

Telstra Corporation Ltd
Network Integrity

SIMEC Mining
Tahmoor Coal N.S.W.

MANAGEMENT PLAN
LONGWALL MINING (LW W3 &
W4) BENEATH TELSTRA PLANT
@ PICTON N.S.W.

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AUTHORISATION OF MANAGEMENT PLAN

Authorised on behalf of Tahmoor Coal:

Name	Zina Ainsworth
Signature	<i>Zina Ainsworth</i>
Position	Environment and Community Manager
Date	03/09/2021

Authorised on behalf of Telstra Corporation Ltd:

Name	MARK SCHNEIDER
Signature	<i>MS</i>
Position	PROJECT SPECIALIST
Date	3rd September 2021

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1.0 Introduction

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

Tahmoor Coal has previously mined 34 longwalls to the north and west of the Tahmoor Mine's current pit top location. In November 2019 Tahmoor Coal commenced longwall mining in the new Western Domain area consisting of four longwalls LW W1 to LW W4. The area is located north of previous mining in LW28-LW32 and to the north of Thirlmere Way and south of Barkers Lodge Road. In this newer development area LW W1 has completed extraction in November 2019 and LW W2 completed extraction in June 21. Currently mining is planned to continue in this area and commence mining in LW W3 in September 2021 followed on completion by LW W4. The location of the longwalls LW W1 to LW W4 is shown in Plates 1 and 2.

As part of the planning for mining of LW W3–W4, Tahmoor Coal has identified surface assets which may be affected by the mining operation in the Picton west area. Some of these assets belong to Telstra and are part of Telstra's infrastructure in the area. There are current changes underway to ownership of Telstra's external cable and conduit network. Some of the existing communications infrastructure in the area has been transferred to NBNC Co ownership as they establish their new network throughout the area of Picton - Tahmoor.

Telstra will maintain ownership of their existing cable and conduit network while NBNC Co will have ownership over the cable installed from the Node or Pillar to the customer's premises, as well as their own Inter Exchange Network (IEN) optical fibre cable network. Hence ownership of the telecommunications network throughout this area is a composite arrangement essentially with NBNC Co owning cables from the Node to the customer and their IEN network with Telstra owning their existing cable and conduit network plus main copper and optical fibre cables.

During the extraction of previous longwalls LW22 - LW32 and LW W1 to LW W2 the mining impacts from mine subsidence on the Telstra networks that have occurred have been managed satisfactorily from Telstra's perspective. As mining had continued north of the Tahmoor telephone exchange, the potential for impacts on the major network cable infrastructure had varied, with the different types of telecommunications infrastructure exposed to mining. Within the Western Domain, the southern area of the longwalls has and will influence network along Thirlmere Way and Stonequarry Creek Road and the northern area will potentially influence network along Barkers Lodge Road. With the addition of mining in LW W3 and W4 there will be an extension of mining to the eastern side of the Study Area. These areas present very similar telecommunications infrastructure for subsidence and ground movement consideration. Main IEN optical fibre cables are present in the south and north as well as Customer Access Network (CAN) optical fibre cables to the Telstra RIMS in these areas. Note that the Local cable distribution is now owned by NBNC Co in the south and north areas. The Telstra manhole, pit and conduit installations supports both the NBNC Co and Telstra cable networks in all areas of the Study Area. Therefore, primarily the Telstra cable networks potentially impacted by LW W3-W4 are determined geographically predominantly in the east, north and south of the Study Area as shown in Plates 1 & 2.

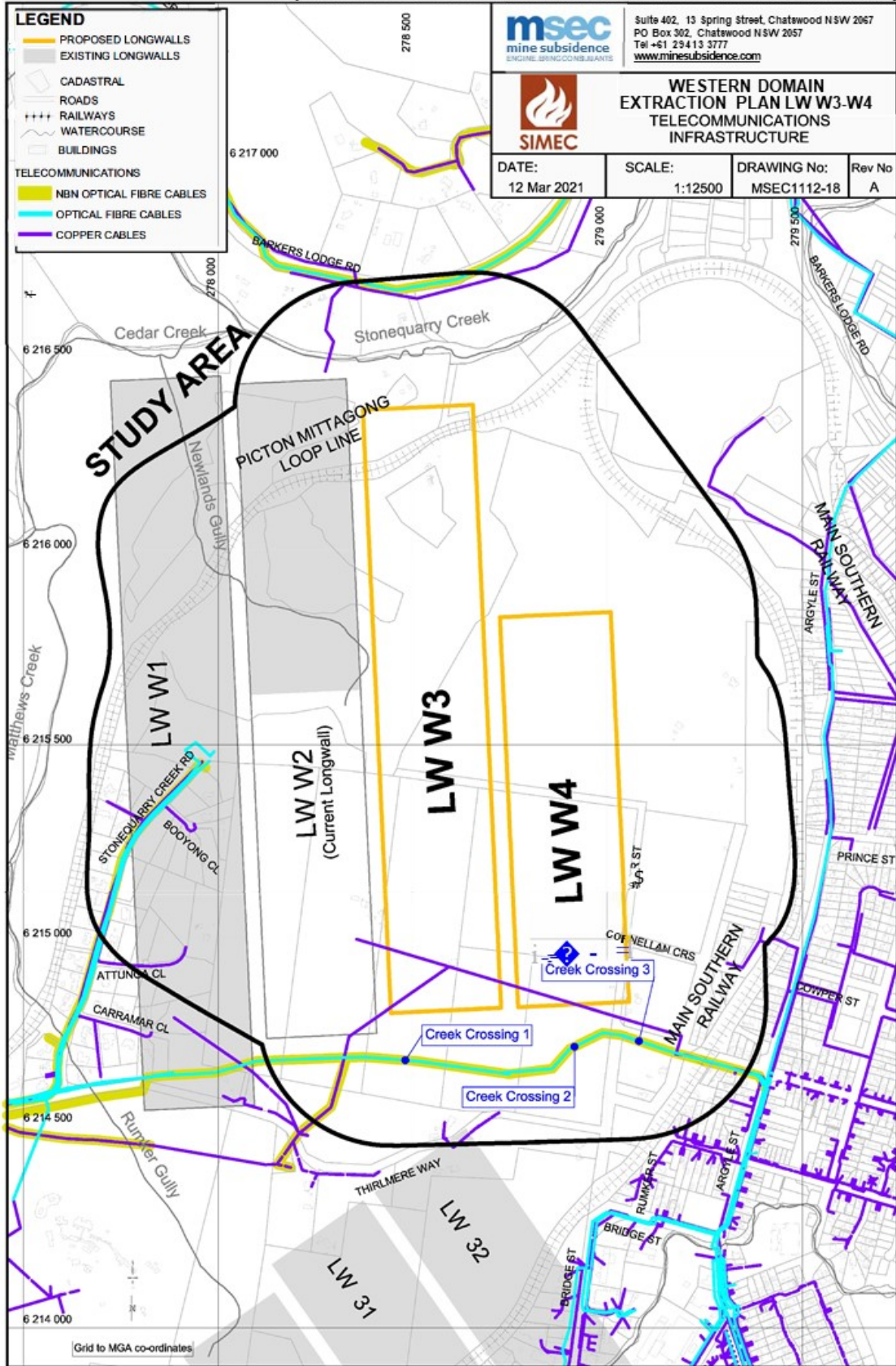


Plate 1:
Telecommunications Infrastructure in Study Area of LW W1-W4.
Western Domain, Extraction Plan LW W3-W4, MSEC Dwg MSEC1112-18, 12 March 2021



Plate 2:

Google Earth view of Study Area (Pink Circle) as shown in Plate 1 also showing Optical Fibre Cables Telstra (Yellow) NBN (Green) and NBN Local Cables (Blue) predominantly at north, south and east edges of the Study Area

1.1) Consultation

1.1.1) Consultation with Telstra

Tahmoor Coal has continued to consult with Telstra over 20 years of longwall mining operations in relation to mine subsidence effects on the various telecommunications assets potentially impacted. This includes consultation during the development of Subsidence Management Plans for previous Longwalls LW W1 and LW W2, and regular reporting of subsidence movements and impacts for these longwalls.

