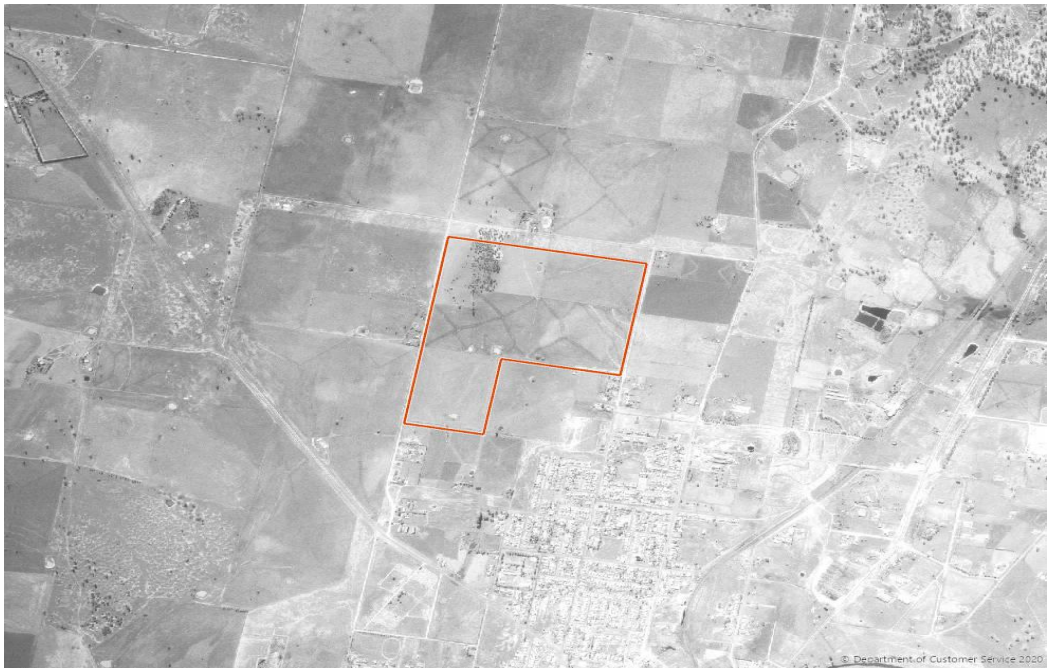

Photo 4 **1983 aerial photograph, with the study area outlined in orange (Source: NSW Spatial Services accessed 2023)**

Step 3. Can you avoid harm to the object or disturbance of the landscape feature?

The proposed works will result in disturbances to soils within the study area and therefore harm cannot be avoided.

Step 4: Desktop assessment and visual inspection

Desktop assessment

Based upon the results from Stages 2a and 2b of the Due Diligence Code, a series of statement have been formulated to broadly predict the type and character of Aboriginal cultural heritage sites likely to exist throughout the study area and where they are more likely to be located.

This model is based on:

- Local and regional site distribution in relation to landform features identified within the study area.
- Consideration of site type, raw material types and site densities likely to be present within the study area.
- Findings of the ethnohistorical research on the potential for material traces to present within the study area.
- Potential Aboriginal use of natural resources present or once present within the study area.
- Consideration of the temporal and spatial relationships of sites within the study area and surrounding region.

Based on this information, a predictive model has been developed, indicating the site types most likely to be encountered during the survey and subsequent sub-surface investigations across the present study area (Table 2). The definition of each site type is described firstly, followed by the predicted likelihood of this site type occurring within the study area.

Table 2 Aboriginal site prediction statements

Site type	Site description	Potential
Scarred trees	Trees with cultural modifications	Moderate: Scarred trees are a common site type within the vicinity of the study area. Due to extensive vegetation clearance only a small number of mature native trees have survived within the westernmost part of the study area. A such potential for scarred trees is moderate within the north-western extent of the study area.
Flaked stone artefact scatters and isolated artefacts	Artefact scatter sites can range from high-density concentrations of flaked stone and ground stone artefacts to sparse, low-density 'background' scatters and isolated finds.	Moderate: Stone artefact sites have been previously recorded in the region on level, well-drained topographies in proximity to reliable sources of fresh water. While the distance from permanent freshwater is high, the presence of temporary water resources indicates the potential for artefacts to as moderate.
Grinding grooves	Grooves created in stone platforms through ground stone tool manufacture.	Moderate: Sites will only occur where there is suitable horizontal sandstone rock outcrops along drainage lines. Geological and hydrological mapping indicates the potential for grinding grooves to be present within the north-western portion of the study area.

Site type	Site description	Potential
Potential Archaeological Deposits (PADs)	Potential sub surface deposits of cultural material.	Low: PADs have been previously recorded in the region across a wide range of landforms. PADs are likely to be present within areas adjacent to permanent water courses, on high points in undisturbed landforms, and areas containing fertile soils.
Burials	Aboriginal burial sites.	Moderate: Aboriginal burial sites are generally situated within deep, soft sediments, caves or hollow trees. Shallow erosional soils within the study area indicates potential for subsurface burials to be low while vegetation in the north-west hold moderate potential for tree burials.
Rock shelters with art and / or deposit	Rock shelter sites include rock overhangs, shelters or caves, and generally occur on, or next to, moderate to steeply sloping ground characterised by cliff lines and escarpments. These naturally formed features may contain rock art, stone artefacts or midden deposits and may also be associated with grinding grooves.	Low: The sites will only occur where suitable sandstone exposures or overhangs possessing sufficient sheltered space exist. Geologically, the study area may support such structures in the norther-western portion of the study area though topographically the terrain does not suit such structures. Potential for rock shelters is therefore low.
Conflict	Previously referred to as massacre sites where confrontations occurred between (1) Aboriginal and non-Aboriginal people, or (2) between different Aboriginal groups.	Low: While one conflict site was located within 10 kilometres of the study area, no sources indicate conflict sites to be located within the study area.
Aboriginal Ceremony and Dreaming sites	Such sites are often intangible places and features and are identified through oral histories, ethnohistoric data, or Aboriginal informants.	Low: There are currently no recorded mythological stories for the study area.
Post-contact sites	These are sites relating to the shared history of Aboriginal and non-Aboriginal people of an area and may include places such as missions, massacre sites, post-contact camp sites and buildings associated with post-contact Aboriginal use.	Low: There are no post-contact sites previously recorded in the study area and historical sources do not identify one.
Aboriginal places	Aboriginal places may not contain any 'archaeological' indicators of a site, but are nonetheless important to Aboriginal people. They may be places of cultural, spiritual or historic significance. Often they are places tied to community history and may include natural features (such as swimming and fishing holes), places where Aboriginal political events commenced or particular buildings.	Low: There are currently no recorded Aboriginal historical associations for the study area.
Shell middens	Deposits of shells accumulated over either singular large resource gathering events or over longer periods of time.	Low: Shell midden sites have not been recorded within the vicinity of the study area. There is a very low potential for shell middens to be located in the study area as the first order drainage line is not permanent water source.

