

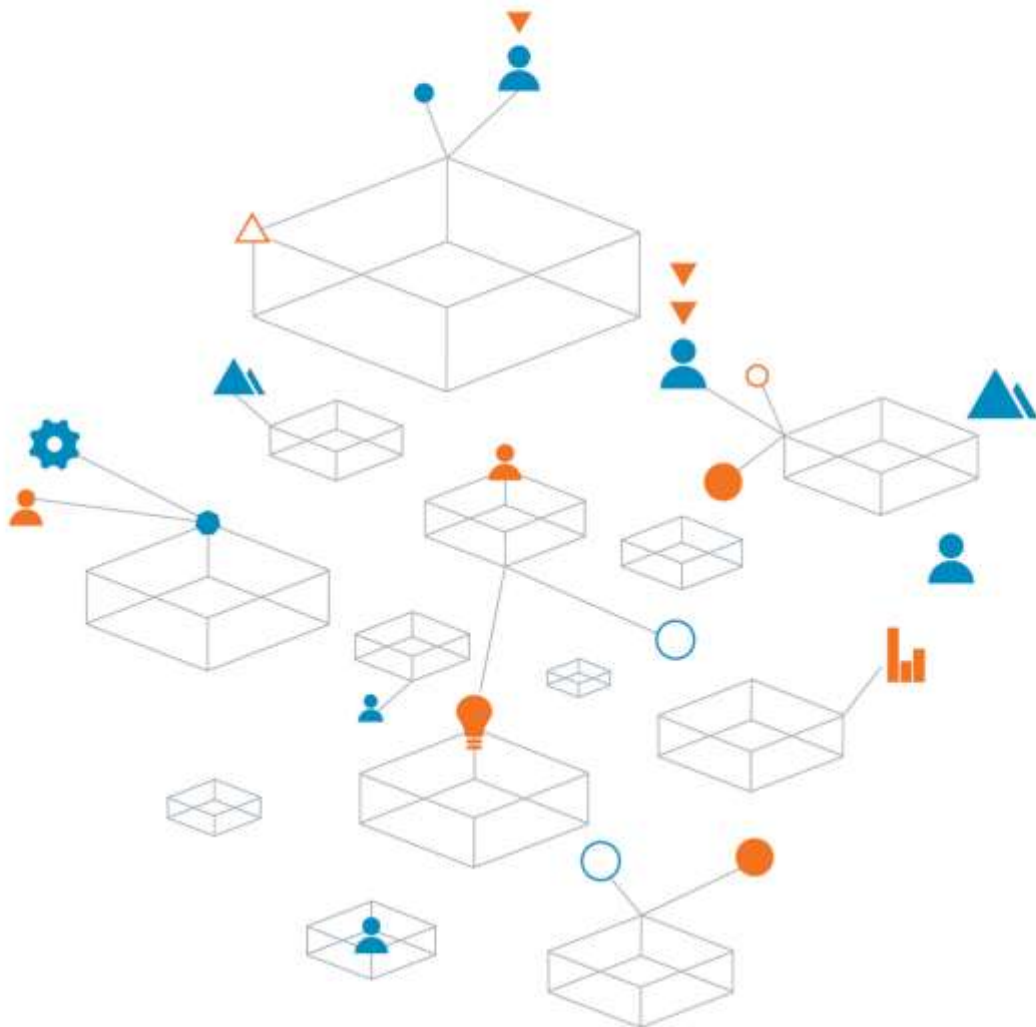
## **Appendix A – Contaminated land - preliminary site investigation**

## Jemena Asset Management Pty Ltd

### Preliminary Site Investigation

#### Lateral Looping Project

16 March 2020



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cornerstone  
of all our  
projects



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# Preliminary Site Investigation, Port Kembla Lateral Looping Project

Prepared for  
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# Executive Summary

Coffey Services Australia Pty Ltd (Coffey) was engaged by Jemena Asset Management Pty Ltd (Jemena) to carry out a Preliminary Site Investigation (PSI) for the proposed modification to the Eastern Gas Pipeline (EGP) Port Kembla lateral pipeline; Port Kembla Lateral Looping Project (the project), a duplication of the existing Port Kembla lateral. The project involves:

- The construction of a 5.6 km long buried gas pipeline ('the proposed pipeline') connecting Port Kembla Gas Terminal at Australian Industrial Energy's (AIE) proposed Cringila facility ('AIE's proposed tie-in facility') located in Spring Hill, to a tie-in point to Jemena's existing EGP facility ('the EGP tie-in facility') located in Kembla Grange; and
- An upgrade to Jemena's existing Kembla Grange EGP facility to include a metering station.

An existing 6.5 km length lateral pipeline to the EGP is located between Kembla Grange and Cringila ('the Port Kembla lateral'). The proposed pipeline will serve as a duplication to the the Port Kembla lateral to increase the volume of natural gas which can be transported to heavy industrial users and New South Wales (NSW) businesses which rely on natural gas for their operations.

A Modification Report is being prepared for the project to support a State Significant Infrastructure (SSI) Modification Application (SI-9973-Mod-1) for the modification of the EGP which recently transitioned to an SSI project. The SSI Modification Application will be subject to approval by the Minister for Planning under the Department of Planning, Industry and Environment (DPI&E).

A Modification Scoping Report (MSR) was prepared by GHD in November 2019 (Ref: Eastern Gas Pipeline, 12517829). The report was prepared to initiate the modification process (for the SSI Modification Application outlined above) and seek confirmation on the environmental assessment requirements for the modification as required under section 5.25 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The MSR included a Preliminary Environmental Assessment to identify potential environmental impacts that may arise as a result of the proposed modification. Contamination was identified as an environmental aspect which may impact on the project during construction activities involving soil disturbance.

This PSI was requested to inform the design of the project and to provide an assessment of contamination for inclusion within the Modification Report. The objectives of the PSI were to:

- Assess the likely presence of contamination along the alignment of the proposed pipeline and potential for this to impact on pipeline construction activities.
- Provide recommendations for further assessment, remediation and/or management for areas of environmental concern identified, if required.

The PSI included a site walkover of accessible areas and a desktop study of readily available information pertaining to potential contamination including historical aerial photographs, and online public records and registers.

Based on a review of publicly available information and observations made during the site walkover, Coffey has identified six types of potential contamination (referred to as areas of environmental concern (AECs)) along the proposed pipeline which may pose an inherent risk to the project during construction of the proposed pipeline. AECs identified comprised:

- Fly-tipped waste (including suspected bonded and friable ACM);
- Uncontrolled fill;
- An infilled drainage channel;
- Previously demolished buildings;
- Stockpiles of unknown origin; and
- Groundwater at 243A Princes Highway, Unanderra.

Furthermore, two areas of the project were identified as being mapped as Class 5 Areas for Acid Sulfate Soils.

Coffey recommends that further investigation is carried out to:

- Assess whether contamination associated with the identified AECs exists and provide recommendations for management/remediation if required.
- Assess whether acid sulfate soils are present in areas mapped as Class 5 for ASS, and provide recommendations for management of ASS, if required.

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## **Appendices**

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## Abbreviations

ACM	Asbestos Containing Material
AEC	Area of Environmental Concern
AHD	Australian Height Datum
AIE	Australian Industrial Energy
ASC NEPM	Assessment of Site Contamination National Environment Protection Measure
BTEX	Benzene, toluene, ethylbenzene and xylene compounds
CLM	Contaminated Land Management
Coffey	Coffey Services Australia Pty Ltd
CoPC	Chemical of Potential Concern
CSM	Conceptual site model
DECCW	Department of Environment, Climate Change and Water
DPI&E	Department of Planning, Industry and Environment
DP	Deposited Plan
EGP	Eastern Gas Pipeline
HDD	Horizontal Directional Drilling
LPI	Land and Property Information
m BGL	metres Below Ground Level
MSR	Modification Scoping Report
NEPC	National Environment Protection Council
NSW EPA	NSW Environment Protection Authority
OEH	Office of Environment and Heritage
OT	Open Trenching
PAH	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated biphenyls
POEO	Protection of the Environment Operations
PSI	Preliminary Site Investigation
SSI	State Significant Infrastructure
TRH	Total recoverable hydrocarbons
VCH	Volatile chlorinated hydrocarbons
VOCs	Volatile organic compounds
WHS	Work Health and Safety

# 1. Introduction

Coffey Services Australia Pty Ltd (Coffey) was engaged by Jemena Limited (Jemena) to carry out a Preliminary Site Investigation (PSI) for the proposed modification to the Eastern Gas Pipeline (EGP) Port Kembla lateral pipeline; Port Kembla Lateral Looping Project (the project), a duplication of the existing Port Kembla lateral. The project involves:

- The construction of a 5.6 km long buried gas pipeline ('the proposed pipeline') connecting Port Kembla Gas Terminal at Australian Industrial Energy's (AIE) proposed Cringila facility ('AIE's proposed tie-in facility') located in Spring Hill, to a tie-in point to Jemena's existing EGP facility ('the EGP tie-in facility') located in Kembla Grange; and
- An upgrade to Jemena's existing Kembla Grange EGP facility to include a metering station.

An existing 6.5 km length lateral pipeline to the EGP is located between Kembla Grange and Cringila ('the Port Kembla lateral'), as shown Figure 1 (Appendix B). The proposed pipeline will serve as a duplication to the the Port Kembla lateral to increase the volume of natural gas which can be transported to heavy industrial users and New South Wales (NSW) businesses which rely on natural gas for their operations.

A Modification Report is being prepared for the project to support a State Significant Infrastructure (SSI) Modification Application (SI-9973-Mod-1) for the modification of the EGP which recently transitioned to an SSI project. The SSI Modification Application will be subject to approval by the Minister for Planning under the Department of Planning, Industry and Environment (DPI&E).

A Modification Scoping Report (MSR) was prepared by GHD in November 2019 (Ref: Eastern Gas Pipeline, 12517829). The report was prepared to initiate the modification process (for the SSI Modification Application outlined above) and seek confirmation on the environmental assessment requirements for the modification as required under section 5.25 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The MSR included a Preliminary Environmental Assessment to identify potential environmental impacts that may arise as a result of the proposed modification. Contamination was identified as an environmental aspect which may impact on the project during construction activities involving soil disturbance.

This PSI was requested to inform the design of the project and to provide an assessment of contamination for inclusion within the Modification Report.

# 2. Objectives

The objectives of the PSI were to:

- Assess the likely presence of contamination along the alignment of the proposed pipeline and potential for this to impact on pipeline construction activities.
- Provide recommendations for further assessment, remediation and/or management for areas of environmental concern identified, if required.



### 3. Scope of Works

To achieve the objectives for the PSI, Coffey carried out the following scope of works:

- A systematic walkover of accessible areas of the project site to observe current conditions and activities along the proposed pipeline.
- A desktop study of readily available online information pertaining to the environmental setting and public records/registers relating to potential contamination along the proposed pipeline.
- Preparation of this PSI report discussing the contamination findings of the site walkover and desktop study in relation to the potential for contamination to impact on the construction of the project.

### 4. Regulatory Framework

This PSI was prepared in general accordance with the relevant sections of the following, where relevant:

- *NSW Work Health and Safety Act 2011* (WHS Act 2011).
- *NSW Work Health and Safety Regulation 2011* (WHS Regulation 2011).
- *Contaminated Land Management Act 1997* (CLM Act 1997).
- *Protection of the Environment Operations Act 1997* (POEO Act 1997).
- National Environment Protection Council, National Environment Protection (Assessment of Site Contamination) Measure, 1999 (April 2013) (ASC NEPM 2013).
- NSW Office of Environment and Heritage (OEH), Guidelines for Consultants Reporting on Contaminated Sites, 2011 (OEH 2011).

### 5. Project Location

The project is located within the Illawarra region of NSW, approximately 80 km south of Sydney. The route for the proposed pipeline is between Spring Hill and Kembla Grange, with Wollongong approximately five kilometres to the north, and Port Kembla approximately three kilometres to the south east. The location of the proposed pipeline is shown on Figure 1 (Appendix B).

The proposed pipeline will connect to the:

- Port Kembla Gas Terminal pipeline at AIE's proposed Cringila facility which is situated adjacent to Jemena's existing Port Kembla lateral's easement off Five Islands Road, Spring Hill; and
- The existing EGP at a tie-in facility at Kembla Grange, south of Jemena's mainline valve station on Wyllie Road at Lot 2 in DP792692.

The proposed pipeline will traverse in a generally westerly direction through the suburbs of Unanderra, Berkeley and Kembla Grange for a total distance of approximately 5.6km.

Major infrastructure traversed by the proposed pipeline will include the F6 Princes Motorway, the Princes Highway, Five Islands Road, Northcliffe Road, Springhill Road, and The South Coast railway line (also known as the Illawarra railway line). The Moss Vale-Unanderra railway is located to the north of the proposed pipeline and runs generally parallel to the proposed pipeline through Kembla Grange.

Approximately 4.2 km of the proposed pipeline will be installed via open trenching (OT), and 1.8 km of the proposed pipeline will be installed via horizontal directional drilling (HDD) techniques. Trenches

will be excavated to approximately 1.7 to 2.0m below ground level (mBGL). Deeper localised excavations will be required to facilitate HDD entry and exit points. Plant and equipment used during construction will be established within an area adjacent to the proposed pipeline defined as the 'proposed workspace laydown area' as shown on Figures 1a to 1c (Appendix B).

Coffey understands that spoil from:

- open trenching will preferably be reused as backfill material (where geotechnically suitable) and surplus soils (if generated) would be disposed offsite at a licenced waste disposal facility.
- HDD activities would be collected into a sucker truck via vacuum extraction for off-site disposal at a suitably licenced waste disposal facility.

From east to west, the proposed pipeline will traverse the properties outlined in Table 1 and Land Zone areas shown in Figures 3a to 3c.

**Table 1: Property Details**

Property Type	Address	Lot/ Section/ Plan	Land Zoning (see Figures 3a to 3c, Appendix B)	Construction Method
<b>Private</b>	Five Islands Road, Unanderra (AEI tie-in facility)	1//DP606430	IN3 – Heavy Industrial*	OT within or directly adjacent to Jemena's existing easement
<b>Road</b>	Five Islands Road, Unanderra	-	SP2 -Infrastructure – Road^	HDD
<b>Private</b>	175-177 Five Islands Road Unanderra	//SP76828	IN3 - Heavy Industrial^	HDD
<b>Private</b>	5-7 Waynote Place, Unanderra	122//DP837651	IN3 - Heavy Industrial^	HDD
<b>Private</b>	9-11 Waynote Place, Unanderra	123//DP837651	IN3 - Heavy Industrial^	HDD
<b>Road</b>	Waynote Place, Unanderra	-	IN3 - Heavy Industrial^	HDD
<b>Private</b>	14 Waynote Place, Unanderra	14//DP1126042	IN3 - Heavy Industrial^	OT within or directly adjacent to Jemena's existing easement
<b>Private</b>	16 Waynote Place, Unanderra	13//DP1126042	IN3 - Heavy Industrial^	OT within or directly adjacent to Jemena's existing easement
<b>Private</b>	23 Glastonbury Avenue, Unanderra	210//DP811435	IN3 - Heavy Industrial^	OT within or directly adjacent to Jemena's existing easement
<b>Private</b>	48 Industrial Road, Unanderra	2//DP1237278	IN3 - Heavy Industrial^	HDD
<b>Private</b>	37 Glastonbury Avenue, Unanderra	1//DP1237278	IN3 - Heavy Industrial^	HDD
<b>Private</b>	13 Lathe Place, Unanderra	13//DP813368	IN3 - Heavy Industrial^	HDD
<b>Private</b>	185 Berkeley Road, Unanderra	21//DP1047513	IN3 - Heavy Industrial^	HDD
<b>Private</b>	2 Industrial Road, Unanderra	22//DP1047513	IN3 - Heavy Industrial^	HDD
<b>Road</b>	Berkeley Road, Unanderra -	-	IN3 - Heavy Industrial^	HDD

Property Type	Address	Lot/ Section/ Plan	Land Zoning (see Figures 3a to 3c, Appendix B)	Construction Method
<b>Council Land (Operational Land)</b>	176 Berkeley Road, Berkeley	127//DP817646	SP1 - Special Activities (Cemetery) ^	OT within or directly adjacent to Jemena's existing easement
<b>Road Reserve</b>	F6 Princes Mtwy, Unanderra	-	SP2 -Infrastructure - Road^	OT (partly within or adjacent to Jemena's existing easement). HDD beneath Nolan Street
<b>Council Land (Community Land)</b>	Warwick Street, Berkeley	48//DP261816	RE1 - Public Recreation^	OT
<b>Motorway</b>	F6 Princes Mtwy, Unanderra	-	SP2 -Infrastructure - Road^	HDD
<b>Private</b>	27 Doyle Avenue, Unanderra	9//DP258635	IN2 - Light Industrial^	HDD
<b>Private</b>	19-23 Doyle Avenue, Unanderra	34//DP217106	IN2 - Light Industrial^	HDD
<b>Road</b>	Doyle Avenue	-	IN2 - Light Industrial^	HDD
<b>Private</b>	243A Princes Highway, Unanderra	100//DP713634	IN2 - Light Industrial^	HDD
<b>Highway</b>	Princes Hwy, Unanderra		SP2 – Infrastructure - Road^	HDD
<b>Railway</b>	South Coast Railway, Unanderra (also known as the Illawarra railway line)	44//DP1189256	SP2 – Infrastructure - Railway^	HDD
<b>Council Land (Operational Land)</b>	Wollongong Lawn Cemetery, Wyllie Road, Kembla Grange	2//DP609232	SP1 - Special Activities (Cemetery) ^	OT within or directly adjacent to Jemena's existing easement
<b>Council Land (Community Land)</b>	Ian McLennan Park, Wyllie Road, Kembla Grange	104//DP617569	RE1 - Public Recreation^	OT within or directly adjacent to Jemena's existing easement

Property Type	Address	Lot/ Section/ Plan	Land Zoning (see Figures 3a to 3c, Appendix B)	Construction Method
<b>Road</b>	Wyllie Road	-	RE1 - Public Recreation^	OT within or directly adjacent to Jemena's existing easement
<b>Private</b>	West Dapto Road, Kembla Grange	2//DP792692	IN2 – Light Industrial^ and RE1 - Public Recreation^	OT within or directly adjacent to Jemena's existing easement

\* *State Environmental Planning Policy (Three Ports) 2013 & State Environmental Planning Policy (Port Botany) Amendment (Port Kembla) 2013*

^ *Wollongong Local Environmental Plan 2009*

Places of interest within 250m of the proposed pipeline are summarised in Table 2.

**Table 2: Places of Interest**

Places of interest/sensitive receivers	Suburb	Proximity to the Project
<b>BHP Centenary Park (Sporting Fields)</b>	Spring Hill	90m south of the proposed pipeline and AIE's tie-in facility
<b>Wollongong City Memorial Gardens and Crematorium</b>	Berkeley	50m south of the proposed pipeline
<b>Nan Tien Temple</b>	Berkeley	60m south of the proposed pipeline
<b>Residential properties west of Nolan Street</b>	Berkeley	20m south of the proposed pipeline
<b>Residential properties north of the Princes Hwy</b>	Unanderra	40m north of the proposed pipeline
<b>Nan Tien Institute (Educational institute)</b>	Unanderra	130m north of the proposed pipeline
<b>Wollongong Lawn Cemetery</b>	Kembla Grange	100m north of the proposed pipeline
<b>Ian McLennan Park (Sporting Fields)</b>	Kembla Grange	Adjacent to the proposed pipeline
<b>Kembla Grange Racecourse and Golf Range</b>	Kembla Grange	200m south of the proposed pipeline beyond the Princes Hwy
<b>Macedonian Church Sv.Petka (Place of Worship)</b>	Kembla Grange	160m north of the proposed pipeline

## 6. Site Walkover

A suitably qualified and experienced contaminated land consultant from Coffey carried out a site walkover of accessible portions of the proposed alignment on 20 January 2020. The site walkover focussed on sections of the proposed pipeline which will be constructed using open trenching due to accessibility. Notable observations made with respect to potential contamination are summarised in Table 3. A selection of photographs taken during the site walkover are shown in Appendix C with locations shown on Figures 1a to 1c (Appendix B).

**Table 3: Notable Observations from the Site Walkover**

Item	Comment
Fly Tipping	<p>Fly tipped waste including suspected bonded and friable asbestos-containing material (ACM) as sheets, fragments, and debris was observed on the ground surface at the following locations:</p> <ul style="list-style-type: none"> <li>• EGP tie-in facility (Lot 1//DP606430)</li> <li>• Along a track extending south-east off Wyllie Road</li> <li>• Ian McLennan Park (Lot 104//DP617569)</li> <li>• Council land and the F6 Princes Mtwy Road Reserve west of Nolan Street</li> <li>• 23 Glastonbury Avenue, Unanderra (Lot 210//DP811435)</li> </ul>
	<p>Soil was observed within the fly-tipped waste at two locations within the Council land and the F6 Princes Mtwy Road Reserve west of Nolan Street.</p>
	<p>A relatively large amount of fly tipped demolition waste was also observed adjacent to the proposed workspace laydown area at 23 Glastonbury Avenue, Unanderra. The waste included concrete, pipes, metal, a small (less than 1m<sup>3</sup>) stockpile of soil, what appeared to be a discarded furnace with suspected loose fibrous (friable) ACM, and possible air ducts made with suspected asbestos fibres. Some of this waste was within and directly adjacent to the workspace laydown area.</p>
Land Filling	<p>The following two properties in Kembla Grange appeared to have been extensively raised (the ground surface was up to approximately 25m higher compared to adjacent roads (Wyllie Road and West Dapto Road)) with unknown material including slag which was visible at the ground surface:</p> <ul style="list-style-type: none"> <li>• EGP tie-in facility (Lot 1//DP606430)</li> <li>• Ian McLennan Park (Lot 104//DP617569)</li> </ul>
	<p>Slag was also observed on the ground surface along Wyllie Road.</p>
	<p>Contractors were observed to be importing and raising the level of the land by applying fill (which appeared to comprise sandstone with bricks) at the property at 14 Waynote Place, Unanderra (14//DP1126042).</p>
	<p>The following two properties appeared undulating and may have previously been filled:</p> <ul style="list-style-type: none"> <li>• 16 Waynote Place, Unanderra (13//DP1126042)</li> <li>• 23 Glastonbury Avenue, Unanderra (210//DP811435)</li> </ul>

Item	Comment
Stockpiles	<p>Several overgrown stockpiles were observed along and adjacent to the proposed pipeline including:</p> <ul style="list-style-type: none"> <li>• A number of overgrown stockpiles along and adjacent to the track which extends south-east from Wyllie Road. The volume of the stockpiles could not be estimated with a reasonable degree of accuracy due to overgrown vegetation which limited access, however they covered an area of approximately 600m<sup>2</sup> within the workspace laydown area.</li> <li>• A relatively large (approximately 900m<sup>3</sup>) stockpile was observed adjacent to the workspace laydown area within the south-west portion of Ian McLennan Park (Lot 104//DP617569). Jemena representatives indicated that this stockpile will likely not be disturbed during construction.</li> <li>• An overgrown stockpile (approximately 2m<sup>3</sup>) in the south-east corner of Ian McLennan Park.</li> <li>• Four overgrown stockpiles within Council land south of Wollongong Lawn Cemetery (Lot 2//DP609232): <ul style="list-style-type: none"> <li>▪ One of the stockpiles (approximately 10m<sup>3</sup>) was located along the proposed pipeline.</li> <li>▪ Jemena representatives indicated that a portion of the largest stockpile (approximately 1,500m<sup>3</sup>) which was along the northern edge of the workspace laydown area may be disturbed in order to deviate the proposed gas pipeline around an existing water pipe in this area.</li> <li>▪ Two of the stockpiles (approximately 160m<sup>3</sup> and 600m<sup>3</sup>) were located along the northern edge of the workspace laydown area. Jemena representatives indicated that it was unlikely that these two stockpiles would be disturbed during construction.</li> </ul> </li> </ul>

Other features observed (not considered to pose a notable contamination risk) included:

- Remnants of burnt vehicle adjacent to the workspace laydown area off Wyllie Road.
- An abandoned and stripped vehicle adjacent to the workspace laydown area west of Nolan Street
- A stormwater drain which crosses the workspace laydown area west of Nolan Street.



## 7. Desktop Study

### 7.1. Previous Reports

No previous contamination reports were provided to Coffey for review as part of this investigation and it was beyond the scope of this PSI to conduct a search for past contamination reports.

### 7.2. Summary of Existing Environment

The information presented below provides a summary of the existing environment along the proposed alignment.

#### 7.2.1. Topography

A review of the Department of Finance, Services and Innovation (DFSI) NSW Contours Dataset available through NSW Globe<sup>1</sup> was undertaken on 6 February 2020. This search indicates that the proposed pipeline traverses undulating land which varies between approximately 10m AHD at AIE's proposed tie-in facility in Spring Hill (at the eastern end of the alignment?) and approximately 40m AHD at the EGP tie-in facility in Kembla Grange (at the western end of the alignment?).

#### 7.2.2. Surface Waters

A review of the DFSI NSW Hydrography Dataset<sup>2</sup> on 6 February 2020 indicates that the proposed pipeline crosses five non-perennial creeks. Surface water along the proposed pipeline is considered likely to discharge via natural watercourses/channels and via throughflow into Mullet Creek and Budjong Creek (which discharge into Lake Illawara) and Nudjia Creek which discharges into Tom Thumbs Lagoon of Port Kembla Harbour via Allans Creek. Surface water features are shown on Figures 1a to 1c (Appendix B).

#### 7.2.3. Registered Groundwater Bores

A search of the All Groundwater Map<sup>3</sup> (published by NSW Department of Primary Industries (DPI) Office of Water) was undertaken on 6 February 2020. This indicates that there are 15 registered groundwater bores within 250m of the proposed pipeline as summarised in Table 4. Bores are shown on Figures 1a to 1c (Appendix B).

**Table 4: Registered Groundwater Bores within 250m of the Proposed Pipeline**

State Bore ID	Final Depth	Standing Water Level (m):	Authorised Purpose(s):	Intended Purpose(s)
GW114638	3	-	-	Monitoring Bore
GW114634	2.4	-	Monitoring Bore	Monitoring Bore
GW114410	6	-	-	Monitoring Bore
GW114636	3	-	-	Monitoring Bore

<sup>1</sup> <http://globe.six.nsw.gov.au/>

<sup>2</sup> <https://data.gov.au/dataset/ds-nsw-7cedd51b-d6c4-40b8-b08a-53abc824be87/details>

<sup>3</sup> <http://realtimedata.water.nsw.gov.au/water.stm>

State Bore ID	Final Depth	Standing Water Level (m):	Authorised Purpose(s):	Intended Purpose(s)
GW114411	4.6	-	-	Monitoring Bore
GW114635	3	-	-	Monitoring Bore
GW114637	3	-	-	Monitoring Bore
GW114408	7.2	-	-	Monitoring Bore
GW111039	3.5	1	-	Monitoring Bore
GW114409	6	-	-	Monitoring Bore
GW112827	6	4	-	Monitoring Bore
GW112828	6	3.5	-	Monitoring Bore
GW112826	6	2.9	-	Monitoring Bore
GW112825	6	4.3	-	Monitoring Bore
GW114884	5	1.305	-	Monitoring Bore

#### 7.2.4. Regional Hydrogeology

Groundwater flow along the proposed pipeline alignment is considered to be towards to the east and south towards Port Kembla and Lake Illawarra respectively. Depths to groundwater are likely to be variable along the proposed pipeline and is anticipated to be relatively shallow (i.e. approximately 5m BGL) through suburbs of Spring Hill, Berkeley and Unanderra. Depths to groundwater within Kembla Grange are likely to be deeper (i.e. greater than 10m BGL) where the ground levels are relatively higher (i.e. between 20m and 40m AHD). It is unknown at this stage whether construction activities will encounter or disturb groundwater.

## 7.2.5. Geology

A review of the Geological Survey of NSW Statewide Seamless Geology dataset available through MinView Online<sup>4</sup> on 6 February 2020 indicates that the proposed pipeline is mapped as being underlain by the following geological units, as illustrated on Figures 4a to 4c (Appendix B).

**Table 5: Geology**

Dominant Lithology	Unit Name	Description
Fine grained igneous rock	Dapto Latite Member	Mafic basaltic-textured latite, aphanitic to porphyritic with crystalline groundmass, vesicles mostly as elongated stringers parallel to flow, sporadically infilled with carbonate, sporadic columnar jointing
Fill	Anthropogenic deposits	Anthropocene deposits varying from large man-made clasts (concrete blocks to building demolition rubble) to quarried natural boulders, with interstitial sand-sized to clay matrix
Shale	Illawarra Coal Measures	Shale, quartz-lithic sandstone, conglomerate, chert, sporadically carbonaceous mudstone, coal and torbanite seams
Sandstone	Broughton Formation	Red-brown or green-grey, lithic to feldspathic sandstone (sporadically quartzose) with minor interbedded siltstone and polymictic pebble conglomerate, sporadic shelly fossils, varying degrees of bioturbation
Conglomerate	Anthropogenic deposits - fill on Quaternary deposits	Land surface raised >1m above natural level by placement of fill on undifferentiated Quaternary deposits over an extensive area
Biogenic sediment	Alluvial fan deposits	Fluvially-deposited quartz-lithic sand, silt, gravel, clay

## 7.2.6. Naturally Occurring Asbestos

A review of the Naturally Occurring Asbestos dataset<sup>5</sup> on 7 February 2020 provided by the DPI&E indicates that there is a low potential for naturally occurring asbestos to occur within 10 m of the surface along the proposed pipeline.

<sup>4</sup> <https://minview.geoscience.nsw.gov.au/>

<sup>5</sup> <https://geo.seed.nsw.gov.au/>

## 7.2.7. Soil Landscapes

A review of the Soil Landscapes of the Wollongong-Port Hacking dataset provided by the DPI&E on 7 February 2020 indicates that the proposed pipeline is mapped as being underlain by the following soil landscapes, as illustrated on Figures 5a to 5c (Appendix B).

**Table 6: Soil Landscapes**

Soil Landscape	Process Group	Soils and Geology
Gwynneville	Residual	Soil profile is typically sandy loam overlying clay. Soils overlie the Illawarra Coal Measures comprising resistant inter bedded quartz lithic sandstone, grey siltstone and claystone, carbonaceous claystone, clay and laminite.
Disturbed terrain	Disturbed terrain	Artificial fill. This includes dredged sand or mud, rocks and local soil materials along with demolition rubble, industrial and household waste
Fairy meadow	Swamp	Soil profile is typically sand overlying clay. Many small areas of disturbed and developed terrain have been included within this soil landscape. Soils overlie quaternary sediments comprising quartz sand, lithic fluvial sand, silt and clay.

## 7.2.8. Acid Sulfate Soils

A review of the CSIRO Land & Water Atlas of Australian Acid Sulfate Soils<sup>6</sup> indicates that the proposed pipeline traverses land which is mapped as having a low probability of occurrence of ASS soils. Classification is provisional in the absence of analytical data.

A review of the Acid Sulfate Soils (Environmental Planning Instrument) dataset<sup>7</sup>, provided by the DPI&E, was undertaken on 7 February 2020. This indicates that two sections of the proposed pipeline traverse through land mapped as Class 5 for acid sulfate soils (as shown on Figures 6a to 6c in Appendix B):

- A 550m section of the proposed pipeline extending west from Five Islands Road which will be excavated using HDD.
- Approximately 1.5km of the proposed pipeline within the following locations which will be excavated with open trenches: 'railway reserve north of Princes Highway', 'Wyllie Road', and 'EGP tie-in facility'.

Acid sulfate soils are not typically found in Class 5 areas, according to the definitions provided in the Environmental Planning Instrument. Areas classified as Class 5 are located within 500 metres of Class 1,2,3 or 4 ASS land. Works in a class 5 area that are likely to lower the water table below by 1 metre on adjacent Class 1, 2, 3 or 4 land typically trigger the requirement for assessment of acid sulfate soils and may require development and implementation of an Acid Sulfate Soil Management Plan.

<sup>6</sup> <https://www.asris.csiro.au/themes/AcidSulfateSoils.html>

<sup>7</sup> <https://data.nsw.gov.au/data/dataset/epi-acid-sulfate-soils>

## 7.2.9. Outstanding Biodiversity Value Register

A search of the NSW Office of Environment and Heritage Area of Outstanding Biodiversity Value (AOBV) register<sup>8</sup> was undertaken on 7 February 2020. A review of the register indicates there are no AOBV declarations at or within 250m of the proposed pipeline under Sections 53-55 of the Threatened Species Conservation Act 1995.

## 7.2.10. Ramsar Wetlands

A review of the Ramsar Wetlands of Australia dataset available through MinView Online<sup>4</sup> on 7 February 2020 indicates that there are no Ramsar wetlands within 250m of the proposed pipeline.

## 7.3. Public Records and Registers

### 7.3.1. NSW EPA Contaminated Land Record and Register

A search of the List of NSW Contaminated Sites Notified to NSW EPA<sup>9</sup> and NSW EPA Contaminated Land Public Record<sup>10</sup> was undertaken on 7 February 2020. This indicates that there are five notified properties (one of which was formerly regulated) within 250m of the proposed pipeline. The location of these properties are shown on Figures 1a to 1c (Appendix B) with further details summarised in Table 7.

**Table 7: NSW EPA Contaminated Land Records**

Site Name	Suburb	Address	Contamination Activity Type (list of Notified Sites)	Management Class (list of Notified Sites)	Property on the Contaminated Land Public Record	Distance from Proposed Pipeline
Port Kembla Steelworks Recycling Area	Port Kembla	Springhill Road	Unclassified	Regulation under CLM Act not required	No	30m east, adjacent to the AEI Tie-in Facility
BHP Area 21	Port Kembla	Springhill Road (Lot 1 DP 606430)	Metal Industry	Contamination formerly regulated under the CLM Act	Yes	270m East of the AEI Tie-in Facility beyond Allans Creek (see discussion below and plan in Appendix 1)
Veolia Environmental Services	Unanderra	9 Waynote Place	Other Industry	Regulation under CLM Act not required	No	40m north of where HDD and open trenching will be carried out
Endeavour Energy Springhill Field Service Centre	Unanderra	195 Five Island ROAD	Other Industry	Regulation under CLM Act not required	No	100m north of where open trenching will be carried out

<sup>8</sup> <http://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/about-threatened-species/critical-habitats>

<sup>9</sup> <https://www.epa.nsw.gov.au/your-environment/contaminated-land/notification-policy/contaminated-sites-list>

<sup>10</sup>

Site Name	Suburb	Address	Contamination Activity Type (list of Notified Sites)	Management Class (list of Notified Sites)	Property on the Contaminated Land Public Record	Distance from Proposed Pipeline
ShawCor Australia	Kembla Grange	66 West Dapto Road	Other Petroleum	Regulation under CLM Act not required	No	130m west of the EGP Tie-in Facility

The property for BHP Area 21 is listed on the Contaminated Land Public Record with the address of Lot 1 DP 606430. However, the area which was subject to assessment by the NSW EPA for regulation of contamination was to the east of Allans Creek as shown on the plan in Appendix D. A voluntary investigation proposal (VIP) was available on the NSW EPA Contaminated Land Public Record for BHP Area 21. A high-level review of the VIP indicates that:

- The VIP was issued on 03 Feb 2003 and was completed on 30 June 2008.
- The NSW EPA considered the groundwater, and potentially surface water, at the Port Kembla Steelworks Processing Area 21 (BHP Area 21, as shown on the plan in Appendix D) was contaminated with contaminants of concern (including petroleum and aromatic hydrocarbons, metals, phenols, ammonia, and cyanide) in such a way as to present a significant risk of harm.
- Causes of land contamination were identified by BHP Steel (AIS) Pty Ltd (BHP) as historical activities associated with iron and steel making, including disposal of coal tar residues, ammoniacal liquors and gas mains condensates, and storage of zinc bearing dusts.
- BHP provided documents to the NSW EPA which outlined a plan for a risk-based investigation of potential impacts on ecosystems in Port Kembla Harbour from contaminated groundwater seepage originating from BHP Area 21.

Coffey considers that the properties outlined in Table 7 are unlikely to be a potential source of contamination encountered or disturbed during construction of the proposed pipeline. This is as the contamination is not regulated by the NSW EPA, and the proposed pipeline does not pass through contaminated properties or areas of the property for BHP Area 21 to which the contamination was identified.

### 7.3.2. Protection of the Environment Operation Public Registers

A search of the NSW EPA POEO Public Registers<sup>11,12</sup> was undertaken on 7 February 2020 for:

- Environment Protection licences, applications, notices, audits or pollution studies and reduction programs.
- Unlicensed premises regulated by the EPA.

The search indicated that the proposed pipeline crosses three properties which have current or surrendered POEO licences.

**Table 8: POEO Search Results**

Number	Name	Location	Type	Status	Issued date	Comment
1531995	Roads and Maritime Services	F6 Southern Freeway, Unanderra, NSW 2526	s.80 Surrender of a Licence	Issued	7-Aug-15	The surrendered licence (#13271) related to the non-thermal treatment of 'general waste and waste storage - other types' of waste. The premise to which the licence relates could not be located based on the information presented in the licence as it referred to a drawing which was not present (DRAWING 004_P_A_1.DGN DATED 9TH MARCH 2010). The licence may have been associated with the construction of the F6 Freeway.
1508278	Shinagawa Refractories Australasia Pty Ltd	23 Glastonbury Avenue, Unanderra, NSW 2526	s.80 Surrender of a Licence	Issued	17-Sep-12	The surrendered licence (#13131) allows the production of ceramics. The EPL includes conditions for monitoring discharges to air (via dryer and kiln exhausts), discharge to waters (via a settling pond) and surface water monitoring (natural watercourses and an evaporation dam). Coffey notes that the proposed pipeline is within Jemena's existing easement through this property. The buildings associated with ceramic production are located to the north-west of the easement. It is possible that the fly-tipping observed at this property (refer to

<sup>11</sup> <https://apps.epa.nsw.gov.au/prpoeoapp/>

<sup>12</sup> <https://www.epa.nsw.gov.au/licensing-and-regulation/public-registers/about-prpoeo/unlicensed-premises-epa-reg>

Number	Name	Location	Type	Status	Issued date	Comment
						Section 6) is associated with site operations.
1014014	Veolia Environmental Services (Australia) Pty Ltd	10-16 Waynote Place, Unanderra, NSW 2526	s.58 Licence Variation	Issued	25-Mar-02	The EPL allows the processing of HIGAB (Hazardous, Industrial or Group A or Group B) waste at Lot 1241 in DP1003875. Coffey notes that the proposed alignment does not pass through this Lot.

### 7.3.3. Former Gasworks

A search of NSW EPA List of Former Gasworks<sup>13</sup> was undertaken on 7 February 2020. The search indicated that there are no known former gasworks at or within 250m of the site.

### 7.3.4. Waste Management Facilities

A search of the Waste Management Facilities<sup>14</sup> dataset provided by Geoscience Australia was carried out on 7 February 2020. The search revealed that there are two registered waste management facilities within 250m of the proposed pipeline as outlined in Table 9, and shown on Figure 1 (Appendix B).

**Table 9: Waste Management Facilities Records**

Name	Owner	Address	Distance from Proposed Pipeline
Transpacific Industries	Transpacific Industries / Cleanaway	10-12 Waynote Place, Unanderra	40m north of where HDD and open trenching is proposed.
Redlam Waste Services Pty Ltd	Redlam Waste Services Pty Ltd	10 Industrial Road, Unanderra	30m south of where HDD is proposed.

A review of the metadata indicates that the dataset was last updated in March 2017, as such it is considered likely that the Transpacific Industries facility is potentially the same facility as the Veolia operated facility outlined in Section 7.3.1 and 7.3.2.

A recycling centre operated by Bingo Industries was also observed during the site walkover adjacent to the EGP tie-in facility at 50 Wyllie Rd, Kembla Grange, NSW 2526.

Coffey considers that these waste management facilities would unlikely act as potential sources of contamination to be encountered or disturbed during construction of the proposed pipeline.

