

Mount Thorley Operations 2014

4

Environmental Impact Statement

Prepared for Mt Thorley Operations Pty Limited | June 2014

VOLUME 4 — Appendices K to L



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EMGA Mitchell McLennan

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Appendix K — Aboriginal cultural heritage study

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Aboriginal Cultural Heritage Assessment Report
for the
Warkworth Continuation 2014 Proposal
and
Mount Thorley Operations 2014 Proposal
Environmental Impact Statements

Prepared by
Central Queensland Cultural Heritage Management Pty Ltd

for
Rio Tinto Coal Australia

May 2014

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Abbreviations

A&CHMP	Archaeology and Cultural Heritage Management Plan
ACHCRP 2010	Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010
AHIMS	Aboriginal Heritage Information Management Service
AHIP	Aboriginal Heritage Impact Permit
AMBS	Australian Museum Business Services
ATSIHP Act	<i>Aboriginal and Torres Strait Islander Heritage Protection Act 198</i>
BSO	Bulga Surface Operations
CHMD	Cultural Heritage Management Database
CHMS	Cultural Heritage Management System
CHWG	Cultural Heritage Working Group
Coal & Allied	Coal & Allied Operations Pty Limited
CQCHM	Central Queensland Cultural Heritage Management Pty Limited
DECCW	Department of Environment, Climate Change and Water
DEWHA	Department of Environment, Water, Heritage and the Arts
DP&E	Department of Planning & Environment
EA	Environmental Assessment
EIS	Environmental Impact Statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
GL	Gigalitres
HMA	Habitat Management Area
HMP	Heritage Management Plan
HRSTS	Hunter River Salinity Trading Scheme
Loder Creek ACHCA	Loder Creek Aboriginal Cultural Heritage Conservation Area
MTO	Mount Thorley Operations
Mtpa	Million tonnes per annum
MTW	Mount Thorley Warkworth
NDA	Non-disturbance Areas
NOOP	Northern out-of-pit
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NPWS	National Parks and Wildlife Service
OEH	Office of Environment and Heritage
OSL	Optically Stimulated Luminescence
PAD	Potential Archaeological Deposit
RAP	Registered Aboriginal Party
SOOP	Southern out-of-pit
ToR	Terms of Reference
WBACHCA	Wollombi Brook Aboriginal Cultural Heritage Conservation Area
WMS	Water Management System

Executive Summary

This report has been commissioned by Coal & Allied as part of the preparation of Environmental Impact Assessments (EIS) for the Warkworth Continuation 2014 & Mount Thorley Operations (MTO) 2014 proposals (together, the proposals) under Part 4 of the New South Wales *Environment Planning and Act* 1979 (EP&A Act). The proposals have been declared State Significant developments under Division 4.1 of Part 4 of the EP&A Act.

Coal & Allied have completed comprehensive Aboriginal cultural heritage surveys and research covering the vast majority of the Mount Thorley Warkworth (MTW) mining leases and the adjoining Coal & Allied owned lands, including the entirety of the proposal areas. These have been conducted over an extended period from 2002, but have been particularly intensive since 2008. This work forms part of the company's strategy of minimising the impact of any of its operations on Aboriginal cultural heritage, and has been carried out in consultation with Aboriginal community members and with their active participation in the conduct of field assessments and management activities.

Coal & Allied has comprehensive policies and protocols in place to guide Aboriginal cultural heritage management across all of their operations. These policies are applied consistently across the integrated MTW operation in close consultation with the Aboriginal community who has interests in the region and with whom Coal & Allied have well developed, formal and active relationships. The proposals generally, but the proposal to extend the Warkworth Mine which, in particular, aims to extend mining operations to the west, have been discussed intensively with the Registered Aboriginal Parties (RAPs) primarily through the Upper Hunter Valley Aboriginal Cultural Heritage Working Group (CHWG).

This report provides:

- an outline of current management practices at MTW as they apply to Aboriginal cultural heritage;
- an outline of the research that has been conducted into Aboriginal cultural heritage in the proposal areas and adjoining Coal & Allied owned lands, including the participation of Aboriginal community members;
- an assessment of Aboriginal cultural heritage significance for the proposals, potential impacts and management proposals, including the views of the Aboriginal community; and
- commitments with respect to Aboriginal cultural heritage management for the proposals.

While the key focus of this report is on the management of impacts on Aboriginal cultural heritage within the proposal areas, it also outlines Aboriginal cultural heritage management strategies and commitments as they relate more generally to other Coal & Allied owned lands including the proposed Wollombi Brook Aboriginal Cultural Heritage Conservation Area (WBACHCA) and Loder Creek Aboriginal Cultural Heritage Conservation Area (Loder Creek ACHCA), that reflect the informed views of the Aboriginal community.

The WBACHCA is to be established on Coal & Allied owned lands along the western boundaries of the MTW mining leases. It will include a significant portion of the highly culturally significant Bulga bora ground area on the eastern side of Wollombi Brook. Initially it will be managed by Coal & Allied in collaboration with the CHWG and in accordance with a management plan, which is well advanced, specific to the area. A key longer-term objective will be to establish a co-management regime for the WBACHCA and other Aboriginal cultural heritage conservations areas (such as that also proposed for the remnant riparian areas along Loder Creek within the MTO 2014 proposal area; i.e. the Loder Creek ACHCA) in partnership with the Aboriginal community through the development of a community-based and culturally-appropriate governance structure.

The proposals provide an opportunity for key stakeholders including the Aboriginal community, Coal & Allied and Government agencies to reconsider aspects of the present approach to Aboriginal cultural heritage management, at least in the Upper Hunter Valley. This report proposes that the development of a cultural heritage management accord between Coal & Allied and the Aboriginal community could deliver secure management of important cultural places, as well as a balance of outcomes that deliver intergenerational equity and enhance the cultural and social strength and cohesion of the Aboriginal community in the Upper Hunter Valley.

It would be expected that the proposed accord would require Coal & Allied to meet obligations with respect to and make provision for:

- reasonable and adequate resources for the establishment of both the WBACHCA and associated community governance entity in the first instance, and for the ongoing long-term management of WBACHCA and Loder Creek ACHCA;
- access to and co-management arrangements for both WBACHCA and Loder Creek ACHCA;
- access to culturally-significant places and / or landscapes have been identified by the Aboriginal community on other Coal & Allied lands associated with the Warkworth Continuation 2014 and Mount Thorley Operations 2014 proposal areas;
- resourcing Aboriginal cultural heritage and land management training and employment; and

- resourcing cultural and oral history recording by Aboriginal community members to ensure the security of existing but threatened cultural and historical information.

The accord will also capture obligations on behalf of the Aboriginal community. These could include:

- development of an integrated framework model for cultural heritage management applicable to all Coal & Allied's operations and lands in the Upper Hunter Valley that would look to make the best use of available resources to maximise outcomes for the Aboriginal community, including intergenerational equity;
- negotiating in good faith about Aboriginal cultural heritage management outcomes across Coal & Allied's operations and lands in the Upper Hunter Valley; and
- responsible management of Aboriginal cultural heritage places, landscapes and lands that are subject to Aboriginal community co-management arrangements.

Discussions surrounding such an accord will require close engagement with the Aboriginal community of the Upper Hunter Valley and relevant Government agencies (including DP&E and OEH), and will require careful consideration and time to conclude.

The report provides an overview of regional archaeological research including archaeological studies within the MTW mining area which date from the late 1970s. Within this, however, there are a series of key studies undertaken throughout the MTW area which inform this report and provide data for the assessment of the significance of Aboriginal cultural heritage objects and places located within the proposal areas and their management in the context of the proposed development activities. These studies fall into three main categories:

- studies relating to the 2002 extension of the Warkworth Mine;
- Coal & Allied studies undertaken throughout MTW between 2008 and 2014; and
- multidisciplinary archaeological and geomorphological investigations undertaken into areas of the Warkworth Sands land system.

The methodologies and key findings of these studies, including consultation with and participation by the Aboriginal community are presented in the report.

The studies have identified a number of cultural places and features that are considered to have some research potential or to have some level of scientific significance for other reasons. However, with the resolution of the issues surrounding the question of possible Pleistocene occupation deposits

associated with the Warkworth Sands landform, there are no places in proposal areas whose scientific values are such that they should constitute a constraint on the proposals.

The great majority of Aboriginal cultural heritage places identified in the MTW mining area are typical of the regional archaeology of the Upper Hunter Valley. The places are concentrated along drainage lines with a particular focus around permanent sources of water. These areas also have generally been subjected to a long history of disturbance through a range of land uses including vegetation removal, grazing, farming and the development of formal and informal access tracks.

In general, the majority of the Aboriginal cultural heritage places which have so far been identified and recorded are unlikely to yield significant additional information with regard patterns of land and resource use either locally or regionally. Further, chronological attribution given sample sizes both within individual places and across place-types, allied against taphonomic considerations, is notoriously difficult for the majority of this cultural heritage. Further archaeological research into the majority of the identified Aboriginal cultural heritage places is, therefore not considered warranted from a scientific viewpoint.

During their participation in the design and conduct of the cultural heritage survey and assessments which have been conducted, Aboriginal community representatives have expressed views about their strong concern for particular places and cultural locations as well as with respect the preferred mitigation of impacts on them from any potential development activities. In the course of the extensive consultation which has been conducted with the Aboriginal community in relation to Coal & Allied's mining activities throughout the MTW area (including the present proposals), the Aboriginal community have continually endorsed an Aboriginal cultural heritage management approach based on the limits of acceptable change to their heritage at a landscape scale and the desirability of achieving long-term and secure management of a range of significant places and areas, such as the Bulga bora ground and Wollombi Brook in general, which have significance to them at a broader regional level.

In general, the cultural heritage places for which the Aboriginal community has evinced the strongest concerns are also those that have been identified as having a higher order of significance from a scientific viewpoint. There are a number of such places identified as such within the MTW area which have been identified on that basis.

A considerable number of places containing Aboriginal cultural heritage have been identified and recorded throughout the MTW mining area and adjoining Coal & Allied owned lands. Within the report, these are reviewed and considered in six broad landuse-based categories, generally based upon their location within the greater MTW mining area as follows:

1. places situated within the Warkworth Continuation 2014 proposal area;
2. places situated within the Mount Thorley Operations 2014 proposal area;
3. places situated within the proposed WBACHCA;
4. places situated within the proposed Loder Creek ACHCA;
5. places situated within the current Warkworth mine development consent area (DA 300-9-2002-i as modified); and
6. places located on other 'on site' Coal & Allied owned lands not situated within 1-5 above.

The specific Aboriginal cultural heritage places within each of these, assessments of significance, and potential impacts from the proposals are assessed for each of these categories.

A series of Aboriginal cultural heritage impact management commitments have been developed for the proposals. These fall into a series of categories as follows:

- the finalisation of the development of an overarching heritage management plan for the MTW mining area (including the proposal areas) and adjoining Coal & Allied owned lands;
- management of Aboriginal cultural heritage within the proposal areas;
- management of Aboriginal cultural heritage located within the proposed Aboriginal cultural heritage conservation areas;
- management of Aboriginal cultural heritage located on other 'on site' Coal & Allied owned lands, including extant places within the current development consent area (DA 300-9-2002-i as modified);
- management of Aboriginal cultural heritage within any 'off site' Coal and Allied Owned lands such as biodiversity conservation offset areas which may be associated with any new development consent; and
- implementation of a program of research known as the Hunter Valley Sand Bodies Research Study focusing on possible Pleistocene occupation.

1. INTRODUCTION

Central Queensland Cultural Heritage Management Pty Limited (CQCHM) was engaged by Coal & Allied Operations Pty Limited (Coal & Allied) to undertake an assessment of Aboriginal cultural heritage impacts due to the Mount Thorley Operations (MTO) 2014 and Warkworth Continuation 2014 mining proposals.

Warkworth Mine and MTO function as an integrated operation and share the use of a number of resources and infrastructure. This includes a joint workforce and management team. This Aboriginal cultural heritage impact assessment has therefore been based on the combined projects (the proposal). This assessment forms part of the environmental impact statement (EIS) for each project. The location of the proposals in relation to MTW is shown in Figure 1.

Rio Tinto Coal Australia provides management services to all Coal & Allied operations including for Aboriginal cultural heritage management through the Heritage & Aboriginal Relations Section of the company's Health, Safety, Environment & Communities, Coal Australia department.

Coal & Allied has comprehensive policies and protocols in place to guide Aboriginal cultural heritage management across all of their operations. These policies are applied consistently across the integrated Mount Thorley Warkworth (MTW) operation in close consultation with the Aboriginal community who has interests in the region and with whom & Allied have well developed, formal and active relationships.

1.1 Warkworth Continuation 2014 Proposal

Warkworth Mine has approval to operate until 19 May 2021 under its development consent. The proposal seeks a 21 year development consent period from the date of any approval. If approval is granted in late 2014, operations at Warkworth Mine are forecast to continue to 2035, a 14 year extension over the current approval. The proposal seeks a continuation of all aspects of Warkworth Mine as it presently operates together with:

- an extension of the approved mining footprint by approximately 698ha to the west of current operations (referred to herein as the proposed 2014 extension area);
- the ability to transfer overburden to MTO to complete MTO's final landform;
- the closure of Wallaby Scrub Road;
- an option to develop an underpass beneath Putty Road for the third bridge crossing yet to be constructed (while retaining the current approval for an overpass);
- the continued use of secondary access gates to the mine site and offsets for activities such as drilling, offset management, equipment shutdown pad access amongst other things; and

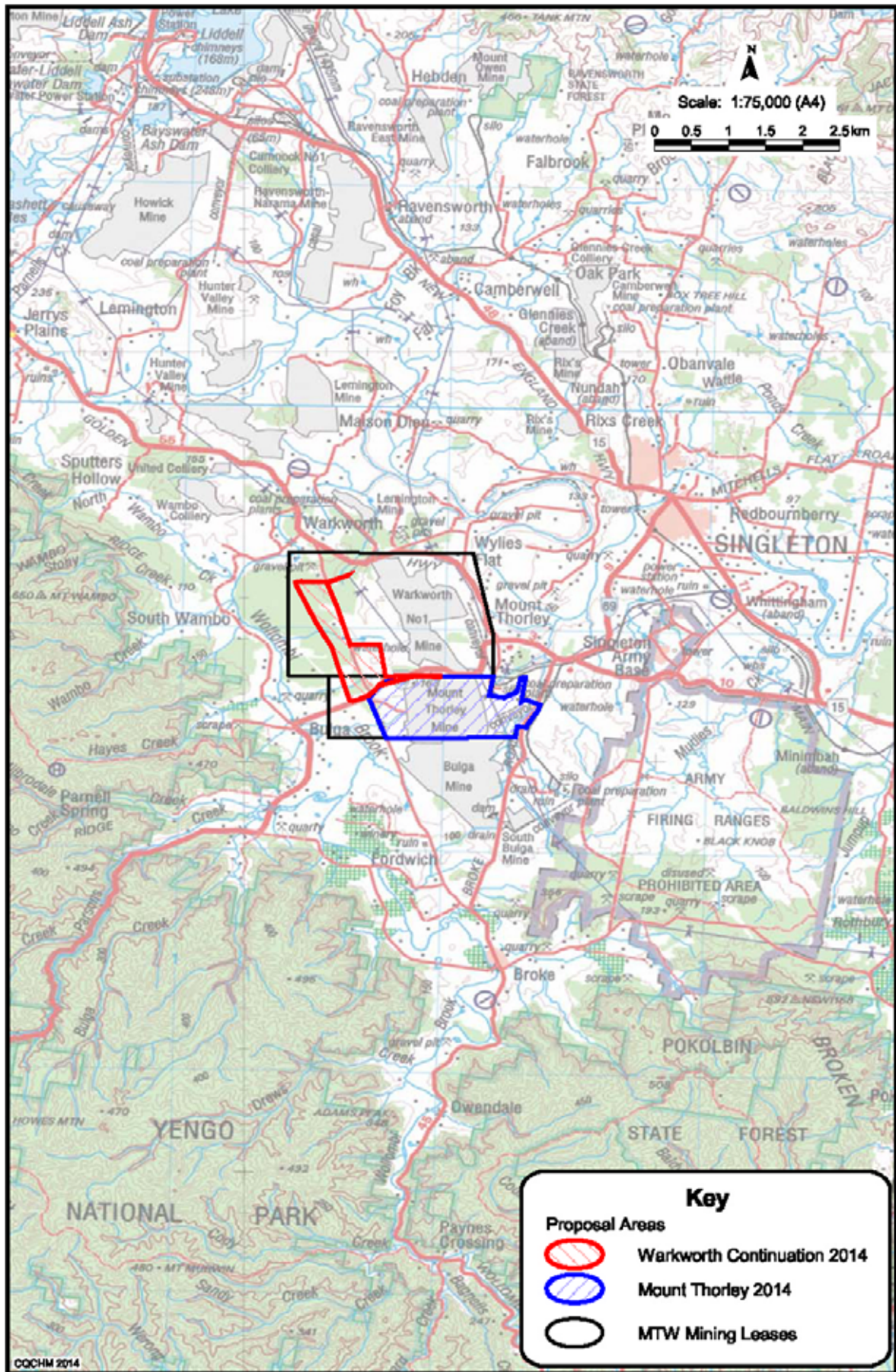


Figure 1: General location of the Warkworth Continuation 2014 and Mount Thorley Operations 2014 proposal areas.

- minor changes to the design of the Northern out-of-pit (NOOP) dam.

1.2 Mount Thorley Operations 2014 Proposal

MTO has approval to mine until 22 June 2017 under its development consent. The proposal seeks a 21 year development consent period from the date of any approval. If approval is granted in 2015, operations at MTO are forecast to continue to the end of 2035, an 18 year extension over the current approval. The proposal seeks a continuation of all aspects of MTO as it presently operates and extends or alters them, including:

- mining in Loders Pit and AGN Pit. Mining in Loders Pit is expected to be completed in approximately 2020. Mining in AGN Pit is yet to commence; however, it is anticipated to take approximately two years and be completed before 2022;
- transfer of overburden between MTO and Warkworth Mine to assist in rehabilitation and development of the final landform;
- maintain existing extraction rate of 10 million tonnes per year (Mtpa) of ROM coal;
- maintain and upgrade to the integrated MTW water management system (WMS), including:
 - upgrade to the approved discharge point and rate of discharge into Loders Creek from 100ML/d to 300ML/d via the Hunter River Salinity Trading Scheme (HRSTS);
 - ability to transfer and accept mine water from neighbouring operations (ie Bulga Coal Complex, Wambo Mine, Warkworth Mine and Hunter Valley Operations); and
 - increase in the storage capacity of the southern out-of-pit (SOOP) dam from 1.6 giga litres (GL) to 2.2GL;
- maintain and upgrade to the integrated MTW tailings management:
 - including use of the northern part of Loders Pit as a TSF after completion of mining; and
 - Wall lift to Centre Ramp Tailings Facility to approximately RL150;
- upgrade to the MTO CPP to facilitate an increase in maximum throughput to 18Mtpa with the ability to receive this coal from Warkworth Mine;
- acknowledge all approved interactions with Bulga Coal Complex; and
- continuation of coal transfer between Warkworth Mine and MTO and transportation of coal via the MTCL to Port of Newcastle.

All activities, including coal extraction will be within disturbance areas approved under the existing development consent.

1.3 The Report's Approach

Coal & Allied have completed comprehensive Aboriginal cultural heritage surveys and research covering the vast majority of the MTW mining leases and the adjoining Coal & Allied owned lands. These have been conducted over an extended period from 2002, but have been particularly intensive since 2008. This work forms part of Rio Tinto Coal Australia's strategy of minimising the impact of any of its operations on Aboriginal cultural heritage, and has been carried out in consultation with Aboriginal community members and with their active participation in the conduct of field assessments and management activities. The proposal, in particular the proposal to extend the Warkworth Mine which aims to extend mining operations to the west, have been discussed intensively with the Registered Aboriginal Parties (RAPs) primarily through the Upper Hunter Valley Aboriginal Cultural Heritage Working Group (CHWG; discussed further below).

While these discussions have tended to focus, at least in the case of the Warkworth Continuation 2014 proposal, on Aboriginal cultural heritage places which reside within the development area, they have also incorporated the future management of Aboriginal cultural heritage on adjoining Coal & Allied owned lands. Considerable progress has been made with respect to formalising these discussions. RAPs have expressed the desire to discuss cultural heritage impacts and management at the landscape level. This approach allows for consideration of the long-term management of a range of significant Aboriginal cultural heritage places and areas, such as the Bulga bora ground and its surrounds, and other places which have been identified as having a high cultural significance to them at a broader regional context.

While the key focus of this report is on the management of impacts on Aboriginal cultural heritage within the proposal areas, it also outlines Aboriginal cultural heritage management strategies and commitments as they relate more generally to other Coal & Allied owned lands including the proposed Wollombi Brook Aboriginal Cultural Heritage Conservation Area (WBACHCA) and Loder Creek Aboriginal Cultural Heritage Conservation Area (Loder Creek ACHCA), that reflect the informed views of the Aboriginal community.

In summary, this report provides:

- an outline of current management practices at MTW as they apply to Aboriginal cultural heritage;
- an outline of the research that has been conducted into Aboriginal cultural heritage in the proposal areas and adjoining Coal & Allied owned lands, including the participation of Aboriginal community members;

- an assessment of Aboriginal cultural heritage significance for the proposals, potential impacts and management proposals, including the views of the Aboriginal community; and
- commitments with respect to Aboriginal cultural heritage management for the proposals.

This Aboriginal cultural heritage assessment, including RAP consultation and the preparation of this report, have been undertaken in a manner consistent with government policy and guidelines. Principal among these has been the Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (ACHCRP 2010 – see Table 1 for assessment requirements), and Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW. Consistent with this Code, the proponent will complete an Aboriginal Site Impact Recording Form and submit it to the Aboriginal Heritage Information Management System (AHIMS) Registrar, for each AHIMS site that would be harmed through the development activities outlined in the proposals.

This report has been prepared in accordance with the Secretary's Requirements.

2. LEGISLATIVE AND REGULATORY FRAMEWORK FOR ABORIGINAL CULTURAL HERITAGE MANAGEMENT

This section of the report presents a brief discussion of the legal and regulatory framework in which Aboriginal cultural heritage is managed and protected in the context of both NSW and for the proposal.

2.1 Commonwealth Legislation

Commonwealth legislation has a potential role in Aboriginal cultural heritage protection in NSW but it is generally focused on particular places and situations as opposed to the comprehensive management and protective focus and the strong consultative element of the State legislation and policy.

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a framework to protect Matters of National Environment Significance. These include nationally significant flora, fauna, ecological communities and heritage places. The EPBC Act establishes both a National Heritage List and Commonwealth Heritage List of protected places. These lists may include Indigenous cultural heritage places or areas in which Indigenous people have interests.

The assessment and permitting processes of the EPBC Act are triggered when a proposed activity or development could potentially have an impact on one of the Matters of National Environment Significance as gazetted under the Act. With respect to the National and Commonwealth heritage lists, no such listed places reside within the proposal.

The Commonwealth *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (ATSIHP Act) is aimed at the protection from injury and desecration of areas and objects that are of significance to Indigenous Australians. This legislation has usually been invoked in emergency and conflicted situations, and has been used as such in the context of MTW around the Bulga bora ground (see Section 3.6 below for further details of this issue). It is generally acknowledged that the legislation has not been successful and is not in accord with contemporary practice. It is at odds with the relationships and protocols that have become the standard between government agencies, developers and representative Indigenous organisations for the protection of Indigenous cultural heritage.

The Commonwealth *Protection of Movable Cultural Heritage Act 1986* includes legislation that prevents objects of cultural heritage significance, such as those that are sacred to Indigenous peoples' heritage, from being exported out of Australia.

The EPBC Act and the *Protection of Movable Cultural Heritage Act 1986* have been reviewed and amended in recent times. The ATSIHP Act, likewise, has been under review for an extended period, stemming initially as a result of the 1995 Evatt inquiry. In August 2009 the Commonwealth released a Discussion Paper (Commonwealth Department of Environment, Water, Heritage and the Arts [DEWHA], 2009) on the ATSIHP Act setting out its perceived shortcomings and the need for reform and calling for submissions from the public. The Discussion Paper sets out proposals

“designed to clarify responsibilities for protecting Indigenous heritage, to set standards of best practice nation-wide, to remove duplication of state and territory decisions that meet the standards, and to improve processes for Australian Government decisions about protection when the standards are not met.” (DEWHA, 2009, p7).

This Act remains under review.

2.2 NSW Legislation

There are two principal elements to the legislative and regulatory framework for Aboriginal cultural heritage management as it may be affected by development activities in NSW. These are

- the NSW *Environmental Planning and Assessment Act 1979* (the EP&A Act); and
- the NSW *National Parks and Wildlife Act 1974* (the NPW Act).

The application and practical effects of these two pieces of legislation and their associated policies are discussed below.

In summary, the EP&A Act establishes the framework for assessment to determine the existence of Aboriginal cultural heritage in an area proposed for development activity and any impact upon it. The NPW Act establishes the framework for protection and management of Aboriginal cultural heritage areas and objects in any situation or tenure.

2.2.1 Environmental Planning and Assessment Act 1979

Development planning, assessment and consent within NSW are controlled under the EP&A Act and its associated regulations. The EP&A Act is administered by the Department of Planning & Environment (DP&E). Over the last ten years this has been subject to several reforms with the most recent repealing and replacing planning processes available to major development projects. In its present form, the following apply to the proposals:

- Part 4 which in general defines the assessment approach for all proposals which require consent under the EP&A Act; and

- within this, Division 4.1 describes the process applicable for proposals which have been declared State Significant developments.

When a development application is made for the Minister's approval for a project, the Secretary of DP&E prepares a set of requirements which set out environmental assessment requirements and key issues to be addressed. The Secretary's Requirements establish the framework for the environmental impact assessment of the project and the format in which an EIS is presented for consideration.

The Secretary's Requirements require the prospective development proponent to provide a comprehensive description of the existing environment and current operations, the nature and impacts of the proposed development and impact mitigation and management proposals with respect to a number of key issues. Aboriginal cultural heritage is included in this list of key issues for examination. The Secretary's Requirements also require consultation with affected parties and stakeholders. For the key issue of Aboriginal cultural heritage, consultation is required to be conducted with relevant Aboriginal communities and organisations and with the NSW Office of Environment and Heritage (OEH) which has a key role in its carriage of the NPW Act.

DP&E maintains a Register of Development Assessment Guidelines for the use of councils, developers, consultants and the general public for the purposes of development assessment at its website at <http://www.planning.nsw.gov.au>. With respect Aboriginal heritage, the Register includes two Guidelines:

- OEH's Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 prepared by the Department of Environment, Climate Change and Water (DECCW – the precursor to the present OEH); and
- A New Biodiversity Strategy for NSW: Discussion Paper prepared jointly between DECCW and the NSW Department of Primary Industries.

In addition, OEH has also published a Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW.

These policy documents have been taken into account in framing the approach to consultation with the Aboriginal community on the management of Aboriginal cultural heritage potentially affected by the proposals.

2.2.2 *National Parks and Wildlife Act 1974*

The NPW Act is the primary legislation concerned with the protection of Aboriginal cultural heritage in NSW. The Act is administered by OEH and provides protection for all Aboriginal objects (broadly defined) and for declared Aboriginal places. Aboriginal Heritage Impact Permits (AHIPs) are generally required for impacts to Aboriginal objects and places in NSW. AHIPs may be issued under Section 87 and/or Section 90 of Part 6 of the NPW Act following application by proponents for developments that will have the effect of disturbing or destroying Aboriginal objects or declared areas.

A permit under s.87 of the Act is required to disturb, move and or take possession of an Aboriginal object or disturb land for the purpose of discovering an Aboriginal object. A consent under s.90 of the Act is required to destroy, damage or deface an Aboriginal object or Aboriginal place. OEH is the decision maker for the purpose of determining the issue of AHIPs.

OEH provides expert advice to DP&E on major projects that are being assessed under the EP&A Act. It should be noted however, that the requirement for an AHIP is suspended for proposals assessed under Part 4, Division 4.1 of the EP&A Act (s.89J) and is generally superseded by a condition of the Part 4 project approval requiring the preparation of a Heritage Management Plan (HMP). Consistent with their respective consent conditions, Archaeology and Cultural Heritage Management Plans (A&CHMPs) have been prepared and approved which cover both the existing Warkworth and MTO development consent areas within the greater MTW mining area (Coal & Allied 2004a & 2004b). These current A&CHMPs, however, have been prepared under Part 6 of the NPW Act and AHIPs are required for sites that are to be impacted by the project and managed under this plan.

The consent conditions for both the disapproved Warkworth Extension Project (PA 09_0202) and the approved MTO consent (DA 34/95 as modified May 2012) also provided for the preparation of HMPs. In these cases a new single HMP which covered the entirety of the MTW mining leases and other Coal & Allied owned lands (and which specifically include the proposal areas) was drafted and circulated for discussion among the CHWG. Attached to this, a separate management plan is also well advanced for the WBACHCA. These are discussed in further detail elsewhere in the report.

OEH's policy approach places strong emphasis on the involvement of the Aboriginal community in all Aboriginal cultural heritage assessment and management decision-making processes associated with development projects. Key policy requirements include informing RAPs about the nature of a project and fully involving them in the assessment of both tangible and intangible Aboriginal cultural heritage, the determination of its significance, proposals for the management of project impacts upon the material and the process of reporting on cultural heritage for the purposes of Part 6 the Act.

This policy approach has formed the basis of Coal & Allied's approach to consultation with the Aboriginal community on the management of cultural heritage potentially affected by the proposals.

3. RIO TINTO COAL AUSTRALIA'S APPROACH TO ABORIGINAL CULTURAL HERITAGE MANAGEMENT

Rio Tinto Coal Australia has developed and implemented a suite of policies, protocols and processes in the areas of community engagement, heritage management, relationships with Aboriginal communities, and ground disturbing operations that have direct relevance to their approach to Aboriginal cultural heritage management.

3.1 The Rio Tinto Coal Australia Cultural Heritage Management System

Rio Tinto Coal Australia has implemented a series of comprehensive cultural heritage management policies and protocols. These are regularly updated and have the status of work standards at all Coal & Allied's projects and operations. These policies and protocols include:

- Rio Tinto Communities Policy and Standard;
- Rio Tinto Cultural Heritage Management Standard for Australian Businesses;
- Rio Tinto Cultural Heritage Management System Guidelines;
- Rio Tinto Cultural Heritage Management System Auditing Protocols;
- Rio Tinto Coal Australia Cultural Heritage Management Policy;
- Rio Tinto Coal Australia Cultural Heritage Management System Manual and Work Procedures; and
- Rio Tinto Coal Australia Ground Disturbance Permit Procedures.

Collectively these comprise Rio Tinto Coal Australia's Cultural Heritage Management System (CHMS) which provides a comprehensive set of processes and procedures for the efficient management of cultural heritage that apply across all of Rio Tinto Coal Australia's development activities and land tenures including MTW and the adjoining Coal & Allied owned lands.

The overarching objective of CHMS is to efficiently manage and mitigate the risks associated with development impacts on cultural heritage in order to provide operations and projects timely and authorised access to land for mining and associated development activities. The CHMS policy states that:

RTCA will manage its projects and operations to comply with the RTCA Cultural Heritage Management System based upon the guiding principle of causing zero harm to Aboriginal cultural heritage. Where development requirements necessitate impacts on cultural heritage RTCA will ensure that all necessary and reasonable measures are implemented in order to mitigate those impacts in compliance with statutory requirements, cultural heritage agreements, Rio Tinto policies and standards, and in consultation with our host communities.

The CHMS has been developed to ensure that all activities and ground disturbances associated with the company's development activities and operations comply not only with Rio Tinto Coal Australia policies, but are also consistent with State and Commonwealth legislation, and other statutory regulations governing the management of Aboriginal cultural heritage.

3.2 Current Aboriginal Cultural Heritage Management at MTW

Rio Tinto Coal Australia employ heritage professionals on staff to provide cultural heritage management services to Warkworth Mine. These services include:

- active participation in regular meetings with the Coal & Allied CHWG to discuss routine management activities and proposals for new research at Warkworth Mine;
- making arrangements with the CHWG for engagement of Aboriginal community members in cultural heritage research, salvage and monitoring / audit activities;
- advising senior site management on the protection and management of Aboriginal cultural heritage.

Separate A&CHMPs were prepared in accordance with the conditions of the development consents for Warkworth Mine (Condition 41; DA-300-9-2002-i as modified January 2014) and MTO (Condition 25; DA 34/95 as modified September 2002). Each plan was approved by the relevant statutory agencies. These management plans set out the protocols for managing Aboriginal cultural heritage affected by mining operations and key issues of concern to the Aboriginal community.

The Warkworth Mining Limited A&CHMP (Coal & Allied 2004a) is currently in operation and its principles and processes have been applied to cover all Aboriginal cultural heritage within the Warkworth mining lease and adjoining Coal & Allied owned lands. Aboriginal cultural heritage outside of the present development consent boundaries, including the proposal area, are also subject to interim protective management measures developed in consultation with the CHWG and in accordance with the Rio Tinto Coal Australia CHMS.

The MTO A&CHMP (Coal & Allied 2004b) is also currently in operation and its principles and processes have been applied to cover all Aboriginal cultural heritage within the MTO mining lease. Aboriginal cultural heritage outside of the present MTO development consent boundaries are, again, also subject to interim protective management measures developed in consultation with the CHWG and in accordance with the Rio Tinto Coal Australia CHMS.

For context, it should be noted that the Warkworth Extension Project approval (PA 09_0202), required the preparation of a Heritage Management Plan (HMP 2012) to replace the 2004 A&CHMP.

Likewise, Condition 34 of the consent conditions for the modification to the MTO consent (DA 34/95 as modified 2012) also required an HMP. A draft HMP to address condition 34 of DA 34/95 as modified 2012 is being developed in consultation with the CHWG, OEH and DP&E for submission to DP&E by 31st July 2014.

In the case of the Warkworth Extension Project (PA 09_0202) the production of the HMP 2012 was interrelated with a number of other consent conditions for the project (most notably the establishment and settlement of a separate management plan for an Aboriginal cultural heritage conservation area – the WBACHCA). In the context of the timeframe outlined within the consent conditions for the production of the HMP 2012 and the requirements of mining continuation, DP&E agreed that a staged approach to the development of this plan would be appropriate. A Stage 1 Warkworth Mine HMP was developed, submitted and approved by DP&E in July 2012.

Since the issue of the development consent in 2003 for the expanded operations at Warkworth Mine, six detailed Aboriginal cultural heritage field surveys, seven cultural heritage salvage programs, and two comprehensive investigations, which have included multi-disciplinary archaeological and geomorphological investigations (including excavations), into areas of the Warkworth Sands land system have also been conducted.

In the case of the Warkworth Continuation 2014 proposal area, this can generally be separated into portions as they relate to Wallaby Scrub Road. The portion of the Warkworth Continuation 2014 proposal area east of Wallaby Scrub Road, generally restricted to the south and adjoining the MTO mining lease, was originally subject to previous Aboriginal cultural heritage assessment in 2002 (AMBS 2002; which included reassessment of several earlier studies) as part of the 2003 Warkworth Extension Project EIS (DA-300-9-2002-i). The results of this were again reassessed as part of the previously approved 2010 Warkworth Extension Project (PA 09_0202) Environmental Assessment (EA) (Coal & Allied 2010; Volume 3, Annex F). The remaining undeveloped areas of this portion to the east of Wallaby Scrub Road were included in comprehensive investigations and assessments undertaken as part of Warkworth Modification 6 (Coal & Allied 2013) and as part of this present Warkworth Continuation 2014 proposal and the MTW South West Stage 2 study (Scarp Archaeology 2009a).

Those portions of the Warkworth Continuation 2014 proposal area west of Wallaby Scrub Road were the subject of systematic and comprehensive cultural heritage investigations and assessment in 2008 and 2009 as part of the MTW West Stage 1 (AECOM 2009) and MTW South West Stage 2 studies (Scarp Archaeology 2009a). The results of these were incorporated into the previously approved 2010 Warkworth Extension Project EA (PA 09_0202; Coal & Allied 2010; Volume 3, Annex F). In

addition to the Warkworth Continuation 2014 area, the AECOM and Scarp Archaeology studies (2009 and 2009a respectively) included the investigation and assessment of all Coal & Allied owned lands to the north and west of this, a large proportion of which is to be conserved within the WBACHCA.

The Mount Thorley Operations 2014 proposal area was the subject of a number of Aboriginal investigations and salvage programs undertaken between the mid 1980s and the early 2000s. The current MTO development consent area (which also includes the Mount Thorley Operations 2014 proposal area) was also reassessed as part of the subsequently disapproved 2010 Warkworth Extension Project (PA 09_0202; Coal & Allied 2010; Volume 3, Annex F), and subsequently reviewed as part of the Ramp 22 Sedimentation Dam study undertaken in 2013 (RPS 2013).

The remaining portions of the MTO mining lease outside the current development consent area, along with adjacent Coal & Allied owned lands, were also the subject of two systematic and comprehensive Aboriginal cultural heritage investigations and assessments undertaken in 2009 and 2010. Principle among these was the MTW South West Stage 2 studies (Scarp Archaeology 2009a), with this being supplemented by the MTW South West Finalisation and Bulga Farm study (Scarp Archaeology 2011) which completed the assessment of the southern portions of Coal & Allied owned lands surrounding Wollombi Brook. As outlined above, a large proportion of the lands included within these assessments are to be conserved within the WBACHCA.

In all cases, these Aboriginal cultural heritage programs were undertaken in consultation with and the active participation of, Aboriginal community members, and from 2005, under the auspices of the CHWG. Their purpose was several: to meet Rio Tinto Coal Australia's CHMS; to address development consent conditions; and to develop an understanding of Aboriginal cultural heritage issues in areas adjoining consent areas. The results and implications of these studies are discussed in detail in Section 5 of this report.

All Aboriginal cultural heritage areas and objects identified during the conduct of Aboriginal cultural heritage investigations have been, and continue to be, managed under either;

- the A&CHMPs approved under their respective development consents; and/or
- in the case of Aboriginal cultural heritage located outside of the operational areas of these A&CHMPs, interim protective management measures developed in consultation with the CHWG in accordance with the Rio Tinto Coal Australia CHMS.

Under these management arrangements, the condition of sites and management actions implemented are regularly monitored / audited and discussed among the CHWG.

As part of the now disapproved Warkworth Extension Project (PA 09_0202) and the 2012 modification to the existing MTO consent (DA 34/95), Rio Tinto Coal Australia staff consulted in detail with the CHWG on the outcomes of the 2008 & 2009 cultural heritage surveys and the implications of the proposed development applications (particularly the Warkworth Extension Project). The objectives of these consultations and the Aboriginal cultural heritage survey studies that have been conducted were to:

- identify issues for the development of management measures that could be incorporated into the new and comprehensive HMP that would apply to the MTW mining area and adjoining Coal & Allied owned lands (which as noted above was drafted and consulted upon); and
- provide the establishment of a specific Aboriginal cultural heritage conservation area (i.e. WBACHCA) in addition to the management of Aboriginal cultural heritage on other Coal & Allied owned lands.

The future proposed Aboriginal cultural heritage impact management commitments, discussed at length elsewhere in this report, will be an extension of these existing arrangements and processes.

3.3 Aboriginal Consultation in the Upper Hunter Valley

Rio Tinto Coal Australia and Coal & Allied personnel and contractors have legal obligations under the NPW Act not to harm or disturb Aboriginal areas and objects. Coal & Allied is committed to direct, ongoing, meaningful and transparent engagement with the Aboriginal community as the basis for developing and implementing successful management of Aboriginal cultural heritage issues for all projects and operations.

Aboriginal community members who have interests in areas and projects owned, leased and/or operated by Coal & Allied, including the proposal areas, are provided with the opportunity to be fully involved in the identification, significance assessment, mitigation and ongoing management of their cultural heritage on lands associated with Coal & Allied operations.

Coal & Allied established the CHWG in September 2005 so that Coal & Allied and the Aboriginal community could work together to develop and implement an integrated cultural heritage consultation and management process for Coal & Allied's operations in the Upper Hunter Valley. This working group is comprised of Coal & Allied representatives, and representatives from Upper Hunter Valley Aboriginal community groups, corporations and other individuals as RAPs. This approach is centred upon a direct and ongoing engagement between Coal & Allied personnel and the Upper Hunter Valley Aboriginal community and other RAPs. In this, Coal & Allied's objectives have been to develop a robust relationship with the Upper Hunter Valley Aboriginal community and other RAPs and to

cooperatively develop Aboriginal cultural heritage management programs that the Aboriginal community are encouraged to jointly design, implement and manage with Coal & Allied.

The CHWG provides a regular forum for discussions related to, and oversees, all matters pertaining to cultural heritage associated with Coal & Allied owned and operated lands, projects and operations in the Upper Hunter Valley. The CHWG regularly reviews the progress and outcomes of Rio Tinto Coal Australia's cultural heritage processes and management programs in the Upper Hunter Valley, revising and refining elements of the process by consensus. The CHWG is recognised by both DP&E and OEH as an appropriate consultative forum. It currently consists of eighty two (82) RAPs, and includes the Wanaruah Local Aboriginal Land Council. The procedures adopted in running the CHWG conform to published OEH consultation requirements by way of establishment, composition, and timeframes for consultation.

3.4 Consultation with the Aboriginal Community regarding the Proposals

An exhaustive Aboriginal community consultation process was undertaken as part of the Warkworth Extension Project (Coal & Allied 2010; Volume 3, Annex F). Community consultation was also undertaken as part of the 2012 Modification to the existing MTO consent. The proposal areas fall entirely within the boundaries of those previous consented areas. As previously outlined, considerable Aboriginal community consultation had also been undertaken as part of the fulfilment of the consent conditions of the now disapproved consent for the Warkworth Extension Project (PA 09_0202). Further community consultation was also undertaken more recently as part of the Warkworth Modification 6, approved in January 2014, and subsequent approval of an AHIP for this area by OEH in February 2014.

Throughout this time, Aboriginal community consultation has occurred primarily under the auspices of the CHWG undertaken in a manner consistent with consultation requirements published by relevant regulatory agencies from time to time. Prior to April 2010, CHWG consultation pertaining to all Coal & Allied development proposals (most relevantly those conducted for the Warkworth Extension Project) was held in accordance with DECCW (now OEH) *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation Guidelines (July 2005)*. Subsequent to April 2010 CHWG consultation has been held in accordance with the OEH ACHCRP 2010. This included Aboriginal community consultation undertaken as part of the 2012 MTO (DA 34/95) modification and the recent Warkworth Modification 6 approval.

All CHWG meetings are advertised in the local Upper Hunter Valley press. Additionally, all persons and corporations already on the CHWG Aboriginal community register as RAPs at the time of each meeting were also advised by letter of all meetings. In effect, once an individual or organisation has

the status of RAP for consultation with Coal & Allied they retain their status as such in the CHWG register unless they subsequently advise Coal & Allied that they wish to withdraw as a RAP for any or all Coal & Allied operational and project areas. Although structured, CHWG meetings are conducted in a format and style that is largely controlled by the Aboriginal community members present. Supported by an agenda, the order of business may be altered on the basis of community concerns and priorities but always covers the primary purposes for which the meeting has been convened. The CHWG structure provides freedom for Aboriginal community representatives to request time within meetings to hold private discussions.

Project documentation presented and discussed at CHWG meetings is made available to all attendees and follow-up mail outs are provided to those RAPs who were unable to attend these meetings. Notification for all consultation, its conduct, and the provision of associated documentation (both prior to and following) has been, and remains, consistent with timeframes required under the relevant consultation guideline.

Aboriginal community consultation meetings conducted under the auspices of the CHWG with regard to the Warkworth Extension Project (PA 09_0202) and subsequent matters covered by consent conditions prior to that consent being disapproved, such as the heritage management plans for the project, were held on:

- 14 August 2008;
- 02 October 2008;
- 27 November 2008;
- 19 March 2009;
- 21 May 2009;
- 27 August 2009;
- 21 September 2009;
- 1 October 2009;
- 22 October 2009;
- 09 December 2009;
- 12 February 2010;
- 22 April 2010;
- 08 July 2010;
- 30 September 2010;
- 25 November 2010;
- 10 February 2011;

- 24 March 2011;
- 12 May 2011;
- 08 September 2011;
- 15 December 2011;
- 8 March 2012;
- 17 May 2012;
- 16 August 2012;
- 04 October 2012;
- 06 December 2012;
- 7 March 2013; and
- 22 August 2013.

At a number of these meetings, underlined above, community consultation specific to the MTO (DA 34/95) modifications was also undertaken.

Despite the proposals falling entirely within areas the subject of the Warkworth Extension Project, Coal & Allied has conducted consultation specific to the Aboriginal cultural heritage impact assessment for both the Warkworth Continuation 2014 and Mount Thorley Operations 2014 proposals at meetings of the CHWG held on 3 April and 7 May 2014. DP&E and OEHL require proponents preparing an Aboriginal cultural heritage impact assessment for an EIS to undertake consultation with the Aboriginal community in conformance with the OEHL 2010 ACHCRP. The ACHCRP process was specifically developed for Aboriginal community consultation for development activities that require assessment and/or AHIP approvals under Part 6 of the NPW Act. The Warkworth Continuation 2014 and MTO 2014 development applications will seek approval for the proposals as State Significant Developments under Part 4, Division 4.1 of the EP&A Act. Such approvals will enact the provision of Section 89J(d) of the EP&A Act which exempts such developments from the requirement for an AHIP consent under Section 90 of the NPW Act. For the purposes of Aboriginal community consultation for the Aboriginal cultural heritage impact assessment for the proposals, Coal & Allied have aligned the respective EIS consultation process with the ACHCRP process to the extent that it is applicable, with the impact assessment requirements and timeframes of the EIS process.

This has been undertaken in a manner entirely consistent with that already conducted and as outlined above and in alignment with the OEHL ACHCRP process. Table 1 provides an overview of the consultation process which has been undertaken.

Step	Aboriginal Cultural Heritage Consultation Requirements for Proponents (ACHCRP) 2010	Warkworth Continuation 2014 EIS and Mount Thorley Operations 2014 EIS Aboriginal Cultural Heritage Impact Assessment Consultation Approach
4.1: Notification of project proposal and registration of interest	<p>Proponents are responsible for ascertaining the names of Aboriginal people who may hold cultural knowledge relevant to determining the significance of Aboriginal objects and/or places.</p> <p>The proponent must</p> <ol style="list-style-type: none"> a) write to reasonable sources requesting this information b) Write to the Aboriginal people and local lands council and notify them of the proposed project and invite them to register for consultation c) Advertise a notice in the paper containing project information d) Compile a list of registered parties and forward information to OEI and the LALC 	<ul style="list-style-type: none"> • a) Coal & Allied's list of RAPs for the Mount Thorley Warkworth Operations area was updated in January 2014 based on RAP consultation for an AHIP application and supporting Aboriginal Cultural Heritage Assessment Report (ACHAR) for the Mount Thorley/Bulga Surface Operations Ramp 22 Sedimentation Dam Project and also for the Warkworth Mine DA -300-9-2002-i Modification 6 AHIP (C0000201). The list is based upon names of RAPs then already registered with Coal & Allied through the CHWG, list of RAPs provided by OEI, and others provided in response to letters of request sent to the various entities listed in 4.1.2 of the ACHCRP. • b) Letter was sent to all Coal & Allied RAPs (currently 82) on 19 March 2014 notifying them of the proposals and inviting them to a CHWG consultation meeting to review the proposal to be held on 3 April 2014 (15 days notice). • c) Separate public notices inviting Aboriginal knowledge holders to register as Aboriginal parties for consultation for both the Warkworth Continuation 2014 and Mount Thorley Operations 2014 proposals were published in the Singleton Argus and the Muswellbrook Chronicle on 21 March 2014. These notices also invited those who wished to register as an Aboriginal Party to attend a meeting of the Coal & Allied CHWG held on 3 April. • d) A list of RAPs engaged for the Warkworth Continuation 2014 and Mount Thorley Operations 2014 proposals EIS' Aboriginal cultural heritage impact assessment consultation is provided in Appendix 1 of this report.
4.2: Presentation of information about the proposed project	Proponents are to provide Aboriginal parties with information about the scope of the project	<ul style="list-style-type: none"> • A copy of the Warkworth Continuation 2014 proposal information factsheet (March 2014), which includes details on the Mount Thorley Operations 2014 proposal, was provided with a letter sent to all Coal & Allied RAPs (currently 82) on 19 March 2014 notifying them of the Warkworth Continuation 2014 and Mount Thorley Operations 2014 proposals and inviting them to a CHWG consultation meeting to review the proposals on 3 April. • Detailed information on the scope of the proposals was presented to the RAPs who attended the CHWG consultation meeting held on 3 April 2014. The presentation also included a briefing on the previous and ongoing consultation with respect to the assessment and management of Aboriginal cultural heritage associated with the proposal area which commenced in 2008 with the EIS for Warkworth Extension Project 2010. • Discussions focused on the proposed development area and impacts and management of

		<p>Aboriginal cultural heritage based upon information from previous assessment surveys conducted between 2008 and February 2014. These discussions also involved a review of the proposed Wollombi Brook and Loder Creek Aboriginal Cultural Heritage Conservation Areas which have been nominated by Coal & Allied as Aboriginal Cultural Heritage protection areas for the proposed development disturbance footprints of the Warkworth Continuation 2014 and Mount Thorley Operations 2014 proposals respectively.</p> <ul style="list-style-type: none"> • Copies of the CHWG presentation, with a statement outlining preliminary impact assessment and proposed management measures, along with other relevant information and maps for the proposals were subsequently mailed out to all RAPs on 7 of April, including those who attended and those who were unable to attend the CHWG consultation meeting held on 3 of April, seeking their comments and feedback on the proposals preliminary impact assessment and proposed management measures.
<p>4.3: Gathering information about cultural significance</p>	<p>Proponents are to facilitate a process whereby registered Aboriginal parties can contribute to information gathering and research, provide information on the significance of objects, have input into the development of any cultural heritage management options</p>	<ul style="list-style-type: none"> • In gathering information about Aboriginal cultural significance of objects and places to inform the preparation of a single Aboriginal cultural heritage impact assessment report for the proposals EIS', Coal & Allied provided information to the RAPs drawn from various Aboriginal cultural heritage assessments that have been conducted over the entirety of the proposal areas and all adjacent Coal & Allied owned lands. These assessments, conducted between 2008 and February 2014, were conducted with the participation of the RAPs through the auspices of the CHWG. • Discussions focusing on the proposals areas and impacts, and management of Aboriginal cultural heritage were conducted at a CHWG meeting held on 3 April. Information on the preliminary impact assessment and proposed management measures were provided for the RAPs to consider in the context of the cultural significance of the objects and places that would be impacted by the development and those that would be managed for their conservation. • Following on from the CHWG meeting of 3 April, Coal & Allied wrote to the RAPs on 7 April to provide them with a preliminary statement on the impact assessment and proposed management measures for their consideration and feedback and to request that they provide feedback on cultural significance objects and places associated with the proposals. The letter also included an invitation for RAPs to attend another CHWG meeting held on 7 May (giving 30 days notice) to review their feedback and discuss management options for Aboriginal cultural heritage. Where RAPs were unable to attend a CHWG meeting they were requested to provide their feedback in writing or to call and submit comments by phone.

		<ul style="list-style-type: none"> • Following the initial CHWG consultation meeting held on 3 April, and prior to the CHWG meeting held on 7 May, Coal & Allied arranged for CHWG RAPs to visit the proposal areas on 29 April to inspect these lands and a range of Aboriginal cultural heritage places which would be impacted by the respective developments, and also to view areas within the proposed Wollombi Brook and Loder Creek Aboriginal Cultural Heritage Conservation Areas. • Feedback gathered from the RAPs at the CHWG meetings on 3 April and 7 May, during the proposal areas inspection conducted on 29 April, and from correspondence received, has been collated and considered to inform the drafting of a single Aboriginal cultural heritage impact assessment report for the proposals EIS’.
4.4: Review of draft cultural heritage assessment report	The proponent must prepare an Aboriginal cultural heritage assessment report with input from registered Aboriginal parties	<ul style="list-style-type: none"> • On 7 April Coal & Allied wrote to all RAPs for the proposals to invite them to a CHWG consultation meeting held on 7 May (giving 30 days notice) to review their feedback on the proposal, gather information about the cultural significance of objects and places associated with the proposal areas, and to discuss their feedback on the preliminary statement on impact assessment and proposed management measures (provide to the RAPs in the mail out of 7 April), to be incorporated into the Aboriginal cultural heritage impact assessment report for the proposals EIS’. This meeting was also advertised by public notices published in local Hunter Valley press during the week 7-11 April. • A final draft Aboriginal cultural heritage impact assessment report was prepared on the basis of information gathered from the RAPs, the results of comprehensive Aboriginal cultural heritage assessment surveys conducted between 2008 and February 2014, outcomes and commitments arising from ongoing consultation with the CHWG and the CHWG meetings of 3 April and 7 May, and the proposal area inspections conducted on 29 April. • During the week commencing 19 May Coal & Allied again wrote to all RAPs for the proposals to provide them with a copy of the final draft Aboriginal cultural heritage impact assessment report that was submitted with the proposals EIS’. • Furthermore, additional comments and feedback received from RAPs after this time, and from written public submissions received during the EIS public exhibition period, will be reviewed, considered and addressed through the Response to Submissions process following the EIS public exhibition period and prior to the submission of the final EIS documentation to DP&E.

Table 1: The proposals EIS’ Aboriginal cultural heritage impact assessment community consultation process, with reference to the 2010 OEH *Aboriginal Cultural Heritage Consultation Requirements for Proponents*.

As a result of the CHWG consultation meetings held on 3 April and 7 May 2014, and the site visit conducted on 29 April 2014, the following specific matters regarding the proposals were addressed and resolved by the RAPs:

- support for the implementation of the Hunter Valley Sands Bodies Research Study;
- the cultural importance of the remaining undeveloped areas around Loder Creek and the desirability of it being included within an ACHCA was confirmed;
- a desire was expressed to continue the work that has been undertaken by the CHWG with respect to refining the area deemed to constitute the indicative boundary of the Bulga bora ground and associated features;
- consideration be given to options for the relocation and reuse of existing residential structures located within the Warkworth Continuation 2014 proposal area by the Aboriginal community;
- that salvage mitigation programs required to be undertaken within the Warkworth Continuation 2014 proposal area should be staged on an annual basis and in line with the Warkworth Mine Annual Operating Plan;
- information from Aboriginal cultural heritage places the subject of salvage mitigation programs is to be collected with a view to informing potential research programs of importance to the CHWG;
- a desire was expressed to incorporate the pre-mining landscape topography into post-mining final landform design for the proposal areas;
- a desire was expressed to establish an access corridor along Wollombi Brook to provide connectivity between the southern end of the WBACHCA and the Aboriginal cultural heritage conservation area established for the adjacent Bulga Coal Complex mining operation; and
- continue investigating possibilities and options available for the acquisition of lands within which the highly culturally significant Baiame Cave is located.

These matters have been further considered and addressed within the impact mitigation commitments outlined in Section 8 below.

In summary, while the RAPs have expressed a view that, as a general principle, they would prefer that no additional disturbance to Aboriginal cultural heritage occur, the views expressed at meetings demonstrate that the proposed management measures described in this document, are acceptable to CHWG participants for managing Aboriginal cultural heritage impacts associated with the proposals. Additionally, Coal & Allied is not in receipt of any material from either a RAP or other CHWG stakeholder advising that they do not hold such a view. Further, there has been no specific opposition expressed with regard the impact management commitments outlined herein.

Finally, the CHWG continues to support the establishment of the WBACHCA, to which Coal & Allied also remains committed. Additionally to address the RAPs' request to protect the remnant riparian areas and Aboriginal cultural heritage places along the section of Loder Creek located within Mount Thorley Operations 2014 proposal area, Coal & Allied proposes to establish the Loder Creek Aboriginal Cultural Heritage Conservation Area (Loder Creek ACHCA).

It is noted, however, that in correspondence received (25 March) from Mr Scott Franks, registering interest as a RAP for the Warkworth Continuation 2014 proposal on behalf of the Plains Clans of the Wonnarua People native title claimant group, advised that the group would not participate in the CHWG RAP consultation process because they 'do not support or allow other people making comment or decisions on or for our country (sic) we also advise that we will not attend a meeting with other Aboriginal people that are not a part of our Registered Native Title Claim Group...' Furthermore, in correspondence received on 6 May Mr Franks, writing on behalf of the Plains Clans of the Wonnarua People, advised that they 'do not support the modified approval of this operation...'

Further details of this consultation, associated meetings and their outcomes are provided in Appendix 1.

3.5 Future Directions for Aboriginal Cultural Heritage Management for Coal & Allied's Upper Hunter Valley Projects and Operations

The proposals and the progress already made with respect to the development of both a consolidated HMP for the MTW mining area (including the adjoining Coal & Allied owned lands), and to the management planning with respect to the WBACHCA remains, in Coal & Allied's view, an opportunity for all stakeholders - the Aboriginal community, Coal & Allied and government agencies - to reconsider the approach to Aboriginal cultural heritage management at its operations in the Upper Hunter Valley.

The issue is brought into particular focus by the proximity of the Warkworth Continuation 2014 proposal to the Bulga bora ground and associated cultural heritage places on the western fringe of the Warkworth mining lease. The Bulga bora ground and the potential impact of coal mining operations on it has been a fraught issue in the past (see Section 3.6 below for a more detailed examination of this issue). There is no doubt that the Aboriginal community of the Upper Hunter Valley attribute to it the greatest of cultural significance. Its historic validity and cultural provenance are well established, and the need for its long-term protection is recognised and supported by the CHWG, Coal & Allied and State Government agencies.

A reconsideration of the current generally accepted industry and regulatory approach to aspects of Aboriginal cultural heritage management would deliver secure management of important sites such as this as well as a balance of outcomes that deliver intergenerational equity and enhance the cultural and social strength and cohesion of the Aboriginal community in the Upper Hunter Valley.

3.5.1 Issues in the Current Approach to Aboriginal Cultural Heritage Management

Rio Tinto Coal Australia and its associated companies remain committed to their present leading practice standards and policies of engagement and consultation with the Aboriginal community and Aboriginal cultural heritage management in the Upper Hunter Valley. Rio Tinto Coal Australia accepts as a threshold principle that it is for the relevant Aboriginal people to define the cultural meaning and significance of material and places that are affected by mining operations and that those Aboriginal people must have the key role in establishing cultural heritage management regimes that are put in place to meet regulatory requirements and other obligations. Rio Tinto Coal Australia is proud of the robust and maturing relationship that has been established with the Aboriginal community in the Upper Hunter Valley.

Nevertheless, some shortcomings in the current standard mitigation management approach as mandated by the state government regulators can be identified:

- there remains an emphasis on the identification, collection and curation of stone artefacts as the centrepiece of cultural heritage management activities. There is no doubt that Aboriginal people regard artefacts as culturally significant and tangible evidence of their connection to their country and their ancestors;
- while this approach provides an avenue of cultural engagement for Aboriginal people and involves economically important employment opportunities, it does little to address the importance of critical and well-known regional cultural heritage places (which may not lie directly within proposed development areas) to Aboriginal people, or to assist in the development of a sense of empowerment over the management of such important cultural places;
- it also does not address the potential for community benefits and intergenerational equity that might arise from active engagement in the long term management of cultural places;
- the focus on material culture can also divert attention from the fact that Aboriginal people themselves are the repositories of historical and cultural information that is important to the community and is under threat as older members of the community age and pass on; and
- there is a lack of certainty both for Aboriginal people and Coal & Allied as the revision of mine plans brings potential impacts to Aboriginal cultural heritage places and areas into focus over time. Cultural heritage places that are regarded as protected from disturbance via

various planning provisions, for example, may lose this status as mining plans are revised to reflect new economic circumstances. While absolute and permanent certainty in land use requirements is an elusive concept, a more regional approach to cultural heritage management and planning with a focus on long term management of critical areas or Aboriginal cultural heritage could bring greater certainty to all parties and deliver better outcomes to the Aboriginal community than those outcomes currently secured through a somewhat piecemeal and incremental approach.

3.5.2 *Limits of Acceptable Change*

Rather than dealing with the management of a particular development proposal's impacts on Aboriginal cultural heritage as a unidimensional and localised issue, it can be more useful to approach it from the standpoint of the limits of acceptable change. Aboriginal people will often accept changes that have an impact on their cultural heritage once they have set that impact within a broader context relating to the socio-cultural wellbeing of their community and can see a wider range of benefits that may accrue. A cultural heritage situation that appears intractable when viewed in isolation can be ameliorated when set within a larger, more holistic model of sustainable community engagement, management and empowerment. Such a model involves the development of well-designed and effectively implemented cultural heritage management arrangements that place control for determining significance and management strategies with Aboriginal people. They include other complementary elements such as:

- the opportunity to provide for long-term management of significant regional cultural heritage places and areas;
- access to traditional lands for cultural purposes; and
- other socioeconomic benefits such as employment and training opportunities.

It is this approach that Coal & Allied has been examining with the Aboriginal community of the Upper Hunter Valley through the CHWG, and incrementally adopting for several years now. While to date this has focussed on the Warkworth Mine, the general principles being developed have looked to be applied to all Coal & Allied operations and lands in the Upper Hunter Valley. Members of the CHWG have expressed the desire to address cultural heritage at a landscape scale and consultations with respect both the subsequently disapproved consent for the Warkworth Extension Project (PA 09_0202) and the present proposals have incorporated this approach. As well as discussing cultural heritage impacts and their management within the proposal areas, consultations have focused on the establishment of the proposed ACHCAs to be established, notably the long-standing proposal to establish that on Coal & Allied owned lands along Wollombi Brook (ie the WBACHCA).

Coal & Allied and the CHWG have largely concluded an exhaustive consultation process which has identified various lands, including a significant portion of the Bulga bora ground area and associated cultural sites and landscapes, that will be managed permanently for the conservation of the Aboriginal cultural heritage values associated with these lands. A core area for inclusion in the WBACHCA had been identified. Moves were in train during the time that the Warkworth Extension Project (PA 09_0202) was operational to have it formally gazetted under s.69B of the NWW Act. The overturn and subsequent appeal of that consent has delayed further progress on this.

In the intervening time, Coal & Allied have identified additional areas immediately adjacent to both the north and south which are now to be included within the WBACHCA. Initially upon approval it will be managed by Coal & Allied in collaboration with the CHWG and in accordance with a management plan specific to the area. The CHWG and the company have jointly developed a set of key objectives and principles, which have informed the development of the management plan, which is both well advanced and ongoing.

3.5.3 A Cultural Heritage Management Accord

The concept of the limits of acceptable change provides the basis for a revised approach to cultural heritage management which, while remaining within the scope of current Rio Tinto Coal Australia and Coal & Allied policies and procedures, and their statutory obligations, could provide for greater flexibility and certainty for both parties and more long lasting socially and culturally beneficial outcomes for the Aboriginal community.

To this end Rio Tinto Coal Australia is investigating the development of a cultural heritage management accord with the Aboriginal community of the Upper Hunter Valley. Such an instrument would to apply to all Coal & Allied owned lands and tenures.

As a first step along this path, Coal & Allied have made, and maintain, a commitment to establish the WBACHCA which, among other things, will provide the Aboriginal community with a measure of certainty around the maintenance of integrity and protection of the eastern portion of the area identified as containing and being associated with the Bulga bora ground, and other regionally important Aboriginal cultural heritage places and landscapes within this area.

Coal & Allied will enter into a co-management arrangement with the Aboriginal community, initially through the auspices of the CHWG, with the ultimate intention to establish a specific Aboriginal community controlled governance structure to manage the proposed WBACHCA. It is hoped that other planned (e.g. the Loder Creek ACHCA proposed within the Mount Thorley Operations 2014 area) and future conservation areas can also be managed under this structure.

Involving as it does substantial areas of existing mining tenement with proven coal reserves, the establishment of WBACHCA will see Coal & Allied forgo access to the development of substantial coal reserves located beneath and immediately adjacent to it in order to ensure that a culturally-appropriate protective management area is established around the eastern portion of the Bulga bora ground and its environs along Wollombi Brook. Although supported by considerable history to this point and settled in the eyes of Coal & Allied and the CHWG, the ultimate final extent of lands to be included within, and excluded from, the WBACHCA (e.g. access roads, statutory easements, future utility corridors etc.) remains to be finalised ahead of the commencement of formal gazettal procedures. Again, this will be achieved through a comprehensive consultation process with key stakeholders: principally the CHWG, Rio Tinto Coal Australia and Coal & Allied; DP&E, OEH and the Division of Resources of Energy within the Department of Trade and Investment; but also other departments and entities as have interests in such lands.

The key element of the accord in the long term is for the Aboriginal community co-management of, in the first instance, the proposed WBACHCA, under a community-based and culturally-appropriate governance structure that would be developed in consultation with, and by the Aboriginal community, over time. Such a community governance structure could provide the basis for transferring the management of additional important areas to Aboriginal management in the longer term and delivering intergenerational benefits to Aboriginal people rather than simply short term engagement.

It would be expected that the proposed accord would require Coal & Allied to meet obligations with respect to and make provision for:

- reasonable and adequate resources for the establishment of both the WBACHCA and associated community governance entity in the first instance, and for the ongoing long-term management of WBACHCA and Loder Creek ACHCA;
- access to and co-management arrangements for both WBACHCA and Loder Creek ACHCA;
- access to culturally-significant places and / or landscapes have been identified by the Aboriginal community on other Coal & Allied lands associated with the Warkworth Continuation 2014 and Mount Thorley Operations 2014 proposal areas;
- resourcing Aboriginal cultural heritage and land management training and employment; and
- resourcing cultural and oral history recording by Aboriginal community members to ensure the security of existing but threatened cultural and historical information.

The accord will also capture obligations on behalf of the Aboriginal community. These could include:

- development of an integrated framework model for cultural heritage management applicable to all Coal & Allied's operations and lands in the Upper Hunter Valley that would look to make the best use of available resources to maximise outcomes for the Aboriginal community, including intergenerational equity;
- negotiating in good faith about Aboriginal cultural heritage management outcomes across Coal & Allied's operations and lands in the Upper Hunter Valley; and
- responsible management of Aboriginal cultural heritage places, landscapes and lands that are subject to Aboriginal community co-management arrangements.

Again, discussions surrounding such an accord will require close engagement. Coal & Allied will engage on the proposal with key stakeholders including the Aboriginal community of the Upper Hunter Valley, DP&E, OEH and Division of Resources and Energy within the Department of Trade and Investment on the proposal.

3.6 A Note Regarding the Location and Management of the Bulga Bora Ground Site within the Wollombi Brook Aboriginal Cultural Heritage Conservation Area

Undoubtedly, the most significant Aboriginal cultural heritage place in the greater MTW area is that commonly referred to as the Bulga bora ground site which is the terminology we use hereafter. This site, included on the OEH AHIMS as #37-6-56, is described as carved trees with a ceremonial ground. An additional AHIMS record (#37-6-55), referred to as a ceremonial ground, is located approximately 2km to the south of the former place location. It is generally acknowledged (including by OEH) that 37-6-55 is, in fact, simply a duplicate recording of 37-6-56 but with an erroneous location. Consequently, 37-6-55 is not referred to in subsequent discussion.

The undoubted presence of a ceremonial site of great social significance to the Aboriginal community of the Upper Hunter Valley (see also Section 6 below) has required Coal & Allied to adopt the highest level of management response. Coal & Allied's response has been to excise the area of this place and additional surrounding lands covering 696 hectares to create a conservation area (i.e. WBACHCA) that will be maintained in perpetuity, despite the presence of substantial coal reserves in this area. Coal & Allied has also committed substantial resources to the development of a comprehensive management plan for WBACHCA, including the establishment of an Aboriginal management group to explore long-term management needs and mechanisms for enhanced Aboriginal management control.

3.6.1 The Issue

Substantial research efforts have been made to accurately determine the location of this site. Subsequently, use has been made of this locational data by Aboriginal organisations in various legal actions. There is a general consensus among Aboriginal stakeholders that the location of the site has

been accurately determined and that it lies within the bounds of the conservation area. Notwithstanding this, there have been repeated assertions by an individual to dispute the location of this place. As these assertions would seek to place the site in locations outside the conservation area, with obvious implications for this important management measure and its value, some attention is now given to this issue.

3.6.2 Brief Background

In 1852 local residents in the Warkworth-Wambo area noted that large numbers of Aboriginal people (possibly as many as 600) had gathered in that area for a major ceremonial gathering. This probably was for the purpose of initiating young boys into manhood. Aboriginal people from as far away as Mudgee and Goulburn apparently travelled to participate in the ceremonies that took place.

In 1918, and following a request from a local resident (A.N. Eather) who had visited the site, this bora ground was visited by personnel from the Australia Museum in Sydney, led by W.W. Thorpe. This team recorded the bora ground site, taking a series of photographs and preparing a sketch map of its location. Their description, though never published, was kept on file at the Museum along with the photographs. As recorded, the place included a bora ring, a raised earthen mound, and a series of carved trees - possibly 12 in number. At the time of this recording in 1918, the trees appeared to be dead. It is known that such trees were often carved at ceremonial grounds in NSW. Thorpe also recorded a camp site located to the west-south-west of the carved tree site, on either side of a creek running into the Wollombi Brook.

Subsequent visits made over the next 80 years failed to find any definite trace of the site (a burnt stump that was thought to be significant in identifying the location of the place was recorded in 2002). In 2002-3, a concerted effort was made to definitively answer the question of its location. This research, undertaken by Brayshaw (2003) pursued several lines of inquiry. All documentary data available on the site was exhaustively reviewed. In addition, the last person to have actually seen the bora ground and the carved trees (a local resident named Jim Eather, a descendant of A.N. Eather who had initially brought the site to the attention of the Australian Museum) revisited the site in early 2003. His recollection of the site's location tallied extremely closely with the sketch map made by Thorpe, as well as relevant cadastral data, environmental descriptions and anecdotal information. Based on the cross-referencing of these independent lines of evidence, the location of the bora ground site was considered to have been accurately identified. It is considered that a high degree of confidence can be attached to this conclusion.

3.6.3 Location and Current Condition

Based on the exhaustive work of Brayshaw and subsequent research undertaken by Coal & Allied and others, the best estimate of the site's location is as shown in Figure 2 below. It should be noted that this includes as significant management buffer as agreed with the CHWG. This location has been delineated based on Brayshaw's detailed examination of all the evidence to hand, and confirmed by a number of visits to the area undertaken by RAP and other CHWG representatives in 2009 and as recently as January 2014 – see appendix 1. That portion of the bora ground management precinct incorporating the carved tree/ceremonial site lies categorically within the boundaries of the WBACHCA settled with the CHWG.

Repeated inspections of the area dating from the 1930s confirm that there are now no material vestiges of the site remaining. The area has been subject to repeated bushfires, grazing, land clearing and use for other agricultural purposes. All of the carved trees have disappeared, quite possibly burnt in bushfires, and no one has identified either the rings or the earthen mound reported. Irrespective of the absence of any physical remains, Coal & Allied accepts that this is irrelevant to the significance of the place, and its management precinct, for the Aboriginal community of the Upper Hunter Valley.

3.6.4 ATSIHP Act Section 10 Application and Response

In 2004 the Chief Executive of the Wannaruah Local Aboriginal Land Council lodged an application under provisions of the ATSIHP Act seeking the relevant Minister issue a Section 10 order as provided by that Act. Such orders allow the Minister to set in place such measures as are deemed necessary to protect the cultural heritage values of the place in question. In this case, an order was sought covering not only the site itself but all land falling within an area 4km in radius within which the OEH site (AHIMS 37-6-0056) lay. The basis for the area covered by the application was that there were a large number of other archaeological sites within that area that were directly associated with the bora ground and its use.

Coal & Allied objected to the application on various grounds – notably that the application if granted would have had major economic consequences and that there was no evidence that in any way linked the other known sites within the 4km radius used in preparation of the section 10 application with the bora ground site in the manner asserted in the application. At no stage, however, did Coal & Allied question the significance of the site to the local Aboriginal community (contra comments made by Bell in his 1980 completion of the AHIMS site recording card for this site). To the contrary, Coal & Allied accepted that the site retained its significance and required appropriate management. Coal & Allied made a series of commitments; notable among these being that it would not undertake any mining activities in the area in question and would develop a management plan for the site.

The Minister, taking account of the report received following investigation of the application and responses received to the same, decided not to issue a Section 10 order as had been sought.

One additional point should be made. No person at the time the Section 10 application was made (based as it was on the location of the place as held by OEH on its AHIMS) suggested in any submission made to the ministerial rapporteur that the location of the site was otherwise than as included on AHIMS.

3.6.5 Alternative Locations

In March 2011 two Wonnarua persons contacted Coal & Allied regarding the location of the Bulga bora ground site. These persons claimed to have new information regarding its location and features, including an earthen bora ring situated about 400m to the west of the carved trees area. In consultation with OEH and DP&E, arrangements were made for them to visit the bora ground site location as then understood to verify their information. This visit took place in April 2011. At that time (and as subsequent events likewise indicate) the persons involved agreed that this location, as originally identified both from the AHIMS record and Brayshaw's review, was the location of the bora ground site, and in doing so also accepted, at least by obvious implication, that it lay squarely within the WBACHCA as proposed.

Subsequently, there was correspondence and communication between the parties in relation to the site and its future management.

In August 2012 one of these same individuals gave testimony in the Land and Environment Court (NSW) with respect the Warkworth Extension Project. In that testimony the claim was made that the currently accepted location of the Bulga bora ground site was incorrect and that information should be interpreted as indicating that it was situated some kilometres to the south of the currently accepted location. The implication of this was that the site was not, as was claimed, within the WBACHCA and was at risk from proposed mining activities. While no evidence was tabled, it was claimed that the wrong parish map had been used when the widely accepted assessment of the site's location was made. Accepting for one moment that this claim was correct, and setting aside all other evidence that corroborates the generally accepted and current location, Coal & Allied notes that taking this claim of the alternative locality literally (measuring a distance 2 miles directly east from the 'Meerea' homestead site), would still place the site within the boundaries of the WBACHCA and not within any area which would be subject to development impact.

Subsequent to the Land and Environment Court action, there was further correspondence between the parties regarding the site's location and its ongoing management.

3.6.6 Commentary on Claims of Alternative Locations

In the absence of a new body of historical evidence that makes a compelling case that all other substantiated assessments of its location are incorrect, Coal & Allied continues to view the currently accepted location of the Bulga bora ground as accurate. Even allowing for some error of several hundred metres, the site sits well within the conservation area, and well outside of the proposal area and, therefore, will be protected in perpetuity.

4. ABORIGINAL CULTURAL HERITAGE RESEARCH AND ASSESSMENT

Archaeological research in the Upper Hunter Valley has a long history and has gained significant momentum as a consequence of impact assessment requirements as development activity, particularly coal mining, has expanded since the 1980s. These summaries draw on and acknowledge material from several Aboriginal cultural heritage baseline studies which have been conducted for the broader region, but also a range of specific studies conducted for Coal & Allied on and near the MTW mining area (in this respect notably Coal & Allied 2010 prepared for the Warkworth Extension Project). A number of these relate specifically to the proposal areas.

4.1 Regional Research Summary

Amongst the earliest known studies of Aboriginal cultural heritage in the area is of places containing rock art at Bulga Creek in the late nineteenth century (Matthews 1895 in ERM 2004a). Subsequently, the Bulga bora ground, located on the western boundary of the Warkworth mining lease, was first recorded by Thorpe in 1918 (Brayshaw 2003). What can be termed archaeological ‘research’ into Aboriginal cultural heritage has been conducted in the Upper Hunter Valley since the first half of the twentieth century, initially by archaeologists from the Australian Museum such as McCarthy and Moore in the 1930s. Following this in the 1940s, Davidson (McCarthy and Davidson 1943 in AECOM 2009) located stone artefacts from scatters located adjacent to the Hunter River near Singleton. The Australian Museum under the supervision of David Moore also undertook a systematic archaeological survey of the Hunter River from its confluence with Wollombi Brook to Singleton (Moore 1970 in ERM 2004a).

From the mid to late 1970s an increasing number of surveys and investigations on Aboriginal cultural heritage have been carried out in the Hunter Valley, notably as components of environmental impact studies, but also for individual site management purposes. The acceleration of such investigations from this period is largely attributable to the introduction of the NPW Act in 1974 and the subsequent EP&A Act in 1979, and the interaction of the two in the environmental assessment process.

In 1983 the NSW National Parks and Wildlife Service (NPWS) commissioned a comprehensive study of the region’s archaeology. The impetus for this was increasing development pressures being both experienced and foreshadowed throughout the Upper Hunter Valley, and the perceived threats posed by broad scale mining to the archaeological record.. Significant reports were generated by this research effort (Hughes 1984; Hiscock 1986; Koettig, 1984). The work provided several outcomes: a predictive model for the distribution of various archaeological place-types; a model for landscape use and occupation; archaeological evidence for the use of the plateau and mountain zones of the region; and an understanding of typology and change in stone tool manufacture and use in the region.

Hughes' 1984 study, in particular, made a series of observations regarding chronological models of occupational change within the region. Scarp Archaeology (2009b:23) have summarized this as follows:

Hughes' 1984 project focused in and around the central lowlands between Branxton and Muswellbrook, and with a strong geomorphological focus, examined the nature of archaeological discard in relation to dominant duplex soils. Observing that Aboriginal artefacts only occurred within an upper stratigraphic soil unit, now well known as 'horizon A', and not in the lower clay sediments, 'horizon B', Hughes and colleagues essentially set up the model by which subsequent excavations have been phrased for over 20 years. Further to this they also asserted that as 'horizon A' contained assemblages containing backed blades, sites were typically 5,000 years old or younger. Hughes acknowledged however, that the upper horizon A soils can extend up to Pleistocene in age as rivers within the region have remained fairly stable (Hughes 1983:75)

In the early 1990s NPWS commissioned three additional studies which aimed at: increasing the understanding of the geomorphological context for the region's archaeology (Dean-Jones and Mitchell 1993); proposed management approaches for the archaeological record (Holdaway 1993); and suggested future directions for the focus of archaeological research (Baker 1992).

With respect to the later study, ERM (2004a:49) observed that:

Baker identified the need for research driven archaeology rather than the "dig it and describe it" approach which was common at the time. Baker also identified the need for scientific significance to be based on tangible data rather than vague reference to research potential based simply on observation of high artefact densities.

Throughout the 1990s and into the new millennium the number and scale of Aboriginal cultural heritage research and assessment within the Upper Hunter Valley continued to increase. Again, this was primarily motivated by the need for archaeological information for planning and assessment processes associated with the potential impacts of coal development on Aboriginal cultural heritage. The studies undertaken differed substantially in size and scale concentrating as such studies do on specific areas of land proposed for development. It was again considered that there had been little attempt to draw together the results of this work into a regional understanding of Aboriginal cultural heritage.

With this in mind the Upper Hunter Valley Aboriginal Heritage Trust commissioned another baseline study (ERM 2004a). The study area for this research was defined by the boundaries of the Wanaruah Local Aboriginal and Council. It covered 14,500km² and included a number of biogeographic regions present throughout the Upper Hunter Valley. This study aimed at providing a synthesis of Aboriginal cultural heritage research and assessment which had been undertaken throughout this area in three categories: 'the landscape, the archaeological resource and the history since contact with Europeans' (ERM 2004a:1). It also aimed to identify gaps in the current knowledge –base with respect to these

three areas. The study aimed to use this information to provide future research directions into Aboriginal cultural heritage and ‘facilitate the cultural assessment of sites and places often undertaken for environmental impact assessments in the region’ (ERM 2004a:1).

A series of six sub-regions were identified within the overall study area. These included: the Central Lowlands; Southern Mountains; Central Goulburn Valley; North Eastern Mountains; Merriwa Plateau; and, Northern Ranges. Within these, the Central Lowlands generally corresponds with the bulk of the mining development within the Upper Hunter Valley, including the proposal areas. As a result, this sub-region was identified as having been the most intensively studied and, therefore, contained the largest numbers of recorded Aboriginal cultural heritage places. This bias was evident in an analysis of the Aboriginal Heritage Information Management System (AHIMS) site records available at that time (ERM, 2004a: 60) which showed that although the Central Lowlands comprised approximately 30% of the overall study area, it contained almost three quarters of the Aboriginal cultural heritage places recorded in the Upper Hunter Valley at that time (Table 2).

Study Sub-region	AHIMS Records	%
Central Lowlands	2,641	73.6
Southern Mountains	228	6.4
Central Goulburn Valley	402	11.2
North Eastern Mountains	219	6.1
Merriwa Plateau	90	2.5
Northern Ranges	6	0.2
<i>Totals</i>	<i>3,586</i>	<i>100</i>

Table 2: AHIMS site records across sub-regions identified within the Upper Hunter Valley Aboriginal Heritage Baseline Study (adapted from ERM 2004a:59).

Of the sites included on AHIMS in the Central Lowlands, the vast majority (n=2,576; 97.5%) consisted of places containing stone artefacts or associated with stone artefact production (including a quarry). Other place-types had also been recorded but these were in far smaller numbers and included culturally modified trees (scarred / carved), areas of grinding grooves, and places associated with ceremonial activities (ERM 2004a:59; see also AMBS 2002: 24).

4.2 Aboriginal Occupation of the Central Lowlands

The conduct of Aboriginal cultural heritage surveys, and to a lesser extent excavations, have revealed a rich archaeological record throughout the Central Lowlands. Although, as outlined above, other place-types have been identified, the vast majority of Aboriginal cultural heritage places identified (in excess of 95%) consist of stone artefacts. While not uncommonly found as scatters (some quite extensive) they are more frequently identified as isolated finds. In some measure, this observable patterning is a direct result of the long history of land-use practices (particularly agricultural and pastoral) throughout the lowland areas.

Stone artefact assemblages include a large component associated with the manufacture of backed blades. Within individual assemblages, backed artefacts typically comprise between 1% and 2%, with rare cases being as high as 5% (ERM 2004a:53). The bulk of the remainder is comprised of unmodified flakes and the cores from which they have been struck. Other artefacts, commonly identified as ‘tools’, such as portable grindstones and axes are present but are considerably less common.

A variety of raw materials are utilised in the manufacture of these artefacts although silcrete and indurated mudstone, also variously referred to as tuff, dominate. Other materials such as chert, quartz, prettified wood, chalcedony, porcellanite and a range of other volcanic materials are also utilised where available. The high quality sandstones found throughout the lowlands are favoured for grindstones while the more durable volcanic materials such as basalt are commonly utilised in axe manufacture. Emanating from the erosion of the highland areas of the Upper Hunter Valley, all of these raw materials tend to move downstream through the river and major creek systems of the lowlands: indeed considerable areas of Hunter River gravels have previously been identified (ERM 2004a:53) as providing extensive sources of locally available materials suitable for stone artefact manufacture. In addition, silcrete sources, found both as outcropping reef and nodule ‘floaters’ have also been identified across the extensive Hunter River terraces (White 1999).

Several studies (e.g. AMBS 2002 and ERM 2004a) have stressed the importance and concentration of Aboriginal occupation within the Central Lowlands, as evidenced by the presence of large numbers and diversity of Aboriginal cultural heritage places along the major tributaries of the Hunter River and its alluvial terraces. These drainage systems often contain permanent streams and water bodies, and their associated biodiversity would have offered reliable resources to be utilised and managed by Aboriginal people. Such features have been identified (Coal & Allied 2010:25) as core occupation areas in the seasonal round for Aboriginal people in the region.

This position is also captured in the following from AMBS (2002:27):

It appears that, in the Upper Hunter Valley, the creek valley floors of the Central Lowlands formed the focus of residential base occupation. Sequential positioning of foraging radii along these creek valleys over several millennia would have resulted in a continuous archaeological distribution close to creeks reflecting domestic and maintenance activities in a residential base context. Archaeological evidence on the upper slopes, ridge lines and less domestically amenable areas up to several kilometres from the residential base would reflect resource gathering activity locations. The commonly reported pattern of archaeological evidence in the Upper Hunter whereby artefact distributions are concentrated close to creeks and highly dispersed away from the creeks can be explained by this model.

This regional model is reflected in the results of Aboriginal cultural heritage investigations which have been conducted throughout the greater MTW mining area (including the proposal areas). In particular, salvage archaeological investigations conducted in the currently approved Warkworth Mine operational area (McCardle 2008b:67) suggest a similar landscape and resource use pattern:

The main factor influencing decisions regarding camping locations appears to be the availability of reliable water and associated resources. Based on the evidence, it appears that there are distinct areas of occupation and travel along Langford, Sandy Hollow and Doctors Creeks, all of which are situated in between the Hunter River and Wollombi Brook. Both these two major rivers are well known for sustainable and continued occupation of the region. It therefore seems apparent that the areas in between these two rivers were also utilised either as travel routes and or occupation areas.

The antiquity of Aboriginal occupation of all regions is a matter of abiding interest and the same is true of the Upper Hunter Valley and central Lowlands therein. Observable expressions of Aboriginal cultural heritage are generally thought to date to the Holocene period (i.e. the last 10,000 years) and within that the vast majority to the last 4-5,000 years. Within the broader region, however, evidence for Pleistocene (i.e. prior to 10,000 years ago) has been established. In general, however, Hughes (quoted in Scarp Archaeology 2009b:23) notes that while ‘Aboriginal people occupied the Hunter Valley region during the late Pleistocene [it was] in such small numbers that archaeological visibility of this period is lacking. In particular, fluvial erosion or flood alluvium has effectively destroyed/hidden any evidence of th[is] initial occupation’.

