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Appin East Mine Safety Gas Management Project

Section 75W Modification to Bulli Seam Operations Project Application No.08_0150

Also including modifications to the Statement of Commitments, Conditions 4.14 and 4.23, and the surrender of Appin Mine No. 6 Vent Shaft Project Approval (10_0079).

Prepared for South32 Illawarra Coal

June 2016

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Illawarra
Armidale
Newcastle
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Port Macquarie
Brisbane
Cairns

Cover photograph: The proposed gas pipeline route on north side of Brooks Point Road. Niche Environment and Heritage, 2016.

Executive summary

South 32, Illawarra Coal (Illawarra Coal) proposes to continue its underground mining operations at the Bulli Seam Operations (Appin and West Cliff Mines), located in the Southern Coalfield of New South Wales, by extracting coal from the Bulli Seam using longwall mining techniques.

In order to support the safe and efficient extraction of coal in the Bulli Seam Operations (BSO), Illawarra Coal proposes to optimise the underground extraction and utilisation of methane gas from the mine by implementing the "Mine Safety Gas Management Project" (MSGMP). Installation and operation of the proposed pipeline will enable the existing Appin East gas drainage management system to remain in service for an extended period by reducing the frictional pressure drop and leakage in the pipelines between the mining areas and the gas extraction plant. Considerable benefits in terms of power generation and reduction in greenhouse gas emissions will also result from the Project. If the proposed pipeline cannot be installed, the existing Appin East gas extraction system will not be able to provide sufficient suction to extract gas from the mining areas and additional gas extraction infrastructure will need to be installed at an alternative location.

Approval is sought to construct and operate a 1 m diameter suction gas pipeline between Appin No. 3 Vent Shaft and the existing gas drainage plant at Appin No. 2 Shaft (approximately 4 km in length). The pipeline will be buried at the surface, for the most part, along Brooks Point Road.

A s75W modification is proposed to modify the BSO Approval to incorporate the construction and operation of the proposed (MSGMP) gas management infrastructure. This document provides an environmental assessment of the MSGMP and outlines the proposed management activities that will be undertaken during construction, operation and rehabilitation of the MSGMP. The Table below summarises the impacts outlined in this environmental assessment.

Environmental Assessment Summary

Aspect	Impact Summary
Soils and Surface Water	• The MSGMP will involve additional surface soil disturbance for the excavation of the 2 m x 2 m trench of approximately 4 km length. • Topsoil on the pastoral lots owned by private landowners and Illawarra Coal will not be sterilised by the activity and there will be no long term impact on agricultural productivity potential of the private land. • Minor, temporary, localised increase in suspended solids in surface water flowing across the works area into the adjacent road verges, swales and drainage lines. The receiving waters potentially impacted by increased suspended solids loads are ephemeral first and second order tributaries of Simpsons Creek, Elladale Creek and Ousedale Creek. • A minor increase in the extent of disturbed surface soils and cuttings, with localised temporary changes to surface water flows.
Groundwater	• Negligible impacts to regional aquifer expected. • Potential for some minor interception and diversion of perched groundwater by the trench excavation however this is not expected to have any significant long term impacts on the local groundwater resources.
Flora and Fauna	• Known impacts include the modification of approximately 0.45 ha of native vegetation (regenerating Cumberland Plain Woodland, a Threatened Ecological

Aspect	Impact Summary
	Community) and 0.35 ha Exotic grassland/disturbed land. Most of this is located on road verge. • No significant impacts to threatened biodiversity are likely given the highly disturbed existing environment.
Noise	• Temporary noise impacts during the construction period with only one receiver predicted to be temporarily "highly noise impacted". • No impacts expected during operation.
Air and Greenhouse Gases	• Minor temporary impacts resulting from the generation of dust during construction. • Minor increase in construction fuel emissions. • BSO gas drainage greenhouse gas emissions consistent with the Approved BSO Project.
Aboriginal Cultural Heritage	• No impacts expected.
Historical Heritage	• A minor visual impact on the Upper Canal from steel pipe bridging.
Traffic	• Minor temporary increase in traffic on Brooks Point Road and Northamptondale Road during the construction period. • Post-construction improvement to road drainage and road shoulder.
Visual Amenity	• Minor temporary visual impacts resulting from the construction activity itself. • Minor long term visual impact from steel pipe bridging the Upper Canal.
Waste	• Minor additional waste generated compared to the Approved BSO Project.
Socio-economic	• Minor temporary dust, noise, traffic, visual impacts on local residents during construction. • Minor positive socio-economic impact on local contractors and suppliers. • Net positive socio-economic impact by supporting the continuation of safe and efficient extraction of coal in the BSO.

Illawarra Coal have consulted with all landowners where the proposed works would occur and have entered into a written agreement with the relevant private landholder. Illawarra Coal will consult with nearby neighbours and the broader community. Consultation with the community will also extend through the assessment period of this application and during the construction and operational phase of the project.

At the completion of the BSO Project, the infrastructure will be decommissioned in accordance with the Approved BSO Project conditions.

In summary, the potential environmental impacts and proposed mitigation measures are consistent with the Approved BSO Project. Many of the impacts are considered to be minor in scale and temporary in duration due to the temporary nature of the construction works, the disturbed nature of the land, and the proposed management and mitigation measures.

The proposed modification will have a net positive socio-economic impact by supporting the continuation of safe and efficient extraction of coal in the BSO. It will ensure the continued benefits in terms of methane fuelled power generation and reduction in greenhouse gas emissions outlined in the Approved BSO Project.

The proposed modification also seeks to modify the Statement of Commitments, and Conditions 4.14 and 4.23 of the BSO Project Approval, as well as the surrender of Appin Mine No. 6 Vent Shaft Project Approval (10_0079) which is requested to be incorporated into the BSO Project Approval.

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Glossary and abbreviations

Flora and fauna of conservation significance	Threatened species or populations listed on the schedules of the TSC Act and/or listed as MNES under the EPBC Act.
Local population	The population of a particular threatened species that occurs in the locality.
Locality	The area within 10 km of the study area.
Local occurrence	Refers to the distribution of an ecological community within the study area and continuous with it.
Project Area	For the purposes of this assessment the project area has been nominated as an area within 500m of the proposed gas drainage pipeline. Refer Figure 1.
Study Area	For the ecology assessment, the study area is the subject site and any additional areas which are likely to be affected by the proposal, either directly or indirectly (DEC, 2004). For the purposes of this assessment the study area has been nominated as an area within 500m of the proposed gas drainage pipeline. Refer Figure 1.
Works Area	For the purposes of this assessment, the works area is defined as the area within 50 metres of the proposed gas management infrastructure where project related works may be conducted.
Subject Area	Subject area refers to the area that is the subject of archaeological investigation. DECCW (2010) *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales.* For the purposes of this assessment the subject area has been nominated as an area within 500m of the proposed gas drainage pipeline. Refer Figure 1.
Subject site	For the ecology assessment, the subject site is defined as the area of direct disturbance of the proposed gas management infrastructure.
MNES	Matters of National Environmental Significance.
OEH	Office of Environment and Heritage.
TEC	Threatened Ecological Community as listed on the TSC Act and or EPBC Act. Collective term to describe vulnerable, endangered and critically endangered ecological communities.
Threatened biodiversity	Threatened species, populations and ecological communities as listed on the TSC and or EPBC Acts.
TSC Act	NSW *Threatened Species Conservation Act 1995.*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.*
EP&A Act	NSW *Environmental Planning and Assessment Act 1979.*
OCVT	Over Cleared Vegetation Type.
RBVT	Revised Biometric Vegetation Type.
SEPP	State Environment Planning Policy.

1. Introduction

1.1 Background

South 32, Illawarra Coal (Illawarra Coal) proposes to continue its underground mining operations at the Bulli Seam Operations (Appin and West Cliff Mines), located in the Southern Coalfield of New South Wales, by extracting coal from the Bulli Seam using longwall mining techniques.

Project Approval for the Bulli Seam Operations was granted by the Planning Assessment Commission on 22 December 2011. An Environmental Assessment was completed to support the Bulli Seam Operations (BSO) proposal and was prepared by Resource Strategies in consultation with a number of specialist sub consultants.

The BSO mining areas have relatively high coal seam methane concentrations. In order to facilitate safe and efficient first workings development, gas drainage of the coal seam is required prior to mining activities. The effectiveness of in seam gas drainage is a function of the pre-mining lead time where the gas can be removed from the coal seam. Similarly, continued safe and efficient mining of longwalls requires the drainage of methane gas from the coal seams and goaf during mining.

In order to support the safe and efficient extraction of coal in the BSO, Illawarra Coal proposes to optimise the underground extraction and utilisation of methane gas from the mine by implementing the "Mine Safety Gas Management Project" (MSGMP). Installation and operation of the proposed pipeline will enable the existing Appin East gas drainage management system to remain in service for an extended period by reducing the frictional pressure drop and leakage in the pipelines between the mining areas and the gas extraction plant. Considerable benefits in terms of power generation and reduction in greenhouse gas emissions will also result from the Project. If the proposed pipeline cannot be installed, the existing Appin East gas extraction system will not be able to provide sufficient suction to extract gas from the mining areas and additional gas extraction infrastructure will need to be installed at an alternative location.

The construction and use of the proposed surface suction pipeline infrastructure was not approved as part of the BSO Project. Section 2.5.5 of the BSO Project Environmental Assessment noted that "*Construction of any additional surface gas pipeline infrastructure would be subject to separate assessment and approval*". A s75W modification is proposed to modify the BSO Approval to incorporate the construction and operation of the proposed (MSGMP) gas management infrastructure.

This document provides an environmental assessment of the MSGMP, as required by the BSO Project Approval consent conditions. It also details the proposed management activities that will be undertaken during construction, operation and rehabilitation of the MSGMP.

The proposed modification also seeks to modify the Statement of Commitments, and Conditions 4.14 and 4.23 of the BSO Project Approval, as well as the surrender of Appin Mine No. 6 Vent Shaft Project Approval (10_0079) which is requested to be incorporated into the BSO Project Approval.

1.2 Purpose of this Environmental Assessment

The purpose of this EA is to:

- identify the proposed modifications to the existing BSO Project Approval
- describe the proposed additional works and the existing environment of the affected area

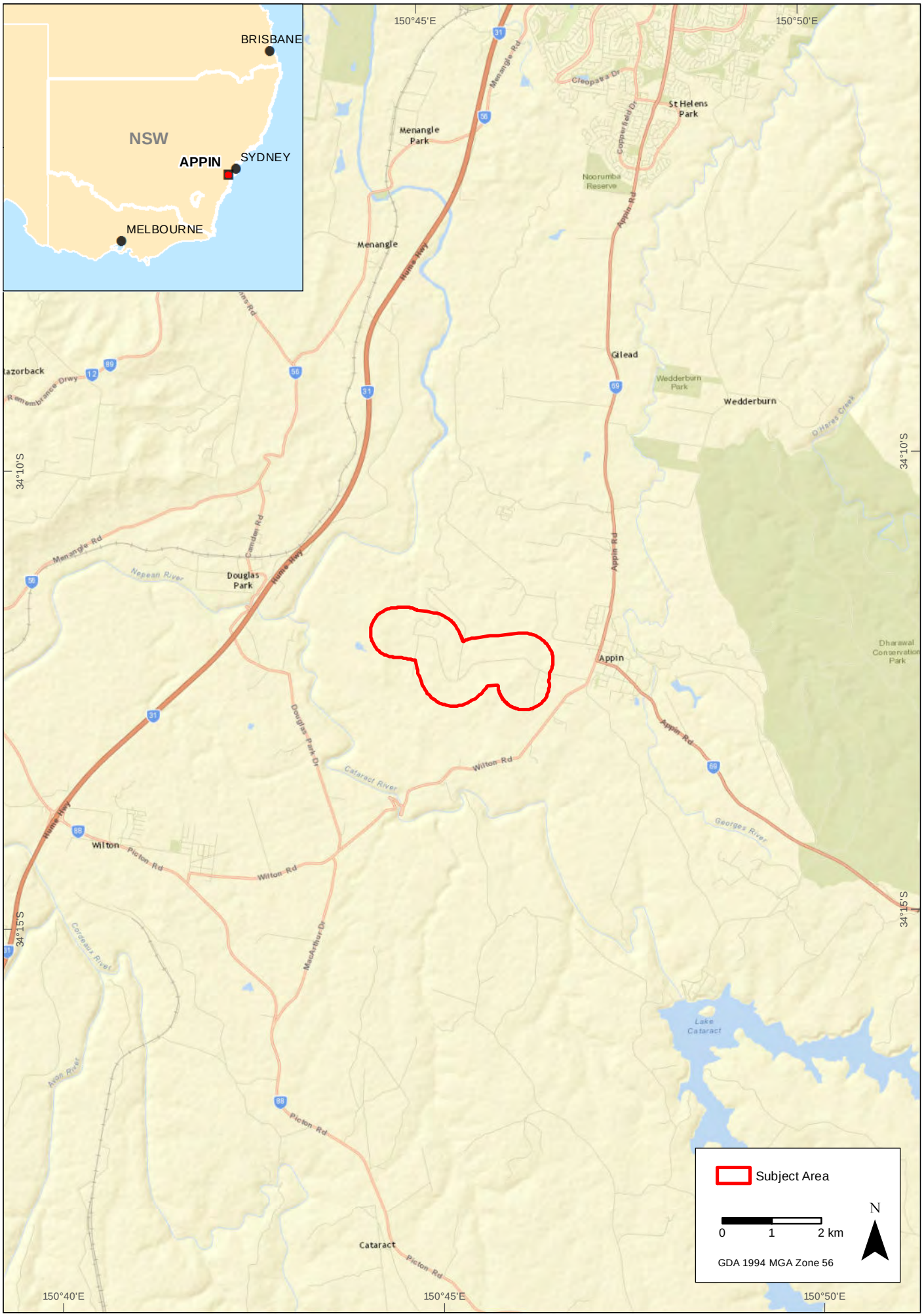
- assess the environmental impacts resulting from the proposed works in comparison to those identified in the Approved BSO Project EA; and
- recommend any additional environmental management and mitigation measures to be undertaken to ameliorate potential impacts resulting from the proposed works.

Approval from the NSW Department of Planning and Environment is required for the following:

- construction of the proposed gas management infrastructure
- operation of the proposed gas management infrastructure.
- proposed modifications to the Statement of Commitments and Conditions 4.14 and 4.23.
- surrender of Appin Mine No. 6 Vent Shaft Project Approval (10_0079).

1.3 Scope of Mine Safety Gas Management Project

Approval is sought to construct and operate a 1 m diameter suction gas pipeline between Appin No. 3 Vent Shaft and the existing gas drainage plant at Appin No. 2 Shaft (approximately 4 km in length). The pipeline will be buried at the surface, for the most part, along Brooks Point Road. Refer Figures 1 - 3 (Annex 1).



Drawn by: RJ Project Manager: CMcE Project Number: 2522 Date: 01/02/2016

Locality Map

Appin East Mine Safety Gas Management Project - s75 Modification

FIGURE 1

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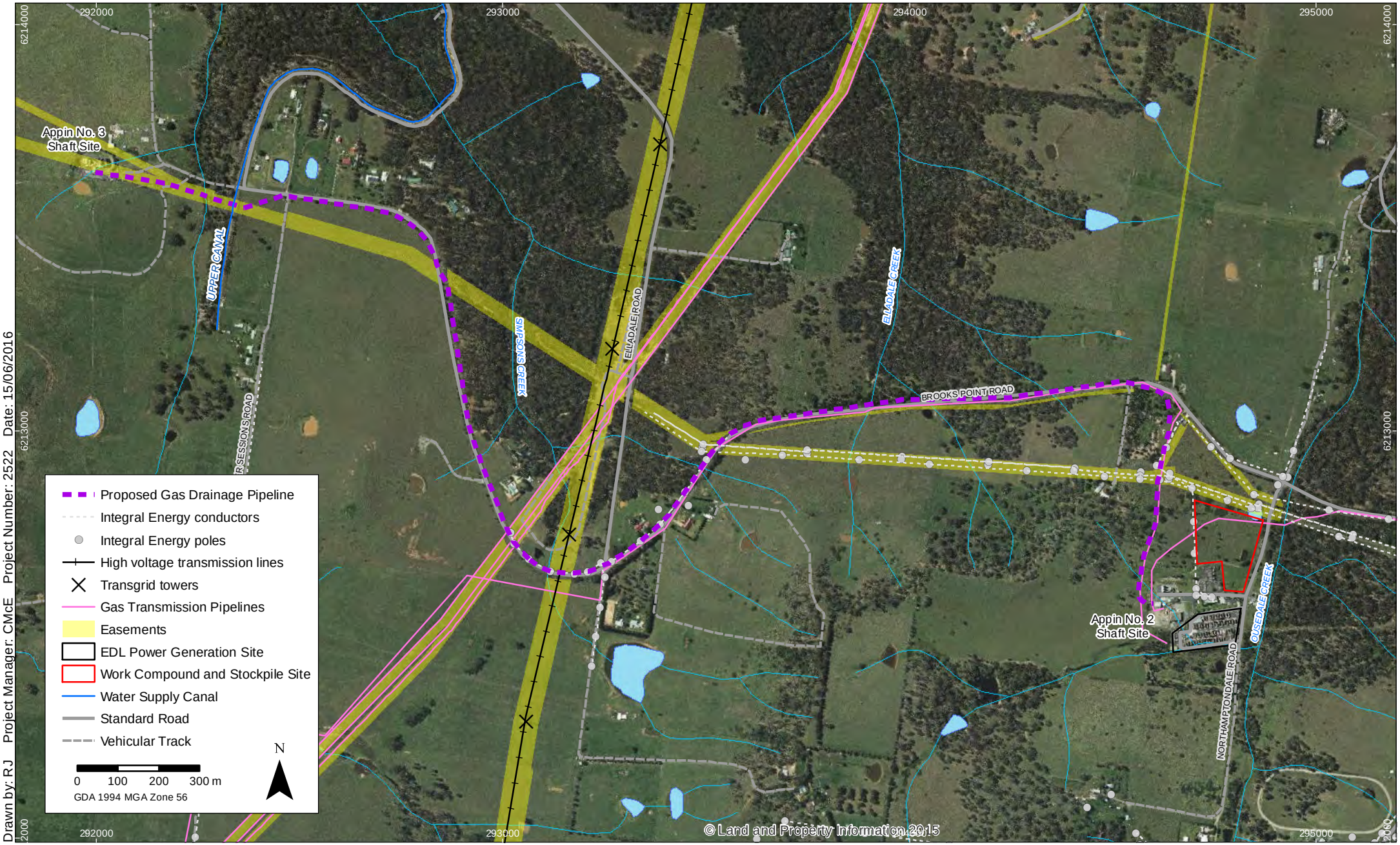

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Site Plan

Appin East Mine Safety Gas Management Project - s75 Modification

FIGURE 2

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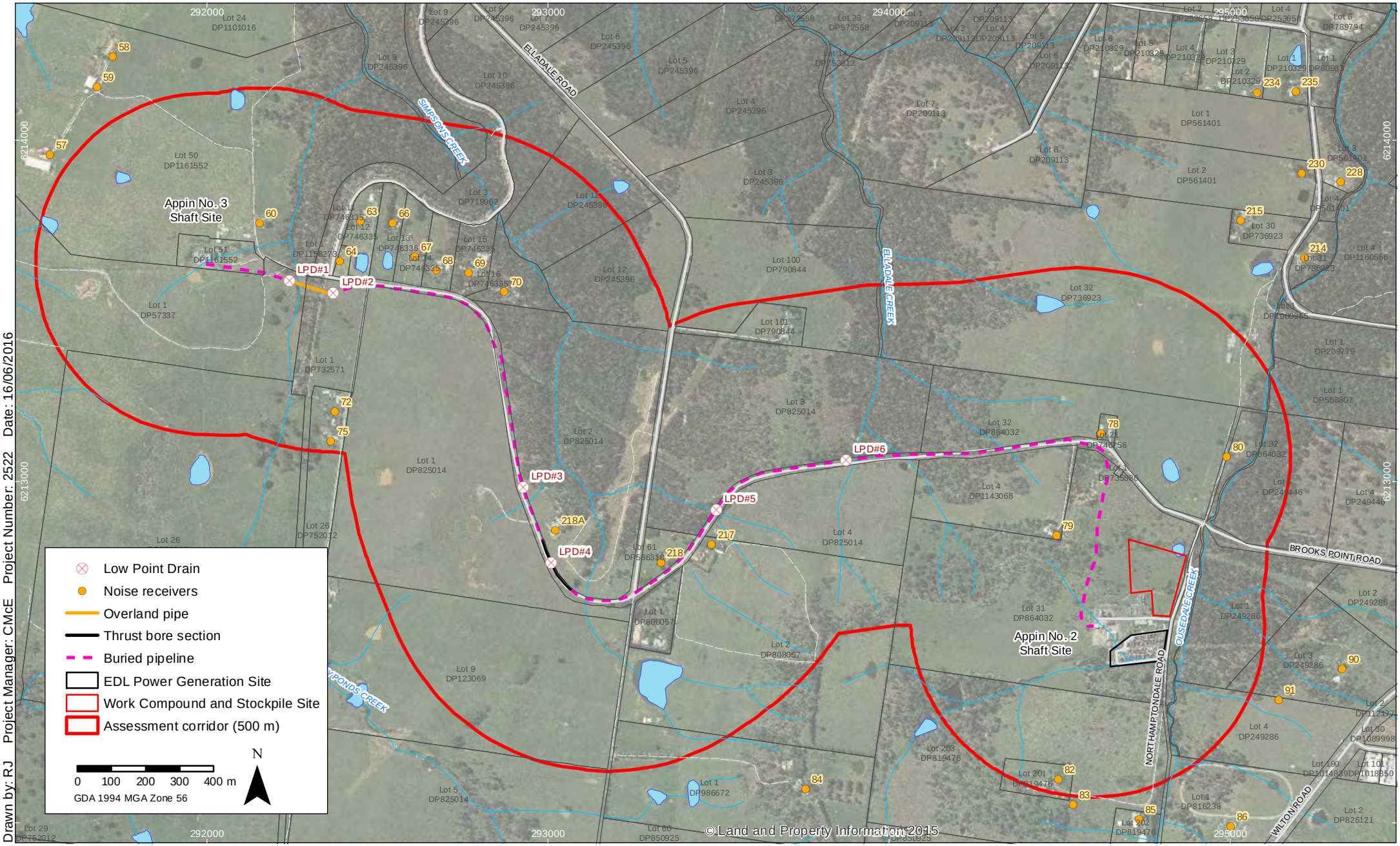

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Proposed Infrastructure

Appin East Mine Safety Gas Management Project - s75 Modification

FIGURE 3

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2. Description of the Project

2.1 Project Description

The MSGMP involves the following activities:

