AECOM Australia Pty Ltd
Level 21, 420 George Street
Sydney NSW 2000
PO Box Q410
QVB Post Office NSW 1230
Australia
www.aecom.com

+61 2 8008 1700 tel

ABN 20 093 846 925

7 July 2022

Karl Okorn
Team Leader
Energy Assessments
Department of Planning and Environment
Level 16 4PSQ 12 Darcy Street
Parramatta NSW 2150

Contamination Assessment Review - Great Western Battery Energy Storage System (BESS) - Contaminated Land

1.0 Introduction

AECOM Australia Pty Ltd (AECOM) has been engaged by Neoen Australia Pty Ltd (Neoen) to complete the Submissions Report for the proposed Great Western Battery (GWB) (the Project), at 173 Brays Lane, Wallerawang, NSW (the Site) (refer to Figure F1 in Attachment A).

Following exhibition of the Environmental Impact Statement (EIS) for the Project (AECOM, 2022), a number of submissions were provided to Neoen for their consideration and response. A submission from Transport for NSW (TfNSW) dated 29 March 2022 requested a Preliminary Contamination Report for the rail corridor where works were proposed. Neoen and TfNSW agreed that this report could be provided following determination of the State Significant Development (SSD) application, should the Project be consented, given the likely contamination status of the rail corridor. However, the Department of Planning and Environment (DPE) have requested further confirmation that the rail corridor is likely to be suitable (given potential contamination risks), or will be able to be made suitable, for the installation of the proposed transmission connection for the Project.

This letter report builds on the contamination assessment provided in the EIS to confirm the likely contamination status of the land, the risks that may be present, the measures required to manage these risks, and that that the rail corridor is suitable or could be made suitable for the proposed transmission connection.

2.0 Project Background

The Project seeks development consent for the construction, operation and maintenance of a battery energy storage system (BESS) of approximately 500 megawatts (MW) and approximately 1000 megawatt-hour (MWh) at 173 Brays Lane, Wallerawang (the Site), as well as a new transmission line that would connect the Site to the existing Transgrid 330 kilovolt (kV) substation at Wallerawang. The Site and the route of the transmission connection are referred to as the Project Area. The Project would provide storage and firming capacity to the National Energy Market as well as additional services to assist grid stability including frequency control ancillary services.

The transmission connection would be installed underground using a combination of trenching and underboring methodologies. Where the transmission connection would be installed using trenching, a maximum excavation depth of 1.5 m below ground surface (m BGS) would be employed.

The Lots managed by TfNSW which the transmission connection passes through are as follows:

- Lot 8 DP252472 – The transmission connection would be horizontally directional drilled (HDD) under this lot. One HDD rig would be located on the Site (Lot 4 DP 751651) and the other would be located on the western side of the rail corridor lot (Lot 9 DP 252472) to south of the Pipers Flat Creek Rail Bridge and north of the rail junction turnout.
- Lot 9 DP252472 – The transmission connection would be installed using HDD and trenching within this Lot. The transmission connection would be installed using HDD from the location just south of Pipers Flat Creek Rail Bridge to a location approximately 150 m north of Main Street. The transmission connection would be installed using trenching for the southern part of this Lot for approximately 150 m. HDD would then be used to install the transmission connection under Main Street and under Lot 2 DP108089 to a location in Lot 1 DP108089, west of the rail line approximately 125 m south of Main Street.

- Lot 1 DP108089 – Within this Lot, the transmission connection would be installed to the west of the rail line for approximately 340 m heading south. Towards the southern and eastern part of this lot the transmission connection would be installed under the rail lines using HDD from this Lot to the north west corner of the Transgrid substation lot (Lot 91 DP1043967).

The new transmission line would connect the BESS to the Transgrid Wallerawang 330 kV substation. The length of the transmission connection within Lots managed by TfNSW land is approximately 1.55 km (hereafter referred to as 'the TfNSW land') where approximately 500 m of transmission connection would be installed using trenching.

With respect to land contamination, the EIS concluded that the land surrounding the Project Area includes potentially contaminating activities associated with industrial, electricity generating, and agricultural land uses.

3.0 TfNSW Submission and discussions

TfNSW provided a submission dated 29 March 2022 which included comments on transport related matters and also requested that a Preliminary Contamination Report be produced to confirm the presence of contamination that may be present within the rail corridor. This submission was informed by the road and rail teams in TfNSW as well as the team at UGL Regional Linx (UGLRL) who has been appointed by TfNSW to manage the Country Rail Network (CRN).

A meeting with TfNSW was held on 6 June 2022 to discuss the submission. At this meeting the conclusions of the contamination assessment within the EIS and the need for a Preliminary Contamination Report was discussed. AECOM provided an overview of the EIS assessment and noted that the risk of contaminants in the rail corridor was low, should contaminants of potential concern be present they are likely to be typical of rural rail corridors and as such whilst no investigations are required at this stage to understand the risk further, ground investigations would take place prior to the transmission connection being installed. In addition, appropriate mitigation measures were identified to manage and address potential contamination impacts, if present. This included commitments to remove excavated material that did not meet commercial / industrial land use criteria for disposal off-site and replacement of this material with backfill of an appropriate standard.

TfNSW confirmed that they did not need to have the Preliminary Contamination Report provided prior to determination of the SSD application but that they would like to have a copy of any contamination investigations that are completed prior to works commencing for their records.

Subsequent to the TfNSW meeting, Neoen also spoke with UGLRL to discuss the need for a Preliminary Contamination Report and they also agreed that this report could be provided following determination of the SSD application should the Project be consented.

The outcomes of these meetings were discussed with DPE. However, DPE has requested further confirmation that the rail corridor is likely to be suitable (given potential contamination risks), or will be able to be made suitable, for the installation of the proposed transmission connection for the Project. To provide further confidence regarding the conclusions of the contamination assessment in the EIS, it was agreed that Neoen would provide a letter to DPE which built on the previous assessment, confirmed the conclusions presented and was to be signed by a suitably qualified and experienced contamination consultant.

4.0 Objectives

The objectives of this letter report are to provide a review of the contamination assessment provided in the EIS to:

- Confirm the likely risk of encountering potential contaminated materials during the construction of the Project.
- Develop a Project Conceptual Site Model (CSM) which includes the potential contamination sources, receptors and exposure pathways for the Project.
- Re-assess the Source-Pathway-Receptor (S-P-R) linkages undertaken for the Project EIS to further confirm suitable management measures or identify other mitigation measures, if required.
- Confirm that that the rail corridor is suitable or could be made suitable for the proposed transmission connection.

5.0 Scope of Work

The approach and methodology to meet the objectives of these works comprised:

- Desktop review of historical and current aerial photographs and publicly available data to assess conditions of the Project and its vicinity. This review identified and confirmed the potential sources of contamination and human health/ecological receptors.
- Development of the preliminary CSM to assess complete and potentially complete S-P-R linkages by understanding the site conditions and the controls that would be put in place during the construction works and operation of the transmission line.

The scope of work specifically consisted of:

- Review of available site contamination reports relevant to the Project
- Review of the Lotsearch report (refer to Attachment B) prepared for the Project (Lotsearch, 2021) which comprises:
  - Historical aerial photographs for the years 2020, 2015, 2007, 1999, 1994, 1984, 1975, 1966, 1961, 1955, 1943
- Review of publicly available information from government database searches and maps:
  - Various NSW Environment Protection Authority (EPA) records
  - Historical topographic maps
  - Registered groundwater wells
  - Geology, soils, acid sulfate soil risk, dryland salinity potential
  - Lithgow Local Environmental Plan 2014 (LEP) land use zones
- Documentation of this letter to review the contamination impact assessment provided within the EIS for the Project construction and operation, in comparison to the searches undertaken above.

6.0 Site Environmental Setting

A summary of the environmental setting of the Project Area from the EIS and review of publicly available information is presented in **Table 1**.

Table 1 Summary of the Site Environmental Setting

Aspect	Description
Land Use zoning (refer to Figure F2, Attachment A)	The Site is located on land zoned as RU1 (Primary Production). The transmission connection passes through land zoned RU1 (Primary Production), IN1 (General Industrial) and SP2 Rail Infrastructure Facility.
Topography	Regionally, Wallerawang is located at the base of a valley which slopes from the north, east and south towards Wallerawang and Lake Wallace. The Site slopes to the southeast towards Pipers Flat Creek, with the land proposed for the BESS development ranging from approximately 902 m to 891 m AHD. The transmission connection alignment descends from the Site to around 875 m AHD close to Pipers Flat Creek before rising to generally around 880 m AHD to the Transgrid Wallerawang 330 kV substation. North of Main Street the transmission connection alignment follows a topographical spur which separates the catchments of Pipers Flat Creek to the west and Coxs River to the east.
Geology and Soils (refer to Figure F3 and Figure F4, Attachment A)	Soils within the Project Area and surrounds viewed on eSPADE, include Cullen Bullen, Pipers Flat (corresponding to the Piper's Flat Creek), Lithgow and Disturbed Terrain (associated with the areas of Wallerawang Power Station Lidsdale Siding and the Transgrid Substation). A review of the Lithgow LEP Acid Sulfate Soil Risk Mapping did not identify any risk of acid sulfate soils. The NSW DPE Hydrogeological Landscape and Salinity

Aspect	Description
	Hazard Maps (viewed through eSPADE) did not identify any areas of inland soil salinity risk. No risk of mine subsidence was identified from a review of the NSW Government Mine Subsidence District Mapping. Soil sampling was completed and documented in the AECOM (2022) EIS. a total of six samples were tested for erosivity within the BESS area and along the north western area of the transmission line alignment (excluding the area which aligns with the rail line). No information pertaining to contamination was recorded during the investigation. The 1:100,000 geological map sheet for the Western Coalfield (south) indicates that the surface geology of the Project Area is of Permian to Quaternary, underlain by Early to Later Permian Shoalhaven Group. Quaternary alluvium is present in the floodplains of the Pipers Flat Creek and Coxs River.
Hydrogeology (refer to Figure F5, Attachment A)	A review of available groundwater assessments undertaken within close proximity to the Project Area indicates that there is a shallow unconfined aquifer in the vicinity of the Project and new transmission line. A deeper regional aquifer is present in the region which outcrops to the north of the new transmission line location (RPS, Aquaterra, 2012). Based on the NSW Office of Water real-time continuous water monitoring network, the likely depth to the shallow unconfined aquifer was approximately 1.64m BGS, located approximately 120 m from Pipers Flat Creek. It is considered that the shallow unconfined aquifer may be associated with local recharge of the groundwater table from the creek. As creek lines within the area are identified to be ephemeral, seasonal variation in groundwater levels may occur. The floodplain for Pipers Flat Creek sits at an elevation of approximately 875 m AHD. As the Site is located approximately 13 – 17m above the flood plain of Pipers Flat Creek it is expected that the groundwater table would occur at depths greater than 10 m BGS. The underground installation of the transmission line between the Site and the Transgrid Wallerawang 330 kV substation would require the cable to be installed beneath Pipers Flat Creek and its flood plain. Groundwater in this location is likely to be closer to the surface with the closest borehole (GW110520) providing a standing water level of 1.64 m BGL. As such it is possible that groundwater could be intercepted during the installation of the transmission line. However, these activities are considered to be minimal impact activities under the *NSW Aquifer Interference Policy* (DPI, 2012). In the absence of site-specific data, it is considered that groundwater flow would be consistent with the topography of the Project Area, towards Pipers Flat Creek or Coxs River where the transmission alignment comes closer to the Transgrid Wallerawang 330 kV substation. A search of the Australian Groundwater Explorer available from the Bureau of Metrology identified seven registered groundwater bores present within a 1 km radius of the Project Area as summarised in **Table 2**. The EIS (AECOM, 2022) indicates that bore GW053071 located in the Project Area was no longer used for irrigation purposes.

