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Report on
Preliminary Site Investigation for Contamination

Future Development Areas
& Associated Trails
Bingara Gorge Estate, Wilton

Prepared for
Lend Lease Communities (Wilton) Pty Ltd

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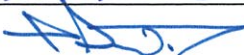
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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

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Preliminary Site Investigation for Contamination Future Development Areas & Associated Trails Bingara Gorge Estate, Wilton

1. Introduction

This report presents the results of a Preliminary Site Investigation (PSI) for contamination undertaken for specific future development areas and associated proposed trails at Bingara Gorge Estate, Wilton. The PSI was undertaken in two stages. The first stage of the PSI was commissioned by Cardno (NSW/ACT) Pty Ltd (Cardno) and was undertaken at the request of Ms Helena O'Rourke of Cardno, project managers acting on behalf of Lend Lease Communities (Wilton) Pty Ltd, site developers. The second stage was undertaken at the request of Mr Robert Bennett of Lend Lease Communities (Wilton) Pty Ltd.

The objectives of this PSI are to:

- Identify potential sources and areas of contamination and determine potential contaminants of concern;
- Identify potential human and ecological receptors;
- Assess the suitability of the site for the proposed development; and
- Make recommendations for further work, if necessary.

It is understood that the future development areas will be subject to primarily low-rise residential development with associated roads, parks and open space and will require vegetation clearance at certain areas. In addition, trails for pedestrians and cyclists, and fire trails are proposed at some bushland areas, just beyond the future development area boundaries, which will also require some vegetation removal. It is understood that this report will be used as information to support development applications.

This report has been prepared to provide the consent authority with information to address Clause 7 of *State Environmental Planning Policy No 55 – Remediation of Land* (SEPP 55) whereby contamination and remediation is to be considered when determining a development application. In particular, this report presents the findings of a preliminary investigation as outlined in Department of Urban Affairs and Planning & Environment Protection Authority, *Managing Land Contamination, Planning Guidelines, SEPP 55-Remediation of Land*, 1998, which must be considered by the consent authority according to Clause 7 (2) of SEPP 55.

2. Scope of Works

The scope of the PSI was undertaken in two stages. The first stage was undertaken for specific future development areas and comprised the following:

- Review of readily available site history, comprising:

- Information from a previous contamination assessment;
- Historical aerial photographs;
- Public databases held under the *Contaminated Land Management Act 1997* and the *Protection of the Environment Operations Act 1997*;
- Review of site information, comprising:
 - Geological and topographical maps/drawings;
 - Groundwater bores registered with the NSW Office of Water;
 - Geotechnical information previously collected by DP; and
- Conduct a site walkover (of future development areas) and observe for situations that indicate a potential for contamination.

The second stage was undertaken with a focus on proposed bushland trails (which were not included as part of the site in the first stage) and comprised:

- Conduct a site walkover at proposed bushland trails and observe for situations that indicate a potential for contamination;
- Conduct brief a site walkover at the future development areas to observe for any changes to the site since the first stage site walkover;

The findings of both stages of the investigation have been detailed in this PSI report.

3. Site Identification and Description

3.1 Site Identification

3.1.1 Future Development Areas

The future development areas for the site comprise nine areas within Wilton, NSW as shown on the drawing titled *Bingara Gorge – Future Development Areas*, Appendix A. Seven of the nine areas were, in May 2015, subject to development approvals pending determination by Wollondilly Shire Council as follows:

- Greenbridge East Stage 4C & 4D (DA 010.2015.213.001) (2 areas);
- Fairways East Stage 1J (DA 010.2015.230.001) (1 area); and
- Fairways East Stage 1M (b) (DA 010.2015.214.001) (4 areas).

The other two areas are much larger and will be subject to future development. According to the NSW Government Land & Property Information SIX maps website (accessed on 2 June 2015):

- The western Future Development Area comprises the majority of Lot 23 in Deposited Plan 270536 as well as Lot 210 in Deposited Plan 11043390 (a small land parcel); and
- The eastern Future Development Area comprises the majority of Lot 5 in Deposited Plan 270536 as well as Lot 211 in Deposited Plan 270536 (a small land parcel).

These two larger areas will be subject to significant vegetation removal as shown on the drawing titled *Bingara Gorge 1800 DA, Vegetation Removal*, Appendix A.

The future development areas cover a total area of approximately 130 ha.

3.1.2 Trails

In addition to the future development areas described above, the site includes proposed trails for pedestrians and cyclists, and fire trails which are located in nearby bushland beyond the future development area boundaries. The proposed trails are shown on the drawing titled *Bingara Gorge 1800 DA, Vegetation Removal 1800 Lots*, Appendix A, and include:

- Proposed trails alongside the northern end of the western Future Development Area (The Fairways North);
- Proposed trails alongside the northern part of the eastern Future Development Area (Golf North); and
- Proposed trails alongside the northern and eastern parts of Greenbridge East Stage 4C & 4D.

3.2 Description of Future Development Areas – May 2015

A walkover by an Environmental Engineer from DP was conducted for the majority of the future development areas on 22 May 2015, and for the western Future Development Area on 28 May 2015. The subsections below provide a description of observations made for each of the future development areas at that time. A hand held GPS was used to provide coordinates of specific site features (and are referenced to GDA94 / MGA zone 56).

3.2.1 Greenbridge East Stage 4C & 4D

The two areas that make up Greenbridge East Stage 4C & 4D were primarily land which had a thick cover of grass and scattered mature tree growth. The ground surface undulates and generally slopes down towards Allens Creek to the east. Sandstone outcrops were observed, particularly within the southern area. A fenced area at the south has signage indicating the presence of buried services (the Moomba – Sydney gas pipeline). A dam was present between the two areas. Only infrequent general waste materials were encountered on the ground surface (such as an old tyre or plastic).

Stockpiles or fill mounds were observed within the site as listed in Table 1.

Table 1: Observed Stockpiles or Fill Mounds at Greenbridge East Stage 4C & 4D

Stockpile or fill mound description	Photograph No. (see Appendix B)	Location Coordinates
A series of small, elongated fill mounds comprising soil and rock at the south-eastern part of the southern area. No anthropogenic materials or signs of potential contamination were observed on the surface.	Photograph 1	From: E: 288214, N: 6209740 To: South-eastern corner of area
Grass covered stockpile of approximately 500 m ³ of soil and rock in amongst trees at southern area. No anthropogenic materials or signs of potential contamination were observed on the surface.	Photograph 2	E: 288020 N: 6209800
Small stockpile (~2 m ³) of soil with general waste materials observed on the surface including bricks and plastic, at northern area.	Photograph 3	E: 288052 N: 6210108
Small stockpile (~4 m ³) of soil and rock with waste materials on the surface including bricks and concrete, at northern area	Photograph 4	E: 288057 N: 6210224
Small stockpile (~2 m ³) of grass covered soil and rock at northern area. No anthropogenic materials or signs of potential contamination were observed on the surface.	Photograph 5	E: 287977 N: 62010246

Neighbouring land was observed to include bushland to the north, east and south; low rise residences to the south; a golf course to the north-west; and grassed, vacant land to the west.

3.2.2 Fairways East Stage 1J

The majority of the Fairways East Stage 1J area was grassed with some mature trees. Asphalt access roadways were present at the southern part of the area. An area at the north-eastern corner had been cleared with minor quantities of general waste materials observed on the ground. Only infrequent general waste materials (such as fabric) were encountered on the ground surface in other parts of the area. The western boundary of the area is raised (filled) for a dam located at the adjacent land to the west. Water had also pooled at the north-western corner of the area. The area generally slopes down towards where the water has pooled. A large trench was observed at the eastern part of the area.

There are several small fill mounds and stockpiles of soil and rock within the western parts of the area (see Photographs 6 and 7, Appendix B). A small stockpile (~4 m³) within this part of the site (E: 286634, N: 6210804) was observed to contain a mix of soil and asphalt (Photograph 8, attached). Apart from this stockpile, anthropogenic materials were not observed on the surface of fill mounds and stockpiles. Signs of potential contamination were not observed on the surface of the fill mounds or the surface of the stockpiles.

Neighbouring land was observed to include a golf course to the north, west and east; land currently being developed for residential purposes to the south; a parking area (for the golf course and sporting facilities) and vacant land to the east.

3.2.3 Fairways East Stage 1M(b)

Fairways East Stage 1M(b) comprises four areas. The southernmost two areas, at Stirling Drive, have been subject to previous filling works [as part of an approved development application, DA ID1558.04, shown as Fill Zone A on VKL Consulting Drawing No. 5504-08-67A, Appendix A]. The two areas were partly fenced off due to subdivision construction works [on the adjacent Stage 1M subdivision as per approved DA ID993.05]. Observations were limited at this part of the site due to the construction works, however, the surface soil did not appear to have anthropogenic materials or signs of potential contamination (see Photographs 9 and 10, Appendix B).

The northernmost two areas of Fairways East Stage 1M(b), at Fairway Drive, were occupied by large stockpiles as well as a contractor compound (see Photographs 11 to 14, Appendix B). [These stockpiles are from approved subdivision works carried out on Fairways East (DA 010.2013.411.001) and Stage 1M (DA ID993.05). All stockpile placement was observed by a geotechnical engineer at the time]. The surfaces of four large stockpiles were observed to contain soil and rock with infrequent anthropogenic materials such as plastic. A stockpile of sandstone boulders and a stockpile of trees were located next to a soil stockpile. Signs of potential contamination were not observed on the surface of the stockpiles. The contractor compound comprised site sheds, a container, a skip bin, building materials and some general waste materials. A new substation was present adjacent to the compound (see Photograph 13, Appendix B). The presence of stockpiles and site sheds meant that most of the ground surface could not be observed, however, signs of potential contamination were not observed on exposed ground surfaces.

This part of the site slopes down gently towards the adjacent golf course to the north. Apart from the golf course, surrounding land was currently being developed for residential purposes.