Details regarding consultation and engagement are outlined below:

- Meetings with Colin Dove (Comms Network Solutions) in March 2019 to discuss the preparation of the draft Telstra Management Plan for the Western Domain Longwalls LW W1-W4.
- A Risk Assessment was completed by Tahmoor Coal for LW W1-W4 Infrastructure on 26 March 2019, which included the identification of potential risks to Telstra infrastructure.
- Discussions with Telstra Network Integrity regarding completion of Telstra management plan on 15th July 2019 at Parramatta Office
- Discussions with Colin Dove (Comms Network Solutions) in July 2021 regarding proposed commencement of mining for LW W3 and LW W4 and preparation of Telecommunications Management Plan to identify risks and management of risk for the telecommunications network in this particular area.

Tahmoor Coal will continue to consult regularly with Telstra during the extraction of LW W3-W4 in relation to progress of longwalls, presentation of survey data and mine subsidence effects from continued mining.

1.2) Subsidence Predictions (Reference No 1)

The Mine Subsidence Engineering Consultants Pty Ltd Report MSEC1112 Revision A, "Subsidence Predictions and Impact Assessments For Tahmoor LW W3-W4" March 2021, Reference 1, Section 6.11.4 Telecommunications Services makes the statement that:

"TC and Telstra have developed and acted in accordance with an agreed risk management plan to manage potential impacts to telecommunications infrastructure during the mining of LW22 to LW32, and LW W1-W2. TC has also developed a risk management plan for NBNCo to manage potential impacts to NBN infrastructure during the mining of LW W1-W2

*.....
It is recommended that these management plans are reviewed and updated to incorporate LW W3-W4."*

Therefore, this management plan for the Telstra network will take into consideration the subsidence predictions for longwall LW W3-W4 as well as utilising the experience gained from the management of the Telstra infrastructure from previous subsidence events due to LW22 to LW32 and LW W1-W2 at Tahmoor Mine.

It is recognised from past experience gained at Tahmoor Mine that the more critical parts of the Telstra network are:

- 1 Optical Fibre Cable - this is predominantly due to the nature of the cable in that it is only able to sustain relatively low ground compressive and tensile strains before the external sheath transfers the strain to the individual fibres within the cable. When this occurs the individual fibres have limited capacity to tolerate tensile or compressive strains before they cause interruption to, or failure of, the transmission systems. The other concern with optical fibre cables is that they have much larger capacity to carry telephone, data and internet services such that any minor interruption to traffic can cause serious impacts on the overall telecommunications network.
- 2 Aerial Cable - Aerial cable anchored at adjacent poles or from pole to building can be impacted by ground tilt. Where poles are affected by ground tilt the top of the pole can move such that there is a change in the cable catenary with the potential to either stretch the cable or reduce the ground clearance on the particular cable. There is some NBNCo Local aerial cable present in the south east corner of the study area along Thirlmere Way and along the western end of Connellan Crescent, south and east of LW W3 and LW W4 within the Study Area.

Generally, the more extensive Main and Local copper cable network is more robust and able to reasonably

tolerate levels of mining induced ground strain. The interaction is complex since the network comprises of very small copper cable of 5mm diameter up to larger and more fragile 20mm diameter optical fibre cables, spread diversely in the north, south and east sections of the Study Area. As a result, the cables of similar type will be considered together:

- a. Local copper cable distribution, direct buried and in conduit in Thirlmere Way, Stonequarry Creek Road and Barkers Lodge Road owned by NBNC Co. Not part of Telstra's assets and not considered in this Telstra Management Plan.
- b Telstra Optical Fibre Cables
 - i) Telstra direct buried IEN optical fibre cable crossing the area directly south of LW W3 and LW W4.
 - ii) Telstra CAN optical fibre cable along Stonequarry Creek Road crossing into the western extraction area of LW W1. Note, the major impacts from mining on this cable have occurred over the last 18 months from LW W1 and LW W2 and it is possible there may be some slight incremental impacts on this cable from LW W3 and W4.
 - iii) Telstra direct buried IEN optical fibre cable just crossing into the perimeter of the northern edge of the Study Area of LW W3 and W4 along Barkers Lodge Road. Note it is considered that due to this critical function of this IEN cable, even though it is located on the edge of the subsidence zone, it will require monitoring.
- c Two Telstra RIMs (Optical Fibre to Copper Connection)
Note also as above, the major impacts from mining on these Nodes have occurred over the last 18 months from LW W1 and LW W2 and it remains possible there may be anomalous ground movement particularly at PCTJ since there has been recent ground movement from LW W2 in this area.
 - i) RIM PCTJ – located at the northern end of Stonequarry Creek Road in the western extraction edge of LW W1 and
 - ii) RIM PCTK- located just outside the study area from LW W3-LW W4 along Barkers Lodge Road
- d Cable distribution network consisting of manholes, pits & conduit within the study area supporting both the Telstra cable network.

The total subsidence predictions for these various cable locations are as shown below in Table 1, extracted from Reference No 1 Sections 6.11 & 6.32.

Maximum predicted total vertical subsidence, tilt and curvatures for the optical fibre and copper telecommunications cables (Extracted from data provided in MSEC Report 1112, Revision A, March 2021)

Table 1: Maximum Predicted Cumulative Subsidence Parameters for LW W3 & W4

Location of Network	Subsidence mm	Tilt mm/m	Curvature (1/km)	Transverse Strain (Applying a factor of 10 to curvature)
IEN Optical fibre & Local direct buried copper cable Crossing south of LW W3 & LW W4	950 (W3) 1025 (W4)	5.0	+0.06, -0.10	0.6mm/m tension 1.0mm/m comp, Creek Closure strain approx. + or -0.1mm/m [#]
CAN Optical fibre & Local copper cable Stonequarry Creek Road After LW W4	Total 775	Total 3.0	+0.03, -0.05	0.3mm/m tension 0.05mm/m comp
Local copper cable Thirlmere Way After LW W4	100	< 0.5	+0.01, <-0.01	0.2mm/m tension < 0.1mm/m comp
Local copper cable Connellan Crescent After LW W4	175	1.0	+0.02, < -0.01	0.2mm/m tension < 0.1mm/m comp

See extract below from MSEC Report 1112 Table 6.7 and the related discussion regarding the Telstra and NBNC Co cable lines south of LW W3 and LW W4 and the additional predicted ground strain from upsidence and closure at the three Creek Crossings. Refer to Plate 1 for Creek Crossing locations south of LW W3 and W4.

Extract MSEC Report 1112 Section 6.11.2 and Table 6.7.

The Telstra and NBN cables at the southern end of LW W3-W4 cross a small tributary to Redbank Creek at two locations. Their locations are shown in Drawing No, MSEC1112-18, Creek crossing 1 is located approximately 110 metres to the south of LW W3. Creek crossing 2 is located approximately 110 metres to the south of the centreline of LW W4. Creek crossing 3 is located approximately 100 metres to the south of the maingate edge of LW W4.

A summary of the maximum predicted conventional subsidence and valley-related effects for the creek crossings is provided in Table 6.20, The table provides the maximum total values within a 20 m radius of each culvert due to the extraction of LW W1-W4.

