

West Wallsend Colliery Continued Operations Project – Preliminary Environmental Assessment

October 2009

West Wallsend Colliery Continued Operations Project – Preliminary Environmental Assessment

Prepared by

Umwelt (Australia) Pty Limited

on behalf of

Oceanic Coal Australia Limited

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1.0 Introduction

West Wallsend Colliery (WWC) is an underground mine that has been operating since 1969 and is located within the Newcastle Coalfield of New South Wales. WWC pit-top is located approximately 1 kilometre east of the residential area of Killingworth and approximately 1.25 kilometres south-west of the residential area of Barnsley (refer to **Figure 1.1**). Underground mining has previously extended to the north and south of the pit-top and longwall mining is currently progressing south-westerly beneath areas of bushland west of the F3 freeway.

WWC is operated by Oceanic Coal Australia Pty Limited (OCAL) on behalf of the Macquarie Coal Joint Venture (MCJV). OCAL is the major joint venture participant of MCJV with 70% ownership. Other participants include Marubeni Coal Pty Ltd (17%), OCAL Macquarie Pty Ltd (10%) and JFE Minerals (Aust) Pty Ltd (3%). OCAL, which also owns OCAL Macquarie Pty Ltd, is wholly-owned by Xstrata Coal Pty Limited.

As well as WWC, the MCJV currently operates an open-cut coal mine (Westside Mine) and a coal preparation plant (Macquarie Coal Preparation Plant). Westside Mine is located adjacent to the southern boundary of the WWC pit-top, whilst the MCPP is located approximately 3 kilometres to the east. A second underground coal mine owned by the MCJV at Teralba is presently on a care and maintenance program, while potential options for future mining are evaluated. These operations are collectively referred to as MCJV's Lake Macquarie Operations.

The locations of the WWC Colliery Holding and other facilities operated by the MCJV in the Lake Macquarie Local Government Area (LGA) are shown on **Figure 1.2**. A small portion of the proposed western underground mining area of WWC is also located with the Cessnock LGA.

WWC currently mines the West Borehole coal seams using longwall mining techniques. The majority of the coal from WWC is washed and loaded onto trains at the Macquarie Coal Preparation Plant (MCPP) to be transported to Newcastle Port for export. A minor percentage of coal mined from West Wallsend has been periodically transported from MCPP to Eraring Power Station via coal haul trucks on a private coal haul road.

WWC currently operates under a number of existing development consents, existing mining leases that encompass the remaining Life of Mine (LOM) coal reserves and an approved Subsidence Management Plan (SMP). The approved SMP covers the first three longwall panels in the area referred to as the Western Domain, as shown in **Figure 1.2**. The SMP details all surface features within the mining area and the relative subsidence management strategies that have been developed with the respective stakeholders. The majority of the surface land for future mining at WWC is managed by the Department of Environment, Climate Change and Water (DECCW) as part of the Sugarloaf State Conservation Area (SCA). WWC has well established subsidence management protocols, all developed in close consultation with the relevant stakeholders.

An updated planning approval is required for two small portions of the future workings of WWC which are currently approved for mining under the Savings Provisions of the Lake Macquarie Local Environmental Plan (LEP, 2004). The Savings Provisions expire in December 2010 and hence WWC will require a new development consent for these areas.

Whilst this approval issue relates to two small areas within WWC future mining areas, the overall objective of the project application to which this Preliminary Environmental Assessment relates is to provide WWC with one updated approval for the remaining operations of WWC. Therefore this project not only assesses these two small areas but also

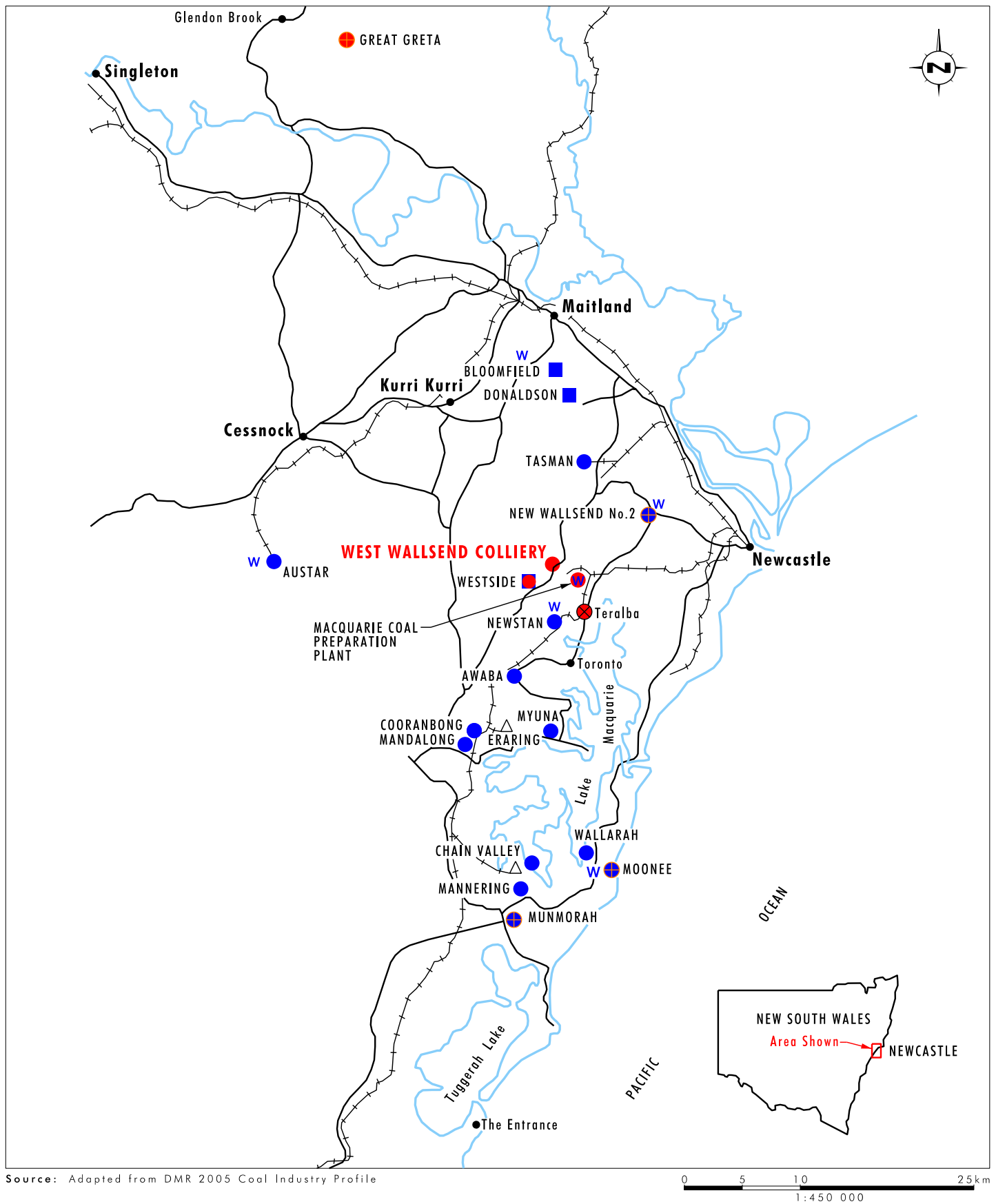
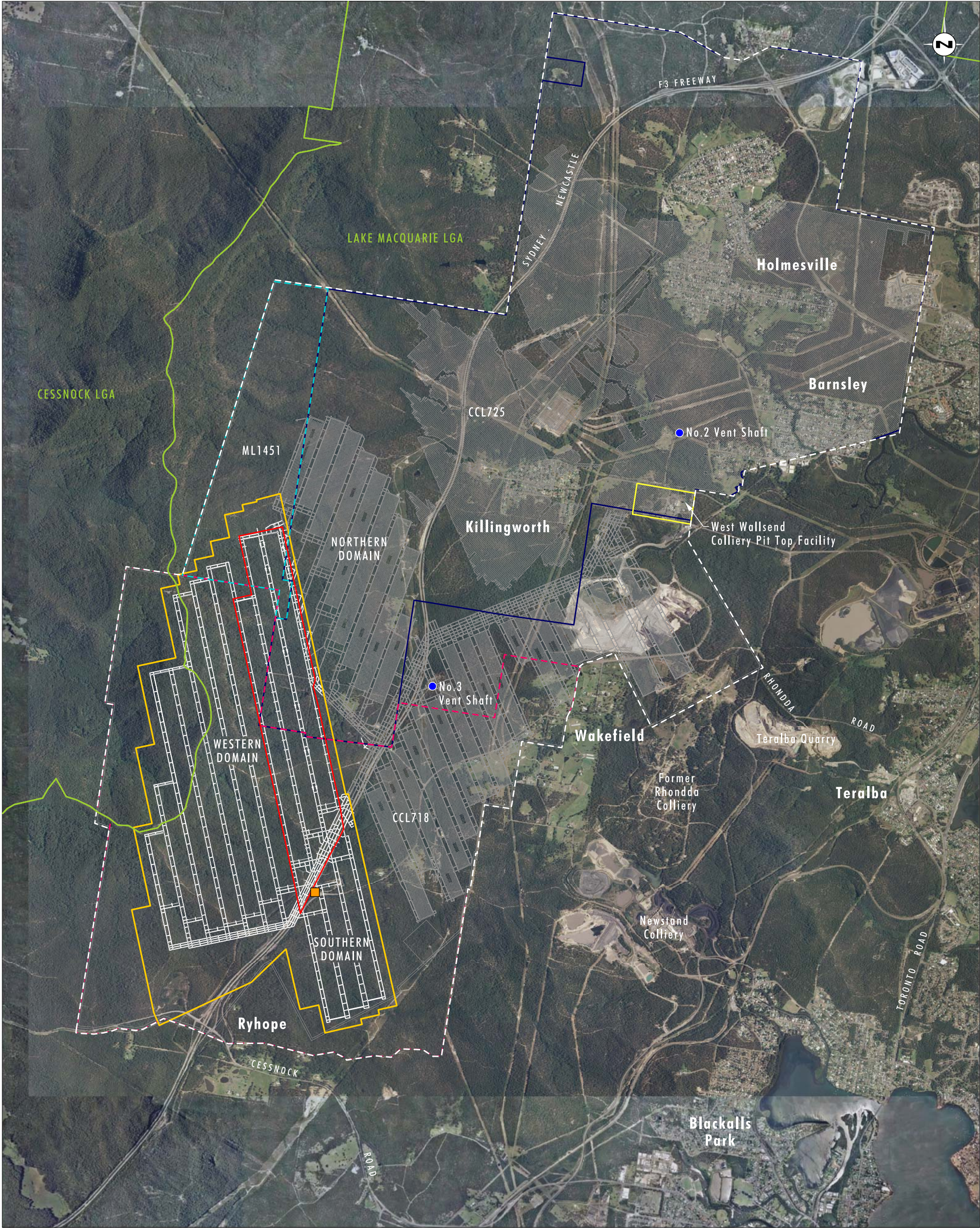


FIGURE 1.1

Location of West Wallsend Colliery
in the Newcastle Coalfield



Source: OCAL, Google Earth 2008

0 0.5 1.0 2.0 km
1:40 000

Legend

- | | |
|---|---|
| West Wallsend Colliery Pit Top Facility | Former Underground Workings |
| CCL725 | Local Government Area |
| CCL718 | Project Application Boundary |
| ML1451 | Proposed Mining Services Facility |
| Proposed Future Longwall Area | Approved SMP Area |
| Proposed Underground Workings | |

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FIGURE 1.2
West Wallsend Colliery Continued Operations Project - Project Area

covers the entire LOM coal reserves for WWC, the existing pit top and other related ancillary surface facilities. It is important to note that no significant changes to the existing underground mining or associated surface operations are proposed as part of the project application, the existing operations will continue as per the current operations. Coal haulage and coal preparation are covered by existing separate approvals, to which no changes are proposed as a part of the project application.

1.1 Background and Overview of the West Wallsend Colliery Continued Operations Project

WWC has been operating since development consent was issued for the operation in 1969 by Lake Macquarie City Council (LMCC). Early operations were mainly bord and pillar workings located in the northern areas of Consolidated Coal Lease (CCL) 725. Longwall mining has been undertaken since 1985. The previous and planned future workings of WWC are outlined in **Figure 1.2**.

Mining at WWC is undertaken in three main areas, referred to as the Northern, the Western and Southern Domains as shown in **Figure 1.2**. Mining is currently being undertaken in the Western Domain. The majority of mining within these two domains is encompassed within CCL 718. Mining within CCL 718 has current development consent under the 1981 Stockton Borehole Consent (the 1981 Consent), which provides for the continuation of mining within this area. However two small portions of mining in the Western Domain are located within CCL 725 and Mining Lease (ML) 1451, as shown on **Figure 1.2**, which are not covered by the 1981 consent.

Mining within CCL 725 and ML 1451 is currently being undertaken under a Part 5 Approval granted under the *Environmental Planning and Assessment Act 1979* (EP&A Act), granted by the Department of Industry and Investment (DII) (previously Department of Primary Industries). This approval is based on the savings provisions of the Lake Macquarie LEP, which enable underground mining to be undertaken, without development consent, where an existing mining lease is related to an existing mining operation.

The savings provisions under the LMCC LEP will expire in December 2010. After December 2010 all mining within CCL 725 and ML 1451 will require a development consent under the EP & A Act. Therefore a new Part 3A project approval under the EP&A Act will be required for all future mining within CCL 725 and ML 1451 after December 2010.

The overall aim of the project application is to provide for ongoing mining in CCL 718, 725 and ML 1451 and to enable continued mining under one consolidated approval that will cover the remaining operations of WWC.

The key features of the WWC Continued Operations Project are outlined below in **Table 1.1**.

Table 1.1 – Key Features of West Wallsend Colliery Continued Operations Project

Major Project Components/Aspects	Proposed Operations
Limits on Extraction	Up to 5.5Mtpa ROM
Estimated Mine Life	Approximately 12 years of mining
Operating Hours	24 hours per day, 7 days per week
Number of Employees	Approximately 390 Full Time Equivalents
Mining Methods	Underground Mining – longwall method
Mining Areas	Western and Southern Domains and existing mains access from longwall areas to pit bottom. Also encompasses all former workings of WWC.
Infrastructure	Existing West Wallsend Surface Facilities Existing No.2 and No.3 Vent Shafts Proposed future ventilation infrastructure Proposed Services Facility

There will be no modification to the existing WWC main surface facilities. The proposed additional mining services facility is located close to Wakefield road, as shown on **Figure 1.2**. The mining services facility will be comprised of a 20 metre by 35 metre compound and a constructed access road off Wakefield Road. The mining services facility will be used for a range of services including a ballast and concrete borehole, supplementary electricity supply for the mine and for the provision of solcenic oil for use underground. Power to the services facility will be provided by an extension of the existing powerline which is adjacent to Wakefield Road.

In addition to the proposed services facility there is likely to be additional ancillary infrastructure associated with future mining, including the installation of additional ventilation infrastructure and potential gas injection infrastructure for the control of potential spontaneous combustion.

Whilst no modification to the former workings of WWC is proposed under this application, the former workings have been included in the project application boundary to provide a consolidated approval for all workings within the WWC holding. This will provide for any future works required in those existing mining areas, such as works associated with mine closure.

As a result of the preliminary studies for this Part 3A approval process, significant changes have been made to the original project design. These changes relate to the noise control improvements at the WWC pit top and substantial modifications to the proposed longwall area to avoid significant Aboriginal archaeological features and low depth of cover areas with potential groundwater impacts. The details of these changes are discussed further in **Section 2.3**.

1.2 Purpose of the Document

This Preliminary Environmental Assessment (PEA) has been prepared by Umwelt (Australia) Pty Limited (Umwelt), on behalf of OCAL, to brief the relevant government agencies about the proposed development (i.e. the Project Description Report as required under Part 3A), to introduce the environmental assessments conducted to date and identify key issues to be addressed in the Environmental Assessment. The Director General's Requirements (DGRs) for the Environmental Assessment will be provided by the Department of Planning and Local

Government (DoP) (formerly Department of Planning) following consideration of agency feedback on this PEA.

Environmental impact assessments were not finalised at the time this document was prepared. All information presented in this document is therefore in preliminary form and may be subject to change in the future.

