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**Tahmoor Coal Pty Ltd**

# **HERITAGE MANAGEMENT PLAN**

**Tahmoor North Western Domain  
Longwalls West 1 and West 2**

**April 2020**

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Document Control

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**MINE:** Tahmoor Coal Mine

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# 1 Introduction

## 1.1 Background

The Tahmoor Coal Mine (**Tahmoor Mine**) is an underground coal mine located approximately 80 kilometres (**km**) south-west of Sydney between the towns of Tahmoor and Bargo, New South Wales (**NSW**) (refer to **Figure 1-1**). Tahmoor Mine produces up to three million tonnes of Run of Mine (**ROM**) coal per annum from the Bulli Coal Seam. Tahmoor Mine produces a primary hard coking coal product and a secondary higher ash coking coal product that are used predominantly for coke manufacture for steel production. Product coal is transported via rail to Port Kembla and Newcastle for Australian domestic customers and export customers.

The Tahmoor Mine has been operated by Tahmoor Coal Pty Ltd (**Tahmoor Coal**) since Tahmoor Mine commenced in 1979 using bord and pillar mining methods, and via longwall mining methods since 1987. Tahmoor Coal, trading as Tahmoor Coking Coal Operations (**TCCO**), is a subsidiary within the SIMEC Mining Division (**SIMEC**) of the GFG Alliance (**GFG**).

Tahmoor Coal has previously mined 32 longwalls to the north and west of the Tahmoor Mine's current pit top location.

Tahmoor Coal proposes to extend underground coal mining to the north-west of the Main Southern Railway (referred to as the 'Western Domain') which will include Longwalls West 1 (**LW W1**) to West 4 (**LW W4**) at Picton and Thirlmere. The first two longwalls to be mined are LW W1 and Longwall West 2 (**LW W2**) (collectively referred to as **LW W1-W2**), which will be the focus of this Extraction Plan. The Western Domain is within Mining Lease (**ML**) 1376 and ML 1539, as illustrated in **Figure 1-2** of the Extraction Plan Main Document.

## 1.2 Purpose

This Heritage Management Plan (**HMP**) has been prepared to support an Extraction Plan for the secondary extraction of coal from LW W1-W2. This HMP has been designed to identify the monitoring and management measures for heritage sites within the Extraction Plan Study Area that are required to be implemented to demonstrate that the relevant performance measures are achieved.

## 1.3 Scope

The Study Area applicable to this HMP consists of a combination of the Predicted 20 millimetre (**mm**) Total Subsidence Contour and the 35° Angle of Draw Line as shown on **Figure 1-2**. Relevant environmental features within a 600 metre (**m**) buffer from extraction that could be susceptible to far-field or valley related movements have also been included for consideration.

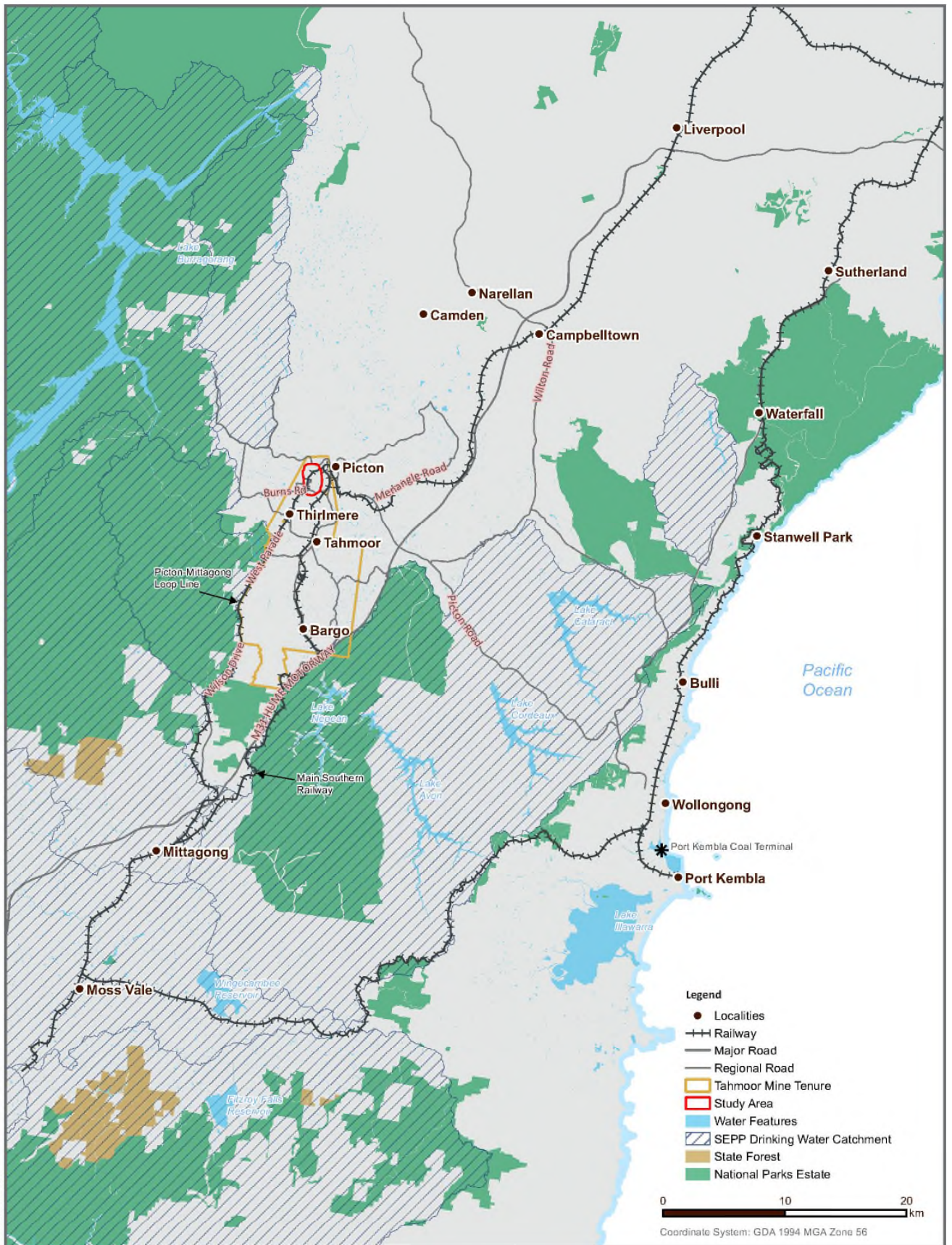
This HMP:

- Addresses specific requirements set by DA 67/98 Condition 13H(vii)(f) (refer to **Section 2.1**);
- Addresses related regulatory requirements (refer to **Section 2.2**);
- Addresses the monitoring and management of potential subsidence-related impacts to Aboriginal and historical heritage (refer to **Section 5**); and
- Provides a Trigger Action Response Plan (**TARP**) to be implemented to manage and protect known heritage values within the Study Area (refer to **Appendix A**).

This HMP has been updated to include the conditions of the Aboriginal Heritage Impact Permit (AHIP) (C0005707) obtained for harm to certain Aboriginal objects as a result of LW W1-W2 extraction, which was granted by NSW Department of Planning, Industry and Environment (DPIE, formerly the NSW Department of Planning and Environment) on 16 March 2020. A copy of the AHIP is provided in **Appendix D**.

This HMP has been prepared based on the contents of the following technical reports:

- Aboriginal Heritage Technical Report (EMM, 2019a) (**Appendix B**);
- Historical Heritage Technical Report (EMM, 2019b) (**Appendix C**); and
- Subsidence Predictions and Impact Assessment (MSEC, 2019) (**Volume 1**).



DOCUMENT FILE PATH



## REGIONAL CONTEXT

Tahmoor North Western Domain Longwalls West 1 and West 2 Extraction Plan



**FIGURE 1-1**

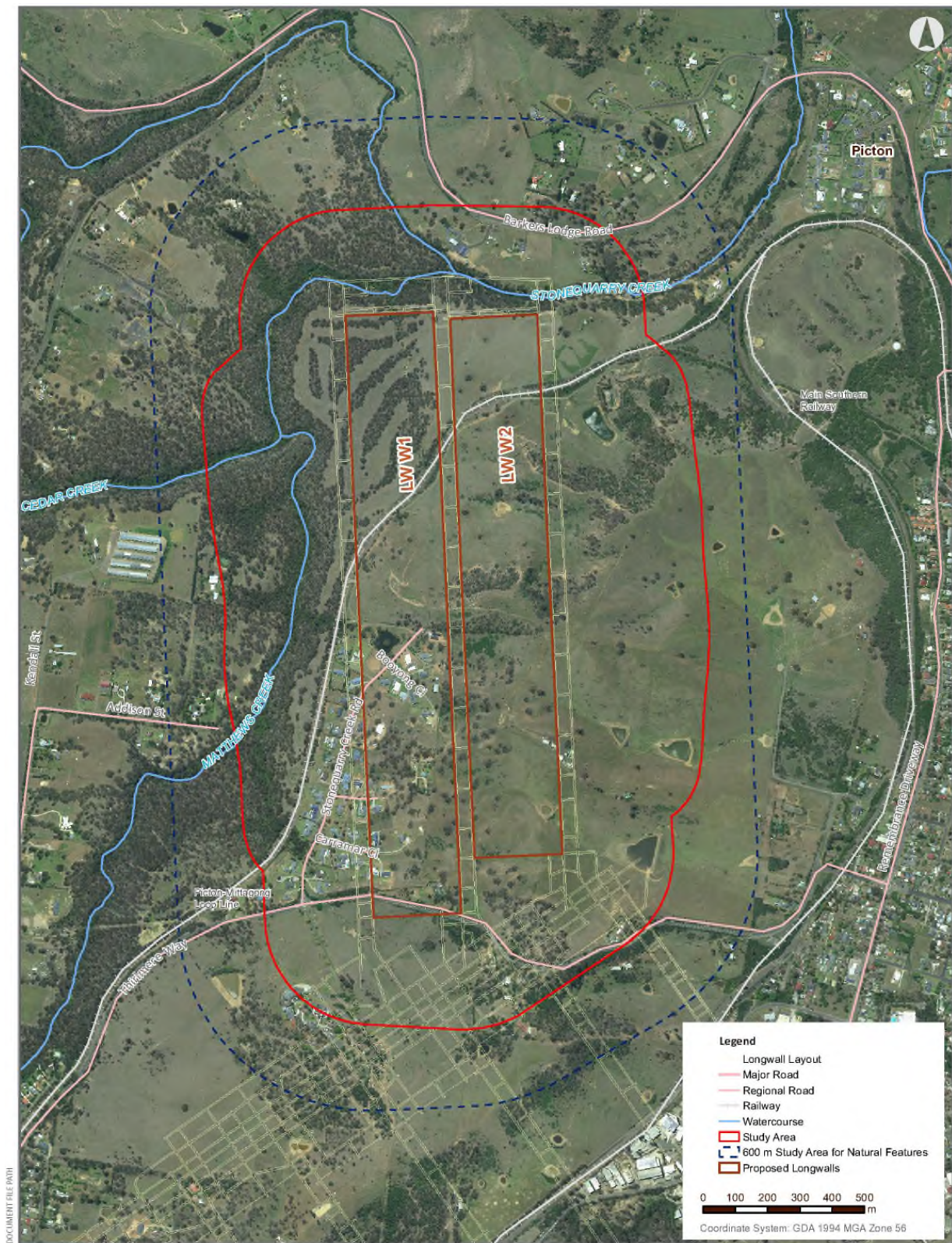
Date: 27/05/2019

Data Sources:  
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**EXTRACTION PLAN STUDY AREA**  
**Tahmoor North Western Domain Longwalls West 1 and West 2**  
**Extraction Plan**

**SIMEC**  
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**FIGURE 1-2**  
 Date: 4/07/2019

Data Sources:  
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 Aerial Imagery: © Photomapping Services (November 2018)

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**Figure 1-2 LW W1-W2 Extraction Plan Study Area**

## 2 Regulatory Requirements

### 2.1 Project Approval

#### 2.1.1 Development Consent

Tahmoor Coal’s operations are conducted in accordance with applicable Commonwealth and State environmental, planning, mining safety, and natural resource legislation. A register of relevant environmental legislative and regulatory requirements is maintained by Tahmoor Coal in a compliance database.