<sup>13</sup> <https://www.epa.nsw.gov.au/your-environment/contaminated-land/other-contamination-issues/former-gasworks-sites>

<sup>14</sup> <https://data.gov.au/dataset/ds-ga-a66ac3ca-5830-594b-e044-00144fdd4fa6/details?q=>



### 7.3.5. Liquid Fuel Facilities

A search of the National Liquid Fuel Facilities Dataset<sup>15</sup> provided by Geoscience Australia was carried out on 7 February 2020 for liquid fuel facilities (liquid fuel depots, refineries, terminals and petrol stations) in proximity to the proposed pipeline. The search indicates that there are no registered liquid fuel facilities within 250m of the proposed pipeline. A search of Google Maps on 7 February 2020 also did not identify any service stations within 250m of the proposed pipeline.

### 7.3.6. NSW Government PFAS Investigation Program

The NSW EPA is leading an investigation program to assess the legacy of per-and poly-fluoroalkyl substances (PFAS) use across NSW. Current investigations are focused on sites where it is likely that large quantities of PFAS have been used. Investigations are currently being carried out at 47 sites within NSW. A search of the NSW EPA website<sup>16</sup> on 7 February 2020 did not identify properties within 1000m of the site which are being investigated for PFAS use under the NSW Government PFAS Investigation Program.

### 7.3.7. Known James Hardie Waste Disposal Sites

The NSW EPA published a summary project report titled *Regulation Project – James Hardie Asbestos Waste Contamination Legacy*<sup>17</sup> in 2012. This report presented a summary of asbestos impacted sites resulting from former operations of James Hardie Industries and related entities (James Hardie).

Sixteen (16) of 47 potential impacted sites were inspected by NSW EPA; the exact location of the other sites could not be verified. The report recommended that the asbestos impacted soils should not be disturbed, unless appropriate plans for investigation/remediation are developed for implementation. A review of the report indicates that the properties along the proposed pipeline are not listed as known James Hardie Waste Disposal Sites.

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<sup>15</sup> <http://services.ga.gov.au/>

<sup>16</sup> <https://www.epa.nsw.gov.au/your-environment/contaminated-land/pfas-investigation-program>

<sup>17</sup> <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/clm/james-hardie/120919jameshardiereport.pdf>.

## 7.4. Aerial Photographs

A review of historical aerial photographs available through Wollongong Council's IntraMaps<sup>18</sup> and Google Earth was carried out to provide an indication for potential contamination along the proposed pipeline including demolished buildings/sheds, landfilling activities and presence of commercial/industrial facilities noted in previous sections. The aerial photographs reviewed are shown on Figures 7 through to 13, and outlined in Table 10.

**Table 10: Aerial Photographs Reviewed**

Date	Source	Suburb			
		Spring Hill	Unanderra	Berkeley	Kembla Grange
1938	IntraMaps (Wollongong Council)	●	⊙	○	○
1948/1951	IntraMaps (Wollongong Council)	●	●	●	●
1961	IntraMaps (Wollongong Council)	●	●	●	●
1977	IntraMaps (Wollongong Council)	●	●	●	●
1986/1987	IntraMaps (Wollongong Council)	●	●	●	●
1993	IntraMaps (Wollongong Council)	●	●	●	●
2006	IntraMaps (Wollongong Council)	●	●	●	●
2018	IntraMaps (Wollongong Council)	●	●	●	●
2020	Google Earth	●	●	●	●

- Full Coverage
- ⊙ Partial Coverage
- No Coverage

A discussion of key notable observations from the aerial photography review is presented in Table 11.

<sup>18</sup> <https://public.mapimage.net/intramaps90/default.htm?configId=3a2fbdc5-a9e4-4323-b27d-6e522a1ed8ad>

**Table 11: Aerial Photography Review Summary**

Location	Comment	Relationship to Project	Proposed Construction Method
Wyllie Road, adjacent to Ian McLennan Park, Kembla Grange.	A house and sheds shown on the 1948/1951 and 1961 aerial photographs was demolished by 1977.	Along the proposed pipeline	Open trenching
Track off Wyllie Road, adjacent to Ian McLennan Park, Kembla Grange.	A farmhouse and sheds shown on the 1961 and 1977 aerial photograph were demolished by 1986/1987. The majority of the buildings were located adjacent to the proposed pipeline, however some of the sheds shown on the 1961 aerial photograph were located along the proposed pipeline.	Along the proposed pipeline	Open trenching
EGP tie-in facility and Ian McLennan Park, Kembla Grange	The 1986/1987 aerial photograph shows extensive filling of these properties.	Along the proposed pipeline	Open trenching
Wyllie Road, Kembla Grange	The 1986/1987 aerial photograph shows a creek was infilled during the construction of Wyllie Road.	Along the proposed pipeline	Open trenching
243A Princes Highway, Unanderra	Aerial photographs from 1948/1951 through to 2006 show this property was used as a scrap yard/smash repairer.	Land adjacent (south) to the proposed pipeline	HDD
Princes Mty Road Reserve, west of Nolan St	Aerial photographs from 2006, 2018 and 2020 show fly tipping has been prevalent in this area.	Along the proposed pipeline	Open trenching
13 Lathe Place, Unanderra	A creek was likely culverted beneath the property during construction circa 1986/1987.	Along the proposed pipeline	HDD
175-177 Five Islands Road, and 5-7 Waynote Place, Unanderra	What appear to be sheds located at these properties shown on 1961 aerial photographs were demolished by 1977.	Along the proposed pipeline	HDD
AEI tie-in facility at Five Islands Road, Unanderra	The 1961 and 1977 aerial photographs indicate that some ground disturbance was likely across the property. This period coincides with when Allans Creek (150 m to the east of the proposed pipeline) was re-aligned and BHP Area 21 was filled and developed for steel making).	Along the proposed pipeline	Open Trenching
23 Glastonbury Avenue, Unanderra	The ceramic factory at this property (refer to Section 7.3.2) was constructed between 1961 and 1977. What appears to be fly-tipping at this property is apparent on aerial photos between 2006 and 2020.	Adjacent to the proposed pipeline	-
10-12 Waynote Place, Unanderra	The waste management facility at this property (refer to Section 7.3.1 and 7.3.4) was constructed between 1993 and 2006.	Adjacent to the proposed pipeline	-

## 8. Areas of Environmental Concern

Contamination, if not managed appropriately could pose a potential risk to human health and/or the environment during construction including excavation and management of spoil. For an environmental or human health risk from contamination to be present, there must be a plausible linkage between the source and a receptor by means of a transport mechanism and exposure route (i.e. source-receptor-exposure pathway). Disturbance of contamination can also impact on construction works, such as where there is a need to manage contaminated spoil generated.

Areas of Environmental Concern (AEC's) (i.e. potential sources of contamination) were identified based on observations made during the site walkover and on a review of information detailed in Section 7. Potential receptors from contamination, if present were considered to comprise:

- Construction workers (earthworks contractors) and site visitors during construction from direct contact, and inhalation of dust, soil vapour and asbestos fibres.
- Adjacent site users during construction from ingestion and inhalation of dust and asbestos fibres.
- Aquatic ecosystems of Mullet Creek, Budjong Creek, Nudjia Creek, Lake Illawara, Allans Creek and Tom Thumbs Lagoon/Port Kembla Harbour, from stormwater runoff and sediment transport.

The following activities may disturb contamination, if present, during construction of the pipeline:

- Site clearing of vegetation exposing soil to wind and runoff.
- Mechanical or manual excavation (i.e. open trenching) during construction.
- Dewatering of groundwater, if encountered within excavations.
- HDD through groundwater.
- Handling, stockpiling and transporting material resources.
- Wind dispersion.

The potential or likelihood for contamination to impact on the project (in the absence of further information or adoption of mitigation or management measures) was determined by evaluation of the likelihood of contamination, and the consequence of contamination. This has been undertaken in light of a preliminary Conceptual Site Model (CSM) developed (i.e. the potential for a source-receptor-pathway linkage to exist). The following was considered when assessing the potential for contamination to pose a risk:

- The proximity of potential or known contamination to the proposed pipeline (i.e. remote, adjacent or along the pipeline).
- The primary environmental media that are likely to be contaminated (i.e. soils or groundwater).
- The construction activities (and methods) that are likely to take place and whether these could result in interaction with potentially contaminated media and generate spoil to which receptors could become potentially exposed.
- Potential pollutant linkages and exposure pathways to potential or known contaminants during construction (inhalation, dermal contact, ingestion).

The identified AECs, associated contaminants of potential concern (CoPC), and the associated potential/likelihood of contamination to impact on the construction of the project are summarised in Table 12. Each AEC is shown on Figures 2a to 2c (Appendix B).

Table 12: Areas of Environmental Concern / Potential Sources of Contamination

AEC	Location	Proximity to the proposed pipeline	Summary of Key Issues	Contaminants of Potential Concern (CoPC)	Media potentially affected along the proposed pipeline	Construction activity which may disturb contamination, if present	Potential or likelihood for contamination to impact on the project
Fly-tipped waste	EGP tie-in facility (Lot 1//DP606430)	Along the proposed pipeline	Fly-tipped waste including suspected bonded and friable ACM was observed during the site walkover. The waste appeared to be from domestic, commercial/industrial, and construction/demolition activities.	Asbestos and lead	ACM as fragments, sheets and debris.	Site establishment and construction, open trenching	High
	Ian McLennan Park (Lot 104//DP617569)						
	Wyllie Road and the track which extends off the road to the south-east						
	Council land and F6 road reserve west of Nolan St.						
	Western portion of 23 Glastonbury Avenue, Unanderra (210//DP811435)						
	Council Land and F6 Road Reserve west of Nolan Street	Along the proposed pipeline	Potential for contamination associated with fly-tipped soil at two locations which is likely to be disturbed during construction.	TRH, BTEX, PAH, metals, phenols, OCP, OPP, PCB, and asbestos	Soil	Open trenching	Moderate to High
Uncontrolled Fill	EGP tie-in facility (Lot 1//DP606430)	Along the proposed pipeline	Extensive filling of Lot 1//DP606430 and Lot 104//DP617569 was observed during the site walkover. Aerial photographs indicate that filling occurred circa 1986/1987. The extent of fill to the north (i.e. within Wyllie Road) is unknown.  Slag was observed at the ground surface within Lot 1//DP606430 and on Wyllie Road. Fill at these properties is likely to include waste from iron and steel manufacturing activities at Port Kembla and may contain other unknown sources of contamination.	TRH, BTEX, PAH, metals, OCP, OPP, PCB, phenols, VOCs (including VCH), ammonia, cyanide, asbestos, and PFAS.	Soil and soil vapour	Open trenching	Moderate to High
	Ian McLennan Park (Lot 104//DP617569)	Along the proposed pipeline			Soil and soil vapour	Open trenching	Moderate to High
	Wyllie Road	Along the proposed pipeline			Soil and soil vapour	Open trenching	Moderate to High
	16 Waynote Place, Unanderra (13//DP1126042)	Along the proposed pipeline	Observations made during the site walkover indicated that these properties may have previously been filled.	TRH, BTEX, PAH, VOCs (including VCH), phenols, metals, OCP, OPP, PCB, and asbestos	Soil and soil vapour	Open trenching	Moderate
	23 Glastonbury Avenue, Unanderra (210//DP811435)	Along the proposed pipeline			Soil and soil vapour	Open trenching	Moderate
	14 Waynote Place (14//DP1126042)	Along the proposed pipeline	The site walkover indicated that the land was being raised by application of fill.		Soil and soil vapour	Open trenching	Moderate
	AIE tie-in facility	Along the proposed pipeline	Review of aerial photographs indicate that this property had ground disturbance circa 1961 and 1977, which was the same period that Allans Creek was realigned, and BHP Area 21 was filled and developed for steel making.	TRH, BTEX, PAH, metals, OCP, OPP, PCB, phenols, VOCs (including VCH), ammonia, cyanide, asbestos, and PFAS.	Soil and soil vapour	Open trenching	Moderate to High
Infilled Drainage Channel	Wyllie Road	Along the proposed pipeline	The 1986/1987 aerial photograph shows a creek which was infilled during the construction of Wyllie Road circa 1980.	TRH, BTEX, PAH, metals, OCP, OPP, PCB, phenols, VOCs (including VCH), ammonia, cyanide, asbestos, and PFAS.	Soil and soil vapour	Open trenching	Moderate to High

AEC	Location	Proximity to the proposed pipeline	Summary of Key Issues	Contaminants of Potential Concern (CoPC)	Media potentially affected along the proposed pipeline	Construction activity which may disturb contamination, if present	Potential or likelihood for contamination to impact on the project
Demolished Buildings	Wyllie Road, and south-east portion of Ian McLennan Park (Lot 104//DP617569)	Along the proposed pipeline	Potential for contamination associated with the demolition of a former residential building and farmhouse buildings which may have contained hazardous building materials.	Asbestos, lead, and PCB	Soil	Open trenching	Moderate to High
	175-177 Five Islands Road, and 5-7 Waynote Place, Unanderra	Along the proposed pipeline	Potential for contamination associated with the demolition of a former buildings which may have contained hazardous building materials.	Asbestos, lead, and PCB	Soil	HDD	Low
Stockpiles of unknown origin	Along the track which extends off Wyllie Road to the south-west	Along the proposed pipeline	A number of overgrown stockpiles were observed along and adjacent to the track.	TRH, BTEX, PAH, metals, phenols, OCP, OPP, PCB, and asbestos	Soil	Open trenching	Moderate to High
	South-west portion of Ian McLennan Park (Lot 104//DP617569)	Adjacent to the workspace laydown area	A relatively large (approximately 900m <sup>3</sup> ) stockpile was observed adjacent to the workspace laydown area, however Jemena indicated that this stockpile will likely not be disturbed during construction.	TRH, BTEX, PAH, metals, phenols, OCP, OPP, PCB, and asbestos	Soil	Open trenching	Low
		Along the proposed pipeline	Potential for contamination associated with an overgrown stockpile (approx. 2m <sup>3</sup> ) in the south-east of the property	TRH, BTEX, PAH, metals, phenols, OCP, OPP, PCB, and asbestos	Soil	Open trenching	Moderate to High
	Council land south of Wollongong Lawn Cemetery	Adjacent to the proposed pipeline	Potential for contamination associated with two overgrown stockpiles (2m <sup>3</sup> , and 1,500m <sup>3</sup> ) which may be disturbed during construction of the proposed pipeline.	TRH, BTEX, PAH, metals, phenols, OCP, OPP, PCB, and asbestos	Soil	Open trenching	Moderate to High
	Council Land and F6 Road Reserve west of Nolan Street	Along the proposed pipeline	Fly-tipped waste includes soil at two locations which is likely to be disturbed during construction.	TRH, BTEX, PAH, metals, phenols, OCP, OPP, PCB, and asbestos	Soil	Open trenching	Moderate to High
Groundwater	Easement of 243A Princes Highway, Unanderra between Princes Hwy and Doyle Ave	Along the proposed pipeline	Potential for groundwater in this area to be impacted as a result of surrounding commercial/industrial properties. Arial photographs from 1948/1951 through to 2006 show this property was used as a scrap yard/smash repairer. This area of the pipeline is proposed to be constructed using HDD.	TRH, BTEX, PAH, metals, VOCs (including VCH), and phenols.	Groundwater	HDD	Low

TRH: Total recoverable hydrocarbons  
BTEX: Benzene, toluene, ethylbenzene and xylene compounds  
PAH: Polycyclic aromatic hydrocarbons  
Metals: Arsenic, cadmium, chromium, copper, mercury, lead, nickel and zinc  
OCP/OPP: Organochlorine/organophosphorus pesticides  
PCB: Polychlorinated biphenyls  
VOCs: Volatile organic compounds  
VCH: Volatile chlorinated hydrocarbons  
PFAS: Per-and poly-fluoroalkyl substances

## 9. Conclusions and Recommendations

Based on a review of publicly available information and observations made during the site walkover, Coffey has identified six types of potential contamination (referred to as areas of environmental concern (AECs)) along the proposed pipeline which may pose an inherent risk to the project during construction of the proposed pipeline. AECs identified comprised:

- Fly-tipped waste (including suspected bonded and friable ACM);
- Uncontrolled fill;
- An infilled drainage channel;
- Previously demolished buildings;
- Stockpiles of unknown origin; and
- Groundwater at 243A Princes Highway, Unanderra.

Furthermore, two areas of the project are mapped as Class 5 Acid Sulfate Soils, as shown on Figure 6 (Appendix B).

Coffey recommends that further investigation is carried out to:

- Confirm the likelihood, nature and extent of contamination along the proposed pipeline and provide recommendations for management/remediation if required.
- Assess whether acid sulfate soils are present along the proposed pipeline in areas mapped as Class 5 for ASS, and provide recommendations for management of ASS, if required.

## 10. Limitations

This report must be read in conjunction with the attached "Important Information about your Coffey Environmental Report".

## **Appendix A - Important Information about Your Coffey Environmental Report**



# Important information about your **Coffey** Environmental Report

## **Introduction**

This report has been prepared by Coffey for you, as Coffey's client, in accordance with our agreed purpose, scope, schedule and budget.

The report has been prepared using accepted procedures and practices of the consulting profession at the time it was prepared, and the opinions, recommendations and conclusions set out in the report are made in accordance with generally accepted principles and practices of that profession.

The report is based on information gained from environmental conditions (including assessment of some or all of soil, groundwater, vapour and surface water) and supplemented by reported data of the local area and professional experience. Assessment has been scoped with consideration to industry standards, regulations, guidelines and your specific requirements, including budget and timing. The characterisation of site conditions is an interpretation of information collected during assessment, in accordance with industry practice.

This interpretation is not a complete description of all material on or in the vicinity of the site, due to the inherent variation in spatial and temporal patterns of contaminant presence and impact in the natural environment. Coffey may have also relied on data and other information provided by you and other qualified individuals in preparing this report. Coffey has not verified the accuracy or completeness of such data or information except as otherwise stated in the report. For these reasons the report must be regarded as interpretative, in accordance with industry standards and practice, rather than being a definitive record.

## **Your report has been written for a specific purpose**

Your report has been developed for a specific purpose as agreed by us and applies only to the site or area investigated. Unless otherwise stated in the report, this report cannot be applied to an adjacent site or area, nor can it be used when the nature of the specific purpose changes from that which we agreed.

For each purpose, a tailored approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible quantify, risks that both recognised and potential contamination pose in the context of the agreed purpose. Such risks may be financial (for example, clean up costs or constraints on site use) and/or physical (for example, potential health risks to users of the site or the general public).

## **Limitations of the Report**

The work was conducted, and the report has been prepared, in response to an agreed purpose and scope, within time and budgetary constraints, and in reliance on certain data and information made available to Coffey.

The analyses, evaluations, opinions and conclusions presented in this report are based on that purpose and scope, requirements, data or information, and they could change if such requirements or data are inaccurate or incomplete.

This report is valid as of the date of preparation. The condition of the site (including subsurface conditions) and extent or nature of contamination or other environmental hazards can change over time, as a result of either natural processes or human influence. Coffey should be kept apprised of any such events and should be consulted for further investigations if any changes are noted, particularly during construction activities where excavations often reveal subsurface conditions.

In addition, advancements in professional practice regarding contaminated land and changes in applicable statutes and/or guidelines may affect the validity of this report. Consequently, the currency of conclusions and recommendations in this report should be verified if you propose to use this report more than 6 months after its date of issue.

The report does not include the evaluation or assessment of potential geotechnical engineering constraints of the site.

## **Interpretation of factual data**

Environmental site assessments identify actual conditions only at those points where samples are taken and on the date collected. Data derived from indirect field measurements, and sometimes other reports on the site, are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions.

Variations in soil and groundwater conditions may occur between test or sample locations and actual conditions may differ from those inferred to exist. No environmental assessment program, no matter how comprehensive, can reveal all subsurface details and anomalies. Similarly, no professional, no matter how well qualified, can reveal what is hidden by earth, rock or changed through time.

The actual interface between different materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions.

For this reason, parties involved with land acquisition, management and/or redevelopment should retain the services of a suitably qualified and experienced environmental consultant through the development and use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other unrecognised features encountered on site. Coffey would be pleased to assist with any investigation or advice in such circumstances.

### **Recommendations in this report**

This report assumes, in accordance with industry practice, that the site conditions recognised through discrete sampling are representative of actual conditions throughout the investigation area. Recommendations are based on the resulting interpretation.

Should further data be obtained that differs from the data on which the report recommendations are based (such as through excavation or other additional assessment), then the recommendations would need to be reviewed and may need to be revised.

### **Report for benefit of client**

Unless otherwise agreed between us, the report has been prepared for your benefit and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendation and should make their own enquiries and obtain independent advice in relation to such matters.

Coffey assumes no responsibility and will not be liable to any other person or organisation for, or in relation to, any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report.

To avoid misuse of the information presented in your report, we recommend that Coffey be consulted before the report is provided to another party who may not be familiar with the background and the purpose of the report. In particular, an environmental disclosure report for a property vendor may not be suitable for satisfying the needs of that property's purchaser. This report should not be applied for any purpose other than that stated in the report.

### **Interpretation by other professionals**

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, a suitably qualified and experienced environmental consultant should be retained to explain the implications of the report to other professionals referring to the report and then review plans and specifications produced to see

how other professionals have incorporated the report findings.

Given Coffey prepared the report and has familiarity with the site, Coffey is well placed to provide such assistance. If another party is engaged to interpret the recommendations of the report, there is a risk that the contents of the report may be misinterpreted and Coffey disowns any responsibility for such misinterpretation.

### **Data should not be separated from the report**

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists or engineers based on their interpretation of field logs, field testing and laboratory evaluation of samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

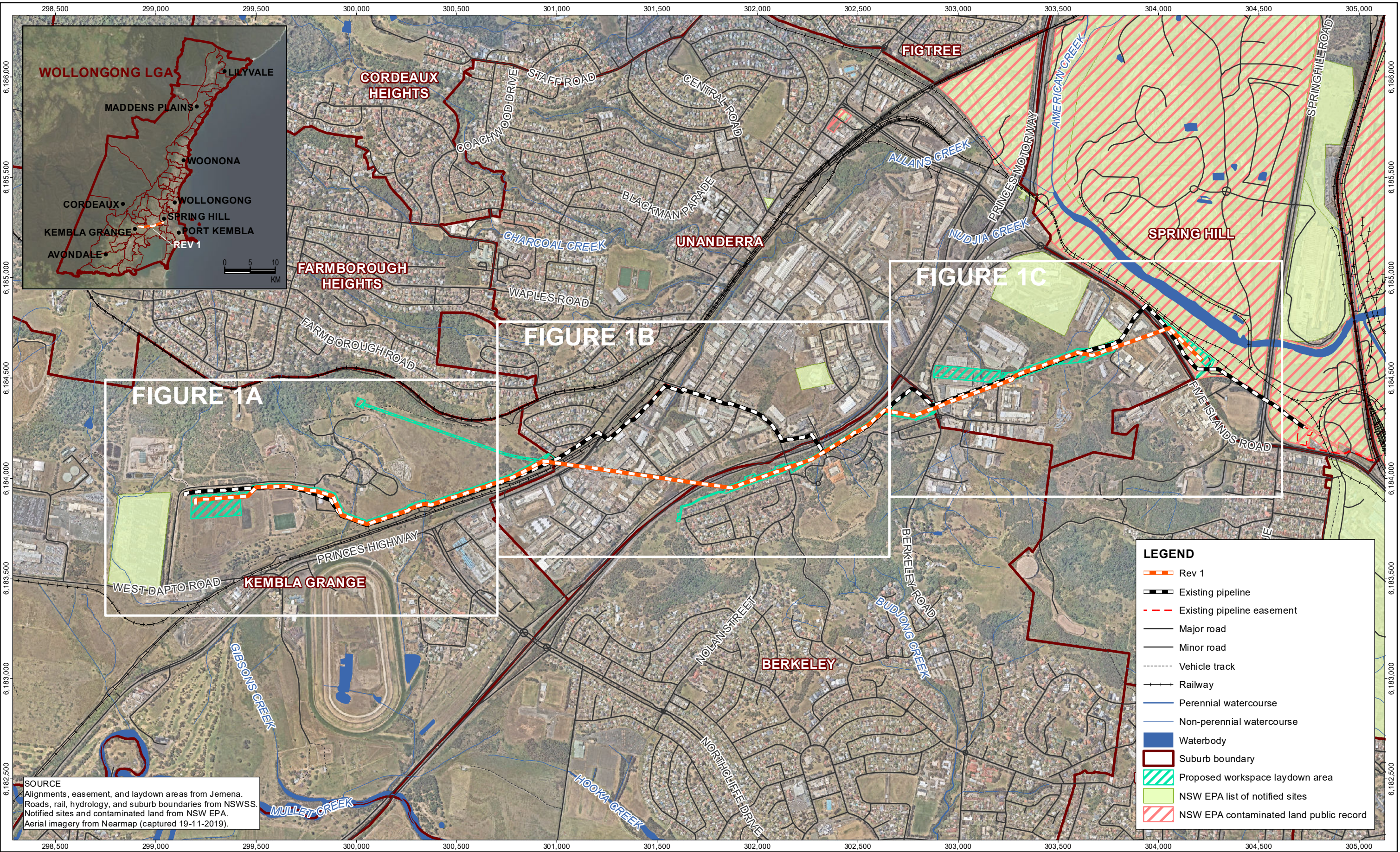
This report should be reproduced in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

### **Responsibility**

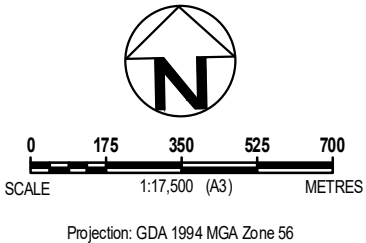
Environmental reporting relies on interpretation of factual information using professional judgement and opinion and has a level of uncertainty attached to it, which is much less exact than other design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. As noted earlier, the recommendations and findings set out in this report should only be regarded as interpretive and should not be taken as accurate and complete information about all environmental media at all depths and locations across the site.

## **Appendix B – Figures**





revision	no.	description	drawn	approved	date
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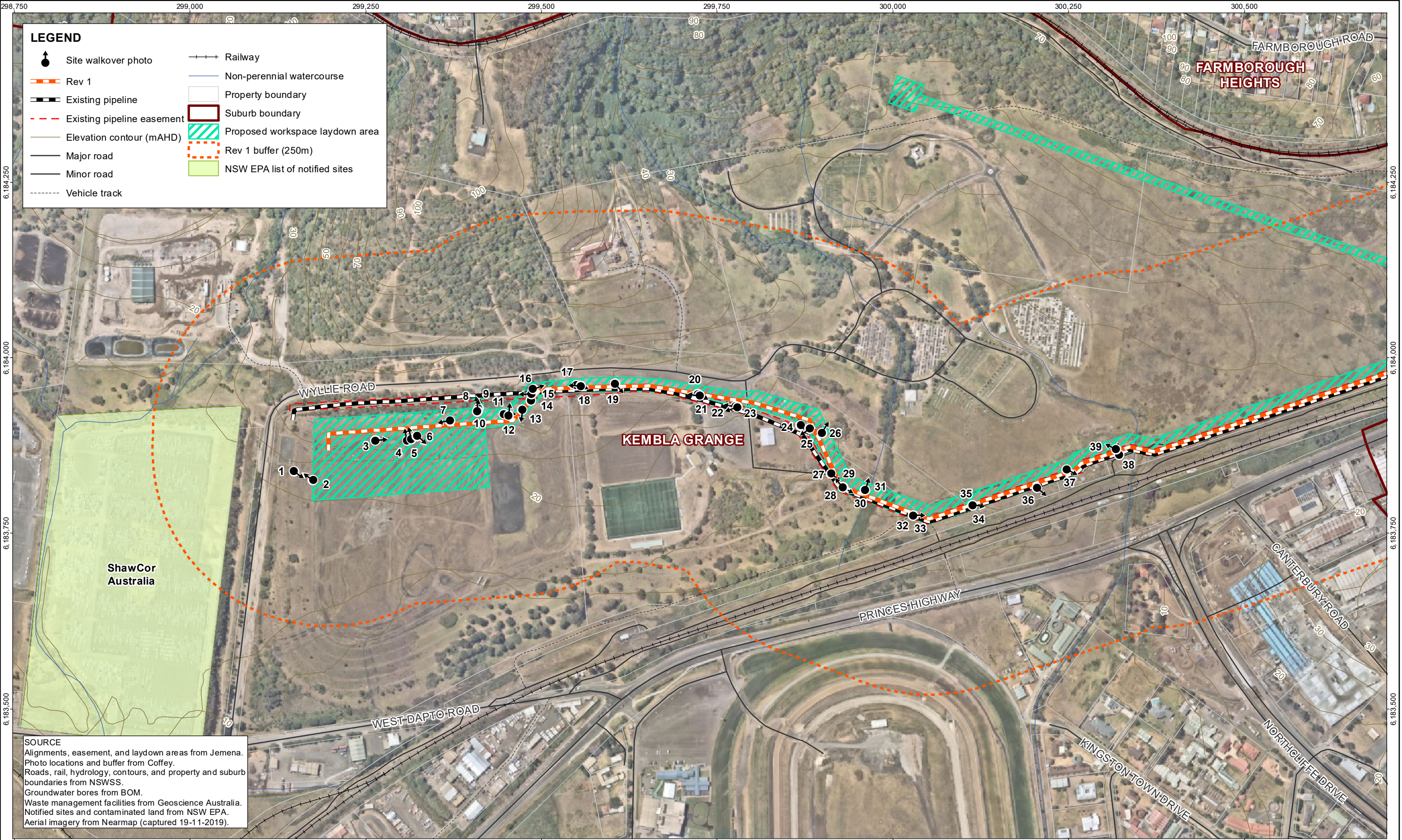


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approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3



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project:	PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
title:	PROPOSED PROJECT LOCATION		
project no:	MELEN269488-R01	figure no:	FIGURE 1
		rev:	A

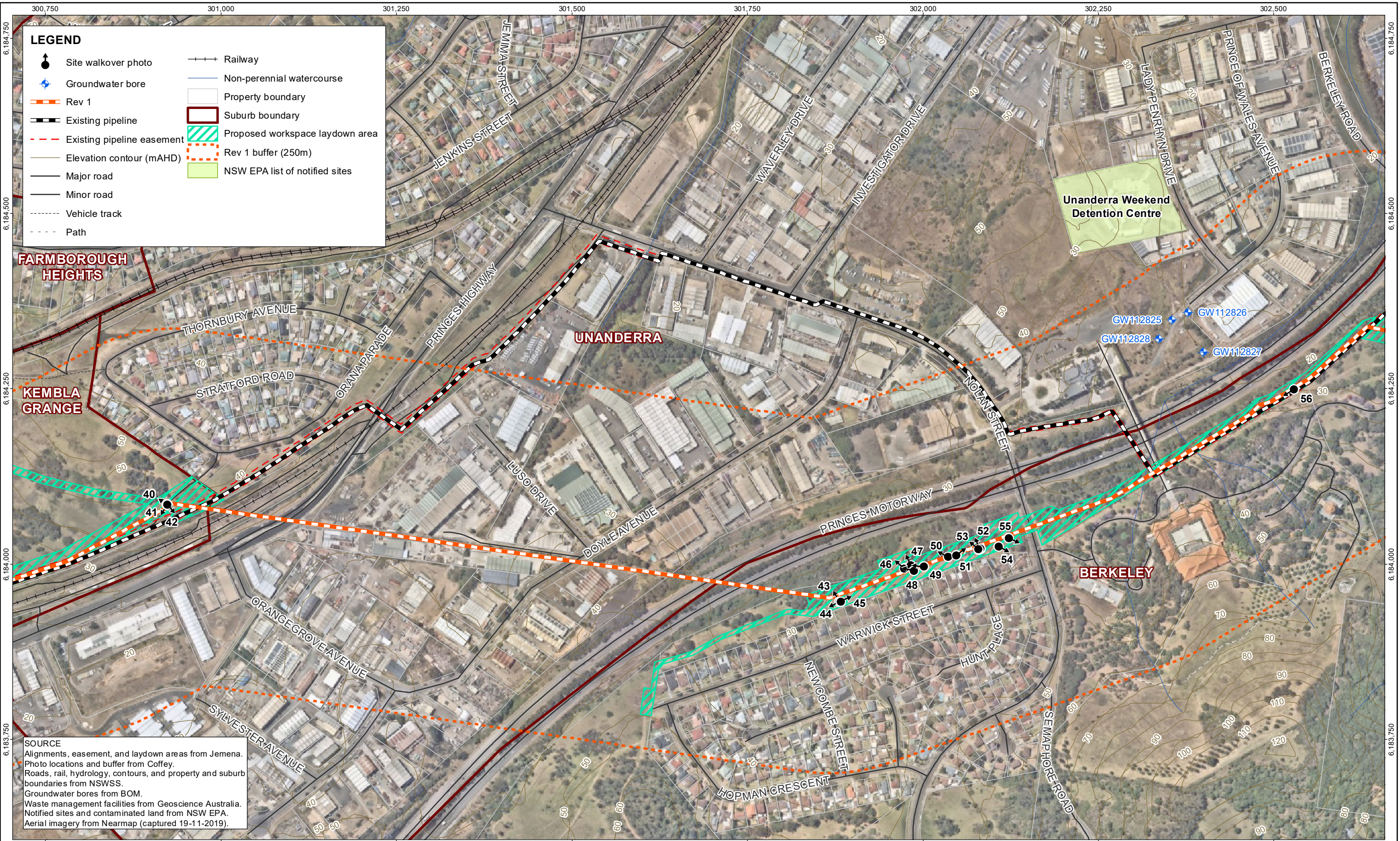




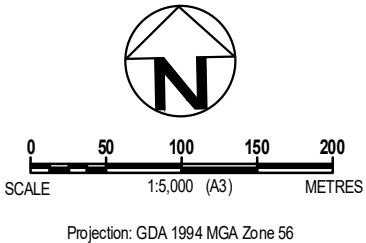
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										project no: MELEN269488-R01				figure no: FIGURE 1A		rev: A							

MXD ref: MELEN269488\_R01\_GS001A\_v0.3





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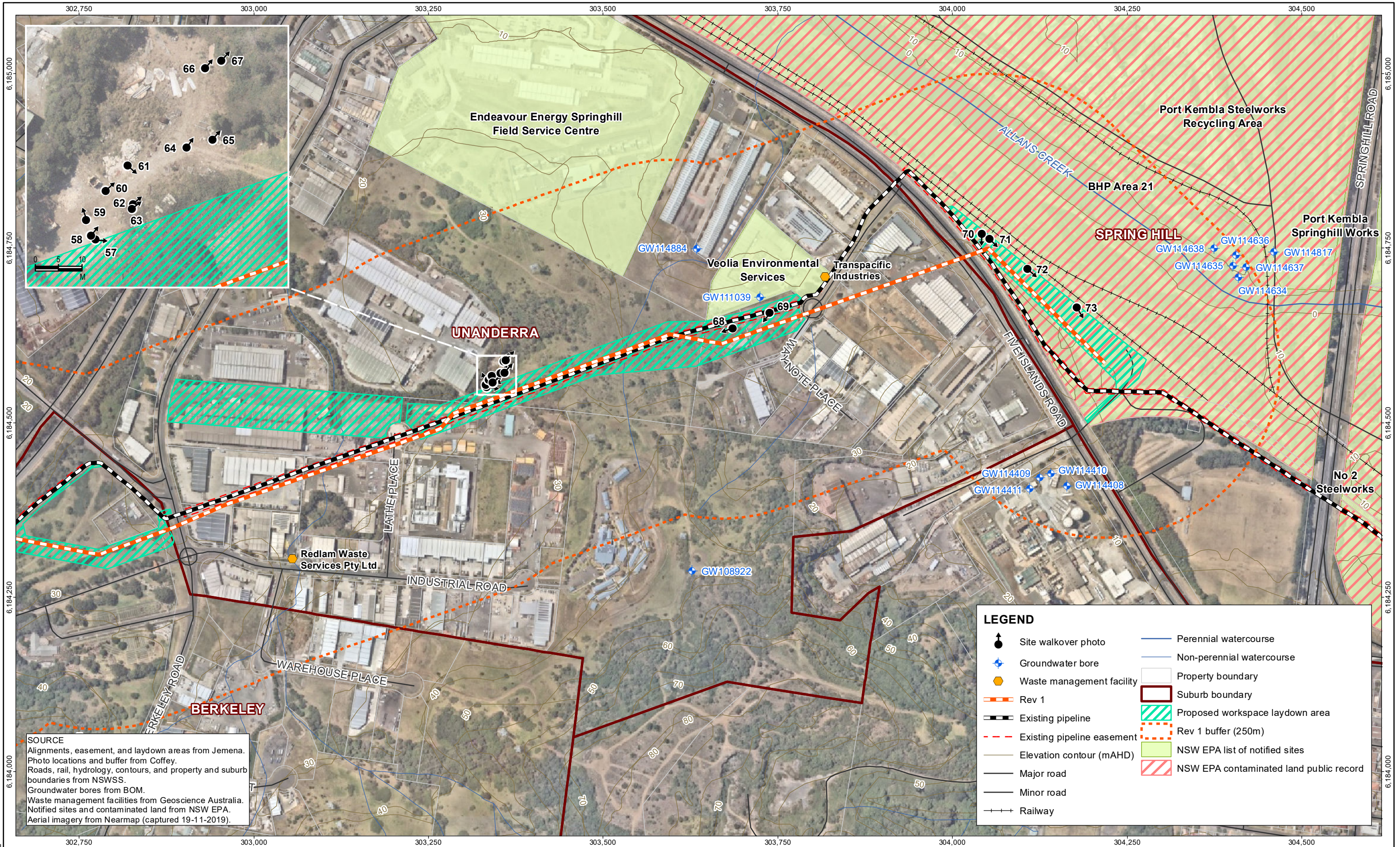
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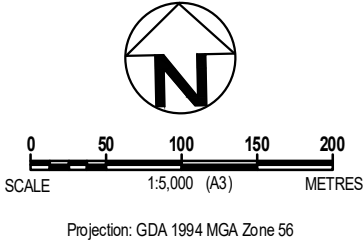
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		rev:	A

MXD ref: MELEN269488\_R01\_GS001B\_v0.2





revision	no.	description			drawn	approved	date
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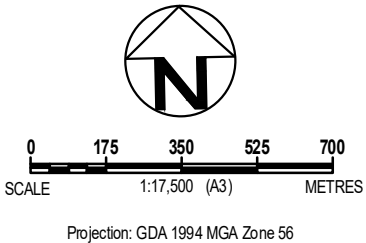
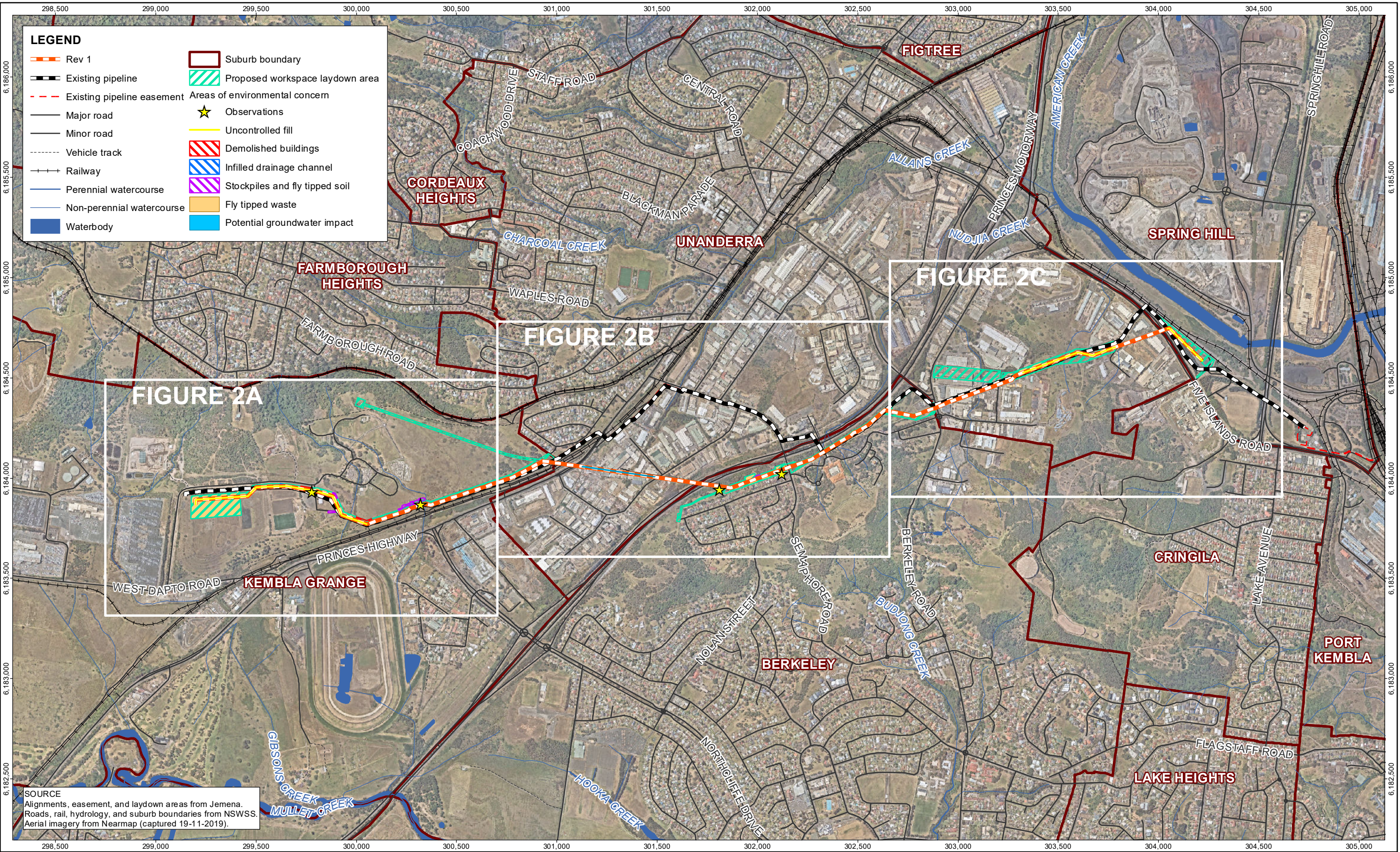


