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TELECOMMUNICATIONS MANAGEMENT PLAN TAHMOOR SOUTH DOMAIN LONGWALLS SOUTH 3A TO SOUTH 7A

Revision of Telstra, NBN Co and TPG Management plans for LWS1A – LWS6A

Tahmoor Coal Pty Ltd

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1. Introduction

1.1 Background

Tahmoor Coal Pty Ltd (Tahmoor Coal) owns and operates the Tahmoor Mine, an existing underground coal mine located approximately 80 kilometres (km) south-west of Sydney in the Southern Coalfields of New South Wales (NSW). Tahmoor Mine surface facilities are situated between the towns of Tahmoor and Bargo within the Wollondilly Local Government Area (LGA). The mine has previously extracted longwalls to the north and west of the surface facilities and has been operating continuously since 1979 when coal was first mined using bord and pillar mining methods, followed by longwall mining methods since 1987.

The location of Tahmoor Mine in the regional context is shown in Figure 1.

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. Extracted coal is processed on site at the coal handling and preparation plant (CHPP) and coal clearance facilities prior to transportation via rail to Port Kembla and Newcastle for Australian domestic and export customers.

In April 2021, Tahmoor Coal received Development Application Approval (SSD 8445) for the Tahmoor South Coal Project, which involves use of the existing surface infrastructure and the expansion of underground longwall mining to the south of the existing workings (referred to as the Tahmoor South Domain). The Tahmoor South Domain is located south of the Bargo River and east of Remembrance Driveway and the township of Bargo.

Tahmoor Coal has submitted a Modification to the development consent to extract LW S7A to the side of LW S6A. The proposed LW S7A will extract directly beneath a section of Yarran Road where Telecommunications infrastructure is located but results in very minor additional subsidence along Remembrance Drive, where optical fibre cables are located. Whilst LW S7A has been included in this Management Plan, Tahmoor Coal cannot extract the longwall until the Department of Planning, Housing and Infrastructure approves the proposed modification to Tahmoor Coal's development consent. The proposed LW S7A will result in very minor additional subsidence along Remembrance Drive where Telecommunications infrastructure is located.

The proposed mining will include series of seven (7) northern (A series) and six southern (B series) longwalls. The A series, Longwalls South 1A to South 7A (LW S1A-S7A), are the focus of this Management Plan (Figure 2). Note that longwalls S1A and S2A are now complete.

Tahmoor Coal has identified telecommunications assets which may be affected by the mining operation in the Tahmoor South area. In August 2022, Tahmoor Coal developed and agreed on specific individual management plans (LWS1A- LWS6A) for Telstra, NBN Co. A management plan was also prepared for TPG, although implemented by Tahmoor Coal, was not signed by the infrastructure owner.

As the nature and location of the telecommunications assets are very similar, this management plan combines all telecommunications assets into one plan and provides detailed information about how the risks associated with mining beneath telecommunications infrastructure will be managed by Tahmoor Coal and the asset owners. This Management plan applies for the mining of longwalls S3A to S7A and provides a revision of the following approved management plans;

a) Management Plan Longwall Mining (LWS1A to LW S6A) Beneath Telstra Plant @ Bargo North NSW Comms Network Solutions, Auguust 2022.

b) Management Plan Longwall Mining (LWS1A to LW S6A) Beneath NBN Co Infrastructure @ Bargo North NSW Comms Network Solutions, Auguust 2022.

c) Management Plan Longwall Mining (LWS1A to LW S6A) Beneath TPG Infrastructure @ Bargo North NSW Comms Network Solutions, Auguust 2022.

1.2 Purpose

This purpose of the Telecommunications Management Plan (TMP) is to;

a) Provide an update of previous approved and implemented Management Plans to include the addition of LW S7A.

b) Ensure the safe and serviceable operation of all telecommunications infrastructure within the study area. Public and workplace safety is paramount.

c) Ensure that the health and safety of people who may be present in the vicinity are not put at risk due to mine subsidence.

d) Ensure that impacts on Telecommunications Infrastructure are minimised and managed within a structured framework.

e) Audit and assess the relative risk, for each section of the Telecommunications network exposed to mine subsidence.

f) Monitor and report the impact of mine subsidence and initiate actions to mitigate potential damage to the network infrastructure by recording visible changes or changes in transmission characteristics which may affect plant performance.

g) Provide a plan of action, should the subsidence effects impact on the serviceability or performance of plant.

h) Provide a forum, Infrastructure Management Group (IMG), to report, discuss and record impacts on Telecommunications plant and transmission performance.

i) Provide a framework for Tahmoor Coal personnel to ensure that compliance is achieved with relevant internal and external regulatory requirements related to Telecommunications Infrastructure monitoring and management within the Extraction Plan Study Area.

j) Support an Extraction Plan for the secondary extraction of coal from LW S3A-S7A.

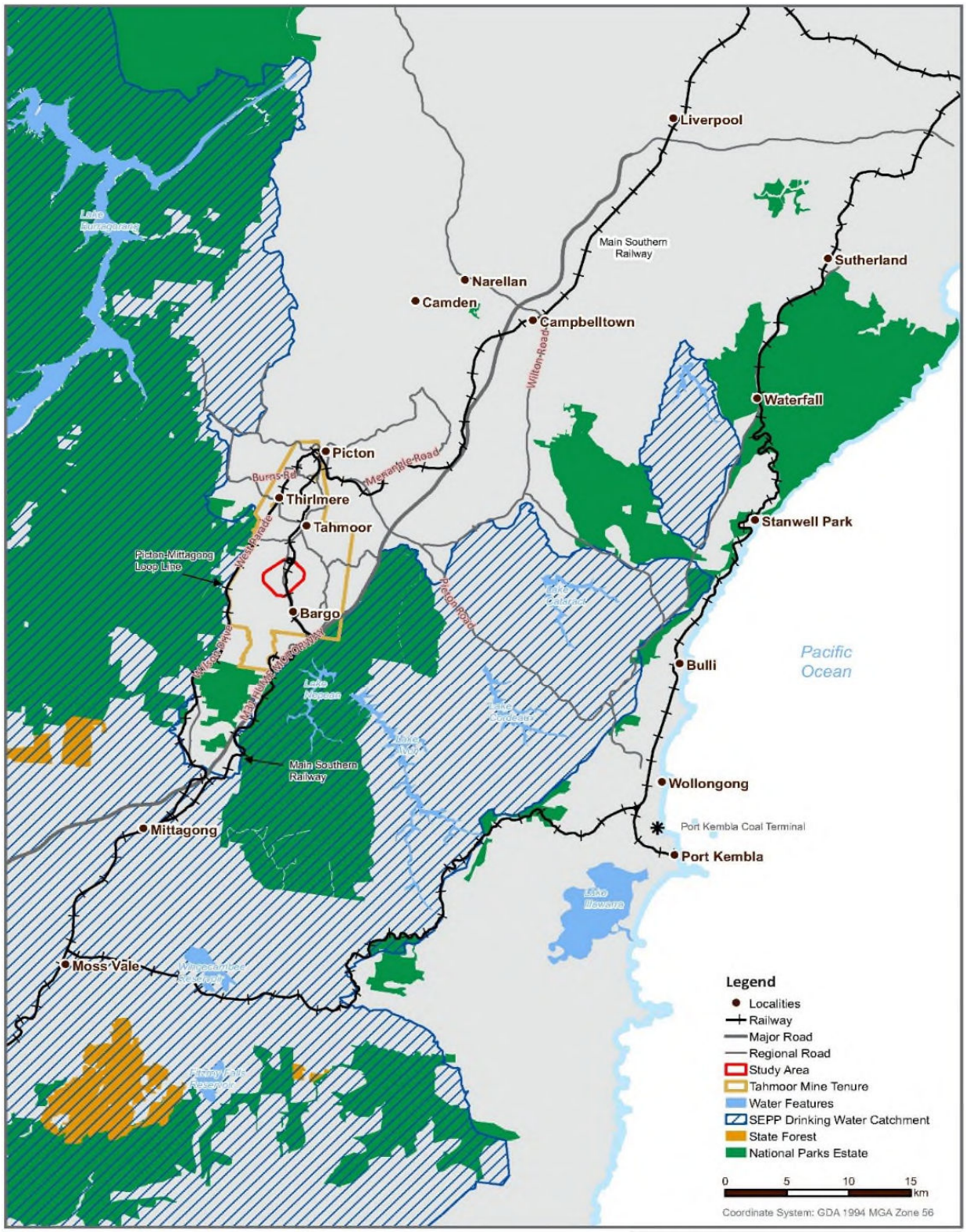

Figure 1 Regional Context

1.3 LW S3A Scope

This Management Plan provides detailed information about how the risks associated with mining beneath the Telecommunications infrastructure will be managed by Tahmoor Coal. The Study Area applicable to this management plan consists of a combination of the predicted 20 millimetre (mm) Total Subsidence Contour and the 35^{o} Angle of Draw Line as shown in Figure 2.**Error! Reference source not found.** The major items of Telecommunications infrastructure are considered, according to their location and the relative subsidence impacts from LW S1A-LW S7A. A summary of these items are detailed below:

a) Local copper cable distribution, direct buried and in conduit in Remembrance Drive, Yarran Road, Caloola Road and to a much lesser degree cable in Great Southern Road and Charlies Point Road on the southern corner of LW S4A-LW S5A. This cable consists of plastic sheathed 30, 20,10 and 2 Pair 0.64dia. cable.

b) Local copper aerial distribution cable located at the western end of Caloola Road inside the northern end of LW S5A and some aerial distribution on the eastern side of Remembrance Drive to the south of Caloola Road in the area of LW S3A and LW S4A.

c) Main Copper Cable network predominantly installed along the western side of Remembrance Drive. This cable consists of some older lead sheathed cable 70/0.64 & 74/0.90 and plastic sheathed 100/0.64.

d) Telstra Optical Fibre Cable F BRGO 101 12f direct buried IEN/CAN optical fibre cable installed along the Rail Corridor and Remembrance Drive crossing the area directly above LW S1A-LW S5A.

e) Cable distribution network consisting of manholes, pits & conduit within the study area supporting the Telstra and NBN cable network.

f) Telstra NBN Telecommunications Tower: a single pole structure (Figure 11) approximately 40m in height located off No. 3166 Remembrance Drive with access from Yarran Road.

The Management Plan is a live document that can be amended at any stage of mining, to meet the changing needs of Tahmoor Coal and the asset owners. Further details of the above assets are contained in Section 4.0.

1.4 Proposed mining schedule

It is planned that LW S1A-S7A will extract coal working northwest from the southeastern ends. This Management Plan covers longwall mining until completion of mining in LW S7A and for sufficient time thereafter to allow for completion of subsidence effects. The current schedule of mining is shown in Table 1.2.

Table 1.2 Schedule of Mining

Longwall	Start Date	Completion Date
LW S1A	October 2022	Complete
LW S2A	August 2023	Complete
LW S3A	May 2024	January 2025
LW S4A	February 2025	October 2025
LW S5A	November 2025	July 2026
LW S6A	August 2026	April 2027
LW S7A	May 2024	December 2027

Please note the above schedule is subject to change due to unforeseen impacts on mining progress.

