



Craigieburn West Precinct Structure Plan Preliminary Land Contamination Assessment

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Craigieburn West, Victoria



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EXECUTIVE SUMMARY

Landserv Pty Ltd (Landserv) was engaged by Victoria Planning Authority (VPA) to complete a Preliminary Land Contamination Assessment (Preliminary Assessment), in the form of a Desktop Site History Review and Site Inspection, to assist the development of 42 allotments, collectively known as the Craigieburn West Precinct in Victoria (the Study Area) in accordance with the Craigieburn West Precinct Structure Plan (PSP). The site has an approximate area of 628 hectares and is located approximately 30 km north-west of Melbourne's Central Business District and 4 km west of Craigieburn Central.

The objective of this assessment was to assess the existing environmental conditions of the Study Area and identify any potential soil or groundwater impacts that may affect or restrict potential uses / development(s), via:

- Completing a Desktop Review to determine previous land uses and implications for environmental contamination, hydrology and geology;
- Undertake a site inspection of the Study Area, examining properties from existing roadways and publicly accessible areas; and
- Prepare a detailed report for review and comment by VPA, outlining the findings and recommendations from the desktop review and site visit.

Based on the information collected during the Assessment, allotments within the Study Area have a long history of agricultural land uses including stock grazing.

It is understood that the site is to be developed for low- and high-density residential dwellings with open parks and recreational areas and schools.

The Preliminary Land Contamination Assessment identified the following key findings and risks. It should be noted that these are potential risks only. Further investigation would be required to confirm their presence or absence:

- Pesticides and fertilisers may have impacted the land during historical agricultural use;
- Minor spills associated with farm machinery and mobile plant historical agricultural use;
- Impacted fill material may exist, associated with the management of vehicle and stock access tracks, infilling of depressions or for construction/amenity, the construction of dams and/or the management of erosion;
- Stock dips are likely to have been installed within the Study Area, although none have been identified to date during the historical aerial review or kerbside inspections;
- Storage of (and incidental disposal of) waste material;
- Hazardous substance storage and handled (or mishandled) chemicals within a small disused CFA facility is located immediately to the west of the Study Area;
- Hazardous building materials associated within buildings and structures, including as a results of disposal or clean-up of a fire that occurred in 2014; and
- The potential use of AFFF in response to fire within or near the Study Area, including the 2014 fire.

It is considered that there is a 'moderate' risk of the majority of the Study Area being impacted by incidental activities such as importation of fill material, use of pesticides and storage (and incidental disposal) of waste. There is also a low to moderate risk of

localised impacts via highly contaminating activities, such as operation of stock dips, disposal of hazardous materials and use of fire suppressants demonstrably impacting the Study Area for the intended use of the development.

It is noted that it is likely that these impacts could be addressed by either site-specific contamination assessments (site specific PSI) and/or soil (and possibly groundwater) sampling with minor remediation and validation works to remove impacts.

No known specific potential impacts to groundwater and/or soil vapour have been identified in this assessment. Although, further risk-based investigations by a suitable environmental professional, should be completed in accordance with the NEPM for each allotment within the Study Area.

No putrescible landfills or other features requiring planning buffers for contamination reasons were identified by this Preliminary Assessment.

In accordance with the Department of Sustainability and Environment (DSE) General Practice Note (2005):

- A site assessment from a suitably qualified environmental professional should be carried out for each development within the Study Area (see recommendations below);
- Pending the outcomes of the site assessments, the Study Area is considered suitable for proposed uses, which include residential use and public open space; and
- Pending the outcomes of the site assessments, the Preliminary Land Contamination Assessment indicates that an Environmental Audit is not required.

Based on the findings of this assessment an Environmental Audit has not been recommended within the Study Area. However, the contamination status of the Study Area is considered to range from low - moderate to moderate depending on the allotment of land.

Based on the findings of this assessment an Environmental Audit has not been recommended within the Study Area. However, the contamination status of the Study Area is considered to range from low - moderate to moderate depending on the allotment of land.

In order to address the requirements within the NEPM and DSE 2005, each development within the Study Area should be further assessed as follows:

1. A site-specific Preliminary Site Investigation (PSI), to be carried out by a suitably qualified environmental professional for each proposed development area (e.g. each subdivision application area) within the Precinct. The PSI should consider the findings of this Preliminary Assessment and include as a minimum:
 - An updated Site Inspection across the site (not just kerbside);
 - Sufficient soil sampling to confirm the environmental condition of potential Areas of Environmental Concern within each development area
 - Sufficient soil sampling and analysis to confirming whether Contaminants of Potential Concern are present and if so, what the implications are for the proposed land use;
 - Confirmation of the requirement (or otherwise) for a Detailed Site Investigation (DSI); and / or
 - Confirmation of the requirement (or otherwise) for an Environmental Audit.

The following additional work will be required if the PSI identifies contamination, or if uncertainty remains as to the environmental condition of each area investigated. The DSE Practice Note provides for the suitably qualified environmental professional to advise on whether an audit is appropriate, using the Practice Note as a guide. Therefore, depending on the nature, extent and severity of contamination, these works may or may not need to be performed within the framework of an Environmental Audit:

2. A Detailed Site Investigation (DSI) may be required to understand the likelihood, nature and extent of potential impacts which may preclude the intend use of the site¹. If a DSI is required it should be carried out in accordance with the NEPM and applicable EPA guidelines, although variations to the NEPM scope may be approved within an Environmental Audit framework.
3. In the event that significant potential impacts to soil vapour and/or groundwater are identified, all further works and remediation activities (if required) should be completed in accordance with NEPM and applicable EPA guidelines.
4. All demolition works and handling of hazardous building materials should be completed in accordance with relevant Worksafe Victoria and applicable EPA Guidelines.
5. All developments should include a provision for “unexpected finds” of potential contamination within the Construction and Environmental Management Plans during the re-development, including engaging a suitably qualified environmental professional (in the event of potential contamination being encountered)¹; and
6. All wastes, including impacted soils being taken off-site should be transported in suitably licenced trucks and disposed of two suitably licensed facilities in accordance with EPA Industrial Waste Resource Guidelines.

1.

The information obtained within this Preliminary Land Contamination Assessment was based on the scope of works commissioned (summarised in **Section 1.3** below) and is subject to the limitations outlined in **Section 6**.

¹ Circumstances requiring a DSI (such as substantial contamination) would normally also require an Environmental Audit under the intent of the DSE Practice Note.

1 BACKGROUND INFORMATION

1.1 Introduction

Landserv Pty Ltd (Landserv) was engaged by Victoria Planning Authority (VPA) to complete a Preliminary Land Contamination Assessment, in the form of a Desktop Site History Review and Site Inspection, to assist the development for the Proposed Craigieburn West Precinct in Victoria (the Study Area) in accordance with the Precinct Structure Plan² (PSP).

It is understood the Study Area has an approximate area of 628 hectares and is located approximately 30 km north-west of Melbourne's Central Business District, 4 km west of Craigieburn Central. Given the nature, location, size and layout of the Study Area, the potential (and ongoing) uses/developments within the study area will likely include a mixture of low- and high-density residential uses with schools and commercial / industrial uses and associated public open spaces.

1.2 Objectives and Summarised Scope of Work

The objective of this project has been to assess the existing environmental conditions of the study area and identify any soil or groundwater contamination that may affect or restrict potential uses / development(s). Scope of Works

To achieve the project objective, this work broadly consisted of the following three tasks:

1. Completing a Desktop Review to determine previous land uses and implications for environmental contamination, hydrology and geology;
2. Undertake a site inspection of the Study Area, examining properties from existing roadways and publicly accessible areas; and
3. Prepare a detailed report for VPA, outlining the findings and recommendations from the desktop review and site visit.

The scope of work for this Preliminary Land Contamination Assessment included:

- A Desktop Study investigating the potential contaminating activities of the study area and surrounding areas, by reviewing:
 - Historical aerial photographs in order to identify potentially impacting historical and current land uses such as areas of imported fill, stock yard and stock dips;
 - Environmental Protection Authority Victoria (EPA online resources including the priority sites register, previous certificates and statements of environmental audit, clean up notices and pollution abatement notices;
 - Additional previous or current (draft) reports and/or studies regarding environment, geological and/or groundwater conditions;
 - Australian Government Department of Environment and Energy's Australian Heritage Databases;
 - Historical title searches for the 42 properties identified within the study area to identify previous owners and an understanding of current and historical land uses that may be of concern;

² Growth Areas Authority (2010), *Craigieburn R2 Precinct Structure Plan, Amendment C120 to the Hume Planning Scheme*, dated September 2010

- A report from the Royal Historical Society of Victoria, including a review of historical development of the broader regional area and their records of industrial/commercial and residential developments;
 - Discussions with the City of Hume to ascertain records of the current and former land use and previous planning permits for both the study area and surrounding areas;
 - Interviews, enquiries and discussion with relevant personnel who are familiar with the Study Area at the direction of VPA.
- The inputs to the Desktop Study have been cross-checked to understand the likelihood, nature and extent of potential contamination sources both onsite and offsite, where relevant, based on the weight of evidence and the potential risk of impact to human health and/or environment;
 - A Site Inspection was completed to identify relevant site features and to “ground truth” the findings of the Desktop Study, with respect to the nature and extent of potential Areas of Concern (AECs) and Potential Contaminants of Concern (PCoCs). This included but was not limited to and investigation of; site infrastructure, site topography, soil type, current/previous land uses, proximity to environmental receptors, characteristics of surface material and presence of waste material; and
 - Preparation of this Contamination Assessment Report to summarise any significant findings (or lack thereof), any potential issues arising from additional works completed, identification and justification of AECs and PCoCs and recommendations.

1.3 General Site Information

A summary of the Study Area is provided in **Table 1.4**.

Table 1.4 Summary of Site Details

Item	Details
Allotment Details	The Study Area contains 42 allotments a summary of which is provided in Table 5.2 below.
Municipality	Hume City Council
Study Area Locality	Craigieburn West, Victoria, Australia. As shown in Figure 1 .
Current Study area Layout:	<p>The majority of the study area is bound by agricultural fencing with gate access, with each allotment of land within the area tending to be fenced independently.</p> <p>The study area is bound by roads to the north (Mt Ridley Road), the west (Mickleham Road), and a portion to the east (Whites Lane). There are also three roads that traverse the Study Area from west to east (Craigieburn Road and Dunhelen Road) and east to west (Olivers Road). To the south of study area is Greenvale Reservoir.</p> <p>Residential and agricultural properties and structures present within the study area tend to have gravel driveways leading from the abounding roads.</p> <p>Generally, the study area is made up of cleared land consistent with agricultural and pastoral uses, with dams located regularly across the study area.</p> <p>The layout of the study area is shown in Figures 2-6.</p>
Study Area:	Approximately 564 hectares as defined for this investigation, as shown in Figure 2 .
Current Study Area use	The Study Area is predominantly agricultural land or residential properties.

Item	Details
Current Zoning:	Farming Zone – Schedule 1 (FZ1) Farming Zone – Schedule 3 (FZ3) Urban Growth Zone (UGZ)
Planning Overlays on-site and nearby ³ :	<p>On site (Study Area):</p> <ul style="list-style-type: none"> Environmental Significance Overlay – Schedule 11 (ESO) Environmental Significance Overlay – Schedule 9 (ESO) Public Acquisition Overlay 1 (PAO) Heritage Overlay (HO35) Public Park and Recreation Zone (PPRZ) Rural Conservation Zone (RCZ3) Vegetation Protection Overlay (VPO) Vegetation Protection Overlay – Schedule 4 (VPO4) <p>Nearby:</p> <ul style="list-style-type: none"> Environmental Significance Overlay (ESO) Melbourne Airport Environment Overlay (MAEO2) Development Plan Overlay (DPO) Public Use Zone – Service and Utility (PUZ1) Rural Conservation Zone (RCZ1) Rural Living Zone (RLZ) <p>This information was obtained from the Department of Environment, Land, Water and Planning 'Land Channel' Website (land.vic.gov.au).</p>
Geographical Coordinates (Map Grid of Australia [MGA] Zone 55):	Easting: 5838340 Northing: 313140 (Approximate centre of Study Area).
Topography: (Google Earth)	<p>The topography of the Study Area undulating and generally sloping downwards to the south-east.</p> <p>Surface elevation varies within the Study Area from approximately 271 to 183 meters Australian Height Datum (mAHD).</p> <p>In general, the elevation of the Study Area increases towards the north-west: elevation increases from approximately 183 to 271 mAHD south to north and 223 to 222 mAHD from east to west.</p>
Surrounding land use:	<p><i>North:</i> Directly north of the study area is cleared land that appears to be used for either farming (pastoral) purposes with some low-density residential properties.</p> <p><i>East:</i> Directly east of the study area is low- and high-density residential properties with some cleared land that appears to be used for farming (pastoral) purposes or is reserved for further residential/commercial development with residential development beyond (Craigieburn).</p> <p><i>South:</i> Directly south of the study area are some low- and high-density residential properties, and the Greenvale Reservoir Park. Further south of this is Greenvale.</p> <p><i>West:</i> To the west of the study area is cleared land predominantly for agricultural use (olive groves), low density residential properties (Yuroke), and a disused Country Fire Association (CFA) Yuroke Satellite Station. EPA anecdotal evidence also suggests a potential gun range to the west of the northern portion of the site. Further west of the Study Area is cleared land that appears to be used for farming (pastoral)</p>

³ Based on review of Victorian State Government, Environment, Land Water and Planning Records, accessed 31 October 2018.

Item	Details
	purposes, and an aggregates and concrete quarry and livestock sales yards at Oaklands Junction.
Previous reports:	Two previous preliminary site investigation reports (Atma 2018 and Cardno 2017) conducted on sites within the Study Area were provided by the client on 23 October 2018, a review included in this report found that their findings did not alter the outcome of the assessment.
Environmental Audit Overlay:	Not Applicable

2 PRELIMINARY CONTAMINATION ASSESSMENT

2.1 Approach and Methodology

The Preliminary Land Contamination Assessment was undertaken generally in accordance with the National Environment Protection (Assessment of Site Contamination) Measure 1999 as amended 2013 (NEPM), published by the National Environmental Protection Council (NEPC, 2013) and with consideration to the Department of Sustainability and Environment's General Practice Note for Potentially Contaminated Land (June 2005). The Preliminary Assessment includes the components outlined in **Table 2.1**.

Table 2.1: Components of Preliminary Land Contamination Assessment

Component	Report Section
Historical Ownership	Section 2.2
Site Inspection	Section 2.3
Surrounding Land Use	Section 2.4
Regional Geology	Section 2.5
Regional Hydrogeology	Section 2.6
Historical Aerial Photographs	Section 2.7
EPA Priority Sites Register	Section 2.8
EPA Certificates and Statements of Environmental Audits	Section 2.9
Interviews	Section 2.10
City of Hume Records	Section 2.11
Royal Historical Society Report	Section 2.12
Australian Government Department of Environment and Energy's Australian Heritage Database	Section 2.13
Anecdotal Evidence	Section 2.14
Previous Environmental Reports	Section 2.15
Areas and Contamination of Potential Concern	Section 2.16

2.2 Historical Ownership

The study area currently consists of 42 plots of land as described in **Table 5.2**. The current and historic title details are summarised in **Appendix C**.

The allotments within the Study Area have typically been owned by private individuals, usually recorded as farmers, prior to the mid- to late-1900's when the vast majority of the land was divided and sold to a combination of private individuals/farmers or Proprietary Limited (Pty. Ltd.) companies. This information supports the understanding that the Study Area has historically been used for predominantly farming purposes. A brief summary of the certificates of titles and land uses associated with these is provided below:

- John Justice, William Thompson, James Sorragham, Frederick James Rhodes and Studleigh Estates Limited owned a number of the larger plots of land prior to the period of significant land division;
- Plot 1 is currently a primary school and has been owned by the Minister of the Crown Administering The Education Act since 1969;
- Numerous plots in the northern section of the Study Area were owned by Australian Thoroughbred Management Pty Ltd before being divided and sold to private individuals and Hume City Council;
- Plot 15 in the Central section of the Study Area is currently owned by Hume Machinery Pty Ltd which could be an indication of possible contamination associated with commercial operations. During the Site Inspection it was noted that old farming machinery were present on across the site;
- Hospital Service Stations Pty Ltd owned Plot 16 from 1989 to 1992, however there is no information regarding what land use and therefore what potential contamination this would have entailed;
- North-East Pastoral and Pig Proprietary Limited owned Plots 23 and 24 when they were one plot of land between 1968 and 2004-2006. This supports the land use observed in the historical aerals reviewed in **Section 2.7**;
- Plot 5 currently hosts a Buddhist temple which has been owned by the North Victorian Buddhist Association and active since 2007;
- Plot 25 currently hosts a Syrian Orthodox Church which has been active since 1995; and
- A vast number of plots are currently owned by a range of property development companies. Given that they currently appear to be undeveloped these are not considered to alter the outcome of the assessment.

A copy of information collected during the search of the Certificate of Title Information is provided in **Appendix C**.

2.3 Site Inspection

On 30 October 2018, Landserv completed a site inspection of the Study Area involving walking and driving around the study area to identify potential AECs and provide a grounding for other components of the Preliminary Assessment. A summary of the site inspection is provided in **Table 2.3** and displayed in **Figures 3 to 6**, with photographs taken during the site inspection provided in **Appendix E**.

Table 2.3: Summary of Site Inspection

Item	Detail
Shape of Study Area	Irregular
Topography	The topography of the study area varied significantly both naturally and due to the presence of stockpiles and engineered dams and barriers.
Current layout	The study area is predominantly vacant grassland consistent with agricultural uses, with some low density residential properties, a primary school and adjacent community centre and two places of religious significance are shown in Figures 3 to 6 .
Surface condition	The surface of the study area is predominantly grassed, with exception to numerous dams and frequent gravel tracks often leading to properties. A number of high traffic areas, with associated exposed earth also appear within the Study Area boundary.
Access control / fencing	Access to the study area varied around the boundary; mostly access was controlled with wire fencing around farm land and properties, with a wooden/board fence along the eastern boundary. Some sections of the eastern boundary fence appeared to be missing in places resulting in the illegal disposal of waste/rubbish.
Site observations	<p>The findings of the site inspection are presented below:</p> <ul style="list-style-type: none"> ▪ The study area is bound by roadways on three boundaries; Mt Ridley Road to the north, Mickleham Road to the west and Whites Land along a portion of the eastern boundary; ▪ The study area is bound by newly developed low to high density residential areas along the eastern and southern boundaries; ▪ The majority of the study area is fenced with either agricultural fencing or new wooden/board fencing and gate access with a few exceptions including residential driveways and gaps in the wooden/board fencing along the eastern boundary; ▪ Vehicle access to the study area is possible at points along all the boundaries including the main roads bounding the study area, and by access via Dunhelen Lane (road traversing west to east allowing access to Aitken Conference Centre [herein referred to as "the Conference Centre"]), Craigieburn Road (traversing west to east across the centre of the Study Area) and Olivers Road (traversing east to west); ▪ The topography of the Study Area varied both naturally and due to the presence of engineered dams and barriers and earthworks; ▪ The Study Area is comprised of predominantly vacant grassland consistent with farmland; ▪ The Study Area has numerous residential properties and sheds (low density residential / rural allotments), predominantly consistent with agricultural uses; ▪ The Study Area has a current primary school and adjacent community centre (consisting of tennis courts, playground and car park) located in the north-west corner of the Study Area; ▪ The Study Area has two places of religious significance; the Mor Yacoub Syrian Orthodox Church located adjacent the eastern boundary and the Buddhist Temple

Item	Detail
	<p>Daham Niketanaya located adjacent the western boundary;</p> <ul style="list-style-type: none"> ▪ The vegetation in the Study Area is typically grazed agricultural pasture, with groomed residential gardens associated with dwellings and some overgrown vegetation; ▪ Evidence of both potential underground and above ground services/features with the Study Area were evident from visual indications and included gas, electricity, water, petroleum fuel, associated with the existing dwellings and shed and telecommunications (two telecommunications towers present on the Study Area); ▪ The immediate surrounding land use of the Study Area is agriculture/pastoral, small farms and rural properties, with low density residential dwelling, to the north and west, and standard to high residential dwellings to the east and south; ▪ Numerous areas where old farm machinery, truck bodies and general waste has been collected, were identified across the Study Area; ▪ Some allotments with the Study Area appear to contain laydown areas for mobile plant and/or materials, which may include the movement of material on and offsite; ▪ Numerous stockpiles of unknown origin, containing both soil and rocks are present within the study area; ▪ The CFA Yuroke Satellite fire station facility is located adjacent the study area to the west and comprises of a shed and grassed laydown area. Through communication with both CFA Greenvale and the CFA district headquarters, it is apparent that this station has been in disuse for a number of years. See Section 2.4 for more information. ▪ A number of troughs and animal scats are consistent with the presence of livestock were observed; and ▪ Access to the whole study area was not possible, therefore identification of major contamination (i.e. staining, discoloration or odours) was not possible across the whole study area; significant infilling appears to have taken place within the Southern (Greenvale) Portion of the Study Area, adjacent to recent residential developments offsite and to the west.
Evidence of soil disturbance	<p>Based on the site inspection, the topography of the Study Area and surrounding land, it is possible that infilling has been used to flatten the land or manage erosion in high traffic areas, such as tracks and gateways. In addition, it is likely that some soil has been disturbed to construct tracks, numerous dams of varying sizes and stockpiles.</p>

2.4 Surrounding Land Use

The Study Area is located within the Craigieburn West Precinct within the City of Hume's Urban Growth Zone. The surrounding land use at the time of the site inspection is provided in **Table 2.4** and shown in **Figure 3-6**.

Table 2.4: Surrounding Land Uses

Direction from Study Area	Current Use
North	Mt Ridley Road with Farmland and low density residential dwellings beyond.
East	Farmland - Agricultural land use and standard to high density residential dwellings including a school and kindergarten
South	Farmland - Agricultural land use and standard to high density residential dwellings including a primary school. Greenvale Reservoir also exists to the south of the site.
West	Mickleham Road with Farmland (Olive groves) and low density residential and rural dwellings beyond.

The CFA Greenvale Satellite Station is located adjacent the western boundary (outside the of the Study Area). Aqueous Film Forming Foams (AFFF) used in fire suppression are known to contain Per- and Poly-Fluoroalkyl Substances (PFAS), including perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), which could pose risks of contamination through their use, storage and handling at the site. These substances are considered an emerging contaminates, in that these chemicals have been widely used across Australia with rising concern in recent years in their impact on human health and the environment. These chemicals are considered highly persistent within the environment and human and bodies. Both CFA Greenvale and CFA District 14 Head Quarters were contacted on 8 November 2018 regarding any information about the use of this site, however no further information was granted. There is no direct evidence of use of these substances at the site and given that the site is down hydraulic gradient from the study area, it is considered unlikely that material levels of contaminant migration will have occurred towards the Study Area.

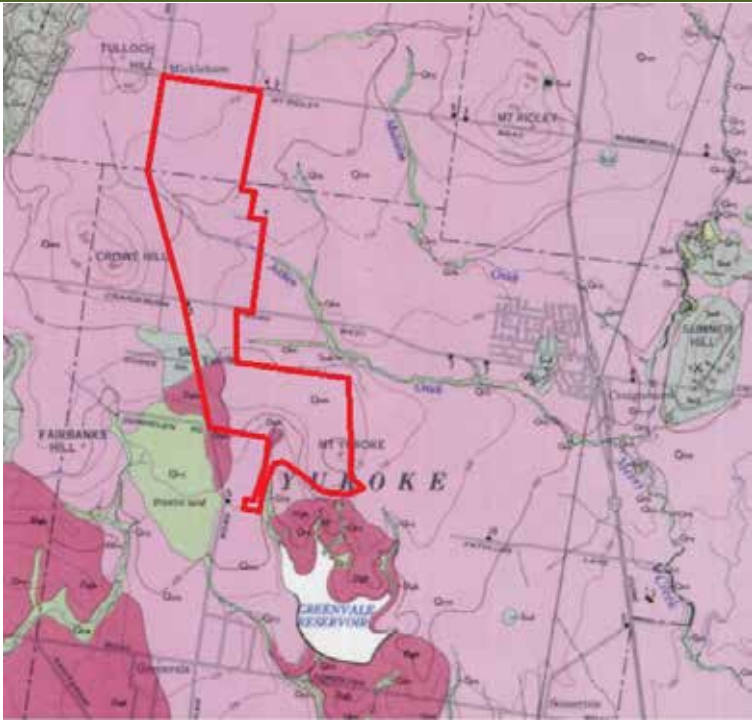
The EPA also provided anecdotal evidence to suggest a site to the west of the Study Area (1775 Mickleham Road, Yuroke), submitted an application to host a shooting range. Landserv has been unable to ascertain the status of this application, but we have not seen any evidence that it has been used for that purpose to date.

2.5 Regional Geology

A summary of the regional geology is provided in **Table 2.5**.

Table 2.5: Summary of Regional Geology

Component	Comment
Topography (Google Earth)	The Study Area generally slopes downwards from North-west to South, with an approximate elevation of 271 to 183 mAHD above sea-level, and generally flat from east to west (223 to 222 mAHD).
Geology (1:63,360 Geological Map Sheet "Sunbury")	The Study Area is predominantly underlain with Tertiary Newer Volcanics (Qnv)(olivine basalt, minor limburgite, trachy-andesite, scoria, thin interbedded sand, clay and tuff), and occasionally Bulla Granodiorite and Keilor Group sediments near Yuroke. The Newer Volcanic basalt within the Study Area is itself underlain by the Dargile Formation sediments (interbedded shale, mudstone and greywacke).

Component	Comment
	 <p>Map extract from: 1:63,360 Geological Map Sheet "Sunbury", Geological Survey of Victoria, including approximate Study Area boundary.</p>
Potential for Acid Sulphate Soil (Acid Sulphate Soils Atlas, ASA, 2017)	The Study Area is located in a region classified as C1 and B4 by the National Acid Sulphate Soil (ASS) Atlas. This classifies the Study Area as having an Extremely low probability / low confidence of the presence of ASS.

2.6 Regional Hydrogeology

A summary of the regional hydrogeology is provided in **Table 2.6.1**

Table 2.6.1: Summary of Regional Hydrogeology

Component	Comment
Inferred Groundwater Depth	A review of the Visualising Victoria's Groundwater (VVG) website GIS database indicates that groundwater depth is expected to vary significantly across the Study Area. Groundwater depth is broadly expected to be 5 to 10 m below ground level (bgl) in the northern section of the Study Area, <5 mbgl in the central section of the Study Area, 10 to 20 mbgl centered around Yuroke, and 20 to 50 mbgl in the southern section of the Study Area.
Aquifers	<p>A review of the Department of Environment Land Water and Planning (DELWP) Groundwater Resource Report for broad sections of the Study Area lists the underlying aquifers and aquitards as follows:</p> <ul style="list-style-type: none"> ▪ Northern Section: <ul style="list-style-type: none"> ○ 0-38 mbgl – Upper Tertiary/Quaternary Basalt (fractured rock) (Salinity of 3501-13000 mg/L). ○ 30-238 mbgl - Basement Mesozoic and Palaeozoic Bedrock (BSE) (Salinity of 1001-3500 mg/L). ▪ Central Section: <ul style="list-style-type: none"> ○ 0-200 mbgl - Basement Mesozoic and Palaeozoic Bedrock (BSE) (Salinity of 3501-13000 mg/L).

Component	Comment
	<ul style="list-style-type: none"> Southern Section: <ul style="list-style-type: none"> 0-15 mbgl - Upper Tertiary/Quaternary Basalt (fractured rock) (Salinity is Unknown). 15-215 mbgl - Basement Mesozoic and Palaeozoic Bedrock (BSE) (Salinity of 3501-13000 mg/L).
Inferred groundwater Classification	<p>SEGMENTS C, D, E and F</p> <p>Based on the DELWP and VVG database searches, it is likely that groundwater at the Study Area would be categorised as “Segment C, D, E or F”, which apply to groundwater with TDS concentrations of between 3,501 and 13,000 mg/L. This categorisation is in accordance with the State Environment Protection Policy (SEPP) Groundwaters of Victoria 2018, (the Groundwater SEPP) under which Victoria’s groundwater is assessed.</p>
Protected beneficial uses	<p>Under Segment C, D, E and F, the beneficial uses of groundwater requiring protection beneath the Study Area and surrounding region include;</p> <p>For Segment F:</p> <ul style="list-style-type: none"> Water dependent ecosystems and species; Water based recreation (primary contact recreation); Traditional Owner cultural values; Cultural and spiritual values; Buildings and structures; and Geothermal activities. <p>For Segment E and F, the above including:</p> <ul style="list-style-type: none"> Agricultural and irrigation. <p>For Segment D, E and F, the above including:</p> <ul style="list-style-type: none"> Industrial and commercial. <p>For Segments C, D, E and F, the above including:</p> <ul style="list-style-type: none"> Potable mineral water supply. A breakdown of each of these beneficial uses, including the rationale behind them, is provided in more detail in the SEPP (Waters) (2018), and the ‘groundwater chemistry’ requirements for each of these are described in the ANZECC Guidelines (2000).
Inferred Regional Groundwater Flow Direction	<p>Groundwater flow in the Newer Volcanics aquifer is very complex, with groundwater movement occurring in fractures and joints, as well as between basalt flows. The extent of groundwater flow within the basalt depends on the size, interconnectivity and frequency of these fractures and joints. Yields from bores range from 0.4 up to 40 L/sec with yields less than 1.2 L/sec being typical (Leonard 1992). Also given the size of the study area, it is likely that multiple flow directions will occur across the Study Area. Generally speaking however, the groundwater flow direction of the study area is assumed to be towards the east in the northern portions, towards the nearest surface water body Aitken Creek (approximately 1.2 km east, and towards the south and south-west of the Study Area for southern portions, to the nearest surface water bodies Moonee Ponds Creek (approximately 1.3 km south-west) and Greenvale Reservoir (approximately 1.3 km south).</p>
Registered Groundwater Bores - Onsite	<p>A search on the VVG website showed 13 registered groundwater bores within the Study Area boundary. These groundwater bores were constructed between 1970 and 2011 and are listed for a range of unses including; 1 for irrigation purposes, 8 for domesitc and stock, 2 for observation and 2 are unknown. These are distributed predmoninantly around the central and southern sections of the Study Area, with none occurring in the northern section.</p>

Component	Comment
Registered Groundwater Bores - Offsite	<p>A groundwater database search conducted on the VVG website highlighted the presence of 82 offsite registered groundwater bores within a 2 km radius of the Study Area boundaries.</p> <p>These offsite groundwater bores were listed as completed between 1962 and 2010 and are distributed widely outside the Study Area. The purpose of these offsite groundwater bores includes; 51 for stock and domestic uses, 2 for observation purposes and 29 are unknown.</p>

Given the topography of the land, bores most likely to be potentially impacted by activities within the study area, are bores present down inferred hydraulic gradient to the east, south and south-west where the surface elevation tends to be decreasing. The vast majority of bores registered in the surrounding areas are for domestic and stock use therefore this must be considered in the future development and use of study area.

The observation bores in the centre of the Study Area (WRK066554 and WRK066555) are installed on a parcel of land that has numerous stockpiles of soil (potentially containing debris) and numerous truck bodies, as identifiable by aerial photographs. This could indicate the investigation of PCoCs within the Study Area. However, a brief search of online EPA records yielded no publicly available reports.

A summary of the bores registered both onsite and offsite within a 2 km radius are provided in **Appendix F**.

2.7 Historical Aerial Photographs

A total of twelve historical aerial photographs dated between 1951 and 2017 were viewed. The aerial photographs were obtained from Lotsearch Pty Ltd.

A summary of the observations and interpretations from the review of aerial photographs are provided for parts (or "Areas") of the Study Area in the **Table 2.7**.

Copies of the historical aerial photographs are provided in **Appendix B**.