Table 6.37 Maximum Predicted total vertical subsidence, curvature, upsidence and closure for the Telstra IEN creek crossings

Label	Maximum predicted total vertical subsidence (mm)	Maximum predicted total hogging curvature (km ⁻¹)	Maximum predicted total sagging curvature (km ⁻¹)	Maximum predicted total upsidence (mm)	Maximum predicted total closure (mm)
Creek crossing 1	< 20	< 0,01	< 0,01	80	60
Creek crossing 2	40	< 0,01	< 0,01	120	80
Creek crossing 2	< 20	< 0,01	< 0,01	40	25

The optical fibre and copper telecommunications cables within Stonequarry Estate cross small tributaries directly above LW W1-W2 and, therefore, they could experience valley-related effects. The maximum predicted valley-related effects for these telecommunications cables are 25 mm upsidence and 50 mm closure.

Therefore, in addition to the predicted ground strain acting on the Telstra and NBNC Co IEN cables, south of LW W3 and LW W4, at Creeks 1 to 3, there will be additional ground strain resulting from upsidence and closure at the creek crossings. The creek crossing locations are shown in Plate 1. The additional predicted strain impacts generated due to upsidence and closure at the cable lines based on the standard factor of 10 applying to predicted curvature in the southern coal-fields would be a maximum of + or - 0.1mm/m.

It is proposed that this management plan will continue the agreement between Telstra and Tahmoor Coal to effectively manage and address the monitoring issues, related to the degree of risk, assessed by Telstra during mining, for the various elements of the Telstra network exposed to mine subsidence from LW W1 and W2 extraction.

1.3) Limitations

The mechanism of mine subsidence and its impact on the Telstra network has now been considered over a large number of longwall mining events in different geographic locations with different types of telecommunications networks present as identified above. The impacts range from undermining of direct buried major interstate optical fibre cables to undermining two pair copper cables servicing one customer. It is known that longwall mining can impact on the transmission characteristics of optical fibre cables, older more brittle lead sheathed cables and aerial cables. In this case since there are direct buried optical fibre cables located just south of LW W3 and LW W4, exposure of these two Telstra and NBNCable cables is associated with accompanying risk to the Inter Exchange Network. This network carries major internet services, data and telephone traffic between Picton and Tahmoor Exchanges, and forms a critical link to maintain all services in the Tahmoor – Picton area and through to Bargo and Campbelltown Exchanges.

Also, as mentioned above there are both, Local copper direct buried cables and cables in conduit which are potentially vulnerable to sheath damage or high tensile loads respectively. Since monitoring has been performed on the Telstra network during LW24 through to LW32 and LW W1 and LW W2 subsidence events, there is now some basis for assessing the performance of these networks from past experience. Generally, as mentioned it has been found that the older lead sheathed Main, Junction, some Local copper cables, and local aerial copper cable distribution networks are vulnerable to ground movement, particularly, the latter, during exposure to ground tilting. However, within the subsidence zone for LW W3-W4 there are no older lead Junction or Local copper cables to consider.

Once the mine subsidence is initiated there is no method of halting the subsidence event and hence, if the degree of ground movement begins to damage communications plant, then the impact is irreversible and repair work is required. This has been done in the past where, through continuous monitoring, vulnerable plant has been identified to be at risk during the event and action has been taken to minimise the risk of any continuing damage to the network. A management plan for Telstra's assets will not necessarily prevent damage but will limit its impact and put in place actions to be taken, should evidence of significant ground movement indicate the potential for damage to occur.

1.4) Objectives

The objectives of this management plan in relation to the Telstra network within the study area are to put in place procedures to be followed to :-

- a. Ensure the safe and serviceable operation of all surface infrastructure. Public and workplace safety is paramount. Ensure that the health and safety of people who may be present in the vicinity are not put at risk due to mine subsidence.
- b. Prevent disruption and inconvenience to be avoided or, if unavoidable, kept to minimal levels.
- c. Audit and assess the relative risk, for each section of the Telstra network exposed to mine subsidence.
- d. Monitor 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.
- e. Provide a plan of action, should the subsidence effects impact on the serviceability or performance of plant.
- f. Establish a clearly defined decision-making process to ensure timely implementation of risk control measures for high consequence but low likelihood mine subsidence induced hazards that involve potential serious injury or illness to a person or persons that may require emergency evacuation, restriction of entry to work areas or total suspension of work activities.
- g. Provide a forum, *Telstra Response Group (TRG)*, to report, discuss and record impacts on Telstra plant and transmission performance. The TRG will involve representatives from Tahmoor Coal, Telstra Network Integrity, Subsidence Advisory NSW, Mine Subsidence Engineering Consultants Pty Ltd, and other consultants as required.

1.5) Scope

As broadly identified in 1.2) above, the Local cable reticulation in Thirlmere Way, Stonequarry Creek Road and Barkers Lodge Road is now owned by NBNC Co while Telstra retains ownership of main cable, manholes, pits and conduit as identified in 1.2) Parts b), c) and d).

This management plan is to be used to assess and protect the performance of the items of the Telstra network identified to be most at risk, due to mine subsidence impacts and to ensure that the health and safety of people who may be present on public property or Telstra property are not put at risk due to mine subsidence. The major items of Telstra plant are considered, according to their location and the relative to subsidence impacts from LW W3-W4. These items are listed below as items b) to d) and are referred to in the management plan by these reference numbers as also identified in Section 1.2) above.

- a) The Local copper customer distribution cable is owned by NBNC Co and not considered as part of this Telstra Management plan.
- b) Telstra optical fibre cables:
 - i) Telstra direct buried IEN optical fibre cable crossing just to the south of the southern end of LW W3 and LW W4
 - ii) Telstra CAN optical fibre cable along Stonequarry Creek Road just crossing into the western extraction area of LW W1 and just within the total LW W3 and W4 20mm subsidence zone
 - iii) Telstra direct buried IEN optical fibre cable along Barkers Lodge Road, just crossing into the northern edge of LW W3 and LW W4 Study Area. It is noted that the area along Barkers Lodge Road and cable lines are just on the northern perimeter of the Study Area. Hence, there is unlikely to be any recordable ground movement in this area and it is intended to allow for one month of OTDR cable testing on the direct buried cable principally since it is an IEN cable and any anomalous impact has the potential to isolate Lakesland telephone exchange from the local area network. As a result, the cable is included in the discussion below, with the caveat that only initial weekly cable testing will be required following the commencement of each longwall.
- c) Two Telstra RIMs at the northern end of Stonequarry Creek Road near the centre of LW W1 - RIM 'PCTJ' and RIM 'PCTK' just outside the Study Area from LWW1 to W4 along Barkers Lodge Road.
- d) Cable distribution network consisting of manholes, pits, poles and conduit over the study area supporting the cable networks identified above.

1.6) Timing

As mentioned above longwall LW W2 was completed 18 June 2021 and LW W3 is anticipated to commence in September 2021. The longwall LW W3 will then take approximately seven months to mine, working to the south from the northern extent of the longwall. It is anticipated that LW W4 extraction will follow, commencing in May 2022 with completion around September 2022. Therefore, this management plan covering the longwall mining under Telstra plant at Picton West will continue in operation until completion of mining of LW W4, anticipated towards the last quarter of 2022 and for sufficient period of time thereafter to allow for completion of subsidence effects.

1.7) Definitions

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 – NBNC Co 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.

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 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 NBNC Co this section of the Telstra cable network will be divested from Telstra to NBNC Co.

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.