References in this document to the 'project area' relate to the former and proposed underground mining areas, the existing surface facilities, the proposed services facility and additional ventilation infrastructure, associated with the project and their immediate surrounds, as shown within the project application boundary on **Figure 1.2**.

2.0 Description of Continued Operations

2.1 Resource Description

The target coal resource is part of the Newcastle Coal Measures. In the western part of the proposed longwall mining area the relatively steep Sugarloaf Range is formed by the overlying resistive Triassic sandstones and conglomerates of the Lower Narrabeen Group.

Current and future mining resources for the project are in the West Borehole Seam. The seam is up to 5 metres thick and is formed by the coalescence of seams that occur in the eastern part of the Colliery Holding, where mining was conducted in the past. A generalised stratigraphic section through the north and south domains has been included to show the location of the West Borehole Seam in relation to the surface and other coal seams (refer to **Figure 2.1**).

The stratigraphy of this area, as in many other parts in the Newcastle coalfield, is marked by rapid lateral variations in inter-seam sediment thicknesses/intervals, resulting from the deposition of sandstone and conglomerate channels. **Figure 2.2** provides a representative stratigraphic column for both the Western and Southern Domains.

The deposition of the Newcastle Coal Measures was strongly influenced by the presence of the Lochinvar Anticline to the west. The entire coal measures sequence thins from in excess of 400 metres east of Lake Macquarie to less than 100 metres in the western part of the WWC Holding.

The coal resource includes a range of coal types from export coking to export thermal and domestic thermal.

The surface terrain is formed by the Moon Island Beach Sub-Group of the Newcastle Coal Measures. Sandstone and conglomerate of the Teralba Conglomerate Formation dominate the ridges within the project area. Tuffaceous claystone (Awaba Tuff), siltstone and coal seams (Fassifern Seam) generally underlie the near surface conglomerate units.

2.2 Geological Structures

Proven and inferred structural features are shown on **Figure 2.3**. Surface outcrops of faults and dykes are uncommon in the project area. Features apparent from aerial photographs appear to be primarily an expression of joint patterns and show little correlation with proven structural features. Excavations for the F3 Freeway have revealed some structures; other sources of information are adjacent workings, geophysical surveys, in-seam drilling and, to a lesser extent, surface boreholes. Geophysical surveys have included an aeromagnetic survey, several phases of ground-magnetic surveys and a trial Mini-Sosie seismic survey.

Several dykes have been intersected or projected from the above sources. Two generations of dykes are apparent from a regional perspective, one set trending east/west and the other, more common set, trending north-west/south-east.

There are several dykes shown on **Figure 2.3**. Most dykes are emplaced in a NW/SE direction, which is the dominant structural trend in the area, and throughout the coalfield. Each dyke requires better delineation at seam level, to determine location, thickness and hardness parameters necessary for detailed mine planning. This assessment will be conducted as part of detailed mine planning processes.

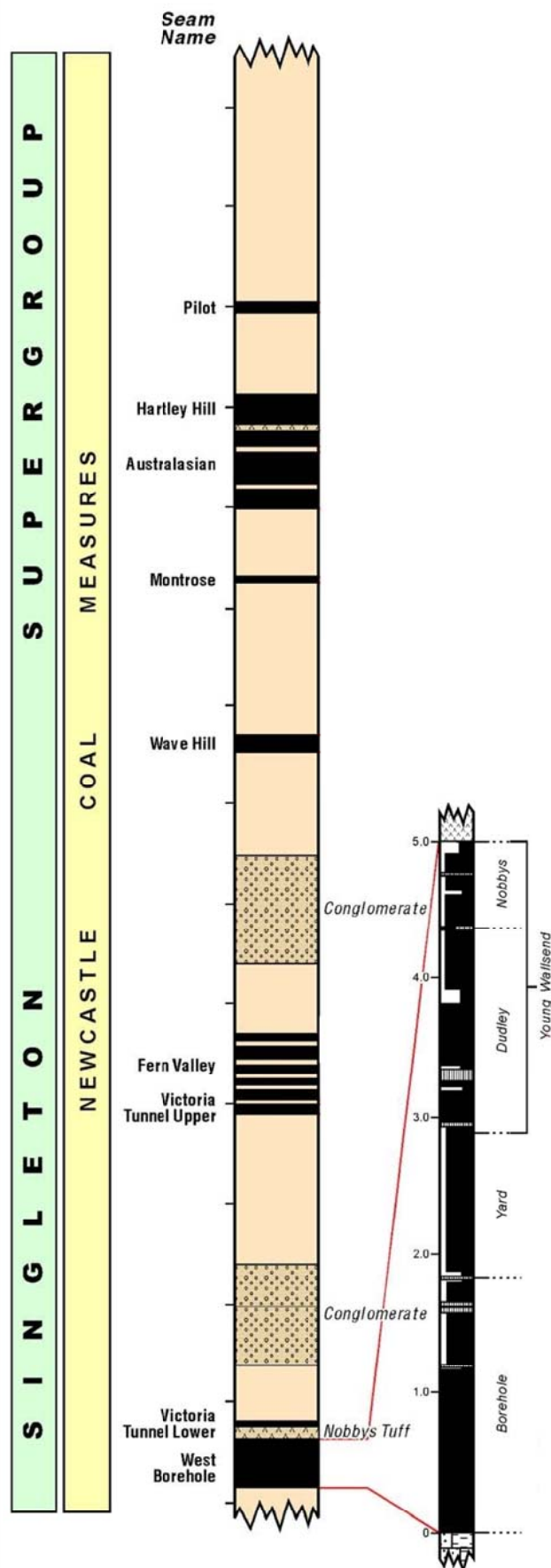


FIGURE 2.1

Typical Stratigraphic Section -
West Borehole Seam

South

North

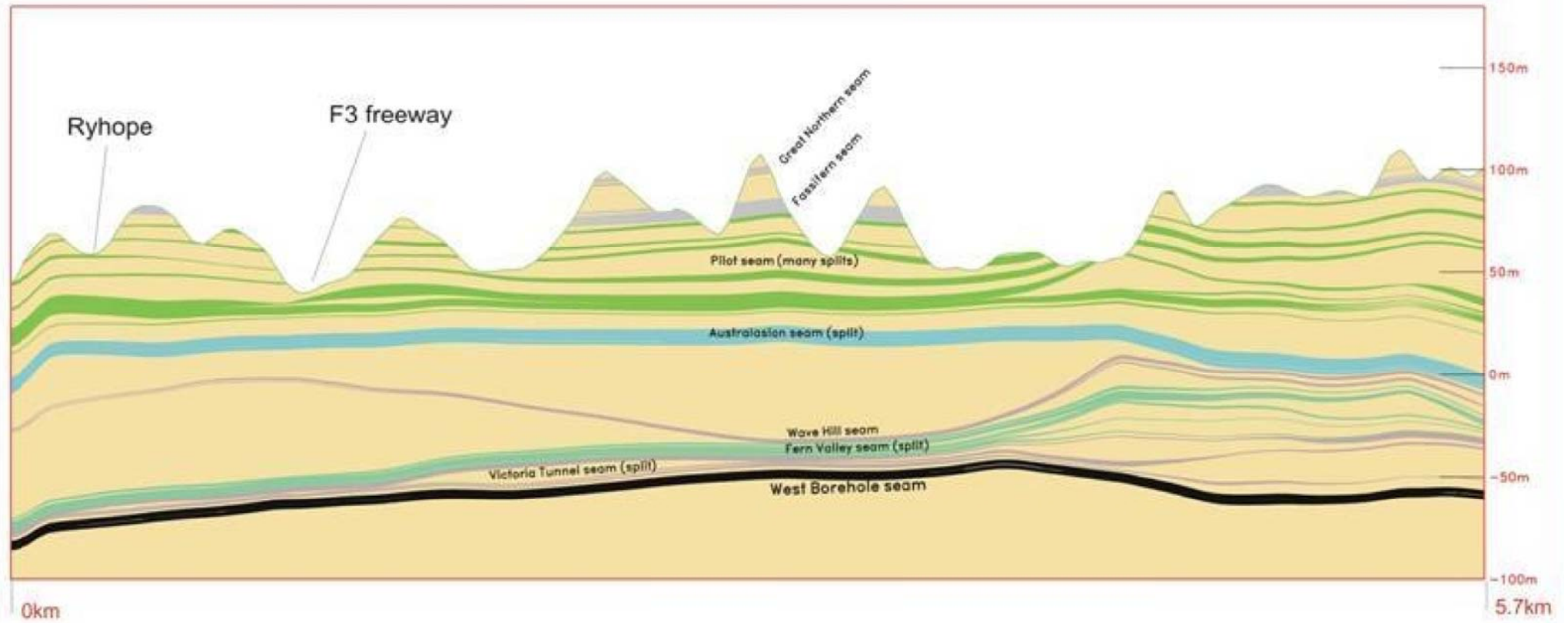
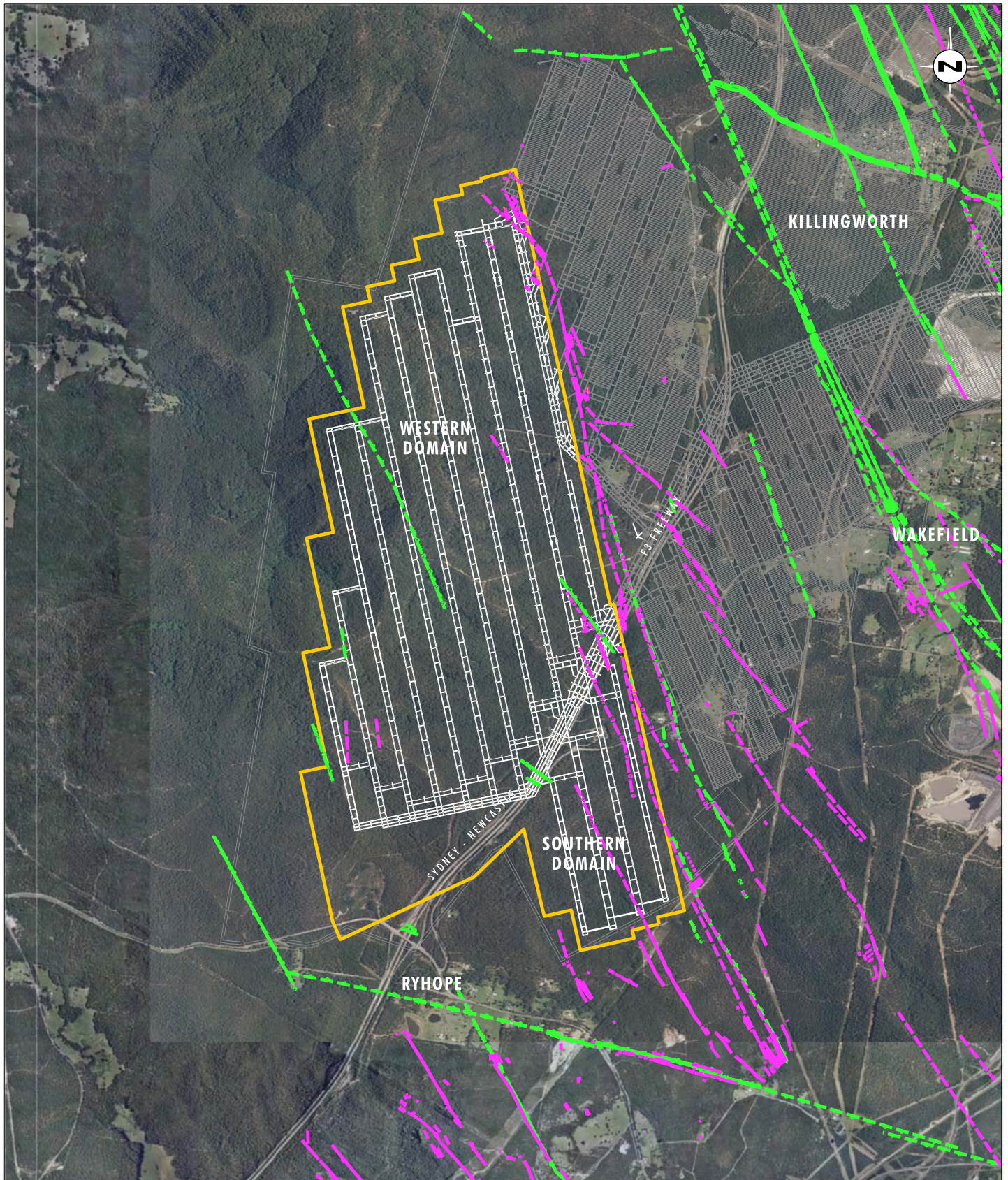


FIGURE 2.2

Representative Stratigraphic Long Section
of the Project Area



Source: OCAL, Google Earth 2008

0 0.5 1.0 2km
1:40 000

Legend

- Proposed Future Longwall Area
- Faults
- Dykes
- Proposed Underground Workings
- Former Underground Workings

FIGURE 2.3

Geological Structures
within the Project Area

Based on current data, there is one major fault, (i.e. >10 metres displacement), within the planned future underground mining area, and possibly only one zone where faulting is likely to exceed 5 metres throw.

These geological structures have been considered during development of the conceptual mine plan outlined in this preliminary environmental assessment report.

2.3 Mining Operations

The longwall panels will be extracted using the existing longwall retreating system of mining. This method has been successfully used for the extraction of the previous longwall panels from LW1 to LW36 since 1985 and is currently being used for the extraction of LW37. The longwall face equipment has been designed for thick seam extraction allowing cutting heights of up to 5.0 metres. An average cutting height of approximately 4.8 metres is expected in the proposed longwall area.

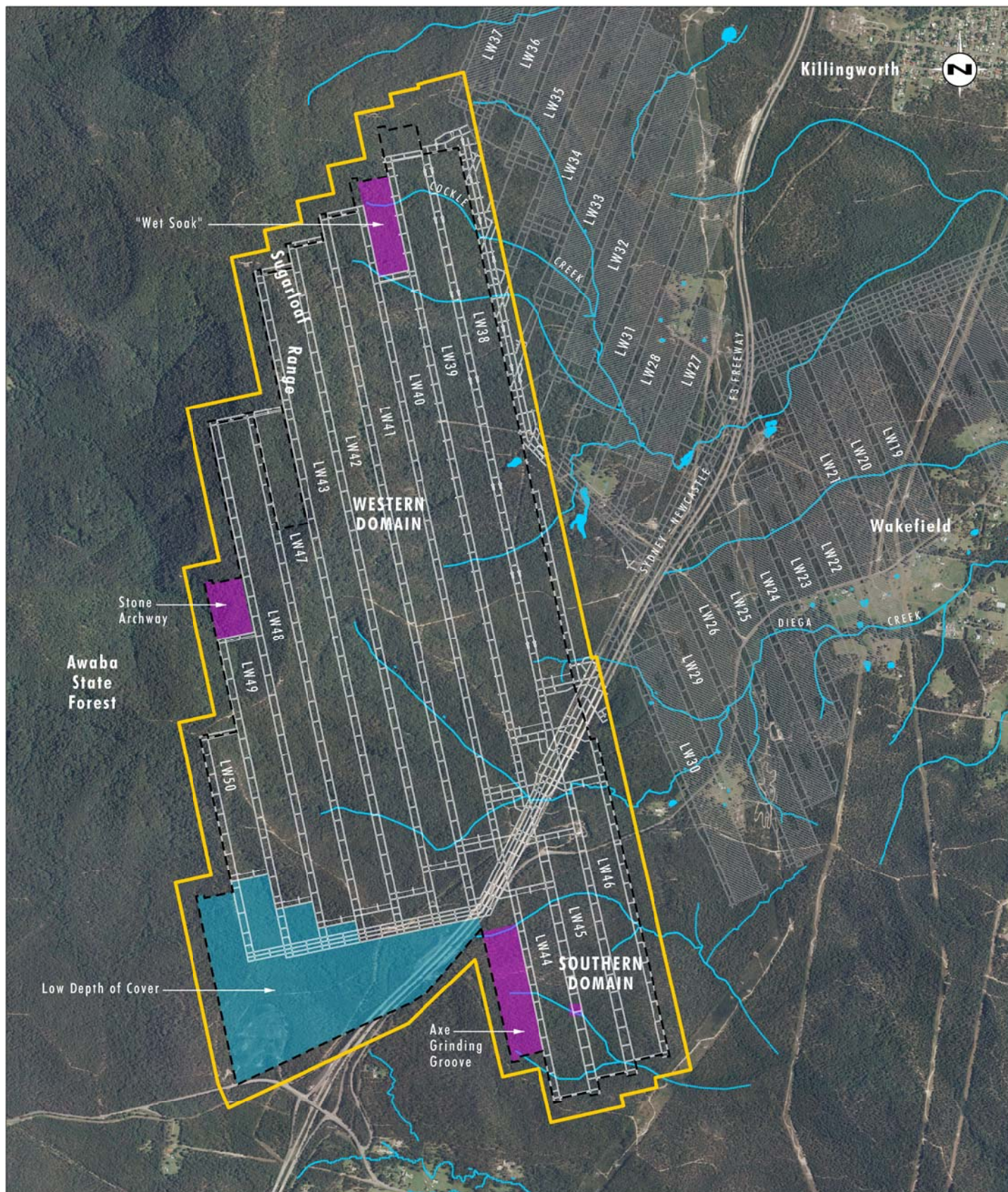
The mining layout of the longwall blocks in the Western and Southern domains was initially designed in consideration of a number of factors and sensitive surface features, these include:

- a) the location of the F3 Freeway and adjacent easement which runs North to South through the WWC proposed longwall area and contains several utilities of significant importance;
- b) the alignment of previously mined longwall blocks and mains development;
- c) the major geological structures which intersect the coal seam to be mined, as described in **Section 2.2**;
- d) the predicted economic limit of mining to the north of the longwall blocks;
- f) the ML boundaries; and
- g) to minimise the risk of impact on the Palmers Creek alluvium.