Table 2.7: Historical Aerial Photographs Summary

Year	Site Description	Surroundings
1951	Northern Portion (Lotsearch Part 1)	
	Aerials of this section of the Study Area were not obtainable for this year.	
	North / Central Portion (Lotsearch Part 2)	
	Aerials of this section of the Study Area were not obtainable for this year.	
	Central Portion (Lotsearch Part 3)	
	<p>The Area predominantly consists of cleared land which is assumed to be used for agricultural or pastoral land. Also, many trees are present across the whole Area.</p> <p>One small structure is evident in the south of the Area, and one large dam in the centre.</p> <p>Numerous clear tracks are also clear, most likely providing access to agricultural land.</p>	<p>The surrounding land is apparently low density residential and agricultural or pastoral land. A second large dam exists on the eastern boundary crossing into the Area.</p>
	South / Central Portion (Lotsearch Part 4)	

Year	Site Description	Surroundings
	<p>The Area predominantly consists of cleared land which is assumed to be used for agricultural or pastoral land. Also, many trees are present across the whole Area.</p> <p>A dam is present in the centre of the Area.</p> <p>A cluster of residential/agricultural properties present in the south-west corner, with a cleared drive way leading to the properties.</p>	<p>The surrounding land is apparently low density residential and agricultural or pastoral land.</p>
	Southern Portion (Part 5) ⁴	
	<p>The Area predominantly consists of cleared land which is assumed to be used for agricultural or pastoral land. Also, a few trees are present across the central section, and there is a dam present in the north-west corner of the Area.</p> <p>A section of Yuroke Creek runs through the western portion of the Study Area.</p> <p>A gravel/dirt track traversing the site from east to west exists in the southern portion of the Area.</p>	<p>The surrounding land appears to be cleared land associated with agricultural or pastoral land use. Low density residential properties exist to the south-west and north-west of the Area.</p> <p>The Royal Australian Navy Armament and Ammunition Depot is apparent to the far south-east of the Area.</p>
1960	Northern Portion (Lotsearch Part 1)	
	Aerials of this section of the Study Area were not obtainable for this year.	
	North / Central Portion (Lotsearch Part 2)	
	Aerials of this section of the Study Area were not obtainable for this year.	
	South / Central Portion (Lotsearch Part 3):	
	<p>The Area remains relatively unchanged since 1951, with the exception of one new dam on the western boundary.</p>	<p>Increased development is apparent along the western boundary, the opposite side of Mickleham Road, assumed to remain agricultural or residential in nature.</p> <p>The surrounding areas on the northern, eastern and southern boundaries remain unchanged.</p>
	Southern Portion (Lotsearch Part 3):	
	<p>The dam in the centre of the Area appears to have increased in size. Another residential property has also been developed on the western boundary. To the east of this property there appear to be a number of 'structures' in rows. It is possible that these could be chicken coups or perhaps even just hay bales lined up. There are also more established land boundaries indicated by lines of trees.</p>	<p>There is further minor residential and agricultural development to the north-west of the Study Area.</p>
	Southern Portion (Part 5) ⁴	

⁴ Referred to as Mickleham Road, Greenvale in Lotsearch Reports

Year	Site Description	Surroundings
	<p>The Area remains relatively unchanged with the exception of a small residential/farming property in the eastern portion of the Area.</p> <p>A second dam has been constructed in the southern section of the Area.</p>	<p>The surrounding areas remain relatively unchanged with the exception of further establishment of structures within the Royal Australian Navy Armament and Ammunition</p>
1963	Northern Portion (Lotsearch Part 1):	
	<p>The Area predominantly consists of cleared land which is assumed to be used for agricultural or pastoral land. Also, many trees are present across the whole Area.</p> <p>A residential property with surrounding structures/sheds for assumed agricultural use is apparent in the centre of the Area, as well as numerous small buildings/structures present in the top north-west corner of the Area. Driveways to properties and some apparent segregation of land indicate possible imported fill material.</p> <p>A plot of land in the south-western section of the Area appears to have undergone recent ploughing at the time of this photograph. However, it is difficult to determine whether there is any potential excavation or filling from the perspective of the aerial photographs.</p>	<p>Directly to the north of the Area is a small oval-shaped track, possibly used as a trotting track or for greyhound racing perhaps. There are a number of structures associated with this that could have acted as stables or kennels.</p> <p>To the west, east and south of the Area is land consistent with the Area and appears to be used for agricultural or pastoral purposes.</p>
	North / Central Portion (Lotsearch Part 2):	
	<p>The Area predominantly consists of cleared land which is assumed to be used for agricultural or pastoral land. Many trees are also present across the whole Area, with dense tree vegetation on the southern boundary. Numerous dams are present across the Area with more recently engineered dams clear in the south-eastern portion of the Area where the excavated soil is freshly stockpiled.</p> <p>There are low density residential farming properties present in the north-west, north and west, with driveways clearly present leading to each property.</p> <p>Livestock appear to be present in the central portions of the Area, with what appear to be numerous pigsty's and the associated agricultural structures in the centre of the Area.</p>	<p>The surrounding land appears to be consistent with the Area and is likely low density residential used for agricultural or pastoral purposes.</p>
	South / Central Portion (Lotsearch Part 3):	
	Aerials of this section of the study area were not obtainable for this year.	
	Southern Portion (Lotsearch Part 4):	
	Aerials of this section of the study area were not obtainable for this year.	

Year	Site Description	Surroundings
1966	Southern Portion (Part 5) ⁴	
	Aerials of this section of the study area were not obtainable for this year.	
	Northern Portion (Lotsearch Part 1):	
	The Area remains relatively unchanged, with the apparently freshly ploughed field now looking in keeping with surrounding land.	The surrounding areas appear to remain unchanged.
	North / Central Portion (Lotsearch Part 2):	
	The Area remains relatively unchanged since 1963.	The surrounding areas appear to remain unchanged.
	South / Central Portion (Lotsearch Part 3):	
	The Area remains relatively unchanged since 1960, with the exception of increase establishment of land parcel boundaries adjacent to the southern boundary.	The surrounding areas appear to remain unchanged, with the exception of further structural development near the south-western corner of the Area.
	Southern Portion (Lotsearch Part 4):	
	The Area remains relatively unchanged with the exception of some land clearing, potentially for a new dam, in the north of the Area. It is difficult to tell from this aerial whether excavation or imported fill might have been involved. The structures in row to the east of the residential property on the western boundary have also been removed and as a result there appears to be patches of bare ground left beneath where they were.	The surrounding areas appear to remain unchanged, with the exception of a new residential/agricultural property to the south of the Area, and a potential warehouse development near the north-west of the Area. From these aerials it is not possible to determine the nature of these warehouses, however it is expected that they are agriculture related.
1974	Southern Portion (Part 5) ⁴	
	The Area remains unchanged.	The surrounding areas remain relatively unchanged with the exception of increased trees lining the fields, marking the property areas.
	Northern Portion (Lotsearch Part 1):	
	The Area remains unchanged since 1966.	The surrounding areas appear to remain relatively unchanged, with the exception of construction of one small structure south-west of the Area.
	North / Central Portion (Lotsearch Part 2):	
1974	The Area remains unchanged since 1966	The surrounding areas appear to remain predominantly unchanged, with the exception of minor development visible along the western boundary. Given the added field definition in the aerials, it is likely this was undergoing development as new agricultural land at this time.
	South / Central Portion (Lotsearch Part 3):	

Year	Site Description	Surroundings
	The Area remains unchanged since 1966	Significant development to the west of the Study Area is apparent. Once again this is presumed to be agricultural in nature. The surrounding areas to the north, east and south remain unchanged.
	Southern Portion (Lotsearch Part 4):	
	The Area remains unchanged since 1966, with the exception of filled in vegetation on bare ground and strange tracks to the north-east of the residential property in the centre of the Area. It is unclear what these are a result of.	The surrounding areas remain unchanged.
	Southern Portion (Part 5) ⁴	
	The Area remains relatively unchanged, with the exception of increased width/establishment of the road traversing the site from east to west.	The surrounding areas have changed dramatically with the construction of Greenvale Reservoir to the south of the Area, the low-density residential properties to the west of the Area are expanding with more structures being apparent.
1979	Northern Portion (Lotsearch Part 1):	
	It is apparent that there has been some significant vegetation clearing in the south and south-eastern portions of the Area, although it is unclear from the aerals what the intention is.	Further minor development in the north-western surrounding area is apparent.
	North / Central Portion (Lotsearch Part 2):	
	Further development is apparent near the northern and southern boundaries of the Area. More tracks are also visible across the Area. The property on the western boundary (to the south) also has numerous long narrow plots of land segregated from each other and other land on the plot by fencing. These are likely either for livestock or for smaller scale crop growth.	Minor development of assumed agricultural and/or residential properties is apparent to the west of the Area. Surrounding areas to the north, east and south remain unchanged.
	South / Central Portion (Lotsearch Part 3):	
	The Area remains unchanged since 1974.	Surrounding areas to the west of the Area appear to have undergone some minor development.
	Southern Portion (Lotsearch Part 4):	
	The Area remains unchanged since 1974.	Surrounding areas remain relatively unchanged.
1984	Southern Portion (Part 5) ⁴	
	The Area remains relatively unchanged.	Surrounding areas remain relatively unchanged.
	Northern Portion (Lotsearch Part 1):	
	Installation of a tennis court to the east of the property in the north-west of the Area is apparent. The rest of the Area remains relatively unchanged.	Surrounding areas to the south of the Area appear to have undergone some minor development. Surrounding areas to the north, east and west of the Area remain relatively unchanged.

Year	Site Description	Surroundings
	North / Central Portion (Lotsearch Part 2):	
	<p>The foundations of new residential property are apparent in the south of the Area near the western boundary. A new structure to the north of this is also noticeable.</p> <p>A new dam is also noted in the centre of the Area, and some earthworks appear to have been undertaken in the north of the Area. It is not possible to determine from the aerial whether it is excavation of filling.</p>	<p>The roads to the west (Mickleham Road) and south (Craigieburn Road) of the Study Area appear to have been surfaced, and a roundabout has been constructed at the south-west corner of the Area.</p> <p>Further structural and land development has occurred in the surrounding areas along the western boundary of the Area.</p>
	South / Central Portion (Lotsearch Part 3):	
	<p>Four residential dwellings have been developed across the Area, likely for farming purposes. Fences and new tracks across the Area have been constructed as a result of this.</p> <p>The farm in the centre of the Area appears to have an orchard or grove to the north.</p>	<p>The surrounding areas to the west of the property have undergone residential and suspected agricultural development.</p>
	Southern Portion (Lotsearch Part 4):	
	<p>Ploughing, land modification and the development of two structures is apparent in the north-west corner of the Area.</p> <p>The rest of the Area remains unchanged.</p>	<p>Surfacing of the road to the west of the Study Area (Mickleham Road) has occurred.</p> <p>A freshly ploughed field is noticeable to the north of the Study Area.</p> <p>The surrounding areas to the east and south remain relatively unchanged.</p>
1991	Southern Portion (Part 5) ⁴	
	<p>The Area remains relatively unchanged.</p>	<p>Significant change to the south-west of the Area included the construction of a new park, with designated car parking, and what appears to be a large water tank.</p>
	Northern Portion (Lotsearch Part 1):	
	<p>A second tennis court has been constructed in the north-west corner of the Area. Another building most likely associated with the tennis courts has also been constructed.</p> <p>The residential buildings present in the centre of the Area have also been removed.</p>	<p>The race track initially noted in the 1963 aerial appears to be disused since the contrast between the track and surrounding land has lessened.</p> <p>Dense vegetation, possibly an orchard/grove, is apparent to the south-west of the Area.</p> <p>Surrounding areas to the east and west appear relatively unchanged.</p>
	North / Central Portion (Lotsearch Part 2):	
	<p>Two new residential properties are apparent in the southern half of the Area. The one near the eastern boundary is what we now understand to be the Syrian Orthodox Church.</p> <p>A new property, assumed to be a farm, has been developed in the centre of the Area near the eastern boundary. The four small white structures nearby are likely livestock sheds of some sort.</p>	<p>Further residential/agricultural development has occurred to the west and south-west of the Area.</p>

Year	Site Description	Surroundings
	The rest of the Area remains relatively unchanged.	
	South / Central Portion (Lotsearch Part 3):	
	The Area remains relatively unchanged with the exception of some earth works on the eastern boundary, on the west side of the dam. It appears to be predominantly stockpiled soil.	Surrounding areas have undergone some apparent minor development, also with the establishment of more tree vegetation.
	Southern Portion (Lotsearch Part 4):	
	The development of 4 structures, likely a combination of residential dwellings and agricultural sheds, is apparent in the north-west corner of the Area. The rest of the Area remains relatively unchanged.	The surrounding areas remain relatively unchanged.
	Southern Portion (Part 5) ⁴	
	The Area remains relatively unchanged.	Surrounding areas remain relatively unchanged with the exception of increased low density residential properties and increase tree vegetation to the south of the Area.
2002	Northern Portion (Lotsearch Part 1):	
	A new residential property has been developed on the western boundary of the Area. Multiple small buildings have also been constructed in the centre of the Area previous buildings had existed and been removed. A mound of soil with vegetation covering the surface is also apparent on the east boundary of the Area.	Removal of the small structures initially associated with the track to the north of the Area is apparent. The track is also only clear from changes in vegetation density. A large residential building has been constructed to the west of the Area. Dense vegetation to the south-west of the Area has increased in size and density.
	North / Central Portion (Lotsearch Part 2):	
	The Area remains relatively unchanged with the exception of more fences and field boundaries and more development to the church on the eastern boundary.	Further land modification for agricultural purposes is apparent to the west and south-west. An oval shaped track, similar to the one noted north of Lotsearch Part 1, is apparent to the east of the Study Area.
	South / Central Portion (Lotsearch Part 3):	
	A new property with a tennis court has been constructed in the southern portion of the Area. Personal drive ways from Mickleham Road are more established, possibly surfaced, and the dam to on the eastern boundary has been divided into two.	Further land modification for agricultural purposes is apparent to the north-west.
	Southern Portion (Lotsearch Part 4):	
	The eastern section of the Area has undergone major development, with the construction of what was at the time BHPs Global Leadership Centre (now Aitken Hill Conference Centre). The rest of the Area remains relatively unchanged.	The surrounding areas remain relatively unchanged with the exception of the removal of some large warehouse-like structures adjacent to the western boundary.

Year	Site Description	Surroundings
	Southern Portion (Part 5) ⁴	
	The Area remains relatively unchanged.	Surrounding areas remain relatively unchanged with the exception of the construction of the now conference centre to the north of the Area.
2009	Northern Portion (Lotsearch Part 1):	
	Aerials of this section of the Study Area were not obtainable for this year.	
	North / Central Portion (Lotsearch Part 2):	
	The Area remains relatively unchanged with the exception of a few small land modifications for farming purposes.	Increased agricultural activity on the western and southern boundaries of the Area, including larger more frequent orchards/groves. The track noted in the previous aerials is more pronounced with multiple tracks in the same area.
	South / Central Portion (Lotsearch Part 3):	
	Numerous trucks and/or farming equipment are notable on the residential property near the northern boundary, otherwise the Area remains relatively unchanged.	The surrounding areas show increased agricultural activity, including the growth of more orchards and groves, on the western and north-western boundary, alongside minor suspected residential development to the west. Significant land modification to the east of the Area, likely for future residential development.
	Southern Portion (Lotsearch Part 4):	
	The Area remains relatively unchanged.	The surrounding areas remain relatively unchanged with the exception of ploughing of field on the northern, eastern and southern boundaries.
	Southern Portion (Part 5) ⁴	
	The Area remains relatively unchanged, with the exception of some land modification/clearing in the western portion of the Area.	Surrounding areas remain relatively unchanged with the exception of land modification in the form of clearing to the west of the Area.
2010	Northern Portion (Lotsearch Part 1):	
	Land modification/clearing for an unknown purpose is apparent in the north-west corner of the Area. More buildings have also been constructed here. Farming machinery and potential waste are apparent in the centre of the Area. Further vegetation of the soil mound in the east of the Area is also apparent.	A significant number of low-density residential dwellings have been developed to the north-east of the Area. Further orchards/groves are apparent south-west of the Area, with further significant land modification assumed to be for agriculture.
	North / Central Portion (Lotsearch Part 2):	
	Aerials of this section of the Study Area were not obtainable for this year.	
	South / Central Portion (Lotsearch Part 3):	
	Aerials of this section of the Study Area were not obtainable for this year.	
	Southern Portion (Lotsearch Part 4):	

Year	Site Description	Surroundings
2017	Aerials of this section of the Study Area were not obtainable for this year.	
	Southern Portion (Part 5) ⁴	
	Aerials of this section of the Study Area were not obtainable for this year.	
	Northern Portion (Lotsearch Part 1):	
	The Area remains relatively unchanged. Grass now covers the previously cleared section of land in the north-west corner of the Area. Clear evidence of stockpiles surrounding dam.	One of the two long, narrow warehouses to the norther-west of the Area has been removed. Further significant standard density residential development has occurred to the north and east of the Area, with land cleared for further to occur. To the east and west of the property there is a clear separation of land into parcels.
	North / Central Portion (Lotsearch Part 2):	
	The Area remains relatively unchanged.	Significant residential development is apparent to the north, east and south-east of the Area. Surrounding areas on the western boundary remain relatively unchanged.
	South / Central Portion (Lotsearch Part 3):	
	The Area remains relatively unchanged, with the exception of the trucks and/or farming machinery noted on Area in the 2009 aerial have been removed.	Significant standard density residential development has been developed adjacent to the eastern boundary of the Study Area. Surrounding areas to the west remain unchanged.
	Southern Portion (Lotsearch Part 4):	
	The Area remains relatively unchanged.	The surrounding areas to the north, north-east and south have undergone significant development into standard to high density residential areas. Surrounding land to the west remains relatively unchanged.
	Southern Portion (Part 5) ⁴	
	The Area has undergone some apparent filling in the western portion of the Study Area, adjacent a newly constructed road. It appears that either a 'laydown' yard has been constructed across the southern portion of the site, indicated of civil or construction activities. A search of nearmap online historical aerials shows the 'laydown' yard operated from at least October 2016 to August 2018, at the same time as the construction of nearby road and dwellings	Surrounding areas have undergone significant standard/medium density residential development to the west, south-west and north-east of the Area.

From the review of the historical aerial photographs, it appears that the Study Area was and still is predominantly agricultural or pastoral land, with a low density of building structures typical for this land use.

Between 1951 and 1991, changes to the Study Area appears to have been relatively minor and there were no major changes in land use. However, from 1991 onwards

there appears to have been an increase in the level of development, both within the study area and within the surrounding areas.

2.8 EPA Priority Sites Register

On 22 October 2018, Landserv conducted a search of the Environmental Protection Authority Victoria (EPA) Priority Sites Register. The search indicated that the Study Area is not listed on the EPA Priority Sites Register.

Three sites on the EPA Priority Sites Register were found to be within a 4 km radius of the Study Area, which indicates that the EPA has issued a Clean-Up Notice (CUN), since the condition of the sites were found to be not compatible with the current or approved uses without active management to reduce the risk to human health and the environment. A summary of key information on these nearby sites are provided in **Table 2.8**.

Table 2.8: Nearby Registered EPA Priority Sites

CUN Identification (ID)	Issue Date	Address	Distance / Hydraulic Gradient	Reason for notice
CUN ID 0090007757	11 July 2017	Mitchell Lasry Quarry 555, Mickleham Road (Now Greenvale Reservoir Park)	1.8 km south/ cross or down-gradient of the addition area	Industrial waste has been dumped at the site. Requires assessment and/or clean up.
CUN ID 0090003107	Not Available	Craigieburn Road (Now Craigieburn Gardens)	3.1 km east / cross or down-gradient	Former landfill. Requires ongoing management.
CUN ID 0090003475	Not Available	Craigieburn Road (Now Craigieburn Gardens)	3.1 km east / cross or down-gradient	Former landfill. Requires ongoing management.

CUN ID 0090007757 relates to dumped industrial waste at Greenvale Reservoir Park, located 2.8 km south of the Study Area. CUN ID 0090003107 & CUN ID 0090003475 relate to former landfill(s) which require ongoing management, located 3.1 km to the east of the Study Area.

All of the nearby sites which are registered on the EPA Priority Sites Register are located some distance and cross or down hydraulic-gradient from the Study Area. Due to this distance, it is therefore considered unlikely that any impacted fill material from these sites would materially impact the Study Area. In addition, it is also considered unlikely that groundwater, landfill gas or soil vapour impacts would have demonstrable impact on the study area. The full list of EPA registered sites is included in **Appendix H**.

2.9 EPA Certificates and Statements of Environmental Audit

Certificates and Statements of Environmental Audit are statutory documents that are issued by the EPA as per the Environment Protection Act 1970 after a statutory environmental audit of a property has been conducted.

On the 22 October, our review of the VVG online databased indicated four sites have undergone an EPA Environmental Audit. A summary of these site is provided in **Table 2.9**.

Table 2.9: Summary of Nearby Environmental Audits

CARMs Number	Audit Type	Address	Distance / Hydraulic Gradient	Completion Date	Contaminant(s)	Media Affected
56205-1	Certificate	Audit Area A, Greenvale Lakes Estate, Greenvale	1.2 km east / down-gradient	1 December 2006	Metals, sulphur and nitrate	Soil Groundwater
56205-2	Certificate	Audit Area B, Greenvale Lakes Estate, Greenvale	1.2 km east / down-gradient	25 September 2009	Metals	Soil (Fill) Groundwater
56205-5	Certificate	Audit Area C, Greenvale Lakes Estate, 30-98 Lysterfield Drive, Greenvale	0.6 km east/down-gradient	13 April 2017	Nickel and Vanadium	Soil
56205-4	Certificate	Audit Area D, Greenvale Lakes Estate, Somerton Road, Greenvale	0.7 km east/ down-gradient	17 May 2008	Metals	Groundwater

All four nearby Environmental Audits apply to parts of a former Royal Australian Navy Armament and Ammunition Depot and resulted in a Certificate of Environmental Audit being issued, in each instance the outcome of these was that the sites were "suitable for all beneficial uses and land uses including low density residential". In addition, these sites are also located down hydraulic-gradient of the study area, therefore, are considered to pose minimal (or no) risk to our study area based on the distance and location relative to the Study Area. It is noted that all four sites are suitable the land uses and are therefore assumed to not represent a risk of contamination to the Study Area.

2.10 Interviews

On 29 October 2018, A Senior Environmental Scientist from Landserv completed a phone interview with Claire Fenby, the Acting Senior Sustainable Environment Officer at City of Hume, who provided the following information:

- The Metropolitan Fire Bridge (MFB) have a training area approximately 4 km to the east, although, Claire believed that catchment would be Merri Creek and would not affect the CW PSP Study Area;
- There are Army Barracks at Broadford, approximately 40 km to the northeast of the Study Area;
- Most of the Study Area appears to be small rural land holdings; and
- The Council have noted some holes in the north-eastern portion of the Study Area, adjacent the recent development to the east.

On 8 November 2018, a Junior Environmental Scientist from Landserv completed a phone interview with both Greenvale CFA and CFA District 14, where it was stated that the CFA Satellite Station at Yuroke has been in disuse for a number of years, although the exact number has not been provided, and the use of this facility for training

purposes was unknown. A further email request for the records relating to this station resulted in no response. It is noted that following this phone interview The City of Hume review their records and provided further information. The information is discussed in **Section 2.11**.

2.11 City of Hume Records

A search of the City of Hume Records management systems was summarised to Landserv by Clair Fenby on 8 November 2018 and did not highlight any activities that would indicate land contamination in the Craigieburn West area. Correspondence from the City of Hume at the time indicated that the land is predominantly zoned for farming, therefore only a few planning permits appear to have been issued, with the vast majority of these being for minor activities such as advertisement signs and land divisions.

Unpermitted activities understandably have not been recorded by the City of Hume. Although, the aerial photographs demonstrate some dumping of waste on properties (e.g. 700 Craigieburn Road, 1570 Mickleham Road, 1690 Mickleham Road, and 1800 Mickleham Road) there is no further information available regarding this issue.

A major fire was recorded in 2014, which appears to have directly the north eastern portion of the Study Area. However, minimal information is available on this.

Other the area affected, no further information was provided, in relation to the damage of the 2014 fire to buildings or structures, impact to the condition of the Study Area, methods employed to manage the fire (or after) or the condition and/or fate of hazardous building materials from the damage of buildings and/or structures.

Information provided by the City of Hume, along with a map of the areas affected by the 2014 fire are provided in **Appendix G**.

2.12 Royal Historical Society Report

On 31 October 2018, a review of the Royal Historical Society Report produced little more information than already gained from historical aerial photograph reviews. A search of the Sands & McDougall's Directory (1974), The Melbourne University 1945 aerial maps, Victorian Municipal Directory (1920s-current) and Melway maps yielded little new information. The 1945 Melway indicated the development of "Aitken Hill", at the time BHP's Global Leadership Centre, and the 2003 Melway noted the development of the Syrian Orthodox church. All other information suggests consistent general urbanisation for residential living purposes. The Royal Historical Society Report is provided in **Appendix D**.

2.13 Australian Heritage Databases

On 31 October 2018, a search of the Australian Heritage Database provided no additional information regarding areas of historical or heritage significance. A search of the Victoria Heritage Database (VHD) highlighted the presence of 'Greenvale Stone Wall' inside the eastern boundary of the Study Area, however no further details are provided. The VHD also highlighted the presence of the Royal Australian Navy Armament Depot approximately 0.5 km south of the site, and Brindley Park approximately 0.5 km west of the southern portion of the site.

Information obtained from the Property Reports for the lots within the study area, indicated that the majority of the study area is considered to be "Areas of Aboriginal Cultural Heritage Sensitivity" as defined under the Aboriginal Heritage Regulations 2018. Depending on the proposed use of the site, and whether or not it is considered a 'high impact activity' will determine whether a detailed cultural heritage management plan

is required. We understand that the Craigieburn West PSP will contain further information regarding the Victorian Aboriginal Heritage Register and consequently Aboriginal sites of cultural significance.

2.14 Anecdotal Evidence

A representative of the Environmental Protection Authority (EPA) provided Landserv with an email highlighting the application for a shooting range (or "gun club") at 1775 Mickleham Road, Yuroke (EPA Reference: P17910) (Pers. Comm. Kate Summons, 30 November 2018). This assessment has not uncovered further evidence in the current or historical aerial photographs that this facility was ever development or operated.

No further anecdotal evidence further to that provided elsewhere in this report was obtained during this assessment.

2.15 Previous Environmental Reports

Ben Weiner from Victoria Planning Authority, on 23 October 2018, provided Landserv with two previous environmental assessment reports completed on allotments within the study area.

A report issues in 2018 by Atma Environmental Pty Ltd '*Preliminary Site Investigation: 1340, 1390, 1430, 1480 Mickleham Rd & 665 Craigieburn Rd, Craigieburn West, Vic*' includes a Preliminary Site Investigation (PSI) of a number of allotments within the central portion the study area. A review of the Atma Environmental PSI report provided the following key information:

- Ownership of the sites between 1930 and 1979 was by Studleigh Estates Pty Ltd, and in 1979 the land was subdivided into the five existing parcels;
- Some light hydrocarbon staining was noted at two locations on site;
- Fuel/chemical tanks, or locations of significant ground staining were not observed;
- A number of locations where above ground waste piles (readily removed) were identified, namely at No. 665 Craigieburn Road; and
- No indication of buried rubbish, waste, or asbestos-containing wastes were found on site.

The report therefore recommended the following actions be undertaken:

- Any wastes removed from the site are managed in accordance with EPA industrial Waste Resource Guidelines;
- A limited soil investigation having emphasis on area of more intensive use be completed to confirm the low potential of any existing contamination and to inform the planned future development.

A report issued in 2017 by Cardno Victoria Pty Ltd '*Preliminary Site Investigation 1600 Mickleham Road, Mickleham, Vic*' includes a PSI of an allotment of land within the study area. A review of the Cardno PSI report provided the following information:

- Historical and current land use in the area identified potential contamination sources adjacent to the site including farming operations, maintenance and storage of machinery, general rubbish, stockpile of imported material, trucks and truck bodies and shipping containers used for storage of household items;
- The site inspection did not identify any evidence of contaminating activities occurring (or having occurred) on the site; and

- Neither the site history review or site inspection indicated that any off-site potentially contaminating activities have encroached onto the site, indicating low potential for resulting contamination.

The report therefore recommended no immediate actions were necessary, however the following actions were recommended to be undertaken during the development of the site:

- If identification of potential contamination should be observed during the re-development of the site, advice should be sought from a qualified environmental practitioner;
- Ensure that any soil brought onto the site for re-development purposes is suitable for residential use; and
- All offsite disposal of soil must be undertaken in accordance with EPA Industrial Waste Resource Guidelines.

2.16 Areas and Contaminants of Potential Concern

Based on Site Inspection and Desktop Study a number of potential AECs and CoPCs have been identified as summarised in **Table 2.16**.

Table 2.16: Potential Contaminants of Concern

Potential sources / Areas	Potential contaminants of concern (COCs)
Historical Agricultural Use / entire Study Area	Metals, Fertilisers (including nitrogen, nitrates, ammonia and phosphorus) and pesticides
Imported fill material and infilling / soil stockpile and infilled areas (particularly high traffic and eroded areas)	Total recoverable hydrocarbons (TRH), polycyclic aromatic hydrocarbons (PAH) and metals.
Farm machinery and commercial plant & operations particularly, sheds and surrounding areas, hardstand and high traffic areas entire Study Area	Total recoverable hydrocarbons (TRH), polycyclic aromatic hydrocarbons (PAH) and metals.
Uncontrolled waste dumping / low lying areas, fill material and low traffic areas	TRH, PAH, metals, asbestos containing materials (ACM), inert wastes and hazardous building materials.
Residential dwellings and sheds	TRH, PAH, metals, inert wastes, hazardous building materials and agricultural wastes
Firefighting activities (including training)	AFFF (including PFOS and PFAS) and hazardous building materials (including ACM).

3 DISCUSSION

The review of historical aerial photographs supports the knowledge that the study area is predominantly farmland, with a few low-density residential dwellings and farm structures, and did not highlight any additional land use that may be of concern (i.e. industrial) within the Study Area between 1951-2017. Although no major land use changes occurred the aerials highlighted some localised areas where contamination may be a concern, i.e. areas with old residential properties and historical farming is apparent. This was confirmed during the site inspection where plots containing evidence of significant farming activity, imported fill material and uncontrolled waste dumping were highlighted as areas of concern.

A site Inspection found the site uses appeared broadly consistent with agricultural uses and rural properties, with some specific evidence for potential imported fill material or

waste materials and/or land use for laydown areas for mobile plant and/or materials of unknown origin. It was noted that a number of community centres were present within the Study Area, including a church, a temple, a primary school and community tennis court with associated car park. In addition, access to the site appeared to be controlled by various types of fencing, with some potential dumping areas noted at the boundaries, typically, associated with more developed portions of the surround area.

A review of EPA online resources highlighted three sites within 4 km of the Study Area boundary listed on the 'Priority Sites Registry' and four sites within 2 km of the Study Area where 'Certificates of Environmental Audit' had been issued. The Priority Sites are not considered likely to impact the Study Area due to their distance and position, down hydraulic gradient of the Study Area, while the outcome of the Audits indicated that the subject sites were no longer considered a risk to human health or the environment for the respective land uses, including low-density residential.

Two previous reports provided by VPA for sites within the Study Area have not highlighted any material potential for contamination. These reports provided broad recommendations which are not considered to alter the outcome of the Investigations.

Based on the historical ownership information collected, the allotments with the Study Area were typically owned by private individuals, consistent with observations of agricultural uses and rural properties. Some sites were noted to be associated businesses including a machinery. Ownership information within the Certificate of Titles provided in this report are not considered to materially alter the outcome and have been considered in the findings and assessment within this report.

Review of the Australian Government Department of Environment and Energy's Australian Heritage Databases, Royal Historical Society report and City of Hume's records highlighted minor changes within the study area that are unlikely to have any significant effect on the potential for contamination.

The CFA Yuroke Satellite fire station facility is located adjacent the Study Area to the west and comprises of a shed and grassed laydown area. Information provided from both CFA Greenvale and the CFA district headquarters indicates that this facility has been in disuse for a number of years. No information has been provided of the material stored at the facility or use of the site.

Information provided from the City of Hume has indicated that in 2014 a fire directly impacted the northern portion of the Study Area. Other the area affected, no further information was provided on the damage to buildings or structures, fate hazardous materials or the methods (and substances) employed to manage the fire directly or during the clean-up works.

4 CONCLUSION

This Preliminary Land Contamination Assessment, including a Desktop Study and Site Inspection, identified the following key findings and potential contamination risks to the Study Area with respect to the proposed developments outlined in the Craigieburn West PSP. It should be noted that these are potential risks only. Further investigation would be required to confirm their presence or absence:

- Pesticides and fertilisers may have impacted the land during historical agricultural use;
- Minor spills associated with farm machinery and mobile plant historical agricultural use;

- Impacted fill material may exist, associated with the management of vehicle and stock access tracks, infilling of depressions or for construction/amenity, the construction of dams and/or the management of erosion;
- Stock dips are likely to have been installed within the Study Area, although none have been identified to date during the historical aerial review or kerbside inspections;
- Storage of (and incidental disposal of) waste material;
- Hazardous substance storage and handled (or mishandled) chemicals within a small disused CFA facility is located immediately to the west of the Study Area;
- Hazardous building materials associated within buildings and structures, including as a results of disposal or clean-up of a fire that occurred in 2014; and
- The potential use of AFFF in response to fire within or near the Study Area, including the 2014 fire.

It is considered that there is a 'moderate' risk of the majority of the Study Area being impacted by incidental activities such as importation of fill material, use of pesticides and storage (and incidental disposal) of waste. There is also a low to moderate risk of localised impacts via highly contaminating activities, such as operation of stock dips, disposal of hazardous materials and use of fire suppressants demonstrably impacting the Study Area for the intended use of the development. Noting that it is likely that these impacts could be addressed in a site-specific assessment and/or within minor construction works.

No known specific potential impacts to groundwater and/or soil vapour have been identified in this assessment. However, further risk-based investigations by a suitable environmental professional should be completed in accordance with the NEPM for each area of the Study Area to confirm that none are present.

No putrescible landfills or other features requiring planning buffers for contamination reasons were identified by this Preliminary Assessment.