Site type	Site description	Potential
Quarries	Raw stone material procurement sites.	Low: There is no record of any quarries being within or surrounding the study area.

Visual inspection

A visual inspection of the study area was undertaken on 25 July 2023 by Nathan Windram (Biosis, Graduate Heritage Consultant). The visual inspection consisted of a meandering survey of the study area to identify and record any Aboriginal archaeological sites visible on the surface, or areas of Aboriginal archaeological potential and cultural sensitivity with special care taken to specifically target areas of remnant vegetation. The archaeological survey was conducted on foot. The methods used during the visual inspection conformed to Requirements 5 to 8 of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b) (the Code). () For terminology and definitions used within this section, please refer to the aforementioned guideline. The results of the visual inspection are outlined below and in Figure 8.

The study area is located on a flat landform with a gently rising slope towards a low-lying crest comprising the north-western portion of the study area. Visibility across the site was generally moderate (50%), hampered by vegetation coverage (Photo 5). Exposure within the study area was moderate (45%) with large swathes of the terrain having been freshly ploughed (Photo 8). Multiple disturbances were present within the study area, including ground disturbing work associated with ploughing, the large scale movement of soil, the movement of heavy vehicles and the presence of structures (Photo 9 to Photo 11). It is also likely that there has been some sub-surface disturbance within the study area associated with the occupied structures present, such as through the construction of foundations or footings and trenches for sub-surface utilities.

Photo 5 Typical example of visibility within the study area, photo facing north

Photo 6 Typical example of visibility within wooded area upon low-lying crest, photo facing south

Photo 7 Young Ironbark tree, , , located upon low-lying crest in area of remnant vegetation showing natural scarring, photo facing west

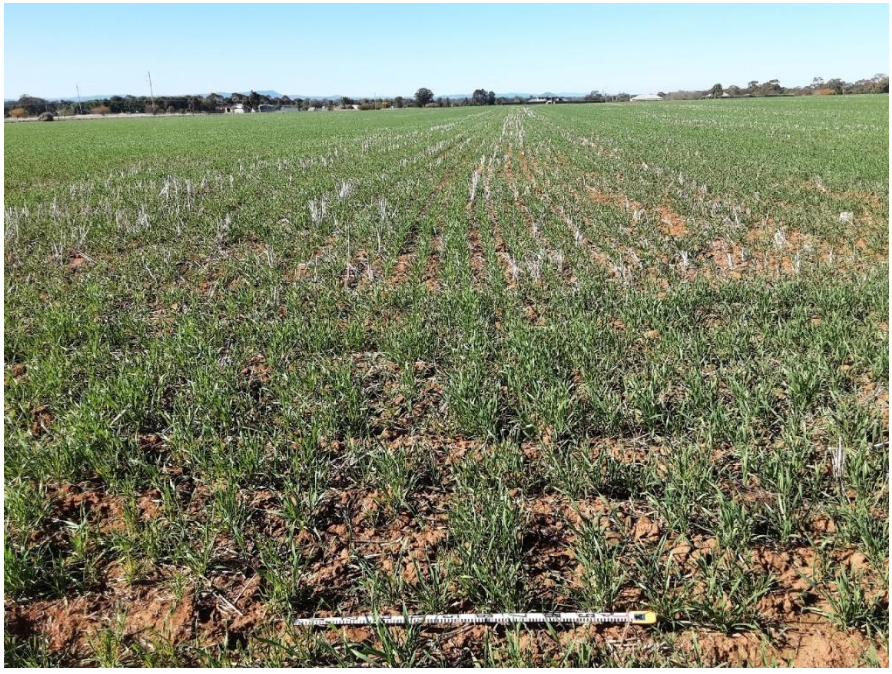

Photo 8 Area of exposure and disturbance associated with ploughing within the north-east paddock, photo facing east.

Photo 9 **Disturbance associated with heavy vehicle movement within north-central paddock, photo facing south-east**

Photo 10 **Disturbance associated with residential site occupation within north-central paddock, photo facing south**

Photo 11 **Disturbance associated with ploughing and land clearance within eastern paddock, photo facing south**

Photo 12 Artificial dam located centrally, photo facing east

Photo 13 Artificial dam at distance located within southern paddock, photo facing south

Discussion and conclusions

The archaeological investigation consisted of a total of one meandering transect walked across the entire study area. The results of the field investigation and transect location can be seen in Figure 8.

Background research identified that the study area contains the Calarie Sandstone geology occupying the north-western corner of the study area encompassed by colluvial and residual deposits, the outcrops of which could be utilised as grinding surfaces and art surfaces in proximity to creek banks, and rock shelters where appropriate overhangs may be present. Geological features can be seen in Figure 5. The study area contains two soil landscapes; the Bald Hill and Parkes soil landscapes which are both characterised as erosional. Erosional soils are generally subject to movement events which lead to poor preservation of archaeological materials, this can be an indication of low probability for the occurrence of Aboriginal sites and objects, soil landscapes can be seen in Figure 7.

A variety of flora and fauna resources were recorded and observed within proximity to the study area, offering numerous sources of exploitation. The study area contains three artificial dams tracking north to south, indicating the location of a drainage pathway which historically followed the lower lying terrain but has since been altered to accommodate agricultural activities. The action of damming the stream strongly suggests it was a non-perennial source and so would not have been reliable. When exploring trends between hydrology and occupation Pearson, M. 1981 and Koettig, M. 1985 each determined that preference was given to permanent water courses in the central west region given their correlation to high resource availiability, the lack of permanent water courses within the study area reduces the likelihood of to occur. Hydrological features can be seen in Figure 6. The study area is contained within a flat landform, topographically this does not provide clear views of the urrounding area which decreases the likelihood that the study area was occupied for extended periods.