Following the completion of preliminary studies as part of this Part 3A approval significant changes have been made to the proposed mining layout. These changes include:

- Following extensive consultation with the registered Aboriginal stakeholders, significant changes have been made to the proposed mine plan in order to protect several significant sites, as shown on **Figure 2.4**. The modifications to the mine plan to protect these significant archaeological features have resulted in a net loss of approximately 2.04Mt of coal resource.
- Furthermore the changes to the mine plan to minimise potential impact on the low depth of cover areas in the vicinity of Ryhope Creek has resulted in a loss of approximately 2.4Mt of coal resource. WWC and Xstrata believe that these changes will ensure that future mining is able to be managed in such a way as to meet current community and environmental expectations.

The modifications to the mine plan to address the above factors, have been made with careful consideration to developing a mine plan which is both economically feasible but also sensitive to the surface features above the proposed longwall mining area.



Source: OCAI - Aerial Photograph, Longwall Layout
LPI - Drainage Lines

0 0.5 1.0 1.5 km
1:30 000

Legend

- Previously Approved Longwall Layout Boundary in Western and Southern Domains
- Proposed Underground Workings
- Former Underground Workings
- Proposed Future Longwall Area
- Drainage Line
- Revised Layout for Aboriginal Cultural Heritage
- Revised Layout for Low Depth of Cover

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FIGURE 2.4
Current Conceptual Mine Plan

2.4 Mine Infrastructure

The project has been designed to utilise the existing WWC infrastructure including the existing pit-top facilities and No.2 and 3 Vent shafts. Whilst no changes to the existing surface infrastructure are proposed as part of the project application, a new services facility and potential gas ventilation infrastructure are proposed to be constructed, as discussed in **Section 2.4.3**.

2.4.1 Pit-Top Facilities and Vent Shafts

The existing pit-top facility is located on The Broadway, as shown in **Figure 2.5** and is approximately 1 kilometre east of Killingworth and 1 kilometre south-west from Barnsley.

The No.2 and No.3 ventilation shafts are both existing infrastructure of WWC, which will continue to be used as part of this project. **Plates 1 and 2** show the vent shafts and the location is shown in **Figure 1.2**.

No changes are currently proposed to this existing surface infrastructure.

2.4.2 Utility Services

The site is currently serviced by Hunter Water mains supply for potable water and mains electricity supply from Energy Australia.

No modification to the existing site services will be required for this project.

Further investigations into the potential for the re-use of minewater may identify the need for additional pipelines for this purpose and this will be further detailed in the Environmental Assessment.

2.4.3 Proposed Services Facility and Ventilation Infrastructure

The proposed services facility, as shown on **Figure 1.2**, will be developed to provide essential services for the continued operations of WWC. The facility will be a constructed compound, comprising a ballast and concrete borehole, emergency egress borehole, solcenic mixing stations and also the provision of additional electricity supply. Provision of power to the proposed site will be obtained from the existing power supply in the vicinity of Wakefield Road.

The facility is proposed to be constructed on land owned by LMCC. The site has been previously disturbed by the construction of both Wakefield road and the F3 freeway. The site is currently comprised of disturbed access adjacent to Wakefield road and some re-growth vegetation. The construction will involve minimal disturbance of an area in the order of 20 metres by 35 metres, with a service road entering the site from Wakefield Road. The proposed site is also in close proximity to a large disturbed area which was used by the RTA during the construction of the F3 freeway.

Consultation and negotiations with LMCC have commenced in relation to establishing an agreement for use of the land for the proposed services facility.

The installation of additional ventilation infrastructure and potential gas injection infrastructure may also be required within the proposed underground mining area.



Source: West Wallsend, Date of Photograph 16/01/2008

0 100 200 250m
1:5000

Legend

- West Wallsend Surface Facilities
- Sediment Dams

FIGURE 2.5

West Wallsend Colliery
Surface Facilities



PLATE 1
No.2 Vent Shaft



PLATE 2
No.3 Vent Shaft

2.5 Workforce and Hours of Operation

At full production, the project will continue to employ approximately 390 full time equivalent employees.

Mining operations are planned to be undertaken 24 hours per day, seven days per week, as per existing operations.

No significant changes to the existing workforce numbers or hours of operation are proposed as part of the project application.

2.6 Alternatives and Justification

2.6.1 Project Alternatives

OCAL has considered a number of variations to the current Life of Mine plan for WWC. The current plan has been developed in consideration of achieving a balance between the maximisation of resource recovery and minimising significant impacts to natural, cultural and built features. As discussed in **Section 2.3**, significant changes to the mine plan have been made in order to protect several significant Aboriginal cultural heritage sites and to minimise potential impacts on water resources.

The key alternatives considered during these studies will be discussed in detail in the Environmental Assessment.

The alternative of not proceeding has also been considered, however this option is not considered appropriate as it is expected that the environmental and social impacts of the project can be effectively managed and not proceeding would result in the loss of the substantial economic benefits of the project to the local, regional, state and federal economies.

2.6.2 Project Justification

WWC, as part of the broader Xstrata Coal group, provides substantial economic benefits at federal, state, regional and local levels whilst maintaining a good working relationship with the local community and implementing sound environmental management practices. The proposed Continued Operations Project will build on these attributes of the existing operations and will provide the following key benefits:

- ongoing employment of approximately 390 people, with many more indirect jobs created through flow-on effects;
- economic recovery of approximately 36 Mt of coal;
- payment of significant royalties to the State of NSW;
- significant export earnings for Australia; and
- significant economic benefits to the local community through ongoing local employment, purchase of goods and services, and local expenditure both directly and through employee wages.

Given the nature of underground mining operations, the mine planning considerations and the successful subsidence management strategies that have been developed during

previous operations to minimise impacts, it is considered that the above economic benefits of the project can be achieved without having a significant adverse impact on the environment and local community.

The use of the existing WWC infrastructure will ensure that coal production is achieved in an economic manner, providing for project viability, whilst also minimising environmental and community impacts potentially associated with construction of substantial new infrastructure.

WWC has demonstrated its commitment to environmental management in its existing operations through the implementation of environmental monitoring programs, Subsidence Management Plans and a comprehensive Environmental Management System. This management approach will also be implemented during the operation of the project, ensuring that environmental and community impacts will be effectively managed.

3.0 Planning Considerations and Consultation

3.1 Planning Considerations

The project requires approval under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as it is of a class of development listed in Schedule 1 of State Environmental Planning Policy (SEPP) (Major Projects) 2005. The listing in Schedule 1 of the SEPP that applies to this project is:

Development for the purpose of mining that is coal or mineral sands mining.

The Lake Macquarie Local Environment Plan (LEP) 2004 is relevant to the permissibility of the project. Under Section 75J(3) of the EP&A Act, the Minister may not grant approval for a project under Part 3A where the project is located within an environmentally sensitive area of State significance or a sensitive coastal location, and would be prohibited under an environmental planning instrument were it not for the application of section 75R of the Act.

The project area is located within Sugarloaf State Conservation Area and is therefore within an environmentally sensitive area of State significance, as defined by the Act. Despite this, the project is not prohibited under any environmental planning instrument by virtue of Clause 19 of the Lake Macquarie LEP 2004, which provides that:

Nothing in this plan prevents a person, with development consent, from carrying out development for the purpose of a mine:

(a) on any land to which this plan applies, if the mine is underground.

Therefore, the project would not be prohibited with development consent under the current LEP and the Minister may grant approval for the project under Part 3A.

The project has also considered the application of the State Environmental Planning Policy - (Mining, Petroleum Production and Extractive Industries) 2007 (Minerals SEPP).

The Minerals SEPP repeals *SEPP No. 37 - Continued Mines and Extractive Industries* and *SEPP No. 45 - Permissibility of Mining*. The Minerals SEPP also removed mining developments from Schedule 1 of *SEPP No. 11- Traffic Generating Development*, meaning that SEPP No. 11 no longer applies to mining projects.

With regards to mining, the Minerals SEPP outlines where various minerals activities are permissible both with and without development consent. The Minerals SEPP also defines mining developments that are prohibited, exempt or complying developments.

In this case, the provisions of the Minerals SEPP do not affect the requirement for approval under Part 3A of the EP&A Act for the Project.

In addition to approval under Part 3A of the EP&A Act, the project may also require approvals under a number of additional Acts or assessment under SEPPs. The additional Acts and policies relevant to this project are listed in **Table 3.1** below with an indication of any approvals likely to be required.

Table 3.1 – Other Potentially Relevant Acts and State Planning Policies

Planning Provision	Comments	Relevant Licences/ Approvals/Assessments
Commonwealth Legislation		
<i>Native Title Act 1993</i>	The Commonwealth government enacted the <i>Native Title Act 1993</i> in response to the High Court of Australia decision in <i>Mabo v Queensland (1992)</i> . The Act is administered by the National Native Title Tribunal. The Act prescribes that Native Title can be extinguished under certain circumstances, including the granting of freehold land.	Areas of land within the proposed underground mining area where native title may not have been extinguished include public road reserves and Crown land. A review of the native title register in August 2009 indicated that there are no native title claims over the land within the project area.
<i>Environment Protection and Biodiversity Conservation Act 1999</i>	Preliminary ecological assessment work has recorded two flora species and two fauna species listed in the EPBC Act within the proposed underground mining area.	Based on the nature of the project and the preliminary ecological assessment findings, the approval of the Commonwealth Minister for the Environment, Heritage and the Arts is unlikely to be required. A preliminary referral will be lodged with the Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA) to confirm this prediction.
NSW Legislation – State Environmental Planning Policies		
State Environmental Planning Policy 33 – Hazardous and Offensive Development	SEPP 33 requires the consent authority to consider whether an industrial proposal is a potentially hazardous industry or a potentially offensive industry. A hazard assessment is completed for potentially hazardous development to assist the consent authority to determine acceptability.	The existing West Wallsend operation is not considered as hazardous or offensive and as this project is essentially a continuation of existing operations, a hazardous assessment is not considered necessary.
State Environmental Planning Policy 44 – Koala Habitat Protection	SEPP 44 restricts a Council from granting development consent for proposals on land identified as core koala habitat without preparation of a plan of management.	A koala habitat assessment will be completed as part of the ecological assessment.

Table 3.1 – Other Potentially Relevant Acts and State Planning Policies (cont)

Planning Provision	Comments	Relevant Licences/ Approvals/Assessments
State Environmental Planning Policy 55 – Remediation of Land	SEPP 55 requires the consent authority to consider potential contamination issues prior to consenting to the development of any land.	No potential contamination issues have been identified within the project area. A closure and decommissioning strategy, including a contaminated land management strategy, will be developed for the closure and decommissioning of the project and remediation of any contaminated land.
State Environmental Planning Policy (Major Development) 2005	As discussed above, this project is of a class of development listed in the SEPP. The project therefore requires approval under Part 3A of the EP&A Act and the Minister for Planning will be the consent authority.	The project will be assessed under Part 3A of the EP&A Act.
NSW Legislation – Acts		
<i>Mining Act 1992</i>	Under the <i>Mining Act 1992</i> , a Mining Lease (ML) is required before any mining can take place. A Mining Operations Plan (MOP) is required to be submitted to the Department of Primary Industries for their approval prior to the commencement of mining. As a condition of a ML, a Subsidence Management Plan or Extraction Plan will also be required prior to longwall extraction.	OCAL currently holds MLs, an approved SMP and MOP over the project area. Approval of a Mining Operations Plan and Subsidence Management Plan/Extraction plan will be sought from the DII following project approval and prior to longwall extraction for future stages.
<i>Coal Mines Health and Safety Act 2002</i>	The <i>Coal Mines Health and Safety Act 2002</i> imposes specific safety requirements on coal mines. This includes the requirement to comply with minimum barriers for underground mine workings and the requirement to obtain consent from the Minister for Mineral Resources for the establishment of emplacement areas.	An approval in accordance with Clause 88 of the <i>Coal Mine Health and Safety Regulation 2006</i> will be required to allow secondary workings prior to longwall extraction. Reject emplacement is undertaken at the nearby Macquarie Coal Preparation Plant (MCP) and no modification to this development consent is sought as part of this project.
<i>Mine Subsidence Compensation Act 1961</i>	Under the <i>Mine Subsidence Compensation Act 1961</i> , the approval of the MSB is required for the erection or alteration of improvements within a mine subsidence district.	The project area is located within the Killingworth/Wallsend and West Lake Mine Subsidence District and approval under s15 of the Act will be required for the construction of surface infrastructure, including the proposed mining services facility.

Table 3.1 – Other Potentially Relevant Acts and State Planning Policies (cont)

Planning Provision	Comments	Relevant Licences/ Approvals/Assessments
<i>Protection of the Environment Operations Act 1997</i>	The PoEO Act is administered by the DECCW and requires licences for environmental protection including waste, air, water, land and noise pollution control for activities listed in Schedule 1 of the Act, including mining for coal.	OCAL holds a current Environment Protection Licence (EPL) for existing mining operations at WWC. This existing licence will be modified if necessary to incorporate the proposed project.
<i>Roads Act 1993</i>	The <i>Roads Act 1993</i> is administered by the Roads and Traffic Authority (RTA), local council or the Department of Lands; the RTA has jurisdiction over major roads, the local council over minor roads, and the Department of Lands over road reserves. The Act requires that applications for the closure of Crown roads be made to the Minister. Consent under Section 138 of the Act is required in order to undertake works within a road reserve.	As part of developing the proposed mining services facility and the related intersection with Wakefield road, the project has the potential to impact on Crown and Council Roads and road reserves and approval under Section 138 of the Roads Act will be required.
<i>Crown Lands Act 1989</i>	The Act provides for the administration and management of Crown land in the eastern and central divisions of the State. Crown land may not be occupied, used, sold, leased, dedicated, reserved or otherwise dealt with unless authorised by this Act or the <i>Crown Lands (Continued Tenures) Act 1989</i> .	The approval of the Department of Lands will be required for any works within Crown road reserves.
<i>Water Act 1912</i>	A water sharing plan under the <i>Water Management Act 2000</i> has not been developed for the water resources within the Project area, therefore the licensing provisions of the <i>Water Act 1912</i> still apply. Under the Act, a permit and/or licence must be obtained to extract surface (Part 2 of the Act) or groundwater (Part 5 of the Act).	An approval under Part 5 of the Act will be required to intercept and extract groundwater from the mine workings and for the proposed groundwater monitoring bores.

Under Part 3A of the EP&A Act, the authorisations listed in **Table 3.2** which may have otherwise been relevant, will not be required if the project is approved.