Telstra Response Group: (TRG) Regularly convened forum, to meet as required by Telstra or Tahmoor Coal, to meet via teleconference, to implement this management plan, in regard to the monitoring and performance of the Telstra network during mine subsidence. Participants from Tahmoor Coal, Telstra NI, Mine Subsidence Engineering Consultants Pty Ltd, Subsidence Advisory NSW and consultants as required as identified in the Contact List (Section 10) to be involved in any discussions considered necessary.

1.8) NSW Work Health and Safety Legislation

All persons conducting a business or undertaking (PCBUs), including mine operators and contractors, have a primary duty of care to ensure the health and safety of workers they engage, or whose work activities they influence or direct. The responsibilities are legislated in *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 and 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).

The risk management process has been carried out in accordance with guidelines published by the NSW Department of Planning, Industry & 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 management plan documents the risk control measures that are planned to manage risks to health and safety associated with the mining of LW W3-W4 in accordance with the WHS laws.

2.0) Principal Risks Identified

In relation to the assets identified in 1.6) item b) to d) above, the following are the assessed relative risks associated with existing Telstra plant within the study area as shown in Appendix A Sheet 1. The items of plant have been assessed according to the probability of damage and the consequences resulting from that damage, associated with that general category of plant. The Risk Factors, from low to high, are shown in the attached Table 2.

Table 2

Relative Risk Factor for Telstra Plant.

Risk Assessment Matrix		Consequence				
		<u>Insignificant</u>	<u>Minor</u>	<u>Moderate</u>	<u>Major</u>	<u>Catastrophic</u>
Likelihood	<u>Almost Certain</u>	Significant	Significant	High	High	High
	<u>Likely</u>	Moderate	Significant	Significant	High	High
	<u>Moderate</u>	Low	Moderate	Significant	High	High
	<u>Unlikely</u>	Low	Low	Moderate	Significant	High
	<u>Rare</u>	Low	Low	Moderate	Significant	Significant

a) As noted above the Local copper customer distribution cable is owned by NBNCo and not considered as part of this Telstra Management Plan.

b) Telstra optical fibre cables

i) Telstra direct buried IEN optical fibre cables crossing south of the southern end of LW W3 and LW W4

The Telstra cable F PCTN 103 12f SMOF cable is a small diameter standard construction cable that is direct buried through this relatively inaccessible rural area away from public roads. The cable is located around 80m to 140m south of the finishing ends of the longwalls. Therefore, since the cable line is not easily accessible for inspection and maintenance and is a relatively old cable it is considered that this cable is vulnerable to potential anomalous ground movement south of the longwalls. The risk factor is assessed associated with an unlikely likelihood but major consequence, and an overall **Significant** risk.



Plate 3: View west from Thirlmere Way & Rumker St where Telstra & NBNCo cables enter rural land south of LW W3 and LW W4

ii) Telstra CAN optical fibre cable along Stonequarry Creek Road.

This cable is installed along the western footpath alignment of Stonequarry Creek Road to the Telstra RIM PCTJ located at the northern end of Stonequarry Creek Road, crossing the LW W1 diagonally from west to east. During mining of LW W1 and LW W2 this cable has been subjected to regular OTDR monitoring without recording any impacts from mining activities on the cable. However, there is one area adjacent to the RIM at the northern end of Stonequarry Creek Road where there has been observable compression at the surface above the cable line.



Plate 4:
View of compression
above Telstra conduit
at northern end of
Stonequarry Creek Rd
adjacent to RIM PCTJ.

The Telstra optical fibre cable is installed in conduit but carries the main connections for the Telstra RIM PCTJ at the northern end of Stonequarry Creek Road. This conduit and Telstra cable almost crosses the full width of LW W1 and have been exposed to both travelling and transverse ground strains over a length of around 300m. This exposure combined with the fact that if damage were to occur to the buried conduit, a significant number of customers in and around Stonequarry Creek Road would lose all internet and telephone services. Therefore, the risk factor is assessed to be associated with an unlikely event with moderate consequences, and an overall **Moderate** risk.

iii) Telstra IEN optical fibre cable Direct Buried, crossing north of northern end of LW W3 and W4

The Telstra cable F LKLD 101 is direct buried through the perimeter of the northern edge of the Study Area and provides services to the RIM PCTK and also provides the only inter-exchange connection to Lakesland telephone exchange. Hence it is a vulnerable critical cable in the network but is located just on the edge of potential subsidence impacts. The main issue, is that no far field impacts occur on the direct buried IEN cable, placing the network at risk. As mentioned above there is no direct subsidence impact in this area, however, there is the remote possibility of far field anomalous ground movement affecting the direct buried cable. Therefore, as a precautionary measure only OTDR monitoring will be maintained on the direct buried IEN cable F LKLD 101 during the first four weeks of extraction of both LW W3 and LW W4. It is acknowledged that the risk is rare event but with a major consequence, providing an overall **Significant** risk.



Plate 5:
View of No 6 Pit in Barkers Lodge Road looking east towards PCTN Exchange showing alignment of direct buried Telstra optical fibre cable F LKLD 101 18f installed along the southern side of the road alignment within the road reserve adjacent to fence line.

c) Two Telstra RIMs, at the northern end of Stonequarry Creek Road RIM PCTJ and in Barkers Lodge Road RIM PCTK

The Telstra RIMs function as a Node to provide interconnections between the optical fibre broadband link into the copper cable services to customers. The main RIM within the Study Area, RIM PCTJ is located in relatively high subsidence areas. The RIM PCTK is now just outside the Study Area along Barkers Lodge Road and will not be considered further in the risk assessment except in relation to Item b) iii) above for monitoring of the cable feed into the RIM from F LKLD 101.

The RIM PCTJ is in the higher, old subsidence zone primarily influenced by potential mining impacts from LW W1 and LW W2, at the northern end of Stonequarry Creek Road. The major risk in this area has passed, however there is current localised compression occurring adjacent to the RIM from LW W2. Hence although LW W3 subsidence risk is low there remains potential for impact particularly on the cable feeding to the RIM. Each RIM through the broadband optical fibre cable connection can support up to 480 copper customer services. Hence the maintenance of this network is vital to the overall operation of telecommunications, data and internet services in the area surrounding the RIM. The subsidence predictions for Stonequarry Creek Road and the RIM location after LW W4 are:-

- Subsidence 775mm
- Tilt +/- 3mm/m
- Ground Strain 0.5mm/m compression to 0.3mm/m tension

There is therefore some risk to the operation of the RIM due to the current compression impacting the kerb above the cable feed to the RIM. Therefore, the risk to the RIM is assessed as moderate unlikely event with moderate consequence, since transmission capacity to or from the RIM could be affected by this current ground movement therefore the risk factor is assessed as **Moderate**. See Plate 6 below.



Plate 6:
View of RIM PCTJ located at the northern end of Stonequarry Creek Road over the eastern extraction edge of LW W1. This RIM is fed by IEN optical fibre cable F PCTN 103 from Picton exchange with a 12f optical fibre cable spur line along Stonequarry Creek Road from the joint at Thirlmere Way.

d) Manhole, Conduit & Pit Network.

The conduit, manhole and pit network are the critical factor in the performance of the cable network during mine subsidence accepting that there are also direct buried cables in the network not supported by conduit. Although the possibility of differential movement between the components of this network, due to mine subsidence is low, due to the large geographical extent of the network, its lack of homogeneity and its differing age, it is considered to be an important factor in the performance of the entire cable network. The conduit, manholes, poles and pits provide the primary method of isolation of the cable network from ground movement and ground strain. In addition, because of the variation in the components of this network it is also the most difficult item of plant to assess for potential risk of damage. The main concern in this network is the performance of the older asbestos pits, however these are only present outside of the direct mining areas along Thirlmere Way and Barkers Lodge Road. The large pits along Stonequarry Creek Road are all HDPE (polyethylene) construction making them far less vulnerable to ground movement impacts than the heavier asbestos or concrete pits located in adjacent areas. Within this extensive geographical area, the conduit network is comprised of varying sized PVC conduit (20-100mm dia.) and pits which are generally considered to be at a low level of risk of damage from ground movement or strain developing across the Study Area. The risk assessment for the manhole, conduit and pit network is considered to be associated with an unlikely likelihood, minor consequence, and an overall **Low** risk.