A review of histoical aerial photofraphs displays that the study area has been used for agricultural purposes since at least 1965, with the earliest aerials showing extensive vegetation clearance and pastoral development. Aerial imagery from 1974 show a minor change in that a track is now visible extending from the northern boundary of the study area towards what may be a small structure or potentially an access gate to paddocks to the south. Due to the high amount of ground alteration as a result of pastoral activities, the overall likeliness of sites occurring within the majority of the study area is low.

No new Aboriginal sites or objects were identified during the archaeological investigation carried out on 25 July 2023. The study area has undergone extensive levels of disturbance, the historically inconsistent stream which has been dammed was likely overlooked in favour of the more permeable watercourses nearby, and the study area overall holds a low elevation level within the wider landscape. Overall the study area has been assessed to hold low potential to contain archaeological deposits (Figure 8).

Step 5: Further investigations and impact assessment

Further assessment is not warranted based upon the completion of Steps 1 to 4 of the Due Diligence Code. The study area has been determined to have been impacted by agricultural works associated with maintaining crop plantations, as well as the operation of heavy machinery and the construction of occupation structures. The field investigation undertaken as part of this project has confirmed the nature of disturbances within the study area which have likely impacted any potential sites present. Due to these disturbances, lack of appropriate environmental features such as raised topography and permanent water course access, and previous regional predictive statements identified during background research it is assessed that there is low potential for intact Aboriginal archaeological sites to occurring within the study area.

The following recommendations have been formulated for the project:

Recommendation 1: No further archaeological assessment is required, works may proceed with caution

No further archaeological work is required in the study area due to the entire study area assessed as having low archaeological potential due to previous disturbances and landscape characteristics.

Recommendation 2: Discovery of unanticipated Aboriginal objects

All Aboriginal objects and Places are protected under the NPW Act. It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by Heritage NSW, Department of Planning and Environment (Heritage NSW). Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object, the archaeologist will provide further recommendations. These may include notifying Heritage NSW and Aboriginal stakeholders.

Recommendation 3: Discovery of Aboriginal ancestral remains

Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity you must:

1. Immediately cease all work at that location and not further move or disturb the remains.
2. Notify the NSW Police and Heritage NSW' Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location.
3. Not recommence work at that location unless authorised in writing by Heritage NSW.

Please contact me if you have any enquiries.

Yours sincerely

Nathan Windram
Graduate Heritage Consultant

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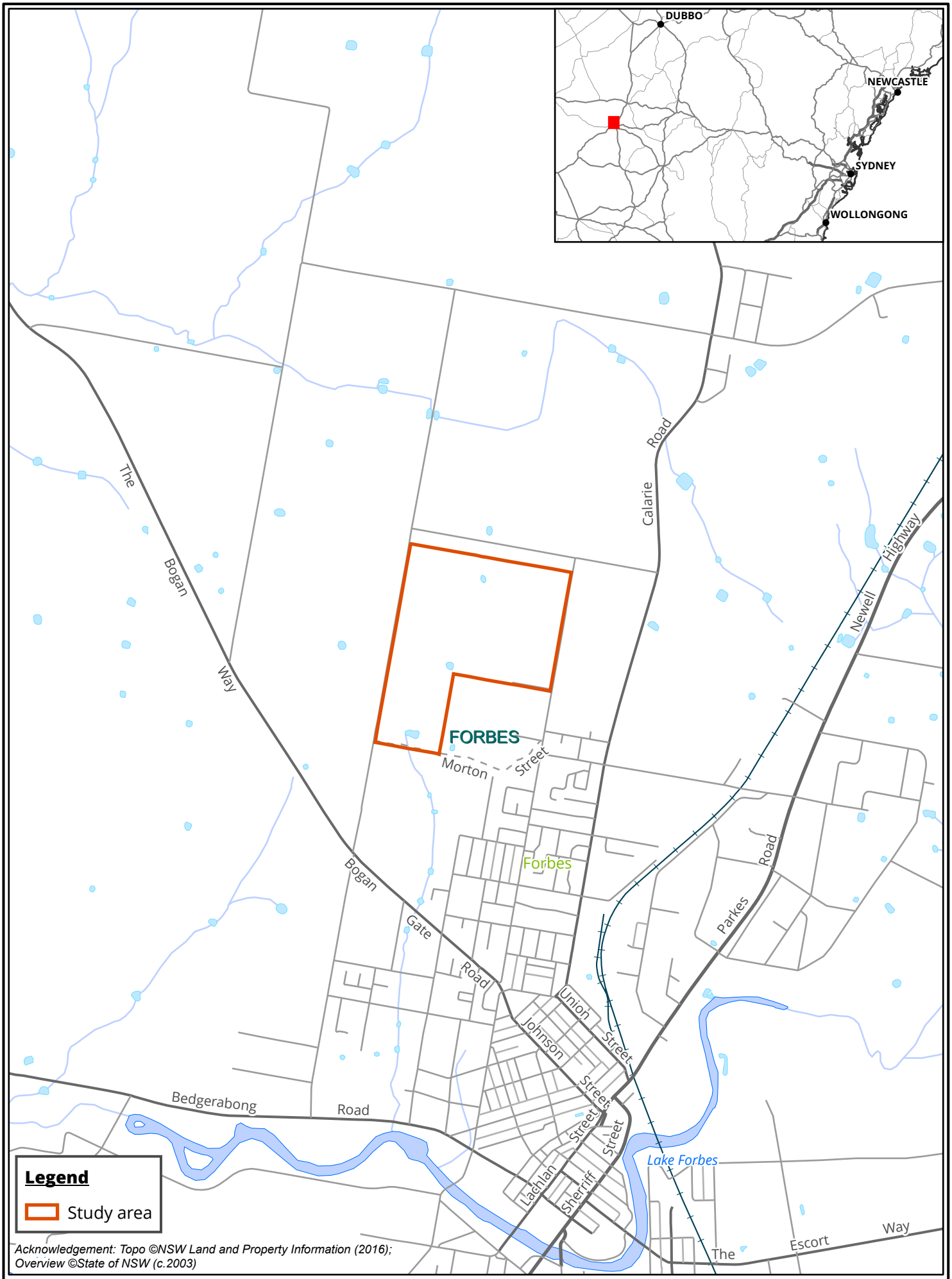

biosis

Figure 1 Location of the study area

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Drawn by: JET, Checked by: BB., Last edited by: jbeckius
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39273_School Rd Forbes ADDA
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0 200 400 600 800 1,000
Metres
Scale 1:30,000@ A4, GDA 1994 MGA Zone 55

