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**Tahmoor Coal Pty Ltd**

# **HERITAGE MANAGEMENT PLAN**

**Tahmoor North - Western Domain  
Longwalls West 3 and West 4**

**August 2021**

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Document Control

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# 1 Introduction

## 1.1 Background

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 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.

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 is a wholly owned entity within the SIMEC Mining Division of the GFG Alliance group.

Tahmoor Coal has previously mined 34 longwalls to the north and west of Tahmoor Mine's current pit top location. The current mining area, the 'Western Domain', is located north-west of the Main Southern Rail between the townships of Thirlmere and Picton. The Western Domain is within the Tahmoor North mining area and is within Mining Lease (ML) 1376 and ML 1539.

The mine plan for the Western Domain includes four longwalls - Longwalls West 1 to West 4. An Extraction Plan for the first two longwalls in the Western Domain, Longwalls West 1 and West 2 (LW W1-W2), was approved by the NSW Department of Planning, Industry and Environment (DPIE) on 8 November 2019. Longwalls West 1 (LW W1) was the first longwall to be extracted in the Western Domain and was completed on 6 November 2020. The extraction of Longwalls West 2 (LW W2) was completed on 17 June 2021.

The proposed Longwalls West 3 and West 4 (LW W3-W4) are an extension of LW W1-W2 and will be the focus of the current Extraction Plan. LW W3-W4 are illustrated in **Figure 1-2**.

## 1.2 Purpose

This Heritage Management Plan (HMP) has been prepared to support an Extraction Plan for the secondary extraction of coal from LW W3-W4. 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.

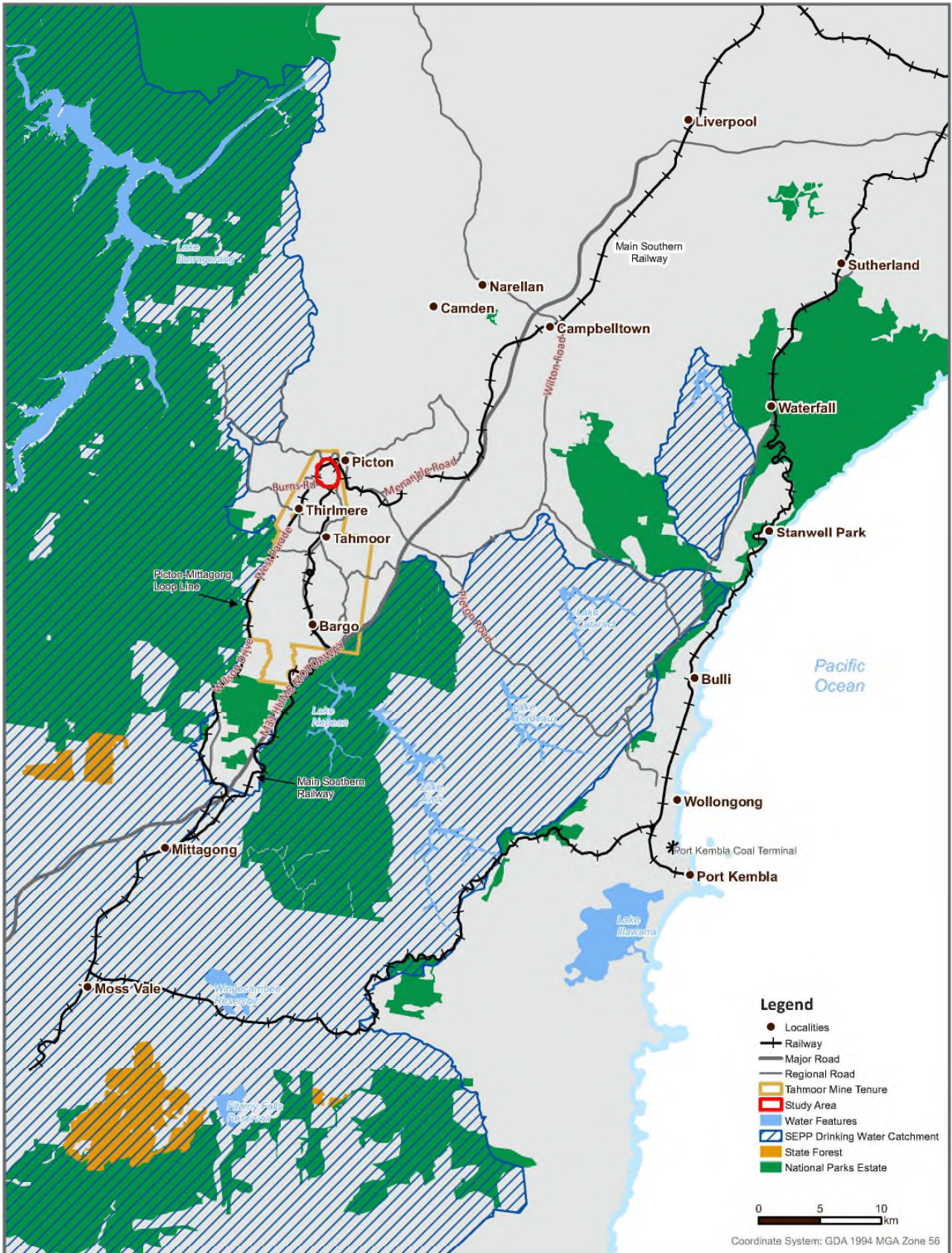
This HMP:

- 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 prepared based on the contents of the following technical reports:

- Aboriginal Heritage Technical Report (AHTR) (EMM, 2021a) (**Appendix B**);
- Historical Heritage Technical Report (HHTR) (EMM, 2021b) (**Appendix C**);
- Main Southern Railway Inspection Report (EMM, 2021d) (**Appendix D**); and
- Subsidence Predictions and Impact Assessment (MSEC, 2021) (**Volume 1**).

The LW W3-W4 Stonequarry Creek Rockbar Management Plan (SCRMP) is a sub-plan to this HMP and details the monitoring and management of the axe grinding groove site (AHIMS #52-2-2068) and surrounding rockbar platform.