Table 1: Summary of Mine Safety Gas Management Project (MSGMP) Scope

Aspect	Description
Project Summary	• Installation and operation of a gas upcast riser within Appin No. 3 Shaft. Appin No. 3 Shaft is now a downcast ventilation shaft and the previous upcast fans are no longer operational. Ancillary infrastructure such as explosion protection and gas flow valving within the Appin No. 3 Shaft precinct will be installed. • Installation and operation of a buried nominal 1000 mm diameter high density polyethylene (HDPE) surface suction pipeline between Appin No.3 Shaft and the existing gas extraction infrastructure and power generation facilities located at the Appin No. 2 Shaft Site (refer Figure 2-3, Annex 1). The pipeline will be located in the shoulder of Brooks Point Road for most of its length. The pipeline will be located within the assessed corridor 20 metres (m) either side of the alignment shown in Figure 2-3. A 5-10 m wide construction corridor would generally be impacted during the construction of the pipeline, with vegetation clearing generally only occur within the 2 m wide trench alignment. • Installation and operation of six water collection traps and associated small diameter pipelines (nominal 50 mm PE) in addition to access infrastructure to enable captured condensate to be removed by suction truck. Condensate will be either discharged into the Appin Mine gas management water system for reuse as seal water in the liquid ring gas extraction pumps or discharged to an appropriately licensed facility. • Installation and operation of above ground crossings of the Upper Canal and a 1st order tributary of Simpsons Creek. These crossings will be nominal 1000 mm steel pipe with supporting concrete abutments and steel gantries. Refer Figure 3 (Annex 1) and drawings (Annex 2). • Brooks Point Road will be crossed twice by the buried surface suction pipeline in accordance with a s138 approval under the NSW *Roads Act 1993* issued by Wollondilly Shire Council. • Underboring of gas and electrical power distribution systems in accordance with infrastructure owner requirements. The Appin East surface suction pipeline connects to existing gas management infrastructure at the existing Appin No. 2 Shaft Site. The gas extracted from Appin Mine is then provided to Energy Developments Limited (EDL) for the generation of power. This existing gas management infrastructure is approved under existing BSO Project Approvals. EDL operate in accordance with separate development approvals. Any gas that cannot be supplied to EDL will be flared in order to minimise greenhouse gas emissions.
Project Location and Access	The proposed suction gas pipeline will be installed along Brooks Point Road between Appin No. 3 Vent Shaft and the existing gas drainage plant at Appin No. 2 Shaft. The eastern end of the MSGMP at Appin No. 2 Shaft is located approximately 2 km south west of Appin. The western end of the MSGMP at Appin No. 3 Shaft is located approximately 4 km west of Appin. Refer Figure 1 and Figure 2 (Annex 1).
Buried Pipeline	A trench nominally 2 m wide and 2 m deep will be constructed by large excavator. No blasting or rock picking will be required, however the shale/sandstone may need to be ripped or cut with a rock saw. HDPE pipe of ~1 m overall diameter will be laid on bedding sand in the trench then backfilled. It is expected that ~50-100 m of trench / pipe will be laid per day. The length of

Aspect	Description
	the buried pipeline is nominally 4000 m. Two work fronts will operate simultaneously from either end of the pipeline route and meet in the middle. Each work front will require: • Survey team in light vehicles and field crew to set out the known services and mark out the pipeline route • Large excavator and / or trenching machine to excavate the majority of the trench for the pipeline. • Two - four dump trucks to deliver bedding sand (expected to be approximately up to 8 deliveries per day after the trench has been excavated). • Two dump trucks to move excavated soil and rock to temporary stockpiles within a few kilometres of the work front. The temporary stockpile area will be located on Illawarra Coal land adjacent to the Appin No. 2 Shaft or on other flat, grassed paddock sites where no native vegetation or cultural heritage sites exist. Appropriate stormwater and erosion control methods will be in place at all temporary stockpile sites. Once the temporary stockpile sites are no longer required, the disturbed area will be rehabilitated back to its original state. • Front end loader or excavator for stockpile management and loading dump trucks. • Semi trailer delivery of pipes (expected to be approximately two – four per day). • Truck mounted crane for pipe installation.
Overland Steel Pipe	A nominal 1 m diameter overland steel pipeline will be constructed to bridge the NSW Water Upper Canal and adjacent creek / farm dam. • Foundations will be excavated by small excavator, formwork will be installed and concrete poured. This is expected to involve approximately six concrete trucks. • All steel elements will be fabricated off site and be transported to site by approximately six semi-trailer loads. • Two truck mounted cranes will install the fabricated steel pipeline elements. • This section is expected to take approximately four to six weeks to construct.
Thrust Bore	A thrust bore will be required to install the buried pipeline below the existing Jemena / APA / Gorodok high pressure gas pipelines. This will require 5 m x 5 m wide x 6 m deep portals to be constructed at both ends of the bore. This will require: • A large excavator, dump trucks, small crane to install shoring equipment. This element will take approximately two weeks. • Thrust boring will take approximately five days. The thrust boring equipment will be lowered into the portals with a small crane over one day. • It is expected noise to be similar to an operating excavator. One semi-trailer of pipes will be delivered and unloaded with truck mounted crane. • Once the thrust bore is completed, filling of the portals will be undertaken which is expected to take up to approximately four days.
Associated Facilities	• A project compound with parking areas and amenities will be established on Illawarra Coal land adjacent to the Appin No. 2 Shaft Site. Refer Figure 2. • A stockpile site will also be established on Illawarra Coal land adjacent to the Appin No. 2 Shaft Site or other suitable location with landholder consent and appropriate environmental controls in place. Refer Figure 2. Short term (a few days duration) soil stockpiling may occur within the construction corridor with appropriate soil and erosion controls. On-site short term stockpiling will minimise traffic on Brooks Point Road. • Fuel and other material supply facilities are located nearby in Appin and

Aspect	Description
	Campbelltown.
Rehabilitation	• Once the pipeline is installed and buried, surface disturbance of the road verge and driveways will be repaired and profiled using standard road maintenance equipment (such as loader, grader, roller) with delivery of road base and other materials with dump trucks. • Previously vegetated areas would be rehabilitated as agreed with Wollondilly Shire Council or the relevant landowner (with re-spreading of top soil, seeding with pasture and/or native grass species and ongoing maintenance).
Traffic Management	• During the proposed construction period, traffic management will be undertaken to ensure traffic disruption on Brooks Point Rd is kept to a minimum and to maintain community road safety. A Traffic Management Plan will be approved by Wollondilly Shire Council in accordance with s138 of the NSW *Roads Act 1993.*
Timing and Duration	• It is expected the duration of the construction will be approximately six to eight months based on Monday to Saturday construction. • The MSGMP will commence on receiving planning approval, expected in mid-2016. The Appin East MSGMP is required to be operational in early 2017 to coincide with the commencement of Longwall 902.
Hours of Operation	All construction activities would be undertaken in accordance with the EPA standard construction working hours of: • Monday – Friday: 7 am to 6 pm. • Saturday: 8 am to 1 pm. • Sunday and Public Holidays: No work.
Employment	• 10-20 temporary construction positions will be created during the construction period • No additional full time positions would be created over the lifetime of the MSGMP.
Residential Receivers	• Thirty seven residential noise receivers were considered to be potentially impacted by the construction of the MSGMP with only one receiver considered likely to be "highly noise impacted". • The operational phase of this project is unlikely to generate any audible noise.
Capital Cost	$7.5 million.

2.2 Comparison to the Approved Project

Table 2 outlines coal seam drainage elements from the Approved BSO Project (from Section 2.5.5 of BSO Project EA) and compares them to the proposed Modification. Other than the MSGMP pipeline and associated infrastructure, no other significant elements are proposed.

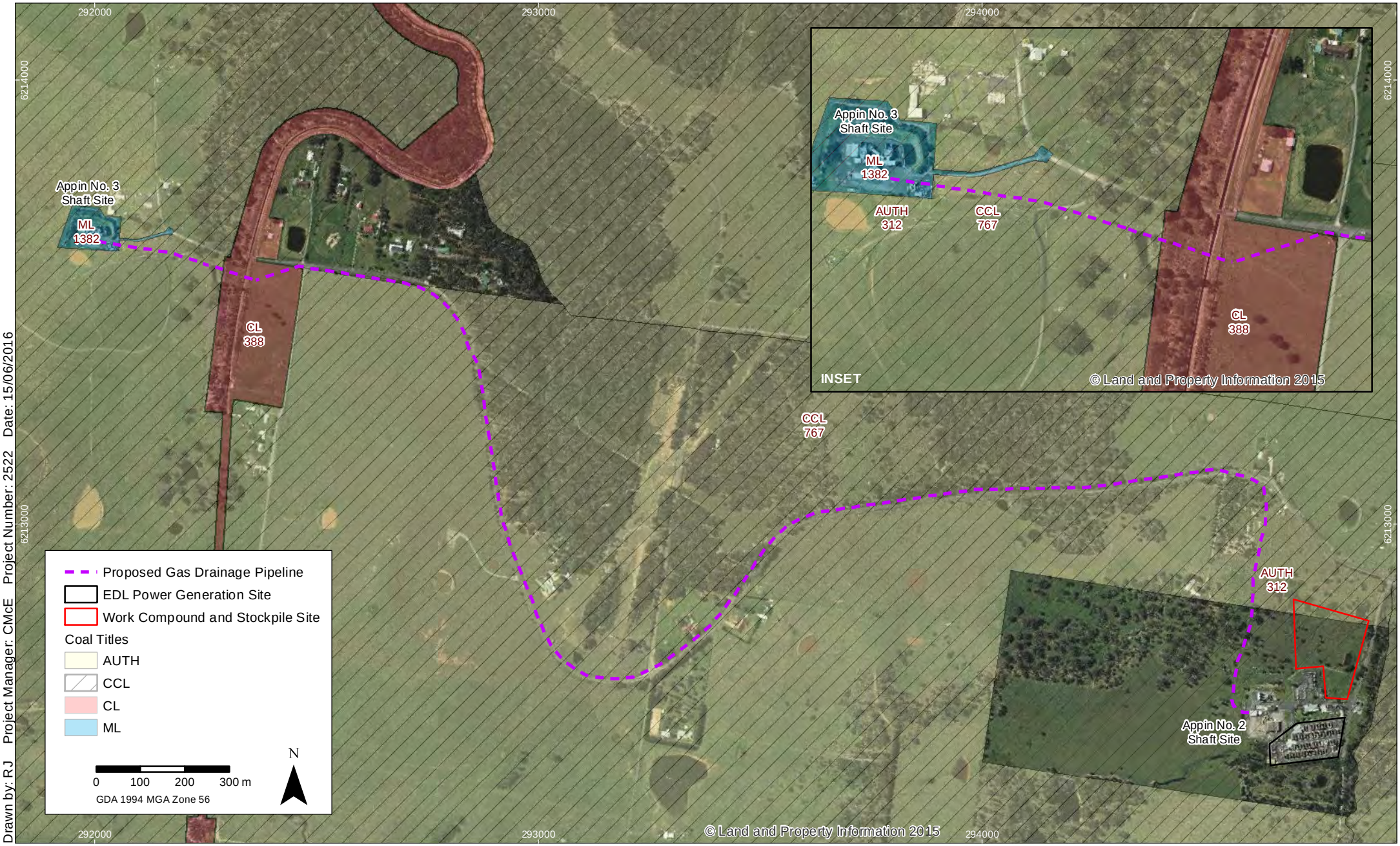
Table 2: Comparison between the Approved BSO Project and Proposed Modification

Aspect	Approved BSO Project (from Section 2.5.5 of BSOP EA)	Proposed Modification
Coal Seam Gas Drainage Method Description	• To reduce the gas content in the Bulli Seam to the target range for longwall operations at the Appin Mine and West Cliff Colliery, the gas is pre-drained by drilling in-seam (i.e. horizontal)	• No Change

Aspect	Approved BSO Project (from Section 2.5.5 of BSOP EA)	Proposed Modification
	boreholes with lengths of up to approximately one kilometre into the Bulli Seam in advance of mining. • Experience has shown that strata relaxation caused by the retreating underground longwall face liberates significant volumes of gas into the mine workings from the underlying Wongawilli Seam (Figure 2-7), which is approximately 20 m below the Bulli Seam. To capture this gas, cross-measure boreholes are also drilled from the mine workings into the Wongawilli Seam. These boreholes are designed to collect the gas at its source or to intercept gas before it migrates into the mine workings.	• No Change
Gas Extraction and Utilisation Infrastructure	• The Appin-Tower Power Project would continue to be used for the BSO Project. The Appin-Tower Power Project is operated by EDL and involves the extraction of coal bed methane gas ahead of mining and capturing in a set of gas engines to provide a maximum of 94 MW of power to the NSW state grid. The coal bed methane collected from the in-seam and cross-measure boreholes would continue to be drawn by vacuum to the gas drainage plants at the Appin West, Appin East and the West Cliff pit tops.	• No Change
Gas pipelines	• The existing underground gas pipeline network would be retained and augmented as necessary to support the BSO Project. • The existing 6.8 km long gas pipeline linking the Appin No.1 and No.2 shafts site and the West Cliff pit top would be maintained for the BSO Project. • Construction of any additional surface gas pipeline infrastructure would be subject to separate assessment and approval.	• No Change • No Change • A new 1 m diameter suction gas pipeline between Appin No. 3 Vent Shaft and the existing gas drainage plant at Appin No 2 Shaft (4 km in length) is proposed. The pipeline will be buried at the surface, for the most part, along Brooks Point Road.

2.3 Modification to Select BSO Project Approval Conditions

The proposed modification also seeks to modify the Statement of Commitments, and Conditions 4.14 and 4.23 of the BSO Project Approval, as well as the surrender of Appin Mine No. 6 Vent Shaft Project Approval (10_0079) which is requested to be incorporated into the BSO Project Approval. Justification is provided in Section 2.4.2 below.



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Coal Titles

Appin East Mine Safety Gas Management Project - s75 Modification

FIGURE 4

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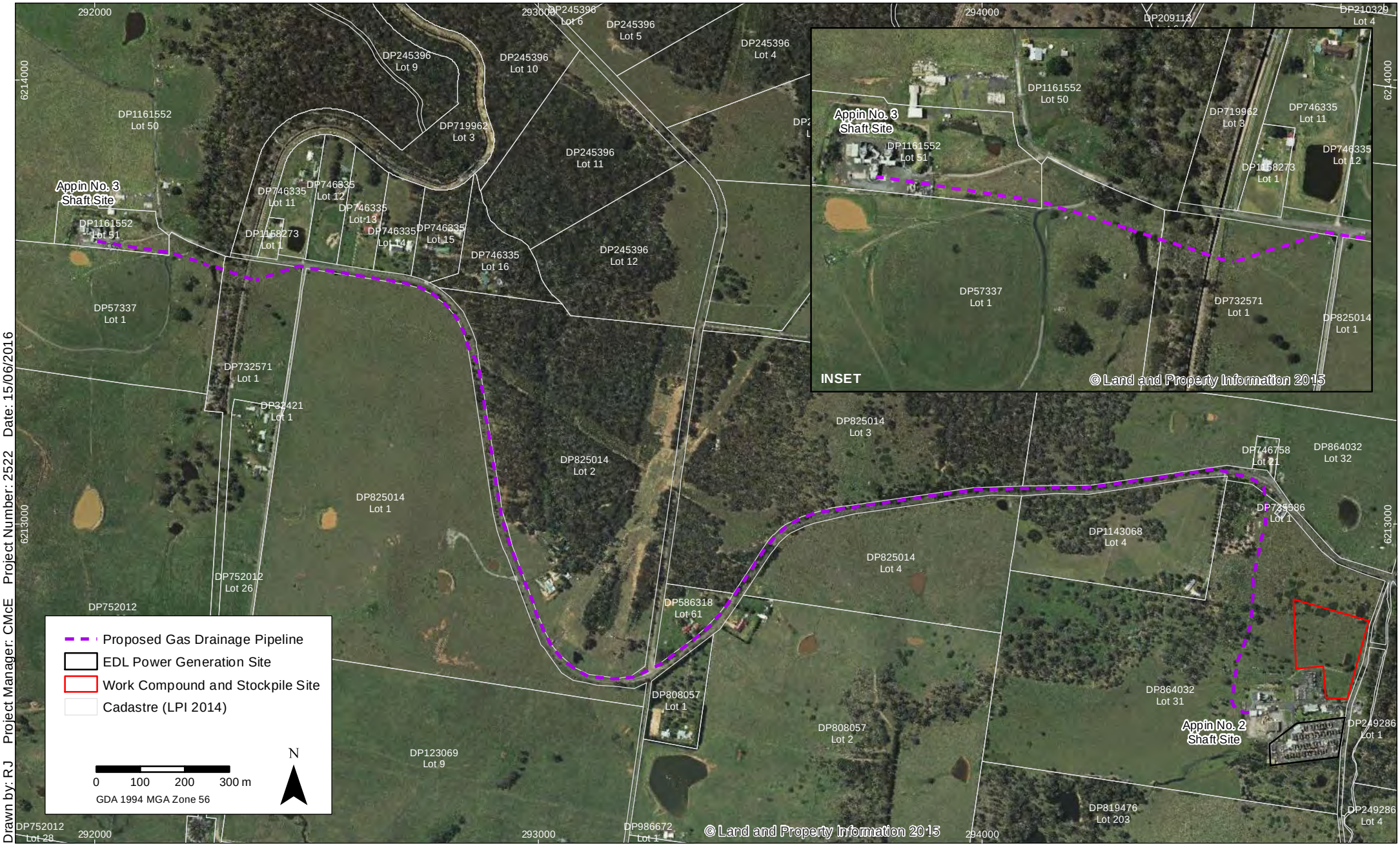

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Cadastre

Appin East Mine Safety Gas Management Project - s75 Modification

FIGURE 5

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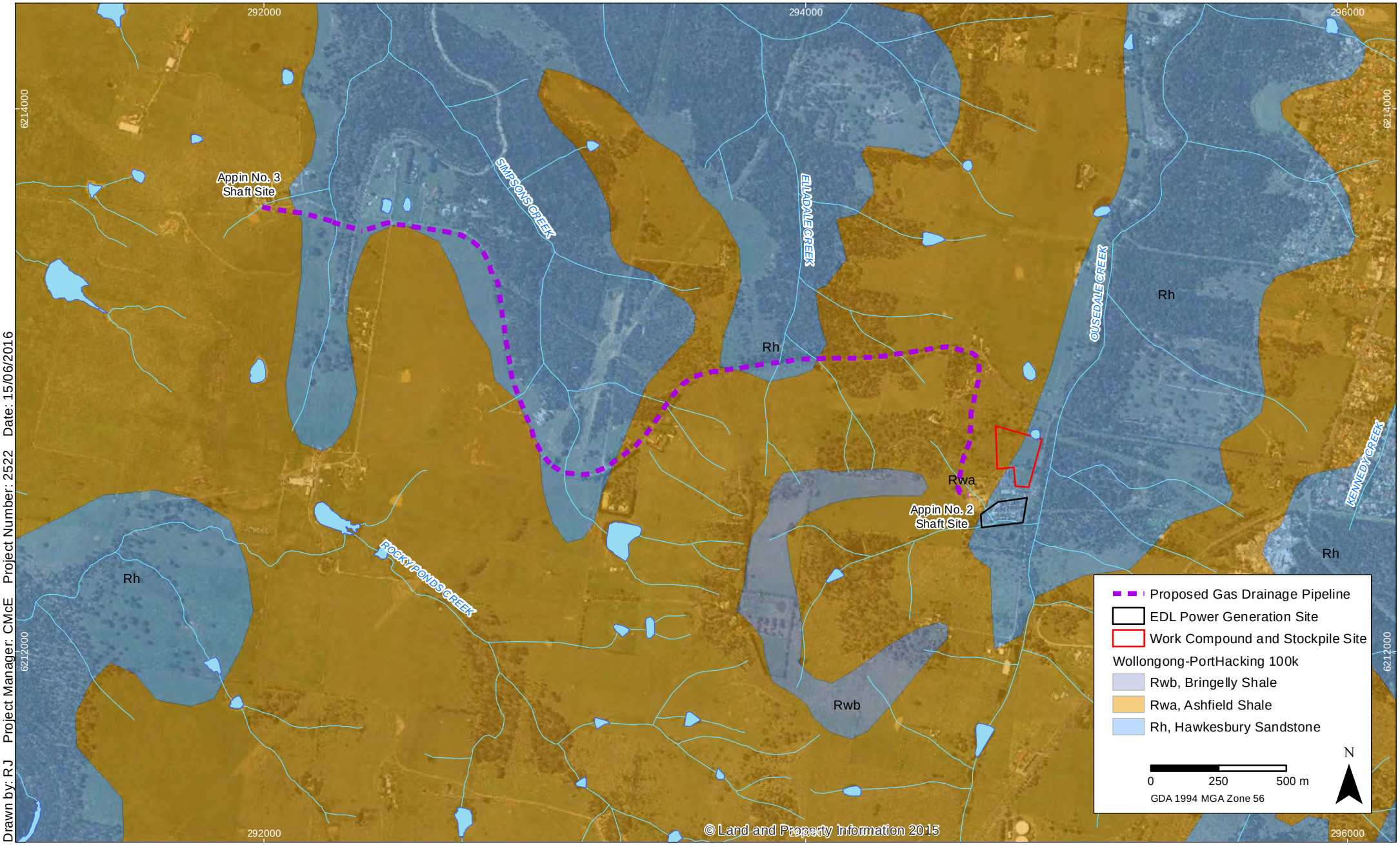

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Surface Geology

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FIGURE 6

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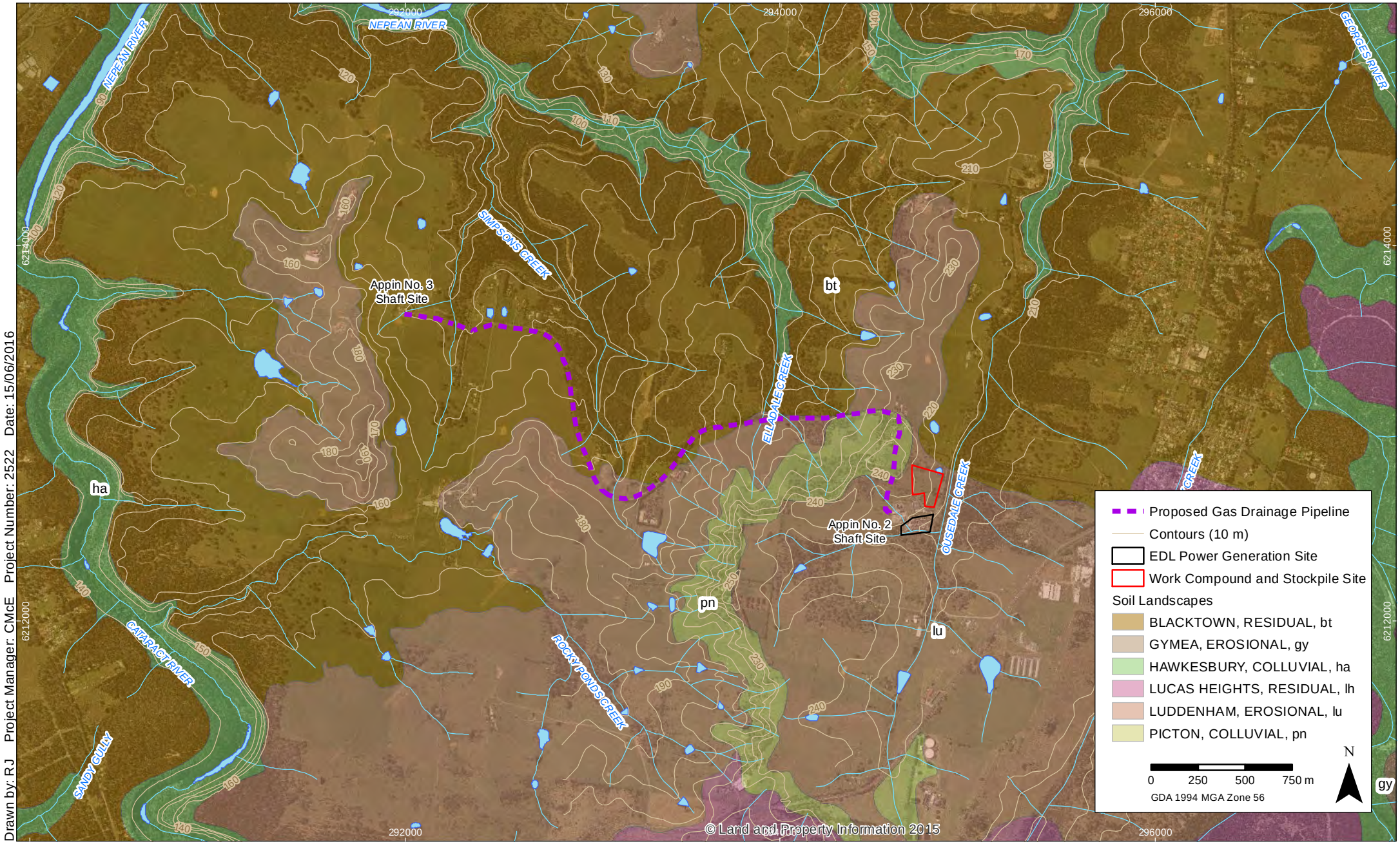

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Soil Landscapes and Hydrology

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FIGURE 7

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2.4 Justification

2.4.1 MSGMP Justification

The Appin Mine longwalls (Appin Area 7 and 9) are progressing to the north west which means the mine workings are becoming further away from the gas extraction facilities at Appin East and Appin West. In the immediate future, gas drainage efficiency will be reduced by the additional distance of the gas drainage pipeline (between the longwalls and the gas drainage plants). To maintain gas drainage efficiency, either the length of the gas pipelines must be reduced or the pipe diameter increased to decrease the pressure drop between the mining area and the gas extraction plant.