In accordance with the Department of Sustainability and Environment (DSE) General Practice Note (2005):

- Based on the information available at the time of this Preliminary Assessment, the whole of the Study Area falls within category 'B' of the DSE General Practice Note Table 2 Assessment Matrix. The DSE General Practice therefore indicates that a site assessment⁵ from a suitably qualified environmental professional should be carried out for each development (subdivision area) within the Study Area;
- Pending the outcomes of the site assessments, the Study Area is considered suitable for proposed uses, which include residential use and public open space; and
- Pending the outcomes of the site assessments, the Preliminary Land Contamination Assessment indicates that an Environmental Audit is not required.

The information obtained within this Preliminary Land Contamination Assessment was based on the scope of works herein and is subject to the limitations outlined in **Section 6**.

⁵ Preliminary and / or Detailed Site Investigation – see Section 5 below.

5 RECOMMENDATIONS

The assessment matrix as provided in the Potentially Contaminated Land General Practice Note (Department of Sustainability and Environment, June 2005) was used to determine both the potential for contamination and whether or not an audit or site investigation is necessary is presented in **Table 5.1**.

Table 5.1: Assessment matrix for potential for contamination.

Proposed Land Use	Potential for Contamination		
	High	Medium	Low
Child care centre, pre-school or primary school	A	B	C
Dwellings, residential buildings etc.	A	B	C
Other Uses			
Open Space	B	C	C
Agriculture	B	C	C
Retail or Office	B	C	C
Industry or warehouse	B	C	C
<p>Notes:</p> <p>A – Require an environmental audit as required by Ministerial Direction No. 1 or the Environmental Audit Overlay when a planning scheme amendment or planning permit application would allow a sensitive use to establish on potentially contaminated land. An environmental audit is also strongly recommended by the SEPP where a planning permit application would allow a sensitive use to be established on land with 'high potential' for contamination.</p> <p>B - Require a site assessment from a suitably qualified environmental professional if insufficient information is available to determine if an audit is appropriate. If advised that an audit is not required, default to C.</p> <p>C - General duty under Section 12(2)(b) and Section 60(1)(a)(iii) of the Planning and Environment Act 1987.</p>			

Based on the findings of this assessment an Environmental Audit has not been recommended within the Study Area. However, the contamination status of the Study Area is considered to range from low - moderate to moderate depending on the allotment of land.

In order to address the requirements within the NEPM and DSE 2005, each development within the Study Area should be further assessed as follows: A site-specific Preliminary Site Investigation (PSI), to be carried out by a suitably qualified environmental professional for each proposed development area (e.g. each subdivision application area) within the Precinct. The PSI should consider the findings of this Preliminary Assessment and include as a minimum:

- An updated Site Inspection across the site (not just kerbside);
- Sufficient soil sampling to confirm the environmental condition of potential Areas of Environmental Concern within each development area
- Sufficient soil sampling and analysis to confirming whether Contaminants of Potential Concern are present and if so, what the implications are for the proposed land use;
- Confirmation of the requirement (or otherwise) for a Detailed Site Investigation (DSI); and / or
- Confirmation of the requirement (or otherwise) for an Environmental Audit.

The following additional work will be required if the PSI identifies contamination, or if uncertainty remains as to the environmental condition of each area investigated. The

DSE Practice Note provides for the suitably qualified environmental professional to advise on whether an audit is appropriate, using the Practice Note as a guide. Therefore, depending on the nature, extent and severity of contamination, these works may or may not need to be performed within the framework of an Environmental Audit:

1. A Detailed Site Investigation (DSI) may be required to understand the likelihood, nature and extent of potential impacts which may preclude the intend use of the site⁶. If a DSI is required it should be carried out in accordance with the NEPM and applicable EPA guidelines, although variations to the NEPM scope may be approved within an Environmental Audit framework.
2. In the event that significant potential impacts to soil vapour and/or groundwater are identified, all further works and remediation activities (if required) should be completed in accordance with NEPM and applicable EPA guidelines.
3. All demolition works and handling of hazardous building materials should be completed in accordance with relevant Worksafe Victoria and applicable EPA Guidelines.
4. All developments should include a provision for "unexpected finds" of potential contamination within the Construction and Environmental Management Plans during the re-development, including engaging a suitably qualified environmental professional (in the event of potential contamination being encountered)¹; and
5. All wastes, including impacted soils being taken off-site should be transported in suitably licenced trucks and disposed of two suitably licensed facilities in accordance with EPA Industrial Waste Resource Guidelines.

1.

A breakdown of the site into allotment as described in their current Certificates of Title and their respective potential for contamination is presented in **Table 5.2** and **Figure 7 (Appendix A)**.

Table 5.2: Key Potential Contaminating Activity and Potential for Contamination.

Plot Number (according to Figure 2)	Allotment	Address	Key Potential Contaminating Activity	Potential for Contamination
1	Lot 1 TP423679L	1880 Mickleham Road, Mickleham, 3064	Imported fill material, building materials, inert waste and storage of chemicals	Moderate
2	Lot 1 TP951293N	1800 Mickleham Road, Mickleham, 3064	Imported fill material, building materials, inert waste and storage of chemicals	Moderate
3	Lot 3 PS301908s	685 Mt Ridley Road, Mickleham, 3064	Imported fill material, building materials, inert waste and storage of chemicals	Moderate

⁶ Circumstances requiring a DSI (such as substantial contamination) would normally also require an Environmental Audit under the intent of the DSE Practice Note.

Plot Number (according to Figure 2)	Allotment	Address	Key Potential Contaminating Activity	Potential for Contamination
4	Lot 1 PS736443K	1780 Mickleham Road, Mickleham, 3064	Imported fill material, agriculture, stockpiled material and fire fighting	Moderate
5	Lot 2 PS736443K	1800 Mickleham Road, Mickleham, 3064	Imported fill material agriculture, stockpiled material and fire fighting	Moderate
6	Lot 2 PS301908S	1760 Mickleham Road, Mickleham, 3064	Imported fill material agriculture (including stock handling), stockpiled material and fire fighting	Moderate
7	Lot 1 LP97698	1720 Mickleham Road, Mickleham, 3064	Imported fill material and agriculture.	Low to Moderate
8	Lot 1 PS445746M	1690 Mickleham Road, Mickleham, 3064	Imported fill material, building materials, inert waste, storage of chemicals and agriculture	Moderate
9	Lot 2 PS445746M	290 Olivers Road, Mickleham, 3064	Imported fill material, building materials, inert waste, storage of chemicals and agriculture	Moderate
10	Lot 2 LP37205	250 Olivers Road, Mickleham, 3064	Imported fill material, building materials, inert waste, storage of chemicals, building and structures and agriculture	Moderate
11	Lot 1 LP212349P	220 Olivers Road, Mickleham, 3064	Imported fill material, building materials, inert waste, storage of chemicals, building and structures and agriculture	Moderate
12	Lot 3 LP97698	1660 Mickleham Road, Mickleham, 3064	Imported fill material, building materials, inert waste, storage of chemicals, building and structures and agriculture	Moderate
13	Lot 1 TP950200E	1630 Mickleham Road, Mickleham, 3064	Imported fill material, building materials, inert waste, storage of chemicals, building and	Moderate

Plot Number (according to Figure 2)	Allotment	Address	Key Potential Contaminating Activity	Potential for Contamination
14	Lot 1 TP341413H	1630 Mickleham Road, Mickleham, 3064	Imported fill material and agriculture.	Low to Moderate
15	Lot 1 TP222329L	225 Olivers Road, Mickleham, 3064	Imported fill material, building materials, inert waste, storage of chemicals, potential commercial use, building and structures and agriculture	Moderate
16	Lot 1 TP558734B	125 Whites Lane, Mickleham, 3064	Imported fill material, building materials, inert waste, potential commercial use, storage of chemicals, building and structures and agriculture	Moderate
17	Lot 1 LP39373	1600 Mickleham Road, Mickleham, 3064	Imported fill material and agriculture.	Low to Moderate
18	Lot 1 LP53210	1570 Mickleham Road, Mickleham, 3064	Imported fill material, building materials, inert waste, storage of chemicals, building and structures and agriculture	Moderate
19	Lot 2 LP53210	1550 Mickleham Road, Mickleham, 3064	Imported fill material and agriculture.	Low to Moderate
20	Lot 3 LP53210	1540 Mickleham Road, Mickleham, 3064	Imported fill material, building materials, inert waste and storage of chemicals	Moderate
21	Lot 1 LP55516	1530 Mickleham Road, Mickleham, 3064	Imported fill material, building materials, inert waste, storage of chemicals, building and structures and agriculture	Moderate
22	Lot 2 LP55516	1520 Mickleham Road, Mickleham, 3064	Imported fill material, building materials, inert waste, storage of chemicals, building and structures and agriculture	Moderate
23	Lot 1 PS411432D	700 Craigieburn Road, Mickleham, 3064	Imported fill material, building materials, inert waste, storage of chemicals, building and	Moderate

Plot Number (according to Figure 2)	Allotment	Address	Key Potential Contaminating Activity	Potential for Contamination
			structures and agriculture	
24	Lot 2 PS411432D	680-690 Craigieburn Road, Mickleham, 3064	Imported fill material, building materials, inert waste, storage of chemicals, building and structures and agriculture	Moderate
25	Lot 1 TP340316L	75 Whites Lane, Mickleham, 3064	Imported fill material and agriculture.	Low to Moderate
26	Lot 1 TP957913B	640 Craigieburn Road, Mickleham, 3064	Imported fill material, building materials, inert waste, storage of chemicals, building and structures and agriculture	Moderate
27	Lot 1 LP129504	1480 Mickleham Road, Craigieburn, 3064	Imported fill material, building materials, inert waste, storage of chemicals, building and structures and agriculture	Moderate
28	Lot 2 LP129504	665 Craigieburn Road, Craigieburn, 3064	Imported fill material, building materials, inert waste, storage of chemicals, building and structures and agriculture	Moderate
29	Lot 3 LP129504	1430 Mickleham Road, Craigieburn, 3064	Imported fill material, building materials, inert waste, storage of chemicals, building and structures and agriculture	Moderate
30	Lot 4 LP129504	1390 Mickleham Road, Craigieburn, 3064	Imported fill material, building materials, inert waste, storage of chemicals, building and structures and agriculture	Moderate
31	Lot 1 TP828863L	1370 Mickleham Road, Craigieburn, 3064	Imported fill material, and agriculture	Moderate
32	Lot 2 TP828863L	1360 Mickleham Road, Craigieburn, 3064	Imported fill material, building materials, inert waste, storage of chemicals, building and	Moderate

Plot Number (according to Figure 2)	Allotment	Address	Key Potential Contaminating Activity	Potential for Contamination
			structures and agriculture	
33	Lot 5 LP129504	1340 Mickleham Road, Craigieburn, 3064	Imported fill material, building materials, inert waste, storage of chemicals, building and structures and agriculture	Moderate
34	Lot 6 LP129504	1320 Mickleham Road, Craigieburn, 3064	Imported fill material, agriculture, stockpiled material and stockpiled building materials	Moderate
35	Lot 7 LP129504	1300 Mickleham Road, Craigieburn, 3064	Imported fill material, building materials, inert waste, storage of chemicals, building and structures and agriculture	Moderate
36	Lot 1 TP612993B	1290 Mickleham Road, Greenvale, 3059	Imported fill material, potential storage of petroleum hydrocarbons and agriculture.	Moderate
37	Lot 8 LP129504	1240 Mickleham Road, Greenvale, 3059	Imported fill material, building materials, inert waste, storage of chemicals, building and structures and agriculture	Moderate
38	Lot 1 PS333257D	1240 Mickleham Road, Greenvale, 3059	Imported fill material, building materials, inert waste, storage of chemicals, building and structures and agriculture	Moderate
39	Lot 2 PS333257D	20 Dunhelen Lane, Craigieburn, 3064	Imported fill material, building materials, inert waste, storage of chemicals, building and structures and agricultural practices	Moderate
40	Lot G PS746051W	1770G Mickleham Road, Greenvale, 3059	Imported fill material, and agriculture	Low to Moderate
41	Lot H PS746051W	1770H Mickleham Road, Greenvale, 3059	Imported fill material, and agriculture, construction or civil earthwork activities	Moderate

Plot Number (according to Figure 2)	Allotment	Address	Key Potential Contaminating Activity	Potential for Contamination
42	Lot J PS746051W	1770J Mickleham Road, Greenvale, 3059	Imported fill material, and agriculture	Moderate

6 REPORT LIMITATIONS

This report has been prepared only for internal use by Victoria Planning Authority, relevant planning departments and agency involved in the intended development of the Study Area. No other parties should rely on the information in this report without prior written consent from Victoria Planning Authority.

Landserv has performed its services in accordance with a scope of work commissioned by Victoria Planning Authority and in a manner consistent with the level of quality and skill generally exercised by members of its profession.

It should be noted that environmental and contamination conditions often vary from those observed at the locations where investigation data has been obtained. Limited data can result in uncertainty in the interpretation of environmental and contamination conditions. Interpreting the environmental condition of the soil for this project has been limited to a desktop review. Environmental and contamination conditions also often vary with the passing of time after the data is obtained, as do regulatory requirements, laws and guideline criteria.

Exposure to the sub-surface environment can potentially corrode or degrade underground services, building foundations and other below-ground man-made structures, whether contamination is present or not. This investigation does not warrant the design, installation, protection or longevity of any future infrastructure built on the subject site.

Despite Landserv's due professional care, all these uncertainties should be considered in relying and acting on the information contained in our reports. This is particularly so if few locations have been sampled, if a report is used after a significant delay in time, if regulations and guideline criteria are known to have changed, or if a change is proposed to the land use for the Study Area.

Opinions and recommendations in our reports are based on the information available to Landserv at the time of undertaking the works, including the information gained during the project. The information we report relating to the condition of the subject site for each project is sufficiently accurate for the purposes stated in the report at the time the document is issued. No warranty of site conditions is intended.

7 REFERENCES

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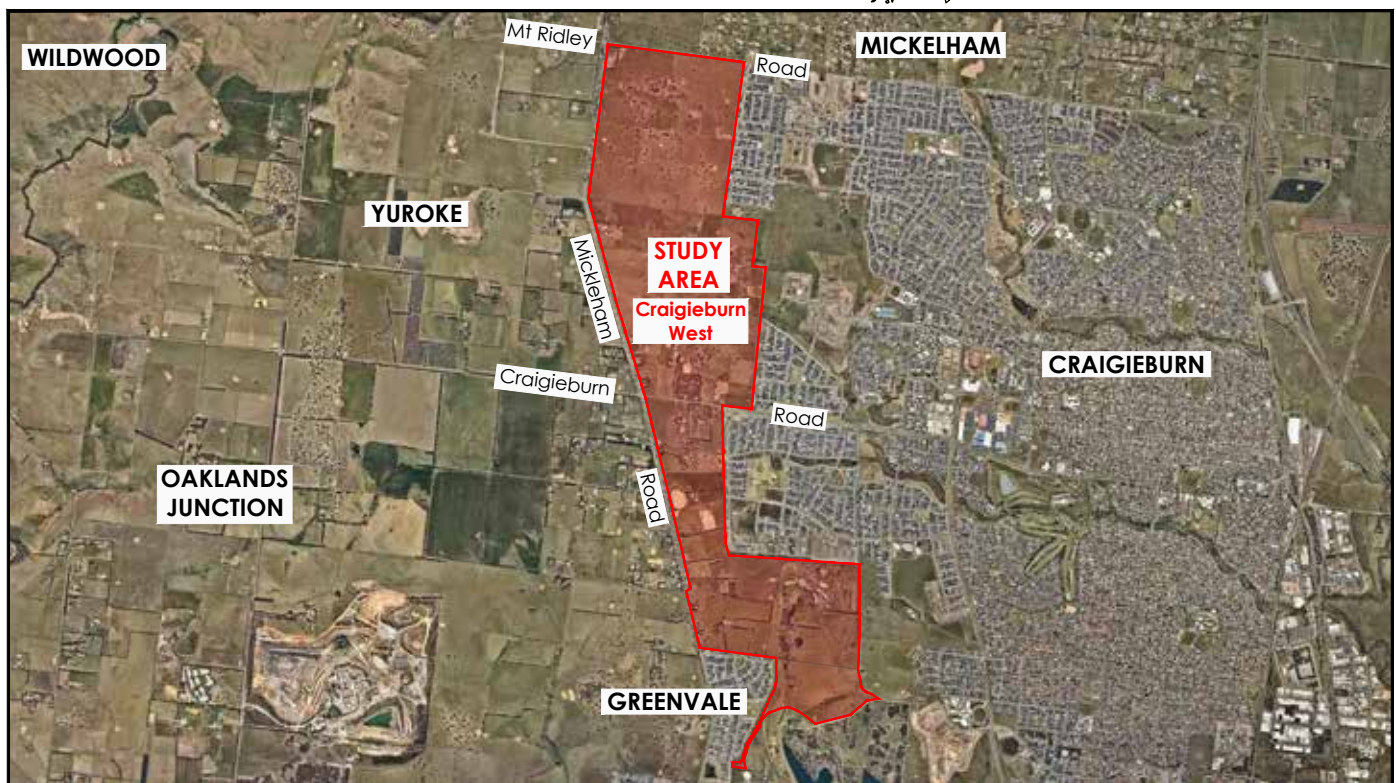
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Appendix A Figures



Project Number : M0639	Figure : 1	Date : 19/12/2018	LEGEND : <div> Study Area</div>
Drawn By : P.Bazalicki	Revision : A	Vertical Datum : Australian Height Datum	
Checked By : H.Sanders	Horizontal Datum: MGA Zone 55 based on GDA94 Datum		
Data Sources : <ul style="list-style-type: none">- Nearmap Aerial Photography, Oct 2018- VICMAP Property Boundaries, Oct 2018- Study Area-Victorian Planning Authority, Oct 2018.		Scale : <div><p>0 500 1000 1500 2000 2500</p><p>Scale in metres</p></div> <div><p>Zone 55 MGA</p></div>	

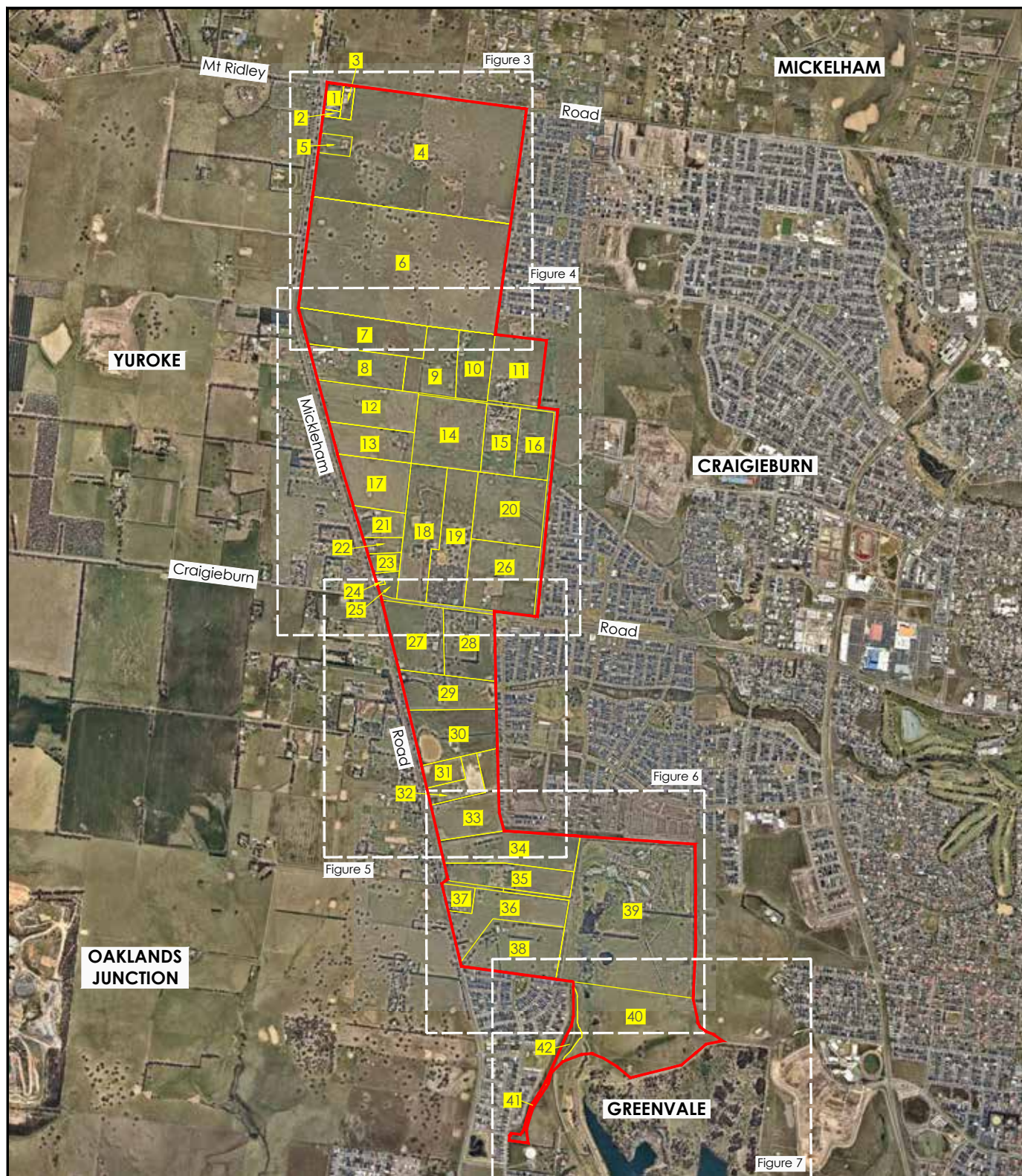
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CLIENT :	Victorian Planning Authority
LOCATION :	Craigieburn West, Victoria
FIGURE TITLE :	LOCATION MAP

M0639_Fig1_Location Plan.dwg



Project Number : M0639	Figure : 1	Date : 19/12/2018
Drawn By : P.Bazalicki	Revision : A	Vertical Datum : Australian Height Datum
Checked By : J.Bowler	Horizontal Datum : MGA Zone 55 based on GDA94 Datum	
Data Sources : - Nearmap Aerial Photography, Oct 2018 - VICMAP Property Boundaries, Oct 2018 - Study Area-Victorian Planning Authority, Oct 2018, 'Additional Area' Nov 2018.		Scale : Scale in metres
		 Zone 55 MGA

LEGEND :

- Study Area
- Allotment Parcels

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CLIENT : Victorian Planning Authority

LOCATION : Craigieburn West, Victoria

FIGURE TITLE : Study Area and Additional Area Boundaries

M0639_Fig2_Study Area & Allotments.dwg



Project Number : M0639	Figure : 3	Date : 19/12/2018
Drawn By : P.Bazalicki	Revision : A	Vertical Datum : Australian Height Datum
Checked By : J.Bowler	Horizontal Datum : MGA Zone 55 based on GDA94 Datum	
Data Sources : - Nearmap Aerial Photography, Oct 2018 - VICMAP Property Boundaries, Oct 2018 - Study Area-Victorian Planning Authority, Oct 2018.		Scale : 0 50 100 150 200 250 Scale in metres
LEGEND : <div style="display: flex; align-items: center;"> <div style="border: 2px solid red; width: 20px; height: 10px; margin-right: 5px;"></div> <div>Study Area</div> </div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="border: 2px solid yellow; width: 20px; height: 10px; margin-right: 5px;"></div> <div>39 Allotment Parcels</div> </div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="border: 2px solid green; width: 20px; height: 10px; margin-right: 5px;"></div> <div>Landuse</div> </div>		

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GEELONG OFFICE
14 Albert Street,
Geelong West Vic 3218
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PO Box 1628 Geelong VIC 3220

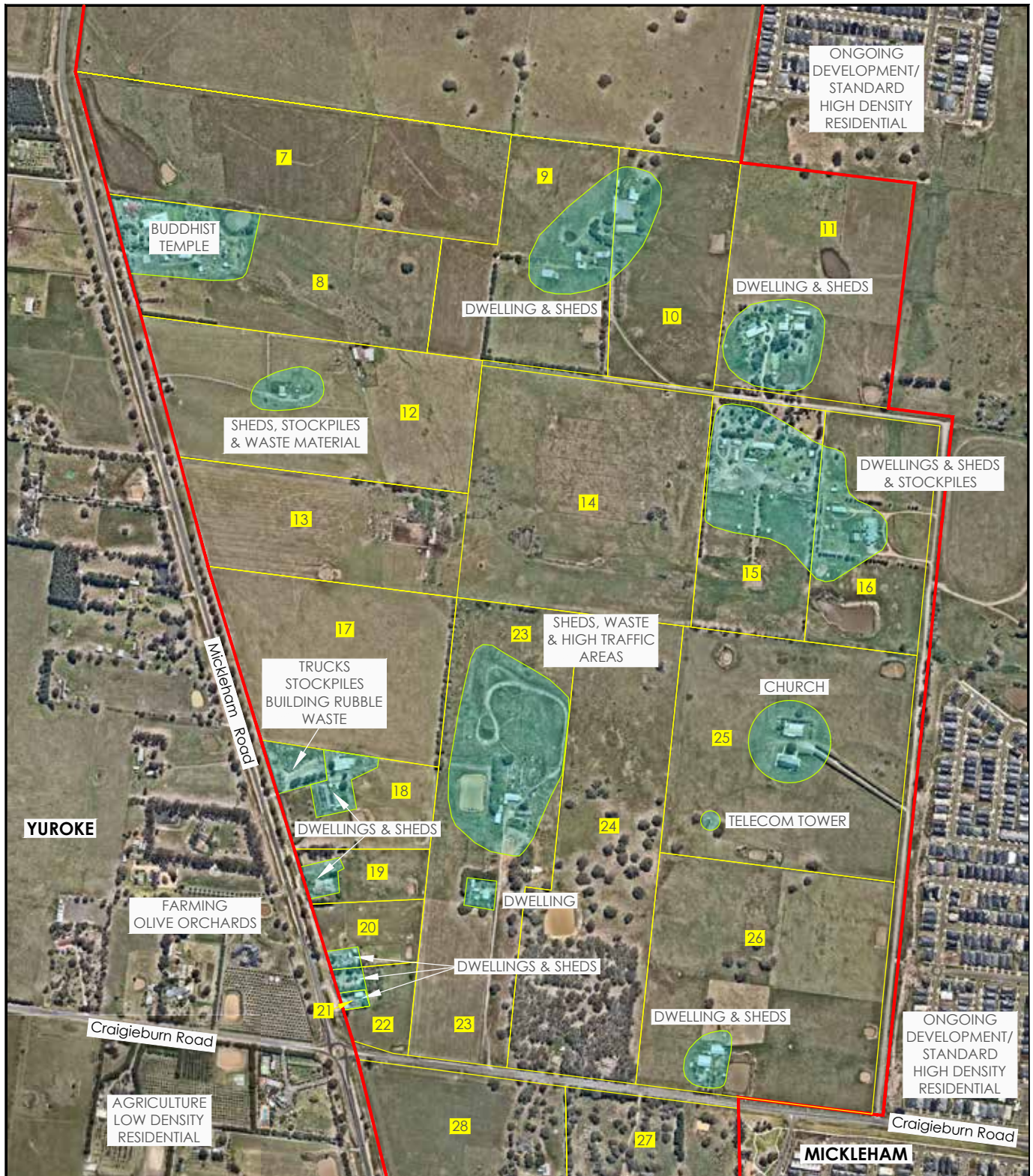
MELBOURNE OFFICE
293A Bay Street, Port Melbourne
T: 03 9646 0833
Email admin@landserv.com.au
www.landserv.com.au

CLIENT : Victorian Planning Authority

LOCATION : Craigieburn West, Victoria

FIGURE TITLE : STUDY AREA LAYOUT PLAN-Northern

M0639_Fig3_Site Inspection_Part 1.dwg



Project Number : M0639	Figure : 4	Date : 19/12/2018
Drawn By : P.Bazalicki	Revision : A	Vertical Datum : Australian Height Datum
Checked By : H.Sanders	Horizontal Datum: MGA Zone 55 based on GDA94 Datum	
Data Sources : - Nearmap Aerial Photography, Oct 2018 - VICMAP Property Boundaries, Oct 2018 - Study Area-Victorian Planning Authority, Oct 2018.		Scale : 0 50 100 150 200 250 Scale in metres
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CLIENT : Victorian Planning Authority

LOCATION : Craigieburn West, Victoria

FIGURE TITLE : STUDY AREA LAYOUT PLAN-North/Central

M0639_Fig4_Site Inspection_Part 2.dwg



Project Number : M0639	Figure : 5	Date : 19/12/2018
Drawn By : P.Bazalicki	Revision : A	Vertical Datum : Australian Height Datum
Checked By : H.Sanders	Horizontal Datum: MGA Zone 55 based on GDA94 Datum	
Data Sources : - Nearmap Aerial Photography, Oct 2018 - VICMAP Property Boundaries, Oct 2018 - Study Area-Victorian Planning Authority, Oct 2018.		LEGEND : <div style="display: flex; align-items: center;"> <div style="border: 2px solid red; width: 20px; height: 10px; margin-right: 5px;"></div> Study Area </div> <div style="display: flex; align-items: center;"> <div style="border: 2px solid yellow; width: 20px; height: 10px; margin-right: 5px;"></div> 39 Allotment Parcels </div> <div style="display: flex; align-items: center;"> <div style="background-color: #90EE90; width: 20px; height: 10px; margin-right: 5px;"></div> Landuse </div>
Scale : <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">0 50 100 150 200 250</div> </div> Scale in metres		

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CLIENT : Victorian Planning Authority

LOCATION : Craigieburn West, Victoria

FIGURE TITLE : STUDY AREA LAYOUT PLAN-South/Central

M0639_Fig5_Site Inspection_Part 3.dwg



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www.landserv.com.au

LEGEND :

- Study Area
- 39 Allotment Parcels
- Landuse

Project Number : M0639

Drawn By : P.Bazalicki

Checked By : J.Bowler

Data Sources :

- Nearmap Aerial Photography, Oct 2018
- VICMAP Property Boundaries, Oct 2018
- Study Area-Victorian Planning Authority, Oct 2018.

Figure : 6 Date : 19/12/2018

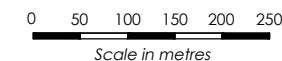
Revision : A

Vertical Datum : Australian Height Datum

Horizontal Datum: MGA Zone 55 based on
GDA94 Datum



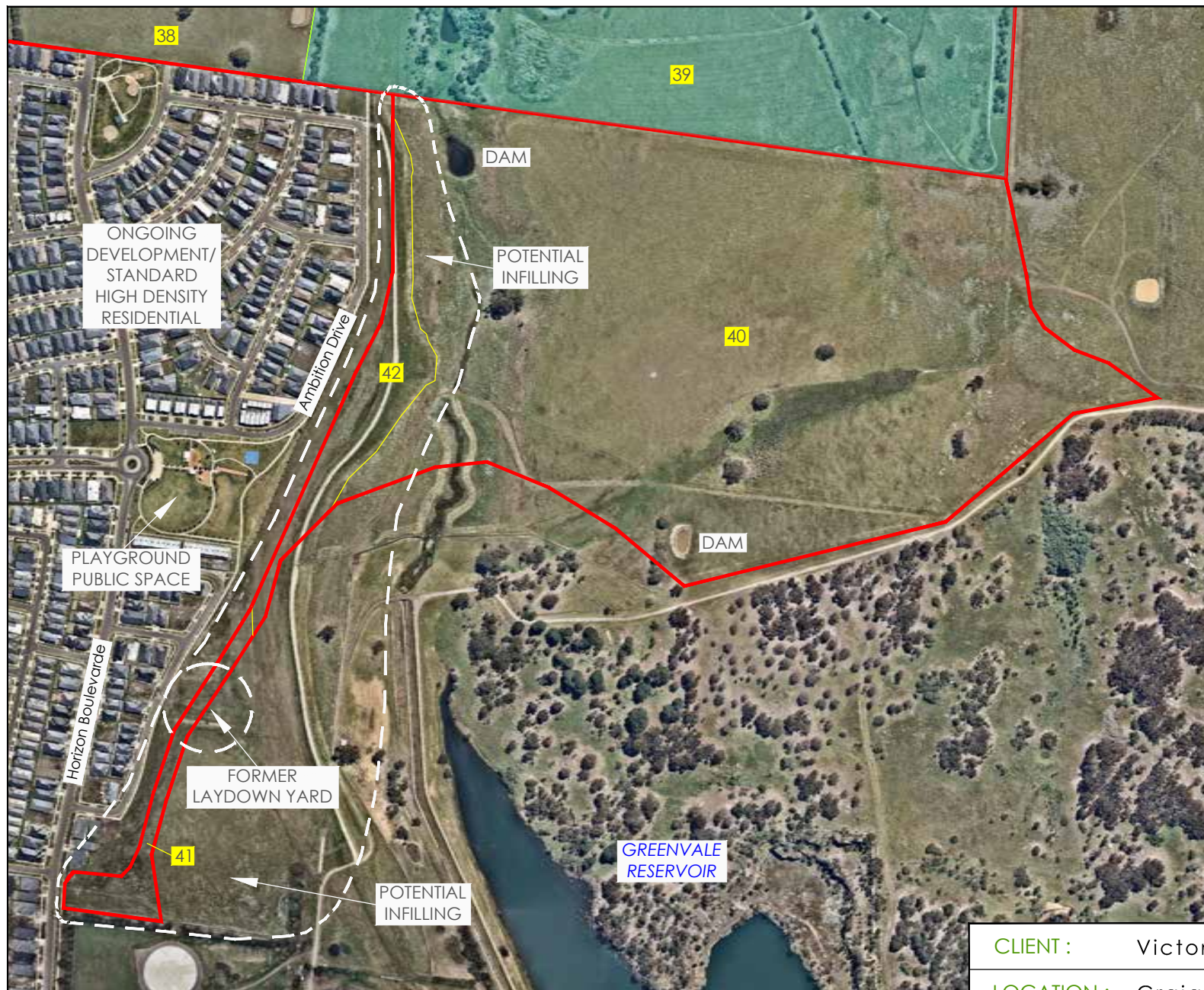
Scale :



CLIENT : Victorian Planning Authority

LOCATION : Craigieburn West, Victoria

FIGURE TITLE : STUDY AREA LAYOUT PLAN-Southern



LEGEND :

- Study Area
- Allotment Parcels
- Landuse
- Potential Infilling Area

Project Number : M0639

Drawn By : P.Bazalicki

Checked By : J.Bowler

Data Sources :

- Nearmap Aerial Photography, Oct 2018
- VICMAP Property Boundaries, Oct 2018
- Study Area-Victorian Planning Authority, Oct 2018.

