



SIMEC

MEMBER OF



Tahmoor Coal Pty Ltd

BUILT FEATURES MANAGEMENT PLAN

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

May 2021

simecgfg.com

This page has been left blank intentionally.

Document Control

APPLICANT: Tahmoor Coal Pty Ltd
MINE: Tahmoor Coal Mine
DEVELOPMENT APPROVAL: DA 57/93 (as modified) and DA 67/98 (as modified)
MINING LEASES: ML 1376 and ML 1539
DOCUMENT TITLE: Tahmoor North - Western Domain
Longwalls West 3 and West 4
Built Features Management Plan
DOCUMENT NUMBER: TAH-HSEC-332
PUBLICATION DATE: May 2021
DOCUMENT STATUS: Final (Version 1)
PREPARED BY: Daryl Kay
Subsidence Engineer
Mining Subsidence Engineering Consultants (MSEC)

April Hudson
Approvals Specialist
Tahmoor Coal – SIMEC Mining

APPROVED BY: Zina Ainsworth
Environment and Community Manager
Tahmoor Coal – SIMEC Mining

Signature: *Zina Ainsworth*
Date: 10 May 2021

Malcolm Waterfall
Mining Engineering Manager
Tahmoor Coal – SIMEC Mining

Signature: *Malcolm Waterfall*
Date: 10.05.2021

Peter Vale
Head of Coal Mines
Tahmoor Coal – SIMEC Mining

Signature: *Peter Vale*
Date: 10-5-21

This page has been left blank intentionally.

Table of Contents

| | |
|---|-----------|
| Table of Contents | 5 |
| List of Figures | 6 |
| List of Tables | 6 |
| 1 Introduction | 7 |
| 1.1 Background | 7 |
| 1.2 Purpose | 7 |
| 1.3 Scope | 7 |
| 1.3.1 Built Features within the Study Area | 8 |
| 2 Regulatory Requirements | 12 |
| 2.1 Project Approval..... | 12 |
| 2.1.1 Development Consent | 12 |
| 2.1.2 Extraction Plan Guidelines | 15 |
| 2.2 Relevant Legislation | 17 |
| 2.2.1 Work, Health and Safety Legislation | 17 |
| 2.3 Risk Management | 18 |
| 2.3.1 Risk Management Process | 18 |
| 2.3.2 Identification of Subsidence Hazards..... | 20 |
| 2.4 Consultation | 21 |
| 2.4.1 Consultation Completed During Extraction Plan Preparation | 21 |
| 2.4.2 Further Consultation for Management Plans | 22 |
| 3 Summary of Built Features | 23 |
| 3.1 Main Southern Railway | 23 |
| 3.2 Picton-Mittagong Loop Line..... | 24 |
| 3.3 Local Roads..... | 26 |
| 3.4 State Roads | 28 |
| 3.5 Potable Water Infrastructure..... | 29 |
| 3.6 Sewerage Infrastructure | 32 |
| 3.6.1 Stonequarry Estate sewerage infrastructure..... | 32 |
| 3.6.2 Sydney Water sewerage infrastructure | 34 |
| 3.6.3 Septic Tanks..... | 34 |
| 3.7 Gas Infrastructure | 35 |
| 3.8 Electrical Infrastructure | 37 |
| 3.9 Telecommunications Infrastructure | 39 |
| 3.10 Public Amenities..... | 41 |
| 3.11 Structures..... | 41 |
| 3.11.1 Structures Risk Management Process | 44 |
| 3.11.2 Current Status | 45 |
| 3.12 Built Heritage Sites..... | 45 |

| | | |
|----------|---|-----------|
| 3.13 | Permanent Survey Marks..... | 48 |
| 4 | Subsidence Monitoring Program..... | 50 |
| 4.1 | Performance Measures..... | 50 |
| 4.2 | Monitoring Program | 50 |
| 5 | Review and Improvement | 52 |
| 5.1 | Reporting Requirements..... | 52 |
| 5.2 | Review and Auditing | 52 |
| 5.3 | Roles and Responsibilities..... | 53 |
| 6 | Document Information..... | 54 |
| 6.1 | References..... | 54 |
| 6.2 | Glossary of Terms..... | 54 |
| 6.3 | Abbreviations | 54 |
| 6.4 | Change Information | 55 |

List of Figures

| | | |
|------------|---|----|
| Figure 1-1 | Regional Context | 10 |
| Figure 1-2 | LW W3-W4 Extraction Plan Study Area..... | 11 |
| Figure 2-1 | Flowchart for Subsidence Impact Management Process | 19 |
| Figure 3-1 | Railway Infrastructure and LW W3-W4 Extraction Plan Study Area (MSEC, 2021).. | 25 |
| Figure 3-2 | Public Roads and LW W3-W4 Extraction Plan Study Area (MSEC, 2021) | 27 |
| Figure 3-3 | TfNSW Infrastructure near Longwalls West 3 and West 4 | 29 |
| Figure 3-4 | Potable Water and Sewerage Infrastructure within the LW W3-W4 Extraction Plan Study Area (MSEC, 2021) | 31 |
| Figure 3-5 | Gas Infrastructure and LW W3-W4 Extraction Plan Study Area (MSEC, 2021) | 36 |
| Figure 3-6 | Electrical Infrastructure and LW W3-W4 Extraction Plan Study Area (MSEC, 2021) | 38 |
| Figure 3-7 | Telecommunications Infrastructure and LW W3-W4 Extraction Plan Study Area (MSEC, 2021) | 40 |
| Figure 3-8 | Building structures and dams and LW W3-W4 Extraction Plan Study Area (MSEC, 2021) | 43 |
| Figure 3-9 | Heritage Sites and LW W3-W4 Extraction Plan Study Area (MSEC, 2021)..... | 47 |

List of Tables

| | | |
|-----------|--|----|
| Table 1-1 | Built features within the study area and associated management plans | 8 |
| Table 2-1 | Key Conditions from DA 67/98 regarding Built Features (October 2020) | 12 |
| Table 2-2 | Extraction Plan Guideline Requirements for Key Component Plans..... | 15 |
| Table 6-1 | Abbreviations | 54 |
| Table 6-2 | Document History | 55 |

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 33 longwalls to the north and west of the Tahmoor Mine's current pit top location. The current mining area, the 'Western Domain', is located north-west of the Main Southern Railway (MSR) 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. Longwall West 1 (LW W1) extraction was completed on 6 November 2020, and the extraction of Longwall West 2 (LW W2) commenced on 7 December 2020.

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 Built Features Management Plan (BFMP) has been prepared to support an Extraction Plan for the secondary extraction of coal from LW W3-W4. This BFMP has been designed to provide the management strategies, controls and monitoring programs to be implemented for the management of potential subsidence impacts on built features affected by the secondary extraction of LW W3-W4.

1.3 Scope

The Study Area applicable to this BFMP consists of a combination of the Predicted 20 millimetres (mm) Total Subsidence Contour and the 35° Angle of Draw Line, as shown on **Figure 1-2**. This BFMP:

- Addresses specific requirements set by DA 67/98 Condition 13H(vii)(b) (refer to **Section 2.1**);
- Addresses related regulatory requirements (refer to **Section 2**); and

- Addresses the monitoring and management of potential subsidence-related impacts to built features resulting (refer to **Section 3** and **Section 4**).

This BFMP has been prepared based on the contents of the Subsidence Predictions and Impact Assessment (MSEC, 2021) (**Volume 1**).

1.3.1 Built Features within the Study Area

The built features located within the Extraction Plan Study Area are managed by this BFMP and supporting individual infrastructure management plans.

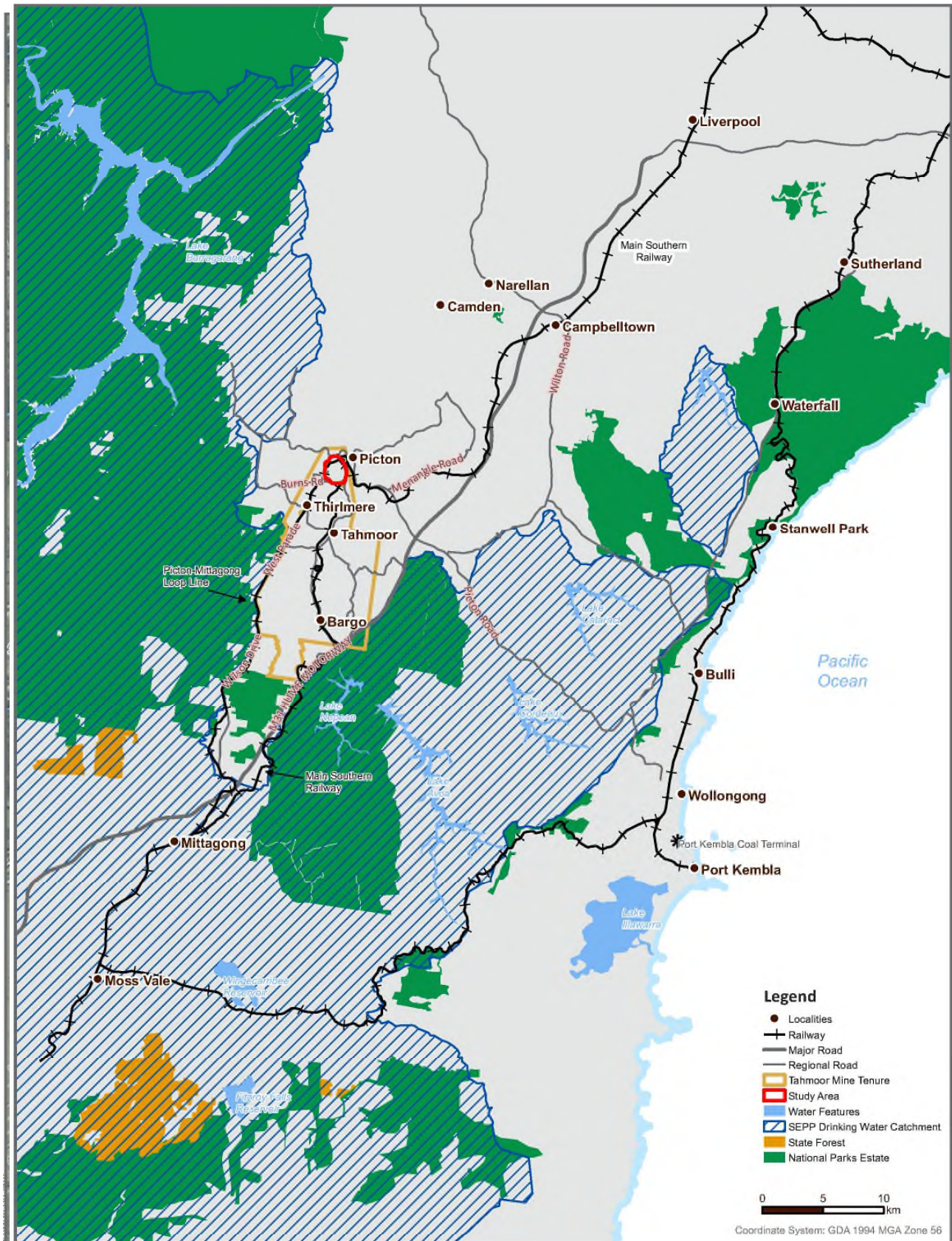
Separate infrastructure management plans have been developed in consultation with stakeholders prior to the influence of subsidence on each relevant feature. Stakeholders include Endeavour Energy, Sydney Water, Jemena, Telstra, NBN Co., Wollondilly Shire Council (WSC), Transport for NSW (TfNSW), Australian Rail Track Corporation (ARTC), Railcorp, Transport Heritage NSW (THNSW), and property owners and managers of the Stonequarry Estate Wastewater Treatment Plant (WTP).

Table 1-1 shows each built feature and the relevant assessment and management plans.