Table 3.2 – Approvals/Legislation Which Does Not Apply

Act	Approval
<i>Fisheries Management Act 1994</i>	Permit for works within a waterway.
<i>Heritage Act 1977</i>	Disturbance to an item listed on the State Heritage Register or the Interim Heritage Order; Excavation permit.
<i>National Parks & Wildlife Act 1974</i>	Preliminary research permit; consent to destroy relics,
<i>Threatened Species Conservation Act 1995</i>	Licence to harm or pick threatened species, populations or ecological communities or habitat
<i>Water Management Act 2000</i>	Water use approval, water management work approval or activity approval.

3.2 Authority Consultation

The authority consultation process for the project has commenced with initial briefing meetings held with a number of government agencies including Lake Macquarie and Cessnock City Councils. The initial briefing meetings held to date include:

- a brief introductory presentation regarding the project was made to the DoP in December 2008;
- ongoing consultation with DI&I NSW (formerly the Department of Primary Industries) throughout the project planning phase including a Conceptual Mine Plan meeting held in February 2009;
- discussions with LMCC and Cessnock Councils in June and July 2009 respectively, to discuss the project and the proposed assessment methodology;
- a meeting with the former Department of Environment and Climate Change (DECC) regarding the assessment and management of underground mining in the Sugarloaf State Conservation Area and a second meeting with the Regulatory division, regarding potential modifications to the existing surface operations and the EPL;
- a meeting with the Department of Water and Energy in March 2009 regarding the surface and groundwater issues and proposed monitoring and remediation strategies;
- a meeting with LMCC Councillors in August 2009, to provide an introduction to WWC and Xstrata Coal and also an overview of the project and the assessment process; and
- a meeting was undertaken with the Mine Subsidence Board (MSB) to discuss the range of surface infrastructure within the proposed underground mining area and the proposed subsidence mitigation strategies.

The next phase of the consultation process is the lodgement of this Preliminary Environmental Assessment (PEA) with DoP. Following agency review of the PEA and the lodgement of the Project Application, DoP will provide the Environmental Assessment Requirements for the Project.

In addition to DoP, there will be on-going consultation with the following agencies:

- LMCC;
- Cessnock CC
- DI&I (formerly Department of Water and Energy);
- DECCW (both SCA and Regulatory division);
- Mine Subsidence Board (MSB);
- Roads and Traffic Authority (RTA).

It is envisaged that there will also be further consultation with the relevant service organisations, including Telstra, Optus, NextGen, Gencom and Jemena, throughout the environmental assessment process.

As discussed in **Table 3.1**, based on assessment work to date the project is unlikely to significantly impact on any matters of National Environmental Significance and therefore the project is considered unlikely to require the approval of the Commonwealth Minister for the Environment, Heritage and the Arts. However, to confirm this view the project will be referred to DEWHA for its consideration.

3.3 Community Consultation

A briefing on the details of the project was provided to the Westside Community Consultative Committee (CCC) in June 2009. The CCC is comprised of community representatives from Barnsley, Killingworth and two residents from Wakefield. These areas are the predominant residential areas surrounding the surface operations of WWC.

The details of the project and feedback on the project was sought as part of the OCAL Community Newsletter. This newsletter is delivered to all residents of Barnsley, Killingworth, Wakefield, Teralba and parts of Boolaroo. No feedback specifically relating to the project has been received to date.

Further community consultation is planned with a project specific newsletter planned for October 2009. This newsletter will provide details on all aspects of the project and assessments to date and provide feedback mechanisms for local residents.

4.0 Preliminary Environmental Assessment

4.1 Environmental and Community Context

4.1.1 Land Ownership

The land ownership details of the proposed underground mining area and mining services facility are provided on **Figure 4.1**.

All existing surface infrastructure, the WWC pit-top and both ventilation shafts, are located on land owned by WWC. The land surrounding the WWC pit-top is predominantly owned by OCAL, with the residential areas of Killingworth, approximately one kilometre to the west and Barnsley, approximately 1 kilometre to the north-east.

The proposed services facility will be located on land owned by LMCC. Consultation with LMCC in relation to the construction of the facility has commenced.

Approximately 86% of the surface land within the proposed longwall mining area is part of the Sugarloaf State Conservation Area (SSCA), formerly managed by Forests NSW and now managed by DECCW.

Within the proposed longwall mining areas there are two private rural landholdings whose land is directly affected by subsidence. These are the McCarthy property in the Western Domain and the Corliss Property in the northern most section of the Southern Domain.

Other landowners within the proposed longwall mining area include the RTA (F3 Freeway), the various service easement stakeholders and LMCC with Wakefield Road.

The majority of the project area lies within the LMCC LGA however a small portion of the Western Domain exists within the Cessnock LGA, as shown on **Figure 1.2**.

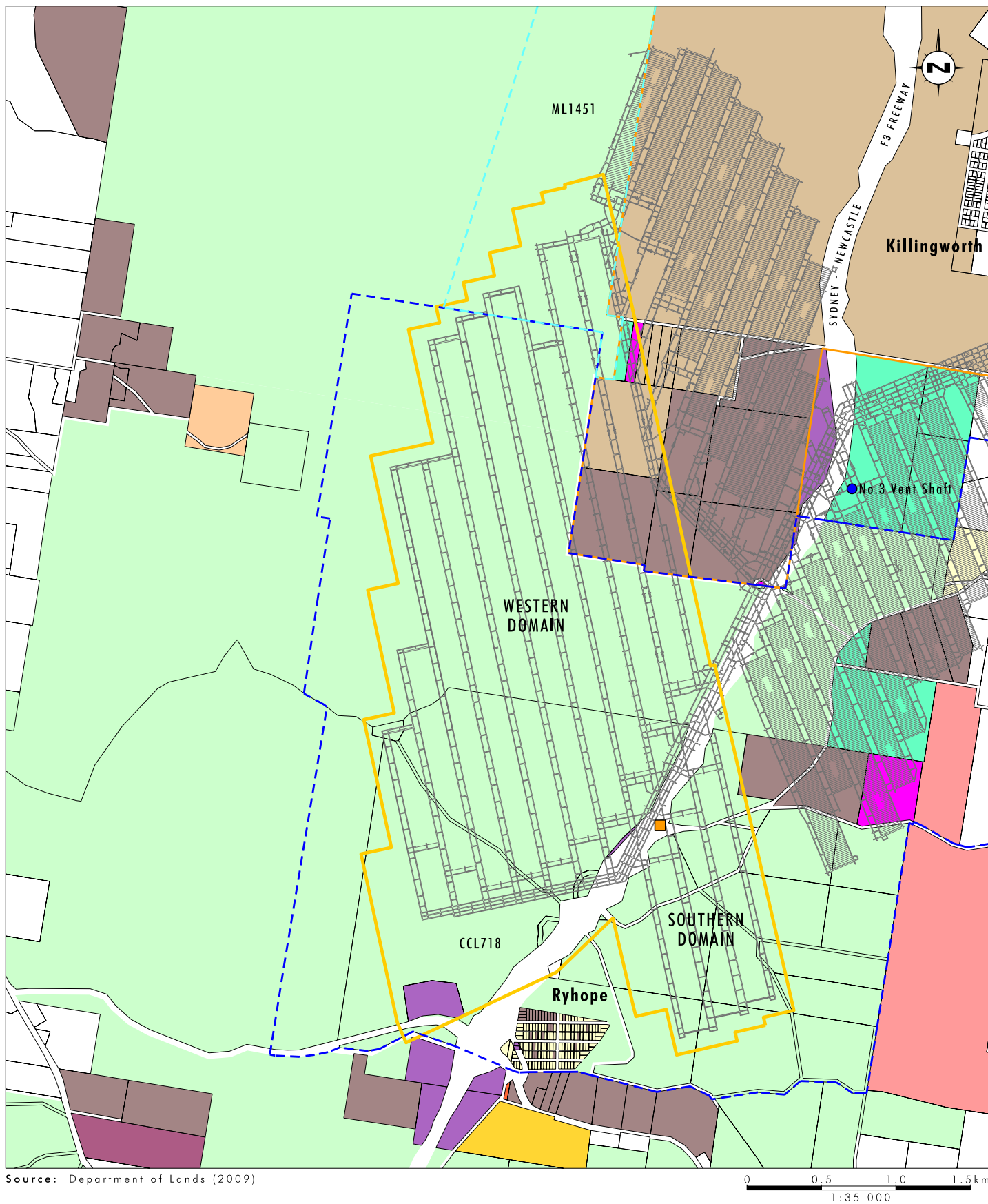
4.1.2 Land Use

The land use within and surrounding the project area includes other coal mines, the Sugarloaf SCA, rural residential holdings and the residential areas of Killingworth, Barnsley, Wakefield and Ryhope. No residential areas are within the proposed longwall mining areas and residential areas will therefore not be impacted by subsidence.

The major land use within the project area is encompassed by the Sugarloaf SCA, managed by DECCW. This area is accessed by various stakeholders mainly for recreational purposes, such as bushwalking and recreational vehicles use.

The Sugarloaf SCA, formerly Awaba and Heaton State Forests, was formed as part of the implementation of the Lower Hunter Regional Strategy (Regional Strategy) and Lower Hunter Regional Conservation Plan (Conservation Plan) in 2007.

The primary objective of the Conservation Plan is to complement the Regional Strategy by analysing the current status of biodiversity within the region and assessing the likely biodiversity impacts of the developments identified in the Regional Strategy. The Conservation Plan aims to recommend priority areas for investment in biodiversity conservation and environmental repair and restoration to offset these impacts.



Legend

- CCL725
- CCL718
- ML1451
- Proposed Future Longwall Area
- Longwalls
- Proposed Mining Services Facility

Land Ownership Status:

- Crown Land
- LMCC
- Macquarie Memorial Park Pty Ltd
- Millfence Pty Ltd
- Hunter Development Corporation
- Mine Owned - MCJV
- Mine Owned - Other
- Private
- RTA
- State Conservation Area
- State of NSW
- State Property Authority
- The Old Brush Ltd

FIGURE 4.1

**Land Ownership within the
Proposed Underground Mining Area**

As outlined in the Conservation Plan, the purpose of classifying areas as a State Conservation Area is to allow for the co-existence of conservation and underground mining activities. Section 47(J) of the *National Parks and Wildlife Act 1974* allows for this provision.

Section 47(J) defines 'mining interests' as any ML under the *Mining Act 1992*. The provisions of Section 47(J), which are relevant to WWC include:

- a mining interest shall not be granted in respect of lands within a State Conservation Area without the concurrence in writing of the Minister; and
- a renewal of, or extension of the term of, a mining interest in respect of lands within a State Conservation Area (other than an existing interest) shall not be granted under the *Mining Act 1992* without the concurrence in writing of the Minister.

These provisions require that should WWC wish to apply for a new ML or renew a ML, the approval of the Minister for Environment and Climate Change will be required.

The Conservation Plan also clearly permits underground mining, as outlined below;

'The State Conservation Area category under the *National Parks and Wildlife Act* will be used in areas that retain potential for underground mining (or for current operations). This category recognises that mining may generate some surface impacts (mainly of a temporary nature) including subsidence and where ventilation or access infrastructure is required. The Government's intent has been to ensure that the new reserves do not sterilise economic mineral and coal resources that can be extracted through underground methods'. **Page 35 Lower Hunter Regional Conservation Plan 2007.**

Other land uses within the proposed underground mining area includes two small private properties, the properties are not currently used for significant agricultural production. The properties are used mainly for rural residential purposes with no commercial crops or significant livestock activities at either property.

The F3 freeway and adjacent services easement also bisects the proposed underground mining area in a north-south orientation. The services easement is comprised of oil and gas pipelines and fibre optic cables.

The land use surrounding the WWC pit-top is mainly vacant land owned by OCAL. The residential areas of Killingworth and Barnsley are located approximately one kilometre to the west and one kilometre to the north-east, of the WWC pit-top.

4.2 Preliminary Environmental Risk Analysis

To identify the key environmental and community issues that require detailed assessment for the project, a preliminary environmental risk analysis has been completed for the project and is included in **Appendix 1**. The risk analysis was completed in accordance with the Xstrata Risk Management Standard 1.02. Consistent with the Xstrata risk assessment standard, environmental risks have been categorised as low, medium or high.

As shown in **Appendix 1**, the majority of aspects are rated as low or medium level risks, with limited high risks. The high risks identified relate to the potential impacts of subsidence on Aboriginal archaeological features, surface water and groundwater resources. Subsequent changes to the mine layout have significantly reduced the potential consequences associated with the majority of these issues. The impacts of subsidence on these features will be assessed in detail as part of the subsidence assessment for the Environmental Assessment.

It is expected that with the completion of further studies and assessment as outlined in **Section 5.0** below, most of these high risks will be able to be reduced to medium level risks due to better definition of potential impacts and effective implementation of management and mitigation measures.

The preliminary environmental risk analysis included in **Appendix 1** also identifies those issues considered to require further assessment. The scope of further assessment required for these issues as part of the Environmental Assessment report is discussed in further detail in **Section 5.0**. Where appropriate, the proposed controls contained in the preliminary environmental risk analysis will be included in the Statement of Commitments in the Environmental Assessment report.

5.0 Key Environment and Community Issues

The key environment and community issues for this project have been determined through the preliminary environmental risk analysis discussed in **Section 4.2** above, the previous history of completing SMP's for WWC and through the initial government agency and community consultation program.

The key environmental and community issues identified to date have included:

- cultural heritage;
- potential surface and groundwater impacts;
- subsidence assessment and management;
- potential impacts upon local ecology;
- consideration of energy, greenhouse and climate change;
- pit-top water management;
- air quality;
- noise; and
- management of potential subsidence impacts on the F3 freeway and adjacent services easement.

These issues and a range of additional issues are discussed in **Sections 5.1 to 5.11** below, including a description of the proposed assessment methodology. The assessment of these issues will form the impact assessment section of the Environmental Assessment report prepared for the project.

5.1 Subsidence

Subsidence impact on both natural and man-made features is one of the key issues for the project. A detailed subsidence assessment is being prepared for the Environmental Assessment by Ditton Geotechnical Services (DGS).

The key issues relating to subsidence impacts are likely to be:

- potential impacts on creeks and drainage lines above the extraction area;
- potential impacts on Aboriginal and European heritage sites;
- potential ecological impacts including impacts on aquatic ecology in affected drainage lines;
- subsidence impacts on private land;
- potential impacts on infrastructure (e.g. F3 Freeway, Wakefield Road, Great North Walk, gas and oil pipelines, optic fibre cables, communication towers, powerlines and farm dams etc.); and

- the associated impacts of subsidence remediation works.

The concept mine plan has been designed so that there is no direct undermining of the F3 Freeway that will result in subsidence, the adjacent services easement to the west of the F3 freeway and the Palmers Creek alluvium to the south. Furthermore, as highlighted in **Section 2.3**, substantial changes have been made to the mine plan to minimise impacts on sensitive archaeological and surface water features.

Preliminary subsidence predictions have been developed by DGS based on the concept mine plan, with further detailed subsidence assessment work still to be completed. A summary of the assessment methodology to be used for this project and the preliminary subsidence assessment work completed to date are included in **Section 5.1.1**.

5.1.1 Assessment Methodology and Preliminary Subsidence Assessment

There are a number of natural features and items of surface infrastructure in the vicinity of the mining area that may be affected by subsidence from the proposed longwall mining. The potential 'Subsidence Affection Area' is the surface area that is likely to be affected by subsidence from the concept mine plan. This area is defined as the surface area bounded by the 26½ degree angle of draw line from the goaf edges of the proposed longwall panels within each seam, and by the predicted 20 millimetres subsidence contour due to the extraction of the longwalls.

The subsidence impact assessment completed for the Environmental Assessment will consider all the major natural features and items of surface infrastructure within the project area. In addition to this, all other natural features and items of surface infrastructure outside of this area, which may be subjected to far field movements and are sensitive to these movements, will be considered in the assessment.

Two empirically based prediction models (ACARP, 2003 and SPDS®) have been used to generate subsidence contours above the proposed longwall panels. Details of the models and modelling process will be provided in the Environmental Assessment. Furthermore Surfer 8® software has then been used to generate subsidence, tilt, horizontal displacement and strain contours above the panels from the SPDS® output files.

The assessment of impact on surface and subsurface features has also considered the predicted subsidence parameters and previous experience gained from detailed subsidence monitoring program undertaken in the Northern Domain longwalls.