Reducing pipeline distance would effectively necessitate relocating the gas extraction facilities at Appin East and Appin West, which is undesirable given they are located next to existing energy generation plants, and several other constraints. Therefore the most feasible option is to increase capacity of the pipeline.

The proposed large diameter suction gas pipeline is required to more effectively manage methane gas during mining in order to maintain safety during longwall mining operations. It will enable sufficient suction to efficiently drain the coal seam prior to and during mining, and convey the gas to the gas extraction plant for beneficial use (electricity generation) or flaring.

The proposed MSGMP Modification will improve or maintain the efficiency of coal seam gas drainage. Occasionally during periods when gas exceeds the capacity of the EDL power plants, gas will be flared (oxidised) rather than being vented to the atmosphere. Green House Gas (GHG) assessment of previous gas drainage proposals (Heggies Pty Ltd, 2008 and Cardno Forbes Rigby, 2009) have indicated that where gas drainage incorporates flaring or power generation, these proposals have a net reduction in GHG emissions. This is because the methane that would be vented to the atmosphere is combusted, converting the methane to CO_2, a gas which has a greatly reduced GHG potential or global warming potential (GWP), relative to methane.

The consequences of this project not proceeding include increased safety risks to mining in these areas, and reduced efficiency in mining caused by stoppages when underground gas concentrations exceed safety limits. The extraction of underground coal reserves in these areas is necessary to ensure continuity of coal supply to customers, consistent with Illawarra Coal's business requirements. This includes significant ongoing operating investment in the Southern Coalfields of NSW, with flow on benefits including continuity of employment, expendable income, export earnings and government revenue.

An alternative pipeline route through Lots 1, 2 & 4 / DP825014 that is within the existing 66kV power line easement operated by Endeavour Energy was investigated. Landowner consent for this alternative was not able to be secured by Illawarra Coal.

2.4.2 Modification to Select BSO Project Approval Conditions

Statement of Commitments

In July 2014, Illawarra Coal requested approval from the Department to cease the operation of the Appin Shopfront in lieu of refocusing community consultation efforts in and around Douglas Park. Douglas Park is the geographic focus of Illawarra Coal's activities in the Bulli Seam, and it is appropriate to directly engage with the community in Douglas Park. Illawarra Coal request that this Commitment originally made by Illawarra Coal in the BSO Environmental Assessment be deleted.

Condition 4.14 Compensatory Water Supply

Illawarra Coal requests that the requirement "in consultation with NOW, and to the satisfaction of the Secretary" be deleted and be replaced with "in accordance with the approved Water Management Plan". This modification provides for up front consultation with NOW during the development of the Water Management Plan and retains a dispute resolution process for the Secretary should any landholders disagree with the proposed measures to be implemented. Illawarra Coal is committed to providing compensatory water to affected landholders in a timely manner. The requirements of the existing condition do not enable Illawarra Coal to provide compensatory water to affected landholders in a timely manner as consultation with NOW and DPE can often take weeks or months.

Condition 4.23 Personal Emergency Device (PED) Communications Management Plan

Personal Emergency Device (PED) Communications are now a redundant technology, thereby making this condition superfluous. However, the Management Plan approach for the further approval of minor surface infrastructure (see Conditions 4.21 & 4.22) has been extensively utilised to approve gas drainage and service borehole activities. Illawarra Coal request that Condition 4.23 be renamed to a "Surface Activities Management Plan". This will enable a variety of smaller activities such as but not necessarily limited to; pipelines, electrical infrastructure, works to public infrastructure, communications and monitoring equipment to be efficiently and effectively approved and regulated. The requirements for the renamed condition could remain unchanged. This condition would not be applicable for the approval of significant activities such as but not limited to; pit tops, ventilation shafts, coal wash emplacements or coal handling facilities.

Surrender of Appin Mine No. 6 Vent Shaft Project Approval (10_0079)

Illawarra Coal also requests the Appin Mine No. 6 Vent Shaft Project Approval (10_0079) be incorporated into the BSO Project Approval. Illawarra Coal owns the land to which Approval 10_0079 applies and the now operational Appin No. 6 Vent Shaft is an integral part of the BSO Project ventilation system. Illawarra Coal will update the relevant Management Plans required by the BSO Project Approval to incorporate the necessary management, monitoring and reporting at the Appin No. 6 Vent Shaft. Approval 10_0079 will then be surrendered.

3. Site Description and Affected Properties

3.1 Site Location

The study area is in the general locality of Appin, New South Wales. The study area is within the approved BSO Project Area, Consolidated Coal Lease (CCL) 767 located in the South Campbelltown Mine Subsidence District in the Southern Coalfield of NSW. The sites are located on several different properties as listed in Table 3, which are situated adjacent to Brooks Point Road, Appin, NSW.

The proposed suction gas pipeline will be installed within a linear works area along Brooks Point Road between Appin No. 3 Vent Shaft and the existing gas drainage plant at Appin No. 2 Shaft.

The eastern end of the MSGMP at (Appin No. 2 Shaft) is located approximately 2 km south west of Appin. The western end of the MSGMP at (Appin No. 3 Shaft) is located approximately 4 km west of Appin. Refer Figure 1 and Figure 2 (Annex 1).

The pipeline traverses five land parcels. Refer Figure 5. Two of these are owned by Illawarra Coal's subsidiaries, one is managed by WaterNSW, one is Brooks Point Road managed by Wollondilly Shire Council, and one is a private corporate owner. Illawarra Coal will have access agreements in place for all relevant sites prior to the commencement of any works. The property descriptions are provided in **Table 3** below (from west to east).

Table 3: Affected Properties

Lot/DP	Description
Lot 51 DP1161552	Lot includes Appin shaft site held under Mine Lease ML1382 and owned by Endeavour Coal (Illawarra Coal).
Lot 1 DP57337	Private pastoral land. The pipeline traverses this lot for a short distance. Overland steel pipeline will be constructed to bridge the creek and farm dam.
Lot 1 DP732571	Lot includes the WaterNSW Upper Canal water supply canal. Overland steel pipeline will be constructed to bridge the canal. It then veers north (as a buried pipe) into the Brooks Point Road road reserve.
Brooks Point Road	Buried pipeline traverses east along southern road shoulder, then crosses to the northern road shoulder at the first curve in the road.
Lot 31 DP864032	Pipeline veers south into pastoral land owned by Endeavour Coal (Illawarra Coal) and terminates at Appin No. 2 Shaft Site gas drainage facility.

3.2 Site Description

The pipeline route traverses a highly modified environment due to historical native vegetation clearing for pastoral and agricultural purposes, road construction and utility infrastructure (gas, electricity, telecommunications) installation. The land parcels on or adjacent to the pipeline route are currently used for cattle and horse grazing, mixed agriculture and rural residential.

A large portion of the study area has been aligned to an exotic grassland vegetation unit. This area contains many introduced grass species with weeds, and occasional native species.

Regenerating Grey Box – Forest Red Gum Grassy Woodland (regenerating) was identified mainly on or adjacent to the road shoulders. It predominantly consists of regenerating shrubs, grasses and native forbs. Weeds were common throughout the ground layer within the native vegetation community.

The topography is gentle to hilly and generally slopes downwards towards the north west and the incised Nepean River gorge. Surface water bodies consist of a few nearby man made dams. Simpsons and Elladale creeks and their tributaries cross the pipeline route (draining northwards).

The key infrastructure present within the study area includes the existing coal mine infrastructure, Brooks Point Road, Wilton Road, Elladale Road, local access roads, rural residential dwellings, farm dams and utilities such as overhead powerlines and telecommunication cables (refer Figure 3). The significant utility infrastructure in the study area includes:

- WaterNSW Upper Canal (water supply canal)
- Transgrid High Voltage electrical transmission lines
- Jemena / APA / Gorodok high pressure natural gas pipelines
- Integral Energy conductors and poles
- Telecommunications conduits.

Photographs of the pipeline route are attached in Annex 2.

3.3 Development Constraints

The majority of the pipeline route has been cleared of native vegetation. The primary development constraints are:

- 1st order tributary of Simpsons Creek, requiring overland steel pipeline to bridge the creek and farm dam.
- WaterNSW Upper Canal (water supply canal), requiring overland steel pipeline to bridge the canal.
- Transgrid High Voltage electrical transmission lines, requiring adequate machinery setbacks to be observed during construction.
- Jemena / APA / Gorodok high pressure natural gas pipelines, requiring underboring.
- Integral Energy conductors and poles, required to be avoided.
- Telecommunications conduits, required to be avoided.
- Brooks Point Road, requiring traffic control during construction and appropriate repair and rehabilitation post construction.
- Adjacent properties and residential dwellings, requiring appropriate repairs to road and driveway crossings where required, and noise mitigation during construction by observing standard construction working hours.
- There is a small road cutting at the crest of Brooks Point Road that will require either cutting of the shale embankment or excavation of the north side of the road to install the pipeline.

4. Consultation

4.1 Department of Planning and Environment

Consultation has been undertaken with the Department of Planning and Environment (DoPE) as follows:

- Notification of intention to submit s75W Modification.
- Pre-submission Planning Meeting conducted at DoPE offices on 6 April 2016.

4.2 Division of Resources and Energy

The Resources and Energy Division of the NSW Department of Industry has been notified of Illawarra Coal's intention to submit this s75W Modification.

4.3 WaterNSW

WaterNSW has been consulted throughout the design process for the pipeline and have provided their requirements on the design considerations for the proposed infrastructure in relation to mitigating impacts on the Upper Canal. This has resulted in Illawarra Coal refining design elements to mitigate any structural impacts on the Upper Canal structure. Refer Annex 7.

Illawarra Coal has provided WaterNSW with a detailed document on 14 April 2016 (refer Annex 7) which specifically addresses WaterNSW's "Requirements for the Protection of the Upper Canal" (WaterNSW 2015). This document outlines the assessment and relevant control measures that will be implemented to minimise risk to the Upper Canal to negligible or low levels in relation to:

- Basis of design of the proposed pipeline to cross the Upper Canal
- Water quality
- Protection of WaterNSW infrastructure
- Operation and maintenance of the Upper Canal
- Security and public safety
- Future construction of a new water supply pipeline
- Incident notification and entry onto controlled Areas
- Heritage
- Land title, easement or licence agreement with WaterNSW for new structures.

A neutral or beneficial effect on water quality (NorBE) assessment is also provided in Annex 7 as recommended by WaterNSW.

4.4 Wollondilly Shire Council

Council has been consulted throughout the design process for the proposed pipeline and have provided feedback on design and rehabilitation considerations for the proposed infrastructure in relation to Brooks Point Road. This has resulted in Illawarra Coal refining design elements and rehabilitation considerations to mitigate impacts infrastructure in relation to Brooks Point Road. Illawarra Coal will enter into an

Agreement with Wollondilly Shire Council to enable the pipeline to be constructed and operated within the easement of Brooks Point Road.

4.5 Jemena / APA / Gorodok

Jemena has been consulted throughout the design process for the proposed pipeline and have provided detailed feedback on design considerations for the proposed infrastructure in relation to mitigating impacts on the high pressure natural gas pipelines. This has resulted in Illawarra Coal refining design elements to mitigate any structural impacts on the high pressure natural gas pipelines and specifically, has informed the decision to underbore them.

4.6 Transgrid

Transgrid has been consulted throughout the design process for the proposed pipeline and have provided detailed feedback on design considerations for the proposed infrastructure in relation to mitigating impacts on the high voltage transmission lines. This has resulted in Illawarra Coal refining design elements to mitigate any structural impacts on the high voltage transmission lines. The high voltage transmission lines and towers will be avoided and required setbacks from power lines during construction will be observed.

4.7 Endeavour Energy

Endeavour Energy has been consulted throughout the design process for the proposed pipeline and have provided detailed feedback on design considerations for the proposed infrastructure in relation to mitigating impacts on power lines. This has resulted in Illawarra Coal refining design elements to mitigate any structural impacts on the power lines. The power lines will be avoided and required setbacks from power lines during construction will be observed.

4.8 Telstra

Telstra has been consulted throughout the design process for the proposed pipeline and have provided detailed feedback on design considerations for the proposed infrastructure in relation to mitigating impacts on the local telecommunications infrastructure. This has resulted in Illawarra Coal refining design elements to mitigate any structural impacts on the local telecommunications infrastructure. The telecommunications infrastructure will be avoided and required setbacks during construction will be observed.

4.9 Sydney Water

Sydney Water has been consulted throughout the design process for the proposed pipeline and have provided detailed feedback on design considerations for the proposed infrastructure in relation to mitigating impacts on water supply and sewerage infrastructure. This has resulted in Illawarra Coal refining design elements to mitigate any structural impacts on local water supply and sewerage infrastructure.

4.10 Private Landholders and Community

Extensive consultation has been undertaken with the private landowner of Lot 1 DP57337. The proposed pipeline extends from the Appin No. 3 Shaft Site and traverses this lot for approximately 150 m before bridging the Upper Canal.

An access agreement has been reached that will enable Illawarra Coal to access the property and install, operate and maintain the proposed pipeline.

Communications for the MSGMP aims to ensure all local stakeholders are informed of the proposed works, and the importance of mine safety. Landholders along the proposed pipeline route will be notified of the MSGMP prior to the submission of the project to DPE for approval, upon approval, advised of the estimated construction dates and receive progress updates as the MSGMP progresses. Information will be provided to the broader Appin community via regular updates provided by Illawarra Coal that updates the community on activities being undertaken in the area. The BSO Community Consultative Committee and Douglas Park Advisory Committee will be regularly updated throughout the MSGMP.

5. Regulatory Framework

An Environmental Assessment was submitted in October 2009 (BHPBIC 2009) for the continuation of underground mining operations at the Appin and West Cliff Collieries (herein referred to as the Bulli Seam Operations (BSO)) in accordance with Part 3A of the *Environmental Planning and Assessment Act, 1979* (EP&A Act) and the *Environmental Planning and Assessment Regulation, 2000* (EP&A Regulation).

Project Approval for BSO was granted by the Planning Assessment Commission on 22 December 2011.

The construction and use of future gas drainage infrastructure was not approved as part of the BSO Project. Section 2.5.5 of the BSO Project Environmental Assessment noted that "*Construction of any additional surface gas pipeline infrastructure would be subject to separate assessment and approval*". A s75W modification is proposed to modify the BSO Project Approval to incorporate the construction and operation of the proposed (MSGMP) gas management infrastructure.

Section 75W of the EP&A Act regulates modifications to Minister's Approval, where by the proponent (Illawarra Coal) may request the Minister to modify the Minister's approval for a project.

This EA forms part of the application for a modification under Section 75W of the EP&A Act to the existing project approval for the Bulli Seam Operations Project (Application No.08_0150). As detailed in this EA, the infrastructure required for the proposed modification works is considered to be consistent with that detailed in the Approved BSO Project. Potential construction of future additional surface gas pipeline infrastructure was noted in Section 2.5.5 of the BSO Project Approval.

The proposed works are considered to be an extension of development under an approved project in a similar geographical and environmental setting. Modification of the Approved BSO Project is likely to have limited environmental consequences beyond the project's original environmental assessment and is not considered to be a separate project.

Approval from the NSW Department of Planning and Environment is required for the following:

- construction of the proposed gas management infrastructure
- operation of the proposed gas management infrastructure.

An overview of the regulatory framework as it relates to the BSO Project is set out in Section 7 of the original EA for the BSO Project Approval and is not repeated here. The proposed modification is consistent with the regulatory framework detailed in the original EA for the BSO Project Approval and additional legislation or planning instruments introduced since this time.

Compliance with the main relevant regulatory instruments is summarised in Table 4 below.

Table 4: Summary of Regulatory Framework

Regulatory Instrument	Compliance Summary
Environmental Planning and Assessment Act 1979	• BSO Project Approval was granted by the Planning Assessment Commission on 22 December 2011 under Section 75J of the EP&A Act. • Section 75W of the EP&A Act regulates modifications to Minister's Approval, where by the proponent (Illawarra Coal) may request the Minister to modify the Minister's approval for a project. • This EA forms part of the application for a modification under Section 75W of the EP&A Act to the existing project approval for the BSO Project (Application No.08_0150).
Environmental Planning and Assessment Amendment (Part 3A Repeal) Act 2011	• Under the Act, existing Part 3A Projects (including the BSO Project as approved) become 'Transitional Part 3A Projects'. Hence, Part 3A will continue to apply to the BSO Project, including modifications under Section 75W.
Environmental Planning & Assessment Regulation 2000	• Part 1 A of the regulation deals with Transitional Part 3A projects. The BSO Project is progressing in accordance with the clauses in Part 1 A of this regulation.
Mining Act 1992	• The BSO Project operates under various leases granted under Part 6 of the Mining Act 1992 including the terms and conditions of Consolidated Coal Lease CCL 767. The proposed modification is consistent with these documents.
Water Management Act 2000	• The *Water Management Act 2000* (WM Act) governs water licensing and approvals in NSW in circumstances where a water sharing plan has commenced for that particular area. The "Greater Metropolitan Region Unregulated River Water Sources' Water Sharing Plan commenced on 1 July 2011 and includes the study area. No licensing or approvals under the WM Act are required for the works described in the modification application.
Pipelines Act 1967	• The *Pipelines Act 1967* (Pipelines Act) regulates the construction and operation of pipelines within NSW. • The requirement for a licence in relation to a petroleum pipeline (one which conveys naturally occurring hydrocarbons in gaseous state) generally relates to high pressure trunk lines and does not extend to the proposed gas drainage pipe. • Construction and operation of the proposed gas drainage pipe would not require a licence under Part 3 of the Pipelines Act.
Protection of the Environment Operations Act 1997	• The proposed modification would be in general accordance with the existing EPL's for Illawarra Coal's BSO (EPL No. 2504), and Energy Developments Limited EPL No.'s 5357 and 5482.
National Parks & Wildlife Act 1974	• Section 6.6 and Annex 4 of this report outline there is not expected to be any impact on Aboriginal Cultural Heritage. • An Aboriginal Cultural Heritage Assessment has been conducted to ensure compliance with provisions of the *National Parks & Wildlife Act 1974* and EP&A Act that regulate Aboriginal Cultural Heritage (refer Annex 4).
Threatened Species Conservation Act 1995	• Section 6.3 and Annex 3 of this report have assessed potential impacts of the modification on biodiversity. There is not expected to be any significant impacts on threatened biodiversity listed on the *Threatened Species Conservation Act 1995* (TSC Act).

Regulatory Instrument	Compliance Summary
State Environmental Planning Policy (Mining, Petroleum, Production & Extractive Industries) 2007	• As per the EA for the Approved BSO Project.
Environment Protection and Biodiversity Conservation Act 1999	• The proposed modification will not have a significant impact on the seven matters of national environmental significance. No additional approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is required. • Section 6.6 and Annex 4 of this report outline that there is not expected to be any significant impacts on threatened biodiversity listed on the EPBC Act.

6. Environmental Assessment

6.1 Geology, Soils and Surface Water

6.1.1 Existing

The existing topography is gentle to hilly formed by a plateau rising from west to east away from the incised Nepean River gorge. The surface geology along the proposed pipeline route varies between Hawkesbury Sandstone (situated lower in the landscape in and around drainage lines and incised areas) and Wianamatta Shales (i.e. Bringelly and Ashfield Shale) in more elevated areas such as hills, ridges and crests. Refer Figure 6.

The dominant soil landscape in the study area is the Blacktown residual soil landscape. This was described in the BSO EA as:

- Friable greyish brown loam (topsoil)
- Hard setting brown clay loam (subsoil)
- Strongly pedal, mottled brown, light clay (subsoil)
- Light grey plastic mottled clay (deep subsoil above shale bedrock).

A thin layer of high plasticity clayey topsoil is present where it is derived from weathering Wianamatta Shale bedrock.

Surface waters generally flow towards the north west, into and along ephemeral first and second order streams where the final receiving surface water body is either man-made dams or the Nepean River. Simpsons Creek and Elladale Creek are the dominant surface water features and drain northwards across the study area. High plasticity clays limit the rate of surface water percolation into perched groundwater within shallow horizons of the Wianamatta Shale (where they occur). Refer Figure 6 and Figure 7.

6.1.2 Impacts Compared to the Approved BSO Project

The MSGMP will involve additional surface soil disturbance for the excavation of the 2 m x 2 m trench of approximately 4 km length. Excavated soil and rock (estimated to be approximately 15,200 m^3 in total) will be temporarily stockpiled at sites adjacent to Appin No. 2 Shaft site or at other flat, grassed locations (with landholder consent) that do not have environmental constraints. Refer Figure 2. Short duration (a few days) construction soil stockpiling may occur within the works area to minimise double handling of soil and traffic movement on Brooks Point Road.

Spoil will be reinstated in the trench after pipe installation in the correct sequential order with native topsoil reinstated last in order to preserve the integrity of the soil. Topsoil on the pastoral lots owned by a private landowners and Illawarra Coal will not be sterilised by the activity and there will be no long term impact on agricultural productivity potential of the private land.

As the proposed pipeline route has already been heavily disturbed and modified by past and present uses, the MSGMP is not considered to represent a significant impact on soil resources.