The proposed LW W1-W2 will be operating in the Tahmoor North mining area under Development Consents DA 57/93 and DA 67/93, as discussed further in **Section 3.2.1** of the Extraction Plan Main Document.

DA 67/98 provides the conditional planning approval framework for mining activities in the Western Domain to be addressed within an Extraction Plan and supporting management plans. Conditions relevant to this HMP from DA 67/98 are detailed in **Table 2-1**.

**Table 2-1 Key Conditions from DA 67/98 regarding Aboriginal and Historical Heritage**

Condition	Condition Requirement	Section(s) Addressed
<b>SUBSIDENCE</b>		
<b>Performance Measures – Natural and Heritage Features etc.</b>		
13A	The Applicant must ensure that extraction of Longwall 33 and subsequent longwalls does not cause any exceedances of the performance measures in Table 1. <i>Note: The Applicant will be required to define more detailed performance indicators (including impact assessment criteria) for each of these performance measures in the various management plans that are required under this consent.</i>	Section 5, Section 6, Appendix A
Excerpt from Table 1	<b>Feature</b>	<b>Performance Measure</b>
	<b>Heritage Sites</b>	
	Heritage sites show in the figures in Appendix 7*	<ul style="list-style-type: none"> <li>Negligible subsidence impacts or environmental consequences.</li> <li>Negligible loss of heritage value.</li> </ul>
	Other Aboriginal and heritage sites	<ul style="list-style-type: none"> <li>Negligible subsidence impacts or environmental consequences.</li> </ul>
13B	Measurement and monitoring of compliance with performance measures and performance indicators in this consent is to be undertaken using generally accepted methods that are appropriate to the environment and circumstances in which the feature or characteristic is located. These methods are to be fully described in the relevant management plans and monitoring programs. In the event of a dispute over the appropriateness of proposed methods, the Secretary will be the final arbiter.	Section 5, Section 6, Appendix A
13C	If the Applicant exceeds the performance measures in Table 1 and the Secretary determines that: <ul style="list-style-type: none"> <li>(i) it is not reasonable or feasible to remediate the subsidence impact or environmental consequence; or</li> </ul>	Noted. Performance measures in Table 1 of DA 67/98 are

Condition	Condition Requirement	Section(s) Addressed
	(ii) remediation measures implemented by the Applicant have failed to satisfactorily remediate the subsidence impact or environmental consequence,  then the Applicant must provide a suitable offset to compensate for the subsidence impact or environmental consequence, to the satisfaction of the Secretary.	not anticipated to be exceeded.
13D	The offset must give priority to like-for-like physical environmental offsets, but may also consider payment into any NSW Offset Fund established by OEH, or funding or implementation of supplementary measures such as: <ul style="list-style-type: none"> <li>(i) actions outlined in threatened species recovery programs;</li> <li>(ii) actions that contribute to threat abatement programs;</li> <li>(iii) biodiversity research and survey programs; and/or</li> <li>(iv) rehabilitating degraded habitat.</li> </ul> Note: Any offset required under this condition must be proportionate with the significance of the impact or environmental consequence	Noted. Performance measures in Table 1 of DA 67/98 are not anticipated to be exceeded.
<b>Extraction Plan</b>		
13H(vi)	describe in detail the performance indicators to be implemented to ensure compliance with the performance measures in Table 1 and Table 2, and manage or remediate any impacts and/or environmental consequences;	Section 5.1, Section 5.2 and Section 6
13H(vii)(f)	Heritage Management Plan which has been prepared in consultation with OEH and relevant stakeholders for heritage items which provides for the management of potential environmental consequences of the proposed second workings on heritage items;	Section 6
13H(vii)(h)	Trigger Action Response Plan/s addressing all features in Table 1 and Table 2, which contain: <ul style="list-style-type: none"> <li>• appropriate triggers to warn of increased risk of exceedance of any performance measure; and</li> <li>• specific actions to respond to high risk of exceedance of any performance measure to ensure that the measure is not exceeded;</li> <li>• an assessment of remediation measures that may be required if exceedances occur and the capacity to implement the measures; and</li> <li>• adaptive management where monitoring indicates that there has been an exceedance of any performance measure in Table 1 or Table 2, or where any such exceedance appears likely; an</li> </ul>	Section 6.3, Section 6.5, Appendix A
13H(vii)(i)	Contingency Plan that expressly provides for: <ul style="list-style-type: none"> <li>• adaptive management where monitoring indicates that there has been an exceedance of any performance measure in Table 1 and Table 2, or where any such exceedance appears likely; and</li> <li>• an assessment of remediation measures that may be required if exceedances occur and the capacity to implement those measures; and</li> </ul>	Section 5.3, Section 6.4, Section 6.5, Appendix A

Condition	Condition Requirement	Section(s) Addressed
	<ul style="list-style-type: none"> <li>includes a program to collect sufficient baseline data for future Extraction Plans.</li> </ul>	

Note: \* As there is no Appendix 7 in DA 67/98 Modification 4, it is interpreted that this refers to Aboriginal heritage sites listed on the Aboriginal Heritage Information Management System, *Wollondilly Local Environmental Plan 2011*, State Heritage Register, and the Australian Heritage Database.

### 2.1.2 Extraction Plan Guideline

This HMP has been prepared in accordance with the *Guidelines for the Preparation of Extraction Plans V5* (Department of Planning and Environment (DPE), 2015), as illustrated in **Table 2-2**.

**Table 2-2 Extraction Plan Guideline Requirements for Key Component Plans**

Extraction Plan Guideline Content Requirements for Key Component Plans	Section(s) Addressed
An overview of all landscape features, heritage sites, environmental values, built features or other values to be managed under the component plan.	Section 3
Setting out all performance measures included in the development consent relevant to the features or values to be managed under the component plan.	Section 2.1.1, Section 5.1
Setting out clear objectives to ensure the delivery of the performance measures and all other relevant statutory requirements (including relevant safety legislation).	Section 2, Section 5.1, Section 6
Proposing performance indicators to establish compliance with these performance measures and statutory requirements.	Section 5.1
Describe the landscape features, heritage sites and environmental values to be managed under the component plan, and their significance.	Section 3
Describe all currently-predicted subsidence impacts and environmental consequences relevant to the features, sites and values to be managed under the component plan.	Section 4
Describe all measures planned to remediate these impacts and/or consequences, including any measures proposed to ensure that impacts and/or consequences comply with performance measures and/or the Applicant's commitments.	Section 6, Appendix A
Describe the existing baseline monitoring network and the current baseline monitoring results, including pre-subsidence photographic surveys of key landscape features and key heritage sites which may be subject to significant subsidence impacts (such as significant watercourses, swamps and Aboriginal heritage sites).	Section 3, Section 5.2
Fully describing the proposed monitoring of subsidence impacts and environmental consequences.	Section 5.2
Describe the proposed monitoring of the success of remediation measures following implementation.	Section 6.4, Appendix A
Describe adaptive management proposed to avoid repetition of unpredicted subsidence impacts and/or environmental consequences.	Section 6.5
Describe contingency plans proposed to prevent, mitigate or remediate subsidence impacts and/or environmental consequences which substantially exceed predictions or which exceed performance measures.	Section 6.4, Appendix A
Listing responsibilities for implementation of the plan.	Section 7.3
An attached Trigger, Action, Response Plan (effectively a tabular summary of most of the above).	Appendix A

## 2.2 Relevant Legislation

This HMP has been prepared in accordance with the principles of the Australia ICOMOS Burra Charter, 2013 (**Burra Charter**). The Burra Charter provides guidance for the conservation and management of places of cultural significance and sets a standard of practice for those who provide advice, make decisions about, or undertake works to places of cultural significance, including owners, managers and custodians.

Items of heritage significance in NSW are protected by a series of acts whose purpose it is to ensure that change is appropriately managed to ensure that significance is not lost. In NSW, the *NSW Heritage Act 1977 (Heritage Act)*, *National Parks and Wildlife Act 1974 (NPW Act)* and the *Environmental Planning and Assessment Act 1979 (EP&A Act)* are the primary statutory controls protecting Aboriginal and historical heritage and archaeology within NSW. Listing on statutory registers provides legal protection for heritage items.

The relevant Acts and regulations protecting and managing Aboriginal and historical heritage in New South Wales are discussed in the sections below.

### 2.2.1 National Parks and Wildlife Act 1974

Aboriginal objects and places are protected in NSW under the Part 6 of the NPW Act. Section 90 of the NPW Act requires an AHIP for harm to an Aboriginal object or Aboriginal place. Significant penalties are in place for harm to Aboriginal objects or places regardless of whether the harm was committed knowingly or not. Defences against prosecution include impacts in compliance with an AHIP, acting in accordance with specified codes of practice or the conduct of certain low impact activities. The Act defines an Aboriginal object as:

*any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises NSW, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction and includes Aboriginal remains.*

Harm is defined as:

*any act or omission that: (a) destroys, defaces or damages the object or place, or (b) in relation to an object—moves the object from the land on which it had been situated, or (c) is specified by the regulations, or (d) causes or permits the object or place to be harmed in a manner referred to in paragraph (a), (b) or (c), but does not include any act or omission that: (e) desecrates the object or place, or (f) is trivial or negligible, or (g) is excluded from this definition by the regulations.*

An application for an AHIP for harm to certain Aboriginal objects as a result of LW W1-W2 extraction was submitted to DPIE on 30 September 2019, and the AHIP was granted on 16 March 2020. The conditions of this AHIP are outlined in **Section 7.1.1** of this document.

### 2.2.2 National Parks and Wildlife Regulation 2009

The *National Parks and Wildlife Regulation 2009 (NPW Regulation)* is subsidiary legislation made under its parent act, the NPW Act. The NPW Regulation provides codes of practice, documents and guidelines that relate to the NPW Act, which include:

- The *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW (Due Diligence Guidelines)* (DECCW, 2010a) is adopted by the NPW Regulation under Clause 80A. Compliance with the Due Diligence Guidelines provide a defence for harming Aboriginal objects and places in certain circumstances;

- Section 80D of the NPW Regulation requires an Aboriginal Cultural Heritage Assessment (**ACHA**) report to be completed to accompany any AHIP application. The *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH, 2011) sets out the information required to support an AHIP;
- The *Aboriginal Consultation Requirements for Proponents 2010* (DECCW, 2010c) set out the consultation requirements for proponents seeking an AHIP. These requirements are under Section 80C of the NPW Regulation; and
- The *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (the Code)* (DECCW, 2010b) has been adopted by clause 3A of the NPW Regulation. Acts carried out in accordance with the Code are excluded from the definition of harm.

An ACHA covering proposed works in the Western Domain (LW W1-W4) was prepared by EMM on behalf of Tahmoor Coal (EMM, 2019c), and submitted to DPIE on 30 September 2019 as part of the AHIP application. The was granted by DPIE on 16 March 2020, and the conditions of this AHIP are outlined in **Section 7.1.1** of this document.

### 2.2.3 Environmental Planning and Assessment Act 1979

#### Aboriginal Heritage Requirements for the Western Domain

An AHIP under Section 90 of the NPW Act is required to harm Aboriginal objects for projects assessed under the EP&A Act, except for projects assessed under Part 4 Division 4.7 (State Significant Development (**SSD**)) and Part 5.2 (State Significant Infrastructure (**SSI**)) of the EP&A Act. An AHIP is required for any impacts resulting from LW W1–W2 as it is not State significant development or infrastructure.

Although negligible subsidence impacts are predicted for all Aboriginal sites and objects within the Study Area, a residual risk of harming Aboriginal objects as defined in the NPW Act will still be present.

An application for an AHIP for harm to certain Aboriginal objects as a result of LW W1-W2 extraction was submitted to DPIE on 30 September 2019, and the AHIP was granted on 16 March 2020. The conditions of this AHIP are outlined in **Section 7.1.1** of this document.