Figure : 7 **Date :** 19/12/2018

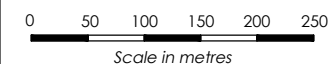
Revision : A

Vertical Datum : Australian Height Datum

Horizontal Datum : MGA Zone 55 based on GDA94 Datum



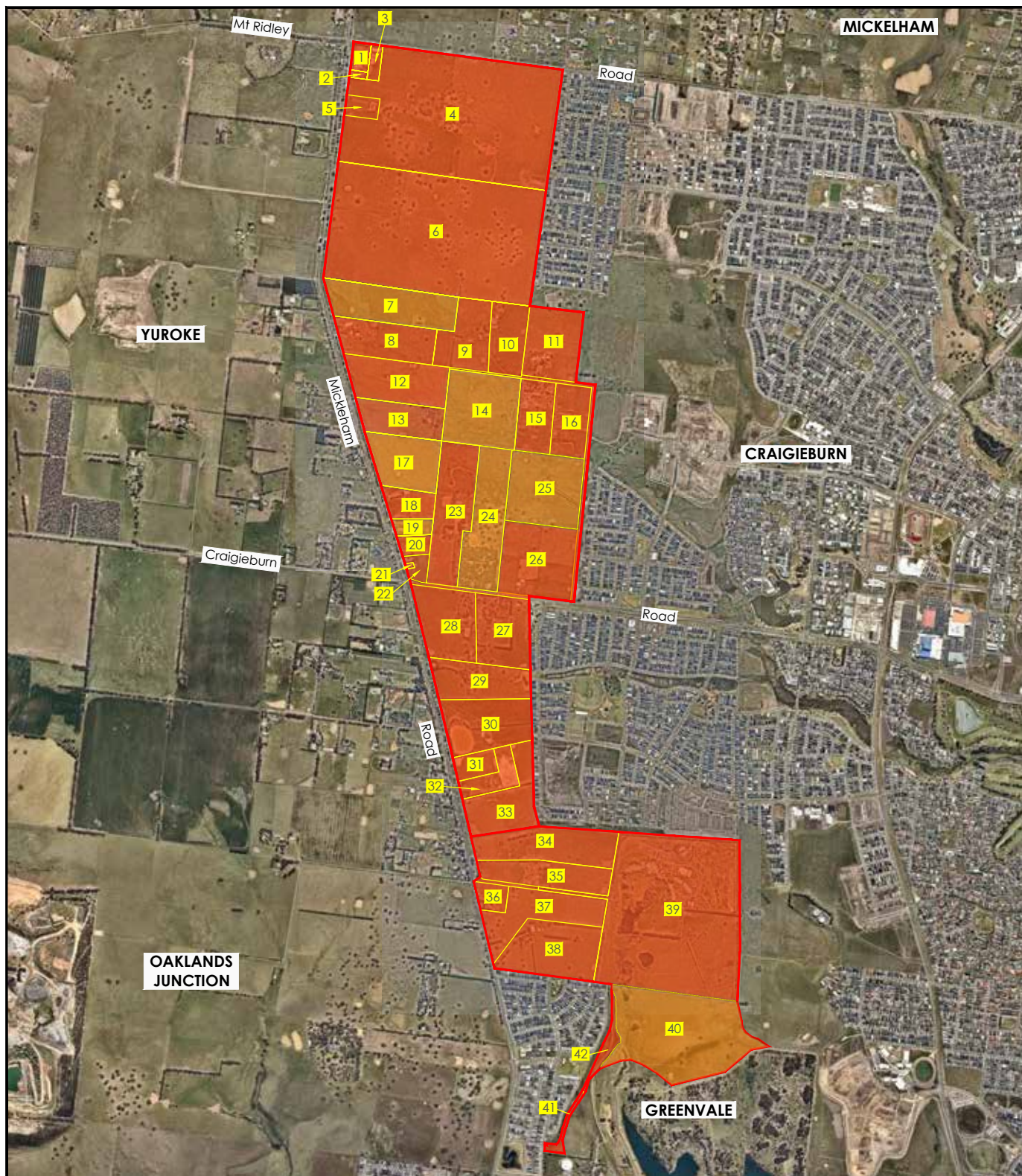
Scale :



CLIENT : Victorian Planning Authority

LOCATION : Craigieburn West, Victoria

FIGURE TITLE : STUDY AREA LAYOUT PLAN-Southern



Project Number : M0639	Figure : 8	Date : 19/12/2018
Drawn By : P.Bazalicki	Revision : A	Vertical Datum : Australian Height Datum
Checked By : H.Sanders	Horizontal Datum : MGA Zone 55 based on GDA94 Datum	
Data Sources : - Nearmap Aerial Photography, Oct 2018 - VICMAP Property Boundaries, Oct 2018 - Study Area-Victorian Planning Authority, Oct 2018.		Scale : Scale in metres
		LEGEND : Study Area Allotment Parcels Potential Contamination-Low to Moderate Potential Contamination-Moderate

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www.landserv.com.au

CLIENT : Victorian Planning Authority

LOCATION : Craigieburn West, Victoria

FIGURE TITLE : STUDY AREA POTENTIAL FOR CONTAMINATION

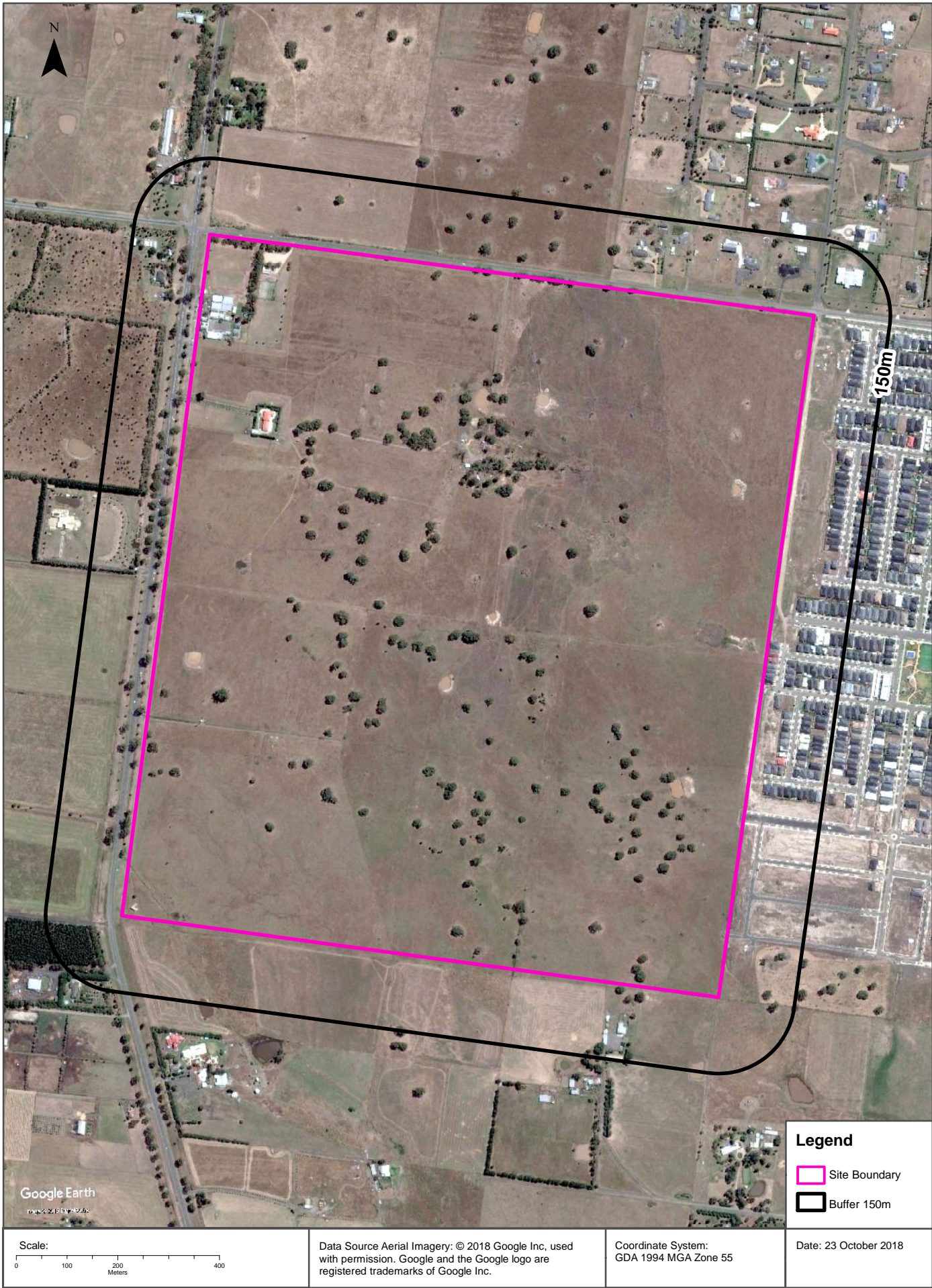
M0639_Fig8_Potential Contamination Plan.dwg

Appendix B

Historical Aerials Photographs

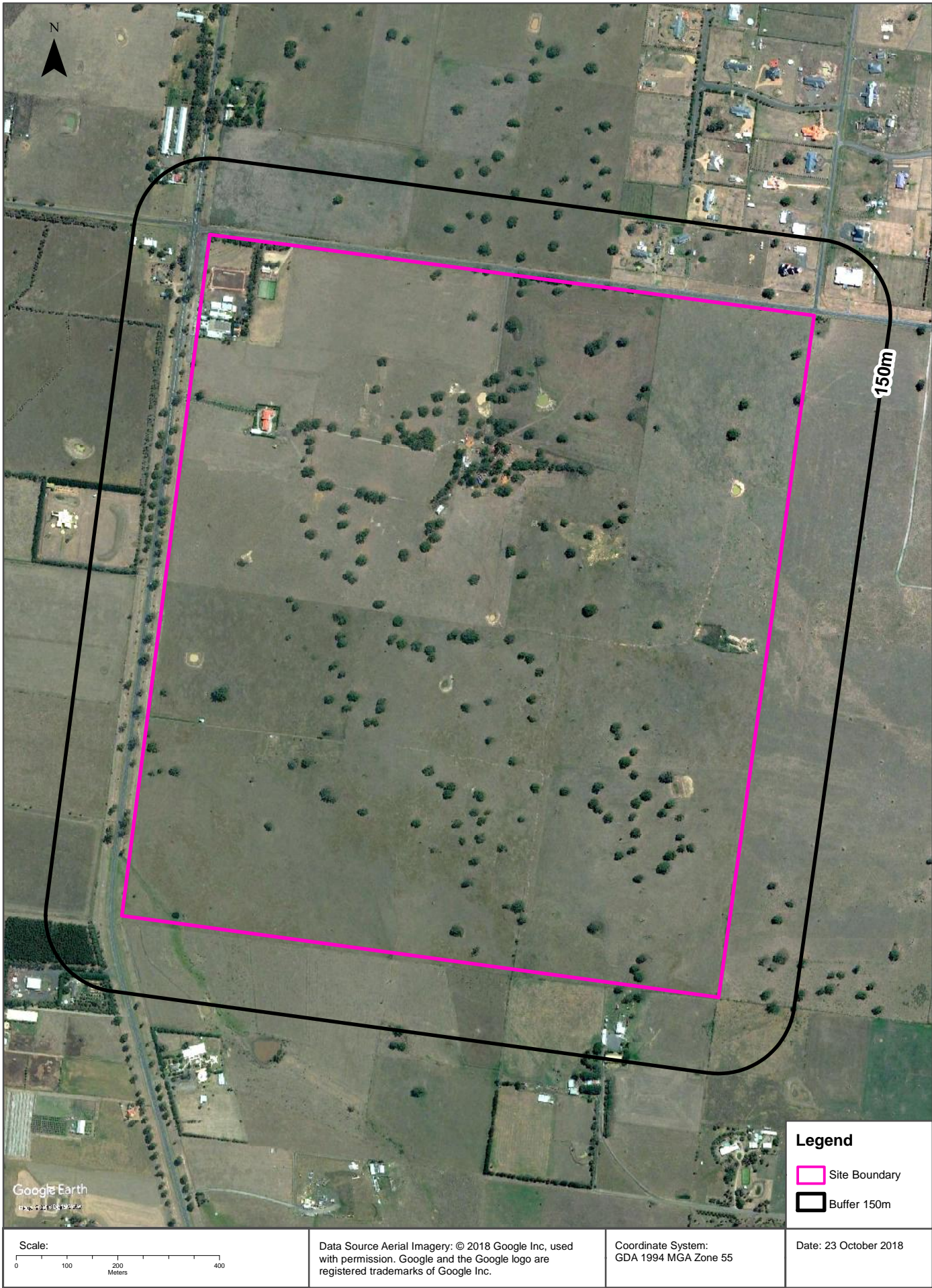
Aerial Imagery 2017

Craigieburn Road, Craigieburn West, VIC 3064 (Part 1)



Aerial Imagery 2010

Craigieburn Road, Craigieburn West, VIC 3064 (Part 1)



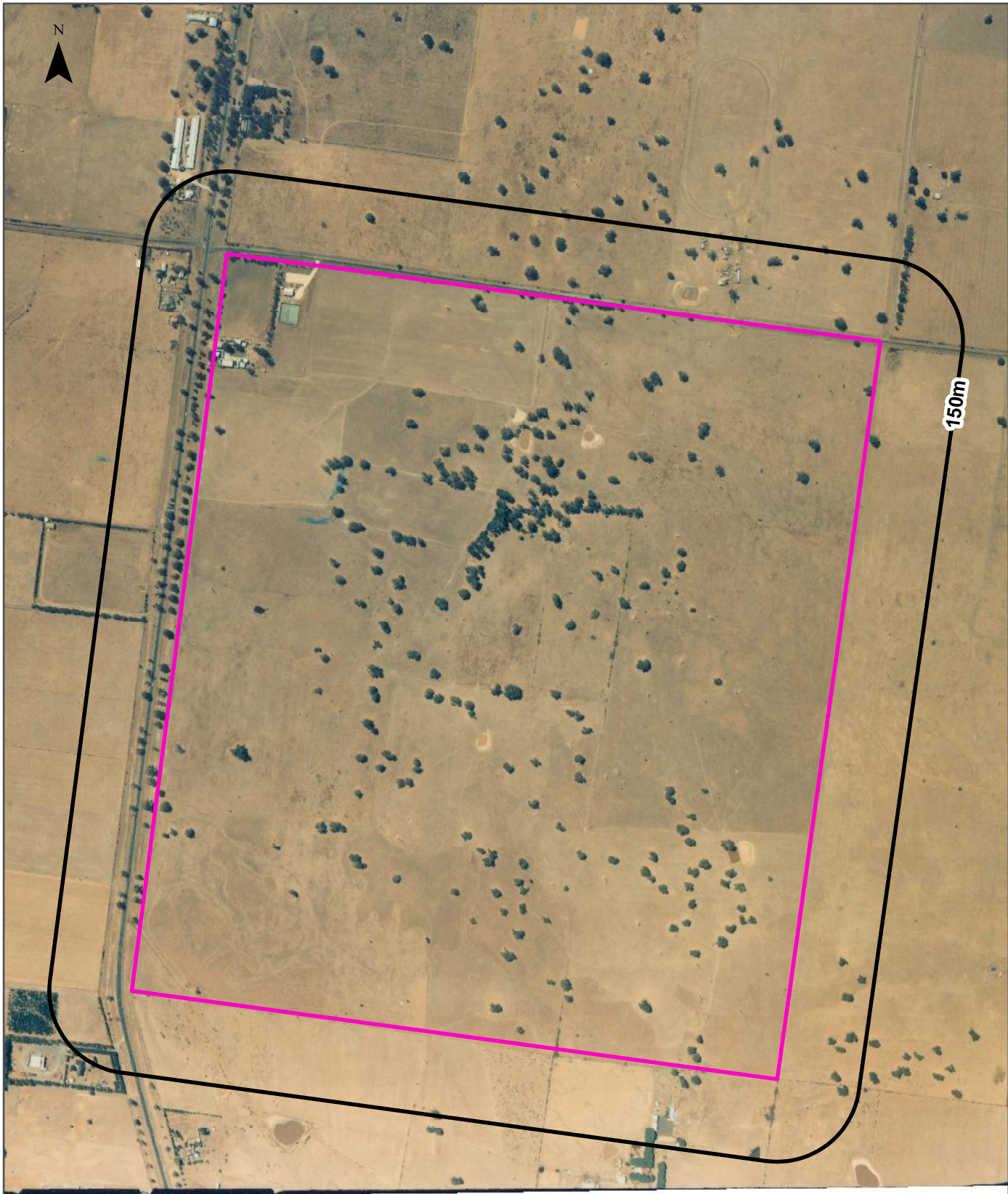
Aerial Imagery 2002

Craigieburn Road, Craigieburn West, VIC 3064 (Part 1)



Aerial Imagery 1991

Craigieburn Road, Craigieburn West, VIC 3064 (Part 1)

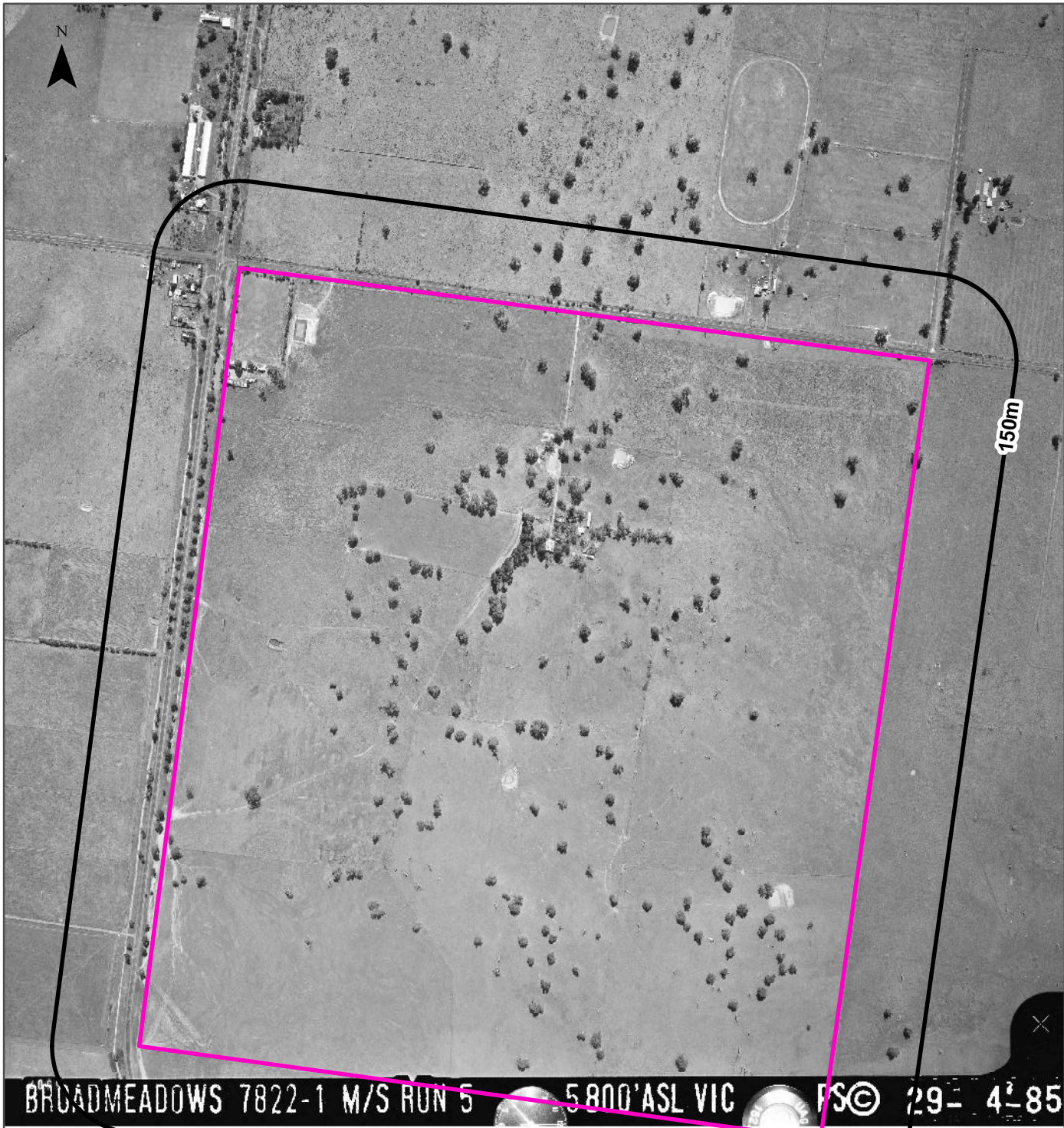


- Legend**
- Site Boundary
 - Buffer 150m

Scale: 0 100 200 400 Meters	Data Source Aerial Imagery: © Department of Environment, Land, Water and Planning (Vicmap Topographic Mapping Program)	Coordinate System: GDA 1994 MGA Zone 55	Date: 23 October 2018
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Aerial Imagery 1984

Craigieburn Road, Craigieburn West, VIC 3064 (Part 1)



Legend

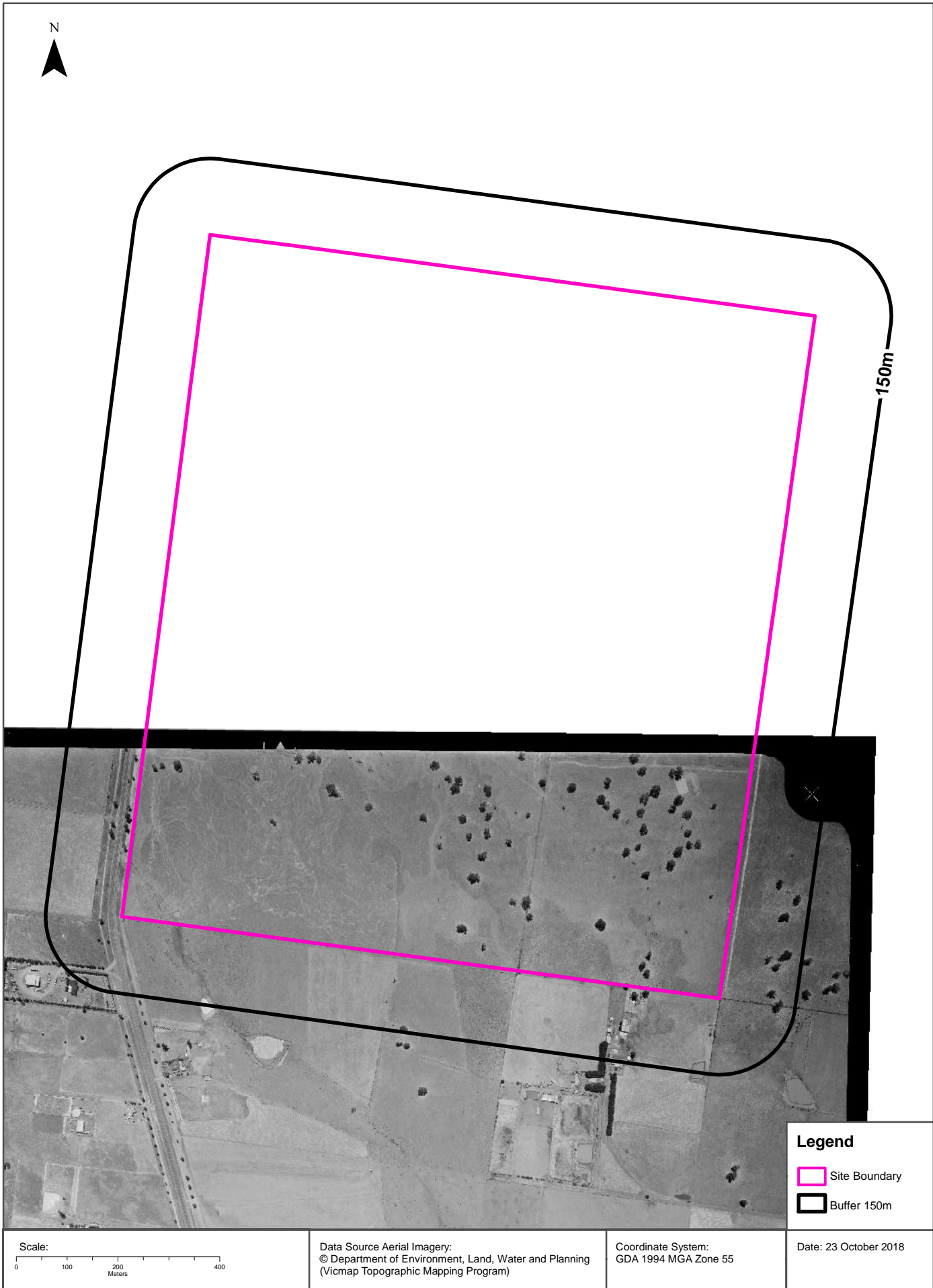
Site Boundary

Buffer 150m

Scale: 0 100 200 400 Meters	Data Source Aerial Imagery: © Department of Environment, Land, Water and Planning (Vicmap Topographic Mapping Program)	Coordinate System: GDA 1994 MGA Zone 55	Date: 23 October 2018
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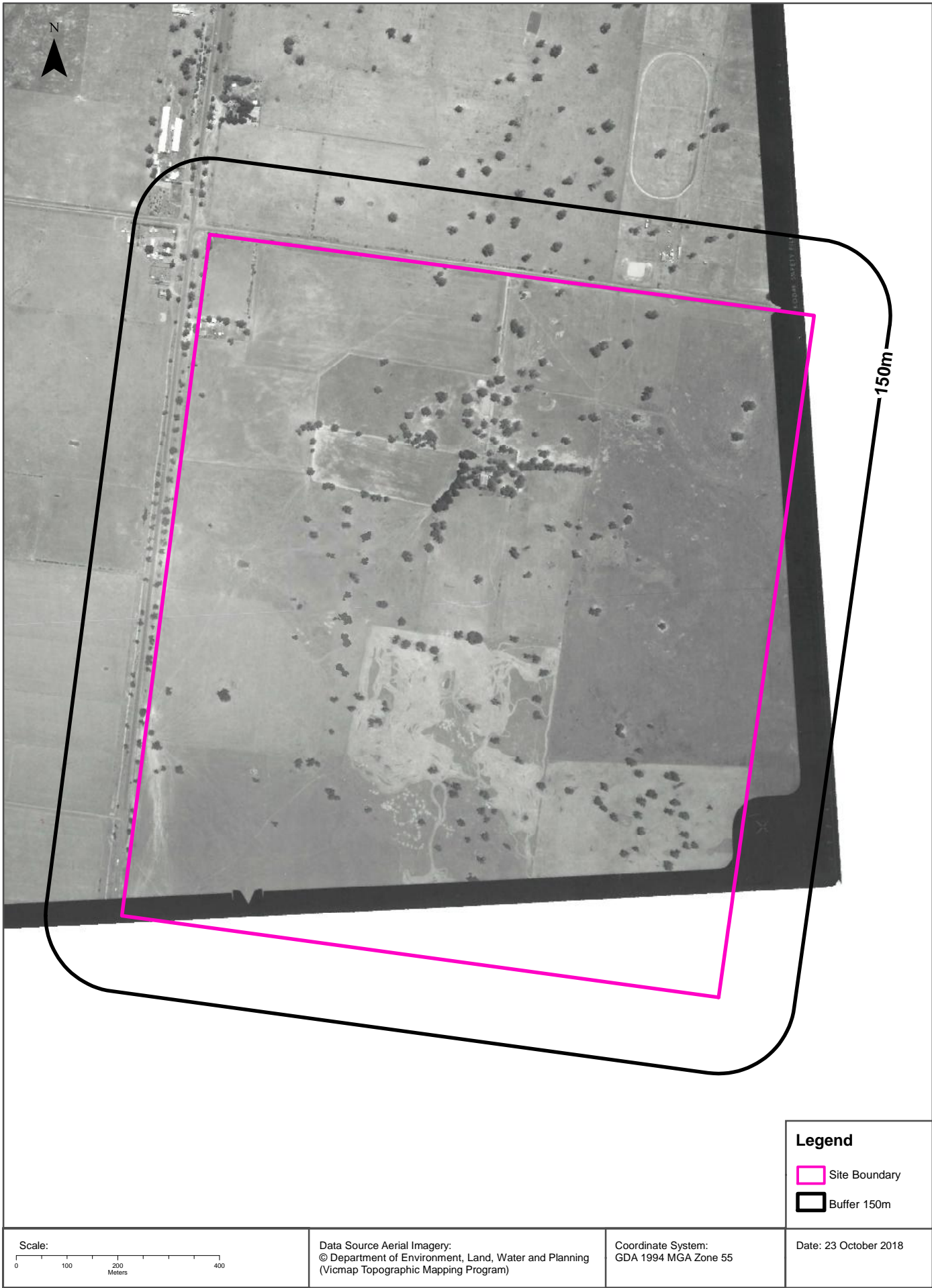
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Craigieburn Road, Craigieburn West, VIC 3064 (Part 1)