3.2.4 Western Future Development Area

The majority of the western Future Development Area was grassed with some clusters of mature trees and is accessed by dirt roads. Topsoil had been stripped to create a truck haulage route from the south of the area so that soil from current development areas to the east could be stored (to the immediate west of E: 286282, N: 6210962) (See Photograph 15, Appendix B). An old sandstone brick cottage surrounded by a man-proof fence was present at the central part of this area. The inside of the cottage was not accessed during the site walkover. Features noted to surround the cottage included:

- An unused derelict tank at the rear of the property (near E:286624, N:6211138) (See Photograph 16, Appendix B);
- A metal shed with old farming equipment (E:286528, N:6211144) (see Photographs 17 and 18, Appendix B);
- An unused aboveground tank to the west of the cottage (near 286565: N:6211088) (See Photograph 18, Appendix B);

- Remnants of old unknown structures (E: 286602, N:6211127; E: 286590, N 6211183; and 286505, N 6211213) (see Photographs 19 to 21, Appendix B);
- Two old (unused) animal pens (E: 286594, N: 6211114 and E:0286517, 6211192); and
- Two small dams (E: 286465, N: 6211227 and E: 286619, 6211208) (see Photographs 22 and 23).

To the south of the cottage was a filled area to create a dam wall that adjoins and provides vehicle access to Fairways East Stage 1J. Small stockpiles of mulch, fertilizer and sand were observed in this filled area (see Photograph 24, Appendix B).

In the northern half of the western Future Development Area, a relatively elevated area that had been disturbed (scraped) and subject to removal of soil was observed, leaving exposed soil and pools of turbid water (E: 286877, N: 6211353) (see Photograph 25, Appendix B). Some piles of soil were present surrounding this area and were presumed to have been sourced from this disturbed area (see Photograph 26, Appendix B). A small dam was located to the south of the disturbed area (E: 286758, N6211273) (see Photograph 27, Appendix B).

The northern end of the western Future Development Area was subject to horse grazing. Rock outcrops were observed at this part of the site. A dam (E: 287190, N6211715) (see Photograph 28, Appendix B) and grass-covered small soil and rock mounds (one at E: 287430, N: 6211461 and four at 287319, N: 6211586) (see Photographs 29 and 30, Appendix B) were observed. Anthropogenic materials were not observed on the surface of the soil mounds.

No signs of contamination associated with the water in dams and pooled water were observed, although the water was cloudy (turbid). Signs of contamination were not associated with areas of exposed soil (such as the truck haulage route and at the relatively elevated part of the site).

The Hume Highway is adjacent to the north-west of the western Future Development Area. Other neighbouring land includes vacant land (reserved for a rail corridor), contractor compounds and water storage ponds to the west; a golf course to the south-west; bushland to the north and east; and some vacant land to the south and east. The western Future Development Area has undulating topography with the majority of slopes down to the south-east, towards the golf course and large dam; down towards Allens Creek to the north; and down towards Stringybark Creek to the east.

3.2.5 Eastern Future Development Area

The majority of the eastern Future Development Area was grassed with some clusters of mature trees and is accessed by dirt roads. At the southern edge of the area is a contractor storage area. A shipping container, general building materials, and stockpiles of sand, concrete pipes and sandstone boulders were observed in this storage area as well as a bundled 5000 L plastic above ground tank for diesel storage (E: 287642, N:6210311) (See Photographs 31 to 33, Appendix B). A stockpile of concrete pipes, a stockpile of mulch, and a stockpile of tree stumps were observed at other parts of the eastern Future Development Area.

Isolated areas of the ground surface were observed to be disturbed for the installation of buried services. Occasional litter (such as plastic and aluminium cans) was observed on the ground surface during the walkover.

A sealed standpipe, labelled as a bore, was observed in an open, grassed area (E: 287670, N: 6210480) (see Photograph 34, Appendix B).

Land surrounding the eastern Future Development Area is either bushland or used for a golf course, apart from land to the south-east which remains as undeveloped vacant land. The area has undulating topography with the majority of slopes down towards Stringy Bark Creek to the west and down towards Allens Creek to the north and east.

3.3 Description of Proposed Trails – February 2016

A walkover by an Environmental Engineer from DP was conducted on 26 February 2016 for the proposed trails which are beyond the future development area boundaries. The proposed trails are located at areas covered with natural vegetation which appeared to be relatively undisturbed bushland and are alongside mainly grassed, undeveloped areas (Photograph 35, Appendix B). Rock outcrops were commonly observed (Photograph 36, Appendix B). No signs of contamination were observed in these areas.

3.4 Update to Future Development Area Descriptions – February 2016

On 26 February 2016, the future development areas were briefly inspected by an Environmental Engineer for any significant changes since May 2015. Observed changes comprised:

- Some (imported) sand was stockpiled at the north-eastern corner of Fairways East Stage 1 (Photograph 37, Appendix B);
- The southernmost two areas of Fairways East Stage 1M(b) were grass covered (Photograph 38, Appendix B). A newly formed road was present between these two areas;
- The northernmost area of Fairways East Stage 1M(b) was covered by one large stockpile of soil and rocks with infrequent anthropogenic materials such as plastic (Photograph 39, Appendix B). The smaller area to the south, on the other side of a newly formed road, was grassed covered and did not have stockpiles (Photograph 40, Appendix B). The contractor compound had been removed;
- Some small stockpiles had been removed from the dam wall at the western Future Development Area; and
- Some additional (imported) sand stockpiles were observed at the contractor storage area at the eastern Future Development Area (Photograph 41, Appendix B).

In addition to the above, the offsite water storage ponds to the west of the western Future Development Area had been drained and were subject to construction activities.

4. Geology and Hydrogeology

4.1 Geology and Soils

The Wollongong-Port Hacking 1:100 000 Geology Sheet indicates that the majority of the site is underlain by Hawkesbury Sandstone which comprises medium to coarse-grained quartz sandstone, very minor shale and laminate lenses. Parts of the site in the west (including parts of the western Future Development Area and Fairways East Stage 1J; and all four of the Fairways East Stage 1M (b) areas) are indicated to be underlain by Ashfield Shale which comprises laminite and dark-grey siltstone.

The Wollongong-Port Hacking 1:100,000 Soils Landscape Sheet indicates that the site has natural soils formed by residual processes, apart from a relatively small part of the western Future Development Area in the west where it is indicated that soils are formed by erosional processes.

4.2 Hydrogeology

The majority of stormwater at the site is expected to infiltrate the permeable surfaces or run-off towards dams and creeks or the golf course. Groundwater is expected to migrate towards the large dam at the golf course, Stringy Bark Creek or Allens Creek.

4.3 Registered Groundwater Bores

A search of the NSW Office of Water groundwater database in June 2015 revealed that no registered groundwater bores are located within the site boundaries, however, a registered test bore (GW109278) was located in between the western Future Development Area and Fairways East Stage 1M (b). The test bore was drilled through clay, sandstone, shale and then basalt to a depth of 180 m. The standing water level was recorded at 48 m.

Approximately 300 m to the south of Fairways East Stage 1J, another test bore (GW109279) was drilled through layers of sandstone, shale, siltstone and claystone to a depth of 193 m. The standing water level was recorded at 44 m.

The third nearest bore (GW106250) is located more than 500 m to the south of the site and was installed for domestic / stock purposes.

The search results are presented in Appendix C.

4.4 Previous Geotechnical Investigations

DP has undertaken numerous geotechnical investigations at Bingara Gorge Estate. DP's *Report on Pavement Investigation, Bingara Gorge Estate – The Fairways East, Pembroke Parade, Wilton*, August 2013 (Prepared for Lend Lease Communities (Wilton) Pty Ltd, reference 43677.25) (DP, 2013), although prepared for a pavement investigation, provides some subsurface information from test pits excavated in the areas of Fairways East Stage 1J and Fairways East Stage 1M (b). The subsections below provide a summary of subsurface findings relevant to this PSI.

4.4.1 Fairways East Stage 1J

Of the 37 test pits excavated, (according to the approximate locations provided in Drawing 1 of DP (2013)) 17 test pits were located within the Fairways East Stage 1J area. Of these 17 test pits, filling was encountered at three test pits which were located at the northern part of the area. [The filling works were carried out as part of the approved works under a development application, DA ID1558.04 (Fill Zone D), as shown on VKL Consulting Drawing No. 5504-08-68A in Appendix A]. Filling comprised soil and rock materials of natural origin (such as brown silty clay and sandstone cobbles and boulders). The depth of filling was 0.1 m at one test pit, but more than 2 m and more than 1.5 m at the other two test pits. No anthropogenic materials were noted in the filling. Natural soil encountered in the test pits was typically brown clayey silt and silty clay which was usually underlain by sandstone, although shale and siltstone were also encountered. No signs of contamination (such as odours or staining) were noted in the filling or natural soil.

4.4.2 Fairways East Stage 1M(b)

One of the test pits from DP (2013) was excavated within the south-western part of Fairways East Stage 1M(b) area. [As stated in Section 3.2.3, filling was previously carried out in this area under the approved works outlined in DA ID1558.04]. Filling at this test pit was noted to contain well compacted grey to dark grey sand gravel, slightly cobbly (sandstone) with a trace of boulders. The depth of filling was 0.5 m. No anthropogenic materials were noted in the filling. No signs of contamination were noted in the filling or underlying natural dark brown silty clay or sandstone.

Two of the test pits from DP (2013) were excavated within the north-western part of Fairways East Stage 1M(b). Filling was not encountered at these test pits. No signs of contamination were noted in the natural dark brown clayey silt and underlying red-brown silty clay and sandstone.

5. Site History Information

5.1 Previous Contamination Assessment

According to an excerpt from of the Wilton Parkland Residential Community: Statement of Environmental Effects (reference J:\2005\05252\Reports\SEE.doc), a preliminary contamination assessment was undertaken by Johnstone Environmental Technology Pty Ltd (JET) in 1999 and the following information was summarised from the JET report.

The Wilton/Douglas Park area was used during World War II as a RAAF High Explosive bombing and gunnery range. The Department of Defence in 1992 advised Wollondilly Council that unexploded bombs or their components could exist buried below the surface, particularly in the target area, however, the presence of the latter items should not pose a major impediment to future development in this area. Workman involved in excavation should be alerted to the possible presence of unexploded ordinance and advised not to move the suspicious items until identified and cleared by qualified military personnel.

The JET report concluded that there was no reason to believe that there were any other possible contamination sources on the property which require any specific attention or further investigation. All personnel involved in construction would be alerted to the possible presence of unexploded ordinance and advised not to move any suspicious item and to call qualified military personnel for identification and handling. If previously undetected contaminated material is encountered during construction, such as zones of filling or waste dumping, all work on site will cease until further investigations are undertaken.

DP has not sighted the JET report.