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title: PROPOSED PROJECT LOCATION		
project no: MELEN269488-R01	figure no: FIGURE 1C	rev: A





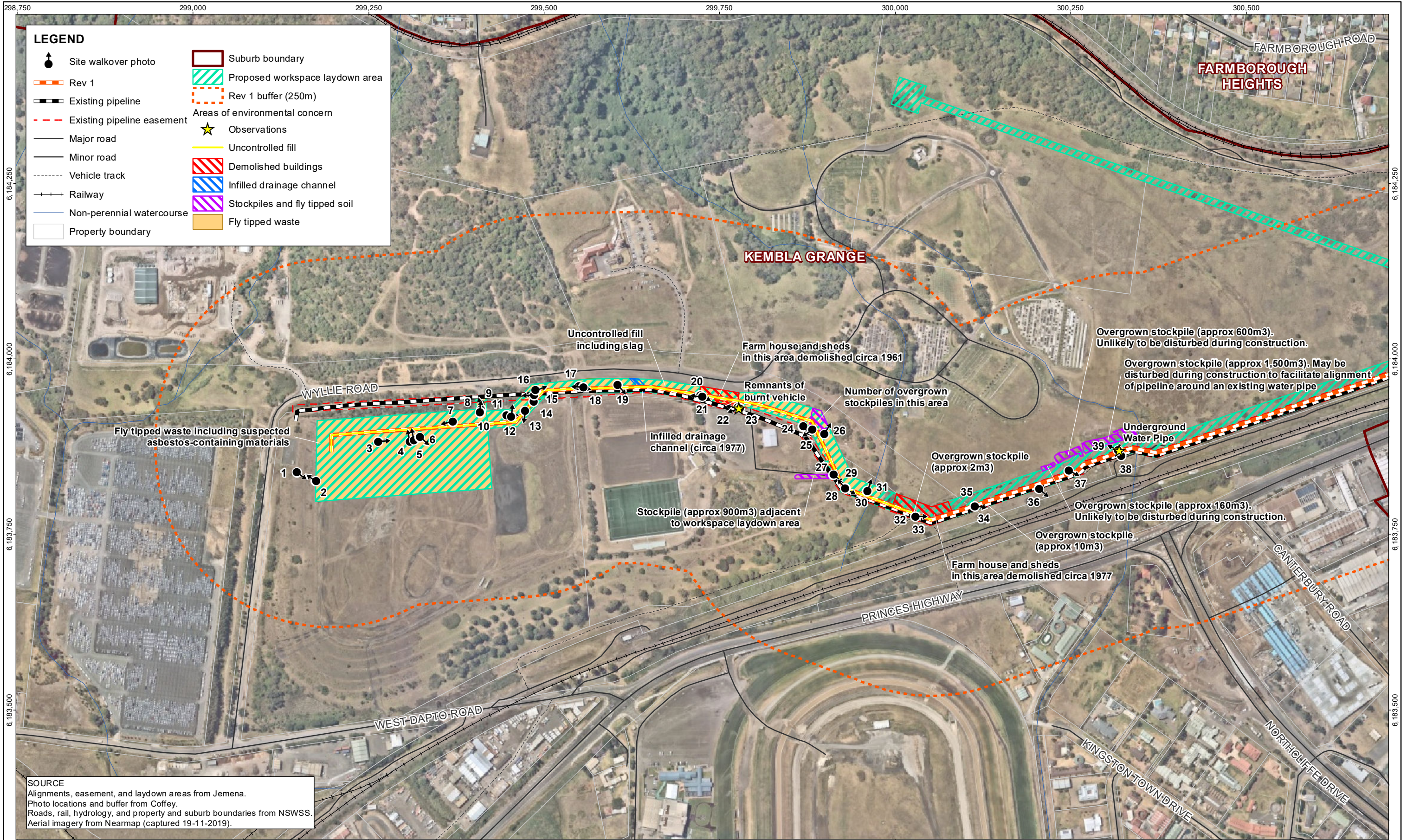
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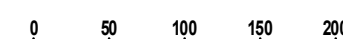



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rev:	A		

MXD ref: MELEN269488\_R01\_GS002\_v0\_3

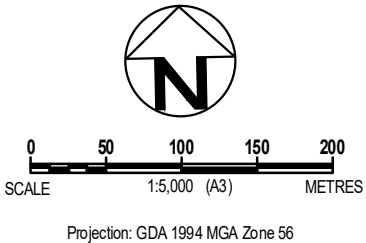
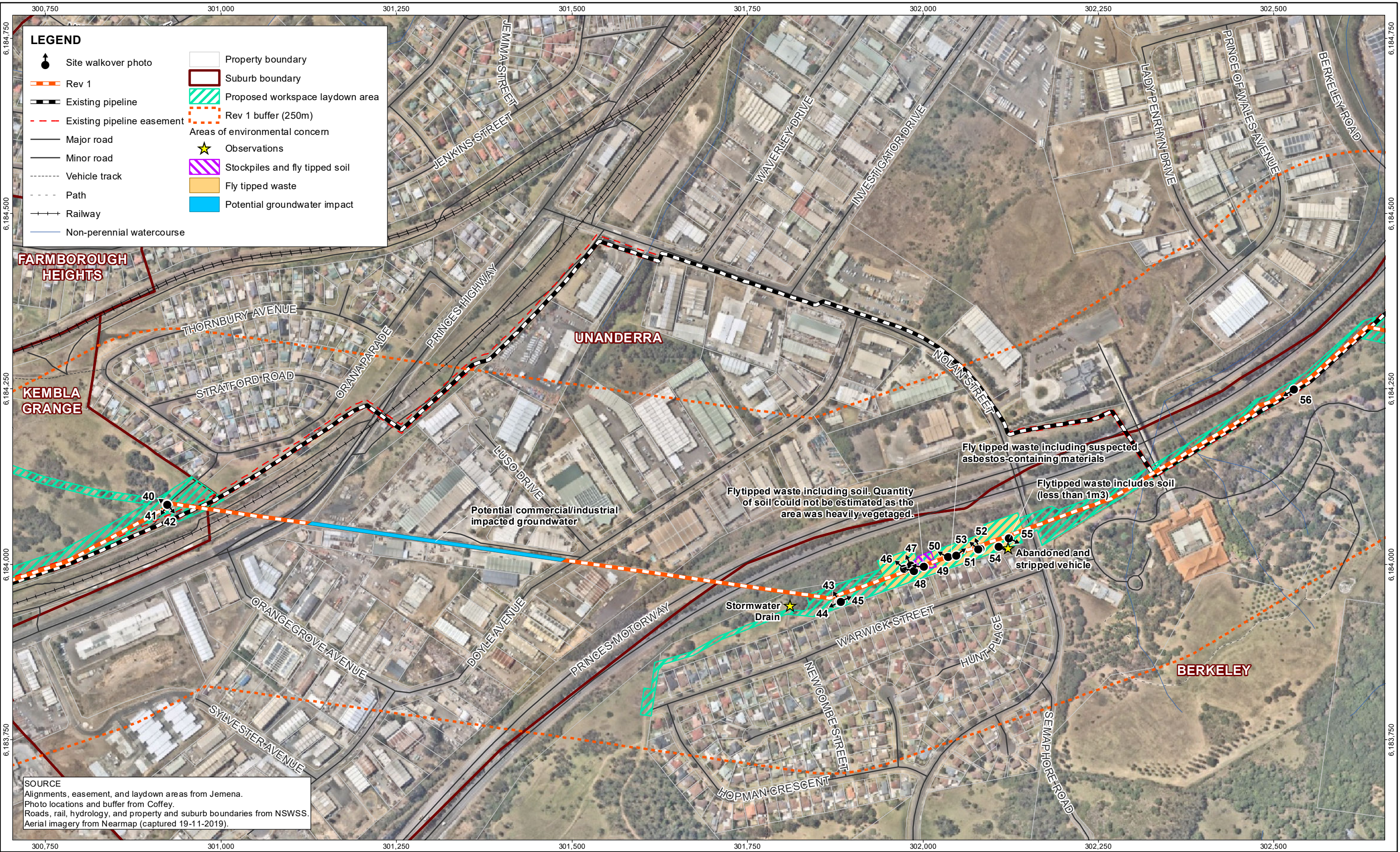




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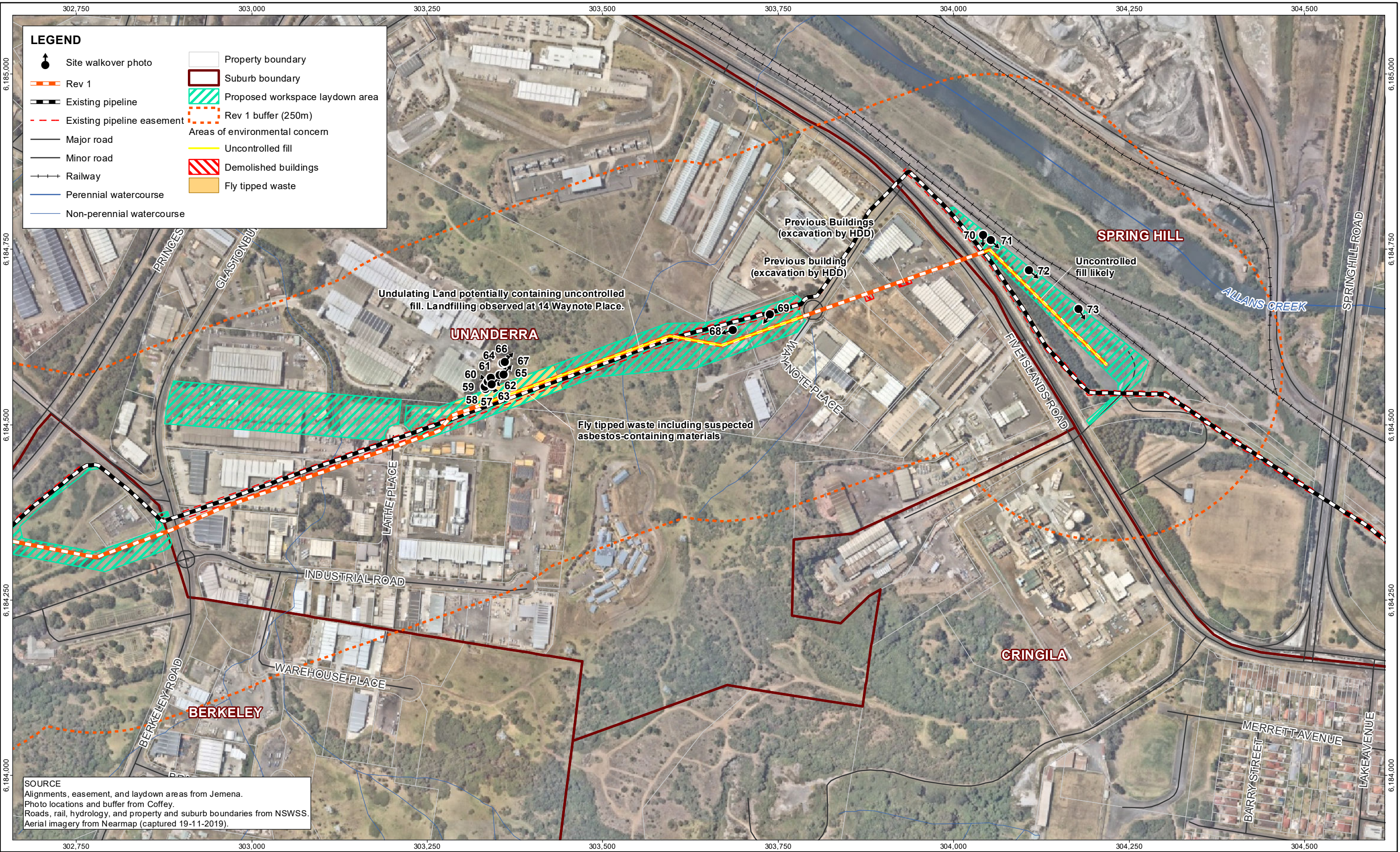
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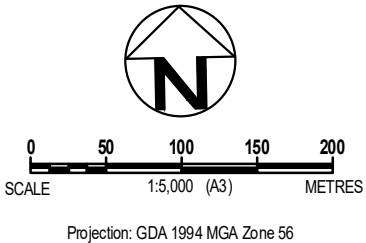
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rev:	A		

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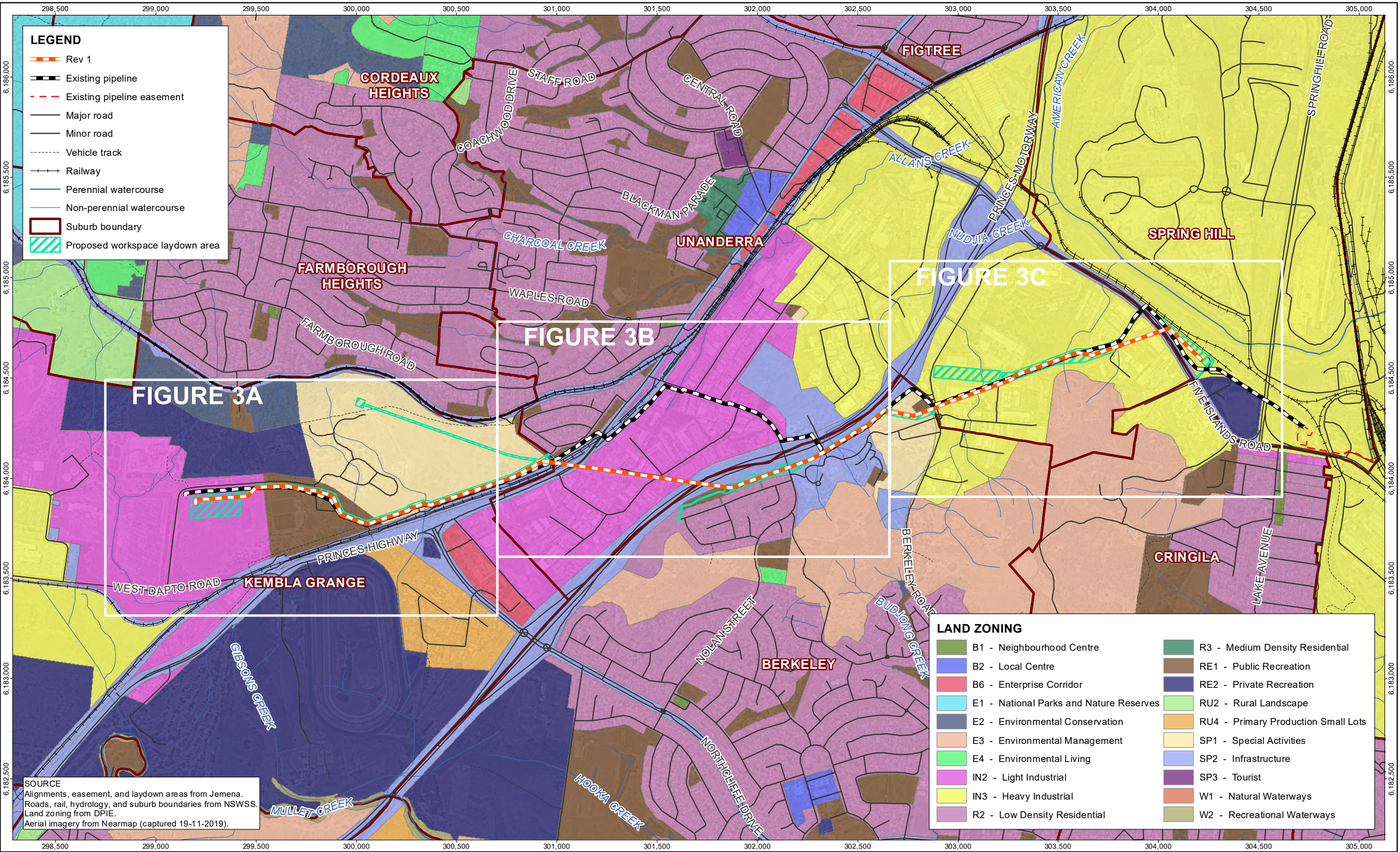
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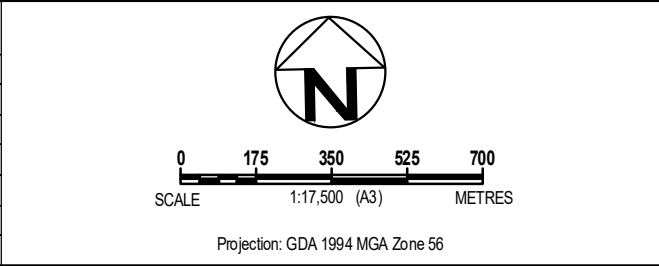
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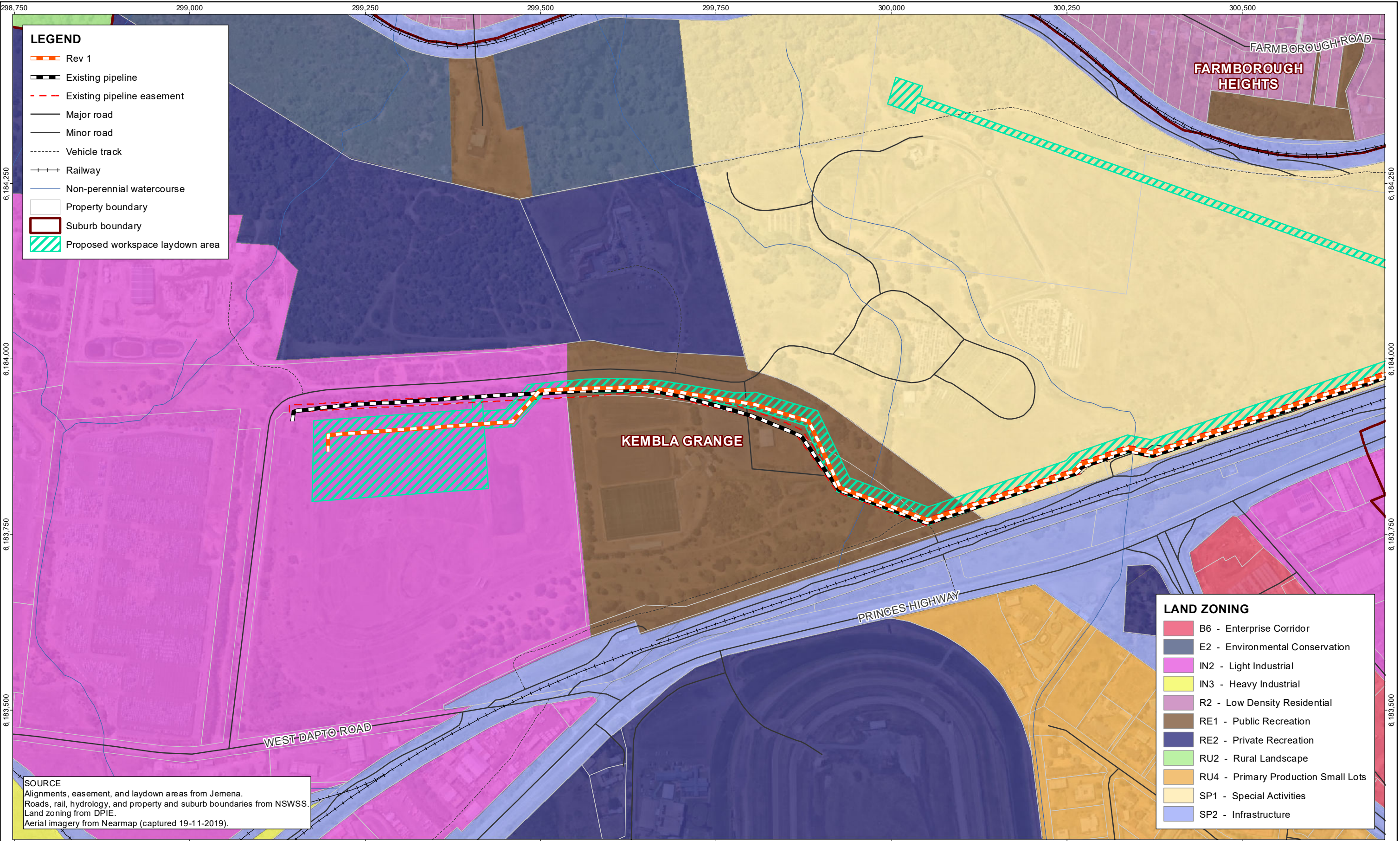
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project no: MELEN269488-R01	figure no: FIGURE 3	rev: A

MXD ref: MELEN269488\_R01\_GS003\_v0.3





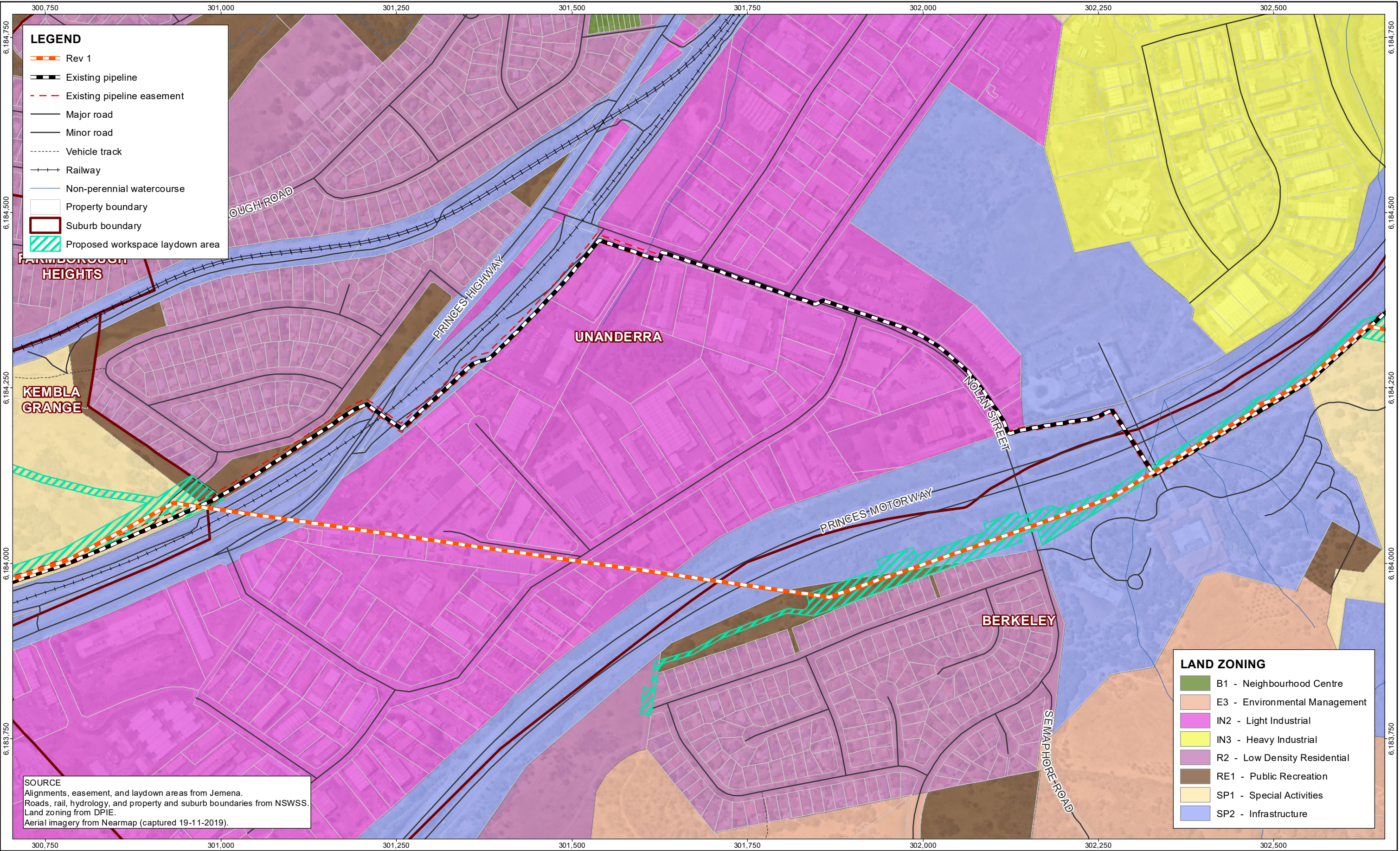
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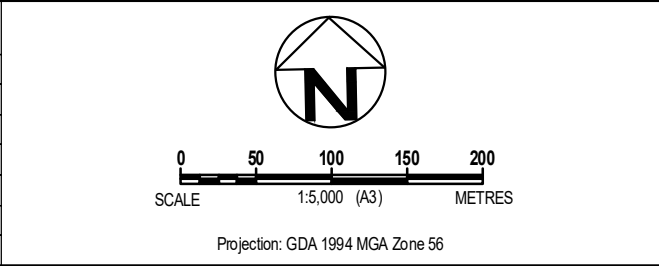
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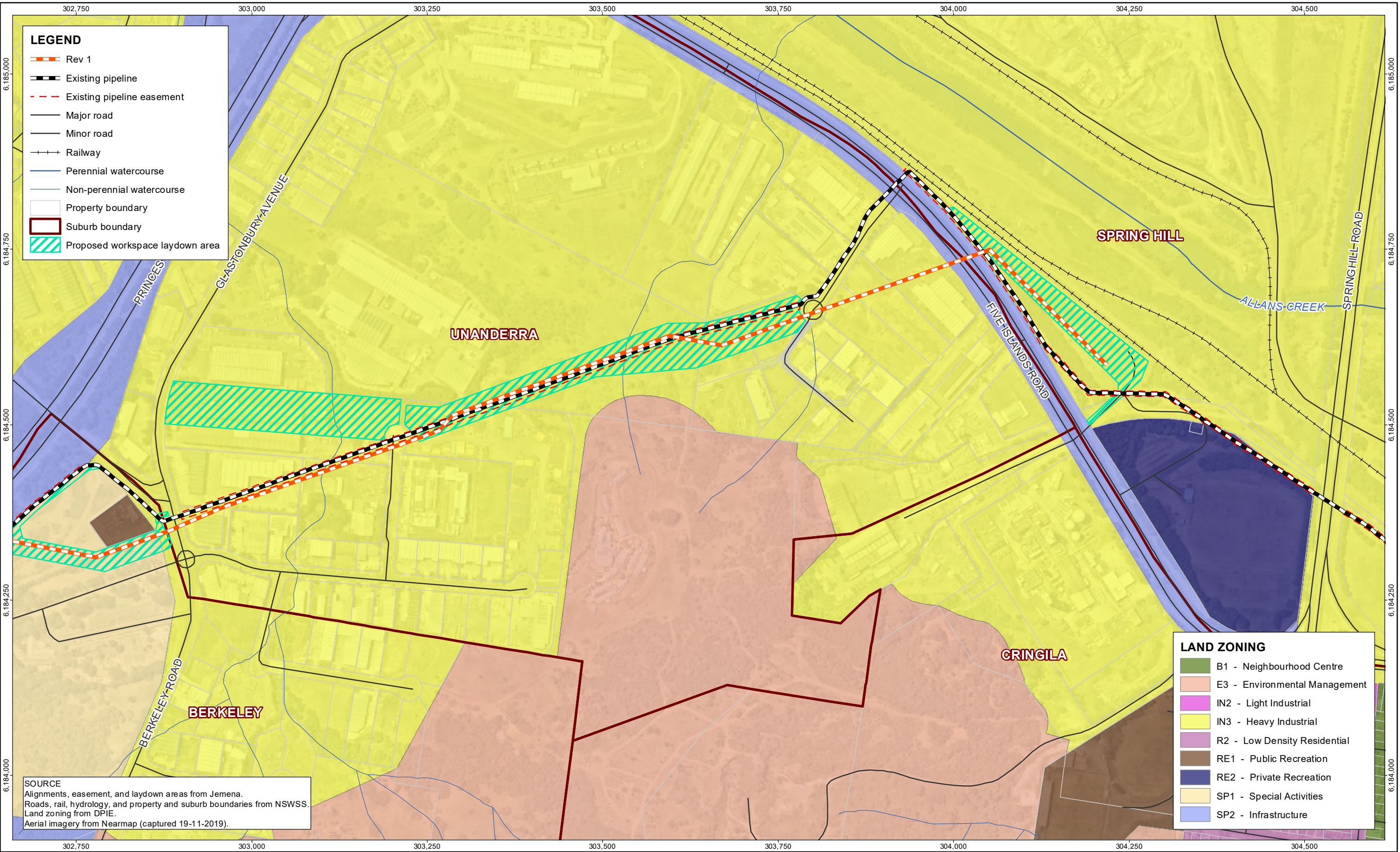
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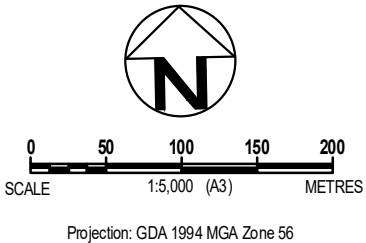
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MXD ref: MELEN269488\_R01\_GS003A-C\_v0\_2





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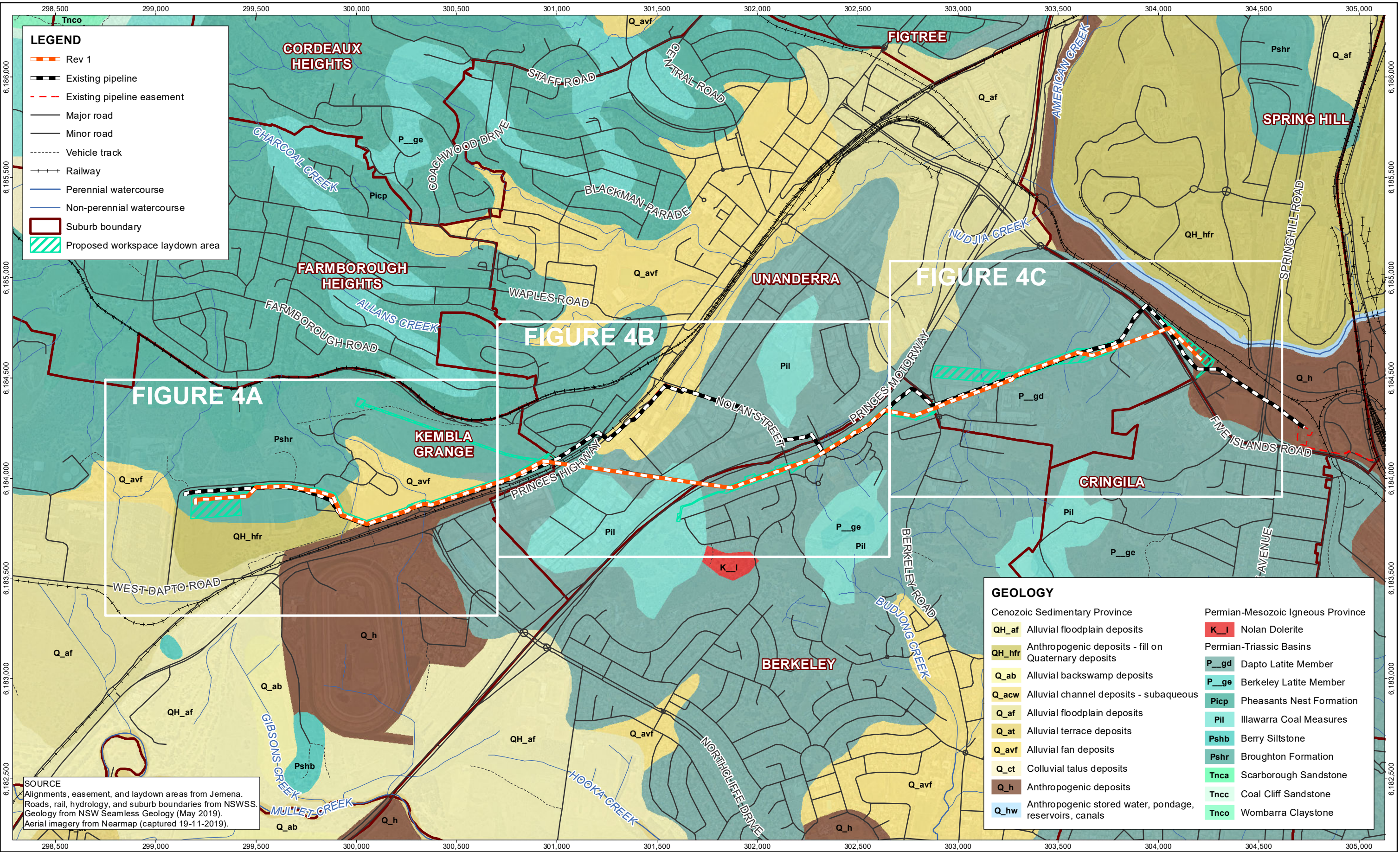
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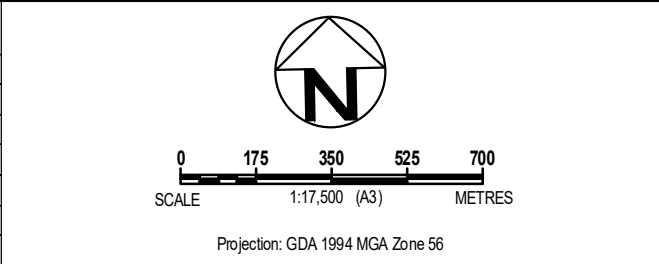
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MXD ref: MELEN269488\_R01\_GS003A-C\_v0\_2





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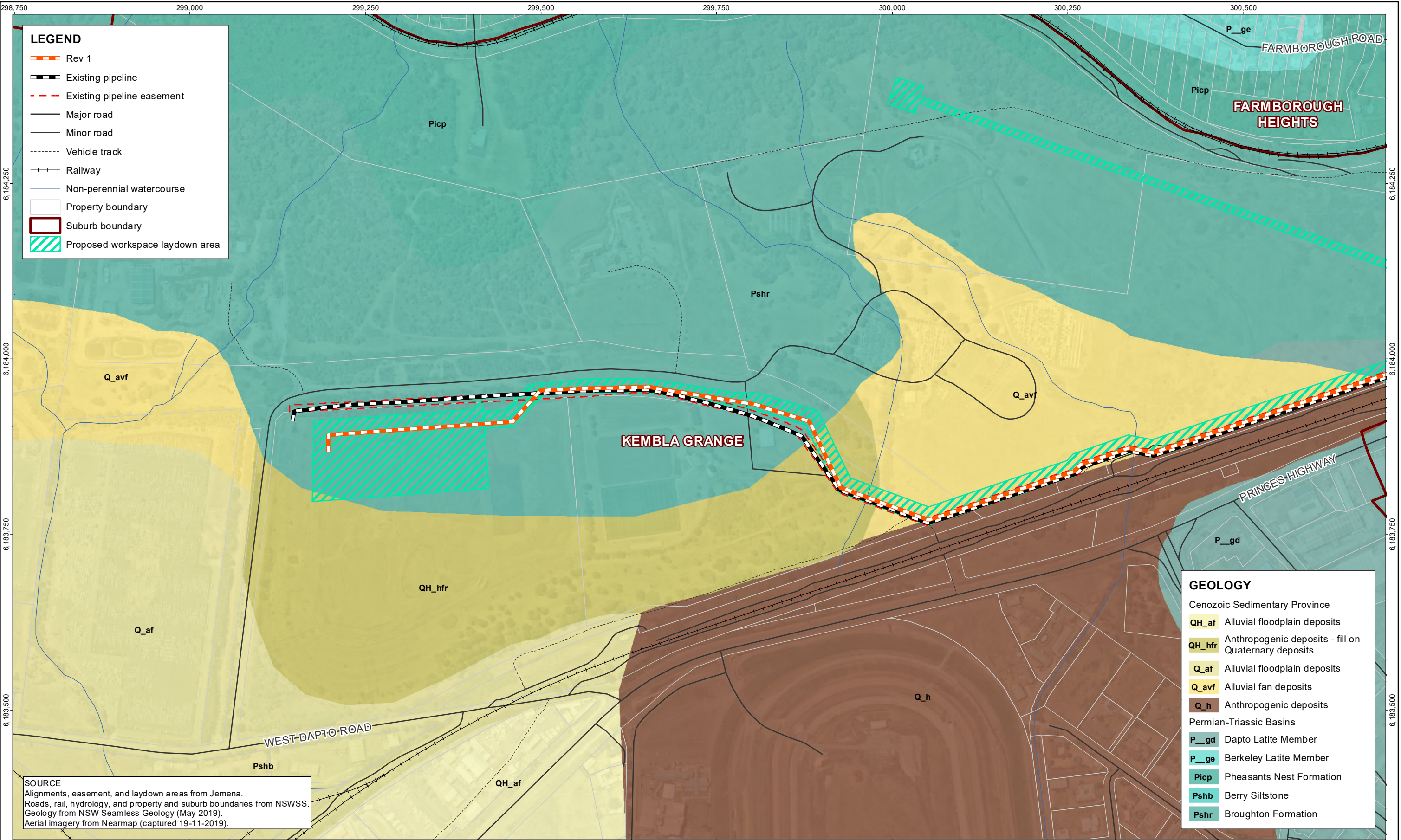
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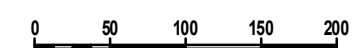