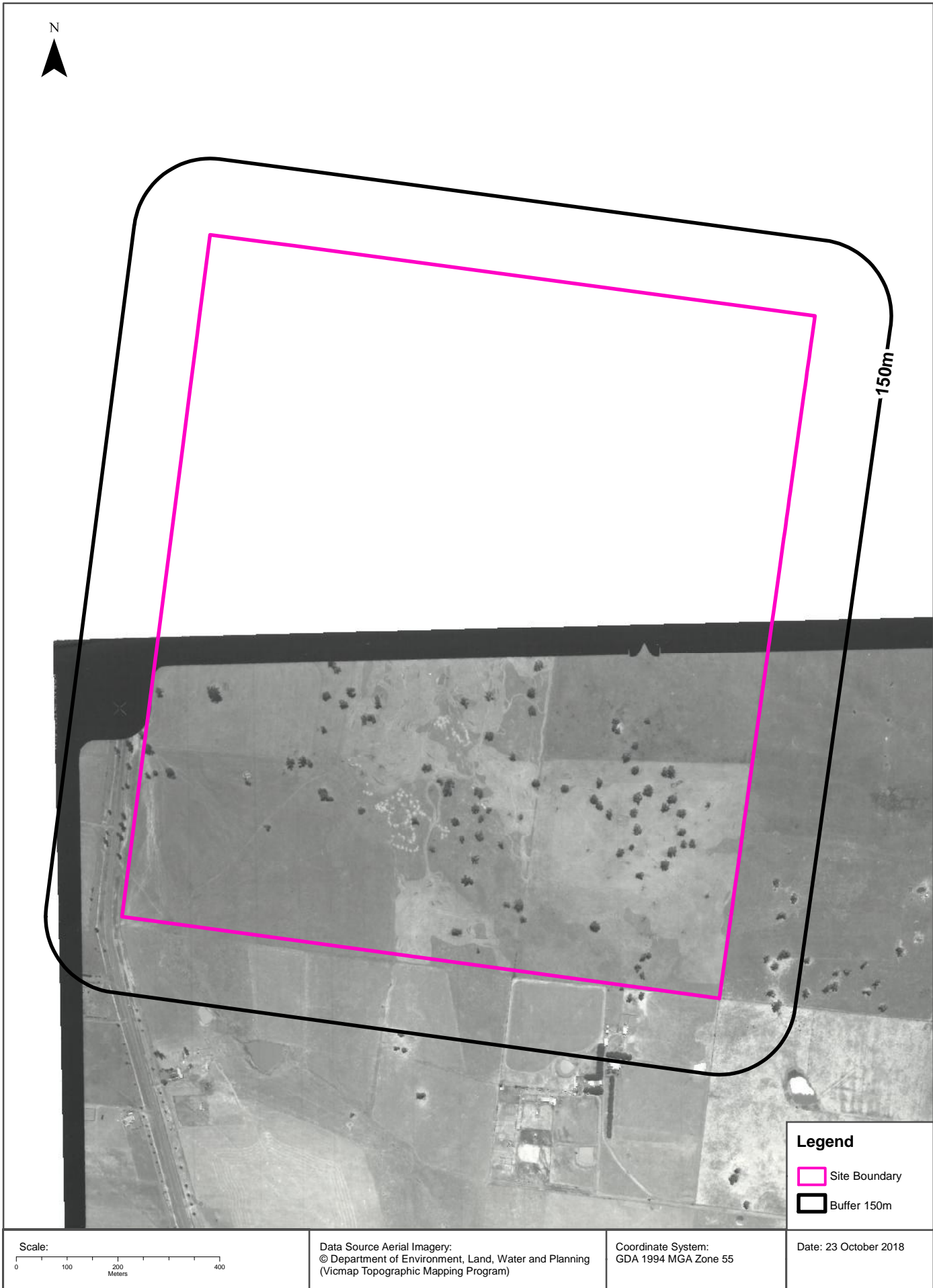
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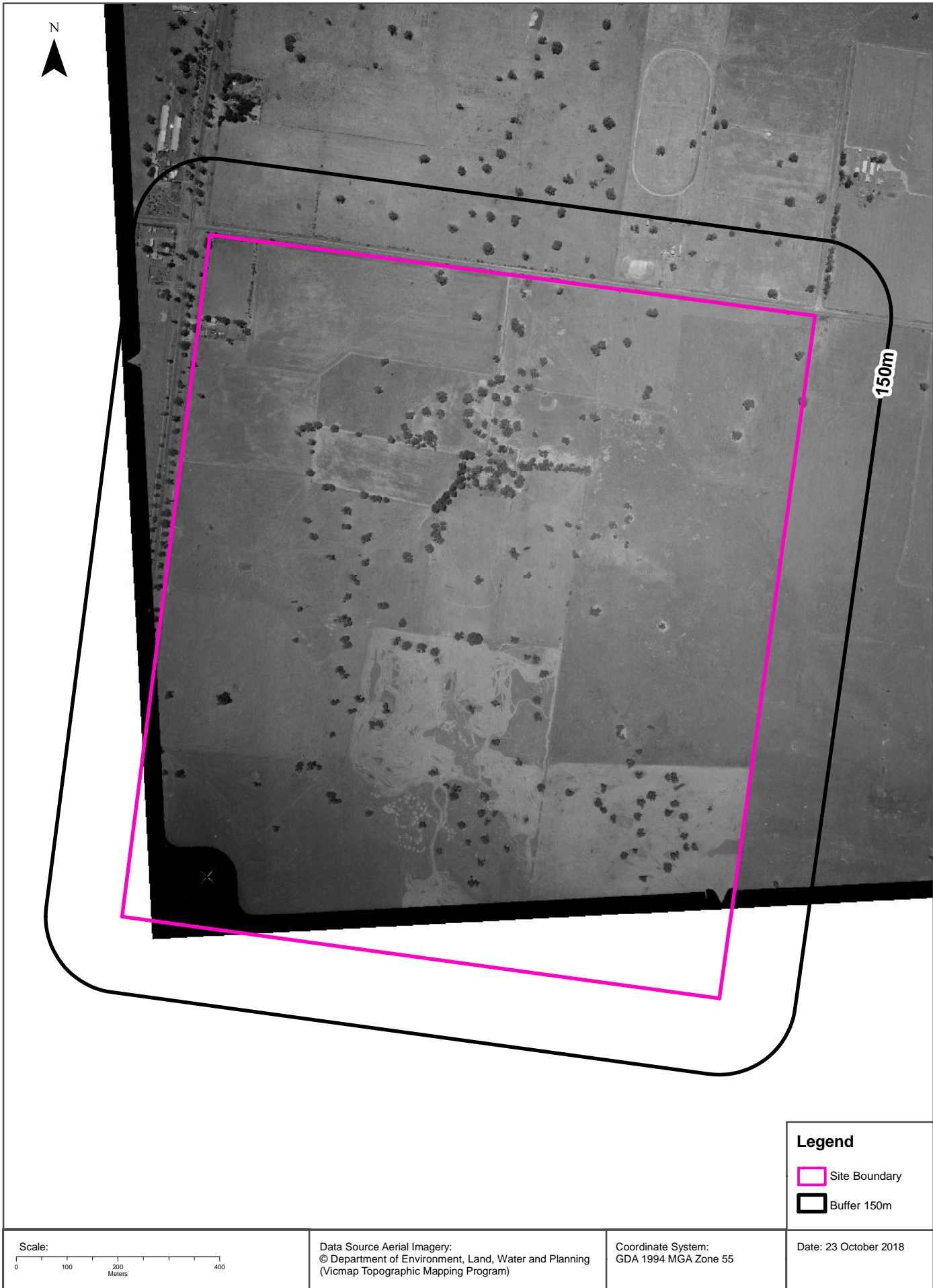
Aerial Imagery 1979

Craigieburn Road, Craigieburn West, VIC 3064 (Part 1)



Aerial Imagery 1979

Craigieburn Road, Craigieburn West, VIC 3064 (Part 1)



Aerial Imagery 1974

Craigieburn Road, Craigieburn West, VIC 3064 (Part 1)



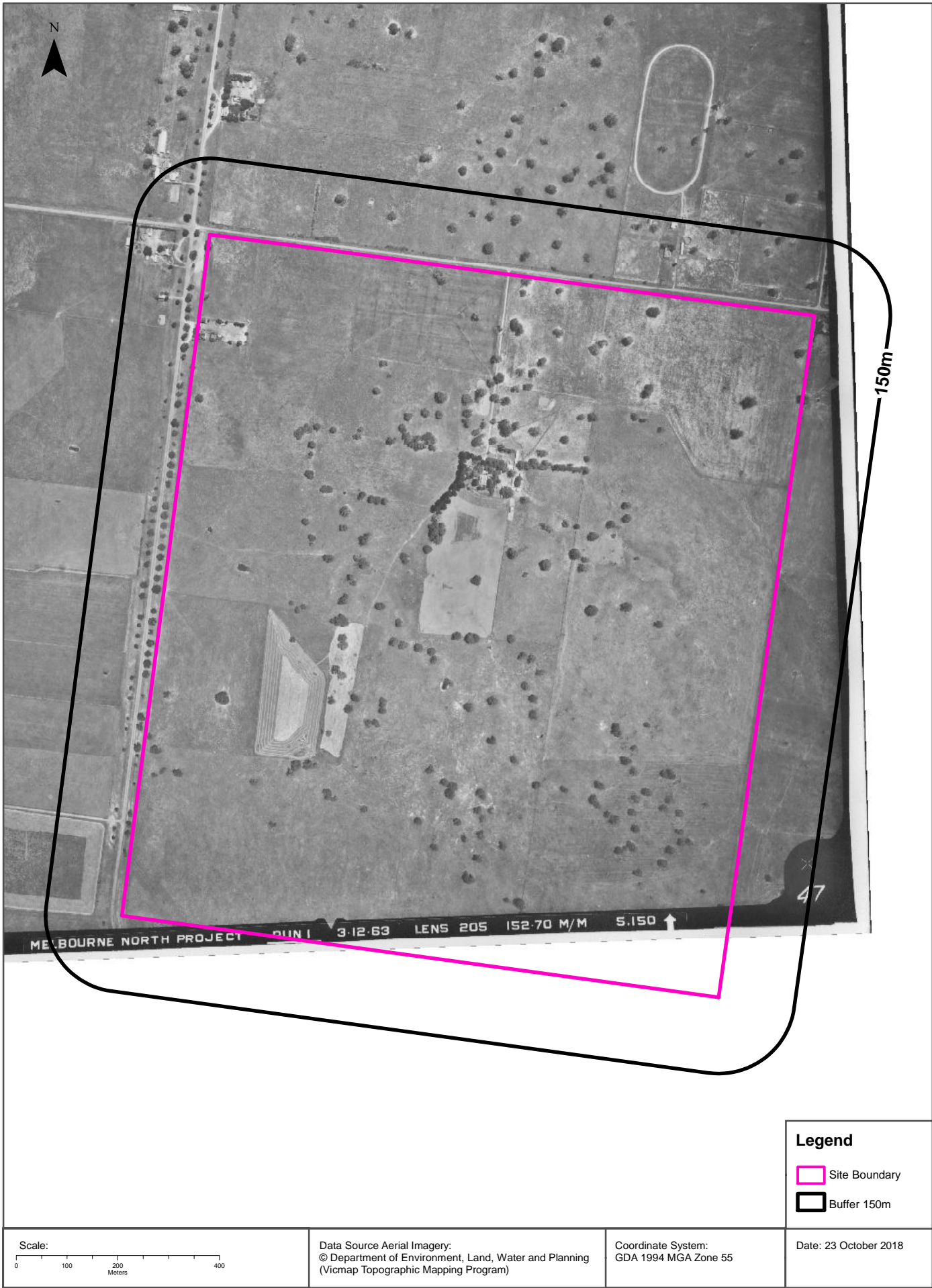
Aerial Imagery 1966

Craigieburn Road, Craigieburn West, VIC 3064 (Part 1)



Aerial Imagery 1963

Craigieburn Road, Craigieburn West, VIC 3064 (Part 1)



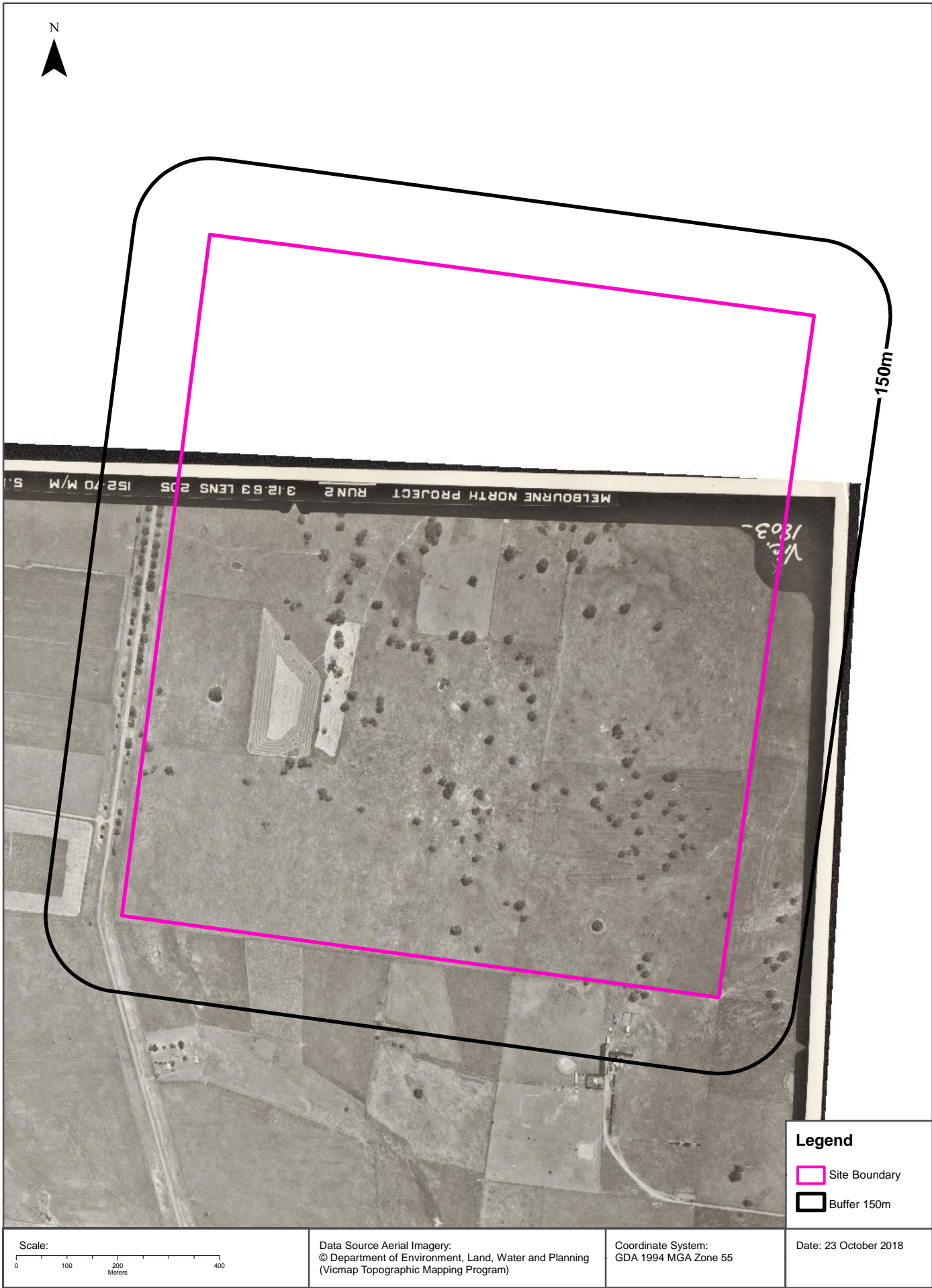
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Craigieburn Road, Craigieburn West, VIC 3064 (Part 1)



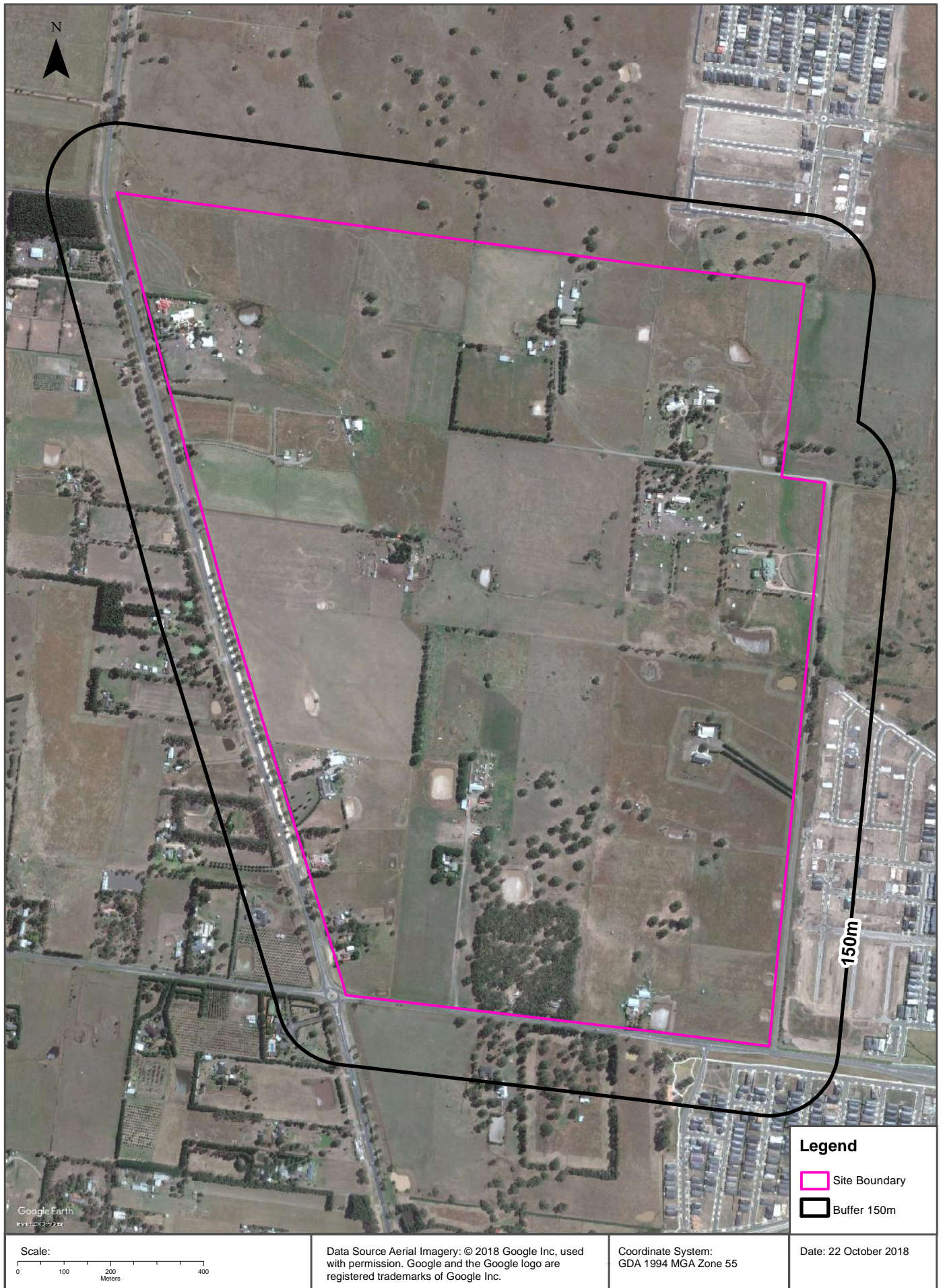
Aerial Imagery 1963

Craigieburn Road, Craigieburn West, VIC 3064 (Part 1)



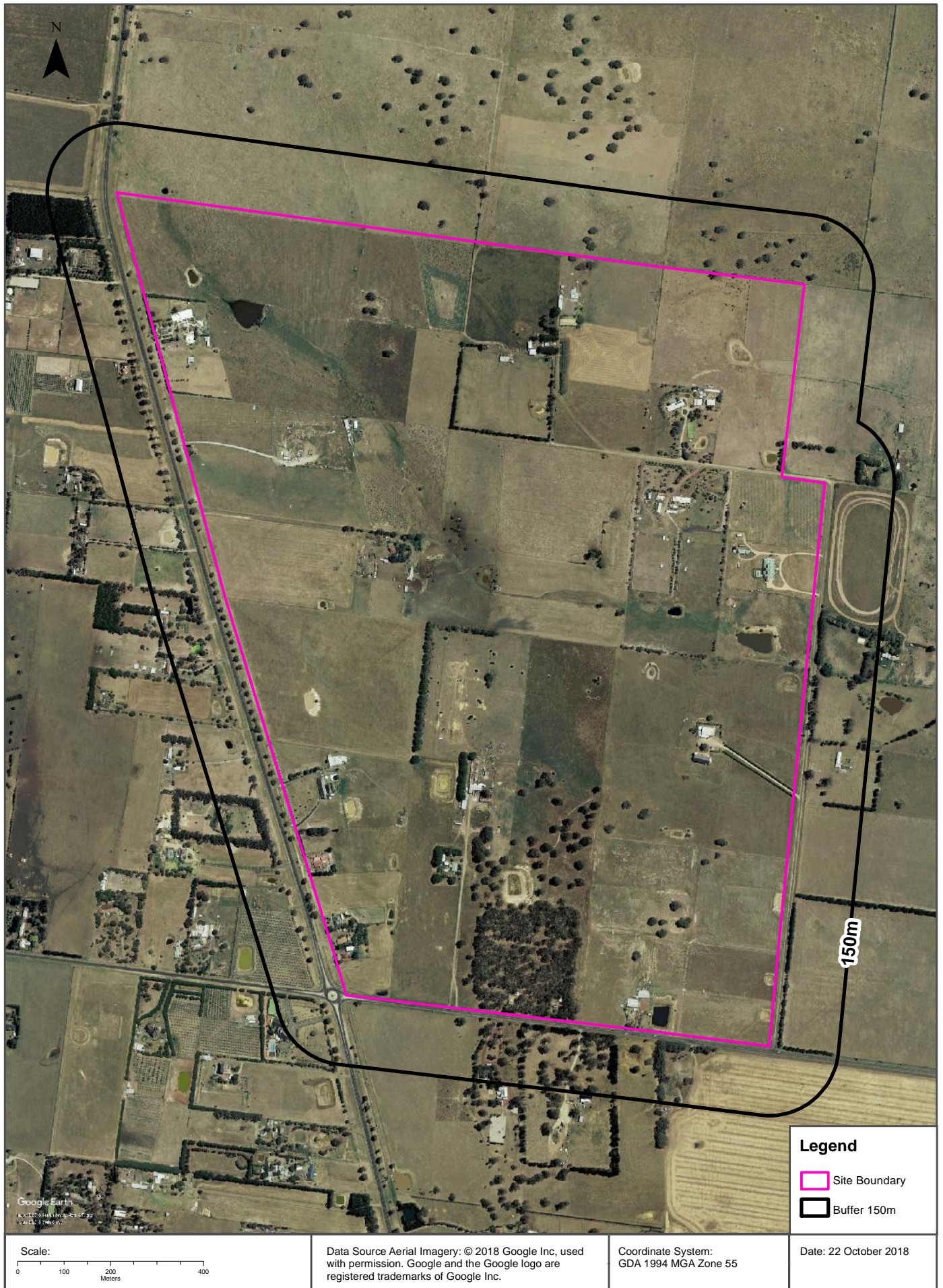
Aerial Imagery 2017

Craigieburn Road, Craigieburn West, VIC 3064 (Part 2)



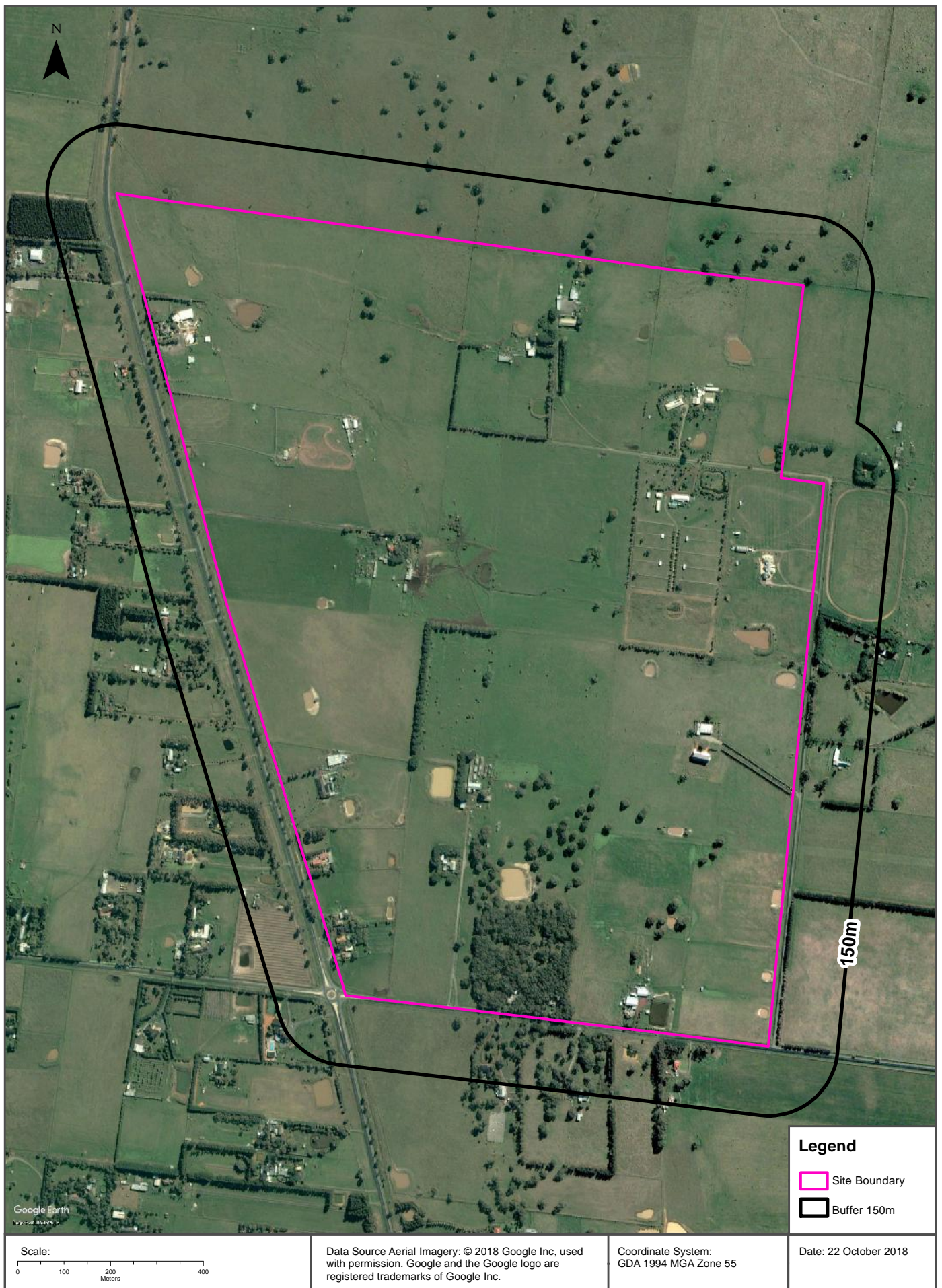
Aerial Imagery 2009

Craigieburn Road, Craigieburn West, VIC 3064 (Part 2)



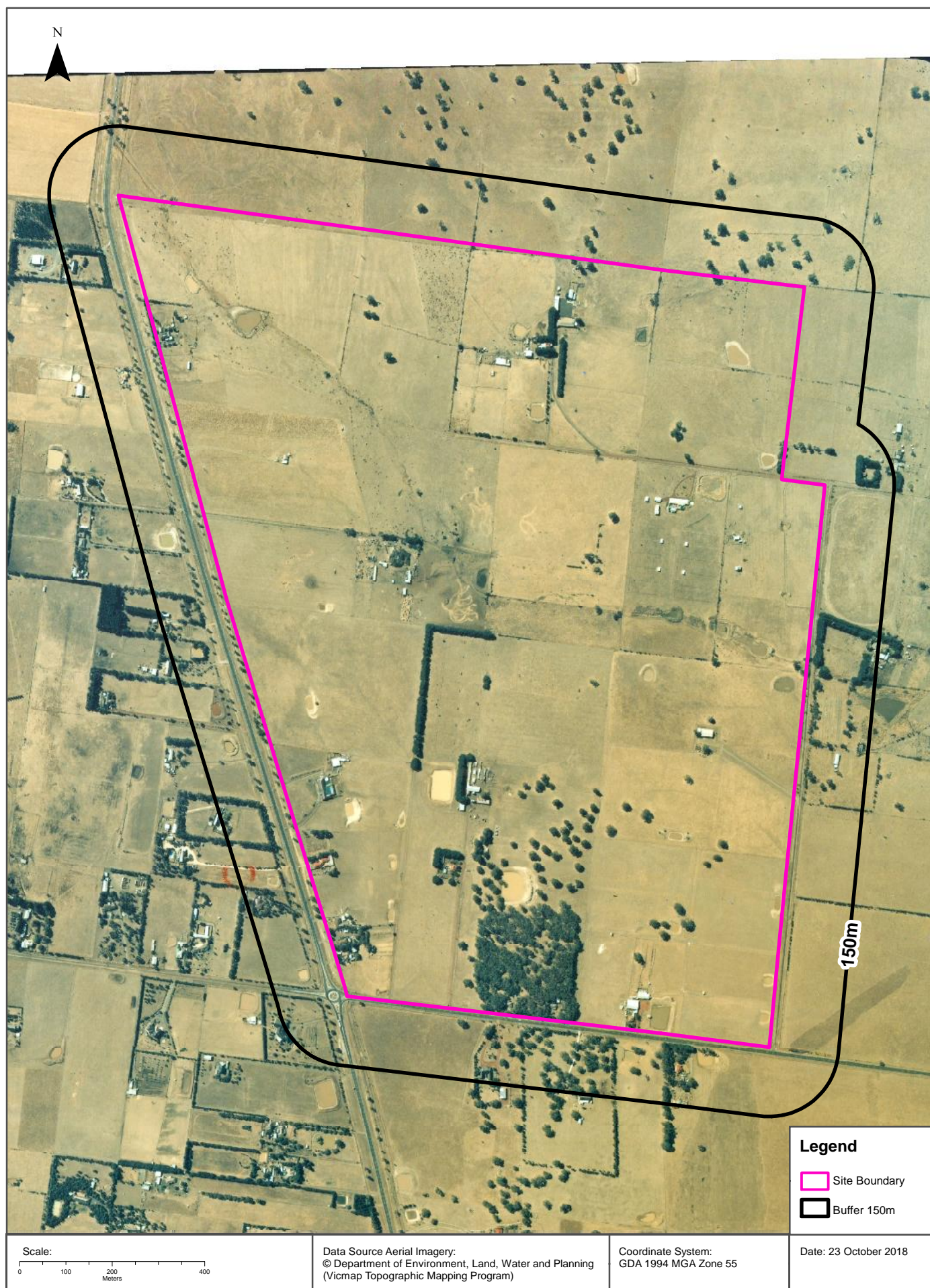
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Craigieburn Road, Craigieburn West, VIC 3064 (Part 2)



Aerial Imagery 1991

Craigieburn Road, Craigieburn West, VIC 3064 (Part 2)



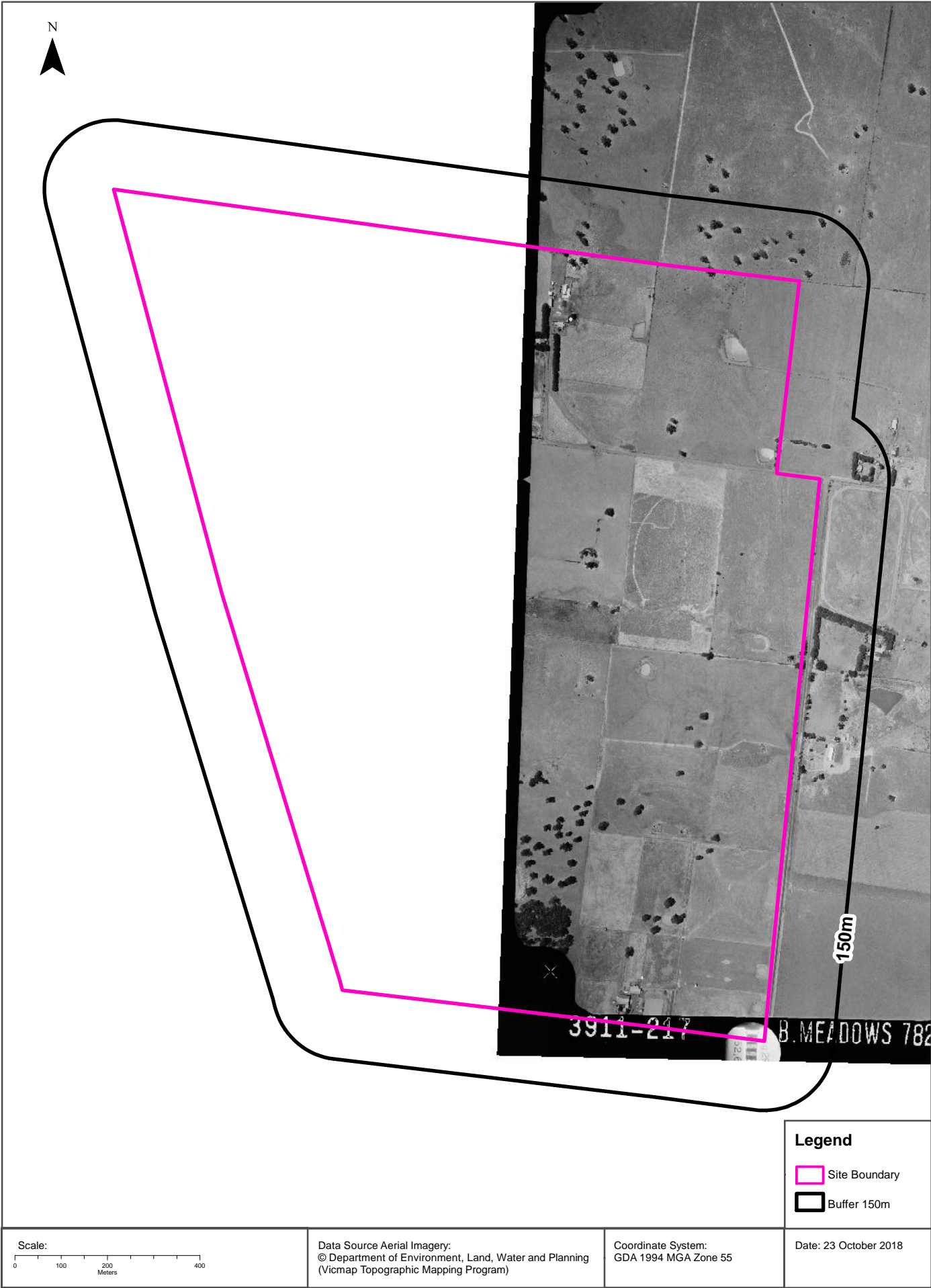
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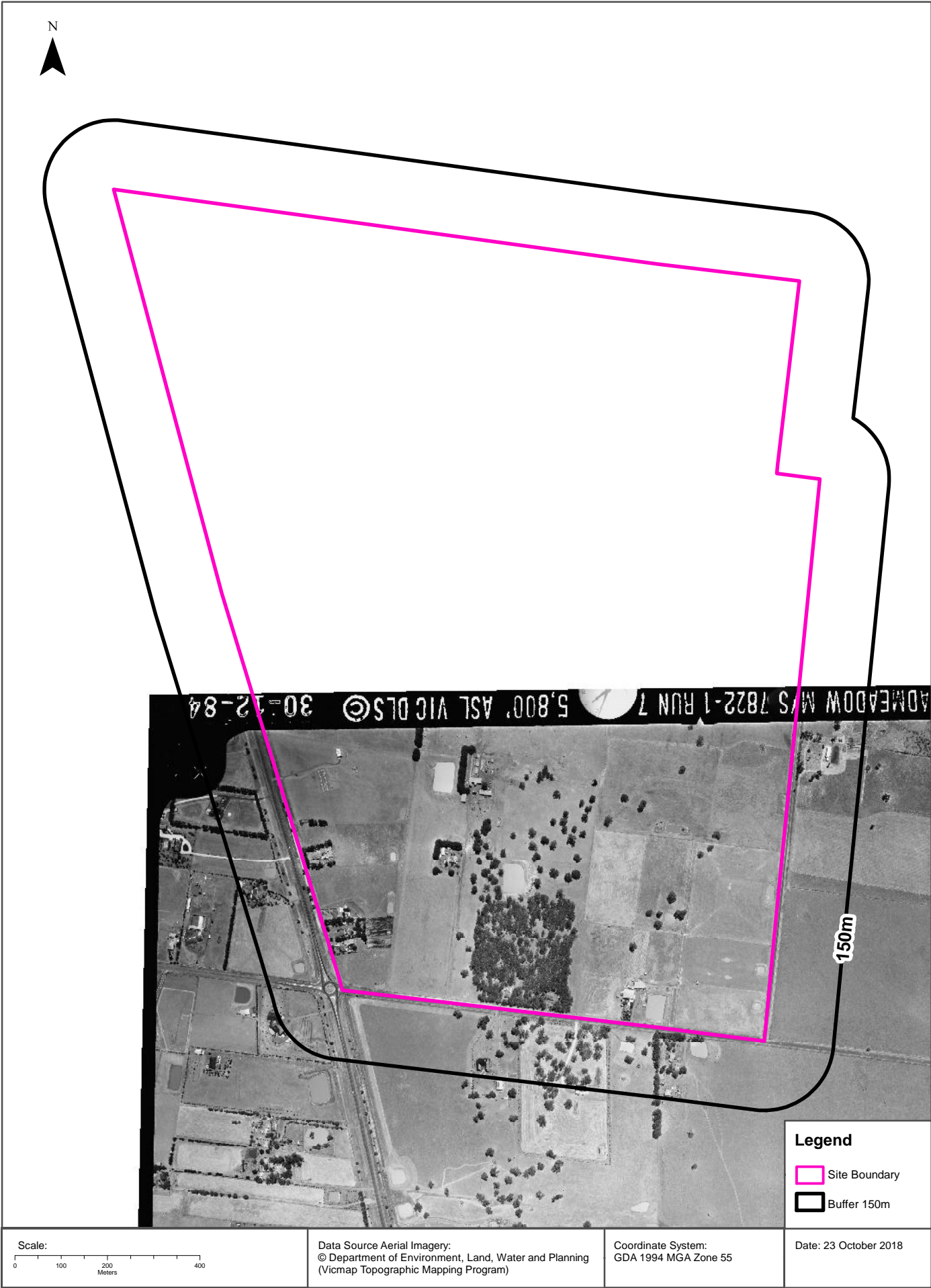
Aerial Imagery 1984