#### Historical Heritage

The EP&A Act establishes the framework for cultural heritage values to be formally assessed in the planning and development consent process in NSW. The EP&A Act requires that environmental impacts are considered before land development; this includes impacts on cultural heritage items and places as well as archaeological sites and deposits.

The EP&A Act requires that local governments prepare planning instruments, such as Local Environment Plans (**LEPs**) and Development Control Plans (**DCPs**) to provide guidance on the level of environmental assessment. This includes identification of heritage items, as listed on the heritage schedules of an LEP.

The Study Area is within the Wollondilly Shire Local Government Area (**LGA**), and therefore the *Wollondilly Local Environment Plan 2011 (WLEP)* is applicable.

### 2.2.4 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* provides a legal framework to protect and manage nationally and internationally important heritage places as well as places that are owned by the Commonwealth, such as defence lands and postal facilities.

### 2.2.5 Heritage Act 1977

The Heritage Act is the statutory framework for the identification and conservation of heritage in NSW.

#### Relics Provision

Relics are defined by the Heritage Act as “any artefact, object or material evidence which relates to the settlement of that area that comprises New South Wales, not being Aboriginal settlement, and is of State or local significance.” Relics are protected under Section 139 of the Heritage Act. Where there exists the potential for relics, the land in which it is found cannot be disturbed or excavated without an excavation permit under s140 of the Heritage Act.

#### State Heritage Register

The State Heritage Register (**SHR**) is a list of places and objects of particular importance to the people of NSW. When a place is listed on the SHR or is affected by an interim heritage order, approval under Section 60 of the Heritage Act, is required for any major work. The purpose of this requirement is to ensure that change to significant places is managed appropriately and does not detract from the heritage significance of the place.

#### Section 170 registers

State government agencies have responsibilities under Section 170 of the Heritage Act that requires them to identify, conserve and manage heritage assets owned, occupied or managed by that agency. Each agency is required to maintain a S170 register of all heritage assets and assess the significance of each asset.

## 2.3 Consultation

OEH and Registered Aboriginal Parties (**RAPs**) were consulted during the preparation of this WMP. A summary of consultation undertaken is provided in **Section 2.1.2** of the Extraction Plan Main Document, and a copy of the incoming correspondence is also provided in **Appendix C** of the Extraction Plan Main Document.

EMM prepared an ACHA for LW W1–W4 to support the AHIP application for LW W1-W2 (EMM, 2019c). This involved formal consultation in accordance with the OEH guideline *Aboriginal Cultural Heritage Consultation requirements for proponents* (DECCW, 2010c). The ACHA resulted in wider consultation and further opportunity for RAPs to provide cultural input into the assessment of the LW W1-W4 extraction area.

## 3 Existing Environment

### 3.1 Aboriginal Heritage Items

There are 25 Aboriginal sites recorded in the Study Area, comprising 17 rockshelters (including those with multiple features), one grinding groove site, six open artefact sites and one modified tree. **Table 3-1** and **Figure 3-1** provide an overview of all the identified Aboriginal sites within the Study Area.

Further information about the Aboriginal heritage sites can be found in the ACHA reports (EMM, 2019c; Niche, 2014). The AHTR (EMM, 2019a) also provides a discussion on the landscape potential for archaeology, a more detailed review of the Aboriginal sites, and a summary of archaeological significance of the sites discussed below.

#### 3.1.1 AHIMS Sites within the Study Area

A search of the Aboriginal Heritage Information Management System (**AHIMS**) database on 14 March 2019 identified 20 Aboriginal sites within the Study Area (EMM, 2019a).

The predominant Aboriginal site type within the Study Area are rockshelters. These are located on the sandstone scarps beside Matthews and Cedar Creeks near the western and northern boundaries of the Study Area. Four rockshelters contain art including charcoal and ochre drawings and hand stencils, and one rockshelter above Cedar Creek (#52-2-4430) also contains a series of grinding grooves on a boulder within the shelter. Five isolated stone artefact sites have been identified in the north-east quadrant of the Study Area on the banks and lower slopes beside Stonequarry Creek. The only listed Aboriginal site directly above LW W1–W2 is a modified tree (#52-2-2100) (EMM, 2019a).

The Aboriginal sites of highest significance within the Study Area are two rockshelters with art beside Matthews Creek (#52-2-4391) and Cedar Creek (#52-2-4430) and a substantial axe grinding groove site, with at least 90 grinding grooves, located near a vehicle crossing in Stonequarry Creek (#52-2-2068) (EMM, 2019a).

#### 3.1.2 Archaeological Survey and Baseline Recording for the AHTR

EMM conducted a survey of the LW W1–W4 Study Area, in conjunction with baseline recording of all rockshelters within the LW W1–W2 Study Area over four days in March 2019. The survey targeted land where outcropping sandstone is predicted to occur, localised to the channels of Cedar, Matthews and Stonequarry Creeks, primarily on scarp and cliff landforms and outcropping sandstone bedrock associated with stream channels. The survey aimed to identify obtrusive site types, particularly those that are theoretically susceptible to subsidence impacts, i.e. rockshelters, rock carvings, grinding groove sites and rock pools (EMM, 2019a).

Thirteen AHIMS rockshelter sites were inspected and recorded, four new rockshelter sites were identified and recorded, and one new open artefact site was identified and recorded. Of the newly identified sites, most of the rockshelters were in the sandstone scarps adjacent to Matthews and Cedar Creeks and an additional rockshelter was identified on a tributary to Cedar Creek (CCT1). Most of the rockshelters did not have visible artefacts or art but had a floor of accumulated deposit (mostly soil, rock fall and debris) that may have retained artefactual material (known as a Potential Archaeological Deposit (**PAD**)) (EMM, 2019a).

The scarred tree (#52-2-2100) was inspected and recorded. Although largely hollowed out by termites and the upper branches are dead, the tree is still alive. The scar is now closed over by overgrowth.

The AHIMS open artefact sites were not inspected as access was not permitted. However, these types of sites are at low risk of subsidence impacts. An additional open artefact site (SQC1) was identified in the eroding bank beside Stonequarry Creek, approximately 200 m west of the grinding groove site (#52-2-2068). This surface scatter represents what is most likely a much wider area of PAD (EMM, 2019a).

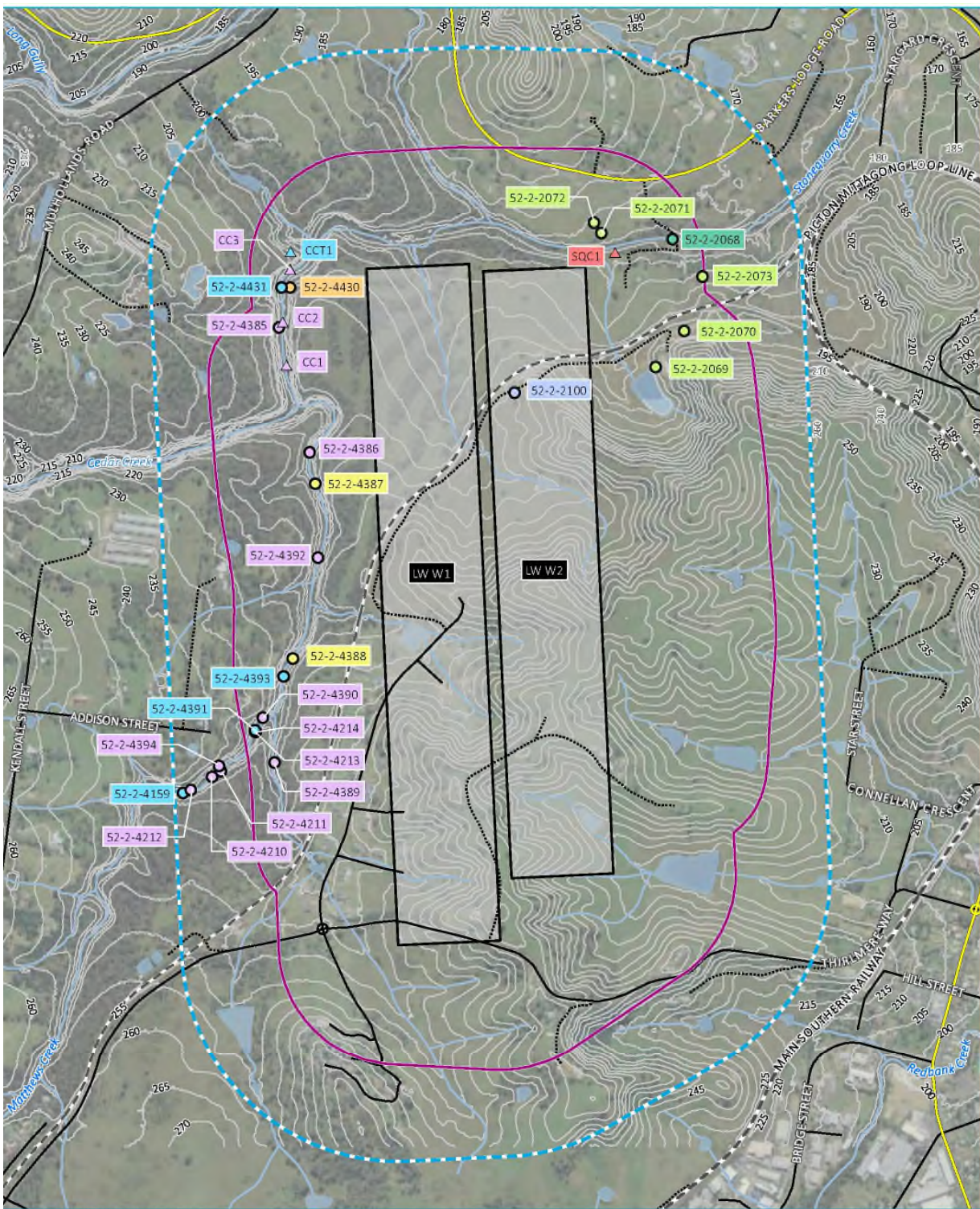
**Table 3-1 Aboriginal Heritage Sites within the Study Area (EMM, 2019a)**

AHIMS site number	Site name	Site type	Description	Landform	Significance
52-2-2068	Stonequarry Creek 1	Grinding groove site	Two clusters of axe grinding grooves on a stone platform in the bed of Stonequarry Creek. A total of approximately 90 grooves.	Creek bed	High
52-2-2069	Isolated Finds 5	Isolated find	Silcrete flake identified in a paddock used as grazing pasture.	Lower hillslope	Low
52-2-2070	Isolated Finds 9	Isolated find	Stone artefact identified on pastoral grazing land.	Lower hillslope	Low
52-2-2071	Isolated Finds 2	Isolated find	Flaked piece of white quartz, near a small tributary of Stonequarry Creek.	Lower hillslope	Low
52-2-2072	Isolated Finds 1	Isolated find	Chert flake near a small tributary of Stonequarry Creek.	Lower hillslope	Low
52-2-2073	Isolated Finds 3	Isolated find	Retouched silcrete flake with possible use-wear in a paddock.	Lower hillslope	Low
52-2-2100	Clearview	Modified tree	White mahogany tree with scar 0.3x 0.75 cm (now concealed by overgrowth), on pastoral land.	Mid hillslope	Moderate
52-2-4213	QVMH-RS-001	Shelter with PAD	Rockshelter with sandstone base, facing west.	Middle scarp	Moderate
52-2-4214	QVMH-RS-002 <sup>1</sup>	Shelter with PAD	Large rockshelter with small areas of PAD at either end, facing west.	Middle scarp	Moderate
52-2-4388	MCR 2014 – 1	Shelter with artefacts and PAD	Large cavernous rockshelter, 2 artefacts (quartz core and chert distal flake) and PAD.	Middle scarp	Moderate
52-2-4389	MCR 2014 – 2	Shelter with PAD	Small, low rockshelter with PAD.	Scarp footslope	Moderate
52-2-4390	MCR 2014 -3	Shelter with PAD	Shallow and wide, high sandstone shelter with PAD.	Upper scarp	Moderate
52-2-4391	MCR 2014 – 4	Shelter with art and PAD	Rockshelter with art comprising over 20 red ochre hand stencils on the back wall and ceiling in 4 panels, PAD. RAPs noted that the site has special significance and cultural values.	Middle scarp	High