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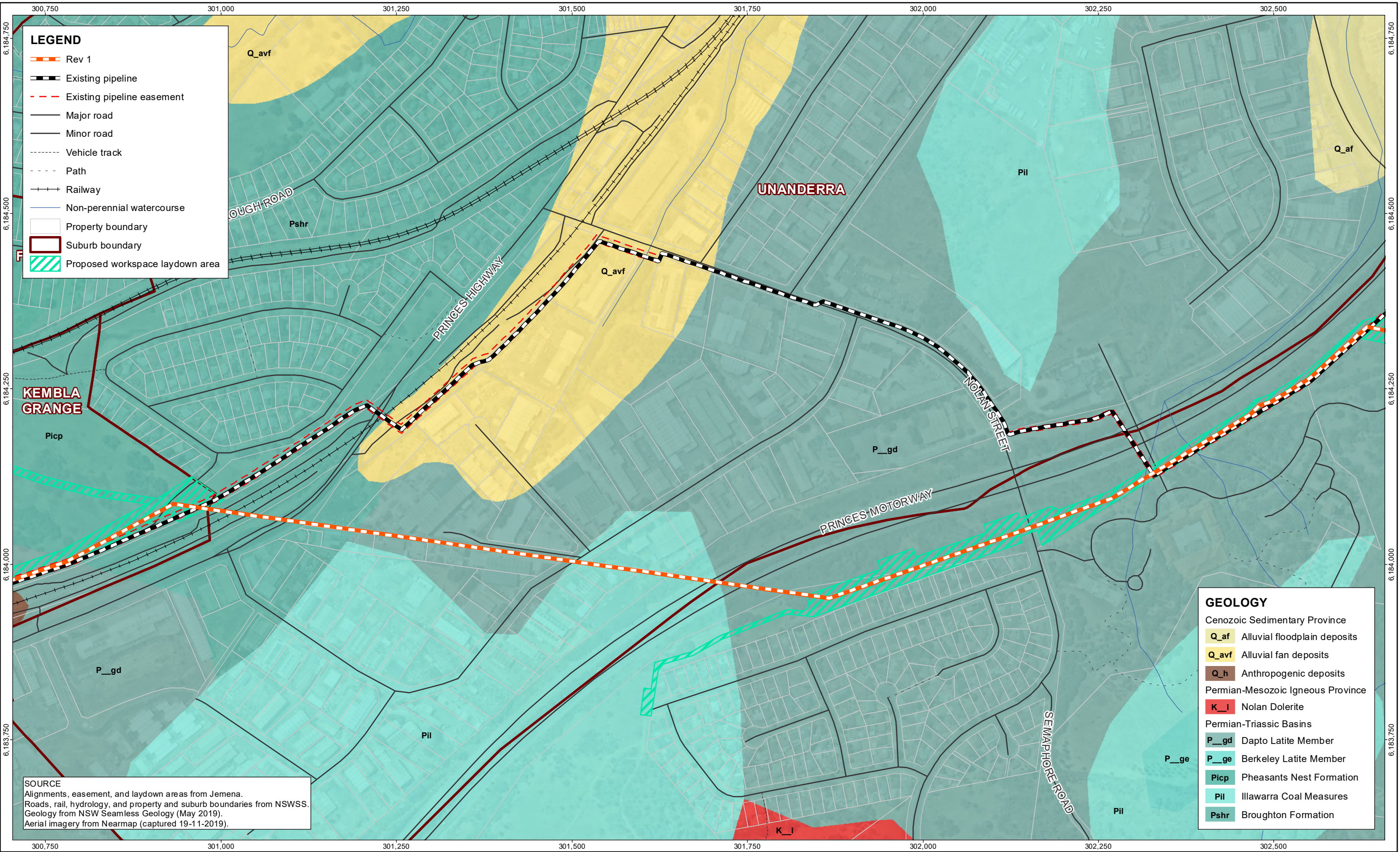




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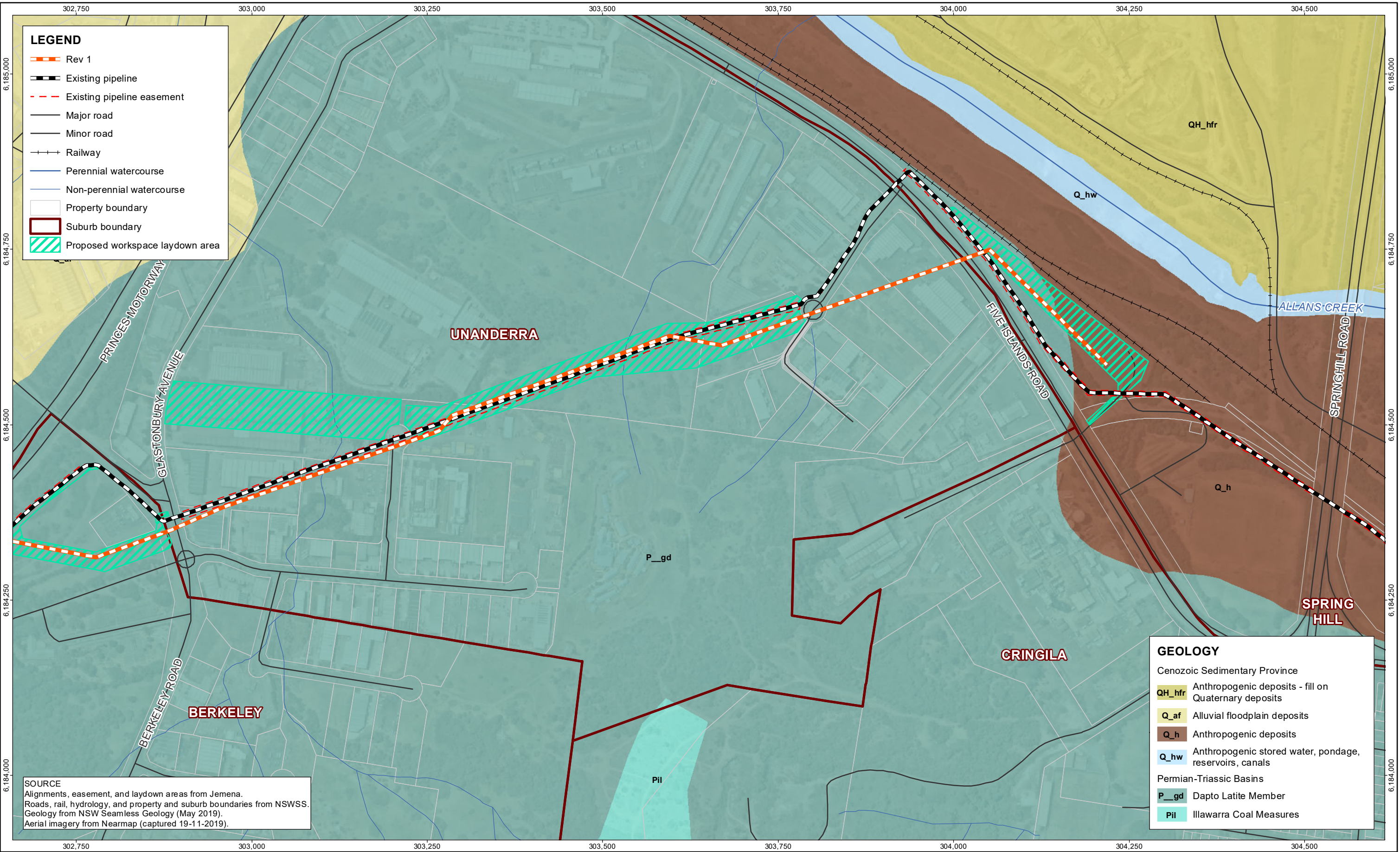
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approved	AP
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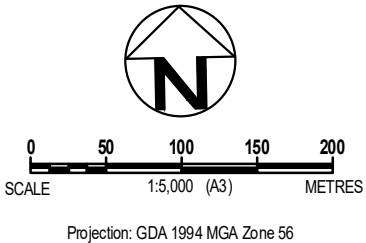
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		rev:	A

MXD ref: MELEN269488\_R01\_GS004B\_v0\_3





revision	no.	description			drawn	approved	date
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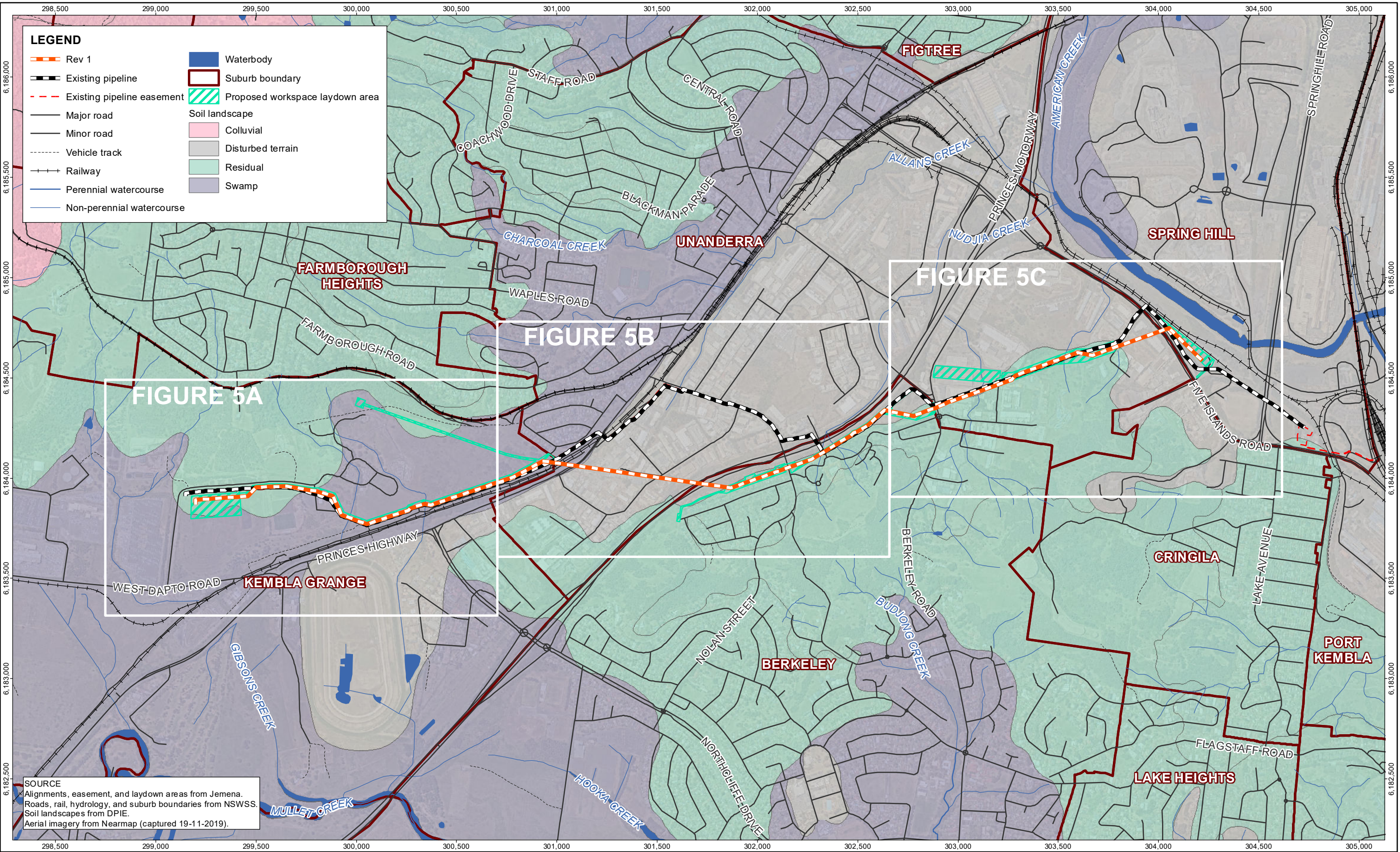
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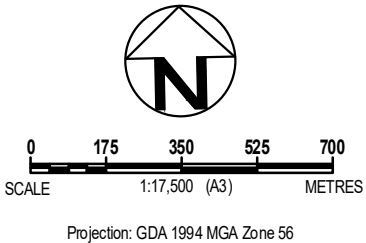
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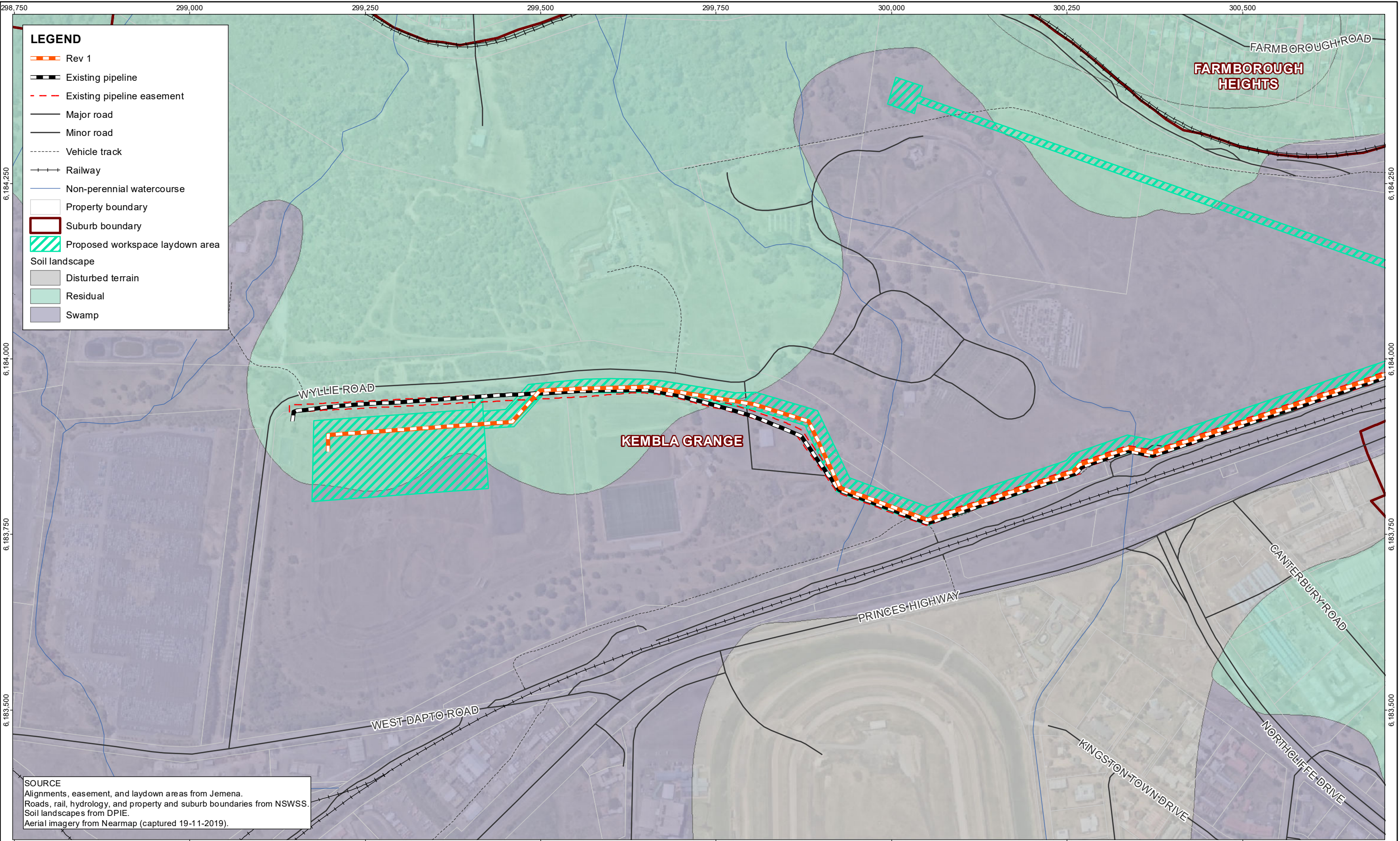
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project:		PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT	
title:		SOIL LANDSCAPES	
project no:	MELEN269488-R01	figure no:	FIGURE 5
		rev:	A

MXD ref: MELEN269488\_R01\_GS005\_v0\_3

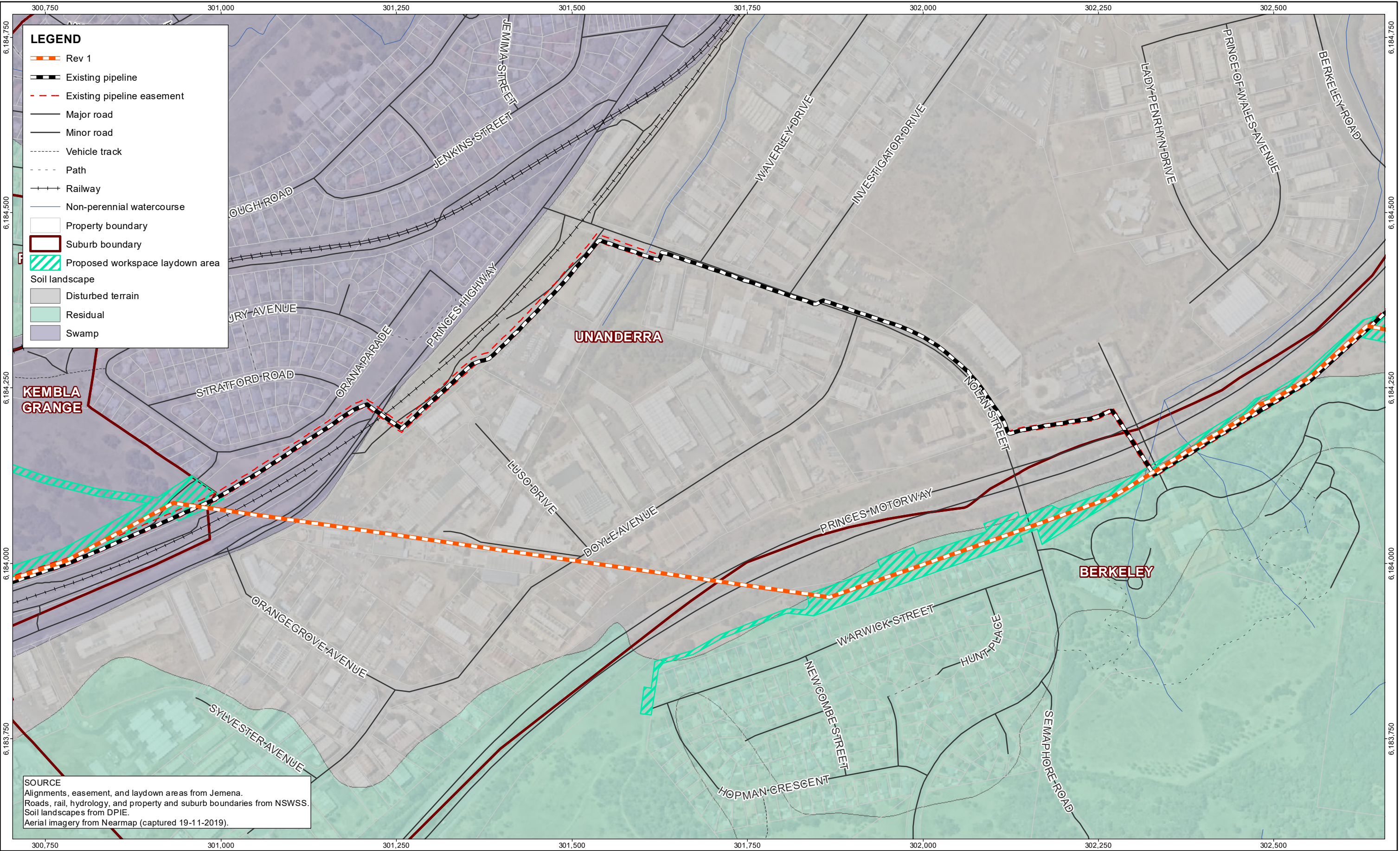





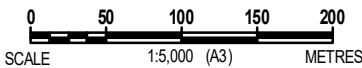
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MXD ref: MELEN269488\_R01\_GS005A-C v0.3





revision	no.	description	drawn	approved	date
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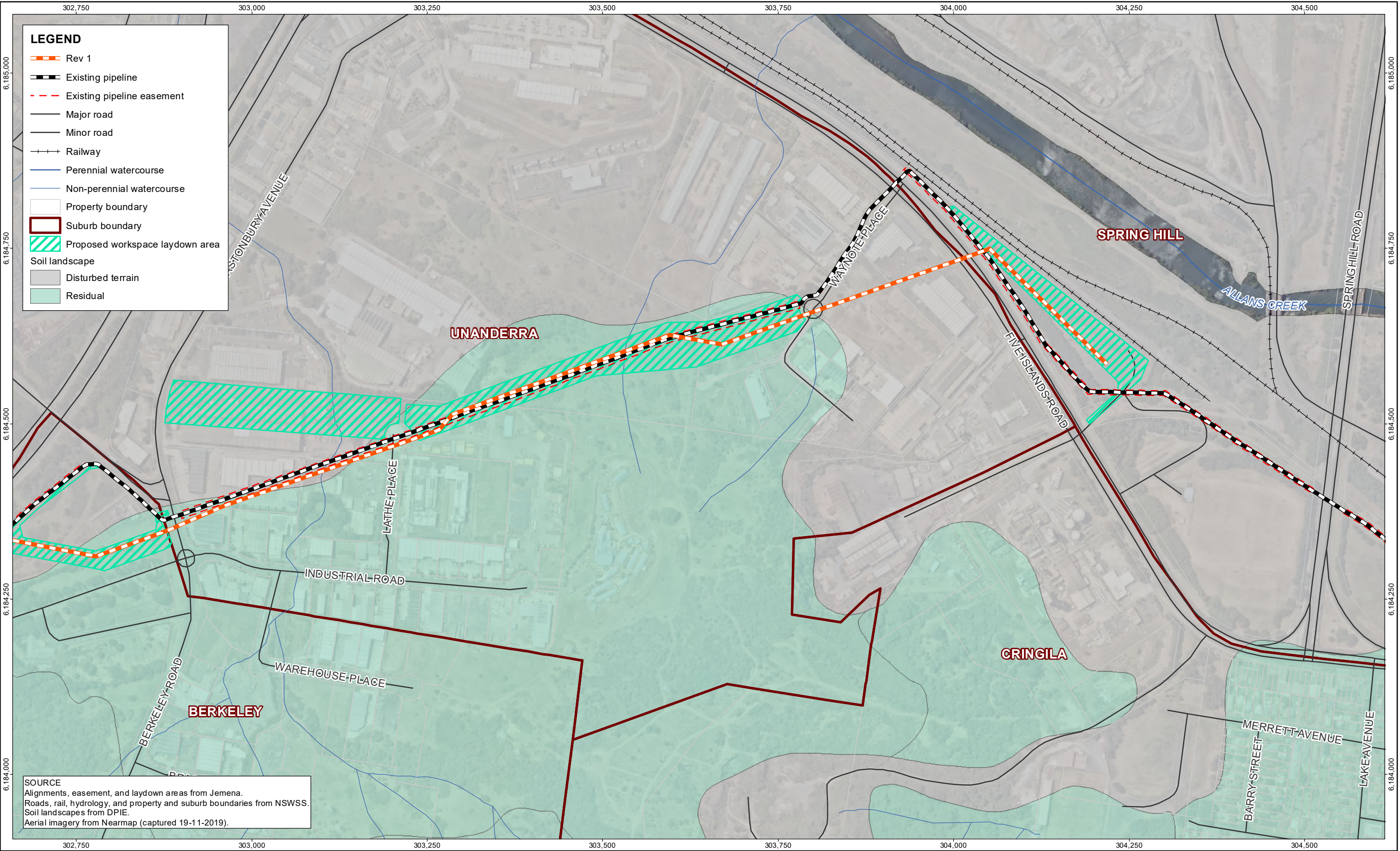
  
  
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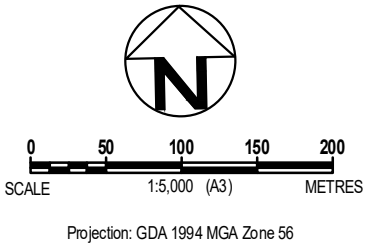
  
A TETRA TECH COMPANY

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title:	SOIL LANDSCAPES		
project no:	MELEN269488-R01	figure no:	FIGURE 5B
rev:	A		





revision	no.	description			drawn	approved	date
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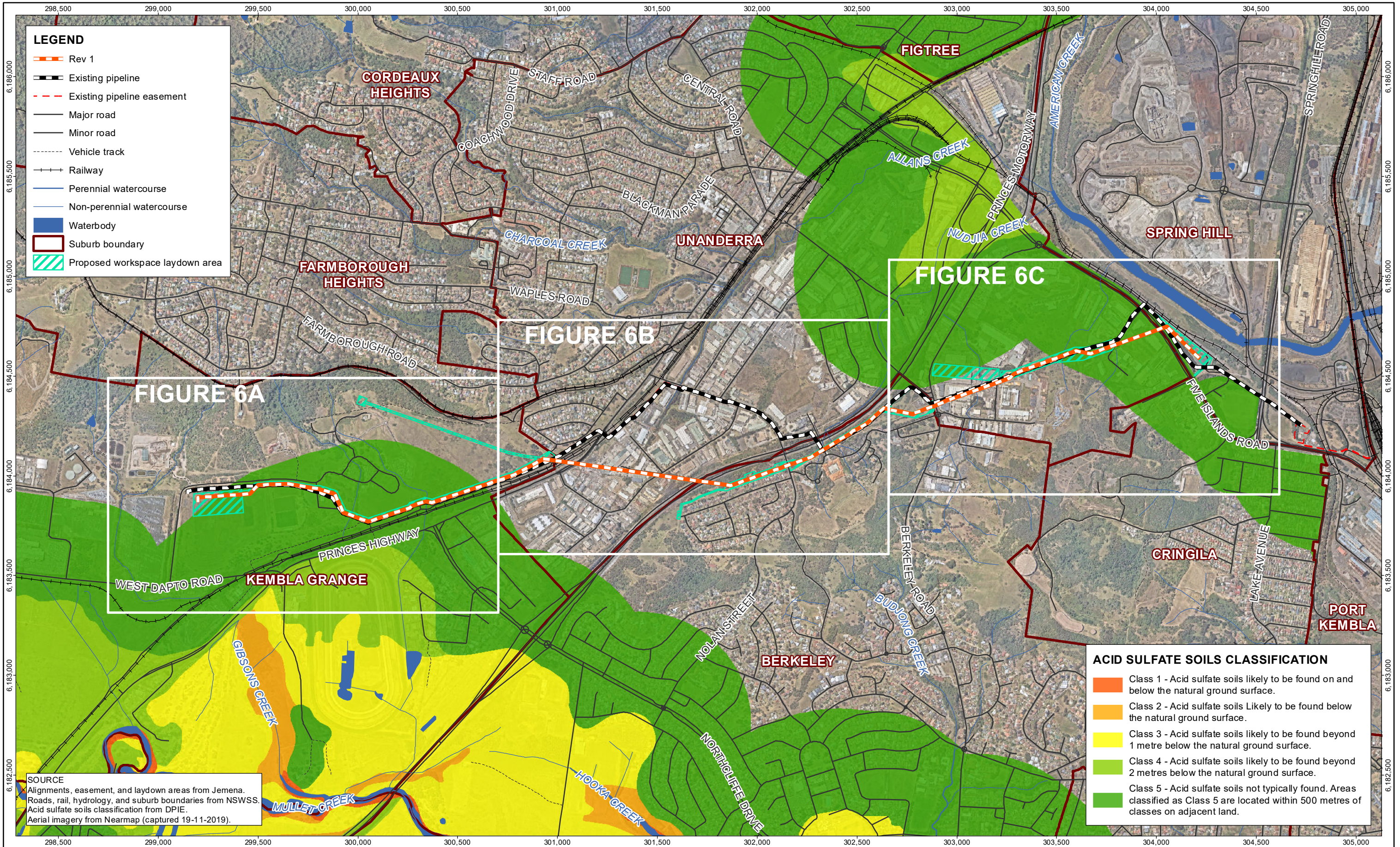
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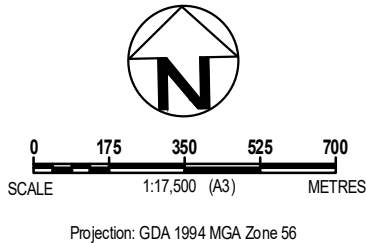
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rev:	A		

MXD ref: MELEN269488\_R01\_GS005A-C\_v0\_3





revision	no.	description		drawn	approved	date
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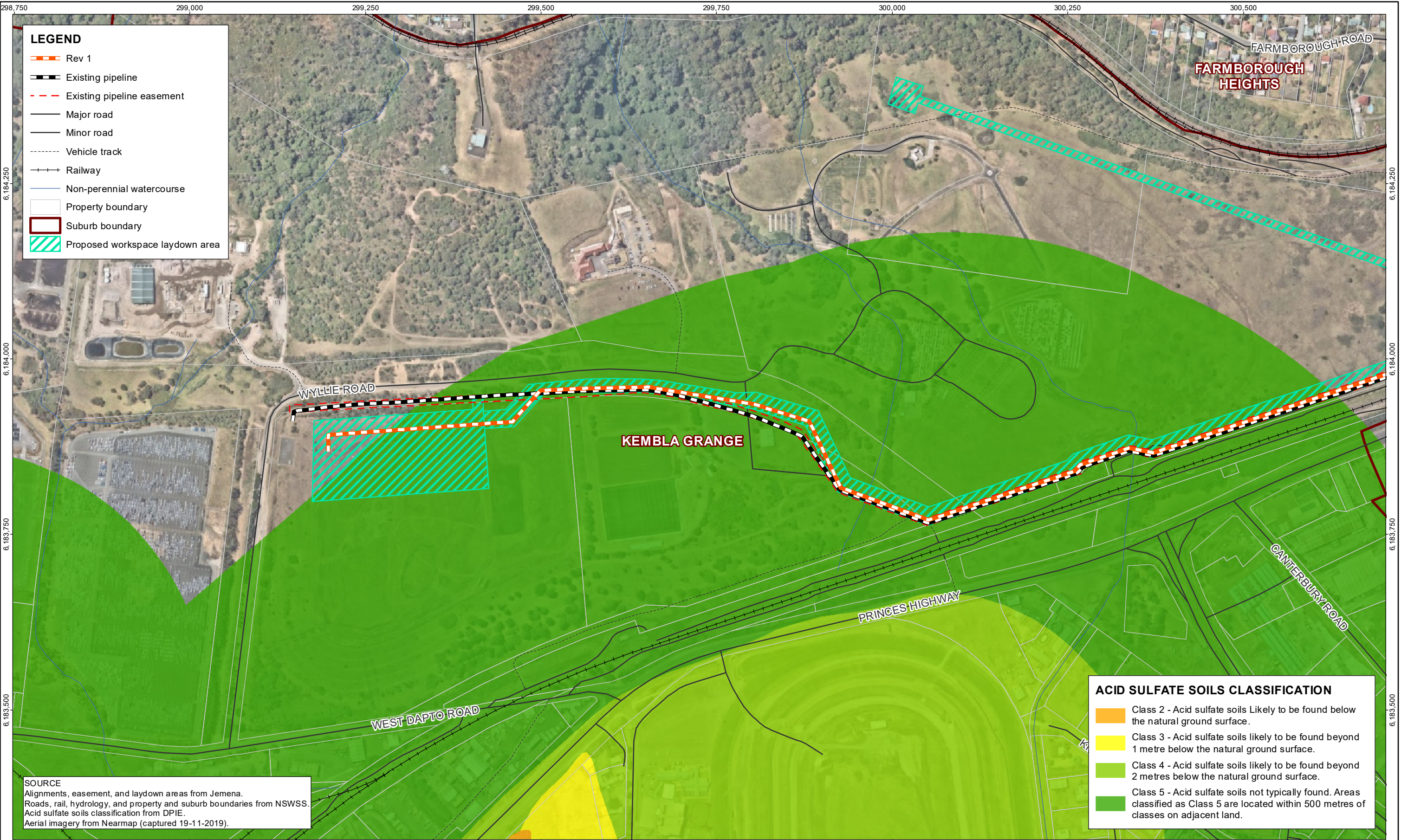


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title:		ACID SULFATE SOILS CLASSIFICATION	
project no:	MELEN269488-R01	figure no:	FIGURE 6
		rev:	A





LEGEND

Rev 1

Existing pipeline

Existing pipeline easement

Major road

Minor road

Vehicle track

Railway

Non-perennial watercourse

Property boundary

Suburb boundary

Proposed workspace laydown area

SOURCE  
Alignments, easement, and laydown areas from Jemena.  
Roads, rail, hydrology, and property and suburb boundaries from NSWSS.  
Acid sulfate soils classification from DPIE.  
Aerial imagery from Nearmap (captured 19-11-2019).

ACID SULFATE SOILS CLASSIFICATION

Class 2 - Acid sulfate soils Likely to be found below the natural ground surface.

Class 3 - Acid sulfate soils likely to be found beyond 1 metre below the natural ground surface.

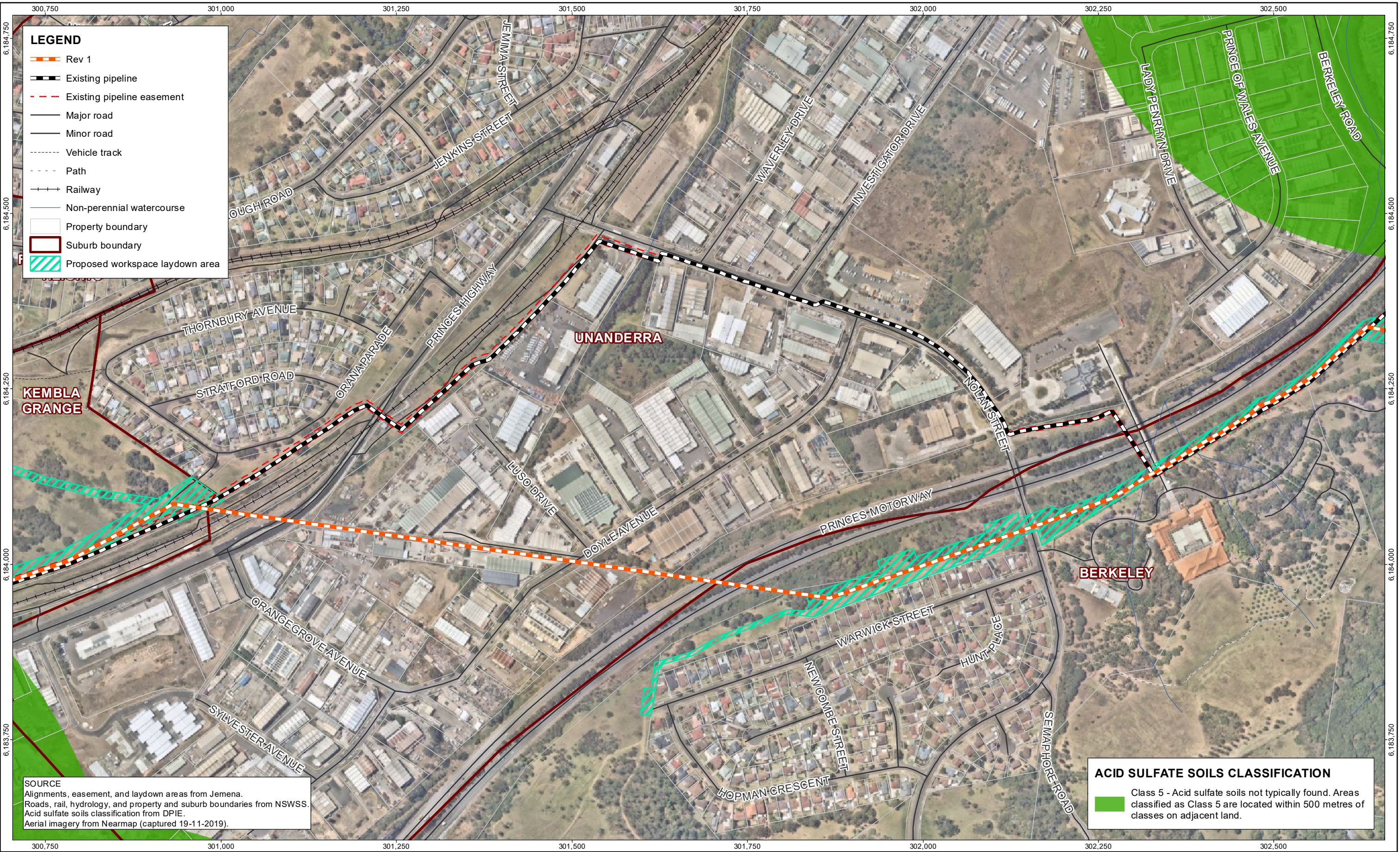
Class 4 - Acid sulfate soils likely to be found beyond 2 metres below the natural ground surface.

Class 5 - Acid sulfate soils not typically found. Areas classified as Class 5 are located within 500 metres of classes on adjacent land.