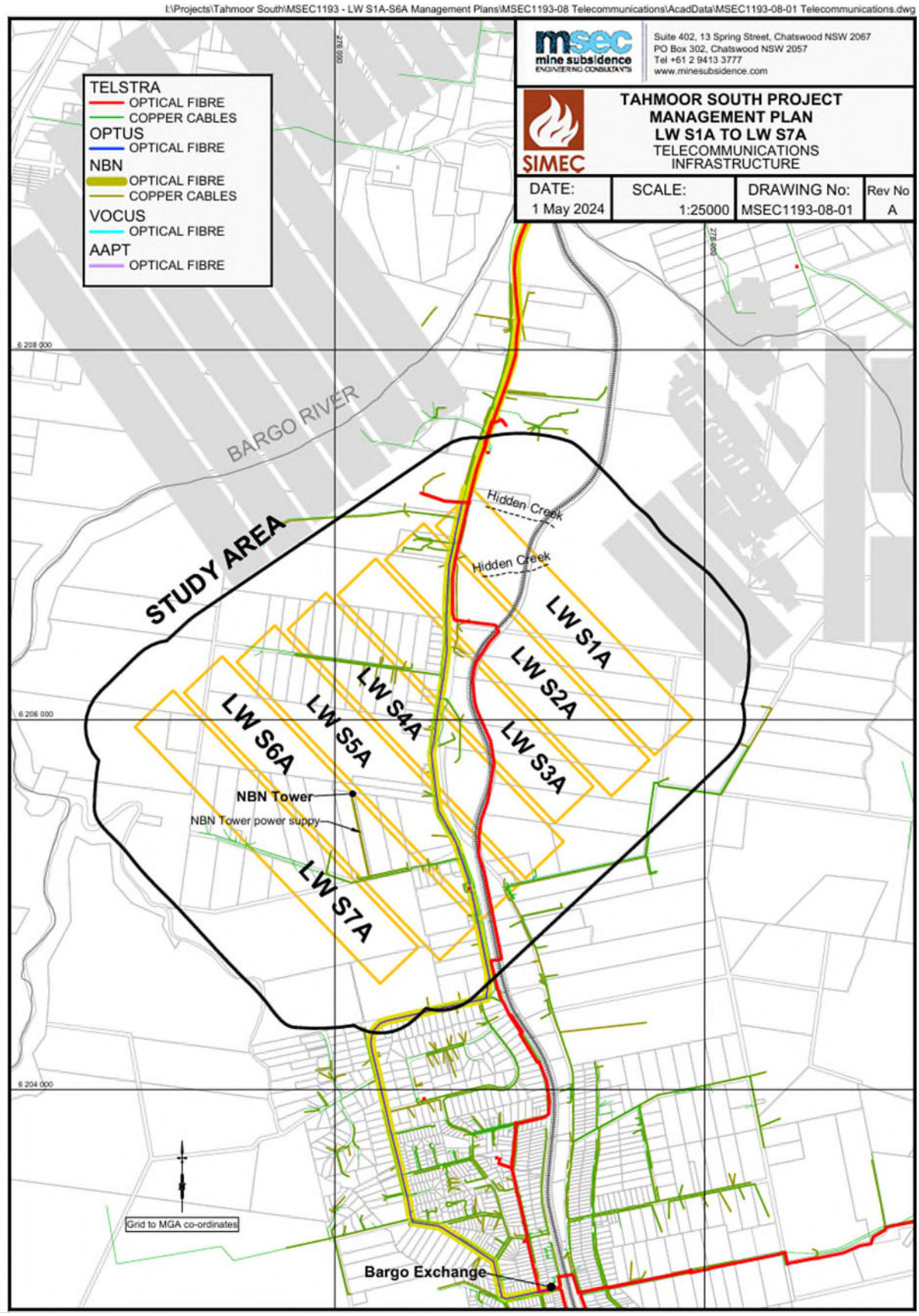

Figure 2 Telstra NBN and other telecommunications assets (MSEC1193)

1.5 Definition of Active Subsidence Zone

As a longwall progresses, subsidence begins to develop at a point in front of the longwall face and continues to develop after the longwall passes. The majority of subsidence movement typically occurs within an area 150 metres in front of the longwall face to an area 450 metres behind the longwall face.

This is termed the “active subsidence zone” for the purposes of this Management Plan, where surface monitoring is generally conducted. The active subsidence zone for each longwall is defined by the area bounded by the predicted 20 mm subsidence contour for the active longwall and a distance of 150 metres in front and 450 metres behind the active longwall face, as shown by Figure 3.

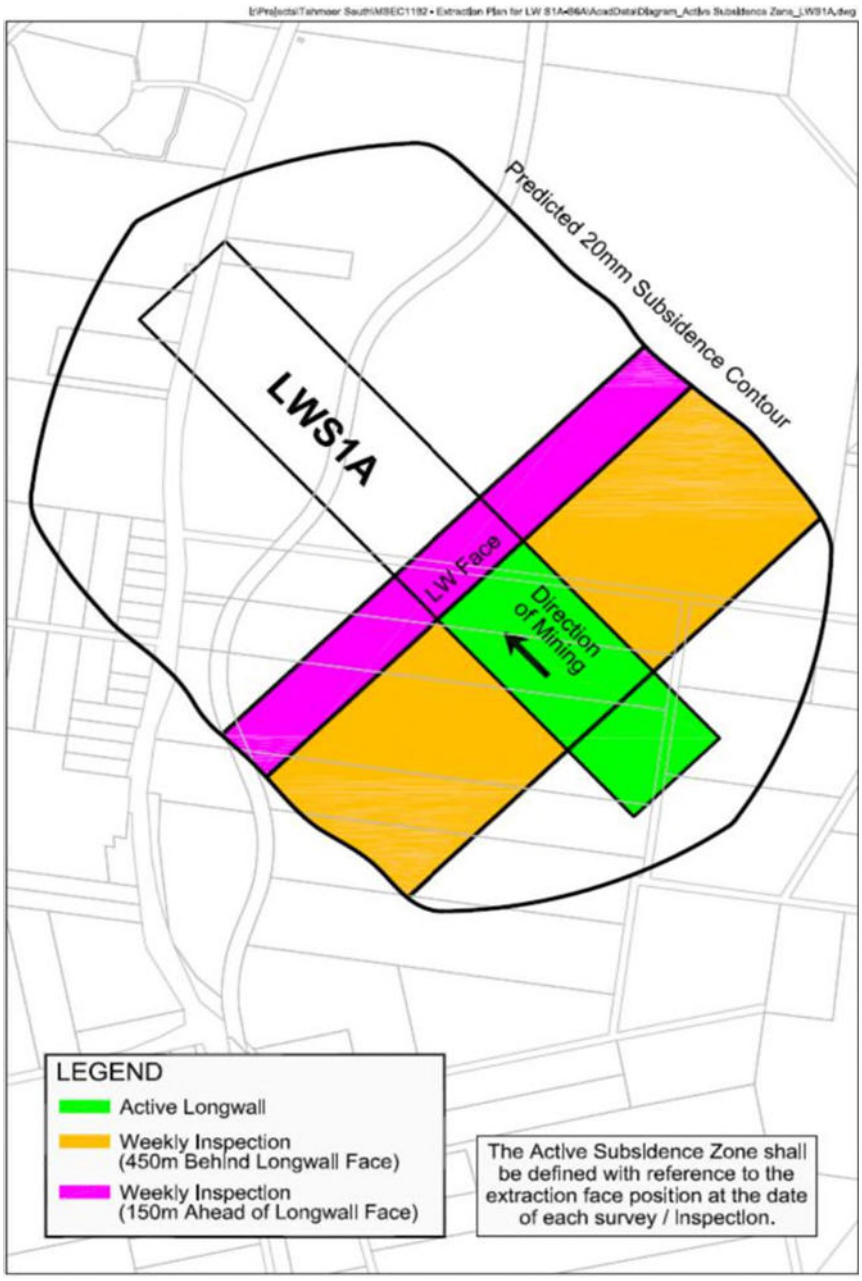

Figure 3 Diagrammatic Representation of Active Subsidence Zone

2. Regulatory Requirements

2.1 Project Approval

2.1.1 Development Consent Conditions

2.1.1.1 Extraction Plan Requirements

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.

LW S1A-S7A will be extracted in the Tahmoor South mining area under Development Consent SSD 8445 and as detailed in the Extraction Plan (approved add date).

2.1.1.2 Management Plan Requirements

Condition E5 of the Consent outlines the general requirements for all management plans. **Table 1** outlines the requirements under this condition and identifies where these requirements have been addressed.

Table 1 Management Plan Requirements

Condition Reference	Condition Requirement	Where Addressed
E5	Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:	Noted.
(a)	a summary of relevant background or baseline data;	**Section 3**
(b)	details of:	NA
(b)(i)	the relevant statutory requirements (including any relevant approval, licence or lease conditions);	**Sections 2.1.1.1**
(b)(ii)	any relevant limits or performance measures and criteria; and	**Section 5.4, 5.6, 5.7, Table 5.1**
(b)(iii)	the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	**Section 5.4, 5.6, 5.7, Table 5.1**
(c)	any relevant commitments or recommendations identified in the document/s listed in condition A2(c);	**Section 2.1.2**
(d)	a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;	**Section 4.0, 5.0, 6.2**
(e)	a program to monitor and report on the:	NA
(e)(i)	impacts and performance of the development; and	**Section 5, Table 5.1**
(e)(ii)	effectiveness of the management measures set out pursuant to condition E5(d);	**Section 6.2**
(f)	a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	**Section 3.3, 5.0, 6.4**
(g)	a program to investigate and implement ways to improve the environmental performance of the development over time;	NA
(h)	a protocol for managing and reporting any:	NA
(h)(i)	incident, non-compliance or exceedance of any impact assessment criterion or performance criterion;	**Section 6**
(h)(ii)	complaint; or	**Section 6**
(h)(iii)	failure to comply with other statutory requirements;	**Section 7**

Condition Reference	Condition Requirement	Where Addressed
(i)	public sources of information and data to assist stakeholders in understanding environmental impacts of the development; and	**NA**
(j)	a protocol for periodic review of the plan.	**Section 6.4, 6.5**

2.2 Stakeholder Consultation

2.2.1 Consultation, Co-operation, and Coordination

Substantial consultation, co-operation and co-ordination has taken place between Tahmoor Coal and Telstra prior to the development of this Management Plan. Tahmoor Coal has continued to consult with Telstra and other telecommunication asset owners over 22 years of longwall mining operations in relation to mine subsidence effects on the various telecommunications assets potentially impacted. This includes recent consultation during the development of Subsidence Management Plans for previous Longwalls LW W1 and LW W4 (Western Domain) and more recently LWS1A and S2A. Telstra have also been involved in regular reporting of subsidence movements and impacts for these recent longwalls.

Tahmoor Coal will consult regularly with Telecommunications asset owners during the extraction of LW S3A -LW S7A in relation to progress of longwalls, presentation of survey data and mine subsidence effects from continued mining.

A summary of the feedback provided by stakeholders is summarised within **Table 2.1** below.

Table 2.1 Consultation to Date

Consulted Stakeholder	Consultation Conducted	Outcomes of Consultation
Comms Network Solutions	Meetings with Colin Dove (Comms Network Solutions) in December 2021 to discuss the preparation of the draft Telstra Management Plan for the Southern Project Area Longwalls LW S1A-LW S6A.	Noted.
	Discussions with Colin Dove in January 2022 regarding proposed commencement of mining for LW S1A and LW S6A and preparation of Telecommunications Management Plan to identify risks and management of risk for the telecommunications network in this particular area.	Noted.
Telstra	Discussions with Telstra Network Integrity regarding completion of Telstra management plan in February 2022.	Noted.
	Email correspondence with Telstra regarding management of direct buried optic fibre cable in an area of potential risk from subsidence in July and August 2023.	Agreement by Telstra to complete a scoping process to confirm mitigation requirements (subject to Tahmoor meeting contract requirements).
Tahmoor Coal	A Risk Assessment was completed by Tahmoor Coal for LW WS1A-WS6A Infrastructure on 3 November 2021, which included the identification of potential risks to Telstra infrastructure.	Noted.

Consulted Stakeholder	Consultation Conducted	Outcomes of Consultation
Telstra	Weekly Remembrance Drive compression hump Teams meeting with Telstra technical staff (Feb 24 – May 24).	Update on subsidence results and status of mining activity (LWS2A during active subsidence). Telstra provide update on optic fibre condition.

2.2.2 Consultation with Government Agencies & Key Infrastructure Stakeholders

Government agencies including the NSW Department of Planning & Environment, Resources Regulator, Mine Safety Operations, Subsidence Advisory NSW and key infrastructure stakeholders including Wollondilly Shire Council, Telstra, NBN, TPG, Endeavour Energy and Sydney Water have also been consulted as part of the Extraction Plan approval process.

2.3 Compensation

The *Coal Mine Subsidence Compensation Act 2017* (CMSC Act) is administered by Subsidence Advisory NSW. Any claims for mine subsidence damage need to be lodged with Subsidence Advisory NSW. Subsidence Advisory NSW 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 https://www.nsw.gov.au/subsidence-advisory.

2.4 NSW Work Health & 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 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 it is are not reasonably practical to eliminate
- maintaining control measures
- 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 NSW Department of Planning & Environment, Resources Regulator, Mine Safety Operations (MSO, 2017).

2.5 Method of Assessing Potential Mine Subsidence Impacts

The risk management process has been carried out in accordance with guidelines published by the NSW Department of Planning & Environment, Resources Regulator, Mine Safety Operations (MSO, 2017). The following main steps of subsidence risk management have been and will be undertaken, in accordance with the guidelines.

1. identification and understanding of subsidence hazards
2. assessment of risks of subsidence
3. development and selection of risk control measures
4. implementation and maintenance of risk control measures, and
5. continual improvement and change management.

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

1. consultation, co-operation and co-ordination, and
2. monitoring and review.

This updated Management Plan documents the risk control measures that are planned to manage risks to health and safety associated with the mining of LW S3A-S7A in accordance with the WHS laws.