To date there seems little convincing and unequivocal evidence of Pleistocene occupation within the Central Lowlands. Work at both Fal Brook (Koettig 1987), and Mount Arthur (Kuskie 1999) has seen arguments made for Pleistocene cultural materials within ‘Unit B’ soil horizons (currently accepted as having to be older than the Holoene in age), but issues around both of these interpretations remain largely unresolved (see ERM 2004a:68). Subsurface cultural material was identified within colluvial deposits at Carrington. Although radiocarbon determinations did not extend beyond the Holocene period (Huonbrook 2000), the presence of stone artefacts within Unit B soils (referred to in this study as the ‘Lower Stratum’) and the extent of their weathering, was interpreted as being indicative of having been deposited during the Pleistocene. To date, no follow up work has been undertaken.

More recently there has been a strong focus in the Central Lowlands upon research into sand dunes and sheet of aeolian origin as potential hosts of Pleistocene occupation (summarised in detail in AMBS 2002; ERM 2004a). This has included work at places such as AHIMS site 37-5-63 on the northern side of the Hunter River (Hughes 1997), Cheshunt (Hughes 2001, Hughes and Shawcross 2001), and at two areas in the current Warkworth mining consent area (AMBS 2002; Scarp Archaeology 2009a, 2013).

The AMBS (2002) study obtained optically stimulated luminescence (OSL) dates which suggested that cultural material found within this sand sheet potentially dated to the Pleistocene. This consisted of a very sparse stone artefact assemblage inferred to be older than 14,000 years. Scarp Archaeology (2009a) undertook a detailed and multi-disciplinary study of this same sand sheet. This included an extensive excavation and dating program using a refined OSL technique. The results of other geomorphological and sediment studies (such as magnetic susceptibility) provided clear evidence that the sand sheet is a highly mobile and bioturbated feature – internal mixing of sediments being amply demonstrated. Further no association was identified between the cultural material and the Pleistocene period. This will be discussed in further detail below.

4.3 Ethnographic Context for Aboriginal Use of the Central Lowlands

The majority of the information in this section is drawn from AECOM (2009:7-8). The Singleton region was occupied in pre-European times by the Wonnarua peoples (although spelling variations throughout the literature include: Wanaruwa, Wanarua, Wannarawa, Wannerawa, Wonarua, Wonnah Kuah, Wonnuaruah and Wanaruah). According to Brayshaw (1983), the Singleton area, and by extension the proposal areas, lie at the heart of Wonnarua country.

Pre-contact Aboriginal population densities are notoriously difficult to estimate and it is no different in the case of the Wonnarua. Available information (see Brayshaw 1987:46-48) has suggested relatively low numbers, in the order of ten to fifteen individuals within each camp, but several instances of 200-300 ‘able-bodied men observed in separate groups’ (Brayshaw 1987:747) are suggestive of higher overall numbers. Curr (1886:352) estimates that the overall Wonnarua population in 1841 to have numbered 500 individuals, with this having decreased dramatically by the 1880s principally as a result of introduced diseases. It is widely accepted however that the lowland areas had good permanent water bodies and a range of ecosystem types that would have provided a range of living strategies for the Aboriginal occupants.

The information to hand (both from ethnographic sources and the archaeological record) suggests that the base residential unit consisted of small family-based groups of up to ten people. It is thought that at times, four to six family groups may have been found together in locations where certain seasonally abundant resources could be found. Larger, although irregular or infrequent, temporary ‘community’ aggregations in excess of 150 people were also noted as forming to exploit either seasonal plenty or to conduct ceremonial activity.

There are also records of Aboriginal people in the region constructing mud, bush timber and grass huts in large, semi-permanent ‘summer camps’ along the riverine margins of the plains country associated

with descriptions of the seasonal aggregations. From these, people exploited the abundant animal and plant resources (including grass seed) available in the forests, creeks and rivers at these times.

One well documented example of ceremonial aggregation has been noted within the historical record. This recounts a particularly large regional ceremonial gathering at the Bulga bora ground, which, although outside of the Warkworth Continuation 2014 area, at least in part lies in the western portion of the Warkworth Mining lease (see Figure 2). Brayshaw (2003:2) notes in respect of this gathering that ‘This Bora ceremony was held in the year 1852, and on reliable authority residents of the locality was attended by between 500 and 600 aborigines from as far as Mudgee and Goulburn’.

Archaeological and ethnographic research, current models of pre-contact occupation and documented contact history notwithstanding, Aboriginal people whose traditional country lies in the Upper Hunter Valley have a view about their past that is informed by their traditions and cultural belief system. At times, this may be at variance with current scientific understandings but this makes it no less valid. What also informs Aboriginal people’s views is the oral tradition that they inherit from their forbears who lived through the contact period of first encounters with European settlers in the Upper Hunter Valley.

The Aboriginal owners of the Upper Hunter Valley lands endured a similar fate to that encountered by many Aboriginal people whose productive country lay at the expanding edge of European settlement on the east coast of Australia in the late 18th and 19th centuries. They were dispossessed, marginalised and institutionalised. Today, their descendants assert their rights for recognition and a meaningful voice in the management of their cultural heritage.

5. RESEARCH AND DATA SOURCES FOR THIS REPORT

There are a series of key studies undertaken throughout the MTW area which inform this report and provide data for the assessment of the significance of Aboriginal cultural heritage objects and places located within the proposal areas and their management in the context of the proposed development activities.

These fall into three main categories:

- studies relating to the 2002 extension of the Warkworth Mine;
- Coal & Allied studies undertaken between 2008 and 2014; and
- multidisciplinary archaeological and geomorphological investigations undertaken into areas of the Warkworth Sands land system.

The first is the Aboriginal heritage study prepared for the EIS compiled for the extension of Warkworth Mine's operational area in 2002 (the Warkworth Extension Project; AMBS 2002). This study included new survey and assessment fieldwork (including the conduct of excavations) as well as the re-recording and reassessment of all Aboriginal cultural heritage places which had previously been identified and recorded within its study area.

The second category is a series of comprehensive and systematic studies commissioned by Coal & Allied between 2008 and 2014. These aimed for complete coverage of their respective study areas and in all cases were conducted under the auspices of the CHWG and with direct participation of the RAPs. Collectively, these have included either the reappraisal or new investigation of all portions of the MTW mining leases and adjoining Coal & Allied owned lands outside the current consents. Additionally, the comprehensive and systematic reassessment of the undeveloped south eastern portion of the MTO mining lease (included within the Mount Thorley Operations 2014 area) have also commenced but remain to be completed. The purposes of these studies have been several: to meet Rio Tinto Coal Australia's CHMS; to address development consent conditions; and to develop an understanding of Aboriginal cultural heritage issues in areas adjoining current consent areas. These studies include:

- the MTW West Stage 1 Aboriginal cultural heritage study completed in July 2008 (AECOM 2009);
- the MTW Southwest Stage 2 Aboriginal cultural heritage study undertaken in July 2009 (Scarp Archaeology 2009b);

- the MTW Non-Disturbance Area 2 (sometimes referred to as MTW Stage 3) Aboriginal cultural heritage study undertaken in September 2009 (MCH 2009);
- the finalisation of the assessment of the MTW Southwest Stage 2 and new Aboriginal cultural heritage assessment of the area referred to as the Bulga Farm in May 2010 (Scarp Archaeology 2011);

(These studies directly informed the previously granted (but subsequently disapproved) EIS prepared for the Warkworth Extension Project (PA 09_0202))

- at MTO, the Aboriginal cultural heritage study undertaken of the Ramp 22 Sedimentation Dam area in the south east of the current development consent area in August 2013 (RPS 2013); and
- the reassessment of the remaining undeveloped western portions of the Warkworth mining leases located to the east of Wallaby Scrub Road. This area was investigated in two stages, the first in November 2013 as part of the Warkworth Mine Modification 6 (Coal & Allied 2013) and the second in February 2014 as part of the Warkworth Continuation 2014 proposal.

In the final category there have been two comprehensive investigations, one of which was a large scale, multidisciplinary archaeological and geomorphological investigation into areas of the Warkworth Sands land system within the Warkworth mining leases. These include:

- the Warkworth Sands Archaeological Project carried out in 2008 (Scarp Archaeology 2009a); and
- the Warkworth Sandsheet Sub-Area A archaeological test excavations carried out in August 2012 (Scarp Archaeology 2013).

The relationship of these study areas to the MTW mining leases, the proposal areas, and one another is presented in Figure 2. The reports relating to these studies can be provided upon request in electronic data format (see Appendix 2).

In addition to these formalised studies, a number of places containing Aboriginal cultural heritage have been discovered by Rio Tinto Coal Australia and Aboriginal community cultural heritage field officers during the course of their duties. Such places are also considered in this report.

All places containing Aboriginal cultural heritage areas or objects identified as a result of these studies have been registered on the AHIMS maintained by OEHL, as well as included in a Cultural Heritage Management Database (CHMD) established by Coal & Allied specifically for the greater MTW mining area and adjoining Coal & Allied owned lands. The CHMD documents the nature, form,

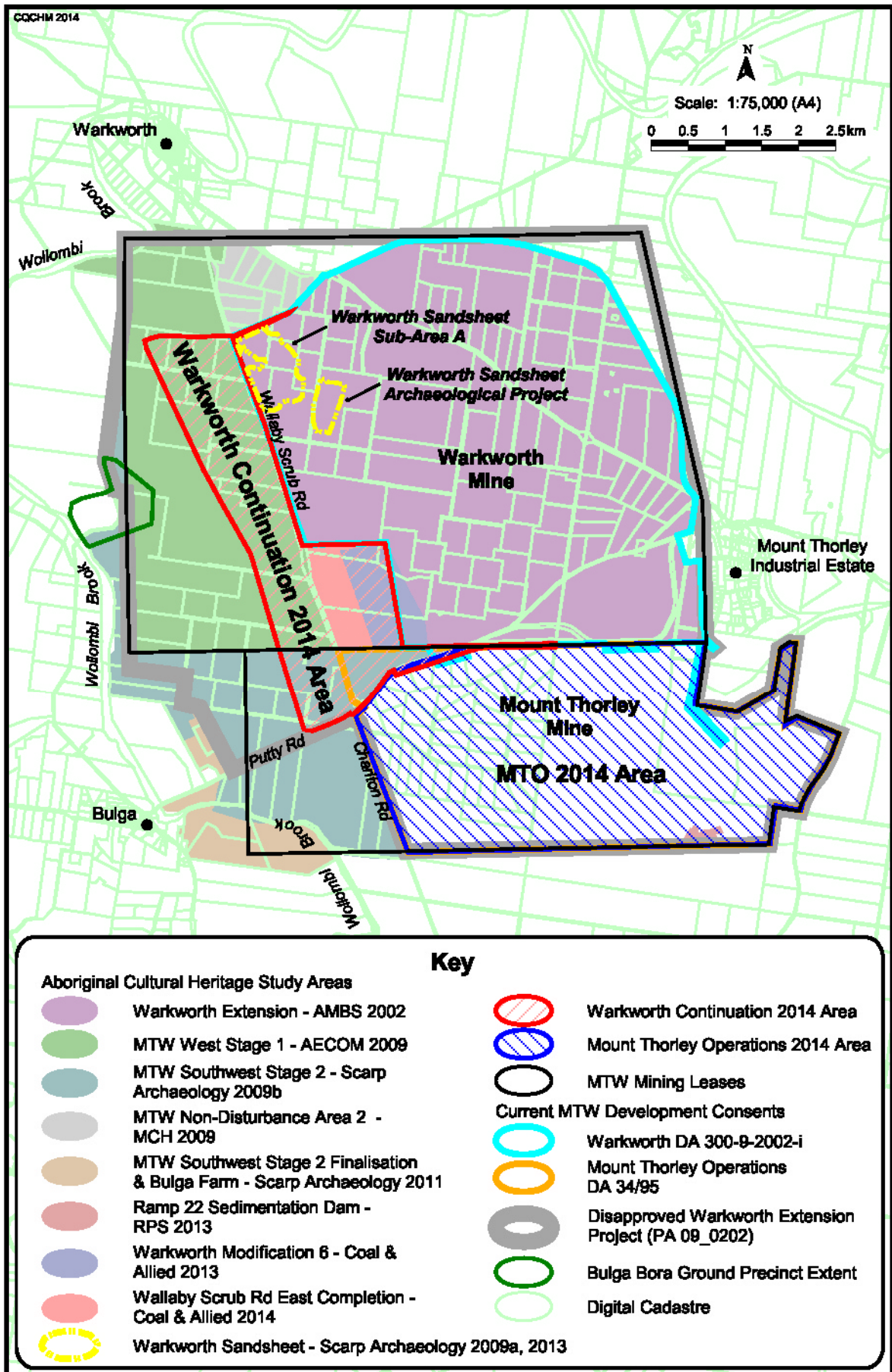


Figure 2: Key Aboriginal cultural heritage study areas and their relationship to the proposal areas, major consent areas, tenements and other features referred to in the text.

condition and specific management requirements as agreed by the CHWG, for each place. As a minimum requirement the MTW CHMD includes the following information:

- a unique MTW place identifier;
- the unique AHIMS number maintained by OEH;
- the place type (e.g. isolated find/s, artefact scatter, scarred tree etc);
- grid reference along with datum and projection information as collected exclusively by GPS;
- place description and values (e.g. number / density and attributes);
- place extent (e.g. 10m diameter);
- date recorded and technical adviser recording;
- management options covering eventualities for both the disturbance and non-disturbance as agreed within the CHWG.

The information held within the CHMD is regularly updated as a result of ongoing site inspection / monitoring and implementation of agreed management measures. The CHMD is a key element within the preparation and operation of management plans (including the current Warkworth and MTO A&CHMPs) and associated management arrangements as settled.

The CHWG has worked with Coal & Allied to develop a comprehensive cultural heritage investigation and assessment process. This includes: community consultation procedures: a project work Terms of Reference (ToR) template; cultural heritage investigation methodologies; processes for the selection and engagement of technical advisors (archaeologists or other professionals as may be required to assist with specific tasks); and a process for the selection and engagement of Aboriginal corporate entities for project management and administrative coordination. These arrangements encourage Aboriginal people to take an active role in fieldwork and reporting arrangements for project work with the assistance of technical advisors.

The reports provided for the above-mentioned studies set out detailed accounts of study methodology, analysis, significance assessment, including the views of relevant Aboriginal community groups and the CHWG, impact descriptions and management recommendations. The Warkworth Sands, and to a lesser extent the Sub-Area A, studies addressed the major research question of the possible occupation of the Warkworth Sandsheet area by Aboriginal people in the Pleistocene. Neither of these studies produced evidence that unequivocally supports this proposition.

An outline of each of the studies and a summary of key aspects of each study's findings is presented below. The authors acknowledge freely citing from these study reports in compiling these outlines.

5.1 Warkworth Extension EIS Study – AMBS 2002

5.1.1 Study Outline

The 2002 Aboriginal cultural heritage study undertaken as part of the 2002 Warkworth Extension was commissioned by Coal & Allied and WML as a part of the EIS documentation submitted in support of a proposed modification to DA-300-9-2002-i. This project provided for the extension of the Warkworth Mine open cut operations further to the west.

The study involved two principle components. The first involved the synthesis of all previous Aboriginal cultural heritage survey, assessment and management (e.g. salvage) programs which had been undertaken throughout areas located within the Warkworth mining lease. This noted Thorpe's 1918 recording of the Bulga bora ground, as well as the myriad more recent impact assessment survey work undertaken from 1979 to 1999, and salvage projects undertaken from 1990 to 2002.

The second component consisted of a fieldwork program which was carried out in late 2001, and early to mid-2002 by a team of archaeologists and other specialists from Australian Museum Business Services (AMBS) in collaboration with Dr. Phillip Hughes of Huonbrook Environment and Heritage Pty Ltd. Seven Aboriginal people representing the Upper Hunter Wonnarua Council, the Wanaruah Local Aboriginal Land Council, the Lower Wonnarua Tribal Council and the Wonnarua Nation Aboriginal Corporation participated in the field surveys and test excavations and provided advice on significance and recommendations for the conduct of the study.

The field surveys undertaken were based upon a sampling strategy that inspected 100% of areas of high archaeological and cultural interest (primarily drainage lines) supported by survey transects along selected representative sections of the balance of the study area (see Figure 2). To the extent that it was able to be achieved, the locations for all previously recorded Aboriginal cultural heritage places which lay within the undeveloped portions of this area were also relocated and rerecorded. Although the northern and southern areas were not within the proposed extension project area, the fieldwork program undertaken included all portions of the Warkworth Mining lease west to Wallaby Scrub Road.

A series of test excavations were carried out in the Sandy Hollow Creek area of the Warkworth Sandsheet landform (see Figure 2). It was considered that this landform was created primarily by aeolian action in periods of landscape instability during the late Pleistocene and therefore that evidence of Aboriginal occupation may extend into these periods. A series of 10 x 1m² squares were excavated at two locations in the north and south of this feature respectively. These were excavated by a mixture of hand and shovel, and to a lesser extent, by backhoe in 100mm depth increments (spits). An additional trench 2m x 0.5m was also excavated in the southern excavation area.

The test pitting strategy included the collection of three sediment samples for OSL dating to determine their age and, by inference, the potential age of any artefacts associated with the sampled stratigraphy.

5.1.2 Key Findings

The field surveys identified a total of 120 places containing Aboriginal cultural heritage within the study area (Table 3). These included 47 places which had been previously identified and recorded during earlier studies and 73 new places. With the exception of two areas containing grinding grooves, the remaining places (in excess of 98% of the total) contained stone artefacts.

Place Type	Place No	%
Stone Artefact Scatters	68	56.7
Isolated Stone Artefact/s	50	41.7
Grinding Grooves	2	1.6
<i>Total</i>	<i>120</i>	

Table 3: Frequency of Aboriginal cultural heritage place types identified within the AMBS study for the 2002 Warkworth Extension.

As a result of their analysis of the recorded Aboriginal cultural heritage places and materials AMBS (2002:95) noted that:

The results of the survey and excavations fit with site prediction models. The largest sites occur along major water courses. Grinding grooves occur where there are outcrops of sandstone in the creeklines. Stone artefact scatters were the predominant type of site recorded. The nature of artefacts and raw materials were as expected. The artefacts were of locally derived raw materials. The overall artefact assemblage did not contain any attributes that make them unique or rare in the Upper Hunter Valley.

The study identified that larger cultural places with higher numbers of stone artefacts were generally located on drainage lines (principally Sandy Hollow Creek and Longford Creek) and though these may have some research potential they were adjudged to be of low archaeological significance given the large amount of survey and salvage work that had already been undertaken within the MTW area and the low likelihood of additional research at these places adding to an understanding of Aboriginal people's use of the landscape in the area.

Of the two places identified as containing grinding grooves, only one (Site M) remains extant with PN10 having been the subject of a salvage and relocation program conducted between May and September 2010 (Scarp Archaeology 2010). The Site M grinding grooves were originally identified by Dyll (1979) who identified a total of 73 grooves in a distinct cluster across outcropping sandstone in the bed of an unnamed tributary of Wollombi Brook. Additional surveys of this area by Haglund (1999) recorded an additional nine grooves some 250m upstream. The AMBS (2002) fieldwork relocated both of these grinding areas and, in the case of the larger downstream accumulation (Dyll's original Site M), a detailed sketch plan was prepared.

With respect to the significance of these grinding areas, AMBS (2002:102-03) noted that these have 'some archaeological significance, given they are a relatively rare (although not unexpected) site type. While such sites do not provide much research value, they can be seen to have social, educational and aesthetic values'.

On the whole (see below), the places identified within the study area were, therefore, described as being generally of low archaeological significance, lacking the potential to contribute appreciable additional information to that already obtained from previous research to current research questions on antiquity, spatial patterning, inter-site variation or about Aboriginal life in the past.

The AMBS study highlighted the Warkworth sand sheet located adjacent to Sandy Hollow Creek and its associated artefact assemblages as an exception to the conclusion that the sites in the study area were of little archaeological significance. In this it was noted that such sand sheets are regionally rare and the test pitting carried out by the AMBS within this feature confirmed the presence of cultural materials within its profile.

The study concluded that the sand sheet landform should be viewed as having moderate to high archaeological significance (AMBS 2002: 103) and that its loss to mining could affect aspects of the ability to understand past occupation and use of this landform feature.

Although only available subsequent to the completion of the AMBS study, Hughes (*et. al.* 2003) reported upon the results of the initial OSL dating of the three sediment samples. The upper of the two bands of stone artefacts identified during these excavations was considered to be less than 14,000 years old while the lower (represented by a sparse scatter of seven stone artefacts) was thought could be between 14,000 and 47,000 years old (Hughes *et. al.* 2003:6). The team though remained convinced that the sand sheet had been subject to considerable bioturbation and much more than was suggested by the orderly progression of the OSL dates from younger to older through the profile. The principle effect of such bioturbation was noted as being the downward movement of stone artefacts through the sand sheet. Despite this, the results of these excavations raised the possibility that the Warkworth Sandsheet landform contained evidence of Pleistocene Aboriginal occupation and potentially, on the basis of the lowermost date, one of the oldest areas of human occupation recorded in Australia.

Seventy places containing Aboriginal cultural heritage were identified as being within the proposed extended mining operational area and requiring consent for destruction under Section 90 of the NPW Act. All works required under the consent conditions associated with this modification as granted have been completed.

5.1.3 *Aboriginal Community Views*

A representative of the Upper Hunter Wonnarua Council and Wonnarua Nation Aboriginal Corporation was engaged by Coal & Allied to conduct an Aboriginal cultural heritage assessment of the study area and provided a report. This was completed (Perry 2002) and appended to the AMBS study report (AMBS 2002:Appendix A).

This report noted the cumulative effect on the Aboriginal community of the destruction of Aboriginal cultural heritage places through mining operations in the Upper Hunter Valley and the general view that all such places were of significance to Aboriginal people. Further, it was noted that such destruction was an undesirable outcome. The report advised that Aboriginal people were particularly concerned about the grinding grooves identified in the AMBS study. The report advised that the Upper Hunter Wonnarua Council and Wonnarua Nation Aboriginal Corporation would not oppose the application for Section 90 consent for the sites affected by the proposed operational extension subject to Coal & Allied agreeing to the following recommendations:

- that the Upper Hunter Wonnarua Council be funded to carry out an historical video of the entire Warkworth mining lease area prior to the commencement of mining in order that such footage be added to their historical library. This video was to be carried out by Upper Hunter Wonnarua Council personnel only;
- that an Aboriginal collection and salvage program be drawn up by the Upper Hunter Wonnarua Council for all the affected Aboriginal cultural heritage places recorded inside the area of proposed mining extension; that representatives of the Upper Hunter Wonnarua Council be employed to develop a strategy to be incorporated within the Archaeological and Cultural Heritage Environmental Management Plan for possible identification of Aboriginal skeletal remains during the topsoil stripping process. Should such remains be found the strategy was to provide for the immediate contact with the Upper Hunter Wonnarua Council, Wonnarua Nation Aboriginal Corporation, Lower Wonnarua Tribal Council and Wanaruah Local Aboriginal Land Council (in addition to state regulating authorities) prior to any further work proceeding;
- that representatives of the Upper Hunter Wonnarua Council be employed to assist in the removal of the northern PN10 grinding grooves that were to be affected by this proposal. It was the opinion of the Upper Hunter Wonnarua Council that once the grinding grooves had been removed they should be either placed close to the Site M grinding grooves located further to the south and outside of the proposed development area, or placed in a cultural heritage centre;
- that Aboriginal cultural materials recovered by the Upper Hunter Wonnarua Council as part of the developed salvage program were to be cleaned and catalogued by the Upper Hunter

Wonnarua Council representatives, and that a report developed by the Upper Hunter Wonnarua Council detailing this activity was to be provided to Coal & Allied and the regulating agency once completed. Care and control of all the Aboriginal cultural materials salvaged by the Upper Hunter Wonnarua Council, would be applied for by the Upper Hunter Wonnarua Council. All expenses for this were to be paid for by Coal & Allied; and

- that, although not within the proposed mining extension area, the Upper Hunter Wonnarua Council be able to fence off the Bulga bora ground also at Coal & Allied's expense.

All of these issues have been addressed and works completed via the consultative processes established under the auspices of the CHWG.

5.1.4 The Development Consent and the Archaeology and Cultural Heritage Management Plan

The development consent for the 2002 Warkworth Extension imposed a number of conditions with respect to Aboriginal cultural heritage management. These requirements are set out briefly below:

- carry out salvage archaeological investigations in four landform zones within the project area including the Warkworth Sandsheet;
- obtain Section 90 consent for destruction of sites within the operational footprint;
- allow Aboriginal people to salvage material from the s.90 Aboriginal cultural heritage places prior to destruction and in accordance with a Cultural Salvage Program to be developed under an A&CHMP;
- conserve Aboriginal places and artefacts within the Habitat Management Areas (HMAs) and Non-disturbance Areas (NDAs) established for the operation;
- make a contribution to the Hunter Aboriginal Cultural Heritage Trust Fund;
- develop an A&CHMP in consultation with NPWS and local representative Aboriginal bodies that includes the following:
 - Archaeological Salvage Excavation Program;
 - Cultural Salvage Program;
 - Destruction Program; and
 - Conservation Program

The A&CHMP was also to provide a protocol for consultation on Aboriginal cultural heritage management procedures to be followed if new material is found during the development.

The A&CHMP required by the development consent (the Warkworth Mining Limited Archaeology and Cultural Heritage Management Plan; Coal & Allied 2004a) has been developed with the CHWG and approved by the regulating agency. Key issues that were raised by Aboriginal members of the

CHWG during the preparation of the A&CHMP, and addressed within it, included the definition and management of the Bulga bora ground, the management of the northern, PN10, grinding grooves that would be impacted by mining, and the management of sites in the proposed Habitat Management Areas and Non-Disturbance Areas.

All of the consent conditions attached to the 2002 Warkworth Extension have been met. Salvage archaeological excavations on three of the landforms and salvage collection studies were conducted in the consent area in 2008 under the guidance of the CHWG and with the active participation of Aboriginal cultural heritage fieldworkers (McCardle 2008a; 2008b). Additional salvage work was carried out on the surface Warkworth Sandsheet places in August 2009 (McCardle 2009). Aboriginal cultural material from these programs has been collected and placed for safe keeping in the secure storage facility at Coal & Allied's Hunter Valley Services site in accordance with the procedures developed by the CHWG.

The CHWG desired that the PN10 grinding grooves be placed at a purpose built facility at Coal & Allied's Putty Road property which is also used as the meeting place of the CHWG. This work was completed in 2010 (Scarp Archaeology 2010).

The entirety of the area covered by the AMBS (2002) Aboriginal heritage study and the 2003 development consent conditions have now been investigated and comprehensively mitigated under statutory authorities (s.87 permits and s.90 consents under the NPW Act) and are approved for development. The vast majority of this area has also been subject to mining development impacts.

5.1.5 Additional Aboriginal Community Consultation

In late September 2009 thirteen members of the CHWG inspected the Site M grinding grooves (within the present Warkworth Continuation 2014 area) as part of a more general inspection of the Aboriginal cultural heritage places located within the area known as Non-disturbance Area 1 (NDA1). At this time, the visit was undertaken in the context of the then proposed Warkworth Extension Project 2010 (DA 09_0202), which was to include the NDA1 area in general and the grinding grooves specifically.

As a result of that project, this area, and the Aboriginal cultural heritage places within (including the Site M grinding grooves) it, was within the zone of direct mining disturbance. CHWG members reaffirmed the significance of Site M and discussed options for its mitigation. Depending upon the outcomes of additional assessments (notably geotechnical) the agreed management measures included the completion of detailed recordings of the grinding areas, relocation of all or portions of these features should such be technically feasible, and ultimately destruction if mining is to occur.

The group also viewed the general location of the other Aboriginal cultural heritage places identified and recorded throughout the NDA1 area and discussed cultural salvage options for these. The agreed measures provided for the collection of surface artefacts from all those which were to be impacted by mining and associated development activities.

It should be noted that the eastern portions of NDA1 have been the subject of a subsequent modification (Modification 6) for the Warkworth Mine. This is discussed further below as are the results of additional visits to the present Warkworth Continuation 2014 proposal which also includes these areas and places.

5.2 Warkworth West Stage 1 Study – AECOM 2009

5.2.1 Study Outline

This study was developed in response to Coal & Allied's requirement for additional and updated baseline information with regards Aboriginal cultural heritage as it may be present throughout the western portions of the Warkworth mining lease to the west of Wallaby Scrub Road, and in the north a small portion of adjoining Coal & Allied owned lands fronting Wollombi Brook (see Figure 2). While these areas had been included within the boundaries of earlier studies, Coal & Allied recognised that these had been neither comprehensive nor systematic and had not been refreshed in the intervening times. Updated information was required to assist with the planning, design and management of future projects and activities that might be proposed throughout these areas. A comprehensive ToR for the study was developed through a collaborative process between Coal & Allied and representatives of the Aboriginal community of the Upper Hunter Valley under the auspices of the CHWG. The CHWG drafted, discussed, refined and endorsed these ToR.

The study area comprised approximately 1,050 hectares, bounded in the east by Wallaby Scrub Road and in the north, west and south by either the Warkworth tenement boundaries or the extent of the adjoining Coal & Allied owned lands (see Figure 2).

Due to the size of this area, the survey was conducted across two survey blocks:

- the first was conducted across 9 days in March 2008 during which 13 one hundred metre wide pedestrian transects (totalling approximately 70km) were undertaken;
- the second was undertaken across eight days in July 2008 and during this fieldwork block a further 23 pedestrian transects (totalling approximately 45km) were completed.

The Rio Tinto Coal Australia CHMS requires 100% pedestrian survey coverage of all planned study areas. In the present case this was achieved by a single field team comprising six Aboriginal cultural heritage field officers, their technical advisor (archaeologist), and a Coal & Allied data management officer responsible for the real time recording of the location and features of all Aboriginal cultural heritage identified. This was captured directly within GPS-based mobile mapping equipment and incorporated within the MTW CHMD. The fieldwork team was spaced evenly apart and conducted each pre-planned survey transect by moving forward together in a straight line. This methodology enabled the comprehensive assessment of the entire study area and is a more effective approach than relying on sample transects of areas that are perceived to be prospective for Aboriginal cultural heritage material. Under the fieldwork roster developed and implemented for this study a total of 17 representative members of the CHWG participated in the survey fieldwork.

The fieldwork noted significant levels of human disturbance in parts of the study area due to historic land use practices (e.g. grazing, tree clearing, roads and airfield construction – the WWII Bulga RAAF base is also located within the study area).

5.2.2 Key Findings

The field investigations identified a total of 116 places containing Aboriginal cultural heritage within the study area. Four of these (MTW2, 13, 16 and 81) were not considered as being of Aboriginal origin and were not further considered within the study’s reporting. Following discussions among the CHWG however, they were noted as having social / cultural importance to the Aboriginal community and management requirements were developed for them as with all other Aboriginal cultural heritage. As a result, they were subsequently registered on AHIMS (37-6-2301, 2312, 2315 and 2380 respectively).

The 112 places identified as containing Aboriginal cultural heritage (Table 4) and considered by the report were dominated by places containing stone artefacts which composed in excess of 95% of the identified Aboriginal cultural heritage places. In addition there were five potential scarred trees, one of which, described within the report as a complex, was associated with a low density scatter of stone artefacts.

Place Type	Place No	%
Isolated Stone Artefact/s	61	54.4
Stone Artefact Scatters	46	41.1
Scarred Trees	4	3.6
Scarred Tree / Stone Artefact Scatter	1	0.9
<i>Total</i>	<i>112</i>	

Table 4: Frequency of Aboriginal cultural heritage place types identified within the AECOM Warkworth West Stage 1 study.

A total of 42 stone artefacts were identified in the 108 places identified as containing stone artefacts (including those associated with the scarred tree). The great majority of these were classified as being amorphous flakes and broken flakes, although very small numbers of points, blades, cores and hammer stones were also recorded. The majority of the lithic material was manufactured from indurated mudstone and silcrete. One artefact at MTW19 was a thick piece of dark bottle glass that showed clear evidence of having been flaked. Flaking of glass and ceramic is not uncommonly recorded across Australia in areas in which 19th and early 20th century contact between Aboriginal people and European settlers occurred. The study concluded that the glass artefact site at MTW19 was of high scientific significance.

The five potential Scarred Trees identified as MTW8, 14, 43, 70 and 80 were also considered to be of high significance when the views of Aboriginal people and the sites' scientific potential were taken into account (AECOM 2009: 28). Artefact scatters identified as MTW25, 28, 60 and 65, were considered to be of moderate significance, while the remaining places were assessed as being of low significance.

Consistent with agreed processes established through the CHWG for such places, a verification inspection of the five identified potential scarred trees was conducted at the end of October 2008. This was conducted by Aboriginal community representatives with the assistance of specialist technical advice. Of the scars, four were verified as being Aboriginal in origin and a fifth, although considered not to be, was nonetheless still considered as being culturally significant. An additional inspection conducted by an elders groups in November 2011 subsequently considered that the scar present on MTW43 was not Aboriginal in origin. This tree has nevertheless been registered on AHIMS (37-6-2342) and will be managed in accordance with the agreed management measures for such places.

It was particularly noted that very few places containing Aboriginal cultural heritage were found in the central west of the study area. It was considered that this may be due to the density of woodland present in this area, although ground surface visibility throughout this area is of an order experienced elsewhere within the study area and in which larger numbers of Aboriginal cultural heritage places were identified. It was therefore considered that this patterning may also relate to the additional relative distance to Wollombi Brook in these areas.

The maximum stone artefact densities present within scatters throughout the study area was identified as being 1 artefact / 5m², with the majority of such places being considerably lower than this. Although this was noted as being very low, overall this result was considered comparable to those recorded in other studies in the Upper Hunter Valley which have been likewise dominated by low-density artefact scatters (AECOM 2009: 23).

Although not recorded during the field assessments, the report notes that the location of at least the eastern most portion of the Bulga bora ground precinct (see Figure 2), and both AHIMS records for this ceremonial area (37-6-055 and 56) are located within this study area. The Bulga bora ground has been previously identified as being of particular significance to the Aboriginal community of the Upper Hunter Valley.

5.2.3 Additional Aboriginal Community Consultation

Following the conclusion of the study and the preparation of the draft report, an Aboriginal community consultation meeting was held in mid-January 2009 in Singleton. All RAPs (i.e. members of CHWG) were invited to attend. A total of sixteen Aboriginal community members attended the meeting. The purpose of the meeting was to present the results of the survey and scientific significance assessment, the subsequent scarred tree verification inspection, and to obtain feedback from the community on social significance and management recommendations. Aboriginal community groups agreed in general with the options for management presented at the meeting however there were requests for additional site visits (AECOM 2009:18-19). In response to community feedback in the AECOM report that other community representatives be given the opportunity to inspect several of the more significant Aboriginal cultural heritage places and landscapes (including the Bulga bora ground), Coal & Allied conducted a community sites tour of these areas and further CHWG consultation meeting in late September 2009.

5.3 Warkworth Southwest Stage 2 Study – Scarp Archaeology 2009

5.3.1 Study Outline

The rationale, survey methodology for, and conduct of this study is directly comparable to that previously described above for the Warkworth West study (see above). It was carried out by a team comprising six Aboriginal cultural heritage field officers, a technical advisor (on this occasion Scarp Archaeology) appointed through the processes for this established by the CHWG, a Coal & Allied site supervisor and data management officer responsible for the real time recording of the location and features of all Aboriginal cultural heritage identified.

This study was undertaken over a 10 day period in late July 2009. The ToR for the survey were finalised with the CHWG prior to the fieldwork commencing. The study area focussed on the western portions of the MTO mining lease and the adjoining Coal and Allied owned lands westwards to Wollombi Brook. It also included a sliver of Coal & Allied owned land immediately adjoining the Warkworth mining lease (see Figure 2). The study area totalled approximately 770 hectares.

Of the areas able to be assessed, 100% coverage was achieved using the pre-planned 100 metre wide pedestrian transects. A small area in the southern part of the study area was not able to be surveyed due to inundation (subsequently completed and reported upon below) while some 69 hectares in the general area of the Bulga bora ground was not surveyed at the request of CHWG members due to its cultural sensitivity. The 55 survey transects completed totalled 75km.

5.3.2 Key Findings

Although grouped into 80 cultural heritage ‘complexes’ in the report, the field investigations identified a total of 174 individual places containing Aboriginal cultural heritage within the study area (Table 5). As identified during the Stage 1 study (see above) these are again dominated by places containing stone artefacts (88.5%). The vast majority of these consisted of isolated stone artefact/s of which one was identified in association with source stone suitable for working. In addition, a considerable number of features identified as scarred trees (n=16) were identified and recorded. Three areas containing grinding grooves and a small (three metres in diameter) mounded feature, considered to have the potential to contain burial/s, were also identified.

Place Type	Place No	%
Isolated Stone Artefact/s	145	83.3
Possible Scarred Trees	16	9.2
Stone Artefact Scatters	8	4.6
Grinding Grooves	3	1.7
Isolated Stone Artefact/s / Source Stone	1	0.6
Mound Feature (potential burials)	1	0.6
<i>Totals</i>	<i>174</i>	

Table 5: Frequency of Aboriginal cultural heritage place types identified within the Scarp Archaeology Warkworth South West Stage 2 study.

The study’s report noted significant levels of human disturbance to Aboriginal cultural heritage places in parts of the study area as a result of historic land use practices – primarily grazing. Despite the increased diversity of place-types identified during this study, none were considered to be unusual in terms of the regional archaeological record.

On reflection, a number of the places that contained stone artefacts within what was termed cultural ‘complexes’ within the report, such as those identified on Wollombi Brook to the south of the Bulga bora ground, were considered to be significant. The three such complexes as identified include:

- Places MTW237-243 and 245-251 and the scarred tree recorded as MTW 257 located on the eastern bank of Wollombi Brook;

- Places MTW260-263, and including the scarred tree recorded as MTW258-59 and 264. One of the stone artefacts identified within this complex, again located on the eastern bank of Wollombi Brook, included a large basalt edge ground axe; and
- Places MTW 287-309 located directly south of the western most margins of the Bulga RAAF Base's east-west runway.

Other places specifically noted within the report as being significant included:

- the places containing grinding grooves (MTW256 and 268) also located on the eastern bank of Wollombi Brook; and
- the remaining scarred trees not included above within a cultural complex. This includes places recorded as MTW139, 165, 168-69, 179, 181, 223, 227-29, 283 and 285.

With respect to the features identified as being potential scarred trees, the study report recommended that, consistent with agreed processes established through the CHWG for such places, they be the subject of a verification inspection. With the exception of MTW258, which was unable to be visited, this was conducted at the end of August 2010 by Aboriginal community representatives with the assistance of specialist technical advice. Four of these (MTW 139, 229, 257 & 259) were determined not to be Aboriginal in origin. There were no further management measures required for these and they were not registered on AHIMS when the remaining survey results were submitted.

A distinguishing feature of the results of this study was the identification of a considerable number of areas which had the potential to contain archaeological deposits (PADs). A total of 94 of the recorded Aboriginal cultural heritage places (54% of the total identified and recorded) were considered to have this potential. By far the greatest numbers of these are directly associated with the terraces above Wollombi Brook.

The technical advisor's report provided detailed management recommendations for all sites including further possible archaeological research and site protection recommendations.

5.3.3 Additional Aboriginal Community Consultation

The results of the study were presented by Scarp Archaeology for discussion at a meeting of the CHWG in late August 2009. An additional consultation meeting between Scarp Archaeology and the RAPs was held in early September 2009 in Singleton. In the case of the areas surrounding Wollombi Brook, the Aboriginal community representatives made specific reference to the concept of a cultural landscape (i.e. an integrated view of these sites), rather than as individual places. As a result of this,

the final report considered the area in these broader landscape terms (Scarp Archaeology 2009b: 18, 32).

Subsequently, a community site visit was conducted in late September 2009 to visit several significant cultural sites and landscapes throughout both the Stage 1 and this Stage 2 study areas. In terms of individual places within this Stage 2 study area, the thirteen members of the CHWG present inspected the two grinding groove places on Wollombi Brook (Places MTW256 and 268) and the large cultural complex (Places MTW260 to 263) and associated scarred trees to their south located also on the eastern banks of Wollombi Brook. The great significance of these places, as well as the Bulga bora ground, both individually and collectively as a cultural landscape, to Aboriginal people, was reaffirmed and management options were discussed.

5.4 Warkworth Non-Disturbance Area 2 – MCH 2009

5.4.1 Study Outline

This study area comprised approximately 110 hectares on land located on the eastern side of Wallaby scrub road between the northern limits of the current Warkworth development consent and the Golden Highway (see Figure 2). The rationale, survey methodology for, and conduct of this study is directly comparable to that previously described above for the Warkworth West study outlined above. As is the case for all such studies, it was carried out by a team comprising six Aboriginal cultural heritage field officers, a technical advisor (on this occasion McCardle Cultural Heritage Pty Ltd - MCH) appointed through the processes for this established by the CHWG, and a Coal & Allied site supervisor and data management officer.

Given the relatively small size of the area, the fieldwork for the study was undertaken over three days – two in early September 2009 and finalised in early October 2009. The ToR for the survey were finalised with the CHWG prior to the fieldwork commencing. A 100% survey coverage of the area was able to be achieved using the pre-planned 100 metre wide pedestrian transects. Thirteen transects totalling approximately 12km were completed.

5.4.2 Key Findings

Forty six places identified as containing Aboriginal cultural heritage were identified within the study area (Table 6). As has been the case in the vast majority of other field assessments undertaken throughout MTW, the majority of the identified Aboriginal cultural heritage places contain stone artefacts (91.3%) either as isolated examples or as part of larger scatters. In addition, an additional four trees considered to have scars of Aboriginal origin were also identified and recorded. No areas of PAD were identified within the study area. This was attributed to ‘... the distance from reliable water

and the high levels of erosion and subsequent disturbances to the cultural materials and minimal A horizon remaining...’ (MCH 2009:35).

Place Type	Place No	%
Isolated Stone Artefact/s	36	78.3
Stone Artefact Scatters	6	13.0
Possible Scarred Trees	4	8.7
<i>Totals</i>	<i>46</i>	

Table 6: Frequency of Aboriginal cultural heritage place types identified within the MCH Warkworth NDA2 study.

The area had previously been subject to two assessments, the original by Haglund (1999) with this being reassessed and supplemented with additional surveys as part of the AMBS (2002) study outlined above. Eighteen places containing Aboriginal cultural heritage were identified and recorded within the NDA as a result of these investigations. With the exception of five (PN4, PN5 (north), W32, W70 & W71), the remaining places were able to be relocated. Stone artefact/s were originally identified and recorded at these places although PN5 (north) was also noted as also containing a scarred tree. It is possible that this feature was observed during the surveys and was not considered to be Aboriginal in origin. All of these places are, nonetheless, registered on AHIMS (37-6-2705-06, 1264, 1239 & 1241 respectively).

The four potential scarred trees were considered to have moderate scientific significance on the basis that they are uncommon in the contemporary cultural landscape owing to the passage of time since they were created and the intervening effects upon them by landuse practices (notable clearing) and bushfires. As a result conservation of these trees was considered warranted. This was not the case for the remaining places (all of which contained stone artefacts) which were considered as having a low scientific significance owing to them being situated within disturbed contexts and being very well represented throughout the Hunter Valley. Despite this assessment, all places containing Aboriginal cultural heritage are afforded equal consideration within the Rio Tinto Coal Australia CHMS and are managed accordingly.

No further assessments (either surface surveys or sub-surface testing for the presence of Aboriginal cultural heritage) were considered as being required.

Although the area was, and remains, to be set aside as a conservation area, management measures were presented for each place. These were presented in three categories. The first was in terms of immediate management actions which included the fencing of these places. The second was in the eventuality that they were to be disturbed which included the collection and removal under an

appropriate NPW Act s90 permit. Finally, where these places were not to be further disturbed they were to remain *in situ* and be managed as agreed among the CHWG but consistent with the provisions of the Warkworth A&CHMP and the Rio Tinto Coal Australia CHMS

Consistent with these provisions, a scarred tree verification visit, tied in with others such identified and recorded trees which had been identified as a result of other previous studies, was undertaken at the end of August 2010. This was undertaken by Aboriginal community representatives with the assistance of specialist technical advice. This resulted in the assessment that all four of these trees contained scars which were Aboriginal in origin.

5.4.3 Additional Aboriginal Community Consultation

MCH invited all of the RAPs to a meeting to discuss the results, significance and management recommendations for each of the Aboriginal cultural heritage places identified during the study. This was held in mid November 2009 in Singleton. Only two representatives of the Aboriginal community were in attendance and a copy of the minutes is appended to the final report of the study. At this the Aboriginal community reiterated its view that all of the identified and recorded places containing Aboriginal cultural heritage were of significance to them. In general the recommendations were supported, particularly the protection of the identified Aboriginal cultural heritage places. It was requested, that should plans alter and there becomes a need for mining development to impact any of these places, that a full and separate consultation process occur prior to the lodgement of any s90 application. This was included within the final report.

5.5 Warkworth Southwest Finalisation and Bulga Farm Study – Scarp Archaeology 2011

5.5.1 Study Outline

This study was the last in the series undertaken in order to complete the comprehensive and systematic studies of the western portions of both the Warkworth and MTO mining lease and adjoining Coal & Allied owned lands. This assessment completed the small portions of the Warkworth Southwest Stage 2 area which were inundated at the time of the initial study. It also included the area known as Bulga Farm, predominantly located on the southern side of Wollombi Brook and in the south western corner of the MTO mining lease and adjacent western areas (see Figure 2). No previous Aboriginal cultural heritage investigations are known to have taken place in this area and there were no previously registered AHIMS records within.

In all the study area comprised approximately 175 hectares.

To maintain consistency between the various studies rationale, survey methodology for, and conduct of this study is directly comparable to that previously described above for the Warkworth West,

Southwest and NDA1 studies outlined above. Again, the present field assessment was undertaken by a team comprising six Aboriginal cultural heritage field officers, a technical advisor (Scarp Archaeology) appointed through the CHWG processes, and a Coal & Allied site supervisor and data management officer.

Again given the relatively restricted size of the area, the fieldwork for the study was undertaken over three days in late May 2010. As was the case with all of these studies, a ToR was finalised with the CHWG prior to the fieldwork commencing. On this occasion 100% survey coverage of the area (including the remnant portions of the Warkworth Southwest Stage 2 study area) was achieved using the pre-planned 100 metre wide pedestrian transects. In all 20 survey transects totalling approximately 20km were completed as part of the study.

5.5.2 Key Findings

The fieldwork identified a total of 56 individual locations containing Aboriginal cultural heritage (Table 7). As was the case during the Warkworth Southwest Stage 2 study, Scarp undertook some groupings of these reducing the total number to 48. The full 56 as originally recorded will be discussed here.

These are almost exclusively (in excess of 98%) places containing stone artefacts. That a total of 124 stone artefacts were identified from these is testament to the low densities observed. In addition, a possible scarred tree was originally recorded however this was determined not to be Aboriginal in origin during a subsequent verification inspection conducted by Aboriginal community representatives with the assistance of specialist technical advice in late August 2010. There were no further management measures required for this place and it was not registered on AHIMS when the remaining survey results were submitted.

Place Type	Place No	%
Isolated Stone Artefact/s	54	96.4
Stone Artefact Scatter	1	1.8
Possible Scarred Tree	1	1.8
<i>Totals</i>	<i>56</i>	

Table 7: Frequency of Aboriginal cultural heritage place types identified within the Scarp Archaeology Warkworth South West Stage 2 Finalisation and Bulga Farm study.

The study’s report noted significant levels of human disturbance to Aboriginal cultural heritage places in parts of the study area as a result of historic land use practices – primarily grazing. Despite the increased diversity of place-types identified during this study, none were considered to be unusual in terms of the regional archaeological record.

The report proposed that large parts of the Bulga Farm area were an aggrading landscape with sedimentation building up over time. This was based on three factors. These included: the presence of a series of fence posts which were substantially buried; the strong positive correlation between identified stone artefacts and erosion areas; and the large numbers of Aboriginal cultural heritage places immediately adjacent on the northern side of Wollombi Brook. As a result, PADs were directly associated with 42 (75%) of the identified and recorded Aboriginal cultural heritage places. This includes all but one of the total number of places in the area located on the southern side of Wollombi Brook.

A significance assessment was made of each of the Aboriginal cultural heritage places identified and recorded. Scientific significance was assessed from the separate categories of rarity / representativeness, integrity and research potential. All of these places were considered to be either medium or low across these categories. A series of places were noted as having medium significance across all of these categories however. These include MTW366-72, 378-96 and 398-408. Within this, places which contained the most potential for further archaeological research were identified. Proposed works included the conduct of detailed recordings while others were identified as being locations suitable for the further investigation unidentified subsurface cultural materials (i.e. PAD).

While the places as individual elements of a cultural landscape were noted as all being significant to the Aboriginal community, it was this landscape which was of particular significance. Portions of the study area were also noted as being in close proximity to Wollombi Brook which was noted as being an important cultural feature in its own right.

The technical advisor's report provides detailed management recommendations for all sites including the further possible archaeological research outlined above and site protection recommendations. With the areas outside of any current mining development consent area and there not being any plans to include them in such, no mitigation strategies were proffered or considered appropriate.

5.5.3 Additional Aboriginal Community Consultation

At the completion of the fieldwork, the results of the study were presented by Scarp Archaeology to at two meetings. The first was at a general CHWG meeting held in early July 2010. A subsequent consultation meeting between Scarp Archaeology and the RAPs was held in early January 2011 in Singleton. Minutes of these meetings are appended to the final report.

These meetings provided an opportunity for Aboriginal community representatives to provide feedback on the survey results, review the proposed recommendations, and provide additional management requirements for the Aboriginal cultural heritage places identified. In April 2011, an

updated draft of the report was provided to all members of the CHWG. The only response was received from the Wanaruah Local Aboriginal Land Council. This endorsed the proposals around the protection and monitoring of the identified and recorded places as well as the desirability of undertaking sub-surfacing testing in identified PAD areas.

5.6 MTO Ramp 22 Sedimentation Dam Area Assessment – RPS 2013

5.6.1 Study Outline

Coal & Allied commissioned the preparation of an Aboriginal Cultural Heritage Assessment Report for the proposed construction of a new sedimentation dam in the south east of the MTO mining lease. Although the proposed development is to be constructed by the adjacent Glencore-Xstrata Bulga Surface Operations (BSO) under their proposed Western Mining Limit modification (DA 41-03-99 Modification 7), the dam will be constructed predominantly if not wholly within the existing MTO development consent area (also the Mount Thorley Operations 2014 proposal area). The study area for this assessment was approximately 11 hectares in size (see Figure 2).

The study was co-ordinated by Coal & Allied and therefore undertaken in a manner consistent with their existing processes for the planning, co-ordination and conduct of such. As is the case with all such Coal & Allied studies, a ToR was finalised with the CHWG prior to the fieldwork commencing. Given the highly restricted size of the area, the fieldwork for the study was undertaken over two days in late July 2013. A 100% survey coverage of the area was achieved using the pre-planned pedestrian transects. The field assessment was undertaken by a team comprising six Aboriginal cultural heritage field officers, two technical advisors (both from RPS) appointed through the CHWG processes, a site supervisor and data management officer both from Coal & Allied.

The study undertook a detailed review of all previous Aboriginal cultural heritage assessment work undertaken throughout the MTO mining lease and immediately adjacent areas. This review indicated that, with the exception of the largely undeveloped south eastern portion of the current development consent area (which is the entirety of the MTO mining lease east of Charlton Road), the remainder had been the subject of a series of Aboriginal cultural heritage investigation and salvage operations which completed all such works ahead of mining development. With respect to the study area, this review identified a number of previously identified and recorded Aboriginal cultural heritage places that had been identified and registered on AHIMS. Initially, only one (37-6-2716) was determined as not having been destroyed under a finalised s90 consent issued under the NPW Act. Irrespective, the location of all of these places was revisited and their current status identified during the fieldwork.

Much of the study area had already been the subject of considerable development impacts. These include dam, drainage channel, bund wall and water pumping station construction, and well as the

development of powerlines, vehicle tracks, fencing and sedimentation traps. Large portions therefore have been cleared of their original vegetation and affected subsequently by erosion. In addition, and linked with these developments, the area has been the subject of a previous Aboriginal cultural heritage salvage program (ERM 2004b).

Undeveloped areas remained within the study area and are predominantly the remnant riparian areas located along the tributary of Loder Creek. These areas formed the core of the field inspections undertaken. Two formal survey transects totalling approximately 1.2km were completed. The previously disturbed areas were also reviewed, particularly with respect to the status of previously registered AHIMS records.

5.6.2 Key Findings

The fieldwork identified a total of 32 individual locations containing Aboriginal cultural heritage (Table 8). Seven previously recorded and registered on AHIMS were also revisited (six of which were inside the study area). Additional Aboriginal cultural material was identified and recorded at five of these. These consist entirely of stone artefacts found predominantly as isolated examples, although there were noted as more extended scatters. All of these places have been registered on AHIMS with the new recordings replacing those previously entered on AHIMS.

Place Type	Place No	%
Isolated Stone Artefact/s	29	96.4
Stone Artefact Scatter	3	1.8
<i>Totals</i>	32	

Table 8: Frequency of Aboriginal cultural heritage place types identified within the RPS Ramp 22 Sedimentation Dam assessment.

The potential for sub-surface Aboriginal cultural material (i.e. PAD) to exist within the study area was also noted in two instances. These are associated with two of the three identified stone artefact scatters.

A significance assessment was made of each of the Aboriginal cultural heritage places identified and recorded. Scientific significance was assessed via the application of a matrix that reviewed the several variables (e.g. research potential and rarity) at both local and regional scales. With the exception of two, the remaining Aboriginal cultural heritage places were considered to have a low overall scientific significance. This was largely on the basis of their relatively low numbers of stone artefacts and high levels of disturbance.

The remaining two Aboriginal cultural heritage places consisted of stone artefacts scatters and included the two MTW524 and 526; AHIMS #37-6-2887 and 2889 respectively) which had been

identified as being associated with PAD. Despite not being assessed as being of State Significance, these were considered as having a medium scientific significance at the regional level and high at the local level. In support of this RPS (2013:54) noted that:

Both these sites showed evidence of conjoining artefacts (knapping event), single platform and multi platform cores, formal tools including hammerstones, evidence of heat treatment and a variety of raw material types including basalt, trachyte, rhyolite and porcellinite. Porcellinite is relatively uncommon in the Upper Hunter Valley area, but had been previously found at other sites near Loder Creek. In addition, it was considered that there was a high potential for in situ subsurface artefacts in the terrace close to the creek line.

Both primary and secondary impacts upon the Aboriginal cultural heritage places recorded during the study were identified. Primary impacts (described as Area A within the report) included those places which would be directly impacted as a result of the dam construction and associated vehicle movements. Within Area B it was identified that secondary impacts to these places may result from increased creek flow and associated potential inundation and erosion as a result of the installation of the dam, as well as from remediation works which may be required to be undertaken throughout the study area.

Fourteen Aboriginal cultural heritage places were identified as being located within the primary impact zone and for which an AHIP would need to be sought for thirteen prior to the commencement of the development activities. All of the remaining places, which were outside of the primary impact areas, were to be appropriately barricaded for the duration of the constructions works. They were also to be monitored and, in the eventuality that secondary impacts meant that any would subsequently be required to be salvage or remediated / rehabilitated, these works would also be undertaken under a subsequently sought AHIP.

The technical advisor's report provides detailed management recommendations for all sites including the further possible archaeological research outlined above and site protection recommendations. With the areas outside of any current mining development consent area and there not being any plans to include them in such, no mitigation strategies were proffered or considered appropriate.

5.6.3 Additional Aboriginal Community Consultation

This report contains very detailed information regarding consultation with the RAPs and other Aboriginal community stakeholders undertaken as part of the study. This includes the presentations and minutes of all meetings (RPS 2013:Appendices 1-4), as well as a detailed statement of compliance with the 2010 DECCW four stage ACHCRP process (RPS 2013:9-14).

At the completion of the fieldwork, the results of the study and a draft of the report were presented by RPS at a CHWG meeting held in late August 2013. Among the general discussions, it was specifically noted that there was a need to undertake some additional assessment of several of the identified Aboriginal cultural heritage places which extended south of MTO into the BSO lands. This additional field assessment was undertaken in mid September and included two representatives of the RAPs, the RPS technical advisor and Coal & Allied representatives.

In early November 2013 all RAPs were invited to take part in a field visit to the study area which was to take place in early December. This was to provide an opportunity for those not present during the fieldwork to review the area and the identified Aboriginal cultural material, provide any comments with respect to that cultural heritage and the proposed development activities and their impacts upon that, and the proposed impact management measures. There were no respondents to this.

A subsequent CHWG meeting with the RAPs was held in early December 2013. This meeting reviewed the draft report prepared for the study and provided the opportunity for further input into that ahead of finalisation. Although having ongoing concerns about downstream effect upon Aboriginal cultural heritage as a result of the sedimentation dam, the impact management strategy, methodology and actions were endorsed.

5.7 Warkworth Modification 6 Study – Coal & Allied 2013

5.7.1 Study Outline

The disapproval of the development consent for the Warkworth Extension Project (DA 09_0202) saw Coal & Allied apply for a modification to their existing consent (DA 300-9-2002-i) under section 75W of the EP&A Act. This proposal was to provide for a continuation of mining within the present West Pit area for a period of two years. This time would allow Coal & Allied to undertake further planning with respect to options for the longer term future of MTW. This has expression in the present proposals.

Warkworth Modification 6 provided for the expansion of the existing development consent area a maximum of 350m to the west towards Wallaby Scrub Road. This included a maximum of 300m of additional open cut mining footprint and 50m for infrastructure provision. This area had been the subject of several Aboriginal cultural heritage assessments since 1979 with the most recent being the 2002 AMBS study (outlined above at the beginning of this section). A further subsequent reassessment and salvage collection program of three Aboriginal cultural heritage places in the south of the study area had also been undertaken in early 2008 (MCH 2008 Volume 2).

In addition to the almost 32 hectares which comprised the proposed development consent modification area, the field assessment was to include two additional areas. The first was the narrow undeveloped

strip of land to the east of the Modification area which lay within the existing development consent boundaries. The second was to continue the survey work westwards across the remaining portion of this southern part of the Warkworth mining lease west to Wallaby Scrub Road. This area was the last remaining portions of the MTW mining area and adjacent Coal & Allied owned lands which Coal & Allied desired to complete an updated reassessment to review the status of Aboriginal cultural heritage. Within the time available to this study, a total of 100 hectares was the subject of a 100% survey coverage (see Figure 2). The remaining part of this area to Wallaby Scrub Road was subsequently completed and is outline separately below.

The fieldwork completed as part of this study was undertaken over two days in late November 2013. Six 100 metre wide pedestrian transects totalling approximately 12km were completed. It was undertaken by a field team consisting of six Aboriginal cultural heritage field officers, their technical advisor (CQCHM) appointed under the processes developed by the CHWG, and a Coal & Allied site supervisor and data management officer.

5.7.2 Key Findings

The fieldwork identified a total of 19 individual locations containing Aboriginal cultural heritage. The majority of these (n=14) were locations already registered on AHIMS and these were reassessed and recordings updated. Additional Aboriginal cultural material was identified and recorded at five new locations. The identified Aboriginal cultural heritage consists entirely of areas containing isolated stone artefact/s. A total of 31 stone artefacts were recorded at these places. Being low in numbers, of materials and form commonly identified throughout both the local area and the broader region, and located within highly disturbed contexts, they were considered to be of low archaeological context. Despite this, consultation with the RAPs through the CHWG settled management measures for each which involved the conduct of a cultural salvage ahead of any development activities. Those which lay outside of the Warkworth Modification 6 area (and within the present Warkworth Continuation 2014 proposal area) have been subject to the protective management regimes established under the Warkworth A&CHMP 2004 and the Rio Tinto Coal Australia CHMS.

No potential for sub-surface Aboriginal cultural material (i.e. PAD) was identified within the areas investigated either within or outside of the Warkworth 6 Modification area.

Eight extant places (including five previously registered on AHIMS and three of those newly identified as a result of this study) were located within the Warkworth Modification 6 area. Following consultation with the RAPs, and ACHAR was developed for this in support of an AHIP application. This AHIP was subsequently granted (#C0000201) and the agreed impact mitigation measures implemented in early February 2014. Two of these Aboriginal cultural heritage places (37-6-1234 and

1235) straddled the western boundary of the Warkworth Modification 6 boundary. Only those portions within this development area have been destroyed under the granted AHIP. The remaining parts of these are located within the Warkworth Continuation 2014 proposal area and are considered further elsewhere in this report.

5.8 Wallaby Scrub Road East Completion Study – Coal & Allied 2014

5.8.1 Study Outline

Following on from the field assessment undertaken as part of the Warkworth Modification 6 study, the remaining portion of the Warkworth mining lease outside of the current development consent and east of Wallaby Scrub road was the subject of an Aboriginal cultural heritage investigation and assessment over two days in late February 2014. This remaining area totalled approximately 75 hectares (see Figure 2). The remaining five pre-planned transects totalling approximately 9.5km were completed.

Being immediately adjacent, the study area had been the subject of the same Aboriginal cultural heritage assessments undertaken between 1979 and 2002. Unlike further to the east however, no Aboriginal cultural heritage salvage programs have been undertaken. The earlier field assessments had identified and recorded 18 places containing Aboriginal cultural heritage. As part of the field program, the location of each of these was revisited and the recordings updated.

The field assessment was undertaken by a single field team comprising six Aboriginal cultural heritage field officers, their technical advisor (CQCHM), and a Coal & Allied site supervisor and data management officer responsible for the real time recording of the location and features of all Aboriginal cultural heritage identified. This information was captured directly within GPS-based mobile mapping equipment and incorporated within the MTW CHMD. The fieldwork team was spaced evenly apart and conducted each pre-planned survey transect by moving forward together in a straight line. This methodology enabled the comprehensive assessment of the entire study area.

A comprehensive ToR for the study was developed through a collaborative process between Coal & Allied and representatives of the Aboriginal community of the Upper Hunter Valley under the auspices of the CHWG. The CHWG drafted, discussed, refined and endorsed these ToR.

5.8.2 Key Findings

The fieldwork identified a total of 26 individual locations containing Aboriginal cultural heritage (Table 9). The majority of these (n=18) were locations already registered on AHIMS and these were reassessed and recordings updated. Additional Aboriginal cultural material was identified and recorded at eight new locations. The identified Aboriginal cultural heritage consists almost entirely of areas containing isolated stone artefact/s. A total of 34 stone artefacts were recorded at these places.

Of particular note was a sandstone grindstone identified at one of the newly identified places (37-6-2949 (MTW-576)). All newly identified places have been registered on AHIMS.

Place Type	Place No	%
Isolated Stone Artefact/s	25	96.2
Grinding Grooves	1	3.8
<i>Totals</i>	<i>26</i>	

Table 9: Frequency of Aboriginal cultural heritage place types identified within the Wallaby Scrub Road East Completion study

Of particular note within this area is the previously discussed Site M grinding grooves. As has been the case during previous inspections, the smaller upstream set of groves (Site M east) was not visible owing to being covered with sediment from the creek it is located within. The main grinding groove area (Site M West) has also been regularly inspected and monitored, including by CHWG representatives, as part of the ongoing Aboriginal cultural heritage management processes across MTW. There were no obvious signs of changes to this area since it was last inspected. This area remains of particular significance to the Aboriginal community having been reinforced during both the fieldwork undertaken as part of this study, and the consultations with the RAPs as part of the present Warkworth Continuation 2014 proposal. Agreed management commitments with respect this place are discussed in detail elsewhere in this report.

Other than the known burial of the grinding grooves at Site M east, and entirely consistent with the results obtained during the field assessment for the adjacent areas to the east, no potential for sub-surface Aboriginal cultural material (i.e. PAD) was identified within this study area.

It is worth noting that the AHIMS record for PL9 notes it as containing stone artefacts and a culturally modified (scarred tree). This place was originally identified and recorded by Haglund (1999) within which it is noted as consisting of a single flake manufactured from red chert locates on a 'scuffed surface' (Haglund 1999:47, see also Table 4.1). Further, a photograph and description of this place (Haglund 1999:Plate 31) shows the location of this artefact (which is staked) and notes that it is 'below tree (in the scuffed area)'. It would appear therefore that the reference to the tree within the plate has been erroneously during the entry of this place within AHIMS. Subsequent reassessment of this place undertaken by both AMBS (2002) and as part of this study, have both failed to note the presence of a scarred tree in this area.

5.9 Warkworth Sands Archaeological Project – Scarp Archaeology 2009

5.9.1 Study Outline

The Warkworth Sands Archaeological Project was undertaken in compliance with the development consent conditions attached to the 2002 Warkworth Extension Project (DA-300-9-2002-i). Aeolian sand dune and sand sheets in general but the Warkworth Sandsheet in particular, has been seen by a

number of researchers as a potential location for Aboriginal cultural material of Pleistocene age. As previously outlined above, a series of test excavations undertaken on this sand sheet as part of the AMBS (2002) study returned a series of OSL dates which suggested that a sparse accumulation of stone artefacts identified in the lower part of the excavations were of Pleistocene age – somewhere between 14,000 and 47,000 years old, and a single lower stone artefact which could be even older. If such an association could be positively established, the Warkworth Sandsheet, particularly the older date, would be of singular importance not only to the Aboriginal community, but to regional and Australian archaeology as it would represent one of the earliest dates for human occupation of the continent. Even if this material was identified as being at the lower end of this potential age bracket, this would provide amongst the earliest evidence for Aboriginal occupation of the Central Lowlands of the Hunter Valley.

Under the mine plan developed for the proposed Warkworth Extension Project this portion of the Warkworth Sandsheet (see Figure 2) would be destroyed. This led the state in its consideration of the development application for the Warkworth Extension Project to raise its interest in and concern about this area and its potential to provide information on significant themes of archaeological research including climatic and environmental change, antiquity and continuity of occupation, human settlement patterns and the range of material evidence. Because of the area's potential scientific and cultural significance, Coal & Allied committed substantial financial, technical and logistical resources to its comprehensive investigation.

In accordance with the protocols established through the CHWG, Coal & Allied undertook comprehensive consultations with the Aboriginal community at all stages of the project. Discussions relating to the salvage strategy for the Warkworth Mine Extension project were conducted across eight CHWG meetings held in 2007 and the early months of 2008. The methodology for the Warkworth Sands Archaeological Project was endorsed at an advertised public meeting for the Aboriginal community held in late February 2008. The RAPs oversaw the appointment of the specialist technical assistance engaged for the project through the CHWG processes. A total of 26 members of the Aboriginal community worked on the project which was undertaken over several months in mid and late 2008.

The study involved:

- the comprehensive excavation of the depositional sequence from five trenches on the sand sheet,
- geomorphological analyses and interpretation of the formation and chronology of the sand sheet development over time;

- typological analysis and interpretations of the recovered stone artefact assemblage;
- securing multiple OSL dates for the stratigraphic sequence across the sand sheet;
- complimenting this dating sequence where available with radiocarbon determinations for comparative purposes;
- the use of ground penetrating radar to define the extent of the sand sheet, its relationship with its basement surface and underlying topography and the degree of disturbance; and
- the use of magnetic susceptibility testing to determine the degree of mixing in the sand sheet material.

A permanent record of the both the project fieldwork and general landscape within which the sand sheet resided was also captured in order that it could be retained by the Aboriginal community. A professional film crew undertook this work. They also oversaw the conduct of a series of interviews with project personnel as the project progressed. A professionally produced twelve disc hi-definition digital video DVD package was produced and distributed to all community stakeholders through the CHWG.

5.9.2 Key Findings

The study represented one of the most extensive multidisciplinary archaeological studies conducted for a single cultural place in Australia. In this the report's authors (Scarp Archaeology 2009a:82) record their view that:

Few other sites have been so intensively sampled and dated with such attention to the problems of taphonomy and stratigraphic integrity. The field study has been exhaustive and reached the point of redundancy (Scarp Archaeology, 2009a, 82).

Whereas the AMBS (2002) test excavations has recovered 213 stone artefacts (which included 88 complete flakes) from 10m² of the sandsheet. The Warkworth Sands Archaeological Project increased this tenfold. From the 100m² excavated during this study a total of 1,067 stone artefacts were recovered. This included a total of 1,043 complete flakes (29 of which had evidence of having been used / modified following initial flaking). Some 24 cores from which flakes had been produced were also identified along with an additional 2,022 other stone fragments which could not be positively identified as being the result of Aboriginal flaking activities.

The distribution of these artefacts identified that none of these stone artefacts were identified within the sandsheet any lower than one metre from the surface of any of the four excavated trenches. Further, none were identified within 15cm of the base of the sandsheet where it interfaced with the lower B Horizon. Additional test excavations into this B Horizon also failed to identify any Aboriginal cultural material.

At the conclusion of the study demonstrated that:

- contrary to what appeared to be the case of the basis of the ground penetrating radar survey, the sandsheet contained no discernable stratigraphy;
- the sandsheet evidenced significant sediment disturbance and that the most likely cause of this was bioturbation (displacement and mixture through the activities of insects, worms, burrowing reptiles and mammals and tree roots);
- the previous Pleistocene OSL dates (reported by AMBS 2002) are unreliable indicators of the antiquity of both sediment deposition and therefore the stone artefacts within;
- the oldest artefacts buried in the Warkworth sands are all probably Holocene in age (less than 10,000 years old), or perhaps slightly older; and
- owing to the degree of sediment mixing, further archaeological work is unlikely to recover any stone artefacts that can be securely dated to a Pleistocene age.

The study concluded that although the study of the Warkworth Sandsheet provided unique insights into site disturbance processes, the significance (particularly scientific) of the sandsheet site is low relative to other Hunter Valley archaeological sites which contain better stratigraphic integrity, chronological resolution and intact features (e.g. hearths, pits). The educational potential for the place itself was similarly considered to be low, although the professional video that documents all activities associated with the investigation will be useful for schools and community knowledge (Scarp Archaeology 2009a: 83).

The project was peer reviewed by Professor Ian McNiven (School of Geography and Environmental Science, Monash University) who reported (2009:1) *inter alia* that:

Overall, I concur with most of the conclusions and recommendations of this report and the methodologies employed to arrive at these conclusions and recommendations. The methodologies are largely cutting edge and in many respects the Scarp Archaeology report can be considered best practice.

These findings have also been acknowledged by the members of CHWG who were intensively involved in the design and conduct of the study. The Stage regulating agency issued a s.90 AHIP covering Warkworth Sandsheet area in July 2009. All archaeological investigations and cultural heritage salvage works have now been completed.

5.10 Warkworth Sandsheet Sub-Area A Study – Scarp Archaeology 2013

5.10.1 Study Outline

Like the Warkworth Sands Archaeological Project, investigations of the remaining portions of this same sandsheet were undertaken in compliance with the development consent conditions attached to subsequently disapproved Warkworth Extension Project (DA 09_0202). These focussed on areas immediately adjacent to these earlier excavations and to the northwest running to Wallaby Scrub Road (see Figure 2). The requirement for the undertaking of this study also aligned with a further consent condition which required a broader research project into sand dune and sheet features more generally within the Hunter Valley. As a response to this, Coal & Allied established an ‘expert panel’ comprised of four eminent professionals (archaeologists and geomorphologists) with particular experience and knowledge of both the Warkworth Sands as a landscape feature, and Pleistocene Aboriginal archaeology in Australia.

Coal & Allied personnel and the expert panel convened a workshop in Singleton in early August 2012 to develop methodologies for these studies. Officers from DP&E and OEH attended and assisted with that process. This was subsequently settled with the RAPs through the CHWG at a meeting later in August, and submitted and approved by DP&E. In the case of the Sub-Area A study, the methodology and various administrative arrangements were settled in an agreed Terms of Reference. In addition to the methodology for the archaeological and geomorphic investigations, a cultural salvage, as requested by the CHWG, was also included.

Preliminary investigations of the study area has noted that it had been substantially altered since European settlement and particularly as a result of the intensification of agricultural and pastoral activities over the previous 100 years which saw these lands revert to smaller and smaller holdings and the duplication of infrastructure and hence impacts associated with that. It was also noted that although now consisting of woodlands, these are known to be regrowth with these having been cleared in the past.

One of the principle elements of the agreed methodology was to test if the patterns and conclusions observed during the very detailed excavations undertaken immediately to the south east during the Warkworth Sandy Archaeological Project also held for this portion of the sandsheet. The agreed methodology provided for the mechanical excavation of six trenches each approximately 5m in length and 0.9m wide (the width of the excavator bucket). Sediments were removed in 10cm increments (spits) through the sandsheet. The six trenches were generally aligned along an east-west transect running across the area. An additional seventh, test, trench was also excavated at the western end immediately adjacent to the areas identified as being part of the sandsheet.

Although provisions were made for the conduct of hand excavations, stone artefact density thresholds identified in the methodology as the trigger for this were not reached at all during the conduct of the fieldwork.

At the completion of the excavations, all of the exposed sections were subject to a geomorphic assessment in order to provide an understanding of the origin, age and post-depositional history of the sand body. As part of this assessment 24 sediments samples taken from six of the seven trenches were submitted for OSL age determination. Additionally, two charred wood samples were submitted for AMS radiocarbon dating.

In the first instance, all sediments removed from the trenches were run through a 1cm sieve with all Aboriginal cultural material retained for analysis. As part of the agreed cultural salvage aspect of the fieldwork, these sediments were subsequently resieved through a 0.5cm mesh.

The fieldwork team consisted of Scarp Archaeology personnel, OSL dating and geomorphological specialists from the University of Wollongong, four CHWG cultural heritage field officers, and Coal & Allied representatives including technical specialists and machine operator.

5.10.2 Key Findings

Approximately 33m³ of sediments was excavated during the fieldwork program. In this area the sandsheet was found to be a maximum of 2.5m deep although this was in one trench only. The remaining trenches contained sand deposits less than 1.6m in depth. In general, the depth of sands decreased dramatically from east to west and between trenches 4-6, this dropped from 56cm to 28cm before the basal deposits were encountered. As had been expected, trench 7 contained almost no sandsheet development, containing a veneer of sands some 10cm in depth.

From these a total of 21 stone artefacts were recovered. Thirteen of these were recovered from the archaeological excavations while the remaining eight were from the additional cultural salvage. As would be expected, the majority of this material (8 of the 13 and 2 of the 8 recovered from the archaeological excavations and cultural salvage respectively) came from those trenches with the deeper deposits. The remaining material was all located from trench 5 (which was a maximum of 43cm deep). No cultural materials were recovered from trenches 4, 6 or 7.

Additionally, within trench two (the deepest occurrence of sands encountered during the study) a shot gun percussion cap was recovered. This was found approximately midway through the sandsheet at a depth of some 120-130cm below the surface. This is some 20-30cm below the lowest identified Aboriginal cultural material. Branding on this percussion cap showed it to be from a company who

commenced manufacturing these from 1837, although the type of shell is indicative of having been produced post-1900.

The OSL dating results were found to vary wildly even between samples taken from the same level within the same trench. Two dates taken from a depth of 60cm within trench one for example returned minimum ages of around 6,600 and 105,000 years old respectively. Additionally, a radiocarbon determination for a piece of charred wood recovered from near the base of trench 4 (a trench which contained no Aboriginal cultural material) returned a result of only 300 years. The second radiocarbon determination for the charred wood located at a depth of approximately 150cm in trench 2 (some 20-30cm below the shot gun percussion cap) returned a date of 43,500 BP.

Overall the results of the dating program indicated extensive mixing of the sediments and the cultural materials (both Aboriginal and European) within. This vertical and lateral displacement of the sediments across the study area was identified as being a result of several factors including tree root penetration (which was observed as being ubiquitous throughout the exposed sections), historical land disturbance, and collapse / slumping as a result of successive wetting and drying conditions.

As was considered the case during the adjacent Warkworth Sandsheet Archaeological Project, the evidence for substantial bioturbation within the Warkworth Sandsheet within Sub-Area A was identified (Scarp Archaeology 2013:43) as including:

- large tree growth (with subsequent decay of roots), deep root penetration and burrowing from insects. With respect animals, it was noted that wombat burrows were common and at least one large termite mound was noted in the immediate area;
- the highly dispersed OSL age determinations for both separate samples taken from the same levels in the same trench, but also from individual sand grains within the same sample;
- the lack of any identifiable old land surfaces or stratigraphic boundaries defining units within the sands; and
- the demonstrated evidence of downward movement of stone artefact-sized objects from the surface up to 1.3m within the deposits.

By way of summary the study's report (Scarp Archaeology 2013:43) concluded that:

...the stratigraphic integrity of the Warkworth Sands at this location is low. The sands are clearly turbated and provide poor chronological resolution. The cultural material contained in the sands is also demonstrably not in situ.

As a result of both the Warkworth Sands Archaeological Project and that subsequently undertaken within Sub-Area A, it was concluded that there were little prospects for additional archaeological research to provide finer resolution or additional insights into questions of Pleistocene cultural materials being located within the Warkworth Sandsheet.

5.11 A Note Regarding the Currency of the Aboriginal Cultural Heritage Studies

OEH has expressed a view that Aboriginal cultural heritage studies should be undertaken in both a timely and effective manner. In particular OEH generally requires that data used in preparing impact assessments, management plans and strategies should be derived from surveys undertaken no more than five years prior to the generation of relevant documentation. OEH does recognise, however, that the currency and validity of data is subject to consideration of the comprehensiveness, effectiveness and methodology of the studies irrespective of when it was undertaken, and also whether significant taphonomic processes, such as large-scale changes in ground surfaces due to erosion, are evident within the study area that would warrant review of the data generated as part of these.

As has been outlined above, the Aboriginal cultural heritage studies outlined above and used as the basis of this impact assessment with respect to the proposals have been conducted between 2008 and 2014. Although there have been two significant weather events which have been experienced across the Upper Hunter Valley in that time these, along with ongoing patterns of land use, erosion and sedimentation have not resulted in any significant changes in landform condition that would have significantly altered the patterns of distribution, form or condition of Aboriginal cultural heritage identified in the course of the fieldwork studies conducted.

This has been concluded on the basis of two main factors. The first is a longitudinal review of aerial imagery collected for the greater MTW mining area across that time, namely that imagery captured in July 2008, December 2010, December 2011, June 2012 and November 2013. This has been complimented with field investigations as part of regular audit and monitoring processes agreed with the CHWG and as captured within various management processes. These activities have been undertaken both specific to particular Aboriginal cultural heritage places and also with the general landscapes within which they reside.

Coal & Allied holds the view that the studies it has undertaken in the proposal areas and over adjoining Coal & Allied owned lands have more than adequate currency and validity for the purpose of informing this impact assessment. As Terms of Reference (Scope of Works) and reports for these studies demonstrate, they were undertaken using a systematic and comprehensive strategy that is consistent with current best practice. Additional studies to provide additional data have been

undertaken and while improving our understanding of issues, have not resulted in any fundamental change in the scale or nature of the issues requiring management.

The technology used in site recording remains of high precision, being either Differential GPS or high resolution (typically less than 2m error) hand-held GPS/Mobile GIS units and the data collected is managed in an integrated Geographic Information System to maintain consistency of recording standards and accuracy while also minimising double handling of data, with the associated possibilities of transcription errors. Consequently, Coal & Allied maintains that the results of these studies, although undertaken over an extended period, remain timely and effective for impact assessment purposes.

6. ABORIGINAL CULTURAL HERITAGE SIGNIFICANCE ASSESSMENT

As is clear from the above discussion, there is a large body of Aboriginal cultural heritage present throughout the MTW area. For the Aboriginal people of the Upper Hunter Valley such places are of cultural significance. While a comprehensive statement of significance has never been tendered on this matter in the Upper Hunter Valley, it is common for people to make comments that capture this in the following terms: archaeological cultural heritage places are seen as the footprint of the ancestors on the landscape, evidence that the ‘old people’ once lived there and indeed that their spirits continue to inhabit that same area and are watching what is going on. In this sense any and all material culture is thereby significant to them. Coal & Allied has accepted this assessment of significance and for this reason, notwithstanding any statement of scientific significance relating to any particular place, has provided for the management of each and every object and area identified during a survey by developing management arrangements with the Aboriginal community that addresses precisely this point.

There are two distinct categories of cultural place that attract Aboriginal cultural heritage significance:

1. places of cultural significance through their association with creator beings, spirit beings, culture heroes, traditional activities, historical events or contemporary values where there may not be any physical material – sometimes referred to as intangible cultural heritage although very tangible to enculturated Aboriginal people; and
2. places where there is material cultural heritage (either organic or inorganic) that derives from cultural activities of Aboriginal people, commonly called archaeological material and constitutes the objects protected under the NPW Act.

Examples of the former have been identified and recorded within the MTW area. The Bulga bora ground (37-6-0056, 37-6-0055) is the most notable in this regard but there are also other features such as an arrangement of three stone mounds (37-6-2315), and an earthen mound with the potential to contain burials (37-6-2555). All of these places and values lie or are situated within the proposed WBACHCA.

Only the latter category of place (i.e. material cultural heritage) with Aboriginal cultural significance has been identified within the proposal areas. Coal & Allied is not aware that any of the extant Aboriginal cultural heritage places identified in the proposal areas are the subject of any specific requirements to address issues of cultural sensitivity. Further, it is considered that there are no Aboriginal cultural heritage places whose scientific values are such that they constitute a constraint on the proposals.

6.1 Scientific Significance

The great majority of Aboriginal cultural heritage places identified in the MTW mining area are typical of the regional archaeology of the Upper Hunter Valley. The places are concentrated along drainage lines with a particular focus around permanent sources of water. These areas also have generally been subjected to a long history of disturbance through a range of land uses including vegetation removal, grazing, farming and the development of formal and informal access tracks.

In general, the majority of the Aboriginal cultural heritage places which have so far been identified and recorded are unlikely to yield significant additional information with regard patterns of land and resource use either locally or regionally. Further, chronological attribution given sample sizes both within individual places and across place-types, allied against taphonomic considerations, is notoriously difficult for the majority of this cultural heritage. Further archaeological research into the majority of the identified Aboriginal cultural heritage places is, therefore not considered warranted from a scientific viewpoint.

Despite this, recommendations for each identified and recorded Aboriginal cultural heritage place deriving from the investigations and assessments undertaken, have been subject to review by Coal & Allied and the Aboriginal community (under the auspices of the CHWG), and reporting finalised consistent with comments received from those parties. The decisions of the CHWG and Coal & Allied, informed by the recommendations, have been accepted and the CHMD developed to capture those decisions, with each recorded place managed in a manner consistent with the scientific significance assessment. The only point at which scientific assessments of significance have not been accepted in their entirety has been where such assessments impose a lesser management requirement than those specified in the CHMD, which set a minimum standard for compliance with Aboriginal cultural significance.

Within the proposal areas, the vast majority of the identified and recorded cultural heritage places consist of isolated stone artefact/s in disturbed contexts. While several scarred trees have been identified they represent a relatively small proportion of the total numbers which would remain extant, and in the case of those within the WBACHCA, will be protected in perpetuity. The most significant place from a scientific perspective is the grinding grooves (37-6-0163) generally referred to as 'Site M'. Although all categories of Aboriginal cultural heritage places have separate and agreed management measures within the CHMD, specific additional management measures have been settled for this place and these are outlined in the impact management commitments below.

6.2 Significance to the Aboriginal Community

In general, the cultural heritage places for which the Aboriginal community has evinced the strongest concerns are also those that have been identified as having a higher order of significance from a scientific viewpoint. There are a number of such places identified as such within the MTW area which have been identified on that basis and these have been outlined above.

During their participation in the design and conduct of the cultural heritage survey and assessments which have been conducted, Aboriginal community representatives have expressed views about their strong concern for particular places and cultural locations as well as with respect the preferred mitigation of impacts on them from any potential development activities. In the course of the extensive consultation which has been conducted with the Aboriginal community in relation to Coal & Allied's mining activities throughout the MTW area, the Aboriginal community have continually endorsed an Aboriginal cultural heritage management approach based on the limits of acceptable change to their heritage at a landscape scale and the desirability of achieving long-term and secure management of a range of significant places and areas, such as the Bulga bora ground and Wollombi Brook in general, which have significance to them at a broader regional level.

The Bulga bora ground, for example, is of very high cultural significance to the Aboriginal community of the Upper Hunter Valley region because it is a location of important traditional ceremonial activity. The place is also of great significance to non-Aboriginal science and history; clearly evinced by its detailed recording by European scientists and anthropologists on several occasions during the nineteenth and early twentieth centuries.

The early recognition of this directly led to the proposal for the establishment of a permanent Aboriginal conservation area to protect such Aboriginal cultural heritage places and areas. This WBACHCA proposal has been jointly developed by Coal & Allied and the Aboriginal community through the CHWG over an extended period and all parties remain committed to its enactment. Having been recently expanded and including considerable areas of the Warkworth mining lease, this is a significant undertaking for Coal & Allied.

With respect to the Mount Thorley Operations proposal area, recent consultation with the Aboriginal community through the CHWG included a request by the CHWG for Coal & Allied to consider options to permanently protect the remnant riparian areas and cultural sites along the section of Loder Creek located within Mount Thorley Operations mining lease area. In response to this request, Coal & Allied has proposed the establishment of an Aboriginal cultural heritage conservation area (approx. 87ha) along Loder Creek as part of the cultural heritage management commitments for the Mount Thorley Operations 2014 proposal.