Table 1-1 Built features within the study area and associated management plans

| Feature | Identification and Assessment | Management and Monitoring |
|--|--|--|
| Main Southern Railway | <ul style="list-style-type: none"> • Subsidence Prediction and Impact Assessment Report (MSEC, 2021). | <ul style="list-style-type: none"> • Tahmoor Coal – LW W3-W4 Management Plan for Potential Impacts to Main Southern Railway, Report No. MSEC1163, 2021. • Built Features Management Plan. • Subsidence Monitoring Program. |
| Picton-Mittagong Loop Line | <ul style="list-style-type: none"> • Subsidence Prediction and Impact Assessment Report (MSEC, 2021). | <ul style="list-style-type: none"> • Tahmoor Coal – LW W3-W4 Management Plan for Potential Impacts to Picton-Mittagong Loop Line, Report No. MSEC1168, 2021. • Built Features Management Plan. • Subsidence Monitoring Program. |
| Public roads, bridges and culverts | <ul style="list-style-type: none"> • Subsidence Prediction and Impact Assessment Report (MSEC, 2021). | <ul style="list-style-type: none"> • Tahmoor Coal – LW W3-W4 Management Plan for Potential Impacts to Wollondilly Shire Council Infrastructure, Report No. MSEC1173-02, 2021. • Built Features Management Plan. • Subsidence Monitoring Program. |
| State roads and infrastructure | <ul style="list-style-type: none"> • Subsidence Prediction and Impact Assessment Report (MSEC, 2021). | <ul style="list-style-type: none"> • Tahmoor Coal – LW W3-W4 Management Plan for Potential Impacts to TfNSW Infrastructure, Report No. MSEC1173-18, 2021. • Built Features Management Plan. • Subsidence Monitoring Program. |
| Potable water infrastructure | <ul style="list-style-type: none"> • Subsidence Prediction and Impact Assessment Report (MSEC, 2021). | <ul style="list-style-type: none"> • Tahmoor Coal – LW W3-W4 Management Plan for Potential Impacts to Sydney Water Potable Water Infrastructure, Report No. MSEC1173-03, 2021. • Built Features Management Plan. • Subsidence Monitoring Program. |
| Sewerage infrastructure (Sydney Water) | <ul style="list-style-type: none"> • Subsidence Prediction and Impact Assessment Report (MSEC, 2021). | <ul style="list-style-type: none"> • Tahmoor Coal – LW W3-W4 Management Plan for Potential Impacts to Sydney |

| Feature | Identification and Assessment | Management and Monitoring |
|--|--|--|
| | | <p>Water Sewerage Infrastructure, Report No. MSEC1173-09 2021.</p> <ul style="list-style-type: none"> • Built Features Management Plan. • Subsidence Monitoring Program. |
| Sewerage infrastructure (Stonequarry Estate) | <ul style="list-style-type: none"> • Subsidence Prediction and Impact Assessment Report (MSEC, 2021). | <ul style="list-style-type: none"> • Tahmoor Coal – LW W3-W4 Management Plan for Potential Impacts to Stonequarry Wastewater Treatment Plant, Report No. MSEC1173-04, 2021. • Built Features Management Plan. • Subsidence Monitoring Program. |
| Gas infrastructure | <ul style="list-style-type: none"> • Subsidence Prediction and Impact Assessment Report (MSEC, 2021). | <ul style="list-style-type: none"> • Tahmoor Coal – LW W3-W4 for Potential Impacts to Jemena Gas Infrastructure, Report No. MSEC1173-05, 2021. • Built Features Management Plan. • Subsidence Monitoring Program. |
| Electrical infrastructure | <ul style="list-style-type: none"> • Subsidence Prediction and Impact Assessment Report (MSEC, 2021). | <ul style="list-style-type: none"> • Tahmoor Coal – LW W3-W4 Management Plan for Potential Impacts to Endeavour Energy Infrastructure, Report No. MSEC1173-06, 2021. • Built Features Management Plan. • Subsidence Monitoring Program. |
| Telecommunications infrastructure | <ul style="list-style-type: none"> • Subsidence Prediction and Impact Assessment Report (MSEC, 2021). | <ul style="list-style-type: none"> • Tahmoor Coal – LW W3-W4 Management Plan for Telstra Infrastructure, Comms Network Solutions, 2021; • Tahmoor Coal – LW W3-W4 Management Plan for NBN Co Infrastructure, Comms Network Solutions, 2021. • Built Features Management Plan. • Subsidence Monitoring Program. |
| Public amenities | <ul style="list-style-type: none"> • Subsidence Prediction and Impact Assessment Report (MSEC, 2021). | <ul style="list-style-type: none"> • Tahmoor Coal – LW W3-W4 Management Plan for Potential Impacts to Built Structures, Report No. MSEC1173-12, 2021. • Built Features Management Plan. • Subsidence Monitoring Program. |
| Structures and Farm Dams | <ul style="list-style-type: none"> • Subsidence Prediction and Impact Assessment Report (MSEC, 2021). • Surface Water Technical Report (HEC, 2021). • Land and Agricultural Resource Assessment (SLR, 2021). • Geotechnical Assessment (Douglas Partners, 2021). | <ul style="list-style-type: none"> • Tahmoor Coal – LW W3-W4 Management Plan for Potential Impacts to Built Structures, Report No. MSEC1173-12, 2021. • Water Management Plan. • Built Features Management Plan. • Subsidence Monitoring Program. |
| Heritage sites | <ul style="list-style-type: none"> • Subsidence Prediction and Impact Assessment Report (MSEC, 2021). • Historical Heritage Technical Report (EMM, 2021). | <ul style="list-style-type: none"> • Tahmoor Coal – LW W3-W4 Management Plan for Potential Impacts to No. 796-800 Thirlmere Way (Weatherboard Cottage), Report No. MSEC1173-13-03, 2021. • Heritage Management Plan. • Built Features Management Plan. • Subsidence Monitoring Program. |



REGIONAL CONTEXT

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

MEMBER OF



FIGURE 1-1

Date: 22/12/2020

Data Sources:

© NSW DFSI (2019); © NSW Mining (2019); © SIMEC (2019)

Access and Use Constraints:

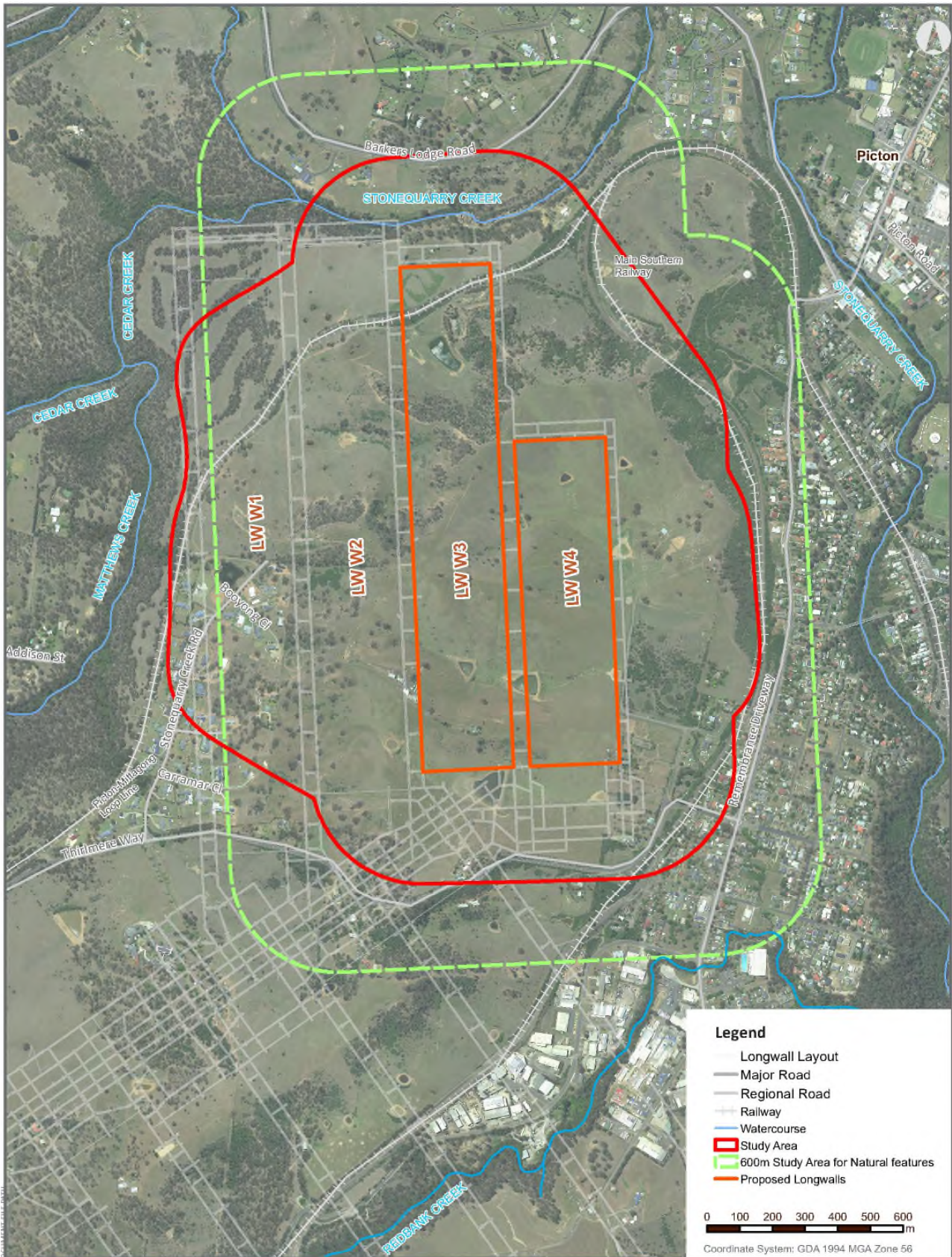
This webmap is intended to be used by SIMEC Mining and other stakeholders involved in the development and operation of SIMEC Mining's mines.

Access to this webmap is restricted to users authorised by SIMEC Mining only. You may not reproduce, adapt, modify, communicate or use any part of this webmap other than for activities related to development and operation of SIMEC Mining's mines.

Disclaimer:

The data displayed in this webmap has been collated from various sources.

The source data may contain inconsistencies or omissions, may not be to scale, may not be current and may present indicative information only. SIMEC Mining does not warrant the accuracy or completeness of the contents of this webmap.



EXTRACTION PLAN STUDY AREA

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



FIGURE 1-2

Date: 10/05/2021

Data Sources:
© NSW DFSI (2019); © NSW Mining (2019); © SIMEC (2019)
Aerial Imagery: © Photomapping Services (November 2018)

Access and Use Constraints:

This webmap is intended to be used by SIMEC Mining and other stakeholders involved in the development and operation of SIMEC Mining's mines. Access to this webmap is restricted to users authorised by SIMEC Mining only. You may not reproduce, adapt, modify, communicate or use any part of this webmap other than for activities related to development and operation of SIMEC Mining's mines.

Disclaimer:

The data displayed in this webmap has been collated from various sources. The source data may contain inconsistencies or omissions, may not be to scale, may not be current and may present indicative information only. SIMEC Mining does not warrant the accuracy or completeness of the contents of this webmap.

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 67/98, as discussed further in **Section 3.2.1** of the Extraction Plan Main Document. Development consent was modified in 2006 (Mod 1), 2012 (Mod 2), 2018 (Mod 4), and 2020 (Mod 5).

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 BFMP from DA 67/98 are detailed in **Table 2-1**.

Table 2-1 Key Conditions from DA 67/98 regarding Built Features (October 2020)

| Condition | Condition Requirement | Section Addressed |
|---------------------------------------|---|---|
| Performance Measures – Built Features | | |
| 13E | <p>The Applicant must ensure that extraction of Longwall 33 and subsequent longwalls does not cause any exceedances of the performance measures in Table 2.</p> <p>Notes</p> <ul style="list-style-type: none"> The Applicant will be required to define more detailed performance measures in the Built Features Management Plans or Public Safety Management Plan. Requirements regarding safety or serviceability do not prevent preventative or mitigatory actions being taken prior to or during mining in order to achieve or maintain these outcomes. Requirements under this condition may be met by measures undertaken in accordance with the <i>Coal Mine Subsidence Compensation Act 2017</i>. | Section 3 Infrastructure Management Plans |

| Condition | Condition Requirement | Section Addressed | |
|---------------------------------------|---|--|---------------------------------|
| Performance Measures – Built Features | | | |
| Table 2 | Feature | Performance Measure | Infrastructure Management Plans |
| | Key Public Infrastructure | | |
| | <ul style="list-style-type: none"> Main Southern Railway; Picton Tunnel; Picton-Mittagong Loop Line; and Electricity transmission lines and towers. | <ul style="list-style-type: none"> Always safe and serviceable. Damage that does not affect safety or serviceability must be fully repairable, and must be fully repaired. | |
| | Other Infrastructure | | |
| | <ul style="list-style-type: none"> Electricity distribution lines, poles and associated towers; Unsealed roads and road culverts, fire trails, fences and other built features; and Other public infrastructure. | <ul style="list-style-type: none"> Always safe. Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated. Damage must be fully repairable, and must be fully repaired or else replaced or fully compensated. | |
| | <ul style="list-style-type: none"> Privately-owned residences. | | |
| | <ul style="list-style-type: none"> Other privately-owned built features and improvements, including farm dams, swimming pools, tennis courts, roads, tracks and fences | | |
| | Public Safety | | |
| | Public Safety | <ul style="list-style-type: none"> Negligible additional risk. | |
| | <p><i>Notes:</i></p> <ul style="list-style-type: none"> <i>The Applicant will be required to define more detailed performance measures in the Built Features Management Plans or Public Safety Management Plan.</i> <i>Requirements regarding safety or serviceability do not prevent preventative or mitigatory actions being taken prior to or during mining in order to achieve or maintain these outcomes.</i> <i>Requirements under this condition may be met by measures undertaken in accordance with the Coal Mine Subsidence Compensation Act 2017.</i> | | |
| 13F | Any dispute between the Applicant and the owner of any built feature over the interpretation, application or implementation of the performance measures in Table 2 is to be settled by the Secretary, following consultation with the Resources Regulator. Any decision by the Secretary shall be final | Noted. | |
| Extraction Plan | | | |
| 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 3 | |

| Condition | Condition Requirement | Section Addressed |
|-------------|---|--|
| 13H(vii)(b) | Built Features Management Plan which has been prepared in consultation with the Resources Regulator, to manage the potential subsidence impacts of the proposed underground workings on built features, and which: | This document Section 2.4 |
| | <ul style="list-style-type: none"> has been prepared in consultation with the owners of potentially affected features, including ARTC and NRSR in relation to potential impacts on rail infrastructure; | MSR Management Plan |
| | <ul style="list-style-type: none"> addresses in appropriate detail all items of key public infrastructure (with particular consideration of transmission lines and towers (including angle towers), the Main Southern Railway including the Picton Tunnel, other public infrastructure and all classes of other built features; | Section 3 Infrastructure Management Plans |
| | <ul style="list-style-type: none"> recommends appropriate pre-mining mitigation measures to reduce subsidence impacts; | Infrastructure Management Plans |
| | <ul style="list-style-type: none"> recommends appropriate remedial measures and includes commitments to mitigate, repair, replace or compensate predicted impacts on potentially affected built features in a timely manner, including an Emergency Response Plan for emergency mitigation works in the Picton Tunnel; and | MSR Management Plan |
| | <ul style="list-style-type: none"> in the case of all key public infrastructure, and other public infrastructure except roads, trails and associated structures, reports external auditing for compliance with ISO 31000 (or alternative standard agreed with the infrastructure owner), and provides for annual auditing of compliance and effectiveness during extraction which may impact the infrastructure; | Infrastructure Management Plans The Risk Management Framework utilised for risk assessment is the risk management process outlined in AS/NZS ISO 31000. |
| 13H(vii)(h) | Trigger Action Response Plan/s addressing all features in Table 1 and Table 2, which contain: | Infrastructure Management Plans |
| | <ul style="list-style-type: none"> appropriate triggers to warn of increased risk of exceedance of any performance measure; and | |
| | <ul style="list-style-type: none"> specific actions to respond to high risk of exceedance of any performance measure to ensure that the measure is not exceeded; | |
| | <ul style="list-style-type: none"> an assessment of remediation measures that may be required if exceedances occur and the capacity to implement the measures; and | |
| | <ul style="list-style-type: none"> 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 | |