It is expected there may be a minor, temporary, localised increase in suspended solids in surface water flowing across the works area into the adjacent road verges, swales and drainage lines. The receiving waters potentially impacted by increased suspended solids loads are ephemeral first and second order

tributaries of Simpsons Creek, Elladale Creek and Ousedale Creek. These impacts are considered minor, temporary and localised.

The works may also involve minor diversion of surface water flows around works areas, through bunds creating clean water diversions. Mapped drainage line crossings will be temporarily diverted or bunded while the pipeline is installed, preferably during dry weather, under the drainage line. The exception is the tributary of Simpsons Creek on Lot 1 DP57337 which will be bridged by the pipeline.

Special care will be taken to prevent any water quality impacts on the WaterNSW Upper Canal water supply canal. It is not expected any water quality impacts will occur to water flowing through the canal. During operation, approximately six water collection traps of 2000 L volume will be installed at low points in the pipeline to enable captured condensate to be periodically removed by suction truck and disposed of at appropriately licensed premises. Water level sensors will be remotely monitored by project personnel to indicate when condensate traps require maintenance. If the volume of liquid collected is in excess of the storage volume, the system will "back up" into the pipeline and the pipeline will provide additional storage. Condensate will not be discharged to land.

6.1.3 Mitigation Measures

Mitigation measures will include:

- preparing Construction Environmental Management Plans (CEMP)
- implementing best practice excavation, stockpiling and soil reinstatement procedures where disturbance footprints are minimised and the trenching / pipe laying / backfilling sequence is undertaken in short lengths over a short duration
- implementing best practice erosion and sediment controls with soil and erosion controls that are consistent with the methods described in the *Managing urban stormwater: soils and construction – Volume 1, 4th Edition*
- minimising the extent of vegetation clearance and ground disturbance by design (by using two working fronts working from each end)
- effective site rehabilitation using spray grass or seed broadcasting techniques.

Consultation will be undertaken with WaterNSW prior to pipeline bridging works commencing. Impact mitigation will include:

- Maintaining appropriate distance from the edge of the Upper Canal for heavy equipment to ensure its structural integrity.
- Installing protective barriers over and around the canal.
- Installing the steel pipeline over the canal so that there is no physical connection to the canal structure.
- Any temporary surface flow diversions deemed necessary on the land adjacent to the canal to avoid overland flow into the Canal.
- Re-establishment of access and drainage infrastructure within the canal easement.

6.2 Groundwater

6.2.1 Existing

Previous Groundwater Assessments (Geoterra 2011) and the BSO Project EA (Section 5.5.1) have described the groundwater resources of the area. The data supports three separate groundwater systems including:

- Perched groundwater system – perched water tables are hydraulically disconnected from the regional aquifer and are associated with swamps, elevated sandstone and shales.
- Shallow groundwater system – associated with the Hawkesbury Sandstone.
- Deep groundwater system – associated with the sandstones of the Narrabeen Group and coal seam aquifers.

Groundwater is encountered in shallow perched lenses within the Wianamatta Shale, before more significant aquifers are encountered in the Hawkesbury sandstone approximately 100 m below the ground surface. Groundwater flows under the plateau floor following the hydraulic gradient to the Nepean River, with flow being predominantly horizontal. Groundwater recharge is generally through lateral migration, with limited vertical migration. Groundwater quality in the area ranges from brackish to saline, with salinity generally increasing with depth.

Figure 5-9 of the BSO Project EA shows no privately owned DWE registered Bores in the immediate proposed MSGMP study area.

6.2.2 Impacts Compared to the Approved BSO Project

Negligible impacts are expected on the regional (Hawkesbury Sandstone) aquifer due to the shallow depth of excavation. The BSO Project EA notes that the shallow regional aquifer is hydraulically disconnected from perched water. There may be some minor interception and diversion of perched groundwater by the trench excavation, however this is not expected to have any significant long term impacts on the dynamics of these systems.

No groundwater would be extracted as part of the MSGMP, apart from short duration dewatering of excavations where required. Groundwater extracted would be tanked away from site for re-use or disposal in accordance with the Approved BSO Project. No significant impacts to local or regional groundwater resources are expected.

The negligible potential impacts outlined above are consistent with the Approved BSO Project.

6.2.3 Mitigation Measures

Mitigation measures will include:

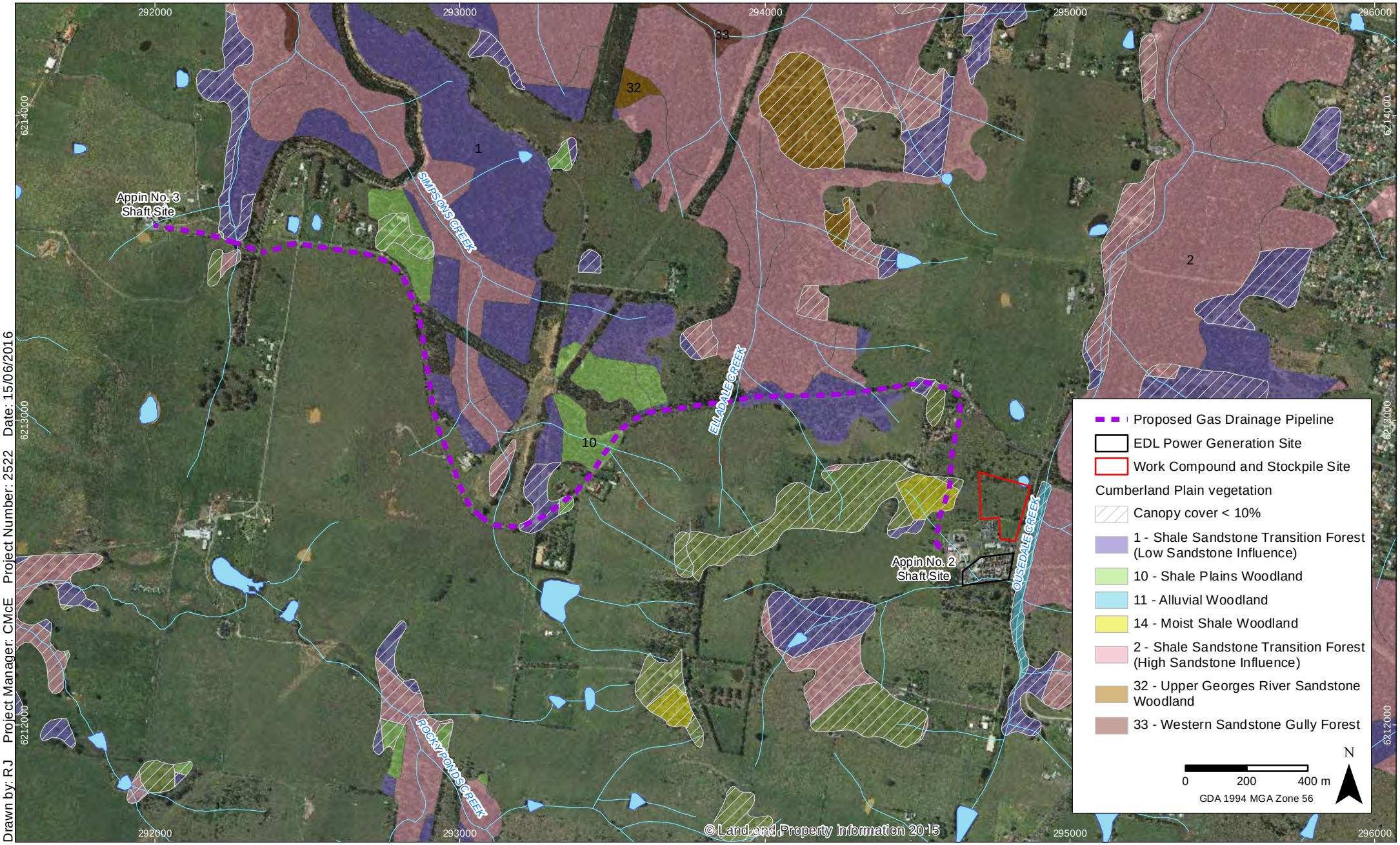
- preparing Construction Environmental Management Plans (CEMP)
- implementing best practice excavation, and soil reinstatement procedures
- minimising the extent of ground disturbance by design
- effective site rehabilitation.

6.3 Flora and Fauna

6.3.1 Existing

Niche Environment and Heritage prepared a Biodiversity Assessment for the MSGMP which is attached in Annex 3 (Niche 2016a).

Vegetation mapping of the study area consisted of areas of cleared land/exotic pasture and areas of regenerating Cumberland Plain Woodland. Cumberland Plain Woodland is listed as a Threatened Ecological Community (TEC) both under the TSC Act and the EPBC Act. Approximately 0.45 ha would be modified by the MSGMP based on the length of pipeline traversing regenerating Cumberland Plain Woodland (2108 m) being multiplied by a trench of 2 m width. Refer Figure 8. All of this native vegetation (much of it located in the road reserve) has been previously cleared and is now in a regenerating condition.



Drawn by: RJ Project Manager: CMcE Project Number: 2522 Date: 15/06/2016

niche Environment and Heritage

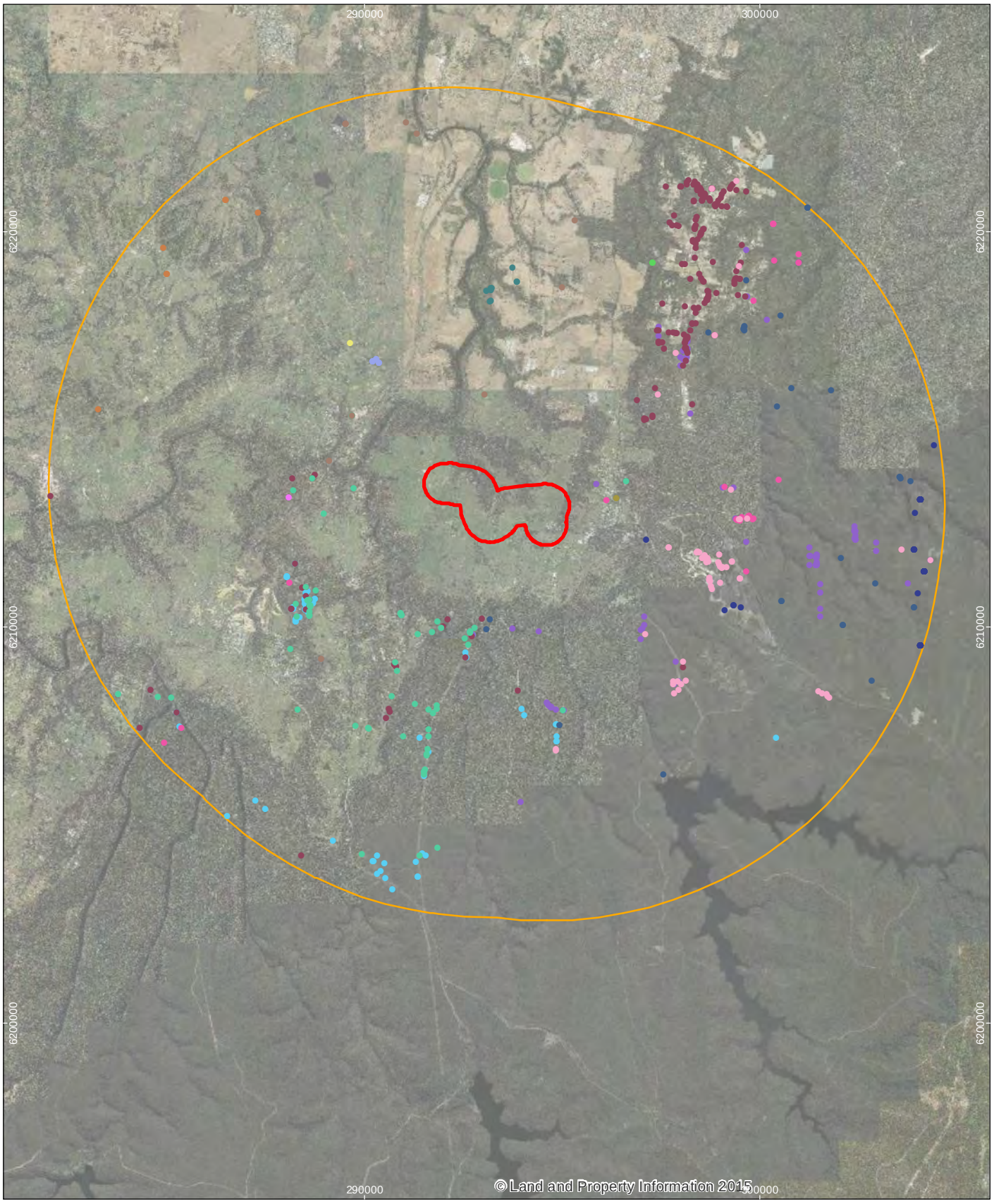
Cumberland Plain Vegetation

Appin East Mine Safety Gas Management Project - s75 Modification

FIGURE 8

Path: T:\spatial\projects\a2500\a2522_AppinEastGas\Maps\report\2522_Figure_8_Vegetation.mxd

Imagery: (c) LPI 2013-02-07



Subject Area
10km Search
Acacia bynoeana
Callistemon linearifolius
Cynanchum elegans
Epacris purpurascens var. purpurascens
Eucalyptus nicholii
Grevillea parviflora subsp. parviflora
Gyrostemon thesioides
Leucopogon exolasius
Melaleuca deanei
Persoonia bargoensis
Persoonia hirsuta
Pimelea spicata
Pomaderris brunnea
Pterostylis saxicola
Pultenaea aristata
Pultenaea pedunculata
Syzygium paniculatum

N

0 1 2 km

GDA 1994 MGA Zone 56

Drawn by: RJ Project Manager: CMcE Project Number: 2522 Date: 15/06/2016

Threatened Flora recorded within 10 km of the Study Area

Appin East Mine Safety Gas Management Project - s75 Modification

FIGURE 9

Imagery: (c) LPI 2008 - 2014

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No threatened flora were recorded in the study area. Based on the results of the field survey, *Grevillea parviflora* subsp. *parviflora* and *Epacris purpurascens* var. *purpurascens* have a moderate likelihood of occurrence within the study area. However, both these species are relatively conspicuous, despite the survey not being carried out during their flowering times. It is therefore considered unlikely that these species occur within the study area. Refer Figure 9.

No threatened fauna were detected during the field survey, however likelihood of occurrence assessments indicated potential habitat (limited) for nine threatened fauna within the study area. Refer Figure 9.

Species include the following:

- Birds: Brown Treecreeper, Little Lorikeet and Varied Sittella
- Invertebrates: Cumberland Plain Land Snail
- Mammals: Eastern False Pipistrelle, Yellow-bellied Sheathtail-bat, Large-footed Myotis, Eastern Freetail-bat and Little Bentwing–bat.

6.3.2 Impacts Compared to the Approved BSO Project

Known impacts include the modification of approximately 0.45 ha of native vegetation. Potential indirect impacts include sedimentation or erosion in adjacent bushland and weed invasion. These indirect impacts would be ameliorated by a series of mitigation measures.

Assessments of Significance have been conducted for the native vegetation that has been aligned to Cumberland Plain Woodland TEC (Appendix 3, Annex 3). Based on the results of the Assessments of Significance, it is considered unlikely that the MSGMP will result in a significant impact to Cumberland Plain Woodland.

Grevillea parviflora subsp. *parviflora* and *Epacris purpurascens* var. *purpurascens* have been given a moderate likelihood of occurrence. Both these species are relatively conspicuous and are unlikely to remain undetected during the field survey, regardless of their state of flowering. No threatened flora are therefore likely to occur within the study area. As such, the MSGMP is unlikely to result in a significant impact on threatened flora.

The birds and microbat species are considered to have potential foraging habitat within the study area. Up to three hollow-bearing trees may be removed. It is possible that the hollow-bearing trees may provide habitat for threatened microbats, and Little Lorikeet. Assessments of significance have been conducted for these species as a precautionary approach (Appendix 3 of Annex 3), along with the implementation of a vegetation clearing protocol to minimise any potential harm to threatened fauna. The Assessment has concluded that these threatened fauna are unlikely to be significantly impacted by the MSGMP.

The Cumberland Plain Land Snail, has the potential to occur within the area directly impacted by the MSGMP. Whilst not recorded during the field survey, as a precautionary approach, an Assessment of Significance has been prepared for the species (Appendix 3 of Annex 3). The Assessment has concluded that the Cumberland Plain Land Snail is unlikely to be significantly impacted by the MSGMP.

The MSGMP is not expected to have a significant impact on threatened biodiversity as listed under the EPBC Act and TSC Act.

An assessment of the project under SEPP 44 Koala Habitat has also been undertaken. This has found that Koala Habitat will not be impacted by the MSGMP.

The proposed modification will not result in any additional significant Biodiversity Impacts from the Approved BSO Project.

6.3.3 Mitigation Measures

To minimise impacts to flora, fauna and their habitats, the following actions are recommended:

- Appropriate measures are to be employed to ensure that machinery working within the site does not bring materials (soils etc.) onto the site that may lead to the spread of Phytophthora cinnamomi. Refer http://www.environment.gov.au/biodiversity/invasive-species/publications/arrive-clean-leave-clean
- Silt fencing should be used at all locations where erosion and sediment runoff may occur.
- Any vegetation removal other than that detailed in this report should be subject to further assessment.
- Implement a two-stage clearing protocol for the removal of the hollow-bearing trees.
- Clearing of native vegetation will generally be restricted to the 2m wide trench corridor required for the pipeline in addition to the two hollow bearing trees on Illawarra Coal land that may be impacted. Appropriate marking / signage will delineate the pipeline route and areas of vegetation to be disturbed. No-go areas will be clearly marked or signposted.

6.4 Noise

6.4.1 Existing

Wilkinson Murray (2016) prepared a Noise Assessment for the proposed Modification which is attached in Annex 6.

The residential receivers potentially impacted by the proposed pipeline construction have previously been studied for the Environmental Assessment of the BSO Project. The receivers closest to the proposed pipeline route are shown in Figure 3 (Annex 6). Receiver numbering from the BSO Project has been used for consistency. Wilkinson Murray (2016) have provided background noise levels as determined for the BSO Project in Table 3-1 of their assessment (Annex 6).

6.4.2 Impacts Compared to the Approved BSO Project

In summary, the Wilkinson Murray Noise Assessment concluded:

- Noise from construction of the buried pipeline is predicted to exceed standard Noise Management Levels (NMLs) when the construction site is within approximately 500 m of any receiver. Significant exceedances would occur for 2-3 days at receivers close to the route.
- Noise from construction of the overland steel pipeline is predicted exceed the NML at up to 14 receivers while cranes are used to lay the pipeline.
- Noise from thrust bored underground pipeline is predicted to exceed the NML at two receivers during the excavation phase (approximately 2 weeks). During the thrust boring phase only one receiver will be impacted (approximately 9 days).
- Construction traffic noise is predicted to comply with the Road Noise Policy criteria.

The operational phase of the MSGMP is unlikely to generate any audible noise and was not considered further in the assessment.

The proposed modification will result in temporary noise impacts during the construction phase. It will not result in significant additional noise impacts compared to the Approved BSO Project.

6.4.3 Mitigation Measures

Mitigation measures will include:

- work will only occur during standard construction hours (except emergencies)
- residents impacted by the construction of the overland pipeline and thrust boring will be notified that construction will occur, and the timeframe of the potential impacts
- Receiver 78 is predicted to be “highly noise impacted” as the pipeline construction passes within 50 m the residence. While the site is this close to the residence, any unnecessary equipment should be turned off or parked away from the site.
- minimising construction duration (by using two working fronts working from each end)
- locating works compound on Nortamptondale Road adjacent Appin No. 2 Shaft Site in order to minimise project noise further west down Brooks Point Road.

6.5 Air and Greenhouse Gases

6.5.1 Existing

An Air Quality Impact and Greenhouse Gas Assessment was prepared for the BSO Project EA by PAE Holmes (2009).

PAE Holmes (2011) and Cardno (2011) have documented the existing air quality environment in the area as semi-rural, set in undulating to hilly topography, where the predominant wind direction is from the south-southeast in most seasons, except winter where strong winds from the west also dominate. The average wind speed recorded at Appin was 3.5 m/s. Ambient levels of key pollutants such as nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO) and PM10 recorded at nearby stations in Bargo (approximately 22 km south west of Appin), MacArthur (approximately 15 km south of Appin) and Oakdale (approximately 31 km northwest of Appin) are generally below impact assessment criteria.

Methane gas is pre-drained from the coal before mining and utilised in gas engines to provide power to the NSW state grid. The gas engines are referred to as the Appin-Tower Power Project operated by EDL. The Appin-Tower Power Project was completed in 1996 and is one of the world's largest coal bed methane power generation projects. Components of the Appin-Tower Power Project infrastructure (managed by EDL) are located adjacent to the Appin No. 1 and No. 2 shaft and fan site and adjacent to the Appin West pit top (Figure 2). The Appin-Tower Power Project is capable of producing some 94 MW of electricity from the pre-drained coal bed methane reducing methane emissions that contribute to greenhouse gas emissions.

6.5.2 Impacts Compared to the Approved BSO Project

It is expected there will be minor additional fugitive dust emissions during construction and minor additional particulate, CO, NO_2 and SO_2 emissions from diesel powered plant / equipment and vehicle movements. This represents a very minor increase in greenhouse gas emissions from the construction activity. In the context of the Approved BSO Project, these additional temporary air quality and greenhouse gas emission impacts are considered minor.

In the BSO Project EA, PAE Holmes (2009) estimated approximately 90 million cubic metres per year (Mm^3/y) of CH_4 and 17 Mm^3/y of CO_2 would be pre-drained. It was assumed there is complete conversion of the CH_4 (via combustion in gas engines), resulting in a total volume of 107 Mm^3/y of CO_2 emissions or approximately 210,000 CO_2 -e t/y.

During the life of the BSO Project, coal bed methane will continue to be drawn by vacuum to the gas drainage plants at the Appin West, Appin East and West Cliff pit tops for transfer to the Appin-Tower Power Project.

The proposed MSGMP modification will maintain the efficiency underground methane gas drainage system. Occasionally during periods when gas exceeds the capacity of the EDL power plants, gas will be flared (oxidised) rather than being vented to the atmosphere. GHG assessment of previous gas drainage proposals (Heggies Pty Ltd, 2008 and Cardno Forbes Rigby, 2009) have indicated that where gas drainage incorporates flaring or power generation, these proposals have a net reduction in GHG emissions. This is because the methane that would be vented to the atmosphere is combusted, converting the methane to CO_2, a gas which has a greatly reduced GHG potential or global warming potential (GWP), relative to methane.

The proposed modification is expected to result in a net reduction in GHG emissions, consistent with what was outlined in the Approved BSO Project.

6.5.3 Mitigation Measures

Mitigation measures will include:

- minimising construction duration (by using two working fronts working from each end)
- effective consultation with adjacent landholders and road users
- utilisation of water spray carts where appropriate
- minimising stockpile volumes and storage duration at the stockpile site by removing excess spoil to the West Cliff mine site
- effective stockpile management practices to reduce dust such as water suppression, protective covering, stabilising with vegetation, or a combination of these methods
- locating works compound and stockpile site on Nortamptondale Road adjacent Appin No. 2 Shaft Site, away from dwellings.
- preparing Construction Environmental Management Plans (CEMP).