The method of assessing potential mine subsidence impacts in the Management Plan is consistent with the Australian/New Zealand Standard for Risk Management (AS/NZS ISO 31000:2009). The Standard defines the terms used in the risk management process, which includes the identification, analysis, assessment, treatment and monitoring of potential mine subsidence impacts. In this context, the terms are defined below:-

2.5.1 Consequence

'The outcome of an event expressed qualitatively or quantitatively, being a loss, injury, disadvantage or gain. There may be a range of possible outcomes associated with an event.' The consequences of a hazard are rated from negligible to catastrophic.

2.5.2 Likelihood

'Used as a qualitative description of probability or frequency.' The likelihood can range from rare to almost certain.

2.5.3 Hazard

'A source of potential harm or a situation with a potential to cause loss.'

The method of assessing potential mine subsidence impacts combines the likelihood of an impact occurring with the consequence of the impact occurring. In this Management Plan, the likelihood and consequence are combined via the SIMEC Risk Matrix to determine an estimated level of risk for particular events or situations. A copy of the risk assessments conducted for the Telecommunications Infrastructure are listed in Section 4.2 and included in an Appendix to this Management Plan.

3. Predicted Subsidence Impacts

3.1 Predicted Subsidence General

A summary of the maximum predicted total conventional subsidence parameters (MSEC 1192) for Telecommunications assets after the completion of each of the proposed longwalls is provided in Table 3.1. The predicted tilts are the maxima along the general alignment of the cables after the completion of each of the proposed longwalls.

A summary of the maximum predicted total conventional subsidence parameters for the optical fibre cable, after the completion of each of the proposed longwalls, is provided in Table 3.2. The predicted tilts are the maxima along the alignments of the cables after the completion of each of the proposed longwalls. The predicted curvatures are the maxima in any direction at any time during or after the extraction of each of the proposed longwalls.

Table 3.1 Maximum predicted total conventional subsidence parameters for Remembrance Drive due to the extraction of LWs S1A to S7A.

Longwall	Maximum predicted subsidence (mm)	Maximum predicted tilt along alignment (mm/m)	Maximum predicted tilt across alignment (mm/m)	Maximum predicted hogging curvature in any direction (km-1)	Maximum predicted sagging curvature in any direction (km-1)
LW S1A	200	1.5	4.0	0.06	0.03
LW S2A	975	5.0	5.5	0.08	0.20
LW S3A	1150	7.0	4.5	0.10	0.20
LW S4A	1300	6.0	5.5	0.12	0.20
LW S5A	1350	6.5	6.0	0.13	0.20
LW S6A	1350	6.5	5.5	0.13	0.25
LW S7A	1400	7.0	5.0	0.13	0.25

The maximum predicted conventional strains for the optical fibre cables, based on applying a factor of 15 to the maximum predicted conventional curvatures, are 2.1 mm/m tensile and 3.0 mm/m compressive.

The optical fibre cables along the Main Southern Railway and Remembrance Drive cross a number of streams within the Subsidence Study Area and could experience valley related movements in these locations. Table 3.2 shows the predicted Total Hogging and Sagging Curvature for the four creek crossings over LW S2A, LW S3A, LW S4A and LW S5A for the optical fibre cable along the rail corridor.

Non-conventional movements can also occur as a result of, among other things, anomalous movements (refer section 3.3).

Table 3.2 Maximum predicted upsidence and closure movements for the optical fibre cable along Remembrance Drive and Main Southern Railway at the stream crossings

Location	Maximum Predicted Total Subsidence (mm)	Maximum Predicted Total Tilt (mm/m)	Maximum Predicted Total Hogging Curvature (1/km)	Maximum Predicted Total Sagging Curvature (1/km)	Maximum Predicted Total Upsidence (mm)	Maximum Predicted Total Closure (mm)
99.388 km	1250	5.0	0.06	0.05	200	150
100.121 km	1250	7.0	0.08	0.09	200	100
100.425 km	1325	4.0	0.05	0.13	150	75
101.000 km	50	< 0.5	< 0.01	< 0.01	50	30

3.2 Predicted Subsidence NBN Tower

The NBN telecommunications tower is located off at No. 3166 Remembrance Drive, with access from Yarran Road. Predictions of conventional subsidence, tilt and curvature have been made at the centroid and at points located around the perimeter of the tower and the shed, as well as at points located at a distance of 20 metres from the perimeter of each structure (MSEC1192). A summary of the maximum predicted values of conventional subsidence, tilt and curvature for each structure is provided in Table 3.3.

Table 3.3 Maximum predicted total conventional subsidence parameters for the NBN telecommunications tower.

Thanks Location	Maximum Predicted Total Subsidence (mm)	Maximum Predicted Total Tilt (mm/m)	Maximum Predicted Total Hogging Curvature (1/km)	Maximum Predicted Total Sagging Curvature (1/km)
Shed	1050	3.5	0.05	0.21
Tower	1050	3.5	0.05	0.22

3.3 Non-Conventional Subsidence

Consideration is required for non-conventional subsidence on Telstra/NBN infrastructure as a result of additional strain, caused by upsidence and closure, most likely at creek crossings. Predicted conventional strains for Telecommunications Infrastructure (in particular optical fibre cable) are identified as maximum strains predicted across most of the longwalls particularly for compressive strain over LW S2A to LW S7A. From experience with optical fibre cables, compressive strains acting over a longer cable length of say 100m, are much more likely to cause cable bending and transmission problems in the cable. Tahmoor Coal have successfully managed areas of high strain associated with direct buried optic fibre cable during the mining of LWS1A and LWS2A (refer section 4.0). Significant experience has also been gained with tower structures during mining of the Tahmoor North and the Western Domain.

4. Managing Potential Subsidence Impacts to Telecommunications Infrastructure

4.1 Managing Public Safety

The primary risk associated with mining beneath Telecommunications infrastructure is public safety. Tahmoor Coal has previously directly mined beneath or adjacent to more than 2000 houses and civil structures, commercial and retail properties, towers, power poles, the Main Southern Railway, local roads and bridges and supporting infrastructure. It has implemented extensive measures prior to, during and after mining to ensure that the health and safety of people have not been put at risk due to mine subsidence. People have not been exposed to immediate and sudden safety hazards as a result of impacts that have occurred due to mine subsidence movements.

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 repair the structure.

In the case of this Subsidence Management Plan, the potential for impacts on public safety has been assessed on a case by case basis for each item of infrastructure. The assessments include those of a structural engineer for the building structures including towers (JMA, 2023, 2024), and Telstra/NBN infrastructure by Colin Dove (Commsnet 2023).

4.1.1 Subsidence Impact Management Process for Infrastructure

Tahmoor Coal has developed and acted in accordance with subsidence management plans to manage potential impacts during the mining of Longwalls 22 to 32, LW W1-W4 at Tahmoor North and Western Domain and LW S1A-S2A at Tahmoor South. The management strategy has been reviewed and updated based on experiences gained during the mining of these longwalls and the strategy for LW S3A-S7A at Tahmoor South includes the following process:

1. Regular consultation with Tahmoor Mine Site before, during and after mining;
2. Site-specific investigations;
3. Implementation of mitigation measures following inspections by a structural engineer, a mine subsidence engineer, and, if required, a geotechnical engineer or other specialist engineer; and
4. Surveys and inspections during mining within the active subsidence area:
    - Detailed visual inspections and vehicle-based inspections along the streets;
    - Ground surveys along streets; 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 Telecommunications infrastructure experiences mine subsidence movements is shown in Figure 4.

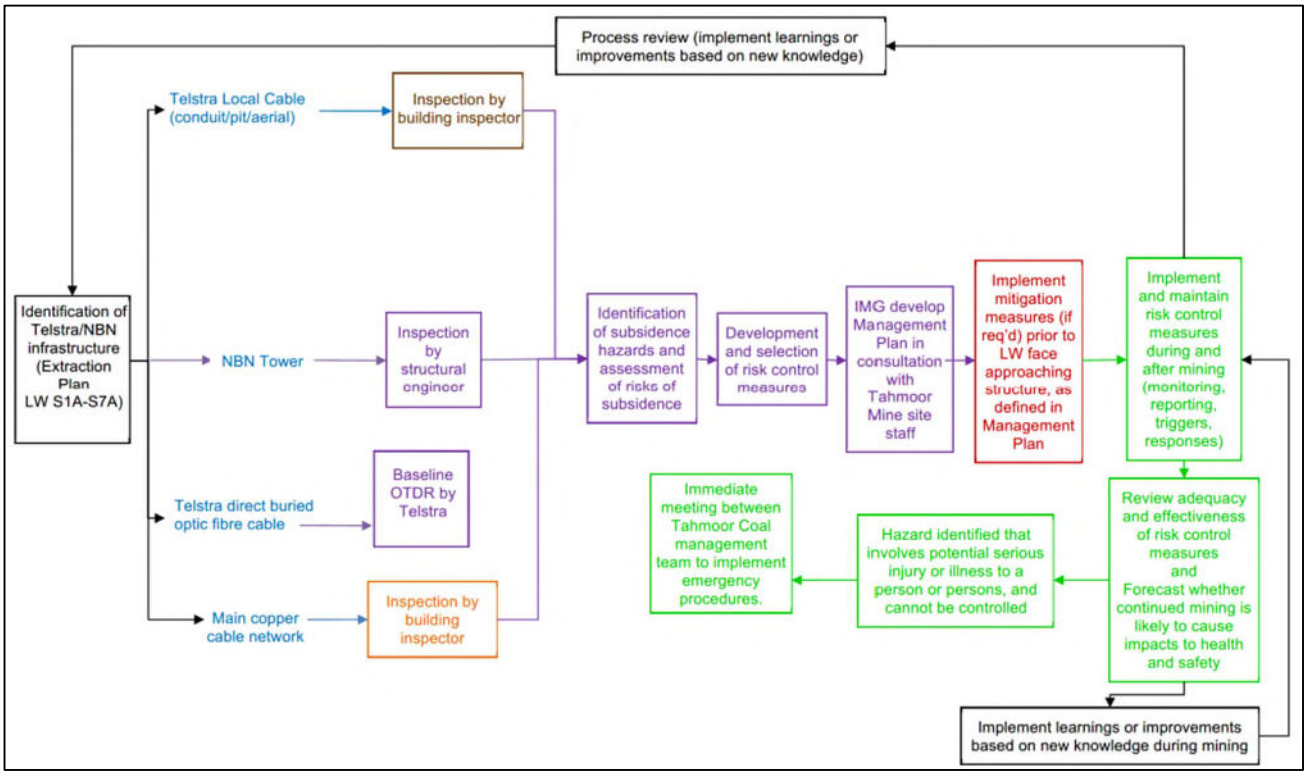

Figure 4 Flowchart illustrating the subsidence impact management process

4.2 Risk Assessment

Multiple risk assessments were conducted in relation to the potential for subsidence impacts on Telecommunications infrastructure.

- A Broad-Brush risk assessment was undertaken to consider potential subsidence impacts to all public infrastructure including Telstra, NBN and TPG by Tahmoor Coal in June 2023 (TC, 2023a). The risk assessment was attended by Tahmoor Mine Environment & Community team.
- A detailed risk assessment was undertaken to consider potential subsidence impacts to Telstra (NBN and TPG) infrastructure on a case-by-case basis from an operational and health and safety perspective in December 2023 (TC, 2023b). A total of 12 risks were identified, the majority of which were assessed as LOW. There were two risks considered as MEDIUM: Telstra Optic Fibre cable direct buried within the subsidence impact area and the NBN Tower (non-Telstra asset). The results of the risk assessment are included in the Appendix.

Additional information on each potential impact is provided in the Management Plan.

4.3 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.

This section of the Management Plan summarises hazards which could give rise to risks to health and safety of people relating to Telecommunications Infrastructure and potentially impact on system integrity. Using the processes described in Section 4.1 of this Management Plan, hazards have been identified, investigated and analysed in a systematic manner by examining each aspect of infrastructure, as described in Sections 4.4 of this Management Plan. Each of the aspects below could potentially experience mine subsidence movements that give rise to risks to the health and safety of people or impact system integrity.

- Telstra Local Cable (Conduit and Pit Network)
- Telstra Local Cable (Aerial Cable Network)
- Main Copper Cable Network.
- Telstra direct buried IEN/CAN optical fibre cable F BRGO 101 12f SMOF
- Manhole, Conduit & Pit Network.
- NBN Telecommunications Tower.

The identification and risk assessment process took into account the location of infrastructure relative to LWs S1A to S7A and the associated timing and duration of the subsidence event, as described in Section 3 of this Management Plan.