<table>
<tr><th>Aspect</th><th>Description</th></tr>
<tr><td></td><td>
Table 2 Registered Groundwater Bores
<table>
<tr><th>Bore Number</th><th>Use</th><th>Approx. Distance from Project Area</th></tr>
<tr><td>GW053071</td><td>Irrigation</td><td>In the Project Area</td></tr>
<tr><td>GW110437</td><td>Test Bore</td><td>575 m</td></tr>
<tr><td>GW110520</td><td>Industrial</td><td>740 m</td></tr>
<tr><td>GW115011</td><td>Monitoring</td><td>750 m</td></tr>
<tr><td>GW115261</td><td>Not available</td><td>750 m</td></tr>
<tr><td>GW115010</td><td>Monitoring</td><td>830 m</td></tr>
<tr><td>GW115260</td><td>Not available</td><td>830 m</td></tr>
</table>
No standing water levels were available for the above registered groundwater bores. Other registered monitoring wells were used for monitoring or test bores.

A search for groundwater dependent ecosystems (GDEs) that may occur within the Project Area was undertaken using the Bureau of Meteorology's (BoM) Groundwater Dependent Ecosystems Atlas, as follows:

• Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands vegetation community. This vegetation community occurs in a small pocket at the north west of the Site, and within the vegetated area east of Brays Lane through which the transmission connection would traverse. This vegetation community is also listed as an Endangered Ecological Community (EEC) under the Biodiversity Conservation Act 2016 (NSW).
• Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands. This vegetation community occurs in small pockets to the north west and south west of the Project Area.
</td></tr>
</table>

7.0 Contamination Assessment

7.1 NSW EPA Records

A review of the NSW EPA Contaminated Land Record of Notices and the List of Notified Sites was undertaken on 28 June 2022. The results of the review identified two contaminated sites notified to the EPA within a 5 km radius of the Project Area. These included:

- Wallerawang Power Station for other petroleum; and
- Lidsdale Coal Loading Facility for other industry.

Both sites were listed as "regulation not required" under the *Contaminated Land Management 1997 Act (NSW)*. Additional reviews of the NSW EPA and Department of Defence websites indicated there are no gasworks, no Department of Defence properties in which per and poly-fluoroalkyl substance (PFAS) investigations were being completed and no NSW EPA PFAS investigation sites within a 5 km radius of the Project.

7.2 Historical Mapping

A review of historical maps (Wallerawang Topographic Sheet from 1932 [Australian Survey Corporation]) did not identify any additional information pertaining to potential contamination sources in the vicinity of the Project. No historical parish maps were available for review.

7.3 Historical Aerial Imagery Review

A review of the historical aerial imagery provided by the Lotsearch Aerial report (Attachment B) and the Historical Image Index (NSW Government) was completed to understand the potential for current and historical contaminating land uses to have occurred within the vicinity of the Project. **Table 3** provides a summary of the review of the historical aerial images for the Project and surrounds.

Table 3 Historical Aerial Imagery Review

Year	Project Area	Project Area Surrounds
1954	The Site is cleared with the exception of vegetation in the northwest and southwestern corners and a small portion of the eastern boundary. Two drainage lines are present running west to east which appear to be tributaries of Piper Flat Creek. Both drainage lines converge at towards the centre of the Site. No riparian vegetation is apparent corresponding to the drainage lines. The transmission connection alignment appears to comprise a combination of native vegetation, rail line and cleared ground surface which may be potentially unsealed construction access tracks. The present day Transgrid Wallerawang 330 kV Substation is not apparent in the aerial image.	**North:** The area north of the Project area is primarily open space land (appears to be grassed) with heavily vegetated area to the northwest. **South:** Immediately southeast of the Site are buildings which appear to form a homestead. Further south is areas of cleared ground corresponding to the rail line and the present location of the Lidsdale Coal Loading Facility. Potential that this area may have been used as a construction yard during the construction of Wallerawang Power Station. The town of Wallerawang is apparent in the far south primarily comprising of low-density residential homes. **East:** Wallerawang Power Station appears to be under construction with a large portion of ground appearing to have been cleared. Eight buildings are located within the vicinity of the power station which appear to be industrial. **West:** The visible area primarily comprises of open space (grassed) and vegetated areas.
1969	The Site is generally consistent with the 1954 aerial image however some tree clearing has occurred. The transmission line alignment also appears generally consistent with the 1954 aerial image, however land clearing / earthworks is no longer apparent indicating potential construction works may have finished.	All areas surrounding the Project Area appear to be generally consistent with the 1954 aerial image with the exception of the following: • Wallerawang Power Station construction is now completed and appears to be operational. • Areas of vegetation clearing are now apparent in northern and southern surrounding areas. • The Wallerawang Sewage Treatment Plant is apparent approximately 900 m south west of the Site.

Year	Project Area	Project Area Surrounds
1972	Both the Site and transmission line alignment are generally consistent with the 1969 aerial image. Construction of the present day Transgrid Wallerawang 330 kV Substation appears to have commenced.	All areas surrounding the Project Area appear generally consistent with the 1969 aerial image with the exception of the following: • Further construction works is apparent at Wallerawang Power Station, however the image quality is too poor to determine specific activities. • A water reservoir has been constructed the north of the Project Area.
1984	The Site appears to now be split into three paddocked areas, with the dam adjacent to the eastern boundary now apparent. The rail corridor has been extended to the present-day alignment extending along the transmission line alignment in a north south direction.	**North and West:** are generally consistent with the 1972 aerial image. **East:** Construction appears to be finished within the Wallerawang Power Station and the Transgrid Wallerawang 330 kV Substation. **South:** The Lidsdale Siding coal handling facility is now apparent in its present-day location. To the south of this facility, a new tree plantation area is apparent however, trees appear to be immature. Additional development of low-density properties is also visible in Wallerawang to the far south.
1989	Generally consistent with the 1984 aerial image.	Generally consistent with the 1984 aerial image however, vegetation in the plantation area appears mature.
1998	The transmission line alignment is generally consistent with the 1989 aerial image. Earthworks and construction of a dam is apparent towards the centre of the Site with the surface water drainage channels no longer visible.	Generally consistent with the 1984 aerial image however, some additional development has occurred within Wallerawang and some structures have been removed at Wallerawang Power Station including one of the generators.
2001	Generally consistent with the 1998 aerial image.	Generally consistent with the 1998 aerial image.
2006	Generally consistent with the 2001 aerial image.	Generally consistent with the 2001 aerial image.
2019	Generally consistent with the 2006 aerial image.	Generally consistent with the 2006 aerial image however, Wallerawang Power Station appears to now be in the process of decommissioning.

Based on the historical aerial photo review, potential contaminating activities at the Project Area would likely to be related to historical agricultural activities and use of the land as a rail corridor from between 1972 and 1984. Industrial activities in the vicinity of the Project Area at the Transgrid Wallerawang 330 kV Substation, Wallerawang Power Station, Lidsdale Coal Loading Facility and Wallerawang Sewage Treatment Plant may have contributed to potential contamination of the Project Area.

7.4 Summary of Contamination Assessment

Based on the review provided herein from available site data, **Table 4** identifies the potential sources of contamination that were identified in and surrounding of the Project Area. Potential sources of contamination are presented on Figure F6, Attachment A. Overall the data review is consistent with the findings of the contamination study provided in the EIS.

Table 4 Potential Sources of Contamination and Impact on the Project Area

Potential Sources of Contamination	Potential Impact on the Project Area	Likelihood of Impact
Rail uses along the rail line corridor	Potential for contamination in surface soils due to historical ongoing operation of rail infrastructure in the transmission line corridor since the 1970s, including the historical use of fuel, grease, solvents and chemicals and the possible for trace asbestos from old train brake pads. No records of major incidents have been identified; therefore, it is considered that the risk of encountering contamination is low and if encountered can be managed during construction.	Possible
Potential presence of imported fill materials from an unknown origin	Imported fill material (often associated with disturbed terrain soil types) can be of unknown origin and composition, potentially containing contaminated materials. As no information is available the risk of encountering contaminated fill materials is considered to be low to moderate, noting that construction activities are expected to extend to a depth of 1.5m BGS. The contaminants of potential concern (CoPC) expected in fill materials can be managed during construction by an unexpected finds protocol and work health and safety procedures.	Possible
Wallerawang Power Station	Potential for contamination arising at the Wallerawang Power Station to leach to deeper groundwater and migrate to within the Project Area. The Project is unlikely to intercept ground water in deeper aquifers given the proposed excavation depths. Should the power station have contaminated shallower groundwater associated with alluvial soils of the Coxs River, and based on the topographical spur that forms a boundary between the Pipers Flat Creek catchment and the Cox's River catchment, it is likely that contamination in groundwater would have flowed to the northeast away from the Project Area and on to the Cox's River.	Unlikely
Lidsdale Siding (Coal Loading Facility)	Potential for contamination arising at the Lidsdale Siding to leach to deeper groundwater and migrate to within the Project Area. The Project is unlikely to intercept ground water in deeper aquifers given the proposed excavation depths. Should the Lidsdale Siding have contaminated shallower groundwater associated with alluvial soils of the Pipers Flat Creek, given the topographical spur that forms a boundary between the Pipers Flat Creek catchment and the Cox's River catchment, it is likely that this contamination in groundwater would have flowed to the northwest, away from the transmission connection alignment. As such the risk of encountering contamination is considered to be low as the excavation activities associated with installing the transmission connection are expected to extend to a maximum depth of 1.5m BGS.	Unlikely
Wallerawang Ash Repository	The Wallerawang Ash Repository is located, approximately 2.5 km to the northwest from the Project Area. Due to the distance of this source, the construction activities proposed and that the ash repository is not associated with the alluvial soils of Pipers Flat Creek or Coxs River, it is considered that	Unlikely.

Potential Sources of Contamination	Potential Impact on the Project Area	Likelihood of Impact
	the risk of encountering contamination from this source to be low.	
Septic Tanks on residential properties within the Project Area	Potential for contamination in surface soils and localised groundwater to be present due to historical and ongoing use of septic tanks at properties adjacent to the Project Area. Given that these properties have been occupied and Septic tanks are required to be maintained in accordance with local council regulations, it is considered that the risk of encountering contamination from this source to be low.	Unlikely
Hazardous materials (asbestos and lead paints) which may be present in building materials used to construct houses adjacent to the Project Area	Potential for hazardous materials (such as asbestos and lead paints) to be present in building materials on properties surrounding the Project Area, noting that properties immediately adjacent to the Site were constructed prior to 1954. Deterioration of these materials over time may potentially cause localised contamination to surface soils. Based on the vicinity of these sources to the Project Area it is considered that the risk of encountering contamination from this source to be low.	Unlikely
Storage and use of pesticides, fertiliser, herbicides, fuels and/or other agricultural chemicals within and adjacent to the Site.	Potential for contamination in surface soils and groundwater due to historical and ongoing agricultural land use within and adjacent to the Project Area. Based on the aerial imagery review, no intensive farming practices have been conducted within the Project Area. It is likely that the storage and application of chemicals within the Project Area would be limited and therefore the risk of encountering contamination from this source is considered to be low. Given the distance of the pine plantations at the Lidsdale coal loading facility, from the Project Area, the risk of encountering contamination from the potential use of pesticides and herbicides is considered to be low.	Unlikely
Wallerawang Sewage Treatment Plant	Potential contamination of surface waters and leaching to groundwater. Based on the proximity of this source to the Project Area and the expected depth of groundwater, it is considered that the risk of encountering contamination from this source is low.	Unlikely

Where there is a possible likelihood of encountering contamination from the identified potential sources, these sources have been carried forward into a preliminary CSM for further assessment.