The key ongoing objective in the particular development of the WBACHA and the proposed Loder Creek ACHCA, will be to establish a co-management regime in partnership with the Aboriginal community through the development of a comprehensive and well considered management strategy supported by an appropriate community-based governance structure. Discussions, positions and mechanisms for the delivery of both are well advanced.

7. ABORIGINAL CULTURAL HERITAGE WITHIN THE GREATER MTW MINING AREA AND EXPECTED IMPACTS

A considerable number of places containing Aboriginal cultural heritage have been identified and recorded throughout the MTW mining area and adjoining Coal & Allied owned lands. For the purposes of this EIS, it is relevant to review and consider these in six broad landuse-based categories. These are generally based upon their location within the greater MTW mining area as follows:

1. places situated within the Warkworth Continuation 2014 proposal area;
2. places situated within the Mount Thorley Operations 2014 proposal area;
3. places situated within the proposed WBACHCA;
4. places situated within the proposed Loder Creek ACHCA;
5. places situated within the current Warkworth mine development consent area (DA 300-9-2002-i as modified); and
6. places located on other 'on site' Coal & Allied owned lands not situated within 1-5 above.

Each of the six categories will be considered in turn below and are presented in Figure 3.

7.1 Warkworth Continuation 2014 Proposal Area

The entirety of the Warkworth Continuation 2014 proposal area (approximately 698ha) has been the subject of comprehensive and systematic cultural heritage investigations. A total of 111 places (either wholly or in part) containing Aboriginal cultural heritage objects have been identified and recorded within this area (Figure 4; see also Figure 3). Of these, one (37-6-1250 - W23;) has previously been destroyed under a finalised consent (AHIP #1131171) under the NPW Act and as such require no further management consideration here. A further two (37-6-1234 - W12 and 37-6-1235; W13) have been only partially destroyed under another finalised consent (AHIP #C0000201) and as such are included in the discussion here.

The remaining 110 extant places (including those which have previously been partially destroyed) primarily consist of stone artefacts although examples of culturally modified (scarred) trees, areas of PAD, and an area containing grinding grooves have all been identified (Table 10). Further details regarding these places are provided in Table 11.

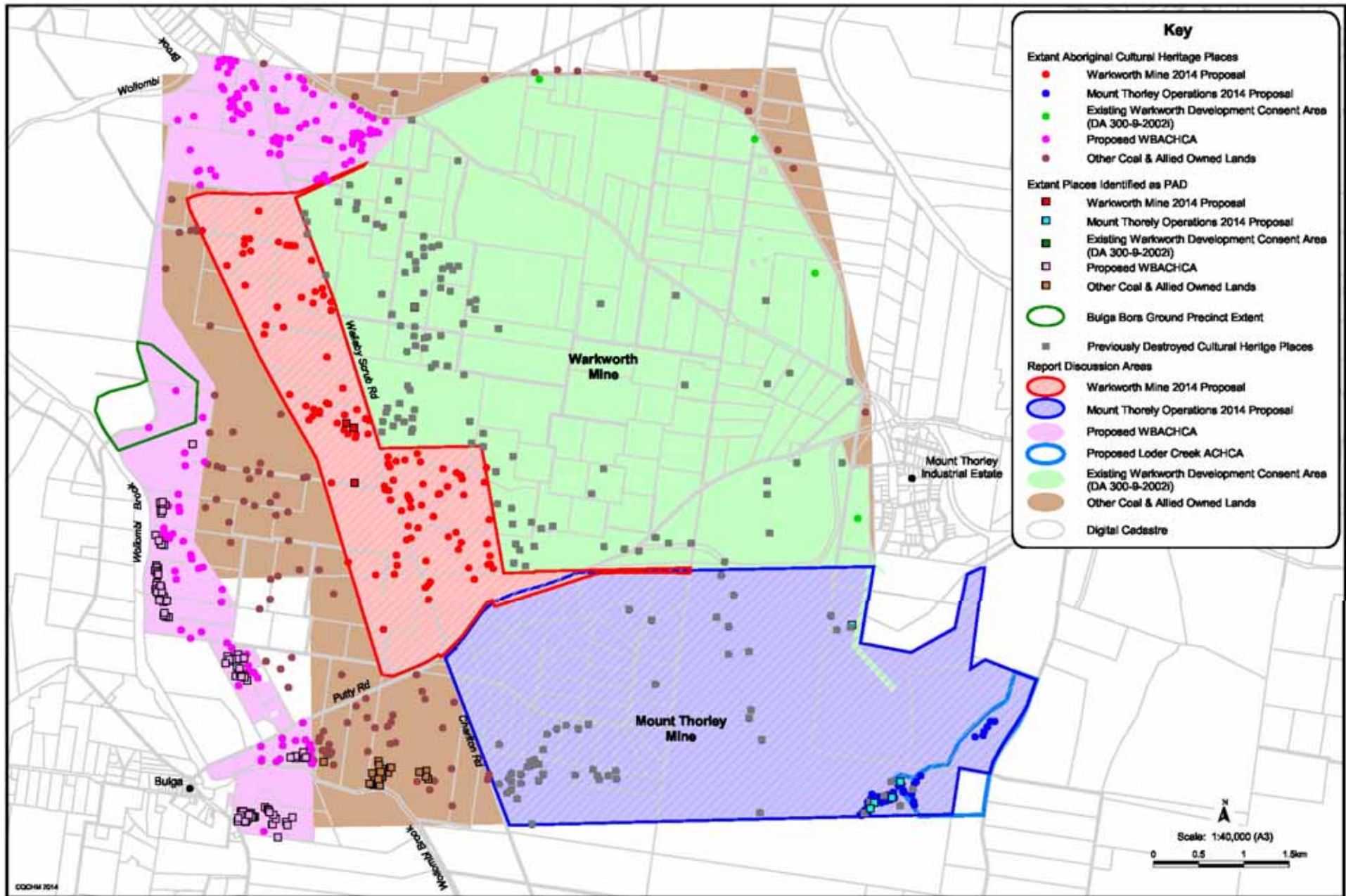


Figure 3: Map showing the current status of Aboriginal cultural heritage places within the proposal areas and the other portions of the greater MTW area discussed in the text.

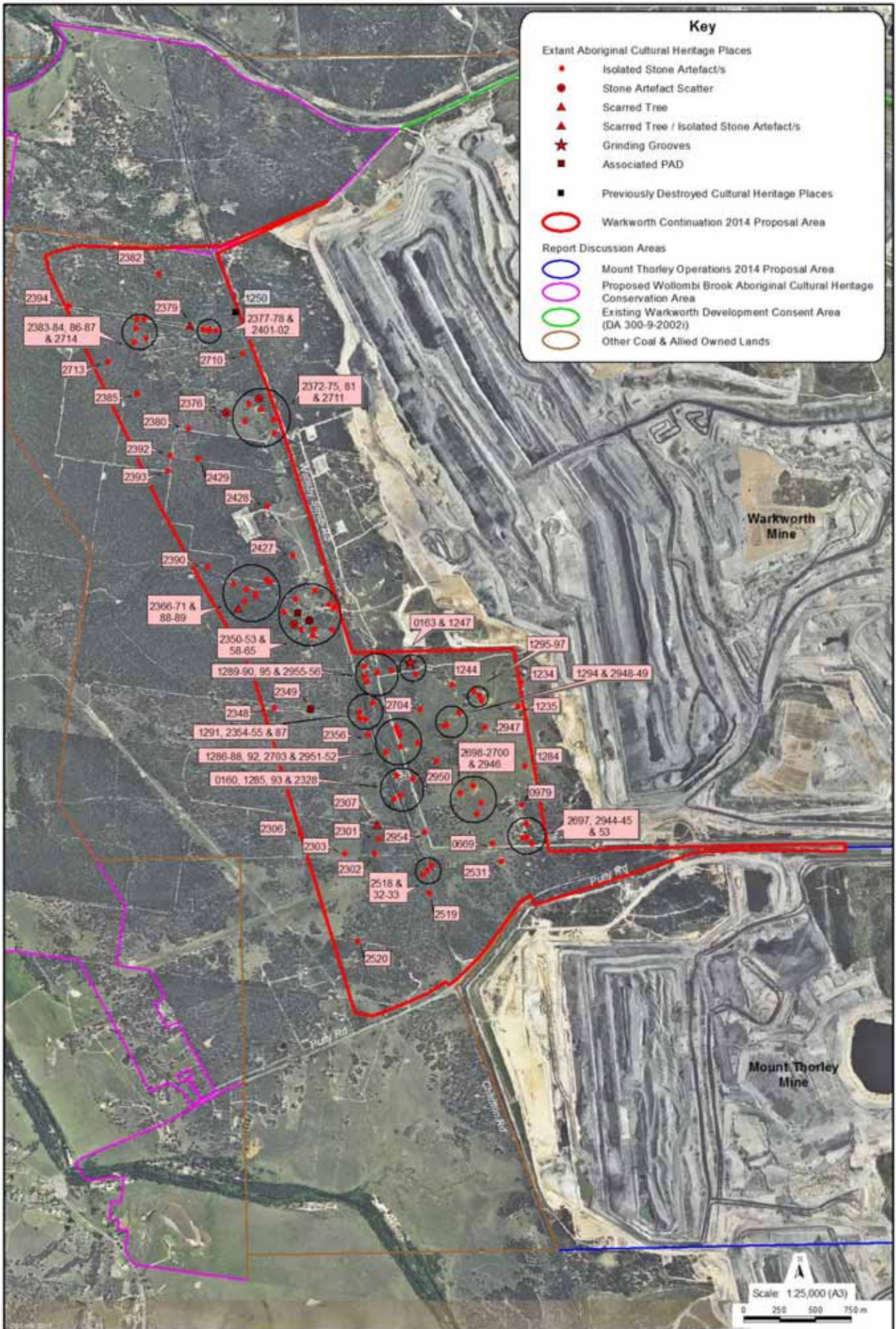


Figure 4: Map showing the location and current status of Aboriginal cultural heritage places within the Warkworth Continuation 2014 proposal area. Note: all place numbers are prefixed by the AHIMS code 37-6-XXXX.

Place Type	Number	%
Stone Artefacts	103	93.7
Stone Artefacts / PAD	3	2.7
Scarred Trees	2	1.8
Scarred Tree / Isolated Stone Artefact/s	1	0.9
Grinding Grooves	1	0.9
<i>Total</i>	<i>110</i>	

Table 10: Summary of extant Aboriginal cultural heritage place-types located within the Warkworth Continuation 2014 proposal area. Note: PAD = Potential Archaeological Deposit.

AHIMS No	Place Name	Place Type	PAD	Status
37-6-0160	Mt Thorley J (MTW590-594)	Isolated Stone Artefact/s	-	Valid
37-6-0163	Mt Thorley M	Grinding Grooves	-	Valid
37-6-0669	MT 37 (MTW587-587)	Isolated Stone Artefact/s	-	Valid
37-6-0979	BP-4	Isolated Stone Artefact/s	-	Valid
37-6-1234	W12 (MTW-563)	Isolated Stone Artefact/s	-	Partially Destroyed
37-6-1235	W13 (MTW-562)	Isolated Stone Artefact/s	-	Partially Destroyed
37-6-1244	W20 (MTW-573)	Isolated Stone Artefact/s	-	Valid
37-6-1247	W21	Isolated Stone Artefact/s	-	Valid
37-6-1250	W23	Isolated Stone Artefact/s	-	Destroyed
37-6-1284	W48 (MTW-561)	Isolated Stone Artefact/s	-	Valid
37-6-1285	W49 (MTW-579)	Isolated Stone Artefact/s	-	Valid
37-6-1286	W50 (MTW-580)	Isolated Stone Artefact/s	-	Valid
37-6-1287	W51 (MTW-582)	Isolated Stone Artefact/s	-	Valid
37-6-1288	W52 (MTW-584)	Isolated Stone Artefact/s	-	Valid
37-6-1289	W53	Isolated Stone Artefact/s	-	Valid
37-6-1290	W54 (MTW-599)	Isolated Stone Artefact/s	-	Valid
37-6-1291	W55 (MTW-596)	Isolated Stone Artefact/s	-	Valid
37-6-1292	W56 (MTW-595)	Isolated Stone Artefact/s	-	Valid
37-6-1293	W57 (MTW-589)	Isolated Stone Artefact/s	-	Valid
37-6-1294	W58 (MTW-574)	Isolated Stone Artefact/s	-	Valid
37-6-1295	W59	Isolated Stone Artefact/s	-	Valid
37-6-1296	W60 (MTW-570)	Isolated Stone Artefact/s	-	Valid
37-6-1297	W61 (MTW-572)	Isolated Stone Artefact/s	-	Valid
37-6-2301	MTW-2	Isolated Stone Artefact/s	-	Valid
37-6-2302	MTW-3	Isolated Stone Artefact/s	-	Valid
37-6-2303	MTW-4	Isolated Stone Artefact/s	-	Valid
37-6-2306	MTW-7	Isolated Stone Artefact/s	-	Valid
37-6-2307	MTW-8	Scarred Tree	-	Valid
37-6-2328	MTW-29	Isolated Stone Artefact/s	-	Valid
37-6-2348	MTW-49	Isolated Stone Artefact/s	-	Valid
37-6-2349	MTW-50	Isolated Stone Artefact/s	Yes	Valid
37-6-2350	MTW-51	Isolated Stone Artefact/s	-	Valid
37-6-2351	MTW-52	Isolated Stone Artefact/s	-	Valid

AHIMS No	Place Name	Place Type	PAD	Status
37-6-2352	MTW-53	Isolated Stone Artefact/s	-	Valid
37-6-2353	MTW-54	Isolated Stone Artefact/s	-	Valid
37-6-2354	MTW-55	Isolated Stone Artefact/s	-	Valid
37-6-2355	MTW-56	Isolated Stone Artefact/s	-	Valid
37-6-2356	MTW-57	Isolated Stone Artefact/s	-	Valid
37-6-2357	MTW-58	Isolated Stone Artefact/s	-	Valid
37-6-2358	MTW-59	Isolated Stone Artefact/s	-	Valid
37-6-2359	MTW-60	Stone Artefact Scatter	Yes	Valid
37-6-2360	MTW-61	Stone Artefact Scatter	-	Valid
37-6-2361	MTW-62	Isolated Stone Artefact/s	-	Valid
37-6-2362	MTW-63	Isolated Stone Artefact/s	-	Valid
37-6-2363	MTW-64	Isolated Stone Artefact/s	-	Valid
37-6-2364	MTW-65	Isolated Stone Artefact/s	Yes	Valid
37-6-2365	MTW-66	Isolated Stone Artefact/s	-	Valid
37-6-2366	MTW-67	Isolated Stone Artefact/s	-	Valid
37-6-2367	MTW-68	Isolated Stone Artefact/s	-	Valid
37-6-2368	MTW-69	Isolated Stone Artefact/s	-	Valid
37-6-2369	MTW-70	Scarred Tree	-	Valid
37-6-2370	MTW-71	Isolated Stone Artefact/s	-	Valid
37-6-2371	MTW-72	Isolated Stone Artefact/s	-	Valid
37-6-2372	MTW-73	Isolated Stone Artefact/s	-	Valid
37-6-2373	MTW-74	Isolated Stone Artefact/s	-	Valid
37-6-2374	WS2A (MTW-75)	Stone Artefact Scatter	-	Valid
37-6-2375	MTW-76	Isolated Stone Artefact/s	-	Valid
37-6-2376	MTW-77	Stone Artefact Scatter	-	Valid
37-6-2377	MTW-78	Isolated Stone Artefact/s	-	Valid
37-6-2378	MTW-79	Isolated Stone Artefact/s	-	Valid
37-6-2379	MTW-80	Scarred Tree / Isolated Stone Artefact/s	-	Valid
37-6-2380	MTW-81	Isolated Stone Artefact/s	-	Valid
37-6-2381	MTW-82	Isolated Stone Artefact/s	-	Valid
37-6-2382	MTW-83	Isolated Stone Artefact/s	-	Valid
37-6-2383	MS1 (MTW-84)	Isolated Stone Artefact/s	-	Valid
37-6-2384	MS8 (MTW-85)	Isolated Stone Artefact/s	-	Valid
37-6-2385	MTW-86	Isolated Stone Artefact/s	-	Valid
37-6-2386	MTW-87	Isolated Stone Artefact/s	-	Valid
37-6-2387	MTW-88	Isolated Stone Artefact/s	-	Valid
37-6-2388	MTW-89	Isolated Stone Artefact/s	-	Valid
37-6-2389	MTW-90	Isolated Stone Artefact/s	-	Valid
37-6-2390	MTW-91	Isolated Stone Artefact/s	-	Valid
37-6-2392	MTW-93	Isolated Stone Artefact/s	-	Valid
37-6-2393	MTW-94	Isolated Stone Artefact/s	-	Valid
37-6-2394	MTW-95	Isolated Stone Artefact/s	-	Valid

AHIMS No	Place Name	Place Type	PAD	Status
37-6-2401	MTW-102	Isolated Stone Artefact/s	-	Valid
37-6-2402	MTW-103	Isolated Stone Artefact/s	-	Valid
37-6-2427	MTW-128	Isolated Stone Artefact/s	-	Valid
37-6-2428	MTW-129	Isolated Stone Artefact/s	-	Valid
37-6-2429	MTW-130	Isolated Stone Artefact/s	-	Valid
37-6-2518	MTW-220-MSW-09-50	Isolated Stone Artefact/s	-	Valid
37-6-2519	MTW-221-WSW-09-51	Isolated Stone Artefact/s	-	Valid
37-6-2520	MTW-222-WSW-09-52	Isolated Stone Artefact/s	-	Valid
37-6-2531	MTW-234-WSW-09-9	Isolated Stone Artefact/s	-	Valid
37-6-2532	MTW-235-WSW-09-59	Isolated Stone Artefact/s	-	Valid
37-6-2533	MTW-236-WSW-09-60	Isolated Stone Artefact/s	-	Valid
37-6-2695	PL10 (MTW-600)	Isolated Stone Artefact/s	-	Valid
37-6-2697	PL2	Isolated Stone Artefact/s	-	Valid
37-6-2698	PL3	Isolated Stone Artefact/s	-	Valid
37-6-2699	PL4 (MTW-568)	Isolated Stone Artefact/s	-	Valid
37-6-2700	PL5 (MTW-577)	Isolated Stone Artefact/s	-	Valid
37-6-2703	PL8	Isolated Stone Artefact/s	-	Valid
37-6-2704	PL9	Isolated Stone Artefact/s	-	Valid
37-6-2707	WS10	Isolated Stone Artefact/s	-	Valid
37-6-2710	WS2	Isolated Stone Artefact/s	-	Valid
37-6-2711	WS3	Isolated Stone Artefact/s	-	Valid
37-6-2713	WS7	Isolated Stone Artefact/s	-	Valid
37-6-2714	WS9	Isolated Stone Artefact/s	-	Valid
37-6-2944	MTW-566	Isolated Stone Artefact/s	-	Valid
37-6-2945	MTW-567	Isolated Stone Artefact/s	-	Valid
37-6-2946	MTW-569	Isolated Stone Artefact/s	-	Valid
37-6-2947	MTW-571	Isolated Stone Artefact/s	-	Valid
37-6-2948	MTW-575	Isolated Stone Artefact/s	-	Valid
37-6-2949	MTW-576	Isolated Stone Artefact/s	-	Valid
37-6-2950	MTW-578	Isolated Stone Artefact/s	-	Valid
37-6-2951	MTW-581	Isolated Stone Artefact/s	-	Valid
37-6-2952	MTW-583	Isolated Stone Artefact/s	-	Valid
37-6-2953	MTW-585	Isolated Stone Artefact/s	-	Valid
37-6-2954	MTW-588	Isolated Stone Artefact/s	-	Valid
37-6-2955	MTW-597	Isolated Stone Artefact/s	-	Valid
37-6-2956	MTW-598	Isolated Stone Artefact/s	-	Valid

Table 11: Details of all Aboriginal cultural heritage places and their current status within the Warkworth Continuation 2014 proposal area. Note: the presence of brackets around the Place Name field indicates places which have been assigned multiple place names during the conduct of separate cultural heritage investigations.

Given the nature of the proposed development activities to be undertaken within the Warkworth Continuation 2014 proposal area, it is most likely that all of the presently extant places containing

Aboriginal cultural heritage will be disturbed or destroyed as those activities progress. Impact management commitments stemming from CHWG consultations are outlined further below. In the meantime, these places have been and will continue to be managed consistent with the provisions of the current Warkworth Mine A&CHMP 2004 and the CHMS.

The 'Site M' grinding grooves (37-6-0163) will ultimately be destroyed as mining proceeds in a westerly direction through the Warkworth Continuation 2014 proposal area. With this in mind, the place has been the subject of various investigations. These have focused on three issues:

1. gaining an understanding of the extent of the place, noting that the grooves lie in a creek bed and unconsolidated sediments from higher up the drainage system have washed down and blanketed parts of the site, thereby perhaps obscuring some of the grinding grooves;
2. the nature of the impacts that mining will have on the place, notably the use of explosives and their effects on the integrity of the grinding grooves as it currently stands with increasing proximity of mining development to them;
3. the geological context of the place and the feasibility of any impact being mitigated by the salvage and relocation of the grooves.

In relation to the first, we note that there have been earlier efforts at longitudinal research which have both determined and aimed to determine if there were additional elements buried under sediments (e.g. Dyall 1979; Haglund 1999; AMBS 2002; see sections 5.1 and 5.8). In recent years Coal & Allied has commissioned work on this issue as well. While this has provided a good appreciation of the nature and scale of the place, additional work directly focused on this issue will be undertaken by Coal & Allied as part of the management strategy agreed with the RAPs and other stakeholders.

With respect the second issue, reports considering the impacts of blasting have been commissioned by Coal & Allied both expressly for these grinding grooves but also for other heritage sites located on Coal & Allied lands in the Upper Hunter Valley. Lewandowski (2012) has made an assessment of Site M. He notes two risks associated with blasting: direct vibration of the site and the impact of fly rock. He observes that the geology of the place is such that it will withstand considerable vibration without negative consequences. On his modelling, fly rock will become a significant issue when blasting comes to within 300 metres of the place. He suggests that physical measures to protect the fabric of the place could be taken to minimise impacts from this hazard. However, by implication, this report also indicates that any research on the place would be compromised by blasting when it is taking place within 500m from the place owing to the imposition of blasting exclusion zones.

In relation to the final issue, RTCA has commissioned a report on the geology of site M grinding grooves (Strata Control Technology 2010). This report noted that the place (divided into two parts in the report: Site M East and Site M West) consists of sandstone bedrock. To remove even a relatively small section containing grooves at Site M West (the main body of the place) would require the excision of a block 4m in length, 2.5m wide, 1m thick and weighing an estimated 25 tonnes. Site M East would be somewhat smaller but the geology is such that damage during such an attempt could not be ruled out. The report (Strata Control Technology 2010: 9) concludes as follows:

Sites M West and M East are both massive bedrock exposures along a creek, all the observed grinding grooves are located on exposed bedrock. . . . The massive nature of the outcrops and the thicker nature of the host rock unit create . . . difficult logistical issues. More geotechnical analysis is required to determine if a recovery strategy can be proposed which is logistically possible.

RTCA has committed to undertaking these additional studies to determine the best course of management for this place in the context of mining proceeding through this area.

Although containing areas of the Warkworth Sands Woodland landform, no additional or similar sandsheet or dune features considered as having the potential to contain *in situ* Aboriginal cultural heritage have been identified within the Warkworth Continuation 2014 proposal area. An area of potential interest in this regard though has been identified within the WBACHCA adjacent to the north of Warkworth Continuation 2014 proposal area. This is discussed further in Section 7.3 below.

Impact management commitments for all places identified within the Warkworth Continuation 2014 proposal area are outlined in Section 8 below.

7.2 Mount Thorley Operations 2014 Proposal Area

The entirety of the Mount Thorley Operations 2014 proposal area (approximately 1,465 ha) has an existing development consent granted in 1996 for mining (which is mostly completed) and associated activities. As such, the area has also been the subject of cultural heritage investigations undertaken over an extended period of time. In addition, Coal & Allied has commenced the undertaking of comprehensive and systematic reassessment surveys across the remaining undeveloped south eastern portions of the Mount Thorley Operations 2014 proposal area in order to refresh the currency and comprehensiveness of its understanding of the Aboriginal cultural heritage of this area. The majority of lands the subject of this reassessment are located within the proposed Loder Creek ACHCA (see Section 7.4 below).

A total of 103 places containing Aboriginal cultural heritage objects have been identified and recorded within the Mount Thorley Operations 2014 proposal area (Figure 5, see also Figure 3). These are

almost exclusively dominated by places containing stone artefacts although a number of areas with the potential to contain archaeological deposits (i.e. PAD) have been identified. Additional details of these places are provided in Table 12.

Of these places, 55 (see Table 13 and Figure 5) have previously been destroyed under finalised consents under the NPW Act and as such require no further management consideration here. Another (37-6-2717; AG-PAD-1) has been only partially destroyed and as such is included in the discussion here.

Place Type	Number	%
Stone Artefacts	98	95.2
PAD	3	2.9
Stone Artefacts / PAD	2	1.9
<i>Total</i>	<i>103</i>	

Table 12: Summary of extant Aboriginal cultural heritage place-types located within the Mount Thorley Operations 2014 proposal area. Note: PAD = Potential Archaeological Deposit.

The 48 extant places (including the remnant portion of 37-6-2717; see Table 13) consist of stone artefacts (n=45; 93.8%) found both as isolated findsites and larger scatters. Areas noted as having the potential for archaeological deposit (PAD) have also been identified. While three of these are features devoid of any surface Aboriginal cultural heritage (37-6-2715, 2716 and 217), two are directly associated with places identified as also containing stone artefacts.

With the exception of two areas, the Mount Thorley Operations 2014 proposal (which mirrors the current MTO consent - DA 34/95 as modified 2012 - boundary) has been extensively mined and rehabilitated across substantial areas. The remaining extant Aboriginal cultural heritage places are predominantly located across the south eastern corner of the Mount Thorley Operations 2014 proposal area. The only exception to this is a partially destroyed PAD (37-6-2717; AG-PAD-1) located in the north east.

As part of its ongoing program of assessing the cultural values present on all lands that it owns or operates on, Coal & Allied is committed to completing the systematic and comprehensive reassessment of the south eastern corner of the Mount Thorley Operations 2014 proposal area which it commenced in mid-2013. All Aboriginal cultural heritage, both extant and as may be identified and recorded during the completion of the reassessment surveys, will continue to be managed consistent with the provisions of the current MTO A&CHMP 2004 and the CHMS.



Figure 5: Map showing the location and current status of Aboriginal cultural heritage places within the Mount Thorley Operations 2014 proposal area. Note: all place numbers are prefixed by the AHIMS code 37-6-XXXX.

AHIMS No	Restricted	Place Name	Place Type	PAD	Status
37-6-0312	-	MT 26	Stone Artefact Scatter	-	Valid
37-6-0313	-	MT 27	Stone Artefact Scatter	-	Valid
37-6-0314	-	MT 28	Stone Artefact Scatter	-	Valid
37-6-0315	-	MT 29	Stone Artefact Scatter	-	Valid
37-6-0316	-	MT 30	Stone Artefact Scatter	-	Valid
37-6-0317	-	MT 31	Stone Artefact Scatter	-	Valid
37-6-0318	-	MT 32	Stone Artefact Scatter	-	Valid
37-6-0319	-	MT 33	Isolated Stone Artefact/s	-	Valid
37-6-0529	-	B53	Stone Artefact Scatter	-	Valid
37-6-0656	-	B73	Stone Artefact Scatter	-	Valid
37-6-0658	-	B 75	Stone Artefact Scatter	-	Valid
37-6-0659	-	B 76	Stone Artefact Scatter	-	Valid
37-6-0660	-	B 77	Stone Artefact Scatter	-	Valid
37-6-2715	-	AG-PAD-2	PAD	Yes	Valid
37-6-2716	-	AG-PAD-3	PAD	Yes	Valid
37-6-2717	-	AG-PAD-1	PAD	Yes	Partially Destroyed
37-6-2887	-	MTW-524	Stone Artefact Scatter	Yes	Valid
37-6-2888	-	MTW-525	Isolated Stone Artefact/s	-	Valid
37-6-2889	-	MTW-526	Stone Artefact Scatter	Yes	Valid
37-6-2890	-	MTW-527	Stone Artefact Scatter	-	Valid
37-6-2891	-	MTW-528	Isolated Stone Artefact/s	-	Valid
37-6-2892	-	MTW-529	Isolated Stone Artefact/s	-	Valid
37-6-2893	-	MTW-530	Isolated Stone Artefact/s	-	Valid
37-6-2894	-	MTW-531	Isolated Stone Artefact/s	-	Valid
37-6-2895	-	MTW-532	Isolated Stone Artefact/s	-	Valid
37-6-2896	-	MTW-533	Isolated Stone Artefact/s	-	Valid
37-6-2897	-	MTW-534	Isolated Stone Artefact/s	-	Valid
37-6-2898	-	MTW-535	Isolated Stone Artefact/s	-	Valid
37-6-2899	-	MTW-536	Isolated Stone Artefact/s	-	Valid
37-6-2900	-	MTW-537	Isolated Stone Artefact/s	-	Valid
37-6-2901	-	MTW-538	Isolated Stone Artefact/s	-	Valid
37-6-2902	-	MTW-539	Isolated Stone Artefact/s	-	Valid
37-6-2903	-	MTW-540	Isolated Stone Artefact/s	-	Valid
37-6-2904	-	MTW-541	Isolated Stone Artefact/s	-	Valid
37-6-2905	-	MTW-542	Isolated Stone Artefact/s	-	Valid
37-6-2906	-	MTW-543	Isolated Stone Artefact/s	-	Valid
37-6-2907	-	MTW-544	Isolated Stone Artefact/s	-	Valid
37-6-2908	-	MTW-545	Isolated Stone Artefact/s	-	Valid
37-6-2909	-	MTW-546	Isolated Stone Artefact/s	-	Valid
37-6-2910	-	MTW-547	Isolated Stone Artefact/s	-	Valid
37-6-2911	-	MTW-548	Isolated Stone Artefact/s	-	Valid
37-6-2912	-	MTW-549	Isolated Stone Artefact/s	-	Valid
37-6-2913	-	MTW-550	Isolated Stone Artefact/s	-	Valid
37-6-2914	-	MTW-551	Isolated Stone Artefact/s	-	Valid

AHIMS No	Restricted	Place Name	Place Type	PAD	Status
37-6-2915	-	MTW-552	Isolated Stone Artefact/s	-	Valid
37-6-2916	-	MTW-553	Isolated Stone Artefact/s	-	Valid
37-6-2917	-	MTW-554	Isolated Stone Artefact/s	-	Valid
37-6-2918	-	MTW-555	Isolated Stone Artefact/s	-	Valid
37-6-0288	-	MT 2	Stone Artefact Scatter	-	Destroyed
37-6-0289	-	MT 3	Stone Artefact Scatter	-	Destroyed
37-6-0290	-	MT 4	Isolated Stone Artefact/s	-	Destroyed
37-6-0291	-	MT 5	Isolated Stone Artefact/s	-	Destroyed
37-6-0292	-	MT 6	Isolated Stone Artefact/s	-	Destroyed
37-6-0293	-	MT 7	Isolated Stone Artefact/s	-	Destroyed
37-6-0294	-	MT 8	Isolated Stone Artefact/s	-	Destroyed
37-6-0295	-	MT 9	Isolated Stone Artefact/s	-	Destroyed
37-6-0296	-	MT 10	Isolated Stone Artefact/s	-	Destroyed
37-6-0297	-	MT 11	Isolated Stone Artefact/s	-	Destroyed
37-6-0298	-	MT 12	Isolated Stone Artefact/s	-	Destroyed
37-6-0299	-	MT 13	Isolated Stone Artefact/s	-	Destroyed
37-6-0300	-	MT 14	Isolated Stone Artefact/s	-	Destroyed
37-6-0302	-	MT 16	Stone Artefact Scatter	-	Destroyed
37-6-0303	-	MT 17	Stone Artefact Scatter	-	Destroyed
37-6-0304	-	MT 18	Stone Artefact Scatter	-	Destroyed
37-6-0305	-	MT 19	Stone Artefact Scatter	-	Destroyed
37-6-0306	-	MT 20	Isolated Stone Artefact/s	-	Destroyed
37-6-0307	-	MT 21	Stone Artefact Scatter	-	Destroyed
37-6-0308	-	MT 22	Stone Artefact Scatter	-	Destroyed
37-6-0309	-	MT 23	Stone Artefact Scatter	-	Destroyed
37-6-0310	-	MT 24	Stone Artefact Scatter	-	Destroyed
37-6-0311	-	MT 25	Stone Artefact Scatter	-	Destroyed
37-6-0320	-	MT 34	Isolated Stone Artefact/s	-	Destroyed
37-6-0321	-	MT 35	Isolated Stone Artefact/s	-	Destroyed
37-6-0322	-	MT 36	Isolated Stone Artefact/s	-	Destroyed
37-6-0530	-	B54	Stone Artefact Scatter	-	Destroyed
37-6-0535	-	B59	Isolated Stone Artefact/s	-	Destroyed
37-6-0657	-	B 47	Stone Artefact Scatter	-	Destroyed
37-6-0661	-	W5	Stone Artefact Scatter	-	Destroyed
37-6-0846	-	Site V (Bulga)	Stone Artefact Scatter	-	Destroyed
37-6-0847	-	Site U (Bulga)	Stone Artefact Scatter	-	Destroyed
37-6-0849	-	Site S (Bulga)	Stone Artefact Scatter	-	Destroyed
37-6-0850	-	Site R (Bulga)	Isolated Stone Artefact/s	-	Destroyed
37-6-0851	-	Site Q (Bulga)	Stone Artefact Scatter	-	Destroyed
37-6-0852	-	Site P (Bulga)	Stone Artefact Scatter	-	Destroyed
37-6-0853	-	Site O (Bulga)	Stone Artefact Scatter	-	Destroyed
37-6-0854	-	Site N (Bulga)	Stone Artefact Scatter	-	Destroyed
37-6-0855	-	Site M (Bulga)	Isolated Stone Artefact/s	-	Destroyed
37-6-0856	-	Site L (Bulga)	Isolated Stone Artefact/s	-	Destroyed

AHIMS No	Restricted	Place Name	Place Type	PAD	Status
37-6-0857	-	Site K (Bulga)	Stone Artefact Scatter	-	Destroyed
37-6-0858	-	Site J (Bulga)	Stone Artefact Scatter	-	Destroyed
37-6-0859	-	Site I (Bulga)	Stone Artefact Scatter	-	Destroyed
37-6-0860	-	Site H (Bulga)	Stone Artefact Scatter	-	Destroyed
37-6-0861	-	Site G (Bulga)	Stone Artefact Scatter	-	Destroyed
37-6-0862	-	Site F (Bulga)	Isolated Stone Artefact/s	-	Destroyed
37-6-0863	-	Site E (Bulga)	Isolated Stone Artefact/s	-	Destroyed
37-6-0864	-	Site D (Bulga)	Isolated Stone Artefact/s	-	Destroyed
37-6-1108	Yes	-	Isolated Stone Artefact/s	-	Destroyed
37-6-1109	-	AG-IF-2	Isolated Stone Artefact/s	-	Destroyed
37-6-1110	-	AG-OS-1	Stone Artefact Scatter	-	Destroyed
37-6-1111	-	AG-OS-2	Stone Artefact Scatter	-	Destroyed
37-6-1112	-	AG-OS-3	Stone Artefact Scatter	-	Destroyed
37-6-1113	Yes	-	Stone Artefact Scatter	-	Destroyed
37-6-1114	Yes	-	Stone Artefact Scatter	-	Destroyed

Table 13: Details of all Aboriginal cultural heritage places and their current status within the MTO 2014 proposal area.

Other than those places the subject of an AHIP application as part of the proposed ramp 22 sedimentation dam construction proposal (see Section 5.6 above), none of the remaining extant Aboriginal cultural heritage places will be impacted by the Mount Thorley Operations 2014 proposal and indeed the majority will reside within the proposed Loder Creek ACHCA (see Section 7.4 below). Commitments around this are outlined in Section 8 below.

7.3 Wollombi Brook Aboriginal Cultural Heritage Conservation Area

The WBACHCA was proposed for the 2010 Warkworth Extension Project and covered approximately 513 hectares. The area was identified by the Aboriginal community during the Warkworth Extension Project consultation process as being of high conservation value for the protection and conservation of significant Aboriginal cultural heritage objects, places and landscapes, and includes the entirety of the portion of the Bulga bora ground that is known to be situated on Coal & Allied owned lands. Coal & Allied made a commitment during the Warkworth Extension Project to establish an Aboriginal Cultural Heritage Conservation Area over those lands and since 2010 has implemented internal management measures to exclude development disturbance activities in the proposed WBACHA.

The WBACHCA proposed for the Warkworth Continuation 2014 proposal has been enlarged to incorporate additional lands for the in-perpetuity protection of Aboriginal cultural heritage. The proposed WBACHCA 2014 lands will protect a total of approximately 696 hectares (see Figure 3), an increase of approximately 35 per cent in the areas to be permanently protected than originally proposed in 2010.

The westerly extents of the WBACHCA front large areas of Wollombi Brook and several other drainage systems. It also includes substantial portions of the existing Warkworth mining lease. The adequacy of the original area proposed as a conservation area for the in perpetuity protection of Aboriginal cultural heritage has been widely discussed and accepted among both the Aboriginal community and government, including DP&E and OEH.

As outlined in Section 5.3 above, on the advice of the CHWG and owing to the sensitivity of its location (which is in the area of the Bulga bora ground), a small portion (some 69 hectares) of the WBACHCA has not been the subject of comprehensive and systematic cultural heritage investigation and assessment at this time. A total of 265 places containing Aboriginal cultural heritage have been identified and recorded within the areas that have been subject of survey.

Although again heavily dominated by places containing stone artefacts, there is considerably more diversity in Aboriginal cultural heritage place types which have been identified here than elsewhere across the greater Warkworth area (Table 14). Of particular note is the identification of spiritual and ceremonial places (notably the Bulga bora ground which is of particular significance to the Aboriginal community) and a mound feature which potentially may contain burials. Examples of grinding grooves and scarred trees noted elsewhere within the Warkworth mining area are also present within the WBACHCA albeit in greater numbers. For scarred trees this probably is a direct function of the general lack of all forms of development activity which have taken place in this area.

Although not specifically included in Table 14 below (c.f. Table 15), a large number of places (n=112; 42.3% of the total number) containing the potential for archaeological deposits (i.e. PAD) have been identified. As elsewhere across the MTW mining area, these are predominantly associated with areas containing stone artefacts (n=106; 94.6% of the total PAD areas), but they also were found associated with three of the grinding groove places, two of the scarred trees and the mound feature.

Place Type	Number	%
Stone Artefacts	244	92.1
Scarred Trees	11	4.1
Grinding Grooves	4	1.4
Spiritual Place	1	0.4
Spiritual Place / Scarred Trees	1	0.4
Stone Arrangement	1	0.4
Mound Feature (potential burials)	1	0.4
Stone Source	1	0.4
Isolated Stone Artefact/s / Stone Source	1	0.4
<i>Total</i>	<i>265</i>	

Table 14: Summary of Aboriginal cultural heritage place-types located within the proposed WBACHCA area.

Further details for these places in provided in Table 15.

AHIMS No	Place Name	Place Type	PAD	Status
37-6-0055	Wollombi Brook 04	Spiritual Place	-	Valid
37-6-0056	Wollombi Brook 03	Spiritual Place / Scarred Tree	-	Valid
37-6-1103	Site 1 GG	Grinding Grooves	-	Valid
37-6-1239	W70	Isolated Stone Artefact/s	-	Valid
37-6-1241	W71	Isolated Stone Artefact/s	-	Valid
37-6-1254	W25 (MTW337-336)	Stone Artefact Scatter	-	Valid
37-6-1255	W26 (MTW-334, MTW-343)	Isolated Stone Artefact/s	-	Valid
37-6-1258	W27 (MTW-342)	Isolated Stone Artefact/s	-	Valid
37-6-1259	W28 (MTW-314)	Isolated Stone Artefact/s	-	Valid
37-6-1260	W29 (MTW-356)	Isolated Stone Artefact/s	-	Valid
37-6-1262	W31 (MTW-333)	Isolated Stone Artefact/s	-	Valid
37-6-1264	W32	Isolated Stone Artefact/s	-	Valid
37-6-1265	W33 (MTW-332)	Isolated Stone Artefact/s	-	Valid
37-6-1267	W34 (MTW-320)	Isolated Stone Artefact/s	-	Valid
37-6-1268	W35 (MTW-312)	Isolated Stone Artefact/s	-	Valid
37-6-1270	W36 (MTW-316)	Isolated Stone Artefact/s	-	Valid
37-6-1300	W64 (MTW-315)	Isolated Stone Artefact/s	-	Valid
37-6-2308	MTW-9	Isolated Stone Artefact/s	-	Valid
37-6-2309	MTW-10	Isolated Stone Artefact/s	-	Valid
37-6-2310	MTW-11	Isolated Stone Artefact/s	-	Valid
37-6-2312	MTW-13	Stone Source	-	Valid
37-6-2313	MTW-14	Scarred Tree	-	Valid
37-6-2314	MTW-15	Isolated Stone Artefact/s	-	Valid
37-6-2315	MTW-16	Stone Arrangement	-	Valid
37-6-2316	MTW-17	Isolated Stone Artefact/s	-	Valid
37-6-2317	MTW-18	Isolated Stone Artefact/s	-	Valid
37-6-2318	MTW-19	Isolated Stone Artefact/s	-	Valid
37-6-2319	MTW-20	Isolated Stone Artefact/s	-	Valid
37-6-2320	MTW-21	Isolated Stone Artefact/s	-	Valid
37-6-2321	MTW-22	Isolated Stone Artefact/s	-	Valid
37-6-2324	MTW-25	Isolated Stone Artefact/s / Stone Source	-	Valid
37-6-2325	MTW-26	Isolated Stone Artefact/s	-	Valid
37-6-2326	MTW-27	Isolated Stone Artefact/s	-	Valid
37-6-2327	MTW-28	Isolated Stone Artefact/s	Yes	Valid
37-6-2330	MTW-31	Isolated Stone Artefact/s	-	Valid
37-6-2403	MTW-104	Isolated Stone Artefact/s	-	Valid
37-6-2404	MTW-105	Isolated Stone Artefact/s	-	Valid
37-6-2405	MTW-106	Isolated Stone Artefact/s	-	Valid
37-6-2406	MTW-107	Isolated Stone Artefact/s	-	Valid
37-6-2407	MTW-108	Isolated Stone Artefact/s	-	Valid
37-6-2408	MTW-109	Stone Artefact Scatter	-	Valid

AHIMS No	Place Name	Place Type	PAD	Status
37-6-2409	MTW-110	Isolated Stone Artefact/s	-	Valid
37-6-2410	MTW-111	Isolated Stone Artefact/s	-	Valid
37-6-2411	MTW-112	Isolated Stone Artefact/s	-	Valid
37-6-2412	MTW-113	Stone Artefact Scatter	-	Valid
37-6-2413	MTW-114, MTW-518	Isolated Stone Artefact/s	-	Valid
37-6-2414	MTW-115	Isolated Stone Artefact/s	-	Valid
37-6-2415	MTW-116	Isolated Stone Artefact/s	-	Valid
37-6-2416	MTW-117	Isolated Stone Artefact/s	-	Valid
37-6-2417	MTW-118	Isolated Stone Artefact/s	-	Valid
37-6-2418	MTW-119	Isolated Stone Artefact/s	-	Valid
37-6-2419	MTW-120	Isolated Stone Artefact/s	-	Valid
37-6-2420	MTW-121	Isolated Stone Artefact/s	-	Valid
37-6-2421	MTW-122	Isolated Stone Artefact/s	-	Valid
37-6-2422	MTW-123	Isolated Stone Artefact/s	-	Valid
37-6-2423	MTW-124	Isolated Stone Artefact/s	-	Valid
37-6-2424	MTW-125	Isolated Stone Artefact/s	-	Valid
37-6-2425	MTW-126	Isolated Stone Artefact/s	-	Valid
37-6-2426	MTW-127	Isolated Stone Artefact/s	-	Valid
37-6-2430	MTW-131	Isolated Stone Artefact/s	-	Valid
37-6-2431	MTW-132	Isolated Stone Artefact/s	-	Valid
37-6-2432	MTW-133	Isolated Stone Artefact/s	-	Valid
37-6-2433	MTW-134	Isolated Stone Artefact/s	-	Valid
37-6-2434	MTW-135	Isolated Stone Artefact/s	-	Valid
37-6-2435	MTW-136	Isolated Stone Artefact/s	-	Valid
37-6-2493	MTW-195-WSW-09-75	Isolated Stone Artefact/s	-	Valid
37-6-2495	MTW-197-WSW-09-14	Isolated Stone Artefact/s	-	Valid
37-6-2496	MTW-198-WSW-09-14	Isolated Stone Artefact/s	-	Valid
37-6-2497	MTW-199-wsw-09-14	Isolated Stone Artefact/s	-	Valid
37-6-2498	MTW-200-WSW-09-15	Isolated Stone Artefact/s	Yes	Valid
37-6-2499	MTW-201-WSW-09-15	Isolated Stone Artefact/s	Yes	Valid
37-6-2500	MTW-202-WSW-09-15	Stone Artefact Scatter	Yes	Valid
37-6-2501	MTW-203-WSW-09-79	Isolated Stone Artefact/s	-	Valid
37-6-2502	MTW-204-WSW-09-16	Isolated Stone Artefact/s	-	Valid
37-6-2503	MTW-205-WSW-09-76	Isolated Stone Artefact/s	-	Valid
37-6-2504	MTW-206-WSW-09-80	Isolated Stone Artefact/s	-	Valid
37-6-2508	MTW-210-WSW-09-19	Isolated Stone Artefact/s	Yes	Valid
37-6-2509	MTW-211-WSW-09-19	Isolated Stone Artefact/s	Yes	Valid
37-6-2510	MTW-212-WSW-09-19	Isolated Stone Artefact/s	Yes	Valid
37-6-2511	MTW-213-WSW-09-19	Isolated Stone Artefact/s	Yes	Valid
37-6-2512	MTW-214-WSW-09-78	Isolated Stone Artefact/s	-	Valid
37-6-2513	MTW-215-WSW-09-77	Isolated Stone Artefact/s	-	Valid
37-6-2514	MTW-216-WSW-09-46	Isolated Stone Artefact/s	-	Valid
37-6-2515	MTW-217-WSW-09-47	Isolated Stone Artefact/s	-	Valid

AHIMS No	Place Name	Place Type	PAD	Status
37-6-2516	MTW-218-WSW-09-48	Isolated Stone Artefact/s	-	Valid
37-6-2517	MTW-219-WSW-09-49	Isolated Stone Artefact/s	-	Valid
37-6-2525	MTW-227-WSW-09-33	Scarred Tree	-	Valid
37-6-2526	MTW-228-WSW-09-34	Scarred Tree	-	Valid
37-6-2527	MTW-230-WSW-09-55	Isolated Stone Artefact/s	-	Valid
37-6-2528	MTW-231-WSW-09-56	Isolated Stone Artefact/s	-	Valid
37-6-2529	MTW-232-WSW-09-20	Isolated Stone Artefact/s	Yes	Valid
37-6-2530	MTW-233-WSW-09-58	Isolated Stone Artefact/s	-	Valid
37-6-2534	MTW-237-WSW-09-10	Isolated Stone Artefact/s	Yes	Valid
37-6-2535	MTW-238-WSW-09-10	Isolated Stone Artefact/s	Yes	Valid
37-6-2536	MTW-239-WSW-09-10	Isolated Stone Artefact/s	Yes	Valid
37-6-2537	MTW-240-WSW-09-10	Isolated Stone Artefact/s	Yes	Valid
37-6-2538	MTW-241-WSW-09-10	Isolated Stone Artefact/s	Yes	Valid
37-6-2539	MTW-242-WSW-09-10	Isolated Stone Artefact/s	Yes	Valid
37-6-2540	MTW-243-WSW-09-10	Isolated Stone Artefact/s	Yes	Valid
37-6-2541	MTW-244-WSW-09	Isolated Stone Artefact/s	-	Valid
37-6-2542	MTW-245-WSW-09-10	Isolated Stone Artefact/s	Yes	Valid
37-6-2543	MTW-246-WSW-09-10	Isolated Stone Artefact/s	Yes	Valid
37-6-2544	MTW-247-WSW-09-10	Isolated Stone Artefact/s	Yes	Valid
37-6-2545	MTW-248-WSW-09-10	Isolated Stone Artefact/s	Yes	Valid
37-6-2546	MTW-249-WSW-09-10	Isolated Stone Artefact/s	Yes	Valid
37-6-2547	MTW-250-WSW-09-10	Isolated Stone Artefact/s	Yes	Valid
37-6-2548	MTW-251-WSW-09-10	Isolated Stone Artefact/s	Yes	Valid
37-6-2549	MTW-252-WSW-09-20	Isolated Stone Artefact/s	Yes	Valid
37-6-2550	MTW-253-WSW-09-20	Isolated Stone Artefact/s	Yes	Valid
37-6-2551	MTW-254-WSW-09-20	Isolated Stone Artefact/s	Yes	Valid
37-6-2552	MTW-255-WSW-09-20	Isolated Stone Artefact/s	Yes	Valid
37-6-2553	MTW-256-WSW-09-22	Isolated Stone Artefact/s	Yes	Valid
37-6-2554	MTW-258-WSW-09-21	Scarred Tree	Yes	Valid
37-6-2555	MTW-260-WSW-09-21	Mound Feature (possible Burials)	Yes	Valid
37-6-2556	MTW-261-WSW-09-21	Isolated Stone Artefact/s	Yes	Valid
37-6-2557	MTW-262-WSW-09-21	Isolated Stone Artefact/s	Yes	Valid
37-6-2558	MTW-263-WSW-09-21	Isolated Stone Artefact/s	Yes	Valid
37-6-2559	MTW-264-WSW-09-21	Scarred Tree	Yes	Valid
37-6-2560	MTW-265-WSW-09-21	Isolated Stone Artefact/s	Yes	Valid
37-6-2561	MTW-266-WSW-09-22	Grinding Grooves	Yes	Valid
37-6-2562	MTW-267-WSW-09-22	Grinding Grooves	Yes	Valid
37-6-2563	MTW-268-WSW-09-23	Grinding Grooves	Yes	Valid
37-6-2564	MTW-269-WSW-09-24	Isolated Stone Artefact/s	Yes	Valid
37-6-2565	MTW-270-WSW-09-24	Isolated Stone Artefact/s	Yes	Valid
37-6-2566	MTW-271-WSW-09-24	Isolated Stone Artefact/s	Yes	Valid
37-6-2567	MTW-272-WSW-09-24	Isolated Stone Artefact/s	Yes	Valid
37-6-2568	MTW-273-WSM-09-24	Isolated Stone Artefact/s	Yes	Valid

AHIMS No	Place Name	Place Type	PAD	Status
37-6-2569	MTW-274-WSW-09-24	Isolated Stone Artefact/s	Yes	Valid
37-6-2570	MTW-275-WSW-09-24	Isolated Stone Artefact/s	Yes	Valid
37-6-2571	MTW-276	Isolated Stone Artefact/s	Yes	Valid
37-6-2572	MTW-277-WSW-09-24	Isolated Stone Artefact/s	Yes	Valid
37-6-2573	MTW-278-WSW-09-61	Isolated Stone Artefact/s	-	Valid
37-6-2574	MTW-279-WSW-09-62	Isolated Stone Artefact/s	-	Valid
37-6-2575	MTW-280-WSW-09-62	Isolated Stone Artefact/s	-	Valid
37-6-2576	MTW-281-WSW-09-62	Isolated Stone Artefact/s	-	Valid
37-6-2582	MTW-287-WSW-09-25	Isolated Stone Artefact/s	Yes	Valid
37-6-2583	MTW-288-WSW-09-25	Isolated Stone Artefact/s	Yes	Valid
37-6-2584	MTW-289-WSW-09-25	Isolated Stone Artefact/s	Yes	Valid
37-6-2585	MTW-290-WSW-09-25	Isolated Stone Artefact/s	Yes	Valid
37-6-2586	MTW-291-WSW-09-25	Isolated Stone Artefact/s	Yes	Valid
37-6-2587	MTW-292-WSW-09-25	Isolated Stone Artefact/s	Yes	Valid
37-6-2588	MTW-293-WSW-09-25	Isolated Stone Artefact/s	Yes	Valid
37-6-2589	MTW-294-WSW-09-25	Isolated Stone Artefact/s	Yes	Valid
37-6-2590	MTW-295-WSW-09-25	Isolated Stone Artefact/s	Yes	Valid
37-6-2591	MTW-296-WSW-09-25	Isolated Stone Artefact/s	Yes	Valid
37-6-2592	MTW-297-WSW-09-25	Isolated Stone Artefact/s	Yes	Valid
37-6-2593	MTW-298-wsw-09-25	Isolated Stone Artefact/s	Yes	Valid
37-6-2594	MTW-299-WSW-09-25	Isolated Stone Artefact/s	Yes	Valid
37-6-2595	MTW-300-WSW-09-25	Isolated Stone Artefact/s	Yes	Valid
37-6-2596	MTW-301-WSW-09-25	Isolated Stone Artefact/s	Yes	Valid
37-6-2597	MTW-302-WSW-09-25	Isolated Stone Artefact/s	Yes	Valid
37-6-2598	MTW-303-WSW-09-25	Isolated Stone Artefact/s	Yes	Valid
37-6-2599	MTW-304-WSW-09-25	Isolated Stone Artefact/s	Yes	Valid
37-6-2600	MTW-305-WSW-09-25	Isolated Stone Artefact/s	Yes	Valid
37-6-2601	MTW-306-WSW-09-25	Isolated Stone Artefact/s	Yes	Valid
37-6-2602	MTW-307-WSW-09-25	Isolated Stone Artefact/s	Yes	Valid
37-6-2603	MTW-308-WSW-09-25	Isolated Stone Artefact/s	Yes	Valid
37-6-2604	MTW-309-WSW-09-25	Isolated Stone Artefact/s	Yes	Valid
37-6-2605	MTW-310-WSW-09-66	Isolated Stone Artefact/s	-	Valid
37-6-2606	MTW-311-WSW-09-67	Isolated Stone Artefact/s	-	Valid
37-6-2607	MTW-313	Isolated Stone Artefact/s	-	Valid
37-6-2608	MTW-317	Isolated Stone Artefact/s	-	Valid
37-6-2609	MTW-318	Isolated Stone Artefact/s	-	Valid
37-6-2610	MTW-319	Scarred Tree	-	Valid
37-6-2611	WE 16 (MTW-321)	Scarred Tree	-	Valid
37-6-2612	MTW-322	Scarred Tree	-	Valid
37-6-2613	MTW-323	Scarred Tree	-	Valid
37-6-2614	MTW-324	Scarred Tree	-	Valid
37-6-2615	MTW-325	Isolated Stone Artefact/s	-	Valid
37-6-2616	MTW-326	Isolated Stone Artefact/s	-	Valid

AHIMS No	Place Name	Place Type	PAD	Status
37-6-2617	MTW-327	Isolated Stone Artefact/s	-	Valid
37-6-2618	MTW-328	Isolated Stone Artefact/s	-	Valid
37-6-2619	MTW-329	Isolated Stone Artefact/s	-	Valid
37-6-2620	MTW-330	Isolated Stone Artefact/s	-	Valid
37-6-2621	PN6 (MTW-331)	Isolated Stone Artefact/s	-	Valid
37-6-2622	MTW-335	Isolated Stone Artefact/s	-	Valid
37-6-2623	MTW-338	Isolated Stone Artefact/s	-	Valid
37-6-2624	MTW-339	Isolated Stone Artefact/s	-	Valid
37-6-2625	MTW-340	Isolated Stone Artefact/s	-	Valid
37-6-2626	MTW-341	Isolated Stone Artefact/s	-	Valid
37-6-2627	MTW-344	Isolated Stone Artefact/s	-	Valid
37-6-2628	MTW-345	Isolated Stone Artefact/s	-	Valid
37-6-2629	MTW-346	Isolated Stone Artefact/s	-	Valid
37-6-2630	MTW-347	Isolated Stone Artefact/s	-	Valid
37-6-2631	MTW-348	Isolated Stone Artefact/s	-	Valid
37-6-2632	MTW-349	Isolated Stone Artefact/s	-	Valid
37-6-2633	MTW-350	Isolated Stone Artefact/s	-	Valid
37-6-2634	MTW-351	Isolated Stone Artefact/s	-	Valid
37-6-2635	MTW-352	Isolated Stone Artefact/s	-	Valid
37-6-2636	MTW-353	Isolated Stone Artefact/s	-	Valid
37-6-2637	MTW-354	Isolated Stone Artefact/s	-	Valid
37-6-2638	MTW-355	Isolated Stone Artefact/s	-	Valid
37-6-2639	MTW-357	Stone Artefact Scatter	-	Valid
37-6-2640	MTW-358	Isolated Stone Artefact/s	-	Valid
37-6-2641	MTW-359	Isolated Stone Artefact/s	-	Valid
37-6-2642	MTW-360	Isolated Stone Artefact/s	-	Valid
37-6-2643	MTW-361	Isolated Stone Artefact/s	-	Valid
37-6-2644	MTW-362	Isolated Stone Artefact/s	-	Valid
37-6-2645	MTW-363	Isolated Stone Artefact/s	-	Valid
37-6-2646	MTW-365	Isolated Stone Artefact/s	-	Valid
37-6-2647	MTW-366	Isolated Stone Artefact/s	Yes	Valid
37-6-2648	MTW-367	Isolated Stone Artefact/s	Yes	Valid
37-6-2649	MTW-368	Isolated Stone Artefact/s	Yes	Valid
37-6-2650	MTW-369	Isolated Stone Artefact/s	Yes	Valid
37-6-2651	MTW-370	Isolated Stone Artefact/s	Yes	Valid
37-6-2652	MTW-371	Isolated Stone Artefact/s	Yes	Valid
37-6-2653	MTW-372	Isolated Stone Artefact/s	Yes	Valid
37-6-2654	MTW-373	Isolated Stone Artefact/s	Yes	Valid
37-6-2655	MTW-374	Isolated Stone Artefact/s	Yes	Valid
37-6-2656	MTW-375	Isolated Stone Artefact/s	Yes	Valid
37-6-2657	MTW-376	Isolated Stone Artefact/s	Yes	Valid
37-6-2658	MTW-377	Isolated Stone Artefact/s	Yes	Valid
37-6-2659	MTW-378	Isolated Stone Artefact/s	Yes	Valid

AHIMS No	Place Name	Place Type	PAD	Status
37-6-2660	MTW-379	Isolated Stone Artefact/s	Yes	Valid
37-6-2661	MTW-380	Isolated Stone Artefact/s	Yes	Valid
37-6-2662	MTW-381	Isolated Stone Artefact/s	Yes	Valid
37-6-2663	MTW-382	Isolated Stone Artefact/s	Yes	Valid
37-6-2664	MTW-383	Isolated Stone Artefact/s	Yes	Valid
37-6-2665	MTW-384	Isolated Stone Artefact/s	Yes	Valid
37-6-2666	MTW-385	Isolated Stone Artefact/s	Yes	Valid
37-6-2667	MTW-386	Isolated Stone Artefact/s	Yes	Valid
37-6-2668	MTW-387	Isolated Stone Artefact/s	Yes	Valid
37-6-2669	MTW-388	Isolated Stone Artefact/s	Yes	Valid
37-6-2670	MTW-389	Isolated Stone Artefact/s	Yes	Valid
37-6-2671	MTW-390	Isolated Stone Artefact/s	Yes	Valid
37-6-2672	MTW-391	Isolated Stone Artefact/s	Yes	Valid
37-6-2673	MTW-392	Isolated Stone Artefact/s	Yes	Valid
37-6-2674	MTW-393	Isolated Stone Artefact/s	Yes	Valid
37-6-2675	MTW-394	Isolated Stone Artefact/s	Yes	Valid
37-6-2676	MTW-395	Isolated Stone Artefact/s	Yes	Valid
37-6-2677	MTW-396	Isolated Stone Artefact/s	Yes	Valid
37-6-2678	MTW-397	Isolated Stone Artefact/s	-	Valid
37-6-2679	MTW-398	Isolated Stone Artefact/s	Yes	Valid
37-6-2680	MTW-399	Isolated Stone Artefact/s	Yes	Valid
37-6-2681	MTW-400	Isolated Stone Artefact/s	Yes	Valid
37-6-2682	MTW-401	Isolated Stone Artefact/s	Yes	Valid
37-6-2683	MTW-402	Isolated Stone Artefact/s	Yes	Valid
37-6-2684	MTW-403	Isolated Stone Artefact/s	Yes	Valid
37-6-2685	MTW-404	Isolated Stone Artefact/s	Yes	Valid
37-6-2686	MTW-405	Isolated Stone Artefact/s	Yes	Valid
37-6-2687	MTW-406	Isolated Stone Artefact/s	Yes	Valid
37-6-2688	MTW-407	Isolated Stone Artefact/s	Yes	Valid
37-6-2689	MTW-408	Isolated Stone Artefact/s	Yes	Valid
37-6-2690	MTW-409	Isolated Stone Artefact/s	-	Valid
37-6-2691	MTW-410	Isolated Stone Artefact/s	-	Valid
37-6-2692	MTW-411	Isolated Stone Artefact/s	-	Valid
37-6-2693	MTW-412	Isolated Stone Artefact/s	-	Valid
37-6-2694	MTW-413	Scarred Tree	-	Valid
37-6-2705	PN4	Isolated Stone Artefact/s	-	Valid
37-6-2706	PN5 (N)	Isolated Stone Artefact/s	-	Valid
37-6-2924	MTW-505	Isolated Stone Artefact/s	-	Valid
37-6-2923	MTW-506	Isolated Stone Artefact/s	-	Valid
37-6-2925	MTW-507	Isolated Stone Artefact/s	-	Valid
37-6-2926	MTW-508	Isolated Stone Artefact/s	-	Valid
37-6-2927	MTW-509	Isolated Stone Artefact/s	-	Valid
37-6-2928	MTW-510	Isolated Stone Artefact/s	-	Valid

AHIMS No	Place Name	Place Type	PAD	Status
37-6-2929	MTW-511	Stone Artefact Scatter	-	Valid
37-6-2930	MTW-512	Isolated Stone Artefact/s	-	Valid
37-6-2931	MTW-513	Isolated Stone Artefact/s	-	Valid
37-6-2939	MTW-514	Isolated Stone Artefact/s	-	Valid
37-6-2937	MTW-515	Isolated Stone Artefact/s	-	Valid
37-6-2938	MTW-516	Isolated Stone Artefact/s	-	Valid
37-6-2939	MTW-517	Isolated Stone Artefact/s	-	Valid
37-6-2940	MTW-519	Isolated Stone Artefact/s	-	Valid
37-6-2941	MTW-520	Isolated Stone Artefact/s	-	Valid

Table 15: Details of all Aboriginal cultural heritage places and their current status within the proposed WBACHCA. Note: the presence of brackets around the Place Name field indicates places which have been assigned multiple place names during the conduct of separate cultural heritage investigations over time.

Geographically, PADs have tended to cluster throughout the central and southern portions of the conservation area and particularly adjacent to Wollombi Brook (see Figure 3). In addition, and although not identified formally as a PAD during cultural heritage investigations, portions of an extensive linear Warkworth sand dune (portions of which have previously been quarried) also lie within the WBACHCA.

This later feature was previously identified as one of the locations suitable for further research as part of the Hunter Valley Sand Bodies Research Study. This study was included within two of the conditions (Numbers 59 and 60) within the now disapproved development consent (PA 09_0202) for the 2010 Warkworth Extension Project. Consistent with these previous conditions, a research design and action plan for their implementation was developed by an expert panel in conjunction with DP&E and OEH. DP&E subsequently approved this design and plan.

All Aboriginal cultural heritage located within the proposed WBACHCA are managed in accordance with CHMS provisions and management principles developed in consultation with the CHWG. Under the auspices of the CHWG, a WBACHCA Steering Committee (comprised from the CHWG membership) has been established and in operation for several years. This group has, and it is proposed will continue to develop specific management arrangements for this area. The WBACHCA will be managed under its own stand alone and formalised Aboriginal cultural heritage management plan developed in consultation with the CHWG. A draft management plan was developed during CHWG consultation for the Warkworth Extension Project and is in the process of further consultation and revision. Further details on the commitments stemming from Aboriginal community consultation surrounding the establishment and protection of the WBACHCA are outlined in Section 8 below.

7.4 Proposed Loder Creek Aboriginal Cultural Heritage Conservation Area

As outlined above in Section 7.2, the vast majority of the proposed Loder Creek ACHCA lies within the remaining undeveloped south eastern portion of the Mount Thorley Operations 2014 proposal area (see Figures 5 and 3). The proposed conservation area totals approximately 87 hectares of which 70.6 hectares lies within the Mount Thorley Operations 2014 proposal area. The remaining portion lies on adjoining Coal & Allied owned land and is not currently covered by a mining tenement. The proposed Loder Creek ACHCA represents the remaining remnant riparian landscape within the Mount Thorley Operations 2014 proposal area.

The Loder Creek environment and cultural landscape has been identified, through consultation with the CHWG, as a priority area for protection and conservation. Through discussions with the CHWG RAPs on the Mount Thorley Operations 2014 proposal, Coal & Allied committed to permanently protect this area as an ACHCA. This proposal was supported by the RAPs. The key ongoing objective in the development of the Loder Creek ACHA will be to establish a co-management regime in partnership with the Aboriginal community through the development of a comprehensive and well considered management strategy supported by an appropriate community-based governance structure.

As outlined above, while this portion of the Mount Thorley Operations 2014 proposal area has been the subject of previous Aboriginal cultural heritage investigations, Coal & Allied is conducting a reassessment of this area to refresh the currency and comprehensiveness of its understanding of the Aboriginal cultural heritage of this area. These commenced in mid-2013, with those surveys completed focussing on that portion of the Mount Thorley Operations 2014 proposal area immediately to the west of the proposed Loder Creek ACHCA and required for the construction of the Ramp 22 sedimentation dam (see Section 5.6 above). The reassessment surveys of the proposed Loder Creek ACHCA will be completed to inform the development of a plan of management for the area.

Noting that the identified and recorded Aboriginal cultural heritage places identified within the Loder Creek ACHCA are also within the overall Mount Thorley Operations 2014 proposal area and are also discussed in Section 7.2 above, a total of 19 places containing Aboriginal cultural heritage have been identified and recorded within the Loder Creek ACHCA (see Figure 5). One of these places (37-6-0657 – B47) has previously been destroyed under a finalised consent under the NPW Act and as such will again not be discussed further here.

The remaining 18 extant Aboriginal cultural heritage places currently identified and recorded within the Loder Creek ACHCA are almost exclusively dominated by places containing stone artefacts (n=17; 94.4%) although one area with the potential to contain archaeological deposits (i.e. PAD) has also been identified. When originally identified and recorded, this PAD was not associated with any

surface Aboriginal cultural heritage objects. Additional details of these places are provided in Table 16.

AHIMS No	Restricted	Place Name	Place Type	PAD	Status
37-6-0315	-	MT 29	Stone Artefact Scatter	-	Valid
37-6-0316	-	MT 30	Stone Artefact Scatter	-	Valid
37-6-0314	-	MT 28	Stone Artefact Scatter	-	Valid
37-6-0319	-	MT 33	Isolated Stone Artefact/s	-	Valid
37-6-0659	-	B 76	Stone Artefact Scatter	-	Valid
37-6-0656	-	B73	Stone Artefact Scatter	-	Valid
37-6-0317	-	MT 31	Stone Artefact Scatter	-	Valid
37-6-0318	-	MT 32	Stone Artefact Scatter	-	Valid
37-6-0312	-	MT 26	Stone Artefact Scatter	-	Valid
37-6-0313	-	MT 27	Stone Artefact Scatter	-	Valid
37-6-0658	-	B 75	Stone Artefact Scatter	-	Valid
37-6-0660	-	B 77	Stone Artefact Scatter	-	Valid
37-6-0657	-	B 47	Stone Artefact Scatter	-	Destroyed
37-6-2715	-	AG-PAD-2	Other (PAD)	Yes	Valid
37-6-2907	-	MTW-544	Isolated Stone Artefact/s	-	Valid
37-6-2908	-	MTW-545	Isolated Stone Artefact/s	-	Valid
37-6-2909	-	MTW-546	Isolated Stone Artefact/s	-	Valid
37-6-2917	-	MTW-554	Isolated Stone Artefact/s	-	Valid
37-6-2918	-	MTW-555	Isolated Stone Artefact/s	-	Valid

Table 16: Details of all Aboriginal cultural heritage places and their current status within the proposed Loder Creek ACHCA.

As outlined above, Coal & Allied is committed to completing the systematic and comprehensive reassessment of the proposed Loder Creek ACHCA which it commenced in mid-2013. All Aboriginal cultural heritage, both extant and as may be identified and recorded during the completion of the reassessment surveys, will continue to be managed consistent with the provisions of the current Mount Thorley Operations A&CHMP 2004 and the CHMS until such time as a comprehensive and formalised Aboriginal cultural heritage management plan has been developed in consultation with the CHWG. Commitments to these ends are outlined in Section 8 below.

7.5 Current Warkworth Mine Development Consent Area

A total of 111 places containing Aboriginal cultural heritage objects have also been previously identified and recorded within the current Warkworth Mine development consent area (DA 300-9-2002-i as modified) (Table 17; see Figure 3). With four exceptions (see Table 17), all of the remaining places have been destroyed under finalised consents under the NPW Act. It should be noted that this does not include the two places identified in Section 7.1 above as being Partially

Destroyed (37-6-1234; W12 and 37-6-1235; W13). The remaining extant portions of these two places which lie within the Warkworth Continuation 2014 proposal area are considered above in that section.

AHIMS No	Place Name	Place Type	PAD	Status
37-6-0611	Jerry's Plains Road 2	Isolated Stone Artefact/s	-	Valid
37-6-0682	Wark-2	Isolated Stone Artefact/s	-	Valid
37-6-2061	KR56	Stone Artefact Scatter	-	Valid
37-6-2063	KR58	Stone Artefact Scatter	-	Valid
37-6-0108	Warkworth 1	Scarred Tree	-	Destroyed
37-6-0151	Warkworth Mine 6	Stone Artefact Scatter	-	Destroyed
37-6-0152	Mt Thorley B	Stone Artefact Scatter	-	Destroyed
37-6-0153	Mt Thorley C	Isolated Stone Artefact/s	-	Destroyed
37-6-0155	Warkworth Mine 4	Isolated Stone Artefact/s	-	Destroyed
37-6-0156	Warkworth Mine 2	Isolated Stone Artefact/s	-	Destroyed
37-6-0157	Mt Thorley G	Isolated Stone Artefact/s	-	Destroyed
37-6-0158	Mt Thorley H	Isolated Stone Artefact/s	-	Destroyed
37-6-0159	Mt Thorley I	Isolated Stone Artefact/s	-	Destroyed
37-6-0161	K1,K2	Isolated Stone Artefact/s	-	Destroyed
37-6-0162	Mt Thorley L	Stone Artefact Scatter	-	Destroyed
37-6-0164	Mt Thorley N	Isolated Stone Artefact/s	-	Destroyed
37-6-0165	Mt Thorley O	Isolated Stone Artefact/s	-	Destroyed
37-6-0458	Doctors creek	Stone Artefact Scatter	-	Destroyed
37-6-0549	Warkworth Mine 1	Isolated Stone Artefact/s	-	Destroyed
37-6-0550	Warkworth Mine 3	Stone Artefact Scatter	-	Destroyed
37-6-0589	Warkworth mines 7	Stone Artefact Scatter	-	Destroyed
37-6-0590	Warkworth mines 8	Isolated Stone Artefact/s	-	Destroyed
37-6-0591	Warkworth mines 9	Isolated Stone Artefact/s	-	Destroyed
37-6-0592	Warkworth mines 10	Stone Artefact Scatter	-	Destroyed
37-6-0593	Warkworth mines 11	Stone Artefact Scatter	-	Destroyed
37-6-0662	F1	Isolated Stone Artefact/s	-	Destroyed
37-6-0663	F2	Isolated Stone Artefact/s	-	Destroyed
37-6-0664	F3	Isolated Stone Artefact/s	-	Destroyed
37-6-0665	Ulan Id#71 (F4)	Isolated Stone Artefact/s	-	Destroyed
37-6-0666	F5-15	Isolated Stone Artefact/s	-	Destroyed
37-6-0667	F16 & F17	Isolated Stone Artefact/s	-	Destroyed
37-6-0668	F18	Isolated Stone Artefact/s	-	Destroyed
37-6-0946	W14 Sandsheet	Isolated Stone Artefact/s	Yes	Destroyed
37-6-1090	W79	Isolated Stone Artefact/s	-	Destroyed
37-6-1236	W14 Campsite	Isolated Stone Artefact/s	-	Destroyed
37-6-1237	W15	Isolated Stone Artefact/s	-	Destroyed
37-6-1238	W16	Isolated Stone Artefact/s	-	Destroyed
37-6-1240	W17	Isolated Stone Artefact/s	-	Destroyed
37-6-1242	W18	Stone Artefact Scatter	-	Destroyed
37-6-1243	W19	Isolated Stone Artefact/s	-	Destroyed
37-6-1245	W72	Isolated Stone Artefact/s	-	Destroyed

AHIMS No	Place Name	Place Type	PAD	Status
37-6-1246	W73	Isolated Stone Artefact/s	-	Destroyed
37-6-1248	W22	Isolated Stone Artefact/s	-	Destroyed
37-6-1249	W74	Isolated Stone Artefact/s	-	Destroyed
37-6-1251	W75	Isolated Stone Artefact/s	-	Destroyed
37-6-1252	W24	Isolated Stone Artefact/s	-	Destroyed
37-6-1253	W76	Isolated Stone Artefact/s	-	Destroyed
37-6-1256	W77	Isolated Stone Artefact/s	-	Destroyed
37-6-1257	W78	Isolated Stone Artefact/s	-	Destroyed
37-6-1261	W30	Isolated Stone Artefact/s	-	Destroyed
37-6-1263	W80	Isolated Stone Artefact/s	-	Destroyed
37-6-1266	W81	Isolated Stone Artefact/s	-	Destroyed
37-6-1269	W82	Isolated Stone Artefact/s	-	Destroyed
37-6-1271	W83	Isolated Stone Artefact/s	-	Destroyed
37-6-1272	W37	Isolated Stone Artefact/s	-	Destroyed
37-6-1273	W84	Isolated Stone Artefact/s	-	Destroyed
37-6-1274	W38	Isolated Stone Artefact/s	-	Destroyed
37-6-1275	W39	Isolated Stone Artefact/s	-	Destroyed
37-6-1276	W40	Isolated Stone Artefact/s	-	Destroyed
37-6-1277	W41	Isolated Stone Artefact/s	-	Destroyed
37-6-1278	W42	Isolated Stone Artefact/s	-	Destroyed
37-6-1279	W43	Isolated Stone Artefact/s	-	Destroyed
37-6-1280	W44	Isolated Stone Artefact/s	-	Destroyed
37-6-1281	W45	Isolated Stone Artefact/s	-	Destroyed
37-6-1282	W46	Isolated Stone Artefact/s	-	Destroyed
37-6-1283	W47	Isolated Stone Artefact/s	-	Destroyed
37-6-1298	W62	Isolated Stone Artefact/s	-	Destroyed
37-6-1299	W63	Isolated Stone Artefact/s	-	Destroyed
37-6-1301	W65	Isolated Stone Artefact/s	-	Destroyed
37-6-1302	W66	Isolated Stone Artefact/s	-	Destroyed
37-6-1303	W67	Isolated Stone Artefact/s	-	Destroyed
37-6-1304	W68	Isolated Stone Artefact/s	-	Destroyed
37-6-1305	W69	Isolated Stone Artefact/s	-	Destroyed
37-6-1785	PN12	Isolated Stone Artefact/s	-	Destroyed
37-6-1786	PN 10	Grinding Grooves	-	Destroyed
37-6-1787	PN 7	Isolated Stone Artefact/s	-	Destroyed
37-6-1788	PN 8	Isolated Stone Artefact/s	-	Destroyed
37-6-1789	PN 9	Isolated Stone Artefact/s	-	Destroyed
37-6-1790	PN 11	Isolated Stone Artefact/s	-	Destroyed
37-6-1791	PN 1	Isolated Stone Artefact/s	-	Destroyed
37-6-1792	PC 01	Isolated Stone Artefact/s	-	Destroyed
37-6-1807	WE01	Stone Artefact Scatter	-	Destroyed
37-6-1808	WE02	Isolated Stone Artefact/s	-	Destroyed
37-6-1809	WE03	Isolated Stone Artefact/s	-	Destroyed
37-6-1810	WE04	Stone Artefact Scatter	-	Destroyed

AHIMS No	Place Name	Place Type	PAD	Status
37-6-1811	WE05	Stone Artefact Scatter	-	Destroyed
37-6-1812	WE06	Stone Artefact Scatter	-	Destroyed
37-6-1813	WE07	Isolated Stone Artefact/s	-	Destroyed
37-6-1814	WE08	Stone Artefact Scatter	-	Destroyed
37-6-1815	MTW1	Isolated Stone Artefact/s	-	Destroyed
37-6-1816	WE09	Isolated Stone Artefact/s	-	Destroyed
37-6-1817	WE10	Isolated Stone Artefact/s	-	Destroyed
37-6-1818	WE12	Isolated Stone Artefact/s	-	Destroyed
37-6-1819	WE13	Isolated Stone Artefact/s	-	Destroyed
37-6-1820	WE14	Isolated Stone Artefact/s	-	Destroyed
37-6-1821	WE15	Isolated Stone Artefact/s	-	Destroyed
37-6-2292	PC 2	Isolated Stone Artefact/s	-	Destroyed
37-6-2295	PL12 Location 2	Stone Artefact Scatter	-	Destroyed
37-6-2299	PN2	Isolated Stone Artefact/s	-	Destroyed
37-6-2300	PN3	Isolated Stone Artefact/s	-	Destroyed
37-6-2293	PC 3	Isolated Stone Artefact/s	-	Destroyed
37-6-2701	PL6 (MTW-556)	Isolated Stone Artefact/s	-	Destroyed
37-6-2296	PL12 Location 3	Stone Artefact Scatter	-	Destroyed
37-6-2294	PL12 Location 1	Stone Artefact Scatter	-	Destroyed
37-6-2297	PL13	Stone Artefact Scatter	-	Destroyed
37-6-2298	PL13 - new exposures	Stone Artefact Scatter	-	Destroyed
37-6-2696	PL11	Isolated Stone Artefact/sz	-	Destroyed
37-6-2702	PL7 (MTW-559)	Isolated Stone Artefact/s	-	Destroyed
37-6-2873	MTW-557	Isolated Stone Artefact/s	-	Destroyed
37-6-2874	MTW-558	Isolated Stone Artefact/s	-	Destroyed
37-6-2875	MTW-560	Isolated Stone Artefact/s	-	Destroyed

Table 17: Summary and present status of Aboriginal cultural heritage places located within the current Warkworth Mine development consent area.

The remaining extant places will not be impacted upon by the Warkworth Continuation 2014 proposal and will continue to be managed in a manner consistent with the provisions of the current Warkworth Mine A&CHMP 2004 and the CHMS. Commitments to these ends are outlined in Section 8 below.

As originally recorded, the 111 places containing Aboriginal cultural heritage are broadly similar to the Warkworth Continuation 2014 proposal area (see Section 7.1 above). Aboriginal cultural heritage is dominated by places containing stone artefacts (n=105; 94.6%), but again a culturally modified (scarred) tree and a set of axe grinding grooves were also identified. Only one area (also associated with stone artefacts) was observed to contain PAD. This was the W14 ‘Warkworth Sands’ sand-sheet (37-6-0946) the subject of previous reporting of intensive multidisciplinary investigations (Scarp 2009b; see Section 5.9 above).

7.6 Other ‘On site’ Coal & Allied Owned Lands

Lands which fit this category generally consist of the western parts of the MTW mining leases situated between the Warkworth Continuation 2014 proposal area, and areas south of Putty Road and west of Charlton Road within the MTO mining lease and the proposed WBACHCA. They also include small remnant portions of the Warkworth mining lease in the north and east which lie outside of the current Warkworth development consent area (DA 300-9-2002-i as modified) (see Figure 3). These areas total approximately 1,044 hectares.

An additional 121 places containing Aboriginal cultural heritage have been identified and recorded in this area (Table 18; see Figure 3). As with the WBACHCA (see Section 7.3 above), all of these remain extant. Consistent with patterns observed elsewhere throughout the greater MTW mining area, places containing stone artefacts again dominate, along with a number of scarred trees. Grinding grooves are notably absent from these areas. One place which was noted as having shell material (37-6-2338; MTW-39) was observed. Shell material with the possibility of being culturally-derived (this has not been verified at the present time) has not previously been identified within the greater MTW mining area.

Place Type	Number	%
Stone Artefacts	86	71.1
Stone Artefacts / PAD	23	19.0
Scarred Trees	9	7.4
Isolated Stone Artefact/s / Stone Source	2	1.7
Isolated Stone Artefact/s / Shell Material	1	0.8
<i>Total</i>	<i>121</i>	

Table 18: Summary of Aboriginal cultural heritage place-types located within other ‘on site’ Coal & Allied owned lands.

Although considerably fewer in number than within the WBACHCA, a nonetheless significant number of places identified as containing the potential for archaeological deposit (i.e. PAD) have been identified among these Aboriginal cultural heritage places. These cluster exclusively on the northern side of Wollombi Brook in the south western portions of the MTO mining lease (see Figure 3).

Further detail for all places located throughout the other ‘on site’ Coal & Allied owned lands is provided in Table 19. These places have been and will continue to be managed consistent with the provisions of the current Warkworth Mine A&CHMP 2004 and the CHMS.