The preliminary subsidence prediction results are detailed below:

- final maximum panel subsidence after extracting multiple longwall blocks in the West Borehole Seam will range from 0.36 metres to 2.61 metres (10 % to 58% of mining height).
- the maximum tensile strains will range from 1 millimetre/metre to 42 millimetres/metre.
- the maximum compressive strains will range from 2 millimetres/metre to 53 millimetres/metre.
- surface cracking and shearing will develop within tensile and compressive strain zones and range in width from 10 millimetres to 550 millimetres at cover depths ranging from 360 metres to 70 metres respectively.

The natural and constructed surface features and the preliminary subsidence related impacts identified during the subsidence assessment are outlined in **Table 5.1** and **5.2** respectively.

Table 5.1 - Natural Surface Features and Potential Subsidence Impacts

Natural Surface Features	Potential Subsidence Impacts	Proposed Subsidence Management Strategy
Steep slopes and low-height cliffs in the Western Domain.	Potential instability, land slips and associated rock falls.	Proposed monitoring and remediation (if required) as part of Public Safety Subsidence Management Plan, as per current plan for mining within the Northern Domain.
Several ephemeral drainage lines and tributaries of Cockle, Diega, Ryhope, Palmers and Central Creeks.	Potential for increased erosion, increased ponding in lower lying areas and the potential for sub-surface flow re-routing where rock bars exist within creek channels.	Proposed monitoring and remediation (if required) as part of Surface Water Monitoring Plan, similar to the current plan for mining within the Northern Domain.
Alluvial deposits may exist along the lower reaches of the creeks, specifically Cockle, Diega and Central Creeks.	Potential impacts of direct hydraulic connection or continuous fracturing in areas of low depth of cover (under 70 metres Depth of Cover (DOC)).	The mine plan has been re-designed to avoid mining at a DOC of less than 70 metres.
Flora and fauna species	Potential impacts from ponding, indirect impacts from increased erosion and sedimentation and potential impacts from subsidence remediation works.	Further assessment to be completed as an aspect of the Environmental Assessment. Also to be assessed as part of subsidence monitoring inspection regime.
Aboriginal heritage features	The potential impacts varies for each potential site identified, more specific details of each feature will be outlined in the Environmental Assessment.	Significant changes have been made to the mine plan to minimize the potential for subsidence impacts on a number of culturally significant sites. Further assessment and consultation will be completed to resolve monitoring and management required for other sites.
Historical Heritage Items	No surface features have been identified to date.	Whilst no historical heritage sites have been identified to date, any features that may be identified throughout the assessment process they will be actively managed as part of the Public Safety Subsidence Management Plan.

Table 5.2 - Constructed Features and Potential Subsidence Impacts

Man-Made Surface Features	Potential Subsidence Impacts	Proposed Subsidence Management Strategy
McCarthy's water supply dam (1.25 ML capacity).	Potential breach of the dam wall, this will be managed under an existing management plan with the landholder.	Managed as part of the existing Private Property Subsidence Management Plan, in close consultation with the landholder and the MSB. The specific strategy will involve the lowering of the water level within the dam, during subsidence and then undertaking appropriate remediation, if required.
The Great North Walk and other access roads.	Potential surface cracking in the order of 30 millimetres to 140 millimetres in width along a length of 30-50 metres of the road across each respective longwall panel.	Public Access and remediation of surface cracking will be managed in accordance with the existing management plan with the NSW Department of Lands.
Telstra/Nextgen/Optus Optic Fibre Cables.	Limited potential for far-field movements up of up to 38 millimetres with strains expected to be in the order of 0.5 millimetres/metre to 1.5 millimetres/metre.	Monitoring of these features will be undertaken in accordance with the existing SMP protocols that have been developed with each respective stakeholder.
Caltex/Agility Petroleum and Natural Gas Pipelines.	Impact unlikely however the potential for far-field movements of up of to 38 millimetres with strains expected to be in the order of 0.5 millimetres/metre to 1.5 millimetres/metre.	Monitoring of these features will be undertaken in accordance with the existing SMP protocols that have been developed with each respective stakeholder.
RTA F3 Freeway and associated cuttings, embankments, bridges and drainage infrastructure.	Located outside the angle of draw with low potential for far-field impacts.	Monitoring of the F3 is critical and will be undertaken in accordance with the existing SMP protocols established with the RTA.
Wakefield Road	Susceptible to surface cracking ranging in width from 60 millimetres to 90 millimetres over distances of 10 to 15 metres from associated tilts and strains. Tilts in the order of 24 to 34 millimetres/metre and tensile and compressive strains in the order of 9 millimetres/metre to 11 millimetres/metre.	Subsidence management and remediation will be managed in accordance with the current management plan with LMCC, as per previous longwalls at WWC.
Two Gencom (CT 1 and 2) communications towers and associated power-line.	The towers (CT1 and 2) are located outside limits of longwall but within the angle of draw, potential tilts of 5 millimetres/metre and 2 millimetres/metre and tensile strains of 2 millimetres/metre and 0.5 millimetres/metre respectively.	Monitoring of these features will be undertaken in accordance with the existing SMP management protocol that has been developed with the stakeholder.

Man-Made Surface Features	Potential Subsidence Impacts	Proposed Subsidence Management Strategy
Telstra communications tower (CT3)	Potential for far-field displacements of 38 millimetres and strains of 1 millimetre/metre.	Monitoring of this feature will be undertaken in accordance with the existing management protocol that has been developed with the stakeholder.
Transgrid transmission towers	Located 250 and 460 metres south of the longwalls in the Southern Domain and therefore unlikely to be impacted.	No further action planned.
Energy Australia domestic power line (along Wakefield Road).	Potential impacts as per the impacts associated with Wakefield Road.	Monitoring of this feature will be undertaken in accordance with a management protocol to be developed with the relevant stakeholder.

Subsidence Management Plans (SMPs) already exist for the majority of surface features identified in the project area, as part of the existing WWC SMP Approval. Further consultation has commenced with each of the relevant stakeholders and private landholders regarding the potential subsidence impacts on the above surface features and will continue throughout the project. Detailed subsidence management strategies drawing from extensive experience at WWC will be outlined further in the Environmental Assessment.

5.2 Surface Water Resources

Potential mining impacts on surface water resources will require detailed assessment in the Environmental Assessment in relation to the proposed project. An overview of the surface water assessment for the Project is outlined below.

5.2.1 Existing Environment

The proposed longwall mining area is located in the upper reaches of the Cockle, Diega, Palmer, Bangalow and Burkes Creek systems. Diega Creek, Burkes Creek and the reaches of Upper Cockle Creek all drain to Lake Macquarie via Cockle Creek. The Upper Cockle Creek catchment refers to the catchment area from the upper reaches of Cockle Creek to its confluence with Diega Creek. Bangalow Creek is a part of the Wallis Creek system which forms a tributary of the Hunter River. Palmers Creek drains directly to Lake Macquarie. The boundaries of the subcatchments and creeks within the project area are shown on **Figure 5.1** and the subcatchment areas are listed in **Table 5.3**.

The WWC pit-top facility is located in the catchment of Burkes Creek. Until recently WWC has discharged minewater from the mine into Burkes Creek. As part of a recent modification to the water management system the WWC minewater is currently discharged to Cockle Creek via Westside Mine, as an interim measure whilst discharge to the nearby Teralba quarry is finalised. It is proposed to transfer all WWC minewater for use by the nearby Teralba quarry as part of completing a Pollution Reduction Program for saline minewater discharge. The ability to discharge minewater to Burkes Creek will be maintained as a contingency in the event of potential issues with the current system.



Source: OCAL, Google Earth 2008

0 0.5 1.0 2km
1:40 000

Legend

- Proposed Longwall Area
- - - Catchment Boundary
- Creek and Drainage Lines

FIGURE 5.1

Surface Water Sub-Catchments within the
Proposed Underground Mining Area

Table 5.3 - Catchment Areas

Creek	Total Catchment Area (hectares)	Catchment Area within the Proposed Underground Mining Area (hectares)
Upper Cockle Creek	1120	353
Diega Creek	1020	300
Palmers Creek	2630	311
Bangalow Creek	1110	116
Burkes Creek	1550	5

The surface water and water resources assessment will investigate and document the condition, characteristics and water resources of the existing catchments within the project area. This assessment will include:

- drainage system including stream ordering;
- channel depth, bed-slope and stability;
- nature of the stream bed (e.g. alluvial bed, pool and riffle sequences etc.);
- the relationship between the surface water systems and the ecological value of vegetation communities in the project area; and
- existing water users and land use impacts (including a review of the DII water licence database).

5.2.2 Assessment Approach

Based on the information collected regarding the existing surface water systems and with consideration of the concept mine plans, including infrastructure and likely subsidence and depth of cover ranges, the detailed assessment of the surface water impacts will include:

- likely subsidence impacts and stream remediation requirements;
- potential for surface water capture and/or diversions;
- potential for increased surface ponding;
- potential impacts on the local flooding regime; and
- potential for changes to surface water quality and potential erosion and sediment control measures required.

Appropriate impact mitigation and management strategies and, as appropriate, monitoring requirements will be recommended to ameliorate the impact of the project on surface water systems in the project area.

As part of the surface water assessment an updated site water balance will be developed as part of the Environmental Assessment. This water balance will assess all components of the current water management system, both surface and underground. Furthermore a review of the existing surface water management system will be undertaken, with consideration given

to any potential management measures which may be required for the on-going management of water at the WWC pit-top.

An assessment of potential heavy metal contamination in Burkes Creek, will also be completed as part of the Environmental Assessment, as per a request during initial consultation with DECCW. This assessment is required by DECCW to confirm that there has been no historical contamination during previous operations and will compare levels of metals in both the discharge from WWC and the background levels within Burkes Creek.

5.3 Groundwater

A number of detailed hydrogeological assessments have previously been completed for WWC as part of the SMP process for the northern, southern and western domains. These studies have been used in the mine planning process to define the layout of past and future mine plans. These studies have also resulted in establishment of a series groundwater observation bores to provide background data on groundwater conditions.

Aurecon have been engaged to consolidate the available base-line groundwater data from past investigations, make an assessment of the likely impact of the proposed mining on the groundwater regime, and provide an update on the requirements for future groundwater monitoring. This assessment will be presented as part of the Environmental Assessment for the project. A summary of the existing groundwater environment and the preliminary assessment findings has been included below.

5.3.1 Summary of Existing Environment

Three potential sources of groundwater have been investigated within the project area, these include:

- alluvial aquifers;
- weathered rock aquifers; and
- fractured rock aquifers.

Of these aquifer systems, the alluvial aquifers are potentially the most important, as they generally produce reasonable water quality and are exploited by numerous bores in the Lake Macquarie area. The main catchment areas within the proposed underground mining area include, the Cockle Creek catchment, including its tributaries Burkes Creek and Diega Creek, and the Palmers Creek catchment, including Ryhope Creek and Central Creek. The headwaters of the Bangalow Creek catchment, is also located in the western portion of the proposed underground mining area. Palmers Creek will not be undermined as part of this project.

Previous investigations have been conducted into the nature of the alluvial deposits in Cockle Creek, Palmers Creek and Ryhope Creek. The investigations concluded that the alluvium in Cockle Creek in the proposed underground mining area does not contain a significant aquifer, and that the alluvial groundwater resource in this area is of minor significance, due to its variable quality, and limited volume. The alluvium in Ryhope Creek was found to be similar to that of Cockle Creek, with no major aquifer identified and the groundwater resources considered to be of minor significance due to its variable quality and limited volume. The previous investigation also examined the alluvium in Palmers Creek itself, even though this creek will not be undermined as part of this project. The investigations found water bearing sand and gravel zones, which are probably fed from the main aquifer

zone which is known to exist in the alluvium to the area south of the Palmers Creek channel in this area. This groundwater is exploited in several bores further downstream, and it is considered to be an important local groundwater resource.

The weathered rock aquifer is widespread across the proposed underground mining area and while the groundwater quality can be very good in this aquifer, its occurrence and distribution is patchy. Fractured rock aquifers occur at depth in the coal measure strata. Flows are mostly relatively small and water quality is generally poor and suitable only for stock use. Both the weathered rock aquifer and the fractured rock aquifers have been shown to be of minor importance over the proposed underground mining area and are not known to be utilised by any licensed water users.

5.3.2 Key Risks and Assessment Approach

The major potential hydrogeological risk associated with the proposed future mining in the lease area is ground surface movements and/or the fracturing of the overburden strata as a result of longwall mining potentially draining any aquifers in the alluvial deposits, and impacting on the amenity of any current or future users of these groundwater sources.

The potential for impact on the alluvium will depend on:

- the depth of cover between the mine and the base of the alluvium; and
- the height of interconnected fracturing in the strata above the extracted longwall panels.

In order to determine the likely impact of the proposed mining on groundwater in the alluvium, the following activities were undertaken to assist in the assessment of the potential consequences of the proposed mining:

- data relating to the alluvium has been gathered from previous field studies;
- a field reconnaissance program has been carried out to confirm the location, extent and nature of the alluvial deposits in the project area; and
- a broad evaluation has been made of the current groundwater usage in and near the affected area.

In order to determine the likelihood of any adverse consequences occurring, the following activities will be undertaken:

- an estimation has been made of the likely height of fracturing above the extracted longwall panels, and was determined to be in the order of 70 metres.

Based on this estimation all workings below a DOC of 70 metres with the potential to have significant groundwater impacts have been removed from the conceptual mine plan. This change has been adopted as a means to reduce the likelihood for connective cracking to occur, which may have significant impacts on water resources. This modification has resulted in the sterilisation of approximately 2.4 million tonnes of coal resource.

5.3.3 Impact Assessment

In order to fully assess the potential risks associated with the proposed project on groundwater resources within and surrounding the project area, an assessment will be made of both the probability and the consequence of any adverse impact on groundwater resources within the project area.

In order to assess the probability of impact on water resources within the alluvial aquifers, the depth of cover data will be used to divide the project area into areas of Very High, High, Medium and Low probability of any impact. This data will then overlaid with a map of the extent of the alluvials within the project area to identify any areas of alluvium which intersect with an area of Very High, High or Medium probability of impact.

Initial investigations have identified that there are some areas in Ryhope Creek immediately to the south of the project area with a High and Very High probability of an adverse impact, however after careful consideration these areas will not be undermined by the proposed longwall panels. There are also several small zones within the project area where the probability of an adverse impact on the alluvium due to mining is considered to be Medium. These are located in Cockle Creek, Diega Creek and Central Creek catchments.

The magnitude of the risk in these areas will depend on the consequences of any impact on the alluvium. In determining the potential consequences of mining under these areas, the following must be considered:

- it is highly unlikely that any significant aquifers exist in the alluvium;
- there are no known users of the alluvial groundwater; and
- the contribution of these areas to the groundwater flow in the alluvial aquifers further downstream is negligible.

Assessment to date has indicated that any aquifers in the proposed underground mining area, will be of minor importance, so that the consequences of an adverse outcome will be less than would be the case for extraction under a major aquifer.

This assessment of the probability and consequence of an adverse impact on groundwater resources has been used to evaluate the hydrogeological risks associated with the project. This risk assessment assists in determining the need for mitigation and monitoring measures in the alluvial areas that will be undermined.

The assessment of hydrogeological risk concluded that risks to the groundwater regime in Palmers Creek were Negligible, the risks in Diega Creek and Central Creek were Low to Very Low and the risks in Cockle Creek and Ryhope Creek were Low, following the modification to the mine plan. A monitoring program is being formulated in order to confirm the assessment outcomes and check for any unexpected adverse impacts. At this stage it is planned to include:

- continuation of existing monitoring in Cockle Creek;
- establishment of two additional monitoring bores in the Diega Creek alluvium;
- establishment of three monitoring bores in the Ryhope Creek alluvium, outside the project area; and
- continuation of existing monitoring in the Palmers Creek alluvium, outside the project area.

5.4 Ecology

5.4.1 Ecological Context

There are no significant proposed changes to the existing WWC surface facilities and therefore limited potential for ecological impact within this area, therefore the ecological survey undertaken to date has focussed on the proposed underground mining area. An ecological assessment of the proposed services facility will also be undertaken prior to the completion of the Environmental Assessment.

The surface above the proposed underground mining area forms part of the Sugarloaf State Conservation Area (SCA), and the project area forms part of an extensive tract of vegetation extending along the Sugarloaf Range to the west of Lake Macquarie.