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

2.1.2 Extraction Plan Guidelines

The Extraction Plan and BFMP have been prepared in accordance with the DPIE *Draft Guidelines for the Preparation of Extraction Plans V5* (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 1.3.1 |
| 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 4.1 |
| 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 3 Infrastructure Management Plans |
| Proposing performance indicators to establish compliance with these performance measures and statutory requirements. | Section 5.1 Infrastructure Management Plans |
| Describe the landscape features, heritage sites and environmental values to be managed under the component plan, and their significance. | Section 3 Infrastructure Management Plans |
| Describe all currently-predicted subsidence impacts and environmental consequences relevant to the features, sites and values to be managed under the component plan. | Section 3 Infrastructure Management Plans |
| 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. | Infrastructure Management Plans |
| 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 4.2 Infrastructure Management Plans |
| Fully describing the proposed monitoring of subsidence impacts and environmental consequences. | Section 4.2 |
| Describe the proposed monitoring of the success of remediation measures following implementation. | Infrastructure Management Plans |

| Extraction Plan Guideline Content Requirements for Key Component Plans | Section(s) Addressed |
|---|--|
| Describe adaptive management proposed to avoid repetition of unpredicted subsidence impacts and/or environmental consequences. | Infrastructure Management Plans |
| Describe contingency plans proposed to prevent, mitigate or remediate subsidence impacts and/or environmental consequences which substantially exceed predictions or which exceed performance measures. | Infrastructure Management Plans |
| Listing responsibilities for implementation of the plan. | Section 6.3 Infrastructure Management Plans |
| An attached Trigger, Action, Response Plan (effectively a tabular summary of most of the above). | Infrastructure Management Plans |

2.2 Relevant Legislation

2.2.1 Work, Health and Safety Legislation

All persons conducting a business or undertaking (PCBUs), including mine operators and contractors, have a primary duty of care to ensure the health and safety of workers they engage, or whose work activities they influence or direct. The responsibilities are legislated in the *Work Health and Safety Act 2011* and the *Work Health and Safety (Mines and Petroleum Sites) Act 2013* and associated Regulations (collectively referred to as the 'WHS laws').

The *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014* commenced on 1 February 2015 and contains specific regulations in relation to mine subsidence.

As outlined in the Guide by the NSW Department of Trade & Investment Mine Safety:

"a PCBU must manage risks to health and safety associated with mining operations at the mine by:

- *complying with any specific requirements under the WHS laws;*
- *identifying reasonably foreseeable hazards that could give rise to health and safety risks;*
- *ensuring that a competent person assesses the risk;*
- *eliminating risks to health and safety so far as is reasonably practicable;*
- *minimising risks so far as is reasonably practicable by applying the hierarchy of control measures, any risks that are not reasonably practical to eliminate;*
- *maintaining control measures; and*
- *reviewing control measures.*

The mine operator's responsibilities include developing and implementing a safety management system that is used as the primary means of ensuring, so far as is reasonably practicable:

- *the health and safety of workers at the mine, and*
- *that the health and safety of other people is not put at risk from the mine or work carried out as part of mining operations."*

Detailed guidelines have also been released by the Department of Regional NSW, Resources Regulator (DPE, 2017).

The risk management process has been carried out in accordance with guidelines published by DPIE (DPE, 2017). The following main steps of subsidence risk management have been and will be undertaken, in accordance with the guidelines:

- Identification and understanding of subsidence hazards;
- Assessment of risks of subsidence;
- Development and selection of risk control measures;
- Implementation and maintenance of risk control measures, and
- Continual improvement and change management.

Each of the above steps have been or will be conducted together with the following processes.

- Consultation, co-operation and co-ordination, and
- Monitoring and review.

The infrastructure management plans document the risk control measures that are planned to manage risks to health and safety associated with the mining of LW W3-W4 directly beneath or adjacent to built features in accordance with the WHS laws.

2.3 Risk Management

2.3.1 Risk Management Process

Tahmoor Coal has developed and acted in accordance with a risk management process to manage potential hazards due to mine subsidence on built features. The risk management strategy has been reviewed and updated based on experiences gained during the mining of Longwalls 22 to 32 and LW W1-W2 and the strategy for LW W3-W4 includes the following process:

- Regular consultation with owners and operators of built infrastructure before, during and after mining;
- Site-specific investigations;
- Implementation of mitigation measures following engineering inspections and assessments;
- Surveys and inspections during mining within the active subsidence area:
 - Detailed visual inspections of built features;
 - Ground surveys; and
 - Specific ground surveys and visual inspections, where recommended by an engineer based on the inspections and assessments.

A flowchart illustrating the Subsidence Impact Management Process prior to, during and after mine subsidence movements is shown in **Figure 2-1**.

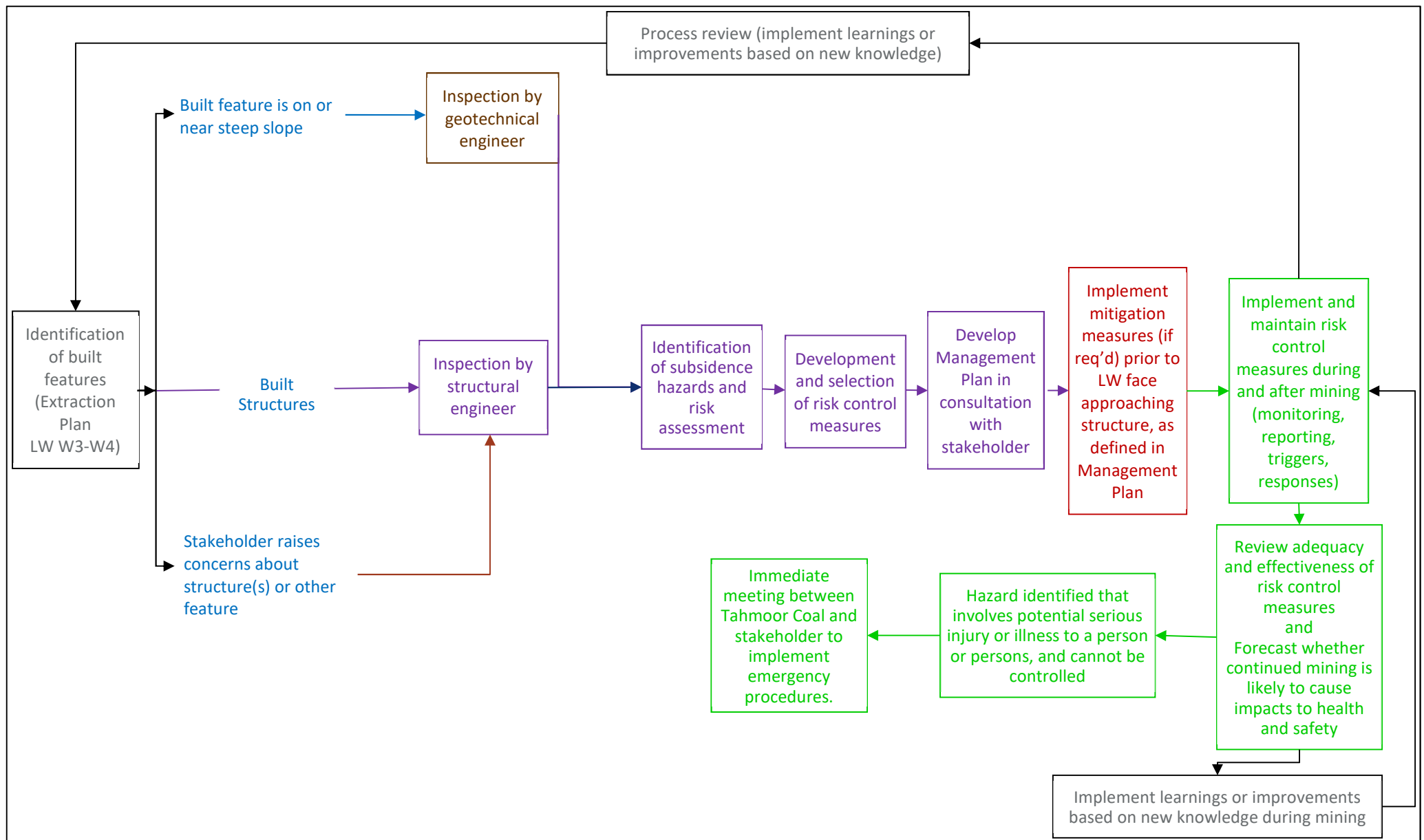


Figure 2-1 Flowchart for Subsidence Impact Management Process

2.3.2 Identification of Subsidence Hazards

Clause 34 of the *Work Health and Safety Regulation (2017)* requires that the duty holder (in this case Tahmoor Coal), in managing risks to health and safety, must identify reasonably foreseeable hazards that could give rise to risks to health and safety.

Mine subsidence hazards have been or will be identified, investigated and analysed in a systematic manner by examining each aspect of the built features. Each of the aspects below could potentially experience mine subsidence movements that give rise to risks to the health and safety of people:

- Railways;
- Local roads, bridges and culverts;
- Potable water infrastructure;
- Sewerage infrastructure;
- Gas infrastructure;
- Electrical infrastructure;
- Telecommunications infrastructure;
- Built heritage;
- Residential structures; and
- Farm dams.

A description of mine subsidence hazards identified that could give rise to risks to health and safety will be described in each of the individual infrastructure management plans.

Tahmoor Coal has completed a Risk Assessment that includes Built Features affected by subsidence from the extraction of LW W3-W4. A full copy of the risk assessment is included in the Public Safety Management Plan.

Tahmoor Coal, in consultation with infrastructure owners, has built upon the risk assessment to assess in detail the likelihood of the identified hazards affecting health and safety, and the severity of potential health and safety consequences during the risk assessment as a group. The results of the risk assessments have been included in each of the individual infrastructure management plans.

The identification and risk assessment process took into account the location of infrastructure relative to LW W3-W4 and the associated timing and duration of the subsidence event.

Whilst mine subsidence predictions and extensive past experiences from previous mining at Tahmoor Coal have been taken into account, the identification and risk assessment process recognises that there are uncertainties in relation to predicting subsidence movements, and uncertainties in how mine subsidence movements may adversely impact built features. This includes the presence and influence of geological structures and valleys.

Tahmoor Coal have considered the outcomes of the hazard identification and risk assessment process when developing measures to manage potential impacts on the health and safety of people, and potential impacts on built features in consultation with stakeholders.

A summary of built features and potential hazards identified in the Extraction Plan for LW W3-W4 are described in **Table 1-1**.

2.4 Consultation

2.4.1 Consultation Completed During Extraction Plan Preparation

The following stakeholders were consulted during the preparation of this BFMP:

- NSW Department of Planning, Industry and Environment (DPIE) – Resources Regulator;
- ARTC;
- THNSW in relation to PMLL;
- Subsidence Advisory NSW (SA NSW);
- NSW Office of the National Rail Safety Regulator (NRSR);
- WSC; and
- TfNSW.

A summary of consultation undertaken is provided in **Section 2.1.2** of the Extraction Plan Main Document, and a copy of the incoming correspondence is also provided in **Appendix C** of the Extraction Plan Main Document.

During consultation with SA NSW, it was requested that:

- The procedures and monitoring in the BFMP will allow the performance criteria set out in the consolidated consent (DA 67/98 Mod 5) for the Tahmoor North project to be met; and
- Procedures and monitoring in the BFMP should also meet any requirements by SA NSW as outlined in the *Coal Mine Subsidence Compensation Act 2017* and SA NSW process for managing claims.

The updated Infrastructure Management Plans will provide details of procedures and monitoring for each of the key public infrastructure and other infrastructure listed in DA 67/98 (Mod 5). These procedures and monitoring plans will allow the DA 67/98 (Mod 5) performance criteria to be met.