5.2 Historical Aerial Photographs

Historical aerial photographs of the site were obtained from NSW Government, Land and Property Information (LPI) and reviewed to identify possible uses of the site and surrounding properties. The aerial photographs are provided in Appendix D. Approximate locations of the future development areas are indicated on the photographs. The earliest available image is from 1956. The following summarises the findings of the review.

1956

The Greenbridge East Stage 4C & 4D areas are not shown on the 1956 image. Most of the land covered by and surrounding the western Future Development Area, Fairways East Stage 1J and Fairways East Stage 1M (b) appear to have been used for grazing. The north of the western Future Development Area and the eastern Future Development Area appear to have been bushland although there appears to be evidence of previous disturbance of the bushland at the eastern Future Development Area. Bushland surrounded the site in areas not used for grazing.

A cottage with nearby sheds and small structures appears to have been present in the centre of the western Future Development Area. A small dam is also nearby.

1966

Unlike the 1956 image, the 1966 photograph shows the entire site. Bushland had been cleared at the north of the western Future Development Area and much of the eastern Future Development Area, presumably to provide more land for grazing. Most of the Greenbridge East Stage 4C & 4D areas were bushland, apart from a small portion which appeared to have been used for grazing. The land at Fairways East Stage 1J and Fairways East Stage 1M (b) appears to have been unchanged since 1956. Land surrounding the site was either bushland or used for grazing.

Although it is difficult to determine from the low quality of the image, it appears that the cottage with nearby sheds and small structures has remained since 1956.

1979

The 1979 image shows that the Hume Highway was being constructed at that time. Bushland had been cleared at the eastern Future Development Area and the Greenbridge East Stage 4C & 4D areas, presumably to provide more land for grazing. The Fairways East Stage 1J and Fairways East Stage 1M (b) areas were relatively unchanged since 1966. At least two dams appear to have been constructed at the western Future Development Area. A dam appears to have been constructed at the eastern Future Development Area and in between the Greenbridge East Stage 4C & 4D areas.

Apart from the Hume Highway construction, land surrounding the site was either bushland or used for grazing.

1988

The 1988 image shows that the construction of the Hume Highway had been completed which included construction of a bridge (overpass) at the site boundary of the western Future Development Area. The majority of the site appears to have been relatively unchanged since 1979, although additional small structures appear to have been present around the cottage at the western Future Development Area. An additional dam appears to have been constructed at the eastern Future Development Area. Land surrounding the site was either bushland or used for grazing.

1994

The 1994 image shows that the site and surrounding area appears to have been relatively unchanged since 1988. The northern part of the eastern Future Development Area had been subject to vegetation growth. Further clearing of bushland at the Greenbridge East Stage 4C & 4D areas had occurred since 1988. A dam may have been filled (or dried out) at the eastern Future Development Area.

2005

The 2005 image shows that the site appears to have been relatively unchanged since 1994. Vegetation had been cleared at the northern part of the eastern Future Development Area.

Residential development had occurred on land adjacent to the south of the Greenbridge East Stage 4C & 4D areas.

2013

The 2013 image shows that some of the site and much of the surrounding land had been subject to development works since 2005. Much of the Fairways East Stage 1M (b) areas had been subject to earthworks with stockpiles being present at one of these areas. Some of the land at the western Future Development Area had been disturbed and a (soil) dam wall had been constructed at the land which adjoins the Fairways East Stage 1J area. [One of the disturbed areas at the western Future Development Area is within Fill Zone C, Drawing 5504-08-68A, Appendix A which has been approved by Council]. Some of the land within the Fairways East Stage 1J area appears to have been

disturbed. [The disturbed land is within at Fairways East Stage 1J is within Fill Zone D, Drawing 5504-08-68A, Appendix A].

The eastern Future Development Area had not been subject to significant change since 2005, although a series of dirt roads had been formed to provide access to neighbouring land. The Greenbridge East Stage 4C & 4D areas appear not to have changed since 2013.

Much of the land surrounding the site was subject to a golf course development including a large dam to the west of Fairways East Stage 1J. New low rise residential development and associated roads had been constructed on nearby land to the south of Fairways East Stage 1J. Water treatment ponds and contractor compounds were present at the land to the west of the western Future Development Area.

5.3 Regulatory Notice Search Under the CLM and POEO Acts

The Protection of the Environment Operations Act public register, published by NSW Environmental Protection Authority (EPA), contains information about environment protection licences and other regulatory information required under the *Protection of the Environment Operations Act 1997* (POEO Act). A search of the register on 5 June 2015 revealed one listing (a licence) within Wilton. Veolia Water Solutions & Technologies (Australia) Pty Ltd had been issued with a licence for sewerage treatment at the Bingara Gorge Wastewater and Water Recycling Scheme, Condell Park Road (located beyond the site boundary, to the south west).

The Contaminated Land Record of Notices, published by NSW EPA, contains a database of:

- Orders made under Part 3 of the *Contaminated Land Management Act 1997* (CLM Act);
- Approved voluntary management proposals under the CLM Act that have not been fully carried out and where the approval of the NSW EPA has not been revoked;
- Site audit statements provided to the NSW EPA under section 53B of the CLM Act that relate to significantly contaminated land;
- Where practicable, copies of anything formerly required to be part of the public record; and
- Actions taken by EPA under section 35 or 36 of the *Environmentally Hazardous Chemicals Act 1985* (EHC Act).

A search of the record on 5 June 2015 revealed no listings sites within Wilton.

The NSW EPA provides a 'List of NSW contaminated sites notified to the EPA' for sites that have been notified to the NSW EPA about contamination under Section 60 of the *Contaminated Land Management Act 1997*. It should be noted that not all contaminated sites in NSW are listed. A search on 5 June 2015 revealed no listed contaminated sites in Wilton.

6. Discussion

6.1 Site History Summary

According to information sourced from JET (1999), during World War II, the Wilton area was used during World War II as a RAAF High Explosive bombing and gunnery range. The earliest available aerial photograph images, from 1956 and 1966, do not provide any evidence (e.g. bunkers) to suggest that the site was used for this purpose; however, a wartime aerial photograph was not available.

The future development areas and surrounding areas appears to have been bushland and then only used for grazing up until recently when the site and surrounding areas has been subject to changes as a result of developments for Bingara Gorge Estate. Aerial photographs indicate that, prior to 2005, only one cottage was present within the site boundary. Sheds (and possibly other small structures) surrounded the property and were probably used to store farming equipment. Fuel (diesel) was likely stored somewhere close to the sheds, as old, disused tanks were observed near the uninhabited cottage during the site walkover. The exact location of where fuel was kept whilst the cottage was occupied is unknown. Aerial photographs indicate that the site was not used for market gardens or orchards.

Numerous farm dams have been constructed at the site. A dam may have been filled at the eastern development area between 1988 and 1994, although this was difficult to determine from the aerial photographs.

6.2 Potential for Contamination and Potential Receptors

Based on the site history information and the site walkover, potential sources of contamination are considered to be limited to the following:

- Fly tipping or imported contaminated filling. There is little evidence of fly tipping and contaminating materials (such as ash, slag, or fibre-cement) on the surface of stockpiles, filling mounds or exposed soil. Test pit logs from the pavement investigation in 2013 (see Section 4.4) indicated that filling at Fairways East Stage 1J and Fairways Est Stage 1M(b) comprises materials of natural origin (soil and rock) and that the filling at Fairways East Stage 1M(b) was noted to be well compacted which confirms that the filling was placed in a controlled manner. It is therefore, considered that the potential for contamination associated with fly tipping or imported contaminated filling is low (but cannot be discounted);
- Spills or leaks from previous fuel and oil storage near the cottage. It is likely that diesel as well as lubricating oil was previously stored near the cottage for tractors or machinery. Leaks or spills of these fluids can contaminate soil and groundwater. Evidence of existing underground storage tanks was not observed during the site walkover. The potential for contamination from previous fuel and oil storage near the cottage is considered to be low to moderate;
- Hazardous building materials from the cottage or surrounding structures. Hazardous building materials (such as lead based paints, asbestos containing materials and polychlorinated biphenyls (PCB) in electrical fixtures) may have been used at some stage at the cottage and surrounding sheds which have the potential to impact surface soil as a result of demolition or deterioration. Soils surrounding galvanised sheds may have elevated levels of zinc caused by zinc leaching from the sheds. It is noted that asbestos containing materials were not observed

around the cottage and the potential for contamination associated with building materials is considered to be low to moderate;

- Possible RAAF use. It is unclear if the site was used by the RAAF as part of a bombing and gunnery range at the Wilton area during World War II. A review of aerial photographs as well as the site walkover did not reveal evidence to suggest that the site was used by RAAF. The potential for contamination and / or unexploded ordnance associated with possible RAAF use of the site is considered to be low to moderate; and
- Contractors' fuel storage. Contractors associated with the current developments at Bingara Gorge Estate (including the golf course) are currently storing fuel at the site for machinery and vehicles. Leaks or spills of fuels can contaminate soil and groundwater, however, these should be avoided through diligent practices (such as constructing a bund around the fuel tank) and therefore the potential for contamination associated with current fuel storage is considered to be low.

Potential receptors to potential contamination from the above sources include:

- Future site users (primarily residential occupants);
- Adjacent site uses (primarily the golf course users and neighbouring residential occupants);
- Construction workers (for the proposed developments);
- Surface water bodies and groundwater;
- Ecological receptors; and
- Future property (in ground structures).

6.3 Recommendations

From a review of site history information and observations made during the site walkover, it is considered that there is generally a low potential for contamination which is consistent with the conclusions of the JET report (see Section 5.1). However, there may be localised impacted areas. The approach recommended by JET that *if previously undetected contaminated material is encountered during construction, such as zones of filling or waste dumping, all work on site will cease until further investigations are undertaken*, is considered appropriate for the development of the site. This approach is otherwise known as an Unexpected Finds Protocol (UFP), whereby if signs of contamination are encountered (in stockpiles, filling or natural soil), an environmental consultant should be engaged to investigate and assess the potential contamination. It is assumed that a UFP (or similar) is in place for the case that unexploded ordnance is encountered during site development.