Craigieburn Road, Craigieburn West, VIC 3064 (Part 2)



Aerial Imagery 1984

Craigieburn Road, Craigieburn West, VIC 3064 (Part 2)



Aerial Imagery 1979

Craigieburn Road, Craigieburn West, VIC 3064 (Part 2)



Legend

- Site Boundary
- Buffer 150m

Scale: 0 100 200 400 Meters	Data Source Aerial Imagery: © Department of Environment, Land, Water and Planning (Vicmap Topographic Mapping Program)	Coordinate System: GDA 1994 MGA Zone 55	Date: 23 October 2018
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Aerial Imagery 1979

Craigieburn Road, Craigieburn West, VIC 3064 (Part 2)



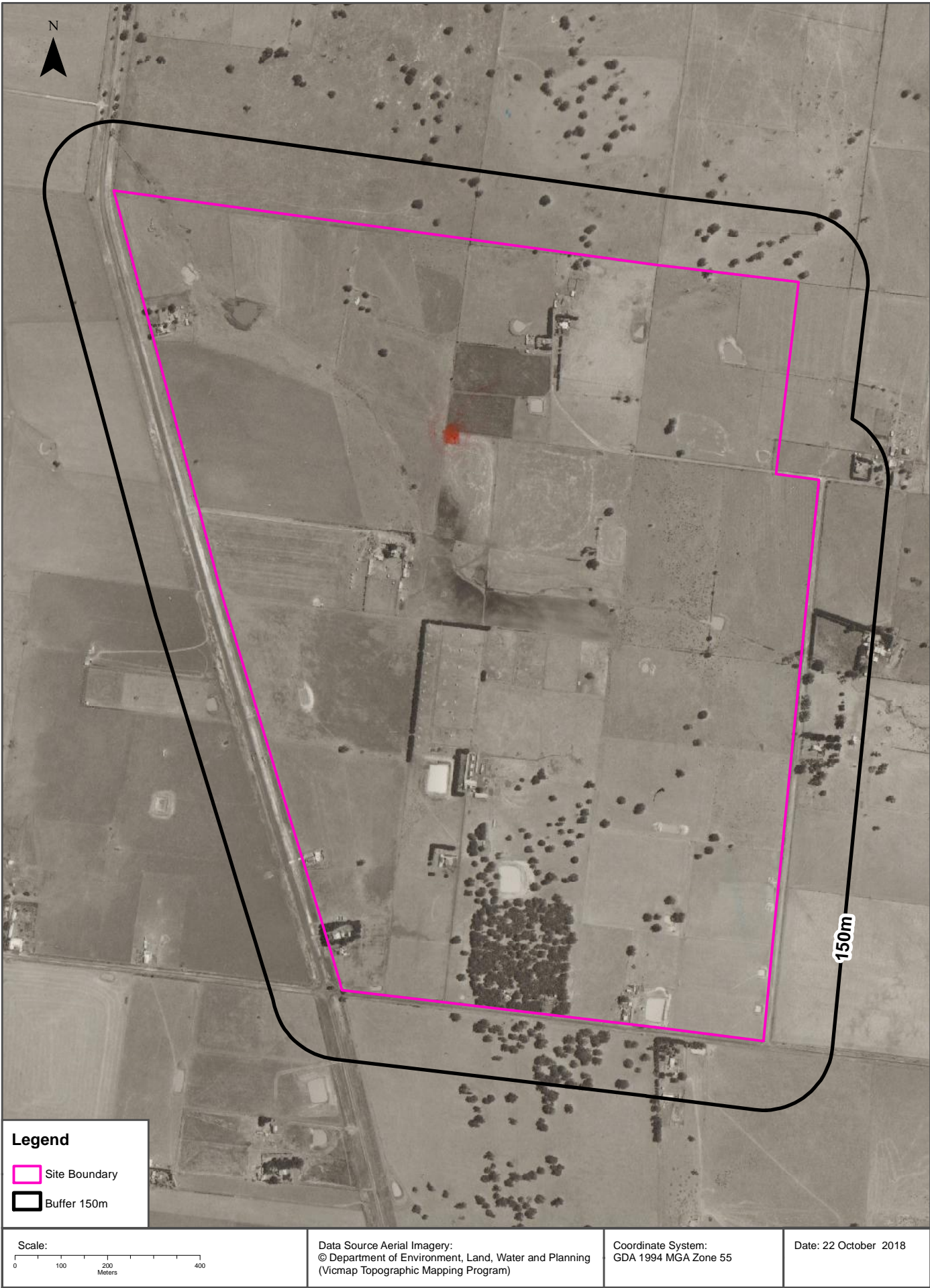
Aerial Imagery 1974

Craigieburn Road, Craigieburn West, VIC 3064 (Part 2)



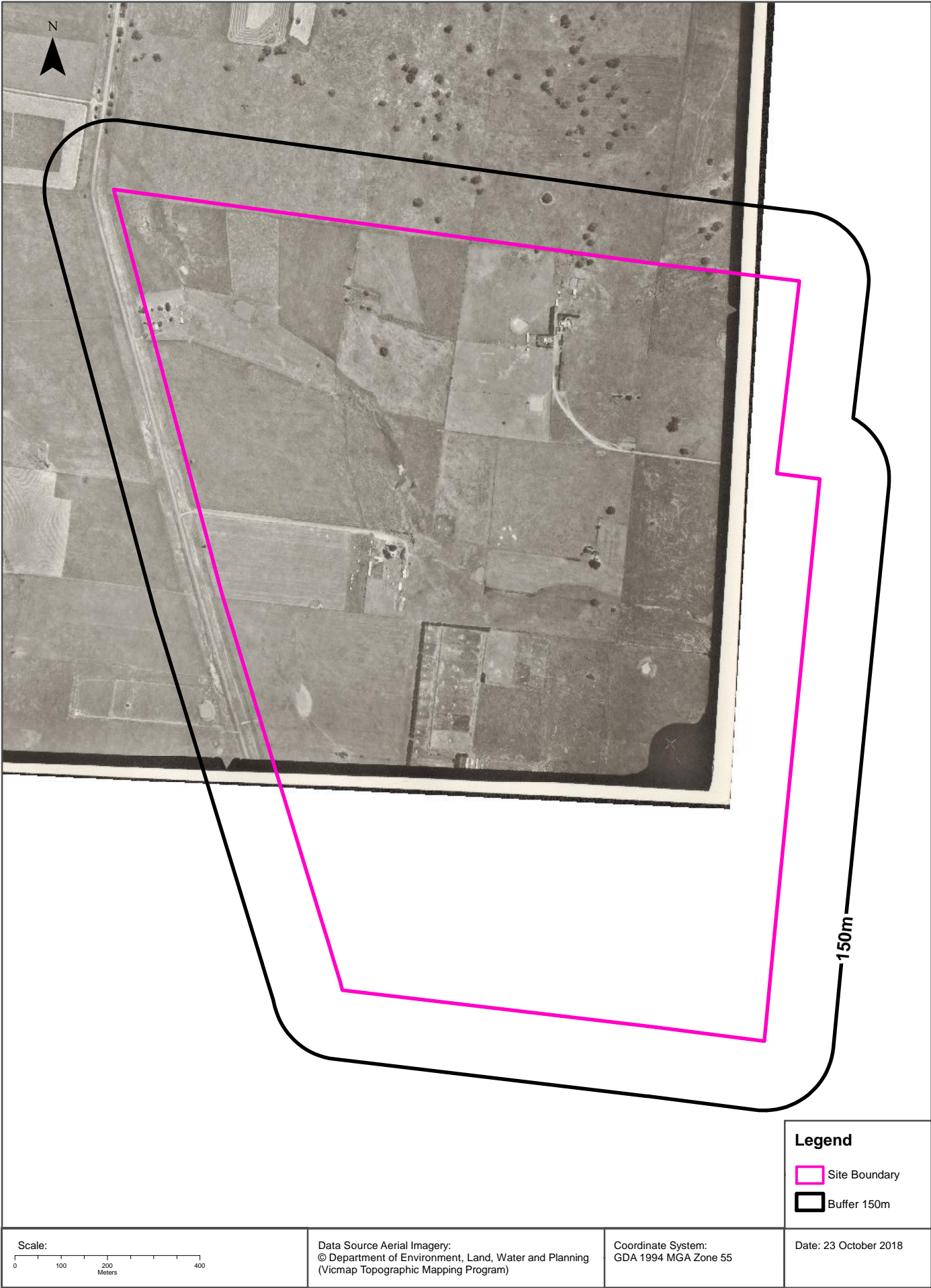
Aerial Imagery 1966

Craigieburn Road, Craigieburn West, VIC 3064 (Part 2)



Aerial Imagery 1963

Craigieburn Road, Craigieburn West, VIC 3064 (Part 2)



Aerial Imagery 1963

Craigieburn Road, Craigieburn West, VIC 3064 (Part 2)



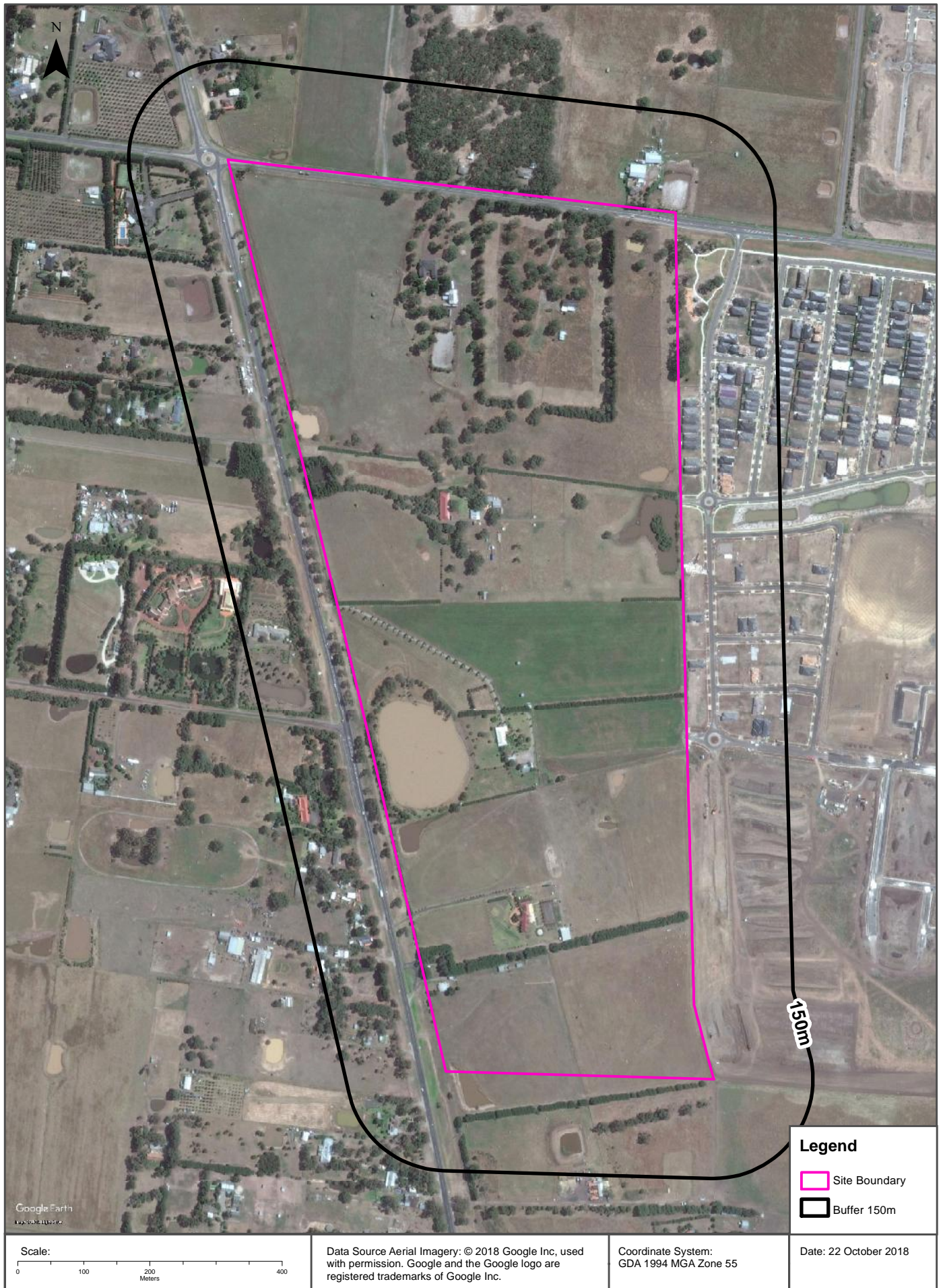
Aerial Imagery 1963

Craigieburn Road, Craigieburn West, VIC 3064 (Part 2)



Aerial Imagery 2017

Craigieburn Road, Craigieburn West, VIC 3064 (Part 3)



Aerial Imagery 2009

Craigieburn Road, Craigieburn West, VIC 3064 (Part 3)



Aerial Imagery 2002

Craigieburn Road, Craigieburn West, VIC 3064 (Part 3)



Aerial Imagery 1991

Craigieburn Road, Craigieburn West, VIC 3064 (Part 3)



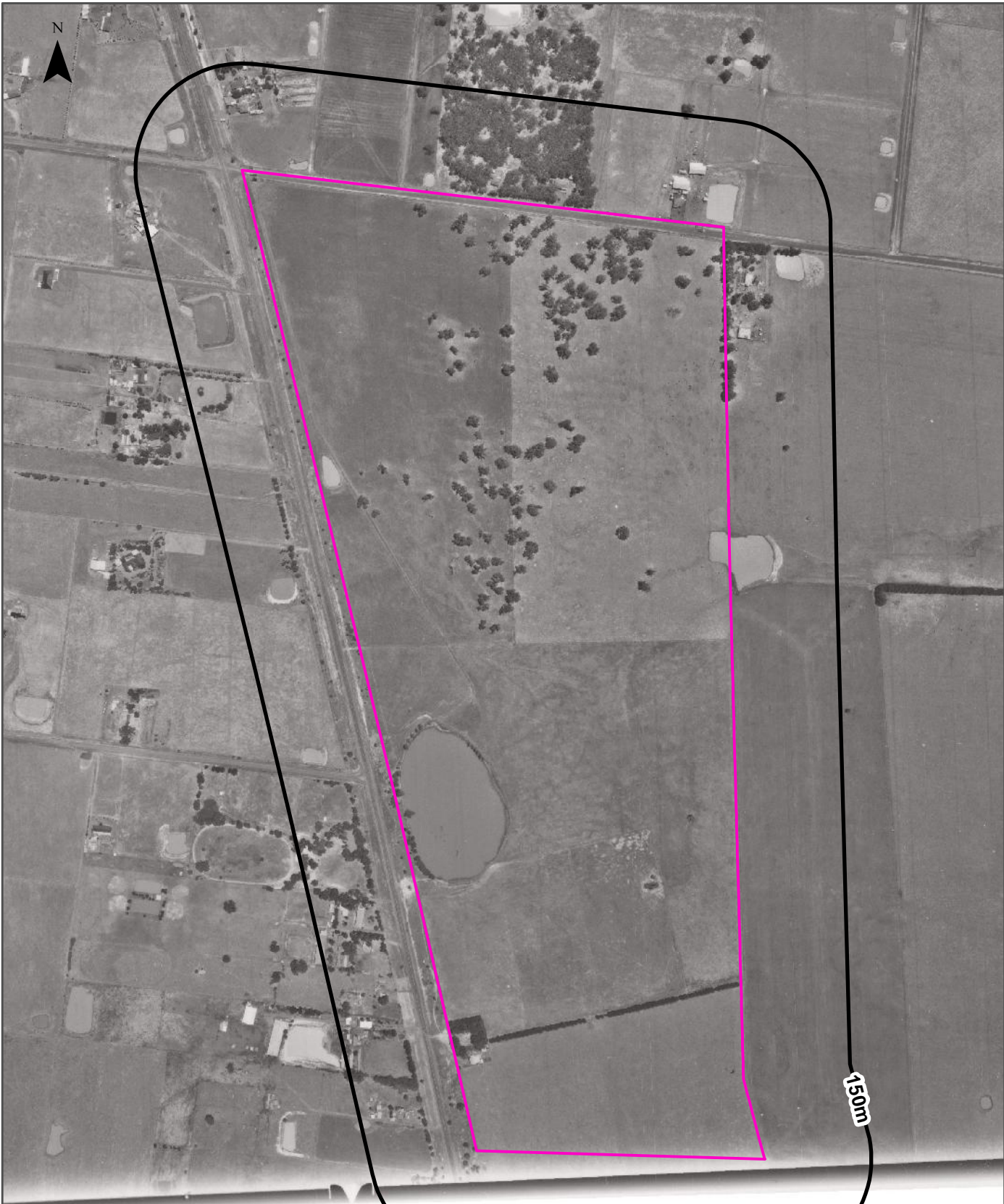
Aerial Imagery 1984

Craigieburn Road, Craigieburn West, VIC 3064 (Part 3)





Aerial Imagery 1979

Craigieburn Road, Craigieburn West, VIC 3064 (Part 3)



Legend

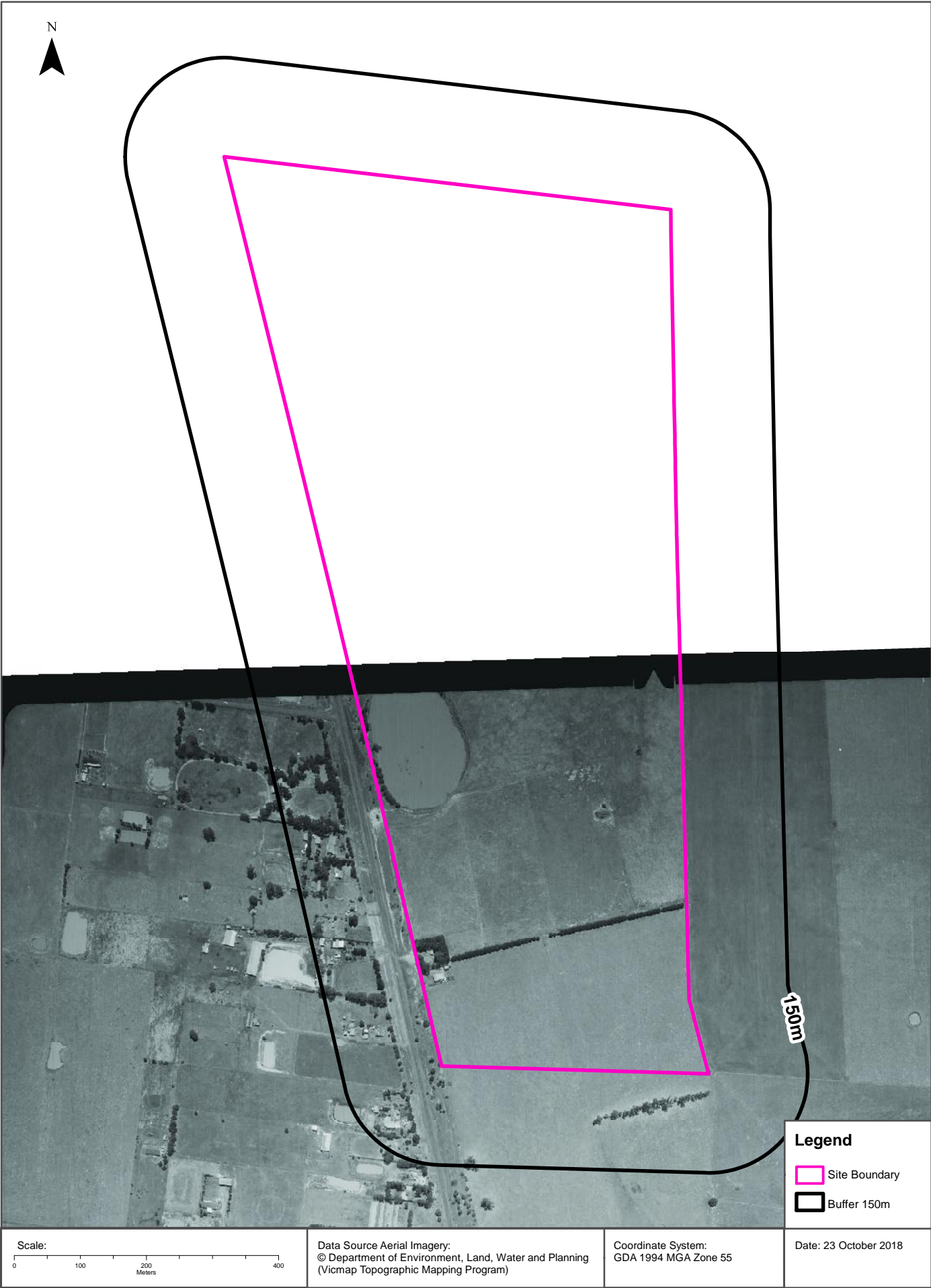
 Site Boundary

 Buffer 150m

<p>Scale:</p> <p>0 100 200 400</p> <p>Meters</p>	<p>Data Source Aerial Imagery:</p> <p>© Department of Environment, Land, Water and Planning</p> <p>(Vicmap Topographic Mapping Program)</p>	<p>Coordinate System:</p> <p>GDA 1994 MGA Zone 55</p>	<p>Date: 22 October 2018</p>
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Aerial Imagery 1979

Craigieburn Road, Craigieburn West, VIC 3064 (Part 3)



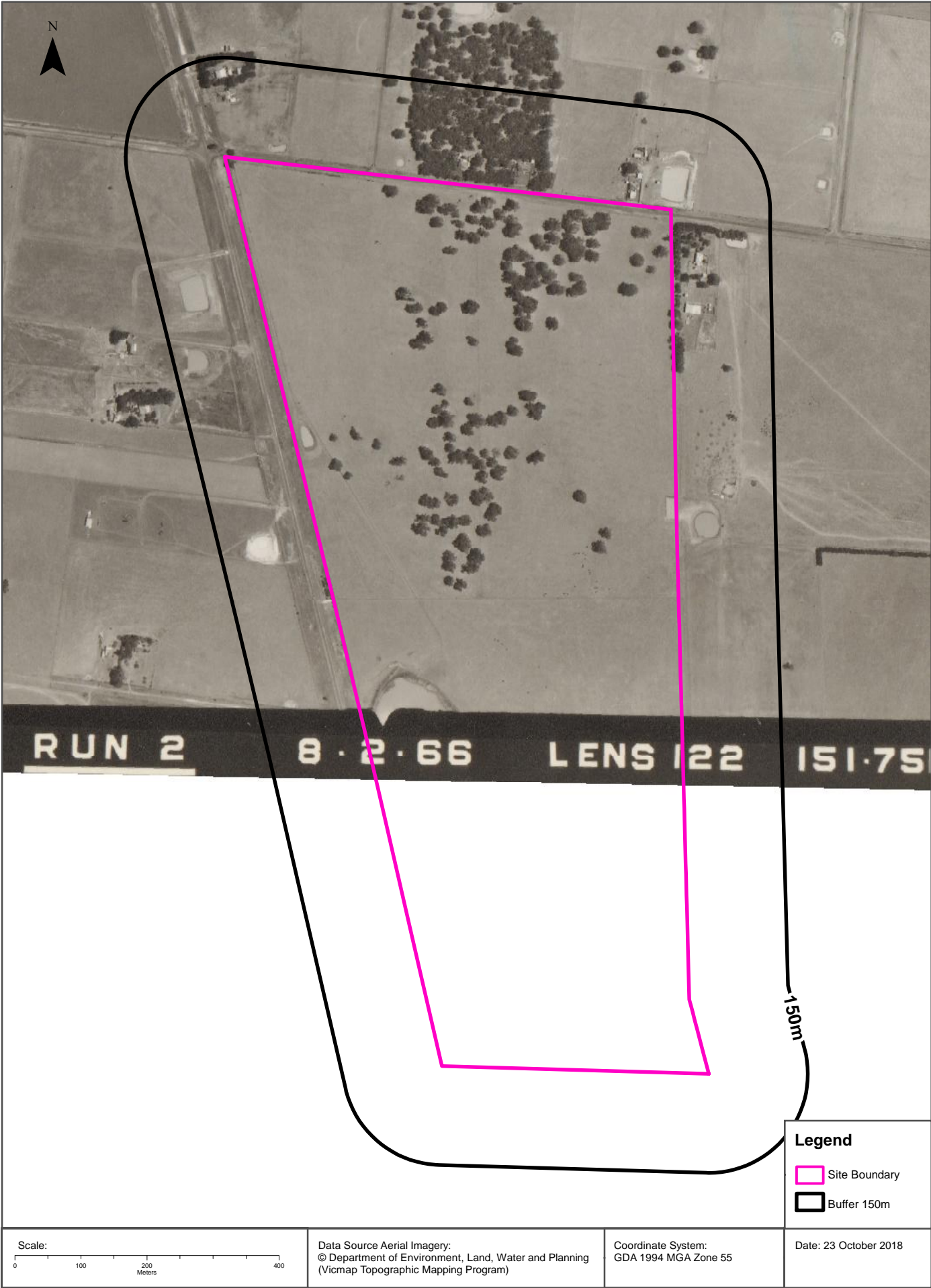
Aerial Imagery 1974

Craigieburn Road, Craigieburn West, VIC 3064 (Part 3)



Aerial Imagery 1966

Craigieburn Road, Craigieburn West, VIC 3064 (Part 3)



Aerial Imagery 1966

Craigieburn Road, Craigieburn West, VIC 3064 (Part 3)



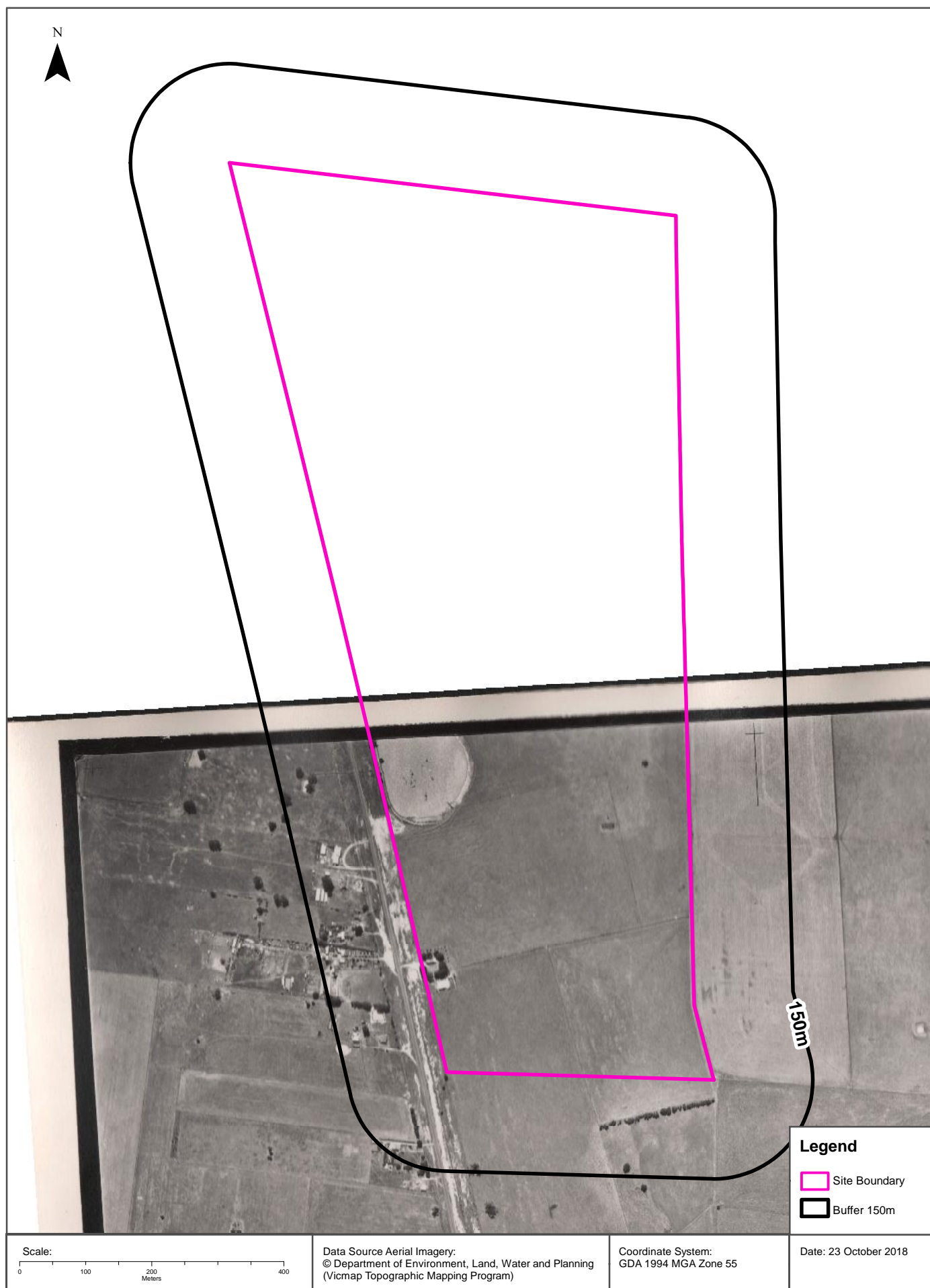
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Craigieburn Road, Craigieburn West, VIC 3064 (Part 3)