This BFMP acknowledges the SA NSW claims process. If a surface improvement is damaged by subsidence as a result of coal mining in NSW, the owner may be eligible to claim compensation under the Coal Mine Subsidence Compensation Act 2017. Subsidence Advisory NSW manages all claims for subsidence damage and claims can be lodged through Subsidence Advisory's online portal. Subsidence Advisory NSW staff will arrange for the damage to be assessed by an independent specialist assessor. If the damage is attributable to mine subsidence, a scope will be prepared and compensation will be determined. For further details please refer to [Guidelines – Process for Claiming Mine Subsidence Compensation](#) at www.subsidenceadvisory.nsw.gov.au.

2.4.2 Further Consultation for Management Plans

Tahmoor Coal and utilities and infrastructure owners (including WSC, ARTC, Sydney Water, Endeavour Energy, Jemena, Telstra, NBN, THNSW, Railcorp, TfNSW, and the owner of Stonequarry Estate WTP) have developed and acted in accordance with agreed subsidence management plans to manage potential impacts to services during the mining of Longwalls 22 to 32 and LW W1-W2.

These will be updated prior to the influence of LW W3-W4. The management plans provide for ground and visual monitoring of infrastructure and are reviewed periodically.

3 Summary of Built Features

This section provides a summary of Built Features, the identification of potential hazards, and the proposed risk controls.

3.1 Main Southern Railway

The ARTC is responsible for maintaining the MSR. The location of the MSR is shown in **Figure 3-1**.

The proposed longwalls do not mine directly beneath the MSR. The closest distance of proposed LW W3 to the Railway is approximately 290 metres at 88.33 km. The closest distance of proposed LW W4 to the Railway is approximately 245 metres at 89.32 km near the Thirlmere Way Underbridge.

Approximately 70 trains run along the railway per day, which equates to one train every 30 to 45 minutes each way. The Up and Down tracks service a range of rail traffic including:

- Heavy haul coal and minerals traffic;
- Containerised traffic;
- Grain and agricultural products; and
- Local, Interstate and Intrastate passenger traffic.

The speed limits range between 70 and 80 km/hr for normal services, and between 75 and 85 km/hr for XPT services.

There are a number of items of rail infrastructure along the MSR that are within or between the sections of track that are within the Study Area. These include the Picton Tunnel, the Mushroom Tunnel (no longer in service), the Thirlmere Way Underbridge, Connellan Crescent Overbridge, culverts, cuttings, embankments and signalling and communications systems. Further details are provided in the Extraction Plan.

In addition to the section of track within the Study Area, there are a number of items of rail infrastructure along the MSR that may be sensitive to differential far field horizontal movements. These include the Argyle Street Underbridge, the Picton Viaduct, the Prince Street Overbridge, two pedestrian overbridges, the Bridge on Matthews Lane and a high retaining wall. Their locations are shown in **Figure 3-1**. Further details on these items of infrastructure are provided in the Extraction Plan.

The potential impacts on the Railway comprise changes in track geometry and changes in rail stress, potential damage to railway structures, culverts, embankment and cuttings.

Tahmoor Coal and ARTC, as the operator of the MSR, have previously managed potential mine subsidence impacts on the Railway during the extraction of LWs 22 to 32 and LW W1-W2. This includes management of potential mine subsidence impacts on the railway structures since the extraction of LW 31.

Tahmoor Coal and ARTC will develop a plan to manage potential impacts during the mining of LW W3-W4 prior to the influence of LW W3. Risk controls will include maintaining the rail track to within operating standards prior to mining, implementation of risk controls prior to the influence of LW W3, surveys, rail stress monitoring, track geometry monitoring and visual inspections along the railway and at the rail structures, and repair of impacts as required to maintain the safe and serviceable operation of the railway during and after mining.

The management plan will also include appropriate remedial measures and commitments to mitigate, repair, replace or compensate predicted impacts on potentially affected built features in a timely manner, including an Emergency Response Plan for emergency mitigation works in the Picton Tunnel in accordance with Condition 13H(vii)(b) of DA 67/98.

3.2 Picton-Mittagong Loop Line

The Picton-Mittagong Loop Line (PMLL) is part of the former alignment of the Main South Line. It was built in 1867. The loop line was bypassed in 1919 following the construction of a new double track deviation, which is the current alignment of the MSR.

THNSW, operating the Trainworks Railway Museum at Thirlmere, holds a licence to use the track. The majority of tourist trains run between Thirlmere and Buxton to the south of the Study Area. Approximately 4 to 5 trains typically travel through the Study Area per week as part of tours or arriving or leaving the Museum for maintenance.

The PMLL is a single line jointed track, which is defined as rails that can move through the rail/sleeper fastenings and which have standard joints with a 6 mm gap installed at neutral temperature. The rails are generally fixed to steel or timber sleepers.

The location of the PMLL and the Study Area are shown in **Figure 3-1**.

The potential impacts on the PMLL comprise changes in track geometry and changes in rail stress, potential damage to culverts, embankment and cuttings.

Tahmoor Coal and THNSW, as the operator of the Trainworks Railway Museum at Thirlmere, have successfully managed potential mine subsidence impacts on the PMLL during the extraction of LW W1-W2, in accordance with the LW W1-W2 PMLL Management Plan.

Tahmoor Coal will develop a subsidence management plan for LW W3-W4 in consultation with THNSW, to ensure the safe and serviceable operation of the PMLL during and after the mining of LW W3, which is the last longwall to affect the track.

In the case of the loop line, there is ample time between trains to undertake monitoring and contingent response measures prior to trains running.

With an appropriate management plan in place, it is considered that potential impacts on PMLL can be managed during the mining of LW W3-W4, even if actual subsidence movements are greater than the predictions or substantial non-conventional movements occur.

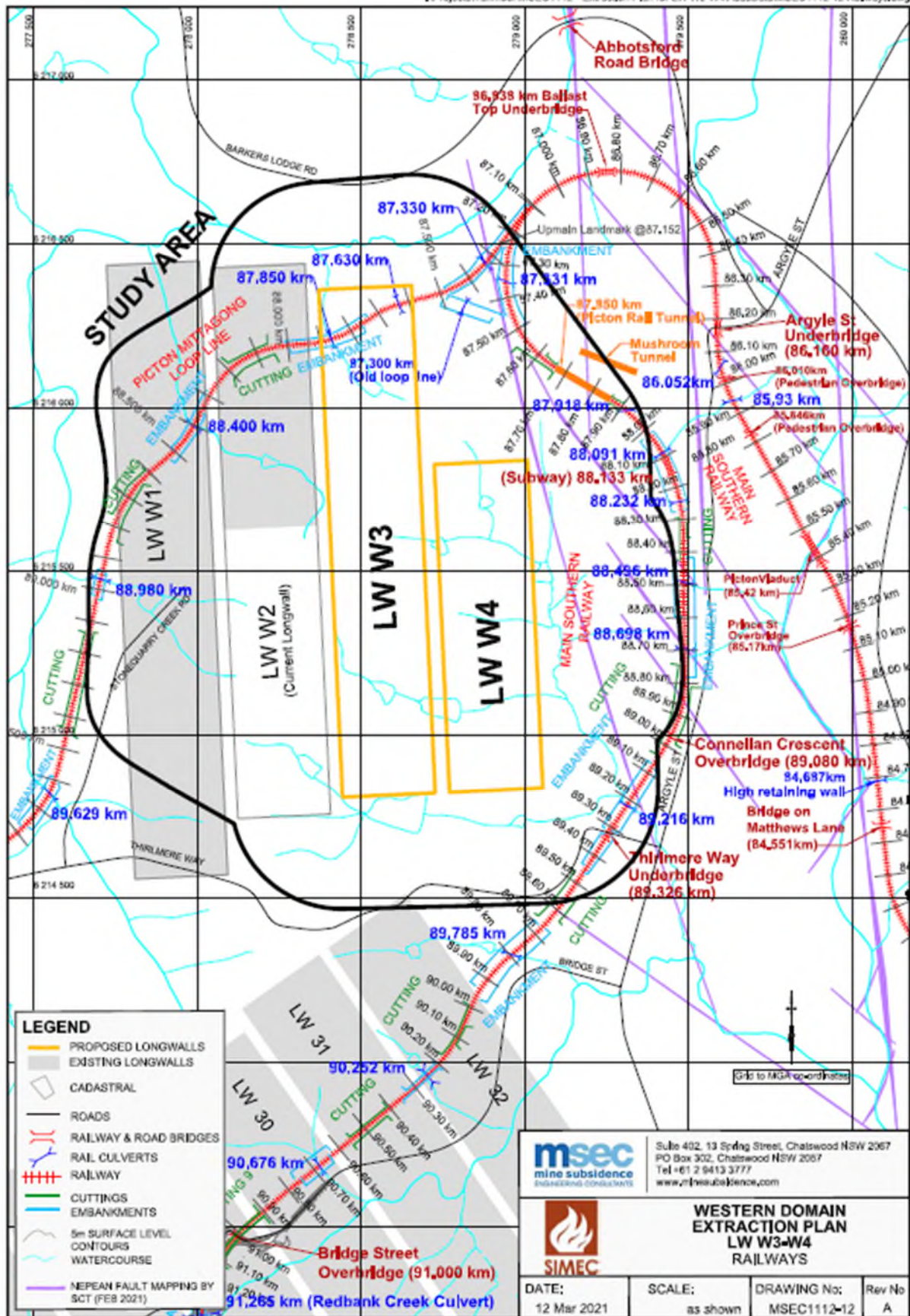


Figure 3-1 Railway Infrastructure and LW W3-W4 Extraction Plan Study Area (MSEC, 2021)

3.3 Local Roads

The main road in the local area is Thirlmere Way which connects Thirlmere and Picton. Thirlmere Way crosses the southern end of the Study Area.

The local roads within the Study Area include Stonequarry Creek Road, Carramar Close, Attunga Close and Booyong Close, which are partially located above the southern end of LW W1. Barkers Lodge Road crosses the northern end of the Study Area. Rumker Street, Connellan Crescent and Star Street are located adjacent to LW W4.

The local roads are maintained by WSC. The locations of public roads within the Study Area are shown in **Figure 3-2**.

There is extensive experience of mining directly beneath local roads in the Southern Coalfield which indicates that impacts can be managed with the implementation of suitable management strategies. In all cases the local roads have remained in safe and serviceable condition and have been remediated using normal road maintenance techniques. This includes the mining of LW W1 directly beneath local roads.

Tahmoor Mine have mined directly beneath more than 28 km of local roads and a total of 52 impact sites have been observed. The observed rate of impact on the local roads equates to an average of one impact for every 540 m of pavement. In most cases, the impacts were relatively minor and were remediated by locally resurfacing the pavements.

The most severe impacts were located where substantial non-conventional movements had developed. These impact sites were identified using visual and ground monitoring and remediation was undertaken during active subsidence to maintain these roads in safe and serviceable conditions.

Impacts have also been observed to concrete kerbs, gutters and drainage pits. The impacts are most commonly focussed around driveway laybacks and involve cracking, spalling or buckling.

Minor impacts were observed to local roads above LW W1. The impacts included cracking in isolated locations, particularly where local roads had been constructed over natural creek lines. Impacts also occurred to concrete kerbs, particularly where stormwater drains had been retrofitted after the kerbs had been formed. Impacts were also observed to the covers of some stormwater drains that are located directly above natural creek lines.

Tahmoor Coal and WSC have developed and acted in accordance with an agreed risk management plan to manage potential impacts to local roads during the mining of LW22 to LW32 and LW W1-W2. The management plan provides for ground and visual monitoring of road pavements. If impacts occur to the road network, WSC is able to quickly repair the pavement, if required.

Tahmoor Coal will develop a subsidence management plan in consultation with WSC prior to the influence of LW W3, to ensure the safe and serviceable operation of local roads during and after the mining of LW W3-W4.



Figure 3-2 Public Roads and LW W3-W4 Extraction Plan Study Area (MSEC, 2021)

3.4 State Roads

While there are no TfNSW assets in the immediate vicinity of LW W3-W4, there are two TfNSW assets within 5 times the seam depth (i.e. 2.5 km) of the longwalls:

- Victoria Bridge, Picton; and
- Menangle Street / Picton Road from the intersection at Argyle Street to approximately 1 km to the east of the intersection of Picton Road and Matthews Lane.

The Victoria Bridge over Stonequarry Creek is located approximately 980 m east of LW W3 and 700 m east of LW W4. Menangle Street – Picton Road is located approximately 1,180 m east of LW W3, and 1,040 m east of LW W4 at its closest point. **Figure 3-3** shows the locations of these assets and their distance from LW W4.

The potential for impacts on key civil infrastructure was identified early as a constraint in the mine planning phase. Key elements of the mine plan in the Western Domain included setting back longwalls at appropriate distances from critical civil structures such as Victoria Road Bridge over Stonequarry Creek such that it would be feasible to maintain safety and serviceability.

Both TfNSW assets are not predicted to experience valley closure and upsidence movements. However, Victoria Bridge may experience absolute and differential far field horizontal movements and may be adversely affected.

Tahmoor Coal has installed a far-field monitoring survey network, which includes two pegs on Victoria Road Bridge as this structure spans the surface expression of the Nepean Fault over Stonequarry Creek.

Survey marks were also installed on the bridge at the abutments on both sides and at the tops and bases of the piers. No measurable changes in horizontal distances were observed between the abutments during the mining of LW 32 to LW W1.

Tahmoor Coal and TfNSW have prepared a management plan to manage potential impacts to TfNSW assets so that they remain safe and serviceable during and after mining of LW W1-W2. The management plan will be updated for LW W3-W4 prior to influence of LW W3, to ensure the safe and serviceable operation of Victoria Bridge during and after the mining of LW W3-W4.