8.0 Preliminary Conceptual Site Model

The preliminary CSM for the Project Area was considered in its current proposed configuration in context of future construction works and maintenance based on information obtained to date. Should the proposed Project Area change, reassessment of the preliminary CSM may be required.

8.1 Potential Sources of Contamination and Contaminants of Potential Concern

Based on the preliminary CSM developed, the following sources of contamination and corresponding CoPC have been identified:

- Current and historical rail uses along the rail line corridor which corresponds to the Project Area for the installation of the transmission line through TfNSW land. CoPC comprise asbestos, Total Recoverable Hydrocarbons (TRH), Benzene, Toluene, Ethylbenzene, Xylene (BTEX), Polycyclic

Aromatic Hydrocarbons (PAHs), Volatile Organic Compounds (VOCs), Semi-volatile Organic Compounds (SVOCs) and heavy metals.

- Potential presence of fill materials from an unknown origin and quality used during the development of the rail line corridor. CoPC comprise asbestos, TRH, BTEX, PAHs, VOCs, SVOCs, Polychlorinated Biphenyls (PCBs), Organochlorine and Organophosphorus Pesticides (OCPs and OPPs), heavy metals and foreign materials.

8.2 Transport Mechanisms

Based on the identified potential sources of contamination within the Project Area and the surrounding area, the following contamination transport mechanisms could potentially result from construction of the Project and/or during the future operation / maintenance of the transmission connection:

- Aerial dispersion of potentially contaminated soil derived dusts during construction works.
- Volatilisation of volatile CoPC within soil.
- Leaching of contaminants from disturbed soils to deeper soils and into groundwater and subsequent migration.
- The release of contaminants from soils to surface water-run off and subsequent migration through the surface water network.
- Sorption of contaminants from surface water to sediments and potential rerelease during high flow events or sediment disturbance.

Based on the nature of activities being undertaken during the construction it is considered unlikely that groundwater will be encountered in the Project Area with the exception of the location of under boring at Pipers Flat Creek. It is understood that minimal (if any) dewatering of groundwater is likely to be required during construction or during future operations based on the following:

- The majority of the proposed transmission connection (approximately 1 km of the 1.55 km alignment) would be installed by HDD which would minimise the amount of excavation required and the handling and management of soils.
- During the HDD work, drilling fluids would be used to create a low-permeability barrier in the hole and any aquifer that may be encountered. Positive pressures in the hole would maintain the stability of the walls and mud cake, which would only be required until pipes are inserted, and the aquifer is sealed off.
- The drilling methodology is only expected to exchange a small amount of water near the open section of the hole which would be collected and stored before being disposed of off-site to a licenced facility.
- The sections of the transmission connection which would be installed using trenching (approximately 550 m) are located away from the main watercourses of Pipers Flat Creek and Coxs River and are located on a topographical high point that separates these catchments. Given the shallow excavations proposed (up to 1.5 m BGS), it is unlikely that groundwater would be intercepted.
- During operation, the transmission connection is unlikely to require significant maintenance and as such disturbance of the soils within the transmission alignment and rail corridor is unlikely.

8.3 Potential Human Health Receptors

Based on this desktop review, the following potential human health receptors have been identified within the Project Area, which may be exposed to potentially contaminated environment media during construction activities:

- Construction and Maintenance workers conducting intrusive ground works during the development of the Project and future sub-surface maintenance work upon the completion of construction activities.
- Commercial workers who may be present during construction but undertake no intrusive works (this is considered to include site visitors).

Off-site receptors such as surrounding residents, commercial and agricultural workers and recreational users of creek lines fall outside the scope of this assessment as they are unlikely to be impacted by the construction of the transmission connection given their distance from the Project Area and works proposed. Therefore these receptors have not been considered further.

8.4 Potential Ecological Receptors

Based on this desktop review, the following potential ecological receptors have been identified within the Project Area, which may be exposed to potentially contaminated environment media during construction activities:

- Aquatic and terrestrial (riparian) ecosystems of the Pipers Flat Creek and Coxs River and associate tributaries.
- Terrestrial ecosystems present within the Project Area and surrounds.

Two GDEs were identified to occur within the Project Area comprising Black Gum grassy woodland of damp flats and drain lines (northwest of the Project Area) and Broad-leaved Peppermint – Red Gum grassy open forest (north west and south west of the Project Area).

It is however noted that potential risks to ecological receptors associated with construction activities would be managed as part of the Construction Environmental Management Plan (CEMP) which will include the following mitigation measures:

- The proposed HDD method of constructing the new transmission connection in areas of environmental sensitivity would allow the Project to avoid direct physical disturbance of the above mentioned GDEs.
- The certified products used for drilling fluid slurry would be inert (such as bentonite clay) or biodegradable (such as xanthan gum).
- Drilling fluids and cuttings are to be stored in a temporary lay down area to minimise leaching of potential contaminants to the environment, and subsequently disposed of to a licenced landfill facility.
- Handling potentially contaminating substances such as chemicals, fuels, oils and contaminated materials (such as excavated fill) in accordance with relevant Australian Standards and guidelines.
- Developing and implementing an adequate spill response plan which complies with regulations.
- The installation of passive containment measures such as silt fencing to capture potentially contaminated eroded soils from entering waterways.

Based on the mitigation measures that would be implemented, the risk to ecological receptors is considered to be low and therefore has not been further considered in this CSM.

8.5 Potential Exposure Pathways

The following potential pathways for contamination have been identified:

- Dermal contact, incidental ingestion and inhalation of contaminated soils / soil derived dusts in outdoor air.
- Dermal contact and incidental ingestion of potentially contaminated shallow groundwater at the HDD rig location close to Pipers Flat Creek.
- Inhalation of soil derived vapour in outdoor air and / or a trench.

It is understood that transmission connection is to be HDD under Pipers Flat Creek therefore, workers completing construction activities would not be in contact with surface waters or sediments of Pipers Flat Creek.

8.6 Source-Pathway-Receptor Linkage Assessment

Based on the data review, the following potentially complete source-pathway-receptor linkage (SPR) were identified in **Table 5**.

Table 5 SPR Linkage Assessment - Human Health

Exposure Pathways / Receptors	Dermal contact and incidental ingestion of soil	Inhalation of soil derived dust in outdoor air	Inhalation of soil and groundwater derived vapour in outdoor air	Dermal contact and incidental ingestion of groundwater
Construction and Maintenance Workers	✗[1]	✗[1]	✗[1]	✗[1]
Commercial Workers and Site Visitors	✗[2]	✗[1]	✗[1]	✗[2]

Notes:
[1]It is considered that works will be completed within the Project Area in accordance with relevant work health and safety legislation, the implementation of CEMP and permitting requirements.

[2] Commercial workers and site visitors are not expected to undertake intrusive works on-site where they may come in contact with soil and groundwater.

Overall, the risk to human health and ecological receptors from understanding of the site conditions, development of the CSM and information on the construction works along the transmission connection, is considered low and can be managed under the implementation of a CEMP and unexpected finds protocol.

9.0 Conclusion

Based on the preparation of EISs and Review of Environmental Factors (REFs) for historical land uses associated with rail use (such as Rozelle Rail Yards[1], numerous preliminary and detailed site investigations for the former State Rail Authority of NSW, and investigation and remediation of regional rail sidings for John Holland on behalf of Australian Rail Track Corporation [ARTC]), AECOM has knowledge of rail corridors and understands the potential contamination sources and associated CoPC that need to be considered in this Contamination Assessment. In the context of this Project, AECOM considers the proposed land use of the transmission line to have a low sensitivity in relation to other surrounding land uses in the area.

Based on the review of the Contamination Assessment within the EIS for this Project, development of the Preliminary Conceptual Site Model and revised S-P-R linkage assessment, it is considered unlikely that potential sources of contamination have significantly impacted the Project Area, inclusive of the transmission connection alignment within the rail corridor. The installation of a transmission line within the rail corridor would involve the installation of a land use with a low sensitivity to this land. As noted in Section 8.5, the potential exposure pathways are limited to the installation of the transmission line. The proposed land use does not promote continuous human occupation, with the exception to periodic maintenance activities. It is likely to be installed and maintained by contractors with experience working in rail corridors who understand how to install cables and other utilities in these areas. On this basis it can be concluded that the rail corridor is a suitable location for the proposed transmission connection. These findings are consistent with the findings of the EIS, including compliance with clause 4.6 of the *State Environmental Planning Policy (Resilience and Hazards) 2021*.

Whilst the risk of potential contamination from the identified sources is considered to be low, construction works within the Project Area should be undertaken under a CEMP, as stated in Section 7.4 and should also include the following:

- Soil and Water Management Plan (SWMP) to document the erosion and sediment controls across the Project and in the vicinity of Pipers Creek and Coxs River.

[1] RMS (2016) Rozelle Rail Yards – Site Management Works Review of environmental factors, dated November 2016

- Documentation of relevant work health and safety (WH&S) standards and controls for the works including the standard use of personnel protective equipment (PPE) to mitigate the risk of being exposed to potentially contaminated materials (such as long clothing).
- An unexpected finds protocol (UFP) as part of the CEMP, which should be used to manage any unexpected contamination which may be encountered during construction works.

Intrusive investigations of the shallow soils (to 1.5m BGS) as part of a Preliminary Contamination investigation are not warranted at this stage given that:

- The potential contamination sources, associated CoPC and preliminary CSM have been confirmed by this review and the potential impact to the Project Area is considered low; and
- Construction works can be managed by implementation of a CEMP.

Nevertheless, as agreed with TfNSW, intrusive investigations would be conducted, if required, prior to the commencement of the construction works if the Project is consented.

10.0 References

AECOM, 2022. *Environmental Impact Statement – Great Western Battery*. Dated 23 February 2022.

Australian Survey Corporation, Wallerawang Topographic Sheet from 1932.

Australian Bureau of Metrology, Australian Groundwater Explorer, viewed at: Groundwater Explorer (bom.gov.au)

Department of Defence, *PFAS Investigation and Management Program*, viewed at: Home: PFAS: Department of Defence

Geological Series Sheet 8931 Edition 1, 1:100,000 Western Coalfield (Southern Part).

Lotsearch Aerials 2021. *Great Western Battery, Wallerawang, NSW 2845.* Dated 31 March 2021.

NSW Department of Primary Industries, *NSW Aquifer Interference Policy* (DPI, 2012).