AHIMS site number	Site name	Site type	Description	Landform	Significance
52-2-4393	MCR 2014 – 6	Shelter with art	Rockshelter with art comprising two panels of indeterminate charcoal line drawings overlain with charcoal graffiti.	Middle scarp	Moderate
52-2-4392	MCR 2014 – 7	Shelter with PAD	Low rockshelter with PAD.	Middle scarp	Moderate
52-2-4387	MCR 2014 – 8	Shelter with artefacts, PAD	Shelter with substantial soil deposit and artefacts comprising quartz flakes, quartz debitage, a silcrete flake and a chert flake.	Middle scarp	Moderate - high
52-2-4386	MCR 2014 – 9	Shelter with PAD	Low, cavernous rockshelter with PAD.	Middle scarp	Moderate
52-2-4385	MCR 2014 – 10	Shelter with PAD	Shallow rockshelter with limited PAD.	Middle scarp	Moderate
52-2-4431	MCR 2014 – 11	Shelter with art and PAD	Large rockshelter with art comprising two panels of indeterminate charcoal line drawings on the ceiling.	Middle scarp	Moderate
52-2-4430	MCR 2014 – 12	Shelter with art, grinding groove, and PAD	Large rockshelter with art comprising of at least 5 panels with red ochre infill, charcoal line, charcoal infill and detailed charcoal drawings of fish, kangaroos and wallabies, anthropomorphic figures, eels and boomerangs. 20 artefacts (18 quartz and 2 silcrete) and bone fragments. 5 parallel grinding grooves on a boulder under the drip line in the centre of the shelter.	Middle scarp	High
	MCR 2014 – 13 <sup>1</sup>	Shelter	Described in the ACHA (Niche, 2014) as a rockshelter with art comprising indeterminate charcoal lines overlain by charcoal graffiti.	Middle scarp	N/A
	CCT 1	Shelter with art	Rockshelter with charcoal markings beside a western tributary to Cedar Creek.	Middle scarp	Medium
	CC 1	Shelter with PAD	Rockshelter formed by cavernous weathering, 5 m from Cedar Creek with PAD at southern end.	Scarp footslope	Medium
	CC 2	Shelter with PAD	Rockshelter above Cedar Creek, rockfall has reduced area of PAD.	Middle scarp	Medium
	CC 3	Shelter with PAD	Rockshelter with PAD formed by cavernous weathering, above Cedar Creek.	Middle Scarp	Medium

AHIMS site number	Site name	Site type	Description	Landform	Significance
	SQC 1	Artefact scatter	Eleven flakes (silcrete, chert and IMT) found within a 20 m <sup>2</sup> area of eroding bank beside Stonequarry Creek.	Creek bank	Medium

<sup>1</sup> MCR 2014-13 is recorded in the ACHA (Niche, 2014) but has no corresponding AHIMS record. It was inspected by EMM and confirmed not to be an Aboriginal site. The rockshelter had a sloping sandstone base, no PAD and limited overhang. The charcoal markings on the wall comprised alpha-numeric letters and were determined to be modern graffiti.



Source: EMM (2019); DFSI (2017); GA (2011)

0 250 500  
m  
GDA 1994 MGA Zone 56

<b>KEY</b>	Contour (5 m)	Aboriginal sites (EMM 2019)
Study area	AHIMS sites	Rock shelter
Longwall	Isolated find	Rock shelter with art
Longwall buffer (600 m)	Rock shelter	Artefact scatter
Rail line	Rock shelter with art	
Main road	Rock shelter with art and grinding grooves	
Local road	Rock shelter, artefacts	
Vehicular track	Grinding groove site	
Watercourse/drainage line	Modified tree	
Waterbody		

Aboriginal sites within the study area

Tahmoor coal mine extraction plan LW W1-W2  
Aboriginal heritage technical report  
Figure 3.1



**Figure 3-1 Aboriginal Heritage Sites within the Study Area (EMM, 2019a)**

## 3.2 Historical Heritage Items

### 3.2.1 Listed Historical Heritage Sites within the Study Area

A review of the following databases was undertaken in April 2019 (EMM, 2019b):

- Commonwealth Heritage List (**CHL**);
- National Heritage List (**NHL**);
- SHR;
- WLEP (2011), schedule 5;
- Wingecarribee LEP (2010), schedule 5;
- NSW Department of Health s170 register;
- Rail Corp s170 register;
- Australian Rail Track Corporation (**ARTC**) s170 register; and
- National Trust register.

There are no heritage items within the Study Area that are listed on the CHL, NHL, SHR or National Trust registers.

Four heritage items are listed on the Wingecarribee LEP (2010), WLEP (2011) or the Department of Health S170 register. The Picton-Mittagong Loop Line Railway Line (hereafter referred to as the '**Loop Line**') is listed on the Wingecarribee LEP (2010) (I473) for the section of the line between Buxton and Mittagong, but the section of the Loop Line within the Wollondilly Shire LGA (and within the Study Area) is not listed on the WLEP (EMM, 2019b).

Three heritage items within the Study Area are listed on the WLEP (2011) and have local significance. Two WLEP items (the Queen Victoria Memorial Hospital, and Harmony House archaeological site) are also listed on the Department of Health S170 register. Rural landscape – Thirlmere Way is linked to the Department of Health S170 group record for The Queen Victoria Memorial Hospital Precinct (EMM, 2019b).

Details of these heritage items are listed in **Table 3-2** and items are shown on **Figure 3-2**. Further detail of these heritage items can be found in the HHTR (EMM, 2019b).

There are also two locally listed historical heritage sites outside the Study Area but within the 600 m longwall buffer of the extents of LW W1–W2: the brick arch Picton Rail Tunnel and the stone arch Mushroom Tunnel.

**Table 3-2 Listed Historical Heritage Sites within the Study Area (EMM, 2019b)**

WLEP	Department of Health S170 Register	Address	Description of Item	Distance from Longwalls	Significance
Mill Hill, Millers House and archaeological relics (I210)	NA	675 Thirlmere Way, Picton	One of a set of mills constructed locally by the Larkin family, which was in use from 1842-47. While there are no above-ground remains of the mill, the surface indications are that this site has archaeological potential. The Miller's House, a single storey weatherboard cottage, survives on the site.	Partially within the southern boundary of the Study Area. 230 m from LW W1.	Local
Queen Victoria Hospital (I265)	Queen Victoria Hospital Precinct. S170 register individually lists the following items: <ul style="list-style-type: none"> <li>• Chalets (seven items);</li> <li>• Cultural landscape;</li> <li>• Daycare Centre;</li> <li>• Goodlet House;</li> <li>• Library and Diversional Therapy;</li> <li>• Nursing Administration;</li> <li>• Polyclinic;</li> <li>• Remnant native landscape;</li> <li>• Repatriation Chalet;</li> <li>• Tennis Court;</li> <li>• The Grove;</li> <li>• Visitors Chalet; and</li> <li>• Workshop and stores.</li> </ul>	Thirlmere Way, Picton	Established in 1886 as probably the first tuberculosis sanatorium in NSW and possible Australia. The site comprises a large complex of buildings which have been altered and added to over the years. The site is currently used as a nursing home.	Within this complex of buildings, four structures are within the southern boundary of the Study Area: <ul style="list-style-type: none"> <li>• Goodlet House (c.1886), the original sanatorium building is approximately 320 m south west of LW W1;</li> <li>• The main modern three-storey building is approximately 310 m from LW W1;</li> <li>• Building V04bh1 is adjacent to Goodlet House (east); and</li> <li>• Building V04ag1 is approximately 320 m from LW W1.</li> </ul>	Local

WLEP	Department of Health S170 Register	Address	Description of Item	Distance from Longwalls	Significance
Harmony House Archaeological site (A14)	Artefacts	220 Bridge St, Thirlmere (Thirlmere Way, Picton)	Harmony House was built (c.1882) as the original country retreat dwelling of Colonel John Hay Goodlet. Between 1907-1912 it was used as a children's hospital for state wards. For the next twenty years it became a boarding house before being demolished in 1933.	Partially within the southern boundary of the Study Area.	Local
NA	Rural Landscape – Thirlmere Way	Thirlmere Way, Picton	The rural landscape provides the picturesque setting for the QVMH precinct. The site dates from c.1882 with a dam added in 1910 and further modifications between 1920-1930. The boundary of this item is defined as the setting for the QVMH.	Partially within the southern boundary of the Study Area.	Local

### 3.2.2 Culverts along Picton-Mittagong Loop Line

The Loop Line was opened in February 1867 as an extension to the Main South Line that opened in 1863 and terminated at Picton. In 1919, a new deviation line was constructed on an alignment to the east of the original line. The original alignment, which became known as the “Picton to Mittagong Loop Line” passed through the Mushroom Tunnel (east of the Study Area) and along an embankment (now disused) (EMM, 2019b).

A site inspection of the Loop Line was completed on 29 March 2019 and focused on the section of Loop Line directly above the northern ends of LW W1–W2. Three sandstone and two brick culverts were recorded on the Loop Line within the Study Area. Two additional brick culverts were recorded outside the Study Area but within the 600 m buffer (EMM, 2019b).

Details of the culverts inspected are provided in **Table 3-3**, and the location of all culverts is shown on **Figure 3-2**.

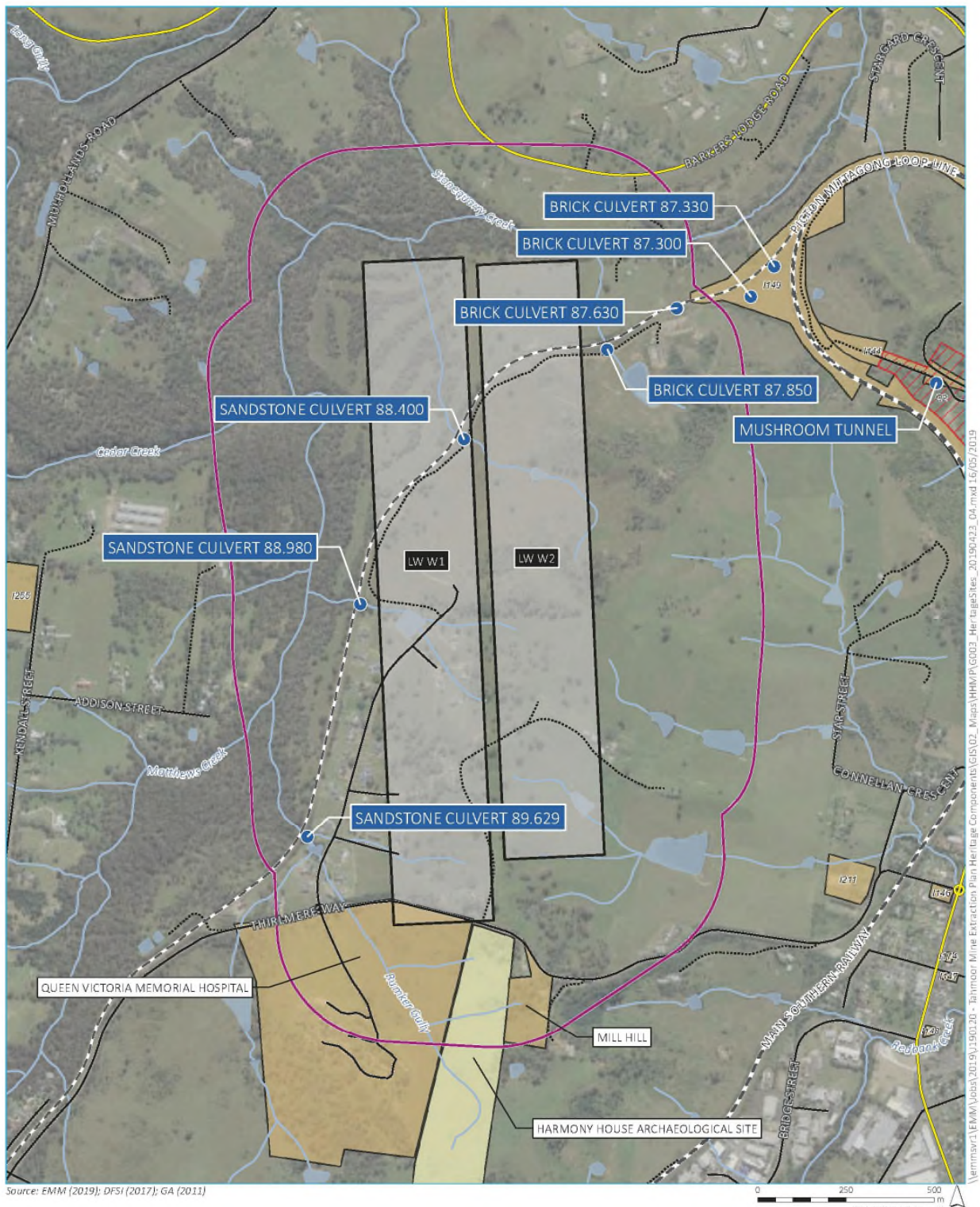
The sandstone culverts are likely to date to the construction of the original line in 1863 and the brick culverts to additional works in 1919. The culverts have local significance as individual items and as a group. The sandstone culverts located along the Loop Line have historical significance as part of the works and structures constructed to overcome the challenging terrain during the construction of the Main Southern Railway during the 1860s, while the brick culverts which were added in 1919, have historical significance as part of the story of the development of the railway in NSW and the changing construction techniques (EMM, 2019b).