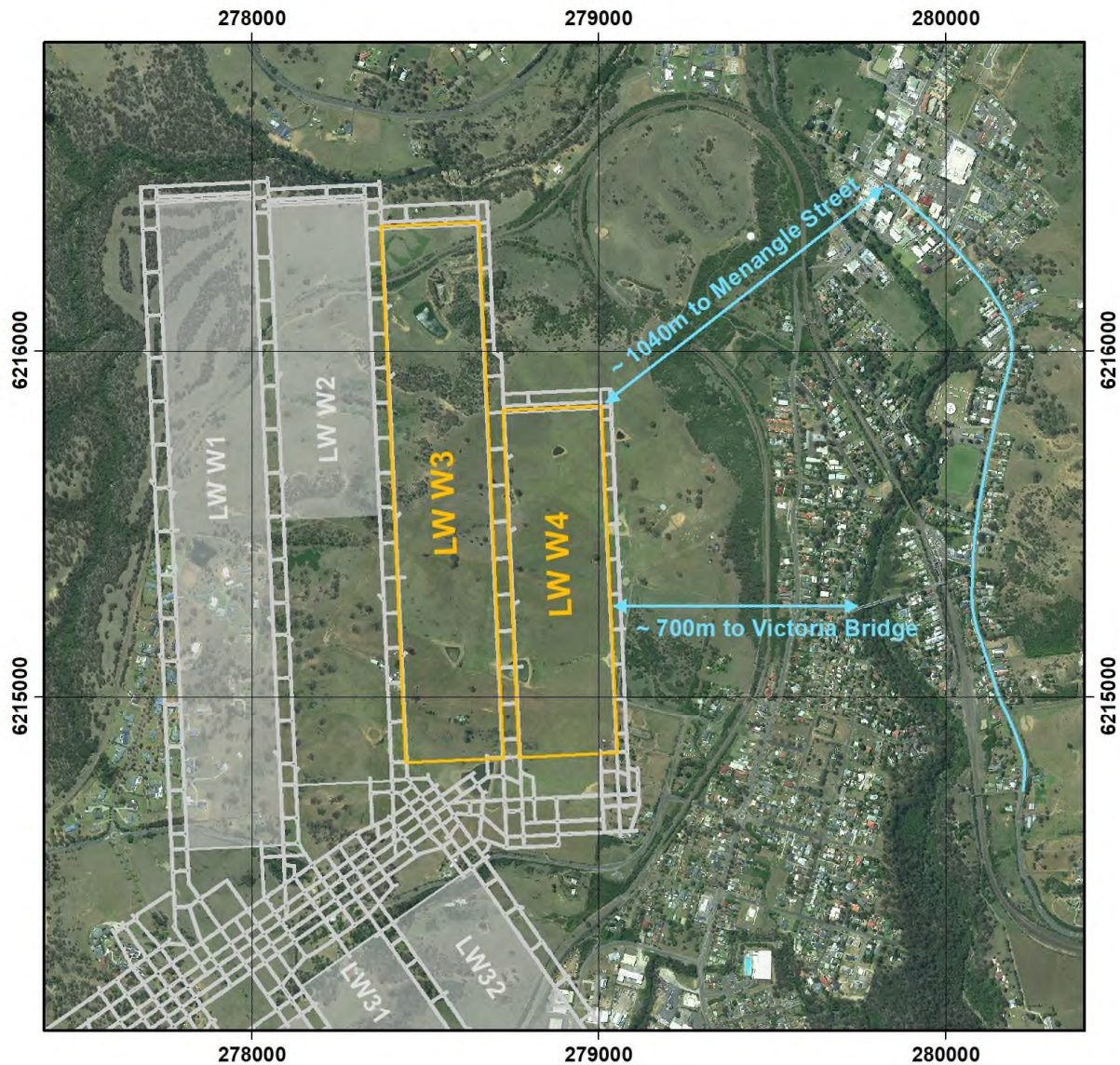


Figure 3-3 TfNSW Infrastructure near Longwalls West 3 and West 4

3.5 Potable Water Infrastructure

LW W3-W4 will not mine directly beneath the potable water infrastructure.

The potable water infrastructure within the Study Area comprises buried 100 mm and 180 mm uPVC pipelines along Thirlmere Way, Stonequarry Creek Road, Attunga Close, Booyong Close and Carramar Close. Some pipelines are located above the southern end of previously extracted LW W1. 100 mm diameter uPVC pipelines are also located to the east of LW W4 at Connellan Crescent and Thirlmere Way.

The total length of potable water pipelines within the Study Area is approximately 1.3 km.

The potable water infrastructure is owned by Sydney Water. The locations of the potable water infrastructure within the Study Area are shown in **Figure 3-4**.

Tahmoor Coal have directly mined beneath approximately 25 km of potable water pipelines during the mining of LW22 to LW32. These pipelines comprise older Ductile Iron Concrete Lined (DICL) and Cast Iron Concrete Lined (CICL) pipelines. The extraction of longwalls beneath these pipelines at Tahmoor has only resulted in minor impacts. Water leaks were repaired by Sydney Water using normal response procedures. The newer unplasticised polyvinyl chloride (uPVC) pipelines located within the Study Area are expected to be less susceptible to impacts from mine subsidence than the DICL and CICL pipelines located above the previously extracted longwalls.

LW W1 mined directly beneath potable water pipelines. A minor leak was observed the end of Carramar Close, which was promptly repaired by Sydney Water. Whilst minor additional impacts may occur at these locations during the LW W2, it is unlikely that further additional impacts will occur during the mining of the proposed LW W3-W4.

The proposed LW W3-W4 will extract adjacent to but directly beneath potable water infrastructure to the east. The likelihood of impacts to the pipelines is considered to be very low. If impacts occur, they are more likely to develop where of non-conventional ground movements are identified, including at the tributary crossings due to the valley-related effects. Any impacts are expected to be of a minor nature that could be readily repaired.

Tahmoor Coal and Sydney Water have developed and acted in accordance with an agreed risk management plan to manage potential impacts to local roads during the mining of LW22 to LW32 and LW W1-W2. The management plan provides for ground and visual monitoring of local roads. If impacts occur to the potable water network, Sydney Water is able to quickly repair the pipework.

The management plan will be updated for LW W3-W4 prior to influence of LW W3, to ensure the safe and serviceable operation of potable water infrastructure during and after the mining of LW W3-W4.

3.6 Sewerage Infrastructure

Sewerage infrastructure are located within the Study Area.

Sewerage infrastructure within Stonequarry Estate is managed by Stonequarry Estate and sewerage infrastructure within the Picton township to the east of the proposed LW W3-W4 is managed by Sydney Water. There are also septic tanks located on some properties within the LW W3-W4 Study Area.

3.6.1 Stonequarry Estate sewerage infrastructure

A WTP, Re-Use Water Storage Pond and associated pumping stations and pipework at Stonequarry Estate are located within the Study Area. The WTP and Re-Use Water Storage Pond are located directly above LW W3, as shown in **Figure 3-4**.

The Stonequarry Estate sewerage infrastructure was constructed between 2002 and 2005 and the design was approved by the Mine Subsidence Board (now SA NSW).

LW W1 has mined directly beneath the Stonequarry Estate gravity and rising main sewer pipelines with no impacts observed.

Pipelines

Tahmoor Coal, in consultation with Sydney Water, has successfully mined beneath approximately 30.5 km of sewer pipes at Tahmoor and Thirlmere during the mining of LWs 22 to 32. The sewerage infrastructure at Tahmoor and Thirlmere are mainly gravity sewers with some rising mains and the pipework consists mainly of PVC pipes. The experiences during the mining of LWs 22 to 32 have been used to assess potential impacts on sewer pipes within the Stonequarry Estate.

As the proposed LW W3-W4 are located more than 300 metres away from the sewer pipes, it is very unlikely that the extraction of LW W3-W4 will result in damage to the sewer pipes. Impacts may occur during the extraction of LW W2 and if this occurs, additional impacts may develop during the extraction of LW W3. In this situation, Tahmoor Coal would review and update risk controls within the Stonequarry Estate subsidence management plan to ensure the safe and serviceable operation during mining.

Pumping Stations

Pumping Station 2 and Overflow Storage Tanks are located above the western side of LW W1 and consist of buried reinforced concrete storage chambers, surrounded by an earth bund.

No impacts were observed to Pumping Station 2 and the Overflow Storage Tanks during the mining of LW W1. If impacts occur during the extraction of LW W2, it is possible that additional impacts could develop during the mining of LW W3.

If cracking occurs, the pumping rate can be increased to reduce the depth of sewage in the chamber. The cracks can also be repaired by patching. Horizontal struts can also be installed across the chamber if required.

The pumping station would be temporarily offline if repairs are required. Sewage collected by the chamber can be manually collected by tanker truck and transported directly to the WTP.

Wastewater Treatment Plant (WTP)

The WTP consists of a series of partially buried reinforced 2.4 metre deep concrete tanks, the largest of which are 8.4 metres in diameter. The tanks are founded on a 150 mm deep sand bed and backfilled with compacted soil material. Effluent is treated in series, which are connected by above-ground pipework with flexible joints. Treated effluent is used for irrigation and stored in the Re-Use Storage Pond. An earth bund is located within the WTP compound to trap effluent in the event of leakage within the WTP system.

The WTP is powered by its own electrical substation, which is connected to Endeavour Energy's network via Barkers Lodge Road.

Whilst the WTP has been designed to tolerate mine subsidence movements, it is possible that the WTP could experience impacts during the extraction of LW W3. Potential impacts including cracking to the tanks, damage to pipework and connections, damage to cabling, damage to the earth bund, damage to the control shed and damage to fencing and gates.

The potential impacts and flow-on consequences of leakage has been reduced substantially by the design of the WTP and overall sewerage system. This includes the selection of tanks that are relatively small in size, interconnecting pipework with flexible joints and are above ground, above ground cabling and flexible nature of the earth bund.

In the unlikely event that a tank becomes cracked and leaks as a result of mine subsidence, it is possible to temporarily isolate and repair the tank whilst continuing to operate the WTP. It is possible to temporarily operate the WTP without one large or one small tank if required.

In the worst case scenario where the WTP experiences severe damage in multiple locations and must be temporarily shut down for repairs, sewage can be stored at Pumping Station 2 and the Overflow Storage Tanks and transported by tanker truck to Sydney Water's Campbelltown Sewage Treatment Plant in accordance with arrangements already in place by Stonequarry Estate and a private contractor.

Re-Use Water Storage Pond

The pond consists of engineered earthworks with relatively shallow batter slopes of 1 in 3 to 1 in 4. The pond has been designed in accordance with SA NSW (formerly Mine Subsidence Board) requirements and was constructed between 2003 and 2005. A 300 mm thick clay liner has been included in the design along the floor of the dam and along the inside face of the dam wall.

The pond was inspected by geotechnical engineer Douglas Partners, who advised that the dam wall was in good condition with grass covered batters and relatively flat batter slopes. No signs of instability in the embankment or toe were observed.

There is extensive experience of mining directly beneath farm dams in the Southern Coalfield, which indicates that the incidence of impacts on these features is very low. Farm dams are commonly constructed with cohesive materials in the bases and walls which can absorb the conventional subsidence movements typically experienced in the Southern Coalfield without the development of substantial cracking. Non-conventional movements can result in localised cracking and deformations at the surface and, where coincident with farm dams, could result in adverse impacts.

Tahmoor Coal has mined LW 22 to LW 31 beneath a total of 103 dams with no impacts on public safety. This includes some large wastewater treatment dams above Longwall 24A and a large wastewater dam managed by Sydney Water to the side of LW 32.

Management of potential impacts

Tahmoor Coal and Stonequarry Estate have developed a subsidence management plan to manage potential impacts on the sewerage infrastructure, including the pipework, pumping stations, WTP and Re-Use Water Storage Pond during the extraction of LW W1-W2. Risk controls include ground surveys, structure surveys and visual inspections. Survey marks were placed on and around the structures at the WTP and Re-Use Water Storage Pond prior to the commencement of LW W2.

The infrastructure can be repaired as contingency plans are in place to repair impacts if they occur.

The management plan will be updated for LW W3-W4 prior to influence of LW W3, to ensure the safe and serviceable operation of Stonequarry Estate sewerage infrastructure during and after the mining of LW W3-W4.

3.6.2 Sydney Water sewerage infrastructure

LW W3-W4 will not mine directly beneath the Sydney Water sewerage infrastructure. The sewerage infrastructure comprises buried 100 mm and 150 mm diameter PVC pipelines along Thirlmere Way, alongside the MSR corridor and behind properties on Hill Street. The locations of the Sydney Water sewerage infrastructure within the Study Area are shown in **Figure 3-4**.

Tahmoor Coal, in consultation with Sydney Water, has successfully mined beneath approximately 30.5 km of sewer pipes at Tahmoor and Thirlmere during the mining of LWs 22 to 32. The sewerage infrastructure at Tahmoor and Thirlmere are mainly gravity sewers with some rising mains and the pipework consists mainly of PVC pipes. No impacts have been observed to Sydney Water sewerage infrastructure when it has been located beyond the longwall footprint.

Given that the infrastructure is located at the outer margins of the Study Area and is predicted to experience very minor subsidence movements, the likelihood of impacts to the sewerage infrastructure is considered to be very low. Any impacts are expected to be of a minor nature that could be readily repaired.