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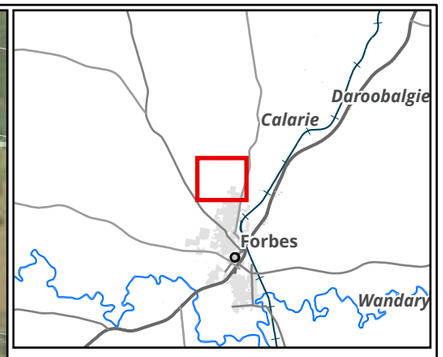

Legend

- Study area
- Lot

Figure 2 Study area detail

0 100 200

Metres

Scale: 1:6,000@ A3

Coordinate System:
GDA 1994 MGA Zone 55

N

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Matter: 39273, Date: 22 August 2023,
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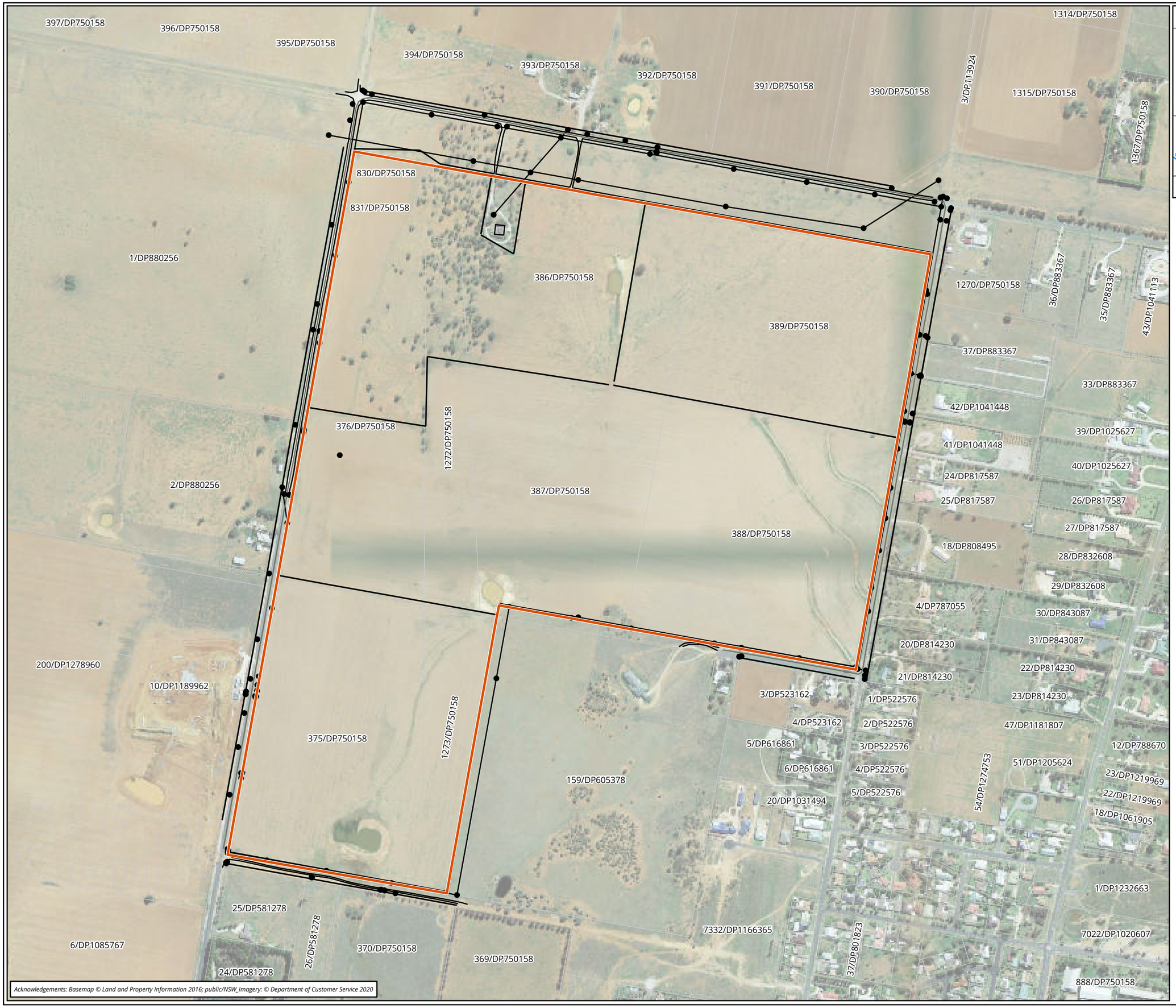