299,750		299,000		299,250		299,500		299,750		300,000		300,250		300,500				
revision	no.	description			drawn	approved	date	<div><div><div></div><div>N</div></div><div><div>050100150200</div><div>SCALE1:5,000 (A3)METRES</div></div><div>Projection: GDA 1994 MGA Zone 56</div></div>			drawn	GH	<div><div>coffey</div><div>A TETRA TECH COMPANY</div></div>			client: JEMENA		
	A	ORIGINAL ISSUE			GH	AP	13.03.20	approved	AP	project: PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT								
								date	13.03.2020	title: ACID SULFATE SOILS CLASSIFICATION								
								scale	AS SHOWN	project no: MELEN269488-R01								
								original size	A3	figure no: FIGURE 6A		rev: A						

MXD ref: MELEN269488\_R01\_GS006A-C v0.3





revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	GH	AP	13.03.20

  
0 50 100 150 200  
SCALE 1:5,000 (A3) METRES  
Projection: GDA 1994 MGA Zone 56

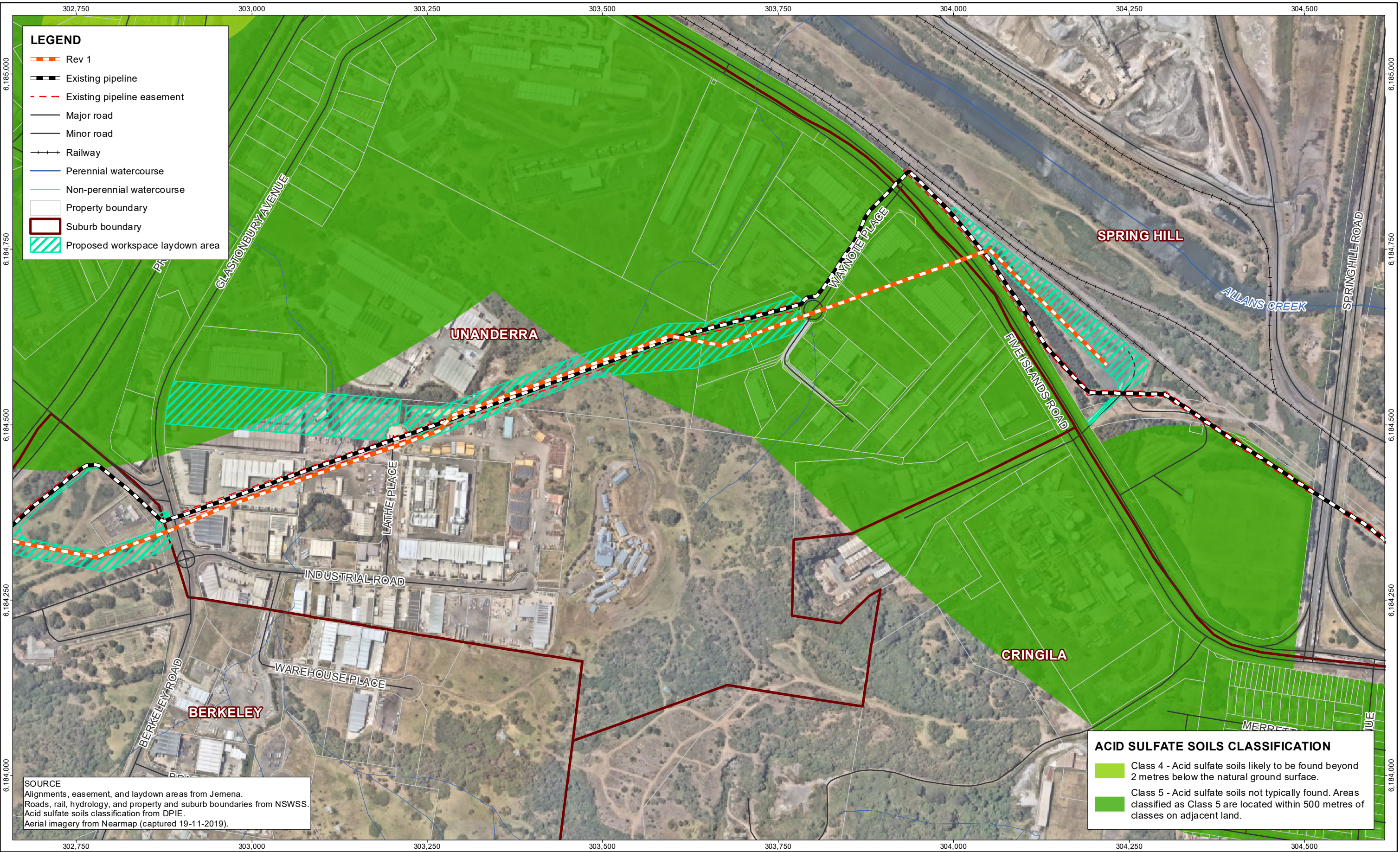
drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3

  
A TETRA TECH COMPANY

client:	JEMENA		
project:	PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
title:	ACID SULFATE SOILS CLASSIFICATION		
project no:	MELEN269488-R01	figure no:	FIGURE 6B
rev:	A		

MXD ref: MELEN269488\_R01\_GS006A-C\_v0\_3





revision	no.	description			drawn	approved	date
	A	ORIGINAL ISSUE			GH	AP	13.03.20

N

050100150200

SCALE1:5,000 (A3)METRES

Projection: GDA 1994 MGA Zone 56

drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3

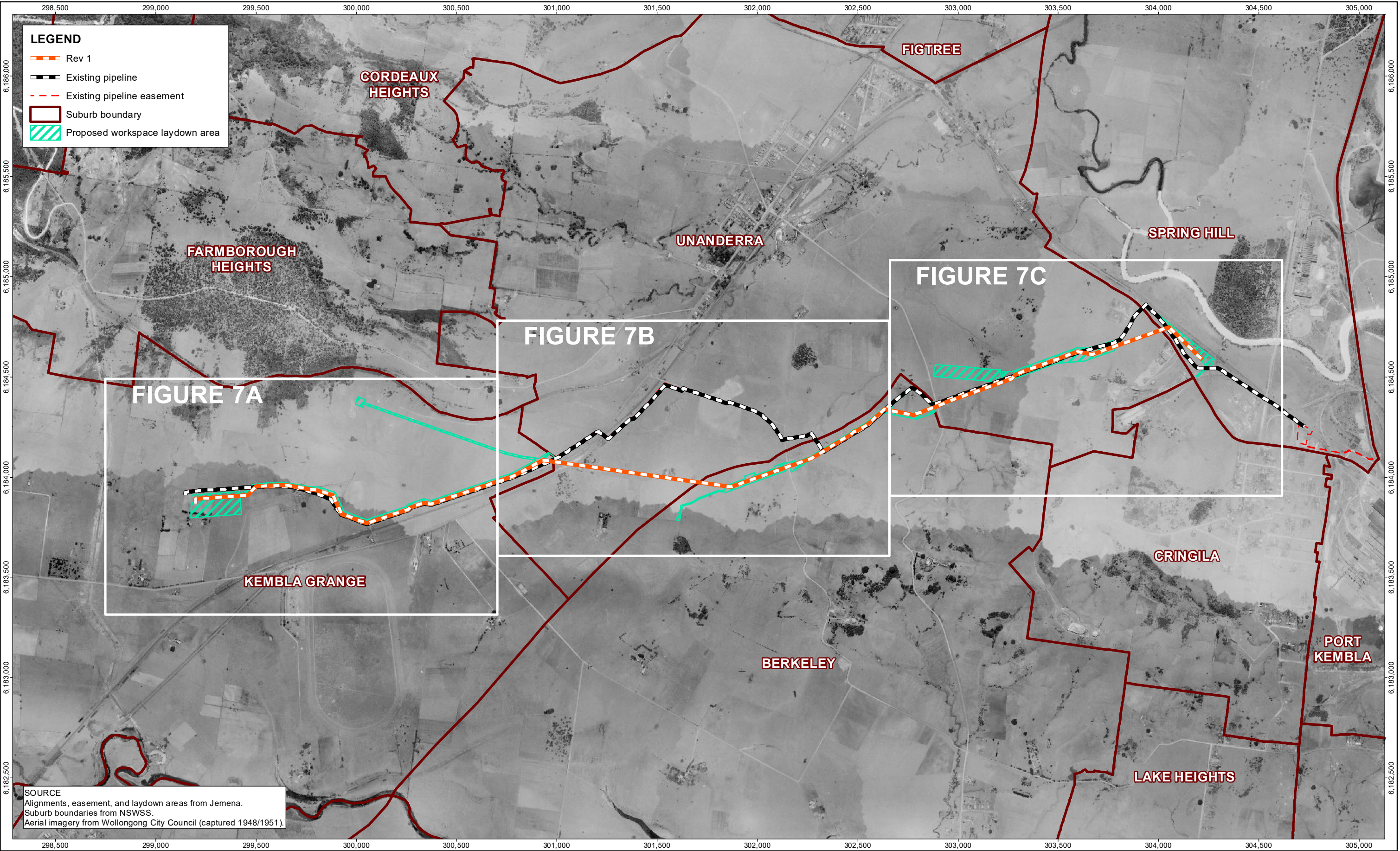
coffey

A TETRA TECH COMPANY

client:	JEMENA		
project:	PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
title:	ACID SULFATE SOILS CLASSIFICATION		
project no:	MELEN269488-R01	figure no:	FIGURE 6C
		rev:	A

MXD ref: MELEN269488\_R01\_GS006A-C\_v0\_3





revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	GH	AP	13.03.20

0175350525700

SCALE1:17,500 (A3)METRES

Projection: GDA 1994 MGA Zone 56

drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3

coffey



A TETRA TECH COMPANY

client: JEMENA		
project: PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
title: AERIAL PHOTOGRAPH (1948/1951)		
project no: MELEN269488-R01	figure no: FIGURE 7	rev: A

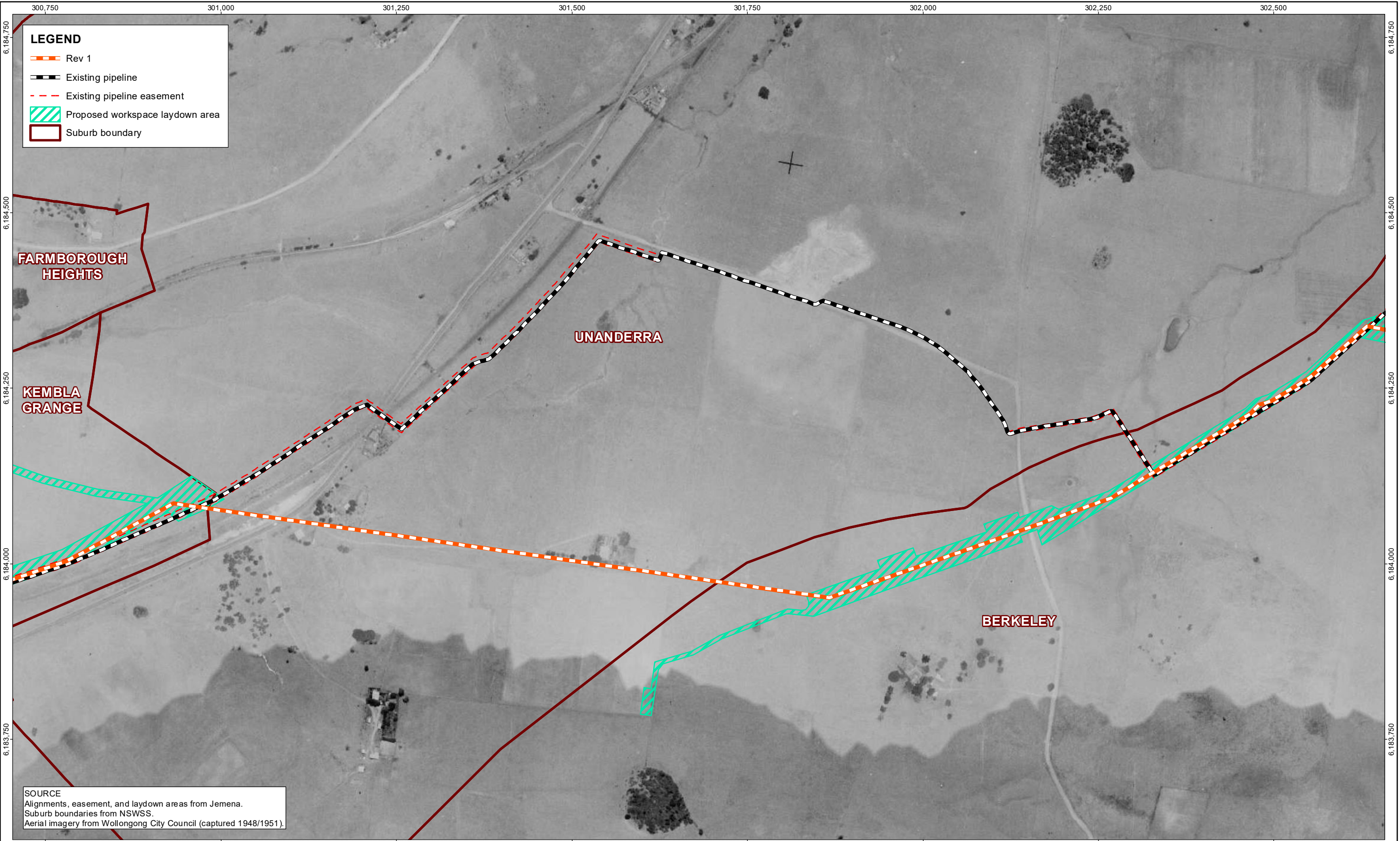
MXD ref: MELEN269488\_R01\_GS007\_v0\_3






revision	no.	description			drawn	approved	date	<div> <div><div>0</div><div>50</div><div>100</div><div>150</div><div>200</div></div><div>SCALE1:5,000 (A3)METRES</div><div>Projection: GDA 1994 MGA Zone 56</div></div>	drawn	GH		client: JEMENA		
	A	ORIGINAL ISSUE			GH	AP	13.03.20		approved	AP		project: PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
									date	13.03.2020		title: AERIAL PHOTOGRAPH (1948/1951)		
									scale	AS SHOWN		project no: MELEN269488-R01	figure no: FIGURE 7A	rev: A
									original size	A3				






revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	GH	AP	13.03.20



050100150200

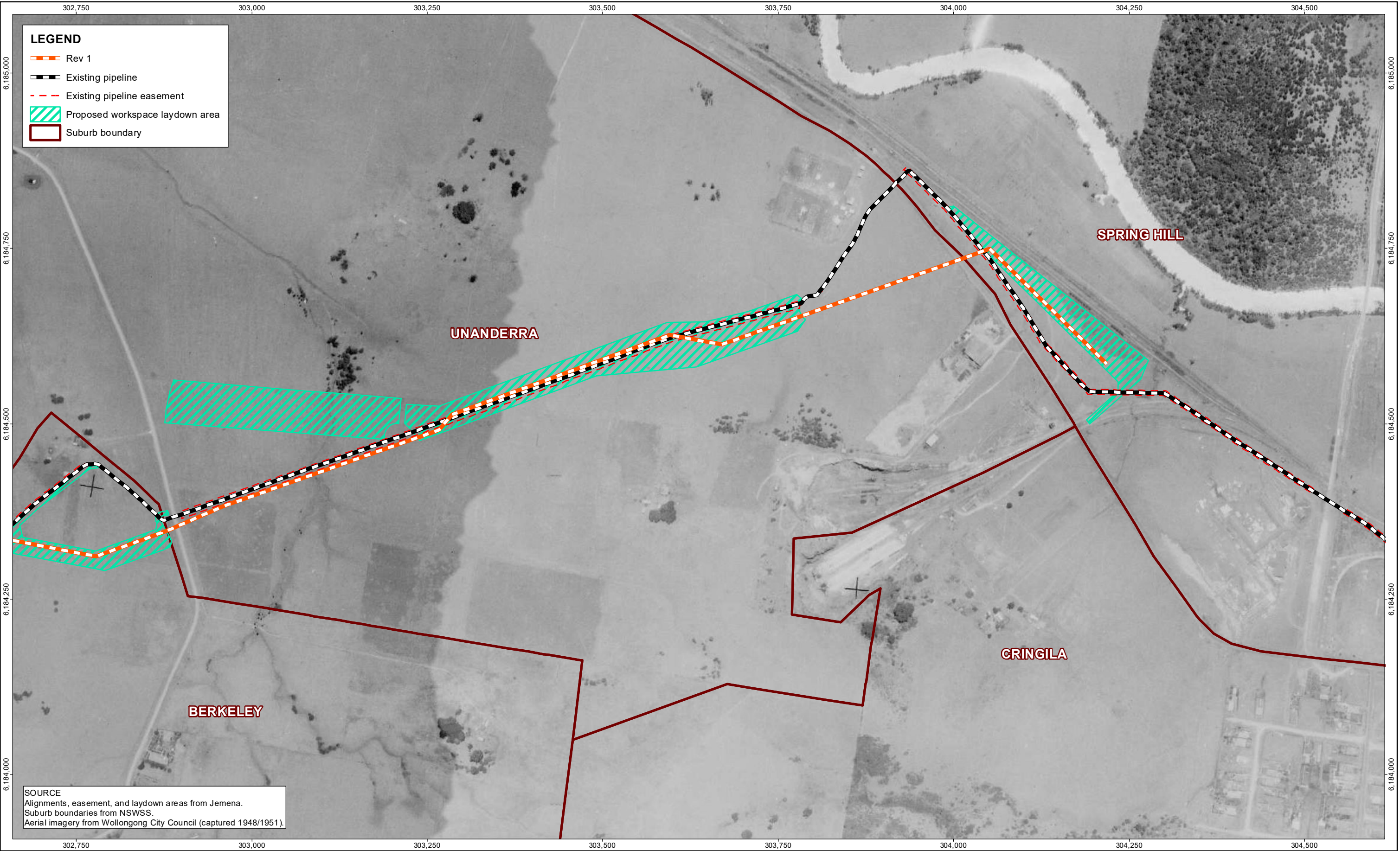
SCALE1:5,000 (A3)METRES

Projection: GDA 1994 MGA Zone 56

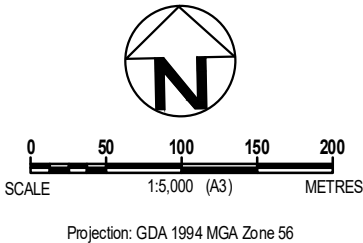
drawn	GH		client: JEMENA		
approved	AP		project: PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
date	13.03.2020		title: AERIAL PHOTOGRAPH (1948/1951)		
scale	AS SHOWN		project no: MELEN269488-R01	figure no: FIGURE 7B	rev: A
original size	A3				

MXD ref: MELEN269488\_R01\_GS007A-C\_v0\_3





revision	no.	description			drawn	approved	date
	A	ORIGINAL ISSUE			GH	AP	13.03.20

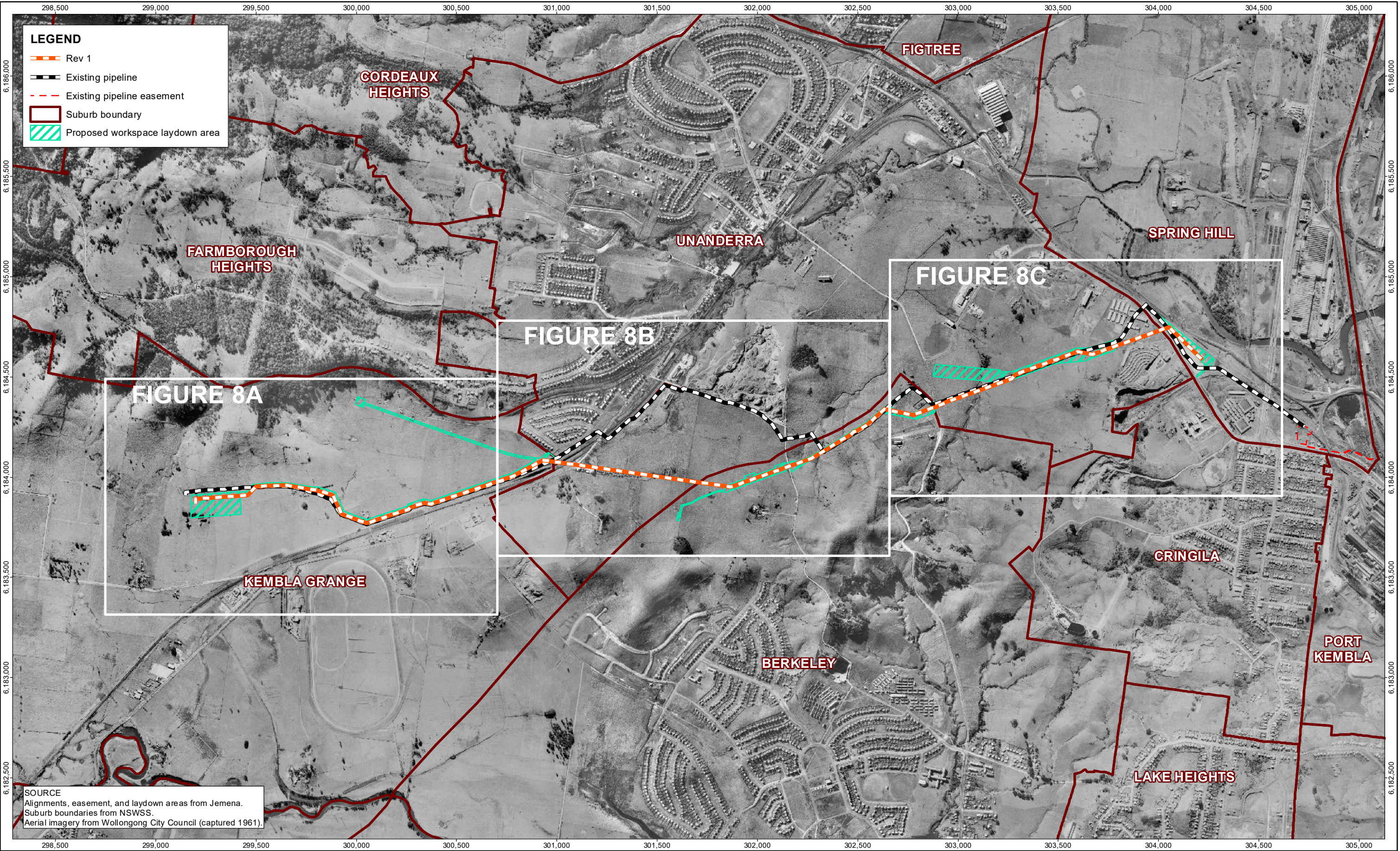


drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3



client:		JEMENA	
project:		PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT	
title:		AERIAL PHOTOGRAPH (1948/1951)	
project no:	MELEN269488-R01	figure no:	FIGURE 7C
		rev:	A





LEGEND

Rev 1

Existing pipeline

Existing pipeline easement

Suburb boundary

Proposed workspace laydown area

SOURCE  
Alignments, easement, and laydown areas from Jemena.  
Suburb boundaries from NSWSS.  
Aerial imagery from Wollongong City Council (captured 1961).

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	GH	AP	13.03.20

0175350525700

SCALE1:17,500 (A3)METRES

Projection: GDA 1994 MGA Zone 56

drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3

coffey

A TETRA TECH COMPANY

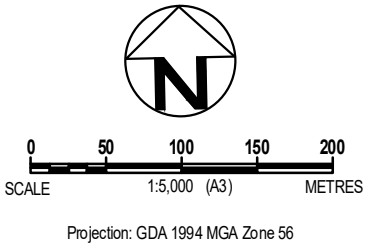
client:	JEMENA		
project:	PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
title:	AERIAL PHOTOGRAPH (1961)		
project no:	MELEN269488-R01	figure no:	FIGURE 8
		rev:	A





SOURCE  
Alignments, easement, and laydown areas from Jemena.  
Suburb boundaries from NSWSS.  
Aerial imagery from Wollongong City Council (captured 1961).

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	GH	AP	13.03.20



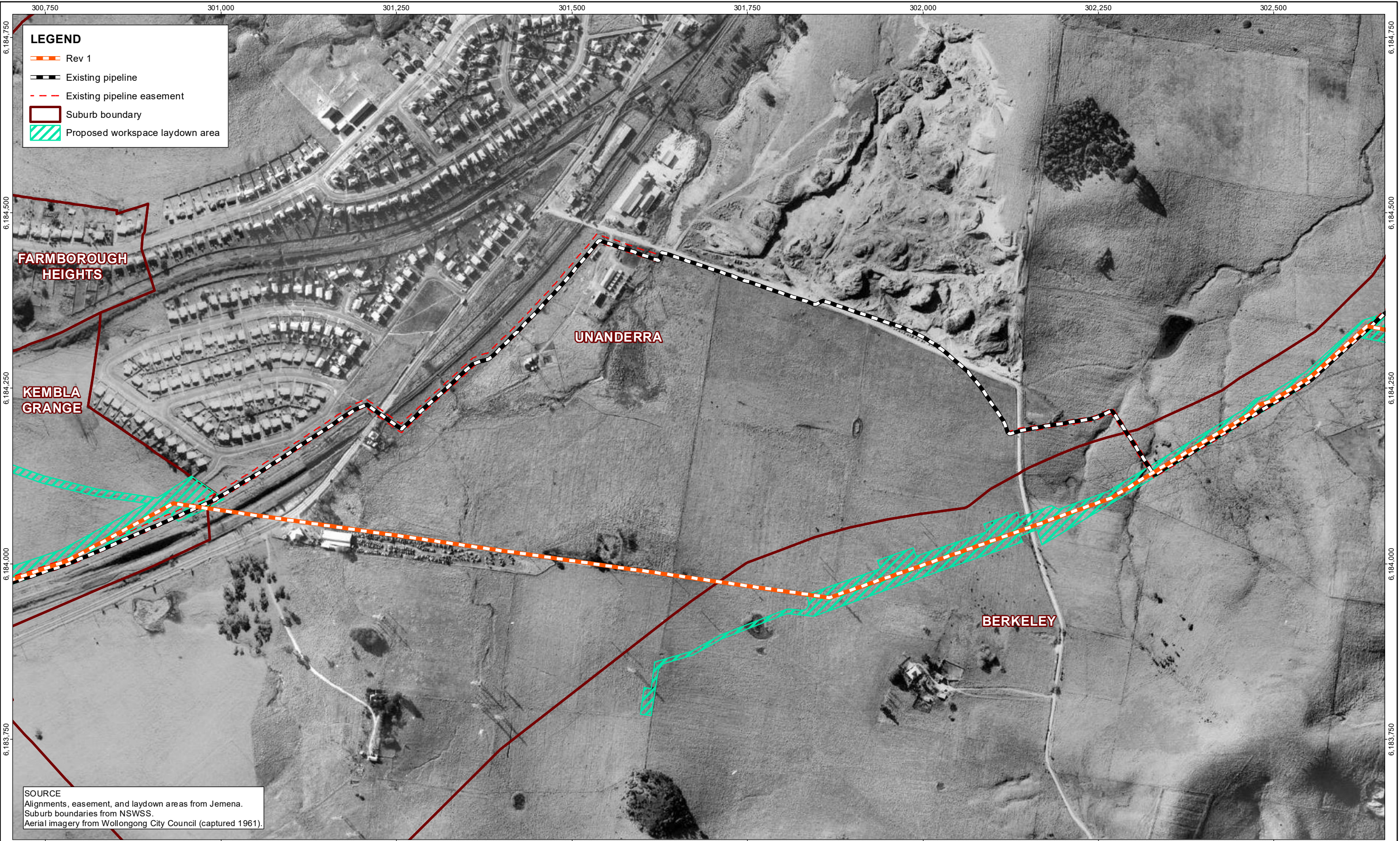
drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3



client:	JEMENA		
project:	PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
title:	AERIAL PHOTOGRAPH (1961)		
project no:	MELEN269488-R01	figure no:	FIGURE 8A
		rev:	A

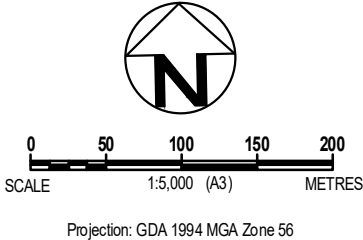
MXD ref: MELEN269488\_R01\_GS008A-C v0.3





SOURCE  
Alignments, easement, and laydown areas from Jemena.  
Suburb boundaries from NSWSS.  
Aerial imagery from Wollongong City Council (captured 1961).

revision	no.	description			drawn	approved	date
	A	ORIGINAL ISSUE			GH	AP	13.03.20



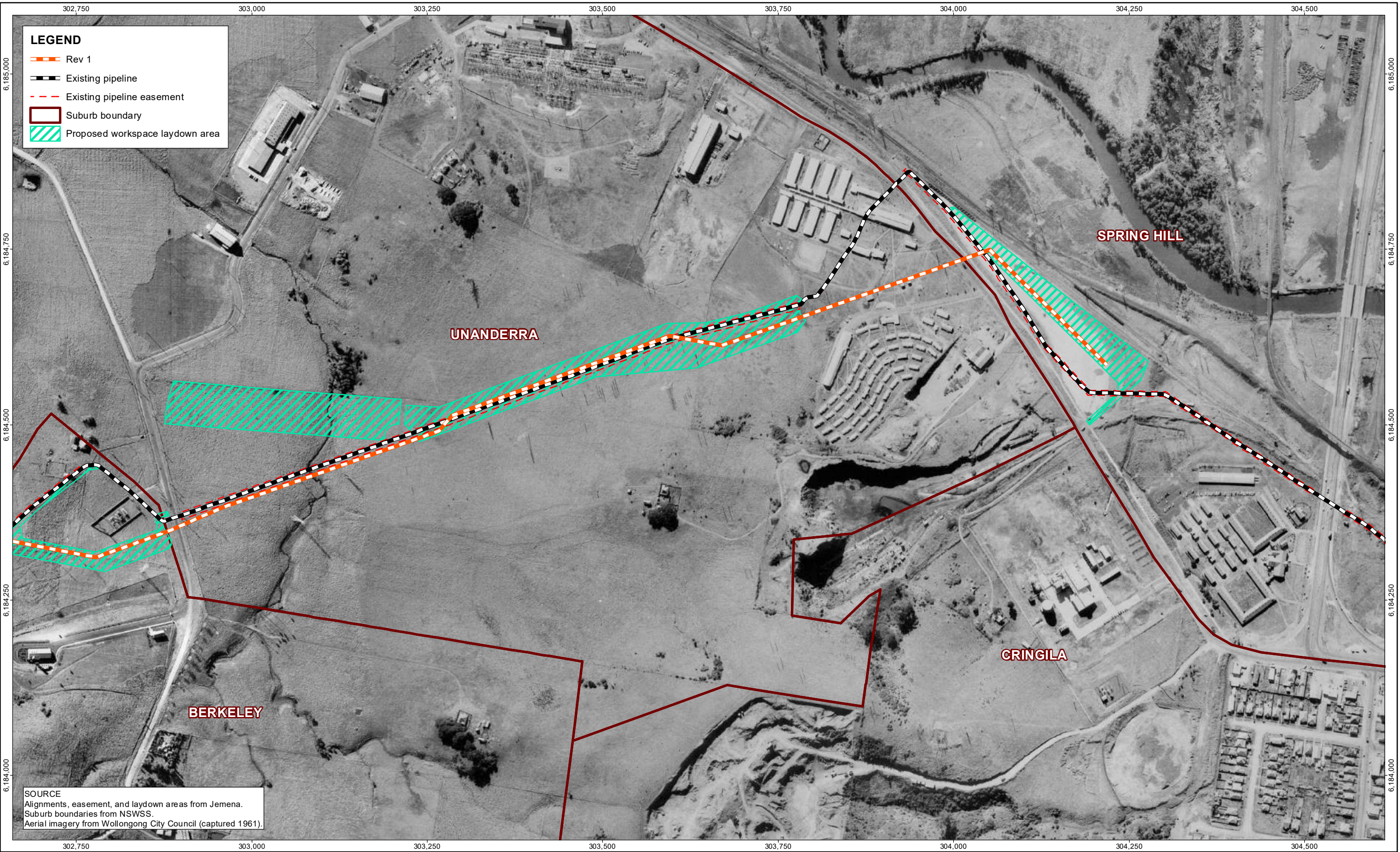
drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3



A TETRA TECH COMPANY

client:		JEMENA	
project:		PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT	
title:		AERIAL PHOTOGRAPH (1961)	
project no:	MELEN269488-R01	figure no:	FIGURE 8B
		rev:	A





revision	no.	description			drawn	approved	date
	A	ORIGINAL ISSUE			GH	AP	13.03.20

050100150200

SCALE1:5,000 (A3)METRES

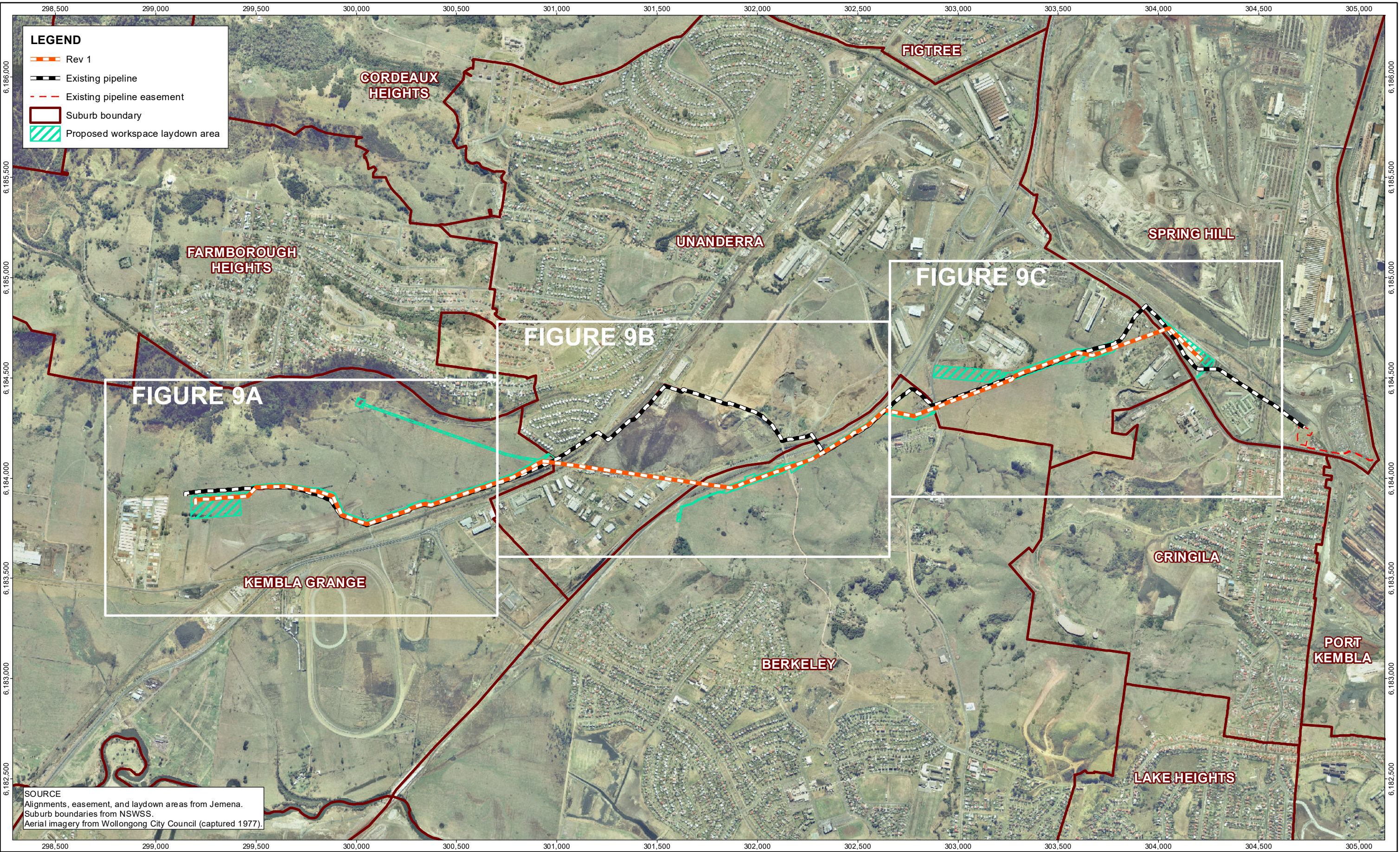
Projection: GDA 1994 MGA Zone 56

drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3

A TETRA TECH COMPANY

client: JEMENA	
project: PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT	
title: AERIAL PHOTOGRAPH (1961)	
project no: MELEN269488-R01	figure no: FIGURE 8C
rev: A	





LEGEND

Rev 1

Existing pipeline

Existing pipeline easement

Suburb boundary

Proposed workspace laydown area

SOURCE  
Alignments, easement, and laydown areas from Jemena.  
Suburb boundaries from NSWSS.  
Aerial imagery from Wollongong City Council (captured 1977).

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	GH	AP	13.03.20

0175350525700

SCALE1:17,500 (A3)METRES

Projection: GDA 1994 MGA Zone 56

drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3

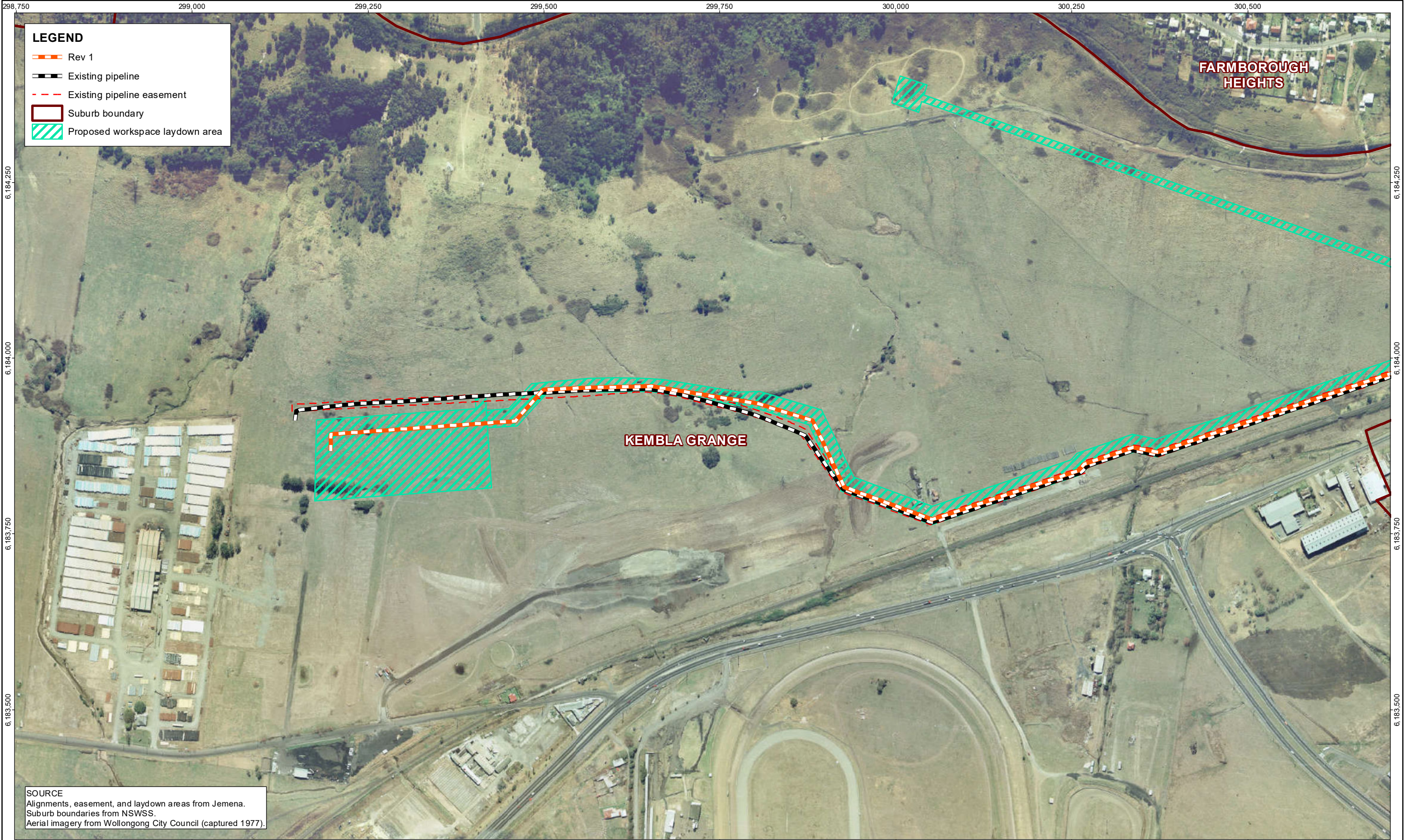
coffey

A TETRA TECH COMPANY

client:	JEMENA		
project:	PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
title:	AERIAL PHOTOGRAPH (1977)		
project no:	MELEN269488-R01	figure no:	FIGURE 9
		rev:	A

MXD ref: MELEN269488\_R01\_GS009\_v0\_3

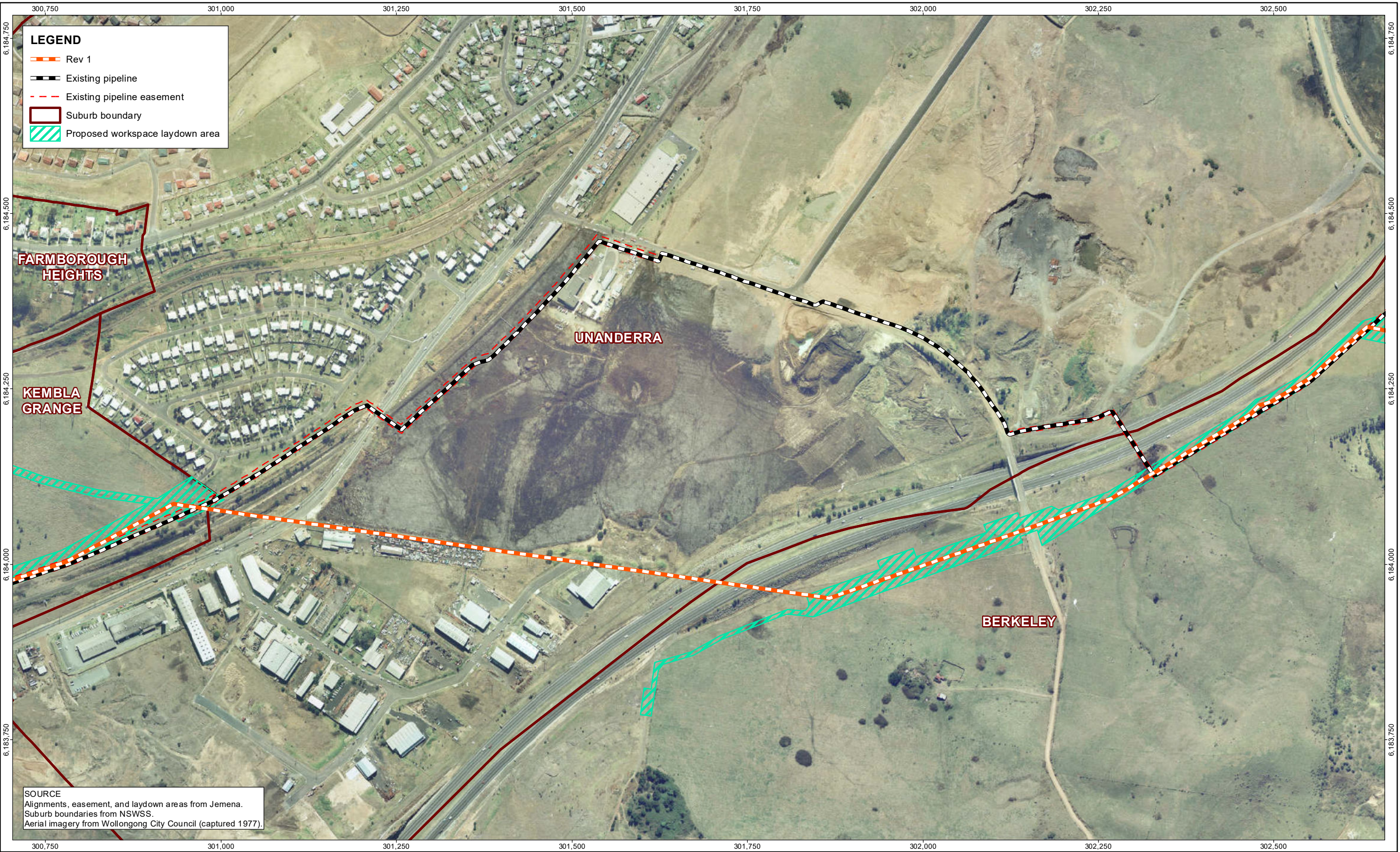




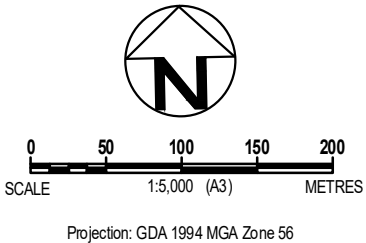
298,750		299,000		299,250		299,500		299,750		300,000		300,250		300,500		
revision	no.	description	drawn	approved	date	<div><div><div></div><div>N</div></div><div><div>050100150200</div><div>SCALE1:5,000 (A3)METRES</div></div><div>Projection: GDA 1994 MGA Zone 56</div></div>				drawn	GH	<div><div>coffey</div><div>A TETRA TECH COMPANY</div></div>		client: JEMENA		
	A	ORIGINAL ISSUE	GH	AP	13.03.20					approved	AP			project: PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
										date	13.03.2020			title: AERIAL PHOTOGRAPH (1977)		
										scale	AS SHOWN			project no: MELEN269488-R01figure no: FIGURE 9Arev: A		
										original size	A3					

MXD ref: MELEN269488\_R01\_GS009A-C v0.3





revision	no.	description			drawn	approved	date
	A	ORIGINAL ISSUE			GH	AP	13.03.20



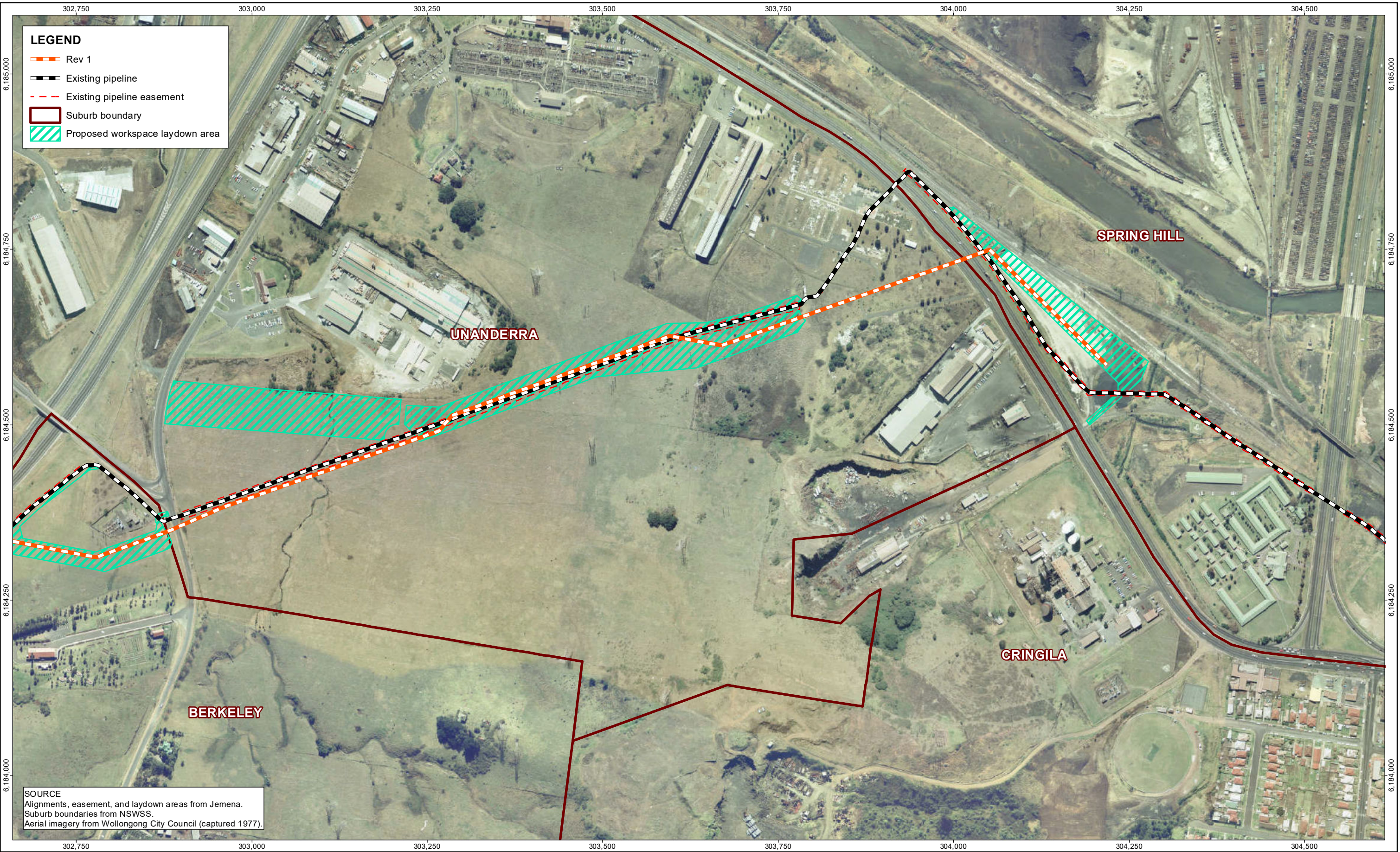
drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3



A TETRA TECH COMPANY

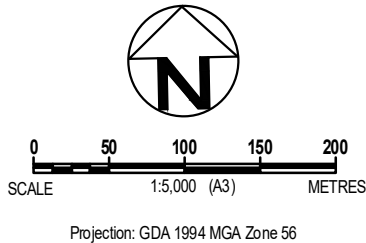
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project:		PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT	
title:		AERIAL PHOTOGRAPH (1977)	
project no:	MELEN269488-R01	figure no:	FIGURE 9B
		rev:	A





SOURCE  
Alignments, easement, and laydown areas from Jemena.  
Suburb boundaries from NSWSS.  
Aerial imagery from Wollongong City Council (captured 1977).