Tahmoor Coal and Sydney Water have developed and acted in accordance with agreed risk management plans to manage potential impacts to sewerage infrastructure during the mining of LW22 to LW32. A management plan will be developed and implemented prior to the extraction of LW W4, to ensure the safe and serviceable operation of Sydney Water sewerage infrastructure during and after the mining of LW W4. The management plan would include ground surveys and visual inspections along the MSR, Thirlmere Way and Connellan Crescent.

3.6.3 Septic Tanks

Septic tanks are located on a number of properties within the LW W3-W4 Study Area.

Given that tanks are quite small (usually less than 3 m in diameter), constructed of reinforced concrete and are usually bedded in sand and backfilled, the likelihood of cracking to septic tanks is assessed as low.

It is noted that no impacts to septic tanks have been reported during the mining of Longwalls 22 to 32.

Pipe joints are usually flexible and consist of relatively short lengths, due to the proximity of septic tanks to houses. However, given that both the house and septic tank are effective ground anchors, it is possible that pipe joints can pull out or shear as a result of subsidence. SA NSW reports that this has been observed in a small number of cases during the mining of Longwalls 22 to 32. This impact is relatively easy to repair. SA NSW also report that on two occasions during the mining of

Longwalls 22 to 26, the grade of the sewer pipe to the septic tank had been reversed. The impacts are considered to have been partially due to very low pre-mining grades. In both cases, the repairs were straightforward, where the pipes were re-laid at an improved fall, entering the septic tank at a slightly lower level.

Tahmoor Coal developed a subsidence management plan to manage potential impacts on all built structures during the extraction of LW W1-W2. The management plan will be updated for LW W3-W4 prior to influence of LW W3, to ensure the safe and serviceable operation of septic tanks during and after the mining of LW W3-W4.

3.7 Gas Infrastructure

No gas pipelines are located directly above LW W3 W4. The gas infrastructure comprises buried 32 mm, 50 mm and 75 mm nylon pipelines along Thirlmere Way, Stonequarry Creek Road, Attunga Close, Booyong Close and Carramar Close. Some of these pipelines are located above the southern end of the previously mined LW W1. The total length of gas pipelines within the Study Area is approximately 1 km. The locations of the gas infrastructure within the Study Area are shown in **Figure 3-5**.

The gas infrastructure is owned by Jemena.

LW22 to LW32 at Tahmoor Coal have directly mined beneath approximately 19 km of gas pipelines and no adverse impacts have been recorded to date. The nylon pipelines are very flexible and have demonstrated that they are able to withstand the full range of subsidence experienced during longwall extraction at Tahmoor Coal. While no impacts have been experienced to date, it is acknowledged that the most vulnerable element of the system is the rigid copper pipe connections between the gas mains and the houses, which can be readily repaired.

A low-level gas leak has been detected on 16 March 2021 near the intersection of Stonequarry Creek Road and Carramar Close. It is unlikely to be mining related from the mining of LW W1 but will be confirmed when it is repaired. Weekly checks will be carried out until Jemena repair the leak in the next fortnight.

Tahmoor Coal and Jemena have developed and acted in accordance with an agreed risk management plan to manage potential impacts to gas infrastructure during the mining of LW22 to LW32 and LW W1-W2. The management plan includes ground and visual monitoring including the use of hand-held gas detection devices, and planned responses if triggered by observations of increased ground strains, ground curvature or localised surface deformations. Jemena inspectors have also conducted targeted regular inspections if triggered by monitoring results during the mining of LW24A, LW25, LW31 and LW32.

If the conditions are considered sufficient to potentially damage a section of pipe, Jemena is able to quickly uncover the pipe section, inspect the pipe for signs of stress and, if required, isolate the pipe section at short notice and repair.

The management plan will be updated for LW W3-W4 prior to influence of LW W3, to ensure the safe and serviceable operation of gas infrastructure during and after the mining of LW W3-W4.

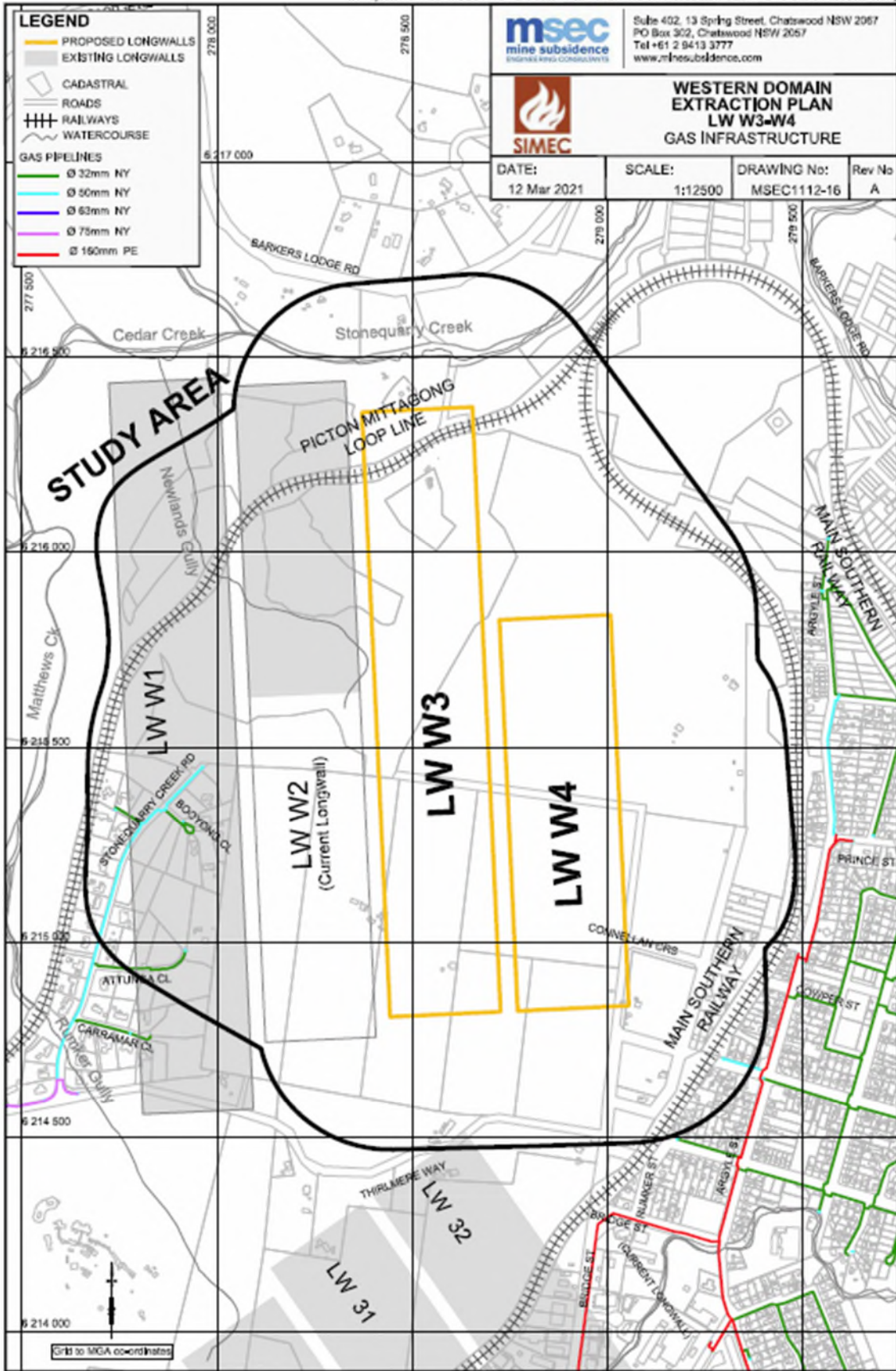


Figure 3-5 Gas Infrastructure and LW W3-W4 Extraction Plan Study Area (MSEC, 2021)

3.8 Electrical Infrastructure

The electrical infrastructure comprises 11 kilovolt (kV) and low voltage powerlines that generally follow the local roads. The powerlines are located above the southern ends of LW W1-W2 and the northern end of LW W3. The total length of powerlines located above the longwalls is approximately 300 m. The total length of powerlines within the Study Area is approximately 7.3 km.

The 11 kV powerline along Thirlmere Way and the section of the low voltage powerline above the southern end of LW W2 comprise aerial conductors supported by timber poles. The powerlines along Stonequarry Creek Road, Attunga Close, Booyong Close and Carramar Close are buried.

The electrical infrastructure is owned by Endeavour Energy. The locations of the electrical infrastructure within the Study Area are shown in **Figure 3-6**.

LW22 to LW32 at Tahmoor Coal have directly mined beneath approximately 44 km of electrical cables and 1,100 power poles and no significant impacts have been recorded and there were no significant adverse impacts. However, tension adjustments have been made by Endeavour Energy to some aerial services connections to houses. This is understandable as the overhead cables are typically pulled tight between each house and power pole.

LW W1 has mined directly beneath the Stonequarry Estate buried powerlines with no impacts observed.

While the experience at Tahmoor Coal has been relatively benign, Endeavour Energy has been required to adjust power pole tilts and catenaries as a result of mine subsidence at other locations within the Southern Coalfield. This repair work is more substantial but the frequency of such impacts is very low.

The past experiences demonstrate that there have only been minor impacts on aerial powerlines that have been directly mined beneath by previously extracted longwalls in the Southern Coalfield. Some remedial measures were required, which included adjustments to cable catenaries, pole tilts and to consumer cables which connect between the powerlines and houses. The incidence of these impacts was very low.

There is less experience of mining beneath buried powerlines in the Southern Coalfield. However, there is extensive experience of mining beneath buried copper telecommunications cables, as discussed in **Section 3.9**. This experience indicates that the likelihood of impacts on buried copper cables is also low.

Tahmoor Coal and Endeavour Energy have developed and acted in accordance with an agreed risk management plan to manage potential impacts to electrical infrastructure during the mining of LW22 to LW32 and LW W1-W2. The management plan provides for ground and visual monitoring including specific surveys of critical power poles that have been identified within the network by Endeavour Energy.

The management plan also provides for planned responses if triggered by observations of impacts. If impacts occur to the network, Endeavour Energy is able to quickly make adjustments and restore power, where required.

The management plan will be updated for LW W3-W4 prior to influence of LW W3, to ensure the safe and serviceable operation of electrical infrastructure during and after the mining of LW W3-W4.

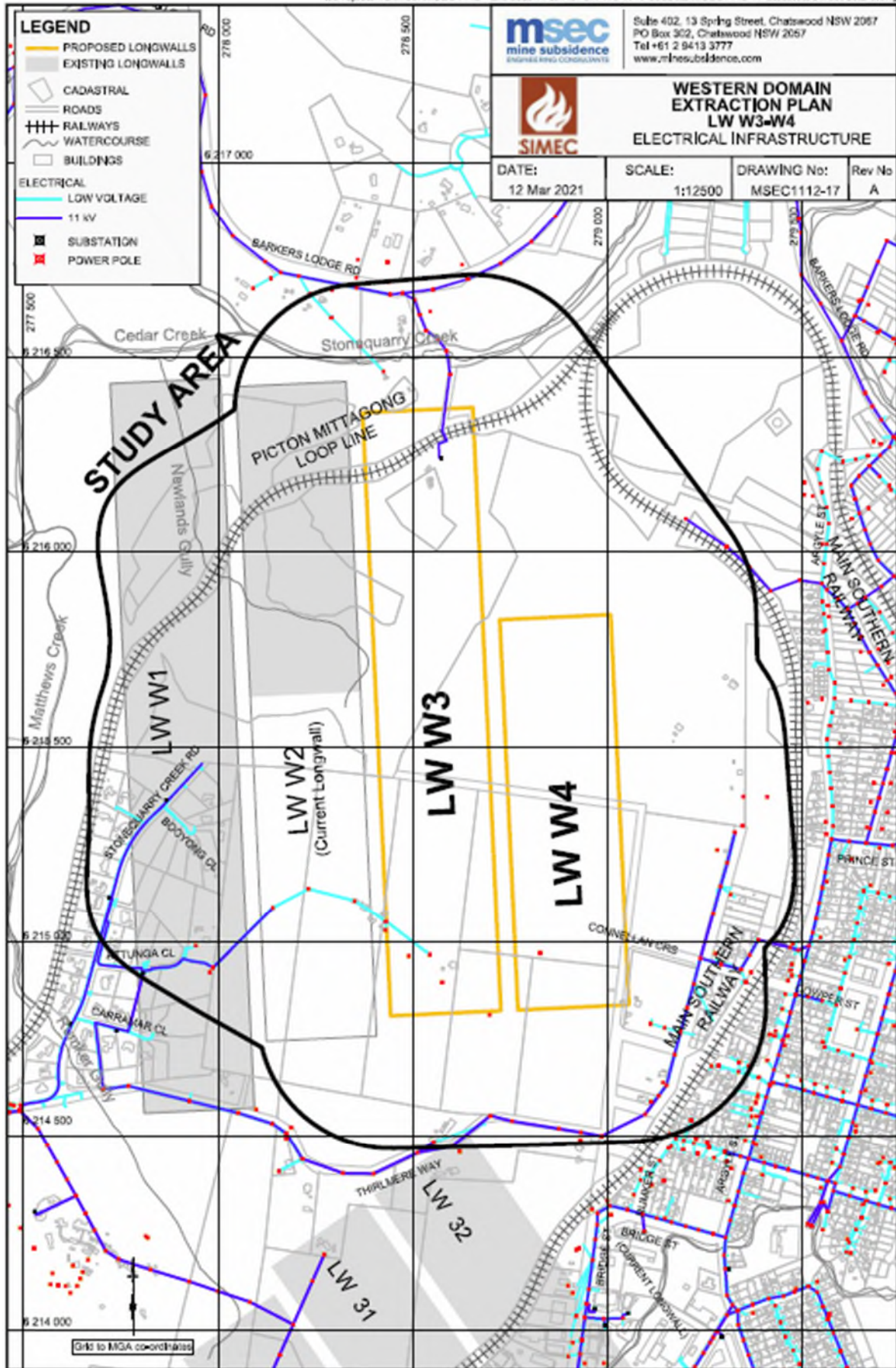


Figure 3-6 Electrical Infrastructure and LW W3-W4 Extraction Plan Study Area (MSEC, 2021)

3.9 Telecommunications Infrastructure

The telecommunications infrastructure comprises buried optical fibre cables and copper telecommunications cables that generally follow the local roads. NBN copper cables are located above the finishing (i.e. southern) ends of LW W3-W4. There are no optical fibre telecommunications cables located above the proposed longwalls.