NSW Department of Planning, Industry and Environment, eSPADE, viewed at: eSPADE v2.2 (nsw.gov.au)

NSW EPA, *List of Notified Sites,* viewed at: List of notified sites (nsw.gov.au)

NSW Government Spatial Services, SIX Maps, viewed at: SIX Maps (nsw.gov.au)

NSW Government Historical Imagery, viewed at: Historical Imagery (nsw.gov.au)

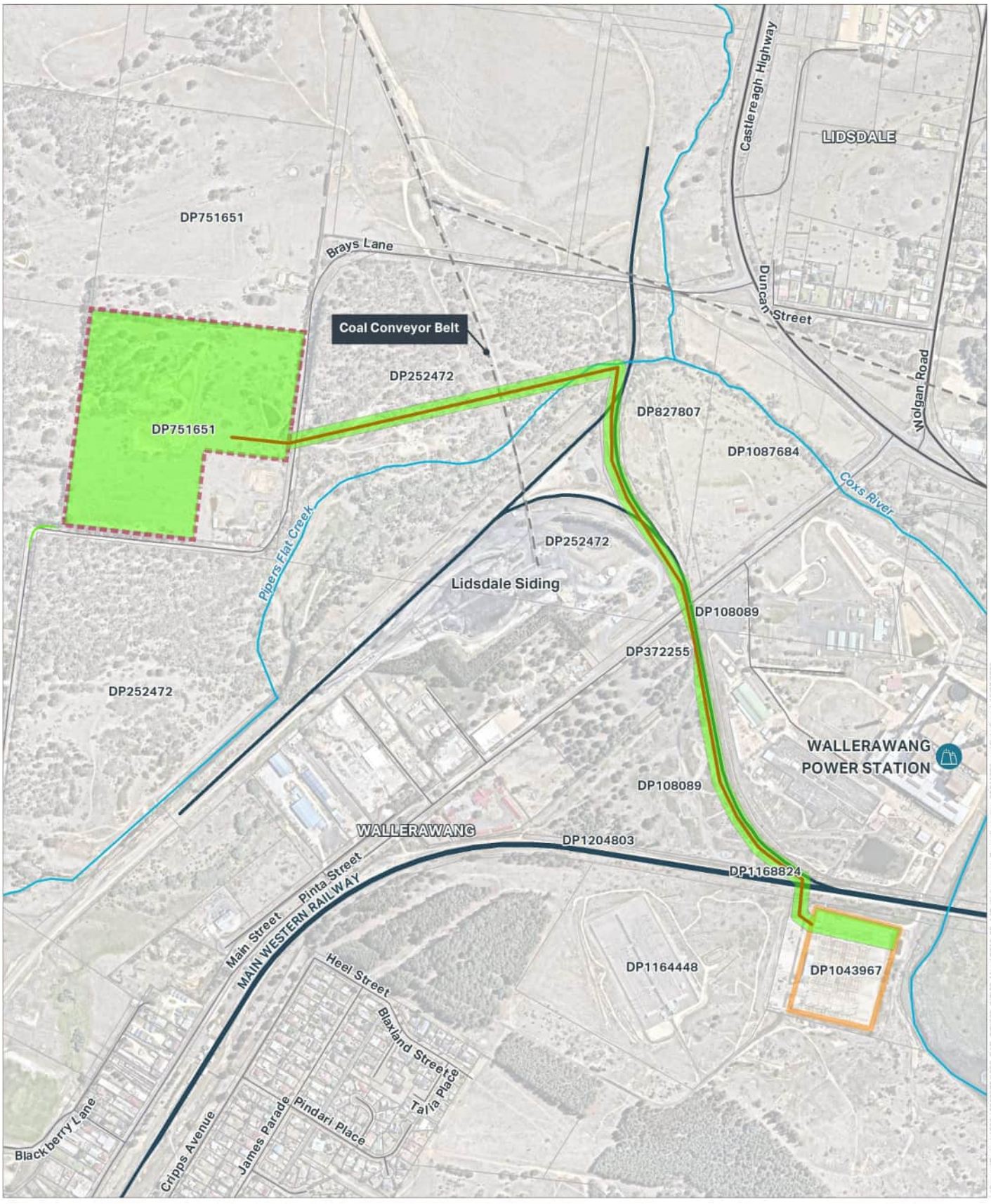
RPS Australia East Pty Ltd 2012. *Lidsdale Siding Upgrade Project – Environmental Assessment*. Dated August 2012.

Yours faithfully

Orla Ferguson
Associate Director - Environment

Brad Eismen
Industry Director CEnvP, CS

encl: Attachment A - Figures
Attachment B - Historical Aerial Photographs



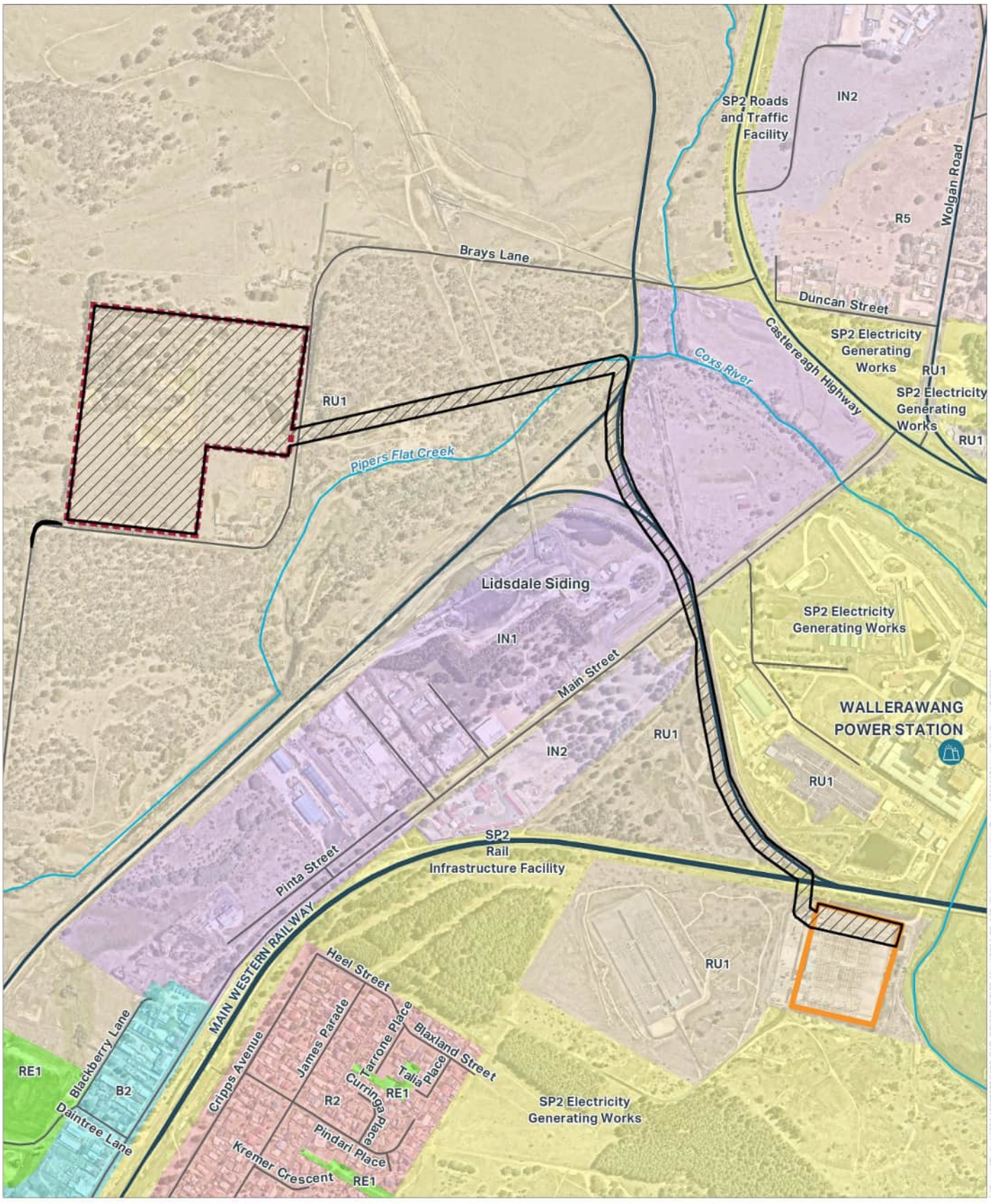
Legend

- The Site
- Transgrid 330kV Wallerawang Substation
- The Project Area
- Cadastre Boundaries
- Transmission Line
- Railway
- Watercourse

N 0 200 400 m

AECOM

Figure F1 - Site Location



Legend

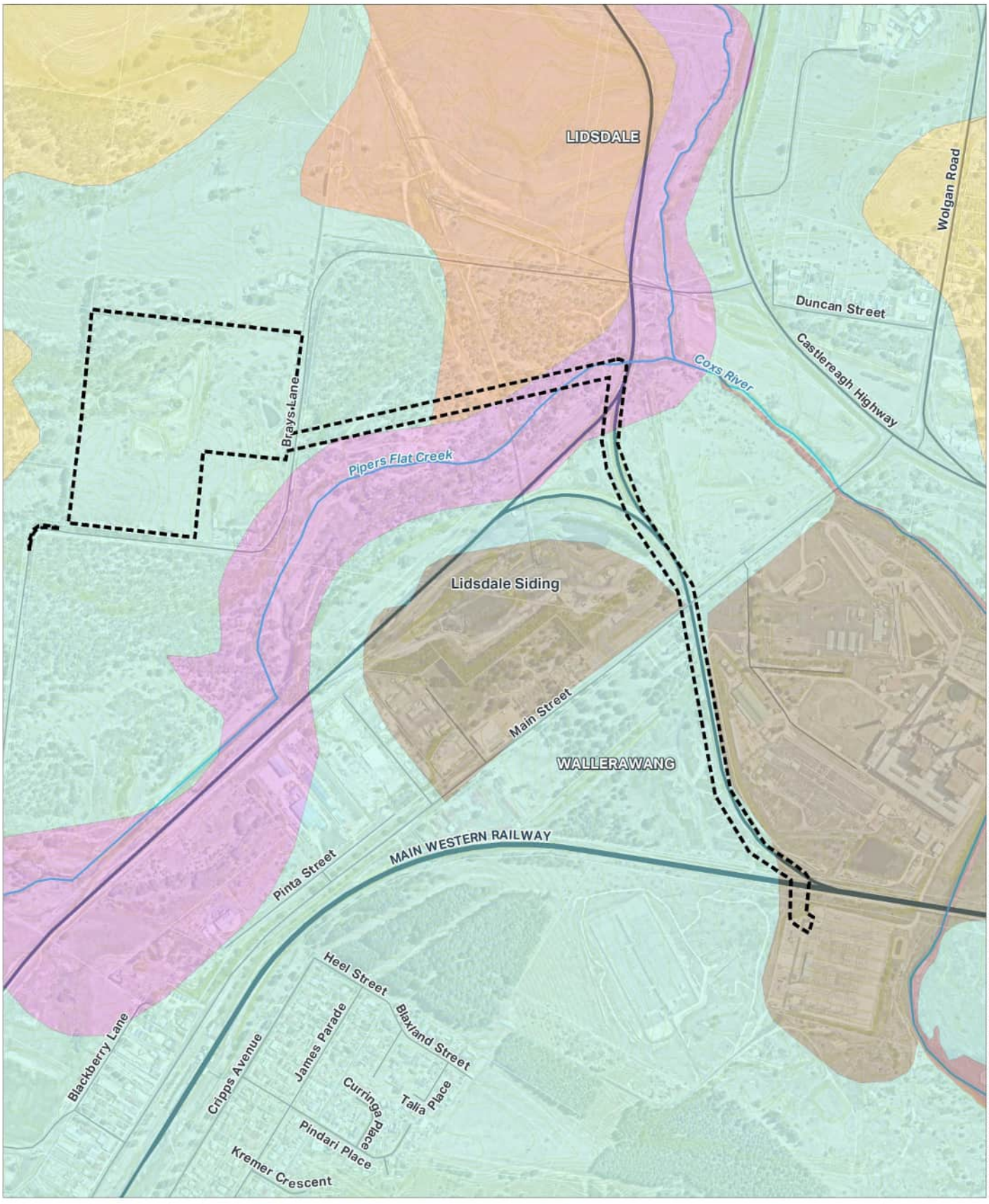
- The Project Area
- The Site
- TransGrid 330kV Wallerawang Substation
- Watercourse
- Primary Road
- Local Road
- Railway