AHIMS No	Place Name	Place Type	PAD	Status
37-6-0641	Lemington Mine Lease ISF4	Isolated Stone Artefact/s	-	Valid
37-6-0848	Site T (Bulga)	Stone Artefact Scatter	-	Valid
37-6-0991	JP30	Isolated Stone Artefact/s	-	Valid
37-6-1437	JP 16	Isolated Stone Artefact/s	-	Valid
37-6-1438	JP 17	Isolated Stone Artefact/s	-	Valid
37-6-1440	JP 18	Isolated Stone Artefact/s	-	Valid
37-6-1441	JP 19	Isolated Stone Artefact/s	-	Valid
37-6-1442	JP 21	Isolated Stone Artefact/s	-	Valid
37-6-1445	JP 24	Stone Artefact Scatter	-	Valid
37-6-1446	JP 25	Stone Artefact Scatter	-	Valid
37-6-1448	JP 27	Stone Artefact Scatter	-	Valid
37-6-1450	JP 31	Isolated Stone Artefact/s	-	Valid
37-6-1451	JP 35	Stone Artefact Scatter	-	Valid
37-6-2062	KR57	Stone Artefact Scatter	-	Valid
37-6-2064	KR59	Stone Artefact Scatter	-	Valid
37-6-2065	KR60	Stone Artefact Scatter	-	Valid
37-6-2304	MTW-5	Isolated Stone Artefact/s	-	Valid
37-6-2305	MTW-6	Isolated Stone Artefact/s	-	Valid
37-6-2311	MTW-12	Isolated Stone Artefact/s	-	Valid
37-6-2322	MTW-23	Isolated Stone Artefact/s	-	Valid
37-6-2323	MTW-24	Isolated Stone Artefact/s	-	Valid
37-6-2329	MTW-30	Isolated Stone Artefact/s	-	Valid
37-6-2331	MTW-32	Isolated Stone Artefact/s	-	Valid
37-6-2332	MTW-33	Isolated Stone Artefact/s	-	Valid
37-6-2333	MTW-34	Isolated Stone Artefact/s	-	Valid
37-6-2334	MTW-35	Isolated Stone Artefact/s	-	Valid
37-6-2335	MTW-36	Isolated Stone Artefact/s	-	Valid
37-6-2336	MTW-37	Isolated Stone Artefact/s	-	Valid
37-6-2337	MTW-38	Isolated Stone Artefact/s	-	Valid
37-6-2338	MTW-39	Isolated Stone Artefact/s / Shell Material	-	Valid
37-6-2339	MTW-40	Isolated Stone Artefact/s	-	Valid
37-6-2340	MTW-41	Isolated Stone Artefact/s	-	Valid
37-6-2341	MTW-42	Isolated Stone Artefact/s	-	Valid
37-6-2342	MTW-43	Scarred Tree	-	Valid
37-6-2343	MTW-44	Isolated Stone Artefact/s / Stone Source	-	Valid
37-6-2344	MTW-45	Isolated Stone Artefact/s	-	Valid
37-6-2345	MTW-46	Isolated Stone Artefact/s	-	Valid
37-6-2346	MTW-47	Isolated Stone Artefact/s	-	Valid
37-6-2347	MTW-48	Isolated Stone Artefact/s	-	Valid
37-6-2391	MTW-92	Isolated Stone Artefact/s	-	Valid
37-6-2395	MTW-96	Isolated Stone Artefact/s	-	Valid

AHIMS No	Place Name	Place Type	PAD	Status
37-6-2396	MTW-97	Isolated Stone Artefact/s	-	Valid
37-6-2397	MTW-98	Isolated Stone Artefact/s	-	Valid
37-6-2398	MTW-99	Isolated Stone Artefact/s	-	Valid
37-6-2399	MTW-100	Isolated Stone Artefact/s	-	Valid
37-6-2400	MTW-101	Isolated Stone Artefact/s	-	Valid
37-6-2436	MTW-137	Isolated Stone Artefact/s	-	Valid
37-6-2437	MTW-138	Isolated Stone Artefact/s	-	Valid
37-6-2438	MTW-140	Stone Artefact Scatter	-	Valid
37-6-2439	MTW-141	Stone Artefact Scatter	-	Valid
37-6-2440	MTW-142	Stone Artefact Scatter	-	Valid
37-6-2441	MTW-143	Isolated Stone Artefact/s	Yes	Valid
37-6-2442	MTW-144	Isolated Stone Artefact/s	-	Valid
37-6-2443	MTW-145	Isolated Stone Artefact/s	-	Valid
37-6-2444	MTW-146-WSW-09-4	Isolated Stone Artefact/s	Yes	Valid
37-6-2445	MTW-147-WSW09-4	Isolated Stone Artefact/s	Yes	Valid
37-6-2446	MTW-148-WSW-09-4	Isolated Stone Artefact/s	Yes	Valid
37-6-2447	MTW-149-WSW-09-4	Isolated Stone Artefact/s	Yes	Valid
37-6-2448	MTW-150-WSW-09-4	Stone Artefact Scatter	Yes	Valid
37-6-2449	MTW-151-WSW-09-4	Isolated Stone Artefact/s	Yes	Valid
37-6-2450	MTW-152-WSW-09-4	Isolated Stone Artefact/s	Yes	Valid
37-6-2451	MTW-153-WSW-09-4	Isolated Stone Artefact/s	Yes	Valid
37-6-2452	MTW-154-WSW-09-4	Isolated Stone Artefact/s	Yes	Valid
37-6-2453	MTW-155-WSW-09-4	Isolated Stone Artefact/s	Yes	Valid
37-6-2454	MTW-156-WSW-09-4	Isolated Stone Artefact/s	Yes	Valid
37-6-2455	MTW-157-WSW-09-4	Isolated Stone Artefact/s	Yes	Valid
37-6-2456	MTW-158-WSW-09-4	Isolated Stone Artefact/s	Yes	Valid
37-6-2457	MTW-159-WSW-09-4	Isolated Stone Artefact/s	Yes	Valid
37-6-2458	MTW-160-WSW-09-4	Isolated Stone Artefact/s	Yes	Valid
37-6-2459	MTW-161-WSW-09-4	Isolated Stone Artefact/s	Yes	Valid
37-6-2460	MTW-162-WSW-09-4	Isolated Stone Artefact/s	Yes	Valid
37-6-2461	MTW-163-WSW-09-41	Isolated Stone Artefact/s	-	Valid
37-6-2462	MTW-164-WSW-09-40	Isolated Stone Artefact/s	-	Valid
37-6-2463	MTW-165-WSW-09-27	Scarred Tree	-	Valid
37-6-2464	MTW-166-WSW-09-42	Isolated Stone Artefact/s	-	Valid
37-6-2465	MTW-167-WSW-09-43	Isolated Stone Artefact/s	-	Valid
37-6-2466	MTW-168-WSW-09-28	Scarred Tree	-	Valid
37-6-2467	MTW-169-WSW-09-29	Scarred Tree	-	Valid
37-6-2468	MTW-170-WSW-09-44	Isolated Stone Artefact/s	-	Valid
37-6-2469	MTW-171-WSW-09-5	Isolated Stone Artefact/s	-	Valid
37-6-2470	MTW-172-WSW-09-45	Isolated Stone Artefact/s	-	Valid
37-6-2471	MTW-173-WSW-09-6	Isolated Stone Artefact/s	Yes	Valid
37-6-2472	MTW-174-WSW-09-6	Isolated Stone Artefact/s	Yes	Valid
37-6-2473	MTW-175-WSW-09-6	Isolated Stone Artefact/s	Yes	Valid

AHIMS No	Place Name	Place Type	PAD	Status
37-6-2474	MTW-176-WSW-09-6	Stone Artefact Scatter	Yes	Valid
37-6-2475	MTW-177-WSW-09-7	Isolated Stone Artefact/s	-	Valid
37-6-2476	MTW-178-WSW-09-68	Isolated Stone Artefact/s	-	Valid
37-6-2477	MTW-179-WSW-09-30	Scarred Tree	-	Valid
37-6-2478	MTW-180-WSW-09-69	Isolated Stone Artefact/s	-	Valid
37-6-2479	MTW-181-WSW-09-31	Scarred Tree	-	Valid
37-6-2480	MTW-182-WSW-09-70	Isolated Stone Artefact/s	-	Valid
37-6-2481	MTW-183-WSW-09-71	Isolated Stone Artefact/s	-	Valid
37-6-2482	MTW-184-WSW-09-11	Stone Artefact Scatter	Yes	Valid
37-6-2483	MTW-185-WSW-09-12	Isolated Stone Artefact/s	-	Valid
37-6-2484	MTW-186-WSW-09-12	Isolated Stone Artefact/s	-	Valid
37-6-2485	MTW-187-WSW-09-12	Isolated Stone Artefact/s	-	Valid
37-6-2486	MTW-188-WSW-09-12	Isolated Stone Artefact/s	-	Valid
37-6-2487	MTW-189-WSW-09-12	Isolated Stone Artefact/s	-	Valid
37-6-2488	MTW-190-WSW-09-57	Isolated Stone Artefact/s	-	Valid
37-6-2489	MTW-191-WSW-09-72	Isolated Stone Artefact/s	-	Valid
37-6-2490	MTW-192-WSW-09-13	Isolated Stone Artefact/s	-	Valid
37-6-2491	MTW-193-WSW-09-73	Isolated Stone Artefact/s	-	Valid
37-6-2492	MTW-194-WSW-09-74	Isolated Stone Artefact/s	-	Valid
37-6-2494	MTW-196-WSW-09-14	Isolated Stone Artefact/s	-	Valid
37-6-2505	MTW-207-WSW-09-18	Isolated Stone Artefact/s	-	Valid
37-6-2506	MTW-208-WSW-09-17	Isolated Stone Artefact/s	-	Valid
37-6-2507	MTW-209-WSW-09-18	Stone Artefact Scatter	-	Valid
37-6-2521	MTW-223-WSW-09-32	Scarred Tree	-	Valid
37-6-2522	MTW-224-WSW-09-53	Isolated Stone Artefact/s	-	Valid
37-6-2523	MTW-225-WSW-09-54	Isolated Stone Artefact/s	-	Valid
37-6-2524	MTW-226-WSW-09-8	Isolated Stone Artefact/s / Stone Source	-	Valid
37-6-2577	MTW-282-WSW-09-63	Isolated Stone Artefact/s	-	Valid
37-6-2578	MTW-283-WSW-09-36	Scarred Tree	-	Valid
37-6-2579	MTW-284-WSW-09-64	Isolated Stone Artefact/s	-	Valid
37-6-2580	MTW-285-WSW-09-37	Scarred Tree	-	Valid
37-6-2581	MTW-286-WSW-09-65	Isolated Stone Artefact/s	-	Valid
37-6-2708	WS12	Isolated Stone Artefact/s	-	Valid
37-6-2709	WS13	Isolated Stone Artefact/s	-	Valid
37-6-2712	WS6	Isolated Stone Artefact/s	-	Valid
37-6-2942	MTW-521	Isolated Stone Artefact/s	-	Valid
37-6-2943	MTW-522	Isolated Stone Artefact/s	-	Valid

Table 19: Details of all Aboriginal cultural heritage places and their current status within the remaining MTW Coal & Allied Owned lands.

Impact management commitments with respect to these other ‘on-site’ Coal & Allied owned lands are outlined in Section 8 below.

8. ABORIGINAL CULTURAL HERITAGE IMPACT MANAGEMENT COMMITMENTS

The numerous development consent processes in which Coal & Allied have been engaged over the last decade throughout the MTW mining area and adjoining Coal & Allied owned lands, along with the structures that have been established with respect Aboriginal community consultation, engagement and heritage management, have seen a responsible working relationship developed with the Aboriginal community of the Upper Hunter Valley in relation to cultural heritage issues. The Aboriginal cultural heritage impact management commitments provided here form part of a longstanding suite of management strategies which have been developed with them through the CHWG.

The Aboriginal cultural heritage impact management commitments which have been developed for the proposals fall into a series of categories as follows:

- the finalisation of the development of an overarching heritage management plan for the MTW mining area (including WML and MTO and therein the proposal areas) and adjoining Coal & Allied owned lands;
- management of Aboriginal cultural heritage within the proposal areas;
- management of Aboriginal cultural heritage located within the proposed Aboriginal cultural heritage conservation areas;
- management of Aboriginal cultural heritage located on other 'on site' Coal & Allied owned lands, including extant places within the current development consent area (DA 300-9-2002-i as modified);
- management of Aboriginal cultural heritage within any 'off site' Coal and Allied Owned lands such as biodiversity conservation offset areas which may be associated with any new development consent; and
- implementation of a program of research known as the Hunter Valley Sand Bodies Research Study focusing on possible Pleistocene occupation.

The management commitments within each of these areas are outlined separately below.

8.1 Integrated Heritage Management Plan

A completed consultation draft HMP 2012 had been provided to the RAPs as part of the previous Warkworth Extension Project approval. This captured existing agreed principles, protocols and processes for Aboriginal cultural heritage management which were also given expression within the Warkworth Mine and MTO A&CHMPs previously settled and agreed in 2004, as well as the provisions of the Rio Tinto Coal Australia CHMS. Coal & Allied commits:

- to reviewing, revising and settling Aboriginal cultural heritage management measures for the proposal area, and
- to the finalisation and implementation of an integrated HMP for the MTW mining area and adjoining Coal & Allied owned lands.

8.2 Warkworth Continuation 2014 Proposal Impact Area

A total of 110 extant places (or remnant portions thereof) containing Aboriginal cultural heritage are located within this area. It is highly likely that all of these will be impacted by the proposed mining development activities. Notwithstanding this, Coal & Allied commits:

- to only implement the agreed impact management measures for those places for which development impacts are unavoidable, with avoidance through design planning being the preferred option;
- the implementation of the agreed impact management measures will be staged over time so that these measures (such as salvage) would be implemented no more than five years in advance of mine operation plan requirements;
- until such time as the agreed impact management measures need to be implemented, all Aboriginal cultural heritage within the area will continue to be managed in accordance with the Warkworth Mine A&CHMP 2004, the provisions of the CHMS, or, upon finalisation, the HMP. Avoidance and physical protection will comprise the key management strategy in this period;
- if and when mitigation becomes necessary, areas containing stone artefacts (as per Table 11) will be managed in accordance with the specific provisions for such objects within the HMP. This will include standard salvage collection measures, which in the case of the four stone artefact scatters (37-6-2359,2360, 2374 and 2376) will include controlled collections with the assistance of established grids;
- if and when mitigation becomes necessary, the three areas (37-6-2349, 2359 & 2364) noted as having the potential to contain archaeological deposits (i.e. PAD) will be investigated and managed in accordance with the specific provisions for such features within HMP. This will involve sub-surface testing to confirm or otherwise this potential. The results will be submitted to DP&E/OEH;
- if and when mitigation becomes necessary, the three scarred trees (37-6-2307, 2369 and 2379) will be managed in accordance with the specific provisions for such objects within the HMP and the RTCA Scarred Tree Management Procedure. This may include removal and relocation;

- although considerable review of the matter has taken place already, investigations will continue into the feasibility of moving the Site M grinding grooves (37-6-0163). The final management and salvage measures for this place will be settled in consultation with the CHWG, and with DP&E and OEH. Specific settled impact mitigation activities that will be undertaken include:
 - further geotechnical assessment and testing of the suitability for the removal and relocation of all or parts of this place;
 - the removal of soils which surround and cover portions of the place to gain the fullest appreciation of its constituents;
 - the completion of high definition laser scanning (including photography) of the site and its immediate surrounds; and
 - ahead of the completion of the final management and salvage measures for this place, the establishment of a blast monitoring regime to ensure that ongoing mining activities are not having deleterious effects upon the place;
- any other currently unidentified Aboriginal cultural heritage place, or currently unidentified place-type, which may come to light as part of the implementation of impact management measures, will also be managed in accordance with the relevant specific provisions for such places within the HMP. Such will be reported to DP&E / OEH ahead of the implementation of the agreed impact management measures;
- the Aboriginal community will be involved in the implementation of all impact management measures consistent with the existing CHWG processes and protocols with such being formalised and conducted under a Terms of Reference; and
- all Aboriginal cultural heritage objects collected will be curated and stored in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW*. Until such time as an adequate facility is in place within the WBACHCA, objects will be stored in the secure facility at Hunter Valley Services.

8.3 Mount Thorley Operations 2014 Proposal Area

A total of 48 extant places (or remnant portions thereof) containing Aboriginal cultural heritage are located within this area. With regard the continuation of mining activities, and the management of the Aboriginal cultural heritage within, Coal & Allied commits:

- to complete the reassessment surveys of the remaining undisturbed portion of the Mount Thorley Operations 2014 proposal area along Loder Creek with a view to determining the area to be included in the proposed Loder Creek ACHCA;

- all Aboriginal cultural heritage within the area (both as currently known and as may be identified from the completion of the reassessment survey) will continue to be managed in accordance with the MTO A&CHMP 2004, the provisions of the Rio Tinto Coal Australia CHMS, or, upon finalisation, the HMP;
- places assessed as vulnerable to unintended harm owing to the proximity of roads or tracks or other operational infrastructure, will be appropriately buffered and barricaded in accordance with existing protection procedures and protocols as outlined within the MTO A&CHMP 2004, the provisions of the Rio Tinto Coal Australia CHMS or, upon finalisation, the HMP;
- all Aboriginal cultural heritage places within these areas will be monitored in accordance with such procedures and protocols as outlined within the A&CHMP, the provisions of the Rio Tinto Coal Australia CHMS or, upon finalisation, the HMP; and
- should mine plans change and any additional and currently undisturbed portions of the Mount Thorley Operations 2014 proposal area (excluding the Loder Creek ACHCA) are to be impacted, the following shall apply:
 - the implementation of the agreed impact management measures will only be undertaken for those places for which development impacts are unavoidable, with avoidance through design planning being the preferred option elsewhere;
 - areas containing stone artefacts will be managed in accordance with the specific provisions for such objects within the HMP. This will include standard salvage collection measures, which in the case of stone artefact scatters will include controlled collections with the assistance of established grids;
 - the areas noted as having the potential to contain archaeological deposits (i.e. PAD) will be investigated and managed in accordance with the specific provisions for such features within the HMP. This will involve sub-surface testing to confirm or otherwise this potential. The results will be submitted to DP&E / OEH;
 - the other currently unidentified Aboriginal cultural heritage place, or currently unidentified place-type, which may come to light as part of the implementation of impact management measures, will also be managed in accordance with the relevant specific provisions for such places within the HMP. Such will be reported to DP&E / OEH ahead of the implementation of the agreed impact management measures;
 - the Aboriginal community will be involved in the implementation of all impact management measures consistent with the existing CHWG processes and protocols with such being formalised and conducted under a Terms of Reference; and
 - all Aboriginal cultural heritage objects collected will be curated and stored in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW*. Until such time as an adequate facility is in place, objects will be stored in the secure facility at Hunter Valley Services.

8.4 Wollombi Brook Aboriginal Cultural Heritage Conservation Area

Coal & Allied remains committed to the establishment of the WBACHCA and reconfirms as follows:

- the establishment of the WBACHCA in perpetuity for the conservation and management of Aboriginal cultural heritage places and values. In particular, it will provide for the protective management and cultural maintenance of the Bulga bora ground and associated cultural landscape and other places;
- the WBACHCA will be protected permanently from all mining (open cut, underground, highwall), exploration drilling and associated development disturbance;
- will include the expanded areas as shown in Figure 3;
- the WBACHCA will be managed in accordance with a specific management plan developed in consultation with the CHWG and other stakeholders including DP&E and OEH. This plan will include the following matters:
 - the establishment of strictly controlled non-access zones and protocols around culturally sensitive areas as determined in consultation with the CHWG;
 - the establishment of areas for use by the Aboriginal community for cultural and community purposes;
 - the establishment of areas for active Aboriginal cultural heritage and landscape management, including vegetation rehabilitation;
 - the processes and protocols by which ongoing Aboriginal community access to the WBACHCA can be facilitated; and
 - procedures for access and works for maintenance of existing infrastructure, land management, environmental compliance, land management and safety requirements;
- the Aboriginal community, through a WBACHCA management committee, will oversee the implementation of the management plan;
- Coal & Allied will continue to ensure an active Aboriginal community role in both Aboriginal cultural heritage and environmental management activities for the WBACHCA with this including training and employment development opportunities; and
- engage with Wambo Coal Pty Ltd with a view to developing a collaborative management protocol for highly significant areas associated with and immediately adjacent the Bulga bora ground (which has been identified as containing portions of the extended Bulga bora ground precinct and associated places) situated on Wambo Coal lands.

8.5 Proposed Loder Creek Aboriginal Cultural Heritage Conservation Area

Coal & Allied is committed to the establishment of the Loder Creek ACHCA as follows:

- the establishment of the Loder Creek ACHCA in perpetuity for the conservation and management of Aboriginal cultural heritage places and values. in particular, it will provide for the protective management and cultural maintenance of the remaining undisturbed portion of Loder Creek within the Mount Thorley Operations 2014 proposal area;
- the Loder Creek ACHCA will be protected permanently from all mining (open cut, underground, highwall), exploration drilling and associated development disturbance;
- the Loder Creek ACHCA will be managed in accordance with a specific management plan developed in consultation with the CHWG and other stakeholders including DP&E and OEH.

This plan will include the following matters:

- the establishment of strictly controlled non-access zones and protocols around culturally sensitive areas as determined in consultation with the CHWG;
- the establishment of areas for use by the Aboriginal community for cultural and community purposes;
- the establishment of areas for active Aboriginal cultural heritage and landscape management, including vegetation rehabilitation;
- the processes and protocols by which ongoing Aboriginal community access to the Loder Creek ACHCA can be facilitated; and
- procedures for access and works for maintenance of existing infrastructure, land management, environmental compliance, land management and safety requirements;
- the Aboriginal community, through a Coal & Allied ACHCA management committee, will oversee the implementation of the management plan; and
- Coal & Allied will continue to ensure an active Aboriginal community role in both Aboriginal cultural heritage and environmental management activities for the Loder Creek ACHCA with this including training and employment development opportunities.

8.6 Other ‘On Site’ Coal & Allied Owned Lands

A range of Aboriginal cultural heritage places are located throughout these areas. With regard these lands, Coal & Allied commits that:

- all Aboriginal cultural heritage within these areas will continue to be managed for long-term protection in accordance with the relevant A&CHMP, the provisions of the CHMS, or, upon finalisation;

- places assessed as vulnerable to unintended harm owing to their proximity to roads or tracks or other operational infrastructure will be appropriately buffered and barricaded in accordance with existing protection procedures and protocols as outlined within the relevant A&CHMP, the provisions of the CHMS or, upon finalisation, the HMP; and
- all Aboriginal cultural heritage places within these areas will be monitored in accordance with such procedures and protocols as outlined within the relevant A&CHMP, the provisions of the CHMS or, upon finalisation, the HMP.

8.7 ‘Off Site’ Coal & Allied Owned Lands (Biodiversity Offsets)

In the event that any Coal & Allied managed ‘off site’ biodiversity offset areas are required for the proposals, Coal & Allied commits to the following management measures for Aboriginal cultural heritage:

- the inclusion of Aboriginal cultural heritage management processes, aligned with biodiversity management principles, within separate management plans;
- processes that will provide for the identification, conservation and enhancement of Aboriginal cultural heritage values (both archaeological and cultural) of these areas;
- the provision of regulated access by the Aboriginal community to these areas for cultural purposes;
- the establishment of a Cultural Heritage Zoning Scheme for each area which details the current status and management actions / responsibilities for all parts of each area; and
- the establishment, through the CHWG, of the Offsets Management Group, who will be responsible for:
 - providing direct input into the development of the Aboriginal cultural heritage provisions for each plan;
 - overseeing the conservation and management of Aboriginal cultural heritage within these areas in a culturally-appropriate fashion; and
 - maintaining a direct role in the management of Aboriginal community access to these areas.

8.8 Hunter Valley Sand Bodies Research Study

As outlined in Section 5.10 above, the consent conditions for the now disapproved Warkworth Extension Project (PA 09_0202) also included a condition with respect the undertaking of what was termed the Hunter Valley Sand Bodies Research Study. With respect to the present Warkworth Continuation 2014 proposal, Coal & Allied remains committed to the implementation of this research program, the research design and implementation action plan for which was previously developed by an expert panel with input from DP&E and OEH, and which was subsequently approved by DP&E.

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Appendix 1

Aboriginal Community Consultation Undertaken for the Proposals

Appendix 1.1: Consultation Register

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
CHWG Meeting	7 April 2014	9 - 11 April 2014	7 May 2014	<u>Warkworth Continuation 2014 proposal (DP&E EP&A, OEH ACHCR 2010)</u> <ul style="list-style-type: none"> • Discussion & review of long term approval proposal for Warkworth Mine, including: scope of proposal , Aboriginal cultural heritage impact assessment & proposed management measures • Feedback on CHWG EIS site tour of the MTW proposal area 	<u>Mount Thorley Operations 2014 proposal (DP&E EP&A, OEH ACHCR 2010)</u> <ul style="list-style-type: none"> • Discussion & review of long term approval proposal for Mount Thorley Mine, including: Scope of proposal • Aboriginal cultural heritage impact assessment proposed management measures. • Feedback on EIS site tour of the MTO proposal area 	<ul style="list-style-type: none"> • Joel Deacon – RTCA Specialist Cultural Heritage • David Cameron - RTCA Manager Cultural Heritage • Scott L'Oste-Brown - CQCHM • Georgia Bennett – RTCA Advisor Cultural Heritage • Noel Downs – WLALC • Suzie Worth – WLALC • Rhonda Ward – Ungooroo Cultural & Community Services Inc. • Rhoda Perry – Upper Hunter Wonnarua Council <p>[Note – email received on 6/5/14 from Scott Franks on behalf of the PCWP native title claimants advising that they ‘do not support the modified approval of this operation...’]</p> <p>[Note - email response to Scott Franks made by David Cameron on 11/05/14 acknowledging his email and its inclusion in the consultation section of the Aboriginal Heritage impact assessment for the Warkworth Continuation 2014 EIS].</p>
CHWG Site	9 April 2014	n/a	29 April 2014	<u>Warkworth Continuation</u>	<u>Mount Thorley Operations</u>	<ul style="list-style-type: none"> • Joel Deacon – RTCA Specialist

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
Visit				<u>2014 proposal</u> ; site tour of cultural heritage sites in the proposal area and the Wollombi Brook ACH conservation area, and Springwood and Newport ACH conservation areas.	<u>2014 proposal</u> site tour	Cultural Heritage <ul style="list-style-type: none"> • Georgia Bennett – RTCA Advisor Cultural Heritage • Luc Daigle – SCT • Rhonda Griffiths - HVAC • Suzie Worth - WLALC • Gary Perkins – Divine Diggers Aboriginal Cultural Consultants • Les Atkinson - <u>Jarban & Mugrebea</u>
CHWG Meeting	19 March 2014	Week of 17 March 2014	3 April 2014	<u>Warkworth Mine Continuation 2014 Proposal</u> <ul style="list-style-type: none"> • Discussion and review of long term approval proposal and review of Aboriginal cultural heritage impact assessment process for EIS 	<u>Mount Thorley Operations Continuation 2014 Proposal</u> <ul style="list-style-type: none"> • Discussion and review of long term approval proposal and review of Aboriginal cultural heritage impact assessment process for EIS 	<ul style="list-style-type: none"> • Joel Deacon – RTCA Specialist Cultural Heritage • David Cameron - RTCA Manager Cultural Heritage • Scott L'Oste-Brown - CQCHM • Georgia Bennett – RTCA Advisor Cultural Heritage • Deslee Matthew – Deslee Talbot Consultants • Vicky Slater – Kawul Cultural Services • Noel Downs – WLALC • Tim Miller - WLALC • George Sampson - Cacatua General Services • Mitchum Neave – HECMO • Des Hickey – Wattaka Wonnarua Cultural Consultants Service

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
						<ul style="list-style-type: none"> • Kerry Boyd – HECMO • Rhonda Ward – Ungooroo Cultural & Community Services Inc. • Les Atkinson – Jarban & Mugreba <p>[Note – email response received on 25/3/14 from Scott Franks registering interest as RAP for PCWP native title claimants but advised the PCWP would not participate in CHWG consultation process because they ‘do not support or allow other people making comment or decisions on or for our country we also advise that we will not attend a meeting with other Aboriginal people that are not a part of our Registered Native Title Claim Group...’]</p>
CHWG Meeting		5 - 7 February 2014	19 February 2014	<p><u>Warkworth Coal Mine Development Consent (DA-300-9-2002-i).</u> Modified approval for Minor Extension to West Pit. Review of AHIP approval.</p> <ul style="list-style-type: none"> • RAs inspection of Bulga bora ground visit 	<p><u>Mount Thorley/Bulga Ramp 22 Sedimentation Dam AHIP Application (DA 34/95)</u></p>	<ul style="list-style-type: none"> • Joel Deacon – RTCA Specialist Cultural Heritage • David Cameron - RTCA Manager Cultural Heritage • Margaret Matthews – Aboriginal Native Title Consultants • John Matthews – Aboriginal Native Title Consultants • Clifford Johnson – Hielamon • Arthur Fletcher – Wonn 1 • Suzie Worth – WLALC

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
						<ul style="list-style-type: none"> • Gary Perkins – Divine Diggers • Kevin Sampson – Bawurra Consultants • Les Field - L.J Culture Management • Tony Griffiths - T & G Culture Consultants • Rhonda Ward – Ungooroo Cultural & Community Services Inc. • Tracey Skene – Culturally Aware • Maree Waugh - Wallangan Cultural Services • Samuel Cameron - Luke Cameron Cultural Management • Laurie Perry - Wonnarua Nation Aboriginal Corporation • Deslee Matthews – Deslee Talbot Consultants • Steven Hickey – Widescope • Luke Hickey - HVCS • Des Hickey – Wattaka • Mitchum Neave - Hecmo
CHWG Meeting	14 November 2013	15, 19, 20, 21 November 2013	5 December 2013	<u>Warkworth Coal Mine Development Consent</u> (DA-300-9-2002-i). <ul style="list-style-type: none"> • Modification proposal for Minor Extension to West Pit & lodgement 	<u>Mount Thorley/Bulga Ramp 22 Sedimentation Dam AHIP Application</u> (DA 34/95). <ul style="list-style-type: none"> • Summary of results of assessment survey. 	<ul style="list-style-type: none"> • Joel Deacon – RTCA Specialist Cultural Heritage • David Cameron - RTCA Manager Cultural Heritage • Georgia Bennett – RTCA Graduate Cultural Heritage

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
				<p>of EA.</p> <ul style="list-style-type: none"> Review of previous & current consultation process re: management of ACH in West Pit EA area. Review of results (draft Aboriginal Cultural Heritage Assessment Report) of previous ACH assessments & supplementary investigations for EA area. AHIP. Bulga Bora Ground Community Visit/Meeting Proposal 	<ul style="list-style-type: none"> Review of development impacts on ACH. Review of draft report and discussion of management measures for AHIP application <p><u>Mount Thorley Development Consent condition 34</u> preparation & implementation of a HMP.</p>	<ul style="list-style-type: none"> Rhonda Griffiths - Hunter Valley Aboriginal Corporation Jenny-Lee Chambers – JLC Cultural Services Gary Perkins – Divine Diggers Aboriginal Cultural Consultants Rhoda Perry – Upper Hunter Wonnarua Council Incorporated Noel Downs – Wanaruah Local Aboriginal Lands Council Maree Waugh – Wallangan Cultural Services Des Hickey – Wattaka Wonnarua Cultural Consultants Service Rod Hickey – Kawul Cultural Services Vicky Slater -Kawul Cultural Services
CHWG Meeting	30 July 2013	1 – 2 August 2013	22 August 2013	<p><u>Warkworth Coal Mine Development Consent</u> (DA-300-9-2002-i).</p> <ul style="list-style-type: none"> Review of potential requirement for an Aboriginal Heritage Impact Permit for Battle Axe Pit development under 	<p><u>Mount Thorley Development Consent</u> (DA 34/95) Modification.</p> <ul style="list-style-type: none"> Update on status of consent condition 34, & status of WML Archaeological & Cultural Heritage Management Plan 	<ul style="list-style-type: none"> Joel Deacon – RTCA Specialist Cultural Heritage David Cameron - RTCA Manager Cultural Heritage Georgia Bennett – RTCA Graduate Cultural Heritage Gillian Goode – RPS Paul Amidy – Bulga Coal Rhonda Griffiths – Hunter Valley

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
				WML Archaeological & Cultural Heritage Management Plan 2003.	2003. <u>Mount Thorley/Bulga Ramp 22</u> Sedimentation Dam AHIP Application (DA 34/95). <ul style="list-style-type: none"> • Briefing by RPS on results of assessment survey to inform an AHIP assessment report. • Review of development impacts, CH management measures for managing development impacts. 	Aboriginal Corporation <ul style="list-style-type: none"> • Laurie Perry –Wonnarua Nation Aboriginal Corporation • Maree Waugh- Wallangan Cultural Services • Noel Downs – Wanaruah Local Aboriginal Lands Council • Allen Paget - Ungooroo Aboriginal Corporation • Kerry Boyd – HECMO Consultants • Jenny Chambers - JLC Cultural Services • Deslee Matthews – Deslee Talbot Consultants • Arthur Fletcher - Wonn 1 • Gary Perkins - Divine Diggers • Margaret Matthews – Aboriginal Native Title Consultants • John Matthews – Aboriginal Native Title Consultants • Gay Horton – Muswellbrook Culture Consultants • Martin Salavador
CHWG Meeting	4 February 2013	6 – 8 February 2013	7 March 2013	<u>Warkworth Extension Project Approval</u> (PA_09_0202). <ul style="list-style-type: none"> • Detailed review of 	<u>Mount Thorley Development Consent</u> (DA 34/95) Modification <ul style="list-style-type: none"> • Review of final draft 	<ul style="list-style-type: none"> • Joel Deacon – RTCA Specialist Cultural Heritage • David Cameron - RTCA Manager Cultural Heritage

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
				<p>Aboriginal Cultural Heritage consent conditions, including:</p> <ul style="list-style-type: none"> • (53, 54 & 55) Preparation & implementation of Aboriginal Heritage Conservation Strategy, including establishment of Wollombi Brook ACH Conservation Area and review possible draft terms of Conservation Agreement under section 69 of NP&W Act – Submitted 30 October • (64) Preparation & implementation of Heritage Management Plan for the project – Review of final draft • Summary update on outcomes of initial WBACHCA Steering Group meetings held 6th Sept, 15th Oct, 15th Nov (53, 54, 55) • Warkworth Extension initial management & 	<p>of consent condition 34 (HMP)</p> <ul style="list-style-type: none"> • Review of Mount Thorley/Bulga Mine shared boundary proposed land use – ACH sites recording & management requirements • Discussion of potential AHIP application for construction of sediment dam in vicinity of the Mount Thorley/Bulga Mine shared boundary 	<ul style="list-style-type: none"> • Gary Pappin – RTCA Advisor Cultural Heritage • Georgia Bennett – RTCA Graduate Cultural Heritage • Rhonda Griffiths – Hunter Valley Aboriginal Corp • Rhoda Perry – Upper Hunter Wonnarua Council Incorporated • Laurie Perry – Wonnarua Nation Aboriginal Corporation • Maree Waugh- Wallangan Cultural Services • Suzie Worth – Wanaruah Local Aboriginal Lands Council • Steven Hickey - Widescope Indigenous Group • Allen Paget - Ungooroo Aboriginal Corporation • Vicky Slater – Kawul Cultural Services • Rod Hickey – Kawul Cultural Services • Les Atkinson - Jarban & Mugrebea • Jenny Chambers - JLC Cultural Services

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
				mitigation program		
CHWG Meeting	19 November 2012	Week of 19 November 2012	6 December 2012	<p><u>Warkworth Extension Project Approval</u> (PA_09_0202).</p> <ul style="list-style-type: none"> • Review of ACH consent conditions including: <ul style="list-style-type: none"> - (53, 54 & 55) Preparation & implementation of Aboriginal Heritage Conservation Strategy, including establishment of Wollombi Brook ACH Conservation Area and review possible draft terms of Conservation Agreement under section 69 of NP&W Act – Submitted 30 October - (61) Interim results of Archaeological Excavation Program of Warkworth Sand Sheet – Conducted September 2012 - (64) Preparation & implementation of Heritage Management 	<p><u>Mt Thorley Development Consent</u> (DA 34/95) Modification.</p> <ul style="list-style-type: none"> • Review of consent condition 34. 	<ul style="list-style-type: none"> • Joel Deacon – RTCA Specialist Cultural Heritage • Scott L'Oste -Brown - CQCHM • Gary Pappin – RTCA Advisor Cultural Heritage • Georgia Bennett – RTCA Graduate Cultural Heritage • Noel Downs – WLALC • Rhoda Perry – UHWC • Rhonda Griffiths - Hunter Valley Aboriginal Corp • George Sampson – Cacatua Culture Consultant • Annette Dunstan - Ungooroo Aboriginal Corp • Laurie Perry – Wonnarua Nation Aboriginal Corp • Les Atkinson – Jarban & Mugrebea

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
				Plan for the project <ul style="list-style-type: none"> • Summary update on outcomes of initial WBACHCA Steering Group meetings held 6th Sept, 15th Oct, 15th Nov (53, 54, 55) • Warkworth Extension initial management & mitigation program 		
CHWG Meeting	10 September 2012	Week of 10 September 2012	4 October 2012	<u>Warkworth Extension Project Approval</u> <ul style="list-style-type: none"> • Review of Aboriginal Cultural Heritage consent conditions, including: <ul style="list-style-type: none"> - (53, 54 & 55) Preparation & implementation of Aboriginal Heritage Conservation Strategy, including establishment of Wollombi Brook ACH Conservation Area and review possible draft terms of Conservation Agreement under section 69 of NP&W Act, - (61) Methodology for Archaeological 	<u>Mt Thorley Development Consent (DA 34/95) Modification.</u> <ul style="list-style-type: none"> • Review of consent condition 34. 	<ul style="list-style-type: none"> • Joel Deacon – RTCA Specialist Cultural Heritage • Dave Cameron – RTCA Manager Cultural Heritage • Scott L’Oste -Brown - CQCHM • Gary Pappin – RTCA Advisor Cultural Heritage • Georgia Bennett – RTCA Graduate Cultural Heritage • Arthur Fletcher – Wonn 1 • Allen Paget – Ungooroo Aboriginal Corp • Noel Downs – WLALC • Cliff Johnson – Heilamon Cultural Consultants • Deslee Matthews – Deslee Talbot Consultants • John and Margaret Matthews – ANTC • George Sampson – Cacatua Culture

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
				<p>Excavation Program of Warkworth Sand Sheet</p> <ul style="list-style-type: none"> - (64) Preparation & implementation of Heritage Management Plan for the project. • Review of schedule for heritage activities required under these Approval conditions: - Outcomes of initial WBACHCA Steering Group meeting held 6th Sept (53, 54, 55) - Interim results from Warkworth Sand Sheet Further Archaeological Excavation Program (61) • Warkworth Extension archaeological excavations • Review of any new expressions of interest in participation in this Steering Group 		<p>Consultant</p> <ul style="list-style-type: none"> • Terry Mathews – Breeza Plains • Colleen Stair – • Martin Salvador • Brian Horton - Muswellbrook Culture Consultants
CHWG Meeting	25 July 2012	Week of 23 July 2012	16 August 2012	<p><u>Warkworth Extension Project Approval (PA 09 0202)</u></p> <ul style="list-style-type: none"> • Detailed review of Aboriginal Cultural Heritage consent 	<p><u>Mt Thorley Development Consent (DA 34/95).</u></p> <p>Review of consent condition 34.</p>	<ul style="list-style-type: none"> • Joel Deacon – RTCA Specialist Cultural Heritage • Dave Cameron – RTCA Manager Cultural Heritage • Scott L'Oste -Brown - CQCHM

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
				<p>conditions, including:</p> <ul style="list-style-type: none"> - (53, 54 & 55) Preparation & implementation of Aboriginal Heritage Conservation Strategy, including establishment of Wollombi Brook ACH Conservation Area and review possible draft terms of Conservation Agreement under section 69 of NP&W Act, - (59 & 60) Undertaking a Hunter Valley Sand Bodies Research Study - (61) Methodology for Archaeological Excavation Program of Warkworth Sand Sheet - (64) Preparation & implementation of Heritage Management Plan for the project. • Review of schedule for heritage activities required under these Approval conditions • Warkworth Extension initial management & mitigation program 		<ul style="list-style-type: none"> • Gary Pappin – RTCA Advisor Cultural Heritage • Georgia Bennett – RTCA Graduate Cultural Heritage • Tahlea Walton - RTCA • Allen Paget – Ungooroo Aboriginal Corp • Noel Downs – WLALC • Rhoda Perry – UHWC • Rhonda Griffiths – HVAC • Nerida Saunders – KL.KG Saunders Trading • Steven Hickey - Widescope • Laurie Perry -WNAC • Luke Hickey – Hunter Valley Cultural Surveying • Cliff Johnson – Heliamon Cultural Consultants • Corey Matthews - • Des Hickey – Wattaka Wonnarua Cultural Consultants • Norm Archibald - • George Sampson – Cacatua Culture Consultants • Arthur Fletcher – Wonn 1

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
CHWG Meeting	20 April 2012	Week of 23 April 2012	17 May 2012	<p><u>Warkworth Extension Project Approval (PA_09_0202)</u></p> <ul style="list-style-type: none"> Confirmation of PAC approval & review of Heritage conditions, including AHCS & HMP Detailed review of methodology for initial Archaeological Excavation Program of Warkworth Sand Sheet for 2012/13 MOP areas. Review of Wollombi Brook ACH conservation area project approval consent requirements Review of schedule for Heritage activities required under Development Consent <p><u>Warkworth Extension initial management & mitigation program</u> (field work)</p> <ul style="list-style-type: none"> Warkworth ex-Hawkes property – survey of buffer lands (field 	n/a	<ul style="list-style-type: none"> Joel Deacon – RTCA Specialist Cultural Heritage Dave Cameron – RTCA Manager Cultural Heritage Gary Pappin – RTCA Cultural Heritage Advisor Georgia Bennett – RTCA Graduate Cultural Heritage Allen Paget – Ungooroo Aboriginal Corp Noel Downs – WLALC Rhoda Perry – UHWC Rhonda Griffiths – HVAC Tammy Knox – Bunda Consultants Nerida Saunders – KL.KG Saunders Trading Deslee Matthews – Deslee Talbot Consultants Kevin Sampson – Bawurra Consultants Steven Hickey - Widescope

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
				work)		
CHWG Meeting	10 February 2012	15 – 17 February 2012	8 March 2012	<u>Warkworth Extension Project Approval (DP&E EP&A Part 3A)</u> <ul style="list-style-type: none"> • Confirmation of project approval from PAC & review of Heritage conditions • Detailed review of management measures required for interim initial Archaeological Excavation Program & Management Mitigation Plan for 2012/13 MOP areas. • Review of schedule for Heritage activities required under Development Consent • Warkworth ex-Hawkes property – survey of buffer lands (field work) 	<u>MTO loader/Kangaroo Downs area – survey of buffer lands</u> (field work)	<ul style="list-style-type: none"> • Joel Deacon – RTCA Specialist Cultural Heritage • Gary Pappin – RTCA Advisor Cultural Heritage • Georgia Bennett – RTCA Graduate Cultural Heritage • Scott L’Oste Brown – CQCHM • Alieria French - Alieria French Trading • George Sampson - Cacatua Culture • Arthur Fletcher – Wonn 1 • David French – HVNCRM • Noel Downs – WLALC • Rhonda Griffiths – HVAC • Allen Paget – Ungooroo Aboriginal Corp • Rod Hickey – Kawul • Aaron Slater – Warragil CS • Norm Archibold – Yinarr Cultural Services • John Simpson – Dynamic Spatial Solutions • Des Hickey – Wattaka • Luke Hickey – HVCS • John and Margaret Matthews – ANTC • Rhoda Perry – UHWC • Jeff Matthews – Crimson Rosie

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
						<ul style="list-style-type: none"> Deslee Matthews – Deslee Talbot Consultants
CHWG Meeting	22 November 2011	23 – 25 November 2011	15 December 2011	<p><u>Warkworth Coal Mine (DA-300-9-2002-i) Stage 3 AHIP Application (OEHAACHCR 2010)</u></p> <ul style="list-style-type: none"> Confirmation of receipt of AHIP & circulation of permit to Aboriginal stakeholders, as per conditions Detailed review of management and mitigation measures implemented Update on other project approvals – Warkworth Coal Mine Extension Environmental Assessment (DoP EP&A Part 3A) Survey of additional buffer lands 	<p><u>MTO loader/Kangaroo Downs area – survey of buffer lands</u></p>	<ul style="list-style-type: none"> Joel Deacon – RTCA Specialist Cultural Heritage Gary Pappin – RTCA Advisor Cultural Heritage Georgia Bennett – RTCA Graduate Cultural Heritage Scott L’Oste Brown – CQCHM Luke Godwin - CQCHM Rhonda Griffiths – HVAC Laurie Perry – WNAC Lee Perry – Upper Hunter Wonnarua Council Luke Hickey – HVCS Des Hickey – Wattaka Suzie Worth – Lands Council Arthur Fletcher – Kauwul trading as Wonn 1
CHWG Meeting	12 August 2011	Week of 15 August 2011	8 September 2011	<p><u>Warkworth Coal Mine (DA-300-9-2002-i) Stage 3 AHIP Application (OEHAACHCR 2010)</u></p> <ul style="list-style-type: none"> Confirmation of 	<p><u>MTO loader/Kangaroo Downs area – survey of buffer lands</u></p>	<ul style="list-style-type: none"> Joel Deacon – RTCA Specialist Cultural Heritage Dave Cameron – RTCA Cultural Heritage Manager Peter Pichler – RTCM Riversdale

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
				<p>submission to OEH & circulation of submission documents to Aboriginal stakeholders, as per ACHCR</p> <ul style="list-style-type: none"> Detailed review of management and mitigation measures to be implemented and construction schedule Update on other project approvals – Warkworth Coal Mine Extension Environmental Assessment (DoP EP&A Part 3A) Survey of buffer lands – Ex-Hawkes property 		<ul style="list-style-type: none"> Rhonda Griffiths – HVAC Laurie Perry – WNAC Rhoda Perry – UHWC George Sampson – Cacatua Ashley Sampson - Cacatua Desley Matthews - DTC Travis Matthews – RNMC Luke Hickey – HVCS Norm Archibald – Yinarr Kathie Kinchella – <u>Yinarr</u> Des Hickey - Wattaka
CHWG Meeting	11 April 2011	14 -15 April 2011	12 May 2011	<p><u>Warkworth Coal Mine (DA-300-9-2002-i) Stage 3 AHIP Application Methodology & Report (OEH ACHCR 2010)</u></p> <ul style="list-style-type: none"> Review of stakeholder feedback on draft AHIP application assessment and mitigation methodology report and ACHMP sites 	n/a	<ul style="list-style-type: none"> Joel Deacon – RTCA Specialist Cultural Heritage Eleanor Cooper – RTCA Cultural Heritage Advisor Scott L’Oste Brown – CQCHM Barry Stair – Giwiirr Colleen Stair – Bullem Bullem Arthur Fletcher – Wonn1 Contracting Noel Downs – Wanaruah LALC Rhonda Griffiths – HVAC

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
				<p>management procedures</p> <ul style="list-style-type: none"> Detailed review of management and mitigation measures to be implemented and construction schedule <p><u>Warkworth Coal Mine Extension Environmental Assessment (DoP EP&A Part 3A)</u></p>		<ul style="list-style-type: none"> Allen Paget – Ungooroo Aboriginal Corporation John Matthews – HVCC Gay Horton – MCC Margaret Matthews – ANTC Briana Matthews – UHHC Laurie Perry – WNAC Darrel Matthews – UHHC Rhoda Perry – UHWC Cliff Matthews - Mingga Sheryl Matthews – Carrawonga consultants
CHWG Meeting	4 March 2011	Week of 7 March 2011	24 March 2011	<p><u>Warkworth Coal Mine (DA-300-9-2002-i) Stage 3 AHIP Application Methodology & Report (DECCW ACHCR 2010)</u></p> <ul style="list-style-type: none"> Presentation of AHIP application assessment and mitigation methodology report Review of the ACHMP sites management procedures Detailed review of management and mitigation measures to be implemented and 	n/a	<ul style="list-style-type: none"> Dr David Cameron – RTCA Principal Advisor Cultural Heritage Eleanor Cooper – RTCA Cultural Heritage Advisor Joel Deacon – RTCA Specialist Cultural Heritage NSW Scott L’oste-Brown – CQCHM Donna Sampson? – Cacatua Culture Consultants Rhonda Griffiths – Hunter Valley Aboriginal Corporation Noel Downs – Wannaruah Local Aboriginal Lands Council Rhoda Perry – Upper Hunter Wonnarua Council

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
				construction schedule <u>Warkworth Coal Mine Extension Environmental Assessment (DoP EP&A Part 3A)</u>		<ul style="list-style-type: none"> • Laurie Perry – Wonnarua Nation Aboriginal Corporation • Alen Pages – Ungooroo Aboriginal Corporation
CHWG Meeting	10 January 2011	19 – 21 January 2011	10 February 2011	<u>Warkworth Coal Mine (DA-300-9-2002-i) Stage 3 AHIP Methodology (DECCW ACHCR 2010) MTW Extension Environmental Assessment (DoP EP&A Part 3A)</u>	n/a	<ul style="list-style-type: none"> • Dr David Cameron – RTCA Principal Advisor Cultural Heritage • Eleanor Cooper – RTCA Cultural Heritage Advisor • Joel Deacon – RTCA Cultural Heritage Advisor • Phil Shiner – RTCA Graduate Cultural Heritage • Luke Hickey – Hunter Valley Cultural Surveying • Mark Hickey – Kayaway Eco-cultural & Heritage Services • Steven Hickey – Widescope Indigenous Group • Kathie Kinchela – Yinarr Cultural Services • Noel Downs – Wanaruah Local Aboriginal Land Council • Arthur Fletcher – Wonn1 Contracting • George Sampson – Cacatua Cultural Consultants • Lloyd Matthews – Bullem Bullem

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						<ul style="list-style-type: none"> • Paulette Ryan – Hunter Traditional Owner Environmental Services • Pansy Hickey
CHWG Workshop & Meeting	3 November 2010 (letter to administrative co-ordinator) 6 September 2010	3 – 5 November 2010	25 November 2010	<u>MTW Extension Environmental Assessment (DoP EP&A)</u> <ul style="list-style-type: none"> • Wollombi Brook Aboriginal Cultural Heritage Conservation Area - management plan discussions • PN10 Grinding Groove relocation 	n/a	<ul style="list-style-type: none"> • Dr David Cameron – RTCA Principal Advisor Cultural Heritage • Eleanor Cooper – RTCA Cultural Heritage Advisor • Joel Deacon – RTCA Cultural Heritage Advisor • Rebecca Yit – RTCA Cultural Heritage Advisor • Rachel Mapson – RTIO Heritage Advisor • Dan Gillespie – Central Queensland Cultural Heritage Management • Michael Slack – Scarp Archaeology • Helen Selimiotis – Scarp Archaeology • Mark Hickey – Kayaway Eco-cultural & Heritage Services • Kathie Kinchela – Yinarr Cultural Services • Wayne French – Yarrawalk • Colleen Stair – Valley Culture • Gay Horton – Muswellbrook Culture Consultants • Margaret Matthews – Aboriginal Native Title Consultants

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
						<ul style="list-style-type: none"> • John Matthews – Hunter Valley Culture Consultants • Darrel Matthews – Upper Hunter Heritage Consultants • Rod Hickey – Hunter Traditional Owner Services • Georgina Berry – Upper Hunter Wonnarua Council • Rhonda Ward – Ungooroo Cultural & Community Services • Des Hickey – Wattaka Wonnarua Cultural Consultants Service • Joshua Hickey – Hunter Valley Cultural Surveying • Noel Downs – Wanaruah Local Aboriginal Land Council • Arthur Fletcher – Wonn1 Contracting • George Sampson – Cacatua Cultural Consultants • Allen Paget – Ungooroo Aboriginal Corporation • Maree Waugh – Wonnarua Nation Aboriginal Corporation • Cliff Matthews – Mingga Consultants • Justin Matthews – Carrawonga Consultants • Rhoda Perry – Upper Hunter

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						<p>Wonnarua Council</p> <ul style="list-style-type: none"> • Scott Franks – Yarrawalk • Rhonda Griffiths – Hunter Valley Aboriginal Corporation • Michele Stair – Giwiir Consultants • Lloyd Matthews – Bullem Bullem • Tracey Skene – Culturally Aware • Tom Miller – Lower Hunter Wonnarua Council
CHWG site tour	3 November 2010 (letter to administrative co-ordinator)	3 – 5 November 2010	26 November 2010	<u>Site tour to Wollombi Brook Aboriginal Cultural Heritage Conservation Area and Bulga Farm Areas</u>	n/a	<ul style="list-style-type: none"> • Dr David Cameron – RTCA Principal Advisor Cultural Heritage • Eleanor Cooper – RTCA Cultural Heritage Advisor • Joel Deacon – RTCA Cultural Heritage Advisor • Rebecca Yit – RTCA Cultural Heritage Advisor • Mark Nolan – RTCA • Rachel Mapson – RTIO Heritage Advisor • Dan Gillespie – Central Queensland Cultural Heritage Management • Sarah Paddington - DECCW • Michelle Bruce – DECCW • John Treadgold – DECCW • Kylie Seretis - DoP • Colleen Stair – Valley Culture

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						<ul style="list-style-type: none"> • Wayne French – Yarrawalk Enterprises • Scott Franks – Yarrawalk Enterprises • Margaret Matthews - Aboriginal Native title consultants • Des Hickey - Wattaka Wonnarua Cultural Consultants Service • Rhonda Griffiths - Hunter Valley Aboriginal Corporation • Georgina Berry - Upper Hunter Wonnarua Council • Allen Paget - Ungooroo Aboriginal Corporation • Rhonda Ward - Ungooroo Cultural and Community Services • Darrel Matthews- Upper Hunter Heritage Consultants • Clifford Matthews- Mingga Consultants • Michele Stair - Giwiir Consultants • John Matthews - Hunter Valley Culture consultants • Arthur Fletcher – Wonn 1 • Joshua Hickey - Hunter Valley Cultural Surveying • George Sampson - Cacatua Culture Consultants

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
						<ul style="list-style-type: none"> • Lloyd Matthews - Bullem Bullem • Tom Miller - Lower Hunter Wonnarua Council • Maree Waugh - Wonnarua Nation Aboriginal Corporation • Mark Hickey - Kayaway eco-cultural and heritage services • Justin Matthews - Carrawonga Consultants • Rod Hickey - Hunter Traditional Owner Services • Gay Horton - Muswellbrook Culture consultants • Noel Phillips • David Swan • Kirstin Berry • Rhoda Perry - Upper Hunter Wonnarua Council
CHWG Meeting	6 September 2010	8 – 10 September 2010	30 September 2010	<ul style="list-style-type: none"> • Warkworth Coal Mine Extension Wollombi Brook Aboriginal Cultural Heritage Conservation Area draft management plan - review plan and recommendations from steering committee (DoP EP&A Part 3A) • Briefing on MTW 	n/a	<ul style="list-style-type: none"> • Dr David Cameron – RTCA Principal Advisor Cultural Heritage • Rebecca Yit – RTCA Cultural Heritage Advisor • Noel Downs - WLALC • Barry Stair – Giwiirr Consultants • Arthur Fletcher – Wonn1 Contracting • George Sampson – Cacatua Cultural Consultants

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
				PN10 grinding grooves salvage excavation and relocation to WBACHCA (AHIP #2801, DECCW ACHCR 2010) <ul style="list-style-type: none"> Briefing on MTW Extension Environmental Assessment (DoP EP&A Part 3A) 		<ul style="list-style-type: none"> Allen Paget – Ungooroo Aboriginal Corporation
CHWG Meeting and site visit	administrative Co-ordinator)	Week of 7 June 2010	7 & 8 June 2010	Visit to MTW West extension, PN10 grinding grooves, WBACHCA. <ul style="list-style-type: none"> Discussion & endorsement of the PN 10 grinding grooves site excavation results & revised relocation methodology & Care & Control Permit application to DECCW (ACHCR 2010) Review of draft Wollombi Brook ACH Conservation Area Management Plan (EP&A Part 3A) Results of MTW South-West & Bulga Farm assessment surveys (ACHCR 	n/a	<ul style="list-style-type: none"> Dr David Cameron – RTCA Principal Advisor Cultural Heritage Eleanor Cooper – RTCA Cultural Heritage Advisor Joel Deacon – RTCA Cultural Heritage Advisor Dan Gillespie – Central Queensland Cultural Heritage Management Luke Godwin - Central Queensland Cultural Heritage Management Michael Slack – Scarp Archaeology Helen Selimiotis – Scarp Archaeology Mark Hickey – Kayaway Eco-cultural & Heritage Services Norm Archibald – Yinarr Cultural Services Wayne French – Hunter Valley Aboriginal Corporation

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				2010)		<ul style="list-style-type: none"> • Barry Stair – Giwiirr Consultants • Colleen Stair – Bullem Bullem Consultants • Gay Horton – Muswellbrook Culture Consultants • Margaret Matthews – Aboriginal Native Title Consultants • John Matthews – Hunter Valley Culture Consultants • Darrel Matthews – Upper Hunter Heritage Consultants • Paulette Ryan – Hunter Traditional Owner Services • Georgina Berry – Upper Hunter Wonnarua Council • Maree Waugh – Wonnarua Nation Aboriginal Corporation • Rhonda Ward – Ungooroo Cultural & Community Services • Des Hickey – Wattaka Wonnarua Cultural Consultants Service • Luke Hickey – Hunter Valley Cultural Surveying • Suzie Worth – Wanaruah Local Aboriginal Land Council • Arthur Fletcher – Wonn1 Contracting • George Sampson – Cacatua Cultural

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						Consultants <ul style="list-style-type: none"> • Allen Paget – Ungooroo Aboriginal Corporation • Laurie Perry – Wonnarua Nation Aboriginal Corporation • Cliff Matthews – Mingga Consultants • Justin Matthews – Carrawonga Consultants • Rhoda Perry – Upper Hunter Wonnarua Council
CHWG Meeting	7 April 2010	Week of 5 April 2010	22 April 2010	<u>Update on WML Extension Project (EA report, Conservation Area)</u>	n/a	<ul style="list-style-type: none"> • Dr David Cameron – RTCA Principal Advisor Cultural Heritage • Elspeth Mackenzie – RTCA Cultural Heritage Advisor • Dan Gillespie – Central Queensland Cultural Heritage Management • Arthur Fletcher – Wonna 1 Consultants • Kathleen Steward-Kinchela – Yinarr Cultural Services • George Sampson – Cactus Culture Consultants • Darrel Matthews – Upper Hunter Heritage Consultants • John Matthews – Upper Hunter Heritage Consultants • Margaret Matthews – Aboriginal

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						Native Title Consultants <ul style="list-style-type: none"> • Laurie Perry – Wonnarua Nation • Allen Paget – Ungooroo Aboriginal Corporation • Luke Hickey – Hunter Valley Cultural Surveying • Mark Hickey – Kayaway eco-Cultural and Heritage Services • Noel Downs – Wanaruah Local Aboriginal Lands Council • Suzie Worth – Wanaruah Local Aboriginal Lands Council • Rhoda Perry – Upper Hunter Wonnarua Council • Des Hickey – Wattaka Wonnarua Traditional Owner
Workshop	23 February 2010 (letter sent to Administrative Co-ordinator)	Week of 22 February 2010	4 & 5 March 2010	<u>Workshop to consider community alliance of Upper Hunter Cultural & Heritage stakeholders</u>	n/a	<ul style="list-style-type: none"> • Dr David Cameron – RTCA Principal Advisor Cultural Heritage • Arthur Fletcher – Wonn1 Contracting • Margaret Matthews – Aboriginal Native Title Consultants • Colleen Stair – Hunter Valley Culture Consultancy • George Sampson – Cacatua Culture Consultants • Rhonda Ward – Ungooroo Aboriginal Cultural & Community Services

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
						<ul style="list-style-type: none"> • Mark Hickey – Kayaway eco-Cultural and Heritage Services • Gay Horton – Muswellbrook CC • Des Hickey – Wattaka Wonnarua Traditional Owner • Justin Matthews – Carrawonga • Laurie Perry – Wonnarua Nation • John Matthews – Valley Culture • Pansy Hickey – Yarrawalk Aboriginal Corporation • Tom Miller – Lower Hunter Wonnarua Council • Kathleen Steward-Kinchela – Yinarr Cultural Services • Maree Waugh – Wonnarua Nation • David Swan – Culturally Aware • Sarah Hall – Ungooroo Aboriginal Corporation • Noel Downs – Wanaruah Local Aboriginal Lands Council • Suzie Worth – Wanaruah Local Aboriginal Lands Council • Lloyd Matthews – Bullem Bullem Consultants • Cliff Matthews – Mingga Consultants • Georgina Berry – UHWC • Michael Stair – Giwirr

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						<ul style="list-style-type: none"> • Gail Shearer – Wonaruah Custodian • Darrel Matthews – UHHC • Paulette Ryan - HTO
CHWG Meeting	22 January 2010	Week of 25 January 2010	12 February 2010	<u>Update on WML Extension Project (EA report, Conservation Area)</u>	n/a	<ul style="list-style-type: none"> • Dr David Cameron – RTCA Principal Advisor Cultural Heritage • Elspeth Mackenzie – RTCA Cultural Heritage Advisor • Scott L'Oste-Brown – CQCHM • Dan Gillespie - CQCHM • Arthur Fletcher – Wonna 1 Consultants • George Sampson – Cacatua Culture Consultants • Rick Coles – Hunter Traditional Owners EMS • Colleen Stair – Hunter Valley Culture Consultancy • Barry French – Hunter Valley Aboriginal Corporation • John Matthews – Upper Hunter Heritage Consultants • Margaret – Aboriginal Native Title Consultants • Lloyd Matthews – Bullem Bullem Consultants • Suzie Worth – Wanaruah Local Aboriginal Lands Council

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
						<ul style="list-style-type: none"> • Des Hickey – Wattaka WCCS • Rhonda Ward – Ungooroo Aboriginal Cultural & Community Services • Maree Waugh – Wonnarua Nation • Laurie Perry – Wonnarua Nation • Keith Rogers – Keith Rogers Consulting • Gay Horton – Muswellbrook CC • Joshua Hickey • Mark Hickey - Kayaway • Darrel Matthews – Upper Hunter Heritage Consultants • Melissa Matthews – Upper Hunter Heritage Consultants • Allen Paget – Ungooroo AC • Rhoda Perry – Upper Hunter Wonnarua Council • Justin Matthews – Carrawonga • Mick Matthews - Mingga • Michael Matthews – Mingga • Malcolm Moodie – Mingga • Tom Miller – Lower Hunter Wonnarua Council • Luke Hickey – Hunter Valley Cultural Surveying • Noel Downs – Wanaruah Local Aboriginal Lands Council

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
CHWG Meeting	17 November 2009	Week of 16 November 2009	9 December 2009	<p><u>Review of the draft Warkworth Mine Extension Aboriginal cultural heritage assessment report for the Environmental Assessment</u></p> <ul style="list-style-type: none"> • Discuss report elements and key findings • Review and confirm development impacts on Aboriginal cultural heritage • Review and confirm proposed cultural heritage management measures for development and non-development areas <p><u>Review of updated concept plan and management options for the Wollombi Brook Aboriginal Cultural Heritage Conservation Area</u></p> <ul style="list-style-type: none"> • Review of draft concept plan for the conservation area • Operational feedback on current and potential future mining development requirements 	n/a	<ul style="list-style-type: none"> • Dr David Cameron – RTCA Principal Advisor Cultural Heritage • Elspeth Mackenzie – RTCA Cultural Heritage Advisor • Laura Harkins – RTCA Graduate Community Relations • Celeste Baldwin – RTCA Vacation Student Cultural Heritage • Trent Jordan - SKM • Julie Ling - SKM • Kathleen Steward-Kinchela – Yinarr Cultural Services • Ronda Ward – Ungooroo Aboriginal Cultural & Community Services • Maree Waugh – Wonnarua Nation • Norm Archibald – Wanaruah Local Aboriginal Land Council • Victor Perry – Upper Hunter Wonnarua Council • Laurie Perry – Wonnarua Nation • Allen Paget – Ungooroo AC • Rhoda Perry – Upper Hunter Wonnarua Council • Donna Sampson – Cacatua Culture Consultants • Darrel Matthews – Upper Hunter Heritage Consultants

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
				<ul style="list-style-type: none"> • Review of key management principles and core conservation areas 		
CHWG Workshop	9 October 2009	Week of 5 October 2009	22 October 2009	<ul style="list-style-type: none"> • Proposal for MTW AHIP#2801 time extension for site PN10 • WML Extension project update • WML Extension & associated CNA lands & leases management zones • WML Extension development impacts area management measures • Proposed Wollombi Brook Aboriginal Cultural Heritage Conservation Area 	n/a	<ul style="list-style-type: none"> • Dr David Cameron – RTCA Principal Advisor Cultural Heritage • Elspeth Mackenzie – RTCA Cultural Heritage Advisor Joel Deacon – RTCA Cultural Heritage Advisor • Barry Hunter – RTCA Aboriginal Relations Specialist • Laura Hawkins – RTCA Graduate Communications • Dan Gillespie – Central Qld Cultural Heritage Management • Allen Paget – Ungooroo Aboriginal Corporation • Annie Hickey – Gidaawale WCHC • Arthur Fletcher – Wonn1 Contracting • Barry Stair – Cacatua Culture Consultants • Mick Matthews – Mingga Consultants • Colleen Stair – Hunter Valley Culture Consultancy • Darrel Matthews – Upper Hunter Heritage Consultants • Des Hickey – Wattaka Wonnarua Cultural Consultants Service

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
						<ul style="list-style-type: none"> • Irene Hickey – Hunter Traditional Owners • Jesse Waugh – Culturally Aware • John Matthews – Valley Culture • Justin Matthews – Carrawonga Consultants • Lloyd Matthews – Bullem Bullem Consultants • Luke Hickey – Hunter Valley Cultural Surveying • Margaret Matthews – Aboriginal Native Title Consultants • Maree Waugh – Wonnarua Nation • Michele Stair – Giwirr Consultants • Pansy Hickey – Yarrawalk Aboriginal Corporation • Rhoda Perry – Upper Hunter Wonnarua Council • Rhonda Ward – Ungooroo Aboriginal Cultural & Community Services • Suzie Worth – Wanaruah Local Aboriginal Land Council • Tom Miller – Lower Hunter Wonnarua Council • Tony Matthews – Hunter Valley Aboriginal Corporation
CHWG Meeting	7 September	Week of 7	1 October	<u>MTW Extension</u>	n/a	<ul style="list-style-type: none"> • Dr David Cameron – RTCA Principal

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
	2009	September 2009	2009	<u>Aboriginal cultural heritage assessment process</u> <ul style="list-style-type: none"> • Update on Warkworth Extension Environmental Assessment process • Cultural heritage assessment & management plan consultation process for EA • Review of results of AMBS 2002, MTW West 2008 and South-West 2009 survey assessments and management recommendations • Briefing on discussions conducted during the community site tour and consultation meeting on site 21 September 		<p>Advisor Cultural Heritage</p> <ul style="list-style-type: none"> • Dan Gillespie – Tallegalla Consultants • Scott L'Oste-Brown – Central Queensland Cultural Heritage Management • Arthur Fletcher – Wonn1 Contracting • Darrel Matthews – UHHC • Rodney Matthews - Giwirr • Donna Sampson – Cacatua • Colleen Stair – HVCC • Suzie Worth - WLALC • Rhoda Perry – UHWC • Des Hickey – Wattaka WCCS • Lloyd Matthews – Bullem Bullem • Justin Matthews – Carrowonga • Margaret Matthews – Aboriginal Native Title Consultants • John Matthews – Aboriginal Native Title Consultants
Site Visit and meeting	1 September 2009 (letter sent to administration co-ordinators)	Week of 7 September 2009	21 September 2009	<u>Community visit to cultural heritage sites in proposed extension area</u> <u>Review of Warkworth Extension EA process,</u> <ul style="list-style-type: none"> • community feedback on proposed ACH 	n/a	<ul style="list-style-type: none"> • Dr David Cameron – RTCA Principal Advisor Cultural Heritage • Laura Hawkins – Graduate Communications • Mark Nolan – Environmental Specialist Project Approvals

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
				management and conservation areas and discussion on management options to inform development of a draft ACHMP		<ul style="list-style-type: none"> • Dan Gillespie – Tallegalla Consultants • Arthur Fletcher – Wonn1 • Michele Stair - Giwirr • Barry French - Cacatua • Colleen Stair – HVCC • Suzie Worth - WLALC • Rhoda Perry – UHWC • Justin Matthews – UHHC • Margaret Matthews – ANTC • John Matthews – Bullem Bullem • Mick Matthews – Mingga • Kathleen Steward/Kinchela – Yinarr Cultural Services • Allen Paget – Ungooroo AC • Luke Hickey - HVCS
CHWG Meeting	22 July 2009	Week of 27 July 2009	27 August 2009	<u>MTW Extension options assessment process</u> <ul style="list-style-type: none"> • EA being developed during 2009 • Cultural heritage assessment & management plan consultation <u>MTW South-West assessment survey</u> <ul style="list-style-type: none"> • Review of interim results of MTW South-West assessment survey 	n/a	<ul style="list-style-type: none"> • Dr David Cameron – RTCA Principal Advisor Cultural Heritage • Elspeth Mackenzie – RTCA Cultural Heritage Advisor • Dr Luke Godwin – CQCHM • Dan Gillespie – Tallegalla Consultants • Dr Michael Slack – Scarp Archaeology • Helen Selimiotis – Scarp Archaeology • Arthur Fletcher – Wonna 1 Consultants • Darrel Matthews – UHHC

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
				<ul style="list-style-type: none"> • Linkage to MTW West survey assessment and management • Proposal for an integrated MTW cultural heritage management plan as basis for MTW Extension EA <p><u>MTW Bulga Bora Ground (BBG) management strategy</u></p> <ul style="list-style-type: none"> • Reviewing options for current and future management options for the Bulga Bora Ground focusing on extent within CNA lands • Initiate the BBG management strategy committee <p><u>MTW Warkworth Sandsheet s90 AHIPs 1103070 & 2801 sites salvage results</u></p> <ul style="list-style-type: none"> • Overview of cultural salvage activities conducted 4-5 August • Reporting requirements 		<ul style="list-style-type: none"> • Michele Stair - Giwiirr • Kathleen Steward/Kinchela – Yanarr Cultural Services • Nicole Smith - HVAC • Suzie Worth - WLALC • Rhoda Perry – UHWC • Des Hickey – Wattaka WCCS • Irene Hickey – HTO • Gordon Swan - Yarrawalk
CHWG Meeting	27 April	Week of 27	21 May 2009	<u>Warkworth Sandsheet archaeological excavation</u>	n/a	<ul style="list-style-type: none"> • Dr David Cameron – RTCA Principal

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
	2009	April 2009		<ul style="list-style-type: none"> • s90 application & cultural salvage update <u>MTW West assessment report</u> • proposed interim management measures <u>MTW South-West assessment study</u> • review future management options and survey proposed for South west study area 		<p>Advisor Cultural Heritage</p> <ul style="list-style-type: none"> • Elspeth Mackenzie – RTCA Cultural Heritage Advisor • Kathleen Steward/Kinchela – Yinarr Cultural Services • David French – HVNCRM • Margaret Matthews – ANTC • John Matthews – ANTC • Darrel Matthews - UHHC • Luke Hickey – HVCS • Arthur Fletcher – Wonna Consultants • Suzie Worth - WLALC • Rhonda Ward – UCCS • Rhoda Perry – UHWC • Des Hickey – Wattaka WCCS
CHWG Meeting	24 February 2009	Week of 23 February 2009	19 March 2009	<p><u>Warkworth Sandsheet archaeological excavations progress report</u></p> <p><u>MTW West assessment report</u></p>	n/a	<ul style="list-style-type: none"> • Dr David Cameron – RTCA Principal Advisor Cultural Heritage • Scott L'Oste-Brown – Heritage Advisor – CQCHM • Pansey Hickey - HVCS • Rhonda Ward – UCC • Rick Coles - HVCS • Allen Paget – Ungooroo Aboriginal Corporation • Rhoda Perry – UHWC • Kathleen Steward/Kinchela – Yinarr Cultural Services

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
						<ul style="list-style-type: none"> • David French – HVNCRM • Cara Coles – HTO Environmental Management
Meeting cancelled	28 January 2009		19 February 2009	<u>Warkworth Sandsheet archaeological excavations progress report</u> <u>MTW West assessment report</u>	n/a	n/a
CHWG Meeting	7 November 2008	Week of 10 November 2008	27 November 2008	<u>Warkworth Sandsheet archaeological excavations progress report</u> <u>MTW West assessment results briefing</u>	n/a	<ul style="list-style-type: none"> • Dr David Cameron – Cultural Heritage Systems Specialist – Brisbane • Dr Luke Godwin – Principal Heritage Advisor – CQCHM • Elspeth Mackenzie – Graduate Cultural Heritage – RTCA • Dr Richard Fullagar – Scarp Archaeology • Luke Hickey – HVCS • Arthur Fletcher – Wonna Consultants • Suzie Worth - WLALC • George Sampson – CCC • Rick Coles - HVCS • Des Hickey – Wattaka WCCS • Allen Paget – Ungooroo Aboriginal Corporation • Rhoda Perry – UHWC • Lew Griffiths - Oziris
CHWG Meeting	22 September	Week of 22	2 October	<u>MTW West assessment</u>	n/a	<ul style="list-style-type: none"> • Dr David Cameron – Cultural Heritage

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
	2008	September 2008	2008	<u>briefing</u> <u>Bulga Bora Ground Management Plan</u> <u>Warkworth Sandsheet archaeological excavations progress report</u> <u>s90 application methodologies - MTW</u> West road mitigation		Systems Specialist – Brisbane <ul style="list-style-type: none"> • Dr Luke Godwin – Principal Heritage Advisor – CQCHM • Allen Paget – Ungooroo Aboriginal Corporation • Luke Hickey – HVCS • Arthur Fletcher – Wonna Consultants • Colleen Stair – HVCC • Barry Stair – HVAC • Suzie Worth - WLALC • George Sampson – CCC • Rhonda Ward – UCC • Des Hickey – Wattaka WCCS • Noel Downs - WLALC • Margaret Matthews – ANTC • John Matthews – ANTC • Michael Stair • Rhoda Perry – UHWC • Barry Anderson – LWTC • Barry McTaggart – Yarrawalk Aboriginal Corporation • Michael Everleigh - Yarrawalk Aboriginal Corporation (trainee)
CHWG Meeting	18 July 2008	Week of 22 July 2008	14 August 2008	<u>Warkworth Sandsheet archaeological excavations progress report</u> <u>Warkworth West cultural</u>	n/a	<ul style="list-style-type: none"> • Dr David Cameron – Cultural Heritage Systems Specialist – Brisbane • Arthur Fletcher – Wonn 1 Consultants • Suzie Worth - WLALC

Consultation Activity	Letter & Information Sent	Notice Advertised	Date of Consultation	Warkworth	Mount Thorley Operations	RTCA / Consultants and RAPs in Attendance or non-attending RAP feedback
				<u>heritage assessment</u>		<ul style="list-style-type: none"> • Margaret Matthews – ANTC • John Matthews – Giwirri • Melissa Matthews – Upper Hunter Heritage Consultants • Darrell Matthews – Upper Hunter Heritage Consultants • Chloe Matthews – Upper Hunter Heritage Consultants • George Sampson – CCC • Donna Sampson - CCC • Rhonda Ward – UCCS • Michael Roy Stair – HVAC • Luke Hickey – HVCS • Noel Downs – WLALC • Des Hickey - Wattaka WCCS • Colleen Stair – UHHC • Barry Anderson – LWTC • Rhoda Perry - UHWC

Appendix 1.2: RAP and Stakeholder Consultation Contact List - May 2014

Mr David Ahoy
Lower Hunter Aboriginal Incorporated

Mr Ben Cameron
BJC Cultural Management

Mr Barry Anderson
Lower Wonnarua Tribal Consultancy Pty Ltd

Mr Luke Cameron
Luke Cameron Cultural Management

Christine Archbold
Hunter Valley Cultural Consultants

Jenny-Lee Chambers
JLC Cultural Services

Mr Norm Archibald
Jumbunna Traffic Management Group Pty Ltd

Hazel Collins

Mr Les Atkinson
Jarban & Mugrebea

Susan Cutmore
Moreeites

Kerren Boyd
HECMO Consultants

Mr Noel Downs
Wanaruah Local Aboriginal Lands Council

Fiona Draper

Mr Scott Franks
Plains Clans of the Wonnarua People

Helen Faulkner
DRM Cultural Management

Mr Scott Franks
Tocomwall

Mr Les Field
L.J Culture Management

Aliera French
Aliera French Trading

Gina Field

Mr David French
Upper Hunter Natural and Cultural Resources
Management

Mr Arthur Fletcher
Kauwul trading as Wonn 1

Mr Wayne Griffiths
Bigundi Biame Traditional People

Mr Arthur Fletcher
Wonnarua Elders Council Inc.

Rhonda Griffiths
Hunter Valley Aboriginal Corp

Mr Greg Griffiths
Gomerioi Murri Ganuurr Yuuray Wadi Palinka

Mr Luke Hickey
Hunter Valley Cultural Surveying

Marie-Ellen Griffiths
ME Griffiths Cultural Management

Mr Rod Hickey
Kawul Cultural Services

Mr Tony Griffiths
T & G Culture Consultants

Mr Mark Hickey
Kayaway Eco-Cultural and Heritage Services

Chantae Griffiths

Gordon Griffiths
Wonnarua Culture Heritage

Mr Des Hickey
Wattaka Wonnarua Cultural Consultants
Service

Amanda Hickey

Mr Steven Hickey
Widescope Indigenous Group Pty. Ltd.

Mrs Anne Hickey
Gidawaa Walang Cultural Heritage
Consultancy

Mr David Horton
Gomery Cultural Consultants

Mr Brian Horton
Muswellbrook Culture Consultants

Mr Robert Lester
Plains Clans of the Wonnarua People

Elizabeth Howard
Waabi Gabinya Cultural Consultancy

Rebecca Lester
Wonnarua Culture and Heritage

Alison Howlett
Buda Mada Koori Womens Aboriginal
Corporation

John & Margaret Matthews
Aboriginal Native Title Consultants

Ivy Jaeger
I & E Aboriginal Culture and Heritage

Mr Terry Matthews
Breeza Plains Culture and Heritage
Consultants

Mr Clifford Johnson
Hielamon Cultural Consultants

Mr Lloyd Matthews
Bullem Bullem Consultants

Tammy Knox
Bunda Counsultants

Mr Justin Matthews
Carrawonga

Mr Jeff Matthews
Crimson-Rosie

Deslee Matthews
Deslee Talbot Consultant

Mr Tom Miller
Lower Hunter Wonnarua Council Inc.

Karen Matthews
Galamaay Consultant

Mr Allen Paget
Ungooroo Aboriginal Corporation

Mr Rodney Matthews
Giwiirr

Deidre Perkins
Divine Diggers Aboriginal Cultural
Consultants

Mr Clifford Matthews
Mingga Consultants

Mr Roger Noel Matthews

Mrs Rhoda Perry
Upper Hunter Wonnarua Council Incorporated

Mr Darrel Matthews
Upper Hunter Heritage Consultants

Mr Laurie Perry
Wonnarua Nation Aboriginal Corporation

Paulette Ryan
HTO Environmental Management Services

Mr Robert Smith
Murrawan Cultural Consultants

Mr Kevin Sampson
Bawurra Consultants

Mr Timothy Smith
Smith Dhagaans Cultural Group

Mr George Sampson
Cacatua General Services

Mr & Mrs Barry & Colleen Stair

Michele Stair

Krystal Saunders
KL.KG Saunders Trading Services

Kathleen Steward-Kinchela
Yinarr Cultural Services

Mr Warren Schillings
My Land Cultural Heritage

Maria Stocks
Wanaruah Aboriginal Custodians Corporation

Tracey Skene
Culturally Aware

Mr Warren Taggart

Mrs Rhonda Ward
Ungooroo Cultural & Community Services Inc

Esther Tighe

Maree Waugh
Wallangan Cultural Services

Mr Derrick Vale Sr
DFTV Enterprises

Marvonnia Welsh

Mr Larry van Vliet
Valley Culture

Suzie Worth
Wanaruah Local Aboriginal Lands Council

Wanaruah Cultural Heritage

Appendix 1.3: Example Consultation Meeting Invitation Letter for the Proposals

Private and confidential

[NAME AND ADDRESS]

7th April 2014

Dear [NAME],

Coal & Allied Cultural Heritage Working Group Meeting – 7th May 2014

Coal & Allied will conduct its consultation process with registered Aboriginal parties, through the auspices of the Coal & Allied Upper Hunter Valley Aboriginal Cultural Heritage Working Group (CHWG), regarding the assessment and management of Aboriginal cultural heritage associated with development activities at its operations, projects and lands requiring assessment and/or Aboriginal Heritage Impact Permit (AHIP) approvals under Part 6 of the *National Parks & Wildlife Act* (NPW Act), and other projects and development activities that are associated with major projects that are subject to a project approval &/or ACHMP conditioned by the Department of Planning & Infrastructure and not requiring an AHIP approval from OEH.

Details of the next CHWG meeting are as follows:

Date: Wednesday 7th May 2014
Time: 9.00am to 2.00pm
Venue: Wollombi Brook Conservation Area, 1916 Putty Road, Bulga (see location map). Morning tea and lunch will be provided

Please advise of your intention to attend the CHWG meeting at your earliest convenience (or by close of business 6th May 2014) or if you have any queries about the community consultation meeting. You are receiving this letter because you have already registered your expression of interest for consultation with Coal & Allied regarding Aboriginal cultural heritage and there is no need to re-register your written expression of interest.

The following developments are to be discussed at the CHWG meeting:

- **The Mount Thorley Operations (MTO) 2014 Proposal** (DoPI EP&A, OEH ACHCR 2010). Review of Aboriginal cultural heritage impact assessment and draft management measures for Mount Thorley Operations Environmental Impact Statement
- **Warkworth Mine Continuation 2014 Proposal** (DoPI EP&A, OEH ACHCR 2010). Review of Aboriginal cultural heritage impact assessment and draft management measures for Warkworth Mine Environmental Impact Statement.

For your review ahead of this meeting, attached with this letter are two preliminary statements outlining the Aboriginal cultural heritage impact assessments & the proposed management measures for each proposal. These documents outline Coal & Allied's approach to cultural heritage management, the consultation process for the proposals

(including previous relevant consultation), previous cultural heritage assessments over the areas, the nature of cultural heritage sites recorded in the areas, expected impacts, significance assessments & proposed management measures for the proposals.

All environmental, economic and social impacts associated with the proposals will be assessed as part of the two EISs, which will also include a dedicated Social Impact Assessment (SIA). The SIA process, to be undertaken by EMGA Mitchell McLennan (EMM), includes consultation with community members and other key stakeholders in order to assess the social impacts related to the proposed projects. If you would like to provide feedback through the SIA process, please contact EMM on (02) 4927 0506 or sia@emgamm.com. Any information or concerns you have regarding the proposals will be reported on as part of the assessment. All information you provide will be kept confidential and will not be linked to you in any way.

The CHWG meeting will also discuss existing and planned operations and development activities at other CNA mining operations that are associated with consents required under the Environmental Planning and Assessment Act 1979 (EP&A Act), in particular:

- Hunter Valley Operations South (PA06_0261)
- Hunter Valley Operations North (DA 450-10-2003)
- Mount Thorley Development Consent (DA 34/95)
- Warkworth Coal Mine (DA-300-9-2002-i)
- Mount Pleasant Coal Project (DA92/97)

CHWG discussions pertaining to development activities requiring assessment and AHIP approvals under Part 6 of the NPW Act are held in accordance with the OEH *Aboriginal cultural heritage consultation requirements for proponents 2010*. CHWG discussions pertaining to approvals obtained under the EP&A Act & conditioned by DoPI are held in accordance with the OEH *Draft Guidelines for Aboriginal cultural heritage impact assessment and community consultation guidelines (July 2005)*.

If you are unable to attend the meeting you may lodge comments, queries or feedback on these or other topics associated with CNA's cultural heritage management program via letter, fax, email or phone prior to the scheduled date of the CHWG meeting. Please see the attached CHWG confidential feedback form which you may choose to complete for this purpose.

I look forward to seeing you at the meeting, and please also find enclosed the minutes & presentation from the last CHWG meeting, as well as directions to the venue if you have yet to visit the facility. If you have any queries prior to this date, please feel free to contact myself on the numbers below.

Yours sincerely



Joel Deacon
Specialist Cultural Heritage, NSW – External Relations, Coal Australia
Rio Tinto
Hunter Valley Services, Lemington Road, LEMINGTON

PO Box 315 SINGLETON, NSW, 2330 Australia
P: (02) 6570 0462
M: +61 (0)488 721 985
F: (02) 65703601
joel.deacon@riotinto.com

Please see enclosed the following documents

- 140407_Warkworth_Continuation_2014_Preliminary_ACH_Statement
- 140407_MTO_2014_Preliminary_ACH_Statement
- Minutes of CHWG meeting 3rd April 2014
- Presentation from the 3rd April 2014 CHWG meeting
- Confidential feedback form
- Agenda for CHWG meeting 7th May 2014
- Map & directions to the venue

Appendix 1.4: Example Consultation Meeting Public Notices for the Proposals



Public Notice

Invitation for Aboriginal parties to register their interest to participate in cultural heritage consultation for the Mount Thorley Operations 2014 Proposal

The Mount Thorley Operations 2014 Proposal is an application for an approval under Part 4, Division 4.1 of the Environmental Planning and Assessment Act 1979 (EP&A Act) to complete mining & rehabilitation activities within the current limits of approval DA 34/95. The Mount Thorley Operations 2014 Proposal area is located at the Mount Thorley Mine, approximately 12kms south-west of Singleton.

Aboriginal people who hold cultural knowledge relevant to determining the significance of Aboriginal object(s) and/or place(s) associated with the Mount Thorley Operations 2014 Proposal area are invited to participate in consultation with Coal & Allied to inform the preparation of an Aboriginal Cultural Heritage impact assessment for the Mount Thorley Operations 2014 Proposal Environmental Impact Statement.

If you wish to register your interest as an Aboriginal party your registration must be in writing (letter, fax or email), and include your name/organisation, current contact details (postal address, email, phone number/s) and be received by Coal & Allied by close of business on **Tuesday 6th May 2014** (see contact details at end of this notice). Details of people registering as Aboriginal parties will be provided to Office of Environment and Heritage (OEH), and also the Wanaruah Local Aboriginal Land Council unless you specify otherwise.

Aboriginal parties who register for consultation are invited to attend a meeting of the **Coal & Allied Upper Hunter Valley Aboriginal Cultural Heritage Working Group (CHWG)** with the following details:

Date: Wednesday 7th May 2014

Time: 9.00am to 2.00pm

Venue: Wollombi Brook Conservation Area, 1916 Putty Road, Bulga
(Morning tea and lunch will be provided)

CHWG discussions and other consultation with Registered Aboriginal Parties pertaining to the Mount Thorley Operations 2014 Proposal application under Part 4, Division 4.1, EP&A Act, and other activities requiring approvals under Part 6 of the National Parks & Wildlife Act 1974, are conducted in accordance with the OEH *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*.

The CHWG meeting will also review current and proposed operations and development activities that are associated with existing development approvals, in particular:

- Hunter Valley Operations South (PA06_0261)
- Hunter Valley Operations North (DA 450-10-2003)
 - Mount Pleasant Coal Project (DA92/97)
 - Mount Thorley Operations (DA 34/95)
 - Warkworth Operations (DA-300-9-2002-i)

If you are unable to attend the meeting you may lodge comments, queries or feedback on these or other topics associated with Coal & Allied's cultural heritage management program via letter, fax, email or phone prior to the scheduled date of the CHWG meeting.

Joel Deacon
Specialist Cultural Heritage
Rio Tinto Coal Australia Pty Ltd
Hunter Valley Services
PO Box 315, Singleton NSW 2330
joel.deacon@riotinto.com
Fax: 02 6570 0350
Ph: 02 6570 0462



Public Notice

Invitation for Aboriginal parties to register their interest to participate in cultural heritage consultation for the Warkworth Continuation 2014 Proposal

The Warkworth Continuation 2014 Proposal is an application for an approval under Part 4, Division 4.1 of the Environmental Planning and Assessment Act 1979 (EP&A Act) to continue mining beyond the current limits of approval DA 300-9-2002-i. The Warkworth Continuation 2014 Proposal area is located at the Warkworth Mine, approximately 11kms south-west of Singleton.