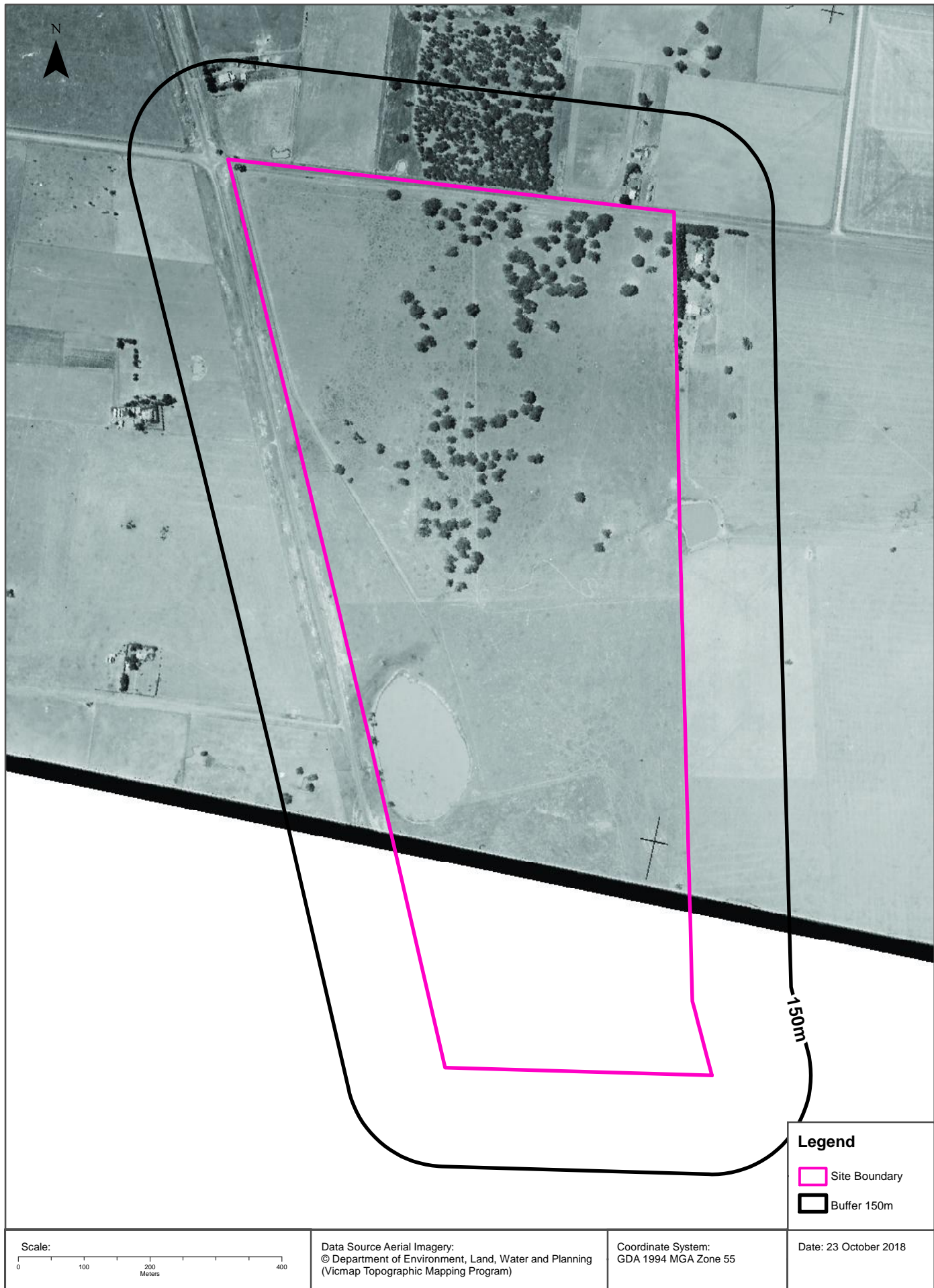
Aerial Imagery 1960

Craigieburn Road, Craigieburn West, VIC 3064 (Part 3)



Aerial Imagery 1951

Craigieburn Road, Craigieburn West, VIC 3064 (Part 3)



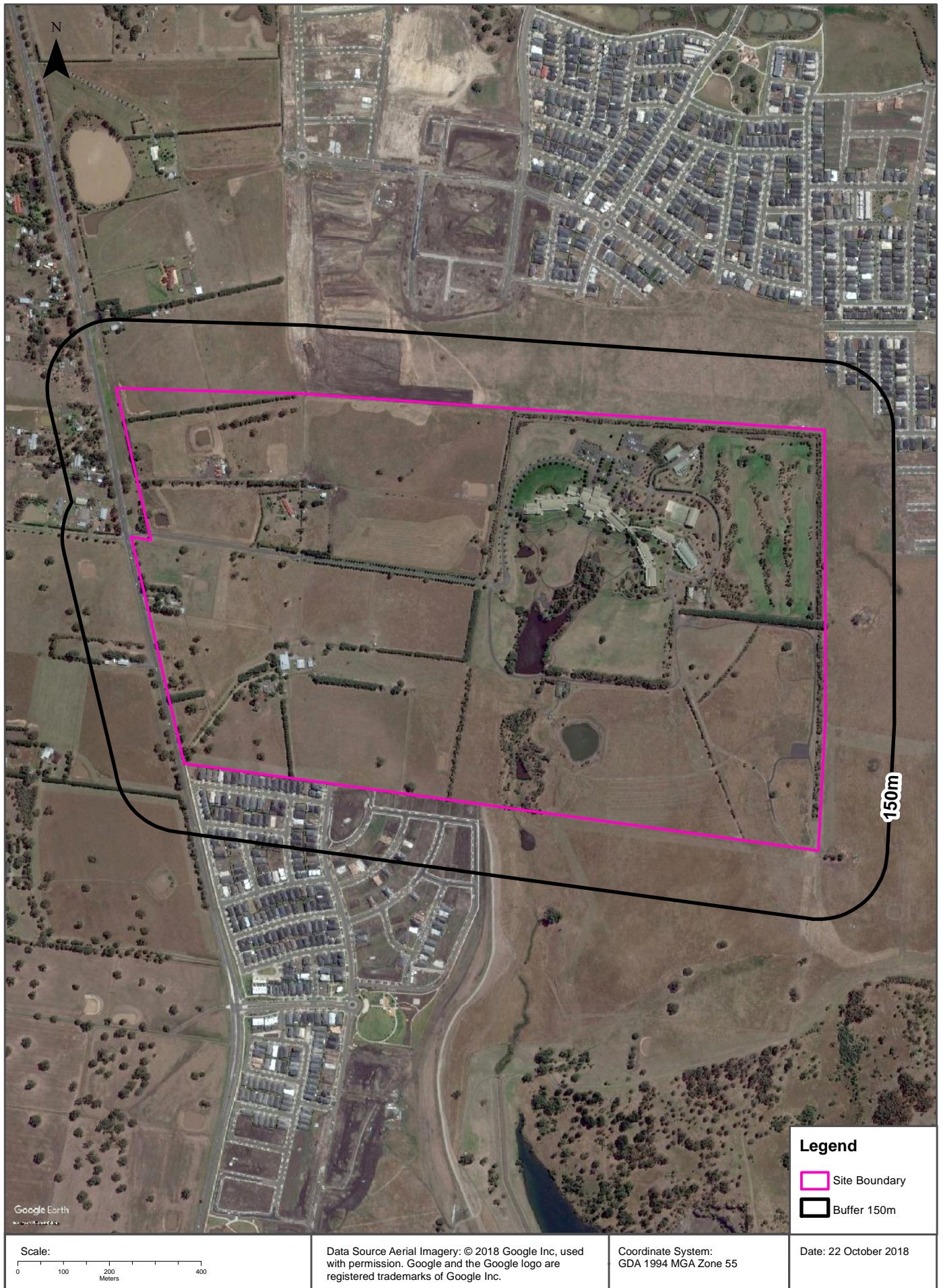
Aerial Imagery 1951

Craigieburn Road, Craigieburn West, VIC 3064 (Part 3)



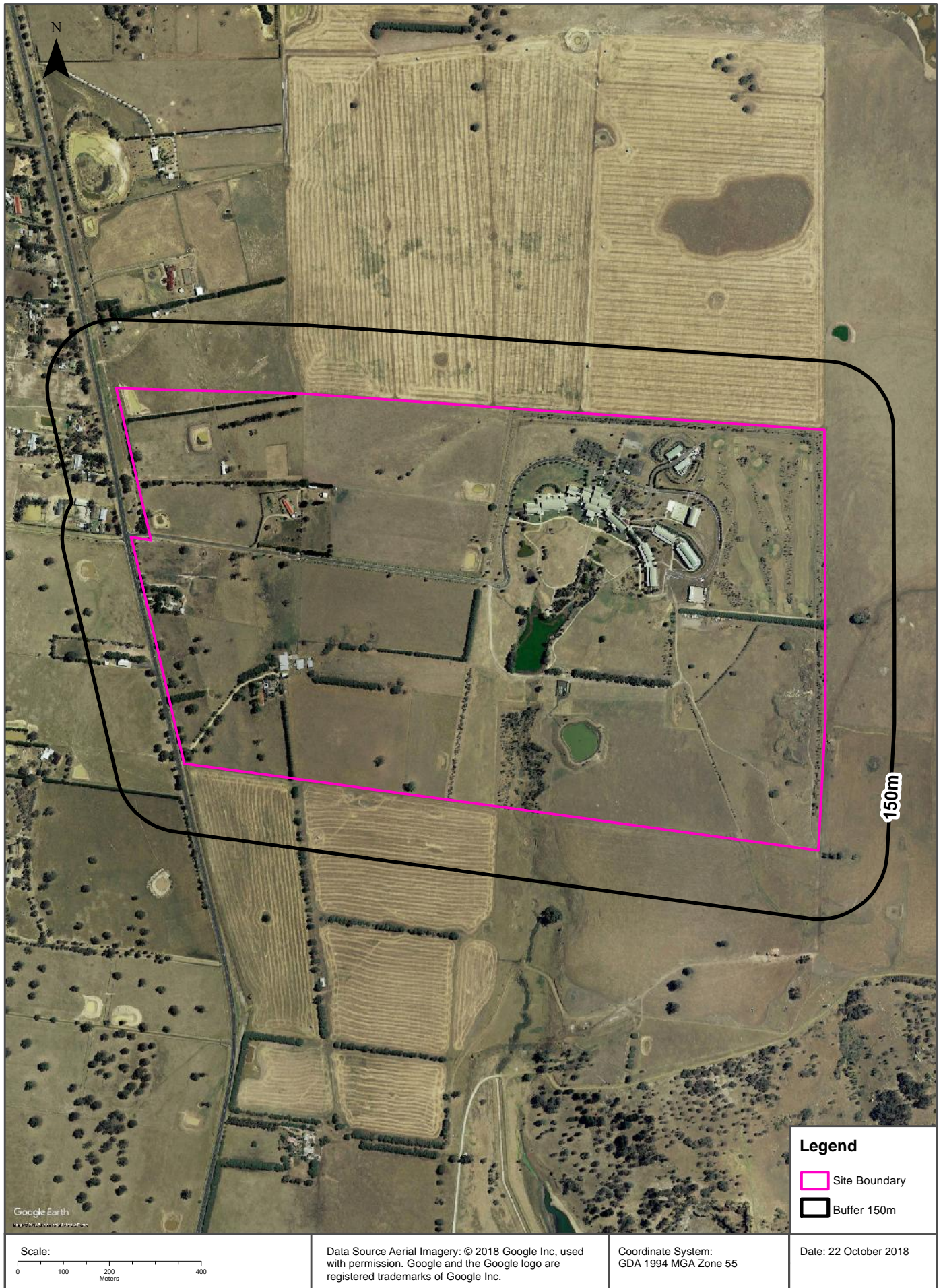
Aerial Imagery 2017

Craigieburn Road, Craigieburn West, VIC 3064 (Part 4)



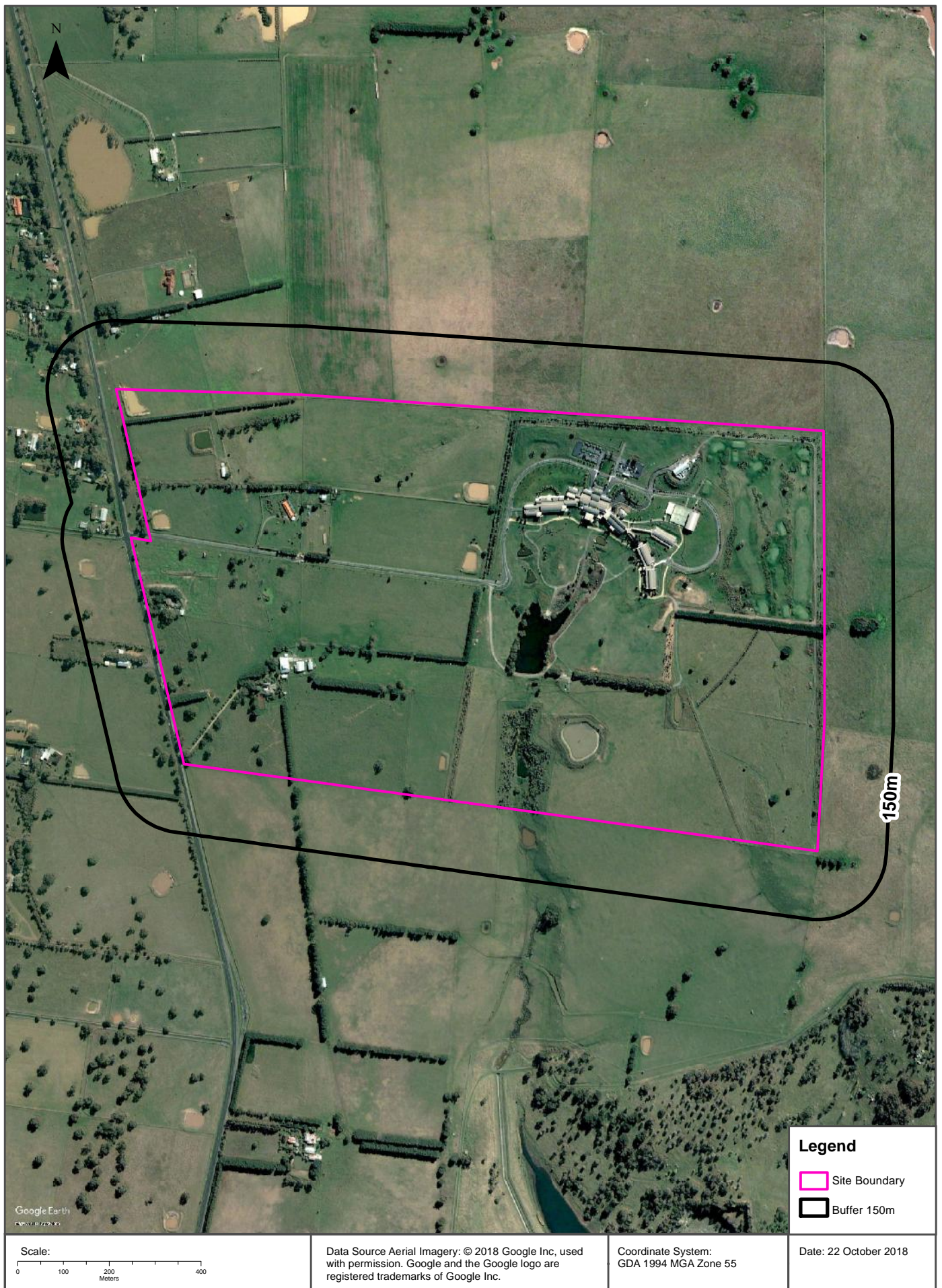
Aerial Imagery 2009

Craigieburn Road, Craigieburn West, VIC 3064 (Part 4)



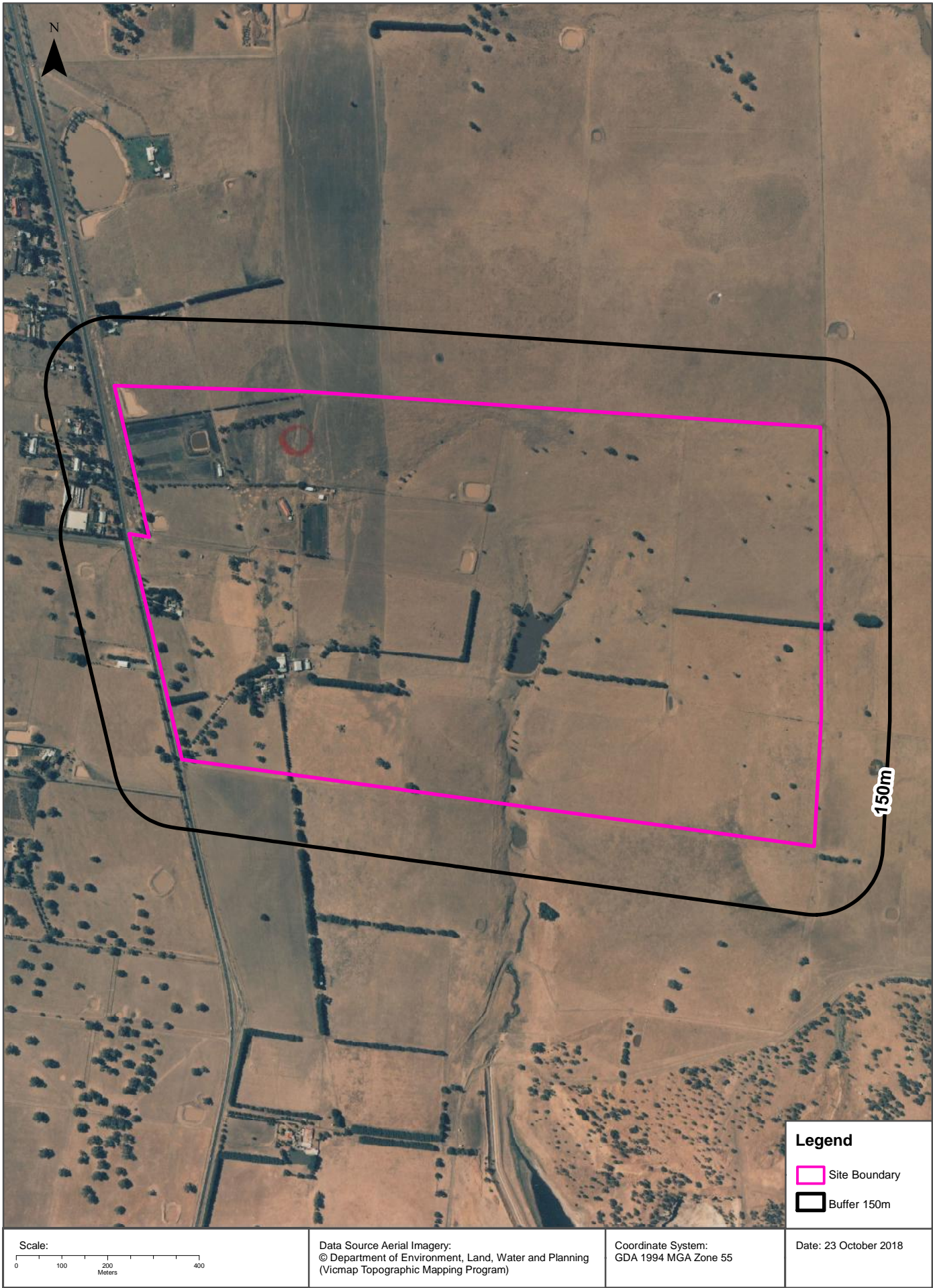
Aerial Imagery 2002

Craigieburn Road, Craigieburn West, VIC 3064 (Part 4)



Aerial Imagery 1991

Craigieburn Road, Craigieburn West, VIC 3064 (Part 4)



Aerial Imagery 1984

Craigieburn Road, Craigieburn West, VIC 3064 (Part 4)



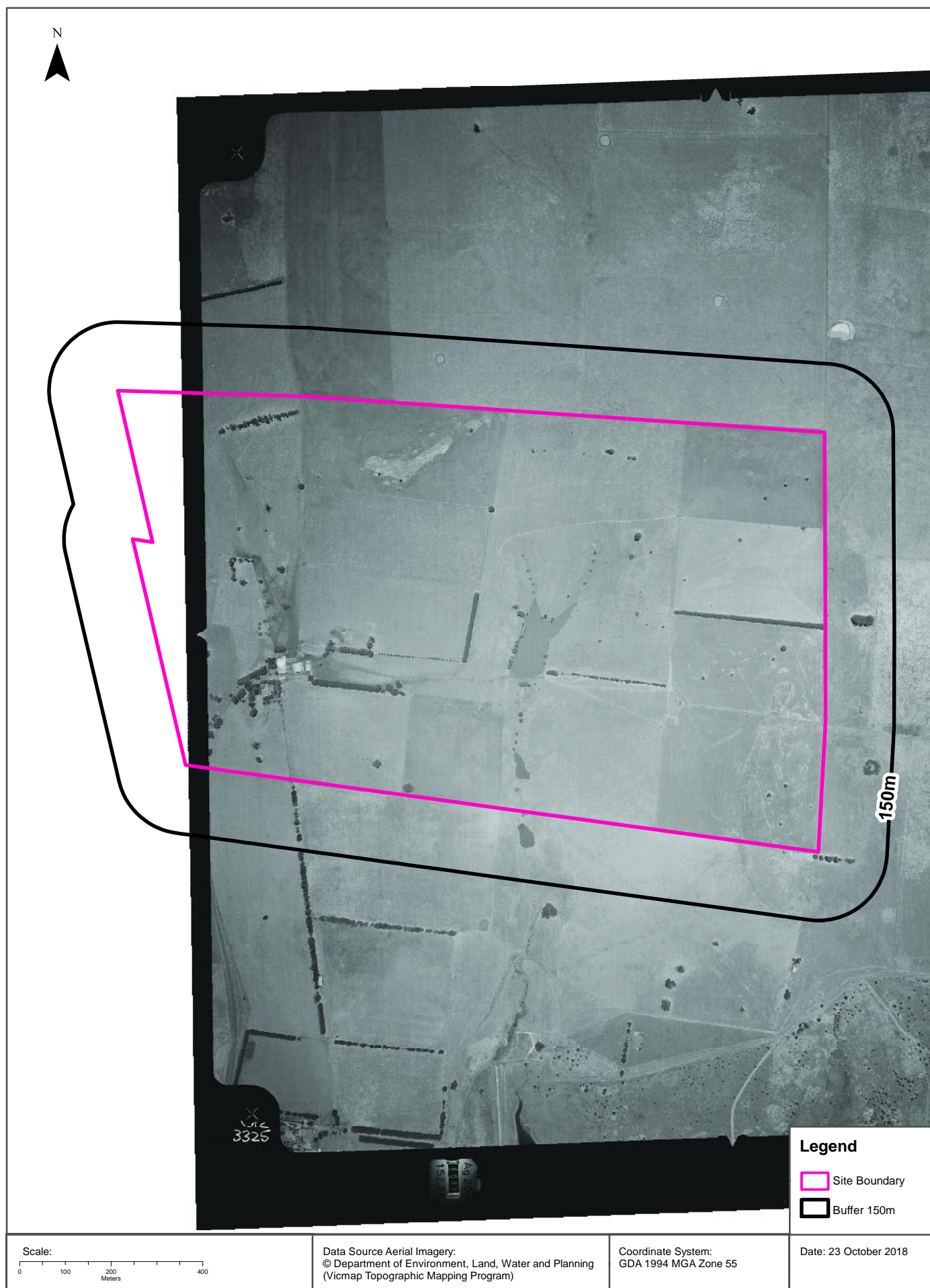
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Craigieburn Road, Craigieburn West, VIC 3064 (Part 4)



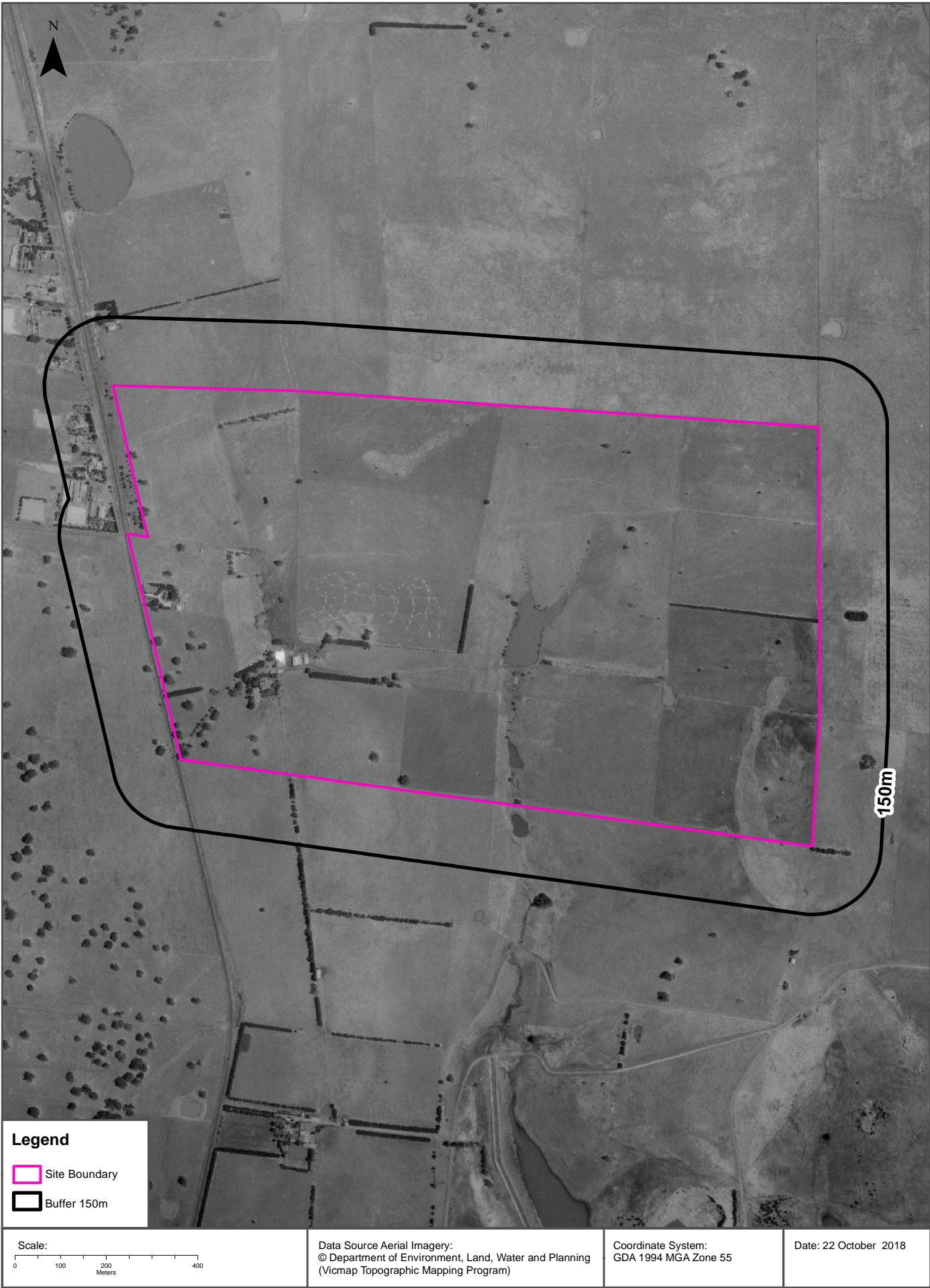
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Craigieburn Road, Craigieburn West, VIC 3064 (Part 4)



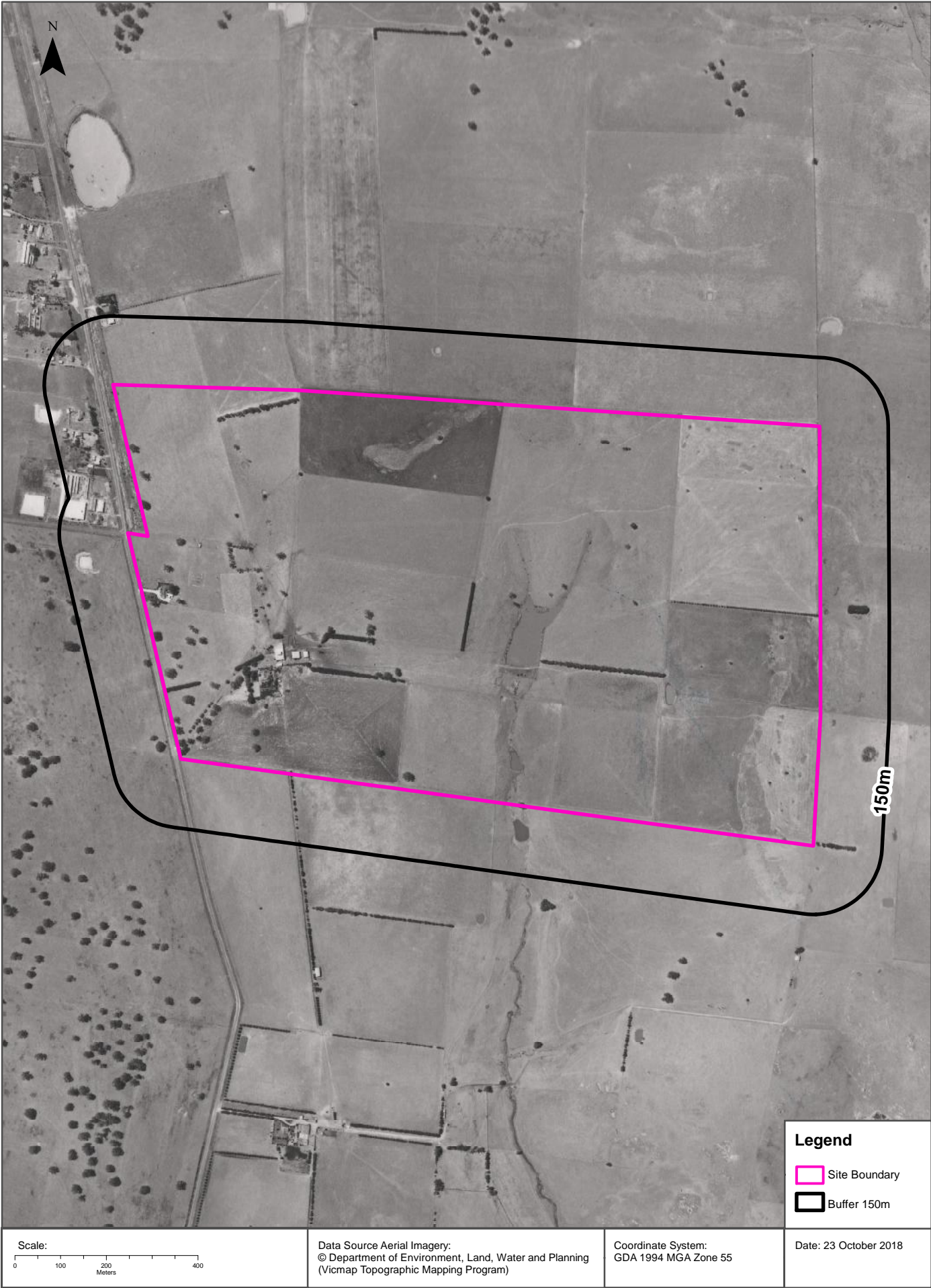
Aerial Imagery 1974

Craigieburn Road, Craigieburn West, VIC 3064 (Part 4)



Aerial Imagery 1966

Craigieburn Road, Craigieburn West, VIC 3064 (Part 4)



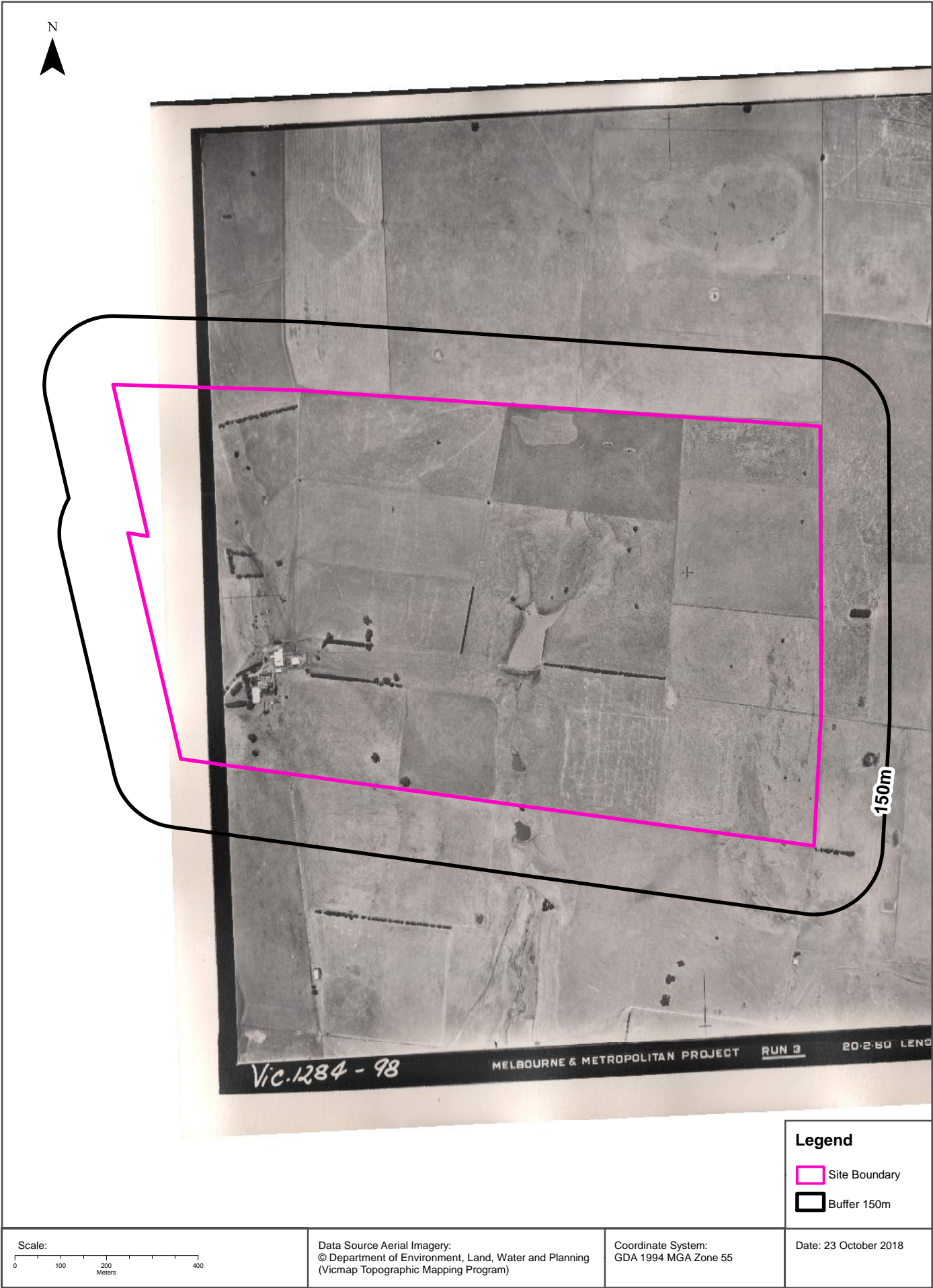
Aerial Imagery 1960

Craigieburn Road, Craigieburn West, VIC 3064 (Part 4)