6.6 Aboriginal Cultural Heritage

6.6.1 Existing

Niche Environment and Heritage prepared an Aboriginal Cultural Heritage Assessment for the proposed Modification which is attached in Annex 4 (Niche 2016b).

Archaeological visibility and exposure within the Study Area is likely to be low due to the cover of native and imported grasslands. Visibility and exposure will most likely occur as a result of surface wash, utility and road construction and other past land use disturbance.

The Study Area would typically be considered to have good potential for surface and buried Aboriginal objects. This archaeological potential, however, has been negated by the levels of vegetation clearance and past land use in the Subject Area to the extent that there is some, but limited potential for Aboriginal objects to be retained in-situ. There are six known Aboriginal sites within the subject area, however none of these sites are within close proximity to the works area. There are three sites located approximately 100 m from the proposed pipeline, on private property. Refer Figure 12.

Where Aboriginal objects are present they will most likely occur as:

- Stone artefact sites consisting of isolated stone artefacts or low density stone artefacts will be the most common site type in the Subject Area.
- Potential Archaeological Deposits of Aboriginal objects where intact soil profiles are present in association with drainage lines and well drained flats and lower slopes.
- Culturally modified trees where mature age trees are present, though this is unlikely due to the levels of past vegetation clearance.
- Grinding groove and engraving sites where sandstone outcrops and creek beds are present though this is unlikely in the area of works due to limited availability of suitable sandstone outcrops. The closest grinding groove site is located over 200 m from the proposed pipeline, on private land.

6.6.2 Impacts Compared to the Approved BSO Project

The Aboriginal heritage survey was conducted on 20 January 2016.

The survey team consisted of nine individuals (six representatives of the RAPS, two archaeologists and one ecologist). The survey team walked the length and width of the proposed activity. Survey participants were generally spaced 1 m apart.

No Aboriginal objects or landscape features with the potential for subsurface archaeological deposits were identified during the assessment. Illawarra Coal can proceed with the proposed works without any further archaeological assessment.

The proposed modification will not result in any additional significant Aboriginal heritage Impacts from the Approved BSO Project.

6.6.3 Mitigation Measures

Should any Aboriginal objects be unexpectedly uncovered during the works, all activity must stop and further investigation must be carried out by a qualified archaeologist in consultation with the relevant Aboriginal stakeholders.

Should suspected human skeletal remains be uncovered by the proposed drilling, works must stop immediately and the NSW Police and OEH contacted for further analysis.

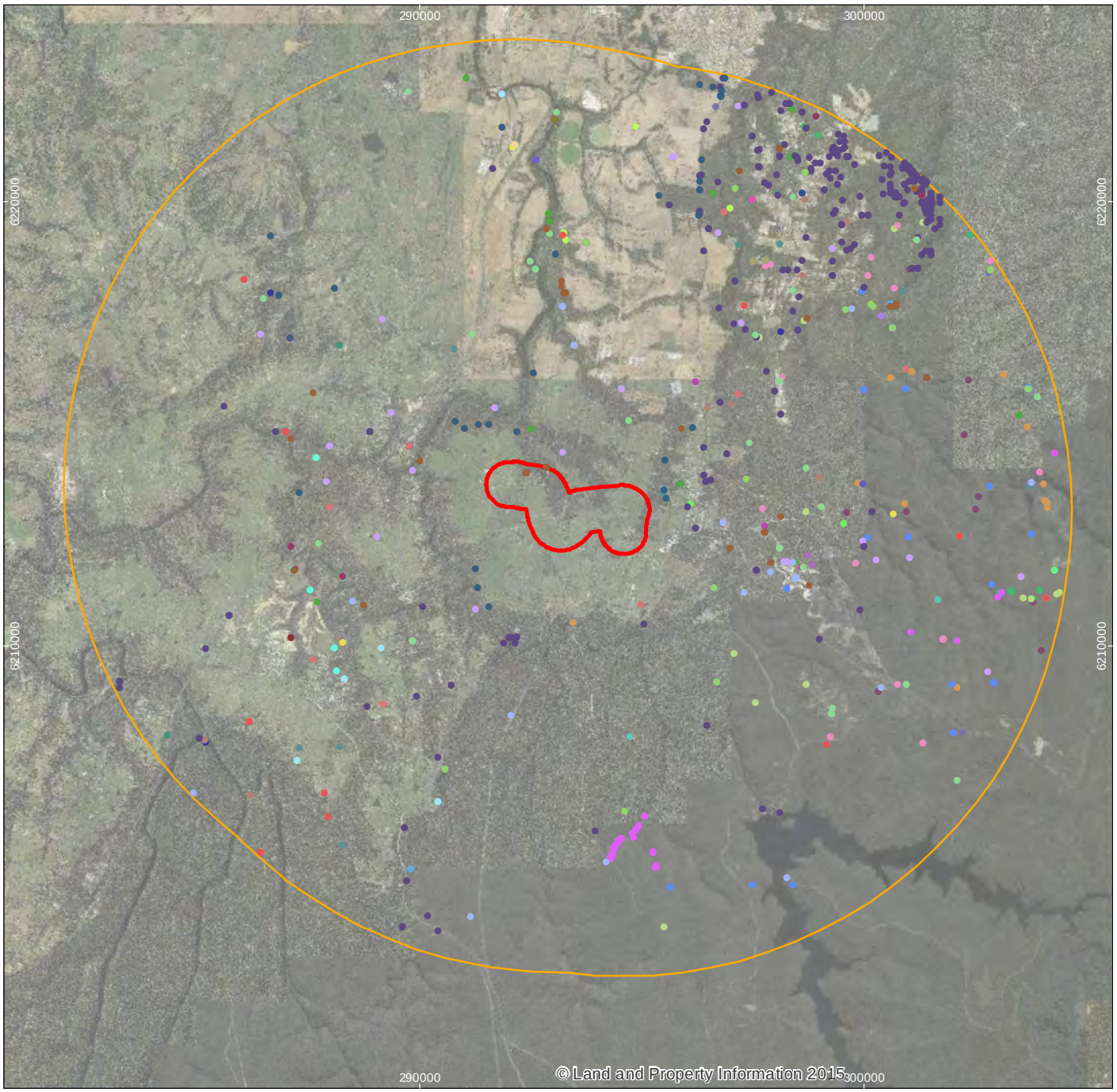
6.7 Historic Cultural Heritage

6.7.1 Existing

Niche Environment and Heritage prepared a Historical Heritage Assessment for the proposed Modification which is attached in Annex 5 (Niche 2016c).

Only one heritage item was identified within the subject area. This item is the Upper Canal, which is a State significant heritage item listed on the NSW State Heritage Register (SHR ID: 01373). Refer Figure 10. The Upper Canal forms part of the Upper Nepean Scheme and consists of a system of tunnels, aqueducts and open canals collectively known as the Upper Canal, which enable water diverted through the Nepean Tunnel to flow a distance of 64 km to the major distribution reservoir at Prospect, and supply water to a number of localities en route (MPHMC 2009: A-113). Built in the 1880s, the Upper Canal is still the only way of transferring water to Sydney from the four Upper Nepean dams (Cataract, Cordeaux, Avon and Nepean) and the Upper Nepean Scheme continues to supply 20 to 40 percent of Sydney's Water (WaterNSW 2016).

The Upper Canal System is significant as a major component of the Upper Nepean Scheme. As an element of this Scheme, the Canal has functioned as part of Sydney's main water supply system since 1888. Apart from maintenance and other improvements, the Upper Canal has changed little. The Canal is aesthetically



Date: 15/06/2016

Drawn by: RJ Project Manager: CMcE Project Number: 2522

- Subject Area
- 10km Search
- Barking Owl
- Black Falcon
- Black-chinned Honeyeater (eastern subspecies)
- Broad-headed Snake
- Brown Treecreeper (eastern subspecies)
- Bush Stone-curlew
- Cumberland Plain Land Snail
- Diamond Firetail
- Dural Woodland Snail
- Eastern Bentwing-bat
- Eastern False Pipistrelle
- Eastern Freetail-bat
- Eastern Ground Parrot
- Eastern Pygmy-possum
- Flame Robin
- Gang-gang Cockatoo
- Giant Burrowing Frog
- Giant Dragonfly
- Glossy Black-Cockatoo
- Golden-tipped Bat
- Greater Broad-nosed Bat
- Grey-headed Flying-fox
- Hooded Robin (south-eastern form)
- Koala
- Large-eared Pied Bat
- Little Bentwing-bat
- Little Eagle
- Little Lorikeet
- Littlejohn's Tree Frog
- Masked Owl
- New Holland Mouse
- Powerful Owl
- Red-crowned Toadlet
- Regent Honeyeater
- Rosenberg's Goanna
- Scarlet Robin
- Southern Myotis
- Speckled Warbler
- Spotted Harrier
- Spotted-tailed Quoll
- Square-tailed Kite
- Squirrel Glider
- Swift Parrot
- Turquoise Parrot
- Varied Sittella
- Yellow-bellied Glider
- Yellow-bellied Sheathtail-bat

N

0 1 2 km

GDA 1994 MGA Zone 56

Threatened Fauna recorded within 10 km of the Study Area

Appin East Mine Safety Gas Management Project - s75 Modification

niche Environment and Heritage

FIGURE 10

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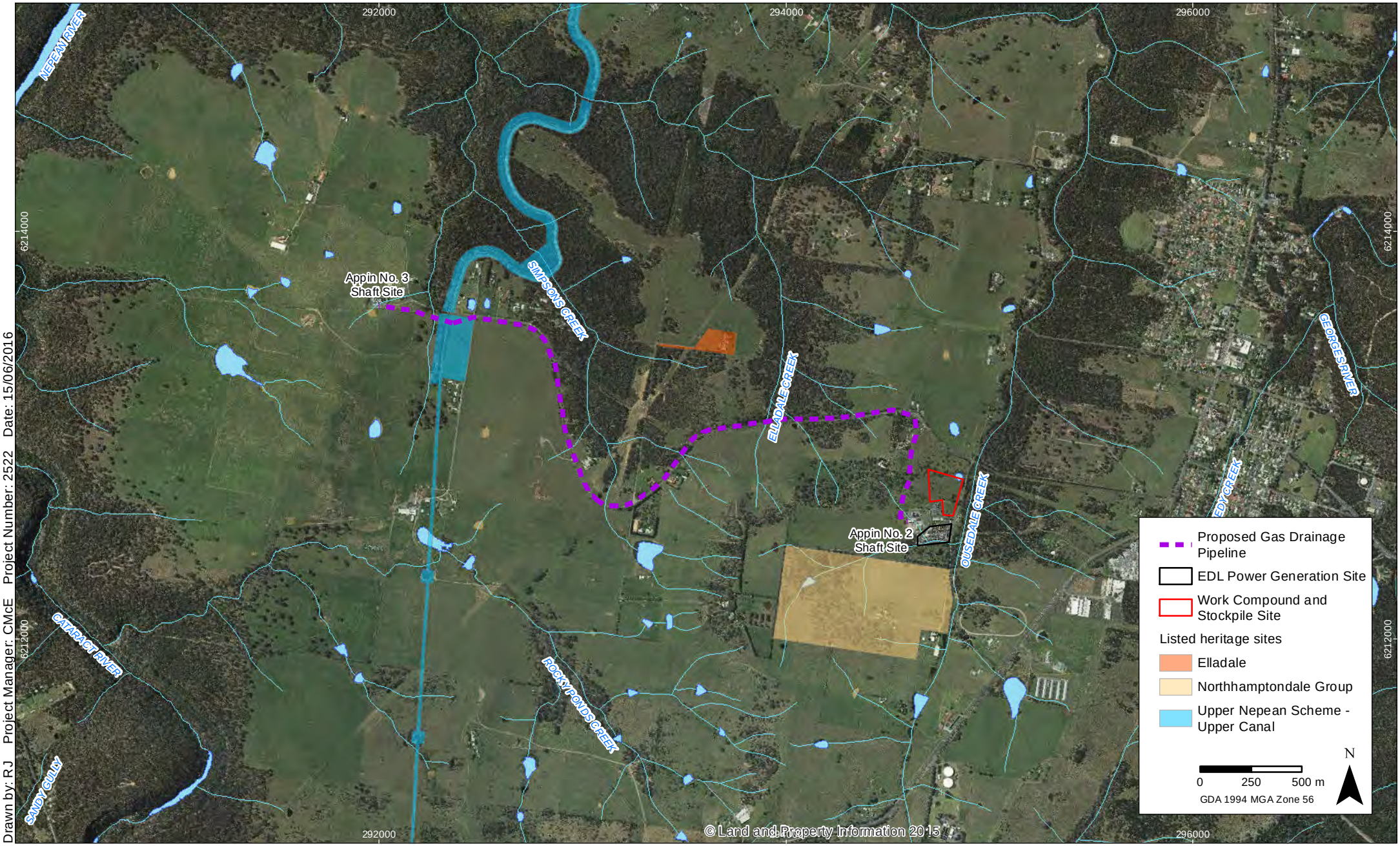

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Historical Cultural Heritage Sites

Appin East Mine Safety Gas Management Project - s75 Modification

FIGURE 11

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significant, running in a serpentine route through a rural bushland setting as an impressive landscape element with sandstone and concrete-lined edges. The Canal is significant as it demonstrates the techniques of canal building, and evidence of engineering practice. The Canal as a whole is an excellent example of 19th century hydraulic engineering, including the use of gravity to feed water along the canal. Further detail is provided in Annex 5.

No additional heritage items were identified within the subject area. A small number (>10) of blue transfer ware fragments, dating to the mid to the late nineteenth century, were identified approximately 1 km east along the north side of Brooks Point Road. Given the absence of any previous historical development, or construction, the ceramics are likely associated with the use of the earlier road through the subject area ('Lachlan Vale Road') from c.1858, and later land disturbance due to the realignment and widening of the road in 1974. They are not considered to be *in situ* or to be associated with an area of archaeological potential and were subsequently assessed to have no heritage significance.

6.7.2 Impacts Compared to the Approved BSO Project

The assessment found the proposed installation of an above ground gas drainage pipeline crossing the Upper Canal in the vicinity of Brooks Point Road is of a minor nature and would have little, to no, adverse impacts on the heritage significance of the Upper Canal. The proposed pipeline would be sited independently to the Canal itself, and would have no direct impacts to the Canal's fabric or associated infrastructure. The proposed pipeline would have a minor impact on views to and from the Canal and its visual setting, although its aesthetic values could continue to be appreciated by the public and users in many other localities along its length. Preliminary design drawings of the above ground gas drainage pipeline crossing the Upper Canal are attached in Annex 2.

It is also concluded that there is a low likelihood for archaeological deposits to exist within the subject area. If any such deposits have survived they are likely to be highly disturbed and have limited historical significance or research potential. Further detail is provided in Annex 5.

The assessment recommends no further historical heritage assessment of the subject area, prior to the commencement of project works.

The proposed modification will not result in any additional significant historical heritage Impacts from the Approved BSO Project.

6.7.3 Mitigation Measures

Mitigation measures will include:

- compliance with WaterNSW Requirements for protection of Upper Canal and any conditions imposed by WaterNSW landholder consent to construct and operate the pipeline in the Upper Canal easement
- design of the steel pipe bridge over the Upper Canal in order to eliminate potential impacts of underboring works
- preparation of the Historical Heritage Assessment to avoid any significant impacts
- consultation with WaterNSW regarding steel pipe bridge design and installation
- detailed construction plans and on-site work methods must ensure that no impact occurs to the significant fabric of the Upper Canal or its associated infrastructure, including the overbridge, culvert and draining channel on Brooks Point Road. Appropriate protective mechanisms may include temporary signage and fencing of these items during construction, as deemed safe and appropriate

- on-site inductions highlighting the specific heritage context, legislative values and significance of the Upper Canal and its associated infrastructure should be provided to all personnel working within, or in the vicinity of, the Upper Canal
- in the unlikely event that historical archaeological relics were to be discovered during ground disturbance for the installation of the proposed gas drainage pipeline along Brooks Point Road (including sections on both sides of the Upper Canal), work in the immediate area would need to cease and a suitably qualified archaeologist be engaged to assess the condition, extent and likely significance of the remains. Depending on the results of this assessment, OEH may need to be notified of the discovery in accordance with s.146 of the *Heritage Act 1977*
- preparing Construction Environmental Management Plans (CEMP)
- implementing best practice excavation, construction and soil reinstatement procedures
- minimising the extent of ground disturbance by design
- effective site rehabilitation.

6.8 Traffic and accessibility

6.8.1 Existing

Brooks Point Road is a relatively quiet semi rural local road with typically low traffic levels. It is estimated to be used for daily commuting by approximately twenty six dwellings. Additional traffic movements occur for:

- delivery of goods and services and employees to the local landholders
- employees commuting to and from the local landholders
- management of the WaterNSW Upper Canal assets
- delivery of goods and services and employee commuting to the Appin No. 3 and the Appin No. 1 & 2 Shaft Sites
- delivery of goods and services and employee commuting to the EDL Energy generation Site.

6.8.2 Impacts Compared to the Approved BSO Project

As outlined in Section 2, each work front is expected to require:

- large excavator
- two dump trucks to deliver bedding sand (expected to be approximately up to 8 deliveries per day after the trench has been excavated)
- two dump trucks to move excavated soil and rock to temporary stockpiles within a few kilometres of the work front
- front end loader for stockpile management and loading dump trucks
- semi trailer delivery of pipes (expected to be approximately two per day)
- truck mounted crane for pipe installation
- employee movements in light vehicles to and from the works compound on Nortamptondale Road (adjacent the Appin No. 2 shaft site).

This represents a moderate, short term and localised impact on traffic movements in Brooks Point Road which will be mitigated by several measures as outlined below. Traffic impacts to the broader Appin Area are considered minor, temporary and localised. A temporary half road closure will be required for the two proposed pipeline crossings on Brooks Point Road. The road crossings will require traffic control and be undertaken in accordance with an approval issued under s138 of the Roads Act by Wollondilly Shire Council. Each road crossing will have a duration of 2-5 days.

Where the construction of the pipeline coincides with driveways, there may be short duration (1-2 days) disruption to the access to private residences from Brooks Point Road. Alternative accesses or other temporary measures will be developed by Illawarra Coal in consultation with the landholder during these short duration periods.

The proposed modification will not result in additional significant or long term traffic impacts compared to the Approved BSO Project.

6.8.3 Mitigation Measures

Mitigation measures will include:

- s138 Permit from Wollondilly Shire Council
- preparation of a project specific Traffic Management Plan (TMP)
- use of Traffic Control where appropriate to minimise disruption to local road users
- consultation with Wollondilly Shire Council
- observing standard EPA construction hours
- effective consultation with adjacent landholders and road users
- minimising traffic disruption by minimising construction duration (by using two working fronts working from each end)
- locating works compound on Nortamptondale Road adjacent Appin No. 2 Shaft Site in order to minimise project traffic commuting further west down Brooks Point Road in private vehicles.

During the proposed construction period, traffic management will be required to ensure traffic disruption to the minimal amount of traffic of Brooks Point Rd is kept to a minimum.

6.9 Visual amenity

6.9.1 Existing

The proposed pipeline route traverses a semi rural landscape of grazed paddocks and local road alignment. The surrounding vistas are typically cleared and grazed paddocks with residential and farm infrastructure and remnant native vegetation. In addition to the Upper Canal, several easements with overhead power transmission lines and towers also traverse the area and are clearly visible (Figure 2). Photos of the route are provided in Annex 2.

6.9.2 Impacts Compared to the Approved BSO Project

During construction works there will be a minor temporary additional visual impact to local dwellings that can view the works and to road users of Brooks Point Road. The level of visual impact is consistent with the visual impacts from other short term construction projects such as road works.

After installation most of the pipeline will be buried and the alignment rehabilitated so the longer term visual impact will be negligible. The historic heritage assessment has found that the proposed above-ground pipe crossing of the Simpson Creek tributary and Upper Canal would have a minor visual impact over the longer term. Refer drawings in Annex 2.

The proposed modification will not result in significant additional visual impacts compared to the Approved BSO Project.

6.9.3 Mitigation Measures

Mitigation measures will include:

- burial of the majority of the pipeline
- minimising construction duration (by using two working fronts working from each end)
- consultation with WaterNSW and Council regarding the appearance of the above-ground pipe crossing
- effective consultation with adjacent landholders and road users
- locating works compound on Northamptondale Road adjacent Appin No. 2 Shaft Site, largely out of site for dwellings and traffic commuting further west down Brooks Point Road in private vehicles.

6.10 Waste and Hazardous Materials

6.10.1 Existing

The BSO Project EA described in detail various aspects of the project that generate, or have to potential to generate waste. The proposed MSGMP Modification will generate a small additional volume of waste as detailed below.

6.10.2 Impacts Compared to the Approved BSO Project

The trenching works could be expected to excavate approximately 15,200 m^3 of material of which 3,100 m^3 is expected to be excess spoil which will be transferred by road to West Cliff Coal Wash Emplacement for land rehabilitation purposes.

There will be a minor increased risk of spills (from fuel or hydraulic fluids) which is to be managed through safe work practices and the use of spill kits.

During construction there will be mixed rubbish generation from the site workers and miscellaneous waste from excess materials or offcuts from construction materials. There will be minor volumes of additional sewage from temporary portable toilets.

No hazardous wastes or contaminated materials are expected to be generated or encountered during construction.

During operation, approximately six water collection traps of 2000 L volume will be installed at low points in the pipeline to enable captured condensate to be periodically removed by suction truck and disposed of at appropriately licensed premises. Water level sensors will be remotely monitored by project personnel to indicate when condensate traps require maintenance. If the volume of liquid collected is in excess of the storage volume, the system will “back up” into the pipeline and the pipeline will provide additional storage. Condensate will not be discharged to land.

6.10.3 Mitigation Measures

Mitigation measures will include:

- minimising waste generation by design
- the risk of spills (fuel or drilling fluids) is to be managed through safe work practices and the use of spill kits
- Wastes will be disposed of at appropriately licensed facilities
- preparing Construction Environmental Management Plans (CEMP)
- All waste will be classified in accordance with the Waste Classification Guidelines (EPA 2014) and disposed of at an appropriately licenced facility.

6.11 Socio Economic

6.11.1 Existing

A Socio-Economic Assessment (including a regional economic impact assessment) was prepared for the BSO Project EA by Gillespie Economics. Using input-output analysis, it was estimated that the existing operation of the Appin Mine and West Cliff Colliery make the following contribution to the regional economy:

- $1,484M in annual direct and indirect regional output or business turnover
- $873M in annual direct and indirect regional value added
- $217M in annual household income
- 2,389 direct and indirect jobs.

As described in Section 2 areas adjacent the MSGMP footprint are primarily used for agricultural, residential, mining and utility infrastructure purposes.

6.11.2 Impacts Compared to the Approved BSO Project

As previously noted in Section 6 of this EA, it is expected there may be the following potential impacts on the adjacent landholders:

- minor temporary impacts resulting from the generation of dust during construction
- temporary impacts resulting from the generation of construction noise
- minor temporary traffic impacts resulting from increased construction vehicle movements
- minor temporary visual impacts resulting from the construction activity itself and a minor visual impact from a section of steel pipe bridging the Upper Canal.