The total length of copper cables located above the longwalls is approximately 0.9 km. The optical fibre cables are owned by Telstra and NBN Co. and the copper telecommunications cables are owned by Telstra. The locations of the telecommunications infrastructure within the Study Area are shown in **Figure 3-7**. The optical fibre cables cross three small creek crossings, where non-conventional valley closure movements and increased compressive strains may develop.

Longwalls 22 to 32 at Tahmoor Coal have directly mined beneath approximately 43.1 km of buried copper cable and 4.5 km of buried optical fibre cable and 6.5 km of aerial cable and no impacts have been recorded to telecommunications services so far.

Adjustments to tension of aerial telecommunications cables were required during the mining of Longwall 26 on Tahmoor Road and Krista Place. Damage was also observed to a conduit on the north-western abutment of the Castlereagh St Bridge. No issues were detected during the mining of Longwalls 27 to 31.

Tahmoor Coal and Telstra have developed and acted in accordance with an agreed risk management plan to manage potential impacts to Telstra telecommunications infrastructure during the mining of LW22 to LW32 and LW W1-W2. The management plan provides for ground and visual monitoring, which includes detailed inspections of pits and cables prior to, during and after mining, and Optical Time Domain Reflectometry (OTDR), which can be used to notify the infrastructure owners of strain concentrations due to non-conventional ground movements or valley related effects on optical fibre cables.

Tahmoor Coal also developed a plan to manage potential impacts on NBN infrastructure so that they remain safe and serviceable during and after mining. Tahmoor Coal communicated with NBN on numerous occasions to facilitate the review of the plan by NBN. However, the management plan for NBN Infrastructure remains unsigned. The Telstra and NBN Management Plans will be updated for LW W3-W4 prior to influence of LW W3, to ensure the safe and serviceable operation of telecommunications infrastructure during and after the mining of LW W3-W4. A ground survey line be installed along the Telstra / NBN Co. optical fibre cables beyond the southern ends of LW W2-W4, particularly where they cross the creeks.

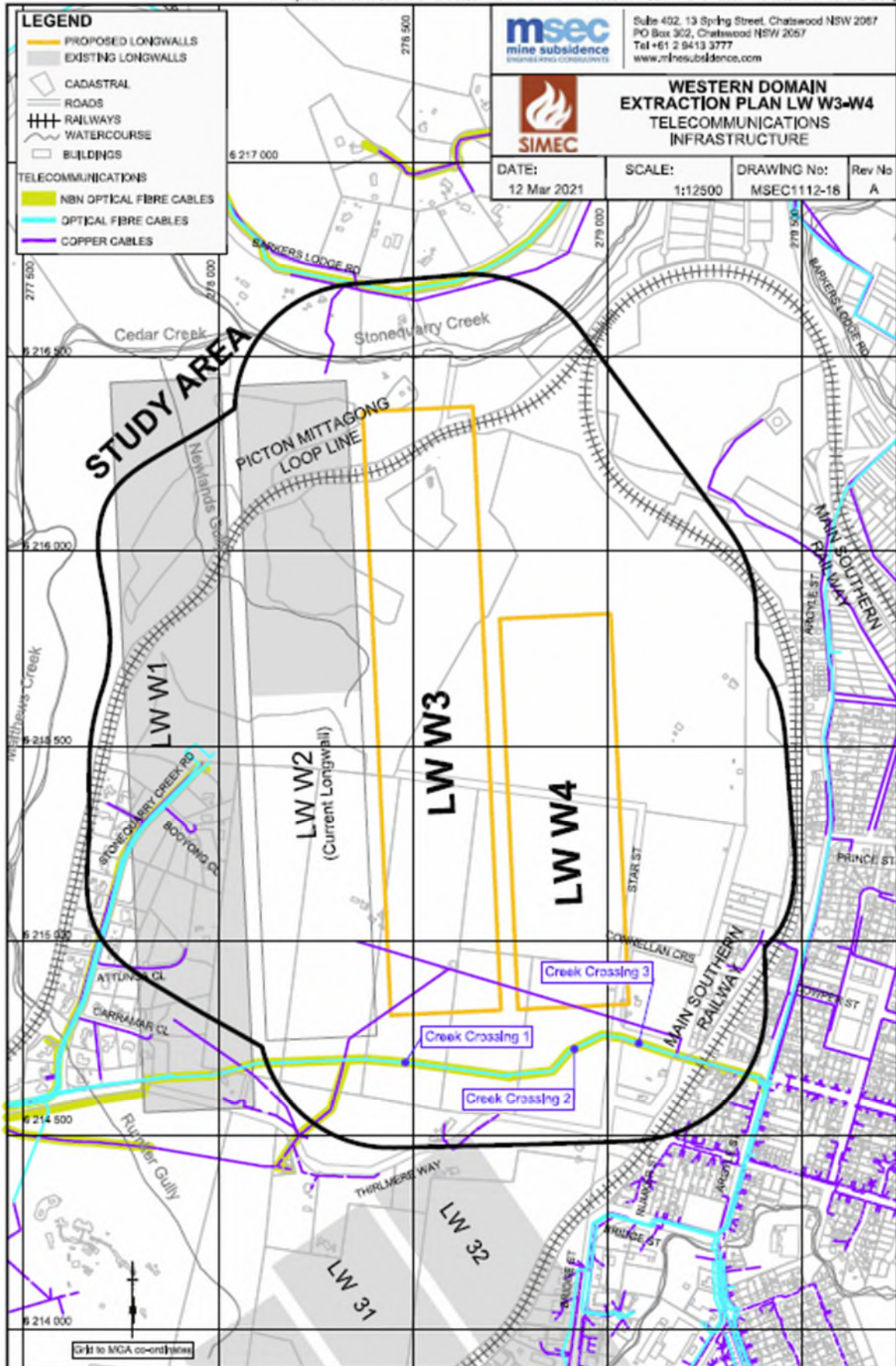


Figure 3-7 Telecommunications Infrastructure and LW W3-W4 Extraction Plan Study Area (MSEC, 2021)

3.10 Public Amenities

The locations of the public amenities within the Study Area are shown in **Figure 3-8**.

There are no public amenities located within the Study Area. The Queen Victoria Memorial Home (Property Ref. V04) is located to the southwest of LW W3. The structures are at a minimum distance of approximately 880 metres.

3.11 Structures

A total of 69 houses, 15 swimming pools and 196 associated sheds and other rural and residential structures have been identified within the Study Area. The locations of the structures within the Study Area are shown in **Figure 3-8**.

There is one house located directly above LW W3 and no houses located directly above LW W4. The house above LW W3 is derelict and not habitable. The houses located within the Study Area and outside of the proposed longwalls are predominately located within the Stonequarry Estate, directly above the previously extracted LW W1, and between LW W1 and the PMLL. The main township of Picton is located to the east of the Study Area. A small number of houses are located to the south-east of LW W4.

Detailed predictions and a probabilistic assessment of potential impacts on houses are provided in the Subsidence Predictions and Impact Assessment Report for LW W3-W4 (**Appendix A in Volume 1**).

The primary risk associated with mining beneath structures is public safety. Historically, residents have not been exposed to immediate and sudden safety hazards as a result of impacts that occur due to mine subsidence movements in the NSW Coalfields with longwall mining techniques, where the depths of cover were greater than 350 m, such as the case above the proposed longwalls. This includes the recent experience at Tahmoor during the longwall mining of LWs 22 to 32 and LW W1, with more than 2,000 houses and civil structures in the subsidence area.

Emphasis is placed on the words “immediate and sudden” as in rare cases, some structures have experienced severe impacts, but the impacts did not present an immediate risk to public safety as they developed gradually with ample time to relocate residents.

The existing condition of structures varies within the Study Area. This is a function of age, structural design, construction workmanship and maintenance. Pre-mining hazard identification inspections undertaken by Tahmoor Coal have identified elements of structures that did not appear to comply fully with Australian Standards, in regard to design and construction. In a small number of previous cases prior to the extraction of previous longwalls, the existing structural condition has been considered potentially unsafe and Tahmoor Coal has undertaken measures to repair the defect.

There is a remote possibility that the comparatively small additional contribution of mine subsidence movements could be sufficient to result in the structures that do not meet Australian Standards to become potentially unstable.

Tahmoor Coal will continue its current practice of ensuring that built structures remain safe and serviceable at all times during mining. In consultation with landowners, Tahmoor Coal have studied the potential for impacts on the structures and other infrastructure and have developed management measures. The study includes input from structural and subsidence engineers. The

risk management process has been implemented through a four-staged process, as described in **Section 3.11.1.**

3.11.1 Structures Risk Management Process

Stage One

Regular consultation with the community before, during and after mining. This includes letters and door knocking to all residents of structures that will be potentially affected by subsidence. The letters offer a free pre-mining inspection and hazard identification inspection by a structural engineer. A Community Information Booklet is given to all property owners which includes an explanation of mining and the compensation claims process.

Stage Two

Site-specific investigations, where they are necessary and appropriate, into the conditions of buildings and associated structures and their surrounding environment (where access is allowed). The site-specific investigations have been and will continue to be undertaken early so that there is adequate time, if required, to arrange additional inspections and/or surveys and implement any mitigation measures before mining-induced impacts are experienced.

For properties located directly above the first 300 m of the commencing end of a longwall, the investigations are targeted to be undertaken prior to extraction or at the latest, they will be undertaken prior to the first 200 m of extraction of the longwall.

The site-specific investigations include the following:

- Identification of structures from aerial photographs and kerbside inspections;
- Front of house risk and visual screening inspections by Tahmoor Coal in company with a structural engineer for all properties that are predicted to experience more than 20 mm of incremental vertical subsidence due to the extraction of each upcoming longwall. The purpose of the inspections is to identify hazards where access has not been granted by the landowner. In some cases, particularly in semi-rural and rural areas, it is difficult to inspect a structure that is remote from the street front. Where these cases involve properties that are located directly above a longwall, Tahmoor Coal has requested access to conduct a pre-mining inspection and hazard identification inspection by a structural engineer;
- Tahmoor Coal will request access to conduct pre-mining geotechnical inspections of structures located on or immediately adjacent to steep slopes that are predicted to experience more than 20 mm of incremental vertical subsidence due to the extraction of each longwall;
- Tahmoor Coal will request access to conduct pre-mining hazard identification inspections by a structural engineer (where access is allowed by the landowner) to properties with structures that have been specifically targeted on the basis that may be more sensitive to mine subsidence movements. These include:
 - Commercial and business establishments, public amenities and public utilities;
 - Structures of heritage significance;
 - Structures that are located above hidden creeks;
 - Structures that are located above mapped geological structures;
 - Structures that are located on or adjacent to steep slopes or that have been recommended for structural inspection by the geotechnical engineer;
 - Structures that have been identified as being potentially unstable or unsafe by landowners (Stage One), or from the front of house inspections (Stage Two);
 - Houses and units located outside the declared Mine Subsidence Districts; and

- Houses and units estimated to have been constructed prior to the declaration of the Picton Mine Subsidence District as originally declared in 1997 or if outside the original declared boundary, prior to the declaration of the current boundary in 2017.

Stage Three

Implementation of pre-mining mitigation measures following inspections by the geotechnical engineer and the structural engineer, in consultation and agreement with the landowner.

Stage Four

Surveys and inspections during mining within the active subsidence area:

- Detailed visual inspections and vehicle-based inspections along the streets;
- Ground surveys along the streets;
- Specific ground surveys for selected properties, where recommended by the geotechnical engineer or structural engineer due to their proximity to steep slopes or pre-existing condition;
- Visual inspections of residential structures that are either located on or adjacent to steep slopes, are in poor existing condition (based on the hazard identification inspections), have previously reported impacts, or where recommended by the Structures Response Group;
- Visual inspections of pool fences and gates; and
- Visual inspections of commercial, industrial and business establishments, public amenities and public utilities.

Regular updates are given to landholders pre-mining, during mining and post mining to ensure landholders are aware of the status of the longwall in relation to their property and the process of lodging a claim if required.

3.11.2 Current Status

Front of house risk and visual screening inspections have been completed by Tahmoor Coal in company with a structural engineer for structures within the Study Area. The majority of houses within the Study Area have accepted the offer to conduct a pre-mining inspection and hazard identification inspection by a structural engineer.