Whilst mine subsidence predictions and extensive past experiences from previous mining at Tahmoor Mine were taken into account, the identification and risk assessment process recognised that there are uncertainties in relation to predicting subsidence movements, and uncertainties in how mine subsidence movements may adversely impact Telstra infrastructure, as discussed in Section 3 of this Management Plan. This includes consideration of hidden creeks mapped as intersecting Telecommunications infrastructure within the subsidence impact area. Tahmoor Coal has 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 Telecommunications infrastructure in general. These are described below and in Section 5 of this Management Plan.

4.4 Assets

As part of the planning for mining of LW S1A to LW S7A, Tahmoor Coal has identified the Subsidence Study Area comprises Telecommunications infrastructure including optical fibre cables, aerial and copper cables, pits and poles and the NBN Tower. Telstra optical fibre cable follows the alignment of Remembrance Drive and the Main Southern Railway and crosses directly above the proposed LWs S1A to S5A. The copper telecommunications cables are generally direct buried and follow the alignments of local roads across the Subsidence Study Area.

The National Broadband Network (NBN) cables comprise both Optical fibre and copper service cables. NBN optical fibre cable follows the alignment of Remembrance Drive. Copper service cables follow the alignments of local roads across the Subsidence Study Area.

An NBN telecommunications tower is located at No. 3166 Remembrance Drive, with access from Yarran Road. The tower is located directly above LW S6A.

A summary of the telecommunications cables within the Subsidence Study Area is provided in Table 4.1 below.

Table 4.1: Summary of telecommunications infrastructure within the Subsidence Study Area

Location	Total length of cable within Subsidence Study Area (km)	Total length of cable located directly above proposed LWs S1A to S6A (km)
Copper Cables		
Telstra	15.9	10.5
National Broadband Network (NBN)	16.7	11.1
Optic Fibre Cables		
Telstra	3.6	2.6
TPG	2.8	2.3

There are current changes underway to the ownership of Telstra's external cable and conduit network. Some of the existing communications infrastructure in the area is proposed to be transferred to NBN ownership as they establish their new network throughout the area of Tahmoor-Bargo.

Currently NBN have only installed their Main cable network between Tahmoor and Bargo exchanges and the majority of the Local and Main cable network in the LW S1A to LW S7A area still remains in Telstra ownership.

The one exception is that NBN now own the Local cable network at the intersection of Charlies Point Road and Great Southern Road at the southern corner of LW S4A-LW S5A. Telstra however, still retains ownership of the pits and conduits in this area. It is also noted that TPG also have Main optical fibre cable installed along Remembrance Drive through this area of interest.

Tahmoor Coal has successfully managed impacts from mine subsidence on the Telstra (&NBN) network for more than 15 years. The potential impacts on Telecommunications infrastructure associated with LW S3A to LW S7A are expected to be very similar to those previously managed.

A detailed summary of the Telecommunications assets within the mining area including managing potential subsidence impacts are discussed below.

4.4.1 Telstra Local Cable (Conduit and Pit Network)

Local Copper Cable Distribution - direct buried and in conduit in Remembrance Drive, Yarran Road, Caloola Road and to a much lesser degree cable in Great Southern Road and Charlies Point Road on the southern corner of LW S4A-LW S5A.

The majority of this network is installed in 50-100mm diameter conduit between pits and 20-40mm conduits into individual properties from the road boundary. The cable type is characterised by small sized 2 to 50 pair /0.64 copper diameter copper pairs. This cable is jelly filled and with a higher tensile strength of around 10mm/m dependent on cable size and is reasonably resilient and flexible in bending even where directly buried, where it is most vulnerable.

Figure 5 Typical joints in Local copper distribution cable installed along Caloola Road north side

Tahmoor Coal has extensive experience in managing direct buried copper cable, with no significant impacts observed as a result of longwall mining. While the potential for impacts is low, Tahmoor Coal will implement measures to ensure that the infrastructure remains safe and serviceable during the mining of the proposed longwalls. A summary of the risk control measures is as follows;

- Baseline local street surveys along Remembrance Drive, Caloola Road, Yarran Road, prior to active subsidence.
- Weekly street surveys along Remembrance Drive, Caloola Road, Yarran Road during periods of active subsidence;
- Targeted visual inspections based on survey results;
- If triggered refer to IMG for decision on action to be taken as considered necessary by Telecommunication asset owner or their representatives to protect the cables.

A summary of risk controls is included in Section 5.3.

4.4.2 Telstra Local Cable (Aerial Cable Network)

These cables are more modern plastic sheathed jelly filled aerial cables fitted with a steel bearer wire to secure the cable at pole and building terminations and are located at Caloola Road and along the eastern side of Remembrance Drive.

Figure 6 View west of Local aerial distribution cable in Caloola Road at the northwestern end of LW S5A

Tahmoor Coal has extensive experience in managing local aerial distribution cable, with no significant impacts observed because of longwall mining. While the potential for impacts is low, Tahmoor Coal will implement measures to ensure that the infrastructure remains safe and serviceable during the mining of the proposed longwalls. A summary of the risk control measures is as follows;

- Baseline local street surveys along Remembrance Drive, Caloola Road, Yarran Road, prior to active subsidence.
- Weekly street surveys along Remembrance Drive, Caloola Road, Yarran Road during periods of active subsidence;
- Visual inspection of aerial cable network with focus on pole tilt and cable sag/tension. Baseline tilt measurement prior to active subsidence and weekly during active subsidence.
- Targeted visual inspections based on survey results;
- If triggered refer to IMG for decision on action to be taken as considered necessary by Telstra representatives to protect the network.

A summary of risk controls is included in Section 5.3.

4.4.3 Main Copper Cable Network.

The main copper cable network consists of plastic sheath copper main cable and lead sheath main cable. Plastic Sheath Copper Main Cable: older style lead sheathing located along the western side of Remembrance Drive crossing five (5) longwalls within the mining area.

Lead Sheath Main Cable: The main difference from the plastic sheathed cables is that this older style lead sheathing is more likely to be damaged by ground movement. This is more likely to occur where to protective nylon hard jacket has been stripped back to expose the lead sheath at the joint locations, where the cable sheath has to be bent to complete the through joint.

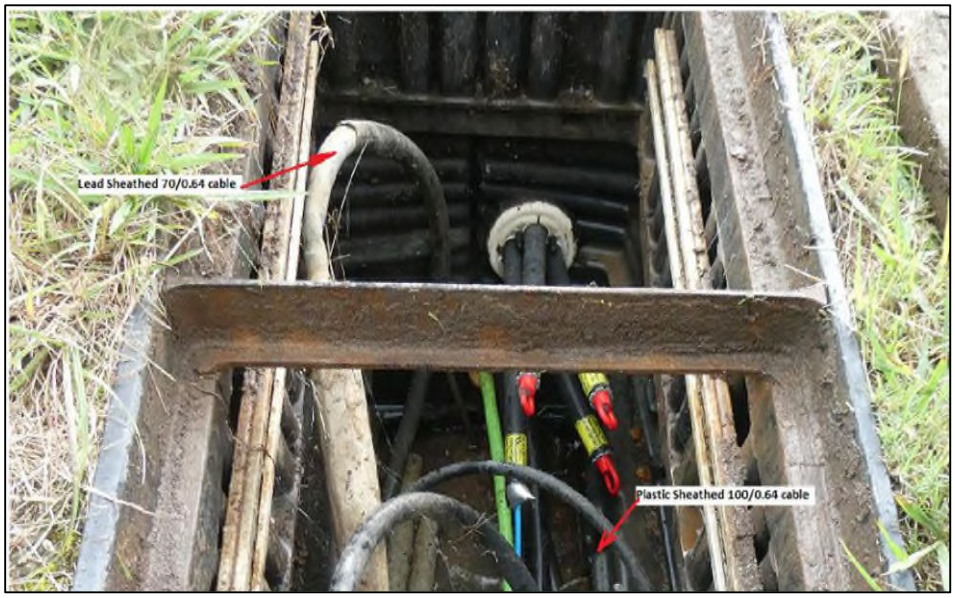

Figure 7 Typical pit showing lead and plastic sheathed cable

Lead sheathed cable also contains paper insulated conductors which are vulnerable to breakdown should the lead sheath break and allow moisture to enter the cable. However, to prevent moisture ingress, the cables are fitted with a positive air pressure system being applied to the cable from the exchange end.

Tahmoor Coal has extensive experience in managing the local copper network, with no significant impacts observed because of longwall mining. While the potential for impacts is low, Tahmoor Coal will implement measures to ensure that the infrastructure remains safe and serviceable during the mining of the proposed longwalls. A summary of the risk control measures is as follows;

- Baseline local street surveys along Remembrance Drive.
- Weekly street surveys along Remembrance Drive during periods of active subsidence;
- Baseline inspection of pits prior to active subsidence and then at end of each longwall.
- Targeted visual inspections based on survey results;
- If triggered refer to IMG for decision on action to be taken as considered necessary by Telstra representatives to protect the network.

A summary of risk controls is included in Section 5.3.

4.4.4 Telstra direct buried IEN/CAN optical fibre cable F BRGO 101 12f SMOF

This Telstra cable F BRGO 101 12f SMOF cable is a direct buried cable installed along the railway corridor and Remembrance Drive for the full 2500m crossing under LW S1A and LW S5A. Note that this cable sheath contains both; i) Direct Inter Exchange Network (IEN) fibres linking Tahmoor and Bargo Telephone Exchanges as well as ii) Customer Access Network (CAN) fibres providing services to major customers in the Study Area

Figure 8 View south showing location of NBN cable adjacent mine site and Remembrance Drive

The risk for this cable is considered medium as it is subject to potential damage and loss of performance particularly in the case of abnormal subsidence (upsidence and closure). During the mining of LWS1A (2023) a section of cable adjacent 3030 Remembrance Driveway experienced ground stains greater than 2.5mm/m. Routine OTDR (Optical Time Domain Reflectometer) testing identified the location of a loss of performance within the cable.

In conjunction with Telstra (Jan 24), Tahmoor Coal excavated a 40m section of the cable to release any inherent strains, encased the cable in conduit and reburied the cable including a spare conduit (refer figure 4.5). This process was completed in 2 days without any interruption to Telstra/NBN services.

Figure 9 Excavation and protection of optic fibre cable along Remembrance Drive (Jan 2024)

OTDR monitoring of optic fibre cable by Comms Network Solutions has been used extensively by Tahmoor Coal during the mining of previously extracted longwalls. With the retirement of Colin Dove, it is proposed to utilise Telstra's routine in house monitoring to manage subsidence impacts on optic fibre cable within the study area.

Telstra NBN conduct real time monitoring of optic fibre performance by comparing transmission loss relative to installed baseline condition. Telstra advise that the monitoring system utilises specific triggers to generate alarms that are regularly reviewed and discussed at weekly technical meetings (refer figure 10 for examples of Telstra optic fibre monitoring reports).

Tahmoor Coal will also advise Telstra of potential areas of concern (high strain) for further targeted transmission performance review. Losses in transmission performance can be identified early and located by with sufficient accuracy to allow the effected cables to be locally exposed by excavation and relieved of deformation (as demonstrated in Jan 2024).