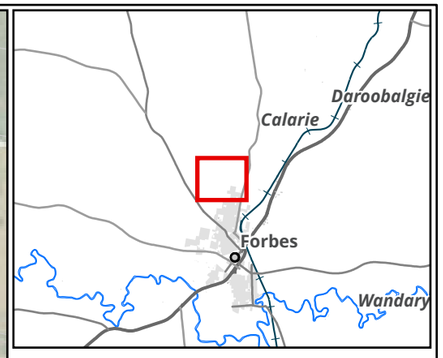

Legend

- Study area
- Lot
- Proposed works - point
- Proposed works - line

Figure 3 Proposed works

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Metres

Scale: 1:6,000@ A3

Coordinate System:
GDA 1994 MGA Zone 55

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biosis

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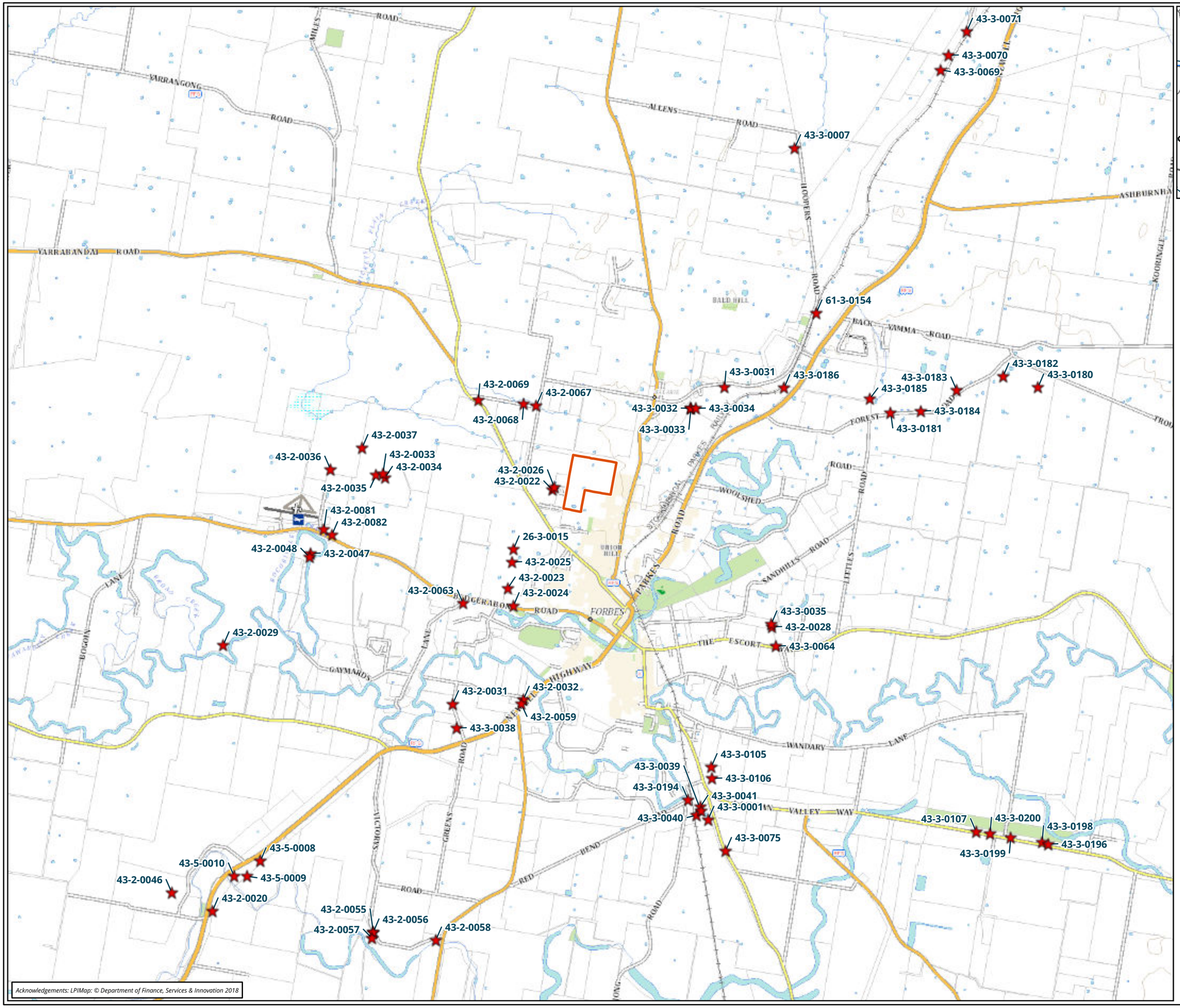

Legend

- Study area
- AHIMS

NOT TO BE MADE PUBLIC

Figure 4 AHIMS within the vicinity of the study area

0 1 2 3

Kilometers

Scale: 1:80,000@ A3

Coordinate System:
GDA 1994 MGA Zone 55

N

biosis

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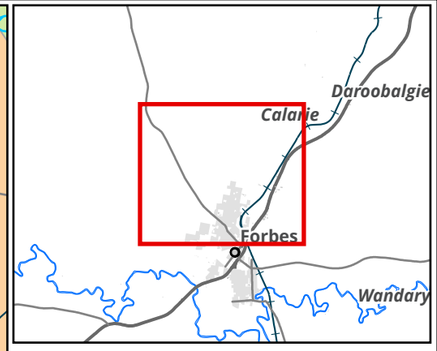
Acknowledgements: LPIMap: © Department of Finance, Services & Innovation 2018



Legend

Study area

Geological units

- CZ_a,Alluvium
- Ddec,Calarie Sandstone
- Onop,Parkes Volcanics
- Q_acm,Alluvial channel deposits - meander-plain facies
- Q_af,Alluvial floodplain deposits
- Q_ca,Mixed colluvial, alluvial and aeolian deposits
- Q_cr,Colluvial and residual deposits
- Sfob,Bocobidgle Conglomerate
- Sfom,Mumbidgle Formation
- Sufc,Cotton Formation