## REGIONAL CONTEXT

Tahmoor North Western Domain Longwalls West 3 and West 4 Extraction Plan

FIGURE 1-1

Date: 22/12/2020

Data Sources:  
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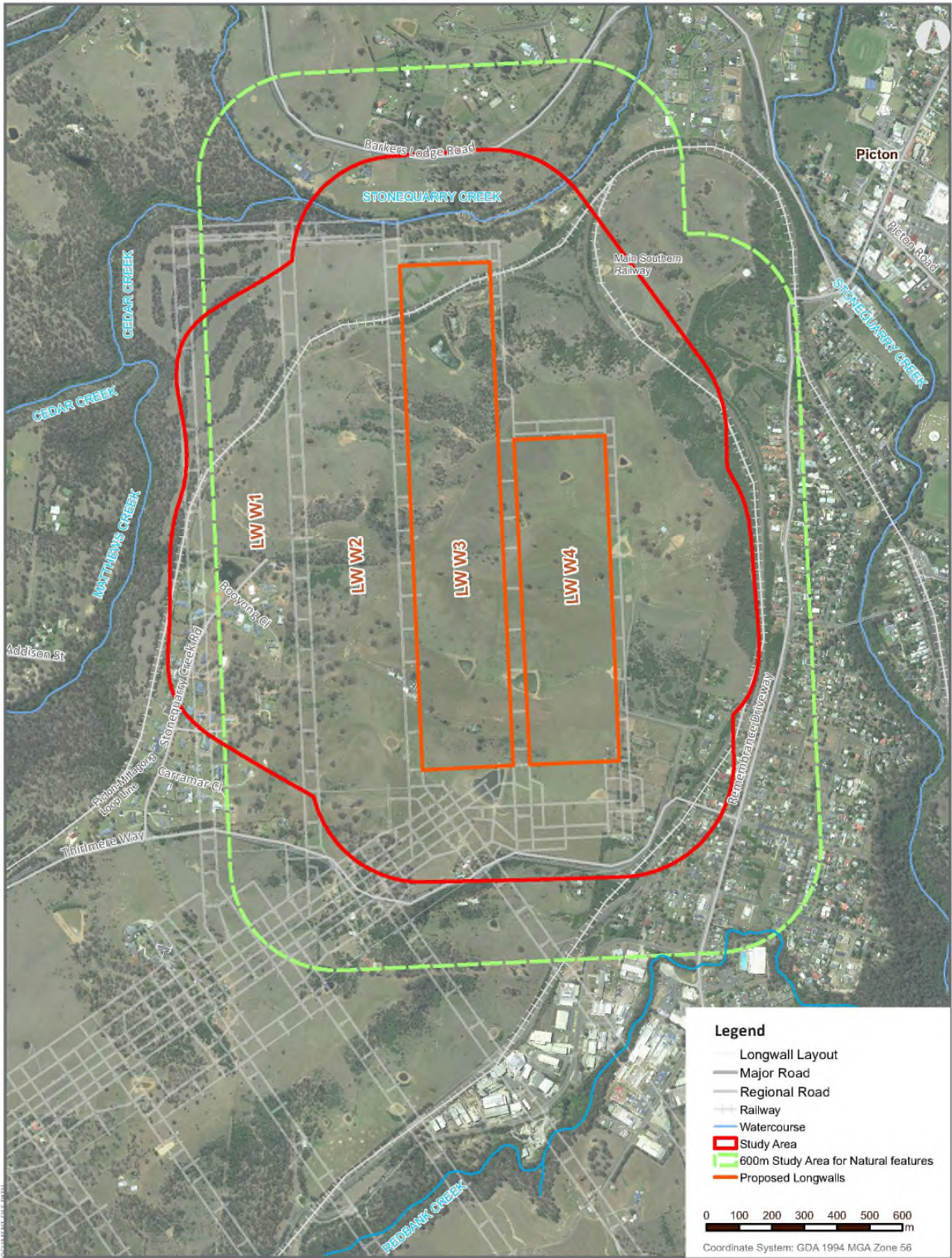
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## EXTRACTION PLAN STUDY AREA

Tahmoor North Western Domain Longwalls West 3 and West 4  
SIMEC Extraction Plan



FIGURE 1-2

Date: 10/05/2021

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

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## 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 W3-W4 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, the SCRMP
Excerpt from Table 1	<b>Feature</b>	<b>Performance Measure</b>
	<b>Heritage Sites</b>	
	Heritage sites	<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, the SCRMP



Condition	Condition Requirement	Section(s) Addressed
13C	<p>If the Applicant exceeds the performance measures in Table 1 and the Secretary determines that:</p> <ul style="list-style-type: none"> <li>(i) it is not reasonable or feasible to remediate the subsidence impact or environmental consequence; or</li> <li>(ii) remediation measures implemented by the Applicant have failed to satisfactorily remediate the subsidence impact or environmental consequence,</li> </ul> <p>then the Applicant must provide a suitable offset to compensate for the subsidence impact or environmental consequence, to the satisfaction of the Secretary.</p>	<p>Noted.</p> <p>Performance measures in Table 1 of DA 67/98 are not anticipated to be exceeded.</p>
13D	<p>The offset must give priority to like-for-like physical environmental offsets, but may also consider payment into any NSW Offset Fund established by EES, or funding or implementation of supplementary measures such as:</p> <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> <p>Note: Any offset required under this condition must be proportionate with the significance of the impact or environmental consequence</p>	<p>Noted.</p> <p>Performance measures in Table 1 of DA 67/98 are not anticipated to be exceeded.</p>
<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, Section 6, the SCRMP
13H(vii)(f)	Heritage Management Plan which has been prepared in consultation with Heritage NSW 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:	Section 6.3, Section 6.5, Appendix A, the SCRMP
	<ul style="list-style-type: none"> <li>• appropriate triggers to warn of increased risk of exceedance of any performance measure; and</li> </ul>	
	<ul style="list-style-type: none"> <li>• specific actions to respond to high risk of exceedance of any performance measure to ensure that the measure is not exceeded;</li> </ul>	
	<ul style="list-style-type: none"> <li>• an assessment of remediation measures that may be required if exceedances occur and the capacity to implement the measures; and</li> </ul>	
	<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 or Table 2, or where any such exceedance appears likely; and</li> </ul>	

Condition	Condition Requirement	Section(s) Addressed
13H(vii)(i)	Contingency Plan that expressly provides for:	Section 5.3, Section 6.4, Section 6.5, Appendix A, the SCRMP
	<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> </ul>	
	<ul style="list-style-type: none"> <li>an assessment of remediation measures that may be required if exceedances occur and the capacity to implement those measures; and</li> </ul>	
	<ul style="list-style-type: none"> <li>includes a program to collect sufficient baseline data for future Extraction Plans.</li> </ul>	

### 2.1.2 Extraction Plan Guideline

This HMP has been prepared in accordance with the DPIE *Draft 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

Extraction Plan Guideline Content Requirements for Key Component Plans	Section(s) Addressed
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 Aboriginal Heritage Impact Permit (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 AHIP (AHIP C0005707) for LW W1-W2 was issued on 16 March 2020 for potential harm to rock shelters and a grinding groove site (AHIMS site #52-2-2068) within the LW W1-W2 Study Area. An application for variation of AHIP C0005707 to include potential impact to AHIMS site #52-2-2068 due to LW W3-W4 extraction was submitted to Heritage NSW on 30 March 2021. The AHIP variation application is currently being assessed.



### 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) has been prepared by EMM on behalf of Tahmoor Coal (EMM, 2021c), and submitted to Heritage NSW on 30 March 2021 as part of the variation application for AHIP C0005707 to include for potential impact to AHIMS site #52-2-2068 due to LW W3-W4 extraction.

### 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 W3–W4 as it is not SSD or SSI.

Although likelihood of impact for the artefact sites and the modified tree within the Study Area is assessed to be very unlikely and the likelihood of harm to the grinding groove site within the Study Area is considered unlikely (i.e 0.015 to 0.018%), the residual risk of harming Aboriginal objects as defined in the NPW Act will still be present.

EMM prepared an ACHA for LW W1–W4 and an AHIP for LW W1–W2 was obtained on 16 March 2020 (AHIP C0005707) which overlaps with the grinding groove site (#52-2-2068). EMM prepared an updated ACHA for LW W1-W4 which specifically addresses the impacts from underground mining of LW W3-W4. The ACHA was developed to support an AHIP variation application that was lodged in March 2021 and is pending approval.

#### 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, including 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 Heritage Act 1977

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

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.

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.

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.

Section 118 of the Heritage Act allows for a minimum standard of maintenance and repair, provided conditions in the section are met.