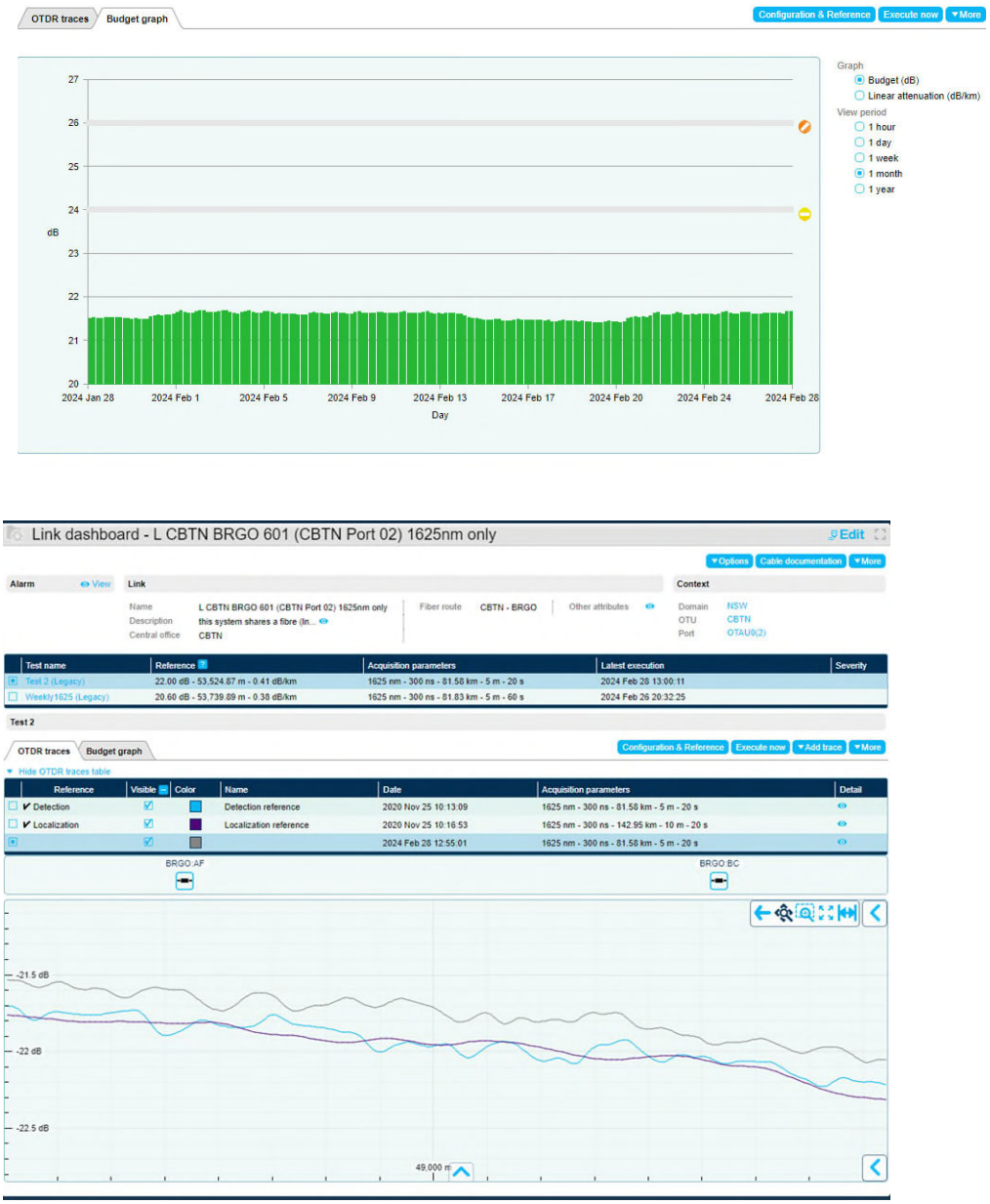

Figure 10 Examples of Telstra optic fibre monitoring reports

Approximately 2km of the optic fibre cable route is located within the rail corridor and crosses four creek crossings where upsidence and closure may also add to the ground strain impacts on the cable. Since the cable is located away from general access within the rail corridor there is little point in Visual inspection of the cable line during the extensive mining under this cable.

As discussed above Tahmoor Coal has extensive experience in managing optic fibre cable networks had has successfully managed areas of high strain with no loss in service or significant impacts to Telstra/NBN optic fibre cable. While the potential for impacts from longwall mining impacts is medium, Tahmoor Coal will implement measures to ensure that the infrastructure remains safe and serviceable during the mining of the proposed longwalls. A summary of the risk control measures is as follows;

- Baseline local street surveys along Remembrance Drive and the rail corridor.
- Weekly street surveys along Remembrance Drive and the rail corridor during periods of active subsidence;
- Routine real time monitoring of optic fibre performance by Telstra (including triggers and weekly in-house technical meetings)
- If triggered refer to IMG for decision on action to be taken as considered necessary by Telstra representatives to protect the network including excavation and uncoupling.

A summary of risk controls is included in Section 5.3.

4.4.5 NBN Telecommunications Tower

The NBN telecommunications tower is a single pole structure (Figure 11) approximately 40m in height located off No. 3166 Remembrance Drive with access from Yarran Road. The tower is expected to experience subsidence during the extraction of proposed LWs S4A and S6A. The predicted tilts of 2.5 mm/m, while small, may affect the operation of the antennae on the structure. The tilts can be readily adjusted by either relevelling the pole or the individual antennae, if required.

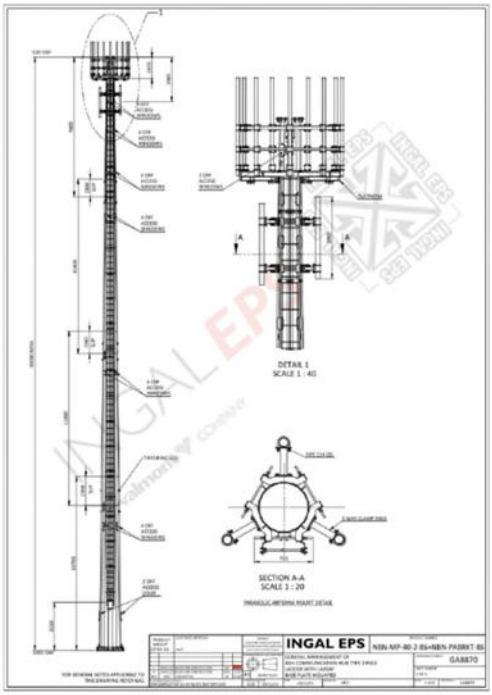

Figure 11 NBN Telecommunications Tower

A targeted preliminary assessment on the potential impact of subsidence to the NBN tower has been completed by structural engineers John Matheson and Associates (JMA 20240101). Analysis was carried out assuming ground tilts of 3.5mm/m which exceed the predicted value of 2.5mm/m.

In summary, the report concluded;

- The lateral displacement of the dishes and antennae at the top of the tower can be calculated assuming rigid body movement of the structure relative to the footing with an estimated error of less than ±1.6%.
- Tilt of up to 3.5mm/m is predicted to increase the bending moment along the height of the tower and very slightly, with structure utilisation predicted to increase by less than 0.5% at the ultimate limit state, which is not significant, and it is unlikely that ground tilt caused by subsidence will adversely impact structure safety.
- Tilt of up to 3.5mm/m is unlikely to increase tip rotation at the top of the tower beyond the designated 1° limit.

- Subsidence, tilt, and ground strain are expected to cause the antennae and dishes to move vertically and horizontally relative to their original datum positions, which could affect signal strength.

JMA recommends that the NBN Telecommunications tower should be monitored during and for an agreed period following active subsidence. A summary of the proposed actions to manage the NBN Tower are listed below and detailed in Table 5.3 - Risk Control Procedures for Telecommunications Infrastructure during the Extraction of LW S3A-S7A.

Tahmoor Coal has extensive experience in managing telecommunications towers had has successfully managed areas of high strain and tilt with no loss in service or significant impacts. This includes a similar tower telecommunications tower located above Redbank Tunnel railway tunnel (now buried) during the mining of LW26 and LW27.While the potential for impacts from longwall mining impacts is medium, Tahmoor Coal will implement measures to ensure that the infrastructure remains safe and serviceable during the mining of the proposed longwalls. A summary of the risk control measures is as follows;

- Baseline local street surveys along Remembrance Drive, Yarran Road and power cable alignment.
- Weekly visual inspections of power cable route and tower during periods of active subsidence;
- Routine real time monitoring tilt monitoring of tower structure (including triggers and review in weekly IMG meetings).
- If triggered refer to IMG for decision on action to be taken as considered necessary by NBN representatives to protect the tower including releveling.

A summary of risk controls is included in Section 5.3.

5. Management of Potential Subsidence Impacts

5.1 Infrastructure Management Group (IMG)

The Infrastructure Management Group (IMG) is responsible for taking the necessary actions required to manage the risks that are identified from monitoring the infrastructure and to ensure that the health and safety of people who may be present on public property are not put at risk due to mine subsidence. The IMG develops and reviews this management plan, collects and analyses monitoring results, determines potential impacts and provides advice regarding appropriate actions. The members of the IMG are detailed in section 6.6.

5.2 Development and selection of risk control measures

Tahmoor Coal has developed and selected risk control measures in consultation, co-ordination and co-operation with the infrastructure owner in accordance with WHS legislation. In accordance with Clauses 35 and 36 in Part 3.1 of the Work Health and Safety regulation (2017) and the guidelines (MSO, 2017), a hierarchy of control measures has been considered and selected where reasonably practicable, using the following process:

1. Eliminate risks to health and safety so far as is reasonably practicable, and

2. If it is not reasonably practicable to eliminate risks to health and safety – minimise those risks so far as is reasonably practicable, by doing one or more of the following:

   a) substituting (wholly or partly) the hazard giving rise to the risk with something that gives rise to a lesser risk;

   b) isolating the hazard from any person exposed to it;

   c) implementing engineering controls;

3. If a risk then remains, minimise the remaining risk, so far as is reasonably practicable, by implementing administrative controls; and

4. If a risk then remains, the duty holder must minimise the remaining risk, so far as is reasonably practicable, by ensuring the provision and use of suitable personal protective equipment. A combination of the controls set out in this clause may be used to minimise risks, so far as is reasonably practicable, if a single control is not sufficient for the purpose. There are primarily two different methods to control the risks of subsidence, namely:

Method A – Selection of risk control measures to be implemented prior to the development of subsidence, (Items 1 and 2 above); and

Method B – Selection of risk control measures to be implemented during the development of subsidence (Items 3 and 4 above).

Method A and B risk control measures are described in Section 5.3 to Section 5.7. Prior to selecting Method B risk control measures, Tahmoor Coal has investigated and confirmed that the measures are feasible and effective for the site-specific conditions during the extraction of LW S1A-S7A.

5.3 Selection of risk control measures for Telecommunication Infrastructure.

Based on its own assessments, Tahmoor Coal considered Method A and Method B risk control measures, in accordance with the process described in Section 5.2.

Elimination
In this instance, no reasonably practicable controls could be identified that would eliminate the identified risks.
Substitution
In this instance, no reasonably practicable controls could be identified that will change the environment so the hazards could be substituted for hazards with a lesser risk.
Isolation
In this instance, no reasonably practicable controls could be identified to isolate a hazard from any person exposed to it.
Engineering Controls
In this instance, no reasonably practicable controls could be identified to isolate a hazard from any person exposed to it.
Administrative Controls
The following Administrative Controls were identified and selected that will put in place procedures on site to minimise the potential of impacts on the health and safety of people in relation to mining-induced damage to Telecommunications infrastructure:

5.3.1 Implementation of a Monitoring Plan and Trigger Action Response Plan (TARP).

As described in the Management Plan, Tahmoor Coal and the telecommunications asset owners have developed and implemented a management strategy of detecting early the development of potential adverse subsidence movements in the ground, so that contingency response measures can be implemented before impacts on the safety and serviceability develop. The TARP includes the following:

- Pre-mining as built inspection of NBN optic fibre cables and other cables potentially affected by the extraction of LW S1A-S7A (completed);
- Continuous GNSS monitoring along the centrelines of LWs S1A to S3A, and at each end of the Main Southern Railway Viaduct over the Bargo River (installed and operating). A GNSS unit will also be installed where the rail corridor is located directly above the centreline of LW S5A at approximate rail kilometrage of 100.55 km ;
- Local 2D surveys along local roads and Main Southern Railway as shown in Drawing No. MSEC1193-01-01. These include Remembrance Driveway (installed and surveyed for LWs S1A and S3A and will be extended prior to influence of each subsequent LWs);
- Absolute 3D survey of subsidence along Remembrance Drive (installed and surveyed for LWs S1A and S3A and will be extended prior to influence of each subsequent LWs);
- Local 3D / Absolute 3D survey of the Teatree Hollow embankment and other road embankments along Remembrance Drive with pegs spaced along the crest and toe on both sides of each embankment. Pegs spacings are generally every 20 metres. The layout of survey marks is shown in Drawing No. MSEC1193-03-07 to MSEC1193-03-10 (pegs installed and surveyed for Teatree Hollow);
- Local 3D / Absolute 3D survey of the cutting on Remembrance Drive with pegs spaced along the crest and toe on both sides of the cutting. Pegs spacings are generally every 20 metres.
- The layout of survey marks is shown in Drawing No. MSEC1193-01-01 (pegs installed);
- Local 3D / Absolute 3D of structure and ground marks on the Remembrance Drive Bridge over the Bargo River, as shown in Drawing No. MSEC1193-03-02 (installed and surveyed);
- Visual inspections along Remembrance Drive and the rail corridor within the active subsidence zone;
- Routine real time tilt monitoring of tower structure (including triggers and review in weekly IMG meetings).