Figure 5 Geological units in the vicinity of the study area

0 200 400 600 800

Metres

Scale: 1:20,000@ A3

Coordinate System:
GDA 1994 MGA Zone 55

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biosis

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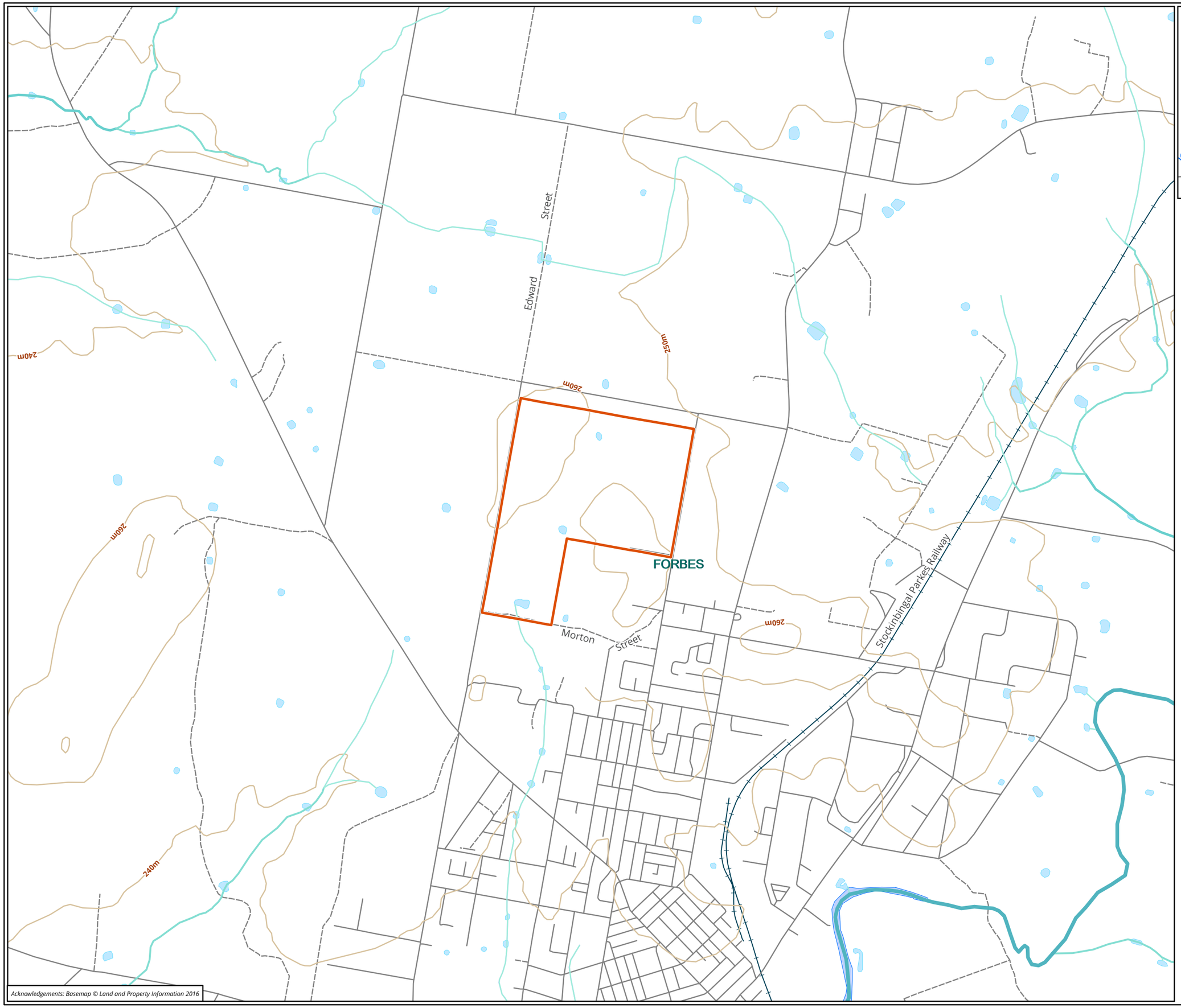

Legend

- Study area
- Contour (10m)

Strahler Order

- 1
- 2
- 3
- 4

Figure 6 Hydrology and topography in the vicinity of the study area

0 200 400 600 800

Metres

Scale: 1:20,000@ A3

Coordinate System:
GDA 1994 MGA Zone 55

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biosis

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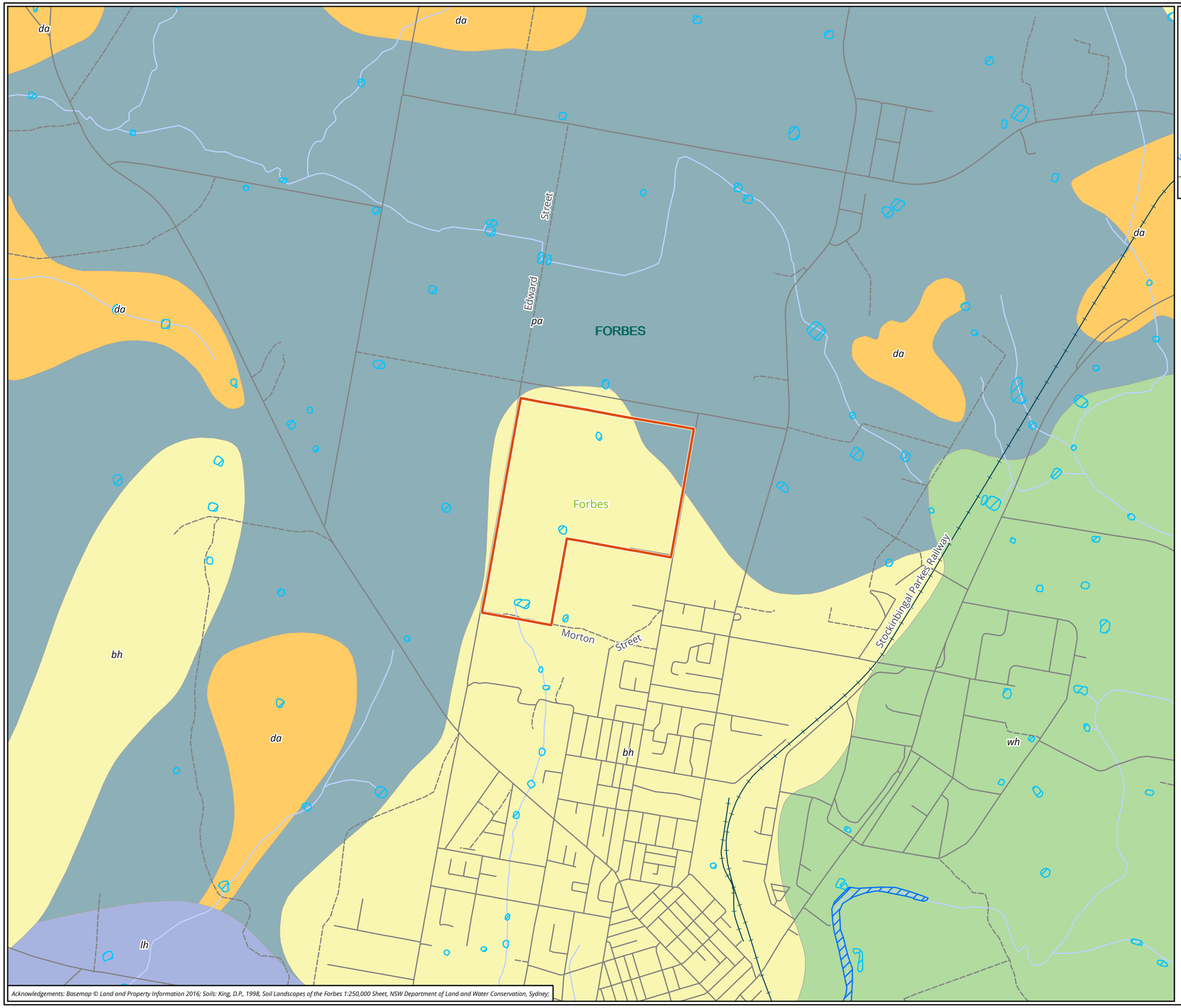