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	GH	AP	13.03.20

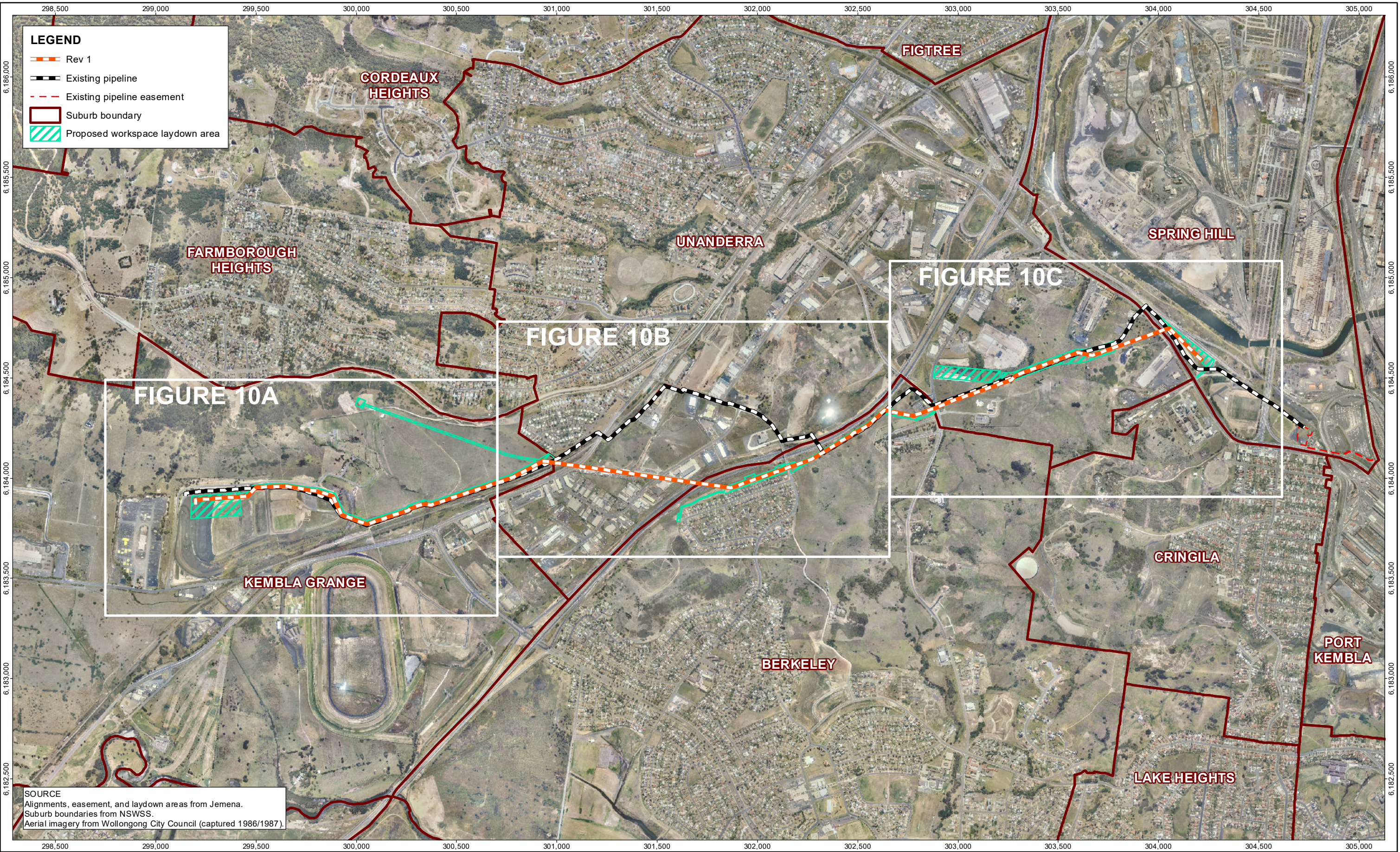


drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3



client:	JEMENA		
project:	PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
title:	AERIAL PHOTOGRAPH (1977)		
project no:	MELEN269488-R01	figure no:	FIGURE 9C
		rev:	A





LEGEND

Rev 1

Existing pipeline

Existing pipeline easement

Suburb boundary

Proposed workspace laydown area

SOURCE  
Alignments, easement, and laydown areas from Jemena.  
Suburb boundaries from NSWSS.  
Aerial imagery from Wollongong City Council (captured 1986/1987).

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	GH	AP	13.03.20

0175350525700

SCALE1:17,500 (A3)METRES

Projection: GDA 1994 MGA Zone 56

drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3

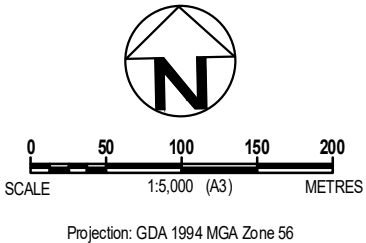
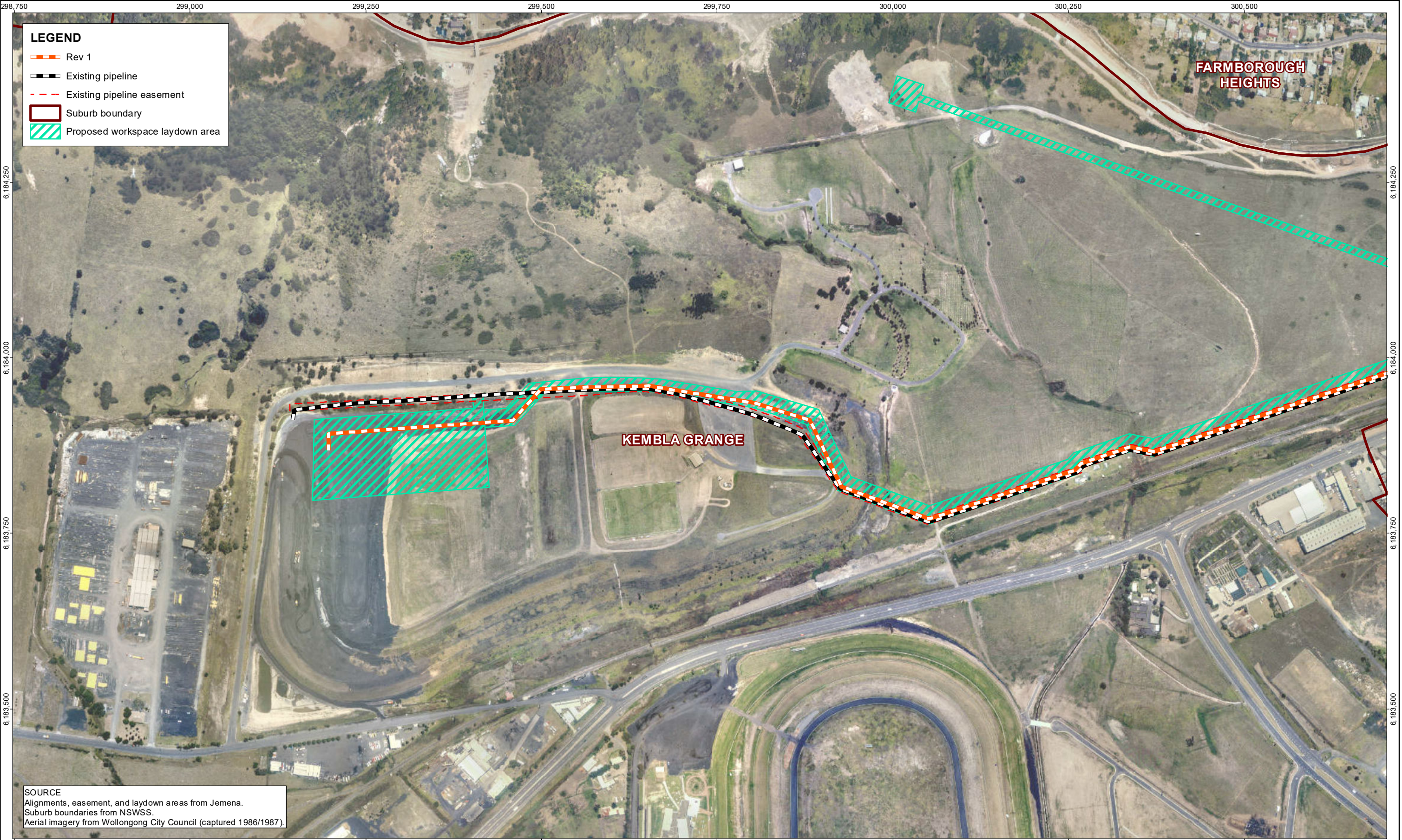
coffey

A TETRA TECH COMPANY

client:	JEMENA		
project:	PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
title:	AERIAL PHOTOGRAPH (1986/1987)		
project no:	MELEN269488-R01	figure no:	FIGURE 10
		rev:	A

MXD ref: MELEN269488\_R01\_GS010\_v0\_3





drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3



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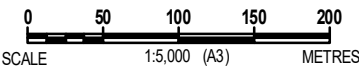
client:	JEMENA		
project:	PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
title:	AERIAL PHOTOGRAPH (1986/1987)		
project no:	MELEN269488-R01	figure no:	FIGURE 10A
		rev:	A

MXD ref: MELEN269488\_R01\_GS010A-C v0.3





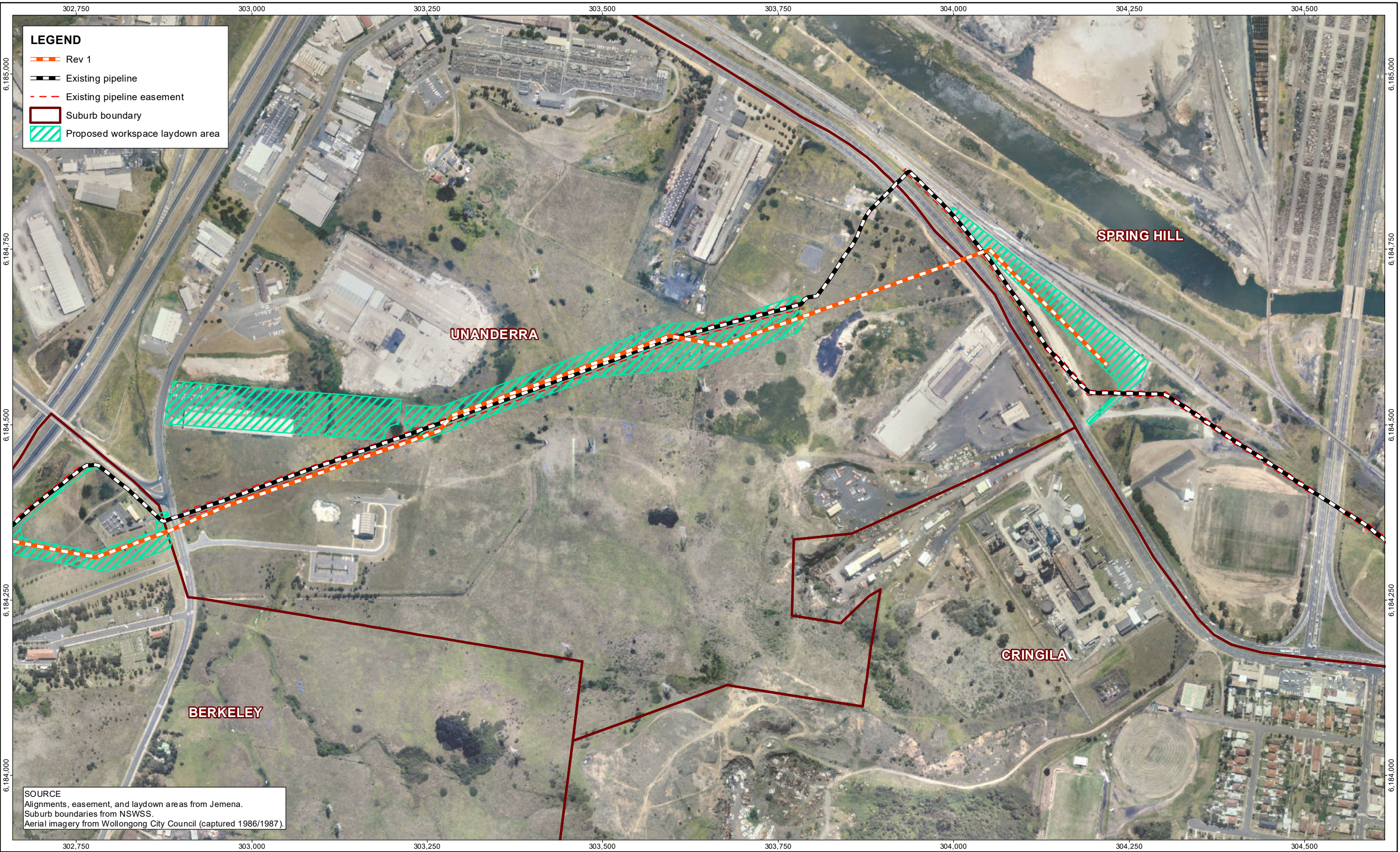
revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	GH	AP	13.03.20

  
  
SCALE 1:5,000 (A3) METRES  
Projection: GDA 1994 MGA Zone 56

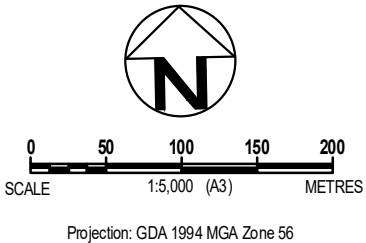
drawn	GH	client: JEMENA		
approved	AP	project: PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
date	13.03.2020	title: AERIAL PHOTOGRAPH (1986/1987)		
scale	AS SHOWN	project no: MELEN269488-R01	figure no: FIGURE 10B	rev: A
original size	A3			







revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	GH	AP	13.03.20

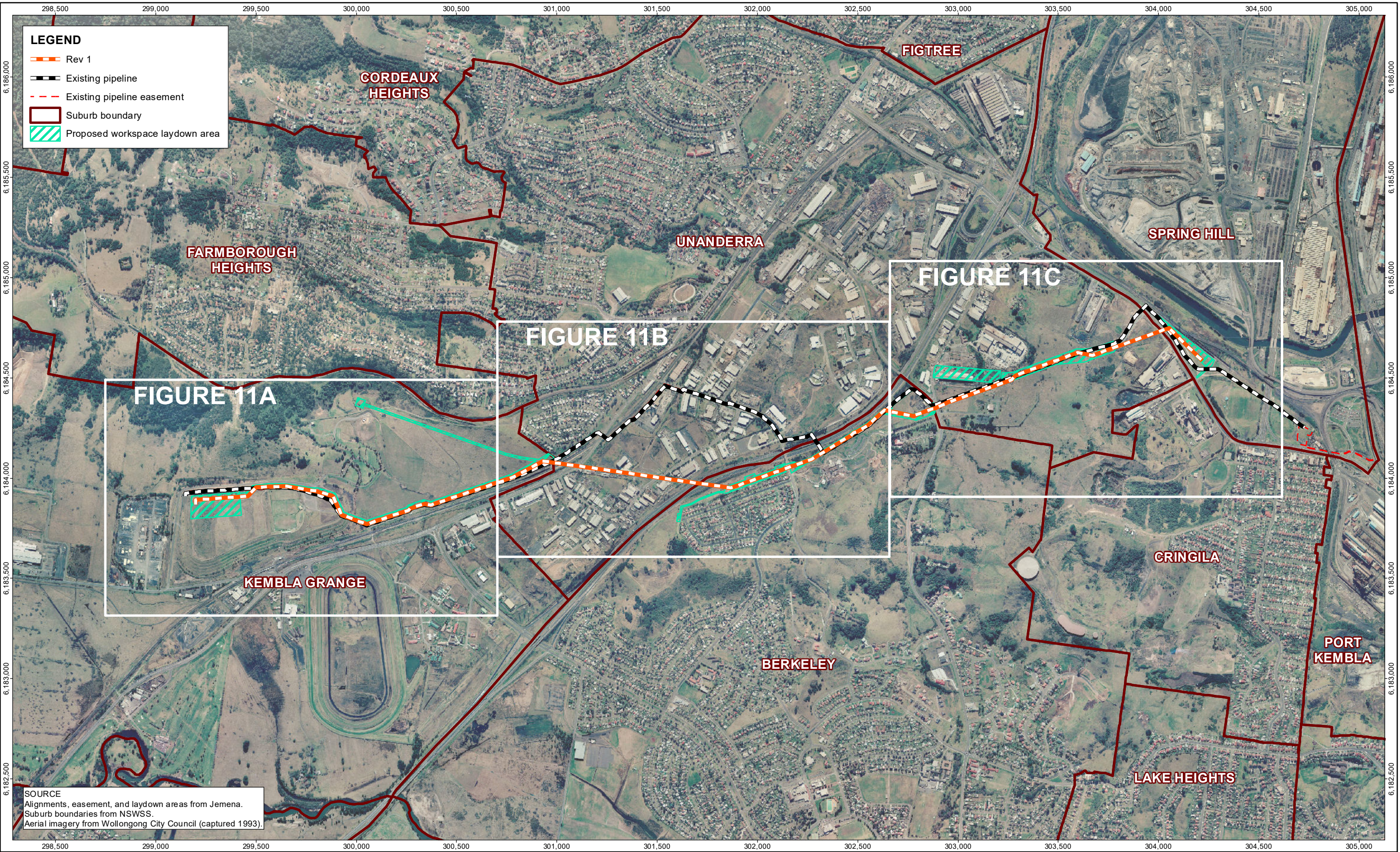


drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3


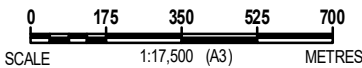


client:	JEMENA		
project:	PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
title:	AERIAL PHOTOGRAPH (1986/1987)		
project no:	MELEN269488-R01	figure no:	FIGURE 10C
		rev:	A





revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	GH	AP	13.03.20

  
  
SCALE 1:17,500 (A3) METRES  
Projection: GDA 1994 MGA Zone 56

drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3

  
A TETRA TECH COMPANY

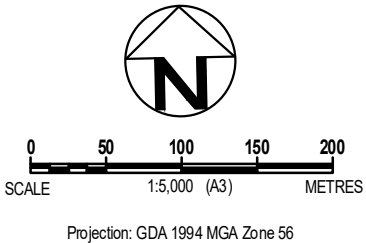
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project:	PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
title:	AERIAL PHOTOGRAPH (1993)		
project no:	MELEN269488-R01	figure no:	FIGURE 11
		rev:	A

MXD ref: MELEN269488\_R01\_GS011\_v0.3





revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	GH	AP	13.03.20



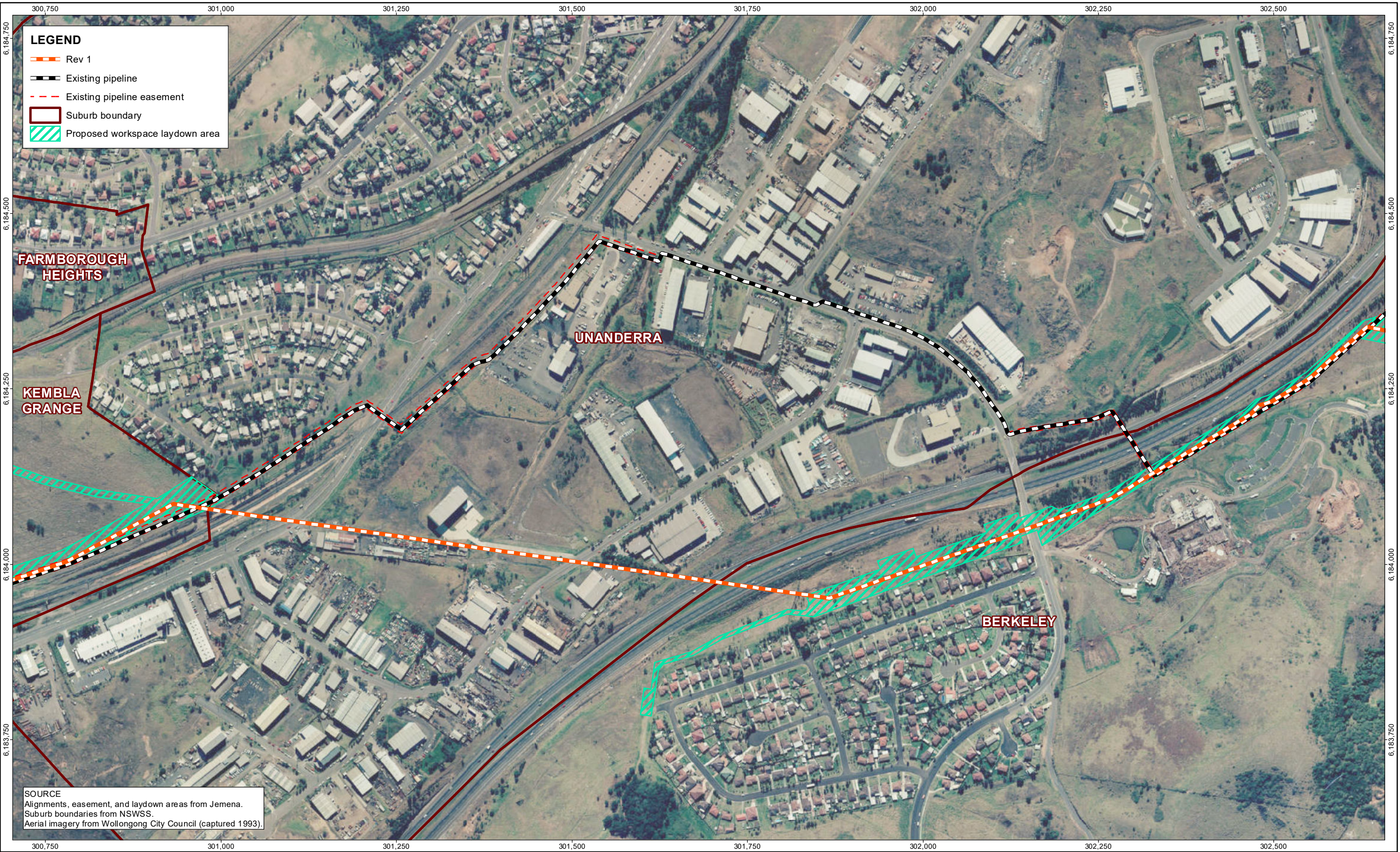
drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3



client:	JEMENA		
project:	PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
title:	AERIAL PHOTOGRAPH (1993)		
project no:	MELEN269488-R01	figure no:	FIGURE 11A
		rev:	A

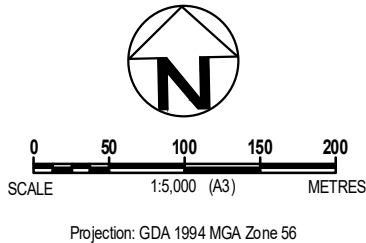
MXD ref: MELEN269488\_R01\_GS011A-C v0.3





SOURCE  
Alignments, easement, and laydown areas from Jemena.  
Suburb boundaries from NSWSS.  
Aerial imagery from Wollongong City Council (captured 1993).

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	GH	AP	13.03.20



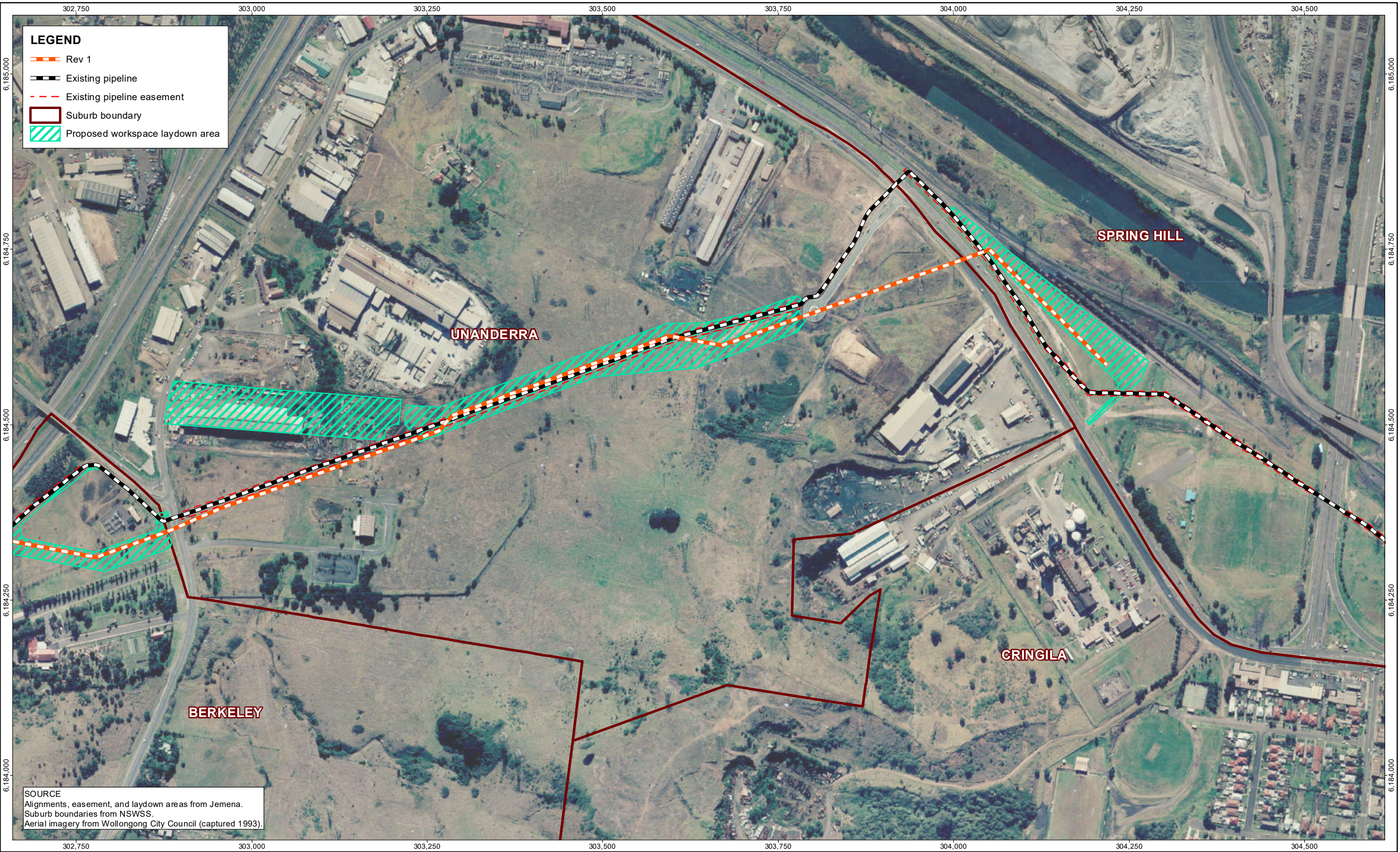
drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3




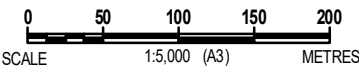
A TETRA TECH COMPANY

client:	JEMENA		
project:	PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
title:	AERIAL PHOTOGRAPH (1993)		
project no:	MELEN269488-R01	figure no:	FIGURE 11B
		rev:	A





revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	GH	AP	13.03.20

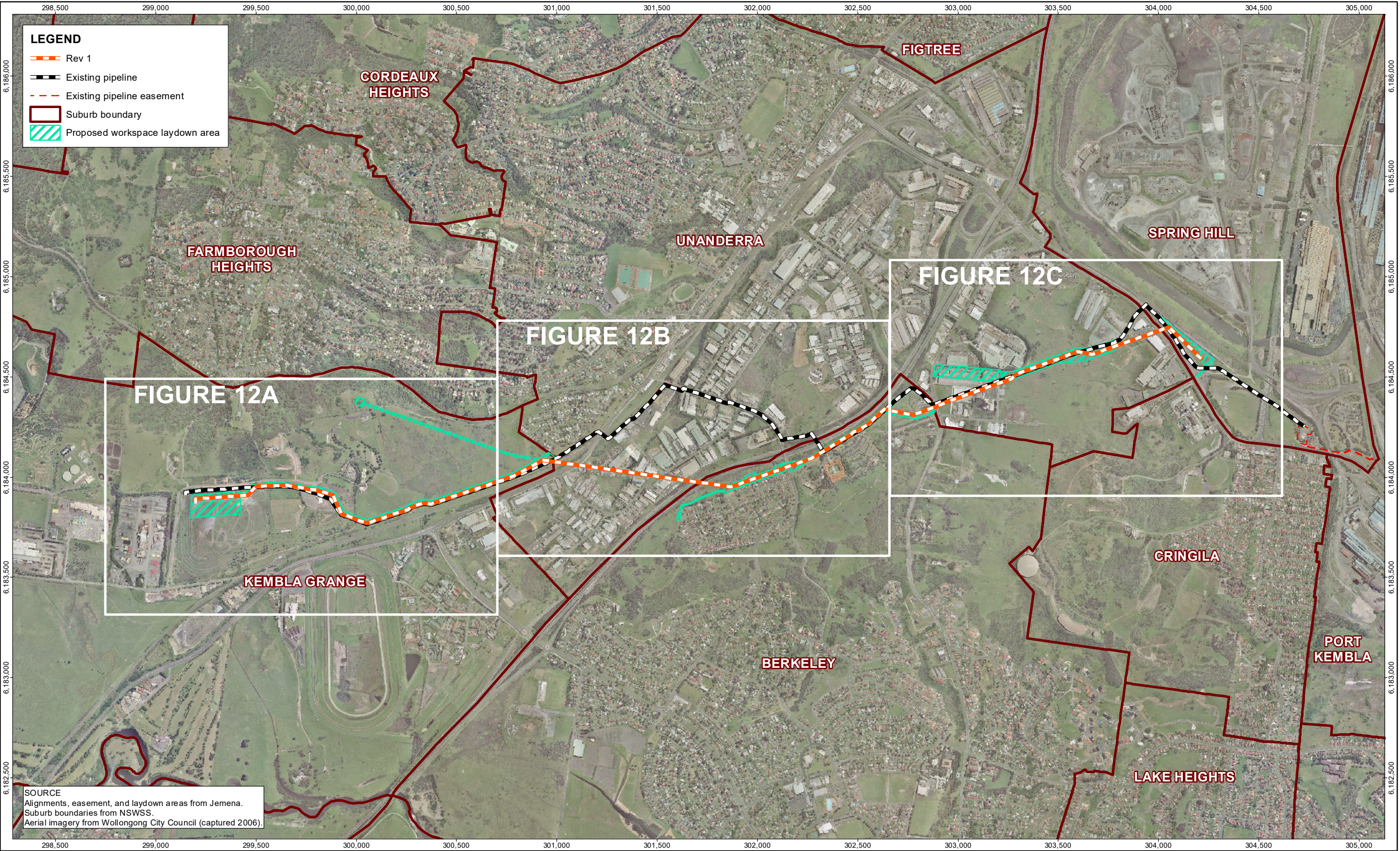
  
  
SCALE 1:5,000 (A3) METRES  
Projection: GDA 1994 MGA Zone 56

drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3

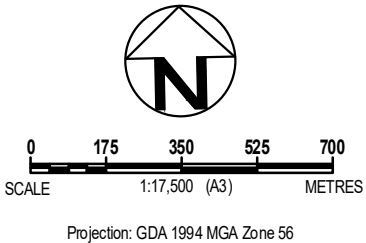
  
A TETRA TECH COMPANY

client:	JEMENA		
project:	PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
title:	AERIAL PHOTOGRAPH (1993)		
project no:	MELEN269488-R01	figure no:	FIGURE 11C
		rev:	A





revision	no.	description		drawn	approved	date
	A	ORIGINAL ISSUE		GH	AP	13.03.20

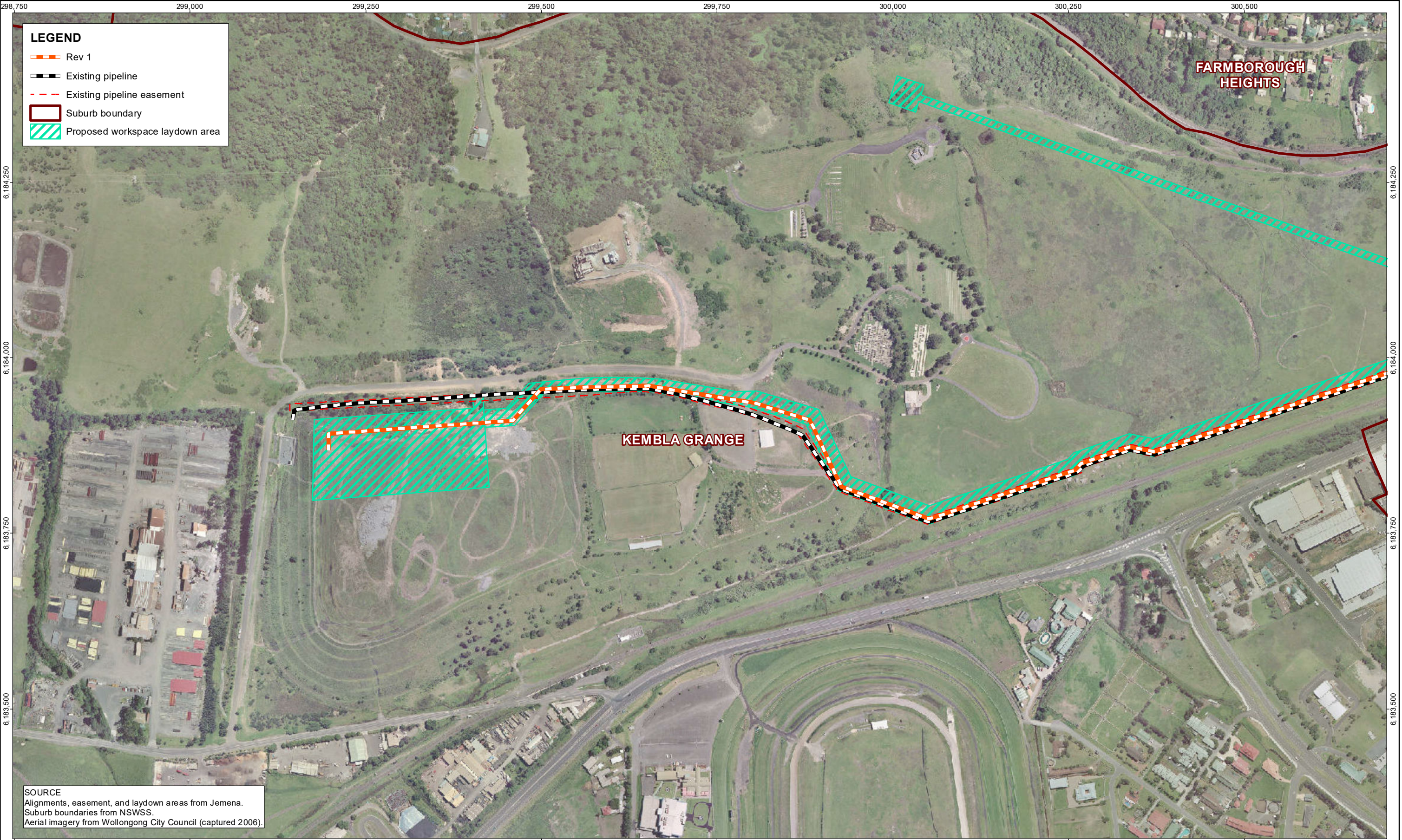


drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3



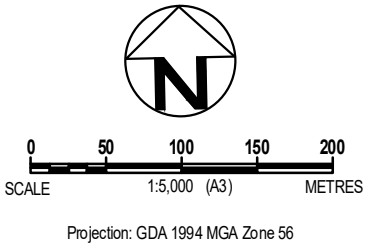
client: JEMENA		
project: PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
title: AERIAL PHOTOGRAPH (2006)		
project no: MELEN269488-R01	figure no: FIGURE 12	rev: A