Impacts to beneficial uses of surface or groundwater by neighbouring properties is unlikely.

Where feasible, local contractors and suppliers will be used to support resourcing of the MSGMP, therefore having a positive socio-economic impact. During operation the MSGMP is deemed to have a net positive socio-economic impact by supporting the continuation of safe and efficient extraction of coal in the BSO.

6.11.3 Mitigation Measures

Mitigation measures have been addressed in the relevant sections above.

6.12 Cumulative impacts

Cumulative impacts involve compounding effects from developments within the locality or at a similar time. Table 5 below provides a summary of the anticipated cumulative impacts. These impacts do not significantly add to the impacts of the Approved BSO Project.

Table 5: Cumulative Impacts Summary

Aspect	Cumulative Impact
Soils and Surface Water	• A minor increase in the extent of disturbed surface soils and cuttings, with localised temporary changes to surface water flows.
Groundwater	• Negligible impacts to regional aquifer expected. • Potential for some minor interception and diversion of perched groundwater by the trench excavation however this is not expected to have any significant long term impacts on the local groundwater resources.
Flora and Fauna	• Known impacts include the additional modification of approximately 0.45 ha of native vegetation (regenerating Cumberland Plain Woodland) and 0.35 ha Exotic grassland/disturbed land. Most of this is located on road verge. • Significant cumulative impacts to flora and fauna are considered unlikely given the highly disturbed existing environment.
Noise	• Temporary noise impacts during the construction period. • No impacts expected during operation.
Air and Greenhouse Gases	• Minor temporary impacts resulting from the generation of dust during construction. • Minor increase in construction fuel emissions. • BSO gas drainage greenhouse gas emissions consistent with the Approved BSO Project.
Aboriginal Cultural Heritage	• No additional impacts expected.
Historical Heritage	• A minor visual impact on the Upper Canal from steel pipe bridging.
Traffic	• Minor temporary increase in traffic on Brooks Point Road and Northamptondale Road during the construction period.
Visual Amenity	• Minor temporary visual impacts resulting from the construction activity itself. • Minor long term visual impact from a small section of steel pipe bridging the Upper Canal.
Waste	• Minor additional waste generated compared to the Approved BSO Project.
Socio-economic	• Minor temporary dust, noise, traffic, visual impacts on local residents during construction. • Minor positive socio-economic impact on local contractors and suppliers. • Net positive socio-economic impact by supporting the continuation of safe and efficient extraction of coal in the BSO.

7. Conclusion

In order to support the safe and efficient extraction of coal in the BSO, Illawarra Coal proposes to optimise the underground extraction and utilisation of methane gas from the mine by implementing the "Mine Safety Gas Management Project" (MSGMP).

A s75W modification is proposed to modify the BSO Approval to incorporate the construction and operation of the proposed (MSGMP) gas management infrastructure. Approval is sought to construct and operate a 1 m diameter suction gas pipeline between Appin No. 3 Vent Shaft and the existing gas drainage plant at Appin No. 2 Shaft (approximately 4 km in length). The pipeline will be buried at the surface, for the most part, along Brooks Point Road.

Installation and operation of the proposed pipeline will enable the existing Appin East gas drainage management system to remain in service for an extended period by reducing the frictional pressure drop and leakage in the pipelines between the mining areas and the gas extraction plant. Considerable benefits in terms of power generation and reduction in greenhouse gas emissions will also result from the MSGMP. If the proposed pipeline cannot be installed, the existing Appin East gas extraction system will not be able to provide sufficient suction to extract gas from the mining areas and additional gas extraction infrastructure will need to be installed at an alternative location.

This document provides an environmental assessment of the MSGMP and outlines the proposed management activities that will be undertaken during construction, operation and rehabilitation of the MSGMP. Table 6 summarises the impacts outlined in this environmental assessment.

Table 6: Environmental Assessment Summary

Aspect	Impact Summary
Soils and Surface Water	• The MSGMP will involve additional surface soil disturbance for the excavation of the 2 m x 2 m trench of approximately 4 km length. • Topsoil on the pastoral lots owned by a private landowners and Illawarra Coal will not be sterilised by the activity and there will be no long term impact on agricultural productivity potential of the private land. • Minor, temporary, localised increase in suspended solids in surface water flowing across the works area into the adjacent road verges, swales and drainage lines. The receiving waters potentially impacted by increased suspended solids loads are ephemeral first and second order tributaries of Simpsons Creek, Elladale Creek and Ousedale Creek. • A minor increase in the extent of disturbed surface soils and cuttings, with localised temporary changes to surface water flows.
Groundwater	• Negligible impacts to regional aquifer expected. • Potential for some minor, temporary interception and diversion of perched groundwater by the trench excavation however this is not expected to have any significant long term impacts on the local groundwater resources.
Flora and Fauna	• Known impacts include the modification of approximately 0.45 ha of native vegetation (regenerating Cumberland Plain Woodland, a Threatened Ecological Community) and 0.35 ha Exotic grassland/disturbed land. Most of this is located on road verge. • No significant impacts to threatened biodiversity are likely given the highly

Aspect	Impact Summary
	disturbed existing environment.
Noise	• Temporary noise impacts during the construction period with only one receiver predicted to be temporarily "highly noise impacted". • No impacts expected during operation.
Air and Greenhouse Gases	• Minor temporary impacts resulting from the generation of dust during construction. • Minor increase in construction fuel emissions. • BSO gas drainage greenhouse gas emissions consistent with the Approved BSO Project.
Aboriginal Cultural Heritage	• No impacts expected.
Historical Heritage	• A minor visual impact on the Upper Canal from steel pipe bridging.
Traffic	• Minor temporary increase in traffic on Brooks Point Road and Northamptondale Road during the construction period.
Visual Amenity	• Minor temporary visual impacts resulting from the construction activity itself. • Minor long term visual impact from steel pipe bridging the Upper Canal.
Waste	• Minor additional waste generated compared to the Approved BSO Project.
Socio-economic	• Minor temporary dust, noise, traffic, visual impacts on local residents during construction. • Minor positive socio-economic impact on local contractors and suppliers. • Net positive socio-economic impact by supporting the continuation of safe and efficient extraction of coal in the BSO.

Illawarra Coal have consulted with all landowners where the proposed works would occur and have entered into a written agreement with the relevant private landholder. Illawarra Coal will consult with nearby neighbours and the broader community. Consultation with the community will also extend through the assessment period of this application and during the construction and operational phase of the MSGMP.

At the completion of the BSO Project, the infrastructure will be decommissioned in accordance with the Approved Project conditions.

In summary, the potential environmental impacts and proposed mitigation measures are consistent with the Approved Project. Many of the impacts are considered to be largely minor in scale and temporary in duration due to the temporary nature of the construction works, the disturbed nature of the land, and the proposed management and mitigation measures.

The proposed modification will have a net positive socio-economic impact by supporting the continuation of safe and efficient extraction of coal in the BSO. It will ensure the continued benefits in terms of methane fuelled power generation and reduction in greenhouse gas emissions outlined in the Approved BSO Project.

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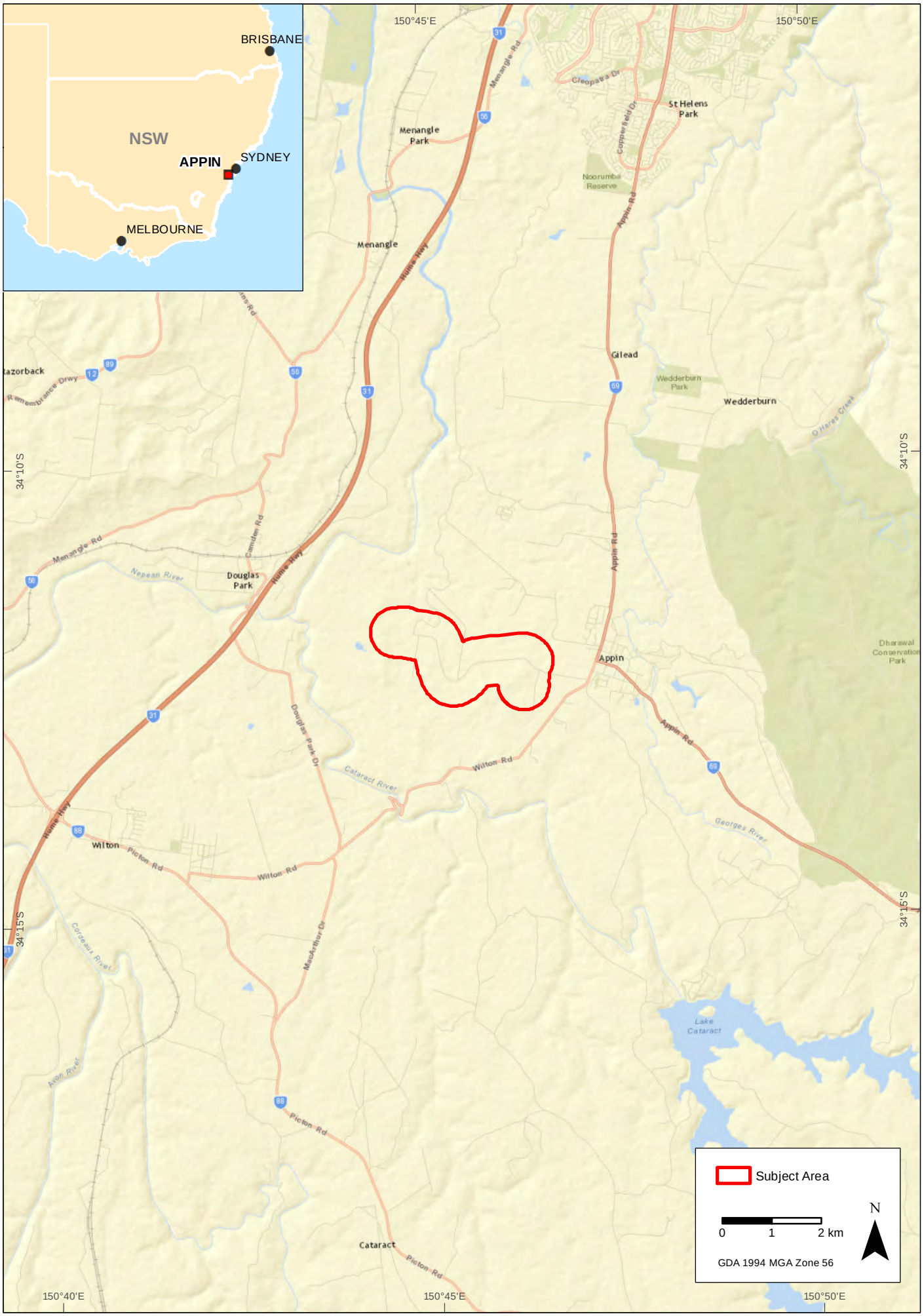
Annex 1 Figures



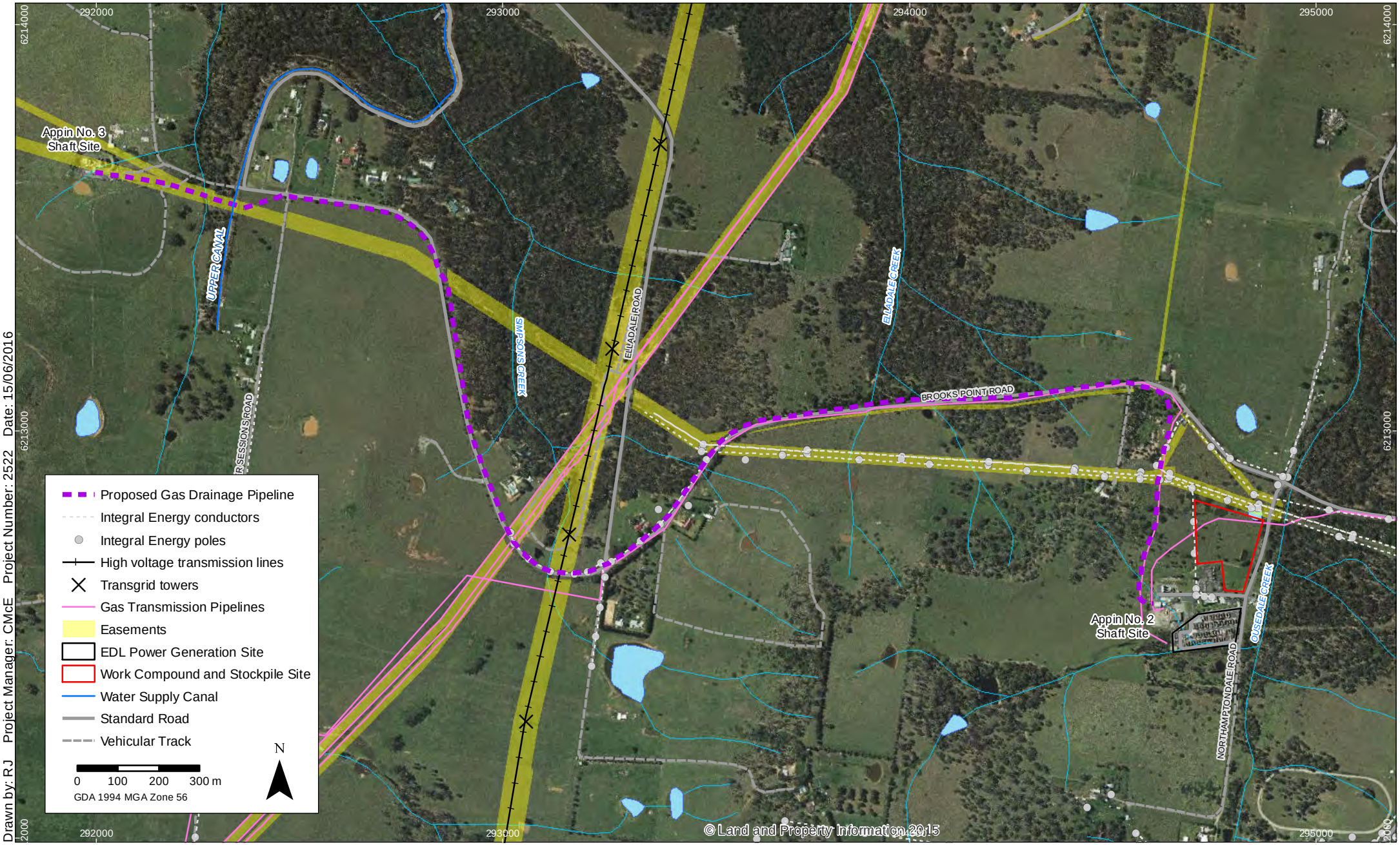
Drawn by: RJ Project Manager: CMcE Project Number: 2522 Date: 01/02/2016

Locality Map

Appin East Mine Safety Gas Management Project - s75 Modification

FIGURE 1

Path: T:\spatial\projects\a2500\a2522_AppinEastGas\Maps\report\2522_Figure_1_StudyArea.mxd



Drawn by: RJ Project Manager: CMcE Project Number: 2522 Date: 15/06/2016

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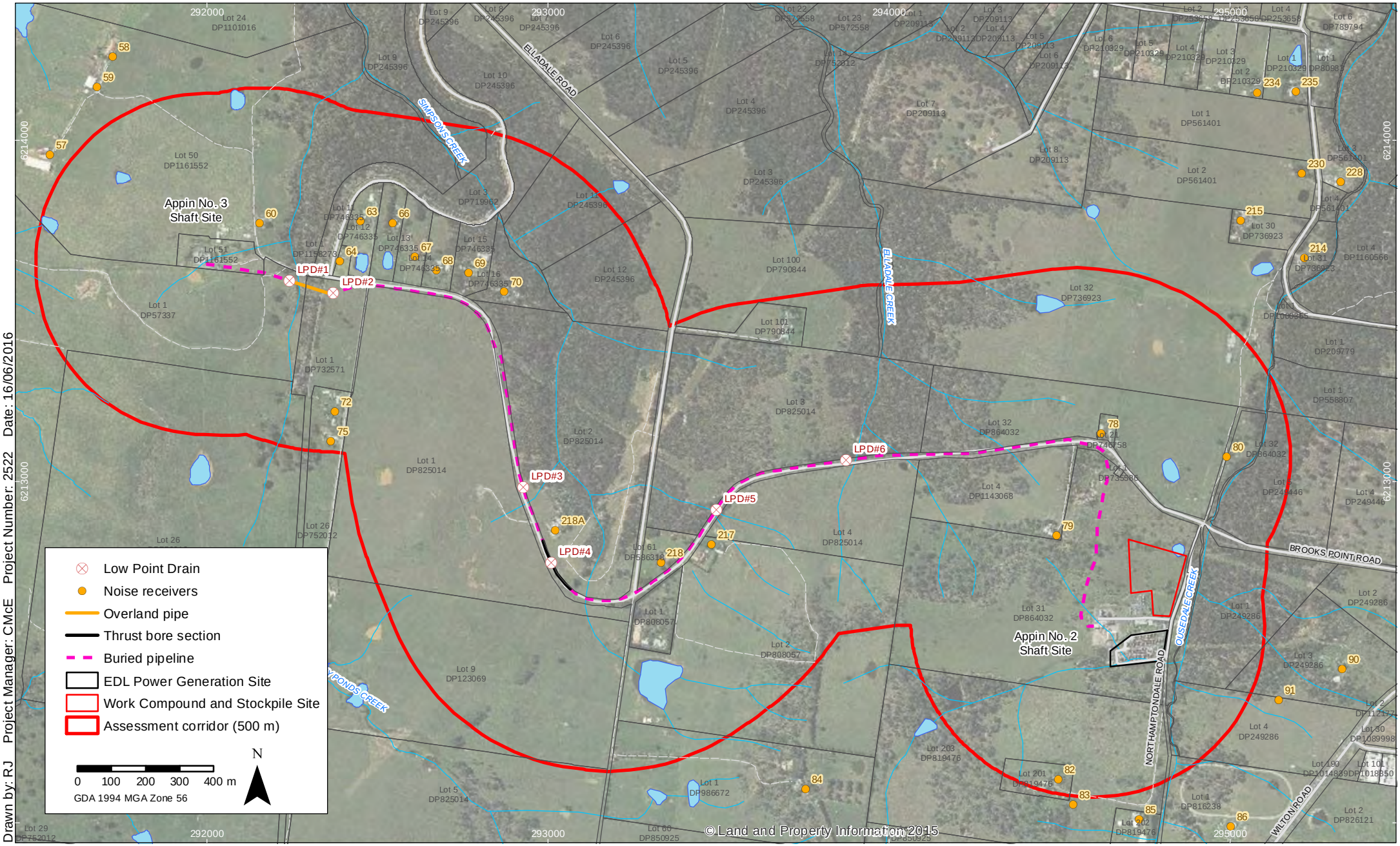
Site Plan

Appin East Mine Safety Gas Management Project - s75 Modification

FIGURE 2

Path: T:\spatial\projects\a2500\a2522_AppinEastGas\Maps\report\2522_Figure_2_Site.mxd

Imagery: (c) LPI 2014-01-04



Drawn by: RJ Project Manager: CMcE Project Number: 2522 Date: 16/06/2016

Proposed Infrastructure

Appin East Mine Safety Gas Management Project - s75 Modification

FIGURE 3

Path: T:\spatial\projects\a2500\a2522_AppinEastGas\Maps\report\2522_Figure_3_Infra.mxd

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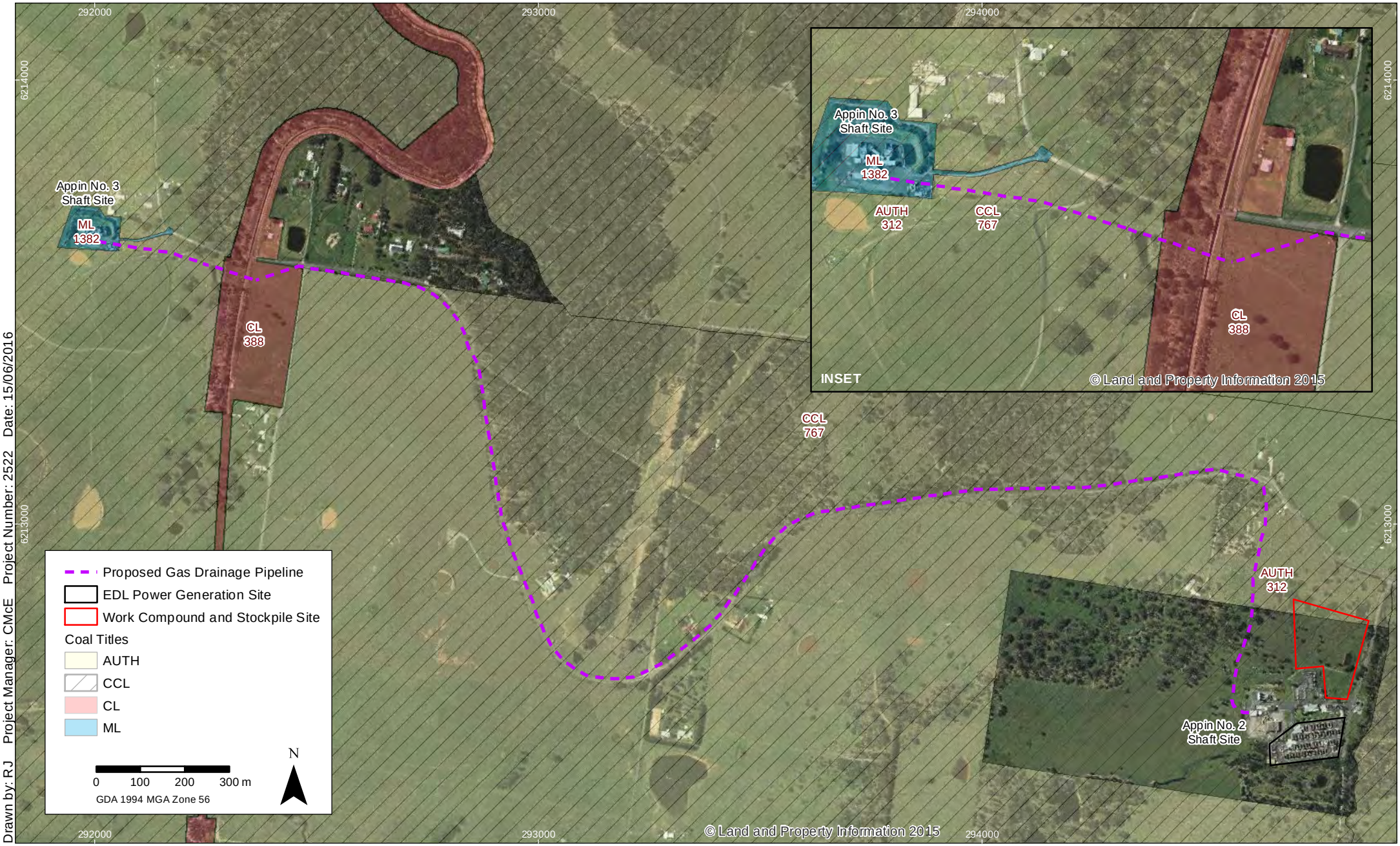