The culverts were found to be generally in fair to good condition except for the sandstone culvert at chainage 88.980 which shows deterioration of the sandstone, specifically exfoliation (EMM, 2019b).

**Table 3-3 Culverts along Picton-Mittagong Loop Line (EMM, 2019b)**

Chainage	Item	Construction date	Notes	Dimensions	Significance
87.300	Brick culvert	c.1919	Located beneath the disused embankment for the original railway alignment. Bricks cracked at northern headwall.	Entrance 1.2 m high	Local
87.330	Brick culvert	c.1919	Drainage channels of rendered brick have been constructed on either side of the embankments in order to funnel water into the culvert. Cracking is along the mortar only and the condition of the fabric is good. Only the south east side of the culvert was inspected.	1.2 m diameter	Local

Chainage	Item	Construction date	Notes	Dimensions	Significance
87.630	Brick culvert	c.1919	Concrete skin on base and rubble at the mouth. Mortar tuck pointed. Headwall and abutment in good condition. Recent embankment to the south-east means water is largely diverted away from the culvert.	Entrance dimensions 3.2 m x 1.5 m	Local
87.850	Brick culvert	c.1919	Overgrown with brambles, difficult to assess.	1.5 m diameter	Local
88.400	Sandstone culvert	c.1867	Overgrown with weeds, difficult to assess. Only the east side was inspected.	2.5 m diameter	Local
88.629	Sandstone culvert	c.1867	Brick wingwalls and headwall (c.1919) on the upstream side to support vehicle track.	3.2 m x 3 m	Local
88.980	Sandstone culvert	c.1867	Poorly "restored" as part of the Stonequarry Estate Development.	Entrance 2.2 m high	Local



- Source: EMM (2019); DFSI (2017); GA (2011)
- |                           |                                 |
|---------------------------|---------------------------------|
| <b>KEY</b>                |                                 |
| Study area                | Historical heritage survey site |
| Longwall                  | Listed heritage sites           |
| Rail line                 | Conservation Area - General     |
| Main road                 | Item - General                  |
| Local road                | Item - Archaeological           |
| Vehicular track           |                                 |
| Watercourse/drainage line |                                 |
| Waterbody                 |                                 |

Heritage sites within the study area

Tahmoor coal mine extraction plan LW W1-W2  
Historical heritage technical report  
Figure 3.1

**Figure 3-2 Historical Heritage Sites in the Study Area and Surrounds (EMM, 2019b)**

# 4 Predicted Subsidence Impacts and Environmental Consequences

## 4.1 Aboriginal Heritage Items

### 4.1.1 Subsidence Predictions for Aboriginal Heritage Sites within the Study Area

Mine Subsidence Engineering Consultants (**MSEC**) prepared a subsidence impact assessment for the Aboriginal heritage sites within and outside of the Study Area. The likelihood of damage occurring at the Aboriginal heritage sites was assessed on criteria which considers theoretical cracking limits caused by strains and tilts. A detailed discussion of the likely impacts to Aboriginal items in the Study Area as a result of subsidence is provided in **Section 4.1** of the AHTR (EMM, 2019a).

A summary of the predicted impacts of subsidence on Aboriginal site types in the Study Area is summarised in **Table 4-1**.

**Table 4-1 Aboriginal Heritage Sites within LW W1-W2 Extraction Plan Study Area and Predicted Likelihood of Impact (EMM, 2019a)**

Aboriginal Heritage Sites	Description of Sites (AHIMS number or site name)	Possible Environmental Consequences	Probability of Impact Rating
Isolated finds/ artefact scatters	1 artefact scatter (SQC 1) 5 isolated finds (AHIMS numbers 52-2-2069, 52-2-2070, 52-2-2071, 52-2-2072, 52-2-2073)	Negligible environmental consequences.	Very unlikely
Scarred tree	1 modified tree (AHIMS #52-2-2100)	Negligible environmental consequences.	Very unlikely
Grinding grooves	1 grinding groove site with ~90 grinding grooves (AHIMS #52-2-2068)	Subsidence impacts include cracking of rock platform due to upsidence and valley movement. Environmental consequences unknown.	Unlikely
Rockshelters	17 rockshelters located between 170-370 m from the longwall footprints (AHIMS numbers 52-2-4213, 52-2-4214, 52-2-4388, 52-2-4389, 52-2-4390, 42-2-4391, 52-2-4393, 52-2-4392, 52-2-4387, 52-2-4386, 52-2-4385, 52-2-4431, 52-2-4430; MCR 2014-13; CCT 1; CC 1; CC 2; CC 3)	Negligible environmental consequences.	Very unlikely

Archaeological sites which are most susceptible to subsidence-induced damage are rock shelters in caves or overhangs, generally associated with cliff lines (DoP, 2008; (p.84)). Streams and valleys are the natural surface features most sensitive to subsidence movements. Axe grinding groove sites and rockshelters are located along the valleys of streams and therefore could experience valley related movements of upsidence and valley closure movements (EMM, 2019a).

Impacts to open sites, such as open artefact scatters and scar trees, are limited to cracking in the surface soils which could lead to erosion channels if left untreated. It is unlikely that the artefacts or trees themselves would be impacted by surface cracking (MSEC, 2019; (p.114)).

#### 4.1.2 Subsidence Predictions for Aboriginal Heritage Sites outside of the Study Area

There are five recorded rockshelter sites outside the Study Area but within the 600 m longwall buffer for LW W1–W2. MSEC has advised that although the likelihood of impact is very unlikely, sites within Matthews, Cedar and Stonequarry Creeks could experience either far-field horizontal movements or valley related movements (MSEC, 2019).

However, given that the likelihood of impacts to rockshelters within the Study Area is predicted to be very unlikely, impacts to these rockshelter sites outside the Study Area is also expected to be very unlikely (EMM, 2019a).

## 4.2 Historical Heritage Items

#### 4.2.1 Subsidence Predictions for Historical Heritage Sites within the Study Area

MSEC prepared a subsidence assessment for the historical sites within the Study Area. The likelihood of damage occurring at the sites was assessed on criteria which consider theoretical cracking limits caused by strains and tilts. A detailed discussion of the likely impacts to historical heritage items in the Study Area as a result of subsidence is provided in **Section 4.1** of the HHTR (EMM, 2019b).

Four listed historical heritage sites are located partly within the Study Area. In addition, three sandstone culverts (unlisted) and two brick culverts (unlisted) that are part of the historical Loop Line are located within the Study Area (EMM, 2019b).

A summary of the predicted impacts of subsidence on historical heritage sites in the Study Area is summarised in **Table 4-2**.

**Table 4-2 Historical Heritage Sites within LW W1-W2 Extraction Plan Study Area and Predicted Likelihood of Impact (EMM, 2019b)**

Site Name	Site Type	Significance	Location in relation to LWs	Predicted Probability of Impact
Queen Victoria Memorial Hospital	Complex of built structures	Local	Goodlet House is approximately 320 m from LW W1	Very unlikely
Mill Hill, Miller’s House and archaeological relics	Built structures and archaeological relics	Local	230 m from LW W1	Unlikely

Site Name	Site Type	Significance	Location in relation to LWs	Predicted Probability of Impact
Harmony House archaeological site	Archaeological relics	Local	Location of archaeological relics outside the Study Area	Very unlikely
Rural Landscape – Thirlmere Way	Landscape	Local	Partly above the southern end of LW W1.	Unlikely
Brick culvert 87.630	Built structure	Local	270 m east of LW W2	Unlikely
Brick culvert 87.850	Built structure	Local	70 m east of LW W2	Unlikely
Sandstone culvert 88.400	Built structure	Local	Directly above LW W1	Possible
Sandstone culvert 88.980	Built structure	Local	60 m west of LW W1	Unlikely
Sandstone culvert 89.629	Built structure	Local	250 m west of LW W1	Unlikely

#### 4.2.2 Subsidence Predictions for Historical Heritage Sites outside of the Study Area

There are two historical heritage sites outside the Study Area but within the 600 m longwall buffer of the extents of LW W1–W2: the brick arch Picton Rail Tunnel and the stone arch Mushroom Tunnel. The potential for impacts on the tunnels does not result from absolute far-field horizontal movements, but rather from differential horizontal movements over the lengths of the structures (EMM, 2019b).

Tahmoor Coal is currently monitoring the position of the Picton Tunnel as part of its far field monitoring program, which is reviewed regularly. This will continue during the mining of LW W1–W2 (MSEC, 2019).

Two brick culverts (unlisted), located at chainage 87.300 and chainage 87.330, are located within the 600 m longwall buffer of the extents of LW W1-W2 (EMM, 2019b).

A summary of the predicted impacts of subsidence on historical heritage sites outside of the Study Area is summarised in **Table 4-3**.

**Table 4-3 Historical Heritage Sites outside the LW W1-W2 Extraction Plan Study Area and Predicted Likelihood of Impact (EMM, 2019b)**

Item	Listing	Address	Distance from LW	MSEC Predictions / Impact Assessment
Mushroom Tunnel (former Mainline Railway Tunnel)	WLEP 2011 (I144)	229 Argyle St, Picton	750 m east of LW W2	Negligible vertical subsidence. Could experience small far-field horizontal movements.
Picton Tunnel – part of the Picton Railway Station Group	WLEP 2011 (I181)	Main Southern Railway, Picton	825 m east of LW W2	Negligible vertical subsidence. Could experience small far-field horizontal movements.
Brick culvert 87.300	Not listed	Mittagong Picton Loop Line	160 m east of LW W2	unlikely
Brick culvert 87.330	Not listed	Mittagong Picton Loop Line	550 m east of LW W2	unlikely

## 5 Subsidence Monitoring Program

### 5.1 Performance Measures and Indicators

Performance measures for Aboriginal and historical heritage sites are provided in Table 1 of Condition 13A of DA 67/98 and are summarised in relation to Aboriginal and historical heritage sites in **Table 5-1**.