Mining at WWC has been undertaken beneath the vegetation communities to the west of the F3 Freeway since 2002, mainly in the Northern domain. Annual monitoring over a period of three years in the Northern domain has shown that subsidence-related impacts have not had a significant impact on vegetation communities and fauna habitats and that significant subsidence remediation works have generally not been required. The main potential for subsidence impacts relates to potential ponding within the drainage lines and consequent effects of water logging of vegetation in ponded areas. Experience to date has indicated that such areas are relatively minor due to the undulating terrain. This is currently being confirmed for the future underground mining area and the outcomes of the surface water assessment will be considered in the compilation of the ecological assessment. The project proposes to utilise the same mining methods in the same coal seam and it is expected that similar minimal impacts on vegetation communities and fauna habitats will occur.

A full ecological impact assessment is being prepared and will be completed and provided in the Environmental Assessment, following the completion of the final subsidence predictions.

An overview of the survey methodology and results undertaken to date is provided below.

5.4.2 Ecological Survey and Assessment

Umwelt has recently completed the first phase of a comprehensive ecological survey of the project area for the purposes of detailed vegetation mapping, and the identification of flora and fauna species. Further detailed ecological survey is scheduled for the third quarter of 2009 to finalise the identification and mapping of ecological values in the project area.

A preliminary investigation of broad vegetation communities mapped as part of the Lower Hunter and Central Coast Regional Environmental Management Strategy (LHCCREMS) vegetation mapping (House 2003) identified nine vegetation communities within the project area, of which Coastal Plains Smooth-barked Apple Woodland was the most widespread community. Plot-based flora surveys have been undertaken within the project area which have resulted in the refinement of the regional scale vegetation community mapping, with further work yet to be completed. Coastal Plains Smooth-barked Apple Woodland is now mapped extensively across the project area with Coastal Foothills Spotted Gum Ironbark Woodland occurring on slopes and ridges in the central and northern portions of the project area. The vegetation of Diega and Cockle Creeks and their tributaries is mapped as Alluvial Tall Moist Forest. Additional plot-based survey work is expected to delineate additional vegetation communities, particularly topographically restricted and sheltered communities, during the third quarter of 2009. Following the completion of the plot-based flora survey a detailed vegetation community map will be produced.

The current flora survey has included extensive targeted threatened species surveys. *Tetratheca juncea*, a threatened plant listed as vulnerable under both the NSW *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) occurs extensively across the project area, typically occurring as a dominant ground layer species in Coastal Plains Smooth-barked Apple Woodland and commonly occurring within Coastal Foothills Spotted Gum Ironbark Woodland (see **Figure 5.2**). Flora surveys completed to date have also identified *Grevillea parviflora* subsp. *parviflora* in the southern portion of the proposed underground mining area (**Figure 5.2**). This species is listed as vulnerable under both the TSC Act and the EPBC Act. Additional plot-based flora survey is expected to identify further records of this species.

Previous surveys in the Southern domain have identified Riparian Melaleuca Swamp Forest. This community is likely to form part of the Swamp Sclerophyll Forest on Coastal Floodplains Endangered Ecological Community (EEC). Further survey work will determine the location and extent of this community.

Additional threatened flora species and threatened ecological communities (TECs) may potentially occur within the project area. Further targeted surveys will be undertaken for potentially occurring threatened species, endangered populations and TECs, if required.

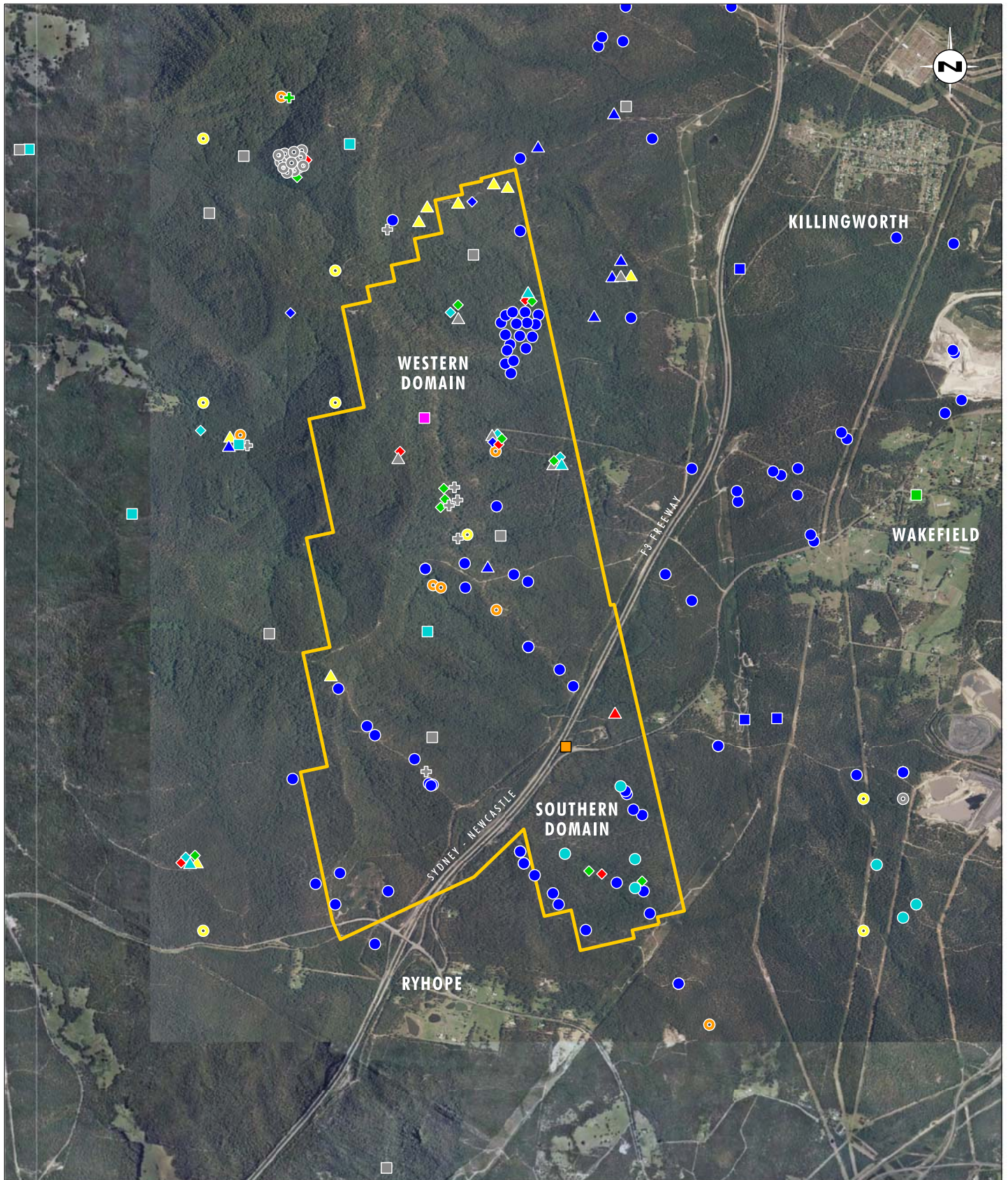
A comprehensive fauna survey is also being undertaken as part of the Environmental Assessment. The survey has been designed to target the threatened fauna species that might occur within the project area and to describe all fauna habitats present.

A total of 31 threatened fauna species are considered to have potential habitat within the proposed underground mining area, have previously been recorded in the region or are considered to have potential to occur based on habitat modelling. The threatened fauna species with potential to occur within the proposed underground mining area were specifically targeted as part of the baseline ecological surveys of the proposed underground mining area. As shown on **Figure 5.2**, eight threatened fauna species have been previously recorded within the proposed underground mining area. These species include:

- glossy black-cockatoo (*Calyptorhynchus latham*);
- sooty owl (*Tyto tenibricosa*);
- powerful owl (*Ninox strenua*);
- spotted-tailed quoll (*Dasyurus maculatus*);
- little bentwing-bat (*Miniopterus australis*);
- yellow-bellied glider (*Petaurus australis*);
- grey-headed flying-fox (*Pteropus poliocephalus*); and
- koala (*Phascolarctos cinereus*).

All of these species are listed as vulnerable under the TSC Act, however the grey-headed flying fox and spotted-tailed quoll are also listed as vulnerable under the EPBC Act.

Two threatened fauna species have been recorded as part of fauna survey work completed by Umwelt for this project, being the yellow-bellied glider and the koala. The locations of these recordings are also shown on **Figure 5.2**. The proposed management of these



Source: OCAL, Google Earth 2008

0 0.5 1.0 2km
1:40 000

Legend

- | | | |
|---|--|---|
| Proposed Longwall Area | + Sooty Owl | ◆ Greater Broad-nosed Bat |
| Proposed Mining Services Facility | ○ Powerful Owl | ● Glossy Black-Cockatoo |
| ● <i>Tetratheca juncea</i> | ○ Masked Owl | ▲ Eastern Freetail-bat |
| ● <i>Grevillea parviflora</i> subsp. <i>parviflora</i> | ◆ Little Bentwing-bat | ◆ Eastern False Pipistrelle |
| ▲ Yellow-bellied Glider | ▲ Large-eared Pied Bat | ◆ Eastern Bentwing-bat |
| + Stephens Banded Snake | ■ Koala | ■ Brown Treecreeper |
| ■ Spotted-tailed Quoll | ▲ Grey-headed Flying-fox | ■ Speckled Warbler |

File Name (A4): R06_V1/2553_030.dgn

FIGURE 5.2

Threatened Species Recorded within
and surrounding the Proposed
Underground Mining Area

threatened species will be discussed in further detail as part of the Environmental Assessment.

A full assessment of the potential impact of the project on threatened fauna species, in accordance with the TSC Act, *Fisheries Management Act 1994* and the EPBC Act will be undertaken as part of the ecological assessment. Appropriate impact mitigation and management strategies and ecological monitoring will be designed to ameliorate the impact of the project on ecological values.

5.5 Aboriginal Archaeology

5.5.1 Previously Recorded Aboriginal Sites

A number of cultural heritage management studies have already been conducted within the proposed underground mining area and immediate surrounds, including archaeological and cultural heritage assessments pertaining to previous Subsidence Management Plan (SMP) applications for WWC. A search of the DECCW's Aboriginal Heritage Information Management System (AHIMS), the NSW register of Aboriginal sites, was conducted between MGA 356 000 - 367 000 east and 6358 000 - 6345 000 north. A total of 62 recorded Aboriginal sites occur within this area. The AHIMS data is summarised in **Table 5.4** below.

Table 5.4 - Summary of AHIMS Registered Aboriginal Sites - MGA 356 000 - 367 000 east and 6358 000 - 6345 000 north

AHIMS Site Type	Site Features	Number of Sites
Artefact	Number and types of artefacts (stone, bone, shell, wood, glass ceramic). Note these sites are usually isolated stone artefacts – Isolated Finds or Artefact Scatters.	19
Open Campsite	Artefact Scatter – stone artefacts.	14
Axe Grinding Groove	Site containing an varied numbers of grooves resulting from the production of edge ground stone axes.	24
Axe Grinding Groove and Water Hole/Well	Site containing an unknown number of grooves resulting from the production of edge ground stone axes in association with a water hole or 'well' feature.	1
Axe Grinding Grooves, Shelter With Deposit	Site containing an unknown number of grooves resulting from the production of edge ground stone axes in association with a rock shelter that has been assessed as containing sediments likely to contain archaeological evidence.	1
Art	Rock art site containing an unknown number of motifs. Technique unknown (may be pigment or engraved art).	1
Tree	Scarred or carved tree.	1
Potential Archaeological Deposit	Sediments assessed as being likely to contain archaeological evidence.	1
Total		62

As shown in **Figure 5.3** fourteen previously recorded sites occur within the project area; three grinding groove sites, one isolated find and 10 sites containing artefacts (presumably isolated finds and artefact scatters).

5.5.2 Potential for Previously Unknown Aboriginal Sites

The proposed underground mining area has the potential to contain previously unrecorded archaeological evidence as well as sites/places of cultural significance to Aboriginal stakeholders. The environmental context of the proposed underground mining area and the Aboriginal sites contained on the AHIMs register indicate that the mostly likely Aboriginal site types to occur in, or within close proximity to the project area are axe grinding grooves and sites containing stone artefacts (either artefact scatters or isolated finds). Rock shelters with evidence of Aboriginal use and rock art sites (including pigment and engraved art) may be contained within the project area and immediate surrounds should suitable geological features occur.

Axe grinding grooves in the Sydney Basin sandstone region are generally located within the channels of drainage lines at the heads of valleys, in areas around rock pools on ridge tops, and on rock platforms near seepages (it is known that water was utilised as a lubricant during the grinding of axes) (Vinnicombe 1980, Dickson 1980, Umwelt 2004a).

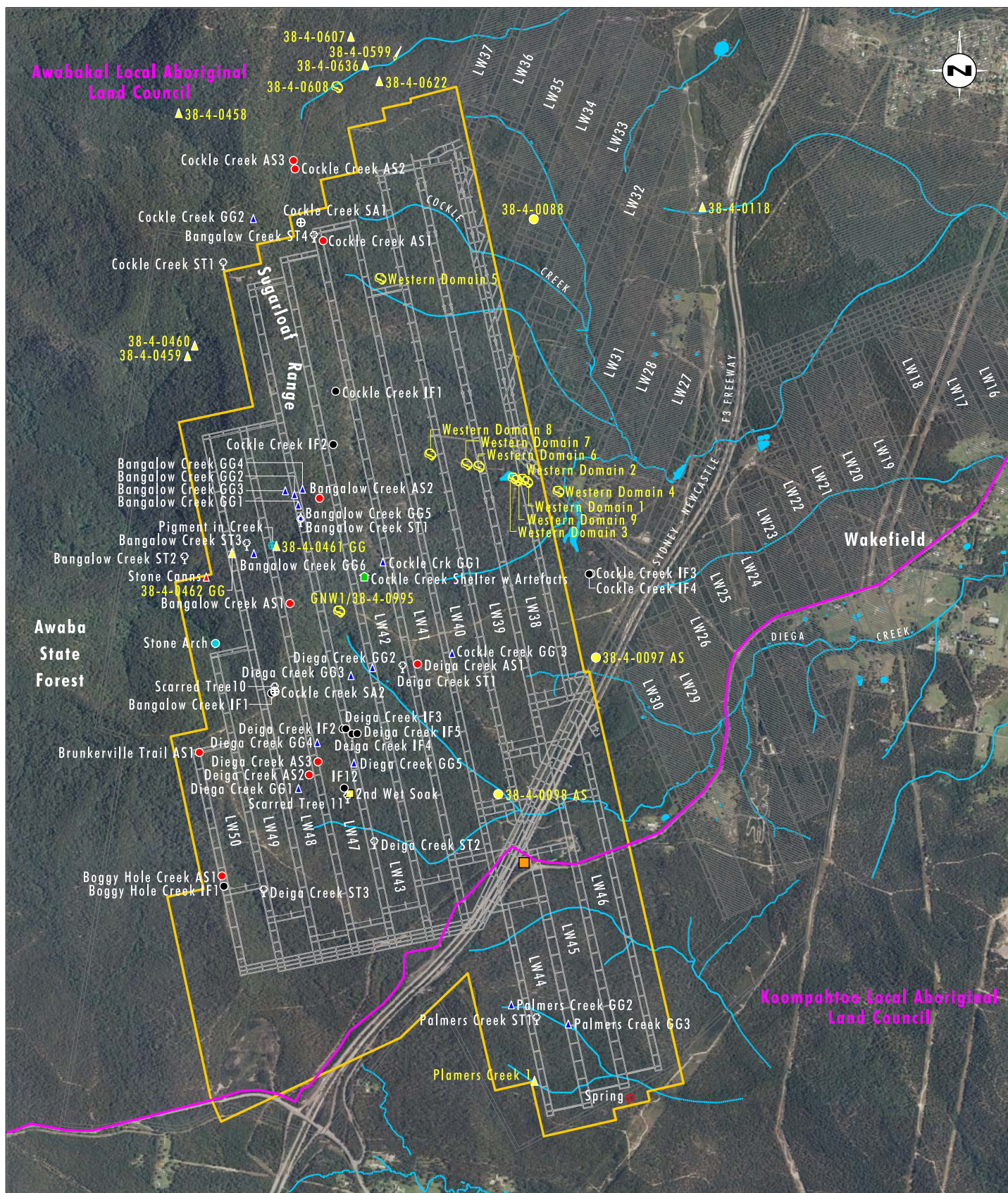
Stone artefacts have generally been located on lower slopes/footslopes adjacent to creeks and on the ridgelines and spurs, which were used as the major thoroughfares allowing people access to and from the steep sandstone landscape (Vinnicombe 1980).