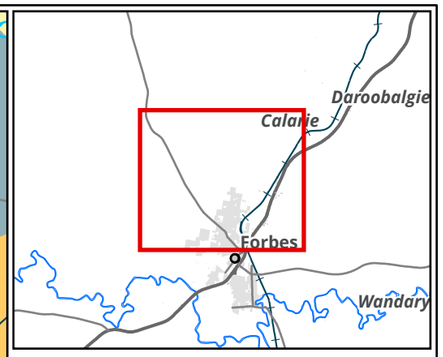

Legend

Study area

Soil landscape units

- bh - BALD HILL
- da - DAROOBALGIE
- lh - LACHLAN
- pa - PARKES
- wh - WAUGHAN

Figure 7 Soil landscapes in the vicinity of the study area

0 200 400 600 800

Metres

Scale: 1:20,000@ A3

Coordinate System:
GDA 1994 MGA Zone 55

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biosis

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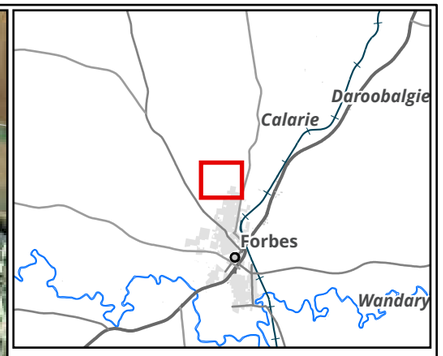
Acknowledgements: Basemap © Land and Property Information 2016; Soils: King, D.P., 1998, Soil Landscapes of the Forbes 1:250,000 Sheet, NSW Department of Land and Water Conservation, Sydney;



Legend

- Study area
- Lot
- Survey tracks

Archaeological potential

- Low

Figure 8 Visual inspection

0 100 200

Metres

N

Scale: 1:5,000@ A3

Coordinate System:
GDA 1994 MGA Zone 55

biosis

Matter: 39273, Date: 22 August 2023,
Drawn by: JET, Checked by: NW, Last edited by: jtownsend
Location: P:\39200s\39273\Mapping\
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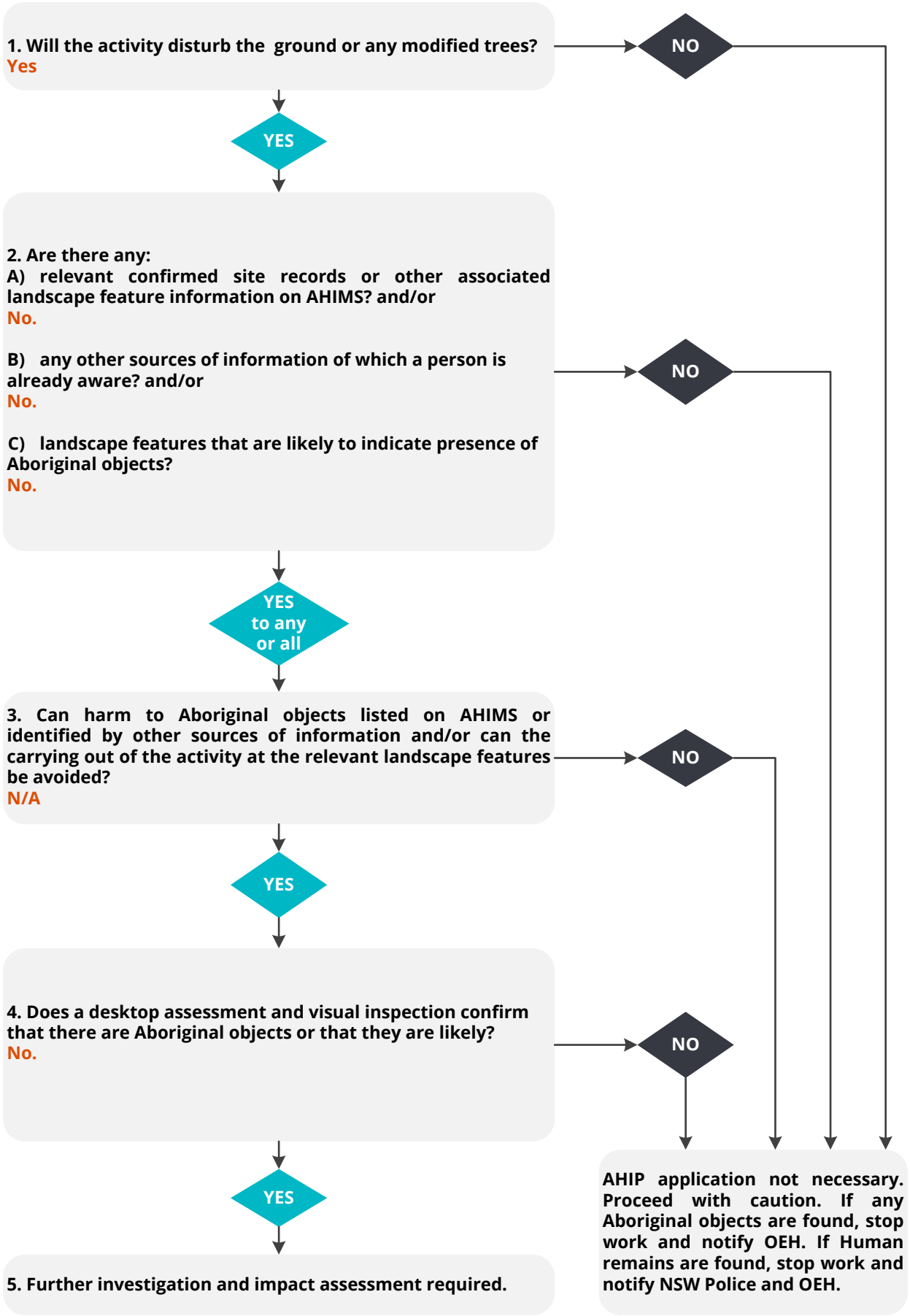
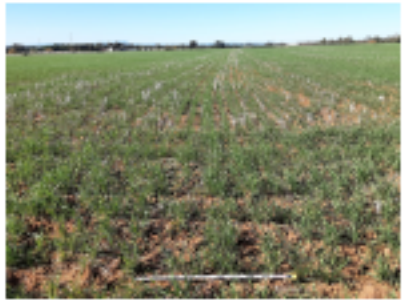
Figure 10: Due diligence flow chart