Aboriginal people who hold cultural knowledge relevant to determining the significance of Aboriginal object(s) and/or place(s) associated with the Warkworth Continuation 2014 Proposal area are invited to participate in consultation with Coal & Allied to inform the preparation of an Aboriginal Cultural Heritage impact assessment for the Warkworth Continuation 2014 Proposal Environmental Impact Statement.

If you wish to register your interest as an Aboriginal party your registration must be in writing (letter, fax or email), and include your name/organisation, current contact details (postal address, email, phone number/s) and be received by Coal & Allied by close of business on Tuesday 6th May 2014 (see contact details at end of this notice). Details of people registering as Aboriginal parties will be provided to Office of Environment and Heritage (OEH), and also the Wanaruah Local Aboriginal Land Council unless you specify otherwise.

Aboriginal parties who register for consultation are invited to attend a meeting of the **Coal & Allied Upper Hunter Valley Aboriginal Cultural Heritage Working Group (CHWG)** with the following details:

Date: Wednesday 7th May 2014

Time: 9.00am to 2.00pm

Venue: Wollombi Brook Conservation Area, 1916 Putty Road, Bulga
(Morning tea and lunch will be provided)

CHWG discussions and other consultation with Registered Aboriginal Parties pertaining to the Warkworth Continuation 2014 Proposal application under Part 4, Division 4.1, EP&A Act, and other activities requiring approvals under Part 6 of the National Parks & Wildlife Act 1974, are conducted in accordance with the OEH *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*.

The CHWG meeting will also review current and proposed operations and development activities that are associated with existing development approvals, in particular:

- Hunter Valley Operations South (PA06_0261)
- Hunter Valley Operations North (DA 450-10-2003)
 - Mount Pleasant Coal Project (DA92/97)
 - Mount Thorley Operations (DA 34/95)
- Warkworth Operations (DA-300-9-2002-i)

If you are unable to attend the meeting you may lodge comments, queries or feedback on these or other topics associated with Coal & Allied's cultural heritage management program via letter, fax, email or phone prior to the scheduled date of the CHWG meeting.

Joel Deacon
Specialist Cultural Heritage
Rio Tinto Coal Australia Pty Ltd
Hunter Valley Services
PO Box 315, Singleton NSW 2330
joel.deacon@riotinto.com
Fax: 02 6570 0350
Ph: 02 6570 0462

Appendix 1.5: Meeting Agenda for the Coal & Allied Upper Hunter Valley Aboriginal Cultural Heritage Working Group Community Consultation Meeting 3 April 2014

Venue: 1916 Putty Road Cultural Heritage Facility - 9.00am to 2.00pm

Welcome and introductions

1. Review of Minutes & Actions from previous CHWG meeting 19th February 2014

2. Update on status of Coal & Allied operations, business outlook & projects

3. Warkworth Mine Continuation 2014 Proposal (DoPI EP&A, OEH ACHCR 2010)

- Discussion & review of long term approval proposal for Warkworth Mine
- Review of Aboriginal cultural heritage impact assessment process for Warkworth Mine Environmental Impact Statement

4. Mount Thorley Operations Continuation 2014 Proposal (DoPI EP&A, OEH ACHCR 2010)

- Discussion & review of long term approval proposal for Mount Thorley Operations
- Review of Aboriginal cultural heritage impact assessment process for Mount Thorley Operations Environmental Impact Statement

5. Mount Thorley/Bulga Ramp 22 Sedimentation Dam Aboriginal Heritage Impact Permit Application (DA 34/95) (OEH ACHCR 2010)

- Update on AHIP application for the proposed Ramp 22 Sedimentation Dam project area
- Review of management measures proposed within AHIP application (salvage mitigation & possible creek remediation works)

6. Hunter Valley Operations – North (DA-450-10-2003) & South (PA_06_0261) - Heritage Management Program (OEH ACHCR 2010)

- Discussion & review of existing & planned operations & development activities at Hunter Valley Operations
- Review of proposed & potential future cultural heritage management activities

7. Updates on other Coal & Allied cultural heritage management activities

- Mount Pleasant Coal Project (DA92/97)
- Mount Thorley Operations (DA 34/95)

8. Administrative Coordination & rostering

- Stakeholder review of eligibility requirements for, & current membership of, the Coal & Allied Cultural Heritage Administrative Co-ordination & Fieldwork Rosters

9. Other Business and Community Feedback/Issues

- Discussion on appropriate training providers, including local Aboriginal community members with relevant skills who may wish to provide an expression of interest, who may be able to offer artefact analysis training programs

Notes:

- 'OEH ACHCR 2010' in text denotes development subject to assessment & AHIP approvals under Part 6 of the NPW Act, Office of Environment and Heritage.
- 'DoPI EP&A' in text denotes development subject to a project approval &/or ACHMP conditioned by the Department of Planning & Infrastructure and not requiring an AHIP approval from OEH.

Appendix 1.6: Meeting Minutes for the Coal & Allied Upper Hunter Valley Aboriginal Cultural Heritage Working Group Community Consultation Meeting 3 April 2014

MINUTES

Date: 3rd April 2014

Time: 0900 - 1400

Venue: Wollombi Brook ACH Conservation Area, 1916 Putty Rd, BULGA.

Chairperson: Joel Deacon

Attendees: Joel Deacon – RTCA Specialist Cultural Heritage
David Cameron - RTCA Manager Cultural Heritage
Scott L'Oste-Brown - CQCHM
Georgia Bennett – RTCA Advisor Cultural Heritage
Deslee Matthew – Deslee Talbot Consultants
Vicky Slater – Kawul Cultural Services
Noel Downs – WLALC
Tim Miller - WLALC
George Sampson - Cacatua General Services
Mitchum Neave – HECMO
Des Hickey – Wattaka Wonnarua Cultural Consultants Service
Kerry Boyd – HECMO
Rhonda Ward – Ungoороо Cultural & Community Services Inc
Les Atkinson – Jarban & Mugrebea

Apologies: Allen Paget – Ungoороо Aboriginal Corporation
Suzie worth - WLALC
Tracey Skene – Culturally Aware
Maree Waugh - Wallangan

Minutes: Georgia Bennett

Meeting started: Minutes silence

Apologies given

Welcome and introductions – by RTCA staff and those present at the meeting.

Main Agenda Items: Two main agenda items today are the announcement of the Warkworth continuation 2014 proposal and the Mount Thorley Operations 2014 proposal. These will be covered in some detail today. Also Ramp 22 and where we're at with that. Other business as per the agenda.

Social Impact Assessment consultants will be here at the end of the meeting if you want to talk to them about the proposal(s). They will record any comments you have to feed into the social impact assessment.

3. Warkworth Mine Continuation 2014 Proposal (DoPI EP&A, OEH ACHCR 2010)

- Discussion & review of long term approval proposal for Warkworth Mine
- Review of Aboriginal cultural heritage impact assessment process for Warkworth Mine

Overview of the Warkworth Continuation 2014 and Mt Thorley Operations 2014 Proposals:

Dave- West pit modification area was approved to give the mine another 2 years to continue mining while we sorted out what to do in the future. The company has now made a decision about what it wants to do: 1) The Warkworth Continuation 2014 proposal, application for a new development under the EP&A Act to continue mining beyond the current limits. 2) Mount Thorley Operations - another approval to seek a new approval for additional time to complete the mining that's already been approved (more time to complete mining within the current footprint). Last time it was an integrated project, this time we need to seek 2 separate EIS's. (Maps can be found in the handouts given out today which show the extent of the Warkworth proposal area which will cross Wallaby Scrub Rd). The area is very similar to what was proposed in 2010 for the Warkworth Extension Project (WEP).

Conservation Areas are pointed out on the map. The Wollombi Brook Aboriginal Heritage Conservation Area (WBACHCA), was set up in 2009 and we've continued to manage that as a conservation area (i.e. no drilling or other development works allowed in that area), are in the process of establishing that as a conservation area under the NPWs act as we were consented to have to do, because that all got suspended its just been sitting there waiting to see what happens in the future. What we're proposing to do now that we are going for a new approval, is to again put this area up for permanent protection as an Aboriginal Conservation area, we now have additional land: Springwood homestead and an area west of Newport Dairy. Also in MTO there is an area at Loder Creek to get locked up as an Aboriginal Conservation Area. MTW and MTO operate as integrated operations. Does anyone have any questions about the overview before we go into a bit more detail?

Mitchum – where's the buffer zone?

Dave – points out the project boundary area (disturbance area), buffer area and conservation areas. The mining leases are also pointed out.

Kerryn – can you tell me what the agreement was with Saddleback Ridge for the protection of Wallaby Scrub rd.?

Dave – under the 2003 consent that area was set aside as NDA1 (non-disturbance area 1 - ecological conservation), since then and after the 2010 extension the government has agreed to rescind that: it doesn't have status as a non-disturbance area any more.

Les – do they put another offset as a conservation area?

Dave - so the process in 2010 they established a series of offsets including this one, as a biodiversity area, further to the north Archerfield, Goulburn River, Bowditch, as offset packages for that proposal. Things have changed in terms of government policy around these conservation offsets, a new government policy came out a few weeks ago that says they're not going to be looking at section 69 under the NPWs act conservation agreements to protect bio-diversity, instead they'll now look at bio-banking and covenant over land and there's also what's called the *Hunter Valley Strategic Offset Strategy* which is a combination of bio-banking or getting other lands that can be used for bio-banking offsets or (Interrupted)

Discussion about losing heritage through offsets being on lands which are off country.

Dave – issue is satisfying what the regulator decides is of conservation importance and significance. They decide what offsets you need to have to offset the ecological disturbance for example. Also funds going into a strategic fund that the government can buy land of ecological significance and set them up as National Parks but that's not a decision we get to make. Ecological offsets is something we have no say over.

When we looked at how we could secure this area with the working group, one of the things that people didn't want was for that area to be protected under a conservation agreement under the NPWs act for a number of reasons; including the government has their finger in it, also raises questions of can the government rescind that, and our legal advice was to put a covenant on title through the conveyancing act. We'll put in those proposals - it's the PAC who will decide what that mechanism is. Covenant is there forever. Main thing is that the area is locked away and protected and is managed by you guys.

- Discussion about Wambo land ownership and the Bora Ground and co-management. Message from the community is that the community wants to be able to manage the area as one area, a holistic place irrespective of the boundaries. Want Wambo to attend a meeting to listen to what you have to say. Noel says that the best form of protection for the area is ownership by Land Council.
- Wollombi Brook Aboriginal Cultural Heritage Conservation Area Steering Group Committee - Principles of Management / governance structure were discussed at numerous steering group workshops (no answer reached as yet): what entity will manage the land and will it then have the status to manage other offsets? It's not the intention of C&A to manage this area, it's for you guys and for us to assist to make sure there are adequate resources to manage the area. Community access, rehabilitation etc. are key issues for the conservation area.

ACTION - distribute the notes / minutes (package of information) from the steering group meetings to show where it got to (44:32)

Dave – both new proposals are **state significant developments**: means provisions under 89J (D) of the EP&A act- exempt from section 90 process of the NPW act. This means that no ACHAR or AHIPS required but will require approved Heritage Management Plan (e.g. HVO South ACHMP). For the EIS process we have to do Aboriginal Cultural Heritage Impact Assessments for both proposals.

Consultation process is explained by Dave with the CHWG being the primary forum for consultation. Part of the consultation process will include a site visit to the impact area (before 7th May) followed by another CHWG meeting on 7th May. Dates to be discussed later on in this meeting. Documentation from today's meeting will be sent out to all RAPs. New guidelines for Aboriginal Consultation Process (supersedes the 2005 guidelines): is specific to AHIPS but this process is not an AHIP but that's the process we have to follow. Extensive consultation process is as part of the EIS process.

Site visit to include: proposal areas, disturbance areas / impact areas, conservation areas

Noel – are there any houses in the area to be destroyed that are suitable for relocation / adaptive re-use that could go onto WLALC land say in Warkworth village?

Dave – yes there are buildings, one or two of which are P1 huts (WWII huts). We'll capture that feedback.

Feedback: "C&A to consider any houses in the impact area that may be relocatable for re-use by Aboriginal Community groups"

Noel - Baiame Cave: is privately owned but WLALC owns two blocks of land behind it. Discussion about the purchase of this land.

ACTION - C&A to investigate status of land ownership at Baiame Cave.

Dave – (see slide 13) project details for Warkworth: it's a continuation of mining activity 698ha. west over Wallaby Scrub Rd. (and subsequent closure of wallaby Scrub Rd). Discussion about assessment studies and comprehensive surveys that have been undertaken in the area (Slides 14 – 20).

Dave – refer to map on slide 15 which shows where all the surveys have been done. Only area not surveyed at the request of the CHWG is small portion of land at Bora Ground. This provokes discussion about the Bora Ground with Noel suggesting it's located a bit further north of current location (still in the conservation area). Dave states that we need to continue on with looking at and understanding that area. Critical that the full extent of the site is within the conservation area.

Noel - registers WLALCs objection to the proposed construction of the dam (Ramp 22 sedimentation dam) and the impact to the creek that this will have.

Dave – those comments that you provided at one of the consultation meetings were recorded at that and put into the ACHAR submission. Noting that the Land Council objected to the development of that dam. That dam is subject to an environmental approval being submitted by Bulga, it is still being assessed by the government.

Noel – asks for the contact for the group / department who is doing the environmental assessment.

Dave - you'll need to talk to Ralph Northey from Bulga Surface Operations.

-MORNING TEA -

Dave - 698 ha (approx.) development disturbance area for the Warkworth continuation has been subject to 100% coverage and systematic survey. Are 110 extant sites in that development area that will be impacted over the life of the mine. 386 extant sites located outside the development disturbance area that will not be impacted. (See slides 17,18, 19, 20 for breakdown of figures and site types).

Dave – slide 21, Wollombi Brook ACH Conservation Area: expanded to include Springwood (extra 74 ha) and Newport (extra 98 ha), total area 685 ha. To provide for the protective management and cultural maintenance of the Bulga Bora Ground and associated cultural landscapes. Area projected from all mining and development activities. Only activities that may be permitted in that area are those associated with environmental compliance. See slide 23 map.

Heritage Management Plan – to be developed in consultation with you guys, one plan for the two operations. Separate plans that we'll integrate.

- **Staged mitigation approach** to be used in the development area (minimize disturbance to 5 years in advance of mining) so we don't culturally sterilize the area.

Noel - re: staged approach we'd prefer that it's a 12 month approach so that the work keeps rolling in over a longer time frame. We don't want to be too far out in front of the mine, break up the 5 years into smaller time frames.

Dave - OK we can capture that, I think we can work with that. Primarily it's about not going too far ahead in case things don't continue and making sure that there's an adequate buffer. Staged on the basis of the annual operating plan - 12 months, so we'll put some words in around this.

Slide 25 Heritage Impact Management Commitments. Discussion about the Hunter Valley Sand Bodies Research Study (which is a commitment): Noel says that he would like to see the research for this continue and also says that if the 110 sites are going to be destroyed then given the Land Councils concern that it's part of a much larger ceremonial area, asks if it could be part of a research project through a university to ensure that as much information as possible is captured.

Dave – that sort of proposal is exactly what will need to be discussed with the group in more detail and that would form part of the management plan. Methodology etc. We can put that in as a proposal.

Further discussion about the cultural heritage values and storylines being captured.

Dave – that's the general overview of the Warkworth process. We'll send out all information from today and a preliminary statement on the impact assessment.

Environmental Impact Statement - specific matters raised were:

- support for the implementation of the Hunter Valley Sands Bodies Research Study;
- a desire to continue the work that has been undertaken by the CHWG with respect to refining the area to be included within indicative boundary of the Bulga Bora ground features;
- considerations for options for the relocation and reuse of existing residential structures located within the Warkworth Continuation 2014 proposal area by the Aboriginal community;
- that salvage mitigation programs required to be undertaken within the Warkworth Continuation 2014 proposal area should be staged on an annual basis and in line with the Warkworth Mine Annual Operating Plan;
- information from Aboriginal cultural heritage places the subject of salvage mitigation programs be collected with a view to informing potential research programs of importance to the CHWG;
- a desire to incorporate the pre-mining topography into post-mining final landform design for the Warkworth Continuation 2014 proposal area;
- a desire to establish an access corridor along Wollombi Brook to provide connectivity between the southern end of the WBACHCA and the Aboriginal cultural heritage conservation area established for the adjacent Bulga Coal Complex; and
- continue to investigate possibilities and options available for the acquisition of lands within which the highly culturally significant Baiame Cave is located.

4. Mount Thorley Operations Continuation 2014 Proposal (DoPI EP&A, OEH ACHCR 2010)

- Discussion & review of long term approval proposal for Mount Thorley Operations
- Review of Aboriginal cultural heritage impact assessment process for Mount Thorley Operations Environmental Impact Statement

Dave – to complete mining within the currently approved mining footprint (not going further than Charlton rd.) The key thing is we're not mining in an area that's not already been approved for mining. The only area subject to future impact is the Ramp 22 dam.

Noel – any chance of C&A returning the final landform back to its original state (i.e. showing features etc.)

Dave - comes down to where the final voids end up how much dump is there, what can be shaped in the area that's there. Part of the HMP process could be to work with the long term planners to work on the rehabilitation plan and what the final landform might look like. Are constraints around that but if you want to be part of that process?

Dave - slide 29, 30 shows a breakdown of the 48 extant sites.

Discussion about recording sites as one big site rather than as numerous sites; one cultural precinct. Problems with this is that government doesn't recognize this recording of one big site / cultural complex.

Dave – Proposed Loder Creek Aboriginal Cultural Heritage Conservation Area (LCACHCA) (slide 31). 18 sites recorded in that area but will undoubtedly find more when a comprehensive survey is conducted.

Need to develop a Heritage Management Plan in consultation with the CHWG. Integrated HMP. Commitments are similar to those listed for Warkworth (slide 34).

Noel – mentions considering an access easement corridor (50 meters on either side of Wollombi Brook) between Xstrata heritage/ conservation area and C&A conservation area.

Dave - that's an overview of the Mount Thorley operations proposal. Summary statement will also be mailed out to you along with all the information from today. Next CHWG meeting on 7th May and there will also be a site visit on 29th April. Important for people to RSVP for the site visit.

Environmental Impact Statement. Specific matters raised were:

- support for the implementation of the Hunter Valley Sands Bodies Research Study;
- confirmed the cultural importance of the remaining undeveloped areas around Loder Creek and the desirability of it being included within an ACHCA;
- a desire to incorporate the pre-mining landscape topography into post-mining final landform design for the MTO 2014 proposal area;
- a desire to establish an access corridor, within the MTO mining lease, along Wollombi Brook to provide connectivity between the southern end of the proposed Wollombi Brook Aboriginal Cultural Heritage Conservation Area (WBACHCA), associated with the Warkworth Continuation 2014 Proposal, and the Aboriginal cultural heritage conservation area established for the adjacent Bulga Coal Complex mining operation; and
- continue to investigate possibilities and options available for the acquisition of lands within which the highly culturally significant Baiame Cave is located.

-MEETING ENDS-

**Appendix 1.7: Meeting Presentation for the Coal & Allied Upper Hunter Valley
Aboriginal Cultural Heritage Working Group Community
Consultation Meeting 3 April 2014**

This documentation is provided in electronic data format independently to this report.

Rio Tinto



**Coal & Allied Aboriginal Cultural Heritage Working Group
Meeting (3rd April 2014)**

CHWG Meeting Agenda

1. **Review of Minutes & Actions from previous CHWG meeting 19th Feb 2014**
2. **Update on status of Coal & Allied operations, business outlook & projects**
3. **Warkworth Continuation 2014 Proposal (DoPI EP&A, OEH ACHCR 2010)**
 - Discussion & review of long term approval proposal for Warkworth Mine
 - Review of Aboriginal cultural heritage impact assessment process for Warkworth Mine Environmental Impact Statement
4. **Mount Thorley Operations 2014 Proposal (DoPI EP&A, OEH ACHCR 2010)**
 - Discussion & review of long term approval proposal for Mount Thorley Operations
 - Review of Aboriginal cultural heritage impact assessment process for Mount Thorley Operations Environmental Impact Statement

CHWG Meeting Agenda

5. Mount Thorley/Bulga Ramp 22 Sedimentation Dam AHIP Application (DA 34/95 - OEH ACHCR 2010)

- Update on AHIP application for the proposed Ramp 22 Sedimentation Dam project area
- Review of management measures proposed within AHIP application (salvage mitigation & possible creek remediation works)

6. Hunter Valley Operations – North (DA-450-10-2003) & South (PA_06_0261) - Heritage Management Program

- Discussion & review of existing & planned operations & development activities at Hunter Valley Operations
- Review of proposed & potential future cultural heritage management activities

7. Updates on other C&A cultural heritage management activities

- Mount Thorley Operations (DA 34/95)
- Mount Pleasant Coal Project (DA92/97)

CHWG Meeting Agenda

8. Administrative Coordination & rostering

- Stakeholder review of status & eligibility requirements for the C&A Cultural Heritage Administrative Co-ordination & Fieldwork rosters

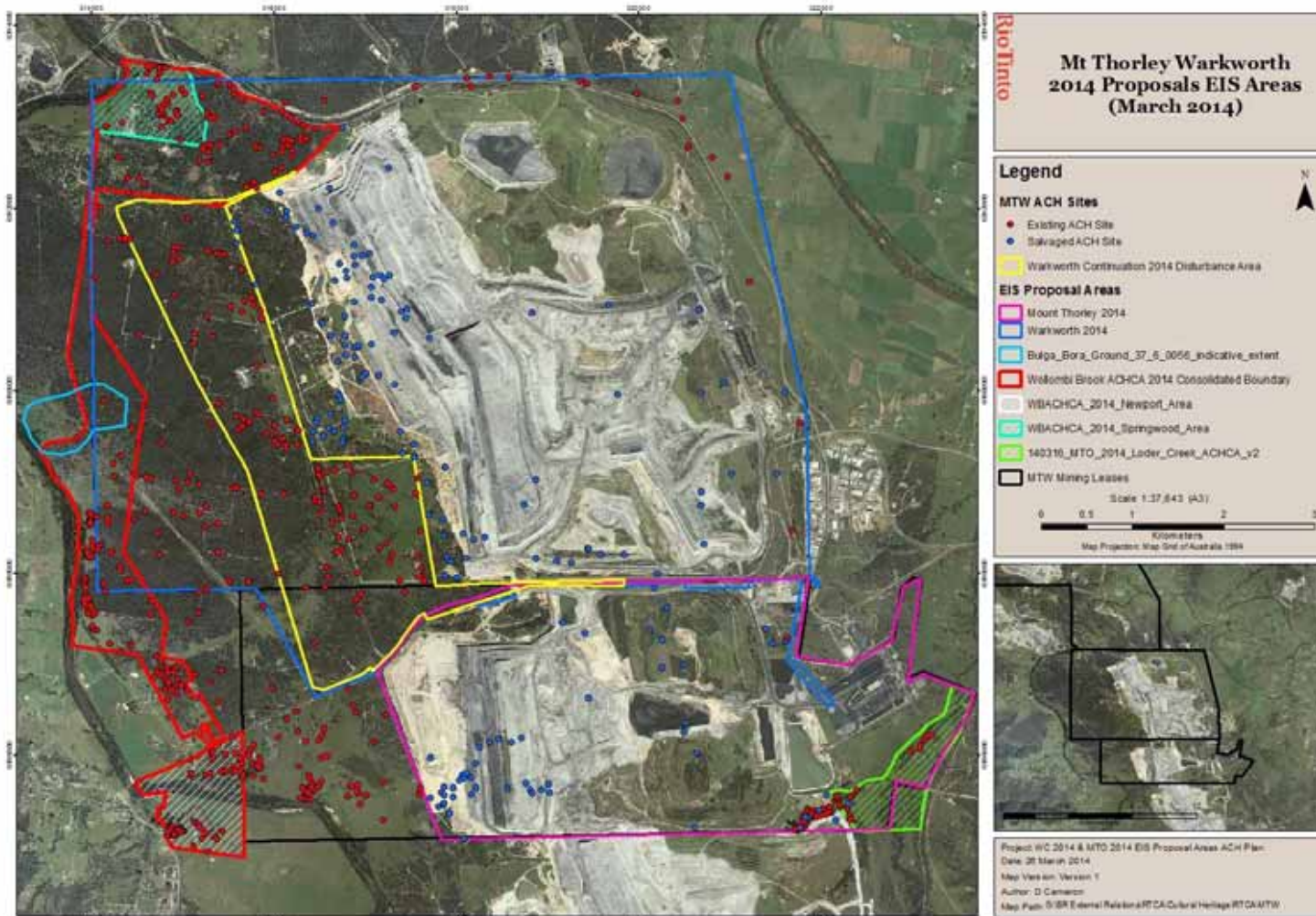
9. Other Business and Community Feedback/Issues

3. Warkworth Continuation 2014 & Mt Thorley Operations 2014 Proposals

1. The Warkworth Continuation 2014 Proposal is an application for an approval under Part 4, Division 4.1 of the Environmental Planning and Assessment Act 1979 (EP&A Act) to continue mining beyond the current limits of approval DA 300-9-2002-i.
2. The Mount Thorley Operations 2014 Proposal is an application for an approval under Part 4, Division 4.1 of the EP&A Act for additional time to complete mining & rehabilitation activities within the current limits of approval DA 34/95.

They are two separate proposals requiring their own Environmental Impact Statements & development consents

3. Warkworth Continuation 2014 & Mt Thorley Operations 2014 Proposals



3. Warkworth Continuation 2014 & Mt Thorley Operations 2014 Proposals

- State Significant Developments (SSD) - Both proposals will have SSD status which enacts the provision under 89J (D) of the EP&A act that exempts them from section 90 of NPW Act.
- No ACHAR or AHIPS required but will require approved Heritage Management Plan (e.g. HVO South ACHMP)
- Aboriginal Cultural Heritage Impact Assessments required for both the Warkworth Continuation 2014 Proposal and for the Mount Thorley Operations 2014 Proposal Environmental Impact Statements

3. Warkworth Continuation 2014 & Mt Thorley Operations 2014 Proposals

ACH Consultation Process & Timelines:

- Coal & Allied CHWG primary forum for Aboriginal Community consultation for these proposals
- DoPI (Planning & Infrastructure) & OEH require development proponents preparing an Aboriginal cultural heritage impact assessment for an EIS to undertake consultation with the Aboriginal community in conformance with the OEH *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (ACHCRP).
- Process will incorporate previous consultation associated with the former Warkworth Extension Project (WEP), Warkworth Modification 6 AHIP & Mt Thorley Operations Ramp 22 Dam AHIP

3. Warkworth Continuation 2014 & Mt Thorley Operations 2014 Proposals

- **ACH Consultation Process & Timelines:**
 - 19th March 2014: Warkworth & Mount Thorley proposals announced
 - 19th March: RAPs notified by letter of proposals & today's CHWG consultation meeting
 - 3rd April: CHWG consultation meeting; information regarding the proposals presented & discussed
 - 7th April: RAPs provided with 3rd April CHWG meeting information package, summary statement of ACH impact assessments & notified of 2nd CHWG consultation meeting (7th May)
 - RAP site visit to proposal & ACHCA areas (timing to be discussed with CHWG RAPs)

3. Warkworth Continuation 2014 & Mt Thorley Operations 2014 Proposals

- **ACH Consultation Process & Timelines:**
 - 7th May: 2nd CHWG consultation meeting to collate RAP feedback on ACH significance, impact assessments & management commitments
 - w/c 12th May: Provision of the EIS submission ACH impact assessment report to RAPs
 - May/June (EIS statutory process):
 - EIS Public Exhibition Period
 - Response to Submissions
 - Submission for Planning & Assessment Commission review

3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment

Warkworth Continuation 2014 Project Description (Key Elements)

- Continuation of mining activity over an additional 698 ha westwards from current operations;
- The maintenance of approval of all aspects of the existing operations for Warkworth Mine approved under DA 300-9-2002-i, including, coal processing rates and integrations with MTO amongst other aspects.
- The closure of Wallaby Scrub Road;
- An option to develop an underpass beneath Putty Road (to connect with MTO)

3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment

Aboriginal Cultural Heritage Assessment Studies

- Aboriginal cultural heritage investigations associated with the Warkworth Mine began in the late 1970s
- Since the granting of the current development consent in 2003 there have been:
 - Six detailed Aboriginal cultural heritage surveys
 - Nine cultural heritage salvage & excavation activities, including:
 - 2008 large scale archaeological excavation & geomorphological investigation, &
 - 2012 trench excavations of the Warkworth Sandsheet landform

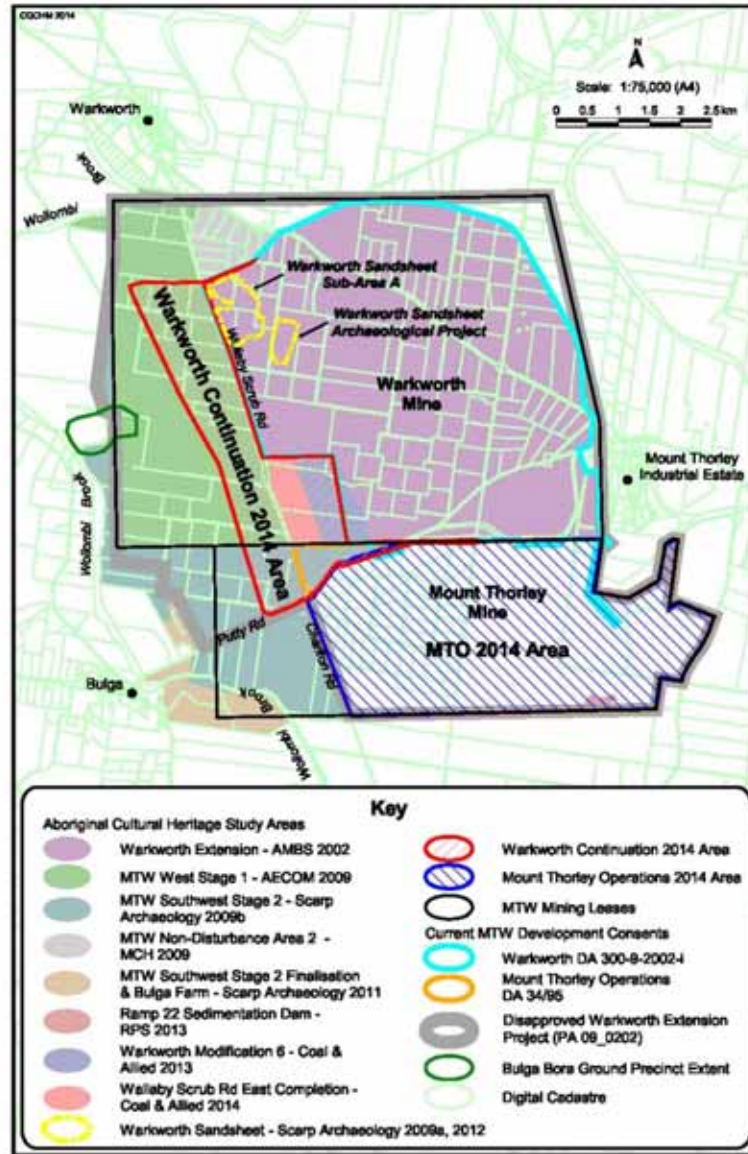


Figure 3: Key Aboriginal cultural heritage study areas and their relationship to the Warkworth Continuation 2014 and MTO 2014 proposal areas, major consent areas, tenement & other features referred to in the text.

3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment

Aboriginal Cultural Heritage Assessment Studies

- The whole of the Warkworth Mine Continuation 2014 Proposal development disturbance area (698ha approx) has been the subject of comprehensive (100% coverage) & systematic cultural heritage investigations.
- There are 110 extant Aboriginal cultural heritage places (objects & sites) that have been identified & recorded within the development disturbance area that will be impacted by the development.
- There are 386 extant Aboriginal cultural heritage places located outside development disturbance area that will not be impacted (on other C&A lands within Warkworth ML & the Wollombi Brook Conservation Area).

3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment

Warkworth Continuation 2014 Proposal Area

	Area (ha)	Number of sites	%
Development Disturbance Area	698ha	110	22.2%
Wollombi Brook ACH Conservation Area	685ha*	265	53.4%
Other 'on-site' C&A lands	1,044ha	121	24.4%
<i>Total</i>		496	
<i>* Approximation subject to final ground truthing</i>			

3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment

ACH sites located in development disturbance area

Place Type	Number	%
Stone Artefacts	103	93.7
Stone Artefacts / PAD	3	2.7
Scarred Trees	2	1.8
Scarred Tree /Isolated Stone Artefact/s	1	0.9
Grinding Grooves	1	0.9
<i>Total</i>	<i>110</i>	

3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment

ACH sites located on other 'on site' C&A lands

Place Type	Number	%
Stone Artefacts	86	71.1
Stone Artefacts / PAD	23	19.0
Scarred Trees	9	7.4
Isolated Stone Artefact/s / Stone Source	2	1.7
Isolated Stone Artefact/s / Shell Material	1	0.8
<i>Total</i>	<i>121</i>	

3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment

ACH sites located in the Wollombi Brook Aboriginal Cultural Heritage Conservation Area

Place Type	Number	%
Stone Artefacts/Scatters	244	92.1
Scarred Trees	11	4.1
Grinding Grooves	4	1.4
Spiritual Place	1	0.4
Spiritual Place / Scarred Trees	1	0.4
Stone Arrangement	1	0.4
Mound Feature (potential burials)	1	0.4
Stone Source	1	0.4
<i>Total</i>	<i>265</i>	

3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment

Wollombi Brook ACH Conservation Area

- WBACHCA 2009 area (513 ha) expanded to include Springwood (74 ha) & Newport (98 ha) with total area of 685ha to be protected in perpetuity for the conservation & management of Aboriginal cultural heritage places & values
- Will provide for the protective management & cultural maintenance of the Bulga Bora Ground & associated cultural landscapes
- Will be protected permanently from all mining (open cut & underground), exploration drilling & associated development disturbance

3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment

Wollombi Brook ACH Conservation Area

- The WBACHCA will be managed in accordance with a specific management plan developed in consultation with the CHWG
- The Aboriginal community, through a WBACHCA management committee, will oversee the implementation of the management plan
- C&A will continue to ensure an active Aboriginal community role in both Aboriginal cultural heritage and environmental management activities for the WBACHA
- Engage with Wambo Coal with a view to developing a collaborative management protocol for highly significant areas associated with and immediately adjacent the Bulga Bora Ground

3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment



3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment

Heritage Management Plan (HMP)

- A HMP will be developed in consultation with CHWG RAPs
- Based on existing principles, protocols & processes for Aboriginal cultural heritage management developed with CHWG
- Intention is for an integrated HMP to cover the entirety of the MTW mining leases & adjoining C&A owned lands
- Management (mitigation) of ACH sites in the development area will be staged to minimise disturbance to five years in advance of mining & development footprint

3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment

Heritage Impact Management Commitments

- Development of integrated heritage management plan for entire MTW mining area & adjacent C&A lands
- In perpetuity protection for the WBACHCA (c.685ha)
- Aboriginal community management & access for the WBACHCA
- Protective management of ACH sites located on adjacent C&A owned lands
- Mitigation for all ACH sites subject to development disturbance activities
- Comprehensive recording & excavation of Site M grinding grooves site & recovery of sections subject to geotechnical assessment
- Implementation of the Hunter Valley Sand Bodies Research Study

4. Mount Thorley Operations 2014: Aboriginal Heritage Impact Assessment

Mt Thorley Operations 2014 Project Description (Key Elements)

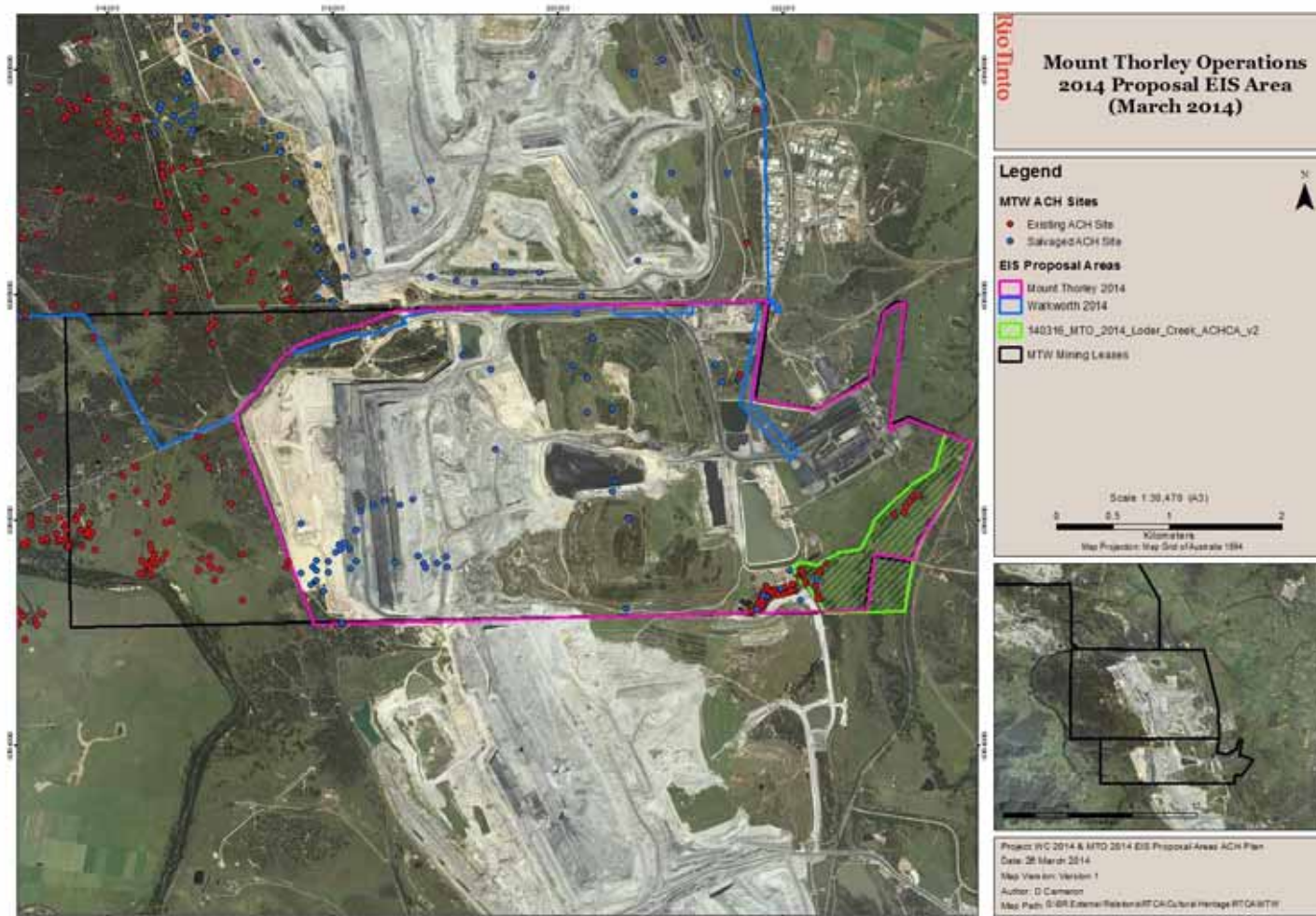
- The completion of mining in Loder & Abbey Green North pits (within currently approved mining footprint east of Charlton Road);
- The ability to accept overburden from Warkworth Mine to complete the final landform;
- The maintenance of operational level integrated components of MTW, including upgrades to the water management system;
- An upgrade to the CPP to facilitate an increase in maximum annual throughput of 18 Mt;
- The maintenance of approval of all aspects of the existing operations for Warkworth Mine approved under DA 34/95, including, coal processing rates and integrations with WML amongst other aspects.

4. Mount Thorley Operations 2014: Aboriginal Heritage Impact Assessment

Aboriginal Cultural Heritage Assessment Studies

- Aboriginal cultural heritage investigations associated with MTO mining area began in the early 1980s
- Since current DA 34/95 consent in 2002 & A&CHMP (2004) a range of cultural heritage investigation & management programs.
- All ACH management completed for current & future mining areas at Loder's Pit & Abbey Green North
- There have been recent cultural heritage surveys in the SE portion of MTO 2014 proposal area – Ramp 22 Sedimentation Dam ACHAR
- MTW South West Stage 2 studies – 2009 & 2010. West of Charlton Road, large portion of land for these assessments to be conserved within Wollombi Brook ACHCA

4. Mount Thorley Operations 2014: Aboriginal Heritage Impact Assessment



4. Mount Thorley Operations 2014: Aboriginal Heritage Impact Assessment

Extant Sites located within the MTO 2014 Proposal Area

Place Type	Number	%
Isolated Stone Artefact/s	30	62.5
Stone Artefact Scatters	15	31.3
PAD (Potential Archaeological Deposit)	3	6.2
<i>Total Sites identified</i>	48	

4. Mount Thorley Operations 2014: Aboriginal Heritage Impact Assessment

ACH sites located in the Loder Creek Aboriginal Cultural Heritage Conservation Area (87ha)

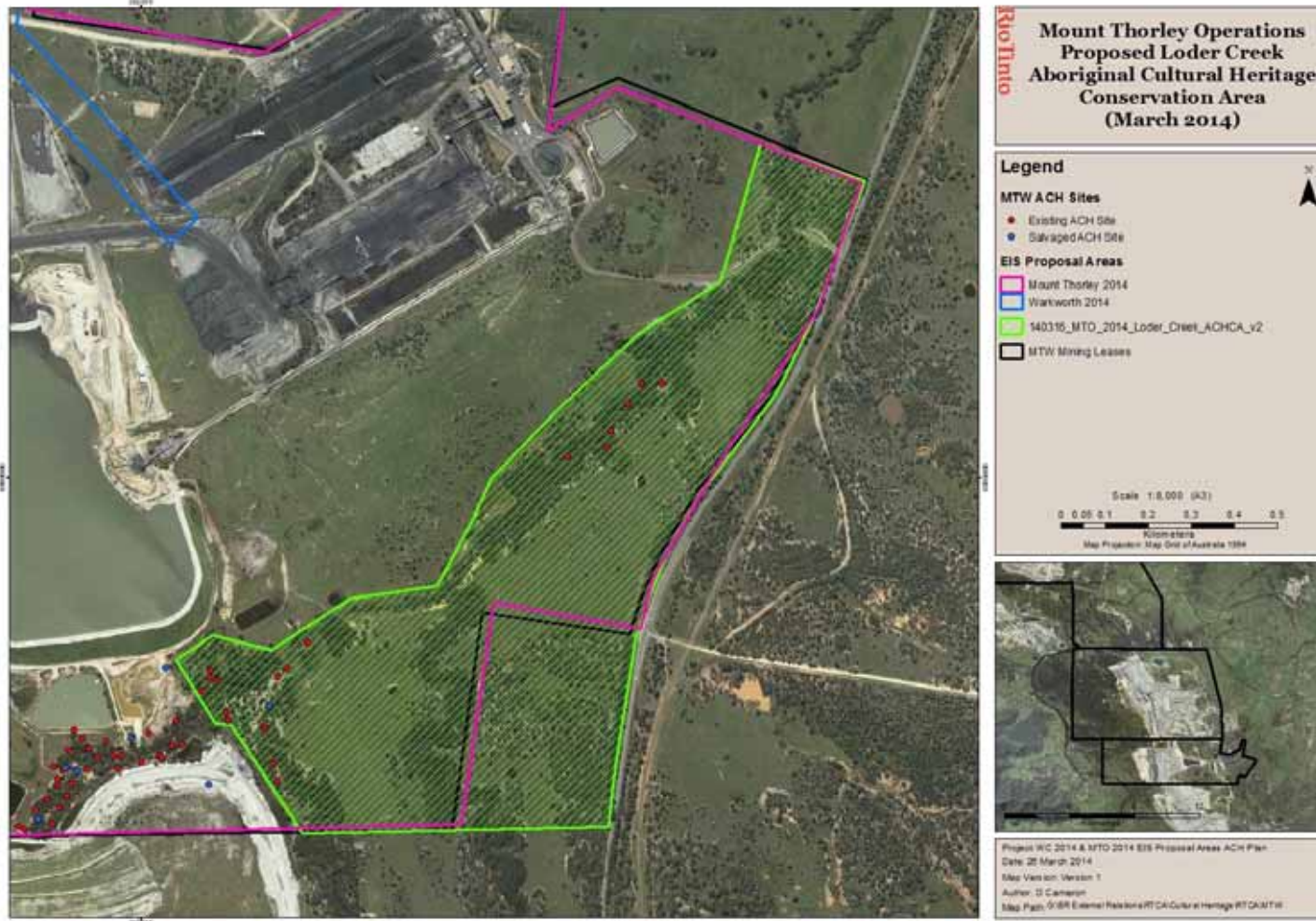
Place Type	Number	%
Stone Artefact/s/ Scatter	11	61.1%
Isolated Stone Artefact/s	6	33.3%
PAD (Potential Archaeological Deposit)	1	5.6%
<i>Total</i>	<i>18</i>	

4. Mount Thorley Operations 2014: Aboriginal Heritage Impact Assessment

Proposed Loder Creek Aboriginal Cultural Heritage Conservation Area (LCACHCA)

- Establish Loder Creek ACHCA in perpetuity for the conservation and management of Aboriginal cultural heritage places and values
- Area to be protected permanently from future mining, exploration, drilling and associated development disturbance
- Proposed conservation area totals approximately 87 hectares protecting about 2.2kms of Loder Creek & 900m of Nine Mile Creek watercourses
- Area has been subject to previous Aboriginal cultural heritage investigations with comprehensive survey assessment to be conducted to inform management plan
- 19 places have previously been identified (one has been salvaged) containing Aboriginal cultural heritage objects in the LCACHCA, primarily of stone artefacts

4. Mount Thorley Operations 2014: Aboriginal Heritage Impact Assessment



4. Mount Thorley Operations 2014: Aboriginal Heritage Impact Assessment

Heritage Management Plan (HMP)

- A HMP will be developed in consultation with CHWG RAPs
- Based on existing principles, protocols & processes for Aboriginal cultural heritage management developed with CHWG
- Intention is for an integrated HMP to cover the entirety of the MTW mining leases & adjoining C&A owned lands
- Management (mitigation) of ACH sites in the development area limited to Ramp 22 Sedimentation Dam area & rehabilitation work along the watercourse (No other sites will be disturbed)
- Current A&CHMP requires revision for DA 34/95 Modification 6 (2012) HMP requirement – to be completed by July 2014

4. Mount Thorley Operations 2014: Aboriginal Heritage Impact Assessment

Heritage Impact Management Commitments

- Development of integrated heritage management plan for entire MTW mining area & adjacent C&A lands
- Complete the reassessment survey of the Loder Creek ACHCA
- In perpetuity protection for the Loder Creek ACHCA (87 ha approx.)
- Aboriginal community management & access for the Loder Creek ACHCA
- Protective management of ACH sites located on adjacent C&A owned lands
- Mitigation of any ACH sites subject to development disturbance activities, e.g. Ramp 22 Area

Appendix 1.8: Invitation to Attend Site Visit to the Proposal Areas 29 April 2014

Private and confidential

[NAME AND ADDRESS]

9th April 2014

Dear [NAME],

Coal & Allied Cultural Heritage Working Group Site Visit – Warkworth Continuation 2014 & Mount Thorley Operations 2014 Proposal Areas Tuesday 29th April 2014

As part of its consultation process with Registered Aboriginal Parties (RAPs) through the auspices of the Coal & Allied Upper Hunter Valley Aboriginal Cultural Heritage Working Group (CHWG) for the Warkworth Continuation 2014 & Mount Thorley Operations 2014 Proposals, Coal & Allied will conduct a site tour of these proposal areas on Tuesday 29th April 2014.

This site tour has been arranged in response to requests from RAPs at the CHWG meeting held on 3rd April 2014 to visit the proposal areas & to provide RAPs with the opportunity:

- to familiarise themselves with current operations at Mount Thorley Warkworth & the proposal areas;
- to familiarise themselves with the location & nature of Aboriginal cultural heritage (ACH) sites within these areas;
- to visit the Wollombi Brook ACH Conservation Area, including the areas recently added to the north (Springwood) & south (Newport), & to inspect some of the significant ACH sites located in this area;
- to visit the proposed Loder Creek ACH Conservation Area & inspect some of the ACH sites located in this area; and
- to personally assess the impacts of the proposals on ACH values to consider the suitability of the proposed management & mitigation measures.

The MTW site visit will be on an **unpaid, voluntary** basis, & participants will be required to wear PPE: i.e. a long-sleeved shirt, long pants & ankle-height lace-up steel-capped boots. The details of the site visit are as follows:

Date: Tuesday 29th April 2014
Time: 10.00am to 2.00pm
Venue: Wollombi Brook Conservation Area, 1916 Putty Road, Bulga (see location map). Lunch will be provided

So that appropriate transportation, mine safety and catering arrangements can be made, it is **essential** that you **RSVP** your intention to attend the site visit by **Thursday 24th April**. RSVPs must be directed to:

Georgia Bennett
Cultural Heritage Advisor, NSW – HSEC
M: +61 (0)477 304 755
Ph: +61 (0)2 6570 0902
georgia.bennett@riotinto.com.au

If you are unable to attend the site visit, or CHWG meetings, you may lodge comments, queries or feedback on these proposals via letter, email or phone to Georgia or myself. I look forward to seeing you on the day, and please find enclosed directions to the Putty Road facility.

Yours sincerely



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Appendix 1.9: Minutes of Site Visit to the Proposal Areas 29 April 2014

Attendance:

Joel Deacon - RTCA
Georgia Bennett - RTCA
Luc Daigle – SCT
Rhonda Griffiths - Hunter Valley Aboriginal Corporation
Suzie Worth – Wanaruah Local Aboriginal Lands Council
Gary Perkins – Divine Diggers Aboriginal Cultural Consultants
Les Atkinson - Jarban & Mugrebea

Apologies:

Arthur Fletcher – Wonn 1
Vicky Slater – Kawul Cultural Services
Jenny Chambers – JLC Cultural Services

- We started the day at the 1916 Putty Road cultural heritage facility where we introduced Luc Daigle, who attended to provide geotechnical advice on potential management measures for the Site M grinding grooves.
- Using the map we spoke about the proposals & where the disturbance impacts would occur, & also looked at the Aboriginal cultural heritage conservation areas, including the new additions proposed.
- We visited the Site M Grinding Grooves & video recorded this discussion. The video file is too large to email, so please let Georgia know if you would like a copy & it can be mailed to you on a disc.
- The main points raised at the grinding grooves were:
 - The need for the site to be fully documented through photography, mapping & also 3D digital imaging. This should occur regardless of whether Coal & Allied receives approval to disturb the area & will provide a time lock copy of what is there now. Spherical imaging will also provide a 3D image of the surface of the grooves and the landscape in which they are situated that will enable the viewer to ‘walk around the site on line’, like Google Street View/Earth.
 - Luc says that it’s not impossible to move the grooves, but he would need to assess the rock strength & composition first to determine if & how this could be done. This work would form a stage 2 package of works that would be completed only if Coal & Allied received permission to move the grooves
 - An issue raised was “where do you store the relocated grinding grooves?” Options within the Wollombi Brook Aboriginal Cultural Heritage Conservation Area (WBACHCA) were discussed, & it was noted that a detailed management plan would be developed first with the wider CHWG group.
 - Luc also mentioned that if left in-situ the sandstone & the grooves will wear away (exfoliate) over time, & that the hay bales placed over them to protect them from potential blast fly rock are not hurting the grooves, & that they would also help reduce the stress caused by the wetting/drying cycle.
- We then went up the road as high as we could to view the current operations & look back over the proposed new mining areas towards the Wollombi Brook conservation area.
- We drove up along the inside of Wallaby Scrub Road within the current consent area to the double scar tree (MTW-321 / 37-6-2611). Issues raised regarding the scar tree were:
 - The need to get a baseline health assessment done of the tree to better understand the impact of mining disturbance on the tree as mining encroaches. The tree’s health would then need to be monitored over time
 - A stronger fence could be erected around the tree, & new access from within the conservation area will need to be instituted as, or if, mining blocks the current access.
- We then crossed over Wallaby Scrub Rd & drove to the conservation area, pointing out the limit of the proposed disturbance area on the tracks as we passed.

- We visited the ACH sites including the grinding grooves & the axe on Wollombi Brook.
- Comments made by the group were
 - The need for suitable relocated buildings for use in the WBACHCA area for community & educational use;
 - community access to the area and camping on site by school groups etc.
 - The use of a caretaker on site to oversee site visits was also raised as a good idea to help maintain & protect these areas.
- The Bora Ground was not visited as the group felt protocol may have been breached if they did.
- We then drove around the airstrip & back down to a clear open field area near Wollombi Brook that would be great for these kinds of activities.
- We then drove north along Wallaby Scrub Road to Springwood to point out the additional area that has been added to the WBACHCA. Wambo's biodiversity conservation area on the other side of Springwood was discussed, & it would be good to talk to them about linking up different company's conservation areas to be managed as one, & also Xstrata Bulga on the other side of the leases.
- We then drove around Warkworth & Mount Thorley mines to the newly proposed Loder Creek Aboriginal Cultural Heritage Conservation Area off the Broke Road
- It was pointed out that the area would need to be surveyed, but that it was highly likely that artefact scatters would continue along this important creek.
- Again, the open country off the creek was noted as being suitable for camping.
- A concern raised by the group was –“ what happens to the land being offered as conservation areas if C&A does not gain new approvals & closes the mine?”
- Before we concluded the day we drove back along the Putty Road to view the new southern additions to the WBACHCA on both sides of Wollombi Brook near Bulga. Comments raised again about the cultural benefits of making connections with Bulga Coal's conservation areas to the south

Site Visit end 2:30pm.

Appendix 1.10: Meeting Agenda for the Coal & Allied Upper Hunter Valley Aboriginal Cultural Heritage Working Group Community Consultation Meeting 7 May 2014

Venue: 1916 Putty Road Cultural Heritage Facility - 9.00am to 2.00pm

Welcome and introductions

1. Review of Minutes & Actions from previous CHWG meeting 3rd April 2014

2. Update on status of Coal & Allied operations, business outlook & projects

3. Warkworth Mine Continuation 2014 Proposal (DoPI EP&A, OEH ACHCR 2010)

- Discussion & review of long term approval proposal for Warkworth Mine, including:
 - Scope of proposal
 - Aboriginal cultural heritage impact assessment &
 - proposed management measures

4. Mount Thorley Operations Continuation 2014 Proposal (DoPI EP&A, OEH ACHCR 2010)

- Discussion & review of long term approval proposal for Mount Thorley Mine, including:
 - Scope of proposal
 - Aboriginal cultural heritage impact assessment
 - proposed management measures

5. Updates on other Coal & Allied cultural heritage management activities

- Mount Pleasant Coal Project (DA92/97)
- Hunter Valley Operations – North (DA-450-10-2003)
- Hunter Valley Operations – South (PA_06_0261)
- Mount Thorley Operations (DA 34/95)

6. Administrative Coordination & rostering

- Stakeholder review of eligibility requirements for, & current membership of, the Coal & Allied Cultural Heritage Administrative Co-ordination & Fieldwork Rosters

7. Other Business and Community Feedback/Issues

Notes:

- 'OEH ACHCR 2010' in text denotes development subject to assessment & AHIP approvals under Part 6 of the NPW Act, Office of Environment and Heritage.
- 'DoPI EP&A' in text denotes development subject to a project approval &/or ACHMP conditioned by the Department of Planning & Infrastructure and not requiring an AHIP approval from OEH.

Appendix 1.11: Meeting Minutes for the Coal & Allied Upper Hunter Valley Aboriginal Cultural Heritage Working Group Community Consultation Meeting 7 May 2014

MINUTES

Date: 7th May 2014 **Time:** 0900 - 1400

Venue: Wollombi Brook ACH Conservation Area, 1916 Putty Rd, BULGA.

Chairperson: Joel Deacon

Attendees: Joel Deacon – RTCA Specialist Cultural Heritage
David Cameron - RTCA Manager Cultural Heritage
Georgia Bennett – RTCA Advisor Cultural Heritage
Noel Downs – WLALC
Suzie Worth - WLALC
Rhoda Perry – Upper Hunter Wonnarua Council Incorporated
Rhonda Ward -Ungooroo Cultural & Community Services

Apologies: Rhonda Griffiths - HVAC
Arthur Fletcher – Wonn 1
Kathy Kinchela –Yinarr Cultural Services
David Ahoy – Lower Hunter Aboriginal Incorporated
Tracey Skene – Culturally Aware
Maree Waugh – Wallangan Cultural Services
John & Margaret Matthews – Aboriginal Native Title Consultants
Deidre Perkins – Divine Diggers
Kerry Boyd – HECMO Consultants

Minutes: Georgia Bennett

Meeting started: Minutes silence

Apologies given

Welcome and introductions – by RTCA staff and those present at the meeting

3. Warkworth Mine Continuation 2014 Proposal (DoPI EP&A, OEH ACHCR 2010)

- Discussion & review of long term approval proposal for Warkworth Mine, including:
 - Scope of proposal
 - Aboriginal cultural heritage impact assessment &
 - proposed management measures

Dave - The two proposals which are being sought for a new approval are Mount Thorley Operations & Warkworth Continuation which is an existing area that's already consented and adding an additional area (very similar to what was looked at in 2010) which crosses Wallaby Scrub rd. and heads toward Wollombi Brook. To continue the life of the mine by 21 years. Mt Thorley Operations proposal, is about having additional time to continue the mine up to, but not crossing Charlton Rd. All within the currently consented area.

Points out the extension area / boundary of the conservation area on the map.

Key Areas: sites in the Warkworth Continuation area
conservation area, including the 2 new areas
Loder Creek Aboriginal Cultural Heritage Conservation Area (in MTO)

Whilst they are separate consents they are inter-related operations, involve two separate approval and two separate EIS's.

State Significant Developments: If / when we get approval we'll need to develop a Heritage Management Plan, to be developed by the RAPs and the CHWG and approved by OEH.

Consultation Process: CHWG is the primary forum. Feedback via attending meetings, phone, email etc. As a result of the last meeting we invited people on a site visit (29th April) to look around the areas to be impacted and the conservation areas. We need to follow the AHIP process even though it's not an AHIP. Key point for this group is that our consultation process doesn't stop, it's a continuous process. We'll also be looking at previous consultation that we've undertaken.

110 extant sites (places) to be impacted, 386 extant sites outside the impact area. 700 ha (approx.) to be disturbed (types of sites is run through).

WBACHCA area has now been extended from 513 ha to 685 ha. Protective management of sites in the area

Bora Ground – the indicative boundary has been expanded to include an area to the north in response to a community request. It is still inside the conservation area and follows the Warkworth Sand woodlands land form.

Noel – there's still a lot interest in doing further work / study out there.

Dave – we need to do this with Wambo.

Noel – we want to talk to Wambo and see how we can get co-management of the two conservation area so there is one protocol. Is the WBACHCA an offset? OEH don't recognize cultural offsets, only conservation areas or a bio-diversity offset.

Dave – looking at options for how to protect that in perpetuity; covenant on title. The PAC decided conservation agreement under section 69 of the NPW act was the best mechanism to protect. Not an actual mechanism under the act that recognizes Aboriginal Cultural Heritage as being off-settable. It is an issue and we want to make sure that this is preserved in perpetuity.

Discussion about conservation lands and cultural offsets / bio-diversity offsets.

Heritage Management plan – to be developed for the Warkworth Mine continuation area: understand the impacts, how do we manage sites (those to be disturbed and not disturbed) how do we manage the impacts, what offset initiatives / commitment do we make i.e. conservation areas: these are critical issues. There will be a separate plan for the conservation areas which will be referenced in the HMP. The HMP will be the management document for the life of the consent.

Dave – does anyone have any feedback on the impacts, management outcomes, commitments, above and beyond what we've already talked about?

No comments are made.

Suzie – I do feel that there needs to be some sort of permanent protection between the area that's going to be mined and the edge of the conservation area. I don't just want to see a fence line

Dave- like the berms? Some sort of physical barrier along that boundary?

Joel – one thing that will happen, because Wallaby Scrub rd. will close as a result of this proposal is we still need to provide access from Putty Rd and the Golden Hwy for the RFS

Suzie - I'm talking about the area that is proposed for the extension

Dave – in terms of a physical barrier for to separate where the mine will end up, then what does that look like? As Joel was about to say one thing we'll have to do inside the development area is there'll be an access track so that company personnel, RFS staff can get to Bulga or other areas quickly, there also looking at potentially an earthen berm to provide a visual barrier back from Bulga.

Noel – Suzie means something like the earthen barrier that runs down Denman rd.

Suzie – physical protection for the environment from the mine, dust etc.

Discussion about ground water / surface water runoff and managing these impacts. Could add into the HMP: how to assess that and the appropriate way to manage it.

Dave – re: un-authorized access we'll have locked gates. One discussion that came up last time was do we fence this boundary? More appropriate maybe to peg the boundary (less disruptive) with markers to define the area?

Rhoda – could this work be done by Aboriginal people?

Dave - Conserving Country Training Program: program to train up Aboriginal people with land management skills. Any of that work could be done through this program.

Dave – any other ideas or proposals?

Rhoda - I still have a bit of a problem with the lack of structure, we're all representing ourselves

Dave – (talks about governance structure issues and that we need to work through the options over time).

Discussion about governance structure and transparency.

Noel – transparency is the Land Councils issue and the model that keeps getting put up is an autonomous non-transparent model that's excludes the Land Council from having a say in it and any organization that wants to exclude the Land Council is going to have opposition from the Land Council. The community wants the Land Council to be involved as its representative talking on their behalf.

Dave – so that challenge is before us and we'll delve back into that again and hopefully find a solution.

Rhoda – I want to see us all move forward together, working together.

Dave – the other thing to raise about the commitments is around the Site M grinding grooves. We'll send out a copy of the video that was taken on the day (site visit 29th April) which shows Luc Daigel (geo-technical engineer) talking about the site. Looking to develop a specific mitigation strategy for that area; protection whilst there and then if mining gets approved how to mitigate that site and further archaeological investigations and 3D recording of the site.

Morning Tea

4. Mount Thorley Operations Continuation 2014 Proposal (DoPI EP&A, OEH ACHCR 2010)

- Discussion & review of long term approval proposal for Mount Thorley Mine, including:
 - Scope of proposal
 - Aboriginal cultural heritage impact assessment
 - proposed management measures

Dave - feedback on the summary impact assessment that was mailed out: anyone have any comments or feedback?

Noel – ours will come out in writing anyway.

Dave – welcome in writing any specific comments. That's great.

Noel – Land Councils usual thing is minimization of impact and ability to access.

Dave – we'll send out the technical report that gets appended to the EIS which picks up all of this and has the consultation requirements and management commitments.

Dave – OK now we'll move onto Mount Thorley some of which may be a bit repetitive. Key thing here is this is effectively a time extension to continue mining in the already consented mine area. No sites disturbed by mining activities at MTO only at Ramp 22. This area has been comprehensively surveyed.

Dave – do you guys know if there's an offset or something in the Bulga site adjacent to the LCACHCA?

Noel – a portion of Loder Creek is supposed to be protected,

Dave – we'll follow that up especially considering the previous comments about connection to other offset areas.

HMP - needs to be developed. We want the 2 plans integrated (MTW and MTO). We need to update the current plan at MTO (between now and July) but that will then be superseded by this integrated plan.

Any other comments or feedback regarding the commitments at MTO?

Noel – Still concerned about Ramp 22 and that gully is a flowing creek.

Dave – you'll note in the ACHAR (Aboriginal Cultural Heritage Assessment Report) that we put in with the AHIP application, that we did include that objection.

Noel – I saw it in the minutes as well

Dave – 2 things; Bulga got their environmental approval for it (which is out of our hands) and the AHIP was approved.

Noel – the only thing I can think of to give it some credence is if you guys took up a water study of it. A definitive yes or no.

Dave - it's out of our hands now, but what we can do as part of the management commitments of that area downstream of the dam wall, is long term management and monitoring of the water quality downstream. We'll pick this up in the management plan for that area.

Any other comments? Again we did send out the impact assessment and its very similar, same issues, so if you have any additional comments please let us know.

No comments made

Site Visit – April 29th

Georgia – gives an overview of the site visit with a focus on the site m grinding grooves. Complete notes of the visit are available as minutes (1.51)

ACTION - develop specific management measures for the double scar tree.

MEETING ENDS

**Appendix 1.12: Meeting Presentation for the Coal & Allied Upper Hunter Valley
Aboriginal Cultural Heritage Working Group Community
Consultation Meeting 7 May 2014**

This documentation is provided in electronic data format independently to this report.

Rio Tinto



**Coal & Allied Aboriginal Cultural Heritage Working Group
Meeting (7th May 2014)**

CHWG Meeting Agenda

1. **Review of Minutes & Actions from previous CHWG meeting 3rd April 2014**
2. **Update on status of Coal & Allied operations, business outlook & projects**
3. **Warkworth Mine Continuation 2014 Proposal (DoPI EP&A, OEH ACHCR 2010)**
 - Discussion & review of long term approval proposal for Warkworth Mine
 - Scope of proposal
 - Aboriginal cultural heritage impact assessment &
 - Proposed management measures
4. **Mount Thorley Operations 2014 Proposal (DoPI EP&A, OEH ACHCR 2010)**
 - Discussion & review of long term approval proposal for Mount Thorley Operations
 - Scope of proposal
 - Aboriginal cultural heritage impact assessment
 - Proposed management measures

CHWG Meeting Agenda

5. Updates on other Coal & Allied cultural heritage management activities

- Mount Pleasant Coal Project (DA92/97)
- Hunter Valley Operations – North (DA-450-10-2003)
- Hunter Valley Operations – South (PA_06_0261)
- Mount Thorley Operations (DA 34/95)

6. Administrative Coordination & rostering

- Stakeholder review of eligibility requirements for, & current membership of, the Coal & Allied Cultural Heritage Administrative Co-ordination & Fieldwork Rosters

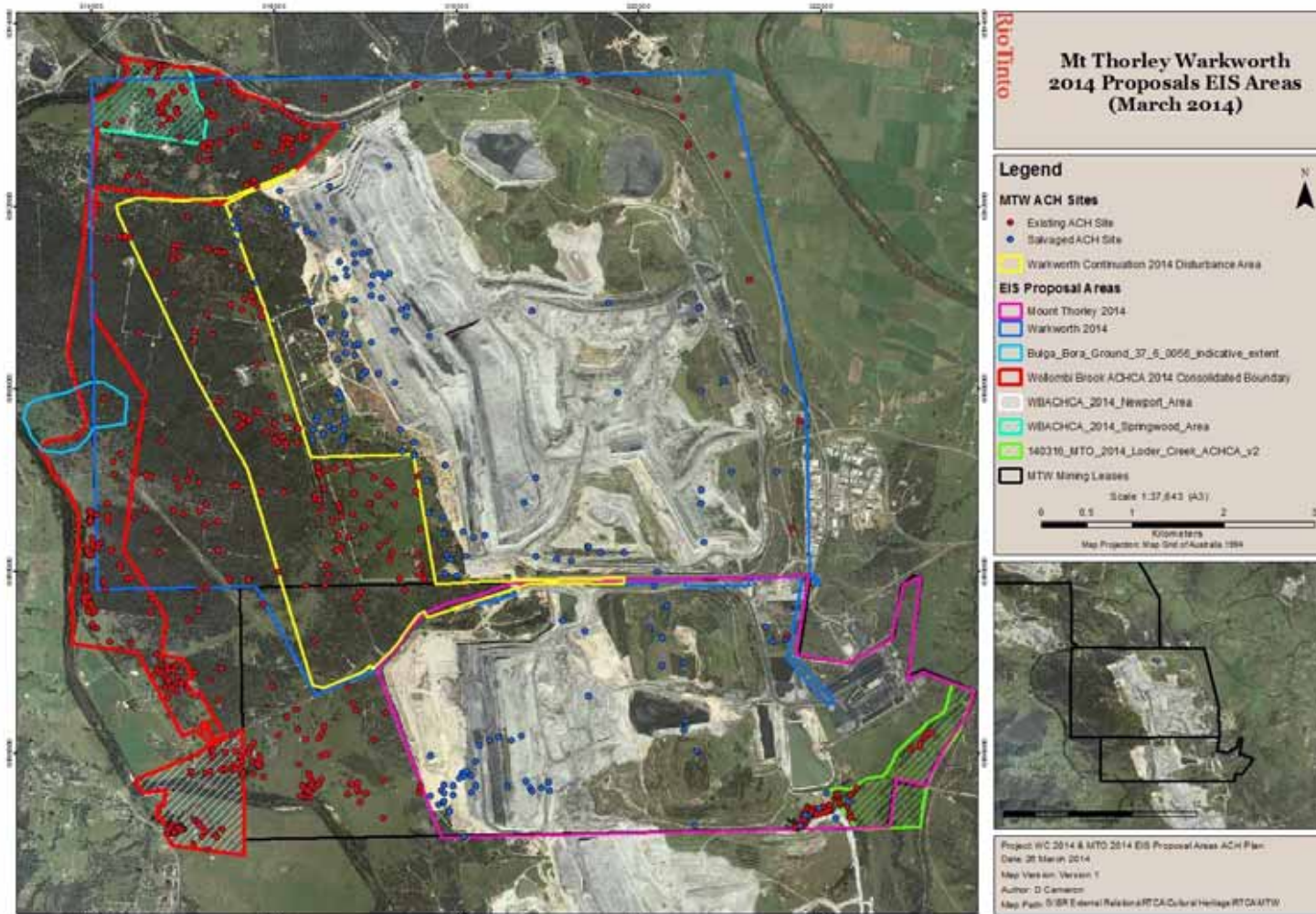
7. Other Business and Community Feedback/Issues

3. Warkworth Continuation 2014 & Mt Thorley Operations 2014 Proposals

1. The Warkworth Continuation 2014 Proposal is an application for an approval under Part 4, Division 4.1 of the Environmental Planning and Assessment Act 1979 (EP&A Act) to continue mining beyond the current limits of approval DA 300-9-2002-i.
2. The Mount Thorley Operations 2014 Proposal is an application for an approval under Part 4, Division 4.1 of the EP&A Act for additional time to complete mining & rehabilitation activities within the current limits of approval DA 34/95.

They are two separate proposals requiring their own Environmental Impact Statements & development consents

3. Warkworth Continuation 2014 & Mt Thorley Operations 2014 Proposals



3. Warkworth Continuation 2014 & Mt Thorley Operations 2014 Proposals

- State Significant Developments (SSD) - Both proposals will have SSD status which enacts the provision under 89J (D) of the EP&A act that exempts them from section 90 of NPW Act.
- No ACHAR or AHIPS required but will require approved Heritage Management Plan (e.g. HVO South ACHMP)
- Aboriginal Cultural Heritage Impact Assessments required for both the Warkworth Continuation 2014 Proposal and for the Mount Thorley Operations 2014 Proposal Environmental Impact Statements

3. Warkworth Continuation 2014 & Mt Thorley Operations 2014 Proposals

ACH Consultation Process & Timelines:

- Coal & Allied CHWG primary forum for Aboriginal Community consultation for these proposals
- DoPI (Planning & Infrastructure) & OEH require development proponents preparing an Aboriginal cultural heritage impact assessment for an EIS to undertake consultation with the Aboriginal community in conformance with the OEH *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (ACHCRP).
- Process will incorporate previous consultation associated with the former Warkworth Extension Project (WEP), Warkworth Modification 6 AHIP & Mt Thorley Operations Ramp 22 Dam AHIP

3. Warkworth Continuation 2014 & Mt Thorley Operations 2014 Proposals

- **ACH Consultation Process & Timelines:**
 - 19th March 2014: Warkworth & Mount Thorley proposals announced
 - 19th March: RAPs notified by letter of proposals
 - 3rd April: CHWG consultation meeting; information regarding the proposals presented & discussed
 - 7th April: RAPs provided with 3rd April CHWG meeting information package, summary statement of ACH impact assessments & notified of this 2nd CHWG consultation meeting
 - 29th April: RAP site visit to proposal & ACHCA areas conducted
 - 7th May: Today's 2nd CHWG consultation meeting to collate RAP feedback on ACH significance, impact assessments & management commitments
 - 12th May: RAPs provided with 7th May CHWG meeting information package

3. Warkworth Continuation 2014 & Mt Thorley Operations 2014 Proposals

- **ACH Consultation Process & Timelines:**
 - w/c 12th May: Provision of the EIS submission ACH impact assessment report to RAPs
 - May/June (EIS statutory process):
 - EIS Public Exhibition Period
 - Response to Submissions
 - Submission for Planning & Assessment Commission review

3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment

Warkworth Continuation 2014 Project Description (Key Elements)

- Continuation of mining activity over an additional 698 ha westwards from current operations;
- The maintenance of approval of all aspects of the existing operations for Warkworth Mine approved under DA 300-9-2002-i, including, coal processing rates and integrations with MTO amongst other aspects.
- The closure of Wallaby Scrub Road;
- An option to develop an underpass beneath Putty Road (to connect with MTO)

3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment

Aboriginal Cultural Heritage Assessment Studies

- Aboriginal cultural heritage investigations associated with the Warkworth Mine began in the late 1970s
- Since the granting of the current development consent in 2003 there have been:
 - Six detailed Aboriginal cultural heritage surveys
 - Nine cultural heritage salvage & excavation activities, including:
 - 2008 large scale archaeological excavation & geomorphological investigation, &
 - 2012 trench excavations of the Warkworth Sandsheet landform

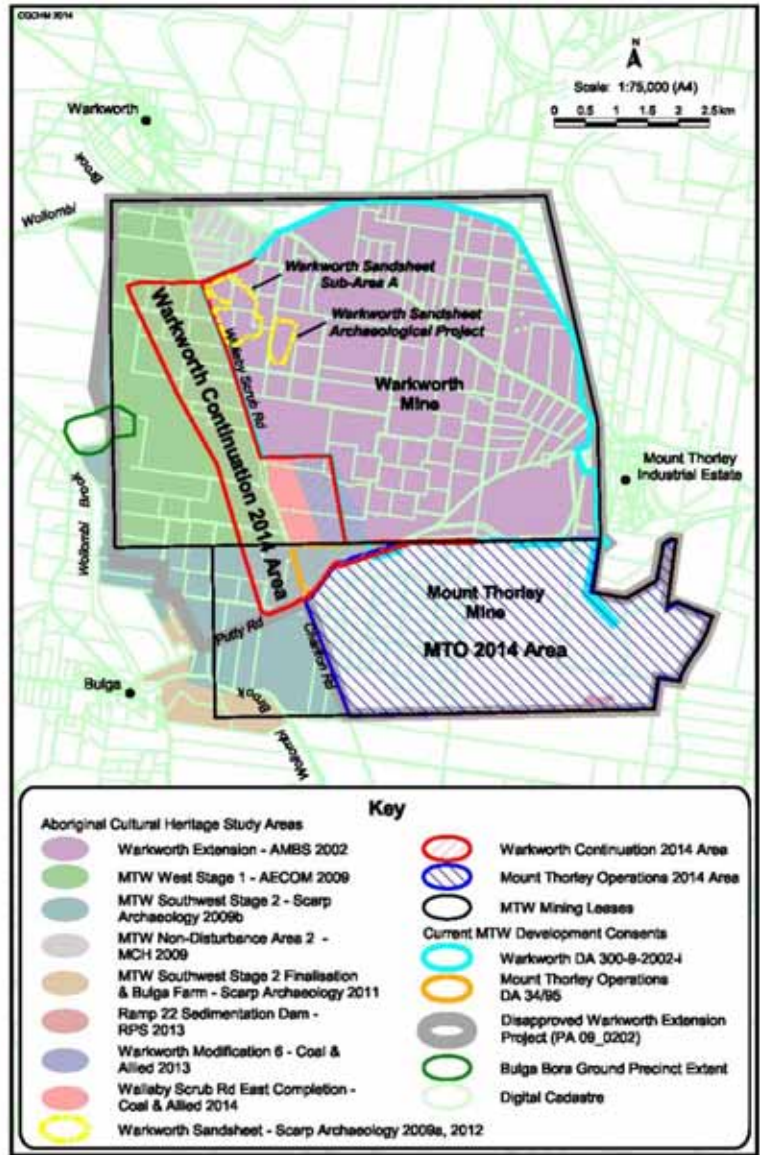


Figure 3: Key Aboriginal cultural heritage study areas and their relationship to the Warkworth Continuation 2014 and MTO 2014 proposal areas, major consent areas, tenement & other features referred to in the text.

3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment

Aboriginal Cultural Heritage Assessment Studies

- The whole of the Warkworth Mine Continuation 2014 Proposal development disturbance area (698ha approx) has been the subject of comprehensive (100% coverage) & systematic cultural heritage investigations.
- There are 110 extant Aboriginal cultural heritage places (objects & sites) that have been identified & recorded within the development disturbance area that will be impacted by the development.
- There are 386 extant Aboriginal cultural heritage places located outside development disturbance area that will not be impacted (on other C&A lands within Warkworth ML & the Wollombi Brook Conservation Area).

3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment

Warkworth Continuation 2014 Proposal Area

	Area (ha)	Number of sites	%
Development Disturbance Area	698ha	110	22.2%
Wollombi Brook ACH Conservation Area	685ha*	265	53.4%
Other 'on-site' C&A lands	1,044ha	121	24.4%
<i>Total</i>		496	
<i>* Approximation subject to final ground truthing</i>			

3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment

ACH sites located in development disturbance area

Place Type	Number	%
Stone Artefacts	103	93.7
Stone Artefacts / PAD	3	2.7
Scarred Trees	2	1.8
Scarred Tree /Isolated Stone Artefact/s	1	0.9
Grinding Grooves	1	0.9
<i>Total</i>	<i>110</i>	

3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment

ACH sites located on other 'on site' C&A lands

Place Type	Number	%
Stone Artefacts	86	71.1
Stone Artefacts / PAD	23	19.0
Scarred Trees	9	7.4
Isolated Stone Artefact/s / Stone Source	2	1.7
Isolated Stone Artefact/s / Shell Material	1	0.8
<i>Total</i>	<i>121</i>	

3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment

ACH sites located in the Wollombi Brook Aboriginal Cultural Heritage Conservation Area

Place Type	Number	%
Stone Artefacts/Scatters	244	92.1
Scarred Trees	11	4.1
Grinding Grooves	4	1.4
Spiritual Place	1	0.4
Spiritual Place / Scarred Trees	1	0.4
Stone Arrangement	1	0.4
Mound Feature (potential burials)	1	0.4
Stone Source	1	0.4
<i>Total</i>	<i>265</i>	

3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment

Wollombi Brook ACH Conservation Area

- WBACHCA 2009 area (513 ha) expanded to include Springwood (74 ha) & Newport (98 ha) with total area of 685ha to be protected in perpetuity for the conservation & management of Aboriginal cultural heritage places & values
- Will provide for the protective management & cultural maintenance of the Bulga Bora Ground & associated cultural landscapes
- Will be protected permanently from all mining (open cut & underground), exploration drilling & associated development disturbance

3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment

Wollombi Brook ACH Conservation Area

- The WBACHCA will be managed in accordance with a specific management plan developed in consultation with the CHWG
- The Aboriginal community, through a WBACHCA management committee, will oversee the implementation of the management plan
- C&A will continue to ensure an active Aboriginal community role in both Aboriginal cultural heritage and environmental management activities for the WBACHA
- Engage with Wambo Coal with a view to developing a collaborative management protocol for highly significant areas associated with and immediately adjacent the Bulga Bora Ground

3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment



3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment

Heritage Management Plan (HMP)

- A HMP for the WMC 2014 area will be developed in consultation with CHWG RAPs
- Based on existing principles, protocols & processes for Aboriginal cultural heritage management developed with CHWG
- Intention is to develop an integrated HMP to cover the entirety of the MTW mining leases & adjoining C&A owned lands
- Management (mitigation) of ACH sites in the development area will be staged to minimise disturbance to five years in advance of mining & development footprint

3. Warkworth Mine Continuation 2014 Proposal: Aboriginal Heritage Impact Assessment

Heritage Impact Management Commitments

- Development of heritage management plan for WMC 2014 area & adjacent C&A lands
- In perpetuity protection for the WBACHCA (c.685ha)
- Aboriginal community management & access for the WBACHCA
- Protective management of ACH sites located on adjacent C&A owned lands
- Mitigation for all ACH sites subject to development disturbance activities
- Comprehensive recording & excavation of Site M grinding grooves site & recovery of sections subject to geotechnical assessment
- Implementation of the Hunter Valley Sand Bodies Research Study

4. Mount Thorley Operations 2014: Aboriginal Heritage Impact Assessment

Mt Thorley Operations 2014 Project Description (Key Elements)

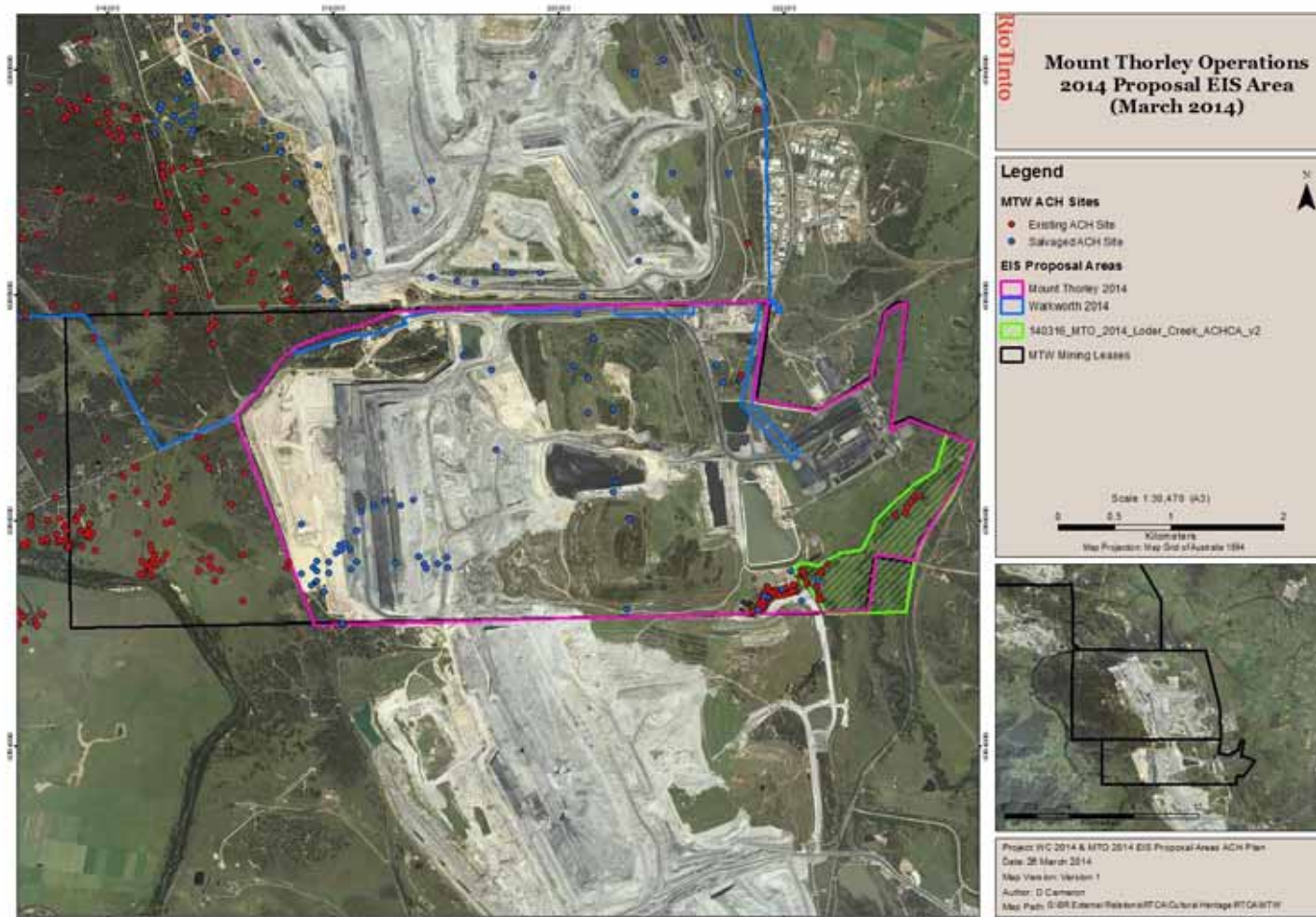
- The completion of mining in Loder & Abbey Green North pits (within currently approved mining footprint east of Charlton Road);
- The ability to accept overburden from Warkworth Mine to complete the final landform;
- The maintenance of operational level integrated components of MTW, including upgrades to the water management system;
- An upgrade to the CPP to facilitate an increase in maximum annual throughput of 18 Mt;
- The maintenance of approval of all aspects of the existing operations for Warkworth Mine approved under DA 34/95, including, coal processing rates and integrations with WML amongst other aspects.