2.1) Identification of subsidence hazards that could give rise to risks to health and safety

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 that have been identified which could rise to risks to health and safety of people in the vicinity of Telstra infrastructure.

Mine subsidence hazards have been identified, investigated and analysed in a systematic manner by examining each aspect of the infrastructure, as described in Section 2.0 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:

- b) Telstra optical fibre cables
 - i) Telstra direct buried IEN optical fibre cables crossing the southern ends of LW W3 and LW W4
 - ii) Telstra CAN optical fibre cable along Stonequarry Creek Road crossing into the western extraction area of LW W1
 - iii) Telstra direct buried IEN optical fibre cable crossing the northern perimeter of the Study Area for LW W3 and W4 along Barkers Lodge Road
- c) The Telstra RIM at the northern end of Stonequarry Creek Road RIM PCTJ.
- d) Cable distribution network consisting of manholes, pits, poles and conduit over the Study Area supporting the cable networks identified above.

The following mine subsidence hazards were identified that could give rise to risks to health and safety due to the extraction of Longwall LW W3-W4.

- Temporary loss of telecommunication IEN or CAN services.
- Disruption of telecommunication services into or out of RIMs

The identification and risk assessment process took into account the location of infrastructure relative to LW W3-W4 and the associated timing and duration of the subsidence events, as described in this management plan.

Whilst mine subsidence predictions and extensive past experiences from previous mining at Tahmoor Coal 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. In this case, creeks have been mapped that intersect with Telstra infrastructure.

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 Telstra infrastructure in general. These are described below in Section 3 of this management plan and the details of the Tahmoor Coal Risk Assessment process are attached as Appendix B to this management plan.

3.0) Control Procedure

(Refer also to Appendix B for details)

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.
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)

Tahmoor Coal considered Method A and Method B risk control measures in relation to managing potential impacts on Telstra infrastructure due to the extraction of LW W3 -W4.

The following considerations have been made by Tahmoor Coal with regards to impact to Telstra infrastructures:

- 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 put in place a structure or item that prevents or minimises risks.
- Administrative Controls -
 - Tahmoor Coal and Telstra have developed and implemented Administrative Controls that will put in place procedures to minimise the potential of impacts on the health and safety of people associated with damage to Telstra infrastructure.

Tahmoor Coal and Telstra have developed 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. These measures are itemized in **Table 3** of this management plan.

The risk control measures described in this management plan have been developed to ensure that the health and safety of people on Telstra 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.

With respect to the extraction of LW W1-W4, no potential hazards have been identified that could reasonably give rise to the need for an emergency response. Of the potential hazards identified, only a complete loss of mobile and fixed line services could possibly give rise to the need for an emergency response. The likelihood is considered remote and would require substantial differential subsidence movements at multiple locations to develop before such an event occurs.

Mine subsidence movements will develop gradually and there will be ample time to identify the development of potentially adverse differential subsidence movements early, consider whether any additional management measures are required, and repair or adjust affected surface features, in close consultation with Telstra.

Tahmoor Coal & Telstra will review and assess monitoring reports and consider whether any additional management measures are required on a weekly basis. If potentially adverse differential subsidence movements are detected, it is anticipated that a focused inspection will be undertaken in the affected area, and a decision will likely be made to increase the frequency of surveys and/or inspections. Additional management measures may also be implemented. It is therefore expected that, if a potential adverse situation escalates, Tahmoor Coal will be present on site on a more frequent basis to survey or inspect the affected site, and that Telstra will be consulted on a more frequent basis.

Notwithstanding the above, if a hazard has been identified that involves potential serious injury or illness to a person or persons on public property or in the vicinity of Telstra infrastructure, and cannot be controlled, the immediate response is to remove people from the hazard. If such a situation is observed or is forecast to occur by either Tahmoor Coal or by people on public property, Tahmoor Coal and Telstra will immediately meet and implement emergency procedures.

3.1) General

As discussed in Item 1.1) above there is now information available on the performance of Telstra plant due to ground subsidence caused by longwall mining operations in the past. The current information available is from experience gained at Appin, Tahmoor, Helensburgh, West Wallsend, Camberwell and Broke in NSW. The longwall mining operation at Tahmoor provides a continuing opportunity to gather information on the performance of the network, needed to understand the interaction between ground movement and the Telstra plant, comprising both robust and also relatively sensitive elements of the network.

The general control procedure considered in this management plan is to look at each item of plant described in Section 2.0) Items b) to d) and determine the practical level of monitoring that can be performed according to the assessed risk factor applied. The monitoring described for the plant identified should be completed during the ground subsidence events occurring at the particular location as the longwall progresses. In addition, Table 3, is a summary of recommendations for monitoring procedures and basic actions to be taken during mining, should the potential for damage be indicated by surface impacts, cable testing or from survey data.

Since there are similar types of cable involved and the proposed monitoring methods for each cable type are similar, they have been grouped together below and in Table 3 to simplify the discussion and management of the network during ground subsidence.

b) Telstra optical fibre cable

i) Telstra direct buried IEN optical fibre cable F PCTN 103 crossing southern of end of LW W3 and LW W4.

Risk Factor is assessed to be **Significant** risk.

This Telstra cable F PCTN 103 12f SMOF cable is a direct buried cable approximately 80m to 120m to the south of LW W3 and W4. The cable for the majority of this section of the route the cable is installed across rural undulating grazing land with the cable route across three creek crossings off the southern ends of the longwalls. Creeks 1 100m from the end of LW W3 and Creeks 2 & 3 approximately 125m and 90m respectively off the southern edge of LW W4. See cable location as shown in Plates 1, 2 and Plate 3 & 7 below.

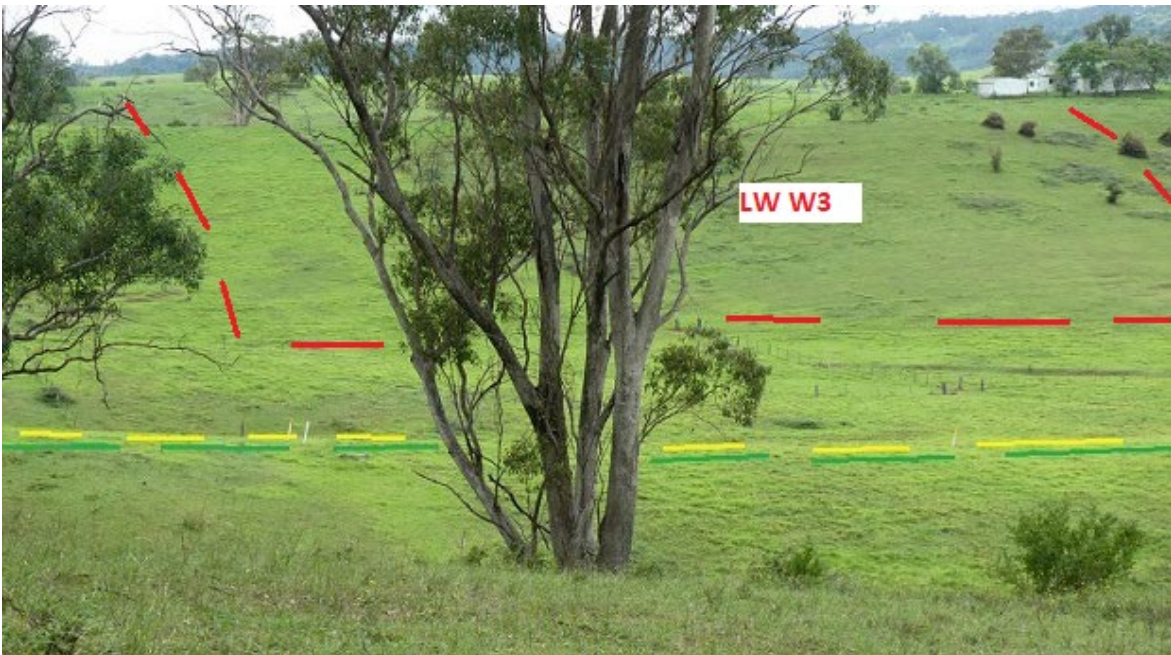


Plate 7:

View of Telstra IEN cable to the south of LW W3. Cable is running east west to the north of Thirlmere Way around 80m to 140m south of the finishing ends of LW W3 and LW W4 respectively.

Since the cable is located away from public roads and through thickly covered grass land there is little point in physical inspection of the cable line during mining. Therefore, it is proposed to utilize OTDR monitoring of the cable through this vulnerable area of the cable route south of LW W3 W4.

Due to the importance of the Telstra and NBNCo IEN cables a monitoring regime will be maintained on the cable consisting of :-

- Physical inspection in the east where the cable leaves along Thirlmere Way at Rumker Street where the accessible section of the cable line enters the rural land.
- Analysis of survey data by Tahmoor Coal surveyors for the Optical Fibre Survey Line and relevant cross lines and longitudinal survey lines for LW W3 and LW W4.
- Cable monitoring, including testing spare fibres in the cable F PCTN 103 from Tahmoor exchange to identify the relevant section of the cable crossing below LW W3 & W4. This OTDR fibre testing across the longwalls will be carried out by Comms Network Solutions Pty Ltd from Tahmoor exchange through the mining area. This specialized individual fibre testing will be able to confirm that there are no or very low levels of transmission loss present on the cable due to mining. The trigger levels and actions for the cable monitoring which will be at 1625nm on individual fibres, to determine any loss characteristics present, will be set as follows:-

In the event of loss being recorded of (+ or -) 0.3 dB then:-

- The point loss or area of loss should be recorded and an investigation carried out of the direct buried cable line at that location to determine if any ground movement is evident, i.e. ground compression / tension along the cable line and analysis of any relevant survey data.
- The loss event should continue to be continuously monitored and should the loss progress to (+ or -) 0.5dB then the cable should be exposed at the recorded location to attempt to relieve pressure or tension/compression on the cable due to ground strain.
- In the event of the loss on the cable continuing excepting that exposure has not relieved or reduced the transmission loss and that loss exceeds 1dB an emergency interruption cable should be laid and pits installed in preparation for cutover of the cable if considered necessary.

ii) Telstra F PCTN 103 AZ-BG optical fibre cable to RIM PCTJ along Stonequarry Creek Road.

Risk Factor is assessed to be **Moderate** risk

This cable is installed along the western footpath alignment of Stonequarry Creek Road to the Telstra RIM PCTK located at the northern end of Stonequarry Creek Road crossing the LW W1 diagonally from west to east.

The Telstra optical fibre F PCTN 103 AZ-BG is installed in conduit and carries the main connections for the Telstra RIM PCTJ to the northern end of Stonequarry Creek Road and also makes a diagonal crossing of LW W1. This exposure combined with the fact that if damage were to occur to the buried conduit, a significant number of customers in and around Stonequarry Creek Road would lose all internet and telephone services. Hence again as with b) i) and iii) this cable will be monitored on spare fibre along Stonequarry Creek Road by CNS Pty Ltd using an OTDR at 1625nm with cable testing at regular intervals while extraction is occurring in LW W3 until the longwall extraction is approximately 350m past the northern end of Stonequarry Creek Road. Survey data from Tahmoor Coal surveyors will also be reviewed for Stonequarry Creek Road to determine if more regular cable testing is required or which areas are to specifically be investigated along the cable route.

iii) Telstra IEN optical fibre cable Direct Buried, crossing north of northern end of LW W3 and W4

Risk Factor is assessed to be **Significant** risk

The Telstra cable F LKLD 101 is direct buried through the perimeter of the northern edge of the Study Area and there is no predicted subsidence impacts on this cable. However, this particular cable is considered critical to the Telstra inter-exchange network. Therefore, as outlined above, as a precautionary measure only, OTDR monitoring as outlined above, will be maintained on the direct buried IEN cable F LKLD 101 during the first four weeks of extraction of LW W3 and LW W4.

c) Telstra RIM at the northern end of Stonequarry Creek Road RIM PCTJ.

The Risk Factor is assessed as **Moderate**

The concern from Telstra's perspective for the RIM is principally anomalous ground movement affecting the optical fibre cable broadband services to and from the connection to the node. Therefore, as outlined above in b) ii) for the cable, OTDR monitoring at 1625nm will be maintained, to ensure the continued operation of the transmission systems into and out of the RIM.

The cable monitoring will be combined with analysing survey data supplied by Tahmoor Coal surveyors to Telstra for the survey line along Stonequarry Creek Road to determine if more regular cable testing is required to address any issues of anomalous ground movement that may become evident during mining.

d) Manhole, Conduit & Pit Network.

The Risk Factor is assessed to be **Low** risk.

The cable distribution network is obviously subject to the greatest risk of damage in the areas of maximum subsidence, however in this case for LW W3-W4, there is a relatively small amount of the network exposed to subsidence impacts along the northern end of Stonequarry Creek Road and this network consists of plastic jointing pits and relatively newer uPVC conduit installation. The remainder of the network along the exposed section of Thirlmere Way and into the south-eastern corner of the Study Area is a combination of pit and conduit and direct buried cable.

For all areas of cable exposure to potential mining impacts it is recommended that the cable routes and pit network be inspected regularly during critical subsidence impacts at each particular location. This will include inspections along parts of Stonequarry Creek Road and areas along Thirlmere Way at varying times during mining. Additionally, the surface area above the conduit should be inspected and checked against road and other infrastructure reports prepared by Tahmoor Coal consultants, to note any changes in road pavement or in the footpath areas, which may indicate excessive ground strains potentially impacting on the surrounding conduit and cable network.

3.2) Surface Subsidence Survey

The control procedure for the Telstra network for LW W3 and W4 should be supplemented by ground surveys carried out by Tahmoor Coal at agreed time intervals along the agreed base lines of Stonequarry Creek Road, Thirlmere Way, the Optical Fibre Cable Line, and cross and longitudinal lines for recording:-

- Initial RL of the surface prior to mining commencing.
- Incremental subsidence over the agreed period.
- Incremental ground strain over the agreed period.
- Incremental ground tilt over the agreed period.

The frequency of the survey and the reporting of the results, to the TPG, are to be agreed by the members of the TPG, at each regular meeting of the group. The initial meeting should agree on the limits of the survey lines and set the initial frequency of the survey work.

Refer to the following table, Table 3, which presents a Summary of the Telstra Plant, Risk Factor, Monitoring and Actions required for items of plant, which may be impacted by mine subsidence. Note that in the Table 3 items of plant have been grouped according to the monitoring technique outlined above and identified by the item numbers previously assigned, items b) to d).