Appendix A. Photo Points

39273 Survey Photo points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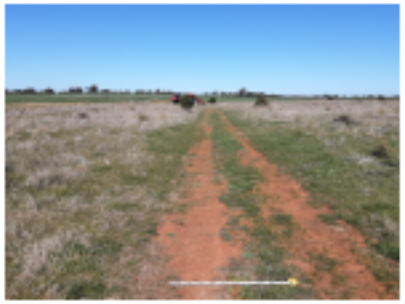
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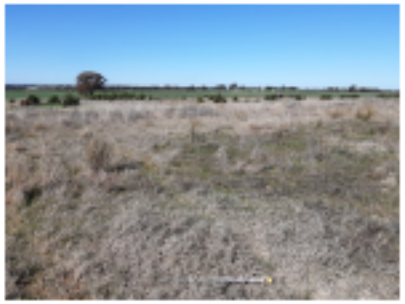
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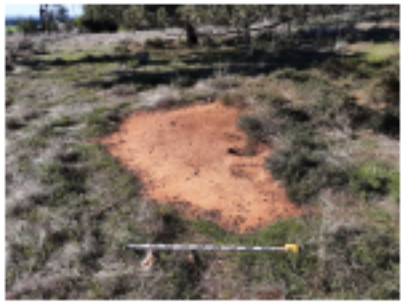
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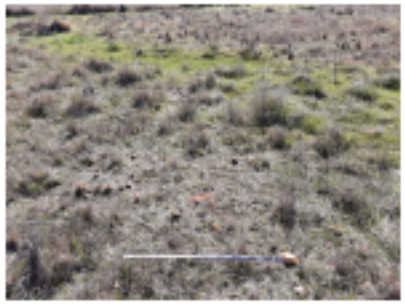
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39273 Survey Photo points


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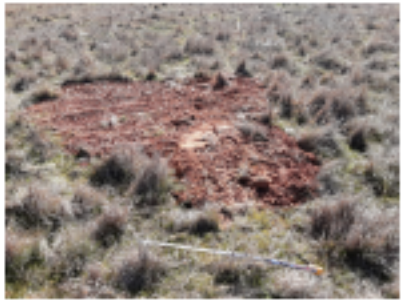
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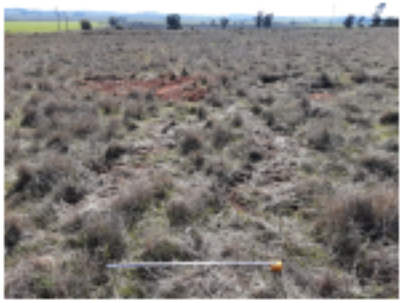
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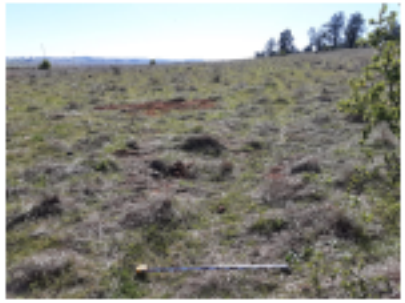
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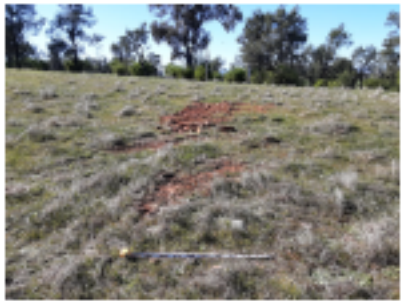
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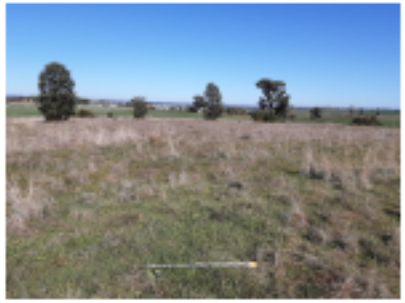
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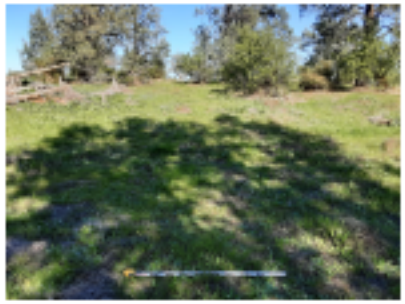
g.jpg

39273 Survey Photo points

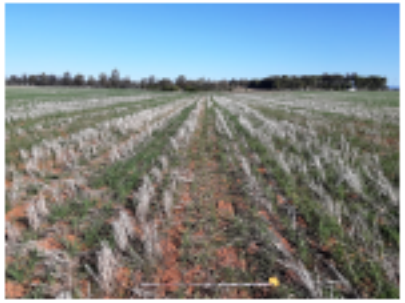


GSV within tree area.jpg

h.jpg

i.jpg

j.jpg

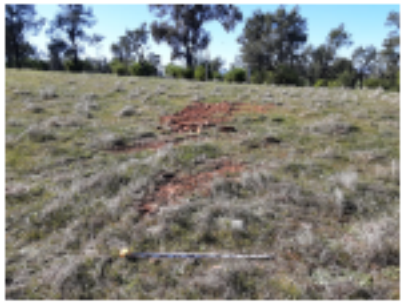


man made dam 2.jpg

man made dam.jpg

not scar tree.jpg

Photo 1.jpg



Tree area vis 2.jpg