**Table 5-1 Subsidence Performance Measures and Performance Indicators for Aboriginal and Historical Heritage Sites (EMM, 2019a; EMM, 2019b)**

Feature / Site	Subsidence Performance Measures	Probability of Subsidence Impact	Subsidence Performance Indicators
Isolated finds/ artefact scatters	Negligible subsidence impacts or environmental consequences	Very unlikely	No performance indicators are currently established as impacts are predicted to be negligible.
Scarred tree	Negligible subsidence impacts or environmental consequences	Very unlikely	This performance indicator will be considered to be triggered if: <ul style="list-style-type: none"> <li>• subsidence monitoring identifies a perceptible tilt increase that places the tree at risk of falling; and/or</li> <li>• subsidence monitoring identifies a perceptible cracking in the tree unrelated to natural weathering or trauma damage.</li> </ul>
Grinding grooves	Negligible subsidence impacts or environmental consequences	Unlikely	This performance indicator will be considered to be triggered if: <ul style="list-style-type: none"> <li>• subsidence monitoring identifies visible perceptible impacts such as subsidence induced cracking; and</li> <li>• these subsidence impacts result in impacts to the heritage values of the site.</li> </ul>
Rockshelters	Negligible subsidence impacts or environmental consequences	Very unlikely	This performance indicator will be considered to be triggered if: <ul style="list-style-type: none"> <li>• subsidence monitoring identifies visible perceptible change, e.g. rockfall, cracking, or toppling within rockshelters; and</li> <li>• these subsidence impacts result in impacts to the heritage values of the sites.</li> </ul>
Queen Victoria Memorial Hospital	Negligible subsidence impacts or environmental consequences Negligible loss of heritage value	Very unlikely	This performance indicator will be considered to be triggered if: <ul style="list-style-type: none"> <li>• subsidence monitoring identifies cracking of external brick work or other physical impacts to the historical heritage values of the building, measurable tilt and internal damage, or cracks in foundations.</li> </ul>

Feature / Site	Subsidence Performance Measures	Probability of Subsidence Impact	Subsidence Performance Indicators
Mill Hill, Miller's House and archaeological relics	Negligible subsidence impacts or environmental consequences Negligible loss of heritage value	Unlikely	This performance indicator will be considered to be triggered if: <ul style="list-style-type: none"> <li>subsidence monitoring identifies damage to external cladding or internal finishes.</li> </ul>
Harmony House archaeological site	Negligible subsidence impacts or environmental consequences Negligible loss of heritage value	Very unlikely	No performance indicators are currently established as impacts are predicted to be negligible. However, if the pre-mining assessment identifies that the cistern is located within the Study Area, this may need to be re-evaluated.
Rural landscape – Thirlmere Way	Negligible subsidence impacts or environmental consequences Negligible loss of heritage value	Unlikely	No performance indicators are currently established as impacts are predicted to be negligible.
Sandstone culverts	Negligible subsidence impacts or environmental consequences	Impacts to the culvert at chainage 88.400 is possible. Impacts to the other culverts is unlikely.	This performance indicator will be considered to be triggered if: <ul style="list-style-type: none"> <li>subsidence monitoring identifies visible perceptible impacts such as subsidence induced cracking, exfoliation, block movement or block fall.</li> </ul>
Brick culverts	Negligible subsidence impacts or environmental consequences	Unlikely	This performance indicator will be considered to be triggered if: subsidence monitoring identifies visible perceptible impacts such as subsidence induced cracking, exfoliation, brick movement or brick fall.

For the purpose of this Extraction Plan and associated documents, 'negligible' is defined as being 'so small and insignificant as to not be worth considering'. Negligible impacts would not constitute harm under the NPW Act (EMM, 2019a).

Based on the predicted subsidence impacts (MSEC, 2019), it is considered that the performance measures (negligible subsidence impacts and environmental consequences) for the Aboriginal and historical heritage sites within the Study Area will be achieved (EMM, 2019a; EMM, 2019b).

Impacts to the grinding groove sites located in Stonequarry Creek (#52-2-2068) are considered unlikely but will need to be reassessed after the partial extraction of LW W1 as outlined in **Section 5.2** (photogrammetry of grinding groove site #52-2-2068) (EMM, 2019a).

One of unlisted heritage sites, the sandstone culverts (chainage 88.400) is at possible risk of subsidence impacts, however, with appropriate mitigation measures, negligible loss of heritage values will be achieved (EMM, 2019b).

## 5.2 Subsidence Monitoring Program

A subsidence monitoring program for Aboriginal and historical heritage items will be implemented to confirm if impacts remain within predictions and identify any management or mitigation measures as required (**Table 5-2**). Further detail of the proposed subsidence monitoring program for Aboriginal and historical heritage items is provided in the AHTR (EMM, 2019a) and HHTR (EMM, 2019b). The location of monitoring for Aboriginal heritage and historical heritage items is illustrated in **Figure 3-1** and **Figure 3-2**, respectively.

The aim of the monitoring program is to identify where there is a risk of impact to Aboriginal and historical heritage items as a result of mining activities. The monitoring program provides for the opportunity to record the condition of the site during the following three phases:

- Prior to Mining – baseline survey of the condition of the site before the commencement of mining, also referred to as the baseline check;
- During Mining – monitoring of the condition of the site during active subsidence to establish whether there has been any change to the site or if changes have occurred from the effects of subsidence. This monitoring is also referred to as the post mining initial condition check; and
- Post Mining – monitoring of the condition of the site after mining to identify whether there has been any change to the site in the period since mining, and to determine if the ground surface conditions have stabilised. This monitoring is also referred to as the post mining secondary condition check.

If an impact is identified to have occurred or is likely to occur, the TARP (refer to **Appendix A**) should then be referred to for the identification of appropriate mitigation strategies.

Access to Aboriginal sites to undertake monitoring is subject to landowner approval. If landowner approval is not obtained, no access can be granted to carry out the monitoring activities.

**Table 5-2 Monitoring Program for Heritage Features (EMM, 2019a; EMM, 2019b)**

Heritage Sites / Item	Monitoring Component	Monitoring		
		Prior to Mining	During Mining	Post Mining
Isolated finds/ artefact scatters	Monitoring not required.	N/A	N/A	N/A
Scarred tree	Baseline recording and photography (subject to site access).	Establish location and condition of the tree (completed).	N/A	Visual inspection conducted by an archaeologist at the completion of each longwall.
Grinding grooves	Baseline recording – drone photography / photogrammetry, plan drawing.	Baseline monitoring to record the site before mining and note any existing cracks or damage. MSEC to update their predictions of impacts to the grinding grooves after approximately 1000 m extraction from LW W1. If it is predicted that performance indicators may be exceeded, Tahmoor to reassess extraction plan for LW W2 using the adaptive management process.	Continuous monitoring from GNSS units in proximity to grinding groove site. Monthly ground survey of rock bar during the period of active subsidence for each longwall.	Visual inspection conducted by an archaeologist at the completion of each longwall.
Rockshelters	Baseline recording – photographs, plan drawings.	Baseline monitoring to record the sites before mining and note any existing cracks and areas of vulnerability.	Monthly visual inspection from a safe location by Tahmoor Coal during the period of active subsidence for each longwall.	Visual inspection conducted by an archaeologist at the completion of each longwall.
Queen Victoria Memorial Hospital	Visual inspection. Survey control points	Pre mining condition and structural assessment as per the QVMH management plan with attention to period specific decorative features.	Regular monitoring as per the QVMH management plan.	Conducted at the completion of LW W2: <ul style="list-style-type: none"> <li>• visual inspection; and</li> <li>• assessment as per the QVMH management plan.</li> </ul>
Mill Hill, Miller’s House and archaeological relics	Visual inspection	Pre mining condition and structural assessment as per the Mill Hill management plan.	Regular monitoring as per the Mill Hill management plan.	Conducted at the completion of LW W2: <ul style="list-style-type: none"> <li>• visual inspection; and</li> <li>• assessment as per the Mill Hill management plan.</li> </ul>

Heritage Sites / Item	Monitoring Component	Monitoring		
		Prior to Mining	During Mining	Post Mining
Harmony House archaeological site	No monitoring is required	NA	NA	NA
Rural Landscape – Thirlmere	No monitoring is required	NA	NA	NA
Loop Line sandstone culverts	<p>Visual inspection.</p> <p>Baseline recording:</p> <ul style="list-style-type: none"> <li>• photographs;</li> <li>• annotated drawings; and</li> <li>• survey control points.</li> </ul> <p>Structural assessment of culverts, with particular attention given to 89.629 and 88.980.</p>	<p>Weeds and vegetation cleared from around culverts.</p> <p>Baseline recording of the site before mining, noting any existing cracks or damage.</p> <p>Install a monitoring system, which will monitor ground movements on and around the culverts.</p>	Monthly visual inspection by Tahmoor Coal during the period of active subsidence for each longwall.	Visual inspection conducted by a heritage specialist at the completion of each longwall.
Loop Line brick culverts	<p>Visual inspection.</p> <p>Baseline recording:</p> <ul style="list-style-type: none"> <li>• photographs;</li> <li>• annotated drawings/ photogrammetry; and</li> <li>• survey control points.</li> </ul>	<p>Weeds and vegetation cleared from around culverts.</p> <p>Baseline recording of the site before mining, noting any existing cracks or damage.</p> <p>Install a monitoring system, which will monitor ground movements on and around the culverts.</p>	Monthly visual inspection by Tahmoor Coal during the period of active subsidence for each longwall.	Visual inspection conducted by a heritage specialist at the completion of each longwall.

## 5.3 Baseline Monitoring for Future Extraction Plans

### 5.3.1 Aboriginal Heritage Baseline Monitoring

To assist in the preparation of future Extraction Plans, monitoring of Aboriginal heritage items would be completed in accordance with the monitoring program in **Table 5-2**. Monitoring data collected during the mining of LW W1-W2 would be used in the review of observed subsidence impacts for future Extraction Plans.

In addition, baseline monitoring will be completed record Aboriginal heritage items within the applicable Study Area. The results of the baseline recordings will be used for comparisons to determine any impacts from mining, and will (EMM, 2019a):

- Mitigate the risk of potential impact through more detailed archival recording; and
- Provide a set of baseline records for the monitoring program.

The baseline recording methodology will involve:

- Inspection of all sites identified on an AHIMS database search;
- Photography of each site, including:
  - The wider context of the site including landscape, shelter/feature/platform and setting at long range and medium scales;
  - Details of the site's features;
- Photography of each rockshelter, including:
  - The internal context showing location of panels and art (if present);
  - Panels and individual motifs (with a scale);
  - A series of photographs with a scale rod taken from left to right facing the shelter that, when stitched together, provides a record of the shelter from the front;
  - Close up photographs of pre-existing cracks, joints, and areas of exfoliation and seepage, and their location noted on the plan drawings;
- Plan drawings of each rockshelter site – a scaled plans of the shelter walls detailing structural and surface features using offset baseline recording. Plans record details of art (if present), as well as damage from graffiti, water seepage, cracks, etc. Pre-existing cracks, joints and areas of seepage are noted on the plan; and
- Photogrammetry of grinding groove sites – photogrammetry using drone photography to provide an archival record of the site prior to mining, as well as a comprehensive record against which to monitor the site.

### 5.3.2 Historical Heritage Baseline Monitoring

To assist in the preparation of future Extraction Plans, monitoring of Aboriginal heritage items would be completed in accordance with the monitoring program in **Table 5-2**. Monitoring data collected during the mining of LW W1-W2 would be used in the review of observed subsidence impacts for future Extraction Plans.

In addition, baseline monitoring will be completed record historical heritage items within the applicable Study Area. The results of the baseline recordings will be used for comparisons to determine any impacts from mining, and will (EMM, 2019b):

- Assess the structure's pre-mining condition;
- Mitigate the risk of potential impact through more detailed archival recording; and
- Provide a set of baseline records for the monitoring program.

The baseline recording methodology will involve:

- Inspection of all sites identified on historical registers;
- Photography of each site, including:
  - The wider context of the site, showing the landscape and setting at long range and medium scales;
  - Details of the structure's features;
  - Close-up photographs of pre-existing cracks and damage, and their location noted on the plan drawings; and
- Annotated plans – sketched plans of each structure to mark the position of pre-existing cracks, joints and areas of seepage prior to the commencement of mining extraction and to provide a cross reference for the photographs.