LEP Land Zoning

- B2 Local Centre
- IN1 General Industrial
- IN2 Light Industrial
- R2 Low Density Residential
- R5 Large Lot Residential
- RE1 Public Recreation
- RU1 Primary Production
- SP2 Infrastructure

N 0 100 200 m AECOM

Figure F2 - Land Use



Legend

- Project Area
- Watercourse
- Railway
- Primary Road
- Local Road
- Contours

Soil Landscapes

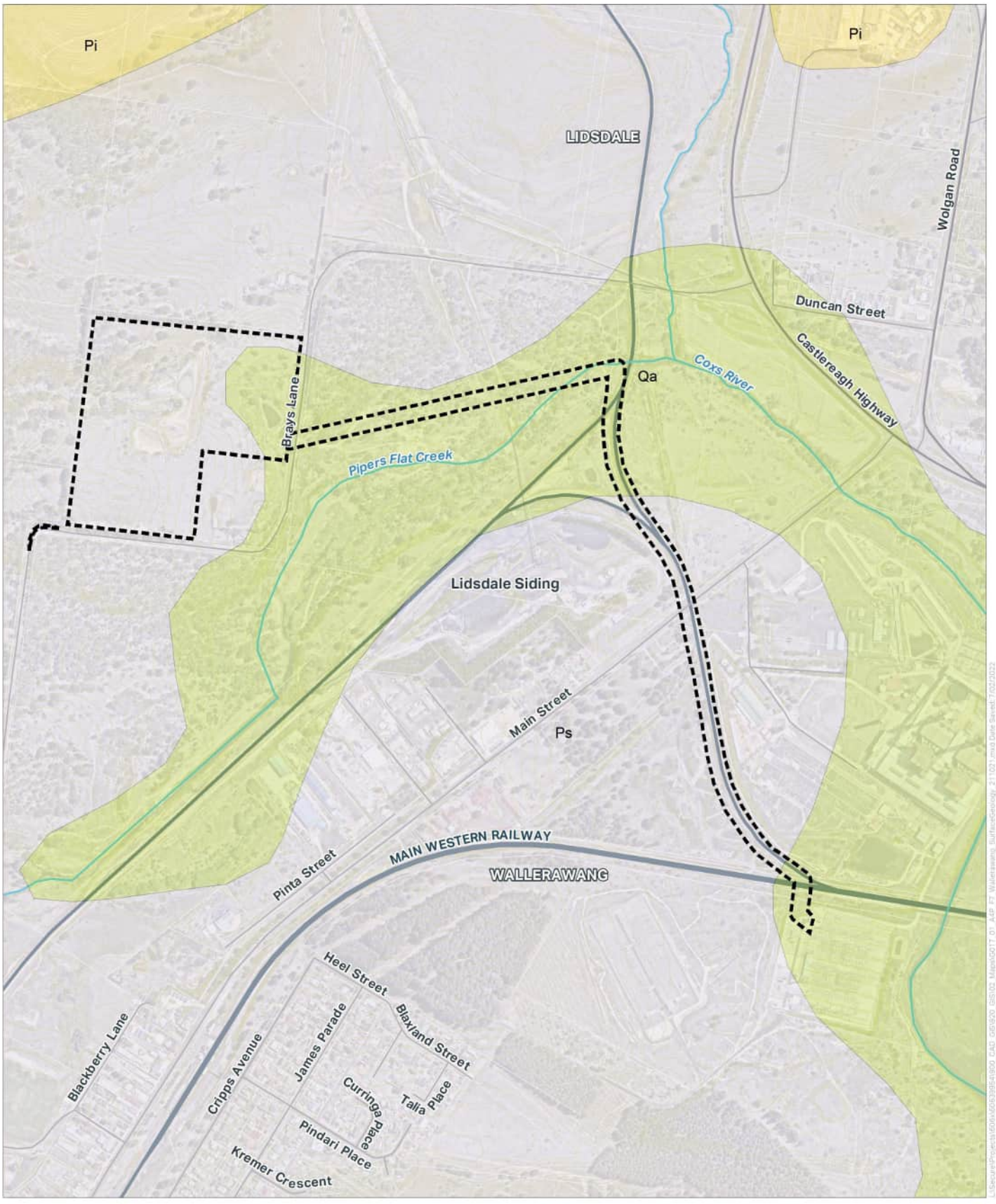
- Cullen Bullen
- Disturbed Terrain
- Hassans Walls
- Lithgow
- Pipers Flat
- Water

N

0 200 400 m

AECOM

Figure F3 - Soil Types



Legend

- Study Area
- Watercourse
- Railway
- Primary Road
- Local Road
- Contours

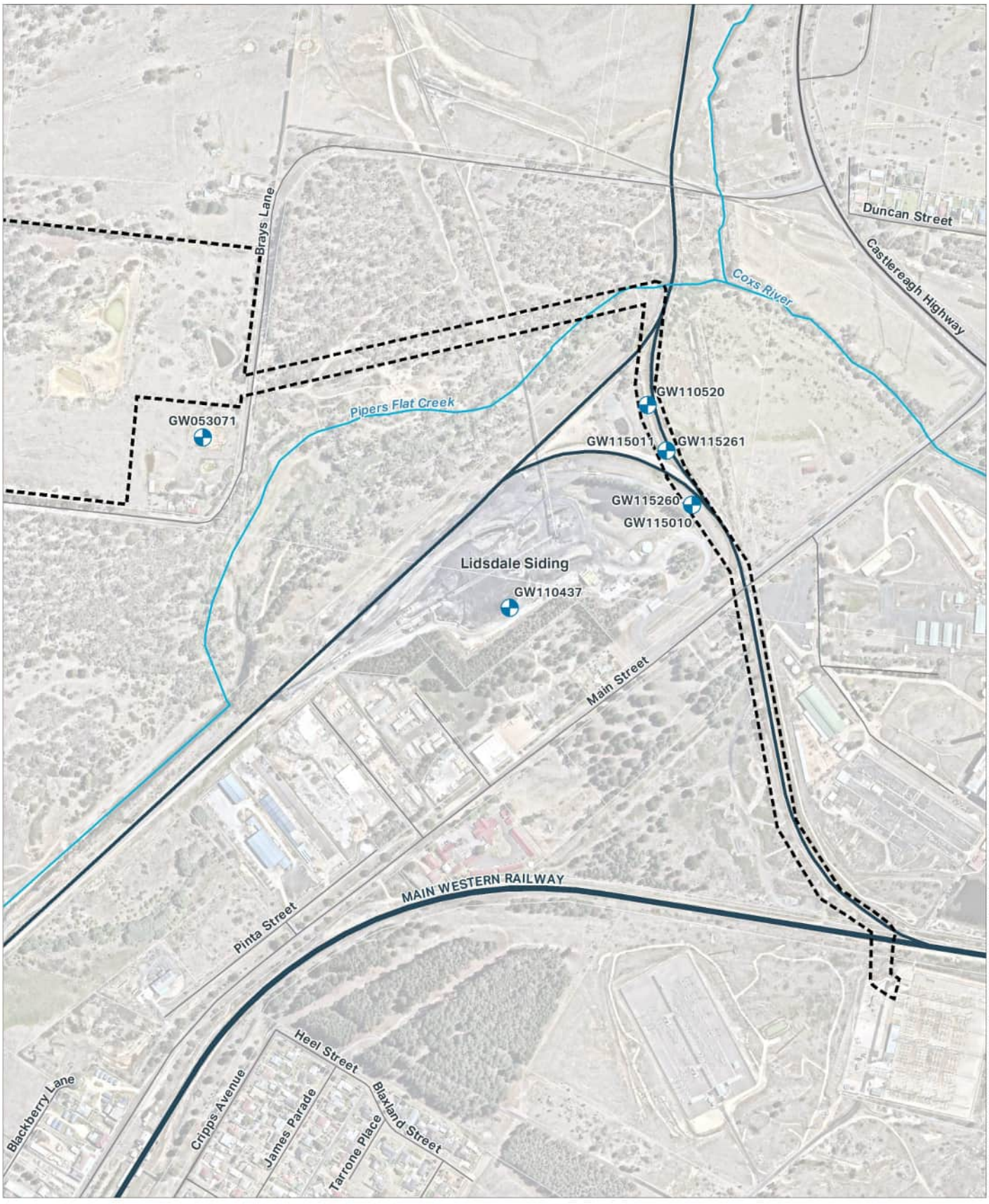
Surface Geology

- Pi
- Ps
- Qa

N 0 200 400 m

AECOM

Figure F4 - Surface Geology



Legend

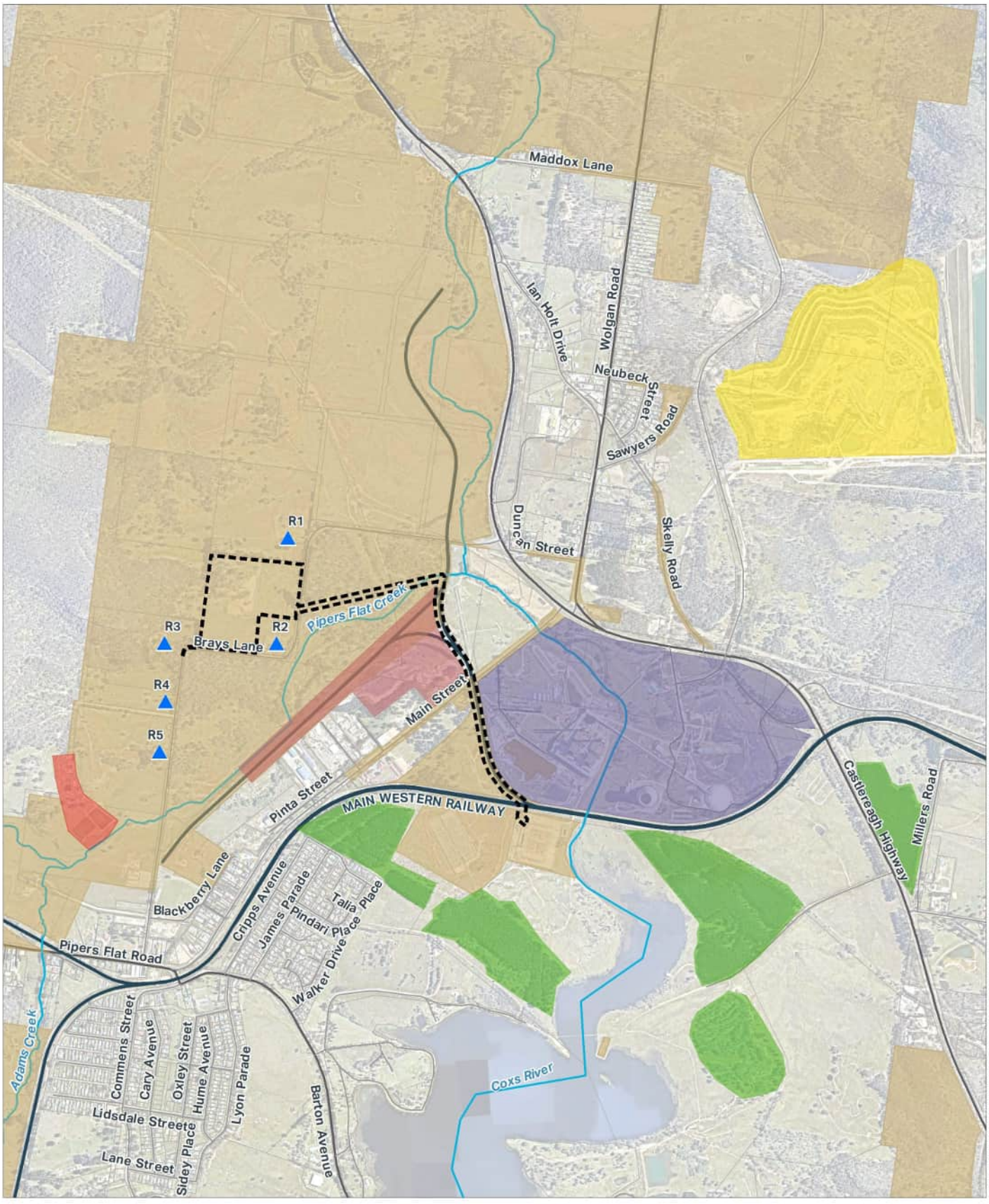
- Project Area
- Groundwater Boreholes
- Watercourse
- Railway
- Primary Road
- Local Road

N 0 150 300 m

AECOM

Figure F5 - Registered Groundwater Bores

Source: Imagery © Nearmap, 2020.