### 2.3 Consultation

NSW Department of Planning, Industry and Environment – Environment, Energy and Science (EES) Group, Heritage NSW, and Registered Aboriginal Parties (RAPs) were consulted during the preparation of this HMP.

A summary of consultation undertaken is provided in **Section 2.1.2** of the Extraction Plan Main Document, and a copy of the incoming Government Agency correspondence is provided in **Appendix C** of the Extraction Plan Main Document. A summary of RAP consultation is also provided in **Section 2.5.1** and detailed in **Appendix C** of the AHTR (**Appendix B**).

EMM prepared an ACHA for LW W1–W4 and an AHIP for LW W1–W2 was obtained on 16 March 2020 (AHIP C0005707) which overlaps with the grinding groove site (#52-2-2068). EMM prepared an updated ACHA (EMM, 2021c) for LW W1-W4 which specifically addresses the impacts from underground mining of LW W3-W4. The ACHA was developed to support an AHIP variation application that was lodged in March 2021 and is pending approval.

The preparation of the ACHA involved formal consultation in accordance with the guidelines for *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 W3-W4 Study Area.

Further Aboriginal consultation has been undertaken as part of the development of the SCRMP and is documented within the SCRMP.

## 3 Existing Environment

### 3.1 Aboriginal Heritage Items

There are eight registered Aboriginal sites recorded in the Study Area comprising 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 registered Aboriginal sites within the Study Area.

Further information about the registered Aboriginal heritage sites can be found in the ACHA reports (EMM, 2021c). The AHTR (EMM, 2021a) 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 Registered Sites within the Study Area

A search of the Aboriginal Heritage Information Management System (AHIMS) database on 17 September 2020 identified a total of 93 registered sites within a 10 km x 10 km area centred on the Study Area. Eight of these registered sites are located within the Study Area (EMM, 2021a).

The Aboriginal site of highest significance within the Study Area is a substantial axe grinding groove site, with 120 grinding grooves (#52-2-2068) (**Figure 3-1**). It is located on a large rockbar within Stonequarry Creek in the north of the Study Area. Originally recorded as 91 grooves, subsequent assessment has identified 120 grooves, in three groupings. The grinding groove site is a rare and extensive example of its type on a local and regional level and has high research value because of its complexity and easy accessibility (EMM, 2021a).

The predominant Aboriginal site type within the Study Area are artefact sites (**Figure 3-1**). Five sites are isolated finds, located on the lower hill slopes to the north and south of Stonequarry Creek in the north of the Study Area. Two isolated finds are located directly above LW W3 (#52-2-2069, #52-2-2070). One site is an artefact scatter, identified in an eroding bank to the south of Stonequarry Creek, approximately 150 m west of the grinding groove site (EMM, 2021a).

A modified tree (#52-2-2100) is situated directly above LW W2 (**Figure 3-1**) beside the Loop Line railway in a paddock that has been cleared of vegetation for pastoral use. The White Mahogany eucalypt has been hollowed out by termites and the upper branches are dead. However, the tree is still alive although the scar is now closed over by overgrowth (EMM, 2021a).

**Table 3-1** Aboriginal Heritage Sites within the Study Area (EMM, 2021a)

AHIMS site number	Site name	Site type	Description	Landform	Significance
52-2-2068	Stonequarry Creek 1	Grinding groove site	Three clusters of axe grinding grooves on a stone platform in the bed of Stonequarry Creek. A total of approximately 120 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

AHIMS site number	Site name	Site type	Description	Landform	Significance
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
52-2-4549	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	Moderate

### 3.1.2 AHIMS Registered Sites near the Study Area

There are a number of identified rockshelters within the AHIMS search area but outside the Study Area. The closest rockshelters are located beside Cedar Creek and Matthews Creek, approximately 800 m to 1.5 km from the LW W3-W4 footprint. Six of these rockshelters are rock art sites, primarily with figurative art, and one with an extensive collection of hand stencils. One of the rockshelters with art and artefacts also contains a series of grinding grooves on a boulder (#52-2-4430) (EMM, 2021a).

These registered AHIMS sites will not be monitored as part of the LW W3-W4 heritage monitoring program.

## 3.2 Historical Heritage Items

### 3.2.1 Registered Historical Heritage Sites

A review of the following databases was undertaken in December 2020 (EMM, 2021b):

- 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 registered on the CHL, NHL, SHR or National Trust registers.

Within the Study Area, there are six registered heritage items of local heritage significance that are registered on the WLEP (2011), the ARTC S170 Register, and the Department of Health S170 register. These items comprise the Mushroom Tunnel, Picton Tunnel, Weatherboard Cottage, Antill Street Underbridge, Rural Landscape (Thirlmere Way), and Redbank Uniting Church. None of these registered heritage items are located directly above the footprint of the longwalls.

A number of registered heritage sites are located outside the Study Area. However, three listed heritage sites have been included in this report as they may be sensitive to far-field horizontal movements during extraction of LW W3–W4. These items comprise the Picton Viaduct, Argyle Street Underbridge (Hole in the Wall), and a pedestrian overbridge at 86.1 km (EMM, 2021b).

Details of these registered heritage items within and outside the Study Area are listed in **Table 3-2** and are shown on **Figure 3-2**. Further detail of these heritage items can be found in the HHTR (EMM, 2021b).

### 3.2.2 Non-Registered Historical Heritage Sites

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, 2021b).

The Loop Line crosses directly above the northern ends of LW W3–W4. Two sandstone and three brick culverts are situated along the section of this railway line within the Study Area. An additional brick culvert (87.300) is situated beneath the disused embankment for the original railway alignment. 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 (EMM, 2021b).

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, 2021b).

The culverts were found to be generally in fair to good condition. While cracking of the brick culverts along the Loop Line was mostly confined to the mortar, the brick culvert at chainage 87.300 under the disused embankment displayed additional cracking to the bricks themselves around the entrance to the culvert (EMM, 2021b).

Details of these un-registered heritage items are listed in **Table 3-2** and are shown on **Figure 3-3**. Further detail of these heritage items can be found in the HHTR (EMM, 2021b).

A number of non-registered items are located on the Main Southern Railway that are either within the Study Area or are outside the Study Area but may be susceptible to far field movement. These items include the following:

- Main Southern Railway culverts— three culverts within the Study Area and four culverts adjacent to the Study Area along the eastern boundary;
- Subway (88.133 km) adjacent to the Study Area;
- High retaining wall (84.687 km) located outside the Study Area;
- Bridge on Matthews Lane (84.551 km) located outside the Study Area;
- Connellan Crescent Overbridge (89.080 km); and
- Prince Street Overbridge (85.171 km).