In addition to the UFP, some soil sampling should be undertaken from around the cottage and nearby shed and remnants of previous structures at the western Future Development Area to confirm (or otherwise) that the soil has not been impacted by possible spills or leaks of oil or fuel or by hazardous building materials. Soil should be tested for contaminants associated with fuel or oil storage (petroleum hydrocarbons, metals and polycyclic aromatic hydrocarbons) as well as asbestos, PCB, lead and zinc. It is noted that this part of the site, where sampling is recommended, is not within areas that are proposed to have significant vegetation removal.

It is recommended that stockpiles observed to contain substantial general waste materials mixed in with soil (such as those shown in Photographs 3, 4 and 8, Appendix B) should be designated for off-site disposal or otherwise tested and assessed by an environmental consultant if the stockpiles are to be reused at the site. Soils designated for off-site disposal need to be classified in accordance with NSW EPA, *Waste Classification Guidelines*, November 2014.

It is recommended that parts of the site used for the storage of contractor's equipment or fuel, as a minimum, be inspected for signs of contamination once the area is no longer used for that purpose. Further assessment (or remediation) will be required if signs of contamination, such as staining of the soil surface, are observed during the inspection.

Apart from inspections and sampling at localised areas described above, it is considered that a detailed investigation (as outlined in Department of Urban Affairs and Planning & Environment Protection Authority, 1998) are not warranted based on the findings of this PSI.

7. Conclusion

Based on a review of site history information and a site walkover, the potential for site contamination is considered to be low. However, some soil sampling should be undertaken around the cottage and shed at the western Future Development Area to confirm (or otherwise) that contamination has not occurred from previous fuel storage or hazardous building materials.

An UFP should be implemented if signs of contamination or unexploded ordnance are encountered during site development.

Stockpiles observed to contain substantial general waste materials mixed in with soil should be designated for off-site disposal or otherwise assessed by an environmental consultant if the stockpiles are to be reused at the site.

It is recommended that parts of the site used for the storage of contractor's equipment or fuel, as a minimum, be inspected for signs of contamination once the area is no longer used for that purpose.

Subject to the recommendations made in this report, it is considered that the site can be made suitable for the proposed development.

8. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for specific development and future development areas Bingara Gorge Estate, Wilton, in accordance with instructions received from Ms Helena O'Rourke of Cardno (NSW/ACT) Pty Ltd (Cardno), on behalf of Lend Lease Communities (Wilton) Pty Ltd (LLC Wilton) and further instructions received from Mr Robert Bennett of LLC Wilton. The work was carried in accordance with the professional services agreement for the project. This report is provided for the exclusive use of Cardno and LLC Wilton for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or by a

third party. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific locations accessible during inspection. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field inspection/testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the locations accessible during the site inspection. The advice may also be limited by site accessibility.

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

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

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the (environmental / groundwater) components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

Asbestos has not been detected by observation, either on the surface of the site, or in filling materials at the locations inspected.

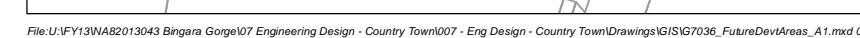
Although the results of this investigation are considered appropriate to achieve the stated project objectives, there are necessarily parts of the site that have not been inspected. This is either due to undetected variations in ground conditions or to budget constraints (as discussed above), or to parts of the site being inaccessible and not available for inspection, or to vegetation preventing visual inspection and reasonable access. It is therefore considered possible that hazardous building materials, including asbestos, may be present in unobserved parts of the site, between and beyond inspected locations, and hence no warranty can be given that asbestos is not present.

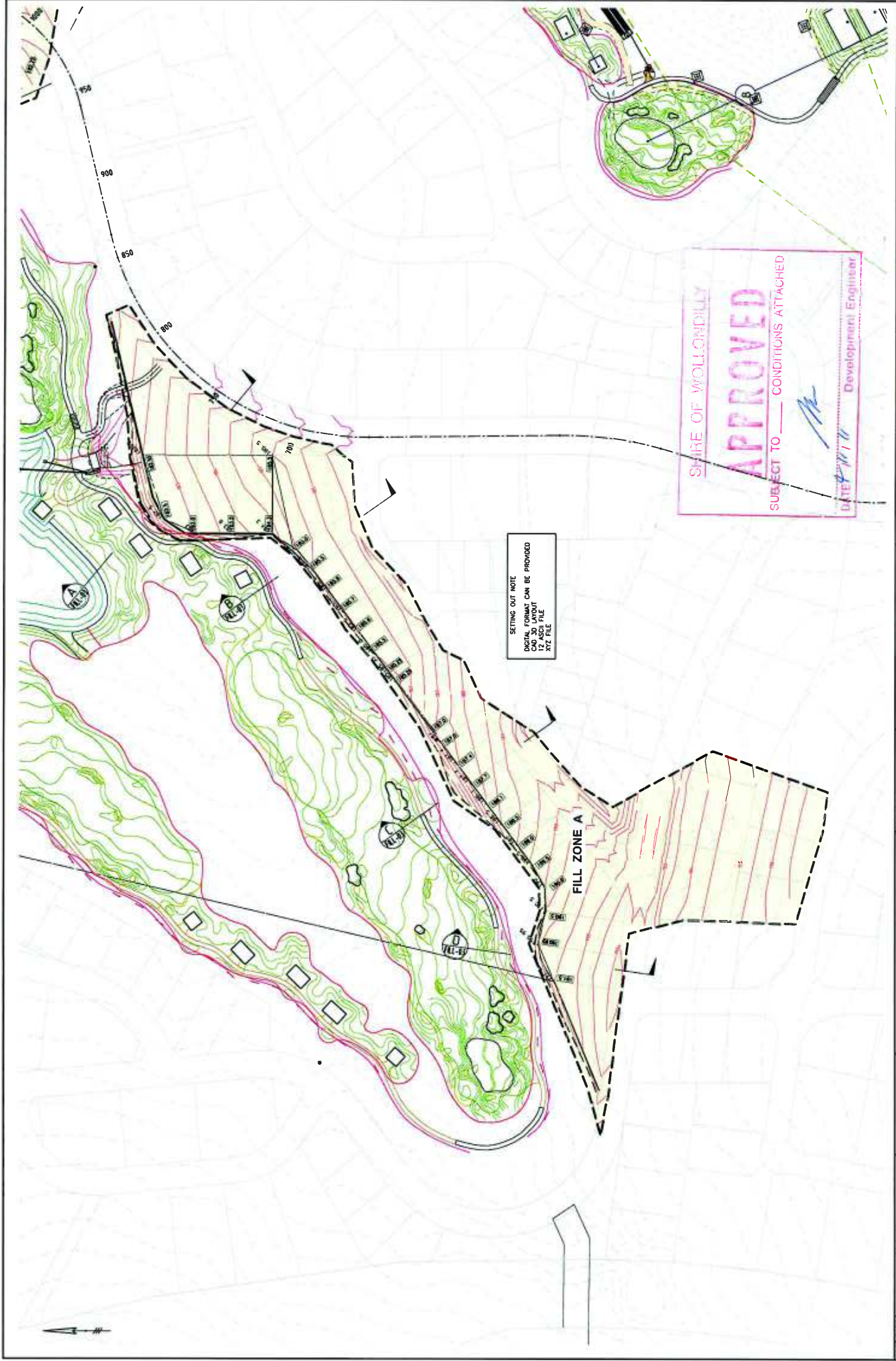
Douglas Partners Pty Ltd

Appendix A

Drawings

Notes About this Report





AMDT	DATE	DESCRIPTION
A	03/11	PRIVATE ROAD LAYOUT



DRAWING TITLE
LAKE A FILL SITE
LAYOUT PLAN - SHEET 1 of 2

DESIGNED	DRAWN
CHECKED	
APPROVED	

vkl consulting
 INFRASTRUCTURE ENGINEERING
 250/5514 030 50

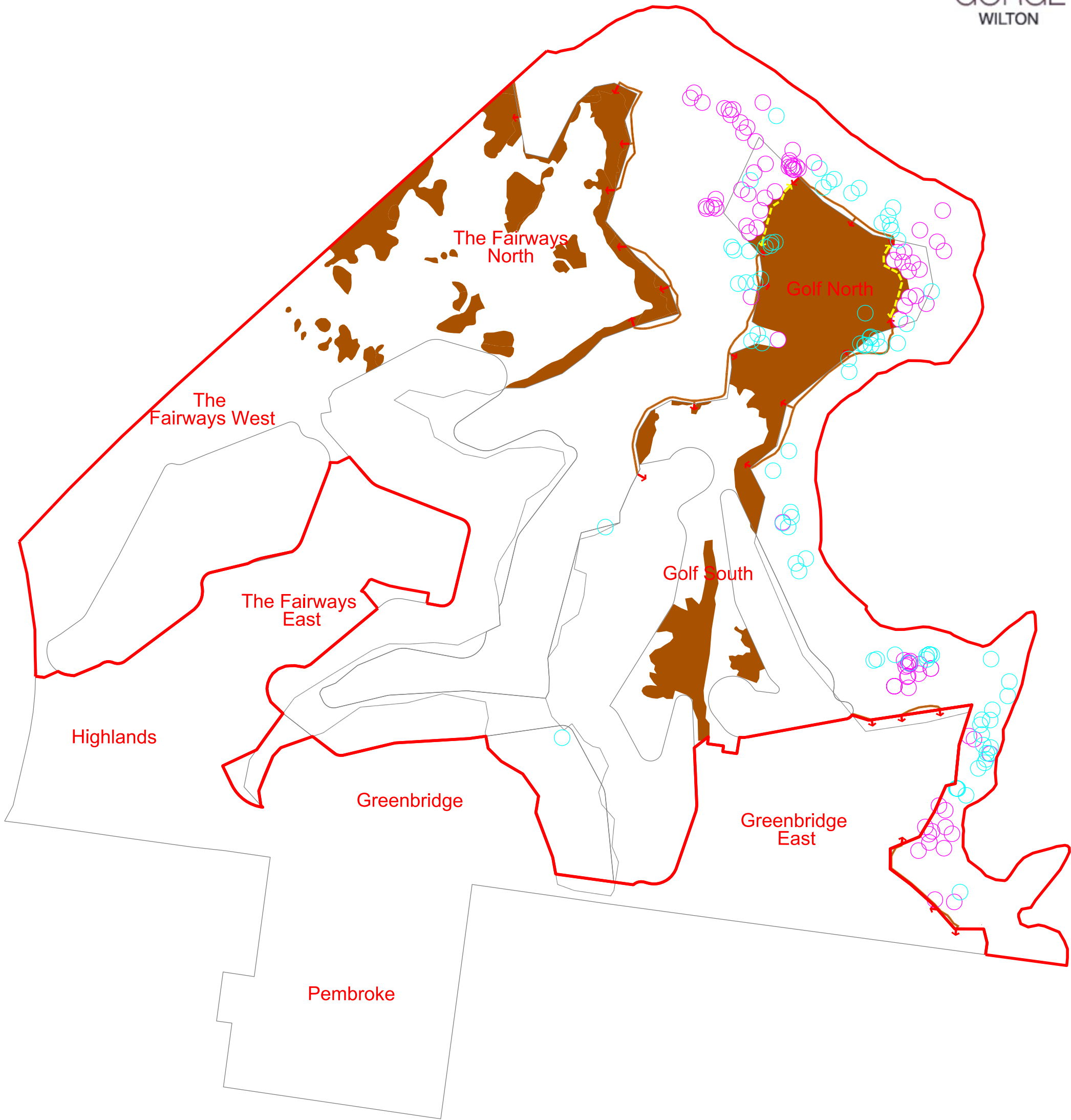
P.O. BOX 282
 ARMORE CITY
 QLD 4271 5510 0200
 FAX: (07) 5510 0280
 EMAIL: mail@vkl.com.au