Table 3 - Summary of Monitoring Procedures and Actions

Item of Plant	Risk Factor	Method Levels	Monitoring Details	Frequency	Trigger	Actions and Responsibilities
b) Telstra optical fibre cable i) Telstra F PCTN 103 direct buried IEN optical fibre cables	Significant	Survey cable line Base line OTDR Testing.	Tahmoor Coal to survey along OF Cable Line cross & longitudinal lines OTDR Testing @ 1625nm of F PCTN 103 over LW W3 & W4 by CNS P/L from TAMR exchange	Initial survey & OTDR test then fortnightly / weekly during critical subsidence events.	Ground Strain > 1mm/m OTDR loss on fibre <0.3dB.	CNS P/L (Colin Dove) to report trigger levels to Telstra Response Group (TRG) for decision on action to be taken as considered necessary by Telstra representatives to protect the cable.
b) Telstra optical fibre cable ii) Telstra CAN optical fibre cable along Stonequarry Creek Road to RIM -PCTJ	Moderate	Survey cable line Base line OTDR Testing.	Tahmoor Coal to survey cable line along Stonequarry Creek Rd. OTDR Testing @ 1625nm of F PCTN 103 AZ-BG by CNS P/L from RIM south.	Survey Data & OTDR test then fortnightly / weekly during critical subsidence events	Ground Strain > 1mm/m, OTDR loss on fibre <0.3dB.	Tahmoor Coal or CNS P/L (Colin Dove) to report trigger levels to TRG for decision on action to be taken as considered necessary by Telstra representatives to protect the cables.
b) Telstra optical fibre cable iii) Telstra direct buried IEN optical fibre cable F LKLD 101	Significant	Base line OTDR Testing.	OTDR Testing @ 1625nm of F LKLD 101 by CNS P/L from PCTN Exchange	OTDR test for first 4 weeks for LW W3 & W4	OTDR loss on fibre <0.3dB.	Tahmoor Coal or CNS P/L (Colin Dove) to report trigger levels to TRG for decision on action to be taken as considered necessary by Telstra representatives to protect their cable.

Item of Plant	Risk Factor	Method Levels	Monitoring Details	Frequency	Trigger	Actions and Responsibilities
c) <u>Telstra RIM PCTJ in Stonequarry Creek Rd</u>	Moderate	Base line OTDR Testing of cable feeding RIM	Tahmoor Coal to maintain survey cable line along Stonequarry Creek Rd OTDR Testing @ 1625nm of F PCTN 103 AZ-BG by CNS PL as identified in b) parts i) to iii) above.	Initial survey & OTDR test then fortnightly / weekly during critical subsidence events	Ground Strain > 1mm/m, OTDR loss on fibre <0.3dB.	Tahmoor Coal or CNS P/L (Colin Dove) to report trigger levels to TRG for decision on action to be taken as considered necessary by Telstra representatives to protect operation of and services to both RIMs
d) <u>Conduit, Manhole Pit & Pole Network</u>	Low	Monitor conduit & cable movement in pits and manholes concurrent with cable testing as outlined above.	Monitor conduit & cable movement in Stonequarry Creek & around Thirlmere Way at Rumker St during subsidence period from LW W3 & W4 impacting on each particular area.	Prior to mining then as determined by longwall progress and as required by TRG.	Visual check of active section being monitored. If significant surface movement impacting on network check distribution cables in conduit network.	Should surface damage occur or survey data indicate anomalous movement check conduit pit and manhole network in this area. C Dove to advise Telstra & TRG of any damage evident and maintenance or repair work considered necessary.
<u>Survey Line</u>	Not Applicable	Permanent marks at approx. 20 metre intervals along roads & cable lines where network is installed.	Tahmoor Coal to carry out detail survey, (subsidence, strain and tilt recorded) along Stonequarry Creek, Thirlmere Way and OF Line for LW W3 & W4. Tahmoor Coal to provide survey results to TRG and Telstra representatives concurrent with mine progress.	To be determined by TRG dependent on degree of subsidence occurring and potential hazard to Telstra plant. Nominal weekly surveys through active subsidence areas	Surveyed ground strain compression or tension above 1mm/m	Tahmoor Coal to make survey results available to Telstra or their representative & TRG following each regular survey of active mining area.

4.0) Resources

Technical resources required to carry out the monitoring as identified In Table 3 are to be provided by Telstra or their consultants as required. The costs associated with the monitoring work required for the networks are to be reported to the TRG and agreement reached as to the responsibility for individual costs. Tahmoor Coal will provide the survey resources required for the line surveys established on the roads around and over LW W3-W4 to determine incremental and total subsidence, strain and tilt during mine subsidence from the longwalls.

Prior to commencing any proposed rectification work the Telstra representatives will detail the extent of the work and the associated costs, to the TRG. At that meeting agreement will be reached between Tahmoor Coal, Telstra and the Subsidence Advisory NSW as to the responsibility for the costs of the proposed work. In the event of a dispute as to responsibility for the costs, involving work to secure Telstra's networks, where loss of service to customers or line systems outage is involved, the work will be carried out by Telstra and the dispute referred to the next meeting of the TRG for further discussion and agreement.

5.0) Roles and Responsibilities

The following procedures will be implemented during and after active subsidence of the Telstra infrastructure, to ensure the continued effective consultation, co-operation and co-ordination of action with respect to subsidence between Tahmoor Coal and Telstra.

The monitoring of the Telstra's network in accordance with this management plan is to be carried out by Telstra or their representatives with the ground survey component of the monitoring work completed by Tahmoor Coal. The TRG is to convene the forum for discussion and resolution of issues raised in the operation of the management plan and impacts on the telecommunication network. Teleconferences arranged by the TRG need only be convened in the event of trigger levels being reached as set out in Table 3, unpredicted ground movement detected by survey or cable faults or damage being recorded within the Telstra network. Any anomalous ground movement resulting from subsidence over LW W3-W4 and any risk perceived by Tahmoor Coal to the network, due to mining is to be used to prompt an initial meeting of the TRG.

The representatives be involved in the Telstra Response Group are:-

Zina Ainsworth – Environment and Community Manager, Tahmoor Coal.
April Hudson – Approvals Specialist, Tahmoor Coal.
Amanda Fitzgerald – Environment & Community Officer, Tahmoor Coal
Daryl Kay – Mine Subsidence Engineering Consultants Pty Ltd.
Colin Dove – Consultant Telecommunications Engineer.

The telecommunication stakeholders are:

Mark Schneider – Team Leader Telstra Network Integrity.
Matthew Montgomery – Infrastructure Manager Subsidence Advisory NSW.
Ray Ramage – Resources Regulator

When required the TRG is to appoint a minute's secretary responsible for maintaining all documentation presented to the meeting and responsible for circulating minutes and advising participants of future meetings.

The purpose of the reviews is to:

- Assess monitoring data, including the early detection of potential impacts on health and safety and impacts to Telstra infrastructure;
- Verify the risk assessments previously conducted;
- Ensuring the effectiveness and reliability of risk control measures; and
- Supporting continual improvement and change management.

At the TRG meetings, Telstra are to report incidents recorded in relation to the performance of their network plant and a detailed log is to be maintained of each incident reported to the TRG. Full details are to be reported of significant events observed or events which have an impact on the communications networks or the provision of telecommunication services in the area. Tahmoor Coal are to report on the degree of subsidence that has occurred at that time and how closely subsidence is following the predictions made in References No 1.

It is the responsibility of this meeting to determine if the events recorded are due to the impact of mine subsidence and then determine the degree of responsibility each party has, for those events.

Should significant risk be identified then either party may call an emergency TRG, with one day's notice, to discuss proposed action and to keep other parties informed of developments in the monitoring or maintenance of the Telstra network.