**Table 3-2 Registered and Non-Registered Historical Heritage Sites in the Study Area and Surrounds (EMM, 2021b; EMM, 2021d)**

Heritage List	Heritage Item	Address	Description of Item	Distance from Longwalls	Significance
<i>Registered heritage sites within the Study Area</i>					
WLEP	Cottage (Weatherboard) (I211)	796-800 Thirlmere Way, Picton	Dates to the late nineteenth century. Twin brick chimneys and a hipped tin roof. Aesthetic contribution to the street and to the historical landscape of Picton.	80 m south of LW W4	Local
WLEP	Redbank Uniting Church (I146)	385 Argyle Street, Picton	Wesleyan Chapel constructed in 1849 using stone quarried in Stonequarry Creek.	330 m north-west of LW W4 (abuts the Study Area)	Local
WLEP	Mushroom Tunnel (former Mainline Railway Tunnel) (I144)	239 Argyle Street, Picton	Formerly part of the Mainline Railway Tunnel, this tunnel was opened in 1867 and closed when the double track tunnel on the main line was opened in 1919.	380 m north-east of LW W4	Local
ARTC S170 Register	Picton Tunnel (part of the Picton Deviation Works)	Chainage 85.500-88.000 km Main Southern Railway	Incorporates a number of heritage items within the 1919 deviation section of the Main Southern Railway line.	240 m north-east of LW W4 north-east at its closest point	Local
ARTC S170 Register	Picton Antill Street Underbridge (also referred to as Thirlmere Way Rail Underbridge)	88.133 km Main Southern Railway	Incorrectly listed on the ARTC S170 Register as located at 88.133 km, this item is located at 89.326 on Thirlmere Way.	430 m east of LW W4	Local



Heritage List	Heritage Item	Address	Description of Item	Distance from Longwalls	Significance
Department of Health S170 Register	Rural Landscape – Thirlmere Way	Thirlmere Way, Picton	The rural landscape provides the picturesque setting for The Queen Victoria Memorial Hospital (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.	250 m south-east of LW W4	Local
<b>Additional registered heritage sites considered within this report</b>					
SHR	Picton Railway Viaduct over Stonequarry Creek (01051)	Main Southern Railway	Double track stone arch viaduct over Stonequarry Creek built during 1862-69.	850 m east of LW W4	State
ARTC S170 Register	Picton Stonequarry Creek Underbridge				Local
WLEP	Picton Argyle Street Underbridge	Argyle Street 86.160 km Main Southern Railway	Railway bridge over Argyle Street, also known as ‘Hole in the Wall’.	720 m north-east of LW W4	Local
ARTC S170 Register	Picton pedestrian overbridge 86.1	86.1 km Main Southern Railway	Overbridge constructed on bearings on concrete footings.	650 m north-east of LW W4	Local
<b>Non-registered heritage sites within the Study Area</b>					
(none)	Loop Line brick culvert 87.300	Picton-Mittagong Loop Line	Located beneath the disused embankment for the original railway alignment. Bricks cracked at northern headwall. Not in association with a creek line.	150 m east of LW W3	Local

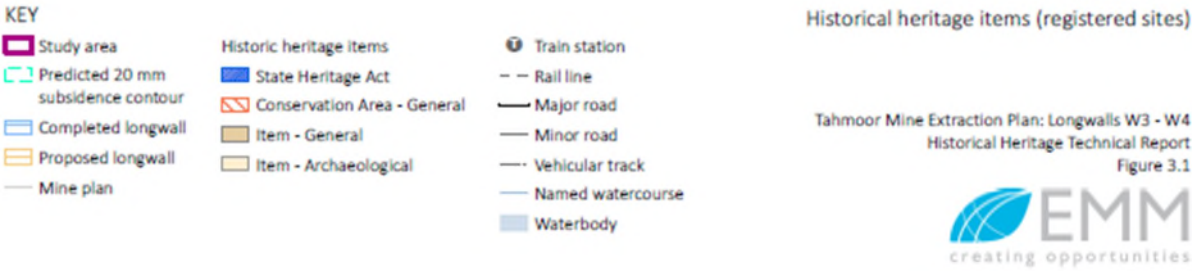
Heritage List	Heritage Item	Address	Description of Item	Distance from Longwalls	Significance
(none)	Loop Line brick culvert 87.330	Picton-Mittagong Loop Line	Drainage channels of rendered brick have been constructed on either side of the embankments in order to funnel water into the culvert.  Cracking is along the mortar only and the condition of the bricks is good.	230 m north-east of LW W3	Local
(none)	Loop Line brick culvert 87.630	Picton-Mittagong Loop Line	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.	Directly above LW W3	Local
(none)	Loop Line brick culvert 87.850	Picton-Mittagong Loop Line	Missing some bricks above the arch. Multiple existing cracks along the mortar.	Directly above LW W3	Local
(none)	Loop Line sandstone culvert 88.400	Picton-Mittagong Loop Line	Integrity of structure and condition of the sandstone is good.	400 m west of LW W3	Local
(none)	Loop Line sandstone culvert 88.980	Picton-Mittagong Loop Line	Poorly “restored” as part of the Stonequarry Estate Development, resulting in exfoliation of sandstone blocks particularly on the roof of the culvert.	700 m west of LW W3	Local
(none)	Brick culvert 87.331	Main Southern Railway	Brick and concrete culvert with multiple outlets in good condition.	290 m east of LW W3	Local

Heritage List	Heritage Item	Address	Description of Item	Distance from Longwalls	Significance
(none)	Brick culvert 87.918	Main Southern Railway	A brick culvert was not identified at chainage 87.918 km, however a concrete drain was visible.	330 m north-east of LW W4	None, concrete drain did not reach the threshold for local contributory significance ( <b>Appendix D</b> ).
(none)	Brick culvert 89.216	Main Southern Railway	Brick culvert, currently in use over a tributary to Matthews Creek, in good condition despite a moderate amount of graffiti.	260 m east of LW W4	Local
<b>Non-registered heritage sites outside the Study Area</b>					
(none)	Brick culvert 88.091	Main Southern Railway	Brick culvert currently in use over tributary creek to Stonequarry Creek, in good condition despite a moderate amount of vegetation overgrowth.	410 m east of LW W4	Local
(none)	Brick culvert 88.232	Main Southern Railway	Brick culvert no longer in use, in good condition despite a moderate amount of vegetation overgrowth.	460 m east of LW W4	Local
(none)	Brick culvert 88.496	Main Southern Railway	Brick culvert currently in use over tributary creek to Stonequarry Creek, only a terracotta pipe outlet in good condition was identified during site visit.	460 m east of LW W4	Local

Heritage List	Heritage Item	Address	Description of Item	Distance from Longwalls	Significance
(none)	Brick culvert 88.698	Main Southern Railway	Brick culvert currently in use over tributary creek to Stonequarry Creek, in good condition with cement sandbag shoring evident.	450 m east of LW W4	Local
(none)	Subway 88.133	Main Southern Railway	A pedestrian walkway providing passage underneath the railway line, in good condition.	410 m east of LW W4	Local
(none)	High retaining wall 84.687	Main Southern Railway	Retaining wall adjacent to the Main Southern Railway that is not within a valley or stream channel, in good condition.	1 km east of LW W4	Local
(none)	Connellan Crescent Overbridge 89.080	Connellan Crescent	An overbridge crossing the Great Southern Railway Line supported by reinforced concrete arch and has brick masonry walls either side of the road, in good condition despite a moderate amount of graffiti.	400 m east of LW W4	Local
(none)	Bridge on Matthews Lane 84.551	Matthews Lane	A single lane timber beam bridge over the Main Southern Railway supported by timber trestles on concrete upstand beams, in good condition.	1040 m east of LW W4	Local
(none)	Prince Street Overbridge 85.171	Prince Street	Steel framed bridge with steel guard rails supported by concrete headstocks over brick arched piers that cross over the Main Southern Railway at Picton Station, in good condition, despite a moderate amount of graffiti.	960 m east of LW W4	Local



Source: EMM (2021); DFS (2017); GA (2011); DPF (2017)



**Figure 3-2** Historical Heritage Items (registered sites) in the Study Area and Surrounds (EMM, 2021b)





Source: EMM (2021); DFSI (2017); GA (2011); DPE (2017)