Delfin
 Land Lease

Bingara GORGE
 WILTON

GOLF COURSE

DRAWING No.
5504 - 08 - 67A










NOTES

Issue	Amendment	Date
A	updated information / data from Ecological Australia	24.02.16
B	updated information and data	02.03.16

Approved and Checked		Date
Regional Development Manager		
Development Manager		
MARKETING		
DESIGN	CB	24.02.16

LEGEND

	1800 DA Boundary		Pedestrian / Cycle / Fire trails
	Project Boundary		Easements
	Vegetation Removal (works)		Flora (Federal)
			Flora (State)

Bingara Gorge 1800 DA
Vegetation Removal

Not to Scale

NOTE: This plan is indicative only, and specific uses, road alignment, boundaries, setbacks, and building layout shown may vary due to detailed design consideration. c 2015 Lend Lease Communities (Australia). All rights reserved. Except as permitted by Lend Lease, no part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the permission of Lend Lease.

G:\Projects\BGIE Bingara Gorge\U URBAN DESIGN\CAD\OVERALL\survey in\ecological\24022016 1800 LEC Dgn No. BG 1800 DA VEG removal

Developer

North



Date : 02 MARCH 2016

About this Report

Douglas Partners



Introduction

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

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

Copyright

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

Borehole and Test Pit Logs

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

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

Groundwater

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

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

- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Appendix B

Site Photographs



Photograph 1 - Elongated fill mound



Photograph 2 - Stockpile



Site Photographs from

Site Walkover for PSI

Bingara Gorge Estate, Wilton

CLIENT: Lend Lease Communities (Wilton) Pty Ltd

PROJECT: 43677.40

PLATE No: B1

REV: A

DATE: 9-Jan-15



Photograph 3 - Small soil stockpile with bricks and plastic



Photograph 4 - Small soil stockpile with concrete and bricks



Site Photographs from

Site Walkover for PSI

Bingara Gorge Estate, Wilton

CLIENT: Lend Lease Communities (Wilton) Pty
Ltd

PROJECT: 43677.40

PLATE No: B2

REV: A

DATE: 9-Jan-15



Photograph 5 - Small stockpile



Photograph 6 - Soil mound (filling)



Site Photographs from

Site Walkover for PSI

Bingara Gorge Estate, Wilton

CLIENT: Lend Lease Communities (Wilton) Pty
Ltd

PROJECT: 43677.40

PLATE No: B3

REV: A

DATE: 9-Jan-15



Photograph 7 - Stockpiles next to roadway



Photograph 8 - Asphalt in stockpiled soil



Site Photographs from

Site Walkover for PSI

Bingara Gorge Estate, Wilton

CLIENT: Lend Lease Communities (Wilton) Pty
Ltd

PROJECT: 43677.40

PLATE No: B4

REV: A

DATE: 9-Jan-15



Photograph 9 - Level area within southern part of Fairways East Stage 1M (b)



Photograph 10 - Southern part of Fairways East Stage 1M (b)



**Site Photographs from
Site Walkover for PSI
Bingara Gorge Estate, Wilton**

CLIENT: Lend Lease Communities (Wilton) Pty
Ltd

PROJECT: 43677.40

PLATE No: B5

REV: A

DATE: 9-Jan-15



Photograph 11 - Large soil and rock stockpile at north of Fairways East Stage 1M (b)



Photograph 12 - Sandstone boulders stockpile. Stockpile of trees behind sandstone boulders



**Site Photographs from
Site Walkover for PSI
Bingara Gorge Estate, Wilton**

CLIENT: Lend Lease Communities (Wilton) Pty
Ltd

PROJECT: 43677.40

PLATE No: B6

REV: A

DATE: 9-Jan-15



Photograph 13 - Large soil and rock stockpiles at north of Fairways East Stage 1M (b)



Photograph 14 - Contractor compound



Site Photographs from

Site Walkover for PSI

Bingara Gorge Estate, Wilton

CLIENT: Lend Lease Communities (Wilton) Pty
Ltd

PROJECT: 43677.40

PLATE No: B7

REV: A

DATE: 9-Jan-15



Photograph 15 - Area subject to placement of soil from other development areas



Photograph 16 - Derelict tank on ground



Site Photographs from

Site Walkover for PSI

Bingara Gorge Estate, Wilton

CLIENT: Lend Lease Communities (Wilton) Pty
Ltd

PROJECT: 43677.40

PLATE No: B8

REV: A

DATE: 9-Jan-15



Photograph 17 - Shed with old farming equipment



Photograph 18 - Aboveground tank (shed in background)



Site Photographs from
Site Walkover for PSI
Bingara Gorge Estate, Wilton

CLIENT: Lend Lease Communities (Wilton) Pty
 Ltd

PROJECT: 43677.40

PLATE No: B9

REV: A

DATE: 9-Jan-15



Photograph 19 - Remnants of unknown structure



Photograph 20 - Remnants of unknown structure



Site Photographs from

Site Walkover for PSI

Bingara Gorge Estate, Wilton

CLIENT: Lend Lease Communities (Wilton) Pty
Ltd

PROJECT: 43677.40

PLATE No: B10

REV: A

DATE: 9-Jan-15



Photograph 21 - Remnants of unknown structure



Photograph 22 - Dam to the north-west of the cottage



Site Photographs from
Site Walkover for PSI
Bingara Gorge Estate, Wilton

CLIENT: Lend Lease Communities (Wilton) Pty
Ltd

PROJECT: 43677.40

PLATE No: B11

REV: A

DATE: 9-Jan-15



Photograph 23 - Dam to the north of the cottage



Photograph 24 - Filled area to create a dam wall with stockpiles on ground surface



Site Photographs from

Site Walkover for PSI

Bingara Gorge Estate, Wilton

CLIENT: Lend Lease Communities (Wilton) Pty
Ltd

PROJECT: 43677.40

PLATE No: B12

REV: A

DATE: 9-Jan-15



Photograph 25 - Disturbed land and pooled water



Photograph 26 - Stockpiles at edge of disturbed area



Site Photographs from
Site Walkover for PSI
Bingara Gorge Estate, Wilton

CLIENT: Lend Lease Communities (Wilton) Pty
Ltd

PROJECT: 43677.40

PLATE No: B13

REV: A

DATE: 9-Jan-15



Photograph 27 - Small dam



Photograph 28 - Dam at North of Western Future Development Area



Site Photographs from
Site Walkover for PSI
Bingara Gorge Estate, Wilton

CLIENT: Lend Lease Communities (Wilton) Pty Ltd

PROJECT: 43677.40

PLATE No: B14

REV: A

DATE: 9-Jan-15



Photograph 29 - Mound of soil and rock



Photograph 30 - Mound of soil and rock



Site Photographs from

Site Walkover for PSI

Bingara Gorge Estate, Wilton

CLIENT: Lend Lease Communities (Wilton) Pty
Ltd

PROJECT: 43677.40

PLATE No: B15

REV: A

DATE: 9-Jan-15



Photograph 31 - Contractor storage area



Photograph 32 - Aboveground tank



**Site Photographs from
Site Walkover for PSI
Bingara Gorge Estate, Wilton**

CLIENT: Lend Lease Communities (Wilton) Pty Ltd

PROJECT: 43677.40

PLATE No: B16

REV: A

DATE: 9-Jan-15



Photograph 33 - Sand stockpiles at contractor storage area



Photograph 34 - Standpipe (bore)



**Site Photographs from
Site Walkover for PSI
Bingara Gorge Estate, Wilton**

CLIENT: Lend Lease Communities (Wilton) Pty
Ltd

PROJECT: 43677.40

PLATE No: B17

REV: A

DATE: 9-Jan-15



Photograph 35 - Typical bushland at proposed trail



Photograph 36 - Rock outcrops at proposed trail



Site Photographs from

Site Walkover for PSI

Bingara Gorge Estate, Wilton

CLIENT: Lend Lease Communities (Wilton) Pty
Ltd

PROJECT: 43677.40

PLATE No: B18

REV: A

DATE: 29-Feb-16



Photograph 37 - North-east corner of Fairways Stage 1J



Photograph 38 - Southern part of Fairways East Stage 1M (b)



**Site Photographs from
Site Walkover for PSI
Bingara Gorge Estate, Wilton**

CLIENT: Lend Lease Communities (Wilton) Pty Ltd

PROJECT: 43677.40

PLATE No: B19

REV: A

DATE: 29-Feb-16



Photograph 39 - Stockpile at Fairways East Stage 1M (b)



Photograph 40 - Gressed area at Fairways East Stage 1M (b)