## 6 Subsidence Management Strategies

### 6.1 Mine Design Considerations

Tahmoor Coal previously submitted a Subsidence Management Plan Application (**SMP Application**) for Longwalls 31 to 37 in the Bulli Coal Seam in December 2014, which included longwalls in the Western Domain. The current mine plan is a revision of this SMP Application mine plan, which was reviewed based on many factors including feedback received from the community following submission of the SMP Application in 2014 and additional information gathered from underground conditions, which influenced the orientation of the proposed longwalls (MSEC, 2019). The current mine design has been designed specifically in response to the sensitive surface features of the environment in order to avoid significant impact. Further discussion of mine design considerations is provided in **Section 3.6.1** of the Extraction Plan Main Document.

The current mine plan proposes to continue underground mining operations by the underground mining operations through the extraction of LW W1-W2 in the Western Domain, to the north of the currently active longwall series. The proposed LW W1-W2 are located to the west of the township of Picton, between Matthews, Cedar and Stonequarry Creeks, the Main Southern Railway and the previous longwall series (refer to **Figure 1-2**).

### 6.2 General Mitigation Measures

#### 6.2.1 Remediation Measures for Aboriginal heritage items

If an impact to Aboriginal heritage occurs, the type of remediation that is undertaken will be dependent on (EMM, 2019a):

- The location of the site (e.g. open paddock, creek bed);
- The site type (e.g. rockshelter, grinding grooves);
- The nature of the damage and its location within the site (e. rockshelter roof or wall; proximity to art);
- The impact on the heritage values of the site (e.g. loss of art works, a crack across grinding grooves);
- Cultural advice from the local Aboriginal community to the proposed remediation measures (e.g. sealants used on cracks or introducing supports or scaffolding into rockshelters); and
- Compliance with relevant AHIP conditions.

Therefore, remediation measures, if needed, will be assessed on a case by case basis in the light of these considerations in order to ensure that performance measures are met.

An AHIP for harm to certain Aboriginal objects as a result of LW W1-W2 extraction was granted by DPIE on 16 March 2020. The conditions of this AHIP are outlined in **Section 7.1.1** of this document.

#### 6.2.2 Remediation Measures for Historical Heritage Items

If an impact to a historical heritage item occurs, the type of remediation that is undertaken will be dependent on (EMM, 2019b):

- The nature of the damage;
- The scale of the damage;

- The impact on the historical heritage values of the site; and
- Expert advice regarding practical and historically sympathetic remediation measures.

Therefore, remediation measures, if needed, will be assessed on a case by case basis in the light of these considerations in order to ensure that performance measures are met and that there are no negative outcomes to historical heritage values.

### 6.2.3 Specific Remediation Measures for Culverts

If needed, management strategies for the culverts will be put in place to maintain their integrity during active subsidence, or to remediate them after the completion of active subsidence. The following measures have been employed to reinforce other culverts above longwall mining domains and could be considered, if needed, in consultation with a structural engineer with historical heritage experience (EMM, 2019b):

- Installation of steel reinforcement structures within the culvert opening;
- Installation of steel reinforcement within the masonry itself; or
- Installation of a sleeve within the culvert opening.

MSEC (2019) advised that that potential impacts on the Loop Line culverts can be managed during the extraction of LW W1–W2 with an appropriate management plan in place, even if actual subsidence movements are greater than the predictions or substantial non-conventional movements occur (MSEC, 2019; p85-6).

### 6.2.4 Unexpected Finds Procedures

#### Discovery of Aboriginal Objects

Under Section 89A of the NPW Act, it is a requirement that OEH is notified of the existence of Aboriginal objects as soon as practicable after they are first identified. This is done through the completion of an OEH Aboriginal Site Card which is submitted to the Registrar of AHIMS for inclusion on the Aboriginal site database. Information regarding AHIMS and site recording forms can be downloaded from the OEH website located at <http://www.environment.nsw.gov.au/licences/DECCAHIMSSiteRecordingForm.htm>.

Under s85A of the NPW Act, Aboriginal objects remain the property, and under the protection of, the Crown until formal transfer to a person or persons of a class prescribed by the regulations occurs (EMM, 2019a).

#### Reporting Impact to Aboriginal Sites

An Aboriginal Site Impact Recording Form must be completed following impacts to AHIMS sites that are (EMM, 2019a):

- A result of test excavation carried out in accordance with the Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW;
- Authorised by an AHIP issued by the OEH (now part of DPIE);
- Undertaken for the purpose of complying with Secretary's environmental assessment requirements issued by the DPIE (formerly the NSW Department of Planning and Environment (DPE)) for:
  - SSD;
  - SSI;
  - A major project; or
  - Authorised by a SSD/SSI/former Part 3A consent/approval under the EP&A Act.

Completed forms must be submitted to the AHIMS Registrar at [www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm](http://www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm).

Aboriginal Site Impact Recording Forms can be downloaded from the OEH website located at <https://www.environment.nsw.gov.au/resources/cultureheritage/aboriginal-site-recording-form-180307.pdf>.

### Discovery of Human Skeletal Remains

In the event that known or suspected human skeletal remains are encountered within the Study Area, the following procedure must be followed (EMM, 2019a):

- The immediate vicinity will be secured to protect the find and the find will be immediately reported to the work supervisor who will immediately advise the site supervisor or other nominated senior staff member;
- The environmental manager or other nominated senior staff member will notify the police and the state coroner on the same day of the find (as required for all human remains discoveries);
- The environmental manager or other nominated senior staff member will contact OEH for advice on identification of the skeletal material as Aboriginal and if so, management of the material;
- If it is determined that the skeletal material is ancestral Aboriginal remains, the Aboriginal community will be contacted, and consultative arrangements will be made to discuss ongoing care of the remains;
- The site will be recorded in accordance with the NPW Act and OEH guidelines;
- If the remains are historical and not of Aboriginal origin, the Heritage Division of OEH will be notified for further instruction; and
- Works will not recommence until written approval is received.

### Discovery of Historical Heritage Items

Due to the nature of the extraction activities, it is unlikely relics will be uncovered however, if they are the following steps should be taken (EMM, 2019b):

- No further harm to the object;
- Immediately cease all work at the particular location;
- Secure the area so as to avoid further harm to the relic; and
- Contact an archaeologist for further information and advice.

## 6.3 Trigger Action Response Plan

A TARP has been developed using the performance indicators for management of Aboriginal and historical heritage items as a result of LW W1-W2 mining (refer to **Appendix A**). Where performance indicators indicate that a level of risk has been triggered greater than a normal level (Levels 2 and 3 with escalating corresponding risk), a response in the form of management / corrective actions is required to be implemented as outlined in the TARP.

## 6.4 Contingency Plan

In the event that performance measures are considered to have been exceeded or are likely to be exceeded, a response will be undertaken in accordance with the TARP provided in **Appendix A**. This response is a contingency plan that describes the management / corrective actions which can be implemented where required to remedy the exceedance.

In the event that a Corrective Management Action Plan is required in accordance with the TARP, this plan will be prepared in accordance with **Section 3.6.3** of the Extraction Plan Main Document. The success of remediation measures that has been implemented for any TARP exceedance would be reviewed as part of any Corrective Action Management Plan, the Annual Review (refer to **Section 6.1.5** of the Extraction Plan Main Document), and the End of Panel Report for each longwall.

## 6.5 Adaptive Management Strategy

An Adaptive Management Strategy has been proposed to review mining-induced ground movement and impacts on the streams in proximity to LW W1 (particularly Cedar Creek and Stonequarry Creek) to inform considerations for the amendment of the commencing position of LW W2. This strategy is discussed in more detail in **Section 3.6.4** of the Extraction Plan Main Document.

While impacts to heritage items will be considered as part of the overall Adaptive Management Strategy, there are no adaptive management strategies proposed specifically to manage impacts to heritage items.

## 7 Review and Improvement

This section of the HMP describes the key elements of implementation relevant to Aboriginal and historical heritage. A description of general reporting requirements, reviews and key responsibilities that are applicable to extraction of LW W1-W2 are discussed in the Extraction Plan Main Document.

### 7.1 Reporting Requirements

Generic reporting requirements for the LW W1-W2 Extraction Plan are discussed in **Section 6.1** of the Extraction Plan Main Document.

#### 7.1.1 Reporting Requirements Specific to Aboriginal Heritage

##### General Reporting Requirements

In accordance with DA 67/98 Condition 48 or as triggered by the TARP, if an incident occurs relating to heritage material whereby performance measures are exceeded and harm to Aboriginal heritage is threatened or caused, a letter report will be issued within one (1) week of the event notifying DPIE, Wollondilly Shire Council, the Heritage Division of OEH, RAPs and any other relevant agencies. The detailed report that will be provided to DPIE will be sent within seven days of the incident including details of the actions being undertaken to prevent recurrence (EMM, 2019a).

##### AHIP Reporting and Notification Requirements

This HMP has been updated to include the conditions of the AHIP (C0005707) obtained for harm to certain Aboriginal objects as a result of LW W1-W2 extraction, which was granted by DPIE on 16 March 2020.

The conditions of this AHIP include a number of reporting and notification requirements, which are listed below:

- Condition 4 – If an alternative to the nominated project manager is appointed, DPIE must be notified of their contact details within 14 days of this appointment;
- Condition 10 – Written notice must be provided to the DPIE office at least 7 days prior to the commencement of actions authorised by this AHIP.
- Condition 11 - Written notice must be provided to the DPIE office within 7 days of the completion of actions authorised by this AHIP.
- Condition 12 - Written notice and a summary report must be provided to the DPIE office within 7 days of the completion of each monthly visual inspection and visual inspection at the completion of each longwall as specified in the Monitoring Management Plan.
- Condition 13 - Written notice and a summary report describing the issue must be provided to the DPIE office within 7 days of harm to an Aboriginal object being observed during the monthly visual inspection and visual inspection at the completion of each longwall as specified in the Monitoring Management Plan.
- Condition 14 - A copy of this AHIP must be provided to each Registered Aboriginal Party, within 14 days of receipt of the AHIP from DPIE.
- Condition 15 - Where this AHIP is varied or transferred, a copy of the AHIP variation or transfer notice must be provided to each Registered Aboriginal Party, within 14 days of receipt of the notice.

- Condition 16 - If any human remains (other than any human remains described in Schedule B4) are discovered and/or harmed in, on or under the land, the AHIP holder must:
  - (a) not further harm these remains;
  - (b) immediately cease all work at the particular location;
  - (c) secure the area so as to avoid further harm to the remains;
  - (d) notify the local police and DPIE's Environment Line on 131 555 as soon as practicable and provide any available details of the remains and their location; and
  - (e) not recommence any work at the particular location unless authorised in writing by DPIE.
- Condition 17 - The AHIP holder must notify the DPIE office in writing as soon as practicable after becoming aware of:
  - (a) any contravention of s.86 of the Act not authorised by an AHIP; and/or
  - (b) any contravention of the conditions of this AHIP.
- Condition 20 - An Aboriginal Site Impact Recording Form (ASIRF) must be completed and submitted to the AHIMS Registrar, for each AHIMS site identified in Schedules B and C, within 4 months of the completion of the actions authorised by this AHIP. If no harm has occurred to an AHIMS site identified in Schedules B and C as a result of the proposed works a ASIRF must still be completed and submitted to AHIMS stating that the site is intact and unharmed.
- Condition 21 - Harm Report must be prepared about the actions relating to the harm of any Aboriginal objects (as permitted by this AHIP). The report must:
  - (a) include a short summary of the report;
  - (b) describe any ongoing consultation with or involvement of representatives of Registered Aboriginal Parties in relation to this AHIP;
  - (c) provide details of the Aboriginal objects which were fully or partially harmed in the course of undertaking the actions;
  - (d) provide details of any conservation or remedial works undertaken;
  - (e) comment on the effectiveness of any mitigation measures that were implemented;
  - (f) comment on the effectiveness of any management plan which was in place;
  - (g) detail the long-term management arrangements for any Aboriginal objects; and
  - (h) include a statement confirming that all Aboriginal Site Impact Recording Forms have been completed and submitted to the AHIMS Registrar.
- Condition 22 - The report must be submitted to the DPIE office within 4 months of the completion of the actions authorised by this AHIP.
- Condition 23 - A copy of the Harm Report, including a summary of the report in plain English, must be sent by registered post to each Registered Aboriginal Party within 14 days of the report being submitted to DPIE.
- Condition 26 - Any requirement to provide written notice to the DPIE office in this AHIP may be complied with by emailing the notice to the DPIE office's email address or by sending by registered post to the DPI E office's address. The DPIE office's contact details are specified at the front of this AHIP.