The existence of rockshelters in the proposed underground mining and immediate surrounds is considered possible should suitable sandstone formations be present. Shelters in the Narrabeen group sandstones are generally formed by the action of cavernous weathering (Twidale 1968, Twidale and Campbell 1993). Where large boulders or tall cliff faces of sandstone are found, cavernous weathering can produce shelters and caves large enough that they may have been used by Aboriginal people. Evidence contained within rock shelters (should they occur within the project area and immediate surrounds) may include stone artefacts and/or hearths either on the surface or within sediments, axe grinding grooves and/or rock art (either pigment or engraved).

The vast majority of previously recorded engraving sites within the Sydney Basin occur on horizontal sandstone platforms (McDonald 2007). The majority of previously recorded engraving sites in the Sydney Basin occur on ridgelines on sandstone platforms with extensive outlooks and/or on platforms located at the heads of valleys (McDonald 2007, Vinnicombe 1980 XI: 6-7). Engravings have also been recorded on sandstone boulders and on vertical sandstone surfaces (most often in close proximity to water courses) (McDonald 2007).

5.5.3 Potential Impacts to Aboriginal Heritage

Continuation of WWC's underground mining operations has the potential to impact Aboriginal sites/places located within and in close proximity to the proposed underground mining through subsidence and associated mitigation works (such as surface crack remediation). An assessment of subsidence and related impacts will be undertaken as part of the broader EA and will be used to inform predictions of likely impacts to Aboriginal heritage, which will in turn inform any advice regarding mitigation strategies and recommendations provided as part of the Archaeological and Cultural Heritage Assessment of the continued operations area.



Source: OCAL - Longwall Layout
LPI - Drainage Lines, DEC AHIMS
AAM Hatch - Aerial Photography (Flown 16.12.2008)

0 0.5 1.0 1.5 km
1:30 000

Legend

- Proposed Longwall Layout
- Active Longwall Layout
- Proposed Longwall Area
- LABLC Boundary
- Drainage Line
- Proposed Mining Services Facility

Sites Recorded During Survey

- Artefact Scatter
- ▲ Isolated Find
- ▲ Grinding Groove
- ♂ Scarred Tree
- ⊕ Stone Arrangement
- ⊕ Pigment in Creek
- Spring
- ▲ Stone Cans
- Stone Arch
- Shelter with Artefacts
- ⊗ Artefact
- / Art

AHIMS Sites

- Previous sites

FIGURE 5.3

Recorded Aboriginal Archaeological Sites within and surrounding the Proposed Underground Mining Area

5.5.4 Proposed Aboriginal Archaeological and Cultural Heritage Assessment

The Aboriginal archaeological survey and assessment has been conducted in compliance with relevant policies and guidelines, specifically the *Aboriginal Cultural Heritage Standards and Guidelines Kit* (NSW Parks and Wildlife Services (NPWS) 1997), *Interim Community Consultation Requirements for Applicants* (DEC 2004) and the Part 3A assessment guideline *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2004b).

There are no significant proposed changes to the existing WWC surface facilities and therefore no potential for impact to cultural heritage sites, therefore the archaeological survey has been undertaken to focus on the proposed underground mining area. A further assessment of the proposed services facility will be undertaken prior to the completion of the project application.

The detailed Aboriginal Archaeology and Cultural Heritage Assessment builds on previous archaeological investigations conducted by Umwelt and will involve the following:

- preparation of a review of relevant archaeological and cultural heritage literature, including a search of the DECCW/AHIMS (Aboriginal) Site Register and Archaeological Reports Register, the Australian Heritage Database (which includes Commonwealth and National Heritage lists) and the Register of the National Estate for listed sites within or adjacent to the Project area;
- undertaking a Native Title search;
- facilitation of Aboriginal stakeholder consultation;
- preparation of a review of the environmental context of the project area, with a specific focus on the taphonomy of Aboriginal sites which are (or are likely to be) located within the project area and immediate surrounds;
- preparation of a predictive model for Aboriginal site location within the project area and immediate surrounds;
- undertaking a field inspection of the proposed underground mining and immediate surrounds to identify Aboriginal sites and/or places of cultural heritage value, recording these (to DECCW standards) and supplying this information both in the report and also directly to the DECCW's AHIMS. This work has been completed in consultation with the registered Aboriginal stakeholders for the project;
- preparation of an assessment of the archaeological significance and facilitation of a cultural significance of the proposed underground mining and immediate surrounds (in accordance with relevant DECCW guidelines);
- preparation of a statement of the likely effect of the proposed project on any Aboriginal sites/places known or predicted to occur within the proposed underground mining and immediate surrounds;
- preparation of an assessment report in relation to the findings of the survey and assessment (including archaeological and cultural heritage significance) of the sites/PADs (if any) and identifies requirements related to their preservation, further investigation and/or mitigated destruction. The report will clearly identify management options from an Aboriginal cultural heritage and archaeological perspective; and

- facilitation of further consultation with registered Aboriginal stakeholders regarding cultural values and management options (see **Section 5.6.5**).

5.5.5 Aboriginal Stakeholder Consultation

Aboriginal stakeholders are the principal determinants of the significance of their heritage (DEC 2004:3), and therefore the consultation process that has been implemented as part of the project has reflected the importance of Aboriginal stakeholder involvement in the identification, assessment and management of Aboriginal heritage (objects and places). Specifically, the process seeks to ensure Aboriginal stakeholders have the opportunity to contribute to the assessment outcome through:

- involvement in the design of the cultural heritage assessment;
- participation in the identification of Aboriginal archaeological sites through involvement in fieldwork (survey and detailed site recording);
- assessing the cultural significance of Aboriginal sites identified, and providing input on the cultural values of the project area and surrounds;
- identifying the impact of development on sites/areas of cultural heritage significance;
- contributing to the development of cultural heritage management recommendations; and
- providing comment on a draft of the assessment report.

Involvement of Aboriginal stakeholders throughout this assessment will proceed in accordance with the *Interim Community Consultation Requirements for Applicants* (DEC 2004).

As discussed in **Section 2.3**, based on the initial feedback from the Aboriginal stakeholders, relating to significant sites within the proposed longwall mining area, substantial changes have been made to the proposed longwall mining layout. Further consultation and feedback will be provided to the stakeholders on the progression of these changes.

5.6 Air Quality

Dust emissions from underground mining operations are significantly less than emissions from open cut mining operations and WWC is not considered to be a significant contributor of dust to the local atmosphere. Dust is, however, a key concern for the local community and therefore a potential key issue for the project. A detailed dust impact assessment will therefore be completed to consider the potential impacts of the project on the existing air quality environment.

Dust emissions at WWC are currently regulated by conditions of the site's Environment Protection Licence (EPL 1360) which require that:

- the premises be maintained in a condition which minimises or prevents the emission of dust from the premises; and
- material removed during conveyor belt cleaning operations must be contained for dust free disposal or reuse.

WWC implements a range of dust management measures at the surface facilities in order to comply with these licence conditions, including:

- dust suppression sprays in the surface yard;
- dust suppression sprays in the coal stockpile areas; and
- enclosure of most conveyors and transfer points.

OCAL also operates an air quality monitoring program with regular dust deposition monitoring undertaken for the nearby Westside Mine and Macquarie Coal Preparation Plant in accordance with the site Environment Protection Licence (EPL) 1360. Monitoring locations are shown on **Figure 5.4**.

While dust emissions from the project are not expected to be significant due to mining operations occurring underground, a detailed air quality impact assessment will be completed for the project in accordance with NSW DECCW guidelines for *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*. The assessment will include:

- an assessment of existing air quality and prevailing meteorology in the project area through a review of available air quality monitoring and meteorological data;
- the development of an emissions inventory for the project;
- the establishment of air quality compliance goals for the project in accordance with NSW DECCW guidelines;
- the assessment of impact on non-project related receivers using a Gaussian plume dispersion model and relevant meteorological data to predict dust deposition rates, concentrations of PM 10 (24hr and annual average) and concentrations of TSP (annual average);
- comparison of predicted values with the air quality compliance goals; and
- recommendations relating to the management and minimisation of dust.

The air quality impact assessment will also include an assessment of cumulative impacts associated with nearby mining operations, including Westside Mine and the Macquarie Coal Preparation Plant (MCP). .

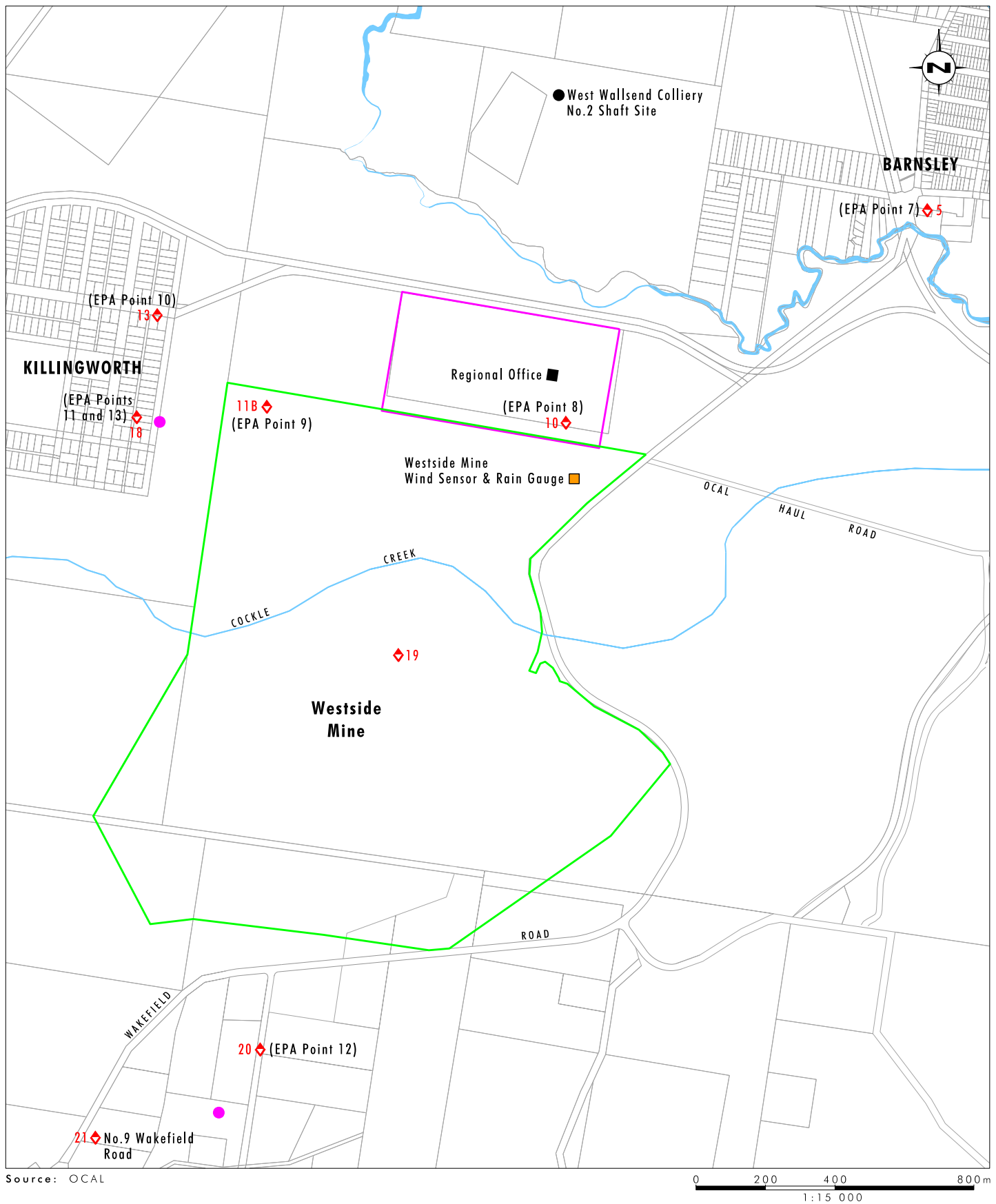
5.7 Greenhouse Gas and Energy

5.7.1 Greenhouse Gas and Energy Context

A Greenhouse Gas and Energy Assessment (GHGEA) will be undertaken as part of the EA to determine the projected energy consumption; energy production; and greenhouse gas (GHG) emissions as a direct and indirect result of current and continued operations at WWC.

GHG emissions and energy consumption are a key consideration for the project, due to the emissions and energy generated from both the underground mining of the coal resource and the subsequent transport and combustion of the product. The GHGEA will provide a detailed calculations of energy and emissions as a result of the proposed project as well as to provide management and mitigation recommendations.

WWC currently implements a comprehensive GHG and energy monitoring and reporting program as part of the existing operations. It is anticipated that this program would be incorporated as the greenhouse and energy reporting framework for the proposed project. Additionally, WWC has a detailed and relatively recent Energy Savings Action Plan (ESAP)



Legend

- Westside Mine
- West Wallsend Colliery Surface Facilities
- ◆ Dust Deposition Monitor
- High Volume Air Sampler Location
- Wind Sensor and Rain Gauge

FIGURE 5.4

**Existing Dust Monitoring Locations -
for West Wallsend Colliery**

which provides a strategy for assessing existing energy consumption and establishes energy reduction and management goals onsite. The ESAP data and established processes will be incorporated into the GHGEA.

5.7.2 Greenhouse Gas and Energy Assessment Approach

The WWC GHGEA framework and objectives will be in direct accordance with the *National Greenhouse and Energy Reporting System* (NGERS) and methodology established in the *National Greenhouse and Energy Report (Measurement) Technical Guidelines 2008 v1.0*. Additionally, the *National Greenhouse and Energy Reporting (Measurement) Determination* provides methods and criteria for the estimation and measurement of greenhouse gas emissions; the production of energy; and the consumption of energy. Also applied to this assessment will be the United Nations Framework Convention on Climate Change (UNFCCC) reporting categories, as adopted and implemented by the Commonwealth Department of Climate Change.

The GHGEA will include an assessment and analysis of Scope 1, Scope 2 and Scope 3 emissions.

- | | |
|----------------|---|
| Scope 1 | covers <i>direct emissions</i> from the combustion of fuels (for example, diesel) and industrial processes within the boundary of the mining operation; |
| Scope 2 | covers <i>indirect emissions</i> from the mining operation's consumption of purchased electricity that is produced by another organisation; and |
| Scope 3 | includes <i>other indirect emissions</i> as a result of the mining operation's activities that are not from sources owned or controlled by the organisation or involve the offsite transportation and subsequent combustion (for example, shipping or rail) of the product. |

5.7.3 Greenhouse Gas and Energy Assessment Components

The GHGEA will have three main components:

- An assessment of the energy consumption, energy production and GHG emission sources at WWC in accordance with nationally and internationally recognised assessment guidelines (an energy and emissions profile).
- Calculation of energy consumption, energy production and GHG emissions from underground coal mining operations, production and transport.
- A summary of the GHGEA, a climate change impact assessment from the Project (including an address of the principles of Ecologically Sustainable Development), and strategic recommendations for the inclusion of management practices to ensure energy consumption and GHG emissions are managed, mitigated and reduced.

5.8 Noise

5.8.1 Background

WWC is located approximately one kilometre from the residential area of Killingworth and approximately one kilometre from the residential area of Barnsley. The Colliery is separated from these residential areas by bushland. The noise environment in these areas is

dominated by traffic noise from the F3 freeway, local traffic noise and noise from the WWC Bradford Breaker.

Due to a recent modification to the pit-top development consent (the 1969 consent), WWC is currently subject to the DECCW's NSW Industrial Noise Policy 2000 (INP) and its regulations.

The Colliery does undertake regular noise monitoring in Killingworth and Barnsley in order to assess and manage noise from its existing operations. A range of noise management measures have been implemented at the site in response to ongoing monitoring, including enclosure of compressors and installation of a coal plug in the base of the coal loading bin to prevent coal from hitting the sides of the bin.

Previous noise monitoring results have shown that noise from the WWC is generally within the INP guidelines for maximum amenity noise levels from industrial noise sources in suburban areas.