The Built Structure Management Plan for LW W1-W2 provides for additional visual inspections and ground surveys in the event that increased subsidence is observed. This includes pre-mining checks of structures within the affected area, daily visual inspections during active subsidence and weekly ground surveys along streets. Tahmoor Coal also consults with Subsidence Advisory NSW to determine whether additional resources are required to assist with undertaking repairs to impacted structures.

The Built Structures Management Plan will be updated for LW W3-W4 prior to influence of LW W3, to ensure that built structures remain safe and serviceable during and after the mining of LW W3-W4.

3.12 Built Heritage Sites

The heritage sites within the Study Area were identified by a specialist heritage consultant and the detailed descriptions are provided in the Extraction Plan for LW W3-W4. The structures identified as having heritage significance within the Study Area are shown in **Figure 3-9**. There are also some

additional heritage relics and artefacts that are located within the Study Area which are also shown in **Figure 3-9**.

Potential impacts and planned risk controls for railway structures along the MSR were discussed in **Section 3.1**. Potential impacts and planned risk controls for railway structures along the PMLL were discussed in **Section 3.2**.

Tahmoor Coal has developed and acted in accordance with risk management plans to manage potential impacts on heritage structures during the mining of previous longwalls. The management plans include assessments by a structural engineer and heritage consultant, ground surveys and visual inspections. A management plan will be developed in consultation with the landowner and WSC to manage potential impacts on the Weatherboard Cottage at No. 796 Thirlmere Way prior to the influence of LW W4.



This information has been
retracted
- For more information
contact Tahmoor Coal

SIMEC

Level 28, 88 Phillip Street,
Sydney NSW 2000

Legal entity name goes here ABN: 00 000 000 000

T: +61 (0) 2 0000 0000

E: xxxxxxxx.xxxxxxx@simecgg.com

simec.com

MEMBER OF



3.13 Permanent Survey Marks

This section provides detailed information about how the risks associated with mining beneath survey infrastructure will be managed by Tahmoor Coal and the Department of Finance, Service and Innovation, Spatial Services Division.

Permanent Survey Marks are fundamental to spatial infrastructure. This includes Geographic Information Systems and databases that are the primary spatial management tools for all levels of Government. The loss of Permanent Survey Marks can adversely affect future upgrades to physical infrastructure such as road, rail, ports and greenfield developments, as well as the planning and management of other development or resource management projects that require a spatial component, such as urban renewal, mapping and environmental management.

Cadastral Reference Marks are fundamental to the definition and re-establishment of the cadastre. The loss of these marks and Permanent Survey Marks can significantly degrade the integrity and accuracy of the cadastre, and add to the costs of subsequent surveys.

Within NSW there are two main types of survey infrastructure, which are:

- State Control Marks; and
- Cadastral Marks.

Survey marks are used as control for:

- Cadastral or Property Boundary;
- Mine Baselines;
- Engineering Construction;
- Stability Monitoring;
- Imagery and LiDAR control;
- Coordinate Services Utility Information; and
- Flood study.

Spatial Services Division within NSW maintain the Survey Control Information Management System to provide the following functions:

- A database of Marks, their coordinates and other associated Metadata;
- The single point of truth for survey control in NSW; and
- Current datums are GDA94 & AHD71 moving to GDA2020 & AHD71.

Survey infrastructure is governed by *Surveying & Spatial Information Act 2002*. Under Section 24 of *Surveying & Spatial Information Act 2002* a person must not remove, damage, destroy, displace, obliterate or deface any survey mark unless authorised to do so by the Surveyor-General. An application is required under Clause 90 of the *Surveying and Spatial Information Regulation 2017* to remove survey marks under section 24 of the Act.

The Surveyor General Direction No. 11 (SGD11) – Preservation of Survey Infrastructure (POSI). In order to obtain authority from the Surveyor-General for the removal of any Permanent Survey Mark or Cadastral Reference Mark, SGD11 POSI process must be followed.

An application to remove, damage or replace Survey Marks affected by subsidence must be in accordance with the SGD11 POSI process.

Under SGD11 POSI process, Tahmoor Coal is responsible to ensure that all survey marks affected by subsidence are protected or that on completion of the works:

- The control survey should be of sufficient horizontal and vertical class to allow existing and/or replacement mark(s) to be coordinated to a similar standard as the mark(s) affected by the works; and
- Sufficient cadastral infrastructure is preserved or additional marks are placed with appropriate measurements to re-establish the cadastre at the accuracies specified in the *Surveying and Spatial Information Regulation 2017*.

The Clause 90 POSI application, generally consists of the following:

- A report outlining the strategy;
- A field audit of all survey marks;
- A project plan outlining the strategy and methodology for mark protection and reinstatement of survey infrastructure for the duration of the project, prior to commencement of any mining activity. The plan is to include a diagram or drawing showing the extent of the proposed works.

Agreement on following process:

- Future active longwalls require a Clause 90 POSI application to be submitted using *Application to Remove or Replace Survey Marks* form and following the *SGD11 POSI Procedure for Mining Projects*. A quarterly report to be provided to indicate the general survey mark movement; and
- Rehabilitation of survey marks post long term subsidence period (after at least 4 years post longwall) a further Clause 90 POSI application to be submitted to outline strategy for rehabilitation of survey marks.

4 Subsidence Monitoring Program

4.1 Performance Measures

Performance measures for built features are provided in Table 2 of Condition 13E of DA 67/98 (refer to **Section 2.1.1**). It is anticipated that the performance measures will be achieved during and after mining of LW W3-W4 through the implementation of the various Infrastructure Management Plans (refer to **Table 1-1**).

4.2 Monitoring Program

Tahmoor Coal has developed a Subsidence Monitoring Program, which is included in the Extraction Plan for LW W3-W4. The Subsidence Monitoring Program describes the inspection regimes, layout of monitoring points, parameters to be measured, monitoring methods and accuracy, timing and frequencies of surveys and inspections, and recording and reporting of monitoring results.

The Subsidence Monitoring Program is consistent with the monitoring commitments as described in the following plans, which are submitted as part of Tahmoor Coal's Extraction Plan for LW W3-W4:

- Tahmoor Coal – Water Management Plan for LW W3-W4, 2021;
- Tahmoor Coal – Land Management Plan for LW W3-W4, 2021;
- Tahmoor Coal – Biodiversity Management Plan for LW W3-W4, 2021;
- Tahmoor Coal – Heritage Management Plan for LW W3-W4, 2021;
- Tahmoor Coal – Built Features Management Plan for LW W3-W4, 2021; and
- Tahmoor Coal – Public Safety Management Plan for LW W3-W4, 2021.

The Subsidence Monitoring Program is consistent with detailed Infrastructure Management Plans, which has been developed by Tahmoor Coal in consultation with stakeholders prior to the influence of subsidence on each relevant feature. Each of these management plans describes measures that will be undertaken to monitor subsidence movements and physical changes and/or impacts that occur during mining. The management plans include:

- Tahmoor Coal – LW W3-W4 Management Plan for Potential Impacts to Wollondilly Shire Council Infrastructure, Report No. MSEC1173-02, 2021;
- Tahmoor Coal – LW W3-W4 Management Plan for Potential Impacts to Sydney Water Potable Water Infrastructure, Report No. MSEC1173-03, 2021;
- Tahmoor Coal – LW W3-W4 Management Plan for Potential Impacts to Sydney Water Sewerage Infrastructure, Report No. MSEC1173-09, 2021;
- Tahmoor Coal – LW W3-W4 Management Plan for Potential Impacts to Stonequarry Wastewater Treatment Plant, Report No. MSEC1173-04, 2021;
- Tahmoor Coal – LW W3-W4 Management Plan for Potential Impacts to Jemena Gas Infrastructure, Report No. MSEC1173-05, 2021;
- Tahmoor Coal – LW W3-W4 Management Plan for Potential Impacts to Endeavour Energy Infrastructure, Report No. MSEC1173-06, 2021;
- Tahmoor Coal – LW W3-W4 Management Plan for Potential Impacts to Transport for NSW Infrastructure, Report No. MSEC1173-18, 2021;

- Tahmoor Coal – LW W3-W4 Management Plan for Telstra Infrastructure, Comms Network Solutions, 2021;
- Tahmoor Coal – LW W3-W4 Management Plan for NBN Co Infrastructure, Comms Network Solutions, 2021;
- Tahmoor Coal – LW W3-W4 Management Plan for Potential Impacts to Built Structures, Report No. MSEC1173-12, 2021;
- Tahmoor Coal – LW W3-W4 Management Plan for Potential Impacts to Picton-Mittagong Loop Line, Report No. MSEC1168, 2021; and
- Tahmoor Coal – LW W3-W4 Management Plan for Potential Impacts to Main Southern Railway, Report No. MSEC1163, 2021.

5 Review and Improvement

This section of the BFMP describes the key elements of implementation relevant to built features. 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.

5.1 Reporting Requirements

Generic reporting requirements for the LW W3-W4 Extraction Plan are discussed in **Section 6.1** of the Extraction Plan Main Document. Specific reporting requirements will be described in the individual infrastructure management plans.

5.2 Review and Auditing

This BFMP can be reviewed and updated to continually improve the risk management systems based on audit, review and learnings from the development of subsidence during mining and manage changes in the nature, likelihood and consequence of subsidence hazards.

The review process will be conducted to achieve the following outcomes:

- Gain an improved understanding of subsidence hazards based on ongoing subsidence monitoring and reviews, additional investigations and assessments as necessary, ongoing verification of risk assessments previously conducted, ongoing verification of assumptions used during the subsidence hazard identification and risk assessment process, ongoing understanding of subsidence movements and identified geological structures at the mine;
- Revise risk control measures in response to an improved understanding of subsidence hazards;
- Gain feedback from stakeholders in relation to managing risks, including regular input from business or property owner;
- Ensure on-going detection of early warnings of changes from the results of risk assessments to facilitate corrective or proactive management actions or the commencement of emergency procedures in a timely manner; and
- Ensure timely implementation of a contingency plan in the event that the implemented risk control measures are not effective.

Some examples where review may be applied include:

- Observation of greater impacts on surface features due to mine subsidence than was previously expected;
- Observation of fewer impacts or no impacts on surface features due to mine subsidence than was previously expected; and
- Observation of significant variation between observed and predicted subsidence.

Should an audit of the BFMP be required during that period, an auditor shall be appointed by Tahmoor Coal to review the operation of the BFMP.

5.3 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 built features management measures identified for the extraction of LW W3-W4.

6 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.

6.1 References

Department of Planning and Environment (DPE) (2015), Draft Guidelines for the Preparation of Extraction Plans V5.

Douglas Partners (2021), Report on Geotechnical Assessment, Extraction Plan Longwall West 3 and West 4, prepared for Tahmoor Coal, March 2021, document 89541.03.R.001.Rev1.

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.

Hydro Engineering & Consulting (2021), Tahmoor Mine Extraction Plan LW W3-W4 – Surface Water Technical Report, prepared for Tahmoor Coal, May 2021, document J1809-10.r1d.

Mine Subsidence Engineering Consultants (2021), SIMEC Mining: 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.

NSW Department of Planning & Environment (2017), Resources Regulator, Mine Safety Operations.

SLR (2021), Tahmoor Extraction Plan LW W3-W4 Land and Agricultural Resource Assessment, prepared for Tahmoor Coal, May 2021, document 630.12732.001-R01-v1.0.

6.2 Glossary of Terms

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

6.3 Abbreviations

Abbreviations used in this document are provided below in **Table 6-1**.

Table 6-1 Abbreviations

| Abbreviation | Definition |
|--------------|---|
| ARTC | Australian Rail Track Corporation |
| BFMP | Built Features Management Plan |
| CICL | Cast Iron Concrete Lined |
| DICL | Ductile Iron Concrete Lined |
| DPE | NSW Department of Planning and Environment (now DPIE) |
| DPIE | NSW Department of Planning, Industry and Environment (formerly DPE) |
| km | Kilometre/s |
| kV | Kilovolt |
| LW | longwall |

| Abbreviation | Definition |
|---------------------|---|
| 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 |
| ML | Mining Lease |
| MSEC | Mine Subsidence Engineering Consultants |
| MSR | Main Southern Railway |
| NRSR | NSW Office of the National Rail Safety Regulator |
| NSW | New South Wales |
| OTDR | Optical Time Domain Reflectometry |
| PCBU | Persons conducting a business or undertaking |
| POSI | Preservation of Survey Infrastructure |
| PSMP | Property Subsidence Management Plan |
| Resources Regulator | Department of Regional NSW – Resources Regulator |
| SMP | Subsidence Management Plan |
| Tahmoor Mine | Tahmoor Coal Mine |
| Tahmoor Coal | Tahmoor Coal |
| TfNSW | Transport for NSW |
| THNSW | Transport Heritage NSW |
| uPVC | Unplasticised polyvinyl chloride |
| WHS laws | <i>Work Health and Safety Act 2011 and the Work Health and Safety (Mines and Petroleum Sites) Act 2013 and associated Regulations</i> |
| WSC | Wollondilly Shire Council |
| WTP | Wastewater Treatment Plant |

6.4 Change Information

Table 6-2 provides the details of document history of this BFMP.

Table 6-2 Document History

| Version | Date Reviewed | Reviewed By | Change Summary |
|---------|---------------|--|----------------|
| 1.0 | May 2021 | April Hudson, David Talbert, Zina Ainsworth, Malcolm Waterfall | New document |