**KEY**

- |                                    |                             |                             |
|------------------------------------|-----------------------------|-----------------------------|
| Study area                         | Historic heritage items     | Heritage Items - not listed |
| Predicted 20 mm subsidence contour | State Heritage Act          | Train station               |
| Completed longwall                 | Conservation Area - General | Rail line                   |
| Proposed longwall                  | Item - General              | Major road                  |
| Mine plan                          | Item - Archaeological       | Minor road                  |
|                                    |                             | Vehicular track             |
|                                    |                             | Named watercourse           |
|                                    |                             | Waterbody                   |

**Historical heritage items (unregistered sites)**

Tahmoor Mine Extraction Plan: Longwalls W3 - W4  
Historical Heritage Technical Report  
Figure 3.2



**Figure 3-3 Historical Heritage Items (unregistered sites) in the Study Area and Surrounds (EMM, 2021b)**

# 4 Predicted Subsidence Impacts and Environmental Consequences

## 4.1 Aboriginal Heritage Items

Mine Subsidence Engineering Consultants (MSEC) has 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, 2021a).

A summary of the predicted impacts of subsidence on Aboriginal site types in the Study Area is summarised in **Table 4-1**, noting that discussion of potential impact to the grinding groove site (AHIMS site #52-2-2068) is omitted from this section and detailed in the SCRMP.

**Table 4-1 Aboriginal Heritage Sites within LW W3-W4 Extraction Plan Study Area and Predicted Likelihood of Impact (EMM, 2021a)\***

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.	Extremely unlikely
Scarred tree	1 modified tree (AHIMS #52-2-2100)	Negligible environmental consequences.	Extremely unlikely

\* Table 4-1 excludes reference to the grinding groove site (AHIMS site #52-2-2068 as it is referred to in detail in the SCRMP.

### 4.1.1 Isolated Finds and Artefact Scatter

Impacts to open sites, such as open artefact scatters, are limited to cracking in the surface soils which could lead to erosion channels if left untreated. It is unlikely that the artefacts themselves would be impacted by any potential surface cracking (MSEC, 2021; (p.202)).

Subsidence movements are not expected to have observable effects on artefact scatters and isolated finds in open terrain, and this is very unlikely to constitute ‘harm’ as defined by the NPW Act. The predicted likelihood of impact on artefact sites is considered to be extremely unlikely (EMM, 2021a).

### 4.1.2 Scarred Tree

The modified tree (#52-2-2100) is located directly above LW W2 and was assessed following the completing of LW W1. No impacts to the tree were observed. Experience from the Southern Coalfield is that the impact of longwall mining on trees is very low (MSEC 2021). Impacts generally only occur at very shallow depths of cover, in the order of 50 m, or on very steeply sloping terrain, in the order of 1 in 1 or greater (MSEC 2021). The depth of cover for the modified tree is over 490 m and the natural surface slopes are less than 1 in 3.

The modified tree is approximately 250 m from LW W3. As cracking in surface soils above longwall mining tends to be isolated and minor, typically in the top few metres of the surface soils, mediation is therefore not generally required. The likelihood of impact to the scarred tree is therefore assessed to be extremely unlikely (MSEC 2021).

## 4.2 Historical Heritage Items

### 4.2.1 Subsidence Predictions for Historical Heritage Sites

MSEC has 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, 2021b).

As the proposed longwalls do not mine directly beneath the Main Southern Railway and given that the predicted conventional subsidence movements along the Main Southern Railway due to the extraction of the proposed LW W3-W4 are very small and well within operational tolerances for the railway, impacts to most heritage items associated with the railway are deemed to be unlikely or very unlikely. The exception is the two brick culverts above LW W3 where impacts are predicted to be possible (EMM, 2021b).

Non-railway related heritage items including the Weatherboard Cottage, Redbank Uniting Church and Rural Landscape (Thirlmere Way) are very unlikely to experience impacts.

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

**Table 4-2 Historical Heritage Sites and Predicted Likelihood of Impact (EMM, 2021b; EMM, 2021d)**

Site Name	Site Type	Significance	Location in relation to LWs	Predicted Probability of Impact
<i>Listed heritage sites within the Study Area</i>				
Cottage (Weatherboard) (I211)	Built structure	Local	180 m south-east of LW W4	Very unlikely
Redbank Uniting Church (I146)	Built structure	Local	330 m south-east of LW W4	Very unlikely
Mushroom Tunnel (former Mainline Railway Tunnel) (I144)	Built structure	Local	500 m east of LW W3 370 m north-east of LW W4	Very unlikely



Site Name	Site Type	Significance	Location in relation to LWs	Predicted Probability of Impact
Picton Tunnel (part of the Railway Deviation Works)	Built structure	Local	430-585 m east of LW W3 295-320 m north-east of LW W4	Very unlikely
Picton Antill Street Underbridge (also referred to as Thirlmere Way Rail Underbridge)	Landscape	Local	250 m south-east of LW W4	Unlikely
<b>Additional listed heritage sites considered within this report</b>				
Picton Railway Viaduct over Stonequarry Creek (01051)	Built structure	State	1200 m east of LW W3 850 m east of LW W4	Very unlikely
Picton Argyle Street Underbridge (Hole in the Wall)	Built structure	Local	720 m north-east of LW W4	Very unlikely
Picton pedestrian overbridge 86.1	Built structure	Local	650 m north-east of LW W4	Very unlikely
<b>Non-registered heritage sites within the Study Area</b>				
Brick culvert 87.300	Built structure	Local	150 m east of LW W3	Unlikely
Brick culvert 87.330	Built structure	Local	230 m north-east of LW W3	Unlikely
Brick culvert 87.630	Built structure	Local	Directly above LW W3	Possible
Brick culvert 87.850	Built structure	Local	Directly above LW W3	Possible
Sandstone culvert 88.400	Built structure	Local	400 m west of LW W3	Unlikely
Sandstone culvert 88.980	Built structure	Local	700 m west of LW W3	Unlikely
Main Southern Railway brick culvert 87.331	Built structure	Local	290 m east of LW W3	Unlikely
Main Southern Railway brick culvert 89.216	Built structure	Local	260 m east of LW W4	Very unlikely
<b>Non-registered heritage items outside the Study Area</b>				
Main Southern Railway brick culvert 88.091	Built structure	Local	410 m east of LW W4	Very unlikely
Main Southern Railway brick culvert 88.232	Built structure	Local	460 m east of LW W4	Very unlikely
Main Southern Railway brick culvert 88.496	Built structure	Local	460 m east of LW W4	Very unlikely
Main Southern Railway brick culvert 88.698	Built structure	Local	450 m east of LW W4	Very unlikely
Subway, Main Southern Railway 88.133	Built structure	Local	410 m east of LW W4	Very unlikely
High retaining wall, Main Southern Railway 84.687	Built structure	Local	1 km east of LW W4	Very unlikely
Connellan Crescent Overbridge 89.080	Built structure	Local	400 m east of LW W4	Very unlikely

Site Name	Site Type	Significance	Location in relation to LWs	Predicted Probability of Impact
Bridge on Matthews Lane 84.551	Built structure	Local	1040 m east of LW W4	Very unlikely
Prince Street Overbridge 85.171	Built structure	Local	960 m east of LW W4	Very 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**.