**Site Photographs from
Site Walkover for PSI
Bingara Gorge Estate, Wilton**

CLIENT: Lend Lease Communities (Wilton) Pty Ltd

PROJECT: 43677.40

PLATE No: B20

REV: A

DATE: 29-Feb-16



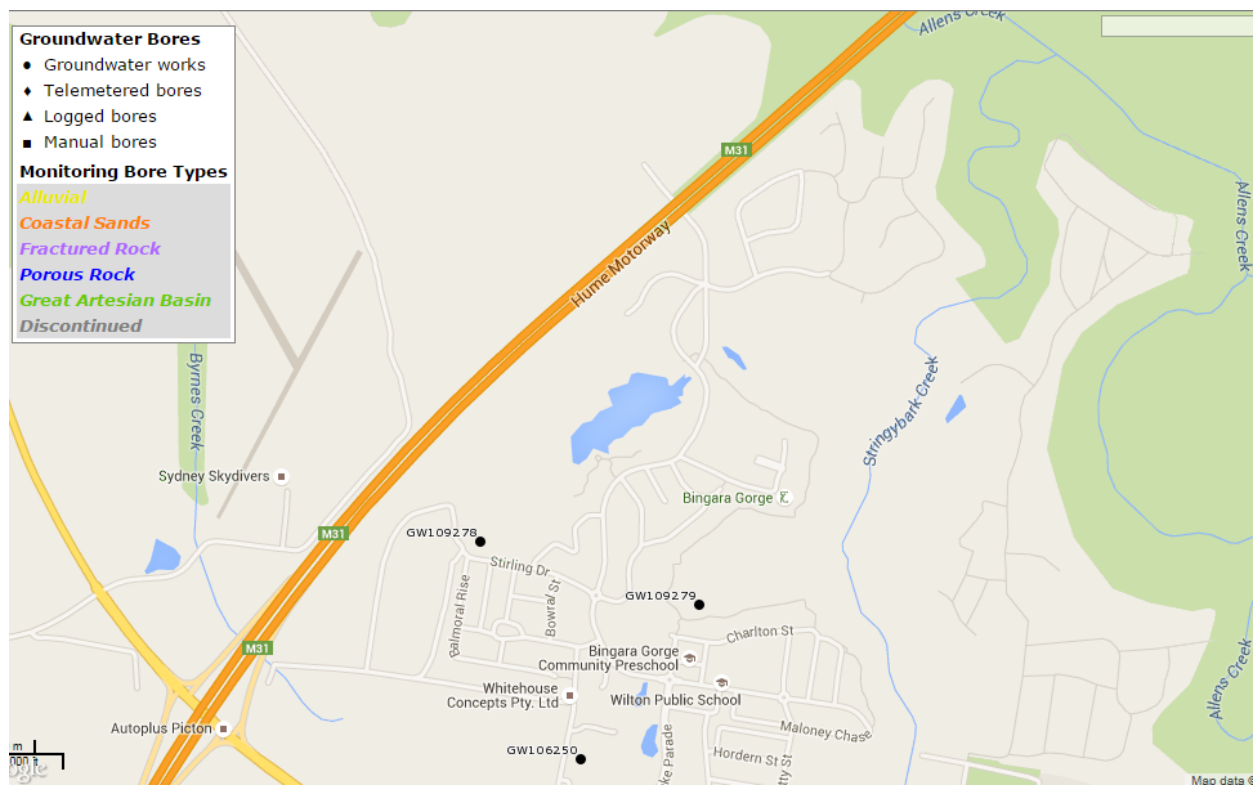
Photograph 41 - Stockpiles at contractor storage area, western Future Development Area

	Site Photographs from	PROJECT: 43677.40
	Site Walkover for PSI	PLATE No: B21
	Bingara Gorge Estate, Wilton	REV: A
	CLIENT: Lend Lease Communities (Wilton) Pty Ltd	DATE: 29-Feb-16

Appendix C

Results of
Registered Groundwater Bore Search

Results of Groundwater Bore Search



Source: <http://allwaterdata.water.nsw.gov.au/water.stm>

NSW Office of Water

Work Summary

GW106250

Licence: 10BL163301

Licence Status: CONVERTED

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

Work Type: Bore
Work Status: Supply Obtained
Construct.Method: Down Hole Hammer
Owner Type: Private

Commenced Date:
Completion Date: 24/05/2004

Final Depth: 151.00 m
Drilled Depth: 151.00 m

Contractor Name: HIGHLAND DRILLING PTY
LTD
Driller: Brett Delamont
Assistant Driller:

Property: SWANSTON 60 CONDELL
PARK RD WILTON 2571
GWMA: -
GW Zone: -

Standing Water 62.000
Level:
Salinity:
Yield: 0.625

Site Details

Site Chosen By:

County	Parish	Cadastre
Form A: CAMDE	CAMDE.49	4//836296
Licensed: CAMDEN	WILTON	Whole Lot 4//836296

Region: 10 - Sydney South Coast
River Basin: 212 - HAWKESBURY RIVER
Area/District:

CMA Map: 9029-4S
Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation (Unknown)
Source:

Northing: 6209811.0
Easting: 286336.0

Latitude: 34°13'51.1"S
Longitude: 150°40'48.9"E

GS Map: -

MGA Zone: 0

Coordinate GIS - Geographic
Source: Information System

Construction

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

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	42.00	200			Down Hole Hammer
1		Hole	Hole	42.00	151.00	165			Down Hole Hammer
1	1	Casing	Pvc Class 9	0.00	42.00	160	146		Driven into Hole, Screwed and Glued

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
84.00	85.00	1.00	Unknown	62.00		0.37		00:30:00	

102.00	103.00	1.00	Unknown			0.08		00:30:00	
125.00	126.00	1.00	Unknown			0.17		00:30:00	

Geologists Log

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	2.00	2.00	topsoil	Topsoil	
2.00	40.00	38.00	sandstone, fine grained	Sandstone	
40.00	42.00	2.00	shale	Shale	
42.00	118.00	76.00	sandstone, medium grained	Sandstone	
118.00	120.00	2.00	shale	Shale	
120.00	142.00	22.00	sandstone, coarse	Sandstone	
142.00	151.00	9.00	shale	Shale	

Remarks

09/12/2009: updated from original form A

*** End of GW106250 ***

Warning To Clients: This raw data has been supplied to the NSW Office of Water by drillers, licensees and other sources. The NOW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

NSW Office of Water

Work Summary

GW109278

Licence: 10BL164264

Licence Status: LAPSED

Authorised Purpose TEST BORE
(s):

Intended Purpose(s): TEST BORE

Work Type: Bore

Work Status:

Construct.Method: Down Hole Hammer

Owner Type: Private

Commenced Date:

Completion Date: 27/08/2008

Final Depth: 180.00 m

Drilled Depth: 180.00 m

Contractor Name: HIGHLAND DRILLING PTY LTD

Driller: Ian Palk

Assistant Driller:

Property: BRADCORP 80 CONDELL
PARK RD WILTON 2571

Standing Water Level: 48.000

GWMA:

GW Zone:

Salinity:

Yield: 0.170

Site Details

Site Chosen By:

County Parish Cadastre
Form A: CAMDE CAMDE.49 205/1104390
Licensed:

Region: 10 - Sydney South Coast

CMA Map:

River Basin: - Unknown

Grid Zone:

Area/District:

Scale:

Elevation: 0.00 m (A.H.D.)

Northing: 6210468.0

Latitude: 34°13'29.6"S

Elevation Unknown

Easting: 286012.0

Longitude: 150°40'36.8"E

Source:

GS Map: -

MGA Zone: 0

Coordinate Unknown

Source:

Construction

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

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	78.00	200			Down Hole Hammer
1		Hole	Hole	78.00	180.00	160			Down Hole Hammer
1	1	Casing	Steel	0.00	2.00	200			Driven into Hole

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
43.00	44.00	1.00	Unknown	48.00		0.10			
65.00	66.00	1.00	Unknown			0.15			

96.00	97.00	1.00	Unknown			0.19			
127.00	128.00	1.00	Unknown			0.16			
157.00	158.00	1.00	Unknown			0.23			
163.00	164.00	1.00	Unknown			0.17			

Geologists Log

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	6.00	6.00	CLAY	Clay	
6.00	12.00	6.00	GREY SANDSTONE	Greenstone	
12.00	18.00	6.00	ORANGE SANDSTONE	Obsidian	
18.00	24.00	6.00	SANDSTONE WHITE ORANGE	Sandstone	
24.00	48.00	24.00	SANDSTONE WHITE	Sandstone	
48.00	96.00	48.00	SANDSTONE HARD	Sandstone	
96.00	120.00	24.00	GRAVEL, SANDSTONE	Gravel	
120.00	138.00	18.00	SANDSTONE GRAVEL	Sandstone	
138.00	150.00	12.00	SHALE	Shale	
150.00	168.00	18.00	SHALE	Shale	
168.00	180.00	12.00	BASEMENT	Basalt	

Remarks

*** End of GW109278 ***

Warning To Clients: This raw data has been supplied to the NSW Office of Water by drillers, licensees and other sources. The NOW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

NSW Office of Water

Work Summary

GW109279

Licence: 10BL164264

Licence Status: LAPSED

Authorised Purpose TEST BORE
(s):
Intended Purpose(s): TEST BORE

Work Type: Bore
Work Status: Test Hole
Construct.Method: Down Hole Hammer
Owner Type: Private

Commenced Date:
Completion Date: 28/08/2008

Final Depth: 193.00 m
Drilled Depth: 193.00 m

Contractor Name: HIGHLAND DRILLING PTY LTD

Driller: Ian Palk

Assistant Driller:

Property: BRADCORP 80 CONDELL
PARK RD WILTON 2571

Standing Water Level: 44.000

GWMA:
GW Zone:

Salinity:
Yield: 0.280

Site Details

Site Chosen By:

County Parish Cadastre
Form A: CAMDE CAMDE.49 207//1104390
Licensed:

Region: 10 - Sydney South Coast
River Basin: - Unknown
Area/District:

CMA Map:
Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Unknown
Source:

Northing: 6210293.0
Easting: 286688.0

Latitude: 34°13'35.8"S
Longitude: 150°41'03.1"E

GS Map: -

MGA Zone: 0

Coordinate Unknown
Source:

Construction

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

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	78.00	200			Down Hole Hammer
1		Hole	Hole	78.00	193.00	165			Down Hole Hammer
1	1	Casing	Steel	0.00	2.30	200			Driven into Hole

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
47.00	48.00	1.00	Unknown	44.00		0.91			
66.00	67.00	1.00	Unknown			0.20			