5.8.2 Proposed Assessment Methodology

The proposed project will not result in any change to production levels or noise sources at the WWC. However, in order to assess the noise impact of the project on nearby sensitive receivers, a detailed noise impact assessment will be completed for the project in accordance with the NSW INP. The assessment will include:

- identification of the nearest potentially affected residential receivers and any other noise-sensitive localities;
- designing and conducting a background noise monitoring program to quantify the existing background and ambient noise levels at relevant locations. ;
- assessment of the existing noise environment;
- identifying project specific noise criteria and sleep disturbance criteria that would be used to establish achievable noise limit sin accordance with Section 10 of the INP;
- prediction of noise emissions for the operational phase of the project and calculation of the noise levels at the nearest potentially affected residential receivers and noise-sensitive localities, using a computer generated noise model;
- comparison of the predicted noise levels with the project specific noise levels and sleep disturbance criteria and assessment of impacts in accordance with Section 10 of the INP;
- consideration of feasible and reasonable noise mitigation strategies;
- the nomination of achievable noise limits in accordance with Section 10 of the INP; and
- the identification of options relating to noise monitoring and management.

Additionally, cumulative noise impact of the proposal and other relevant nearby industrial operations will be assessed.

Noise assessment works completed to date has identified the need for additional noise controls to be implemented for the Bradford breaker at the WWC pit-top facility, the appropriate level of noise control required is currently under further investigation.

No significant changes will occur to the current traffic regime, therefore no assessment of road traffic noise impacts is proposed. Traffic associated with the project will be unchanged from existing operations as there will be no change to production rates or transport methods.

5.9 Historical Heritage

5.9.1 Preliminary Assessment of Potential Historical Heritage Resource

A review of heritage listings (both statutory and non statutory) and a previous archaeological survey of parts of the Western Domain by Umwelt (2006), identified no potential significant historical heritage or historical archaeological items or sites within the project area. However, further work will be undertaken as part of the Environmental Assessment to determine if any potential historic heritage sites need to be assessed.

5.9.2 Historical Heritage Assessment

A detailed historical heritage assessment proposed will be prepared as part of the WWC Continued Operations Project Environmental Assessment will be prepared in accordance with guidelines set out in the *NSW Heritage Manual 1996*, produced by the Heritage Branch, DoP, including *Archaeological Assessments* and *Assessing Heritage Significance* and with consideration of the principles contained in the *Burra Charter: the Australia ICOMOS Charter for Places of Cultural Significance*.

The assessment will identify any historical heritage and historical archaeological values contained within the project area and assess the significance of any impacts on these values potentially resulting from the project.

As discussed in **Section 5.10.1**, a preliminary desktop assessment has not identified any potential historical heritage or historical archaeological items or sites within or in the immediate vicinity of the project area. The scope of the detailed assessment will consist initially of further desktop analysis and research, followed by site survey if found to be required. Building on the preliminary work already undertaken the preparation of the assessment will involve the following:

- searches of the Australian Heritage Database (including the Register of the National Estate and Commonwealth and National Heritage lists), NSW State Heritage Register and State Heritage Inventory and local planning instruments for sites within or adjacent to the proposed project area (already undertaken);
- review and gap analysis of relevant available archaeological, historical and heritage literature;
- historical research and preparation of historical context of the project area;
- a detailed survey will be completed in conjunction with the Aboriginal archaeology survey, further targeted surveys will be completed if required as an outcome of the initial assessments; and
- preparation of a detailed historical and archaeological context in which to assess the significance of any potential historical archaeological resource or heritage item present within the project area.

If historical research and/or site survey (proposed to be undertaken as part of the Aboriginal assessment of the project area) identify any potential historical heritage or historical

archaeological items/sites within, or in the immediate vicinity of, the project area which warrant further investigation (including early residences potentially relating to settlement and/or mining in the area), targeted field inspection will be undertaken to further investigate and record the items/sites. Any historical heritage and/or historical archaeological significance/heritage values will be identified.

Following the desktop assessment and any required survey, a detailed historical heritage assessment will be prepared, including a statement of significance and an assessment of heritage impact, based on historical, archaeological and physical evidence, in accordance with Heritage Branch, Department of Planning guidelines. The impact assessment will consider potential subsidence impacts to any historical heritage and/or historical archaeological items/sites identified within, or in the vicinity of, the project area. Appropriate management strategies will be developed to mitigate any potential historical heritage impacts identified.

5.10 Rehabilitation and Closure

A conceptual closure plan for WWC is currently being developed in accordance with the Xstrata Standards for Mine Closure Planning, as this standard requires that closure planning is a key consideration at each stage of an Xstrata project. A summary of the key aspects of the proposed closure and rehabilitation strategy for WWC will be included in the Environmental Assessment. The key issues to be considered during the preparation of the closure plan will be:

- measures required to ensure safe closure of all mine entries, shafts and boreholes;
- removal of all surface infrastructure and rehabilitation of disturbed land;
- remediation of areas impacted by subsidence; and
- opportunities for progressive rehabilitation throughout the project life.

In relation to subsidence remediation works, all works will be undertaken in accordance with the existing and approved remediation plans and strategies. The nature of subsidence remediation works are specific to the subsidence impacts which may occur within the longwall mining area. Remediation strategies are discussed in detail with each respective stakeholder, to ensure all stakeholder concerns are addressed. This process will be further detailed in the Environmental Assessment.

5.11 Visual Amenity

Due to the nature of underground mining operations, visual impacts associated with this project are expected to be minimal. Potential visual impacts will be limited to views of existing surface infrastructure, with no changes to existing surface facilities proposed as part of this project. Minor visual impacts will be associated with the proposed services facility, which is proposed to be located adjacent to Wakefield Road. Visual assessment of the project will be assessed in further detail as part of the Environmental Assessment.

A visual assessment will be completed as part of the Environmental Assessment for the project and will be limited to a discussion of the general scenic amenity of the area and identifying potential views of surface infrastructure from surrounding private property or public viewing locations (eg. roads). Where appropriate, measures will be proposed to mitigate the visual impacts associated with existing surface mining infrastructure.

5.12 Traffic

Currently employees and contractors of WWC utilise Wakefield Road and The Broadway to access the Colliery. As previously discussed there are no proposed changes to the existing workforce structure and therefore no changes to the existing pit-top traffic regime are proposed as part of the project.

A small number of traffic movements will be associated with the construction of the services facility, as discussed in **Section 2.4.3**. An assessment of potential traffic issues and management will be undertaken as part of the Environmental Assessment.

6.0 Project Schedule

Table 6.1 below outlines the planned schedule for the project application and environmental assessment process. The critical milestone to note is that approval for the project is required prior to December 2010.

Table 6.1 - Project Schedule

Project Milestone	Timeframe
Commence community and agency consultation strategy (Phase 1)	Commenced
Project Application / Preliminary Environmental Assessment	October 2009
Phase 2 Consultation	On-going
Completion of specialist assessments and submission of EA for adequacy assessment	December 2009
Approval Required	December 2010

7.0 References

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APPENDIX 1

West Wallsend Continued Operations Project – Preliminary Environmental Risk Assessment

West Wallsend Colliery Continued Operations Project Preliminary Environmental Risk Assessment October 2008

Number	Activity	Aspect	Impact	Hazard Category	Status and Proposed Controls	MRC	Probability	Risk Score	Further action/assessment required	Assigned To	Date Due
1	Operation of Existing Surface Facilities	Water Management (non-compliance)	Non-compliance, fines, negative community issues	Environmental	Currently manage both surface water runoff and some underground water in accordance with site WMP. Discharge is sampled in accordance with existing EPL.	3	C-Moderate	13	Further assessment as part of EA.	Mark Robinson	
		Dust Generation	Non-compliance, fines, negative community issues	Environmental	Current management measures include manually operated water sprays. No formal Dust Management Plan.	4	D-Unlikely	21	To be considered in EA.	Umwelt	
		Noise Generation	Non-compliance, fines, negative community issues	Environmental	No formal Noise Management Plan. Have undertaken random testing (complaints-based). Bi-annual noise monitoring programme. Issues typically related to breaker, belts and product bin.	3	C-Moderate	13	To be considered in EA.	Umwelt	
		Visual Amenity	Negative community perception	Community	Tree screen established to improve visibility from the Broadway. Relatively remote site. Only minor changes proposed for existing site.	5	D-Unlikely	24	To be considered in EA.	Umwelt	
		Energy Use, e.g. power, diesel etc	Community perception	Community	Multiple energy related public reports and plans each year including: ESAP; SD reporting; NGERS; NPI.	4	D-Unlikely	21	To be considered in EA.	Umwelt	
		Water Demand (Potable water use)	Community perception	Community	Potable water use has been identified as an area for improvement. Potable Water Reduction Project has been developed.	4	D-Unlikely	21	To be considered in EA.	Umwelt	
		Mine Closure	Community perception, relinquishment	Strategic	Mine Closure Plan prepared, which includes costings. Approved by DPI. No major issues identified as part of closure planning.	4	D-Unlikely	21	To be considered in EA.	Umwelt	
		Hydrocarbons/Dangerous Goods/Explosives	Environmental impacts/safety	Environmental	Existing approved Site Security Plan August 2008, which covers explosives. Dangerous Goods notifications in place. Have management plan for the storage of dangerous goods, including fuel (WWC Hazardous Substances Management Standard (S2.5.03). Phase 1 Contamination Assessment has been completed (May 2005). Storage is within approved, bunded compounds as per relevant standards and guidelines.	3	D-Unlikely	17	To be considered in EA.	Umwelt	
		Traffic	Noise impacts	Community	Transport of product coal not part of the proposal. Traffic to be considered is limited to existing workforce, deliveries, bulk goods etc. No change to existing traffic is expected.	5	E-Rare	25	To be considered in EA.	Umwelt	
2	Underground Mining	UG Water Management	Environmental impacts - contamination, excessive use	Environmental	Potential risk of contamination of surface water from solids, solenetic is low risk, due to low volumes and dilution.	4	E-Rare	23	To be considered in EA.	Umwelt	
		Energy Use (Diesel/Electricity)	Community perception	Community	Multiple energy related public reports and plans each year including: ESAP; SD reporting; NGERS; NPI.	4	D-Unlikely	21	To be considered in EA.	Umwelt	
		Gas drainage and venting of mine air	Community perception	Community	Gas drainage (passive) at Westside Open Cut. Mine Ventilation No. 2 and 3 Return Shafts.	5	D-Unlikely	24	To be considered in EA.	Umwelt	
3	Subsidence	Aboriginal Archaeology	Site impacts from subsidence	Community	Known and potential archaeological sites have potential to be impacted within subsidence area.	2	B-Likely	5	To be considered in EA. Consultation with Aboriginal community. Interim S90 for Longwall 38 to be approved by February 2009.	Umwelt	
		European Heritage	Site impacts from subsidence	Community	Potential for mining related heritage in subsidence area (old workings), however no current studies.	4	D-Unlikely	21	To be considered in EA.	Umwelt	

West Wallsend Colliery Continued Operations Project Preliminary Environmental Risk Assessment October 2008

Number	Activity	Aspect	Impact	Hazard Category	Status and Proposed Controls	MRC	Probability	Risk Score	Further action/assessment re	Assigned To	Date Due
		Flora and Fauna	Threatened Species impacts from subsidence	Environmental	Potential impact from ponding due to subsidence leading to loss or alteration of habitat.	3	C-Moderate	13	To be considered in EA.	Umwelt	
		Surface Water	ESC/stability impacts from subsidence	Environmental	Potential inter-connective cracking may impact surface water. Potential for increased erosion and sedimentation. Previous impacts on Diega Creek / Southern Coalfields Inquiry.	2	C-Moderate	8	To be considered in EA.	Umwelt	
		Groundwater	Environmental impacts	Environmental	Potential for inter-connective cracking may impact groundwater.	2	C-Moderate	8	To be considered in EA.	Umwelt	
		Gas/Fuel Pipeline / Fibre-Optic Cables	Env/Community impacts/publicity	Operations	Existing management plans developed with relevant stakeholders.	2	D-Unlikely	12	To be considered in EA.	Umwelt	
		Freeway	Env/Community impacts/publicity	Operations	Existing management plans developed with relevant stakeholder (RTA) for Longwall 38.	2	D-Unlikely	12	To be considered in EA.	Umwelt	
		Council Roads (Wakefield Rd)	Env/Community impacts/publicity	Operations	Will be subsidence under Wakefield Road. No current management plan.	3	D-Unlikely	17		Umwelt	
		Transmission Towers (Transgrid)	Env/Community impacts/publicity	Operations	Located outside of subsidence areas.	4	D-Unlikely	21	To be considered in EA.	Umwelt	
		Communications Towers (Telstra)	Env/Community impacts/publicity	Operations	Potential for small degree of subsidence	3	C-Moderate	13	To be considered in EA.	Umwelt	
		Communications Towers (Gencor)	Env/Community impacts/publicity	Operations	Located within subsidence areas, small potential for impact.	4	C-Moderate	18	To be considered in EA.	Umwelt	
		Great North Walk	Env/Community impacts/publicity	Community	Within subsidence areas. Will be subject to cracking. Great North Walk Management Plan with Department of Lands.	3	D-Unlikely	17	To be considered in EA.	Umwelt	
		State Conservation Area	Env/Community impacts/publicity	Community	Within subsidence areas. Will be subject to cracking. Underground mining approved under SCA.	4	D-Unlikely	21	To be considered in EA.	Umwelt	
		Private Landholders	Community perception	Community	Management plan with McCarthy property in place for Longwall 38. Potential subsidence impacts.	4	D-Unlikely	21	To be considered in EA.	Umwelt	

West Wallsend Colliery Continued Operations Project Preliminary Environmental Risk Assessment October 2008

Number	Activity	Aspect	Impact	Hazard Category	Status and Proposed Controls	MRC	Probability	Risk Score	Further action/assessment re	Assigned To	Date Due
4	Construction of Additional Infrastructure (vent bores etc)	Aboriginal Archaeology	Potential impacts from construction, non-compliance, fines	Community	Potential for surface disturbance from additional infrastructure and access. Will be managed by Due Diligence process.	4	D-Unlikely	21	To be considered in EA.	Umwelt	
		European Heritage	Potential impacts from construction, non-compliance, fines	Community	Potential for surface disturbance from additional infrastructure and access. Will be managed by Due Diligence process.	4	D-Unlikely	21	To be considered in EA.	Umwelt	
		Flora and Fauna	Potential impacts from construction, non-compliance, fines	Environmental	Potential for impacts on threatened species from additional infrastructure and access. Will be managed by Due Diligence process.	4	D-Unlikely	21	To be considered in EA.	Umwelt	
		Surface Water	Potential impacts from construction, non-compliance, fines	Environmental	Potential for erosion and sediment control issues from construction activities.	4	D-Unlikely	21	To be considered in EA.	Umwelt	
		Dust Generation	Non-compliance, fines, negative community issues	Environmental	Potential pollution from drilling activities.	5	D-Unlikely	24	To be considered in EA.	Umwelt	
		Noise Generation	Non-compliance, fines, negative community issues	Environmental	Potential pollution from drilling activities.	5	D-Unlikely	24	To be considered in EA.	Umwelt	
		Visual Amenity	Negative community perception	Community	Potential for minor visual amenity impacts from drilling activities.	5	D-Unlikely	24	To be considered in EA.	Umwelt	
6	Subsidence Remediation	Aboriginal Archaeology	Potential impacts from subsidence remediation, non-compliance, fines	Community	Approval required for required subsidence remediation works required from DECC, including Due Diligence Surveys.	4	D-Unlikely	21	To be considered in EA.	Umwelt	
		Flora and Fauna	Potential impacts from subsidence remediation, non-compliance, fines	Environmental	Approval required for required subsidence remediation works required from DECC, including Due Diligence Surveys.	4	D-Unlikely	21	To be considered in EA.	Umwelt	
		Surface Water	Potential impacts from subsidence remediation, non-compliance, fines	Environmental	DWE approval required for works in close proximity to watercourses.	4	D-Unlikely	21	To be considered in EA.	Umwelt	
7	Other	End user / greenhouse gas issues	Negative community perception	Community	Consultation Strategy developed for project. No significant change in operational activities.	3	C-Moderate	13	To be considered in EA. Consultation Strategy in place.	Umwelt	

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