It is noted that the monitoring program for the grinding groove site (AHIMS site #52-2-2068) is omitted from this section and detailed in the SCRMP.

**Table 5-1 Subsidence Performance Measures and Performance Indicators for Aboriginal and Historical Heritage Sites (EMM, 2021a; EMM, 2021b)**

Feature / Site	Subsidence Performance Measures	Probability of Subsidence Impact	Subsidence Performance Indicators and Triggers
Isolated finds/ artefact scatters	Negligible subsidence impacts or environmental consequences	Extremely unlikely	No performance indicators are currently established as impacts are predicted to be negligible.
Scarred tree	Negligible subsidence impacts or environmental consequences	Extremely 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>
Mushroom Tunnel (former Mainline Railway Tunnel (I144)	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 structure, measurable tilt or visible perceptible impacts such as subsidence induced cracking, exfoliation, brick movement or brick fall.</li> </ul>
Picton Tunnel	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 cracking of external brick work or other physical impacts to the historical heritage values of the structure, measurable tilt or visible perceptible impacts such as subsidence induced cracking, exfoliation, brick movement or brick fall.</li> </ul>

Feature / Site	Subsidence Performance Measures	Probability of Subsidence Impact	Subsidence Performance Indicators and Triggers
Cottage (Weatherboard) (I211)	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 damage to external cladding or internal finishes.</li> </ul>
Redbank Uniting Church	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 visible perceptible impacts such as subsidence induced cracking, brick movement or brick fall.</li> </ul>
Antill Street Underbridge (also referred to as Thirlmere Way Rail Underbridge)	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 physical impacts to the historical heritage values of the structure, measurable tilt or visible perceptible impacts such as subsidence induced cracking, exfoliation, brick movement or brick fall.</li> </ul>
Rural landscape – Thirlmere Way	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>visible subsidence, surface cracks.</li> </ul>
Picton Viaduct (SHI 01051)	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 physical impacts to the historical heritage values of the structure, measurable tilt or visible perceptible impacts such as subsidence induced cracking or spalling.</li> </ul>
Argyle Street Underbridge (Hole in the Wall) (I149)	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 physical impacts to the historical heritage values of the bridge, measurable tilt or visible perceptible impacts such as subsidence induced cracking, brick movement or brick fall.</li> </ul>
Pedestrian overbridge 86.1 km	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 visible perceptible impacts such as subsidence induced cracking.</li> </ul>

Feature / Site	Subsidence Performance Measures	Probability of Subsidence Impact	Subsidence Performance Indicators and Triggers
Loop Line sandstone culverts	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, spalling, block movement or block fall.</li> </ul>
Loop Line brick culverts	Negligible subsidence impacts or environmental consequences	Impacts to the culverts at chainage 87.850 km and 87.630 km are possible. Impacts to the other culverts are 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, brick movement or brick fall.</li> </ul>
Main Southern Railway culverts	Negligible subsidence impacts or environmental consequences	Impacts to the culvert at chainage 88.331 km is unlikely. Impacts to the other culverts are very 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, brick movement or brick fall.</li> </ul>
Subway 88.133 km	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 impacts such as subsidence induced cracking, brick movement or brick fall.</li> </ul>
High retaining wall 84.687 km	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 impacts such as subsidence induced cracking, brick movement or brick fall.</li> </ul>
Bridge on Matthews Lane	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 impacts such as subsidence induced cracking, brick movement or brick fall.</li> </ul>
Prince Street Overbridge	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 impacts such as subsidence induced cracking, brick movement or brick fall.</li> </ul>

Feature / Site	Subsidence Performance Measures	Probability of Subsidence Impact	Subsidence Performance Indicators and Triggers
Connellan Crescent Overbridge	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 impacts such as subsidence induced cracking, brick movement or brick fall.</li> </ul>

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’.

Based on the predicted subsidence impacts (MSEC, 2021), 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, 2021a; EMM, 2021b). While the extraction of LW W3–W4 may result in impacts on historical sites, these can be managed through early detection via monitoring and early response through the implementation of the TARP (Appendix A).

A monitoring program, which was put in place to monitor the impacts and consequences of subsidence effects on known Aboriginal and historical heritage sites during the extraction of LW W1-W2, will continue during the extraction of LW W3-W4. Additional historical heritage items within the LW W3-W4 Study Area will undergo a similar process.

In addition, Picton Viaduct (SHR 01051), while outside the limits of subsidence as assessed by MSEC (2021) which means that subsidence is predicted to be less than 20 mm, is being and will continue to be monitored. Monitoring will continue until approximately 12 months after the completion of longwall mining in the Western Domain (estimated by the end of 2022). Other listed heritage items that are outside the Study Area but considered to be at risk of far field movement and will be or will continue to be monitored include the Argyle Street Underbridge (Hole in the Wall); and the pedestrian overbridge (86 km).

## 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, 2021a) and HHTR (EMM, 2021b). 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.

**Table 5-2 Monitoring Program for Heritage Features (EMM, 2021a; EMM, 2021b; EMM, 2021d)**

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	Recording and photography.	Baseline monitoring to record the condition of the tree was undertaken prior to the commencement of LW W1 (completed). Monitoring at the completion of LW W1-W2 (prior to commencement of LW W3) to be completed.	N/A	Visual inspection conducted by an archaeologist at the completion of each longwall.
Mushroom Tunnel (former Mainline Railway Tunnel (I144))	Visual inspection. Survey control points. Structural assessment.	Pre-mining condition and structural assessment (completed). Install a monitoring system (completed).	Regular monitoring as per the LW W3-W4 Main Southern Railway Plan (to be prepared by MSEC and Tahmoor Coal).	Visual inspection and structural assessment to be conducted at the completion of LW W4.
Picton Tunnel	Visual inspection. Survey control points. Structural assessment.	Pre-mining condition and structural assessment (completed). Install a monitoring system (completed). Additional monitoring for track systems installed (completed).	Regular monitoring as per the LW W3-W4 Main Southern Railway Plan (to be prepared by MSEC and Tahmoor Coal).	Visual inspection and structural assessment to be conducted at the completion of LW W4.
Cottage (Weatherboard) (I211)	Visual inspection. Survey control points. Structural assessment.	Pre-mining condition and structural assessment (completed). Baseline recording of the site before mining, noting any existing cracks or damages (completed).	Regular monitoring as per the Weatherboard Cottage Management Plan.	Visual inspection and structural assessment to be conducted at the completion of LW W4.
Redbank Uniting Church	None required (abuts the Study Area)	None required.	None required.	None required.