4. Mount Thorley Operations 2014: Aboriginal Heritage Impact Assessment

Aboriginal Cultural Heritage Assessment Studies

- Aboriginal cultural heritage investigations associated with MTO mining area began in the early 1980s
- Since current DA 34/95 consent in 2002 & A&CHMP (2004) a range of cultural heritage investigation & management programs.
- All ACH management completed for current & future mining areas at Loder's Pit & Abbey Green North
- There have been recent cultural heritage surveys in the SE portion of MTO 2014 proposal area – Ramp 22 Sedimentation Dam ACHAR
- MTW South West Stage 2 studies – 2009 & 2010. West of Charlton Road, large portion of land for these assessments to be conserved within Wollombi Brook ACHCA

4. Mount Thorley Operations 2014: Aboriginal Heritage Impact Assessment



4. Mount Thorley Operations 2014: Aboriginal Heritage Impact Assessment

Extant Sites located within the MTO 2014 Proposal Area

Place Type	Number	%
Isolated Stone Artefact/s	30	62.5
Stone Artefact Scatters	15	31.3
PAD (Potential Archaeological Deposit)	3	6.2
<i>Total Sites identified</i>	48	

4. Mount Thorley Operations 2014: Aboriginal Heritage Impact Assessment

ACH sites located in the Loder Creek Aboriginal Cultural Heritage Conservation Area (87ha)

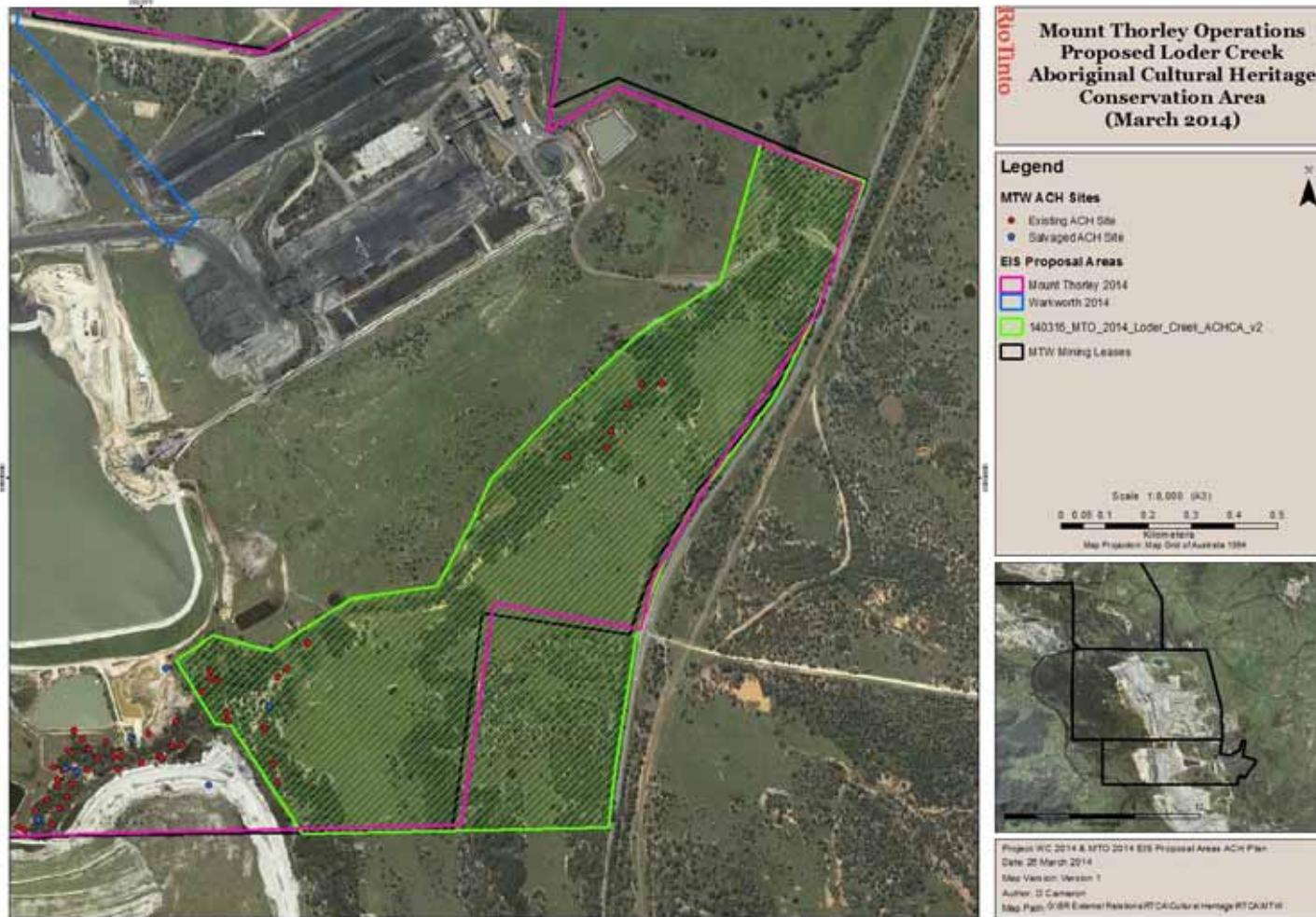
Place Type	Number	%
Stone Artefact/s/ Scatter	11	61.1%
Isolated Stone Artefact/s	6	33.3%
PAD (Potential Archaeological Deposit)	1	5.6%
<i>Total</i>	<i>18</i>	

4. Mount Thorley Operations 2014: Aboriginal Heritage Impact Assessment

Loder Creek Aboriginal Cultural Heritage Conservation Area (LCACHCA)

- CHWG feedback prior to & during EIS process protection of cultural landscape associated with remnant sections of Loder Creek.
- In response C&A proposes to establish the Loder Creek ACHCA for the conservation and management of Aboriginal cultural heritage places and values in that area
- Area to be protected permanently from future mining, exploration, drilling and associated development disturbance
- Proposed conservation area totals approximately 87 hectares protecting about 2.2kms of Loder Creek & 900m of Nine Mile Creek watercourses
- Area has been subject to previous Aboriginal cultural heritage investigations with comprehensive survey assessment to be conducted to inform management plan
- 19 places have previously been identified (one has been salvaged) containing Aboriginal cultural heritage objects in the LCACHCA, primarily of stone artefacts

4. Mount Thorley Operations 2014: Aboriginal Heritage Impact Assessment



4. Mount Thorley Operations 2014: Aboriginal Heritage Impact Assessment

Heritage Management Plan (HMP)

- A HMP for the MTO 2014 area will be developed in consultation with CHWG RAPs
- Based on existing principles, protocols & processes for Aboriginal cultural heritage management developed with CHWG
- Intention is to develop an integrated HMP to cover the entirety of the MTW mining leases & adjoining C&A owned lands
- Management (mitigation) of ACH sites in the development area limited to Ramp 22 Sedimentation Dam area & rehabilitation work along the watercourse (No other sites will be disturbed)
- Current A&CHMP requires revision for DA 34/95 Modification 6 (2012) HMP requirement – to be completed by July 2014

4. Mount Thorley Operations 2014: Aboriginal Heritage Impact Assessment

Heritage Impact Management Commitments

- Development of heritage management plan for MTO 2014 area & adjacent C&A lands
- Complete the reassessment survey of the Loder Creek ACHCA
- Establish the Loder Creek ACHCA (87 ha approx.) & provide for Aboriginal community management & access to the area
- Protective management of ACH sites located on adjacent C&A owned lands
- Mitigation of any ACH sites subject to development disturbance activities, e.g. Ramp 22 Area, & rehabilitation of extant sites in the area (e.g. erosion control, revegetation)

Warkworth Continuation 2014 & Mt Thorley Operations 2014 Proposals

- CHWG inspection of the Warkworth Continuation 2014 & Mount Thorley Operations 2014 Proposal Areas held on 29th April.
- purpose to familiarise RAPs with current operations at Mount Thorley Warkworth & the proposal areas;
- to familiarise RAPs with the location & nature of Aboriginal cultural heritage (ACH) sites within these areas;
- to visit the Wollombi Brook ACH Conservation Area, including the areas recently added to the north (Springwood) & south (Newport), & to inspect some of the significant ACH sites located in this area;
- to visit the proposed Loder Creek ACH Conservation Area & inspect some of the ACH sites located in this area; and
- to personally assess the impacts of the proposals on ACH values to consider the suitability of the proposed management & mitigation measures.

Warkworth Continuation 2014 & Mt Thorley Operations 2014 Proposals

Key outcomes of CHWG inspection:

- Luc Daigle (consultant geotechnical engineer) provided geotechnical advice on the potential recording/relocation/salvage options for the Site M (37-6-0163) grinding grooves (3D imaging & strength testing).
- Continued condition monitoring for double scarred tree WE-16 (37-6-2611)
- Proposed ACH conservation areas are appropriate & will allow for community management of ACH values
- Plan of Management for ACH conservation areas incorporate suitable infrastructure & access to enable community visits, camping & education programs on these lands
- Desire for collaborative approach with adjoining mining companies (Bulga Coal & Wambo Coal) for management & community access to conservation areas

Appendix 2

Aboriginal Cultural Heritage Studies Undertaken within the Proposal Areas

(as reviewed in Section 5)

The documentation from the following studies can be provided in electronic data format upon request.

Author & Year	Study
AMBS 2002	Warkworth Extension
AECOM 2009	Warkworth West Stage 1
Scarp Archaeology 2009	Warkworth Southwest Stage 2
MCH 2009	Warkworth Non-Disturbance Area 2
Scarp Archaeology 2011	Warkworth Southwest Finalisation & Bulga Farm
RPS 2013	MTO Ramp 22 Sedimentation Dam Area
Coal & Allied 2013	Warkworth Modification 6
Scarp Archaeology 2009	Warkworth Sands Archaeological Project
Scarp Archaeology 2013	Warkworth Sandsheet Sub-Area A

Appendix L

Traffic and transport study



Appendix L — Traffic and transport study

L

Warkworth Continuation 2014 and Mount Thorley Operations 2014

Traffic and transport study

Prepared for Warkworth Mining Limited and Mt Thorley Operations Pty Limited | 2 June 2014



Warkworth Continuation 2014 and Mount Thorley Operations 2014

Traffic and transport study

Prepared for Warkworth Mining Limited and Mt Thorley Operations Pty Limited | 2 June 2014

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Warkworth Continuation 2014 and Mount Thorley Operations 2014

Final

Report J14013RP1 | Prepared for Warkworth Mining Limited and Mt Thorley Operations Pty Limited | 2 June 2014

Prepared by	Tim Brooker	Approved by	Duncan Peake
Position	Associate Transport Planner	Position	Associate Director
Signature		Signature	
Date	2 June 2014	Date	2 June 2014

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Document Control

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1 Introduction

1.1 Overview

EMGA Mitchell McLennan Pty Limited (EMM) was engaged by Coal & Allied Operations Pty Limited (Coal & Allied) to undertake an assessment of traffic and transport impacts due to the Mount Thorley Operations (MTO) 2014 and Warkworth Continuation 2014 mining proposals.

Warkworth Mine and MTO function as an integrated operation and share the use of a number of resources and infrastructure. This includes a joint workforce and management team. This traffic and transport impact assessment has therefore been based on the combined projects (the proposal). This assessment forms part of the environmental impact statement (EIS) for each project.

It is important to note that the employee traffic generated by Warkworth Mine and MTO on external public roads will not change under the proposal as there will be no changes to the combined project workforces. Truck traffic generated will also generally remain at similar levels. All product coal is either transported by rail or conveyor currently from the two mine Coal Handling and Preparation (CHPP) plants. The volumes and methods of product coal transported from the mines will remain as per the current operations.

1.2 Mount Thorley Operations EIS

1.2.1 Background

MTO is an open cut coal mine approximately 10.5 kilometres (km) south-west of Singleton in the Hunter Valley, NSW, and is shown in Figure 1.1. The mine is operated by Coal & Allied on behalf of Mount Thorley Joint Venture (MTJV). The site currently operates under Development Consent No. DA 34/95 (the MTO development consent) issued by the then Minister for Planning on 22 June 1996 under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

Immediately to the north is Warkworth Mine. Since 2004, the two mines have integrated at an operational level and are known as Mount Thorley Warkworth (MTW), with a single management team responsible for all the operations. Equipment, personnel, water, rejects and coal preparation are all shared between the mines. The MTW operations involve an existing operation of approximately 1,300 persons, which includes full-time personnel and a small number of short-term contractors. Ownership of the two mines remains separate.

Mining activities approved under DA 34/95 have mostly been completed with the exception of Loders Pit and Abbey Green North Pit (AGN) with rehabilitation well-progressed on the east of the site. Run-of-mine (ROM) coal from MTO is transported to either the MTO or Warkworth Mine coal preparation plant (CPP) for processing. Extraction of coal from other pits has been completed; overburden emplacement is ongoing. Product coal from the CPPs is transported via conveyor or haul road to the Mount Thorley Coal Loader (MTCL). Coal loaded onto trains at the MTCL is transported to the Port of Newcastle for export.

The proposal at MTO seeks an approval under Part 4, Division 4.1 of the EP&A Act to complete mining and rehabilitation activities within the current limits of approval.

1.2.2 Proposal description

MTO has approval to mine until 22 June 2017 under its development consent. The proposal seeks a 21 year development consent period from the date of any approval. If approval is granted in 2015, operations at MTO are forecast to continue to the end of 2035, an 18 year extension over the current approval. The proposal seeks a continuation of all aspects of MTO as it presently operates and extends or alters them, including:

- mining in Loders Pit and AGN Pit. Mining in Loders Pit is expected to be completed in approximately 2020. Mining in AGN Pit is yet to commence; however, it is anticipated to take approximately two years and be completed before 2022;
- transfer of overburden between MTO and Warkworth Mine to assist in rehabilitation and development of the final landform;
- maintain existing extraction rate of 10 million tonnes per year (Mtpa) of ROM coal;
- maintain and upgrade to the integrated MTW water management system (WMS), including:
 - upgrade to the approved discharge point and rate of discharge into Loders Creek from 100MI/d to 300MI/d via the Hunter River Salinity Trading Scheme (HRSTS);
 - ability to transfer and accept mine water from neighbouring operations (ie Bulga Coal Complex, Wambo Mine, Warkworth Mine and Hunter Valley Operations); and
 - increase in the storage capacity of the southern out-of-pit (SOOP) dam from 1.6 giga litres (GL) to 2.2GL;
- maintain and upgrade to the integrated MTW tailings management:
 - including use of the northern part of Loders Pit as a TSF after completion of mining; and
 - Wall lift to Centre Ramp Tailings Facility to approximately RL150;
- upgrade to the MTO CPP to facilitate an increase in maximum throughput to 18Mtpa with the ability to receive this coal from Warkworth Mine;
- acknowledge all approved interactions with Bulga Coal Complex; and
- continuation of coal transfer between Warkworth Mine and MTO and transportation of coal via the MTCL to Port of Newcastle.

All activities, including coal extraction will be within disturbance areas approved under the existing development consent. The proposal is shown in Figure 1.2.

1.3 Warkworth Continuation 2014

1.3.1 Background

Warkworth Mine is an open cut coal mine approximately 8 km south-west of Singleton in the Hunter Valley, NSW, and is shown in Figure 1.1. The mine is operated by Coal & Allied on behalf of Warkworth Mining Limited (WML). The site currently operates under Development Consent No. DA 300-9-2002-i (the Warkworth Mine development consent) issued by the then Minister for Planning in May 2003 under Part 4 of the EP&A Act. The site also operates under two separate Commonwealth approvals (*Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)): EPBC 2002/629 and EPBC 2009/5081.

Warkworth Mine has been in operation since 1981 and the originally approved operation has been modified several times. Immediately to the south of Warkworth Mine is MTO. As noted in Section 1.2.1, the two mines have integrated at an operational level; however, ownership remains separate.

Warkworth Mine currently operates three integrated open cut mining areas, namely North, West and South pits with West and North pits being the focus of production. ROM coal from Warkworth Mine is transported to either the Warkworth or Mount Thorley CPP for processing. Product coal from the CPPs is transported via conveyor to either the MTCL or to the Redbank Power Station. Coal loaded onto trains at the MTCL is transported to the Port of Newcastle for export.

The proposal at Warkworth Mine seeks an approval under Part 4, Division 4.1 of the EP&A Act to extend mining beyond the current limits.

1.3.2 Proposal description

Warkworth Mine has approval to operate until 19 May 2021 under its development consent. The proposal seeks a 21 year development consent period from the date of any approval. If approval is granted in late 2014, operations at Warkworth Mine are forecast to continue to 2035, a 14 year extension over the current approval. The proposal seeks a continuation of all aspects of Warkworth Mine as it presently operates together with:

- an extension of the approved mining footprint by approximately 698ha to the west of current operations (referred to herein as the proposed 2014 extension area);
- the ability to transfer overburden to MTO to complete MTO's final landform;
- the closure of Wallaby Scrub Road;
- an option to develop an underpass beneath Putty Road for the third bridge crossing yet to be constructed (while retaining the current approval for an overpass);
- minor changes to the design of the Northern out-of-pit (NOOP) dam; and
- the continued use of secondary access gates to the mine site and offsets for activities such as drilling, offset management, equipment shutdown pad access amongst other things.

The proposal is shown in Figure 1.2.

1.4 Road and rail transport implications for the proposal

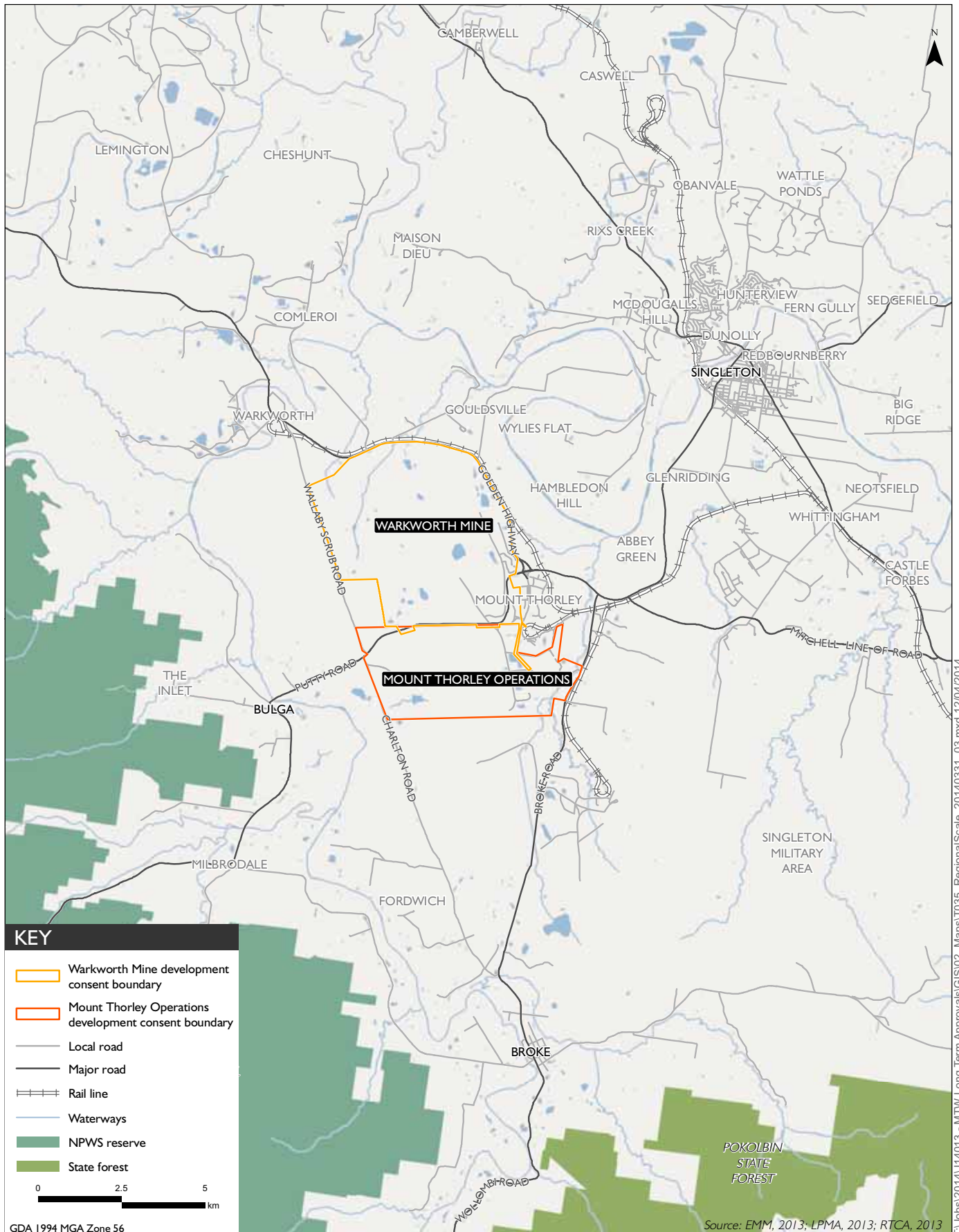
This report assesses the future transport network impacts of the proposal, in accordance with the project Department of Planning and Environment Secretary's requirements for the EIS.

The capacity and performance of the relevant road and rail transport networks are assessed including the effects of the closure of Wallaby Scrub Road, with reference to the most recent road and intersection capacity standards in the *Guide to Road Design* (Austroads 2010) and the Hunter Valley rail network capacity review (ARTC 2013).

Background information reviewed included the previous traffic impact assessments (TIA) and road safety investigations undertaken by Parsons Brinkerhoff in 2010 for the Warkworth Mine Extension Project, and the Bulga Optimisation Project TIA (ARC Traffic + Transport with Transport and Urban Planning 2013). Relevant current information from these documents regarding the road network, intersection operations and traffic safety implications were used to inform this assessment.

The structure of the report is based on the *Guide to Traffic Generating Development* (RTA 2002), which is the standard RMS template for the preparation of traffic impact studies for major projects.

To enable a thorough and detailed assessment, this TIA includes analysis of the current base year traffic conditions in 2014, traffic in the first full year of project operation (2017) following the closure of Wallaby Scrub Road and a cumulative traffic assessment (also in the year 2017) including the closure of Wallaby Scrub Road and forecast mine construction employment at the nearby Bulga Optimisation Project.

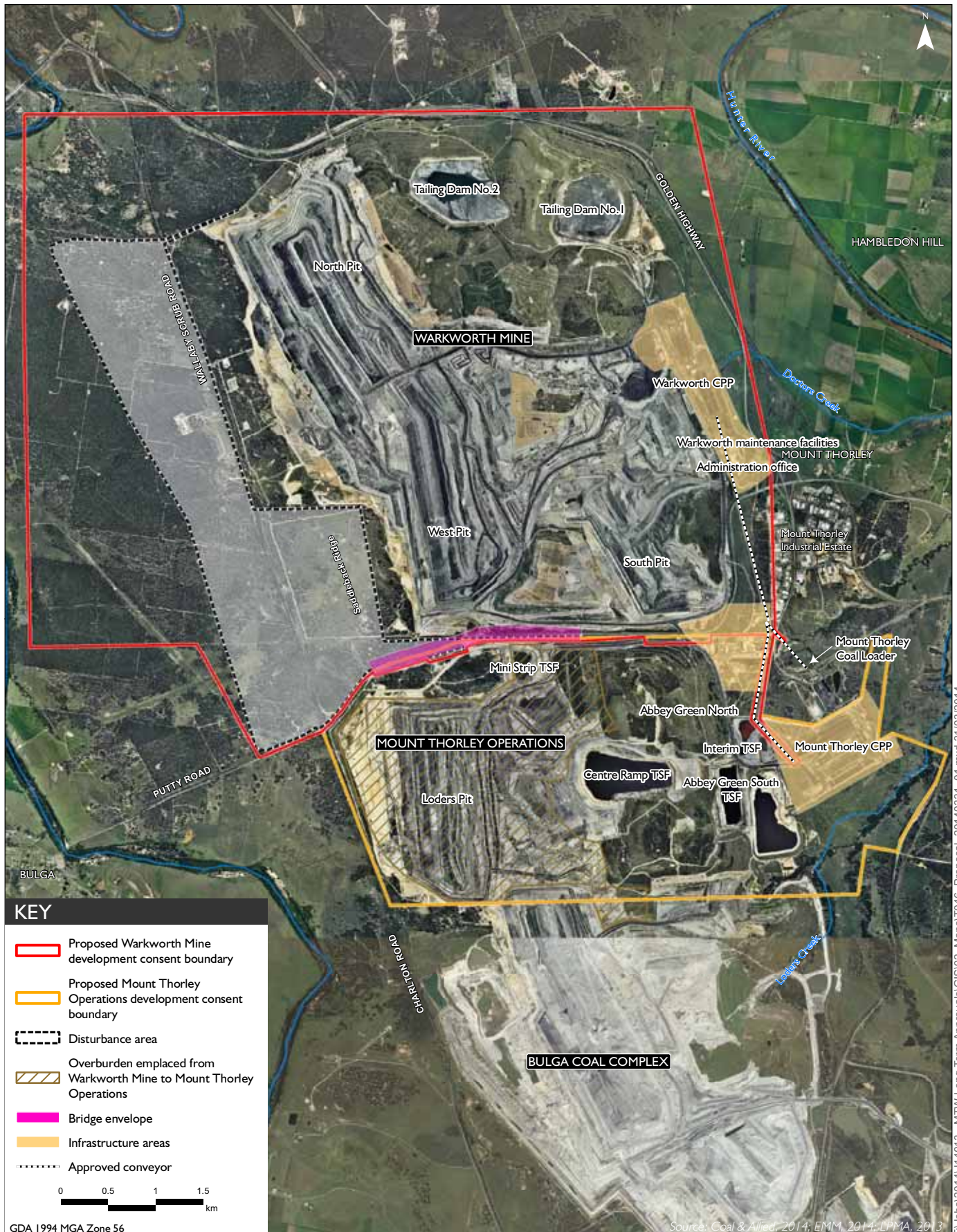


Regional location of the proposal

Mount Thorley Warkworth - Continuation of Mining Operations
Traffic Impact Assessment

Figure I.1





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2 Existing road traffic operations

2.1 Site location

The MTW mining operations are on the southern (MTO) and northern (Warkworth) sides of Putty Road, west of Mount Thorley Industrial Estate, and east of the village of Bulga. The locality of the mining operations and the surrounding roads is illustrated in Figure 2.1.

2.2 Road network

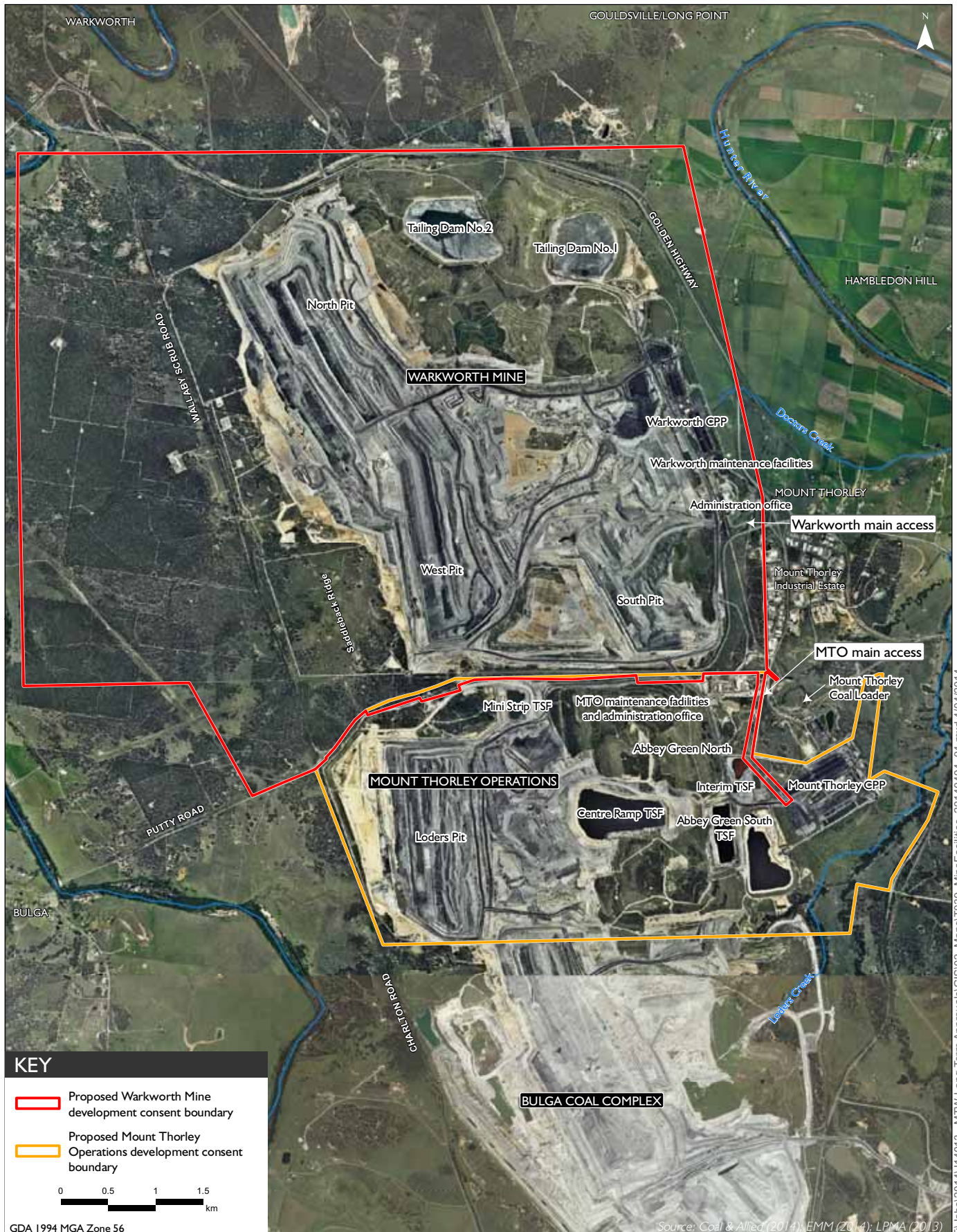
2.2.1 Description of roads

The primary access route for most of the MTW project-related traffic in the Mount Thorley area, is the Golden Highway east of Mount Thorley. Approximately 80 percent of the current and proposed MTW traffic movements will be travelling in this direction, either to or from Singleton, or Maitland and the other Hunter Valley townships further to the east.

A site inspection and photographic survey of the existing mine access intersections, internal car parking areas and the surrounding local road network, including the Golden Highway, Putty Road and other routes was undertaken by EMM on 20 March 2014. The existing traffic lanes widths and configuration/traffic controls at all the major intersections on the surrounding road network were observed and existing road pavement surface conditions noted.

The regional and local transport routes in the vicinity of the project area are depicted in Figure 1.1 and Figure 2.1 and described below.

- Golden Highway – A national road freight route linking the Hunter Region with the central inland regions of NSW. The route is generally a two-lane two-way road with a posted speed limit of 100 km/hr, except where horizontal and vertical alignment requires this to be reduced to 80 km/hr. The roadway is generally constructed to a ‘major rural highway’ design standard, with marked centre and edge lines and sealed shoulders which typically have a minimum width of 1 m or 2 m in many locations.
- Putty Road – Generally an undivided 100 km/hr sealed road which runs between the townships of Singleton in the Hunter Valley and Windsor on the northern outskirts of Sydney. In the vicinity of Mount Thorley, Putty Road shares a section of the route of the Golden Highway, between the intersections with Mitchell Line of Road and Mt Thorley Interchange. To the west Putty Road passes through the village of Bulga, where there is a 60 km/hr speed limit, and continues through generally hilly and mountainous terrain for the remainder of the route towards Windsor.
- Broke Road – An important local road which connects the Golden Highway to the village/settlement of Broke and continues towards the townships of Cessnock and Wollombi via either Broke-Cessnock Road or Wollombi Road. The road also provides the main vehicular access to mining operations at Bulga Coal Mining Complex, where access intersections are a further 3 - 5 km south of the Mount Thorley CPP access intersection. Broke Road is generally a two-lane two-way road with a posted speed limit of 100 km/hr.



Locations of access to the mine facilities from surrounding roads
 Mount Thorley Warkworth - Continuation of Mining Operations
 Traffic Impact Assessment

Figure 2.1

- Charlton and Wallaby Scrub Roads are both two lane rural roads which link the Golden Highway near Wambo with Broke Road approximately 3 km north of Broke village. The route crosses Putty Road approximately 3 km east of Bulga village. These roads generally have 100 km/hr speed limits and variable road pavement width and conditions, such that the edge and centre lines are not typically marked.
- Mount Thorley Road is an industrial road which provides access to the Mount Thorley Industrial Estate and connects to the Golden Highway and Putty Road as the fourth leg of the Mount Thorley Interchange intersection. The road pavement is generally constructed to a wide 'industrial road' standard. The road has a relatively straight and level alignment and speed limit of 60 km/hr at the northern end and also in the vicinity of MTO and the MTCL access at the southern end.

2.2.2 Site access intersections

The main vehicular access routes to the mine facilities are via three intersections:

- from Putty Road, at Lydes Lane, approximately 200 m west of the Mount Thorley Interchange (west side).
- from Broke Road, approximately 2 km south of the Golden Highway.
- from Mount Thorley Road, at the southern end, near the location of the MTCL rail loop.

The majority (80 percent) of the existing MTW workforce resides in the east and travel via the Golden Highway and Putty Road or Mitchell Line of Road routes which connect to Singleton and other Hunter Valley townships. The remainder of the current MTW workforce generally travels from the west via Putty Road, the north via the Golden Highway, and the south via Broke Road with proportions of approximately 7 percent, 8 percent and 5 percent, respectively.

Morning and afternoon peak hour intersection traffic surveys were undertaken between 6.00 to 9.00 am and 3.00 to 6.00 pm on Tuesday 4 March 2014 at the locations shown in Figure 2.2, which include the two mine access intersections from Putty Road and Broke Road which provide the main vehicular access routes and parking for mining employees currently. Daily traffic volume surveys were also undertaken at two locations on the Golden Highway and on Wallaby Scrub Road as shown in Figure 2.3.

Photographs 2.1 to 2.8 illustrate the existing road network at the major road and mine access intersections. The internal car parking areas and truck movement areas are served by roads connecting to these intersections and the Mount Thorley Road intersection (not shown).

2.2.3 Major road intersections

There are four major road intersections potentially affected by traffic generated under the proposal:

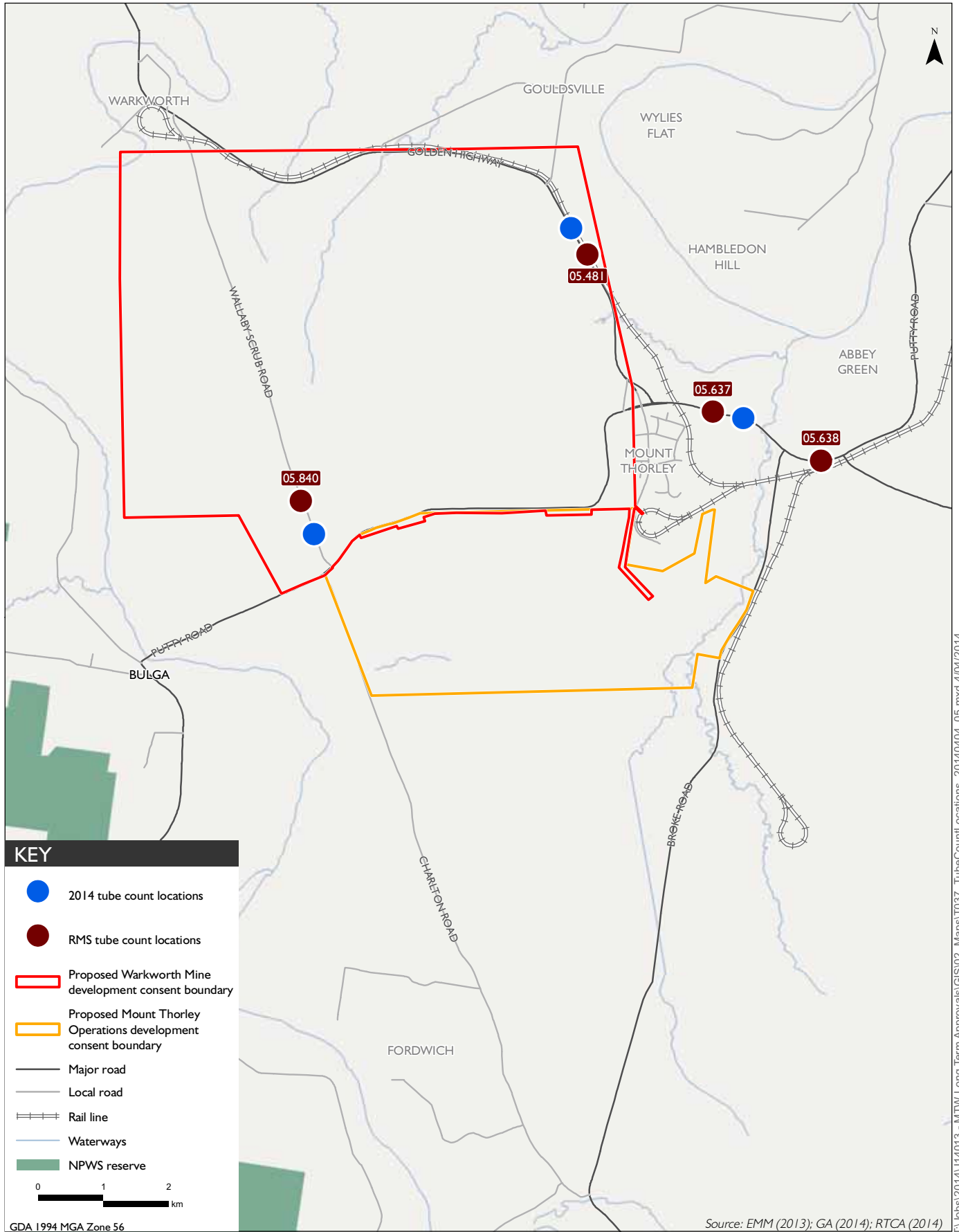
- Golden Highway/Mitchell Line Road;
- Golden Highway Mount Thorley Interchange intersection (west side);
- Golden Highway Mount Thorley Interchange Intersection (east side); and
- Golden Highway/Broke Road.



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Location of intersections
 Mount Thorley Warkworth - Continuation of Mining Operations
 Traffic Impact Assessment
 Figure 2.2



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Location of project tube traffic surveys
 Mount Thorley Warkworth - Continuation of Mining Operations
 Traffic Impact Assessment

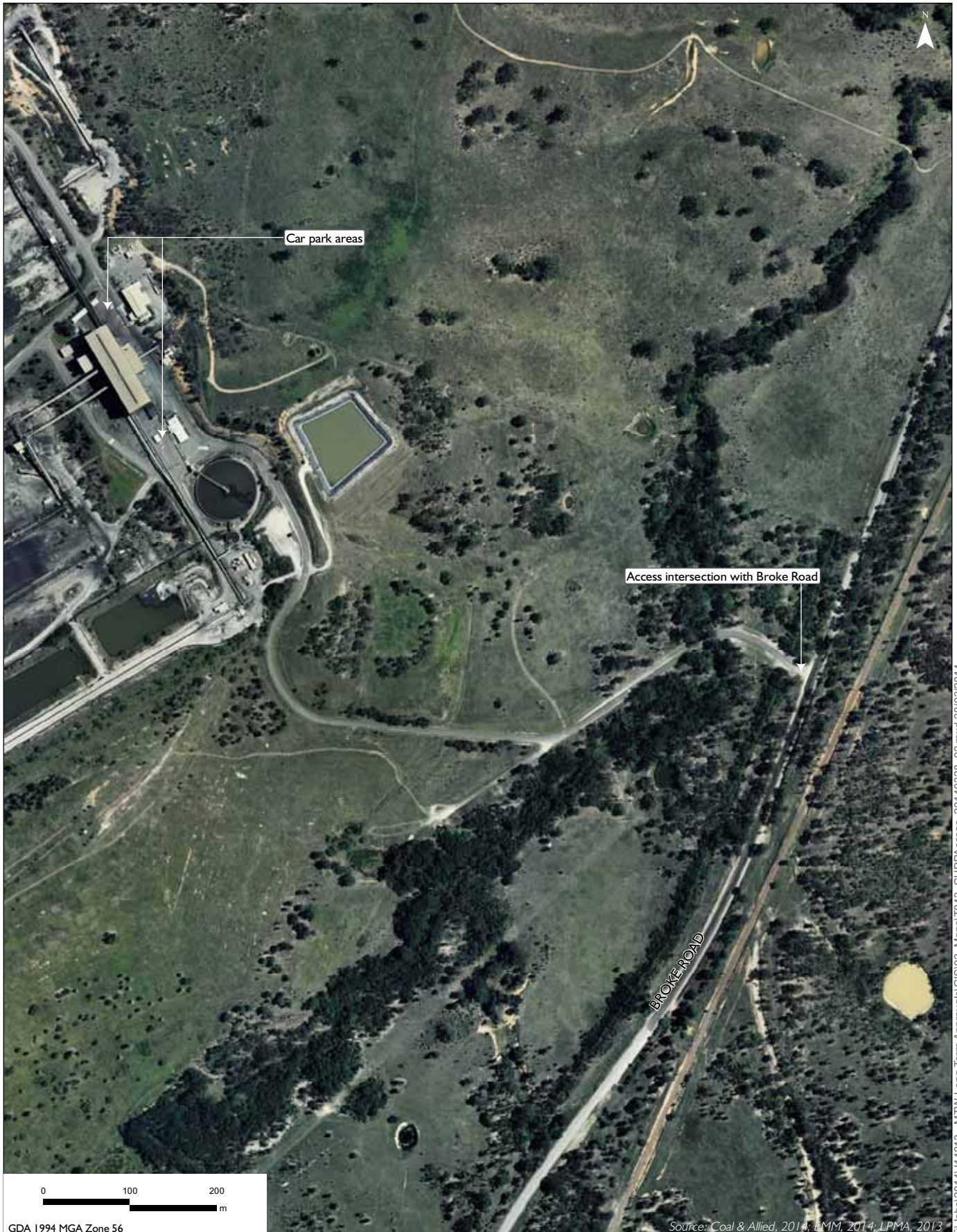
Figure 2.3



T:\Jobs\2014\14013 - MTW Long Term Approvals\GIS\02_Maps\T044_WarkCarParkAccess_20140328_02.mxd 28/03/2014

Source: Coal & Allied, 2014; EMM, 2014; LPMA, 2013

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GDA 1994 MGA Zone 56



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GDA 1994 MGA Zone 56

Source: Coal & Allied, 2014; EMM, 2014; LPMA, 2013



Photograph 2.1 Golden Highway/Mitchell Line Road intersection looking east



Photograph 2.2 Golden Highway/Mitchell Line Road intersection looking west



Photograph 2.3 Golden Highway/Broke Road intersection looking east



Photograph 2.4 Golden Highway/Broke Road intersection looking west



Photograph 2.5 Putty Road/Warkworth Access (Lydes Lane) intersection looking west



Photograph 2.6 Putty Road/Warkworth Access (Lydes Lane) intersection looking east



Photograph 2.7 Broke Road/MTO CHPP access intersection looking south



Photograph 2.8 Broke Road/MTO CHPP access intersection looking north

Since 2010, three locality intersections have been upgraded by the RMS, addressing key issues identified by previous traffic studies (Parsons Brinkerhof, 2010).

- At the Golden Highway/Broke Road intersection (Figure 2.2 and Photographs 2.3 and 2.4), a 'seagull' type intersection has been established to provide a dedicated right hand turning lane into Broke Road and a merging lane for traffic turning right from Broke Road.
- At the Mount Thorley interchange west side intersection (Figure 2.2), dedicated turning lanes have been established westbound on Putty Road for through and right turning traffic.
- At the Mount Thorley interchange east side intersection (Figure 2.2), a dedicated through traffic lane has been established eastbound on Putty Road to improve merging with the traffic from the Golden Highway.

At the Golden Highway/Broke Road and Golden Highway/Mitchell Line Road intersections, which are east of Mount Thorley and are constructed to a high design standard, but not grade separated, there are potential future traffic capacity impacts from the proposal which require detailed assessment.

2.3 Traffic volumes

2.3.1 Daily traffic volumes

Daily traffic volume surveys were undertaken for this study between Tuesday 4 March and Tuesday 11 March 2014 at the locations shown in Figure 2.3. The survey results are in Appendix A. The historic Roads and Traffic Authority (RTA), now Roads and Maritime Services (RMS), daily traffic volumes surveyed between the years 1980 and 2004 are also summarised in Appendix A.

The historic growth in the RMS daily traffic volumes from 1984 to 2004 including other recent surveys which were undertaken in 2009 and 2011 for the Warkworth Extension 2010 Project (PB, 2010) and the Bulga Optimisation Project TIA (ARC 2013) and the future base year traffic growth projections for the Golden Highway and other traffic routes for the years 2014 and 2017, are summarised in Table 2.1.

Table 2.1 Summary of base daily traffic volumes from surveys on the regional road network

RTA-RMS location ref	Route and nearest cross street	Year 1984	Year 1998	Year 2001	Year 2002	Year 2004	Year 2009	Year 2011	Year 2014	Percent annual traffic growth from surveys	Future trend volume in Year 2017 ¹
05.481	Golden Highway (north of Putty Road at Mount Thorley)	4,200	6,256	7,059	-	5,572	-	-	3,314	-	3,512 ²
05.637	Golden Highway (between Broke Road and Mount Thorley)	5,180	-	-	-	-	-	-	8,346	+1.2%	8,847

Table 2.1 Summary of base daily traffic volumes from surveys on the regional road network

RTA-RMS location ref	Route and nearest cross street	Year 1984	Year 1998	Year 2001	Year 2002	Year 2004	Year 2009	Year 2011	Year 2014	Percent annual traffic growth from surveys	Future trend volume in Year 2017 ¹
05.638	Golden Highway (between Broke Road and Mitchell Line of Road)	5,160	7,164	7,966	-	8,143	-	9,355	9,860 ³	+1.7%	10,452
05.840	Wallaby Scrub Road (between Golden Highway and Putty Road)	-	-	-	660	-	777	-	875	+2.0%	928

Note: 1. The traffic growth projections for the current base years 2014 and 2017 are calculated using linear traffic growth projections, including for the period 2014 to 2017, a growth rate of +2 percent annually (the highest rate observed from the traffic surveys in previous years).

2. The +2 percent per annum future traffic growth projection is still assumed to apply to this route despite negative actual growth in recent years (since 2001).

3. The year 2014 daily traffic volume between Broke Road and Mitchell Line of Road has been estimated from comparison of the Golden Highway peak hourly traffic flows east and west of the Broke Road intersection.

Sources: RMS, PB (2010), ARC (2013) and EMM (2014).

Although there has been a gap in the regular sequence of the RTA/RMS traffic surveys between 2004 and the more recent 2009, 2011 and 2014 daily traffic surveys, these surveys can determine the historic traffic growth rates for these roads which are calculated as an annual growth rate projection from the current year 2014 and are also shown in Table 2.1.

The daily traffic volumes on the Golden Highway route north of Putty Road (RTA-RMS location 05.481) have declined in recent years after reaching a peak of over 7,000 vehicles in 2001. Consequently no historic traffic growth rate is calculated for this location in Table 2.1.

The historic traffic growth rates for the three survey locations which are shown in Table 2.1, show a range of traffic growth rates between +1.2 percent and +2.0 percent annually. The higher end of this range of traffic growth rate (+2.0 percent annually) has been used for projecting forward the current base year 2014 daily traffic volumes to 2017 at all the locations shown in Table 2.1. Also, in Chapter 3 of this TIA, the future Year 2017 intersection peak hourly traffic assessments for the Golden Highway and other roads have used this future traffic growth rate, which provides a conservative assumption for the proposal's traffic impact analysis.

The Hunter Expressway opened on 22 March 2014. Over time, the Expressway will influence regional traffic patterns. These effects cannot be quantified at this time. However, the expressway will potentially provide a faster, more direct and safer route linking the M1 Motorway with the Upper Hunter, which will be available to some drivers previously using the Wallaby Scrub Road and Charlton Road route, prior to this date.

2.3.2 Peak hourly traffic volumes

Peak hour intersection traffic counts were undertaken on Tuesday 4 March 2014 at three intersections:

- the Golden Highway/Mitchell Line of Road intersection;
- the Warkworth mine access intersections with Putty Road (Lydes Lane); and
- the MTO mine access intersection with Broke Road.

The locations of these intersections are shown on Figure 2.2. The detailed traffic count results are included in Appendix B.

The peak hourly traffic volumes on the local road network and the proportions of heavy vehicles in traffic which were surveyed by these intersection traffic counts are summarised in Tables 2.2 – 2.4.

The morning and afternoon traffic peak hours at intersections in the vicinity of Mount Thorley occur relatively early (at 6.15 am – 7.15 am and 3.30 pm – 4.30 pm, typically) and are influenced by the shift changes at a number of locality mining operations including MTW, HVO, Wambo and Bulga and the locality industrial employment at Mount Thorley industrial area.

Table 2.2 Summary of peak hourly traffic at Golden Highway and Mitchell Line Road

Road	Direction	Morning peak hour (6.15 am -7.15 am)			Afternoon peak hour (3.30 pm - 4.30 pm)		
		All traffic	Heavy vehicles	Percent heavy*	All traffic	Heavy vehicles	Percent heavy*
Mitchell Line of Road (south of Golden Highway)	N'bound	537	28	5	73	14	8
	S'bound	172	10		338	20	
Golden Highway (west of Mitchell Line Road)	E'bound	328	17	5	704	31	7
	W'bound	944	42		212	32	
Golden Highway (east of Mitchell Line Road)	E'bound	172	7	4	384	11	5
	W'bound	423	14		157	18	

Note: * % Heavy vehicle traffic is the average proportion based on the traffic flow in both directions.

Table 2.3 Summary of peak hourly traffic at Broke Road and MTO CPP access

Road	Direction	Morning peak hour (6.15 am -7.15 am)			Afternoon peak hour (3.15 pm - 4.15 pm)		
		All traffic	Heavy vehicles	Percent heavy*	All traffic	Heavy vehicles	Percent heavy*
Mount Thorley CPP access (west of Broke Road)	E'bound	2	0	0	22	0	0
	W'bound	12	0		0	0	
Broke Road (south of CPP access Road)	N'bound	123	5	4	140	5	5
	S'bound	246	11		100	6	
Broke Road (north of CPP access Road)	N'bound	123	5	4	159	5	4
	S'bound	256	11		97	6	

Note: * percent heavy vehicle traffic is the average proportion based on the traffic flow in both directions.

Table 2.4 Summary of peak hourly traffic at Putty Road and Warkworth Mine access

Road	Direction	Morning peak hour (6.15 am -7.15 am)			Afternoon peak hour (3.30 pm - 4.30 pm)		
		All traffic	Heavy vehicles	Percent heavy*	All traffic	Heavy vehicles	Percent heavy*
Warkworth Mine access (north of Putty Road)	N'bound	101	4	2	8	0	4
	S'bound	111	0		73	3	
Putty Road (west of Warkworth Mine access)	E'bound	38	2	4	31	1	8
	W'bound	12	0		48	5	
Putty Road (east of Warkworth Mine access)	E'bound	139	1	2	102	4	6
	W'bound	103	3		54	5	

Note: * percent heavy vehicle traffic is the average proportion based on the traffic flow in both directions.

2.3.3 Proportions of heavy vehicles in traffic

At the Golden Highway and Mitchell Line Road intersection the proportions of heavy vehicles in traffic during the morning and afternoon peak hourly periods are 4 - 5 percent and 5 – 8 percent, respectively.

At the Mount Thorley CPP access road/Broke Road intersection, the proportions of heavy vehicles on Broke Road are generally 4 - 5% during both the morning and afternoon peak hourly traffic periods.

At the Warkworth Mine access road/Putty Road intersection the proportions of heavy vehicles in traffic during the two peak hourly traffic periods are 2 - 4 percent and 4 - 8 percent, respectively.

2.4 Intersections

The performance of a road network is generally reflected in the performance of key intersections. The Signalised (and Unsignalised) Intersection Design Research Aid (SIDRA) traffic analysis program was used to assess the existing and future traffic capacity at the two mine access intersections and two major road intersections which require detailed traffic assessment for the proposal (ie the Warkworth Mine access (Lydes Lane)/ Putty Road intersection, Mount Thorley CHPP access road/Broke Road, Golden Highway/Broke Road and Golden Highway/Mitchell Line Road).

The peak hour traffic performance of intersections is quantified in terms of ‘level of service’ and ‘degree of saturation’. Level of service is an index of the operation of traffic at an intersection and is based on the average delay per vehicle. The current RMS intersection operation standards for level of service are summarised in Table 2.5. Degree of saturation provides an overall measure of the capability of the intersection to accommodate the traffic levels. A degree of saturation of 1.0 indicates that an intersection is operating at capacity. A satisfactory degree of saturation is considered to be 0.90 or lower at traffic signal controlled intersections and 0.80 or lower at other intersections.

The SIDRA analysis results for the morning and afternoon peak hour base traffic situation for the year 2014, for the four intersections which require assessment under the proposal are summarised in Table 2.6.

Table 2.5 Intersection level of service standards

Level of service	Average delay (seconds per vehicle)	Traffic signals, roundabout	Priority intersection ('Stop' and 'Give Way')
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity. At signals, incidents will cause excessive delays. Roundabouts require other control mode	At capacity; requires other control mode
F	Greater than 71	Unsatisfactory with excessive queuing	Unsatisfactory with excessive queuing; requires other control mode

Source: Guide to Traffic Generating Development (RTA 2002).

Table 2.6 Peak hour SIDRA performance at key intersections (including current mine traffic)

Intersection	Peak Hour Period	Degree of Saturation	Average Delay (seconds/vehicle)	Level of Service
Golden Highway/Mitchell Line of Road/ Putty Road	Morning peak hour (6.15 am - 7.15 am)	0.700	20.6	B
	Afternoon peak hour (3.30 pm - 4.30 pm)	0.270	19.0	B
Golden Highway/Broke Road*	Morning peak hour (6.15 am - 7.15 am)	0.386	31.6	C
	Afternoon peak hour (3.30 pm - 4.30 pm)	0.369	16.5	B
Broke Road/MTO CPP Access	Morning peak hour (6.15 am - 7.15 am)	0.138	12.5	A
	Afternoon peak hour (3.15 pm - 4.15 pm)	0.074	12.5	A
Putty Road/Warkworth Mine access	Morning peak hour (6.15 am - 7.15 am)	0.093	12.9	A
	Afternoon peak hour (3.30 pm - 4.30 pm)	0.063	13.0	A

Note * The current peak hour intersection traffic volumes have been determined from volumes at the two adjoining intersections.

The detailed intersection analysis results from the SIDRA analysis, including the existing intersection lane configurations are included in Appendix C.

Three of the four assessed intersections are currently operating at very good conditions (level of service either A or B), with minimal traffic delays. The highest degrees of saturation occur at the Golden Highway/Mitchell Line of Road intersection (0.700) and are associated with the potentially limiting future capacity for the westbound left turn movement from Mitchell Line of Road during the morning peak hour.

This traffic has to merge with a similarly high traffic flow which is travelling from the Singleton direction towards Mount Thorley as a result of the numerous mining and industrial employment locations in the area, including mining projects at Bulga, Wambo, Mount Arthur and further north.

The Golden Highway/Broke Road intersection is currently operating with acceptable traffic delays which are level of service C. The right turn traffic delays are higher than at the Golden Highway/Mitchell Line of Road intersection (over 30 seconds per vehicle) although the maximum intersection degree of saturation is lower.

The RMS intersection operation standards, Table 2.5, indicate that with level of service C intersection operations, an accident study should be undertaken. However as significant intersection upgrading works have only relatively recently been completed by RMS at this intersection (since 2010) a further accident study is not required at the current time.

2.5 Mine traffic generation

2.5.1 Car and other light vehicle traffic

The current maximum mining workforce at MTW is 1,300 persons of whom approximately 25 percent are office/business employees, 65 percent are day or night shift operations workforce and 10 percent are contractors.

The majority of the workforce is currently based at Warkworth Mine where 80 percent of the combined mining workforce facilities and car parking activity is located. The current MTW based workforce numbers are greatest during the daytime when day shift and office/business staff are present. The typical weekday on - site workforce and contractor numbers (FTE) at both sites are summarised in Table 2.7.

Table 2.7 Locations and current shift working arrangements of the project workforce

Location	Day/night shift operations ¹ (7.00 am to 7.00 pm and 7.00 pm to 7.00 am)	Office and business (7.00 am to 3-6.00 pm)	Contractors (various times)	Total employed workforce
Mount Thorley	169 (approximately 85/day)	65	26	260
Warkworth	676 (approximately 338/day)	260	104	1,040
Total	845 (approximately 423/day)	325	130	1,300

Notes: 1. Approximately half of the shift operations workforce would be on-site, split over two shifts (day and night), in any 24 hour period.

The combined maximum number of employees and contractors who will be travelling to and from work at MTW in any given 24 hour period will be 878 persons (comprised of 423 day/night shift operations staff, 325 office/business staff and 130 contractors). The maximum potential daily car traffic movements which would be generated by this workforce would be a maximum of 1,756 car movements. These traffic movements will generally be travelling either inbound to or outbound from MTW employment locations at different times of the day, as summarised in Table 2.8.

Table 2.8 Summary of current maximum hourly and daily workforce car traffic movements

Time period	Operations in	Office in	Contractors in	Operations out	Office out	Contractors out
5 am - 6 am	-	-	-	-	-	-
6 am - 7 am	212	-	10	-	-	5
7 am - 8 am	-	325	20	211	-	5
8 am - 9 am	-	-	10	-	-	10
9 am - 10 am	-	-	10	-	-	10
10 am - 11 am	-	-	10	-	-	10
11 am - 12 pm	-	-	5	-	-	10
12 pm - 1 pm	-	-	5	-	-	5
1 pm - 2 pm	-	-	5	-	-	5
2 pm - 3 pm	-	-	5	-	-	10
3 pm - 4 pm	-	-	10	-	130	20
4 pm - 5 pm	-	-	10	-	130	10
5 pm - 6 pm	-	-	10	-	65	10
6 pm - 7 pm	211	-	10	-	-	10
7 pm - 8 pm	-	-	5	212	-	5
8 pm - 9 pm	-	-	5	-	-	5
9 pm - 10 am	-	-	-	-	-	-
Total	423	325	130	423	325	130

Although the actual daily site employee car movements would generally be lower than the numbers listed in Table 2.8, due to employee car sharing, site visitors would potentially increase traffic movements, such that the overall total daily and hourly site car traffic movements will still be similar to the numbers listed in Table 2.8.

2.5.2 Truck traffic

i Public roads

The external road transport of mining supplies and other consumables for the mine operations and maintenance activities, usually generates approximately 40 truck and other service vehicle deliveries each weekday (80 movements), mainly via delivery routes using main roads between the mines and either Singleton, Maitland or Newcastle.

ii Private roads

Extensive internal coal haulage is undertaken using the internal private roads within and between the two mines which transport the run of mine coal to CPP facilities and also transfer overburden material within and between Warkworth Mine and MTO.

Two private road crossings of Putty Road already exist for these movements and a third is proposed to be constructed under the proposal.

2.5.3 Construction traffic

Future construction activities at MTW will effectively be part of the continuation of normal mining operations along with ongoing maintenance activities.

These activities include mining equipment upgrades, modifications to existing surface infrastructure and the construction of an underpass or a bridge (already approved) over Putty Road.

Traffic associated with these upgrades, including contractor vehicles and truck traffic, are considered part of MTW's normal operational traffic movements, similar to those which are occurring currently.

2.6 Car parking

The onsite car parking areas are generally located adjacent to the main administration buildings approximately 150 m from Putty Road (for Warkworth Mine) and 200 m from Mount Thorley Road (for MTO). During the peak car parking period (during morning shirt changeover) approximately 240 cars and 80 cars are parked in the main Warkworth Mine and MTO car parks, respectively. These car parks, which are shown on Figures 2.4 – 2.6 have proven to be adequate to meet current peak parking demand.

Other smaller car parking areas are located within MTW for mine employees and contractors who are specifically based at certain infrastructure (eg at the Warkworth and MTO CPPs).

2.7 Public transport

The locality of MTW is remote from regular public transport services. The nearest railway station is Singleton approximately 8 km from MTW.

There are no local public bus services, other than school buses, operating along Putty Road in the locality of Mount Thorley.

Coach services between Newcastle and Dubbo operate via the Golden Highway through this area. However these services are not generally concurrent with the mine shift workforce start and finish times.

Existing public transport services in the locality are considered unlikely to be a suitable commuting option for most MTW employees.

2.8 Pedestrians and cycling

The travel distances between MTW and the nearest residential areas make walking or cycling generally difficult options for commuter travel. Although this type of travel is generally rare in the locality, a small number of MTW employees do occasionally commute by cycling.

2.9 Road safety

Intersection traffic safety and sight distances were observed by EMM during the 20 March 2014 site visit. The Intersection traffic safety and sight distances are considered good at all the intersections potentially affected by the proposal.

The high design standard of the Golden Highway in the locality of Mount Thorley (with marked centre lines and sealed shoulders on all sections) provides a comparatively higher standard of travel safety for traffic using this route in comparison to other roads in the area (eg Wallaby Scrub Road, Charlton Road, Broke Road and Putty Road).

2.10 Coal transport operations

The product coal transport operations for the proposal utilise rail transport for export via the Port of Newcastle using the Mount Thorley (Whittingham) branch line. The location of the Whittingham branch line in relation to the overall Hunter Valley rail network used for coal transport is shown in Figure 2.7.

On the Whittingham branch line there are three coal loading loops which serve the mines at Bulga, MTW, United and Wambo. At MTO there are two coal loading points (MTCL 1 and MTCL 2) which serve the Warkworth CPP and Mount Thorley CPP conveyor loading systems. An additional coal loop on the Whittingham branch line at the Hunter Valley Operations South mine has also been approved but is not yet constructed.

The capacity of the Whittingham branch line (which is single track) is adequate for the current usage (ARTC, 2013). The primary future constraint to this rail line capacity is generally the availability of coal train paths at Whittingham junction where the branch line meets with the Hunter Valley main line, south of Singleton. The railway junction capacity has been improved by the Minimbah Bank Third Rail Project in 2010. The proposed future ARTC coal transport operations for the Whittingham branch line are discussed further in Chapter 4.

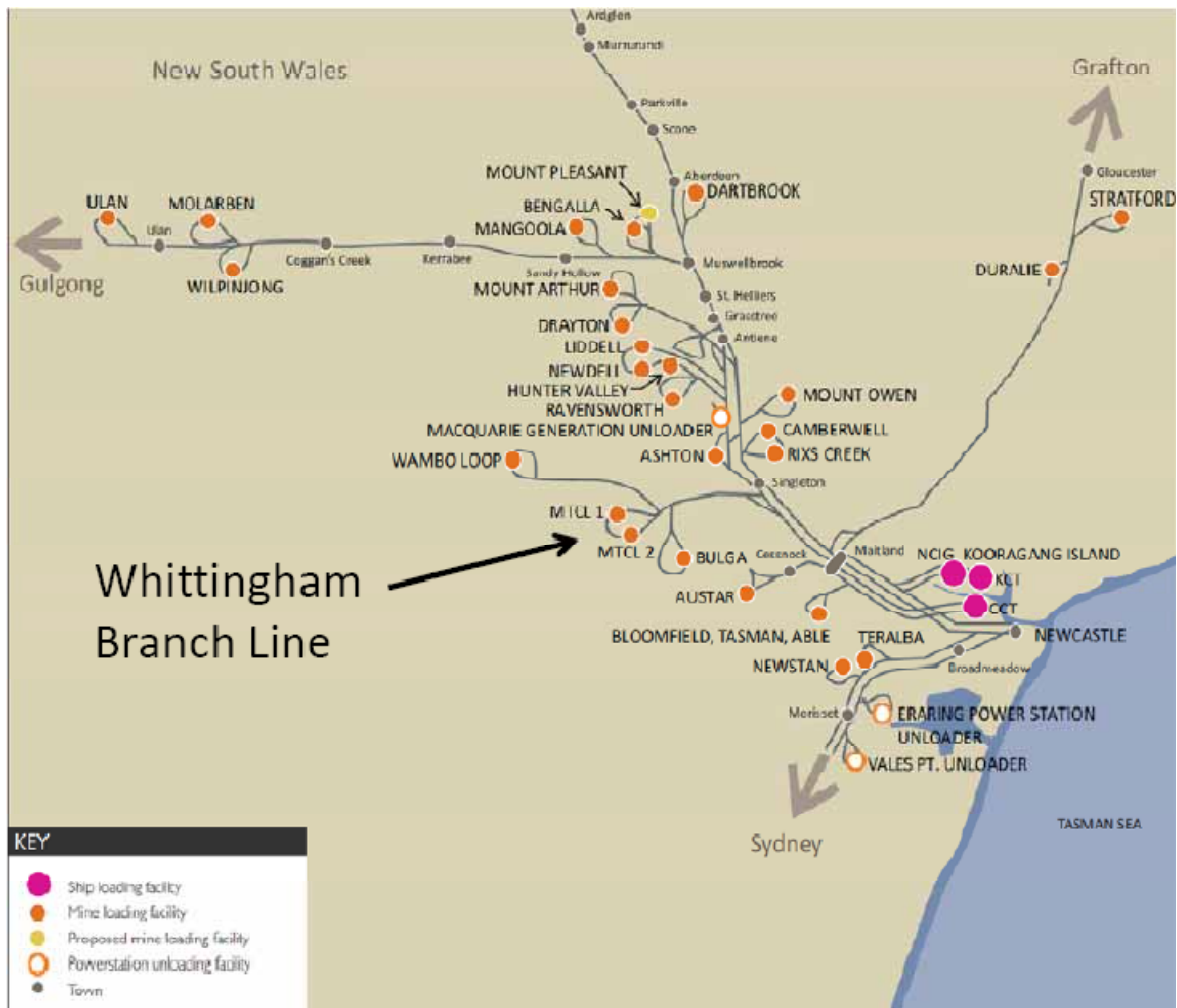


Figure 2.7 Location of MTCL and other coal loading loops on the Hunter Valley Rail Network

3 Road traffic impact assessment

3.1 External traffic movements

Workforce traffic movements for the MTW project on the public road network will not change under the proposal. The current MTW workforce of approximately 1,300 persons, is indicative of future employment levels throughout the proposal period. With the substantial proportion of the workforce employed on a rotating shift basis, the typical maximum number of persons travelling to and from MTW each weekday will remain at approximately 878. The corresponding maximum hourly and daily traffic movements for this workforce over a typical weekday are summarised in Table 2.8.

Approximately 80 daily truck movements are currently generated on public roads by MTW operations (40 truck deliveries each day for maintenance and other activities). This will also not change under the proposal.

Up to 1,756 vehicle movements daily for workforce and site visitor traffic, with up to 80 vehicle movements daily of heavy vehicle traffic, will continue to be generated by MTW operations in future years. This traffic (1,836 daily vehicle movements in total) will be distributed over the surrounding road network in the following general proportions.

- 42 percent total daily vehicle movements to and from the east via Singleton (771 vpd).
- 38 percent total daily vehicle movements to and from the east via other routes (698 vpd).
- 8 percent total daily vehicle movements to and from the west via Putty Road (147 vpd).
- 7 percent total daily vehicle movements to and from the north via Golden Highway (128 vpd).
- 5 percent total daily vehicle movements to and from the south via Broke Road (92 vpd).

3.1.1 Traffic impacts on road networks

The road and intersection traffic surveys for this assessment were undertaken shortly before the Hunter expressway was opened on 22 March 2014. Over time, the expressway will be likely to generate changes to regional traffic patterns. These cannot be quantified currently. However the expressway will provide a faster and safer route for the longer distance traffic travelling between the M1 Motorway and some Upper Hunter locations which will be available to drivers currently using the Wallaby Scrub Road and Charlton Road routes.

The current road network traffic impacts of the proposal are quantified in Table 3.1 in terms of the typical percentage contribution of the MTW generated daily traffic volumes towards the current total daily vehicle traffic movements in early March 2014, at locations on the external roads which correspond to the historic RTA/RMS traffic survey locations shown Figure 2.3 and other locality roads.

The MTW generated daily and hourly car traffic volumes, which are summarised in Table 2.8, will not generally change with the proposal. However other traffic volumes on the surrounding roads will generally change in future years due to either continuing background traffic growth or other changes to the road network such as the closure of Wallaby Scrub Road.

On most major roads in the locality, including sections of the Golden Highway and Putty Road routes, the current MTW daily traffic movements which are shown in Table 3.1 represent between 11 – 22 percent of the total daily traffic movements in March 2014.

On other roads, such as Broke Road and the Golden Highway route north of Mount Thorley, MTW has a lesser contribution to the existing traffic flows, representing only 3 – 4 percent of the total daily traffic movements in March 2014.

Table 3.1 Proportional impact of the mine generated traffic on external roads

RTA-RMS location ref	Road location	Current daily traffic volume (year 2014)	Daily traffic movements generated by MTW	Proportion of current daily traffic volume generated by MTW
05.481	Golden Highway (north of Putty Road at Mount Thorley)	3,314	128	3.8 percent
05.637	Golden Highway (between Broke Road and Mount Thorley)	8,346	1,561	18.7 percent
05.638	Golden Highway (between Broke Road and Mitchell Line of Road)	9,860 (2014 estimate)*	1,469	14.9 percent
N/A	Mitchell Line of Road (south of the Golden Highway and Putty Road)	5,958 (2014 estimate)*	698	11.7 percent
N/A	Broke Road (south of the Mount Thorley CHPP access road intersection)	3,240 (2014 estimate)*	92	2.8 percent
N/A	Putty Road (west of the Warkworth Mine access towards Bulga Village)	686 (2014 estimate)*	147	21.4 percent

Notes: *The actual daily traffic volumes in 2014 were surveyed at the two locations shown on the Golden Highway and on Wallaby Scrub Road. The daily traffic volumes for the other routes were determined from comparisons of the peak hourly intersection traffic volumes using these roads and the Golden Highway at the two surveyed locations.

The effects of the proposal's heavy vehicle traffic movements on the roads shown in Table 3.1 are not currently significant as the MTW generated heavy vehicle traffic movements (which are approximately 80 vehicle movements daily) currently represent between 4 and 5 percent of the total MTW generated daily traffic. These proportions of heavy vehicle traffic are similar to the proportions of heavy vehicles in other traffic which is currently using these roads. There is correspondingly, no disproportionate heavy vehicle generated traffic usage from the MTW activity on surrounding roads. The major roads in the area (eg the Golden Highway) have generally been constructed to carry large volumes of heavy vehicle traffic, so no adverse future heavy vehicle related traffic impacts are anticipated for the MTW related truck traffic using these roads.

3.1.2 Traffic impact at intersections

Detailed traffic impact assessment was undertaken for the intersections potentially affected by the MTW project traffic, which are primarily the two mine access intersections on major roads and two intersections along the Golden Highway route east of Mount Thorley.

The Golden Highway/ Broke Road intersection was previously identified as an intersection likely to require upgrading in the Warkworth Extension 2010 traffic impact assessment (Parsons Brinkerhof 2010). This intersection has been upgraded since 2010 by the construction of the 'seagull type' acceleration lane, which is shown in Photographs 2.3 – 2.4. This improvement has substantially improved the peak hour intersection traffic delays (previously level of service F, now level of service C) and has removed the significant traffic capacity constraint for the major road network in the area which previously existed at this location.

At the two Mount Thorley interchange intersections on the eastern and western sides, dedicated through and right hand turning traffic lanes have also recently been provided for both eastbound and westbound traffic on the Putty Road route to improve the merging and queuing traffic capacity at these intersections.

At the Golden Highway/Mitchell Line Road intersection which is further to the east towards Singleton, the recent traffic impact assessment for the Bulga Optimisation Project (ARC 2013) has identified the intersection as potentially requiring upgrading as a combined result of mining traffic growth and general locality traffic growth on the Golden Highway route through the area. Future potential project traffic impacts (including cumulative traffic impacts) have therefore been considered at this intersection in this assessment.

Three base year and future year traffic scenarios have been defined and evaluated for this traffic impact assessment including the current base year (2014), traffic in the first full year of project operation (2017) following the closure of Wallaby Scrub Road and a cumulative traffic assessment (also in the year 2017) which includes the closure of Wallaby Scrub Road and forecast mine employment at the nearby Bulga Optimisation Project.

These future year traffic impact assessments have also considered the likely additional locality background traffic growth from other sources during the assessment period. However, the effects of the Hunter Expressway, which opened on 22 March 2014, cannot be quantified at this time.

The predicted future background traffic growth which has been included up to the year 2017 in the SIDRA intersection assessments has been +2 percent per annum. This rate corresponds to the higher end of the range of recent recorded traffic growth rates on the major road network shown in Table 2.1. The future (year 2017) peak hour traffic operations at four intersections have been analysed using the SIDRA intersection model for the following future traffic scenarios.

- Scenario 1 – Year 2017 traffic situation including base network traffic growth on the external road network at +2 percent annually.
- Scenario 2 – Year 2017 traffic situation including base network traffic growth on the external road network at +2 percent annually and the detoured traffic from the proposed closure of Wallaby Scrub Road at relevant intersections.
- Scenario 3 – Year 2017 traffic situation including base network traffic growth on the external road network at +2 percent annually at relevant intersections, the detoured traffic from the proposed closure of Wallaby Scrub Road and the additional year 2017 construction traffic movements from a workforce of 25 persons at the Bulga Optimisation Project (eg this traffic does not affect the Warkworth Mine access intersection from Putty Road).

The year 2017 SIDRA intersection analysis results are included in detail in Appendix C and summarised in comparison to the current year 2014 intersection analysis results in Table 3.2.

Table 3.2 Summary of year 2017 peak hour performance at intersections

Intersection	Peak hour period	SIDRA parameter	Base year (2014)	Future traffic scenario 1	Future traffic scenario 2	Future traffic scenario 3
Golden Highway/ Mitchell Line of Road/ Putty Road)	Morning peak hour (6.15 am - 7.15 am)	Dos	0.700	0.766	0.766	0.781
		Delay	20.6	22.5	22.5	23.1
		Los	B	B	B	B
	Afternoon peak hour (3.30 pm - 4.30 pm)	Dos	0.270	0.289	0.289	0.296
		Delay	19.0	19.5	19.5	19.7
		Los	B	B	B	B
Golden Highway/Broke Road (Paynes Crossing Road)	Morning peak hour (6.15 am - 7.15 am)	Dos	0.386	0.409	0.409	0.409
		Delay	31.6	34.1	34.6	34.9
		Los	C	C	C	C
	Afternoon peak hour (3.30 pm - 4.30 pm)	Dos	0.369	0.397	0.412	0.448
		Delay	16.5	17.1	18.2	18.5
		Los	B	B	B	B
Broke Road/Mount Thorley CHPP Access	Morning peak hour (6.15 am - 7.15 am)	Dos	0.138	0.145	0.150	0.156
		Delay	12.5	13.4	13.6	13.6
		Los	A	A	A	A
	Afternoon peak hour (3.15 pm - 4.15 pm)	Dos	0.074	0.078	0.086	0.093
		Delay	12.5	13.2	13.3	13.3
		Los	A	A	A	A
Putty Road/Warkworth Mine Access	Morning peak hour (6.15 am - 7.15 am)	Dos	0.093	0.093	0.095	0.095
		Delay	12.9	12.9	12.9	12.9
		Los	A	A	A	A
	Afternoon peak hour (3.30 pm - 4.30 pm)	Dos	0.063	0.063	0.063	0.063
		Delay	13.0	13.0	13.0	13.0
		Los	A	A	A	A

Notes: Dos = degree of saturation
 Delay = average delay (seconds per vehicle)
 Los = level of service

The results in Table 3.2 show the four intersections are currently operating at either very good or acceptable levels of service during both the morning and afternoon peak hours, with the base year (2014) traffic flows.

At the Broke Road/ MTO CHPP access intersection there will be no change with the future (year 2017) intersection operations in terms of the intersection level of service or any other parameter. The peak hour intersection traffic delays at this intersection will increase marginally from 12.5 seconds per vehicle currently (level of service A) to up to 13.6 seconds per vehicle under the future traffic scenarios considered.

At the Putty Road/ Warkworth mine access intersection there will be no change to the future (year 2017) intersection operations in terms of the intersection level of service or any other parameter. The peak hour intersection traffic delays at this intersection will remain at 12.9 to 13.0 seconds per vehicle (level of service A) under all the future traffic scenarios considered.

At the Golden Highway/Mitchell Line of Road intersection, the level of service and the future intersection traffic delays are also not generally affected under the future traffic scenarios considered. In the highest delayed morning peak period traffic scenarios, the average intersection traffic delays will increase from 20.6 seconds per vehicle (level of service B) to 22-23 seconds per vehicles (also level of service B). This is a relatively minor increase in delay. However, the relatively high degree of saturation for the left turn movements from Mitchell Line Road at the intersection will increase to 0.781 in the most delayed future traffic scenario. This degree of saturation is indicative of a developing traffic capacity constraint at this location, but still within acceptable standards, by the year 2017.

At the Golden Highway/Broke Road intersection, the level of service and the future intersection traffic delays are not generally affected under the future traffic scenarios considered. In the highest delayed am peak period traffic scenarios, the average intersection traffic delays will increase from 31.6 seconds per vehicle (level of service C) to 34-35 seconds per vehicle (also level of service C). This is a relatively minor increase in delay. The degree of saturation for the right turn movements at the intersection from Broke Road will remain generally below 0.45 in the most delayed future traffic scenario in Table 3.2, which is indicative of continuing spare traffic capacity at this intersection to accommodate additional future traffic growth in the longer term beyond 2017.

3.2 Impacts of the Wallaby Scrub Road traffic detour

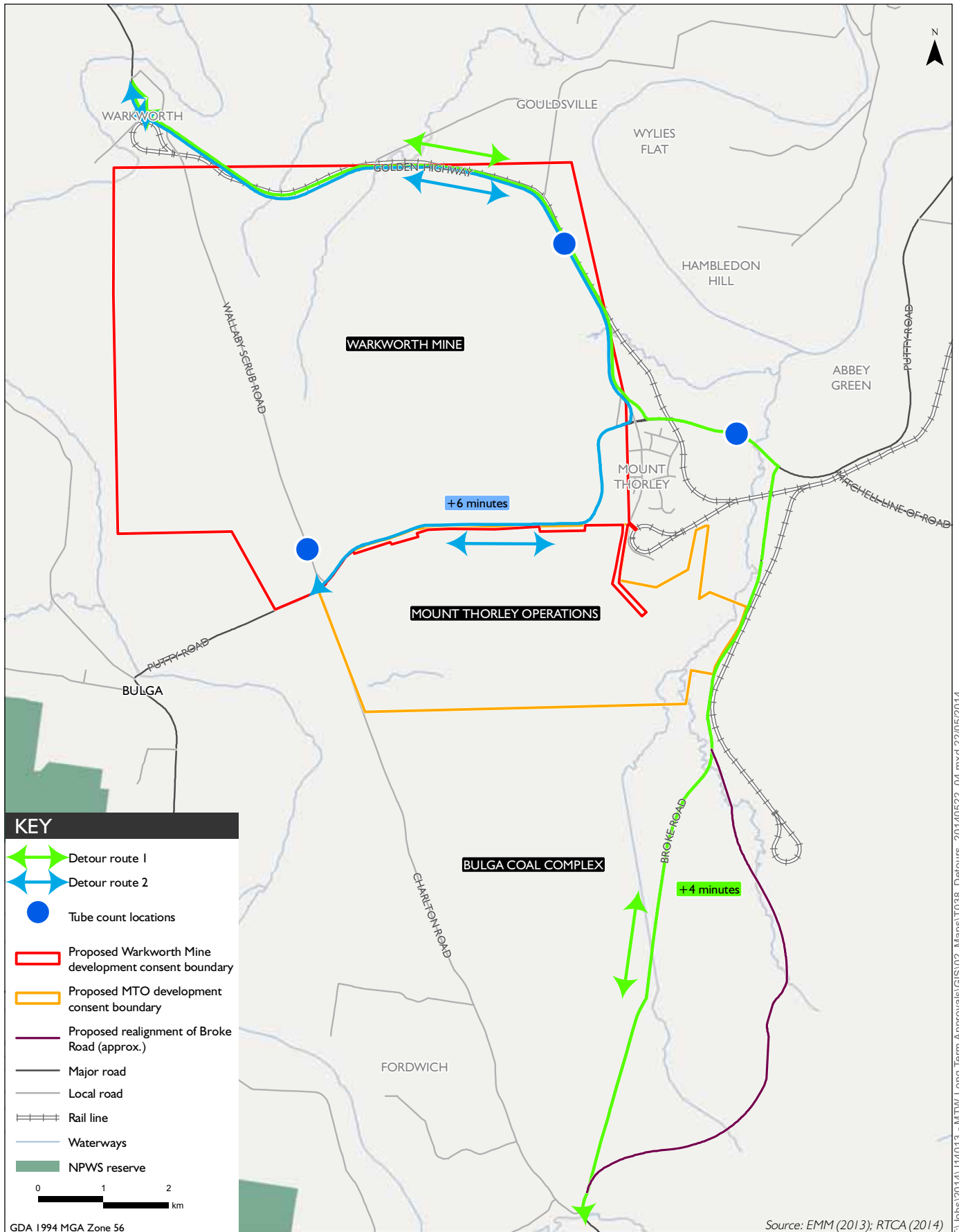
Wallaby Scrub Road is a local road approximately 7 km in length. The proposed closure would divert most traffic to use alternative routes via either the Golden Highway and Putty Road or the Golden Highway and Broke Road, which are shown on Figure 3.1. A replacement fire trail route will be provided to maintain rural fire service emergency access to areas on the western side of the future mine footprint area, between Jerrys Plains, Bulga and Broke. Other emergency vehicles (police and ambulance services) would not generally be affected by the closure as their vehicles are based in Singleton and would not generally travel via Wallaby Scrub Road to access other areas.

The existing traffic movements, which are primarily from the Charlton Road direction, travelling to and from the south, were identified in previous traffic assessments (Parsons Brinkerhof, 2010) as approximately 557 vehicle movements during a 12 hour period and 777 vehicle movements daily, by means of an origin-destination (OD) traffic survey and a tube traffic count. These traffic surveys were repeated for this traffic impact assessment. The latest 2014 traffic surveys returned similar results to the 2010 survey, with 584 vehicle movements recorded during a 12 hour period and 875 vehicle movements daily.

As mentioned previously, the traffic surveys for this assessment were undertaken shortly before the Hunter expressway was opened on 22 March 2014. The expressway provides a faster and safer route for traffic travelling between the M1 Motorway and some Upper Hunter locations. This route will now be available to through traffic which has previously used routes such as Wallaby Scrub Road and Charlton Road, through the Warkworth area.

The March 2014 OD traffic survey included a 24 hour tube traffic counts on Wallaby Scrub Road and at two locations on the Golden Highway to confirm the existing daily traffic volumes on these routes. The locations of these tube traffic count surveys are also shown on Figure 3.1.

The most recent 2014 OD traffic survey results are included in Appendix D. A detailed comparison of the traffic distribution results from the 2014 traffic survey, compared to the previous OD traffic survey (Parsons Brinkerhof 2010) is presented in Table 3.3.



T:\jobs\2014\1414013 - MTW Long Term Approvals\GIS\02_Maps\T038_Detours_20140622_04.mxd 22/05/2014



Wallaby Scrub Road closure traffic detour routes
 Mount Thorley Warkworth - Continuation of Mining Operations
 Traffic Impact Assessment

Figure 3.1

As some of the traffic survey locations were different for the two surveys, the results are not directly comparable at all locations. The 2014 survey also determined the proportion of traffic at the northern end of Wallaby Scrub Road, which had an origin or destination along Wallaby Scrub Road and did not travel through to the southern end of Wallaby Scrub Road.

The 2014 survey also determined traffic which had an origin or destination along Charlton Road and did not travel through to the southern end of Charlton Road. However, the 2010 survey looked in more detail at the proportions of traffic which was travelling to and from the west via Bulga Road and how much of this traffic was travelling either to or from Bulga village or from other origins and destinations, south of Bulga. The most recent (2014) survey results generally confirmed the key findings of the earlier OD survey from 2010, which were that:

- The total surveyed traffic volume using Wallaby Scrub Road is less than 1,000 vehicle movements daily.
- The general traffic proportions using Wallaby Scrub Road were approximately 60 – 70 percent coming from Charlton Road (at the south end) and approximately 20 – 25 percent coming from the Putty Road (west) directions.

Table 3.3 Comparison of Wallaby Scrub Road 2010 and 2014 OD traffic survey results

Direction	Route	2010 Survey traffic (vehicles)	2010 Survey traffic (percent)	2014 Survey traffic (vehicles)	2014 Survey traffic (percent)
Southbound	To Charlton Road	223	76.6	168	63.2
	To Wallaby Scrub Road (local)	0	0	36	13.5
	To Putty Road (east)	14	4.8	8 ¹	3.0 ¹
	To Putty Road (Bulga)	16	5.5	54 ²	20.3 ²
	To Putty Road (south of Bulga)	38	13.1		
	Total Vehicles	291	100.0	266	100.0
Northbound	From Charlton Road	202	75.9	215	67.6
	From Wallaby Scrub Road (local)	0	0	5	1.6
	From Putty Road (east)	0	0	17 ¹	5.3 ¹
	To Putty Road (Bulga)	29	10.9	81 ²	25.5 ²
	To Putty Road (south of Bulga)	35	13.2		
	Total Vehicles	266	100.0	318	100.0
Combined	Charlton Road	425	76.3	383	65.6
	To/from Wallaby Scrub Road (local)	0	0	41	7.0
	Putty Road (east)	14	2.5	25 ¹	4.3 ¹
	Putty Road (Bulga)	45	8.1	135 ²	23.1 ²
	Putty Road (south of Bulga)	73	13.1		
Total Vehicles	557	100.0	584	100.0	

Notes: 1. Also Includes traffic travelling on Charlton Road which does not continue to the southern end.