MXD ref: MELEN269488\_R01\_GS012A-C v0.3

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	GH	AP	13.03.20

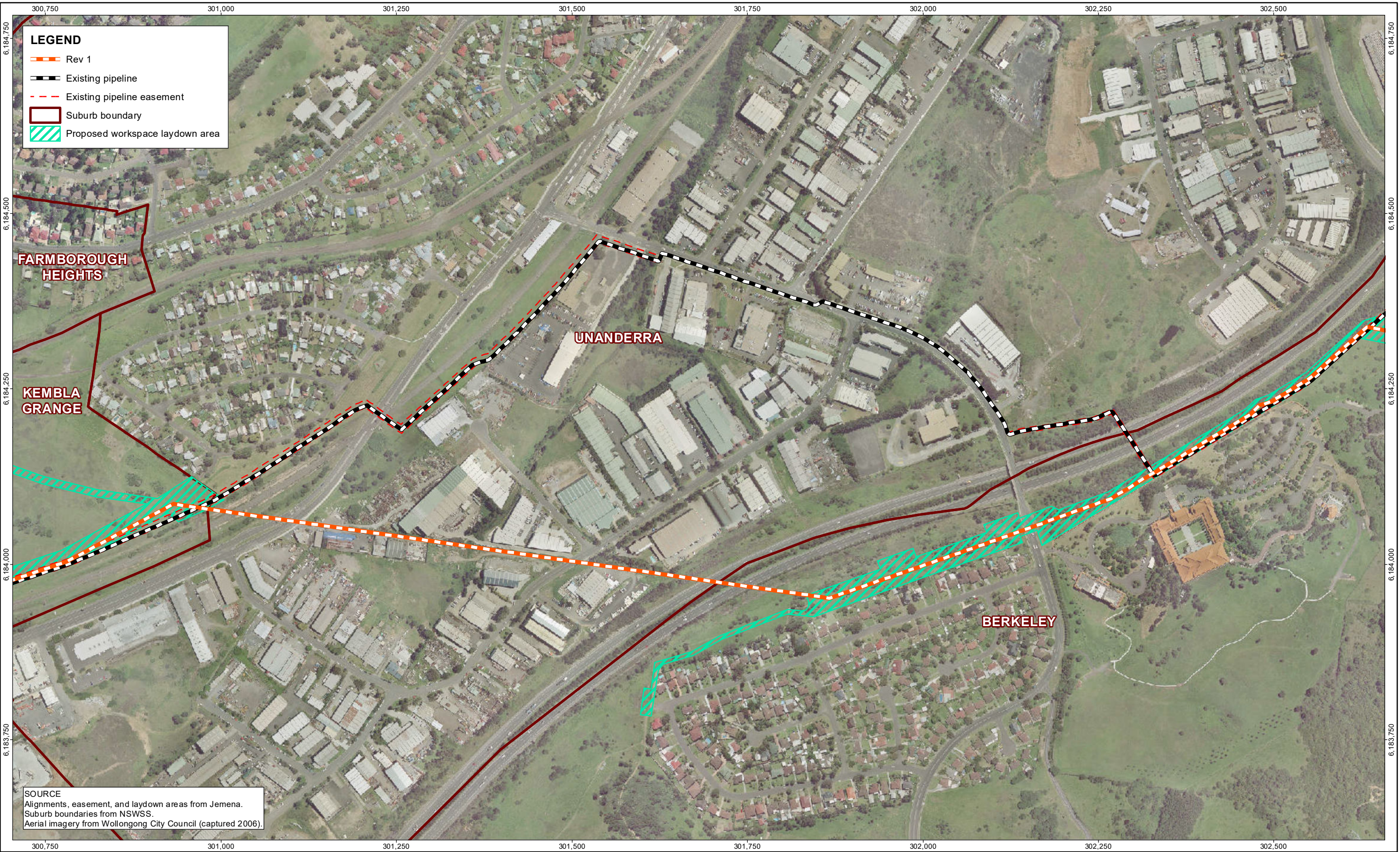


drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3



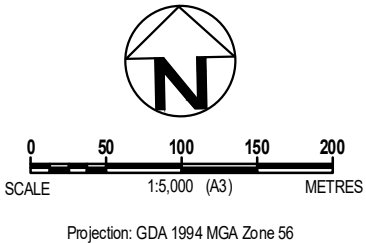
client: JEMENA		
project: PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
title: AERIAL PHOTOGRAPH (2006)		
project no: MELEN269488-R01	figure no: FIGURE 12A	rev: A





SOURCE  
Alignments, easement, and laydown areas from Jemena.  
Suburb boundaries from NSWSS.  
Aerial imagery from Wollongong City Council (captured 2006).

revision	no.	description			drawn	approved	date
	A	ORIGINAL ISSUE			GH	AP	13.03.20

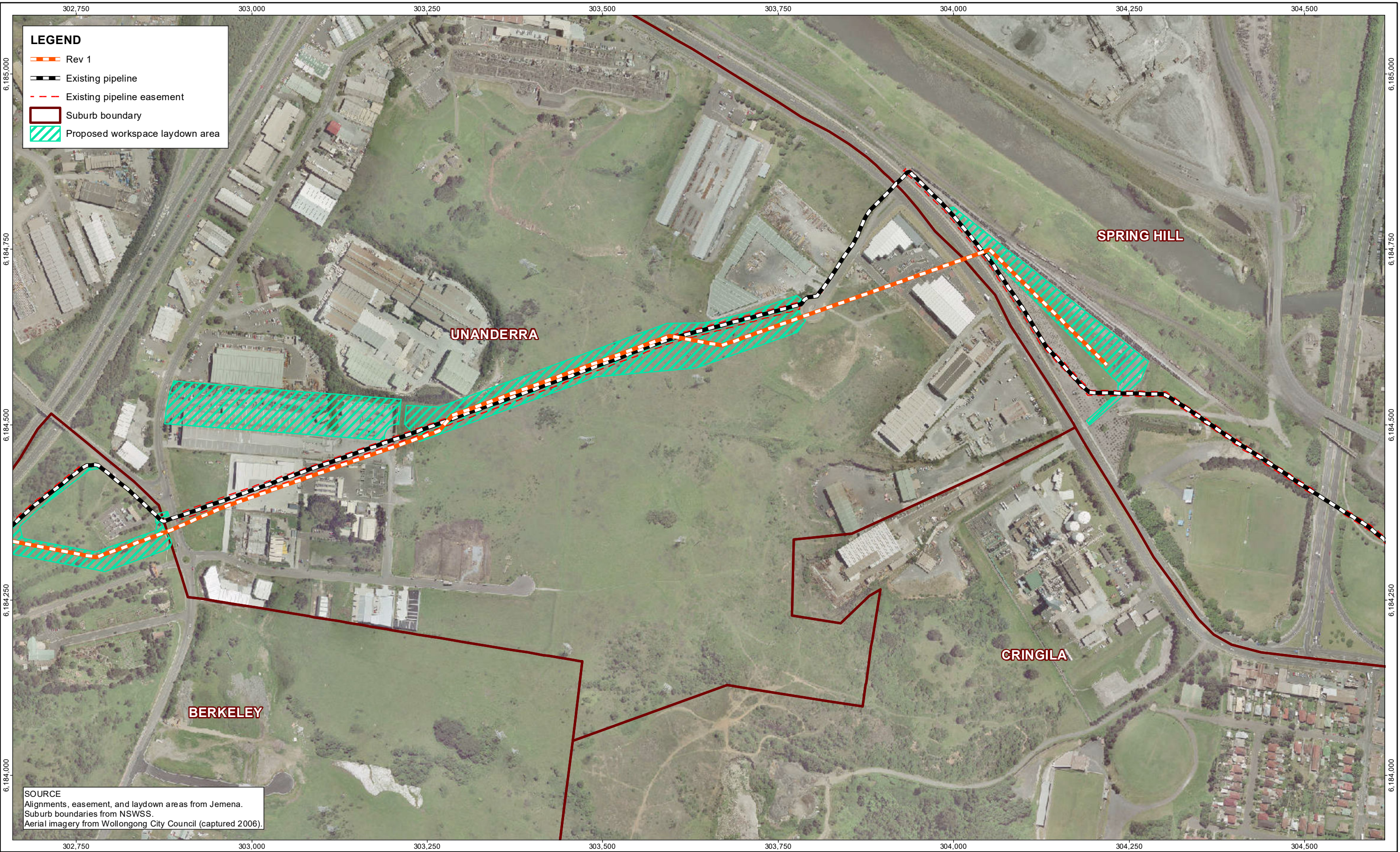


drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3

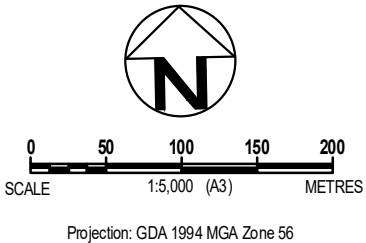


client: JEMENA		
project: PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
title: AERIAL PHOTOGRAPH (2006)		
project no: MELEN269488-R01	figure no: FIGURE 12B	rev: A





revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	GH	AP	13.03.20



drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3



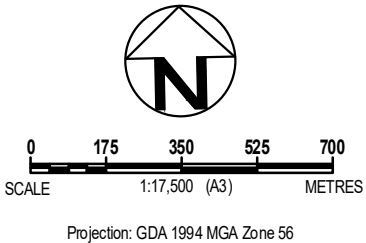
client:	JEMENA		
project:	PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
title:	AERIAL PHOTOGRAPH (2006)		
project no:	MELEN269488-R01	figure no:	FIGURE 12C
		rev:	A

MXD ref: MELEN269488\_R01\_GS012A-C\_v0\_3





revision	no.	description		drawn	approved	date
	A	ORIGINAL ISSUE		GH	AP	13.03.20



drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3

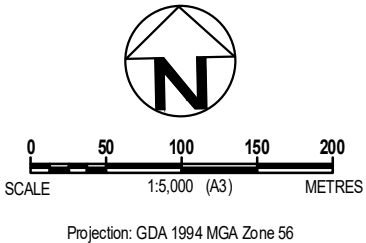
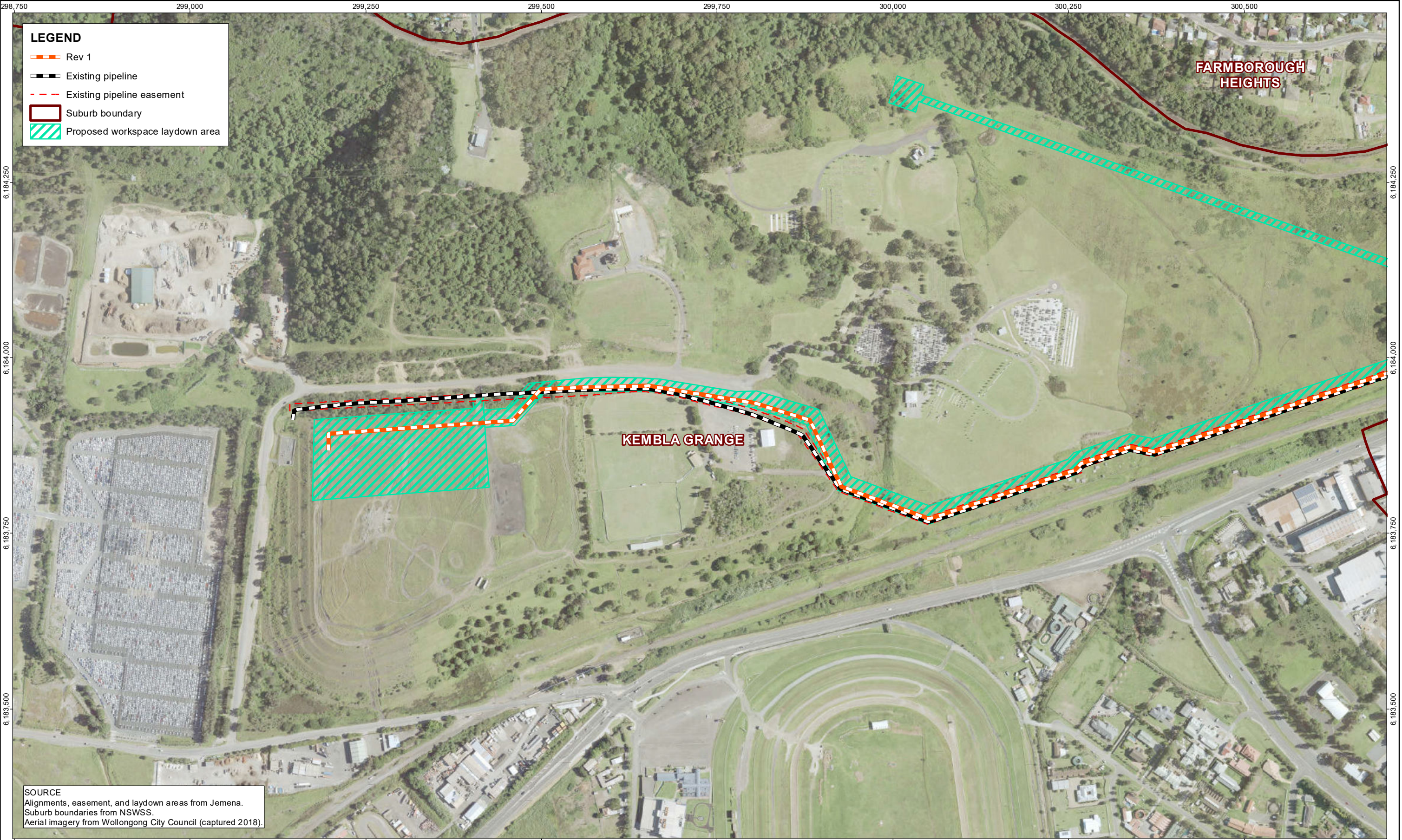


A TETRA TECH COMPANY

client:		JEMENA	
project:		PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT	
title:		AERIAL PHOTOGRAPH (2018)	
project no:	MELEN269488-R01	figure no:	FIGURE 13
		rev:	A

MXD ref: MELEN269488\_R01\_GS013\_v0\_3





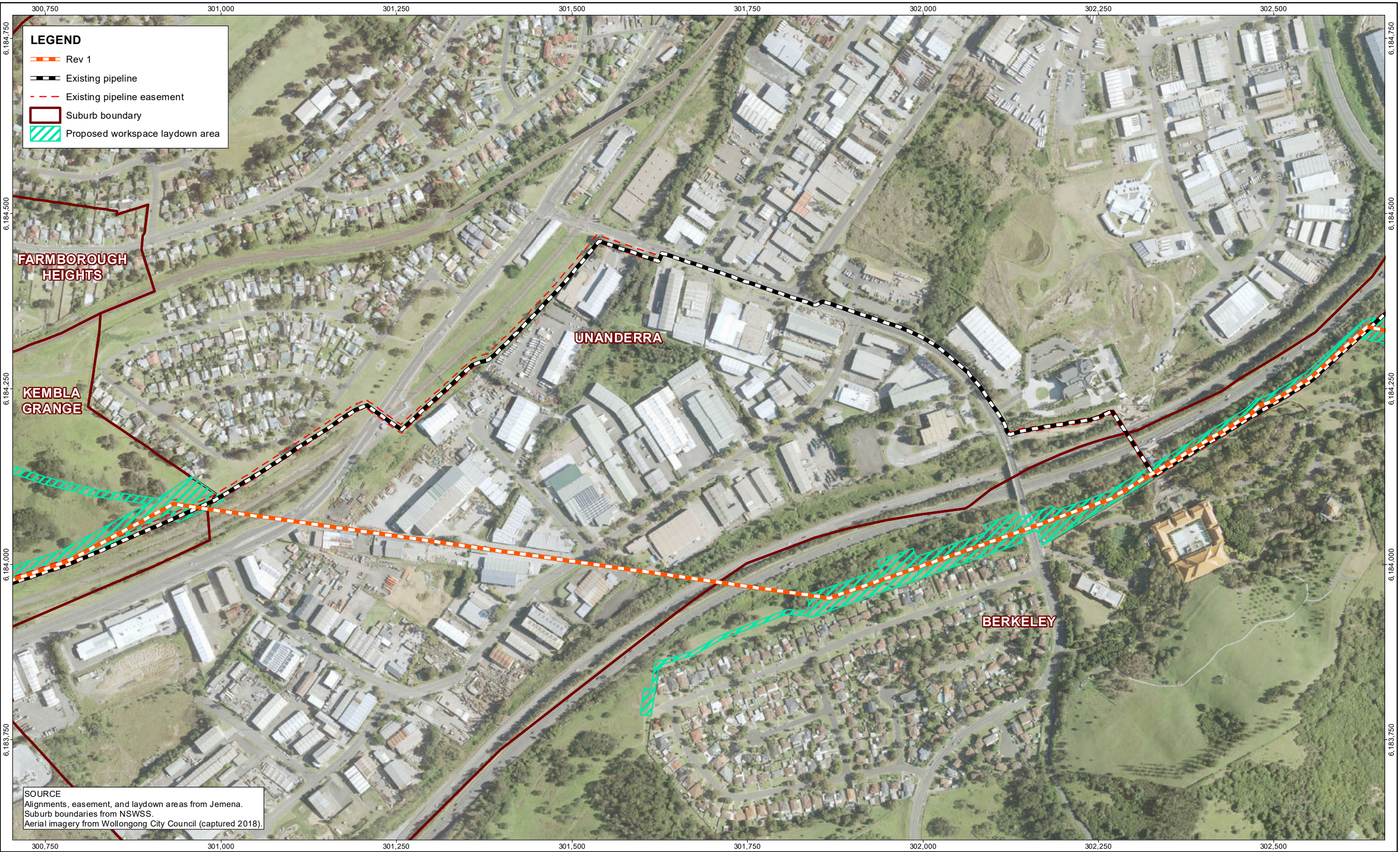
drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3



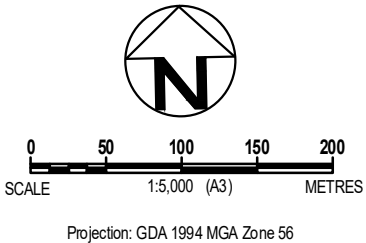
client:	JEMENA		
project:	PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
title:	AERIAL PHOTOGRAPH (2018)		
project no:	MELEN269488-R01	figure no:	FIGURE 13A
		rev:	A

MXD ref: MELEN269488\_R01\_GS013A-C v0.3





revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	GH	AP	13.03.20



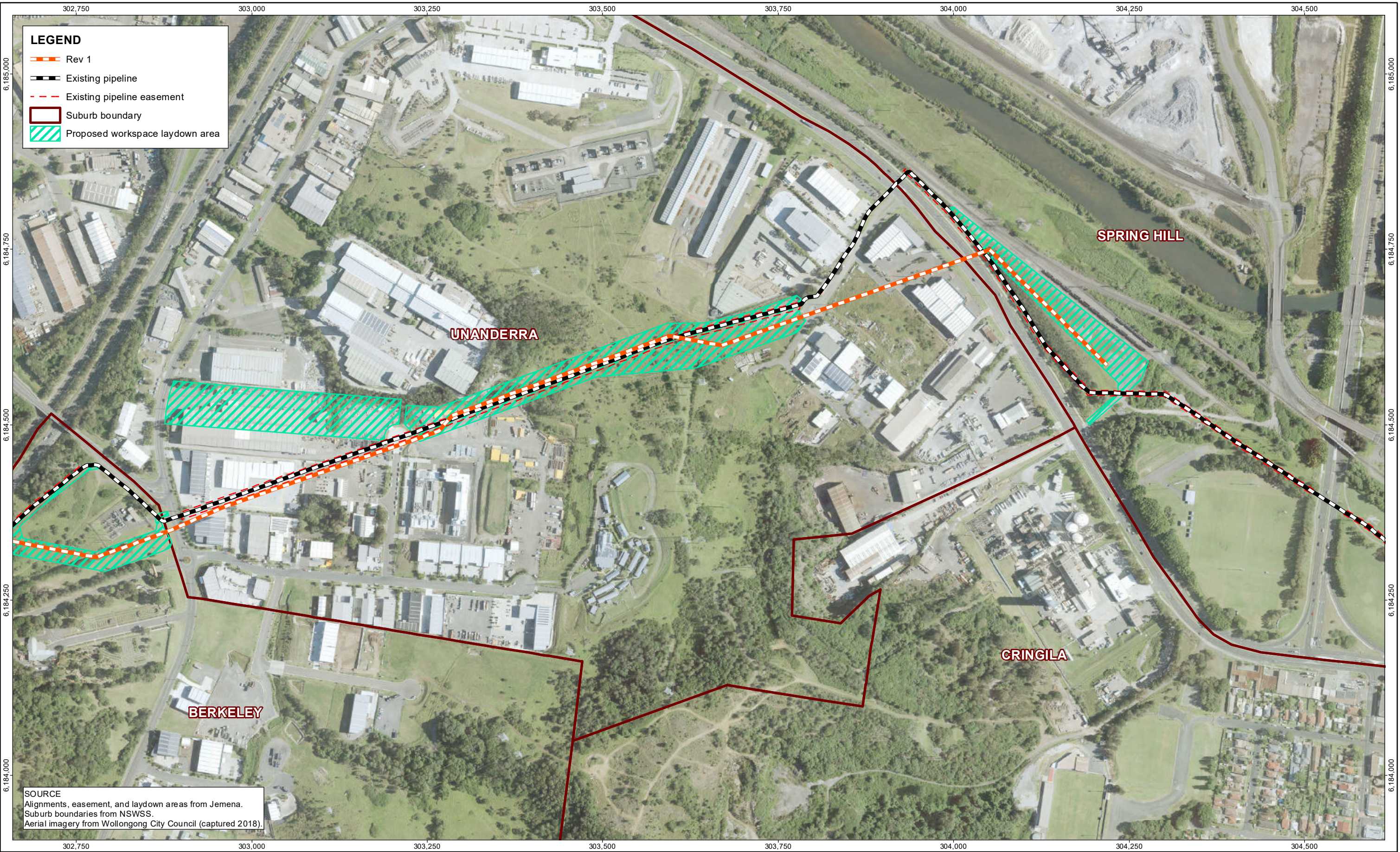
drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3



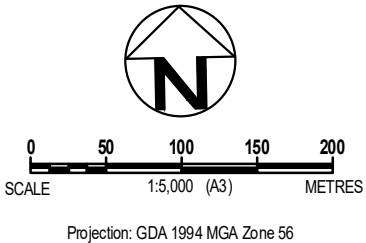
A TETRA TECH COMPANY

client:	JEMENA		
project:	PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
title:	AERIAL PHOTOGRAPH (2018)		
project no:	MELEN269488-R01	figure no:	FIGURE 13B
		rev:	A





revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	GH	AP	13.03.20



drawn	GH
approved	AP
date	13.03.2020
scale	AS SHOWN
original size	A3



client:	JEMENA		
project:	PRELIMINARY SITE INVESTIGATION PORT KEMBLA LATERAL LOOPING PROJECT		
title:	AERIAL PHOTOGRAPH (2018)		
project no:	MELEN269488-R01	figure no:	FIGURE 13C
		rev:	A

MXD ref: MELEN269488\_R01\_GS013A-C\_v0\_3



## **Appendix C – Photographs**



**Photo Number 1 (See Figure 1 in Appendix B for Location)**





**Photo Number 2 (See Figure 1 in Appendix B for Location)**



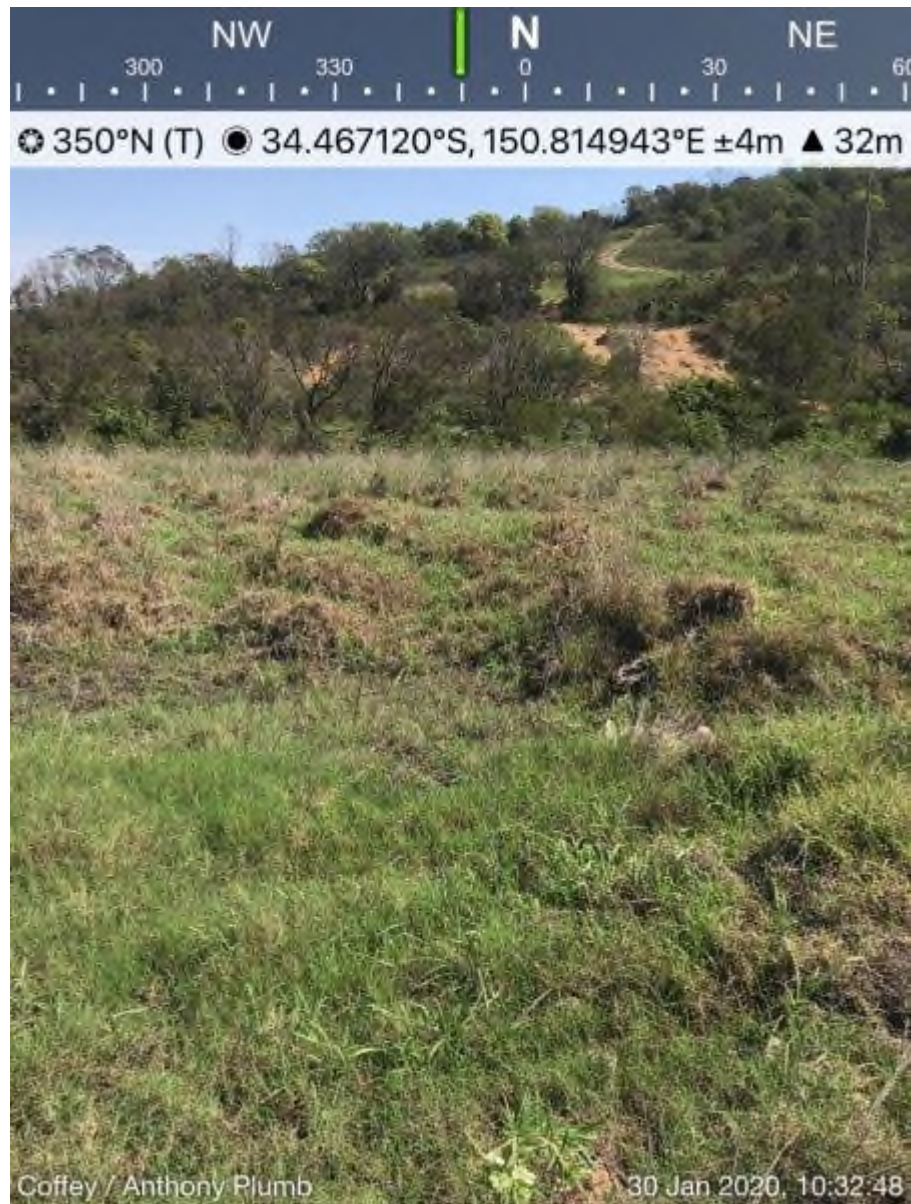


**Photo Number 3 (See Figure 1 in Appendix B for Location)**



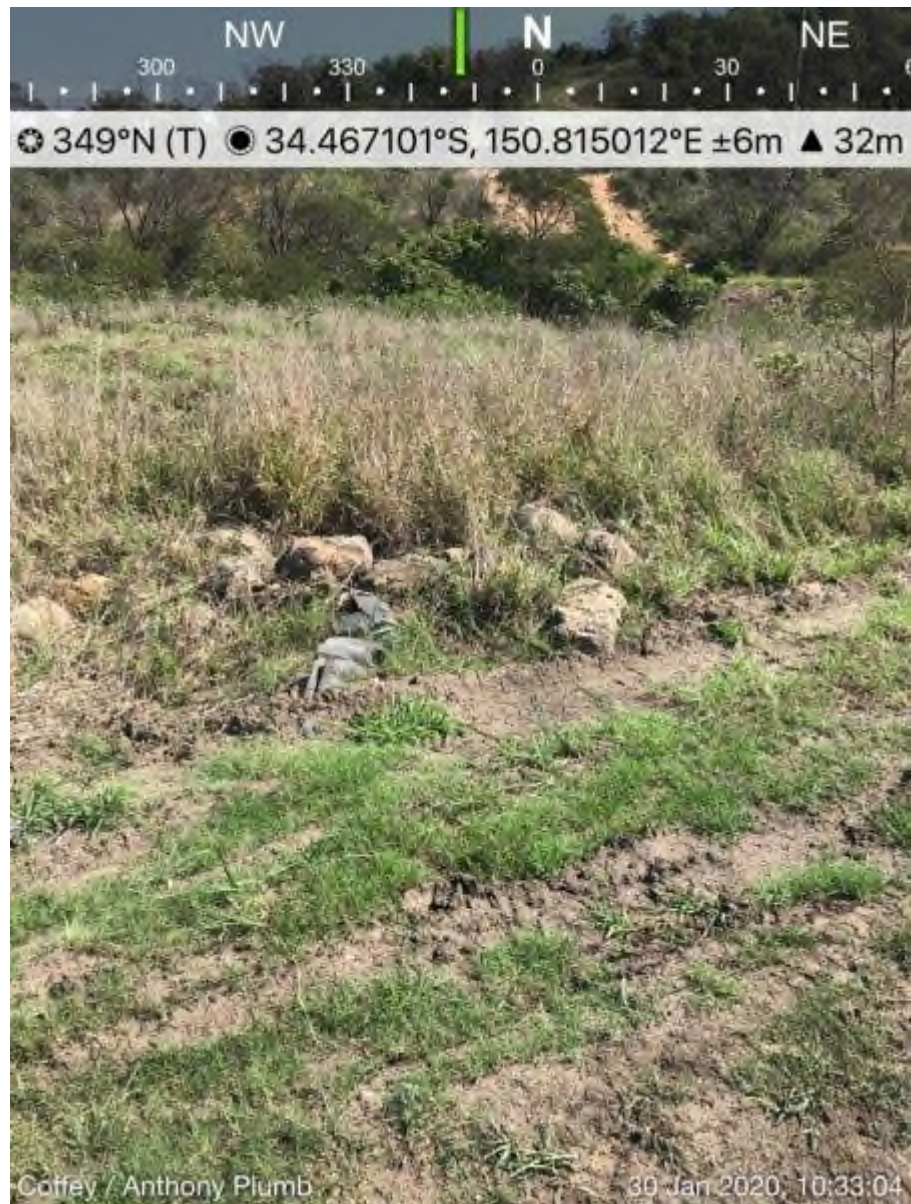


**Photo Number 4 (See Figure 1 in Appendix B for Location)**





**Photo Number 5 (See Figure 1 in Appendix B for Location)**





**Photo Number 6 (See Figure 1 in Appendix B for Location)**





**Photo Number 7 (See Figure 1 in Appendix B for Location)**





**Photo Number 8 (See Figure 1 in Appendix B for Location)**



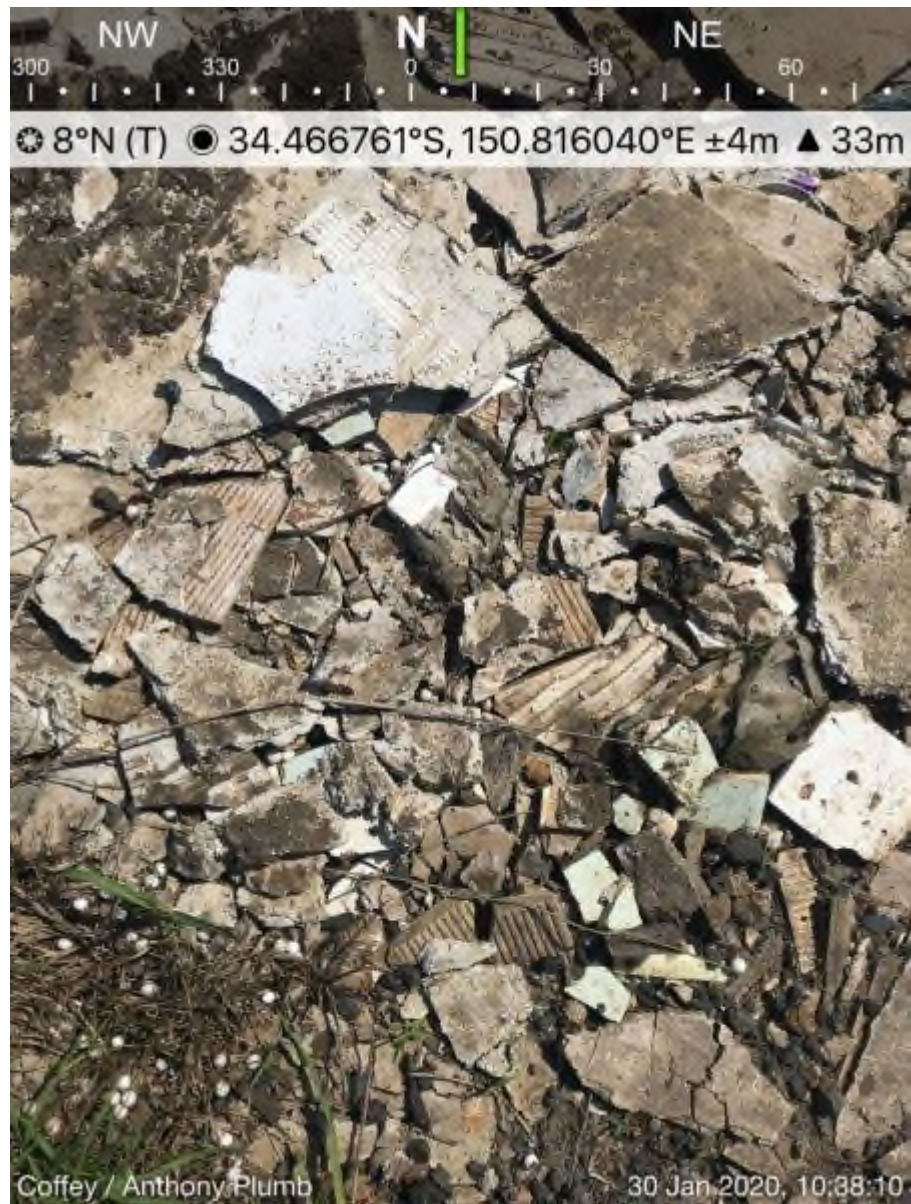


**Photo Number 9 (See Figure 1 in Appendix B for Location)**





**Photo Number 10 (See Figure 1 in Appendix B for Location)**



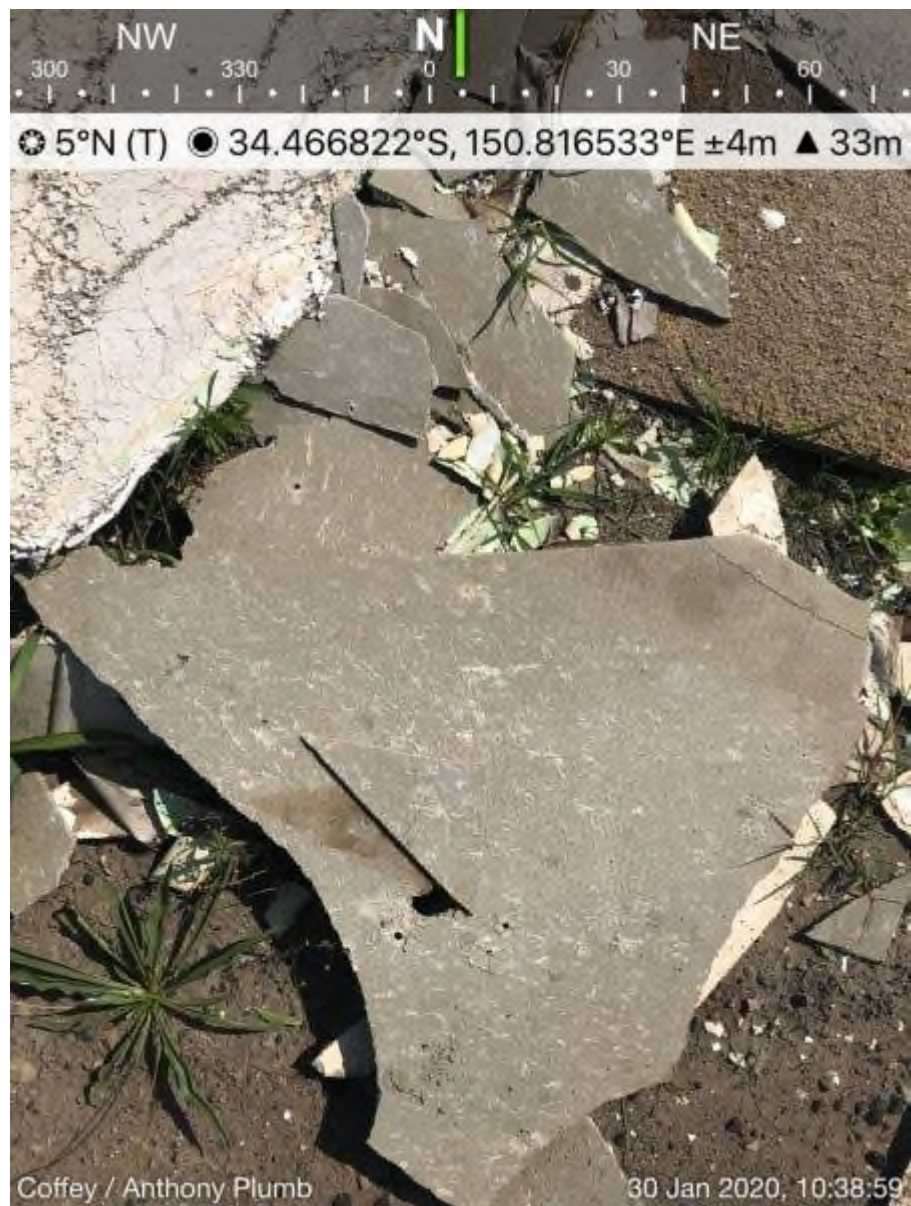


**Photo Number 11 (See Figure 1 in Appendix B for Location)**





**Photo Number 12 (See Figure 1 in Appendix B for Location)**





**Photo Number 13 (See Figure 1 in Appendix B for Location)**





**Photo Number 14 (See Figure 1 in Appendix B for Location)**





**Photo Number 15 (See Figure 1 in Appendix B for Location)**





**Photo Number 16 (See Figure 1 in Appendix B for Location)**





**Photo Number 17 (See Figure 1 in Appendix B for Location)**





A photograph of a dirt road in a coastal landscape. The road is dry and dusty, with some sparse vegetation on the left. In the background, there are trees and a clear blue sky. A compass overlay is visible at the top of the image, showing a heading of 272°W (T) and coordinates 34.466471°S, 150.817651°E. The compass also indicates a bearing of 31m. The image is taken from a low angle, looking down the road.