133.00	134.00	1.00	Unknown			0.43			
156.00	157.00	1.00	Unknown			0.28			

Geologists Log

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	72.00	72.00	SANDSTONE FINE YELLOW GREY	Sandstone	
72.00	78.00	6.00	SHALE	Shale	
78.00	126.00	48.00	SANDSTONE GREY COARSE	Sandstone	
126.00	132.00	6.00	SHALE	Shale	
132.00	150.00	18.00	SANDSTONE GREY COARSE	Sandstone	
150.00	156.00	6.00	SHALE	Shale	
156.00	163.00	7.00	SANDSTONE FINE GREY	Sandstone	
163.00	184.00	21.00	SILTSTONE	Siltstone	
184.00	193.00	9.00	BALDHILL CLAYSTONE	Claystone	

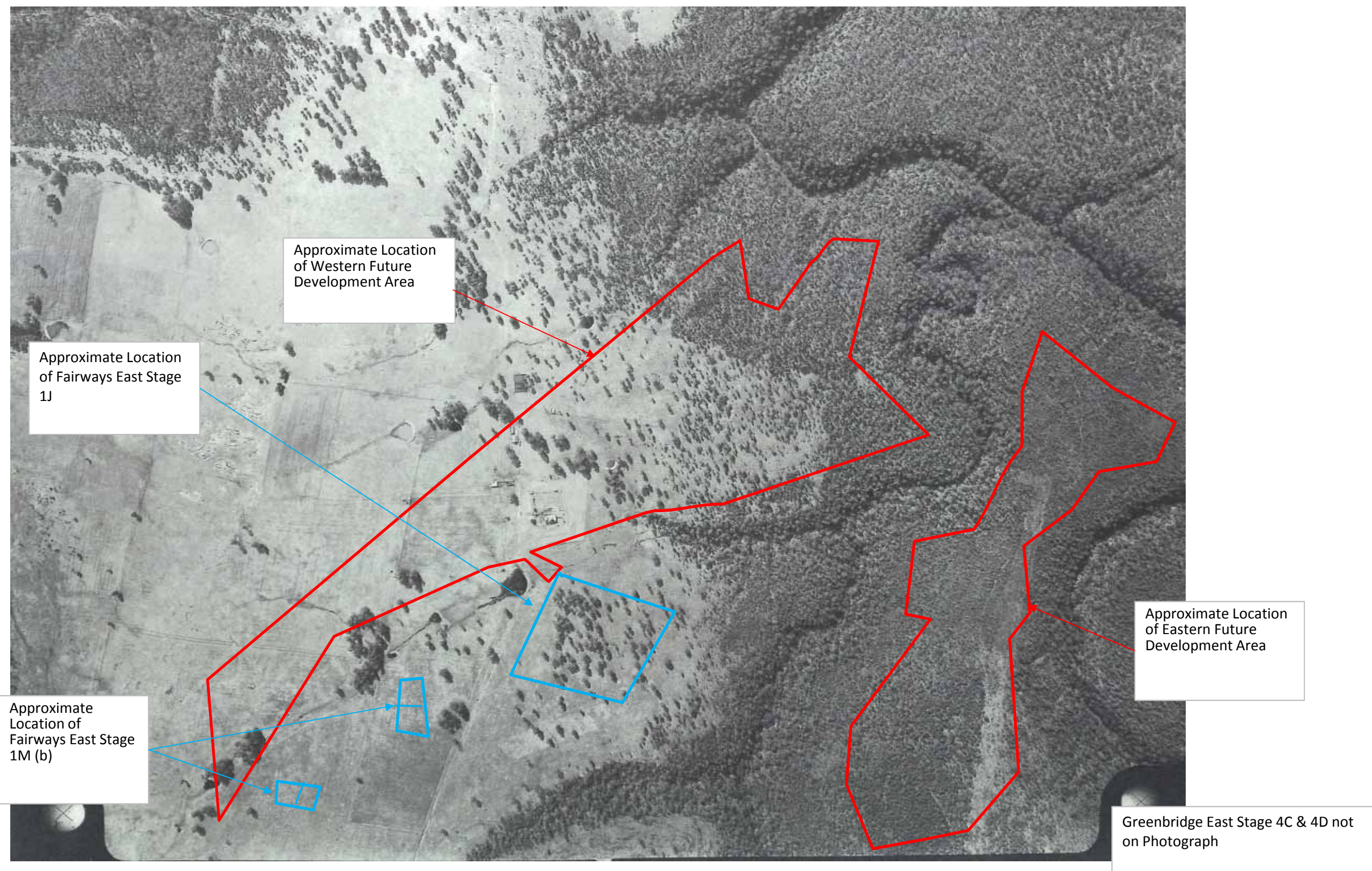
Remarks

*** End of GW109279 ***

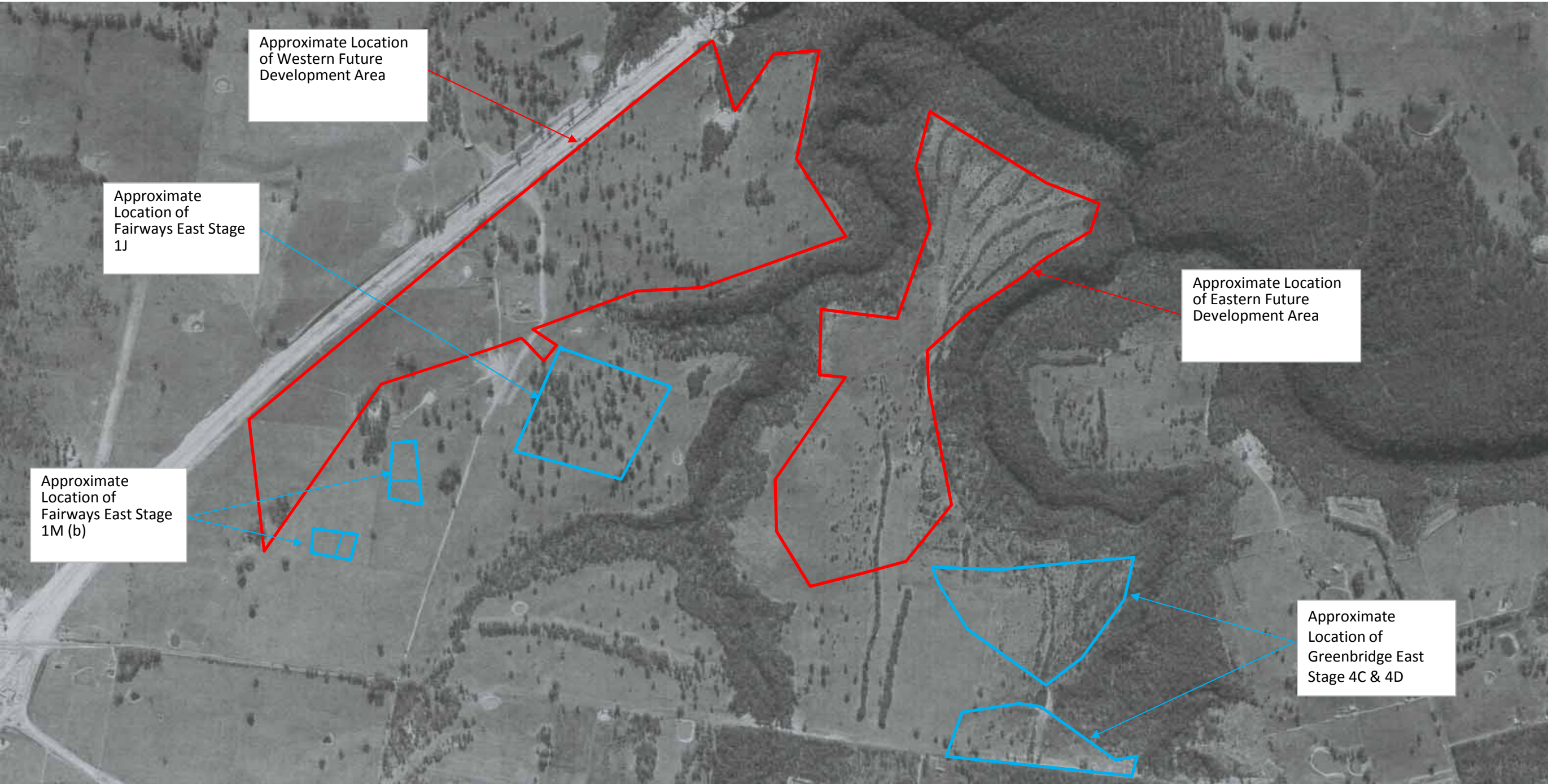
Warning To Clients: This raw data has been supplied to the NSW Office of Water by drillers, licensees and other sources. The NOW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