Legend

- Project Area
- Tree Plantations
- Lisdale Coal Loading Facility
- Wallerawang Ash Repository
- Wallerawang Sewage Treatment Facility
- Wallerawang Power Station
- Agricultural Land
- Residential Properties
- Watercourse
- Primary Road
- Local Road
- Railway

N 0 0.5 1 km

AECOM

Figure F6 - Contaminating Activities

Date: 31 Mar 2021

Reference: LS019212 EA

Address: Great Western Battery, Wallerawang, NSW 2845

Aerial Imagery 2019

Great Western Battery, Wallerawang, NSW 2845

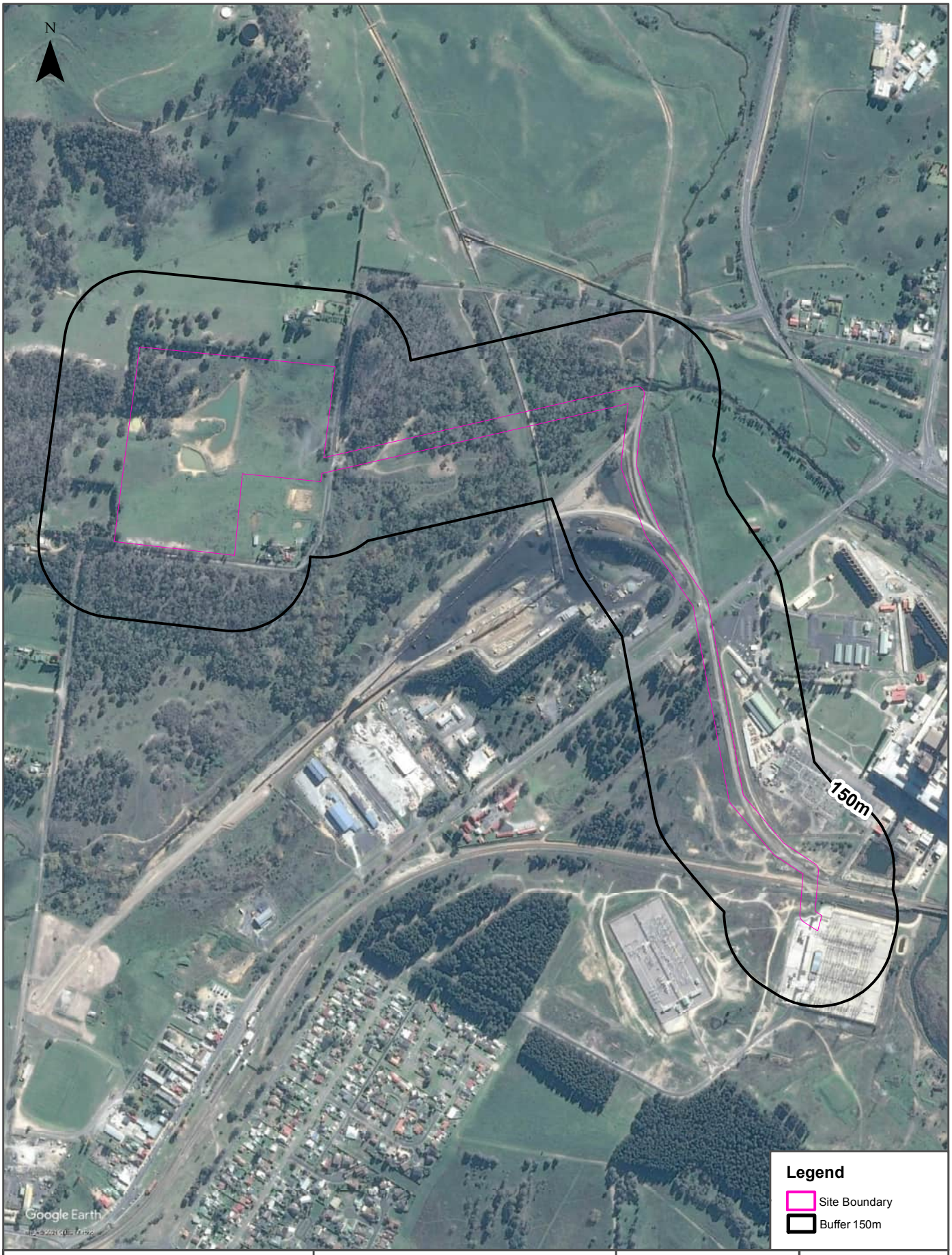
Data Source Aerial Imagery: © 2021 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.

Coordinate System: GDA 1994 MGA Zone 56

Date: 30 March 2021

Aerial Imagery 2014

Great Western Battery, Wallerawang, NSW 2845



Scale:	Data Source Aerial Imagery: © 2021 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 56	Date: 30 March 2021

0 120 240 360 480
Meters

Aerial Imagery 2006

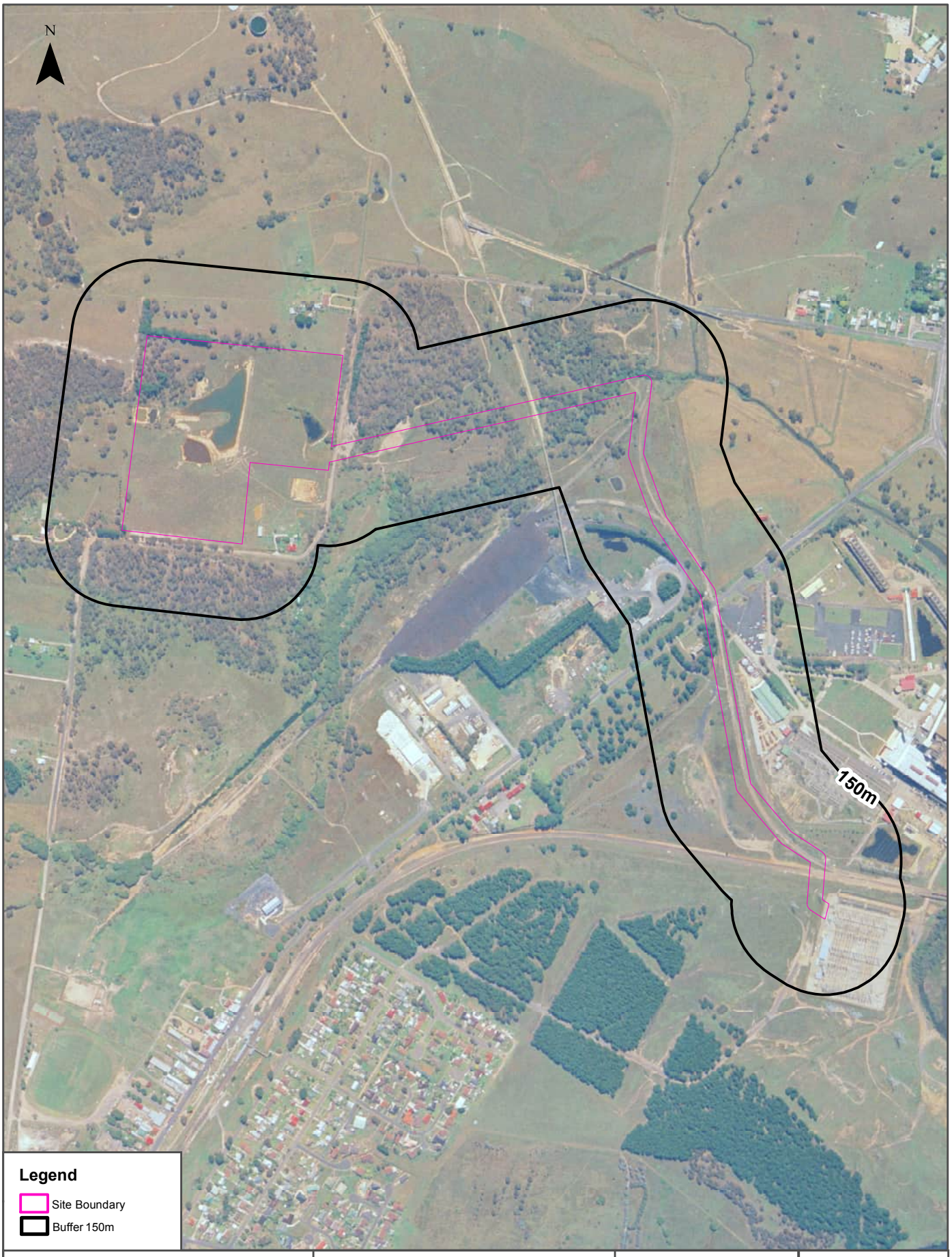
Great Western Battery, Wallerawang, NSW 2845

Scale:	Data Source Aerial Imagery: © 2021 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 56	Date: 30 March 2021