Drawn by: RJ Project Manager: CMcE Project Number: 2522 Date: 15/06/2016

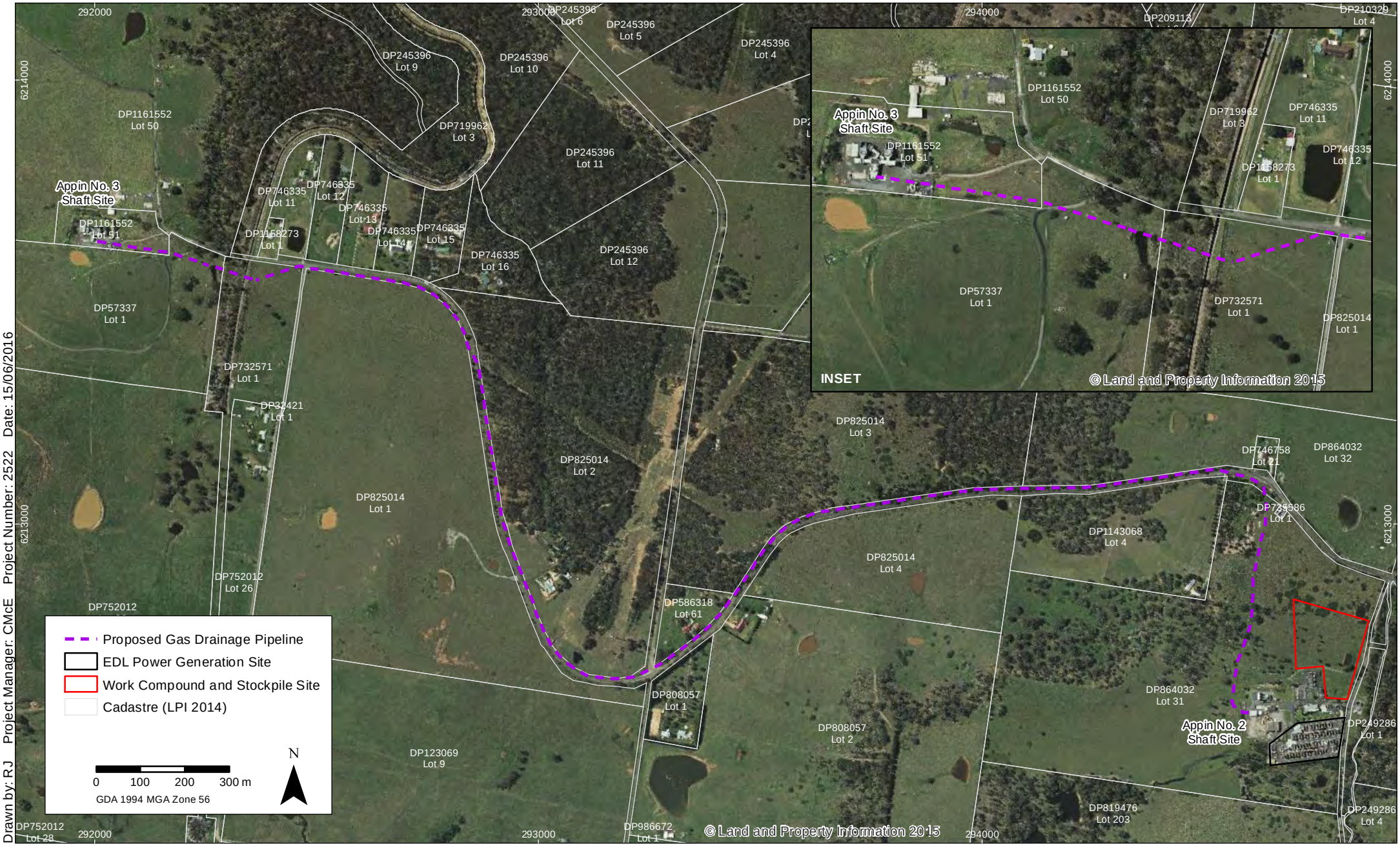
Coal Titles

Appin East Mine Safety Gas Management Project - s75 Modification

FIGURE 4

Path: T:\spatial\projects\a2500\a2522_AppinEastGas\Maps\report\2522_Figure_4_Coal.mxd

Imagery: (c) LPI 2013-02-07



Drawn by: RJ Project Manager: CMcE Project Number: 2522 Date: 15/06/2016

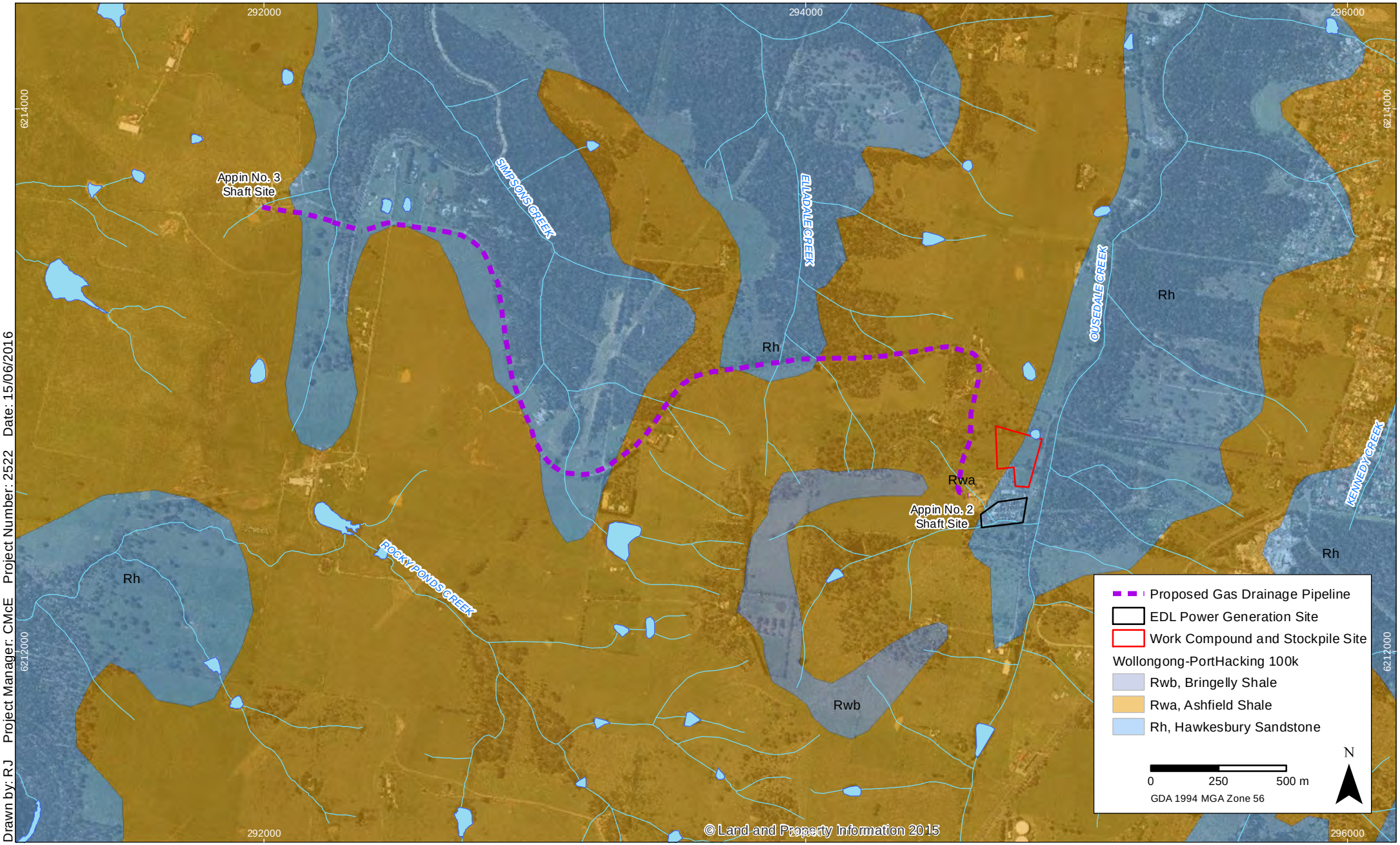
Cadastre

Appin East Mine Safety Gas Management Project - s75 Modification

FIGURE 5

Path: T:\spatial\projects\a2500\a2522_AppinEastGas\Maps\report\2522_Figure_5_Cadastre.mxd

Imagery: (c) LPI 2013-02-07



Drawn by: RJ Project Manager: CMcE Project Number: 2522 Date: 15/06/2016

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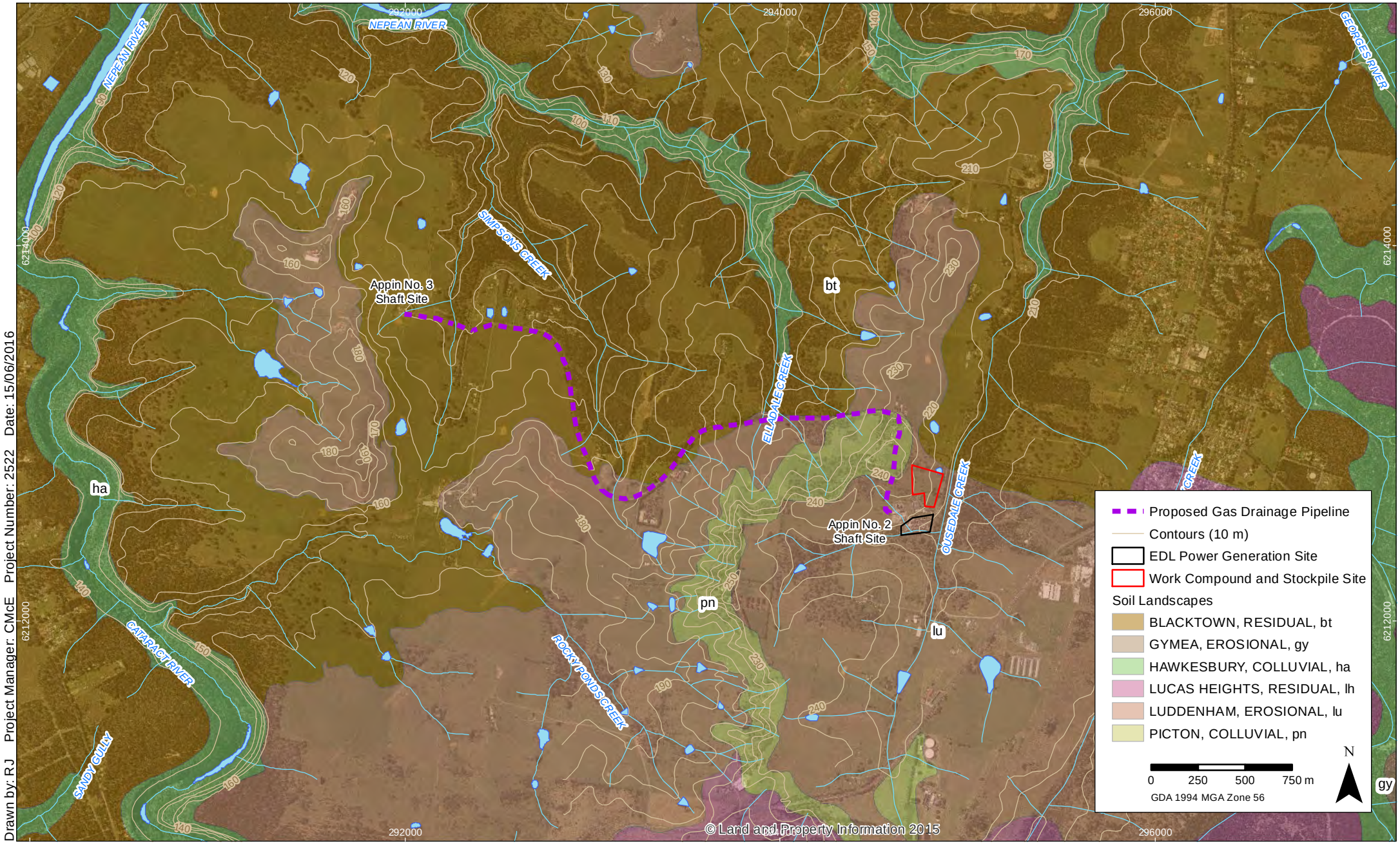
Surface Geology

Appin East Mine Safety Gas Management Project - s75 Modification

FIGURE 6

Path: T:\spatial\projects\a2500\a2522_AppinEastGas\Maps\report\2522_Figure_6_Geology.mxd

Imagery: (c) LPI 2013-02-07



Drawn by: RJ Project Manager: CMcE Project Number: 2522 Date: 15/06/2016

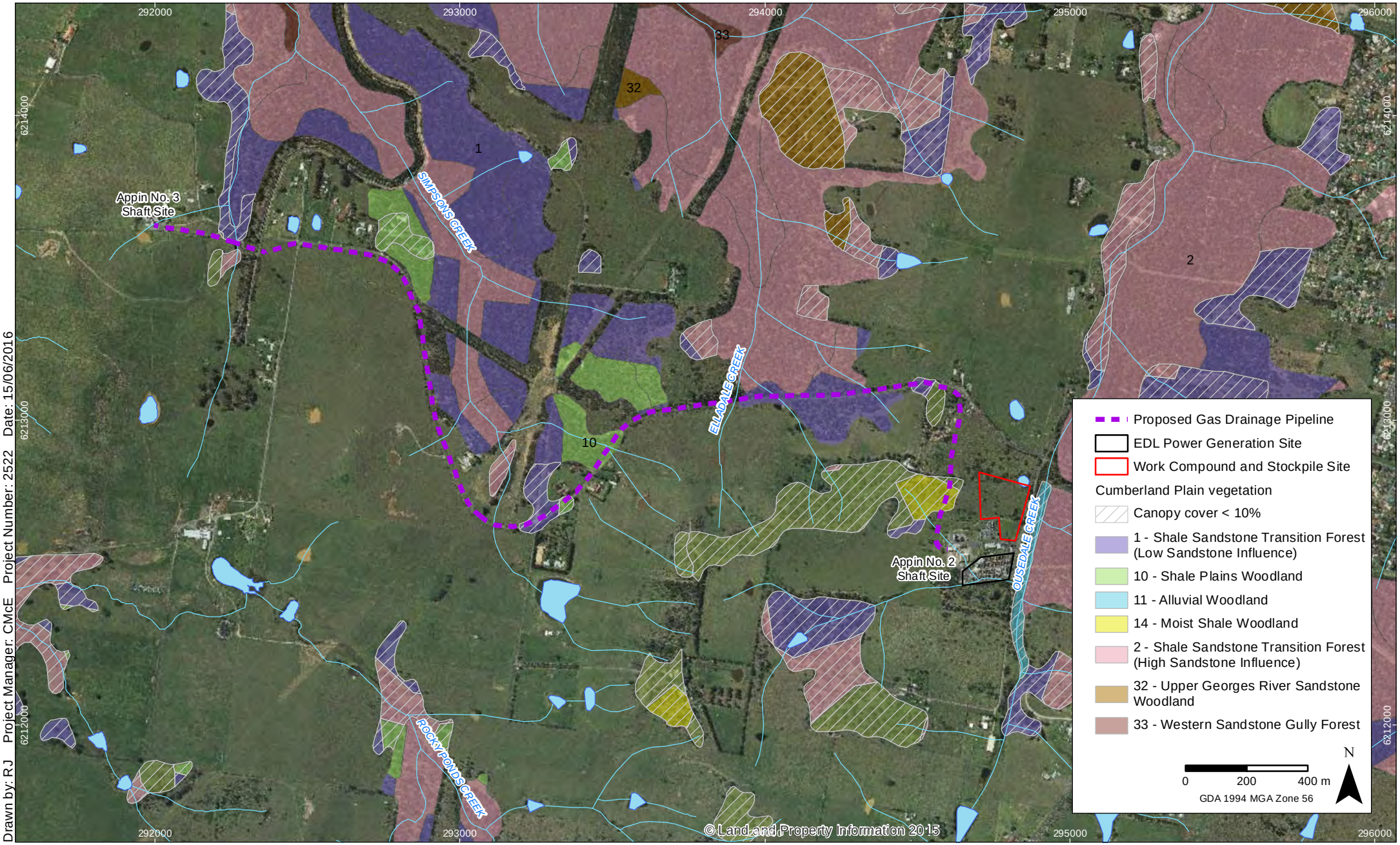
Soil Landscapes and Hydrology

Appin East Mine Safety Gas Management Project - s75 Modification

FIGURE 7

Path: T:\spatial\projects\a2500\a2522_AppinEastGas\Maps\report\2522_Figure_7_SoilWater.mxd

Imagery: (c) LPI 2013-02-07



Drawn by: RJ Project Manager: CMcE Project Number: 2522 Date: 15/06/2016

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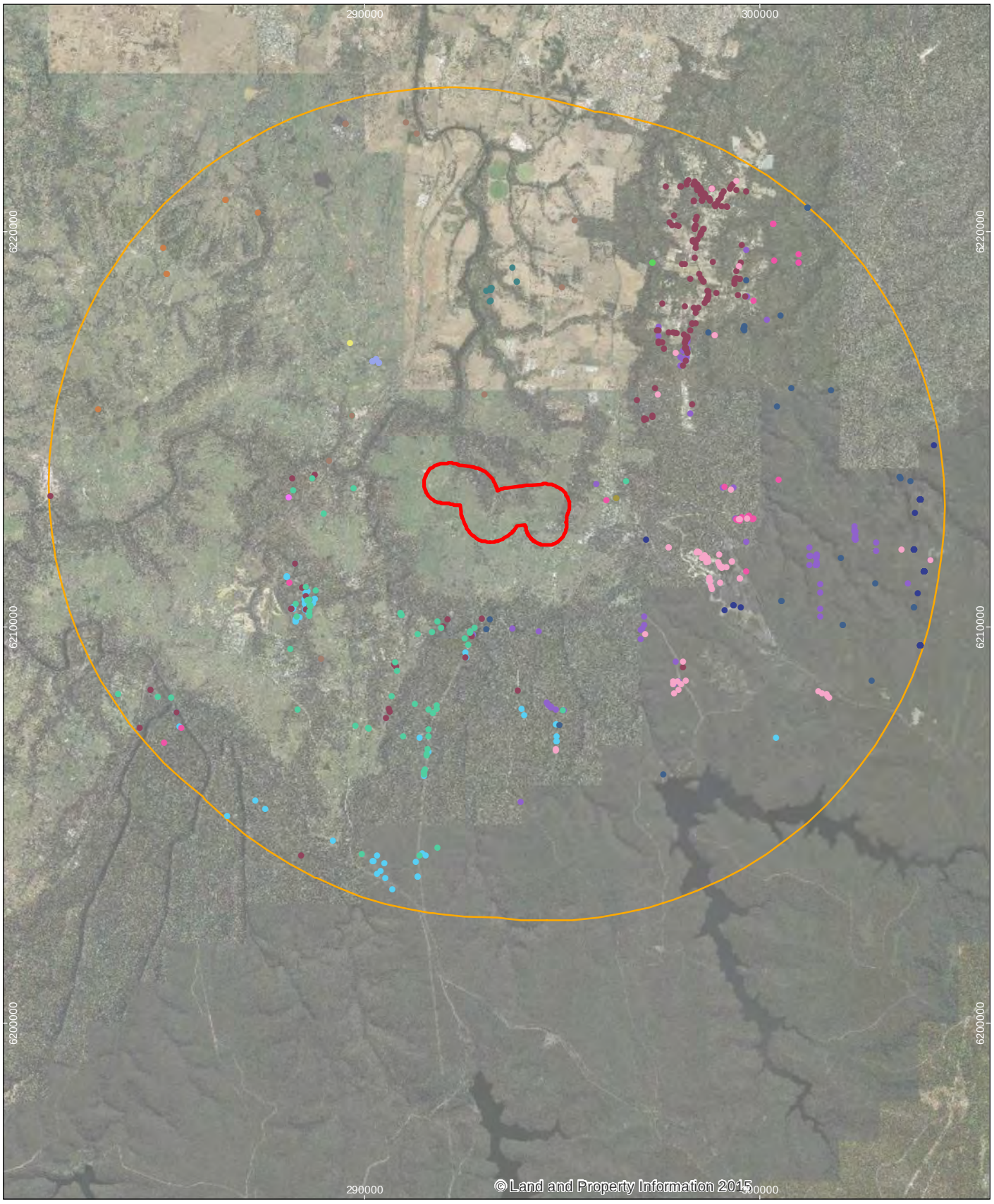
Cumberland Plain Vegetation

Appin East Mine Safety Gas Management Project - s75 Modification

FIGURE 8

Path: T:\spatial\projects\a2500\a2522_AppinEastGas\Maps\report\2522_Figure_8_Vegetation.mxd

Imagery: (c) LPI 2013-02-07



Subject Area
10km Search
Acacia bynoeana
Callistemon linearifolius
Cynanchum elegans
Epacris purpurascens var. purpurascens
Eucalyptus nicholii
Grevillea parviflora subsp. parviflora
Gyrostemon thesioides
Leucopogon exolasius
Melaleuca deanei
Persoonia bargoensis
Persoonia hirsuta
Pimelea spicata
Pomaderris brunnea
Pterostylis saxicola
Pultenaea aristata
Pultenaea pedunculata
Syzygium paniculatum

N

0 1 2 km

GDA 1994 MGA Zone 56

Drawn by: RJ Project Manager: CMcE Project Number: 2522 Date: 15/06/2016

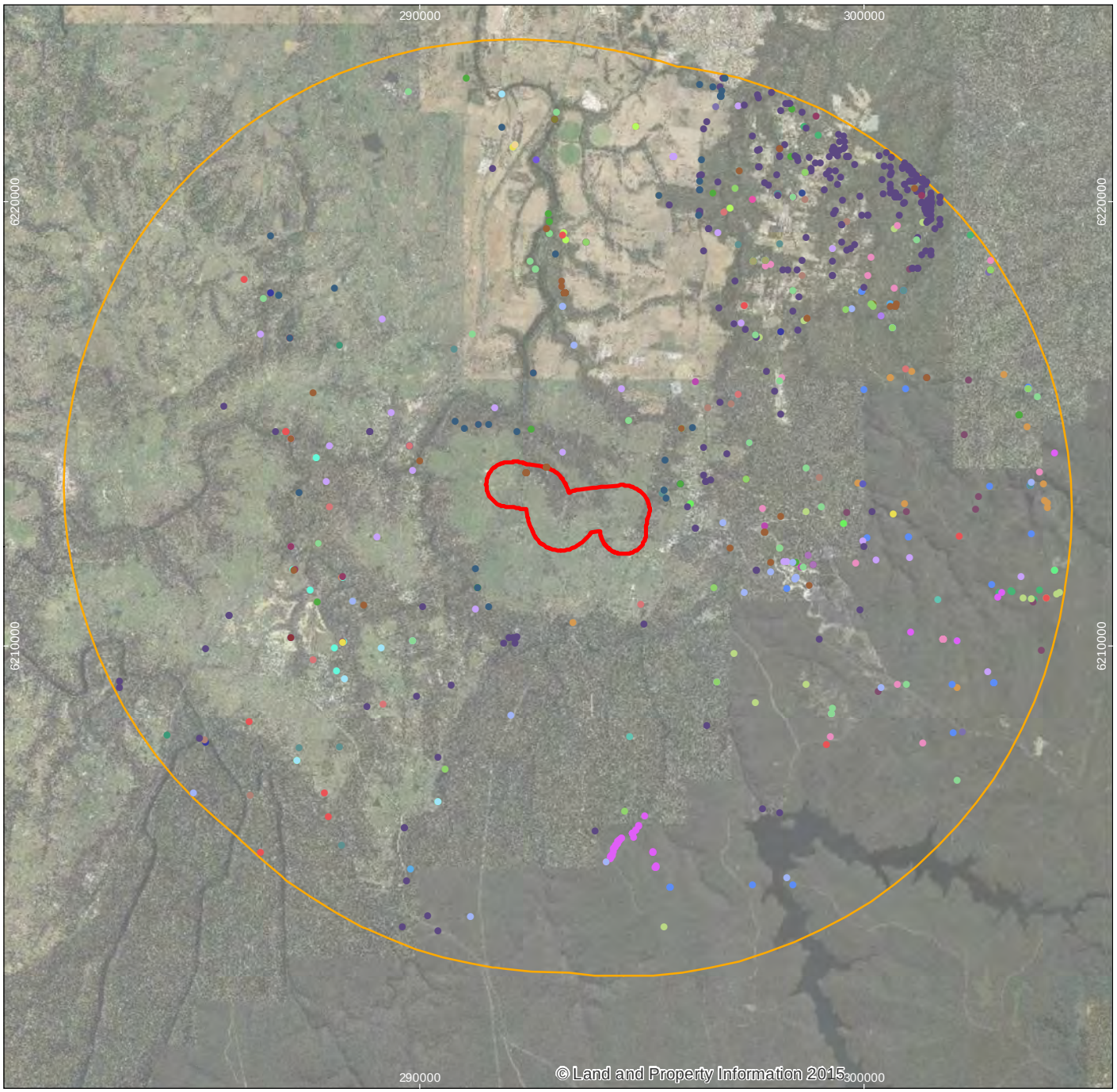
Threatened Flora recorded within 10 km of the Study Area