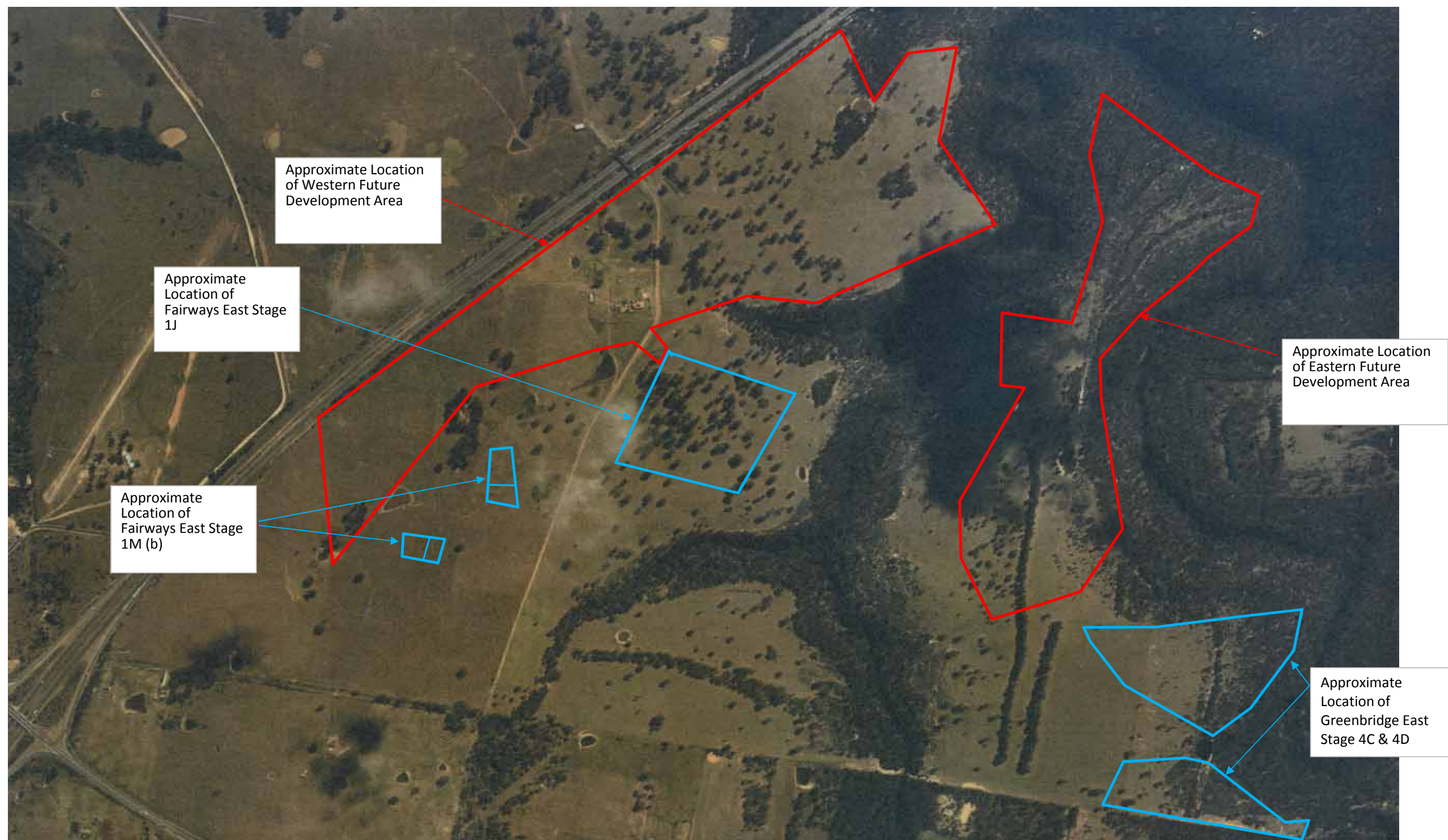
Appendix D

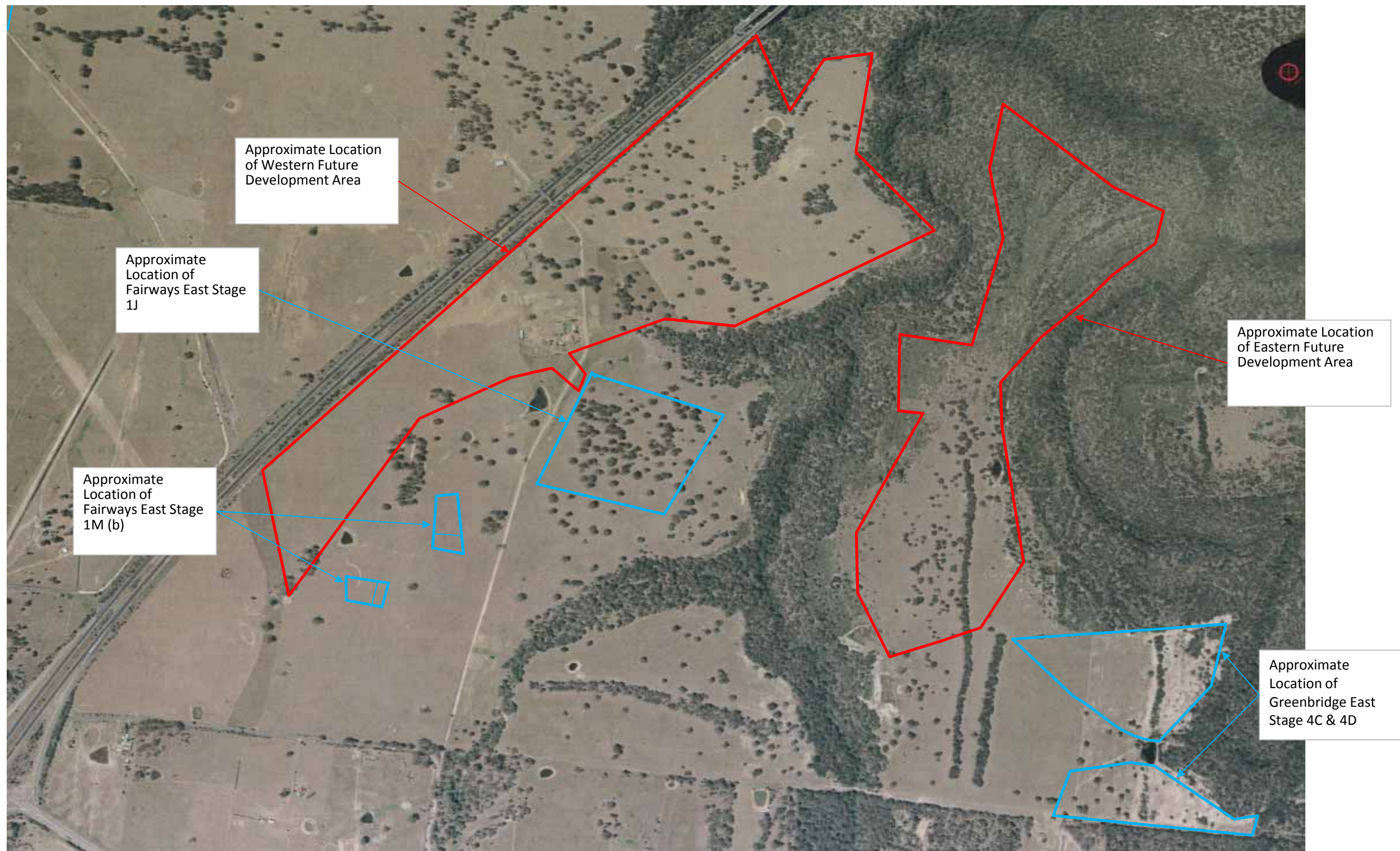
Historical Aerial Photographs

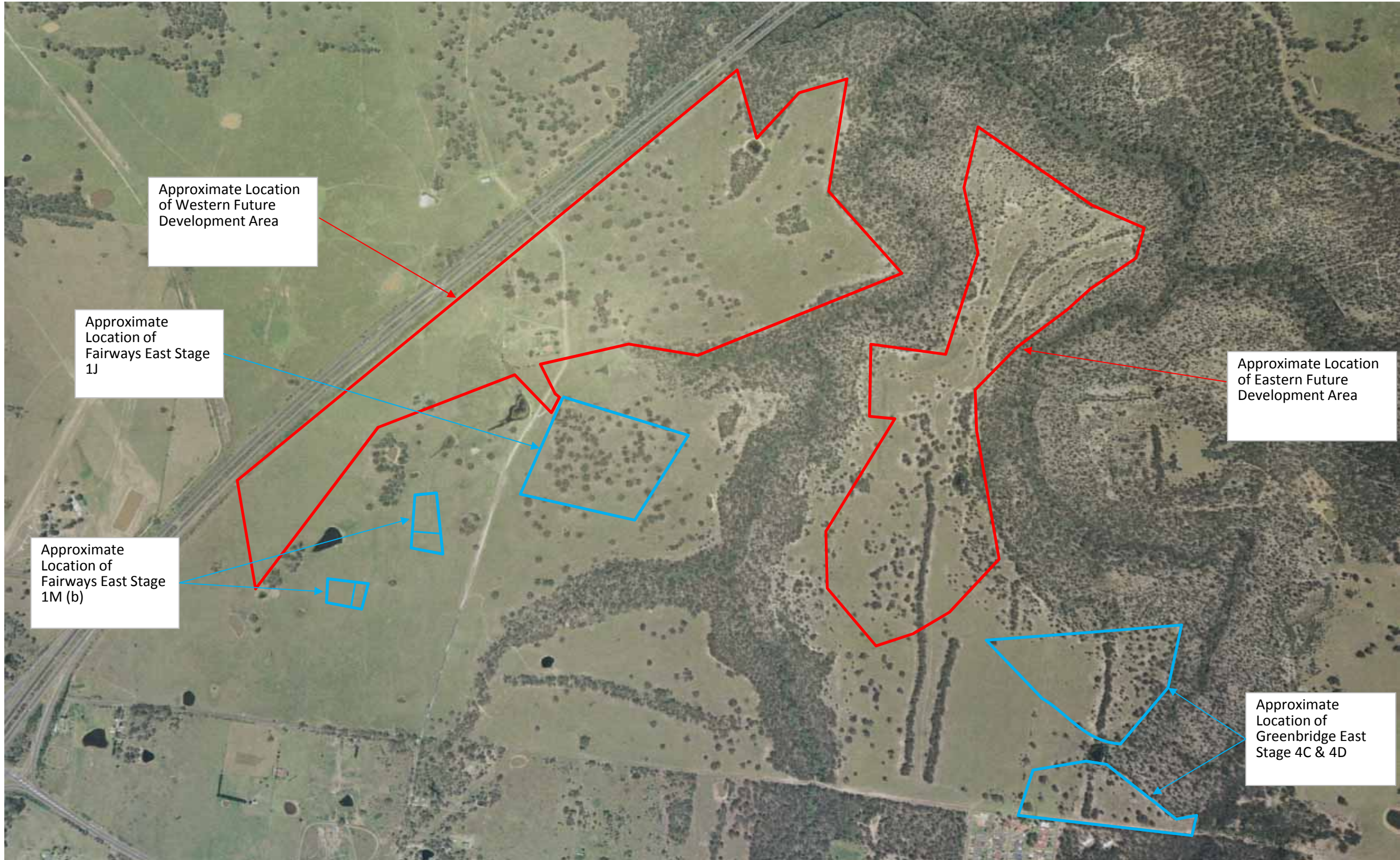












Approximate Location
of Western Future
Development Area

Approximate
Location of
Fairways East Stage
1J

Approximate
Location of
Fairways East Stage
1M (b)

Approximate Location
of Eastern Future
Development Area

Approximate Location
of Greenbridge East
Stage 4C & 4D



CLIENT: Lend Lease Communities (Wilton) Pty Ltd

OFFICE: Sydney

DRAWN BY: DW

SCALE: NA

DATE: 5 Jun 2015

TITLE: **2013 Aerial Photograph**
Preliminary Site Investigation for Contamination
Bingara Gorge Estate, Wilton

PROJECT No: 43677.40

PLATE No: D7

REVISION: A