- Baseline local street surveys along Remembrance Drive, Yarran Road and tower power cable alignment.
- Weekly visual inspections of NBN Tower power cable route and tower during periods of active subsidence;
- Additional surveys and/or inspections, if triggered by monitoring results;
- Regular consultation with the community to report potential impacts. As service interruption may directly impact the community, businesses and residents are more likely to report issues if they occur;
- Additional inspections by Telstra , NBN or TPG if triggered by observations of increased ground strains, ground curvature or localised surface deformations;
- Exposing cables to relieve it of stress if triggered by monitoring results (refer example in section 4.4).
- In the worst case, implement emergency procedures for repair of any damaged cable or other infrastructure; and
- Follow Telstra (and other telecommunications providers) procedures to monitor and respond to impacts.

5.4 Performance Measures and Indicators

There are no specific subsidence Performance Measures and Performance Indicators in the consent conditions for Telecommunications infrastructure. However appropriate performance indicators have been developed using a risk based approach and are detailed in Table 5.1 (TARP).

5.5 Monitoring Program

A subsidence monitoring program for Telecommunications Infrastructure will be implemented to monitor the impacts and consequences of subsidence effects on during the extraction of LW S3A-S7A. The details of this monitoring program are provided in Table 5.1, and the locations of monitoring sites are illustrated in **MSEC drawing MSEC1193-00-01.**

The aim of the monitoring program is to identify where there is a risk of impact to Telecommunications Infrastructure as a result of longwall mining activities. The monitoring program provides for the opportunity to record the condition of the site during the following three phases:

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

If an impact is identified to have occurred or is likely to occur, the relevant TARP (refer to Table 5.1) will then be referred to for the identification of appropriate mitigation strategies.

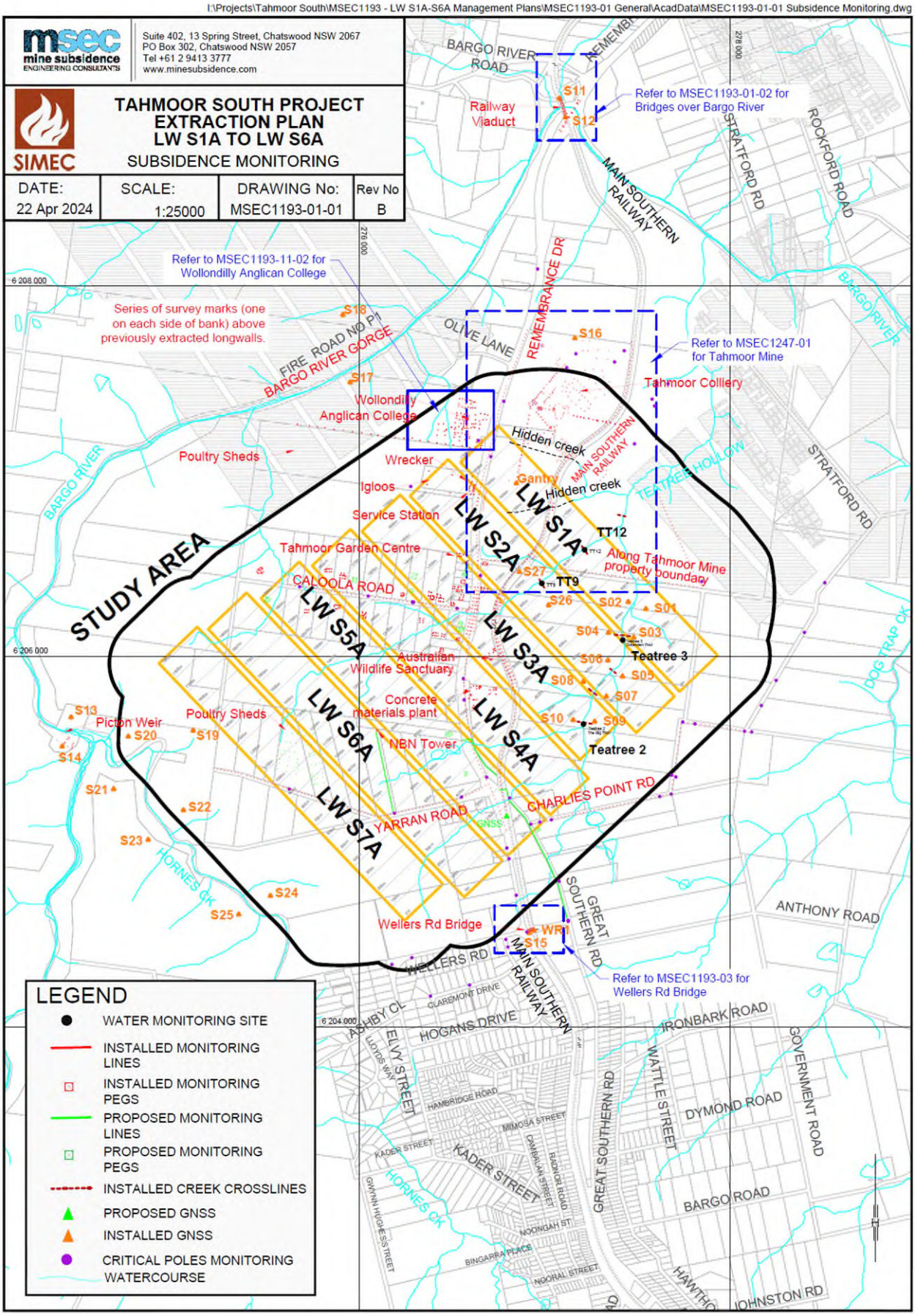

Figure 12 Subsidence Monitoring Plan (MSEC1193)

5.5.1 Limitations for this Management Plan

The Management Plan only covers telecommunications infrastructure that is located within the limit of subsidence, which defines the extent of land that may be affected by mine subsidence because of mining LW S3A-S7A only. The management plan does not include other telecommunications infrastructure which lies outside the extent of this area.

This management plan includes a monitoring program and TARP for Telstra NBN and other telecommunications infrastructure within the Study Area only. This Management Plan is based on the predictions of the effects of mining on surface infrastructure as provided in Report No. MSEC1192 for LWs S1A to S6A by Mine Subsidence Engineering Consultants (MSEC, 2022) and Report No. MSEC1348 for LW S7A by Mine Subsidence Engineering Consultants (MSEC, 2024). Predictions are based on the planned configuration of LW S1A-S6A at Tahmoor South (as shown in Drawing No. MSEC1193-06-01), along with available geological information and data from numerous subsidence studies for longwalls previously mined in the area.

Infrastructure considered in this Management Plan has been identified from site visits and aerial photographs and from discussions between Tahmoor Coal representatives and Telecommunications asset owners. The impacts of mining on surface and sub-surface features have been assessed in detail. It is recognised, however, that the prediction and assessment of subsidence can be relied upon only to a certain extent. The limitations of the prediction and assessment of mine subsidence are discussed in report MSEC1192 by Mine Subsidence Engineering Consultants.

As discussed in the report, there is a low probability that ground movements and their impacts could exceed the predictions and assessments. However, if these potentially higher impacts are considered prior to mining, they can be managed. This Management Plan will not necessarily prevent impacts from longwall mining, but will limit the impacts by establishing appropriate procedures that can be followed should evidence of increased impacts emerge.

5.6 Trigger Action Response Plan

A TARP have been developed to address various components of Telecommunications Infrastructure using performance indicators/triggers for implementation during LW S3A-S7A mining (refer table 5.1).

The primary actions of the TARP are to:

- Define appropriate trigger levels for key telecommunications infrastructure;
- Develop specific actions to respond to high risk of exceedance of any triggers sure to ensure that the measure is not exceeded; and
- Present a plan in the event triggers are exceeded or are likely to be exceeded and describe the management / corrective actions to be implemented (i.e. notifications to relevant agencies, repair of cracks and instabilities).

5.7 Triggers and Responses

Trigger levels have been developed by Tahmoor Coal based on engineering assessments and consultation. with Telecommunications asset owners and engineering specialists John Matheson and Associates (JMA) Sweeting Consulting, Comms Network Solutions and MSEC. Trigger levels for each monitoring parameter are described in the risk control procedures in Table 5.1. Immediate responses, if triggered by monitoring results, may include:

- Increase in survey and inspection frequencies if required by the IMG;
- Additional monitoring and surveys;
- Exposing cables to relieve it of stress;
- Repair of impacts that create a serious public safety hazard; and
- In the worst case, restriction on entry, or access to, Telecommunications infrastructure (if applicable).

The risk control measures described in this Management Plan have been developed to ensure that the health and safety of people in the vicinity of Telecommunications infrastructure are not put at risk due to mine subsidence. It is also an objective to avoid disruption to services, or if unavoidable, keep disruption and inconvenience to minimal levels.

5.7.1 Implementation of Monitoring Program and TARP Requirements

Tahmoor Coal's standard approach for all monitoring, reporting, investigation and remediation is to commence all tasks as soon as practicable. The following sections provide more information on this standard approach to be adopted during the LW S3A-S7A pre-mining, mining and post-mining phases:

- All monitoring commitments will be tracked on a weekly basis so that tasks are completed as required, taking into consideration land access and environmental factors. Post-mining monitoring will typically be completed within one month of the completion of the relevant longwall and prior to the influence from the active subsidence zone on the feature from the next longwall.
- Following the receipt of monitoring data and inspection results, the IMG will review the data (typically weekly) against the relevant TARPs as soon as practicable. It is noted that discussions amongst telecommunications specialists from the different asset owners will not be restricted to IMG meetings, and relevant specialists will be included at any time to discuss results and assist with the completion of required actions and responses, as required. If any TARP trigger has occurred, the IMG will notify telecommunications infrastructure owners and key stakeholders as soon as practicable.
- In the event of a TARP trigger occurrence, Tahmoor Coal will initiate all requirements (actions and responses) in accordance with the relevant TARP as soon as practicable and in accordance with the defined times in the management plan. This timeframe is noted to be subject to issues outside of Tahmoor Coal's control such as land access constraints, inclement weather, extended timeframes where further monitoring is required, and inability to communicate with a third party / landholder.
- Tahmoor Coal will complete the required actions and responses relating to the TARP trigger as soon as practicable and will endeavour to finalise these requirements, subject to issues outside of Tahmoor Coal's control to satisfy the requirements of this plan, the asset owners and key stakeholders.

Table 5.1 Risk Control Procedures for Telecommunications Infrastructure during the Extraction of LW S3A-S7A (TARP)

Item of Plant	RISK	Trigger	Control Procedures	Timing and Frequency	By Whom
1. Telstra Local cable a) Conduit & Pit Network b) Aerial Cable Network	Low Moderate	Ground Strain > 1.5mm/m and/or anomalous ground movement reported.	Survey Lines along Remembrance Drive, Caloola and Yarran Roads. Visual inspection of aerial cable network with focus on pole tilt and cable tension/sag - report other (non-subsidence) infrastructure damage to asset owner. If triggered complete specific visual inspection refer to IMG.	Baseline prior to LW start. Weekly during active subsidence. Weekly during active subsidence Within 48hrs	SMEC/TC TC TC/IMG
2. Main Copper Network. a) Plastic Sheath Cable b) Lead Sheathed Cable	Low	Ground Strain > 1.5mm/m and/or anomalous ground movement reported.	Survey Lines along Remembrance Drive. Visual inspection of pit top only - report other (non-subsidence) infrastructure damage to asset owner. If triggered complete specific visual inspection based on survey results. Refer to IMG.	Baseline prior to LW start. Weekly during active subsidence. Monthly during active subsidence. Within 48hrs	SMEC/TC TC TC/IMG
3. Telstra direct buried IEN/CAN optical fibre cable (F BRGO 101 12f)	Medium	OTDR loss on fibre <0.3dB and/or ground strain >1.5mm/m or anomalous movement.	Baseline local street surveys along Remembrance Drive and the rail corridor. Visual inspection if triggered - report other (non-subsidence) infrastructure damage to asset owner. Routine real time monitoring of optic fibre performance by Telstra (including triggers in-house technical meetings) If triggered refer to IMG (consider uncoupling), visual inspection, report other (non-subsidence) infrastructure damage to asset owner.	Baseline prior to LW start. Weekly during active subsidence. Weekly Within 48hrs	SMEC/TC Telstra TC/IMG
4. Conduit, Manhole and Pit Network	Low	If survey details show anomalous movement check cables in conduit network.	Survey Lines along Remembrance Drive, Caloola and Yarran Roads. Visual inspection of conduit routes pits and manholes in Remembrance Drive, Caloola Road and Yarran Road whilst in area of active - report other (non-subsidence) infrastructure damage to asset owner. If triggered refer to IMG.	Baseline prior to LW start. Weekly during active subsidence. If triggered only. Within 48hrs	SMEC TC TC/IMG
5. NBN Tower	Medium	Tip rotation exceeds 1° (excluding wind effects)	Baseline local street surveys along Remembrance Drive, Yarran Road and power cable alignment. Weekly visual inspections of power cable route and tower - report other (non-subsidence) infrastructure damage to asset owner. Routine real time monitoring tilt monitoring of tower structure If triggered refer to IMG.	Baseline prior to LW start. Weekly during active subsidence. 24hrs/day Within 48hrs	SMEC TC Sweeting Consulting TC/IMG

5.8 Contingency Plan

In accordance with Conditions C8(g)(ix) and E5(f) of the Consent, in the event that performance measures (in the form of pre-defined triggers) are considered to have been exceeded or are likely to be exceeded, a response will be undertaken in accordance with the TARP. This response is a contingency plan that describes the management / corrective management actions which can be implemented where required to remedy the exceedance.