Appin East Mine Safety Gas Management Project - s75 Modification

FIGURE 9

Imagery: (c) LPI 2008 - 2014

Path: T:\spatial\projects\a2500\a2522_AppinEastGas\Maps\report\2522_Figure_9_ThreatFlora.mxd



Date: 15/06/2016

Drawn by: RJ Project Manager: CMcE Project Number: 2522

- Subject Area
- 10km Search
- Barking Owl
- Black Falcon
- Black-chinned Honeyeater (eastern subspecies)
- Broad-headed Snake
- Brown Treecreeper (eastern subspecies)
- Bush Stone-curlew
- Cumberland Plain Land Snail
- Diamond Firetail
- Dural Woodland Snail
- Eastern Bentwing-bat
- Eastern False Pipistrelle
- Eastern Freetail-bat
- Eastern Ground Parrot
- Eastern Pygmy-possum
- Flame Robin
- Gang-gang Cockatoo
- Giant Burrowing Frog
- Giant Dragonfly
- Glossy Black-Cockatoo
- Golden-tipped Bat
- Greater Broad-nosed Bat
- Grey-headed Flying-fox
- Hooded Robin (south-eastern form)
- Koala
- Large-eared Pied Bat
- Little Bentwing-bat
- Little Eagle
- Little Lorikeet
- Littlejohn's Tree Frog
- Masked Owl
- New Holland Mouse
- Powerful Owl
- Red-crowned Toadlet
- Regent Honeyeater
- Rosenberg's Goanna
- Scarlet Robin
- Southern Myotis
- Speckled Warbler
- Spotted Harrier
- Spotted-tailed Quoll
- Square-tailed Kite
- Squirrel Glider
- Swift Parrot
- Turquoise Parrot
- Varied Sittella
- Yellow-bellied Glider
- Yellow-bellied Sheathtail-bat

N

0 1 2 km

GDA 1994 MGA Zone 56

Threatened Fauna recorded within 10 km of the Study Area

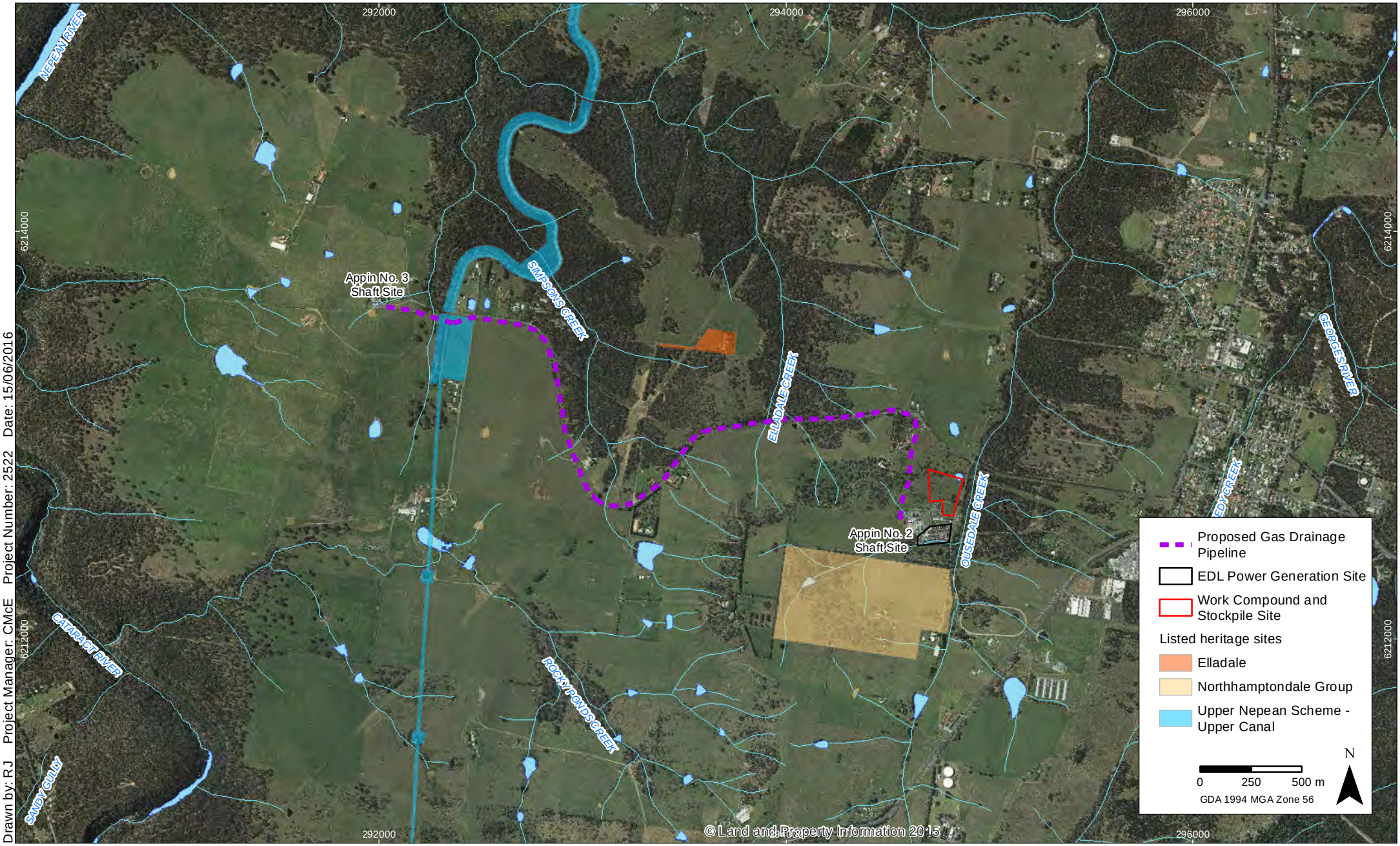
Appin East Mine Safety Gas Management Project - s75 Modification

niche Environment and Heritage

FIGURE 10

Path: T:\spatial\projects\a2500\a2522_AppinEastGas\Maps\report\2522_Figure_10_ThreatFauna.mxd

Imagery: (c) LPI 2008 - 2014



Drawn by: RJ Project Manager: CMcE Project Number: 2522 Date: 15/06/2016

Historical Cultural Heritage Sites

Appin East Mine Safety Gas Management Project - s75 Modification

FIGURE 11

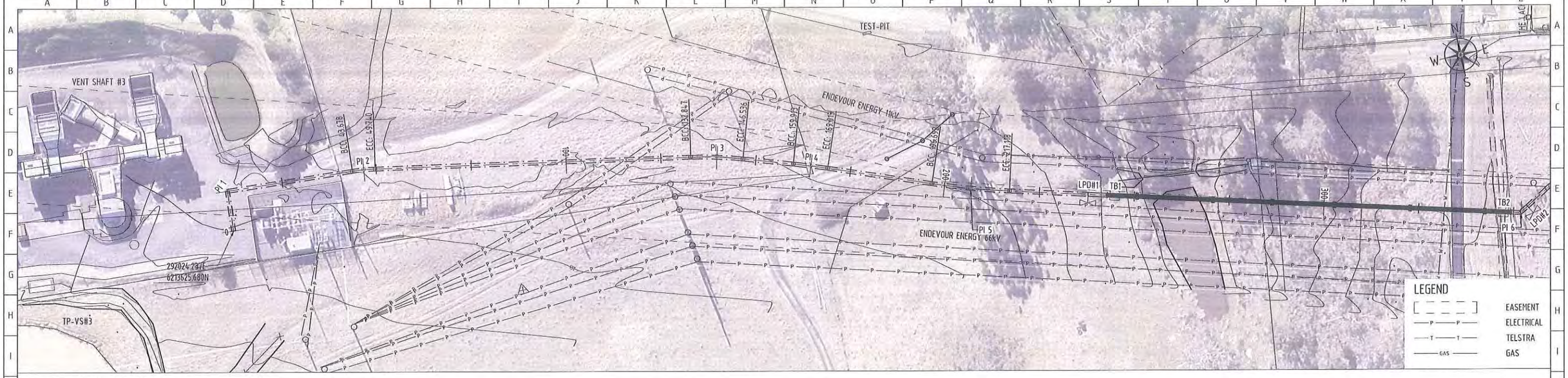
Path: T:\spatial\projects\a2500\a2522_AppinEastGas\Maps\report\2522_Figure_11_CultHerit.mxd

Imagery: (c) LPI 2013-02-07

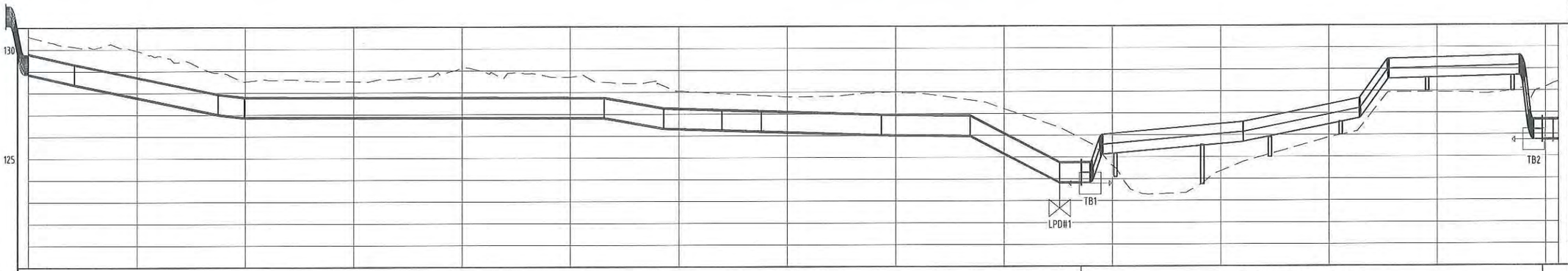
Figure 12 Aboriginal Cultural Heritage Sites

Item removed due to cultural sensitivity

Annex 2 Drawings and Photos



PI = POINT OF INTERSECTION
BCC = BEGINNING OF CURVE CENTRE LINE
ECC = END OF CURVE CENTRE LINE
CH = CHAINAGE
LPD = LOW POINT DRAIN
TB = THRUST BLOCK
NGL = NATURAL GROUND LEVEL
MP = MARKER POST



SCALES:
HORIZONTAL 1:500
VERTICAL 1:100

DATUM 120.000

PIPELINE DETAILS: HDPE 1000ø PE100 (to CH 244.830); DN900 ABOVE GROUND STEEL PIPE REFER TO DRAWING NO. H350892-00000-250-270-0001

CHAINAGE (m)	GROUND LEVEL	PIPE INVERT LEVEL	DEPTH TO INVERT
			1.720
10.490	130.122	128.402	1.720
43.678	128.926	127.033	1.892
49.740	128.510	126.888	1.622
100.000	129.140	126.862	2.278
132.847	128.466	126.845	1.622
146.536	128.295	126.363	1.933
159.913	127.942	126.278	1.664
169.013	127.841	126.220	1.622
196.692	127.979	126.050	1.929
200.000	127.990	126.043	1.947
217.109	127.625	126.003	1.622
237.806	126.356	123.857	2.499
242.806	125.851	123.857	1.994
244.830	125.638	123.857	1.780
300.000	125.878	124.891	0.988
349.299	127.861	125.776	2.085
351.811	128.089	125.776	2.313
			2.541 2.626
354.299	128.318	125.776	

SLOPE / LENGTH

4.530 %	4.125 %	2.398 %	0.052 %	3.519 %	0.637 %	0.637 %	0.612 %	0.230 %	10.369 %	0.000 %	0.000 %	0.000 %	0.000 %
10.49 m	33.19 m	6.06 m	83.11 m	13.69 m	13.38 m	9.10 m	27.68 m	20.42 m	20.70 m	5.00 m	2.02 m	2.02 m	2.51 m

CHANGE IN DIRECTION (VERT / HOR / COMBINED)

0.232 | 90.000 | 89.893
0.988 | 3.474 | 3.609
1.344 | 3.474 | 3.724
1.986 | 3.922 | 4.396
1.651 | 3.922 | 4.255
0.000 | 1.304 | 1.303
0.014 | 1.304 | 1.304
0.219 | 2.925 | 2.933
5.788 | 2.927 | 6.484
5.920 | 0.000 | 5.920
0.000 | 0.000 | 0.000
1.073 | 0.000 | 1.073
1.073 | 0.000 | 1.073
0.000 | 0.099 | 0.099
0.000 | 43.344

HORIZONTAL ALIGNMENT

DIRECTION 183°46'50"
DIRECTION 273°46'50"
R=50.0m BCC2 43.678 49.740 ECC2 I=277°15'20"
DIRECTION 280°43'40"
BCC3 132.847 R=100.0m I=284°39'00" 146.536 ECC3
DIRECTION 288°34'20"
BCC4 159.913 R=200.0m I=289°52'30" 169.013 ECC4
DIRECTION 291°10'40"
BCC5 196.692 R=200.0m I=288°15'10" 217.118 ECC5
DIRECTION 285°19'30"
DIRECTIO 240°21'2

MARKER POST: MP MP MP MP MP MP MP MP MP

REV	DESCRIPTION	DATE	DRN	CKD
A	CLIENT REVIEW	31-03-2016	FH	EC

SUPPLIER DRAWING No.
H350892-00000-220-271-0001
AUTOCAD SAVE NAME
H350892-00000-220-271-0001
RESPONSIBLE ENG
E CARVALHO
APPROVAL
C BEARDMORE
SUPPLIER REFERENCE NO.s
H350892

HATCH™

Contractor Identification

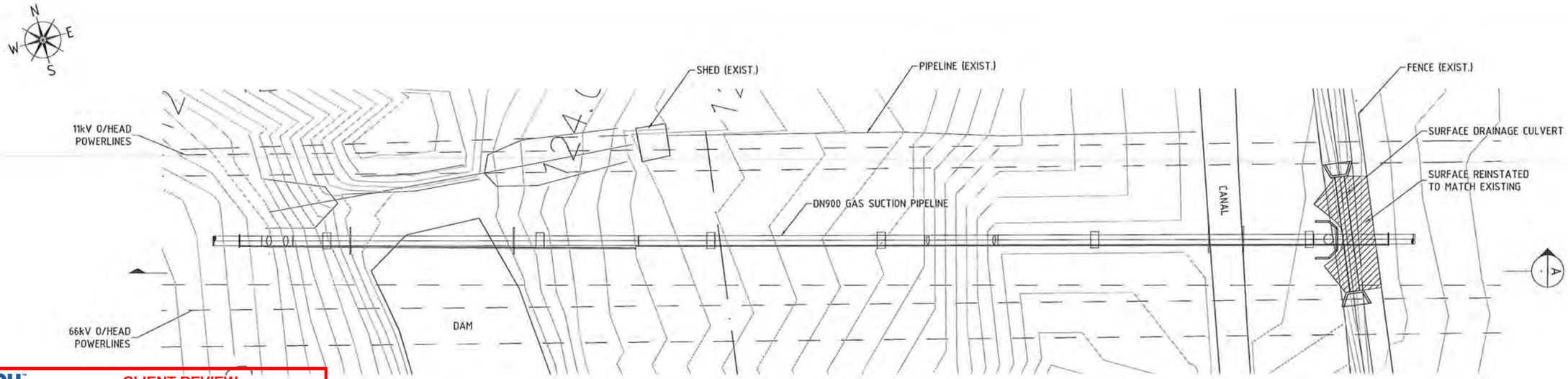
SOUTH32

Illawarra Coal Holdings Pty Ltd
PO Box 514 Unanderra NSW 2526 Australia
ABN 69 093 857 286

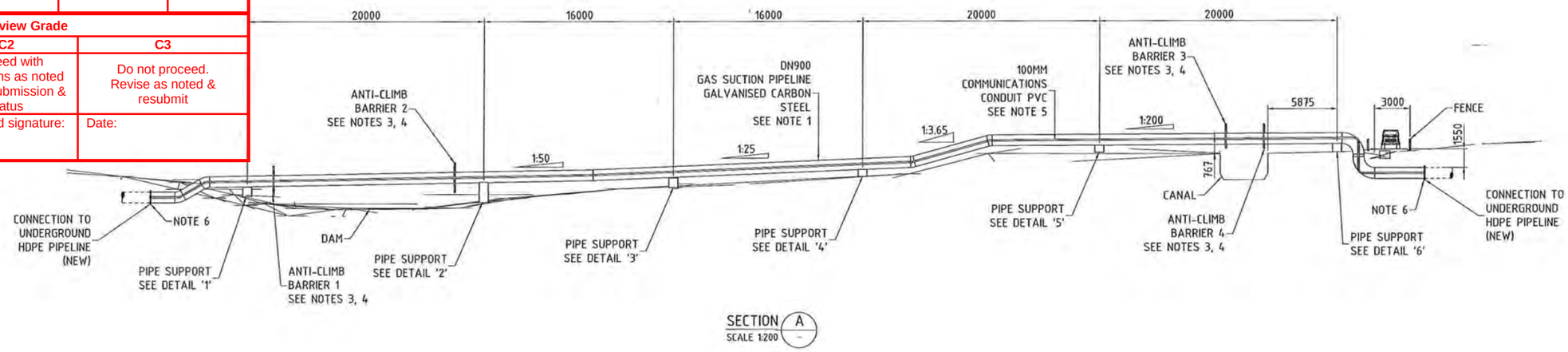
	NAME	DATE
DRN	F HUGO	31-03-2016
CKD	E CARVALHO	31-03-2016
APP	C BEARDMORE	31-03-2016
SCALE	1:500	SIZE A1

Title APGDP UPGRADE
VS#3 TO APGDP PIPELINE
PIPELINE ALIGNMENT SHEET No.1

DRAWING NUMBER APGDP_0703902_001
SHEET 1
REV A



PLAN VIEW
SCALE 1:200



SECTION A
SCALE 1:200

HATCH

CLIENT REVIEW

Doc Number	H350892-00000-250-270-0001	Rev	B
Discipline	Discipline Engineer Name / Signature	Date yy-mm-dd	

Review Grade

C1	C2	C3
Proceed to next submission & status	Proceed with exceptions as noted to next submission & status	Do not proceed. Revise as noted & resubmit

Responsible Engineer: Name and signature: | Date:

NOTES:
1. FOR GALVANISED CARBON STEEL PIPE MATERIALS SPECIFICATION SEE H350892-00000-250-206-0002.
2. FOR PIPE SUPPORT DETAILS REFER TO H350892-00000-230-260-0006.
3. LOCATION OF ANTI-CLIMB BARRIERS TBD.
4. FOR ANTI-CLIMB BARRIER DETAILS REFER TO H350892-00000-250-260-0001.
5. FOR PIPE CLAMP SUPPORT DETAILS OF COMMUNICATIONS CONDUIT REFER TO H350892-0000-250-260-0002.
6. BURIED PIPE CONNECTING TO UNDERGROUND HDPE SYSTEMS SHALL BE COATED WITH PETROLATUM WRAPPING TAPE.

PRELIMINARY
NOT FOR CONSTRUCTION
REV. No: B DATE: 23 MAR 16

REV	DESCRIPTION	DATE	DRN	CKD
B	CLIENT REVIEW	23-03-2016	SR	CB
A	CLIENT REVIEW	10-03-2016	GN	MC

SUPPLIER DRAWING No. H350892-00000-250-270-0001
AUTOCAD SAVE NAME H350892-00000-250-270-0001
RESPONSIBLE ENG M. COATES | APPROVAL C. BEARDMORE | SUPPLIER REFERENCE NO.s H350892

HATCH

Contractor Identification

SOUTH32

Illawarra Coal Holdings Pty Ltd
PO Box 514 Unanderra NSW 2526 Australia
ABN 69 093 857 286

	NAME	DATE
DRN	GN	10-03-2016
CKD	MC	10-03-2016
APP	CB	10-03-2016
SCALE	1:200	SIZE A1

Title APGDP UPGRADE
VS#3 TO APGDP PIPELINE
PIPING GENERAL ARRANGEMENT - CANAL CROSSING

DRAWING NUMBER ADGP-0701401-001 | SHEET 1 | REV B

NOTES:
1) THE PIPELINE DEPICTED IS BASED ON A PRELIMINARY DESIGN.
2) THE PIPELINE DEPICTED IS SHOWN IN APPROXIMATE LOCATION BASED ON CURRENT DESIGN.
3) REFER TO 'PIPING GA – CANAL CROSSING' DRAWING ADGP-0701401-001 FOR FURTHE DETAILS.

REV	DESCRIPTION	DATE	DRN	CKD
A	ISSUED FOR CLIENT REVIEW	14/04/16	JM	CB

SUPPLIER DRAWING No. H350892-00000-250-272-0001
AUTOCAD SAVE NAME H350892-00000-250-272-0001
RESPONSIBLE ENG C.BEARDMORE | APPROVAL C.BEARDMORE | SUPPLIER REFERENCE NO.s H350892

HATCH™

Contractor Identification

SOUTH32

Illawarra Coal Holdings Pty Ltd
PO Box 514 Unanderra NSW 2526 Australia
ABN 69 093 857 286

	NAME	DATE
DRN	J.MYBURG	05/04/16
CKD	C.BEARDMORE	14/04/16
APP	C.BEARDMORE	14/04/16
SCALE	NTS	SIZE A1

Title: APGDP UPGRADE
VS#3 TO APGDP PIPELINE
PHOTO MONTAGE - CANAL CROSSING

DRAWING NUMBER APGDP-041004-001 | SHEET 1 | REV A


Approximate pipeline route