0 120 240 360 480
Meters

Aerial Imagery 2001

Great Western Battery, Wallerawang, NSW 2845

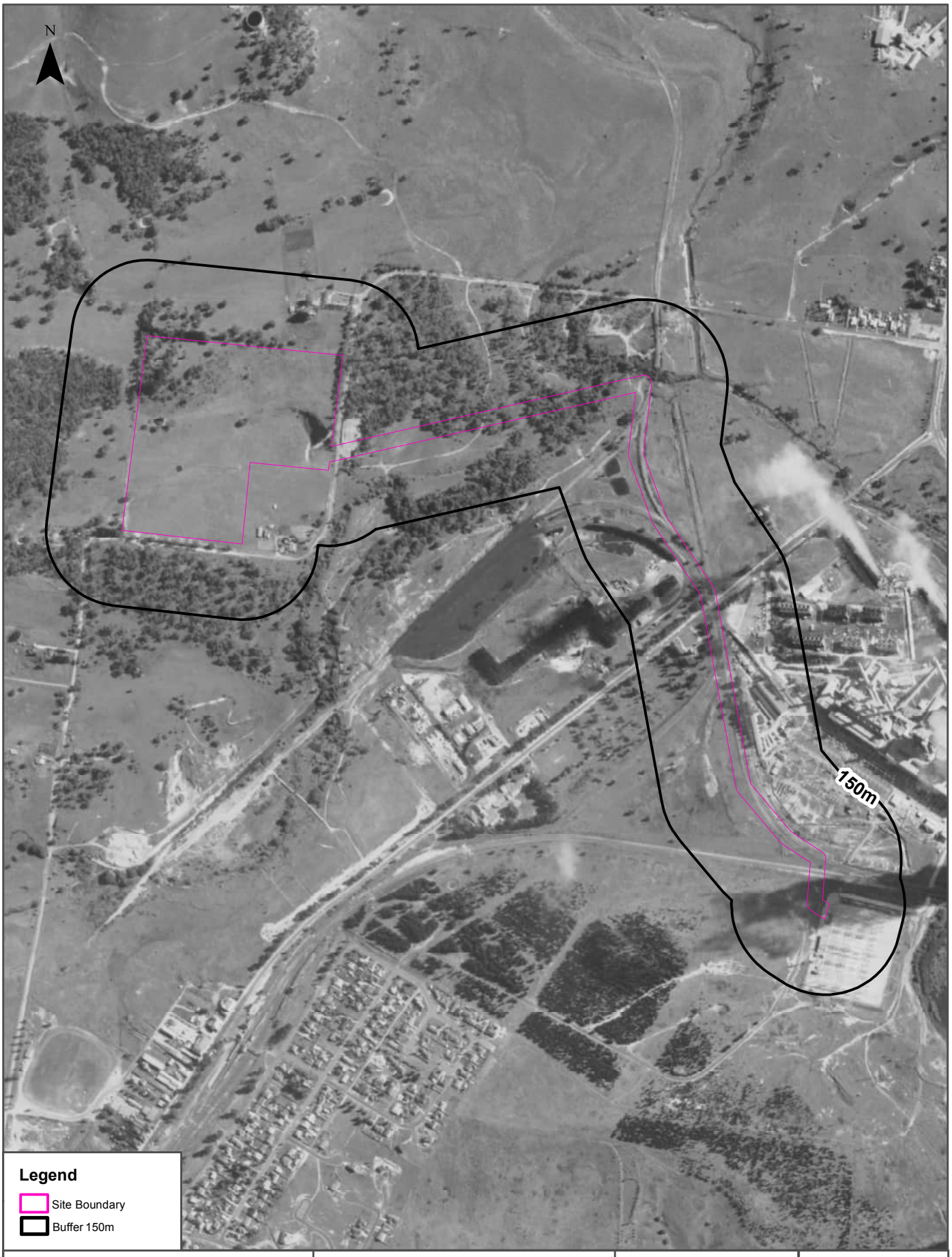


Aerial Imagery 1998

Great Western Battery, Wallerawang, NSW 2845

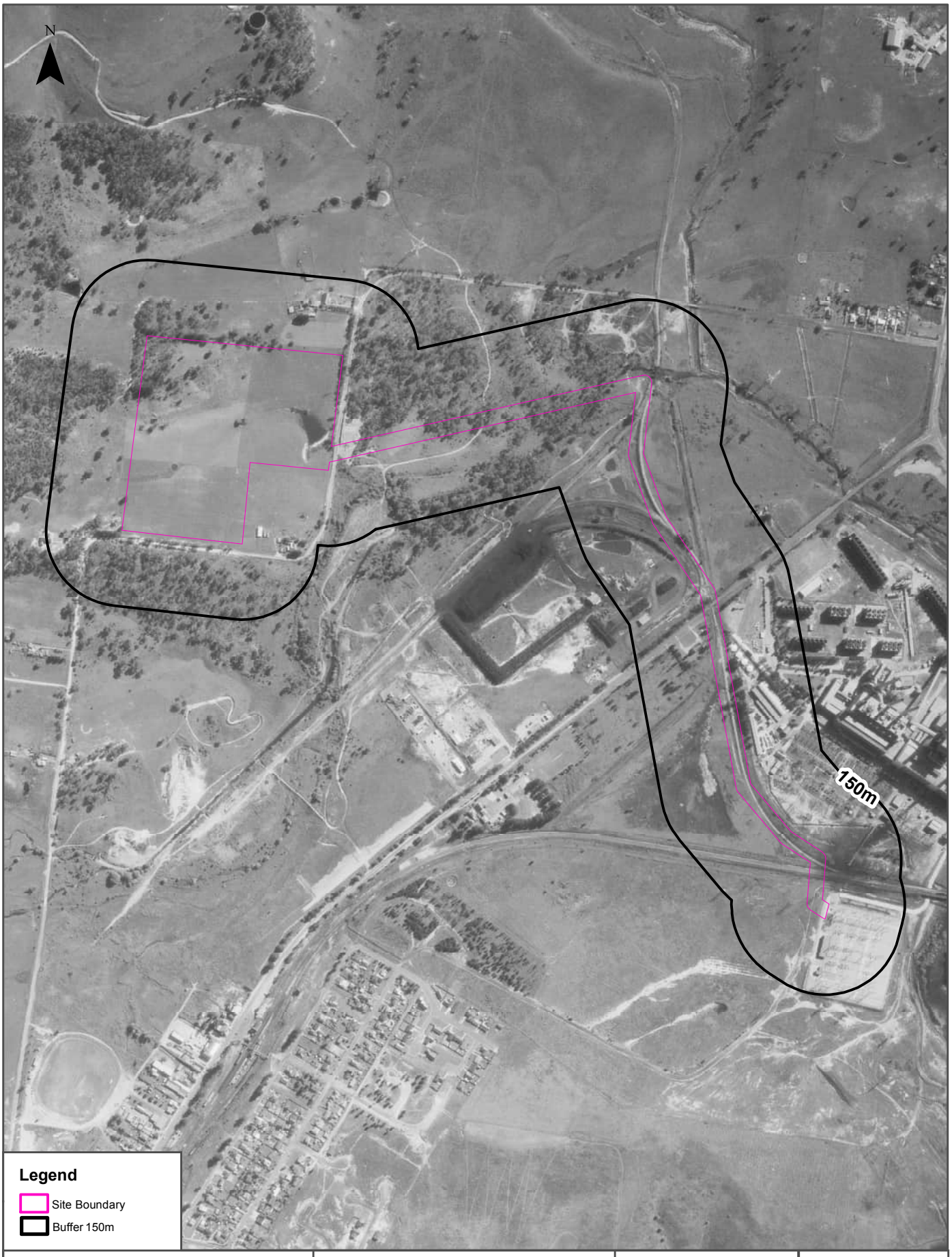
Aerial Imagery 1989

Great Western Battery, Wallerawang, NSW 2845



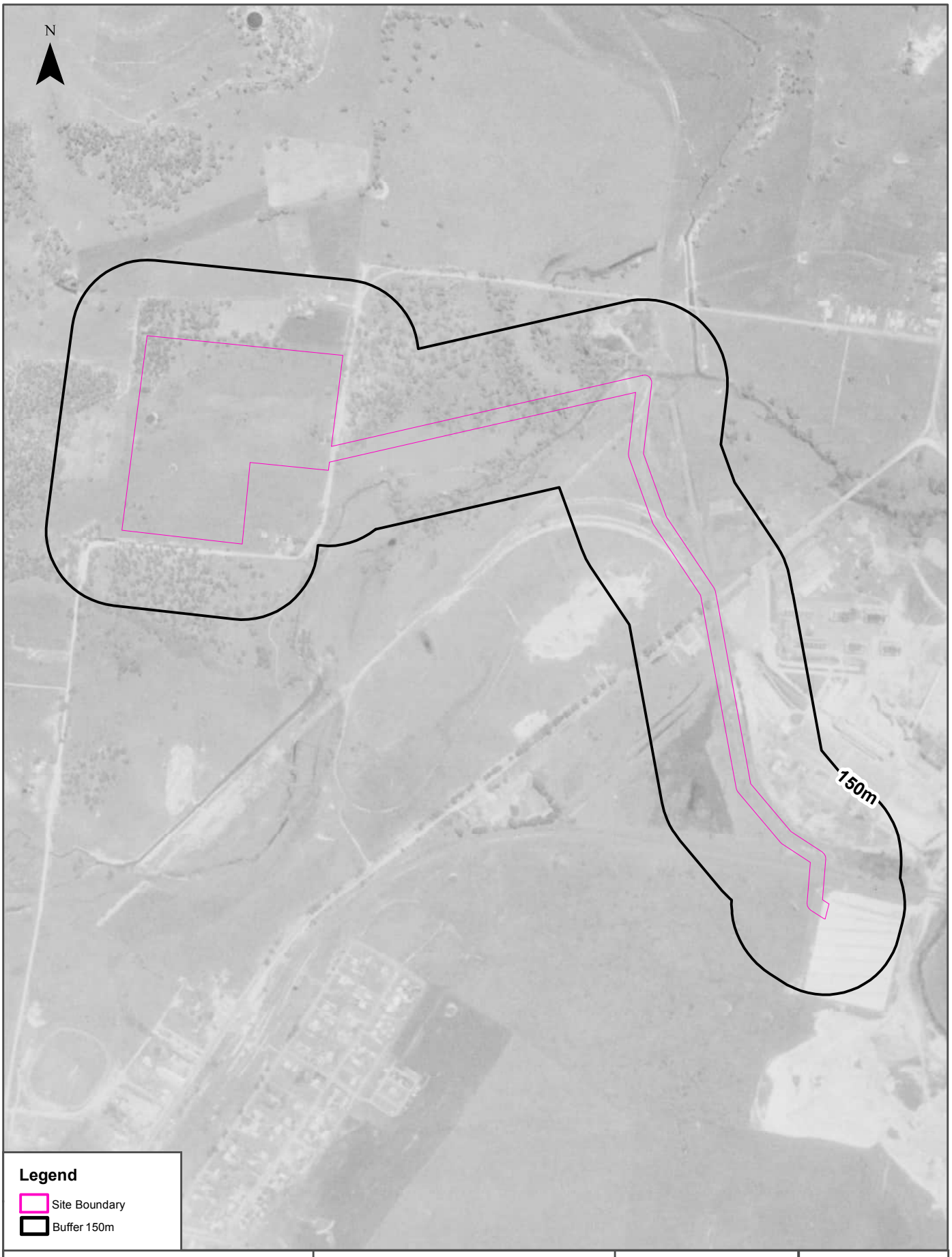
Aerial Imagery 1984

Great Western Battery, Wallerawang, NSW 2845



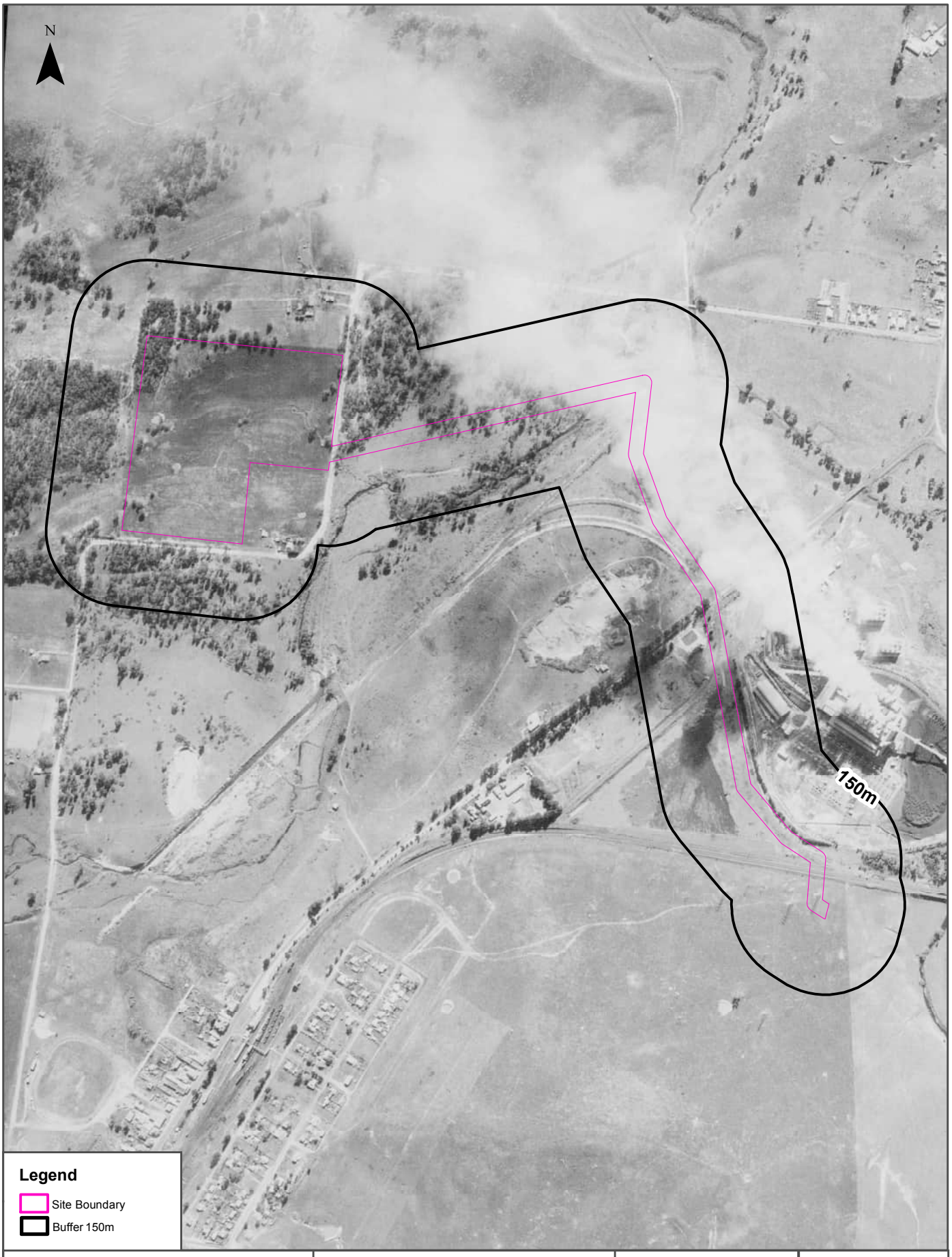
Aerial Imagery 1972

Great Western Battery, Wallerawang, NSW 2845



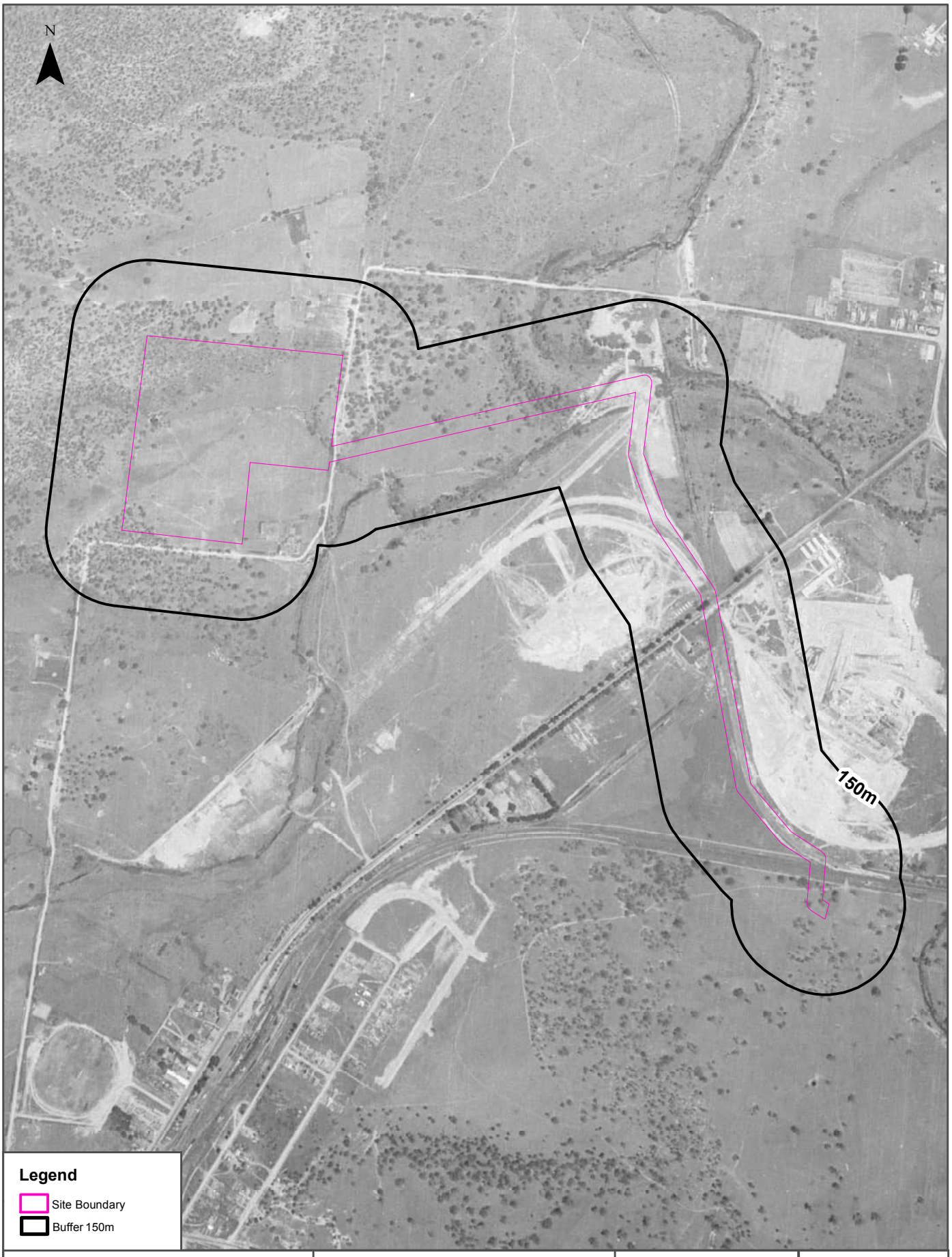
Aerial Imagery 1969

Great Western Battery, Wallerawang, NSW 2845



Aerial Imagery 1954

Great Western Battery, Wallerawang, NSW 2845



USE OF REPORT - APPLICABLE TERMS

The following terms apply to any person (End User) who is given the Report by the person who purchased the Report from Lotsearch Pty Ltd (ABN: 89 600 168 018) (Lotsearch) or who otherwise has access to the Report (Terms). The contract terms that apply between Lotsearch and the purchaser of the Report are specified in the order form pursuant to which the Report was ordered and the terms set out below are of no effect as between Lotsearch and the purchaser of the Report.

1. End User acknowledges and agrees that:
   (a) the Report is compiled from or using content (**Third Party Content**) which is comprised of:
      (i) content provided to Lotsearch by third party content suppliers with whom Lotsearch has contractual arrangements or content which is freely available or methodologies licensed to Lotsearch by third parties with whom Lotsearch has contractual arrangements (**Third Party Content Suppliers**); and
      (ii) content which is derived from content described in paragraph (i);
   (b) Neither Lotsearch nor Third Party Content Suppliers takes any responsibility for or give any warranty in relation to the accuracy or completeness of any Third Party Content included in the Report including any contaminated land assessment or other assessment included as part of a Report;
   (c) the Third Party Content Suppliers do not constitute an exhaustive set of all repositories or sources of information available in relation to the property which is the subject of the Report (**Property**) and accordingly neither Lotsearch nor Third Party Content Suppliers gives any warranty in relation to the accuracy or completeness of the Third Party Content incorporated into the report including any contaminated land assessment or other assessment included as part of a Report;
   (d) Reports are generated at a point in time (as specified by the date/time stamp appearing on the Report) and accordingly the Report is based on the information available at that point in time and Lotsearch is not obliged to undertake any additional reporting to take into consideration any information that may become available between the point in time specified by the date/time stamp and the date on which the Report was provided by Lotsearch to the purchaser of the Report;
   (e) Reports must be used or reproduced in their entirety and End User must not reproduce or make available to other persons only parts of the Report;
   (f) Lotsearch has not undertaken any physical inspection of the property;
   (g) neither Lotsearch nor Third Party Content Suppliers warrants that all land uses or features whether past or current are identified in the Report;
   (h) the Report does not include any information relating to the actual state or condition of the Property;
   (i) the Report should not be used or taken to indicate or exclude actual fitness or unfitness of Land or Property for any particular purpose
   (j) the Report should not be relied upon for determining saleability or value or making any other decisions in relation to the Property and in particular should not be taken to be a rating or assessment of the desirability or market value of the property or its features; and
   (k) the End User should undertake its own inspections of the Land or Property to satisfy itself that there are no defects or failures