Photo Number 19 (See Figure 1 in Appendix B for Location)





**Photo Number 20 (See Figure 1 in Appendix B for Location)**



Coffey / Anthony Plumb

30 Jan 2020, 10:49:05



**Photo Number 21 (See Figure 1 in Appendix B for Location)**





**Photo Number 22 (See Figure 1 in Appendix B for Location)**





**Photo Number 23 (See Figure 1 in Appendix B for Location)**





**Photo Number 24 (See Figure 1 in Appendix B for Location)**





**Photo Number 25 (See Figure 1 in Appendix B for Location)**





**Photo Number 26 (See Figure 1 in Appendix B for Location)**





**Photo Number 27 (See Figure 1 in Appendix B for Location)**





**Photo Number 28 (See Figure 1 in Appendix B for Location)**



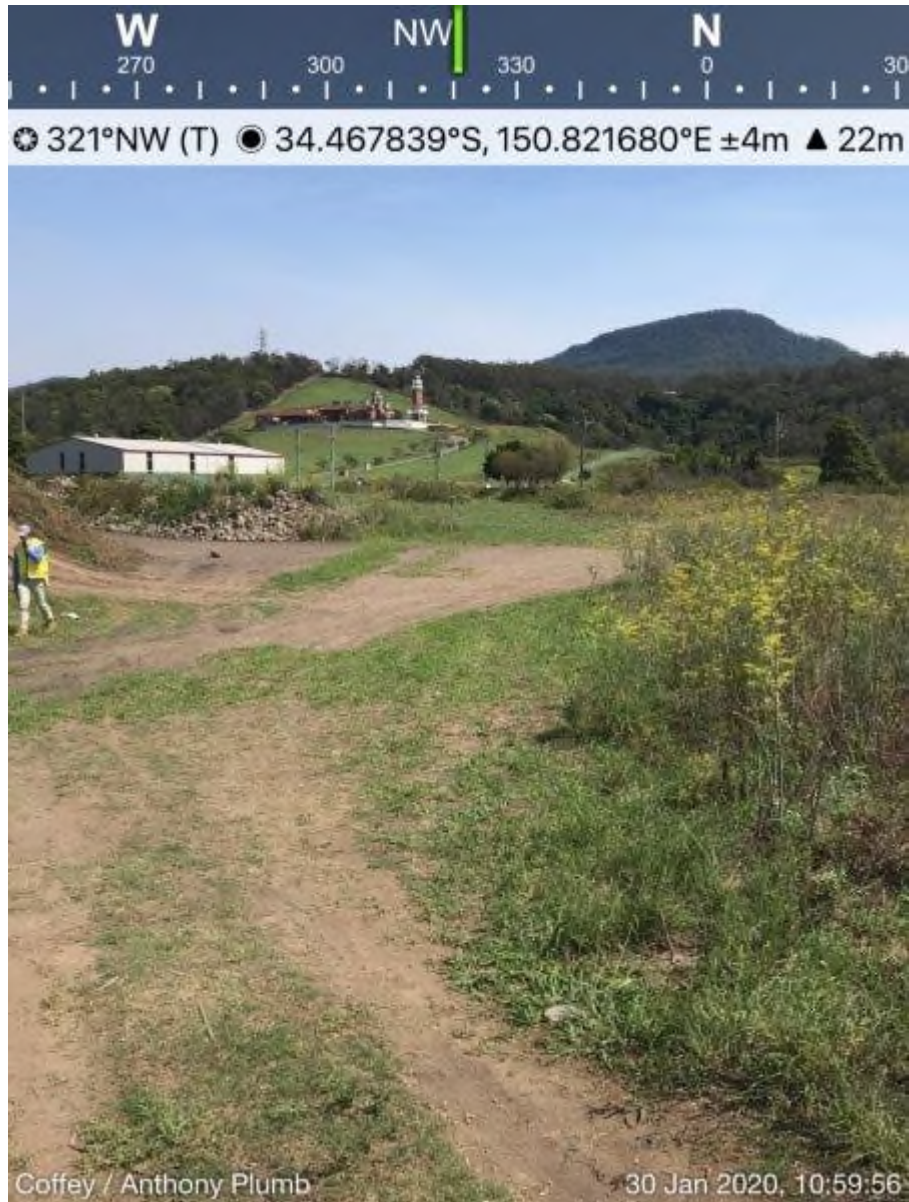


**Photo Number 29 (See Figure 1 in Appendix B for Location)**





**Photo Number 30 (See Figure 1 in Appendix B for Location)**





**Photo Number 31 (See Figure 1 in Appendix B for Location)**





**Photo Number 32 (See Figure 1 in Appendix B for Location)**





Photo Number 33 (See Figure 1 in Appendix B for Location)





**Photo Number 34 (See Figure 1 in Appendix B for Location)**





Photo Number 35 (See Figure 1 in Appendix B for Location)





Photo Number 36 (See Figure 1 in Appendix B for Location)





**Photo Number 37 (See Figure 1 in Appendix B for Location)**





**Photo Number 38 (See Figure 1 in Appendix B for Location)**



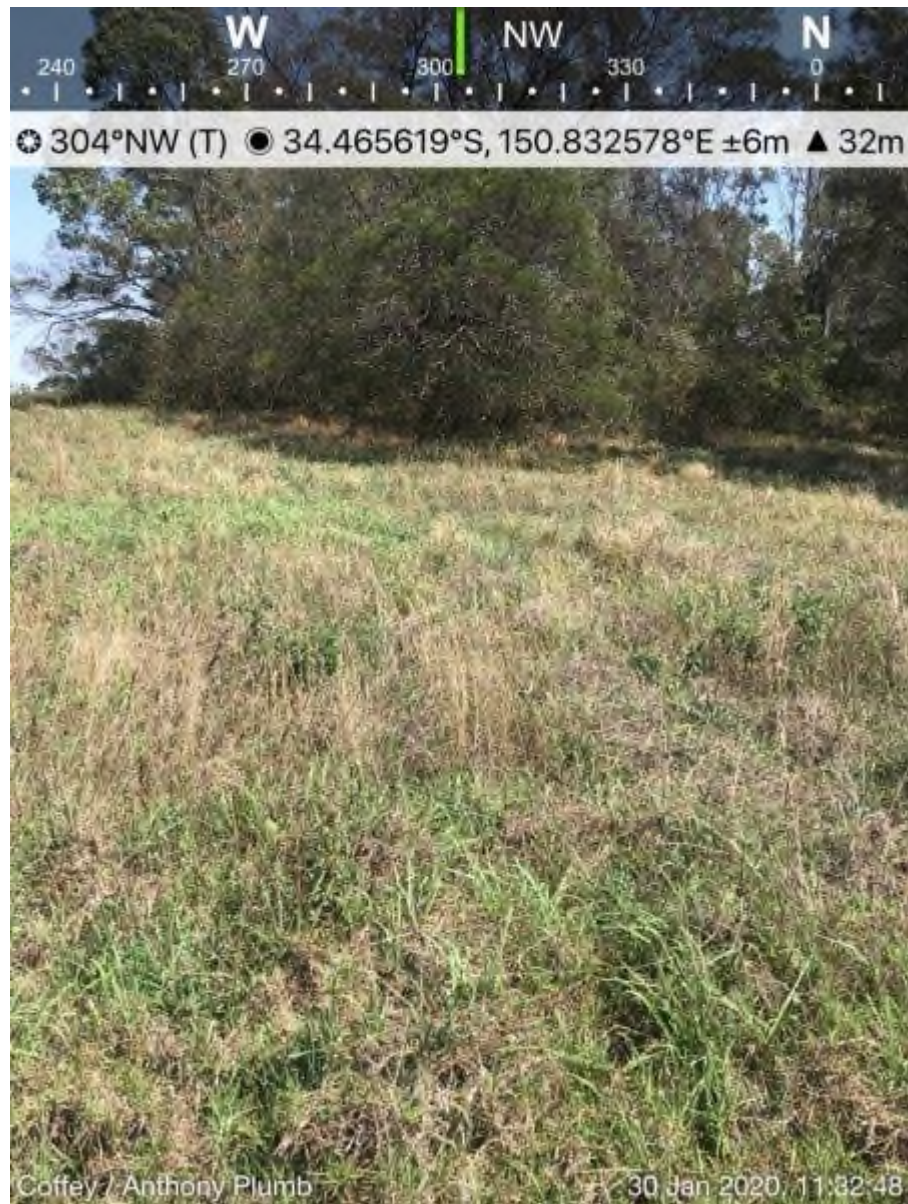


**Photo Number 39 (See Figure 1 in Appendix B for Location)**





**Photo Number 40 (See Figure 1 in Appendix B for Location)**



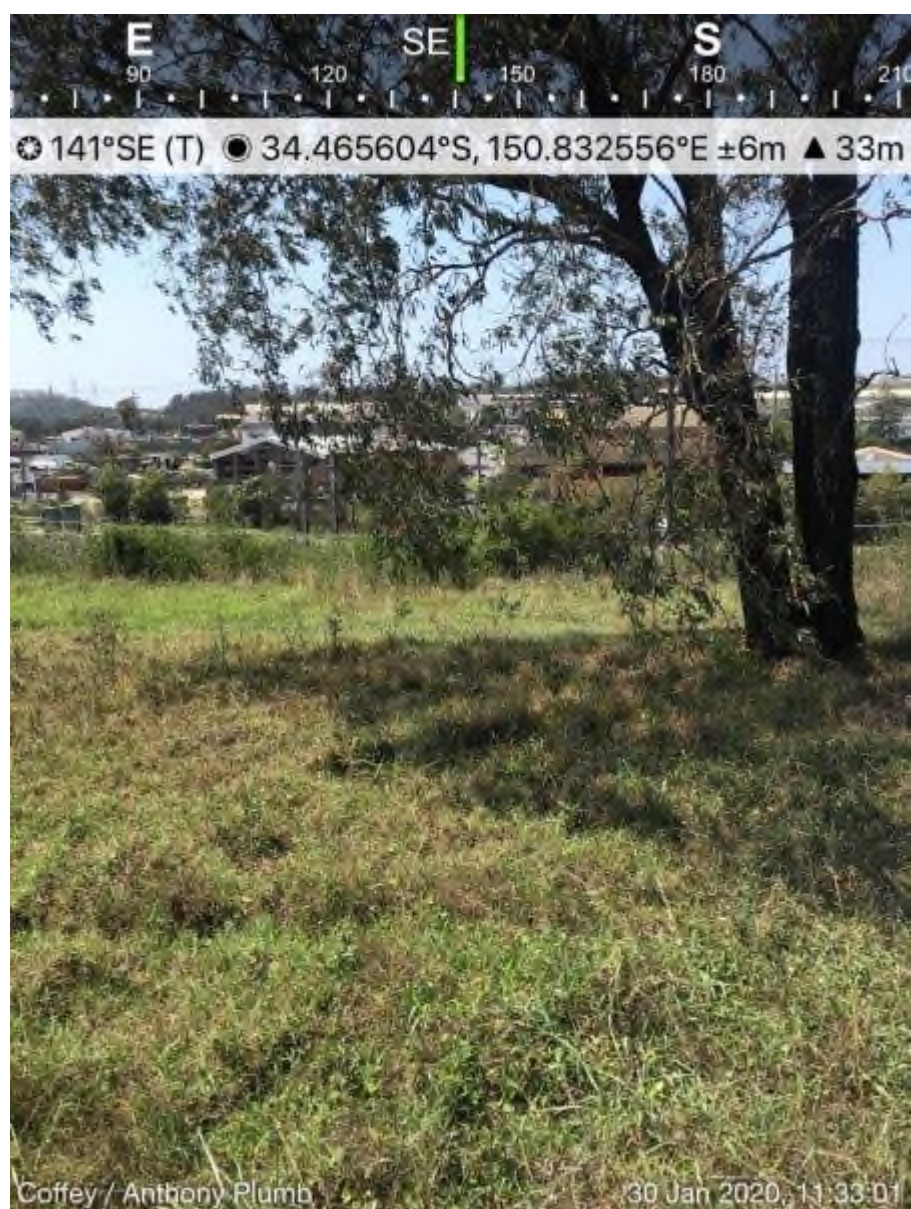


**Photo Number 41 (See Figure 1 in Appendix B for Location)**



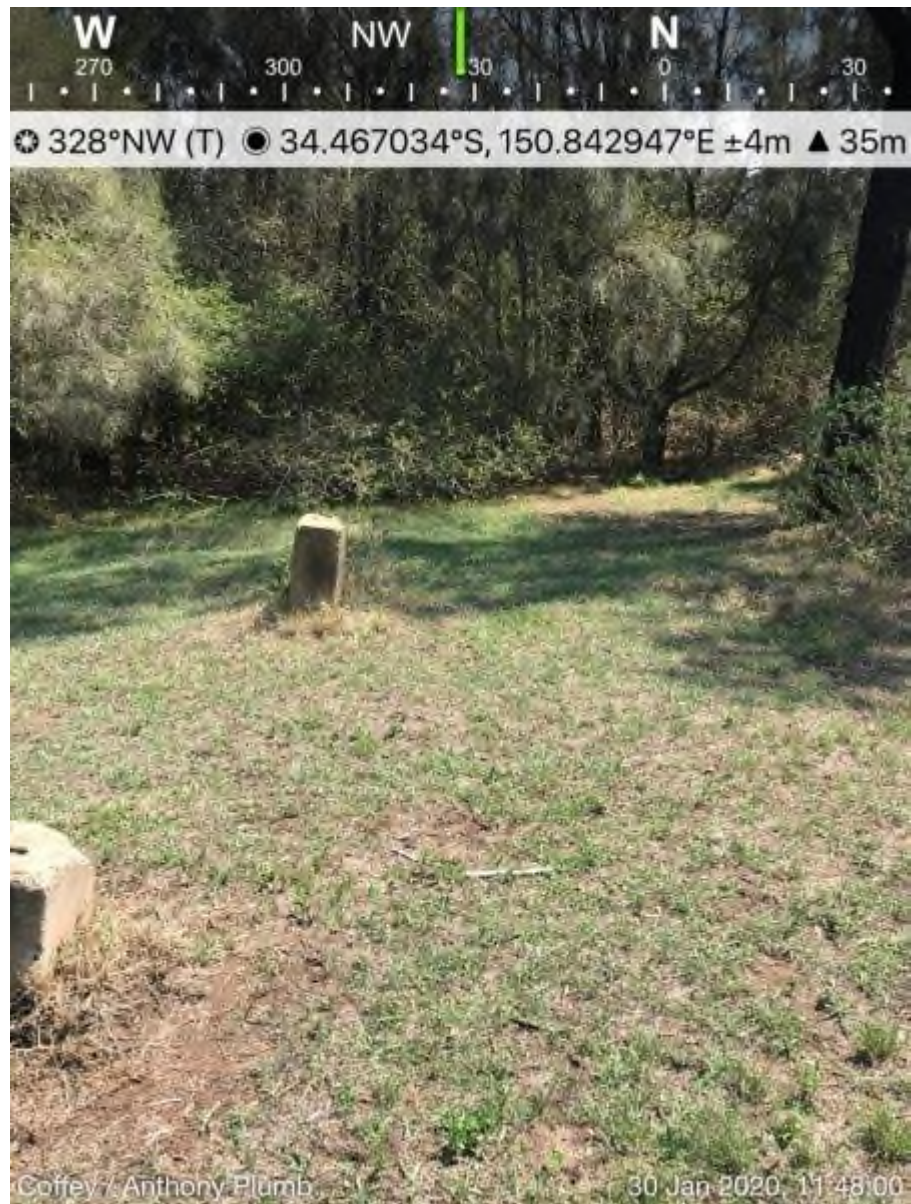


**Photo Number 42 (See Figure 1 in Appendix B for Location)**





**Photo Number 43 (See Figure 1 in Appendix B for Location)**





**Photo Number 44 (See Figure 1 in Appendix B for Location)**





**Photo Number 45 (See Figure 1 in Appendix B for Location)**





**Photo Number 46 (See Figure 1 in Appendix B for Location)**





**Photo Number 47 (See Figure 1 in Appendix B for Location)**





**Photo Number 48 (See Figure 1 in Appendix B for Location)**





**Photo Number 49 (See Figure 1 in Appendix B for Location)**





**Photo Number 50 (See Figure 1 in Appendix B for Location)**





**Photo Number 51 (See Figure 1 in Appendix B for Location)**

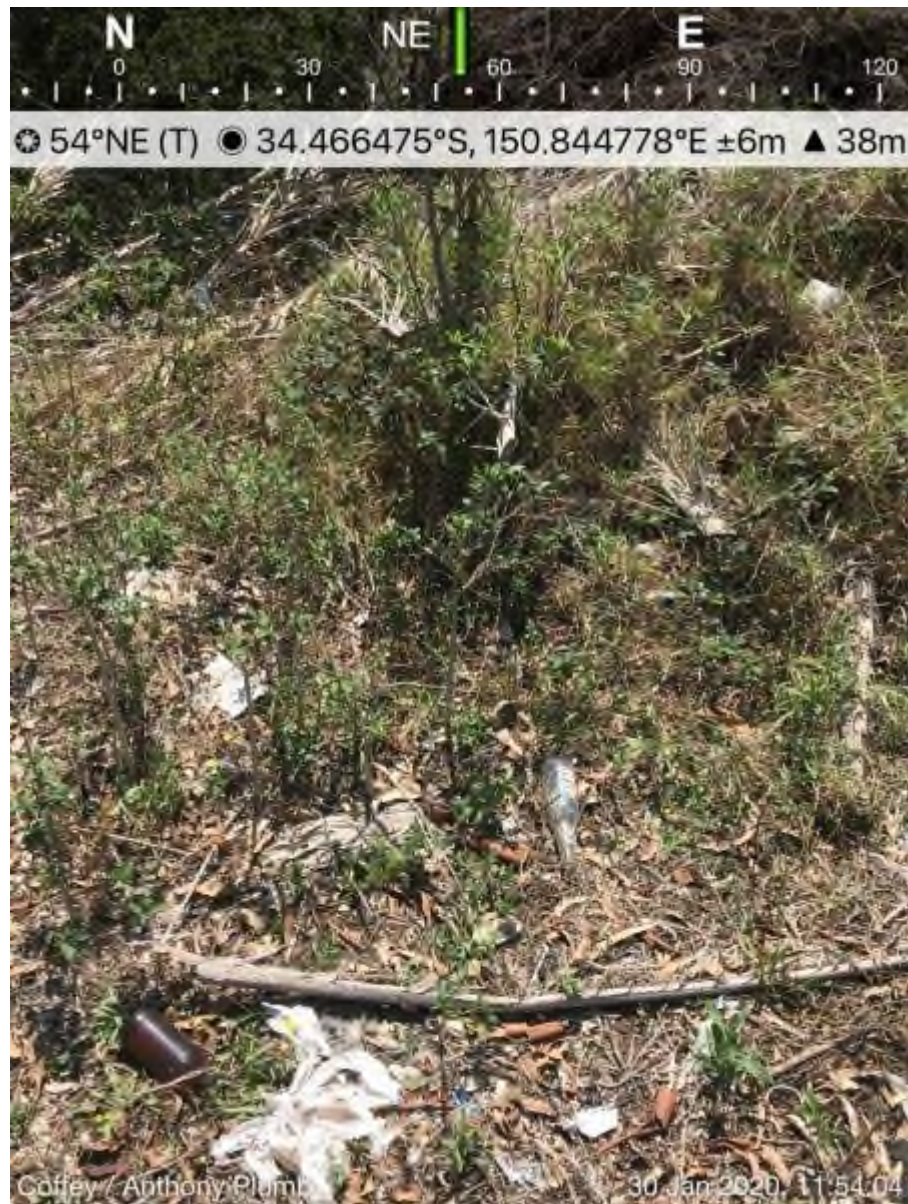




Photo Number 52 (See Figure 1 in Appendix B for Location)





**Photo Number 53 (See Figure 1 in Appendix B for Location)**





**Photo Number 54 (See Figure 1 in Appendix B for Location)**





**Photo Number 55 (See Figure 1 in Appendix B for Location)**





**Photo Number 56 (See Figure 1 in Appendix B for Location)**





**Photo Number 57 (See Figure 1 in Appendix B for Location)**





**Photo Number 58 (See Figure 1 in Appendix B for Location)**

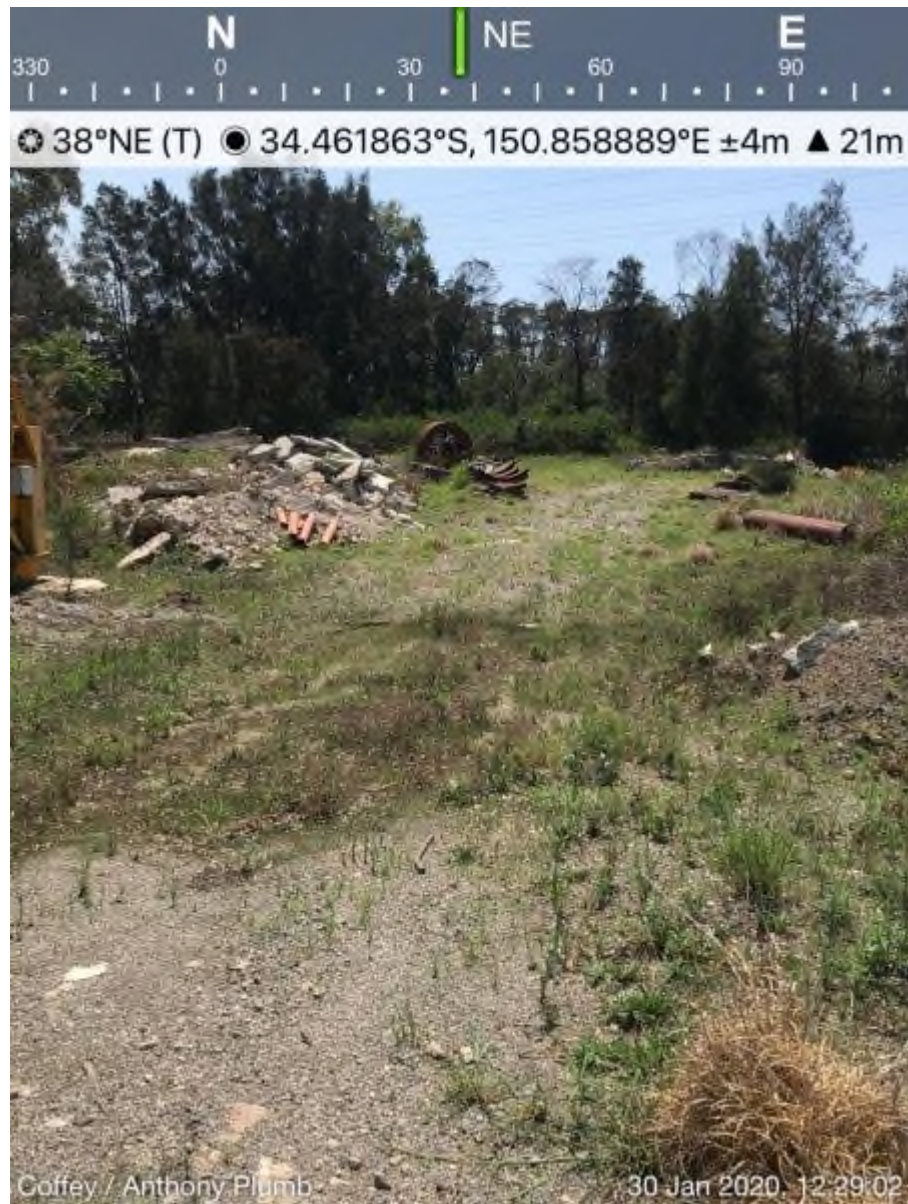
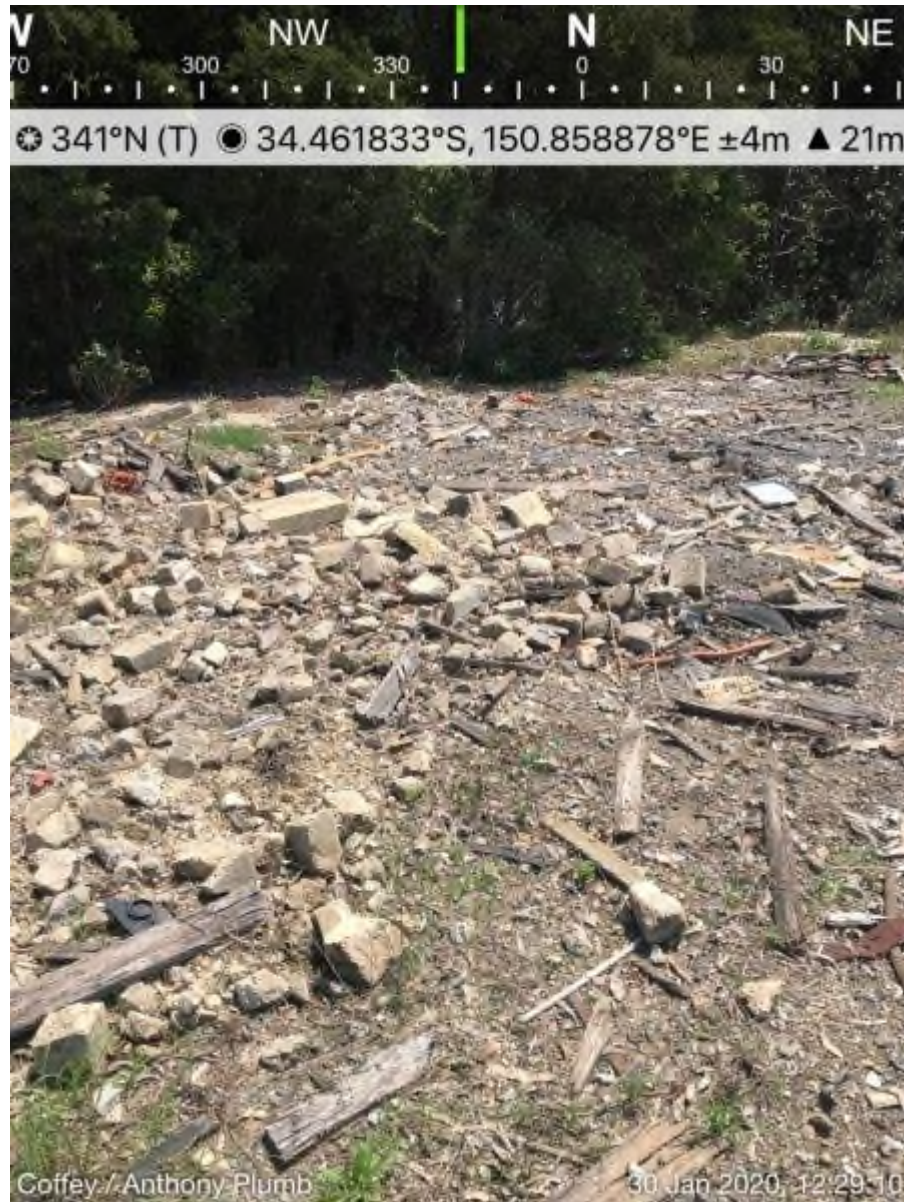




Photo Number 59 (See Figure 1 in Appendix B for Location)





**Photo Number 60 (See Figure 1 in Appendix B for Location)**





**Photo Number 61 (See Figure 1 in Appendix B for Location)**





Photo Number 62 (See Figure 1 in Appendix B for Location)







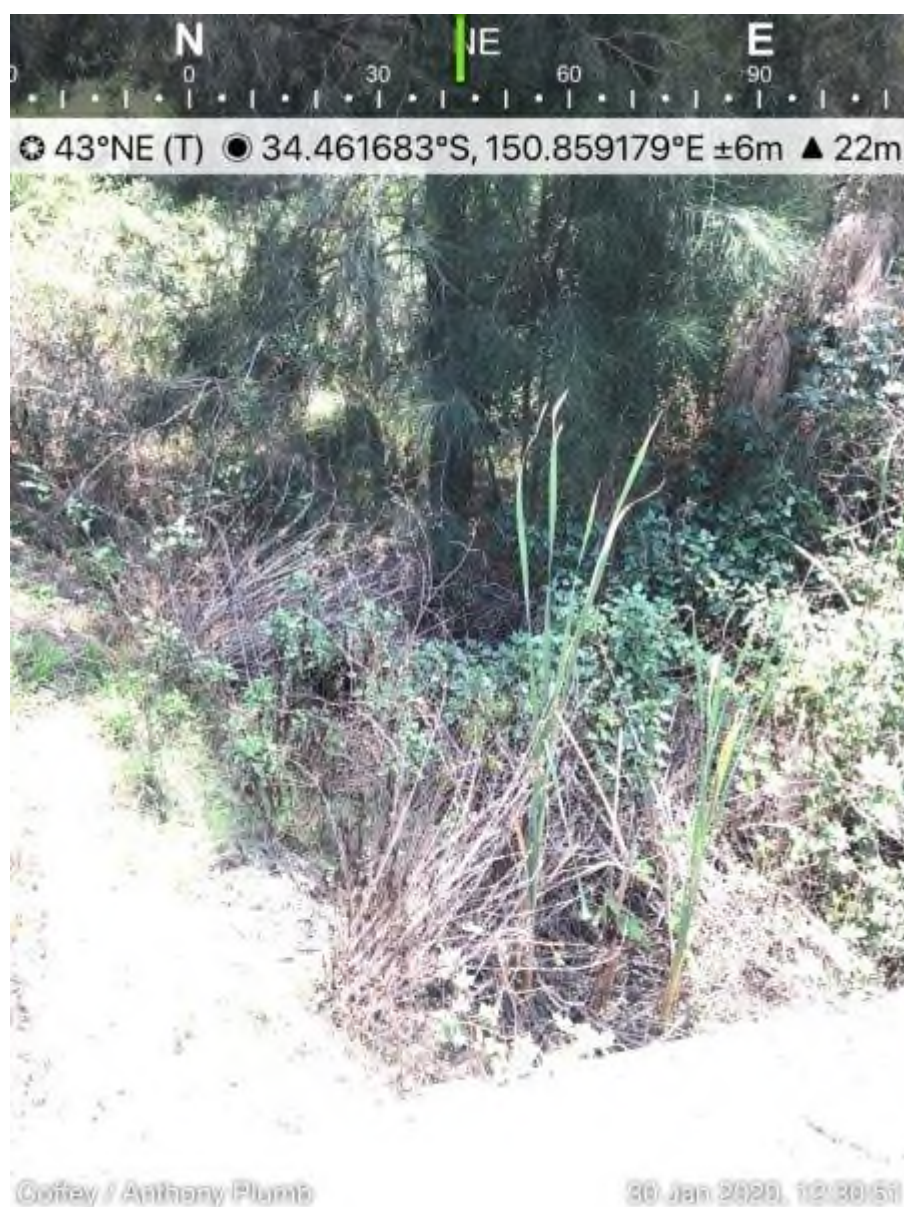


Photo Number 64 (See Figure 1 in Appendix B for Location)





Photo Number 65 (See Figure 1 in Appendix B for Location)





**Photo Number 66 (See Figure 1 in Appendix B for Location)**





**Photo Number 67 (See Figure 1 in Appendix B for Location)**



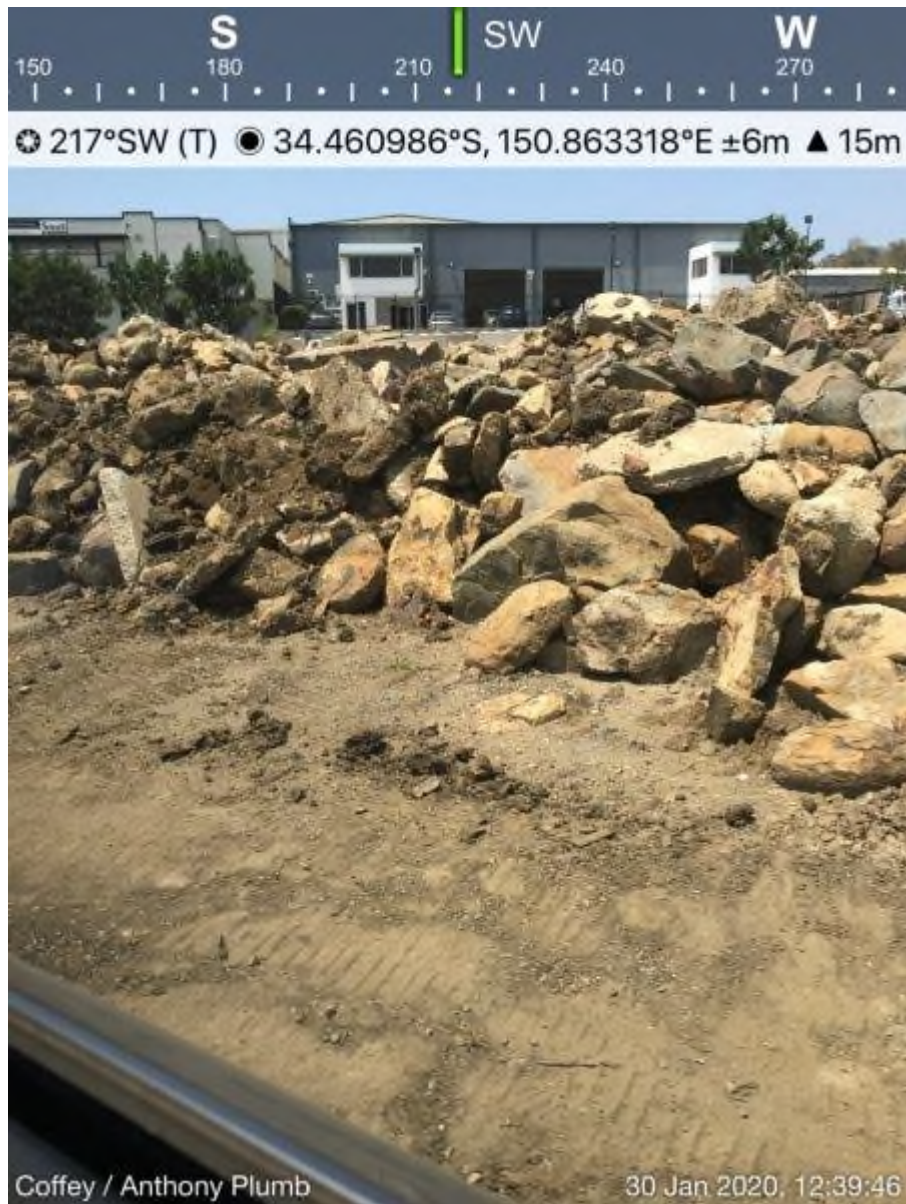


**Photo Number 68 (See Figure 1 in Appendix B for Location)**





**Photo Number 69 (See Figure 1 in Appendix B for Location)**





**Photo Number 70 (See Figure 1 in Appendix B for Location)**





**Photo Number 71 (See Figure 1 in Appendix B for Location)**





Photo Number 72 (See Figure 1 in Appendix B for Location)





**Photo Number 73 (See Figure 1 in Appendix B for Location)**





## **Appendix D – Plans**



EMERGENCY

ph. 6000 (int) or 75 6000 (mobile)

DRIVING ON THE PLANT

As a minimum road rules apply.

CLICK CLACK Front'n Back

Watch for:

OVERSIZE

STOP

RAILS WAY

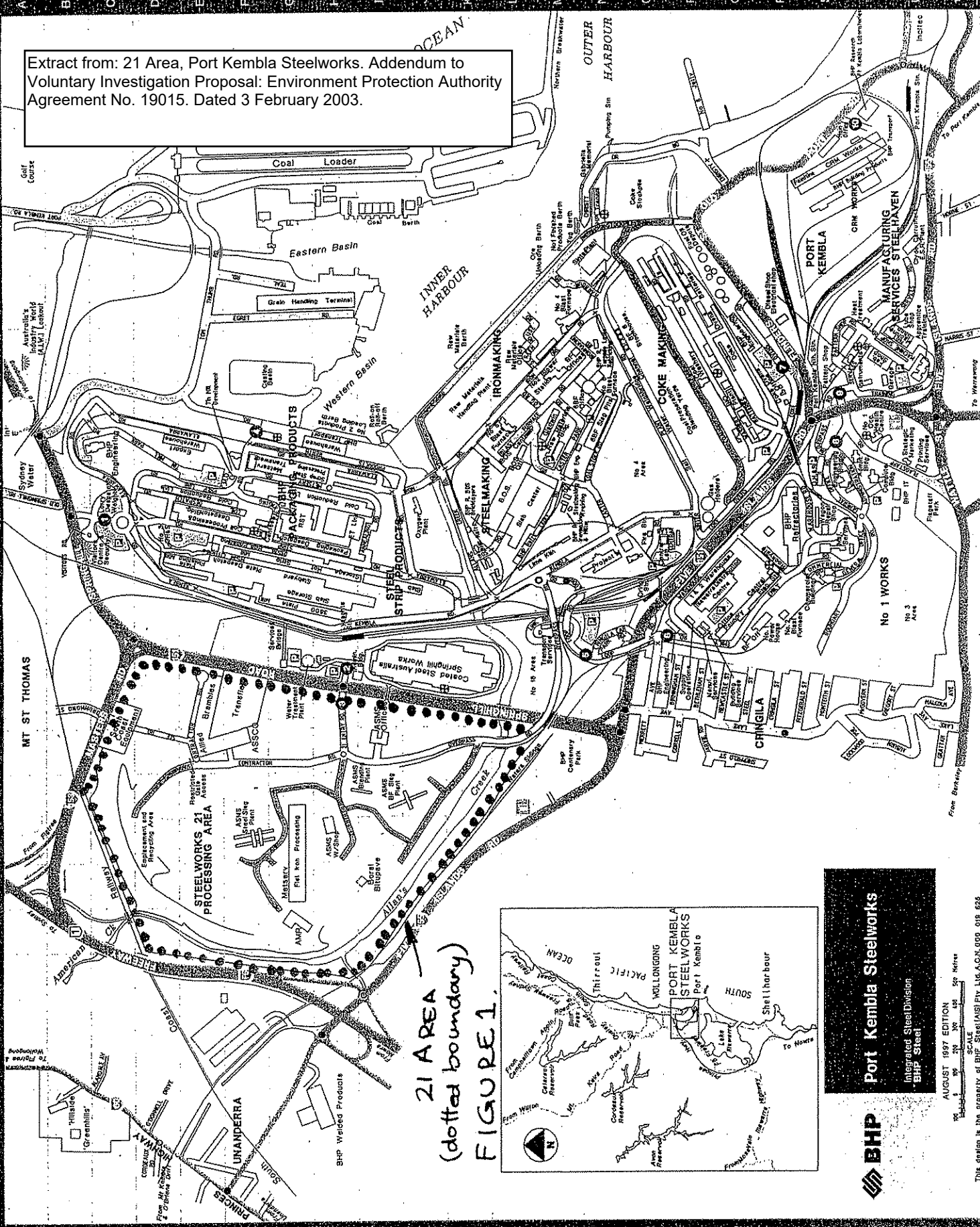
STOP

RAILS WAY

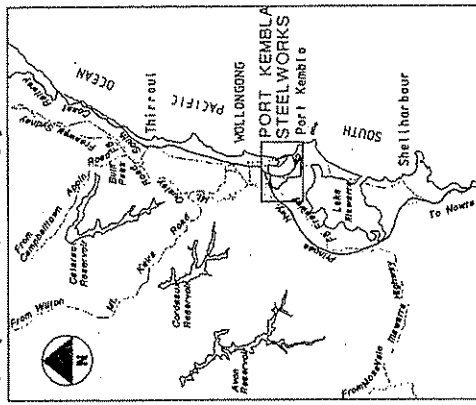
STOP ON RED ON RED SIGNAL

NO LEFT TURN

Extract from: 21 Area, Port Kembla Steelworks. Addendum to Voluntary Investigation Proposal: Environment Protection Authority Agreement No. 19015. Dated 3 February 2003.



21 AREA  
(dotted boundary)  
FIGURE 1.



**Port Kembla Steelworks**  
Integrated Steel Division  
BHP Steel



AUGUST 1997 EDITION

This design is the property of BHP Steel (AUS) Pty Ltd. A.C.N. 000 018 623

ENTRIES

1 NORTH GATE

2 SPRINGELL WORKS

3 21 AREA

4 PRODUCTS BERTH

5 CRINGILA CARPARK

6 NERRETT AVE

7 COKE OVENS

8 GENERAL OFFICE

9 STEELHAVEN

10 CRK WORKS

LEGEND

State and National Route Numbers

Railway Crossing, Roadside and Bridge

Railway and Station

Canary Boundary

Traffic Light

Car Park

Security gate/Entry Point

Ambulance Station

A.L.W. Lookout

A.L.W. Gateway Sign

SPEED ZONES

10

20

40

40

60