Refer to **Appendix D** for the AHIP and full approval conditions.

### 7.1.2 Reporting Requirements Specific to Historical Heritage

In accordance with DA 67/98 Condition 48 or as triggered by the TARP, if an incident occurs relating to heritage material whereby performance measures are exceeded and harm to historical heritage is threatened or caused, a letter report will be issued within one (1) week of the event notifying DPIE, Wollondilly Shire Council, the Heritage Division of OEH and any other relevant agencies. The detailed report that will be provided to DPIE will be sent within seven days of the incident including details of the actions being undertaken to prevent recurrence (EMM, 2019b).

## 7.2 Review and Auditing

Generic review and auditing requirements for the LW W1-W2 Extraction Plan are discussed in **Section 6.2** of the Extraction Plan Main Document.

### 7.2.1 Review and Auditing Requirements Specific to Aboriginal Heritage

Changes to the AHTR and this HMP will be made in the following circumstances:

- Where new Aboriginal sites are discovered, they must be added to the inventory in the AHTR and this HMP within three months of the find; and
- Where an AHIP is issued, the AHTR and this HMP will be reviewed and updated where necessary to comply with the requirements of any AHIP conditions.

Where changes are made to the AHTR and HMP (other than minor plan updates), a draft of the modified plan will be provided to RAPs (once identified) for their review. However, changes to the AHTR and HMP as discussed above are considered minor plan updates, which will not require review by the RAPs. Although RAPs are not required to review the AHTR for minor plan updates, they will be notified if new sites are identified and of updates relating to the status of Aboriginal sites (EMM, 2019a).

Matters raised in consultation which are specific to the changes in the plan will be acknowledged and addressed in the modified plan. Any changes made to the AHTR and HMP will be made in consultation with the DPIE, and a copy of the revised report and management plan will be supplied to the Secretary of the DPIE for approval (EMM, 2019a).

This HMP was updated to include AHIP (C0005707) conditions provided by DPIE on 16 March 2020, and approval of this revised document will be sought from DPIE prior to implementation.

### 7.2.2 Review and Auditing Requirements Specific to Historical Heritage

Any additional historical heritage sites identified during extraction of LW W1–W2, which are determined to be at risk of subsidence impact, will need to be monitored. Assessment and monitoring measures will be developed in consultation with a heritage consultant or archaeologist and this HHTR updated accordingly (EMM, 2019b).

Where new historical heritage sites are discovered, they must be added to the inventory in the HHTR and HMP within three months of the find, including an assessment of potential impacts from subsidence. Any changes made to the HHTR and HMP will be made in consultation with the DPIE, and a copy of the revised report and management plan will be supplied to the Secretary of the DPIE for approval (EMM, 2019b).

## 7.3 Roles and Responsibilities

Generic roles and responsibilities applicable for the implementation of the LW W1-W2 Extraction Plan are discussed in **Section 6.3** of the Extraction Plan Main Document. There are no roles and responsibilities specific to the implementation of Aboriginal heritage or historical heritage management measures identified for the extraction of LW W1-W2.

## 8 Document Information

This section provides a compiled list of references, terms, and abbreviations used in this document. In addition, this section provides the change information for this document.

### 8.1 References

- Australia ICOMOS (2013), Charter for Places of Cultural Significance (The Burra Charter).
- DECCW (2010a), Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW.
- DECCW (2010b), Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales.
- DECCW (2010c), Aboriginal Cultural Heritage Consultation Requirements for Proponents.
- NSW Department of Planning and Environment (DPE) (2015), Guidelines for the Preparation of Extraction Plans V5.
- EMM Consulting (2019a), Tahmoor Mine Extraction Plan: Longwalls West 1 – West 2 – Aboriginal Heritage Technical Report, report for Tahmoor Coal.
- EMM Consulting (2019b), Tahmoor Mine Extraction Plan: Longwalls West 1 – West 2 – Historical Heritage Technical Report, report for Tahmoor Coal.
- EMM Consulting (2019c), Tahmoor Coal Mine Extraction LW W1-W4: Aboriginal Cultural Heritage Assessment report for Tahmoor Coal (in preparation).
- Mining Subsidence Engineering Consultants (2017), Tahmoor Colliery – Longwall 30: Property Subsidence Management Plan for Potential Mine Subsidence Impacts on Queen Victoria Memorial Home, report to Glencore.
- Mining Subsidence Engineering Consultants (2018), Tahmoor Colliery – Longwall 31-32: Management Plan for Potential Impacts to No 675 Thirlmere Way (Mill Hill), report to Tahmoor Coal.
- Mine Subsidence Engineering Consultants (2019), Tahmoor Coking Coal Operations – Longwalls W1 and W2, Subsidence Predictions and Impact Assessments for Natural and Built Features due to the Extraction of the Proposed Longwalls W1 and W2 in Support of the Extraction Plan Application. Prepared for Tahmoor Coal, May 2019, document MSEC1019.
- Niche Environment and Heritage (Niche) (2014), Tahmoor North Longwalls 31 to 37: Aboriginal and European Heritage Assessment, report for Tahmoor Coal Pty Ltd.
- Niche (2018), Redbank Creek 4: Aboriginal Cultural Heritage Assessment, report for Tahmoor Coal.
- NSW Department of Planning (DoP) (2008), Impacts of Underground Coal Mining on Natural Features in the Southern Coalfield: Strategic Review.
- OEH (2011), Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW.

## 8.2 Abbreviations

Abbreviations used in this document are provided below in **Table 8-1**.

**Table 8-1 Abbreviations**

Abbreviation	Definition
ACHA	Aboriginal Cultural Heritage Assessment
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
AHTR	Aboriginal Heritage Technical Report (EMM, 2019a)
ARTC	Australian Rail Track Corporation
Burra Charter	Australia ICOMOS Burra Charter, 2013
CHL	Commonwealth Heritage List
The Code	<i>Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW</i>
Cubbitch Barta	Cubbitch Barta Native Title Claimants
DCP	Development control plan
DECCW	Department of Environment Climate Change and Water
DoP	Department of Planning
DPE	Department of Planning and Environment (now DPIE)
DPIE	Department of Planning, Industry and Environment (formerly DPE)
Due Diligence Guidelines	<i>Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW</i>
EP&A Act	<i>NSW Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
GFG	GFG Alliance
Heritage Act	<i>NSW Heritage Act 1977</i>
HHTR	Historical Heritage Technical Report (EMM, 2019b)
HMP	Heritage Management Plan
km	Kilometre/s
LEP	Local Environment Plan
LGA	Local Government Area
Loop Line	Picton-Mittagong Loop Line Railway Line
LW	longwall
LW W1	Longwall West 1
LW W1-W2	Longwalls West 1 to West 2
LW W2	Longwall West 2
LW W3-W4	Longwalls West 3 to West 4
LW W4	Longwall West 4
m	Metre/s
mm	Millimetre/s
MSEC	Mining Subsidence Engineering Consultants
Niche	Niche Environment and Heritage

Abbreviation	Definition
NHL	National Heritage List
NPW Act	NSW <i>National Parks and Wildlife Act 1974</i>
NPW Regulation	NSW <i>National Parks and Wildlife Regulation 2009</i>
OEH	Office of Environment and Heritage
PAD	Potential Archaeological Deposit
RAP	Registered Aboriginal party
RMZ	Risk management zone
SHR	State Heritage Register
SIMEC	SIMEC Mining Division
SMP Application	Subsidence Management Plan Application
SSD	State Significant Development
SSI	State Significant Infrastructure
Study Area	As defined in <b>Section 1.3</b>
Tahmoor Coal	Tahmoor Coal Pty Ltd
Tahmoor Mine	Tahmoor Coal Mine
TCCO	Tahmoor Coking Coal Operations
TARP	Trigger Action Response Plan
TLALC	Tharawal Local Aboriginal Land Council
WLEP	<i>Wollondilly Local Environment Plan 2011</i>
WSC	Wollondilly Shire Council

### 8.3 Glossary of Terms

The Extraction Plan Main Document provides a compiled Glossary of Terms in **Section 8.3**.

### 8.4 Change Information

**Table 8-2** provides the details of document history of this HMP.

**Table 8-2 Document History**

Version	Date Reviewed	Reviewed By	Change Summary
1.0	July 2019	Ron Bush	New document
2.0	April 2020	Zina Ainsworth	Updates in light of AHIP

# Appendix A – Trigger Action Response Plan

### Trigger Action Response Plan – Heritage Management Plan

Feature	Management	
	Trigger	Action
Aboriginal Heritage	Normal	
	<ul style="list-style-type: none"> <li>Aboriginal heritage site monitoring indicates no detectable environmental consequences.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring and management of sites in accordance with the HMP (<b>Section 5</b> and <b>Section 6</b>).</li> </ul>
	Within Prediction	
	<ul style="list-style-type: none"> <li>Aboriginal heritage site monitoring indicates no detectable environmental consequences.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring and management of sites in accordance with the HMP (<b>Section 5</b> and <b>Section 6</b>).</li> </ul>
Exceeds Prediction		
	<ul style="list-style-type: none"> <li>Aboriginal heritage site monitoring indicates environmental consequences exceeds predictions.</li> </ul>	<ul style="list-style-type: none"> <li>Convene Tahmoor Coal Environmental Response Group to review response.</li> <li>Notify RAPs within 1 week of the event and co-ordinate a site inspection with RAPs.</li> <li>Notify DPIE and OEH within one week of the event.</li> <li>Investigate exceedance of subsidence prediction.</li> <li>Continue monitoring and management of sites in accordance with the HMP (<b>Section 5</b> and <b>Section 6</b>).</li> <li>Investigate and implement any additional management measures and contingency plan (<b>Section 6</b>) as required in consultation with RAPs, OEH and DPIE.</li> <li>Review mine design/predictions against mine criteria.</li> <li>Review monitoring program and modify if necessary.</li> </ul>

Feature	Management	
	Trigger	Action
Historical Heritage (culverts only) (refer to QMVH Management Plan and Mill Hill Management Plan for TARPs applicable to QMVH and Mill Hill)	Normal	
	<ul style="list-style-type: none"> <li>Historical heritage site monitoring indicates no detectable environmental consequences.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring and management of sites in accordance with the HMP (<b>Section 5</b> and <b>Section 6</b>).</li> </ul>
	Within Prediction	
	<ul style="list-style-type: none"> <li>Historical heritage site monitoring indicates no detectable environmental consequences.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring and management of sites in accordance with the HMP (<b>Section 5</b> and <b>Section 6</b>).</li> </ul>
Exceeds Prediction		
<ul style="list-style-type: none"> <li>Historical heritage site monitoring indicates environmental consequences exceeds predictions.</li> </ul>	<ul style="list-style-type: none"> <li>Convene Tahmoor Coal Environmental Response Group to review response.</li> <li>Co-ordinate a site inspection with a structural engineer and qualified archaeologist or heritage architect.</li> <li>Notify DPIE and OEH within one week of the event.</li> <li>Investigate exceedance of subsidence prediction.</li> <li>Continue monitoring and management of sites in accordance with the HMP (<b>Section 5</b> and <b>Section 6</b>).</li> <li>Investigate and implement any additional management measures as recommended and contingency plan (<b>Section 6</b>) as required in consultation with OEH and DPIE.</li> <li>Review mine design/predictions against mine criteria.</li> <li>Review monitoring program and modify if necessary.</li> </ul>	

# Appendix B – Aboriginal Heritage Technical Report

# Appendix C – Historical Heritage Technical Report

# Appendix D – AHIP C0005707