Heritage Sites / Item	Monitoring Component	Monitoring		
		Prior to Mining	During Mining	Post Mining
Antill Street Underbridge (also referred to as Thirlmere Way Rail Underbridge)	Visual inspection. Survey control points. Structural assessment.	Pre-mining condition and structural assessment (completed). Install a monitoring system (completed).	Regular monitoring as per the LW W3-W4 Main Southern Railway Plan (to be prepared by MSEC and Tahmoor Coal).	Visual inspection and structural assessment to be conducted at the completion of LW W4.
Rural landscape – Thirlmere Way	None required.	None required.	None required.	None required.
Picton Viaduct (SHI 01051)	Visual inspection. Survey control points. Structural assessment.	Pre-mining condition and structural assessment (completed). Install a monitoring system (completed). Additional monitoring for track systems installed (completed).	Regular monitoring as per the LW W3-W4 Main Southern Railway Plan (to be prepared by MSEC and Tahmoor Coal).	Visual inspection and structural assessment to be conducted at the completion of LW W4.
Argyle Street Underbridge (Hole in the Wall) (I149)	Visual inspection. Survey control points. Structural assessment.	Pre-mining condition and structural assessment (completed). Install a monitoring system (completed).	Regular monitoring as per the LW W3-W4 Main Southern Railway Plan (to be prepared by MSEC and Tahmoor Coal).	Visual inspection and structural assessment to be conducted at the completion of LW W4.
Pedestrian overbridge 86.1 km	Visual inspection. Survey control points. Structural assessment.	Pre-mining condition and structural assessment (completed). Install a monitoring system (completed).	Regular monitoring as per the LW W3-W4 Main Southern Railway Plan (to be prepared by MSEC and Tahmoor Coal).	Visual inspection and structural assessment to be conducted at the completion of LW W4.
Loop Line sandstone culverts	Visual inspection. Baseline recording (photographs). Survey control points. Structural assessment of culverts.	Baseline recording of the site before mining, noting any existing cracks or damage (completed). Install a system, which will monitor ground movements on and around the culverts (completed).	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.

Heritage Sites / Item	Monitoring Component	Monitoring		
		Prior to Mining	During Mining	Post Mining
		Reinforcement for specific culverts as identified by structural engineer (in place).		
Loop Line brick culverts	Visual inspection. Baseline recording (photographs). Survey control points. Structural assessment of culverts, particular attention given to 87.850 and 87.630.	Baseline recording of the site before mining, noting any existing cracks or damage (completed). Install a monitoring system, which will monitor ground movements on and around the culverts (completed).	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.
Main Southern Railway culverts	Visual inspection. Baseline recording (photographs). Survey control points. Structural assessment of culverts.	Baseline recording of the site before mining, noting any existing cracks or damage (completed). Install a monitoring system, which will monitor ground movements on and around the culverts.	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.
Subway 88.133 km	Visual inspection. Baseline recording (photographs). Survey control points. Structural assessment of culverts.	Baseline recording of the site before mining, noting any existing cracks or damage (completed)	Regular monitoring as per the LW W3-W4 Main Southern Railway Plan (to be prepared by MSEC and Tahmoor Coal).	Visual inspection to be conducted at the completion of LW W4.
High retaining wall 84.687 km	Visual inspection. Baseline recording (photographs). Structural assessment.	Baseline recording of the site before mining, noting any existing cracks or damage (completed)	Regular monitoring as per the LW W3-W4 Main Southern Railway Plan (to be prepared by MSEC and Tahmoor Coal).	Visual inspection to be conducted at the completion of LW W4.

Heritage Sites / Item	Monitoring Component	Monitoring		
		Prior to Mining	During Mining	Post Mining
Bridge on Matthews Lane	Visual inspection. Survey control points. Structural assessment.	Pre-mining condition and structural assessment (completed). Install a monitoring system (completed).	Regular monitoring as per the LW W3-W4 Main Southern Railway Plan (to be prepared by MSEC and Tahmoor Coal).	Visual inspection to be conducted at the completion of LW W4.
Prince Street Overbridge	Visual inspection. Survey control points. Structural assessment.	Pre-mining condition and structural assessment (completed). Install a monitoring system (completed).	Regular monitoring as per the LW W3-W4 Main Southern Railway Plan (to be prepared by MSEC and Tahmoor Coal).	Visual inspection to be conducted at the completion of LW W4.
Connellan Crescent Overbridge	Visual inspection. Survey control points. Structural assessment.	Pre-mining condition and structural assessment (completed). Install a monitoring system (completed).	Regular monitoring as per the LW W3-W4 Main Southern Railway Plan (to be prepared by MSEC and Tahmoor Coal).	Visual inspection to be conducted at the completion of LW W4.

## 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 baseline recording phase and during the mining of LW W3-W4 would be used for comparisons to determine any impacts from mining, which will assist the understanding of potentially impacts for future Extraction Plans.

### 5.3.2 Historical Heritage Baseline Monitoring

To assist in the preparation of future Extraction Plans, monitoring of historical heritage items would be completed in accordance with the monitoring program in **Table 5-2**. Monitoring data collected during the mining of LW W3-W4 would be used in the review of observed subsidence impacts for future Extraction Plans.

## 6 Subsidence Management Strategies

### 6.1 Mine Design Considerations

Tahmoor Coal 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 has been modified since the 2014 SMP Application to consider feedback received following submission of the SMP Application in 2014, and additional information gathered from underground conditions. The revision of the mine plan has been redesigned specifically to avoid significant impact to the sensitive surface features of the environment, particularly avoiding mining directly under streams of third order or above. The revision of the mine plan also resulted in the re-orientation of longwalls in the Western Domain. 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 through the extraction of LW W3-W4 in the Western Domain, which will continue on from the active longwall series (LW W1-W2). The proposed LW W3-W4 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, 2021a):

- The location of the site (e.g. open paddock, creek bed);
- The site type;
- The nature of the damage and its location within the site;
- The impact on the heritage values of the site (e.g. a crack across grinding grooves);
- Cultural advice from the local Aboriginal community to the proposed remediation measures (e.g. sealants used on cracks); and
- Compliance with relevant AHIP conditions, if granted for the activity.

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.

#### 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, 2021b):

- 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.

Mitigation measures should follow best practice principles of heritage management. Any mitigation measures should be visually inconspicuous and preserve the appearance of the heritage item in its setting. Any attachments to the fabric of the structure should be designed to be reversible and to do no harm to the fabric of the heritage item.

A number of specific remediation measures have been prescribed for registered heritage items and are described in **Section 6.3** of the HHTR (**Appendix C**).

### 6.2.3 Unexpected Finds Procedures

#### Discovery of Aboriginal Objects

Under Section 89A of the NPW Act, it is a requirement that Heritage NSW is notified of the existence of Aboriginal objects as soon as practicable after they are first identified. This is done through the completion of a 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 Heritage NSW 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, 2021a).

#### Reporting Impact to Aboriginal Sites

An Aboriginal Site Impact Recording Form must be completed following impacts to AHIMS sites that are (EMM, 2021a):

- 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 Heritage NSW;
- Undertaken for the purpose of complying with Secretary's environmental assessment requirements issued by the DPIE for:
  - SSD;
  - SSI;
  - A major project; or
  - Authorised by a StatSSD/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 Heritage NSW 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, 2021a):

- 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 Heritage NSW 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 Heritage NSW guidelines;
- If the remains are historical and not of Aboriginal origin, Heritage NSW 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, 2021b):

- 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 W3-W4 mining (refer to **Appendix A**). Level 1 of the TARP indicates that, based on monitoring results, the environment is performing within normal levels. Where performance indicators indicate that a level of risk has been triggered greater than a normal level (Levels 2 or higher with escalating corresponding risk), a response in the form of management / corrective actions is required to be implemented as outlined in the TARP.

It is noted that the monitoring and management for the grinding groove site (AHIMS site #52-2-2068) is detailed in the SCRMP, which includes a site-specific TARP for the site.

## 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 management / corrective actions are Corrective Action Management Plan (CAMP) 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 CAMP, the Annual Review and Six Monthly Subsidence Impact Reports (refer to **Section 6.1** of the Extraction Plan Main Document).