2. Includes traffic travelling from Bulga village and from other locations further to the south.

3.2.1 Traffic impacts to the road network

The daily traffic capacity for a two lane rural highway such as the Golden Highway is determined by the traffic capacity for two way flow which is approximately 2,500 vehicles per hour for level terrain, 2,000 vehicles per hour for rolling terrain and 1,400 vehicles per hour for mountainous terrain (RTA, 2002) for routes carrying 5 percent heavy vehicles during the peak traffic hours. The mid range hourly traffic capacity figure of 2,000 vehicles would be applicable to the Golden Highway in this locality as it traverses generally rolling terrain. As the peak hourly traffic is approximately 10 percent of daily traffic using the Golden Highway in the locality of Mount Thorley, the daily traffic capacity of the route is 20,000 vehicles approximately.

For Putty Road and Broke Road, which have a lower design standard than the Golden Highway and lower sealed shoulder widths, the daily traffic capacity is approximately 10 percent lower, at 18,000 vehicles.

The daily traffic increases which will be occurring on the alternative traffic detour routes following the closure of Wallaby Scrub Road are summarised in Table 3.4. Although the current traffic volume of Wallaby Scrub Road is low in comparison to the capacity of the detour routes, there will be proportional daily traffic increases of up to 20 – 30 percent on some of the detour roads.

These increases will however be small in comparison to the actual capacity of the affected roads, which will continue to have considerable spare capacity (in comparison to the daily capacity limits of approximately 18,000 to 20,000 vehicle movements currently) to accommodate the detoured traffic and future improvements will not generally be required to the road widths or the other design standards of these roads.

The potential impacts of the Wallaby Scrub Road traffic detour will affect approximately 93% of the daily traffic movements currently using the route (approximately 863 projected daily vehicle movements) in 2017. However, the affected traffic volume could potentially reduce due to the future effect of the Hunter Expressway route opening, which has yet to be determined.

Table 3.4 Proportional impact of the Wallaby Scrub Road traffic on alternative routes

RTA count reference	Road location	Projected daily traffic volume (year 2017) ¹	Route daily traffic capacity (vehicles)	Daily traffic detoured by Wallaby Scrub Road Closure	Detoured traffic proportion compared to 2017 base daily traffic movements	Detoured traffic proportion compared to route daily traffic capacity
05.481	Golden Highway (north of Putty Road at Mount Thorley)	3,512	20,000	863	24.6 percent	4.3 percent
05.637	Golden Highway (between Broke Road and Mount Thorley)	8,847	20,000	609	6.9 percent	3.0 percent
N/A	Broke Road (south of the Mount Thorley CPP access road intersection)	3,434	18,000	609	17.7 percent	3.4 percent

Table 3.4 Proportional impact of the Wallaby Scrub Road traffic on alternative routes

RTA count reference	Road location	Projected daily traffic volume (year 2017) ¹	Route daily traffic capacity (vehicles)	Daily traffic detoured by Wallaby Scrub Road Closure	Detoured traffic proportion compared to 2017 base daily traffic movements	Detoured traffic proportion compared to route daily traffic capacity
N/A	Putty Road (west of the Warkworth Mine access at Mount Thorley)	727	18,000	254	34.9 percent	1.4 percent

*Notes: *The actual daily traffic volumes in 2014 were surveyed at the two locations shown on the Golden Highway. The 2014 daily traffic volumes for Broke Road and Putty Road were determined by comparison of the peak hourly intersection traffic counts on these roads with the surveyed peak hourly and daily volumes using the Golden Highway. A uniform annual traffic growth factor of 2 percent was applied to all routes.*

3.2.2 Traffic detour impacts at intersections

The potential impacts of the Wallaby Scrub Road closure, will affect approximately 77 to 80 peak hourly vehicle movements from the year 2017 onwards, which is conservatively estimated to increase at approximately +2 percent annually in future years, assuming no reduction from traffic using the Hunter Expressway.

The intersection capacity and delay impacts of the detoured traffic in 2017 have been assessed as shown in future traffic analysis Scenarios 2 and 3 in Table 3.2. The assessment shows there will be minimal traffic delay impacts at intersections on these alternative traffic routes from the Wallaby Scrub Road closure as the relevant intersections have sufficient spare capacity to accommodate this traffic.

Since 2010, three intersections in the area have been upgraded by the RMS, which improves their capacity to accommodate the detoured traffic; namely.

- At the Golden Highway/Broke Road intersection a ‘seagull’ type intersection has been established to provide a dedicated right hand turning lane into Broke Road and a merging lane for traffic turning right from Broke Road.
- At the Mount Thorley interchange west side intersection, dedicated turning lanes have been established westbound on Putty Road for through and right turning traffic.
- At the Mount Thorley interchange east side intersection, a dedicated through traffic lane has been established eastbound on Putty Road to improve merging with the traffic from the Golden Highway.

Following the recent road improvement works (seagull type intersection) which have been implemented by RMS at the Golden Highway/ Broke Road intersection, the peak hour traffic delays and level of service at this intersection have substantially improved (previously level of service F, now level of service C). No further capacity improvements to this intersection or any other intersections on the major road networks in the Mount Thorley area will be required as a result of the generally minimal intersection traffic impacts of the proposal, including the traffic detours from the closure of Wallaby Scrub Road.

At four other intersections, which have not been assessed in detail, at the northern and southern ends respectively of Wallaby Scrub Road and Charlton Road, at the Golden Highway, Putty Road and Broke Road, the detoured traffic will in the future be travelling straight through rather than turning at these intersections. This will generally reduce the turning traffic conflicts and therefore improve the traffic safety and traffic delays at these intersections.

On the Golden Highway section of the traffic detour route, to the north of Putty Road, the existing intersections which provide access to the locality of Gouldsville will have approximately 25% increased daily traffic usage following the Wallaby Scrub Road closure. The existing design standard of these intersections should be reviewed to ensure compliance with the most recent (Austroads 2010) *Road Design Guide* requirements for rural intersections. This review should be incorporated into the road closure plan required for Wallaby Scrub Road, which will be prepared in consultation with RMS and other organisations.

3.2.3 Increased travel times and distances for detoured traffic

The potential impacts of the Wallaby Scrub Road closure will affect approximately 863 vehicle movements daily from the year 2017 onwards, increasing at approximately +2 percent annually in each future year, which is conservatively estimated assuming no reduction from traffic using the Hunter Expressway.

These vehicle movements will be subject to increased travel distances of approximately 8.8 km and 6.2 km per trip, with additional travel times of 6 and 4 minutes per journey respectively and increased fuel usage, for the Putty Road and Charlton Road originating traffic. The alternative traffic routes for each detour are shown in Figure 3.1.

For the Charlton Road originating traffic, it is also likely that with the Bulga Optimisation Project (which is proposed but not yet approved) an additional traffic detour of approximately 3 additional kilometres and 2 minutes per trip will also be implemented to Broke Road which would generally increase the overall travel detour distances and travel times for this traffic to similar levels as for the Putty Road traffic, ie to approximately 9 kilometres and 6 minutes per trip in total.

The current local property access functions for traffic using Wallaby Scrub Road have also been reviewed in this assessment. All the properties affected on Wallaby Scrub Road, to the south of the railway bridge, are owned by MTW. Emergency vehicle access will be maintained by the construction of an emergency access road between Putty Road and the Golden Highway, prior to the closure of Wallaby Scrub Road. The road would be developed in consultation with the Rural Fire Service (RFS) and constructed to access standards prescribed in *Planning for Bush Fire Protection* (Rural Fire Service 2006).

The economic impact of closing Wallaby Scrub Road is discussed and assessed in more detail in the Economic Impact Assessment for the proposal (BA Economics 2014). The economic assessment includes road user costs, operator costs and non- user costs.

3.3 Road safety

The potential impacts of the Wallaby Scrub Road closure have also been assessed in terms of road safety. Detoured traffic will be subject to increased travel distances as detailed in Section 3.2.3.

Generally there will be safer travelling conditions for detoured traffic (and lower accident rates per kilometre travelled) when travelling via the Golden Highway, due to the improved intersection sight distances and higher road construction standards which are present along this route. These improved traffic safety conditions should generally compensate for the greater travel distances which are likely to be travelled by the detoured traffic while travelling through the MTW area in the future.

A road closure implementation plan for Wallaby Scrub Road, will be prepared in conjunction with relevant stakeholders in the local community including RMS, emergency services Singleton Council and the community.

The road closure implementation plan will include strategies to minimise any potential local traffic access and road safety impacts of the closure, including a review of intersection traffic safety at the existing minor road intersections on the Golden Highway at Gouldsville, where the existing design standard of intersections should be reviewed to ensure compliance with the most recent (Austroads 2010) *Road Design Guide* requirements for rural intersections.

3.4 Car parking

There are no proposed changes to the MTW car parking areas. The capacity of the existing car parking areas is adequate for the current, and therefore future, workforce and visitor car parking requirements.

3.5 Public transport access

There are no conveniently accessible local bus routes within the area. There is unlikely to be any additional demand on public transport services in the area from the proposal. The nearest train station at Singleton is also not likely to be affected by the proposal.

3.6 Pedestrian and cyclist access

Given the current patterns of predominantly industrial development in the Mount Thorley area, and distance from residential areas, the local and major roads will continue to have only minimal pedestrian and cyclist usage. Improvements to these roads, such as shoulder widening, or the provision of separate pedestrian footpaths and/or cycleways would not generally be warranted as a result of the proposal.

3.7 Cumulative impacts

3.7.1 Traffic impacts to the road network

The potential cumulative traffic impacts from the proposal and the construction work phases for the Bulga Coal Complex (Bulga Optimisation Project) have also been considered for 2017 which is the first year in which cumulative traffic impacts will potentially occur. Although the proposed construction stage workforce for the Bulga Optimisation Project will be up to 300 persons during the early years of construction in 2014 and 2015 (ARC 2013), this workforce will be greatly reduced (to approximately 25 persons) by the year 2017, such that minimal cumulative traffic impacts are anticipated from the two proposals in that and subsequent years. MTW's workforce and other traffic related contributions to cumulative road traffic impacts (with other mining projects) will remain unchanged under the proposal.

There will potentially be a cumulative traffic detour impact for the MTW project with the Bulga Optimisation Project (which is proposed but not yet approved). For the Charlton Road originating traffic, which will be diverted from the Wallaby Scrub Road route, an additional traffic detour of approximately 3 additional kilometres and 2 minutes per trip would also potentially occur along the Broke Road route, which would further increase the overall travel detour distances and travel times for this traffic to similar levels as for the Putty Road originating traffic, ie to approximately 9 kilometres and 6 minutes per trip in total.

3.7.2 Traffic impacts at intersections

In terms of future intersection operations, there will also be minimal impacts from the cumulative traffic impacts of the proposal in combination with the Bulga Optimisation Project, including the effects of the Wallaby Scrub Road closure. The relevant intersection traffic impacts have been considered in the traffic analysis in Table 3.2, and show these intersections will have sufficient spare capacity to accommodate the predicted cumulative traffic increases, with minimal intersection capacity or delay impacts.

The recent RMS intersection improvement works at the Golden Highway/ Broke Road intersection, which were completed during 2011/12, have substantially improved the peak hour traffic delays and level of service at this intersection (previously level of service F, now level of service C) such that this intersection no longer represents a capacity constraint to the major road network in the locality of Mount Thorley.

4 Coal transport impact assessment

4.1 Introduction

The existing Mount Thorley Coal Loader (MTCL) is shown on Figure 2.6 and the schematic plan of the Hunter Valley rail network in Figure 2.7 shows the Whittingham branch line, rail loops and train loading facilities. These facilities will continue to be used for transport of the export coal produced by MTW. MTCL is a separate facility with a separate development consent and is not subject to this proposal.

The MTCL loop is accessed from the Main Northern Railway at Whittingham (near Singleton). Empty trains exit the Main Northern Railway line at Whittingham junction and travel along the Whittingham branch line to the MTCL spur line, in preparation for loading. On completion of loading, trains return along the Whittingham branch to Whittingham junction and proceed to the coal terminals in Newcastle for ship loading. In addition to MTW, other users of the Whittingham branch include Bulga Coal Complex and Wambo Mine.

The future capacity of the Whittingham branch line must accommodate the combined coal transport demand from the MTCL coal loaders and other mines such as Bulga, Wambo and HVO South potentially, which also use the line. The branch line has single track capacity and its capacity is also potentially constrained by the combined operations and the availability of coal train paths at the junction with the Main Northern Railway line at Whittingham.

4.2 Hunter Valley rail transport capacity

Over 150 million tonnes of coal was exported from the Port of Newcastle in 2013 (calendar year), with current expectations of additional growth in throughput across 2014. Installed coal terminal capacity in Newcastle currently exceeds 200 million tonnes; however, the timing of when industry output in the Hunter Valley might align with or exceed coal terminal capacity in Newcastle is uncertain.

The Australian Rail Track Corporation (ARTC) commenced a 60-year lease of the Hunter Valley coal rail network in 2004. ARTC has published several long-term corridor capacity strategies for the Hunter Valley coal network, where the *2013—2022 Hunter Valley Corridor Capacity Strategy* (ARTC 2013) is the seventh version.

This document outlines ARTC's expectations for customer track access over the short, medium and long-term, and the associated rail investment and operating performance requirements to deliver contracted and prospective volume commitments. Excerpts from the 2013-2022 strategy outline ARTC's view on the expected increase in export coal volumes:

... contracted export coal volumes are... increasing to around 204 mtpa in 2018 and 206 mtpa in 2019. Forward contract volumes are in part conditional on ARTC projects and HVCCC Coal Chain Capacity assessment.

On this basis, it is possible that annual railed coal volumes for export could increase by a further 56 million tonnes by 2019, an almost 40 percent increase on 2013 throughput and a compound annual growth rate (CAGR) of 5.4 percent. The ARTC corridor capacity strategy is based on a combination of contracted volumes (volumes for which contractual arrangements for the transport of coal are already in place) and prospective volumes (volumes from projects which have not progressed to the level at which 'binding' coal transport contracts have been committed to).

The current relationship between contracted volumes, prospective volumes as determined by the Rail Capacity Group of ARTC, and terminal capacity at the Port of Newcastle is shown in Figure 4.1. Further details of the projected contractual and prospective volumes of coal to be transported over each section on the Hunter Valley main line between Newcastle and Muswellbrook are also shown in Figure 4.2.

4.3 Rail transport of product coal

There are no changes proposed by MTW to the MTCL rail loop or spur line as part of the modification. MTCL is a separate facility to MTW and operates to its own development consent.

For the transport of product coal by rail, Coal & Allied (C&A) entered into a rolling 10 year agreement with ARTC in 2012 for track access to provide for the ability to haul coal from MTW to the coal terminals in Newcastle. This agreement was established after the ARTC *Hunter Valley Coal Network Access Undertaking* was approved by the ACCC in June 2011.

A fundamental part of the agreement is the take-or-pay capacity commitment, which provides contracted track access to transport specific monthly and annual coal volumes from MTW for the full 10 year period. All agreements with ARTC are limited to 10 years and RTCA will extend the agreement with ARTC if and when required to accommodate continuing use of the rail network.

ARTC plans and manages network capacity enhancement projects to cater for the track access volumes it has contracted across its customer base and prospective volumes where applicable. The C&A agreement with ARTC for MTW track access is included in ARTC's long-term contractual commitments, and as such, the MTW volumes are considered confirmed for the 10 year period on the basis that ARTC has the available capacity to deliver MTW's contract. The MTW volumes, therefore, are not expected to have any adverse impact on the capacity of the coal rail network because the capacity has been planned and committed for some time.

4.4 Assessment of rail transport

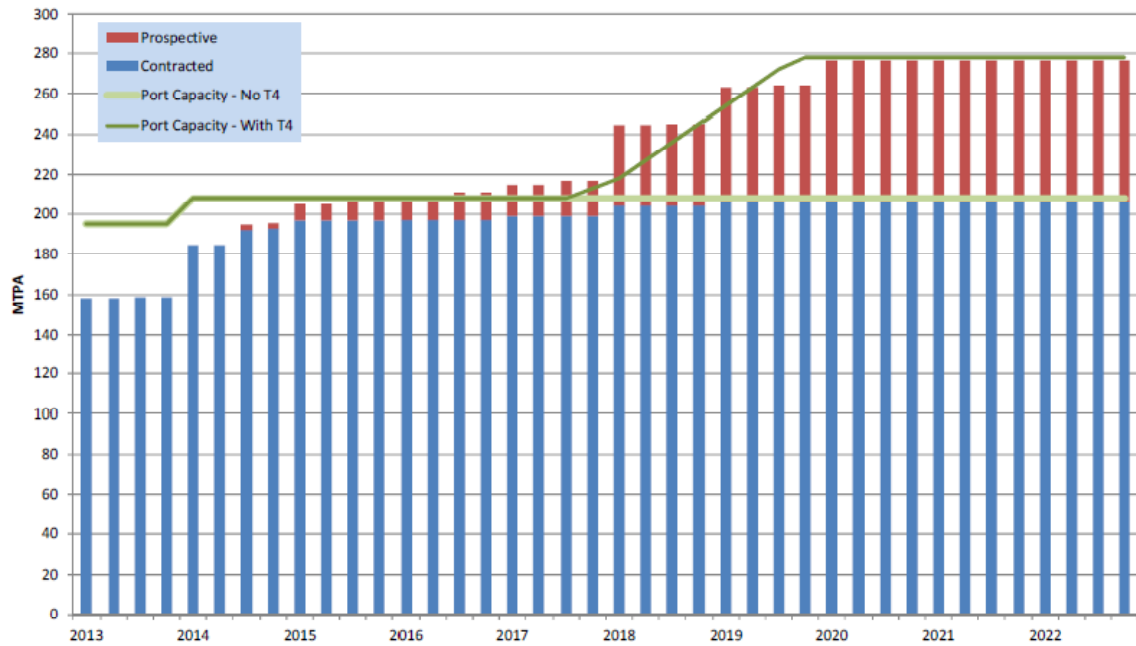
4.4.1 Capacity of the rail line

The daily train movements for MTW coal transport will be consistent with those loaded previously at MTCL and are not anticipated to increase above levels seen historically. As there is no projected increase in annual train movements, the MTW coal transport operations are not expected to cause any increase in delays to other users of the Whittingham branch line.

From the current ARTC strategy, the current contracted and prospective coal transport tonnages for the sections of the Hunter Valley lines shown in Figure 4.2, show there is a planned increase in the total processed export coal transported from existing and proposed mining operations using the Whittingham Branch (eg including the approved HVO South coal loading facility) between the years 2013 and 2022 (the end year of the current ARTC Strategy) from 25 Mt to 40 Mt per annum.

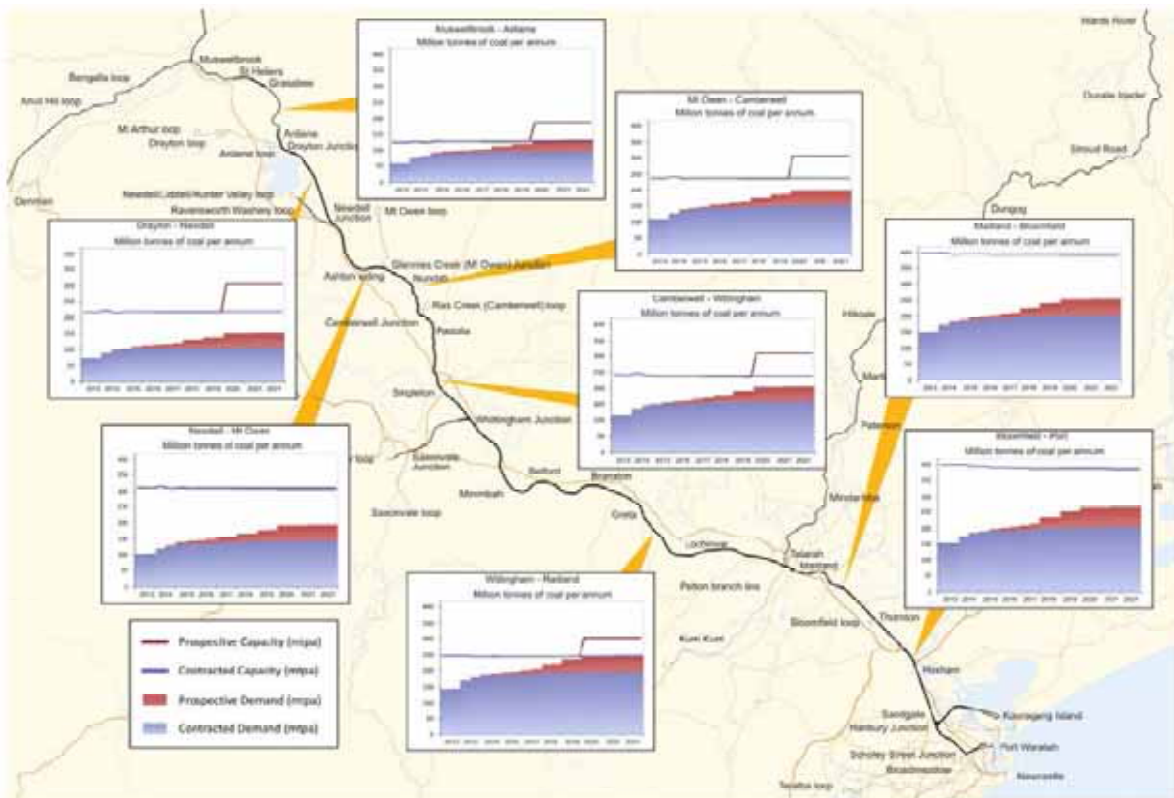
Capacity is incorporated in the ARTC strategy which can accommodate the increased coal transport demand from coal loading facilities using the Whittingham Branch line, notwithstanding that the coal transported from MTW is not anticipated to form part of this demand increase.

The branch line operates with a typical average trainload tonnage of 8,400 tonnes and has potentially 350 days operation per year. The annual average daily number of loaded trains using the Whittingham Branch (from MTW and other mines) will increase from approximately 8.5 in 2013 (to transport approximately 25 Mt of coal) to approximately 13.6 in 2022 (to transport approximately 40 Mt of coal).



Note: Data Source (ARTC, 2013)

Figure 4.1 Forecast growth in rail transport volumes and Newcastle port capacity



Note: Data Source (ARTC, 2013)

Figure 4.2 Forecast growth in transport volumes on sections of the Hunter Valley main line

While 40 Mtpa is within the current operating capacity of a single track branch line, which can generally accommodate approximately one train movement hourly in each direction, it is believed that the limiting factor for the branch line capacity is the number of available train paths at the junction with the main line at Whittingham. This capacity will ultimately determine the capacity of the Whittingham branch line to accommodate the projected daily train loads in the years beyond the currently defined ARTC strategy, which continues until 2022.

4.4.2 Assessment of rail safety

i Level crossings

The ARTC network expansion plans include significant expenditure to construct facilities that separate road vehicles from the high volume public level crossings to eliminate interaction. Notable crossings already completed include Range Road (Singleton), Golden Highway (adjacent to New England Highway intersection) and Hermitage Road (Belford). As there will not be an increase in daily train movements beyond those seen historically for MTW, the number of MTW train interactions with users of existing public and private level crossings will not change.

ii Rail safety

MTW train movements will continue to transport coal in a manner consistent with historical operations. Coal will be loaded onto trains provided by approved rail haulage companies who are licensed and approved to operate on the ARTC network. These companies must comply with the requirements of the Independent Transport Safety Regulator whose principal objective is to facilitate the safe operation of railways in NSW. Therefore MTW is not expected to cause an impact on rail safety.

5 Mitigation and management measures

The following project impact mitigation and related monitoring and management measures have been identified to address the identified road and rail transport related aspects of the project.

The primary road transport impact identified for the proposal is the increased travel time and distance costs for the traffic which is currently using Wallaby Scrub Road when the road is closed and the detour is implemented.

MTW propose to prepare a road closure implementation plan for Wallaby Scrub Road, in conjunction with relevant stakeholders in the local community, emergency services, RMS and Singleton Council, which will include strategies to minimise any potential local traffic access and road safety impacts of the closure.

5.1 Road transport mitigation measures

Emergency vehicle access to areas west of Wallaby Scrub Road will be maintained by the construction of an appropriate emergency access road/fire trail between Putty Road and the Golden Highway, prior to the closure of Wallaby Scrub Road. The fire trail route would be constructed in accordance with the NSW Rural Fire Service access standards in *NSW Bushfire Coordinating Committee policy No 2/2007* (Rural Fire Service 2007). Other emergency vehicles (police and ambulance services) would not generally be affected by the closure as their vehicles are based in Singleton and would not generally travel via Wallaby Scrub Road to access other areas.

Some local residents, e.g. in Bulga village and its surrounding areas will experience increased travel times and distances from traffic diversions as a result of the road closure. However the majority of the traffic using the route is regionally based and travels from areas beyond the southern end of Charlton Road. These traffic volumes are anticipated to reduce in the future following the opening of the Hunter Expressway, which should cause some of the affected traffic to use other routes, regardless of whether Wallaby Scrub Road is closed or not.

The recent RMS intersection improvement works at the Golden Highway/ Broke Road intersection and the two Mount Thorley interchange intersections, on the east and west sides, have substantially improved the peak hour traffic delays and level of service at these intersections. No further intersection improvement works to these or other intersections on the major road network are specifically required as a result of the predicted road traffic impacts of the proposal.

However, on the Golden Highway section of the Wallaby Scrub Road traffic detour route, to the north of Putty Road, the existing intersections which provide access to the locality of Gouldsville should be reviewed to ensure compliance with the most recent (Austroads 2010) *Road Design Guide* requirements for rural intersections. This review should be incorporated into the road closure plan required for Wallaby Scrub Road, which will be prepared in consultation with RMS and other organisations.

5.2 Rail transport mitigation measures

No specific rail transport impact mitigation measures are required for the proposal.

6 Summary and conclusion

The contents of this TIA report are based on the Department of Planning and Environment Secretary's requirements, the list of traffic impact assessment requirements published in the RTA/RMS Guide to traffic impact assessment and the most recent ARTC 2013 - 2022 ten year strategy for coal transport on the Hunter Valley rail network.

This TIA identifies that the proposal is currently generating significant daily traffic movements for both car and truck traffic on the Golden Highway and other major roads in the locality of Mount Thorley. The road network currently has spare capacity (including at all the major intersection) and these intersections are currently operating at good or reasonable peak hour levels of service. Based on historic traffic growth patterns at annual growth rates of up to +2 percent, the future background traffic increases for the locality roads, by the year 2017, have also been calculated to determine the future base year traffic situation against which the impact of the proposed closure of Wallaby Scrub Road and the cumulative impact of the MTW traffic with the Bulga Optimisation Project traffic have been assessed.

Employee traffic generated by Warkworth Mine and MTO on external public roads will not generally increase. Truck traffic movements on the external road network would also generally remain at similar levels. The future road and intersection traffic operations in the locality will not generally change due to these factors.

As there is no projected increase in annual production tonnages or train movements, the proposal is not expected to cause any rail transport impacts.

The proposal would also result in minimal traffic impacts to the wider road network and intersections related to the closure of Wallaby Scrub Road. The traffic surveys for this traffic impact assessment included an Origin-Destination traffic survey during a 12 hour period on Tuesday 4 March 2014, which identified the current volumes and proportions of all traffic entering or leaving the area via the northern end of Wallaby Scrub Road. These were:

- The total surveyed traffic volume using Wallaby Scrub Road is less than 1,000 vehicle movements daily.
- The general traffic proportions using Wallaby Scrub Road were approximately 60 – 70 percent coming from Charlton Road (at the south end) and approximately 20 – 25 percent coming from the Putty Road (west) directions.

However, the Hunter Expressway route which opened on 22 March 2014 now provides a faster, safer and more direct travel route for regional traffic movements between the M1 Motorway and the Upper Hunter. This route option is now available to through traffic from the Charlton Road direction which had previously been travelling via Wallaby Scrub Road.

Traffic detoured by the Wallaby Scrub Road closure will be subject to some increases in travel distances and journey times. However, given the improved road construction standard and travelling conditions on the Golden Highway, the closure of Wallaby Scrub Road should not result in an increase in the travel safety risk for the detoured traffic.

MTW propose to prepare a road closure implementation plan, in conjunction with relevant stakeholders in the local community, emergency services, RMS and Singleton Council, to develop strategies to minimise local traffic related impacts of the closure.

Emergency vehicle access to areas west of Wallaby Scrub Road is proposed to be maintained through the development, in conjunction with RFS, of an emergency access/fire trail route between Putty Road and the Golden Highway, close to the western limit of the proposed mining footprint (see Appendix E). The fire trail route would be constructed in accordance with the NSW Rural Fire Service access standards in *NSW Bushfire Coordinating Committee policy No 2/2007* (Rural Fire Service 2007). Other emergency vehicles (police and ambulance services) would not generally be affected by the closure as their vehicles are based in Singleton and would not generally travel via Wallaby Scrub Road to access other areas.

The potential cumulative traffic impacts of the MTW proposal, with the construction work phases for the Bulga Optimisation Project have also been considered in the year 2017. This is the first year in which these cumulative traffic impacts could occur. The proposed construction stage workforce for the Bulga Optimisation Project will be higher in the earlier years of construction, but will have reduced to approximately 25 persons by the year 2017, such that minimal cumulative traffic impacts will occur from the two proposals in that and subsequent years.

There will potentially be a cumulative traffic detour impact from the MTW project with the Bulga Optimisation Project (which is proposed but not yet approved), where the Charlton Road originating traffic diverted from the Wallaby Scrub Road route, will be subject to an additional traffic detour of approximately 3 additional kilometres and 2 minutes per trip along the Broke Road route, as a result of the traffic detours which would occur to that route with the Bulga Optimisation Project.

References

ARC Traffic + Transport with Transport and Urban Planning, 2013 Traffic Impact Assessment for the Bulga Mine Optimisation Project

ARTC 2013, 2013-2022 Hunter Valley Corridor Capacity Strategy, June 2013

Austrroads 2010, Guide to Road Design

Parsons Brinkerhoff 2010, Traffic Impact Assessment for the Warkworth Mine Extension project

Roads and Traffic Authority 2002, *Guide to Traffic Generating Developments*.

Rural Fire Service 2007, NSW Bushfire Coordinating Committee policy No 2/2007.

Appendix A

Tube traffic count surveys

Job No	N1299		
Client	EMM		
Road	Golden Hwy - Between Thornley and Wallaby Scrub	Average Weekday	3,314
Location	Singleton	7 Day Average	2,978
Site No.	3		
Start Date	4-Mar-14		
Description	Volume Summary		
Direction	Combined		

Time	Day of Week							Ave W'day	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	10-Mar	4-Mar	5-Mar	6-Mar	7-Mar	8-Mar	9-Mar		
AM Peak	268	234	234	232	247	175	194		
PM Peak	292	238	275	266	324	164	250		
0:00	13	22	20	25	24	15	12	21	19
1:00	9	6	14	9	6	12	8	9	9
2:00	6	6	6	11	7	6	7	7	7
3:00	16	8	17	17	15	15	8	15	14
4:00	47	29	32	36	27	17	9	34	28
5:00	182	157	177	180	183	85	75	176	148
6:00	268	234	234	232	219	81	64	237	190
7:00	230	204	190	179	166	95	66	194	161
8:00	183	161	166	202	172	102	76	177	152
9:00	230	168	158	187	230	120	124	195	174
10:00	200	185	193	187	247	175	120	202	187
11:00	199	179	220	195	239	135	194	206	194
12:00	225	168	199	195	237	164	185	205	196
13:00	292	183	198	222	289	125	231	237	220
14:00	238	188	183	218	324	145	250	230	221
15:00	279	238	257	253	294	104	223	264	235
16:00	257	238	275	266	297	107	194	267	233
17:00	213	231	227	236	274	126	189	236	214
18:00	162	154	142	185	225	127	171	174	167
19:00	82	76	75	103	139	41	91	95	87
20:00	36	49	44	54	63	14	51	49	44
21:00	43	22	36	36	34	20	36	34	32
22:00	27	29	27	32	28	17	17	29	25
23:00	26	22	25	17	19	17	13	22	20
Total	3463	2957	3115	3277	3758	1865	2414	3314	2978

7-19	2708	2297	2408	2525	2994	1525	2023	2586	2354
6-22	3137	2678	2797	2950	3449	1681	2265	3002	2708
6-24	3190	2729	2849	2999	3496	1715	2295	3053	2753
0-24	3463	2957	3115	3277	3758	1865	2414	3314	2978

Job No	N1299		
Client	EMM		
Road	Golden Hwy - Between Thornley and Wallaby Scrub	Average Weekday	1,620
Location	Singleton	7 Day Average	1,461
Site No.	3		
Start Date	4-Mar-14		
Description	Volume Summary		
Direction	EB		

Time	Day of Week							Ave W'day	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	10-Mar	4-Mar	5-Mar	6-Mar	7-Mar	8-Mar	9-Mar		
AM Peak	100	99	106	97	126	92	86		
PM Peak	157	147	164	169	208	86	137		
0:00	5	17	18	20	19	9	6	16	13
1:00	8	4	9	7	4	1	2	6	5
2:00	1	2	1	7	5	3	2	3	3
3:00	0	2	5	6	7	11	2	4	5
4:00	8	10	7	9	7	2	3	8	7
5:00	34	25	31	28	30	22	22	30	27
6:00	90	86	96	74	82	44	35	86	72
7:00	82	92	69	58	65	48	40	73	65
8:00	80	72	79	86	82	49	31	80	68
9:00	91	67	74	97	109	70	39	88	78
10:00	88	73	89	77	126	92	49	91	85
11:00	100	99	106	97	123	68	86	105	97
12:00	114	81	105	95	133	86	98	106	102
13:00	119	85	95	126	163	64	119	118	110
14:00	117	117	96	131	208	70	137	134	125
15:00	157	147	157	162	192	50	113	163	140
16:00	140	144	164	169	193	45	103	162	137
17:00	106	118	118	140	130	57	98	122	110
18:00	87	93	83	109	124	79	92	99	95
19:00	38	41	39	60	97	24	61	55	51
20:00	24	26	29	38	39	4	29	31	27
21:00	11	11	23	24	18	7	22	17	17
22:00	8	10	7	15	13	6	12	11	10
23:00	18	15	14	8	11	6	9	13	12
Total	1526	1437	1514	1643	1980	917	1210	1620	1461

7-19	1281	1188	1235	1347	1648	778	1005	1340	1212
6-22	1444	1352	1422	1543	1884	857	1152	1529	1379
6-24	1470	1377	1443	1566	1908	869	1173	1553	1401
0-24	1526	1437	1514	1643	1980	917	1210	1620	1461

Job No	N1299		
Client	EMM		
Road	Golden Hwy - Between Thornley and Wallaby Scrub	Average Weekday	1,694
Location	Singleton	7 Day Average	1,517
Site No.	3		
Start Date	4-Mar-14		
Description	Volume Summary		
Direction	WB		

Time	Day of Week							Ave W'day	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	10-Mar	4-Mar	5-Mar	6-Mar	7-Mar	8-Mar	9-Mar		
AM Peak	178	148	146	158	153	83	108		
PM Peak	173	113	111	100	144	78	113		
0:00	8	5	2	5	5	6	6	5	5
1:00	1	2	5	2	2	11	6	2	4
2:00	5	4	5	4	2	3	5	4	4
3:00	16	6	12	11	8	4	6	11	9
4:00	39	19	25	27	20	15	6	26	22
5:00	148	132	146	152	153	63	53	146	121
6:00	178	148	138	158	137	37	29	152	118
7:00	148	112	121	121	101	47	26	121	97
8:00	103	89	87	116	90	53	45	97	83
9:00	139	101	84	90	121	50	85	107	96
10:00	112	112	104	110	121	83	71	112	102
11:00	99	80	114	98	116	67	108	101	97
12:00	111	87	94	100	104	78	87	99	94
13:00	173	98	103	96	126	61	112	119	110
14:00	121	71	87	87	116	75	113	96	96
15:00	122	91	100	91	102	54	110	101	96
16:00	117	94	111	97	104	62	91	105	97
17:00	107	113	109	96	144	69	91	114	104
18:00	75	61	59	76	101	48	79	74	71
19:00	44	35	36	43	42	17	30	40	35
20:00	12	23	15	16	24	10	22	18	17
21:00	32	11	13	12	16	13	14	17	16
22:00	19	19	20	17	15	11	5	18	15
23:00	8	7	11	9	8	11	4	9	8
Total	1937	1520	1601	1634	1778	948	1204	1694	1517

7-19	1427	1109	1173	1178	1346	747	1018	1247	1143
6-22	1693	1326	1375	1407	1565	824	1113	1473	1329
6-24	1720	1352	1406	1433	1588	846	1122	1500	1352
0-24	1937	1520	1601	1634	1778	948	1204	1694	1517

Job No	N1299	
Client	EMM	
Road	Golden Hwy - Between Broke Rd & Mt Thornley	Average Weekday 9,849
Location	Singleton	7 Day Average 8,346
Site No.	2	
Start Date	4-Mar-14	
Description	Volume Summary	
Direction	Combined	

Time	Day of Week							Ave W'day	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	10-Mar	4-Mar	5-Mar	6-Mar	7-Mar	8-Mar	9-Mar		
AM Peak	1165	1083	1148	1214	1048	372	322		
PM Peak	905	819	915	859	904	411	454		
0:00	22	44	46	61	68	58	25	48	46
1:00	16	24	31	13	20	28	22	21	22
2:00	28	22	36	37	31	24	19	31	28
3:00	34	34	48	64	51	61	23	46	45
4:00	149	123	115	138	145	69	30	134	110
5:00	657	701	691	723	711	269	209	697	566
6:00	1165	1083	1148	1214	1048	372	322	1132	907
7:00	745	720	643	646	605	298	229	672	555
8:00	477	449	461	521	467	191	123	475	384
9:00	476	393	417	475	508	250	212	454	390
10:00	419	412	465	441	560	315	204	459	402
11:00	479	429	502	417	565	266	281	478	420
12:00	442	429	497	529	540	290	309	487	434
13:00	560	443	440	531	663	248	326	527	459
14:00	610	525	552	594	732	243	383	603	520
15:00	905	819	704	859	904	209	320	838	674
16:00	771	761	915	766	727	203	299	788	635
17:00	702	726	717	715	676	316	390	707	606
18:00	595	585	600	605	560	411	454	589	544
19:00	285	291	286	341	353	200	255	311	287
20:00	124	143	103	122	155	62	82	129	113
21:00	74	58	90	86	80	41	75	78	72
22:00	85	73	98	96	81	45	49	87	75
23:00	43	62	65	66	54	32	35	58	51
Total	9863	9349	9670	10060	10304	4501	4676	9849	8346

7-19	7181	6691	6913	7099	7507	3240	3530	7078	6023
6-22	8829	8266	8540	8862	9143	3915	4264	8728	7403
6-24	8957	8401	8703	9024	9278	3992	4348	8873	7529
0-24	9863	9349	9670	10060	10304	4501	4676	9849	8346

Job No	N1299		
Client	EMM		
Road	Golden Hwy - Between Broke Rd & Mt Thornley	Average Weekday	4,649
Location	Singleton	7 Day Average	3,951
Site No.	2		
Start Date	4-Mar-14		
Description	Volume Summary		
Direction	EB		

Time	Day of Week							Ave W'day	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	10-Mar	4-Mar	5-Mar	6-Mar	7-Mar	8-Mar	9-Mar		
AM Peak	294	294	265	256	275	187	172		
PM Peak	628	599	689	650	623	240	246		
0:00	10	36	39	48	42	28	14	35	31
1:00	11	13	16	7	14	10	8	12	11
2:00	6	11	11	11	13	6	3	10	9
3:00	11	17	21	26	25	25	6	20	19
4:00	14	21	19	27	31	15	5	22	19
5:00	53	70	77	75	63	37	31	68	58
6:00	207	237	265	256	230	151	137	239	212
7:00	294	294	229	204	221	187	172	248	229
8:00	176	184	188	183	158	90	49	178	147
9:00	199	186	195	226	247	126	83	211	180
10:00	195	182	176	175	264	165	87	198	178
11:00	232	216	222	204	275	140	113	230	200
12:00	205	210	264	251	298	162	164	246	222
13:00	257	198	202	249	390	109	162	259	224
14:00	300	319	309	361	483	117	178	354	295
15:00	628	599	478	650	623	114	169	596	466
16:00	523	560	689	560	481	96	141	563	436
17:00	390	421	427	420	325	106	155	397	321
18:00	314	352	373	366	313	240	246	344	315
19:00	203	213	196	245	280	159	202	227	214
20:00	55	70	61	66	83	33	47	67	59
21:00	31	28	48	46	36	17	36	38	35
22:00	44	38	58	43	41	17	24	45	38
23:00	38	54	45	47	32	15	14	43	35
Total	4396	4529	4608	4746	4968	2165	2246	4649	3951

7-19	3713	3721	3752	3849	4078	1652	1719	3823	3212
6-22	4209	4269	4322	4462	4707	2012	2141	4394	3732
6-24	4291	4361	4425	4552	4780	2044	2179	4482	3805
0-24	4396	4529	4608	4746	4968	2165	2246	4649	3951

Job No	N1299		
Client	EMM		
Road	Golden Hwy - Between Broke Rd & Mt Thornley	Average Weekday	5,200
Location	Singleton	7 Day Average	4,395
Site No.	2		
Start Date	4-Mar-14		
Description	Volume Summary		
Direction	WB		

Time	Day of Week							Ave W'day	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	10-Mar	4-Mar	5-Mar	6-Mar	7-Mar	8-Mar	9-Mar		
AM Peak	958	846	883	958	818	232	185		
PM Peak	312	305	290	295	351	210	235		
0:00	12	8	7	13	26	30	11	13	15
1:00	5	11	15	6	6	18	14	9	11
2:00	22	11	25	26	18	18	16	20	19
3:00	23	17	27	38	26	36	17	26	26
4:00	135	102	96	111	114	54	25	112	91
5:00	604	631	614	648	648	232	178	629	508
6:00	958	846	883	958	818	221	185	893	696
7:00	451	426	414	442	384	111	57	423	326
8:00	301	265	273	338	309	101	74	297	237
9:00	277	207	222	249	261	124	129	243	210
10:00	224	230	289	266	296	150	117	261	225
11:00	247	213	280	213	290	126	168	249	220
12:00	237	219	233	278	242	128	145	242	212
13:00	303	245	238	282	273	139	164	268	235
14:00	310	206	243	233	249	126	205	248	225
15:00	277	220	226	209	281	95	151	243	208
16:00	248	201	226	206	246	107	158	225	199
17:00	312	305	290	295	351	210	235	311	285
18:00	281	233	227	239	247	171	208	245	229
19:00	82	78	90	96	73	41	53	84	73
20:00	69	73	42	56	72	29	35	62	54
21:00	43	30	42	40	44	24	39	40	37
22:00	41	35	40	53	40	28	25	42	37
23:00	5	8	20	19	22	17	21	15	16
Total	5467	4820	5062	5314	5336	2336	2430	5200	4395

7-19	3468	2970	3161	3250	3429	1588	1811	3256	2811
6-22	4620	3997	4218	4400	4436	1903	2123	4334	3671
6-24	4666	4040	4278	4472	4498	1948	2169	4391	3724
0-24	5467	4820	5062	5314	5336	2336	2430	5200	4395

Job No	N1299	
Client	EMM	
Road	Wallaby Scrub Rd - North of Putty Rd	Average Weekday 921
Location	Singleton	7 Day Average 875
Site No.	1	
Start Date	4-Mar-14	
Description	Volume Summary	
Direction	Combined	

Time	Day of Week							Ave W'day	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	10-Mar	4-Mar	5-Mar	6-Mar	7-Mar	8-Mar	9-Mar		
AM Peak	88	89	68	96	74	52	60		
PM Peak	104	81	82	91	115	54	110		
0:00	3	8	9	10	10	5	5	8	7
1:00	2	0	1	1	5	1	3	2	2
2:00	0	1	0	2	4	1	1	1	1
3:00	4	1	4	5	2	2	1	3	3
4:00	17	9	8	8	10	4	6	10	9
5:00	58	64	49	48	59	28	21	56	47
6:00	88	89	68	96	74	36	32	83	69
7:00	68	54	50	48	50	41	34	54	49
8:00	39	45	40	44	48	30	21	43	38
9:00	44	32	39	39	42	52	28	39	39
10:00	54	28	35	48	50	34	43	43	42
11:00	52	24	43	47	57	45	60	45	47
12:00	57	41	33	43	67	54	63	48	51
13:00	48	40	41	38	68	49	74	47	51
14:00	77	53	54	45	87	47	110	63	68
15:00	104	81	82	91	115	40	86	95	86
16:00	71	58	72	87	105	40	71	79	72
17:00	63	49	63	70	99	40	79	69	66
18:00	50	54	54	63	82	41	61	61	58
19:00	39	33	24	36	58	30	47	38	38
20:00	7	8	16	17	28	5	29	15	16
21:00	6	2	1	9	16	5	9	7	7
22:00	8	10	10	11	10	0	2	10	7
23:00	2	5	3	2	1	7	1	3	3
Total	961	789	799	908	1147	637	887	921	875

7-19	727	559	606	663	870	513	730	685	667
6-22	867	691	715	821	1046	589	847	828	797
6-24	877	706	728	834	1057	596	850	840	807
0-24	961	789	799	908	1147	637	887	921	875

Job No	N1299	
Client	EMM	
Road	Wallaby Scrub Rd - North of Putty Rd	Average Weekday 439
Location	Singleton	7 Day Average 417
Site No.	1	
Start Date	4-Mar-14	
Description	Volume Summary	
Direction	NB	

Time	Day of Week							Ave W'day	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	10-Mar	4-Mar	5-Mar	6-Mar	7-Mar	8-Mar	9-Mar		
AM Peak	72	77	57	80	63	27	26		
PM Peak	35	23	30	27	39	28	45		
0:00	2	0	0	3	0	5	4	1	2
1:00	1	0	1	1	4	1	0	1	1
2:00	0	1	0	0	3	0	0	1	1
3:00	3	1	4	4	1	1	1	3	2
4:00	14	8	7	7	10	3	5	9	8
5:00	53	58	46	43	54	24	21	51	43
6:00	72	77	57	80	63	21	19	70	56
7:00	39	31	31	21	24	13	8	29	24
8:00	22	30	24	21	21	16	11	24	21
9:00	28	17	22	20	20	27	14	21	21
10:00	25	14	13	22	22	19	26	19	20
11:00	21	14	17	12	22	23	22	17	19
12:00	34	23	19	13	26	26	28	23	24
13:00	27	21	22	20	22	28	24	22	23
14:00	28	18	16	9	22	15	45	19	22
15:00	35	13	16	20	26	19	34	22	23
16:00	24	19	20	24	33	18	34	24	25
17:00	30	19	30	27	39	24	43	29	30
18:00	24	10	17	25	38	26	35	23	25
19:00	11	6	11	12	17	4	13	11	11
20:00	4	3	9	9	15	2	10	8	7
21:00	3	2	1	6	8	1	4	4	4
22:00	5	8	7	7	7	0	0	7	5
23:00	0	2	0	0	0	6	1	0	1
Total	505	395	390	406	497	322	402	439	417

7-19	337	229	247	234	315	254	324	272	277
6-22	427	317	325	341	418	282	370	366	354
6-24	432	327	332	348	425	288	371	373	360
0-24	505	395	390	406	497	322	402	439	417

Job No	N1299		
Client	EMM		
Road	Wallaby Scrub Rd - North of Putty Rd	Average Weekday	482
Location	Singleton	7 Day Average	459
Site No.	1		
Start Date	4-Mar-14		
Description	Volume Summary		
Direction	SB		

Time	Day of Week							Ave W'day	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	10-Mar	4-Mar	5-Mar	6-Mar	7-Mar	8-Mar	9-Mar		
AM Peak	31	23	26	35	35	28	38		
PM Peak	69	68	66	71	89	32	65		
0:00	1	8	9	7	10	0	1	7	5
1:00	1	0	0	0	1	0	3	0	1
2:00	0	0	0	2	1	1	1	1	1
3:00	1	0	0	1	1	1	0	1	1
4:00	3	1	1	1	0	1	1	1	1
5:00	5	6	3	5	5	4	0	5	4
6:00	16	12	11	16	11	15	13	13	13
7:00	29	23	19	27	26	28	26	25	25
8:00	17	15	16	23	27	14	10	20	17
9:00	16	15	17	19	22	25	14	18	18
10:00	29	14	22	26	28	15	17	24	22
11:00	31	10	26	35	35	22	38	27	28
12:00	23	18	14	30	41	28	35	25	27
13:00	21	19	19	18	46	21	50	25	28
14:00	49	35	38	36	65	32	65	45	46
15:00	69	68	66	71	89	21	52	73	62
16:00	47	39	52	63	72	22	37	55	47
17:00	33	30	33	43	60	16	36	40	36
18:00	26	44	37	38	44	15	26	38	33
19:00	28	27	13	24	41	26	34	27	28
20:00	3	5	7	8	13	3	19	7	8
21:00	3	0	0	3	8	4	5	3	3
22:00	3	2	3	4	3	0	2	3	2
23:00	2	3	3	2	1	1	0	2	2
Total	456	394	409	502	650	315	485	482	459

7-19	390	330	359	429	555	259	406	413	390
6-22	440	374	390	480	628	307	477	462	442
6-24	445	379	396	486	632	308	479	468	446
0-24	456	394	409	502	650	315	485	482	459

STATE HIGHWAY NO.23 - CHARLESTOWN-SANDGATE HIGHWAY

LAKE MACQUARIE LGA

STATION	LOCATION	MAP	Km	1980 AADT	1982 AADT	1984 AADT	1986 AADT	1988 AADT	1990 AADT	1992 AADT	1995 AADT	1998 AADT	2001 AADT	2004 AADT
05.304	H'BOROUGH-N OF WARNERS BAY RD,MR325	F	0.0	--	--	--	--	--	--	--	--	--	--	29923

NEWCASTLE LGA

STATION	LOCATION	MAP	Km	1980 AADT	1982 AADT	1984 AADT	1986 AADT	1988 AADT	1990 AADT	1992 AADT	1995 AADT	1998 AADT	2001 AADT	2004 AADT
05.308	KOTARA-0.5KM N OF MYALL RD	B	2.4	17470	21170	23630	23624	--	--	--	--	--	--	38866
05.309	KOTARA-N OF CARNLEY AV	B	3.1	--	17650	19620	19580	19790	--	18833	25993	25489	22013	33279
05.310	CARDIFF HEIGHTS-N OF CARDIFF RD,223	B	3.6	--	24290	25490	25822	25086	--	23993	29774	29515	28014	36859
V05.204	NEW LAMBTON HEIGHTS-N OF RIDGEWAY RD	B	4.1	24850*	26936*	29007*	30359*	30594*	30996V	33737V	35149V	35596V	36907V	-- ³
05.312	NEW LAMBTON HTS-N OF MR223,RUSSELL R	B	0.1	15620	16690	18020	19102	--	--	--	--	--	--	--
05.314	LAMBTON-N OF MR188,HOVE ST	B	1.0	20270	21260	22820	22679	23219	--	25284	22398	29247	28695	33571
05.951	SHORTLAND-SH23 OFF/R NB+SANDGTE ON-S	B	7.6	--	--	--	--	--	--	--	14525	15945	16153	16966
05.321	SANDGATE-S OF SH10,PACIFIC HWY	40	9.4	17990	19540	21310	21424	--	--	--	--	--	--	27062

STATE HIGHWAY NO.27 - GOLDEN HIGHWAY

SINGLETON LGA

STATION	LOCATION	MAP	Km	1980 AADT	1982 AADT	1984 AADT	1986 AADT	1988 AADT	1990 AADT	1992 AADT	1995 AADT	1998 AADT	2001 AADT	2004 AADT
05.841	WHITTINGHAM-W OF SH9,NEW ENGLAND HWY	38	0.0	--	--	2560	--	1682	--	2286	3337	3333	3724	3637
05.638	EAST OF MR181B,BROKE RD	38	0.0	3910	--	5160	--	4759	--	4800	6447	7164	7966	8143
05.637	MT THORLEY-E OF MR503,MILBRODALE RD	38	180.3	3160	--	5180	--	--	--	--	--	--	--	--
05.481	MT THORLEY-N OF MR503,THE PUTTY RD	38	0.1	3120	--	4200	--	4757	--	4508	7997	6256	7059	5572
05.482	WARKWORTH-AT WOLLOMBI BROOK BR	38	11.8	3610	--	3430	--	--	--	--	--	--	--	--

³ 05204s has many problems through out 2004

Appendix B

Intersection traffic surveys



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849.

Mobile.0418239019

Client : EMGA
 Job No/Name : 5030 MT. THORLEY Mine Access
 Day/Date : Tuesday 4th March 2014

PEDS	WEST		SOUTH		EAST		TOT
	Golden Hwy	Mitchell Line	Putty Rd				
0600 - 0615							0
0615 - 0630			NOT				0
0630 - 0645			REQUIRED				0
0645 - 0700							0
0700 - 0715							0
0715 - 0730							0
0730 - 0745							0
0745 - 0800							0
0800 - 0815							0
0815 - 0830							0
0830 - 0845							0
0845 - 0900							0
Per End	0	0	0	0	0	0	0

PEDS	WEST		SOUTH		EAST		TOT
	Golden Hwy	Mitchell Line	Putty Rd				
0600 - 0700	0	0	0	0	0	0	0
0615 - 0715	0	0	0	0	0	0	0
0630 - 0730	0	0	0	0	0	0	0
0645 - 0745	0	0	0	0	0	0	0
0700 - 0800	0	0	0	0	0	0	0
0715 - 0815	0	0	0	0	0	0	0
0730 - 0830	0	0	0	0	0	0	0
0745 - 0845	0	0	0	0	0	0	0
0800 - 0900	0	0	0	0	0	0	0
PEAK HR	0	0	0	0	0	0	0

Lights	WEST		SOUTH		EAST		TOT
	Golden Hwy		Mitchell Line		Putty Rd		
	I	R	L	R	L	I	
0600 - 0615	26	10	123	1	4	88	252
0615 - 0630	29	16	171	0	4	103	323
0630 - 0645	35	30	146	1	1	114	327
0645 - 0700	39	31	83	1	1	117	272
0700 - 0715	53	78	100	7	1	68	307
0715 - 0730	42	44	56	4	1	58	205
0730 - 0745	30	29	37	2	4	62	164
0745 - 0800	31	23	44	1	2	51	152
0800 - 0815	39	18	29	1	2	52	141
0815 - 0830	42	19	36	0	2	50	149
0830 - 0845	33	13	23	2	2	24	97
0845 - 0900	46	19	34	2	3	37	141
Per End	445	330	882	22	27	824	2530

Heavies	WEST		SOUTH		EAST		TOT
	Golden Hwy		Mitchell Line		Putty Rd		
	I	R	L	R	L	I	
0600 - 0615	2	2	3	0	4	4	15
0615 - 0630	2	2	8	0	0	4	16
0630 - 0645	2	3	5	0	0	2	12
0645 - 0700	2	4	8	0	0	1	15
0700 - 0715	1	1	7	0	0	7	16
0715 - 0730	1	4	2	0	0	4	11
0730 - 0745	1	1	2	0	1	1	6
0745 - 0800	1	4	8	0	0	4	17
0800 - 0815	4	5	3	0	0	3	15
0815 - 0830	7	8	4	0	1	6	26
0830 - 0845	2	2	5	0	0	1	10
0845 - 0900	2	5	5	0	0	4	16
Per End	27	41	60	0	6	41	175

Combined	WEST		SOUTH		EAST		TOT
	Golden Hwy		Mitchell Line		Putty Rd		
	I	R	L	R	L	I	
0600 - 0615	28	12	126	1	8	92	267
0615 - 0630	31	18	179	0	4	107	339
0630 - 0645	37	33	151	1	1	116	339
0645 - 0700	41	35	91	1	1	118	287
0700 - 0715	54	79	107	7	1	75	323
0715 - 0730	43	48	58	4	1	62	216
0730 - 0745	31	30	39	2	5	63	170
0745 - 0800	32	27	52	1	2	55	169
0800 - 0815	43	23	32	1	2	55	156
0815 - 0830	49	27	40	0	3	56	175
0830 - 0845	35	15	28	2	2	25	107
0845 - 0900	48	24	39	2	3	41	157
Per End	472	371	942	22	33	865	2705

Lights	WEST		SOUTH		EAST		TOT
	Golden Hwy		Mitchell Line		Putty Rd		
	I	R	L	R	L	I	
0600 - 0700	129	87	523	3	10	422	1174
0615 - 0715	156	155	500	9	7	402	1229
0630 - 0730	169	183	385	13	4	357	1111
0645 - 0745	164	182	276	14	7	305	948
0700 - 0800	156	174	237	14	8	239	828
0715 - 0815	142	114	166	8	9	223	662
0730 - 0830	142	89	146	4	10	215	606
0745 - 0845	145	73	132	4	8	177	539
0800 - 0900	160	69	122	5	9	163	528
PEAK HR	156	155	500	9	7	402	1229

Heavies	WEST		SOUTH		EAST		TOT
	Golden Hwy		Mitchell Line		Putty Rd		
	I	R	L	R	L	I	
0600 - 0700	8	11	24	0	4	11	58
0615 - 0715	7	10	28	0	0	14	59
0630 - 0730	6	12	22	0	0	14	54
0645 - 0745	5	10	19	0	1	13	48
0700 - 0800	4	10	19	0	1	16	50
0715 - 0815	7	14	15	0	1	12	49
0730 - 0830	13	18	17	0	2	14	64
0745 - 0845	14	19	20	0	1	14	68
0800 - 0900	15	20	17	0	1	14	67
PEAK HR	7	10	28	0	0	14	59

Combined	WEST		SOUTH		EAST		TOT
	Golden Hwy		Mitchell Line		Putty Rd		
	I	R	L	R	L	I	
0600 - 0700	137	98	547	3	14	433	1232
0615 - 0715	163	165	528	9	7	416	1288
0630 - 0730	175	195	407	13	4	371	1165
0645 - 0745	169	192	295	14	8	318	996
0700 - 0800	160	184	256	14	9	255	878
0715 - 0815	149	128	181	8	10	235	711
0730 - 0830	155	107	163	4	12	229	670
0745 - 0845	159	92	152	4	9	191	607
0800 - 0900	175	89	139	5	10	177	595
PEAK HR	163	165	528	9	7	416	1288



R.O.A.R. DATA

Reliable, Original & Authentic Results

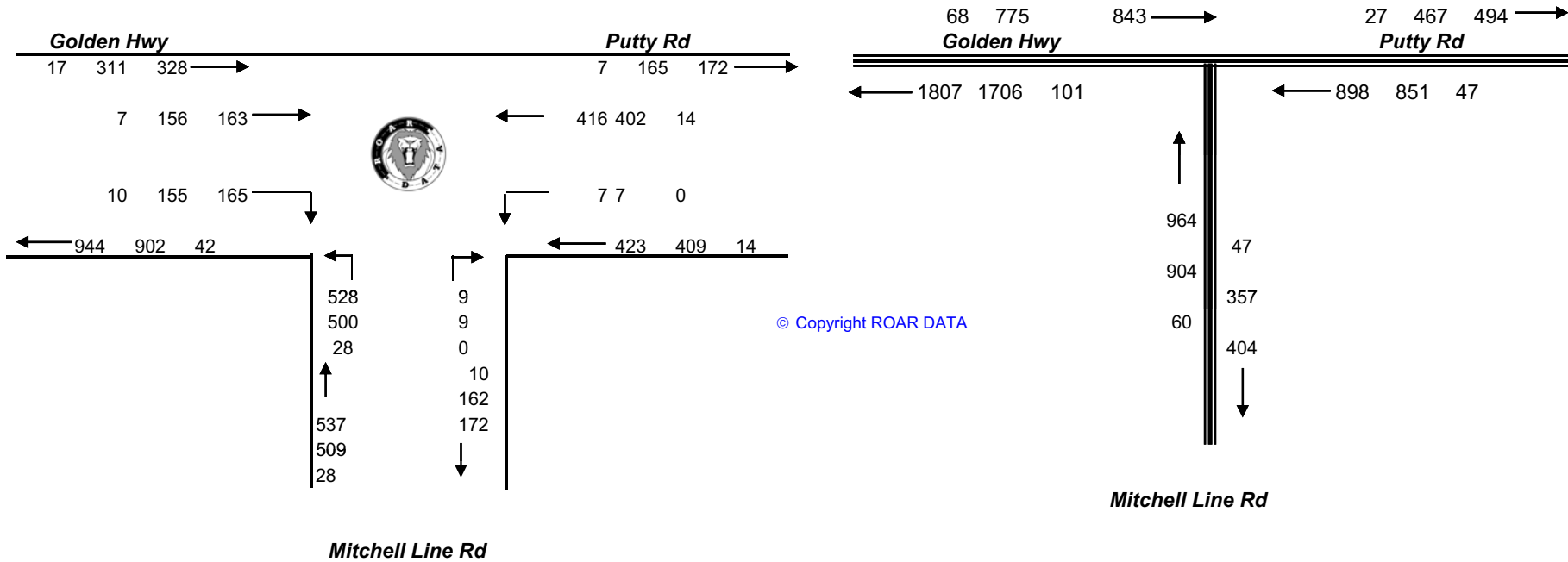
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : EMGA
Job No/Name : 5030 MT. THORLEY Mine Access
Day/Date : Tuesday 4th March 2014

AM PEAK
0615 - 0715



**TOTAL VOLUMES
FOR COUNT
PERIOD**





R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : EMGA
Job No/Name : 5030 MT. THORLEY Mine Access
Day/Date : Tuesday 4th March 2014

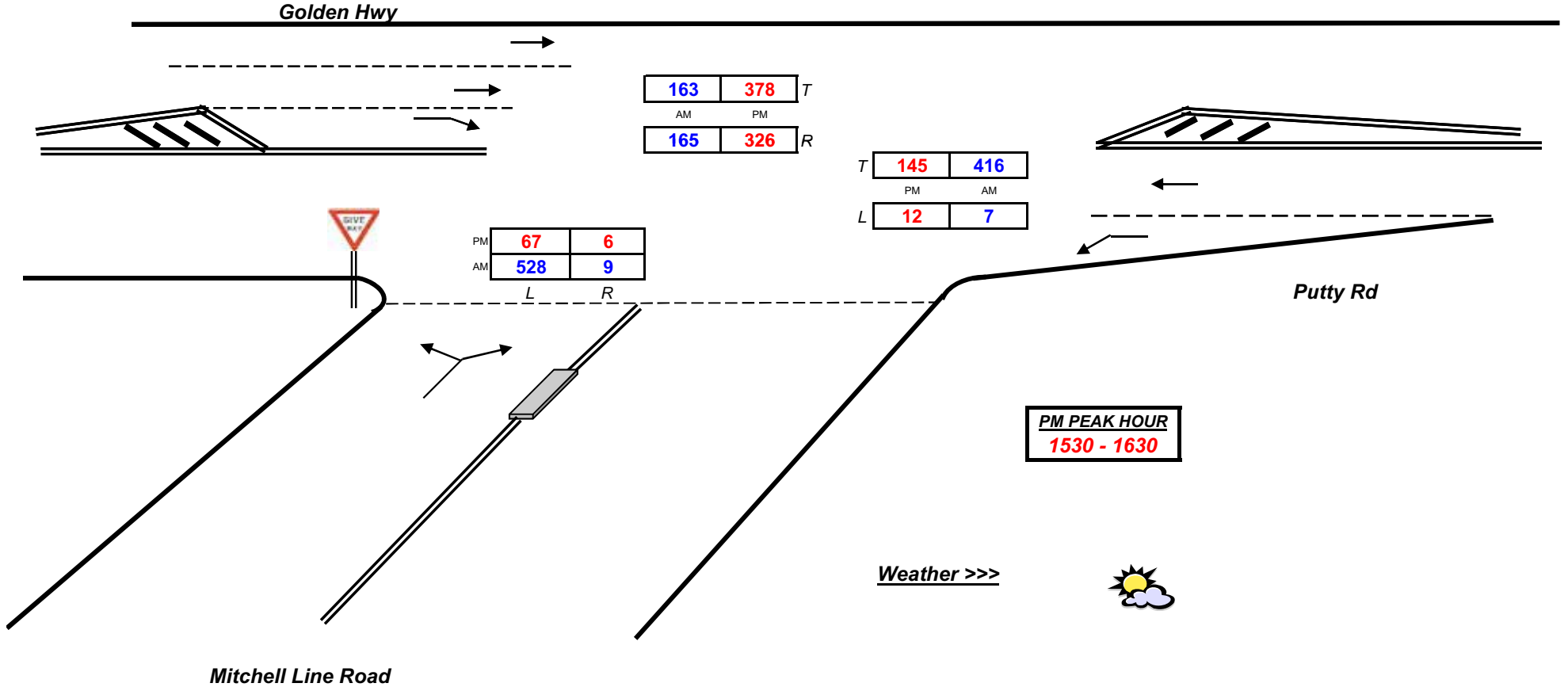
Intersection Details

Obtained via satellite

May be incorrect

AM PEAK HOUR
0615 - 0715

Combined figures only





R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849.

Mobile.0418239019

Client : EMGA
 Job No/Name : 5030 MT. THORLEY Mine Access
 Day/Date : Tuesday 4th March 2014

PEDS	WEST		SOUTH		EAST		TOT
	Golden Hwy	Mitchell Line	Putty Rd				
1500 - 1515							0
1515 - 1530			NOT				0
1530 - 1545			REQUIRED				0
1545 - 1600							0
1600 - 1615							0
1615 - 1630							0
1630 - 1645							0
1645 - 1700							0
1700 - 1715							0
1715 - 1730							0
1730 - 1745							0
1745 - 1800							0
Per End	0	0	0	0	0	0	0

PEDS	WEST		SOUTH		EAST		TOT
	Golden Hwy	Mitchell Line	Putty Rd				
1500 - 1600	0	0	0	0	0	0	0
1515 - 1615	0	0	0	0	0	0	0
1530 - 1630	0	0	0	0	0	0	0
1545 - 1645	0	0	0	0	0	0	0
1600 - 1700	0	0	0	0	0	0	0
1615 - 1715	0	0	0	0	0	0	0
1630 - 1730	0	0	0	0	0	0	0
1645 - 1745	0	0	0	0	0	0	0
1700 - 1800	0	0	0	0	0	0	0
PEAK HR	0	0	0	0	0	0	0

Lights	WEST		SOUTH		EAST		TOT
	Golden Hwy		Mitchell Line		Putty Rd		
	I	R	L	R	L	I	
1500 - 1515	74	80	17	8	4	43	226
1515 - 1530	75	73	17	2	3	27	197
1530 - 1545	90	92	10	1	1	30	224
1545 - 1600	89	79	22	1	4	34	229
1600 - 1615	108	71	7	0	4	32	222
1615 - 1630	80	64	14	4	3	31	196
1630 - 1645	87	62	15	1	3	30	198
1645 - 1700	76	67	23	0	6	25	197
1700 - 1715	86	80	27	3	1	38	235
1715 - 1730	60	51	27	3	1	32	174
1730 - 1745	41	34	32	1	2	44	154
1745 - 1800	54	49	49	2	0	45	199
Per End	920	802	260	26	32	411	2451

Heavies	WEST		SOUTH		EAST		TOT
	Golden Hwy		Mitchell Line		Putty Rd		
	I	R	L	R	L	I	
1500 - 1515	1	5	7	1	0	3	17
1515 - 1530	1	1	5	0	0	1	8
1530 - 1545	4	4	2	0	0	5	15
1545 - 1600	5	4	2	0	0	7	18
1600 - 1615	1	8	5	0	0	2	16
1615 - 1630	1	4	5	0	0	4	14
1630 - 1645	4	2	2	0	0	0	8
1645 - 1700	4	1	2	0	0	0	7
1700 - 1715	2	8	3	0	0	1	14
1715 - 1730	2	3	6	0	0	2	13
1730 - 1745	1	2	4	0	0	2	9
1745 - 1800	1	4	2	0	1	0	8
Per End	27	46	45	1	1	27	147

Combined	WEST		SOUTH		EAST		TOT
	Golden Hwy		Mitchell Line		Putty Rd		
	I	R	L	R	L	I	
1500 - 1515	75	85	24	9	4	46	243
1515 - 1530	76	74	22	2	3	28	205
1530 - 1545	94	96	12	1	1	35	239
1545 - 1600	94	83	24	1	4	41	247
1600 - 1615	109	79	12	0	4	34	238
1615 - 1630	81	68	19	4	3	35	210
1630 - 1645	91	64	17	1	3	30	206
1645 - 1700	80	68	25	0	6	25	204
1700 - 1715	88	88	30	3	1	39	249
1715 - 1730	62	54	33	3	1	34	187
1730 - 1745	42	36	36	1	2	46	163
1745 - 1800	55	53	51	2	1	45	207
Per End	947	848	305	27	33	438	2598

Lights	WEST		SOUTH		EAST		TOT
	Golden Hwy		Mitchell Line		Putty Rd		
	I	R	L	R	L	I	
1500 - 1600	328	324	66	12	12	134	876
1515 - 1615	362	315	56	4	12	123	872
1530 - 1630	367	306	53	6	12	127	871
1545 - 1645	364	276	58	6	14	127	845
1600 - 1700	351	264	59	5	16	118	813
1615 - 1715	329	273	79	8	13	124	826
1630 - 1730	309	260	92	7	11	125	804
1645 - 1745	263	232	109	7	10	139	760
1700 - 1800	241	214	135	9	4	159	762
PEAK HR	367	306	53	6	12	127	871

Heavies	WEST		SOUTH		EAST		TOT
	Golden Hwy		Mitchell Line		Putty Rd		
	I	R	L	R	L	I	
1500 - 1600	11	14	16	1	0	16	58
1515 - 1615	11	17	14	0	0	15	57
1530 - 1630	11	20	14	0	0	18	63
1545 - 1645	11	18	14	0	0	13	56
1600 - 1700	10	15	14	0	0	6	45
1615 - 1715	11	15	12	0	0	5	43
1630 - 1730	12	14	13	0	0	3	42
1645 - 1745	9	14	15	0	0	5	43
1700 - 1800	6	17	15	0	1	5	44
PEAK HR	11	20	14	0	0	18	63

Combined	WEST		SOUTH		EAST		TOT
	Golden Hwy		Mitchell Line		Putty Rd		
	I	R	L	R	L	I	
1500 - 1600	339	338	82	13	12	150	934
1515 - 1615	373	332	70	4	12	138	929
1530 - 1630	378	326	67	6	12	145	934
1545 - 1645	375	294	72	6	14	140	901
1600 - 1700	361	279	73	5	16	124	858
1615 - 1715	340	288	91	8	13	129	869
1630 - 1730	321	274	105	7	11	128	846
1645 - 1745	272	246	124	7	10	144	803
1700 - 1800	247	231	150	9	5	164	806
PEAK HR	378	326	67	6	12	145	934



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : EMGA

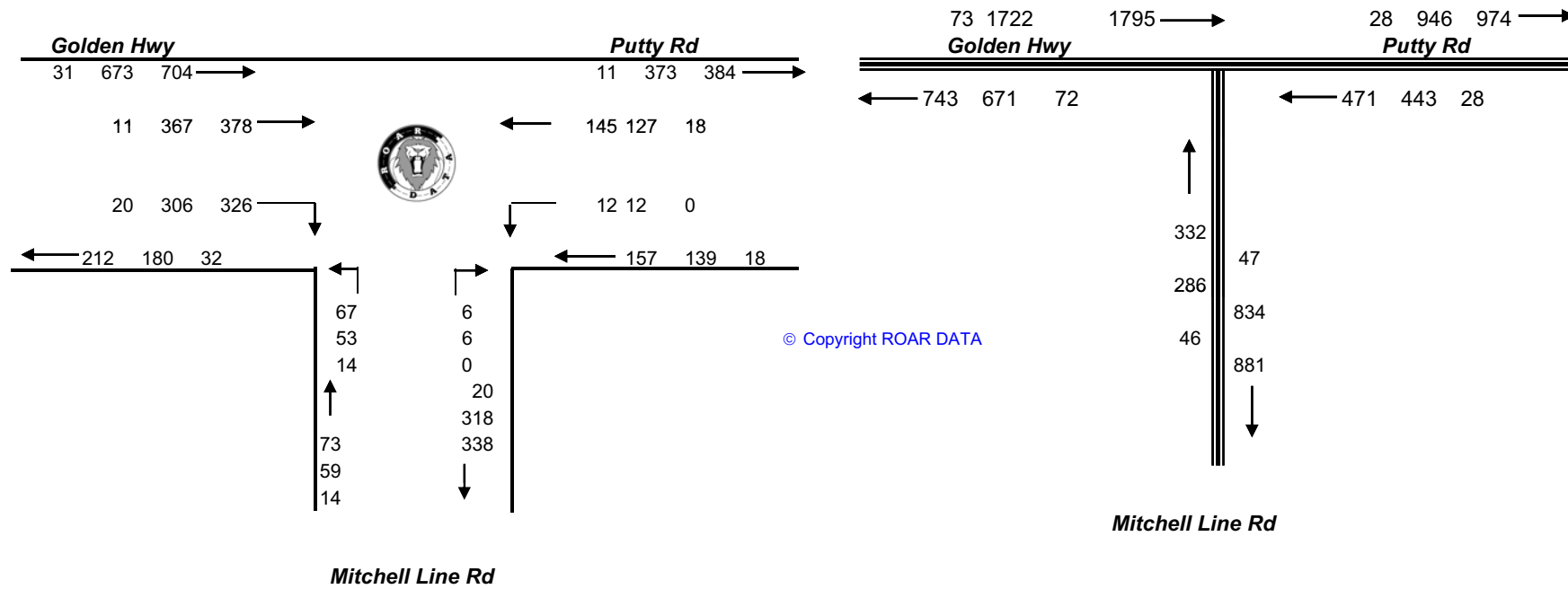
Job No/Name : 5030 MT. THORLEY Mine Access

Day/Date : Tuesday 4th March 2014

PM PEAK
1530 - 1630



TOTAL VOLUMES
FOR COUNT
PERIOD





R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849.

Mobile.0418239019

Client : EMGA
 Job No/Name : 5030 MT. THORLEY Mine Access
 Day/Date : Tuesday 4th March 2014

PEDS	NORTH	WEST	SOUTH	TOT
Time Per	Broke Rd	Mt Thorley	Broke Rd	
0600 - 0615				0
0615 - 0630		NOT		0
0630 - 0645		REQUIRED		0
0645 - 0700				0
0700 - 0715				0
0715 - 0730				0
0730 - 0745				0
0745 - 0800				0
0800 - 0815				0
0815 - 0830				0
0830 - 0845				0
0845 - 0900				0
Per End	0	0	0	0

PEDS	NORTH	WEST	SOUTH	TOT
Peak Per	Broke Rd	Mt Thorley	Broke Rd	
0600 - 0700	0	0	0	0
0615 - 0715	0	0	0	0
0630 - 0730	0	0	0	0
0645 - 0745	0	0	0	0
0700 - 0800	0	0	0	0
0715 - 0815	0	0	0	0
0730 - 0830	0	0	0	0
0745 - 0845	0	0	0	0
0800 - 0900	0	0	0	0

PEAK HR	0	0	0	0
----------------	----------	----------	----------	----------

Lights	NORTH		WEST		SOUTH		TOT
	Broke Rd		Mt Thorley		Broke Rd		
Time Per	I	R	L	R	L	I	
0600 - 0615	26	5	0	0	0	20	51
0615 - 0630	57	3	0	0	1	25	86
0630 - 0645	71	4	0	0	0	27	102
0645 - 0700	60	4	1	1	0	29	95
0700 - 0715	46	0	0	0	0	36	82
0715 - 0730	31	3	0	0	0	40	74
0730 - 0745	27	2	0	0	0	24	53
0745 - 0800	20	1	0	0	0	25	46
0800 - 0815	32	2	0	0	0	24	58
0815 - 0830	15	5	0	0	0	21	41
0830 - 0845	16	0	1	0	0	15	32
0845 - 0900	15	0	0	0	0	26	41
Per End	416	29	2	1	1	312	761

Heavies	NORTH		WEST		SOUTH		TOT
	Broke Rd		Mt Thorley		Broke Rd		
Time Per	I	R	L	R	L	I	
0600 - 0615	0	0	0	0	0	1	1
0615 - 0630	3	0	0	0	0	2	5
0630 - 0645	2	0	0	0	0	1	3
0645 - 0700	2	0	0	0	0	1	3
0700 - 0715	4	0	0	0	0	1	5
0715 - 0730	2	0	0	0	0	2	4
0730 - 0745	2	0	0	0	0	1	3
0745 - 0800	1	0	0	0	0	3	4
0800 - 0815	1	0	0	0	0	3	4
0815 - 0830	2	0	0	0	0	1	3
0830 - 0845	2	0	0	0	0	3	5
0845 - 0900	4	0	0	0	0	2	6
Per End	25	0	0	0	0	21	46

Combined	NORTH		WEST		SOUTH		TOT
	Broke Rd		Mt Thorley		Broke Rd		
Time Per	I	R	L	R	L	I	
0600 - 0615	26	5	0	0	0	21	52
0615 - 0630	60	3	0	0	1	27	91
0630 - 0645	73	4	0	0	0	28	105
0645 - 0700	62	4	1	1	0	30	98
0700 - 0715	50	0	0	0	0	37	87
0715 - 0730	33	3	0	0	0	42	78
0730 - 0745	29	2	0	0	0	25	56
0745 - 0800	21	1	0	0	0	28	50
0800 - 0815	33	2	0	0	0	27	62
0815 - 0830	17	5	0	0	0	22	44
0830 - 0845	18	0	1	0	0	18	37
0845 - 0900	19	0	0	0	0	28	47
Per End	441	29	2	1	1	333	807

Lights	NORTH		WEST		SOUTH		TOT
	Broke Rd		Mt Thorley		Broke Rd		
Peak Per	I	R	L	R	L	I	
0600 - 0700	214	16	1	1	1	101	334
0615 - 0715	234	11	1	1	1	117	365
0630 - 0730	208	11	1	1	0	132	353
0645 - 0745	164	9	1	1	0	129	304
0700 - 0800	124	6	0	0	0	125	255
0715 - 0815	110	8	0	0	0	113	231
0730 - 0830	94	10	0	0	0	94	198
0745 - 0845	83	8	1	0	0	85	177
0800 - 0900	78	7	1	0	0	86	172
PEAK HR	234	11	1	1	1	117	365

Heavies	NORTH		WEST		SOUTH		TOT
	Broke Rd		Mt Thorley		Broke Rd		
Peak Per	I	R	L	R	L	I	
0600 - 0700	7	0	0	0	0	5	12
0615 - 0715	11	0	0	0	0	5	16
0630 - 0730	10	0	0	0	0	5	15
0645 - 0745	10	0	0	0	0	5	15
0700 - 0800	9	0	0	0	0	7	16
0715 - 0815	6	0	0	0	0	9	15
0730 - 0830	6	0	0	0	0	8	14
0745 - 0845	6	0	0	0	0	10	16
0800 - 0900	9	0	0	0	0	9	18
PEAK HR	11	0	0	0	0	5	16

Combined	NORTH		WEST		SOUTH		TOT
	Broke Rd		Mt Thorley		Broke Rd		
Peak Per	I	R	L	R	L	I	
0600 - 0700	221	16	1	1	1	106	346
0615 - 0715	245	11	1	1	1	122	381
0630 - 0730	218	11	1	1	0	137	368
0645 - 0745	174	9	1	1	0	134	319
0700 - 0800	133	6	0	0	0	132	271
0715 - 0815	116	8	0	0	0	122	246
0730 - 0830	100	10	0	0	0	102	212
0745 - 0845	89	8	1	0	0	95	193
0800 - 0900	87	7	1	0	0	95	190
PEAK HR	245	11	1	1	1	122	381



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

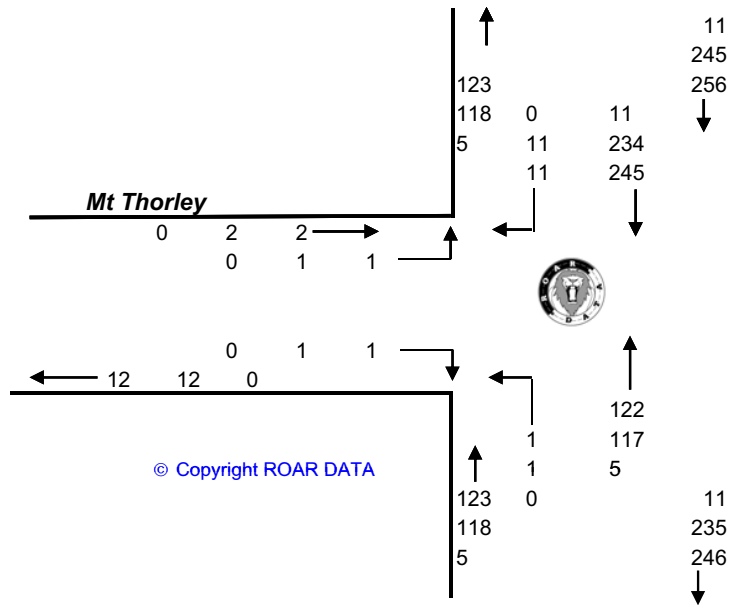
Client : EMGA
Job No/Name : 5030 MT. THORLEY Mine Access
Day/Date : Tuesday 4th March 2014

AM PEAK
0615 - 0715

**TOTAL VOLUMES
FOR COUNT
PERIOD**



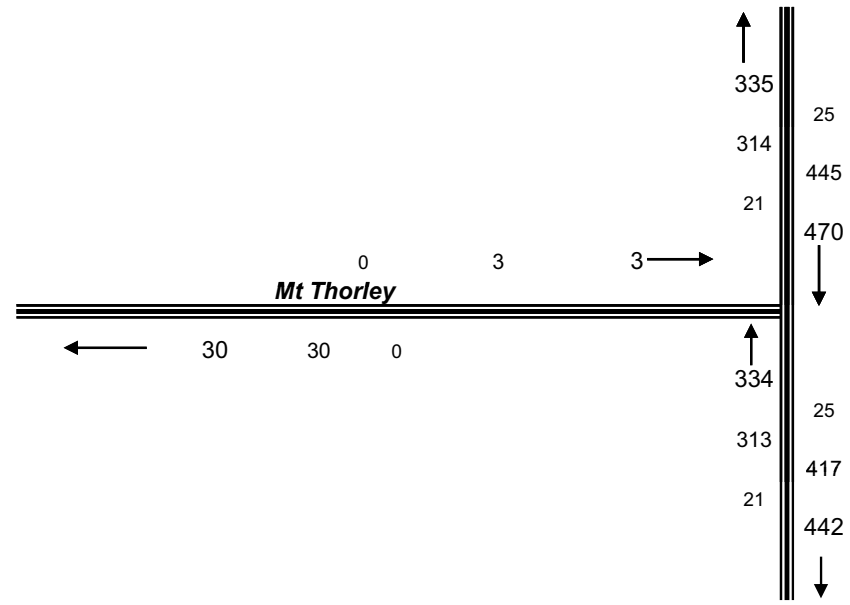
Broke Rd



© Copyright ROAR DATA

Broke Rd

Broke Rd



Broke Rd



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : EMGA
Job No/Name : 5030 MT. THORLEY Mine Access
Day/Date : Tuesday 4th March 2014

Intersection Details

Obtained via satellite

May be incorrect



AM PEAK HOUR
0615 - 0715



Mt. Thorley Mine Access

Broke Rd

	R	T	
	11	245	AM
	0	97	PM

	1	19	L
--	---	----	---

	AM	PM	
	1	3	R

PM	0	140
AM	1	122
	L	T

PM PEAK HOUR
1515 - 1615

Combined figures only

Weather >>>



Broke Rd



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849.