Aerial Imagery 1960

Craigieburn Road, Craigieburn West, VIC 3064 (Part 4)

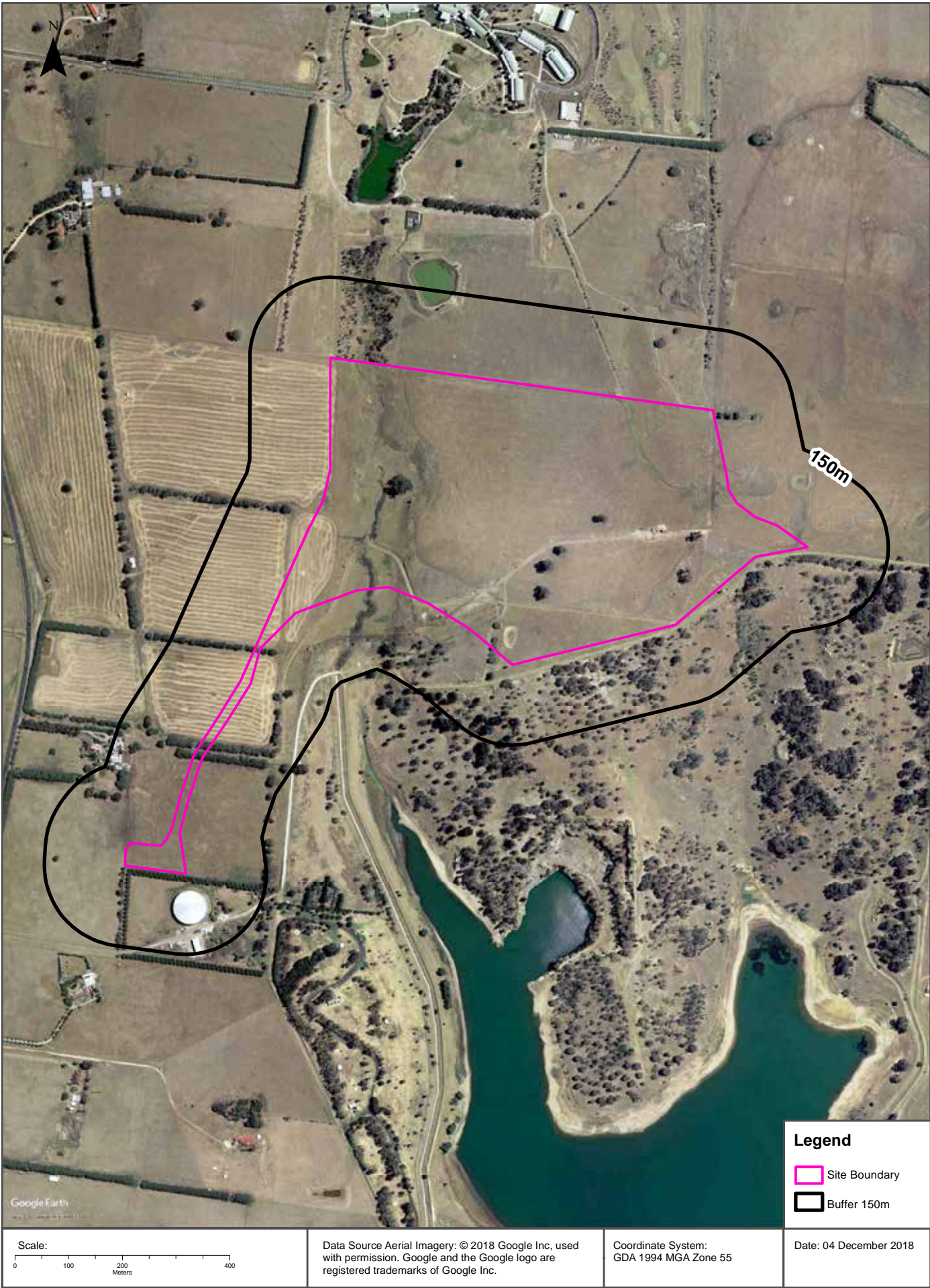


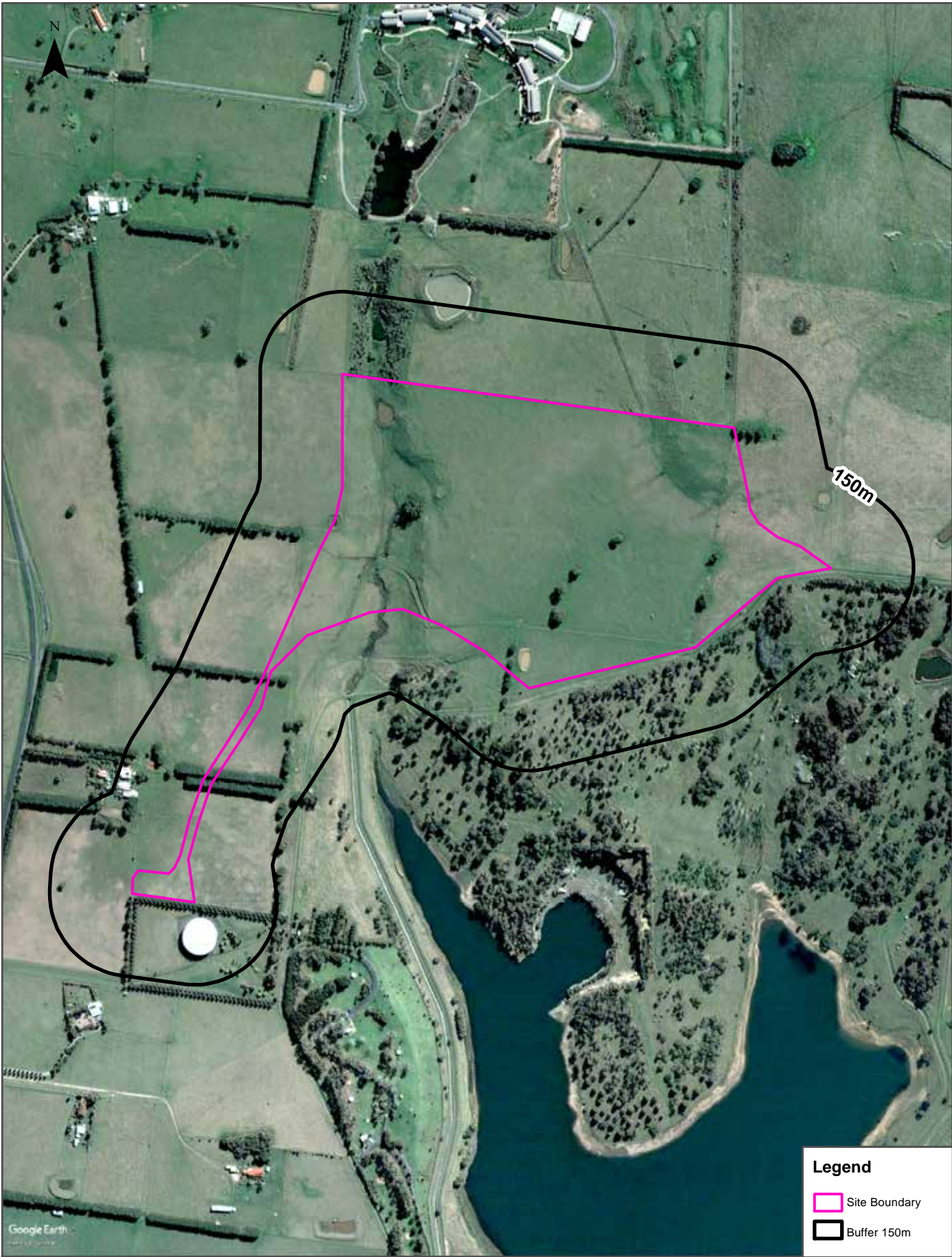
Aerial Imagery 1951

Craigieburn Road, Craigieburn West, VIC 3064 (Part 4)

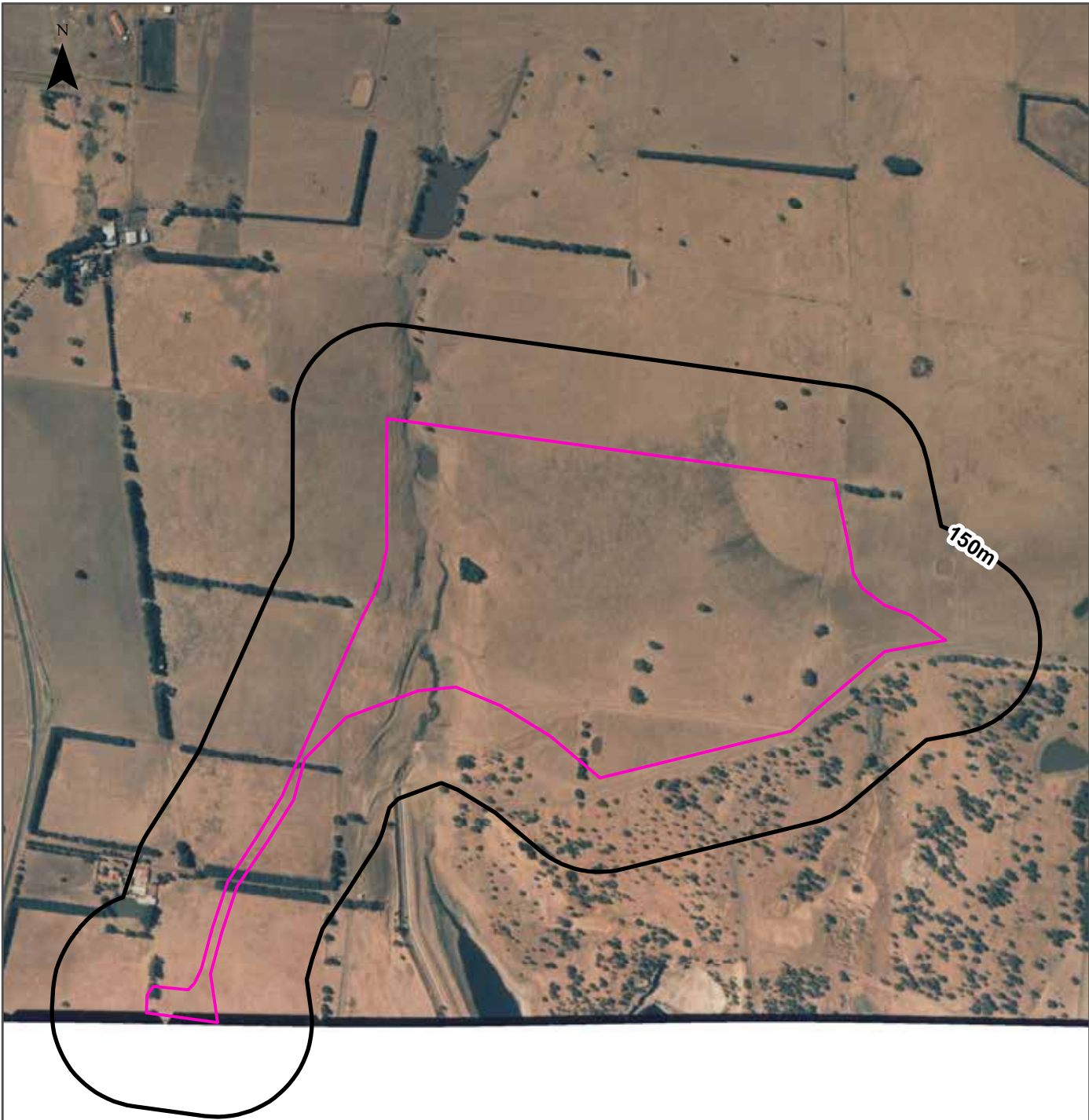










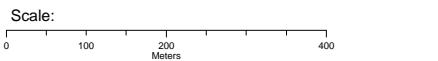
<p>Scale:</p> <p>0 100 200 400</p> <p>Meters</p>	<p>Data Source Aerial Imagery: © 2018 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.</p>	<p>Coordinate System:</p> <p>GDA 1994 MGA Zone 55</p>	<p>Legend</p> <p>Site Boundary</p> <p>Buffer 150m</p> <p>Date: 04 December 2018</p>
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Legend

 Site Boundary

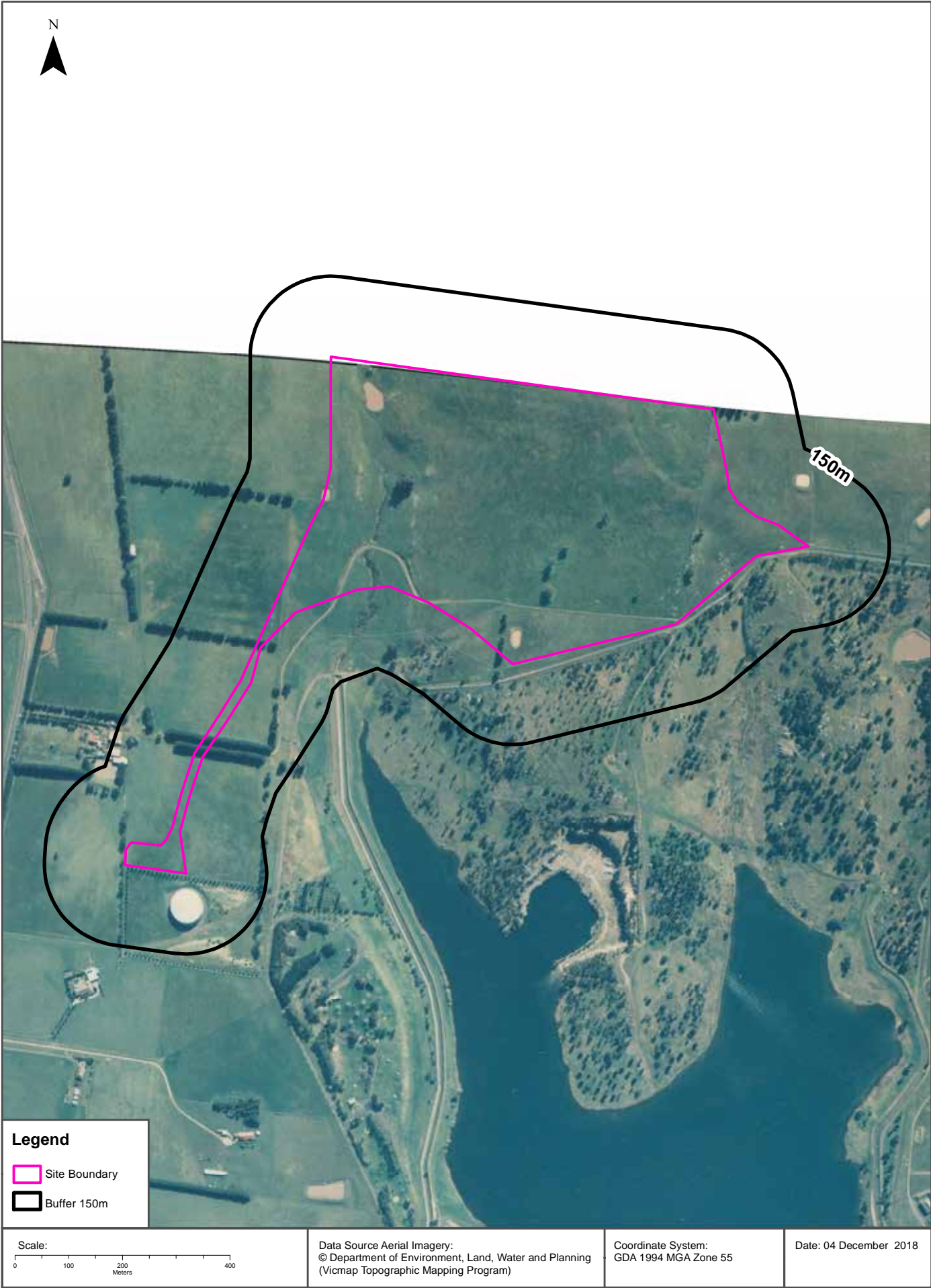
 Buffer 150m

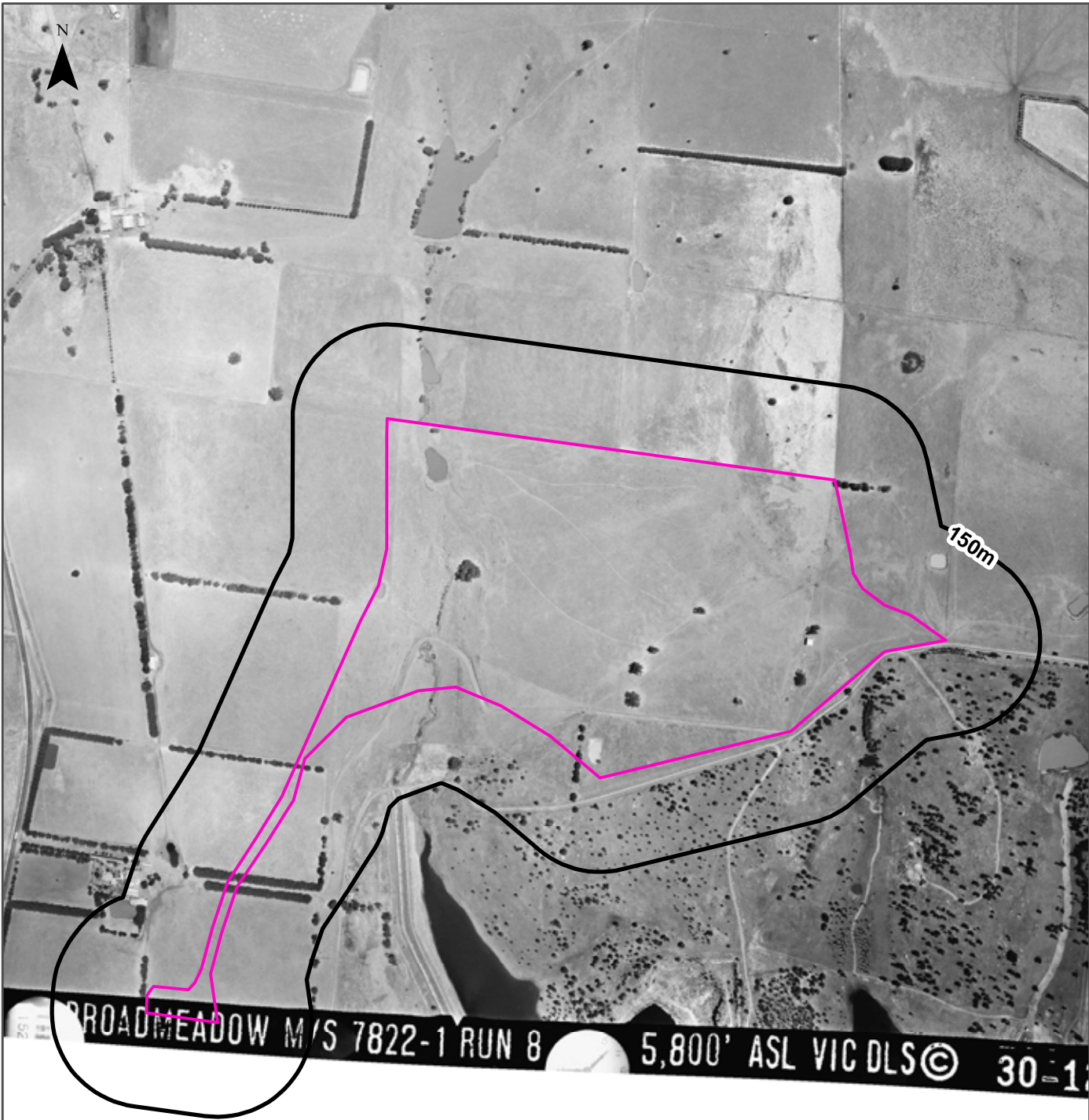


Data Source Aerial Imagery:
© Department of Environment, Land, Water and Planning
(Vicmap Topographic Mapping Program)


Coordinate System:
GDA 1994 MGA Zone 55


Date: 04 December 2018





Legend

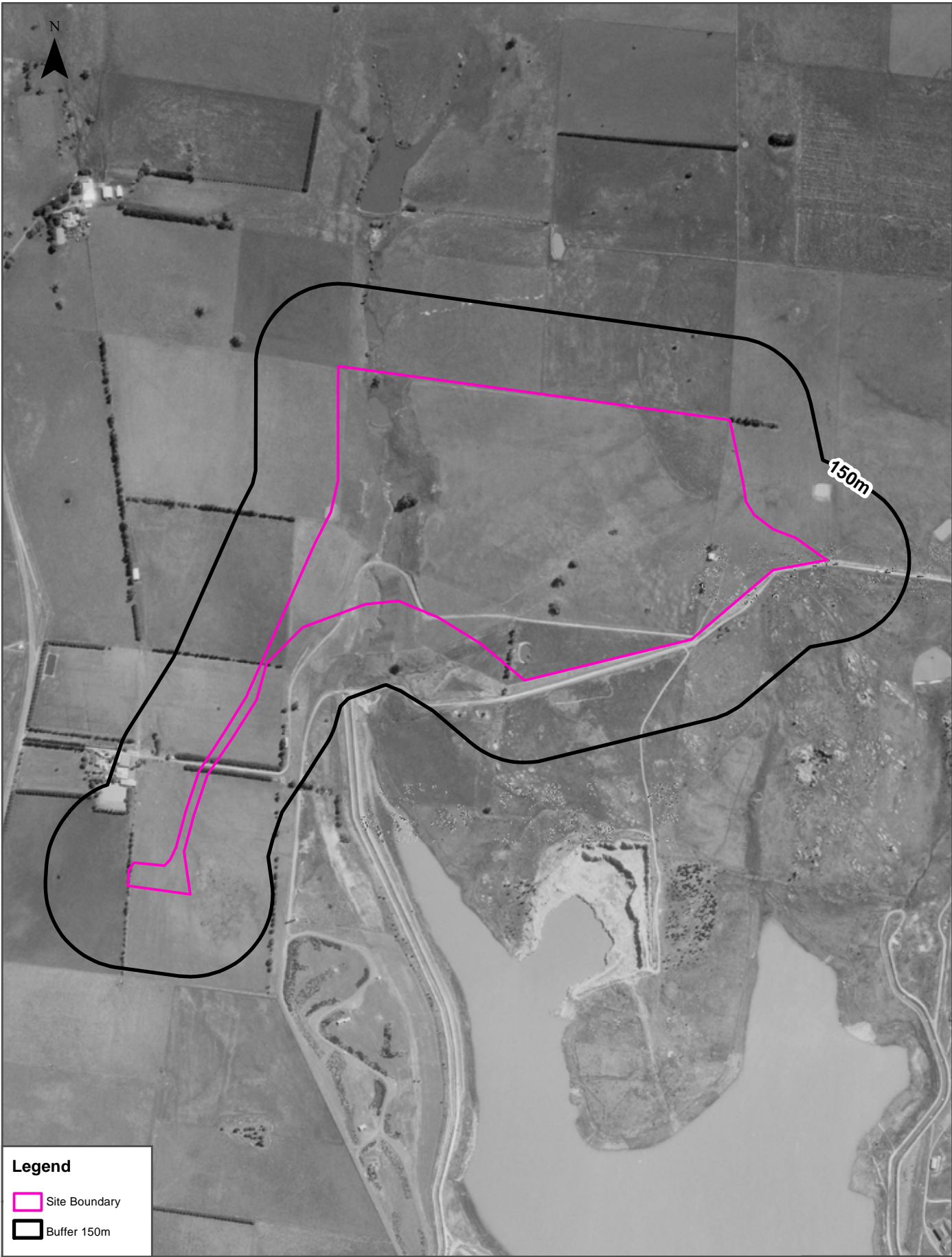
 Site Boundary

 Buffer 150m

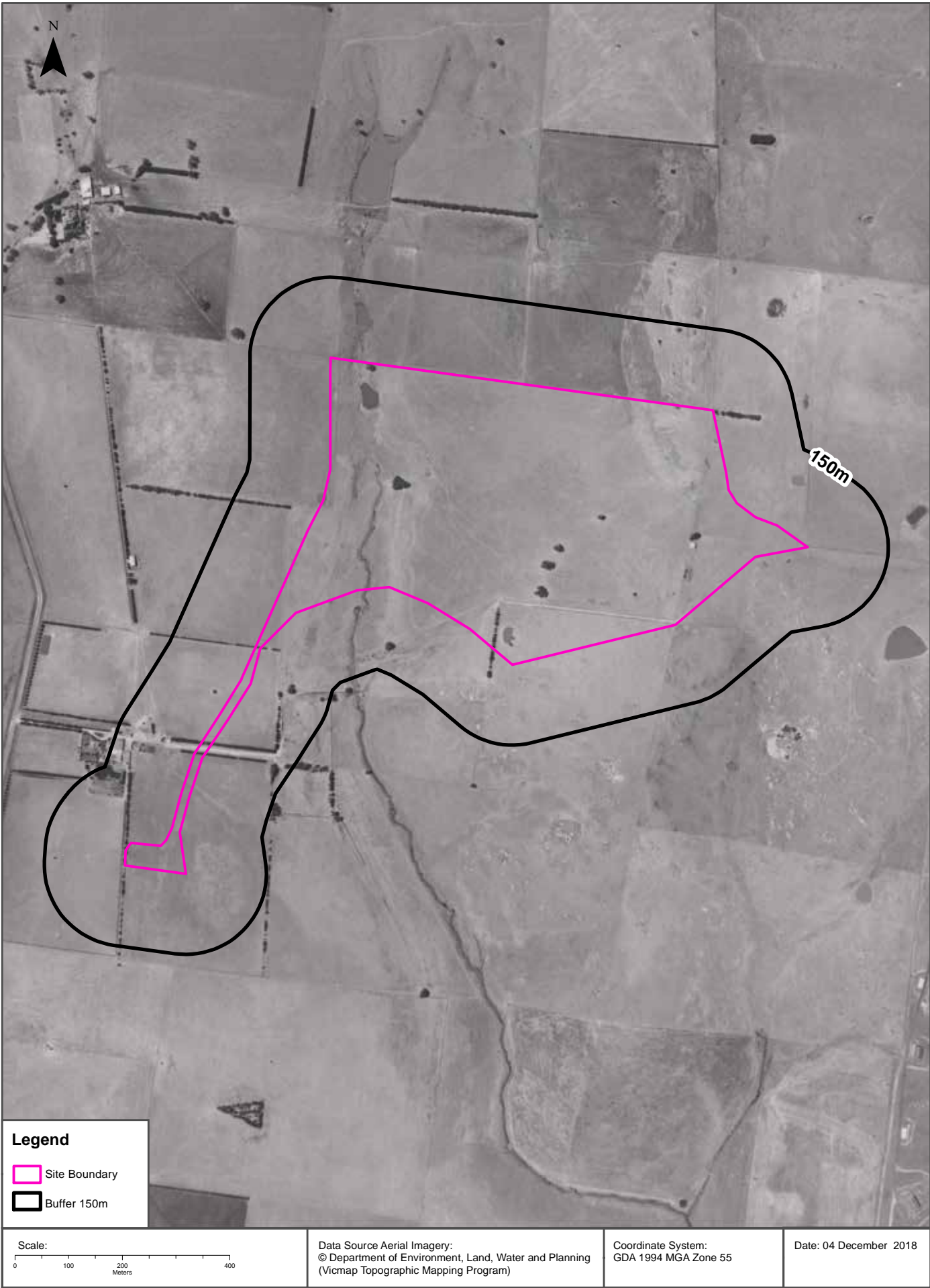
Scale: 0 100 200 400 Meters	Data Source Aerial Imagery: © Department of Environment, Land, Water and Planning (Vicmap Topographic Mapping Program)	Coordinate System: GDA 1994 MGA Zone 55	Date: 04 December 2018
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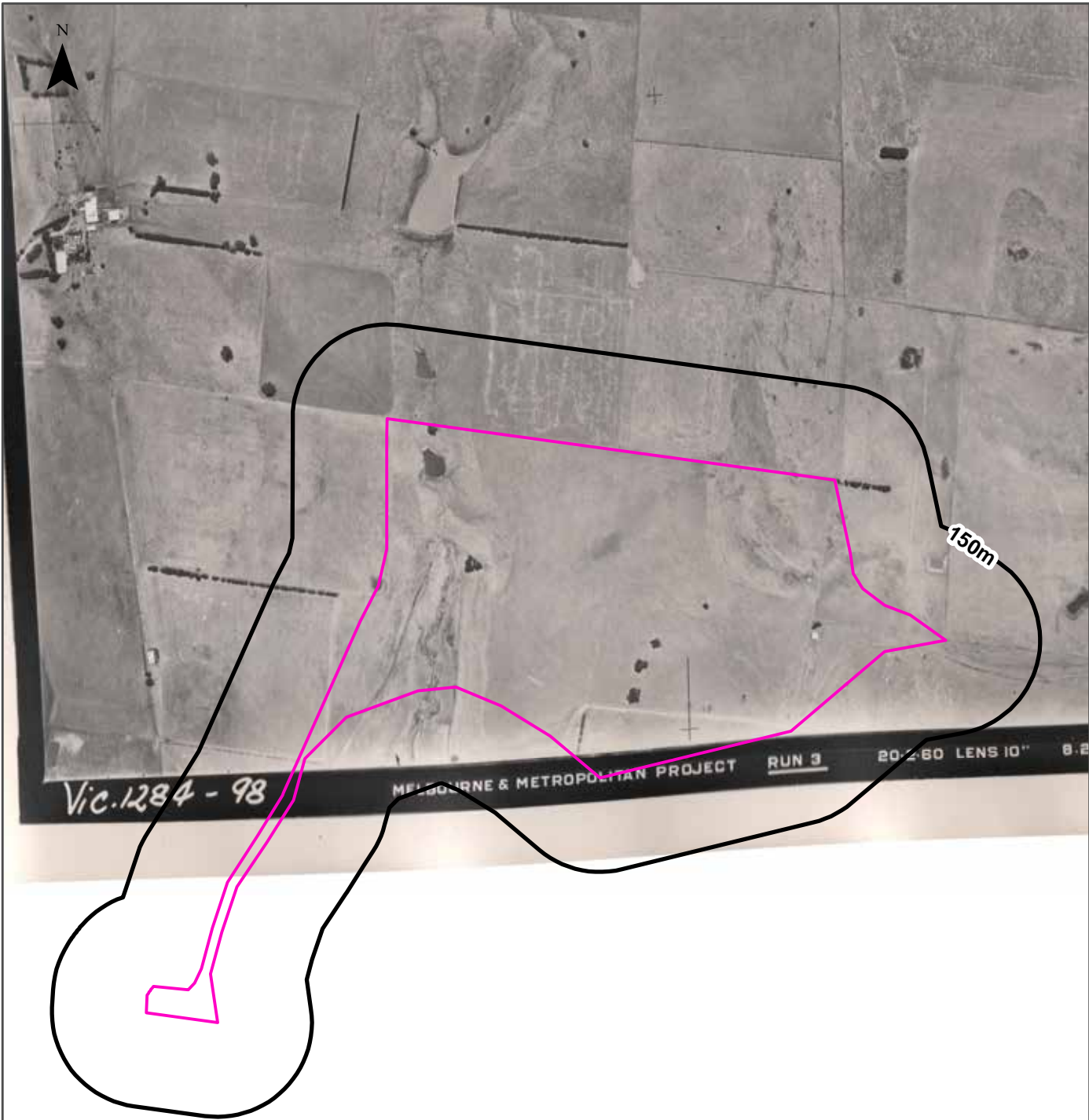








Scale: 0 100 200 400 Meters	Data Source Aerial Imagery: © Department of Environment, Land, Water and Planning (Vicmap Topographic Mapping Program)	Coordinate System: GDA 1994 MGA Zone 55	Date: 04 December 2018
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Legend

 Site Boundary

 Buffer 150m

Scale: 0 100 200 400 Meters	Data Source Aerial Imagery: © Department of Environment, Land, Water and Planning (Vicmap Topographic Mapping Program)	Coordinate System: GDA 1994 MGA Zone 55	Date: 04 December 2018
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