2. The End User may not make the Report or any copies or extracts of the report or any part of it available to any other person. If End User wishes to provide the Report to any other person or make extracts or copies of the Report, it must contact the purchaser of the Report before doing so to ensure the proposed use is consistent with the contract terms between Lotsearch and the purchaser.
3. Neither Lotsearch (nor any of its officers, employees or agents) nor any of its Third Party Content Suppliers will have any liability to End User or any person to whom End User provides the Report and End User must not represent that Lotsearch or any of its Third Party Content Suppliers accepts liability to any such person or make any other representation to any such person on behalf of Lotsearch or any Third Party Content Supplier.
4. The End User hereby to the maximum extent permitted by law:
   (a) acknowledges that the Lotsearch (nor any of its officers, employees or agents), nor any of its Third Party Content Supplier have any liability to it under or in connection with the

Report or these Terms;

(b) waives any right it may have to claim against Third Party Content Supplier in connection with the Report, or the negotiation of, entry into, performance of, or termination of these Terms; and

(c) releases each Third Party Content Supplier from any claim it may have otherwise had in connection with the Report, or the negotiation of, entry into, performance of, or termination of these Terms.

5. The End User acknowledges that any Third Party Supplier shall be entitled to plead the benefits conferred on it under clause 4, despite not being a party to these terms.
6. End User must not remove any copyright notices, trade marks, digital rights management information, other embedded information, disclaimers or limitations from the Report or authorise any person to do so.
7. End User acknowledges and agrees that Lotsearch and Third Party Content Suppliers retain ownership of all copyright, patent, design right (registered or unregistered), trade marks (registered or unregistered), database right or other data right, moral right or know how or any other intellectual property right in any Report or any other item, information or data included in or provided as part of a Report.
8. To the extent permitted by law and subject to paragraph 9, all implied terms, representations and warranties whether statutory or otherwise relating to the subject matter of these Terms other than as expressly set out in these Terms are excluded.
9. Subject to paragraph 6, Lotsearch excludes liability to End User for loss or damage of any kind, however caused, due to Lotsearch's negligence, breach of contract, breach of any law, in equity, under indemnities or otherwise, arising out of all acts, omissions and events whenever occurring.
10. Lotsearch acknowledges that if, under applicable State, Territory or Commonwealth law, End User is a consumer certain rights may be conferred on End User which cannot be excluded, restricted or modified. If so, and if that law applies to Lotsearch, then, Lotsearch's liability is limited to the greater of an amount equal to the cost of resupplying the Report and the maximum extent permitted under applicable laws.
11. Subject to paragraph 9, neither Lotsearch nor the End User is liable to the other for:
    (a) any indirect, incidental, consequential, special or exemplary damages arising out of or in relation to the Report or these Terms; or
    (b) any loss of profit, loss of revenue, loss of interest, loss of data, loss of goodwill or loss of business opportunities, business interruption arising directly or indirectly out of or in relation to the Report or these Terms,

    irrespective of how that liability arises including in contract or tort, liability under indemnity or for any other common law, equitable or statutory cause of action or otherwise.
12. These Terms are subject to New South Wales law.