Mobile.0418239019

Client : EMGA
 Job No/Name : 5030 MT. THORLEY Mine Access
 Day/Date : Tuesday 4th March 2014

PEDS	NORTH	WEST	SOUTH	TOT
Time Per	Broke Rd	Mt Thorley	Broke Rd	
1500 - 1515				0
1515 - 1530		NOT		0
1530 - 1545		REQUIRED		0
1545 - 1600				0
1600 - 1615				0
1615 - 1630				0
1630 - 1645				0
1645 - 1700				0
1700 - 1715				0
1715 - 1730				0
1730 - 1745				0
1745 - 1800				0
Per End	0	0	0	0

PEDS	NORTH	WEST	SOUTH	TOT
Peak Per	Broke Rd	Mt Thorley	Broke Rd	
1500 - 1600	0	0	0	0
1515 - 1615	0	0	0	0
1530 - 1630	0	0	0	0
1545 - 1645	0	0	0	0
1600 - 1700	0	0	0	0
1615 - 1715	0	0	0	0
1630 - 1730	0	0	0	0
1645 - 1745	0	0	0	0
1700 - 1800	0	0	0	0

PEAK HR	0	0	0	0
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Lights	NORTH		WEST		SOUTH		TOT
	Broke Rd		Mt Thorley		Broke Rd		
Time Per	I	R	L	R	L	I	
1500 - 1515	32	0	4	0	0	29	65
1515 - 1530	24	0	3	0	0	33	60
1530 - 1545	26	0	2	0	0	35	63
1545 - 1600	17	0	9	2	0	22	50
1600 - 1615	24	0	5	1	0	45	75
1615 - 1630	23	0	3	0	0	23	49
1630 - 1645	15	0	2	0	0	30	47
1645 - 1700	17	0	1	0	0	32	50
1700 - 1715	25	0	1	0	0	33	59
1715 - 1730	19	0	0	0	0	17	36
1730 - 1745	22	0	0	0	0	22	44
1745 - 1800	11	0	1	0	0	23	35
Per End	255	0	31	3	0	344	633

Heavies	NORTH		WEST		SOUTH		TOT
	Broke Rd		Mt Thorley		Broke Rd		
Time Per	I	R	L	R	L	I	
1500 - 1515	0	0	0	0	0	1	1
1515 - 1530	1	0	0	0	0	1	2
1530 - 1545	2	0	0	0	0	2	4
1545 - 1600	1	0	0	0	0	1	2
1600 - 1615	2	0	0	0	0	1	3
1615 - 1630	2	0	0	0	0	0	2
1630 - 1645	0	0	0	0	0	1	1
1645 - 1700	1	0	0	0	0	2	3
1700 - 1715	0	0	0	0	0	2	2
1715 - 1730	0	0	0	0	0	0	0
1730 - 1745	0	0	0	0	0	1	1
1745 - 1800	0	0	0	0	0	2	2
Per End	9	0	0	0	0	14	23

Combined	NORTH		WEST		SOUTH		TOT
	Broke Rd		Mt Thorley		Broke Rd		
Time Per	I	R	L	R	L	I	
1500 - 1515	32	0	4	0	0	30	66
1515 - 1530	25	0	3	0	0	34	62
1530 - 1545	28	0	2	0	0	37	67
1545 - 1600	18	0	9	2	0	23	52
1600 - 1615	26	0	5	1	0	46	78
1615 - 1630	25	0	3	0	0	23	51
1630 - 1645	15	0	2	0	0	31	48
1645 - 1700	18	0	1	0	0	34	53
1700 - 1715	25	0	1	0	0	35	61
1715 - 1730	19	0	0	0	0	17	36
1730 - 1745	22	0	0	0	0	23	45
1745 - 1800	11	0	1	0	0	25	37
Per End	264	0	31	3	0	358	656

Lights	NORTH		WEST		SOUTH		TOT
	Broke Rd		Mt Thorley		Broke Rd		
Peak Per	I	R	L	R	L	I	
1500 - 1600	99	0	18	2	0	119	238
1515 - 1615	91	0	19	3	0	135	248
1530 - 1630	90	0	19	3	0	125	237
1545 - 1645	79	0	19	3	0	120	221
1600 - 1700	79	0	11	1	0	130	221
1615 - 1715	80	0	7	0	0	118	205
1630 - 1730	76	0	4	0	0	112	192
1645 - 1745	83	0	2	0	0	104	189
1700 - 1800	77	0	2	0	0	95	174
PEAK HR	91	0	19	3	0	135	248

Heavies	NORTH		WEST		SOUTH		TOT
	Broke Rd		Mt Thorley		Broke Rd		
Peak Per	I	R	L	R	L	I	
1500 - 1600	4	0	0	0	0	5	9
1515 - 1615	6	0	0	0	0	5	11
1530 - 1630	7	0	0	0	0	4	11
1545 - 1645	5	0	0	0	0	3	8
1600 - 1700	5	0	0	0	0	4	9
1615 - 1715	3	0	0	0	0	5	8
1630 - 1730	1	0	0	0	0	5	6
1645 - 1745	1	0	0	0	0	5	6
1700 - 1800	0	0	0	0	0	5	5
PEAK HR	6	0	0	0	0	5	11

Combined	NORTH		WEST		SOUTH		TOT
	Broke Rd		Mt Thorley		Broke Rd		
Peak Per	I	R	L	R	L	I	
1500 - 1600	103	0	18	2	0	124	247
1515 - 1615	97	0	19	3	0	140	259
1530 - 1630	97	0	19	3	0	129	248
1545 - 1645	84	0	19	3	0	123	229
1600 - 1700	84	0	11	1	0	134	230
1615 - 1715	83	0	7	0	0	123	213
1630 - 1730	77	0	4	0	0	117	198
1645 - 1745	84	0	2	0	0	109	195
1700 - 1800	77	0	2	0	0	100	179
PEAK HR	97	0	19	3	0	140	259



R.O.A.R. DATA

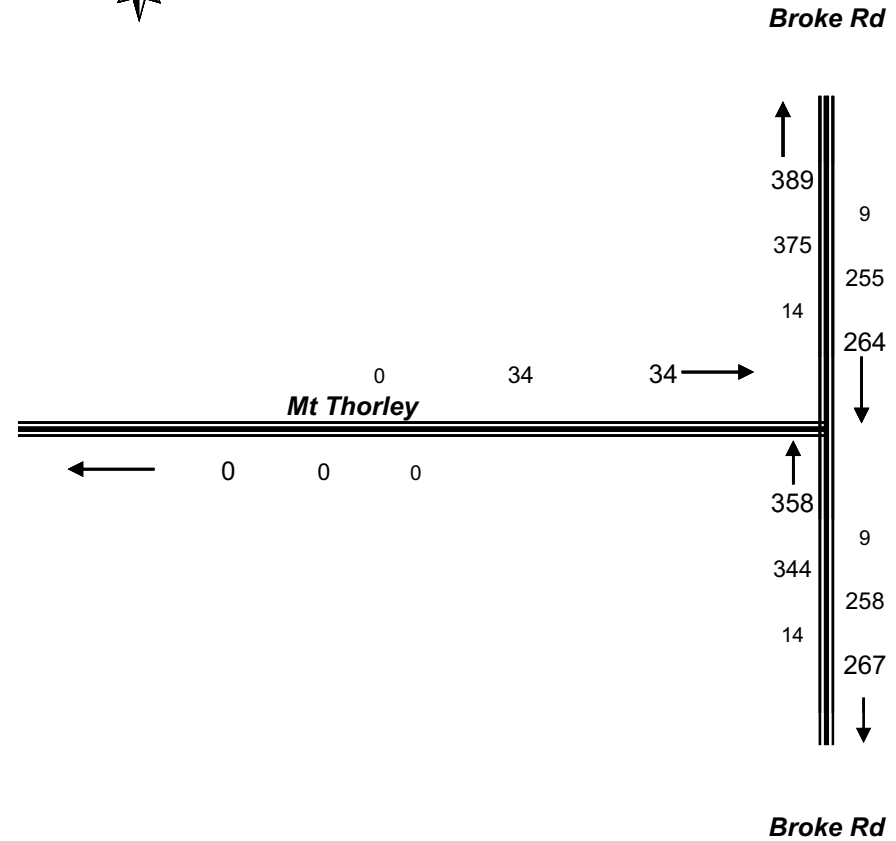
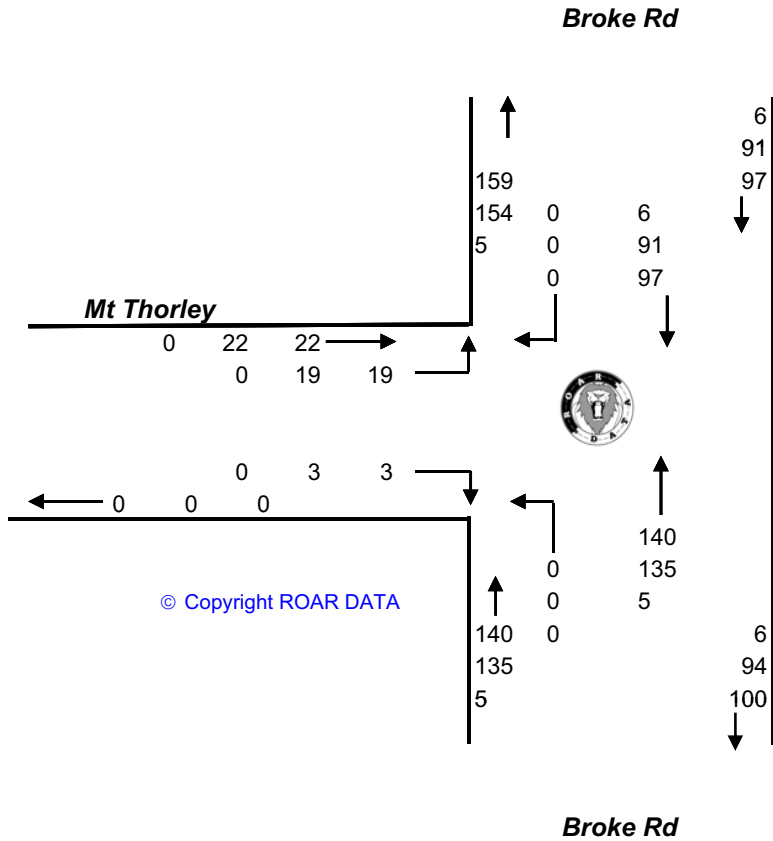
Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : EMGA
Job No/Name : 5030 MT. THORLEY Mine Access
Day/Date : Tuesday 4th March 2014

PM PEAK
1515 - 1615

TOTAL VOLUMES
FOR COUNT
PERIOD





R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849.

Mobile.0418239019

Client : EMGA
Job No/Name : 5030 MT. THORLEY Mine Access
Day/Date : Tuesday 4th March 2014

PEDS	WEST	NORTH	EAST	TOT
Time Per	Putty Rd	Warkworth	Putty Rd	
0600 - 0615				0
0615 - 0630		NOT		0
0630 - 0645		REQUIRED		0
0645 - 0700				0
0700 - 0715				0
0715 - 0730				0
0730 - 0745				0
0745 - 0800				0
0800 - 0815				0
0815 - 0830				0
0830 - 0845				0
0845 - 0900				0
Per End	0	0	0	0

PEDS	WEST	NORTH	EAST	TOT
Peak Per	Putty Rd	Warkworth	Putty Rd	
0600 - 0700	0	0	0	0
0615 - 0715	0	0	0	0
0630 - 0730	0	0	0	0
0645 - 0745	0	0	0	0
0700 - 0800	0	0	0	0
0715 - 0815	0	0	0	0
0730 - 0830	0	0	0	0
0745 - 0845	0	0	0	0
0800 - 0900	0	0	0	0
PEAK HR	0	0	0	0

Lights	WEST		NORTH		EAST		TOT
	Putty Rd		Warkworth		Putty Rd		
Time Per	I	L	R	L	R	I	
0600 - 0615	5	0	0	5	18	2	30
0615 - 0630	1	5	0	14	39	1	60
0630 - 0645	11	0	0	14	19	1	45
0645 - 0700	11	0	1	17	10	4	43
0700 - 0715	7	1	2	63	23	3	99
0715 - 0730	4	1	1	5	13	3	27
0730 - 0745	5	0	0	8	9	5	27
0745 - 0800	9	0	0	5	5	3	22
0800 - 0815	10	1	0	5	6	5	27
0815 - 0830	15	0	1	5	7	8	36
0830 - 0845	11	0	0	2	5	2	20
0845 - 0900	12	0	0	3	3	8	26
Per End	101	8	5	146	157	45	462

Heavies	WEST		NORTH		EAST		TOT
	Putty Rd		Warkworth		Putty Rd		
Time Per	I	L	R	L	R	I	
0600 - 0615	0	0	0	0	0	0	0
0615 - 0630	0	1	0	0	1	0	2
0630 - 0645	0	0	0	0	1	0	1
0645 - 0700	0	0	0	0	1	0	1
0700 - 0715	1	0	0	0	0	0	1
0715 - 0730	0	0	0	0	0	2	2
0730 - 0745	1	0	0	0	0	0	1
0745 - 0800	0	0	0	0	0	0	0
0800 - 0815	0	0	0	0	2	0	2
0815 - 0830	1	0	0	0	1	0	2
0830 - 0845	1	0	0	2	4	0	7
0845 - 0900	1	0	0	2	0	0	3
Per End	5	1	0	4	10	2	22

Combined	WEST		NORTH		EAST		TOT
	Putty Rd		Warkworth		Putty Rd		
Time Per	I	L	R	L	R	I	
0600 - 0615	5	0	0	5	18	2	30
0615 - 0630	1	6	0	14	40	1	62
0630 - 0645	11	0	0	14	20	1	46
0645 - 0700	11	0	1	17	11	4	44
0700 - 0715	8	1	2	63	23	3	100
0715 - 0730	4	1	1	5	13	5	29
0730 - 0745	6	0	0	8	9	5	28
0745 - 0800	9	0	0	5	5	3	22
0800 - 0815	10	1	0	5	8	5	29
0815 - 0830	16	0	1	5	8	8	38
0830 - 0845	12	0	0	4	9	2	27
0845 - 0900	13	0	0	5	3	8	29
Per End	106	9	5	150	167	47	484

Lights	WEST		NORTH		EAST		TOT
	Putty Rd		Warkworth		Putty Rd		
Peak Per	I	L	R	L	R	I	
0600 - 0700	28	5	1	50	86	8	178
0615 - 0715	30	6	3	108	91	9	247
0630 - 0730	33	2	4	99	65	11	214
0645 - 0745	27	2	4	93	55	15	196
0700 - 0800	25	2	3	81	50	14	175
0715 - 0815	28	2	1	23	33	16	103
0730 - 0830	39	1	1	23	27	21	112
0745 - 0845	45	1	1	17	23	18	105
0800 - 0900	48	1	1	15	21	23	109
PEAK HR	30	6	3	108	91	9	247

Heavies	WEST		NORTH		EAST		TOT
	Putty Rd		Warkworth		Putty Rd		
Peak Per	I	L	R	L	R	I	
0600 - 0700	0	1	0	0	3	0	4
0615 - 0715	1	1	0	0	3	0	5
0630 - 0730	1	0	0	0	2	2	5
0645 - 0745	2	0	0	0	1	2	5
0700 - 0800	2	0	0	0	0	2	4
0715 - 0815	1	0	0	0	2	2	5
0730 - 0830	2	0	0	0	3	0	5
0745 - 0845	2	0	0	2	7	0	11
0800 - 0900	3	0	0	4	7	0	14
PEAK HR	1	1	0	0	3	0	5

Combined	WEST		NORTH		EAST		TOT
	Putty Rd		Warkworth		Putty Rd		
Peak Per	I	L	R	L	R	I	
0600 - 0700	28	6	1	50	89	8	182
0615 - 0715	31	7	3	108	94	9	252
0630 - 0730	34	2	4	99	67	13	219
0645 - 0745	29	2	4	93	56	17	201
0700 - 0800	27	2	3	81	50	16	179
0715 - 0815	29	2	1	23	35	18	108
0730 - 0830	41	1	1	23	30	21	117
0745 - 0845	47	1	1	19	30	18	116
0800 - 0900	51	1	1	19	28	23	123
PEAK HR	31	7	3	108	94	9	252



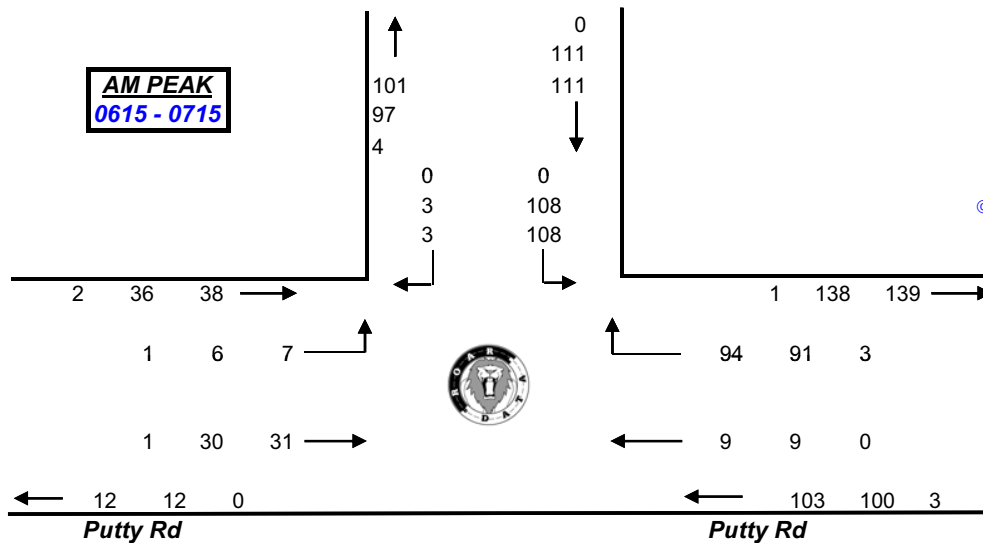
R.O.A.R. DATA

Client : EMGA

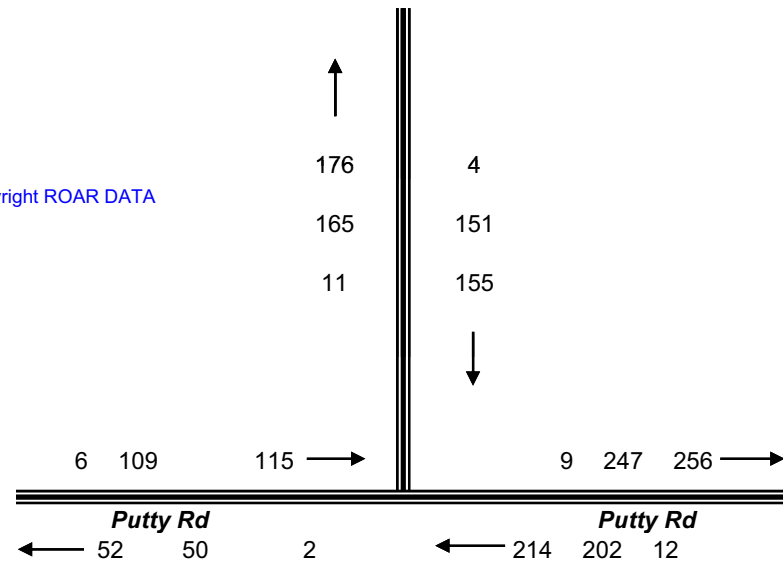


**TOTAL VOLUMES
 FOR COUNT
 PERIOD**

Warkworth Access



Warkworth Access





R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : EMGA
Job No/Name : 5030 MT. THORLEY Mine Access
Day/Date : Tuesday 4th March 2014

Intersection Details

Obtained via satellite

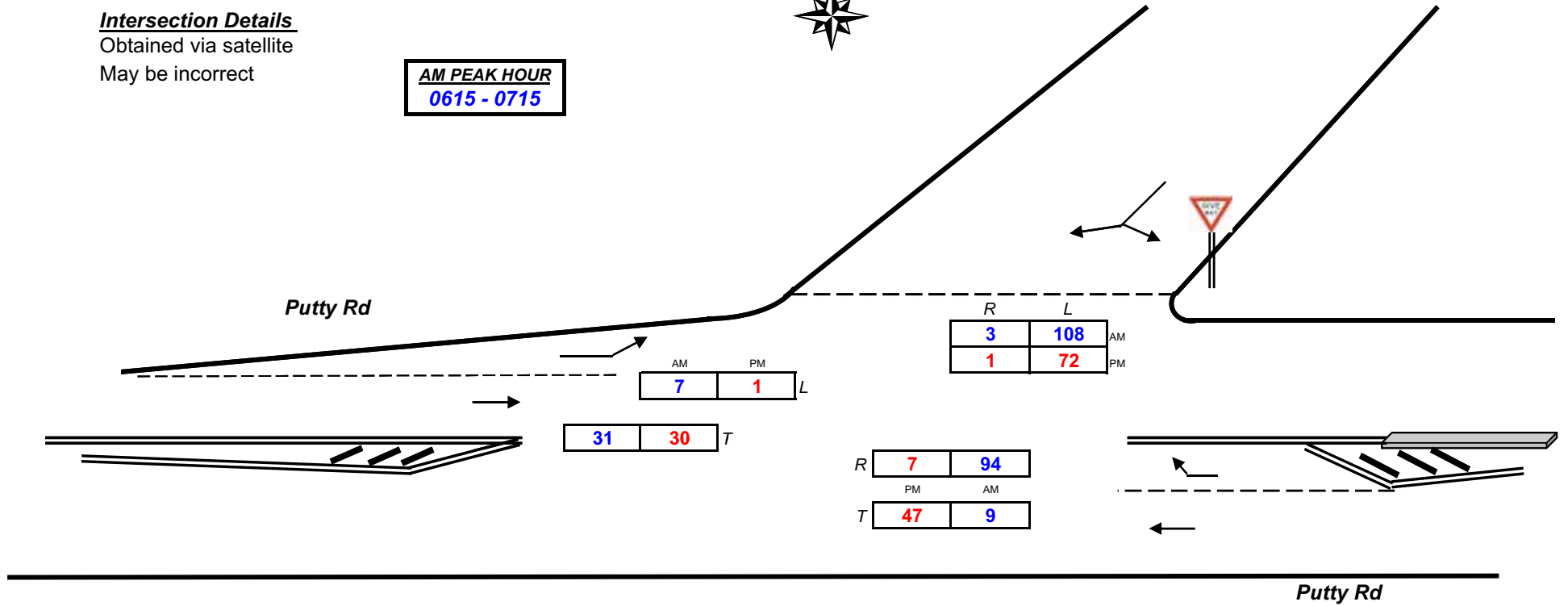
May be incorrect

AM PEAK HOUR
0615 - 0715



Warkworth Access

Putty Rd



Combined figures only

PM PEAK HOUR
1530 - 1630

Weather >>>





R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849.

Mobile.0418239019

Client : EMGA
 Job No/Name : 5030 MT. THORLEY Mine Access
 Day/Date : Tuesday 4th March 2014

PEDS				
	WEST	NORTH	EAST	
Time Per	Putty Rd	Warkworth	Putty Rd	TOT
1500 - 1515				0
1515 - 1530		NOT		0
1530 - 1545		REQUIRED		0
1545 - 1600				0
1600 - 1615				0
1615 - 1630				0
1630 - 1645				0
1645 - 1700				0
1700 - 1715				0
1715 - 1730				0
1730 - 1745				0
1745 - 1800				0
Per End	0	0	0	0

PEDS				
	WEST	NORTH	EAST	
Peak Per	Putty Rd	Warkworth	Putty Rd	TOT
1500 - 1600	0	0	0	0
1515 - 1615	0	0	0	0
1530 - 1630	0	0	0	0
1545 - 1645	0	0	0	0
1600 - 1700	0	0	0	0
1615 - 1715	0	0	0	0
1630 - 1730	0	0	0	0
1645 - 1745	0	0	0	0
1700 - 1800	0	0	0	0

PEAK HR	0	0	0	0
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Lights	WEST		NORTH		EAST		TOT
	Putty Rd		Warkworth		Putty Rd		
Time Per	I	L	R	L	R	I	
1500 - 1515	7	0	0	15	5	5	32
1515 - 1530	4	0	1	6	3	14	28
1530 - 1545	8	1	1	25	2	10	47
1545 - 1600	10	0	0	10	1	4	25
1600 - 1615	4	0	0	23	2	14	43
1615 - 1630	7	0	0	11	2	14	34
1630 - 1645	6	0	0	11	2	9	28
1645 - 1700	2	0	0	6	0	13	21
1700 - 1715	6	1	0	5	11	17	40
1715 - 1730	7	1	0	8	13	8	37
1730 - 1745	2	0	0	7	5	7	21
1745 - 1800	5	0	0	17	32	18	72
Per End	68	3	2	144	78	133	428

Heavies	WEST		NORTH		EAST		TOT
	Putty Rd		Warkworth		Putty Rd		
Time Per	I	L	R	L	R	I	
1500 - 1515	3	0	0	0	0	1	4
1515 - 1530	0	0	0	0	1	0	1
1530 - 1545	1	0	0	2	0	1	4
1545 - 1600	0	0	0	0	0	1	1
1600 - 1615	0	0	0	1	0	1	2
1615 - 1630	0	0	0	0	0	2	2
1630 - 1645	1	0	0	0	0	0	1
1645 - 1700	0	0	0	0	0	0	0
1700 - 1715	2	0	0	0	0	0	2
1715 - 1730	1	0	0	0	0	0	1
1730 - 1745	0	0	0	0	0	0	0
1745 - 1800	0	0	0	0	0	2	2
Per End	8	0	0	3	1	8	20

Combined	WEST		NORTH		EAST		TOT
	Putty Rd		Warkworth		Putty Rd		
Time Per	I	L	R	L	R	I	
1500 - 1515	10	0	0	15	5	6	36
1515 - 1530	4	0	1	6	4	14	29
1530 - 1545	9	1	1	27	2	11	51
1545 - 1600	10	0	0	10	1	5	26
1600 - 1615	4	0	0	24	2	15	45
1615 - 1630	7	0	0	11	2	16	36
1630 - 1645	7	0	0	11	2	9	29
1645 - 1700	2	0	0	6	0	13	21
1700 - 1715	8	1	0	5	11	17	42
1715 - 1730	8	1	0	8	13	8	38
1730 - 1745	2	0	0	7	5	7	21
1745 - 1800	5	0	0	17	32	20	74
Per End	76	3	2	147	79	141	448

Lights	WEST		NORTH		EAST		TOT
	Putty Rd		Warkworth		Putty Rd		
Peak Per	I	L	R	L	R	I	
1500 - 1600	29	1	2	56	11	33	132
1515 - 1615	26	1	2	64	8	42	143
1530 - 1630	29	1	1	69	7	42	149
1545 - 1645	27	0	0	55	7	41	130
1600 - 1700	19	0	0	51	6	50	126
1615 - 1715	21	1	0	33	15	53	123
1630 - 1730	21	2	0	30	26	47	126
1645 - 1745	17	2	0	26	29	45	119
1700 - 1800	20	2	0	37	61	50	170
PEAK HR	29	1	1	69	7	42	149

Heavies	WEST		NORTH		EAST		TOT
	Putty Rd		Warkworth		Putty Rd		
Peak Per	I	L	R	L	R	I	
1500 - 1600	4	0	0	2	1	3	10
1515 - 1615	1	0	0	3	1	3	8
1530 - 1630	1	0	0	3	0	5	9
1545 - 1645	1	0	0	1	0	4	6
1600 - 1700	1	0	0	1	0	3	5
1615 - 1715	3	0	0	0	0	2	5
1630 - 1730	4	0	0	0	0	0	4
1645 - 1745	3	0	0	0	0	0	3
1700 - 1800	3	0	0	0	0	2	5
PEAK HR	1	0	0	3	0	5	9

Combined	WEST		NORTH		EAST		TOT
	Putty Rd		Warkworth		Putty Rd		
Peak Per	I	L	R	L	R	I	
1500 - 1600	33	1	2	58	12	36	142
1515 - 1615	27	1	2	67	9	45	151
1530 - 1630	30	1	1	72	7	47	158
1545 - 1645	28	0	0	56	7	45	136
1600 - 1700	20	0	0	52	6	53	131
1615 - 1715	24	1	0	33	15	55	128
1630 - 1730	25	2	0	30	26	47	130
1645 - 1745	20	2	0	26	29	45	122
1700 - 1800	23	2	0	37	61	52	175
PEAK HR	30	1	1	72	7	47	158



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : EMGA

Job No/Name : 5030 MT. THORLEY Mine Access

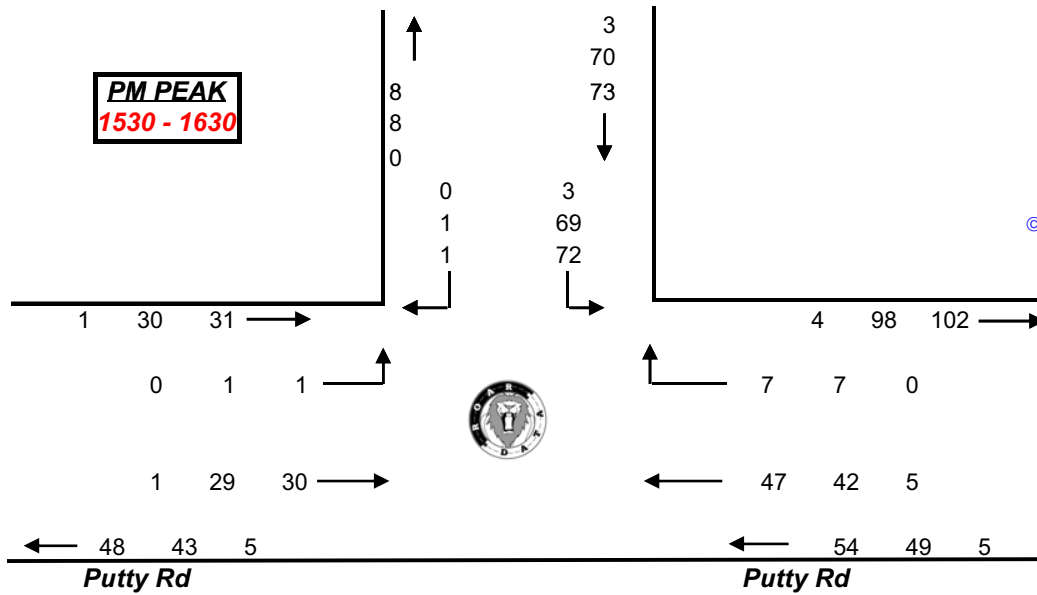
Day/Date : Tuesday 4th March 2014



**TOTAL VOLUMES
FOR COUNT
PERIOD**

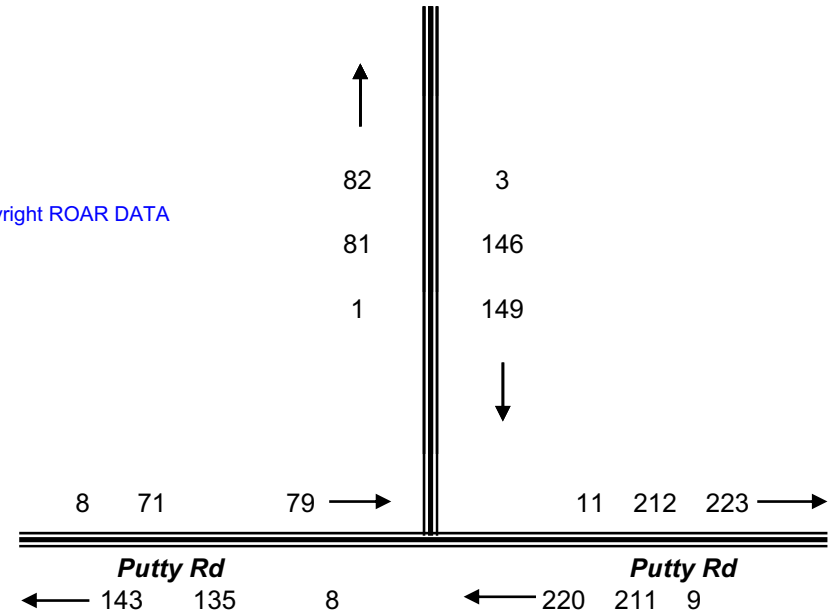
Warkworth Access

**PM PEAK
1530 - 1630**



© Copyright ROAR DATA

Warkworth Access



Appendix C

SIDRA intersection analysis results



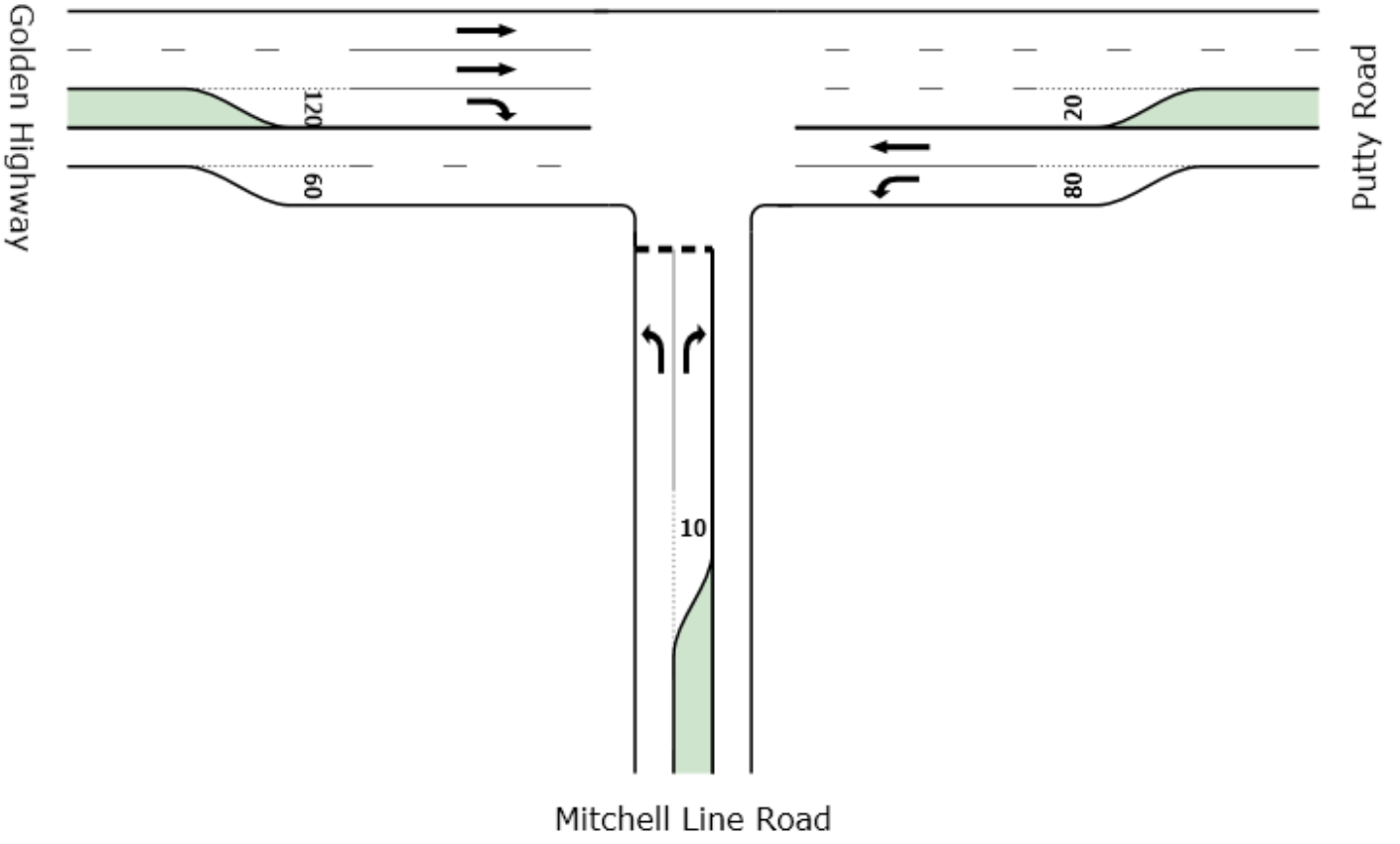
Broke Road



Broke Road

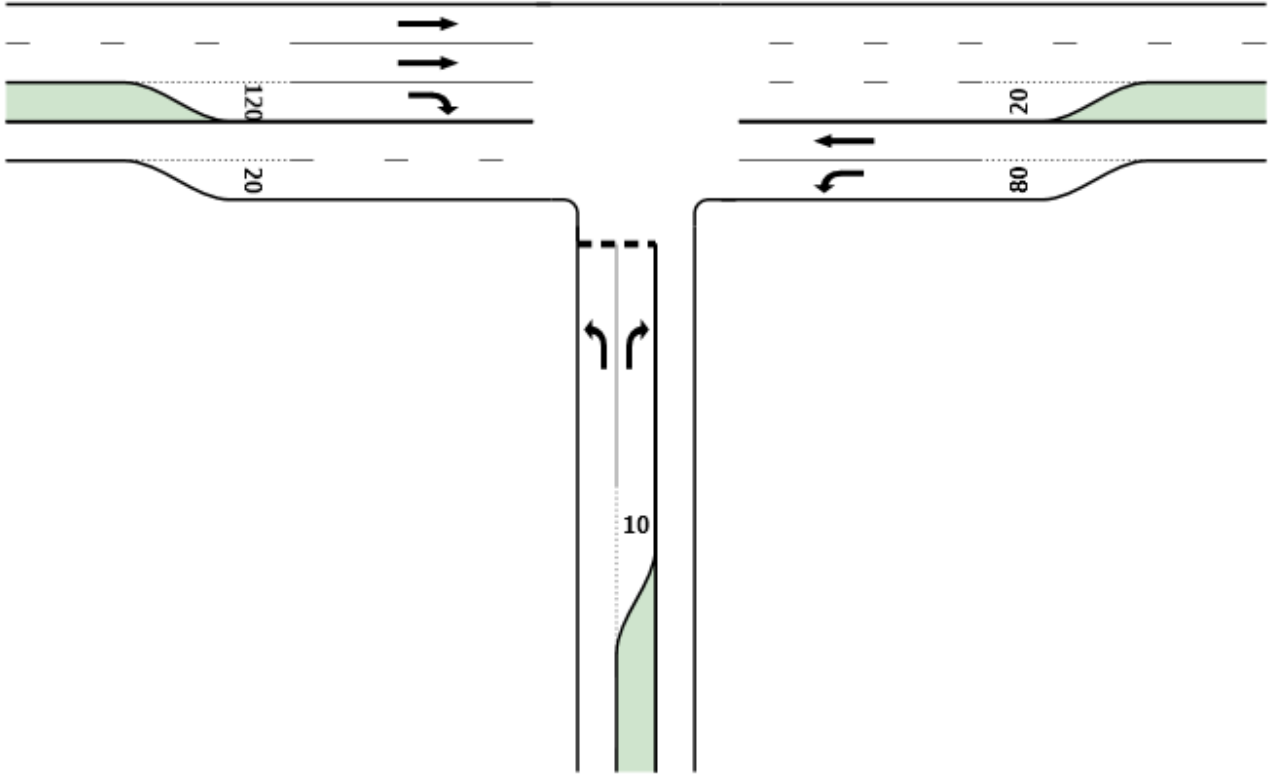
CHPP Access







Golden Highway



Broke Road

Golden Highway



Warkworth Access



MOVEMENT SUMMARY

Site: Golden Hwy Broke Road
Intersection 2014 AM Peak

T Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Broke Road											
1	L	79	5.0	0.186	20.3	LOS B	0.6	4.7	0.69	0.93	58.6
3	R	44	5.0	0.253	31.6	LOS C	0.8	5.7	0.81	0.97	47.4
Approach		123	5.0	0.253	24.3	LOS B	0.8	5.7	0.73	0.94	54.1
East: Golden Highway											
4	L	215	5.0	0.120	13.0	LOS A	0.0	0.0	0.00	0.76	69.1
5	T	729	5.0	0.386	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		944	5.0	0.386	3.0	NA	0.0	0.0	0.00	0.17	90.9
West: Golden Highway											
11	T	284	5.0	0.075	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
12	R	41	5.0	0.086	19.5	LOS B	0.3	2.2	0.69	0.92	59.6
Approach		325	5.0	0.086	2.5	NA	0.3	2.2	0.09	0.12	92.3
All Vehicles		1392	5.0	0.386	4.7	NA	0.8	5.7	0.09	0.23	86.1

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Golden Hwy Broke Road
Intersection 2014 PM Peak

T Intersection
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Broke Road											
1	L	29	5.0	0.030	13.9	LOS A	0.1	0.8	0.29	0.70	67.1
3	R	130	5.0	0.369	16.5	LOS B	1.0	7.4	0.47	0.80	63.7
Approach		159	5.0	0.369	16.0	LOS B	1.0	7.4	0.44	0.78	64.3
East: Golden Highway											
4	L	37	5.0	0.021	13.0	LOS A	0.0	0.0	0.00	0.76	69.1
5	T	175	5.0	0.093	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		212	5.0	0.093	2.3	NA	0.0	0.0	0.00	0.13	92.9
West: Golden Highway											
11	T	574	5.0	0.152	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
12	R	60	5.0	0.051	13.8	LOS A	0.2	1.5	0.31	0.70	67.0
Approach		634	5.0	0.152	1.3	NA	0.2	1.5	0.03	0.07	95.6
All Vehicles		1005	5.0	0.369	3.8	NA	1.0	7.4	0.09	0.19	88.4

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Golden Hwy Broke Road
Intersection 2017 AM Peak

T Intersection
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Broke Road											
1	L	84	5.0	0.215	21.5	LOS B	0.8	5.6	0.72	0.94	57.2
3	R	47	5.0	0.254	34.1	LOS C	0.9	6.7	0.84	0.98	45.5
Approach		131	5.0	0.254	26.0	LOS B	0.9	6.7	0.76	0.95	52.4
East: Golden Highway											
4	L	228	5.0	0.127	13.0	LOS A	0.0	0.0	0.00	0.76	69.1
5	T	773	5.0	0.409	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		1001	5.0	0.409	3.0	NA	0.0	0.0	0.00	0.17	90.9
West: Golden Highway											
11	T	301	5.0	0.080	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
12	R	43	5.0	0.098	20.3	LOS B	0.3	2.5	0.72	0.93	58.5
Approach		344	5.0	0.098	2.5	NA	0.3	2.5	0.09	0.12	92.0
All Vehicles		1476	5.0	0.409	4.9	NA	0.9	6.7	0.09	0.23	85.7

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Golden Hwy Broke Road
Intersection 2017 PM Peak

T Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Broke Road											
1	L	31	5.0	0.032	14.0	LOS A	0.1	0.8	0.30	0.70	67.1
3	R	138	5.0	0.397	17.1	LOS B	1.2	8.6	0.49	0.82	62.8
Approach		169	5.0	0.397	16.5	LOS B	1.2	8.6	0.45	0.80	63.5
East: Golden Highway											
4	L	39	5.0	0.022	13.0	LOS A	0.0	0.0	0.00	0.76	69.1
5	T	186	5.0	0.098	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		225	5.0	0.098	2.3	NA	0.0	0.0	0.00	0.13	92.9
West: Golden Highway											
11	T	608	5.0	0.161	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
12	R	64	5.0	0.055	13.9	LOS A	0.2	1.6	0.32	0.70	67.0
Approach		672	5.0	0.161	1.3	NA	0.2	1.6	0.03	0.07	95.6
All Vehicles		1066	5.0	0.397	3.9	NA	1.2	8.6	0.09	0.20	88.1

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Golden Hwy MLOR
Intersection 2014 AM Peak

T Intersection
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mitchell Line Road											
1	L	528	5.0	0.700	20.6	LOS B	7.1	52.1	0.73	1.10	58.3
3	R	9	5.0	0.036	20.5	LOS B	0.1	0.6	0.61	0.83	58.3
Approach		537	5.0	0.700	20.6	LOS B	7.1	52.1	0.73	1.09	58.3
East: Putty Road											
4	L	7	5.0	0.004	13.0	LOS A	0.0	0.0	0.00	0.76	69.1
5	T	416	5.0	0.220	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		423	5.0	0.220	0.2	NA	0.0	0.0	0.00	0.01	99.3
West: Golden Highway											
11	T	163	5.0	0.043	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
12	R	165	5.0	0.176	15.1	LOS B	0.7	5.4	0.48	0.79	65.7
Approach		328	5.0	0.176	7.6	NA	0.7	5.4	0.24	0.40	79.4
All Vehicles		1288	5.0	0.700	10.6	NA	7.1	52.1	0.36	0.56	73.3

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Golden Hwy MLOR
Intersection 2014 PM Peak

T Intersection
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mitchell Line Road											
1	L	67	7.0	0.067	13.9	LOS A	0.2	1.8	0.27	0.70	67.3
3	R	6	7.0	0.022	19.0	LOS B	0.1	0.4	0.55	0.78	60.5
Approach		73	7.0	0.067	14.4	LOS A	0.2	1.8	0.29	0.71	66.7
East: Putty Road											
4	L	12	7.0	0.007	13.2	LOS A	0.0	0.0	0.00	0.76	69.1
5	T	145	7.0	0.078	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		157	7.0	0.078	1.0	NA	0.0	0.0	0.00	0.06	96.8
West: Golden Highway											
11	T	378	7.0	0.101	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
12	R	326	7.0	0.270	14.0	LOS A	1.3	9.7	0.32	0.71	67.0
Approach		704	7.0	0.270	6.5	NA	1.3	9.7	0.15	0.33	81.6
All Vehicles		934	7.0	0.270	6.2	NA	1.3	9.7	0.14	0.31	82.4

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Golden Hwy MLOR
Intersection 2017 AM Peak

T Intersection
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mitchell Line Road											
1	L	560	5.0	0.766	22.5	LOS B	9.0	65.9	0.78	1.18	56.0
3	R	10	5.0	0.041	21.3	LOS B	0.1	0.8	0.63	0.86	57.4
Approach		570	5.0	0.766	22.5	LOS B	9.0	65.9	0.78	1.17	56.0
East: Putty Road											
4	L	7	5.0	0.004	13.0	LOS A	0.0	0.0	0.00	0.76	69.1
5	T	441	5.0	0.234	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		448	5.0	0.234	0.2	NA	0.0	0.0	0.00	0.01	99.3
West: Golden Highway											
11	T	173	5.0	0.046	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
12	R	175	5.0	0.193	15.3	LOS B	0.8	5.9	0.50	0.81	65.4
Approach		348	5.0	0.193	7.7	NA	0.8	5.9	0.25	0.41	79.2
All Vehicles		1366	5.0	0.766	11.4	NA	9.0	65.9	0.39	0.60	71.7

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Golden Hwy MLOR
Intersection 2017 PM Peak

T Intersection
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mitchell Line Road											
1	L	71	7.0	0.072	14.0	LOS A	0.3	2.0	0.28	0.71	67.2
3	R	6	7.0	0.023	19.5	LOS B	0.1	0.4	0.57	0.79	59.8
Approach		77	7.0	0.072	14.4	LOS A	0.3	2.0	0.30	0.71	66.6
East: Putty Road											
4	L	13	7.0	0.007	13.2	LOS A	0.0	0.0	0.00	0.76	69.1
5	T	154	7.0	0.083	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		167	7.0	0.083	1.0	NA	0.0	0.0	0.00	0.06	96.7
West: Golden Highway											
11	T	401	7.0	0.107	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
12	R	346	7.0	0.289	14.1	LOS A	1.4	10.5	0.34	0.71	66.8
Approach		747	7.0	0.289	6.5	NA	1.4	10.5	0.16	0.33	81.5
All Vehicles		991	7.0	0.289	6.2	NA	1.4	10.5	0.14	0.31	82.3

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: MT Thorley CHPP Broke Road
Access 2014 AM Peak

T Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Broke Road											
1	L	1	4.0	0.065	12.5	LOS A	0.0	0.0	0.00	1.53	63.3
2	T	122	4.0	0.065	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		123	4.0	0.065	0.1	NA	0.0	0.0	0.00	0.01	99.6
North: Broke Road											
8	T	245	4.0	0.138	0.5	LOS A	0.9	6.3	0.27	0.00	85.8
9	R	11	4.0	0.138	13.4	LOS A	0.9	6.3	0.27	1.37	65.9
Approach		256	4.0	0.138	1.1	NA	0.9	6.3	0.27	0.06	84.9
West: CHPP Access											
10	L	1	4.0	0.003	11.2	LOS A	0.0	0.1	0.32	0.58	53.0
12	R	1	4.0	0.003	11.1	LOS A	0.0	0.1	0.32	0.69	53.2
Approach		2	4.0	0.003	11.1	LOS A	0.0	0.1	0.32	0.63	53.1
All Vehicles		381	4.0	0.138	0.8	NA	0.9	6.3	0.19	0.05	88.9

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: MT Thorley CHPP Broke Road
Access 2014 PM Peak

T Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Broke Road											
1	L	1	4.0	0.074	12.5	LOS A	0.0	0.0	0.00	1.53	63.3
2	T	140	4.0	0.074	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		141	4.0	0.074	0.1	NA	0.0	0.0	0.00	0.01	99.7
North: Broke Road											
8	T	97	4.0	0.052	0.5	LOS A	0.3	2.2	0.28	0.00	85.9
9	R	1	4.0	0.052	13.1	LOS A	0.3	2.2	0.28	1.34	66.0
Approach		98	4.0	0.052	0.7	NA	0.3	2.2	0.28	0.01	85.7
West: CHPP Access											
10	L	19	4.0	0.023	10.0	LOS A	0.1	0.6	0.26	0.63	54.2
12	R	3	4.0	0.023	9.9	LOS A	0.1	0.6	0.26	0.71	54.6
Approach		22	4.0	0.023	10.0	LOS A	0.1	0.6	0.26	0.64	54.3
All Vehicles		261	4.0	0.074	1.1	NA	0.3	2.2	0.13	0.07	88.2

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: MT Thorley CHPP Broke Road
Access 2017 AM Peak

T Intersection
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Broke Road											
1	L	1	4.0	0.068	12.5	LOS A	0.0	0.0	0.00	1.53	63.3
2	T	129	4.0	0.068	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		130	4.0	0.068	0.1	NA	0.0	0.0	0.00	0.01	99.7
North: Broke Road											
8	T	260	4.0	0.145	0.6	LOS A	0.9	6.7	0.29	0.00	85.3
9	R	11	4.0	0.145	13.4	LOS A	0.9	6.7	0.29	1.36	66.0
Approach		271	4.0	0.145	1.1	NA	0.9	6.7	0.29	0.06	84.5
West: CHPP Access											
10	L	1	4.0	0.003	11.4	LOS A	0.0	0.1	0.33	0.58	52.8
12	R	1	4.0	0.003	11.3	LOS A	0.0	0.1	0.33	0.69	53.0
Approach		2	4.0	0.003	11.3	LOS A	0.0	0.1	0.33	0.63	52.9
All Vehicles		403	4.0	0.145	0.8	NA	0.9	6.7	0.19	0.04	88.6

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: MT Thorley CHPP Broke Road
Access 2017 PM Peak

T Intersection
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Broke Road											
1	L	1	4.0	0.078	12.5	LOS A	0.0	0.0	0.00	1.53	63.3
2	T	148	4.0	0.078	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		149	4.0	0.078	0.1	NA	0.0	0.0	0.00	0.01	99.7
North: Broke Road											
8	T	103	4.0	0.055	0.6	LOS A	0.3	2.4	0.29	0.00	85.5
9	R	1	4.0	0.055	13.2	LOS A	0.3	2.4	0.29	1.34	66.1
Approach		104	4.0	0.055	0.7	NA	0.3	2.4	0.29	0.01	85.3
West: CHPP Access											
10	L	19	4.0	0.023	10.1	LOS A	0.1	0.6	0.27	0.63	54.2
12	R	3	4.0	0.023	10.0	LOS A	0.1	0.6	0.27	0.71	54.6
Approach		22	4.0	0.023	10.1	LOS A	0.1	0.6	0.27	0.64	54.2
All Vehicles		275	4.0	0.078	1.1	NA	0.3	2.4	0.13	0.06	88.2

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Warkworth Putty Road Access
2014 AM Peak

T Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Putty Road											
5	T	9	3.0	0.005	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
6	R	94	3.0	0.078	12.9	LOS A	0.3	2.0	0.12	0.70	62.5
Approach		103	3.0	0.078	11.7	NA	0.3	2.0	0.11	0.64	65.2
North: Warkworth Access											
7	L	108	3.0	0.093	9.2	LOS A	0.4	2.5	0.11	0.65	54.9
9	R	3	3.0	0.006	10.0	LOS A	0.0	0.1	0.29	0.62	54.2
Approach		111	3.0	0.093	9.3	LOS A	0.4	2.5	0.12	0.64	54.9
West: Putty Road											
10	L	7	3.0	0.004	12.7	LOS A	0.0	0.0	0.00	0.75	63.3
11	T	31	3.0	0.016	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		38	3.0	0.016	2.3	NA	0.0	0.0	0.00	0.14	92.2
All Vehicles		252	3.0	0.093	9.2	NA	0.4	2.5	0.10	0.57	62.5

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Warkworth Putty Road Access
2014 PM Peak

T Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Putty Road											
5	T	47	6.0	0.025	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
6	R	7	6.0	0.006	13.0	LOS A	0.0	0.1	0.10	0.70	62.6
Approach		54	6.0	0.025	1.7	NA	0.0	0.1	0.01	0.09	94.3
North: Warkworth Access											
7	L	72	6.0	0.063	9.4	LOS A	0.2	1.7	0.10	0.65	54.9
9	R	1	6.0	0.002	9.5	LOS A	0.0	0.0	0.22	0.61	54.5
Approach		73	6.0	0.063	9.4	LOS A	0.2	1.7	0.10	0.65	54.9
West: Putty Road											
10	L	1	6.0	0.001	12.5	LOS A	0.0	0.0	0.00	0.75	63.3
11	T	30	6.0	0.016	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		31	6.0	0.016	0.4	NA	0.0	0.0	0.00	0.02	98.6
All Vehicles		158	6.0	0.063	5.0	NA	0.2	1.7	0.05	0.33	71.3

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Warkworth Putty Road Access
2017 AM Peak

T Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Putty Road											
5	T	10	3.0	0.005	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
6	R	94	3.0	0.078	12.9	LOS A	0.3	2.0	0.12	0.70	62.4
Approach		104	3.0	0.078	11.6	NA	0.3	2.0	0.11	0.63	65.5
North: Warkworth Access											
7	L	108	3.0	0.093	9.3	LOS A	0.4	2.5	0.12	0.64	54.9
9	R	3	3.0	0.006	10.1	LOS A	0.0	0.1	0.30	0.62	54.2
Approach		111	3.0	0.093	9.3	LOS A	0.4	2.5	0.12	0.64	54.8
West: Putty Road											
10	L	7	3.0	0.004	12.7	LOS A	0.0	0.0	0.00	0.75	63.3
11	T	33	3.0	0.017	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		40	3.0	0.017	2.2	NA	0.0	0.0	0.00	0.13	92.6
All Vehicles		255	3.0	0.093	9.1	NA	0.4	2.5	0.10	0.56	62.8

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Warkworth Putty Road Access
2017 PM Peak

T Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Putty Road											
5	T	50	6.0	0.027	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
6	R	7	6.0	0.006	13.0	LOS A	0.0	0.1	0.10	0.70	62.6
Approach		57	6.0	0.027	1.6	NA	0.0	0.1	0.01	0.09	94.6
North: Warkworth Access											
7	L	72	6.0	0.063	9.4	LOS A	0.2	1.7	0.11	0.65	54.9
9	R	1	6.0	0.002	9.6	LOS A	0.0	0.0	0.23	0.61	54.5
Approach		73	6.0	0.063	9.4	LOS A	0.2	1.7	0.11	0.65	54.9
West: Putty Road											
10	L	1	6.0	0.001	12.5	LOS A	0.0	0.0	0.00	0.75	63.3
11	T	32	6.0	0.017	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		33	6.0	0.017	0.4	NA	0.0	0.0	0.00	0.02	98.7
All Vehicles		163	6.0	0.063	4.8	NA	0.2	1.7	0.05	0.32	71.9

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: WSD Golden Hwy Broke Road
Intersection 2017 AM Peak

T Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Broke Road											
1	L	130	5.0	0.332	22.8	LOS B	1.3	9.8	0.75	0.97	55.7
3	R	47	5.0	0.258	34.6	LOS C	0.9	6.8	0.84	0.98	45.2
Approach		177	5.0	0.332	25.9	LOS B	1.3	9.8	0.78	0.98	52.4
East: Golden Highway											
4	L	228	5.0	0.127	13.0	LOS A	0.0	0.0	0.00	0.76	69.1
5	T	773	5.0	0.409	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		1001	5.0	0.409	3.0	NA	0.0	0.0	0.00	0.17	90.9
West: Golden Highway											
11	T	301	5.0	0.080	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
12	R	51	5.0	0.117	20.4	LOS B	0.4	3.0	0.72	0.93	58.4
Approach		352	5.0	0.117	3.0	NA	0.4	3.0	0.10	0.14	90.8
All Vehicles		1530	5.0	0.409	5.6	NA	1.3	9.8	0.11	0.26	83.9

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: WSD Golden Hwy Broke Road
Intersection 2017 PM Peak

T Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Broke Road											
1	L	46	5.0	0.048	14.0	LOS A	0.2	1.2	0.31	0.71	67.0
3	R	138	5.0	0.412	18.1	LOS B	1.3	9.4	0.52	0.86	61.4
Approach		184	5.0	0.412	17.1	LOS B	1.3	9.4	0.47	0.82	62.8
East: Golden Highway											
4	L	39	5.0	0.022	13.0	LOS A	0.0	0.0	0.00	0.76	69.1
5	T	186	5.0	0.098	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		225	5.0	0.098	2.3	NA	0.0	0.0	0.00	0.13	92.9
West: Golden Highway											
11	T	608	5.0	0.161	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
12	R	106	5.0	0.092	13.9	LOS A	0.4	2.7	0.33	0.71	66.9
Approach		714	5.0	0.161	2.1	NA	0.4	2.7	0.05	0.11	93.3
All Vehicles		1123	5.0	0.412	4.6	NA	1.3	9.4	0.11	0.23	86.4

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: WSD Golden Hwy MLOR
Intersection 2017 AM Peak

T Intersection
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mitchell Line Road											
1	L	560	5.0	0.766	22.5	LOS B	9.0	65.9	0.78	1.18	56.0
3	R	10	5.0	0.041	21.3	LOS B	0.1	0.8	0.63	0.86	57.4
Approach		570	5.0	0.766	22.5	LOS B	9.0	65.9	0.78	1.17	56.0
East: Putty Road											
4	L	7	5.0	0.004	13.0	LOS A	0.0	0.0	0.00	0.76	69.1
5	T	441	5.0	0.234	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		448	5.0	0.234	0.2	NA	0.0	0.0	0.00	0.01	99.3
West: Golden Highway											
11	T	173	5.0	0.046	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
12	R	175	5.0	0.193	15.3	LOS B	0.8	5.9	0.50	0.81	65.4
Approach		348	5.0	0.193	7.7	NA	0.8	5.9	0.25	0.41	79.2
All Vehicles		1366	5.0	0.766	11.4	NA	9.0	65.9	0.39	0.60	71.7

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: WSD Golden Hwy MLOR
Intersection 2017 PM Peak

T Intersection
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mitchell Line Road											
1	L	71	7.0	0.072	14.0	LOS A	0.3	2.0	0.28	0.71	67.2
3	R	6	7.0	0.023	19.5	LOS B	0.1	0.4	0.57	0.79	59.8
Approach		77	7.0	0.072	14.4	LOS A	0.3	2.0	0.30	0.71	66.6
East: Putty Road											
4	L	13	7.0	0.007	13.2	LOS A	0.0	0.0	0.00	0.76	69.1
5	T	154	7.0	0.083	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		167	7.0	0.083	1.0	NA	0.0	0.0	0.00	0.06	96.7
West: Golden Highway											
11	T	401	7.0	0.107	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
12	R	346	7.0	0.289	14.1	LOS A	1.4	10.5	0.34	0.71	66.8
Approach		747	7.0	0.289	6.5	NA	1.4	10.5	0.16	0.33	81.5
All Vehicles		991	7.0	0.289	6.2	NA	1.4	10.5	0.14	0.31	82.3

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: WSD MT Thorley CHPP Broke
Road Access 2017 AM Peak

T Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Broke Road											
1	L	1	4.0	0.093	12.5	LOS A	0.0	0.0	0.00	1.53	63.3
2	T	175	4.0	0.093	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		176	4.0	0.093	0.1	NA	0.0	0.0	0.00	0.01	99.8
North: Broke Road											
8	T	268	4.0	0.150	0.8	LOS A	1.0	7.3	0.34	0.00	82.9
9	R	11	4.0	0.150	13.6	LOS A	1.0	7.3	0.34	1.32	66.6
Approach		279	4.0	0.150	1.3	NA	1.0	7.3	0.34	0.05	82.3
West: CHPP Access											
10	L	1	4.0	0.003	11.9	LOS A	0.0	0.1	0.39	0.58	52.2
12	R	1	4.0	0.003	11.8	LOS A	0.0	0.1	0.39	0.70	52.5
Approach		2	4.0	0.003	11.9	LOS A	0.0	0.1	0.39	0.64	52.4
All Vehicles		457	4.0	0.150	0.9	NA	1.0	7.3	0.21	0.04	88.0

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: WSD MT Thorley CHPP Broke
Road Access 2017 PM Peak

T Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Broke Road											
1	L	1	4.0	0.086	12.5	LOS A	0.0	0.0	0.00	1.53	63.3
2	T	163	4.0	0.086	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		164	4.0	0.086	0.1	NA	0.0	0.0	0.00	0.01	99.7
North: Broke Road											
8	T	145	4.0	0.077	0.7	LOS A	0.5	3.5	0.31	0.00	84.5
9	R	1	4.0	0.077	13.3	LOS A	0.5	3.5	0.31	1.32	66.3
Approach		146	4.0	0.077	0.8	NA	0.5	3.5	0.31	0.01	84.4
West: CHPP Access											
10	L	19	4.0	0.024	10.2	LOS A	0.1	0.6	0.29	0.63	54.1
12	R	3	4.0	0.024	10.2	LOS A	0.1	0.6	0.29	0.73	54.4
Approach		22	4.0	0.024	10.2	LOS A	0.1	0.6	0.29	0.65	54.1
All Vehicles		332	4.0	0.086	1.0	NA	0.5	3.5	0.16	0.05	87.9

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: WSD Warkworth Putty Road
Access 2017 AM Peak

T Intersection
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Putty Road											
5	T	14	3.0	0.007	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
6	R	94	3.0	0.078	12.9	LOS A	0.3	2.0	0.15	0.69	62.2
Approach		108	3.0	0.078	11.3	NA	0.3	2.0	0.13	0.60	66.3
North: Warkworth Access											
7	L	108	3.0	0.095	9.3	LOS A	0.4	2.6	0.15	0.64	54.7
9	R	3	3.0	0.006	10.3	LOS A	0.0	0.1	0.32	0.62	53.9
Approach		111	3.0	0.095	9.4	LOS A	0.4	2.6	0.15	0.64	54.7
West: Putty Road											
10	L	7	3.0	0.004	12.7	LOS A	0.0	0.0	0.00	0.75	63.3
11	T	52	3.0	0.027	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		59	3.0	0.027	1.5	NA	0.0	0.0	0.00	0.09	94.9
All Vehicles		278	3.0	0.095	8.4	NA	0.4	2.6	0.11	0.51	64.8

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: WSD Warkworth Putty Road
Access 2017 PM Peak

T Intersection
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Putty Road											
5	T	67	6.0	0.036	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
6	R	7	6.0	0.006	13.0	LOS A	0.0	0.1	0.11	0.70	62.5
Approach		74	6.0	0.036	1.2	NA	0.0	0.1	0.01	0.07	95.8
North: Warkworth Access											
7	L	72	6.0	0.063	9.4	LOS A	0.2	1.7	0.12	0.64	54.8
9	R	1	6.0	0.002	9.8	LOS A	0.0	0.0	0.26	0.61	54.3
Approach		73	6.0	0.063	9.4	LOS A	0.2	1.7	0.12	0.64	54.8
West: Putty Road											
10	L	1	6.0	0.001	12.5	LOS A	0.0	0.0	0.00	0.75	63.3
11	T	38	6.0	0.020	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		39	6.0	0.020	0.3	NA	0.0	0.0	0.00	0.02	98.9
All Vehicles		186	6.0	0.063	4.3	NA	0.2	1.7	0.05	0.28	74.5

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: WSD+BUO Golden Hwy Broke Road Intersection 2017 AM Peak

T Intersection
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Broke Road											
1	L	130	5.0	0.335	23.0	LOS B	1.4	9.9	0.76	0.98	55.5
3	R	47	5.0	0.261	34.9	LOS C	0.9	6.9	0.84	0.98	44.9
Approach		177	5.0	0.335	26.2	LOS B	1.4	9.9	0.78	0.98	52.2
East: Golden Highway											
4	L	240	5.0	0.134	13.0	LOS A	0.0	0.0	0.00	0.76	69.1
5	T	773	5.0	0.409	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		1013	5.0	0.409	3.1	NA	0.0	0.0	0.00	0.18	90.6
West: Golden Highway											
11	T	301	5.0	0.080	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
12	R	51	5.0	0.119	20.6	LOS B	0.4	3.0	0.73	0.93	58.2
Approach		352	5.0	0.119	3.0	NA	0.4	3.0	0.11	0.14	90.8
All Vehicles		1542	5.0	0.409	5.7	NA	1.4	9.9	0.11	0.26	83.7

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: WSD+BUO Golden Hwy Broke
Road Intersection 2017 PM Peak

T Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Broke Road											
1	L	46	5.0	0.048	14.0	LOS A	0.2	1.2	0.31	0.71	67.0
3	R	150	5.0	0.448	18.5	LOS B	1.5	10.8	0.53	0.88	60.9
Approach		196	5.0	0.448	17.5	LOS B	1.5	10.8	0.48	0.84	62.2
East: Golden Highway											
4	L	39	5.0	0.022	13.0	LOS A	0.0	0.0	0.00	0.76	69.1
5	T	186	5.0	0.098	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		225	5.0	0.098	2.3	NA	0.0	0.0	0.00	0.13	92.9
West: Golden Highway											
11	T	608	5.0	0.161	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
12	R	106	5.0	0.092	13.9	LOS A	0.4	2.7	0.33	0.71	66.9
Approach		714	5.0	0.161	2.1	NA	0.4	2.7	0.05	0.11	93.3
All Vehicles		1135	5.0	0.448	4.8	NA	1.5	10.8	0.11	0.24	85.9

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: WSD+BUO Golden Hwy MLOR
Intersection 2017 AM Peak

T Intersection
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mitchell Line Road											
1	L	568	5.0	0.781	23.1	LOS B	9.6	69.9	0.80	1.20	55.4
3	R	10	5.0	0.042	21.4	LOS B	0.1	0.8	0.64	0.86	57.3
Approach		578	5.0	0.781	23.1	LOS B	9.6	69.9	0.79	1.19	55.4
East: Putty Road											
4	L	7	5.0	0.004	13.0	LOS A	0.0	0.0	0.00	0.76	69.1
5	T	445	5.0	0.236	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		452	5.0	0.236	0.2	NA	0.0	0.0	0.00	0.01	99.3
West: Golden Highway											
11	T	173	5.0	0.046	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
12	R	175	5.0	0.193	15.4	LOS B	0.8	5.9	0.50	0.81	65.3
Approach		348	5.0	0.193	7.7	NA	0.8	5.9	0.25	0.41	79.1
All Vehicles		1378	5.0	0.781	11.7	NA	9.6	69.9	0.40	0.61	71.3

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: WSD+BUO Golden Hwy MLOR
Intersection 2017 PM Peak

T Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mitchell Line Road											
1	L	71	7.0	0.072	14.0	LOS A	0.3	2.0	0.28	0.71	67.2
3	R	6	7.0	0.023	19.7	LOS B	0.1	0.4	0.57	0.79	59.6
Approach		77	7.0	0.072	14.5	LOS A	0.3	2.0	0.30	0.71	66.6
East: Putty Road											
4	L	13	7.0	0.007	13.2	LOS A	0.0	0.0	0.00	0.76	69.1
5	T	154	7.0	0.083	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		167	7.0	0.083	1.0	NA	0.0	0.0	0.00	0.06	96.7
West: Golden Highway											
11	T	405	7.0	0.109	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
12	R	354	7.0	0.296	14.1	LOS A	1.5	10.8	0.34	0.71	66.8
Approach		759	7.0	0.296	6.6	NA	1.5	10.8	0.16	0.33	81.4
All Vehicles		1003	7.0	0.296	6.3	NA	1.5	10.8	0.14	0.32	82.2

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: WSD+BUO MT Thorley CHPP
Broke Road Access 2017 AM Peak

T Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Broke Road											
1	L	1	4.0	0.093	12.5	LOS A	0.0	0.0	0.00	1.53	63.3
2	T	175	4.0	0.093	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		176	4.0	0.093	0.1	NA	0.0	0.0	0.00	0.01	99.8
North: Broke Road											
8	T	280	4.0	0.156	0.8	LOS A	1.1	7.6	0.34	0.00	82.8
9	R	11	4.0	0.156	13.6	LOS A	1.1	7.6	0.34	1.32	66.6
Approach		291	4.0	0.156	1.3	NA	1.1	7.6	0.34	0.05	82.2
West: CHPP Access											
10	L	1	4.0	0.003	12.0	LOS A	0.0	0.1	0.40	0.58	52.1
12	R	1	4.0	0.003	11.9	LOS A	0.0	0.1	0.40	0.70	52.4
Approach		2	4.0	0.003	12.0	LOS A	0.0	0.1	0.40	0.64	52.2
All Vehicles		469	4.0	0.156	0.9	NA	1.1	7.6	0.22	0.04	87.8

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: WSD+BUO MT Thorley CHPP
Broke Road Access 2017 PM Peak

T Intersection
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Broke Road											
1	L	1	4.0	0.093	12.5	LOS A	0.0	0.0	0.00	1.53	63.3
2	T	175	4.0	0.093	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		176	4.0	0.093	0.1	NA	0.0	0.0	0.00	0.01	99.8
North: Broke Road											
8	T	145	4.0	0.077	0.7	LOS A	0.5	3.5	0.32	0.00	84.0
9	R	1	4.0	0.077	13.3	LOS A	0.5	3.5	0.32	1.31	66.4
Approach		146	4.0	0.077	0.8	NA	0.5	3.5	0.32	0.01	83.8
West: CHPP Access											
10	L	19	4.0	0.025	10.3	LOS A	0.1	0.6	0.30	0.64	54.0
12	R	3	4.0	0.025	10.2	LOS A	0.1	0.6	0.30	0.73	54.3
Approach		22	4.0	0.025	10.3	LOS A	0.1	0.6	0.30	0.65	54.1
All Vehicles		344	4.0	0.093	1.0	NA	0.5	3.5	0.16	0.05	88.0

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: WSD+BUO Warkworth Putty
Road Access 2017 AM Peak

T Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Putty Road											
5	T	14	3.0	0.007	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
6	R	94	3.0	0.078	12.9	LOS A	0.3	2.0	0.15	0.69	62.2
Approach		108	3.0	0.078	11.3	NA	0.3	2.0	0.13	0.60	66.3
North: Warkworth Access											
7	L	108	3.0	0.095	9.3	LOS A	0.4	2.6	0.15	0.64	54.7
9	R	3	3.0	0.006	10.3	LOS A	0.0	0.1	0.32	0.62	53.9
Approach		111	3.0	0.095	9.4	LOS A	0.4	2.6	0.15	0.64	54.7
West: Putty Road											
10	L	7	3.0	0.004	12.7	LOS A	0.0	0.0	0.00	0.75	63.3
11	T	52	3.0	0.027	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		59	3.0	0.027	1.5	NA	0.0	0.0	0.00	0.09	94.9
All Vehicles		278	3.0	0.095	8.4	NA	0.4	2.6	0.11	0.51	64.8

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: WSD+BUO Warkworth Putty
Road Access 2017 PM Peak

T Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Putty Road											
5	T	67	6.0	0.036	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
6	R	7	6.0	0.006	13.0	LOS A	0.0	0.1	0.11	0.70	62.5
Approach		74	6.0	0.036	1.2	NA	0.0	0.1	0.01	0.07	95.8
North: Warkworth Access											
7	L	72	6.0	0.063	9.4	LOS A	0.2	1.7	0.12	0.64	54.8
9	R	1	6.0	0.002	9.8	LOS A	0.0	0.0	0.26	0.61	54.3
Approach		73	6.0	0.063	9.4	LOS A	0.2	1.7	0.12	0.64	54.8
West: Putty Road											
10	L	1	6.0	0.001	12.5	LOS A	0.0	0.0	0.00	0.75	63.3
11	T	38	6.0	0.020	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		39	6.0	0.020	0.3	NA	0.0	0.0	0.00	0.02	98.9
All Vehicles		186	6.0	0.063	4.3	NA	0.2	1.7	0.05	0.28	74.5

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

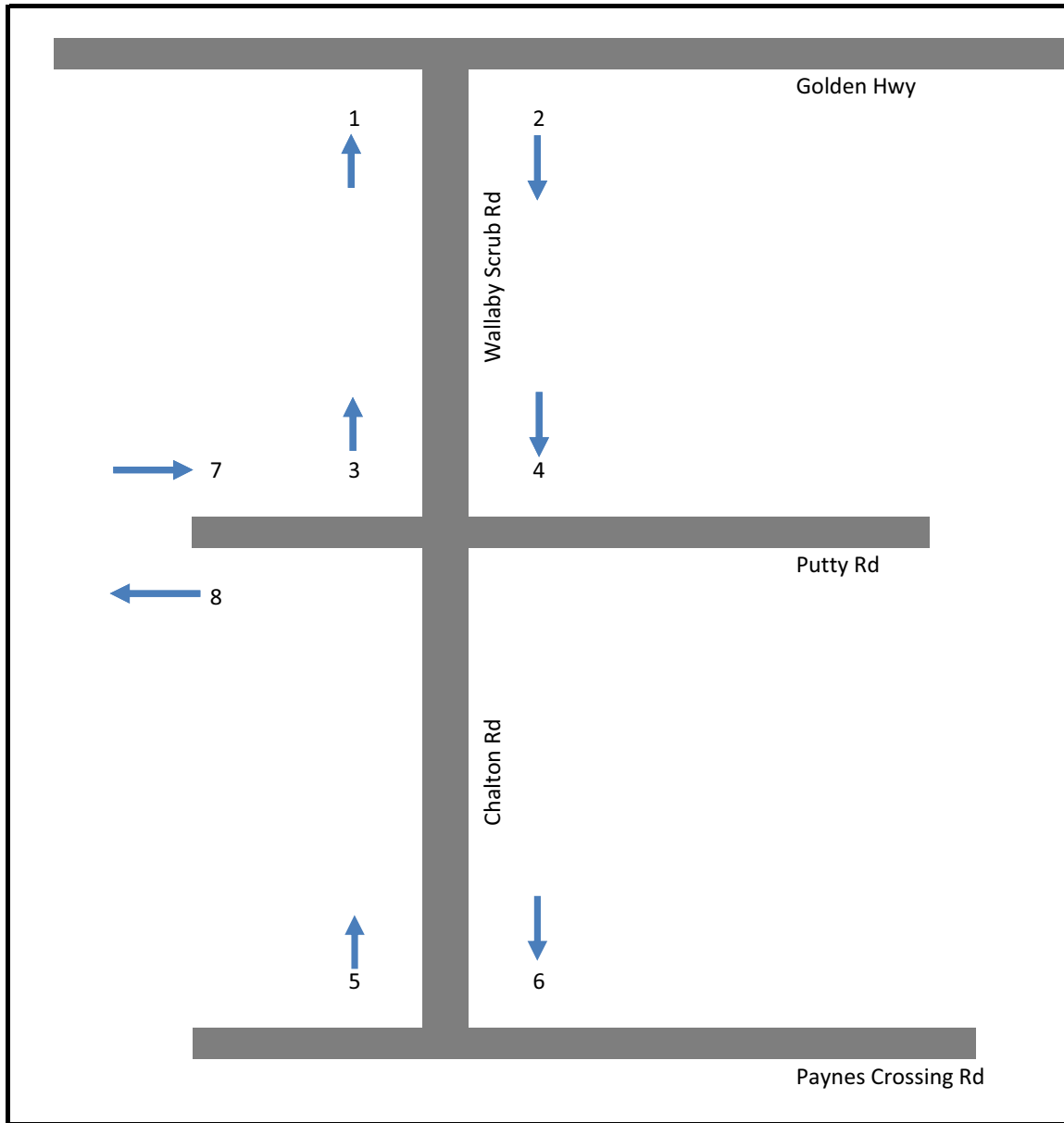
Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

Appendix D

Origin Destination traffic surveys



Job : Wallaby Scrub Road
 Description : Origin Destination Matrices
 Date : Tues 4th March



RAW MATCH

Time Period : 05:00 to 17:00

	Out	1	3	4	6	8	Totals
In	Vol	318	333	273	350	381	1655
2	266			224	132	52	408
3	333	285					285
4	273				133	52	185
5	369	186	193			22	401
7	458	79	75		21		175
Totals	1699	550	268	224	286	126	1454

Time Period : 05:00 to 06:00

	Out	1	3	4	6	8	Totals
In	Vol	44	59	6	5	7	121
2	7			3	1	1	5
3	59	39					39
4	6				1	3	4
5	52	35	37			1	73
7	37	5	6		1		12
Totals	161	79	43	3	3	5	133

Time Period : 06:00 to 07:00

	Out	1	3	4	6	8	Totals
In	Vol	77	76	12	13	9	187
2	13			10	7	1	18
3	76	63					63
4	12				8	1	9
5	71	50	53			0	103
7	50	7	6		0		13
Totals	222	120	59	10	15	2	206

Time Period : 07:00 to 08:00

	Out	1	3	4	6	8	Totals
In	Vol	29	31	20	30	22	132
2	22			17	10	5	32
3	31	29					29
4	20				9	4	13
5	21	13	13			0	26
7	42	10	9		1		20
Totals	136	52	22	17	20	9	120

Time Period : 08:00 to 09:00

	Out	1	3	4	6	8	Totals
In	Vol	30	29	16	29	31	135
2	14			9	7	4	20
3	29	24					24
4	16				12	3	15
5	38	19	19			5	43
7	62	7	5		6		18
Totals	159	50	24	9	25	12	120

Time Period : 09:00 to 10:00

	Out	1	3	4	6	8	Totals
In	Vol	14	16	15	22	30	97
2	15			13	8	5	26
3	16	14					14
4	15				8	5	13
5	14	8	8			3	19
7	43	8	7		4		19
Totals	103	30	15	13	20	13	91

Time Period : 10:00 to 11:00

	Out	1	3	4	6	8	Totals
In	Vol	15	14	14	11	29	83
2	12			11	7	4	22
3	14	14					14
4	14				7	4	11
5	27	6	6			0	12
7	32	9	8		0		17
Totals	99	29	14	11	14	8	76

Time Period : 11:00 to 12:00

EXPANDED MATCH TO ALLOW FOR MISSED NUMBER PLATES

Time Period : 05:00 to 17:00

	Out	1	3	4	6	8	Totals
In	Vol	318	333	273	350	381	1655
2	266			230	168	54	452
3	333	313					313
4	273				168	53	221
5	369	215	232			23	470
7	458	81	90		29		200
Totals	1699	609	322	230	365	130	1656

Time Period : 05:00 to 06:00

	Out	1	3	4	6	8	Totals
In	Vol	44	59	6	5	7	121
2	7			5	2	2	9
3	59	44					44
4	6				1	3	4
5	52	38	48			1	87
7	37	6	10		2		18
Totals	161	88	58	5	5	6	162

Time Period : 06:00 to 07:00

	Out	1	3	4	6	8	Totals
In	Vol	77	76	12	13	9	187
2	13			10	9	1	20
3	76	76					76
4	12				10	1	11
5	71	64	68			0	132
7	50	8	8		0		16
Totals	222	148	76	10	19	2	255

Time Period : 07:00 to 08:00

	Out	1	3	4	6	8	Totals
In	Vol	29	31	20	30	22	132
2	22			17	13	5	35
3	31	29					29
4	20				11	4	15
5	21	15	15			0	30
7	42	11	11		1		23
Totals	136	55	26	17	25	9	132

Time Period : 08:00 to 09:00

	Out	1	3	4	6	8	Totals
In	Vol	30	29	16	29	31	135
2	14			9	9	4	22
3	29	27					27
4	16				16	3	19
5	38	23	23			5	51
7	62	6	6		8		20
Totals	159	56	29	9	33	12	139

Time Period : 09:00 to 10:00

	Out	1	3	4	6	8	Totals
In	Vol	14	16	15	22	30	97
2	15			13	10	5	28
3	16	14					14
4	15				10	5	15
5	14	8	8			3	18
7	43	8	7		6		21
Totals	103	28	16	13	26	13	96

Time Period : 10:00 to 11:00

	Out	1	3	4	6	8	Totals
In	Vol	15	14	14	11	29	83
2	12			11	9	4	24
3	14	15					15
4	14				9	4	13
5	27	6	6			0	12
7	32	8	8		0		16
Totals	99	29	14	11	18	8	80

Time Period : 11:00 to 12:00

	Out	1	3	4	6	8	Totals
In	Vol	15	14	10	15	33	87
2	13			9	5	3	17
3	14	13					13
4	10				5	4	9
5	28	7	8			2	17
7	37	5	5		3		13
Totals	102	25	13	9	13	9	69

Time Period : 12:00 to 13:00

	Out	1	3	4	6	8	Totals
In	Vol	22	22	17	21	31	113
2	16			13	7	7	27
3	22	21					21
4	17				4	7	11
5	24	10	10			2	22
7	33	6	5		0		11
Totals	112	37	15	13	11	16	92

Time Period : 13:00 to 14:00

	Out	1	3	4	6	8	Totals
In	Vol	22	22	21	26	29	120
2	20			14	4	4	22
3	22	20					20
4	21				6	5	11
5	34	16	16			2	34
7	25	3	4		1		8
Totals	122	39	20	14	11	11	95

Time Period : 14:00 to 15:00

	Out	1	3	4	6	8	Totals
In	Vol	16	18	35	55	56	180
2	30			31	17	6	54
3	18	17					17
4	35				17	5	22
5	24	8	8			3	19
7	36	6	7		4		17
Totals	143	31	15	31	38	14	129

Time Period : 15:00 to 16:00

	Out	1	3	4	6	8	Totals
In	Vol	17	13	71	72	44	217
2	68			60	37	5	102
3	13	15					15
4	71				37	5	42
5	18	5	5			3	13
7	30	7	7		0		14
Totals	200	27	12	60	74	13	186

Time Period : 16:00 to 17:00

	Out	1	3	4	6	8	Totals
In	Vol	17	19	36	51	60	183
2	36			34	22	7	63
3	19	16					16
4	36				19	6	25
5	18	9	10			1	20
7	31	6	6		1		13
Totals	140	31	16	34	42	14	137

	Out	1	3	4	6	8	Totals
In	Vol	15	14	10	15	33	87
2	13			9	5	3	17
3	14	14					14
4	10				6	4	10
5	28	9	9			3	21
7	37	5	5		4		14
Totals	102	28	14	9	16	10	77

Time Period : 12:00 to 13:00

	Out	1	3	4	6	8	Totals
In	Vol	22	22	17	21	31	113
2	16			13	9	7	29
3	22	22					22
4	17				5	7	12
5	24	11	12			2	25
7	33	6	6		0		12
Totals	112	39	18	13	14	16	100

Time Period : 13:00 to 14:00

	Out	1	3	4	6	8	Totals
In	Vol	22	22	21	26	29	120
2	20			18	6	5	29
3	22	22					22
4	21				9	6	15
5	34	17	17			2	36
7	25	3	5		1		9
Totals	122	42	22	18	16	13	111

Time Period : 14:00 to 15:00

	Out	1	3	4	6	8	Totals
In	Vol	16	18	35	55	56	180
2	30			31	21	6	58
3	18	16					16
4	35				21	5	26
5	24	10	10			3	23
7	36	6	8		6		20
Totals	143	32	18	31	48	14	143

Time Period : 15:00 to 16:00

	Out	1	3	4	6	8	Totals
In	Vol	17	13	71	72	44	217
2	68			60	46	5	111
3	13	17					17
4	71				46	5	51
5	18	5	5			3	13
7	30	8	8		0		16
Totals	200	30	13	60	92	13	208

Time Period : 16:00 to 17:00

	Out	1	3	4	6	8	Totals
In	Vol	17	19	36	51	60	183
2	36			34	28	7	69
3	19	17					17
4	36				24	6	30
5	18	10	11			1	22
7	31	7	7		1		15
Totals	140	34	18	34	53	14	153

Appendix E

Rural Fire Service response - Wallaby Scrub Road



NSW RURAL FIRE SERVICE

Mr. Mark Molan
Operations Support & Projects
Coal and Allied
127 John St
Singleton NSW
2330

Your reference
Our reference: 2014/05:Ops

19th May 2014

Dear Mr Molan,

Wallaby Scrub Rd

I refer to our meeting on the 15th April 2014 in regards to the proposed development of the Mt Thorley mine complex and the forecast closure of Wallaby Scrub Rd.

Wallaby Scrub Rd provides important access between the townships of Broke, Bulga and Jerrys Plains during bushfires and other emergencies where additional units from the Rural Fire Brigades can be quickly brought in to assist each other. Typical incidents range from bush, grass and scrub fires, house fires as well as motor vehicle accidents and fires. Wallaby Scrub Rd is also an important containment line option during major bushfires.

Whilst our preferred option would be the relocation of Wallaby Scrub Rd to maintain access for emergency services, an acceptable second option is the construction of a suitable fire trail on the perimeter of the proposed expansion and constructed to a standard as documented in the NSW Bushfire Coordinating Committee policy No. 2/2007. Our recommendation would be a strategic classification of Essential. This is a fire trail without which fire response and suppression in an area would be severely compromised. All reasonable efforts must be made to ensure that this trail is trafficable to the agreed vehicle carrying capacity at all times. Sudden problems such as tree falls and land slips should be rectified as soon as identified. This trail should be checked on occasions throughout each year, and particularly before the commencement of the local bush fire season.

Physical barriers to vehicle access must not be deliberately installed, unless they are readily breached by fire fighters. That is, a locked gate with key access for fire fighters would be acceptable; fixed bollards, felled trees, piles of rock and the like would not be acceptable, as the obstruction cannot be removed by a fire fighting crew without additional machinery.

Further more detailed information on the construction standards is available on the RFS website or by contacting myself at the local office.

Regards,

S. Brown

Inspector Steve Brown
Operations Officer
Hunter Valley Team

Postal address

NSW Rural Fire Service
Hunter Valley Team
PO Box 3111
SINGLETON NSW 2330

Street address

NSW Rural Fire Service
Hunter Valley Team
2116 Putty Road
BULGA NSW 2330

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