If a Corrective Action Management Plan is required in accordance with the TARP, this plan will be prepared in accordance with Section 3.6.3 of the Extraction Plan Main Document.

The success of remediation measures / correction management actions that have been implemented for any TARP exceedance would be reviewed as part of any Corrective Action Management Plan, and addressed in weekly Response Group meetings.

5.9 Adaptive Management Strategies

5.9.1 Adaptive Management for Telecommunications Infrastructure

There are no adaptive management strategies currently proposed for the management of Telecommunications Infrastructure during the mining of longwalls LW S1A-S7A.

5.9.2 Continuous Improvement

Tahmoor Coal have adopted the "Plan-Do-Check-Act" continuous improvement model as shown in Figure 13. This model will be applied to all aspects of Tahmoor Coal's subsidence management processes and is utilised to embed the continuous improvement process in all system documents.

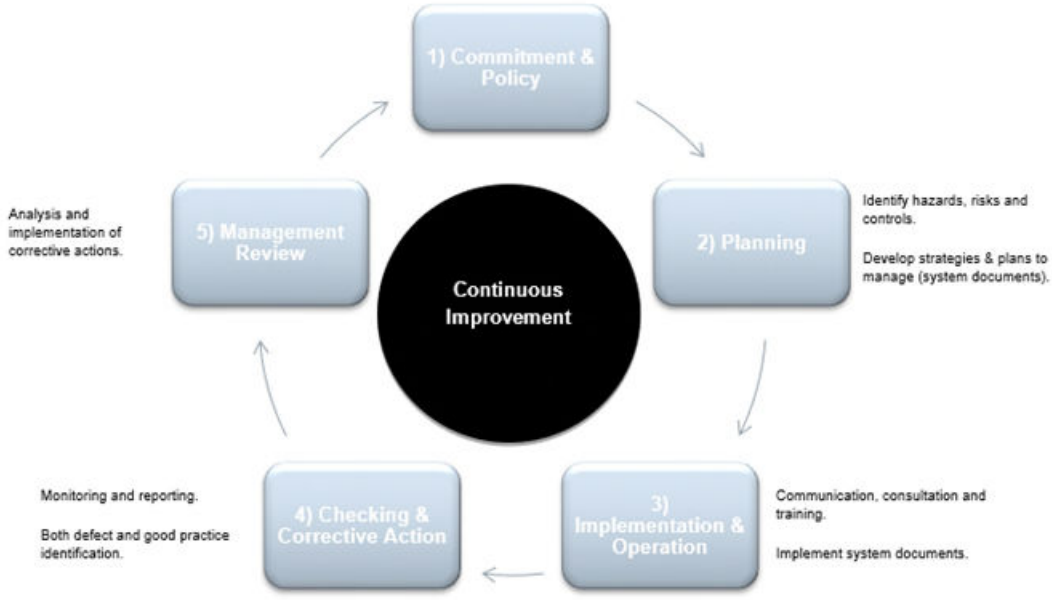

Figure 13 Continuous Improvement Model

6. Implementation and Reporting

6.1 General Requirements

This section of the management plan describes the key elements of implementation and reporting specific to the management of Telecommunications Infrastructure.

A description of requirements and procedures that are applicable to the extraction of LW S1A-S7A in general are provided in the Extraction Plan Main Document. This detail includes:

- General reporting requirements,;
- IMG Meeting process;
- Plan Audit and review requirements;
- Plan Review Timing;
- General roles and responsibilities;
- Document control protocol; and

6.2 Reporting Requirements

The following reporting procedures will be implemented during and after active subsidence to ensure the continued effective consultation, co-operation and co-ordination of action with respect to subsidence between Tahmoor Coal and Telecommunications asset owners:

- Reporting of observed impacts to Telecommunications Infrastructure either during the weekly visual inspection or at any time directly to Infrastructure Management Team (IMG) or nominated key stakeholders;
- Distribution of monitoring reports, which will provide the following information on a weekly basis during active subsidence:
  - Position of longwall;
  - Summary of management actions since last report;
  - Summary of consultation with asset owners since last report;
  - Summary of observed or reported impacts, incidents, service difficulties, complaints;
  - Summary of subsidence development;
  - Summary of adequacy, quality and effectiveness of management process;
  - Any additional and/or outstanding management actions; and
  - Forecast whether there will be any subsidence impacts to the health and safety of people due to the continued extraction of LW S1A-S7A.

Convening of meetings at any time as required, as discussed in Section 6.3;

Arrangements to facilitate timely repairs, if required; and

Immediate contact with Telecommunications asset owners and senior mine management if a mine subsidence induced hazard has been identified that involves potential serious injury or illness to a person or persons on public property or Telecommunications infrastructure and may require emergency evacuation, entry restriction or suspension of work activities.

6.3 IMG meetings

The IMG undertakes reviews and, as necessary, revises and improves the risk control measures to manage risks to health and safety, and potential impacts to infrastructure.

The reviews are undertaken weekly during the period of active subsidence based on the results of the weekly surveys and visual inspections and summarised in the monitoring reports, as described in Section 6.2. The purpose of the reviews are to:

- Detect changes, including the early detection of potential impacts on health and safety and impacts to Telecommunications infrastructure;
- Verify the risk assessments previously conducted;
- Ensure the effectiveness and reliability of risk control measures; and
- Support continual improvement and change management.

IMG meetings may be held by Tahmoor Coal for discussion and resolution of issues raised in the operation of the Management Plan. The frequency of IMG Meetings will be as agreed by Tahmoor Coal and key stakeholders.

IMG Meetings will discuss any incidents reported in relation to the relevant infrastructure, the progress of mining, the degree of mine subsidence that has occurred, and comparisons between observed and predicted ground movements.

It will be the responsibility of the meeting representatives to determine whether the incidents reported are due to the impacts of mine subsidence, and what action will be taken in response.

In the event that a significant subsidence impact is observed, any party may call an emergency IMG Meeting, with one day's notice, to discuss proposed actions and to keep other parties informed of developments in the monitoring of the infrastructure.

6.4 Review and Auditing

6.4.1 Plan Audit Requirements

Should an audit of the Management Plan be required (refer 6.4.2), an auditor shall be appointed by Tahmoor Coal to review the operation of the Management Plan and report at the next scheduled Plan Review Meeting or IMG. The Management Plan shall be audited for compliance with ISO 31000, or alternative standard agreed with key stakeholders of this plan.

Audits of the Telecommunications Management Plan are to be conducted in consultation with the Plan owner(s) and nominated individuals and shall focus on the content and implementation. Audits on the content shall consist of a determination of understanding of the Management Plan by the individual's allocated responsibility under this plan. The review process will be conducted to achieve the following outcomes:

- Gain 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;
- 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 owners;

- 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 this Telecommunications Management Plan determine that a deficiency is evident in the content or implementation, a corrective action must be developed and implemented. Actions will be assigned to a nominated individual and tracked in Cority.

Tahmoor Coal is responsible to verify that the nominated corrective action has been implemented by way of a follow up audit.

Any changes to the Telecommunications Management Plan are to be managed and communicated to all personnel in line with the Change Management Process.

6.5 Plan Review Timing

The purpose of the Plan Review is to update 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.
This Management Plan will be reviewed:

Event based: in accordance with Condition E7 (a) of the Consent, a review will be required within 3 months of any incident, event or finding that identifies an inadequacy in the Telecommunications Management Plan risk assessment or associated documents to continue to effectively manage the identified hazard; a change to the workplace itself or any aspect of the work environment, a change to a system of work, a process or a procedure; or

Time based: in the absence of regular event-based reviews and in accordance with Condition E7 (b-e) of the Consent, this plan will be reviewed within three months of:

b) the approval of any modification of the conditions of this consent (unless the conditions require otherwise); or

c) notification of a change in development phase under Condition A19;

If deemed appropriate, relevant stakeholders may be included in the review process. All reviews are to be documented. The process for review of this document will be in according to Tahmoor Coal's *Document and Record Control* (TAH-HSEC-00124).

Following changes (or as otherwise required above), a copy of the amended management plan will be forwarded to key stakeholders and the Secretary of the DPE.

6.6 Roles and Responsibilities

The responsibilities and contact details specific to the implementation of the Management Plan identified for the extraction of LW S1A-S7A are detailed in table 6.1 below. Members of IMG are shown in blue and denoted with *.

Table 6.1: Roles and responsibilities and contact list

Organisation	Contact	Phone	Email
Telstra Infrastructure	Emergency Contact	13 22 03	
Telstra Engineering Support Manager	Mark Schneider	0419 242 044	Mark.P.Schneider@ team.telstra.com
Telstra Senior Network Engineer	David Blom*	(03) 8649 2993 0418 274 729	David.Blom@team.telstra.com
NBN Transit Engineering and Performance	Steve Yarosz	0439 1291 079	steveyarosz@nbnco.com.au
NBN Executive Manager – Asset, Carrier and Commercial	David Su	0418 268 350	davidsu@nbnco.com.au
TPG Support Manager/Engineer	Philip Price	TBA	Philip.Price@tpgtelecom.com.au
TPG Support Manager/Engineer	Neil McLeod	TBA	Neil.McLeod@tpgtelecom.com.au
NSW Department of Planning and Environment – Resources Regulator	Ray Ramage	(02) 4063 6485 0442 551 293	ray.ramage@regional.nsw.gov.au
NSW Department of Planning and Environment – Resources Regulator	Alan Blakeney	(02) 4063 6485 0442 551 293	Alan.blakeney@regional.nsw.gov.au
Subsidence Advisory NSW	Kieran Black	(02) 4908 4300 1800 248 083	subsidenceadvisory@customerservice.nsw.gov.au
Mine Subsidence Engineering Consultants (MSEC)	Daryl Kay*	(02) 9413 3777 0416 191 304	dary@minesubsidence.com
SIMEC Mining Tahmoor Coal Project Manager	Ross Barber*	(02) 4640 0028 0419 466 143	Ross.barber@simecgfg.com
SIMEC Mining Tahmoor Coal Approvals Specialist	April Hudson	(02) 4640 0022 0466 380 992	April.hudson@simecgfg.com
SIMEC Mining Tahmoor Coal Environment and Community Officer	Amanda Fitzgerald*	(02) 4640 0057 0414 848 213	Amanada.fitzgerald@simecgfg.com

7. Document Information

7.1 Referenced Documents

Reference information, listed in table 7.1 below, is information that is directly related to the development of this document or referenced from within this document.

Table 7.1 Reference Information

Title
AS/NZS ISO 31000:2009 Risk Management – Principles and guidelines
COMMS 2022A – Management Plan Longwall Mining (LWS1A to LW S6A) Beneath Telstra Plant @ Bargo North NSW Comms Network Solutions, Auguust 2022.
COMMS 2022B – Management Plan Longwall Mining (LWS1A to LW S6A) Beneath NBN Co infrastructure @ Bargo North NSW Comms Network Solutions, Auguust 2022.
COMMS 2022C – Management Plan Longwall Mining (LWS1A to LW S6A) Beneath TPG Infrastructure @ Bargo North NSW Comms Network Solutions, Auguust 2022.
JMA (2024) - JMA Solutions 20240101: Preliminary assessment subsidence impacts of NBN monopole tower at 50 Yarran Road, Bargo, Jan 2024.
MSO 2017 - Managing risks of subsidence Guide. WHS (Mines and Petroleum Sites) Legislation, NSW Department of Planning & Environment, Resources Regulator, Mine Safety Operations, February 2017.
MSEC 1192 - Mine Subsidence Engineering Consultants (2022), Tahmoor South Project – Extraction Plan for Longwalls S1A to S7A: Subsidence ground movement predictions and subsidence impact assessments for natural features and surface infrastructure. Prepared for Tahmoor Coal, May 2022.
MSEC1348 - Mine Subsidence Engineering Consultants (2024), Tahmoor Coal – Modification 3 – Longwall S7A – The effects of the proposed addition of LW S7A on previous subsidence predictions and impact assessments. Prepared for Tahmoor Coal, March 2024.
SIMEC (2023) Risk Assessment Tahmoor Underground LWS3A-S7A Subsidence Impacts – Telstra NBN and TPG, Tahmoor Coal Dec 2023.
SIMEC (2020b) Tahmoor South Project Second Amendment Report, Appendices A to O and response to submissions, dated August 2020.
SIMEC (2020c) Additional information responses dated 14 September 2020 (including Appendices A to L), 23 October 2020 and 4 November 2020.