## 6.5 Adaptive Management Strategy

An Adaptive Management Report has reviewed mining-induced ground movement and impacts on the streams in proximity to LW W2 (Cedar Creek and Stonequarry Creek, particularly Pool SR17) to inform considerations for the amendment of the commencing position of LW W3. This Report considers information from a detailed monitoring program and concluded that no change to the commencement position of LW W3. The Report was submitted to DPIE in June 2021.



## 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 W3-W4 are discussed in the Extraction Plan Main Document.

### 7.1 Reporting Requirements

Generic reporting requirements for the LW W3-W4 Extraction Plan are discussed in **Section 6.1** of the Extraction Plan Main Document.

#### 7.1.1 Reporting Requirements Specific to Aboriginal 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 Aboriginal heritage is threatened or caused, a letter report will be issued within one (1) week of the event notifying DPIE, Wollondilly Shire Council, Heritage NSW, 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, 2021a).

#### 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, Heritage NSW 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, 2021b).

### 7.2 Review and Auditing

Generic review and auditing requirements for the LW W3-W4 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 AHIP C0005707 variation is approved, this HMP will be reviewed and updated where necessary to comply with the requirements of any AHIP conditions.

Where significant changes are made to the AHTR and HMP (other than minor plan updates), a draft of the modified plan will be provided to RAPs for their review. However, minor plan updates to the AHTR and HMP 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, 2021a).

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, 2021a).

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

Any additional historical heritage sites identified during extraction of LW W3–W4, 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 the HHTR updated accordingly (EMM, 2021b).

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, 2021b).

## 7.3 Roles and Responsibilities

Generic roles and responsibilities applicable for the implementation of the LW W3-W4 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 W3-W4.

## 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), Draft Guidelines for the Preparation of Extraction Plans V5.
- EMM Consulting (2021a), Tahmoor Mine Extraction Plan: Longwalls West 3 and West 4 – Aboriginal Heritage Technical Report, report for Tahmoor Coal, August 2021, document J200551 RP#3.
- EMM Consulting (2021b), Tahmoor Mine Extraction Plan: Longwalls West 1 and West 2 – Historical Heritage Technical Report, report for Tahmoor Coal, March 2021, document J200551 RP4.
- EMM Consulting (2021c), Tahmoor Coal Mine Study Area LW W1-W4: Impact Assessment LW W3-W4, Aboriginal Cultural Heritage Assessment, report for Tahmoor Coal.
- EMM Consulting (2021d), Tahmoor LW W3-W4: Main Southern Railway Inspection Report, letter to Tahmoor Coal, August 2021.
- Mine Subsidence Engineering Consultants (2021), Tahmoor Coal – Longwalls W3 and W4, Subsidence Predictions and Impact Assessments for Natural and Built Features due to the Extraction of the Proposed Longwalls W3 and W4 in Support of the Extraction Plan Application. Prepared for Tahmoor Coal, March 2021, document MSEC1112.
- 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, 2021a)
ARTC	Australian Rail Track Corporation
Burra Charter	Australia ICOMOS Burra Charter, 2013
CAMP	Corrective Action Management Plan
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>
EES	NSW Department of Planning, Industry and Environment— Environment, Energy and Science Group
Heritage Act	<i>NSW Heritage Act 1977</i>
Heritage NSW	Heritage NSW of the Office of Premier and Cabinet
HHTR	Historical Heritage Technical Report (EMM, 2021b)
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

Abbreviation	Definition
MSEC	Mining Subsidence Engineering Consultants
Niche	Niche Environment and Heritage
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 (now Heritage NSW)
PAD	Potential Archaeological Deposit
RAP	Registered Aboriginal party
RMZ	Risk management zone
SCRMP	LW W3-W4 Stonequarry Creek Rockbar Management Plan
SHR	State Heritage Register
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
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	May 2021	Zina Ainsworth, David Talbert, Malcolm Waterfall	New document
2.0	August 2021	Zina Ainsworth	Updated to include the LW W3-W4 Stonequarry Creek Rockbar Management Plan and incorporate findings from the Main Southern Railway Inspection Report (EMM, 2021d).

# Appendix A – Trigger Action Response Plan

## Trigger Action Response Plan – Heritage Management Plan

Feature	Management		
	Trigger	Action	Response
Aboriginal Heritage items*	Level 1		
	<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 as per monitoring program.</li> </ul>	<ul style="list-style-type: none"> <li>No response required.</li> </ul>
	Level 2		
	<ul style="list-style-type: none"> <li>Aboriginal heritage site monitoring indicates potential detectable environmental consequences.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring as per monitoring program.</li> <li>Convene Tahmoor Coal Environmental Response Group to review response.</li> <li>An archaeologist to inspect the relevant site(s) within the area of potential impact.</li> <li>Review monitoring program and modify if necessary.</li> </ul>	<ul style="list-style-type: none"> <li>If impacts to heritage sites are observed, notify DPIE and Heritage NSW within one week of the event.</li> <li>Notify RAPs within one week of the event and co-ordinate a site inspection with RAPs.</li> <li>Investigate and implement any additional management measures as required in consultation with RAPs, Heritage NSW and DPIE.</li> </ul>
Level 3			
<ul style="list-style-type: none"> <li>Aboriginal heritage site monitoring indicates environmental consequences to heritage site(s).</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring as per monitoring program.</li> <li>Convene Tahmoor Coal Environmental Response Group to review response.</li> <li>Investigate exceedance of subsidence prediction.</li> <li>Review mine design/predictions against mine criteria.</li> <li>Review monitoring program and modify if necessary.</li> </ul>	<ul style="list-style-type: none"> <li>Notify RAPs within 1 week of the event and co-ordinate a site inspection with RAPs.</li> <li>Notify DPIE and Heritage NSW within one week of the event.</li> <li>Investigate and implement any additional management measures as required in consultation with RAPs, Heritage NSW and DPIE.</li> </ul>	

\*This TARP outlines performance indicators to be implemented to ensure compliance with negligible subsidence impacts or environmental consequences to the Aboriginal modified tree within the Study Area, Clearview (#52-2-2100) and considers the management or remediation of any impacts and/or environmental consequences relating to this Aboriginal heritage site. A site-specific TARP for Stonequarry Creek 1 is included in the SCRMP.

Feature	Management		
	Trigger	Action	Response
Historical Heritage	Level 1		
	<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 as per monitoring program.</li> </ul>	<ul style="list-style-type: none"> <li>No response required.</li> </ul>
	Level 2		
	<ul style="list-style-type: none"> <li>Historical heritage site monitoring indicates potential detectable environmental consequences but with negligible impacts to heritage site(s).</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring as per monitoring program.</li> </ul>	<ul style="list-style-type: none"> <li>No response required.</li> </ul>
	Level 3		
<ul style="list-style-type: none"> <li>Historical heritage site monitoring indicates environmental consequences to heritage site(s).</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring as per monitoring program.</li> <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>Investigate exceedance of subsidence prediction.</li> <li>Review mine design/predictions against mine criteria.</li> <li>Review monitoring program and modify if necessary.</li> </ul>	<ul style="list-style-type: none"> <li>Notify DPIE and Heritage NSW within one week of the event.</li> <li>Investigate and implement any additional management measures as recommended and contingency plan as required in consultation with Heritage NSW and DPIE.</li> </ul>	



# Appendix B – Aboriginal Heritage Technical Report

# Appendix C – Historical Heritage Technical Report

# Appendix D – Main Southern Railway Inspection Report