7.2 Related Documents

Related documents, listed in **Table 1** below, are internal documents directly related to or referenced from this document.

Table 1 Related Documents

Number	Title
TAH-HSEC-00120	Community Complaints and Enquiry Procedure
TAH-HSEC-00124	Document and Record Control
TAH-HSEC-00155	Pollution Incident Response Management Plan
TAH-HSEC-00224	Notification of Environmental Pollution Incidents
TAH-HSEC-00323	Emergency and Incident Manual
TAH-HSEC-00365	LW S1A-S6A Extraction Plan Main Document
TAH-HSEC-00361	LW S1A-S6A Water Management Plan
TAH-HSEC-00362	LW S1A-S6A Land Management Plan
TAH-HSEC-00364	LW S1A-S6A Heritage Management Plan
TAH-HSEC-00366	LW S1A-S6A Built Features Management Plan
TAH-HSEC-00365	LW S1A-S6A Public Safety Management Plan
TAH-HSEC-00367	LW S1A-S6A Subsidence Monitoring Plan

7.3 Glossary of Terms

CAN - Customer Access Network, the cable distribution network which provides communications services direct to customers premises.

Main Cable – Subscriber main copper cable providing pairs of copper conductors between the exchange and the distribution point or cross connect point generally a pillar location, i.e. Pillar P8.

Local Cable – NBN customer local copper cable providing pairs of copper conductors between the Pillar or Node distribution point and the customer's premises. This cable may be directly buried or installed in conduit or use aerial distribution to the individual premises. NBN Local cable only identified in the southern corners of LW S4A and LW S5A

NI - Telstra Network Integrity responsible for the protection of the Telstra external plant network.

OTDR - Optical Time Domain Reflectometer, used to determine loss characteristics for transmission systems on optical fibre cables. General used for testing quality of individual optical fibres with testing at 1625nm at higher frequency than transmission systems, to provide early warning of possible transmission loss in the system.

Pillar – Is the interconnection point between the Local cable leading to the customer's premises and the Main cable from the exchange. It provides flexibility within the Customer Access Network to connect new services and disconnect cancelled services. The main telephone exchange distribution area is broken up into smaller distribution areas where the individual pillar provides the connection between the exchange and the customer. Note that with the rollout of NBN this section of the Telstra cable network in the area of LW S1A to LW S7A will be slowly divested from Telstra to NBN ownership.

RIM – This is an external cabinet located generally in the road reserve as a stand-alone cross connect unit which allows improved transmission systems in telephone and data traffic to be provided to generally to rural customers who are located generally more than 5.0 kilometers from their local exchange. The transmission system from the local exchange to more remote locations is provided by optical fibre cable to the RIM and the customer feed is then by traditional Local copper cable distribution from the RIM. From one pair of optical fibres into the RIM up to 560 customers can be remotely connected to the local exchange.

Infrastructure Management Group (IMG) - Regularly convened forum, to meet as required by Telstra/NBN or TPG or Tahmoor Coal via teleconference, to implement this management plan, in regard to the monitoring and performance of the network during mine subsidence. Participants from Tahmoor Coal, Telstra NBN and TPG, Mine Subsidence Engineering Consultants Pty Ltd, Subsidence Advisory NSW and consultants as required as identified in the Contact List (Section 6) to be involved in any discussions considered necessary.

7.4 Abbreviations

Abbreviations used in this document are provided below in **Table 2.**

Table 2 Abbreviations

Abbreviation	Definition
DPE	NSW Department of Planning and Environment
DPIE	NSW Department of Planning, Industry and Environment (formerly DPIE)
EIS	Environmental Impact Statement
km	Kilometre/s
LW	Longwall
LW S1A-S7A	Longwall South 1A – South 6A
m	Metre/s
mm	Millimetre/s
ML	Mining Lease
NSW	New South Wales
Resources Regulator	Department of Regional NSW – Resources Regulator
Study Area	Study Area applicable to this management plan consists of a combination of the predicted 20 millimetre (mm) Total Subsidence Contour and the 35o Angle of Draw Line as shown in Error! Reference source not found..
Tahmoor Coal	Tahmoor Coal Pty Ltd
Tahmoor Mine	Tahmoor Coal Mine
TARP	Trigger Action Response Plan

7.5 Change Information

Full details of the document history are recorded below in **Table 3**.

Table 3 Document History

Version	Date Reviewed	Reviewed By	Change Summary
1.0	March 2024	Zina Ainsworth, Ross Barber, David Talbert, Malcolm Waterfall, Peter Vale	New Document.

APPENDIX A – Risk Review

Major Project Risk Assessment: Tahmoor Underground - LWS3A-S6A Subsidence Impacts - Telstra NBN and TPG

	Step 2: Assess Type; Key Elements-These change depending	Step 3: Identify the risks, causes and potential consequences			Step 4: Identify the existing controls to manage the identified risks	Step 5: Determine RCE	Steps 6, 7 & 8: Determine the Expected Consequence / Likelihood applicable to the Expected Consequence / Current level of risk			Step 10: PMC	Step 11: Treat the Risks				Appendix B: Control Design Effectiveness of Treatment Plans								
☑ Appendix B																							
Site	Type of Risk Assessment	Risk Description - Something happens.....	Consequence - resulting in:	Causes - Caused by	Existing Control Description	Risk Control Effectiveness	Expected Consequence Category	Expected Risk Consequence	Risk Likelihood	Current Risk Rating	Potential Maximum Consequence	Potential Maximum Category	Treatment plans/tasks (Description)	Task Owner	Due Date	Comments	Availability	Reliability	Effectiveness	Average	Overall Impact	Type of Control	Control Design Effectiveness	Date Assessment carried out	Action# (CURA/ Xstrasafe)
Tahmoor Underground	Major Project	Telstra Local Copper Distribution - reduced performance or loss of service	Financial	Subsidence causes damage to local direct buried or conduit encased cable	Telstra Subsidence management plan (including TARP). Ground surveys along streets and Main Southern Railway (weekly during active subsidence) Ground survey along optical fibre cable south of Tahmoor Mine site between Remembrance Drive and Main Southern Railway (weekly during active subsidence) Visual inspections of streets (weekly during active subsidence) Detailed visual inspections of pits and streets (weekly during active subsidence)	2	Financial	1	E	1	1	Property Damage		D. Talbert											
Tahmoor Underground	Major Project	Telstra local copper aerial distribution cable - streched or broken cable or connections, excessive tilt in power poles.	Health & Safety	Subsidence impacts local copper aerial distribution cable.	Telstra Subsidence management plan (including TARP). Ground surveys along streets and Main Southern Railway (weekly during active subsidence) Ground survey along optical fibre cable south of Tahmoor Mine site between Remembrance Drive and Main Southern Railway (weekly during active subsidence) Visual inspections of streets (weekly during active subsidence) Detailed visual inspections of pits and streets (weekly during active subsidence)	2	Health & Safety	1	E	1	1	Health & Safety		D. Talbert											
Tahmoor Underground	Major Project	Telstra local copper aerial distribution cable - streched or broken cable or connections, excessive tilt in power poles.	Financial	Subsidence impacts local copper aerial distribution cable.	Telstra Subsidence management plan (including TARP). Ground surveys along streets and Main Southern Railway (weekly during active subsidence) Ground survey along optical fibre cable south of Tahmoor Mine site between Remembrance Drive and Main Southern Railway (weekly during active subsidence) Visual inspections of streets (weekly during active subsidence) Detailed visual inspections of pits and streets (weekly during active subsidence)	2	Financial	1	E	1	1	Financial		D. Talbert											
Tahmoor Underground	Major Project	Telstra Main Copper Network - reduced performance or loss of service	Financial	Subsidence causes damage to direct buried or conduit encased cable	Telstra Subsidence management plan (including TARP). Ground surveys along streets and Main Southern Railway (weekly during active subsidence) Ground survey along optical fibre cable south of Tahmoor Mine site between Remembrance Drive and Main Southern Railway (weekly during active subsidence) Visual inspections of streets (weekly during active subsidence) Detailed visual inspections of pits and streets (weekly during active subsidence)	2	Financial	1	E	1	1	Financial		D. Talbert											
Tahmoor Underground	Major Project	Telstra NBN (and TPG) Optical Fibre Cable - reduced performance or loss of NBN service	Financial	Subsidence causes damage to Optical Fibre Cable.	Telstra, TPG and NBN Subsidence management plan(s) (including TARP). Ground surveys along streets and Main Southern Railway (weekly during active subsidence) Ground survey along optical fibre cable south of Tahmoor Mine site between Remembrance Drive and Main Southern Railway (weekly during active subsidence) Visual inspections of streets (weekly during active subsidence) Detailed visual inspections of pits and streets (weekly during active subsidence) OTDR monitoring of optical fibre cables (?)	2	Financial	1	E	1	1	Health & Safety		D. Talbert											
Tahmoor Underground	Major Project	Telstra manhole, conduit and pit network - streched or broken cable or connections, damage to old asbestos pits.	Financial	Subsidence causes damage to Telstra manhole, conduit and pit network.	Telstra Subsidence management plan (including TARP). Ground surveys along streets and Main Southern Railway Ground survey along optical fibre cable south of Tahmoor Mine site between Remembrance Drive and Main Southern Railway Visual inspections of streets Detailed visual inspections of pits and streets	2	Financial	1	E	1	1	Financial		D. Talbert											
Tahmoor Underground	Major Project	Telstra manhole, conduit and pit network - streched or broken cable or connections, damage to old asbestos pits.	Health & Safety	Subsidence causes damage to asbestos pits.	Telstra Subsidence management plan (including TARP). Ground surveys along streets and Main Southern Railway Ground survey along optical fibre cable south of Tahmoor Mine site between Remembrance Drive and Main Southern Railway Visual inspections of streets Detailed visual inspections of pits and streets	2	Health & Safety	1	E	1	1	Health & Safety		D. Talbert											
Tahmoor Underground	Major Project	NBN Transmission Tower - reduced performance or loss of service	Financial	Subsidence causes change in orientation of tower (tilt)	Telstra and NBN Subsidence management plan(s) (including TARP). Ground surveys along streets and Main Southern Railway (weekly during active subsidence) Ground survey along optical fibre cable south of Tahmoor Mine site between Remembrance Drive and Main Southern Railway (weekly during active subsidence) Visual inspections of streets (weekly during active subsidence) Detailed visual inspections of pits and streets (weekly during active subsidence) Survey prisms be established on all corners of reinforced concrete footings on site and base line survey	2	Financial	1	E	1	1	Financial	Install tilt-metres on the base slab of the tower oriented in the north-south and east-west direction with real time data provision. NBN to assess the provision of power to the site for any vulnerabilities for ground subsidence or tilt.	D. Talbert										
	Major Project	NBN Transmission Tower - loss of power, streched or damaged cable	Health & Safety	Subsidence causes damage to power supply NBN Tower	Telstra and NBN Subsidence management plan(s) (including TARP). Ground surveys along streets and Main Southern Railway (weekly during active subsidence) Ground survey along optical fibre cable south of Tahmoor Mine site between Remembrance Drive and Main Southern Railway (weekly during active subsidence) Visual inspections of streets (weekly during active subsidence) Detailed visual inspections of pits and streets (weekly during active subsidence) Survey prisms be established on all corners of reinforced concrete footings on site and base line survey	2	Health & Safety	1	E	1	1	Health & Safety	Install tilt-metres on the base slab of the tower oriented in the north-south and east-west direction with real time data provision. NBN to assess the provision of power to the site for any vulnerabilities for ground subsidence or tilt. Survey monitoring line be established for LW S6A (crosses diagonally). Cable and conduit route should be subject to physical inspection.											
	9	9	9	Subtotal CountA (ignoring hidden values)		9				9	9														

Tahmoor Underground	Broad Brush										#N/A											#N/A	07-Dec-22	
Tahmoor Underground	Life of Mine										#N/A											#N/A	07-Dec-22	
Tahmoor Underground	Business																					#N/A	07-Dec-22	