6.0) Audit and Review

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

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

- Gain an improved understanding of subsidence hazards based on ongoing subsidence monitoring and reviews, additional investigations and assessments as necessary, ongoing verification of risk assessments previously conducted, ongoing verification of assumptions used during the subsidence hazard identification and risk assessment process, ongoing understanding of subsidence movements and identified geological structures at the mine.
- Revise risk control measures in response to an improved understanding of subsidence hazards.
- Gain feedback from stakeholders in relation to managing risks, including regular input from business or property 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.
- 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:

- Poor performance of the Telstra plant in regard to mine subsidence, such as interruption or loss of services.
- Any trigger levels being reached or exceeded.
- Favourable performance of the Telstra plant in regard to mine subsidence, no observe red or recorded impacts.
- Significant variations between actual and predicted subsidence occurring including variations in ground strain observed from survey data.
- Evidence of significant geological faults or evidence suggesting major "Far field effects" may develop.

It is anticipated that this plan will be in place for approximately two years from the commencement of mining in LW W3 through to completion of LW W4 or for a minimum period of three months following final ground settlement after extraction of LW W4. Should an audit of the Telstra Management Plan be required during that period then a representative is to be appointed by Telstra, Tahmoor Coal and Subsidence Advisory NSW to review the operation of the plan and report amendments to the next scheduled meeting of the TRG.

7.0) Record Keeping

As required, when meeting is initiated the minutes secretary of the TRG shall keep minutes from the meetings called and advise participants of any future or emergency meetings to be held. The minutes are to include details as reported on the condition of the individual items of Telstra plant, the assessment of the degree of ground subsidence that has occurred, any agreements reached and a log of any incidents/damage reported to the meeting involving the telecommunications network.

8.0) Associated Documents and References

8.1) Appendices

Appendix A (Drawings Extracted from Reference No 1)

MSEC Drawing MSEC1112-30
Western Domain Extraction Plan LW W3-W4
Monitoring Sheet 1 of 1

Appendix B -
Tahmoor Coal Pty Ltd, Risk Assessment Report,
Tahmoor North – Western Domain
Longwalls West 3 & West 4, October 2020

Pages 1 to 50

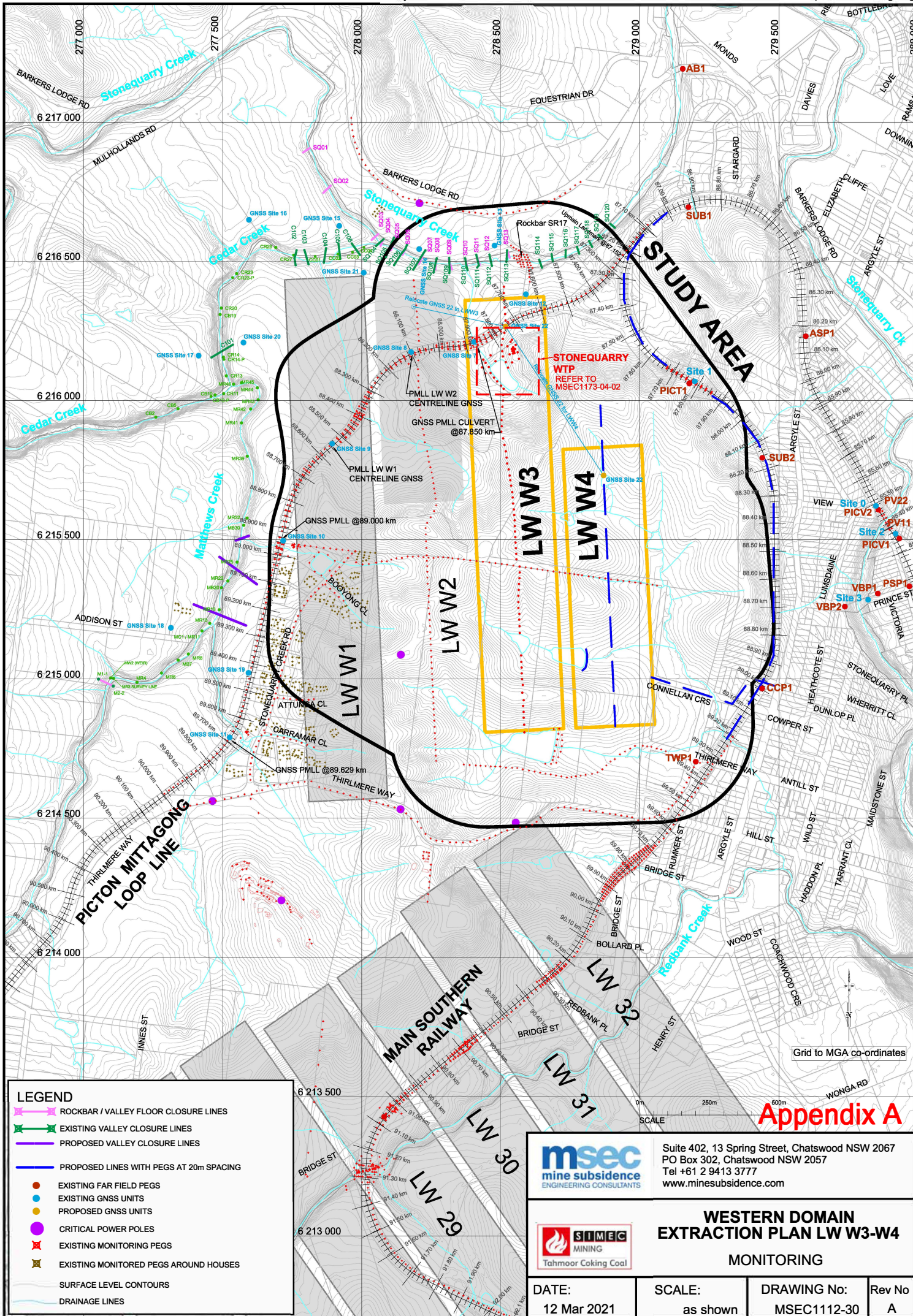
8.2) References

Reference No 1
The Report MSEC 1112, Revision A, March 2021, titled “Subsidence Predictions and Impact Assessments for Tahmoor LW W3-W4”

9.0) Contact List.

Contacts of participants involved in *Telstra Response Group*:

Organisation	Contact Name	Title	Postal Address	Telephone / Mobile	Email
Mine Subsidence Engineering Consultants Pty Ltd	Daryl Kay	Director	PO Box 302 Chatswood, NSW, 2057	9413 3777	daryl@minesubsidence.com
Tahmoor Coal	Zina Ainsworth	Environment and Community Manager	PO Box 100 Tahmoor NSW	46400 100, 0438 284 106	Zina.Ainsworth@Simecgfg.com
Tahmoor Coal	April Hudson	Approvals Specialist	PO Box 100 Tahmoor NSW	4640 0022, 0466 380 992	April.Hudson@simecgfg.com
Tahmoor Coal	Amanda Fitzgerald	Environment and Community Coordinator	PO Box 100 Tahmoor NSW	4640 0025, 0414 848 213	Amanda.Fitzgerald@simecgfg.com
Telstra	Mark Schneider	Project Specialist, Telstra Network Integrity	Locked Bag 5035, Parramatta, 2124, NSW	0419 242 044	Mark.P.Schneider@team.telstra.com
Comms Network Solutions Pty Ltd	Colin Dove	Telecommunications Consultant	20 Bowden Cresc Connells Point, 2221	0428 970 826	cdove@commsnet.net.au
Subsidence Advisory NSW	Matthew Montgomery	Infrastructure Manager, Southern Coalfields	PO Box 40 Picton NSW, 2571	4677 1967, 0425 275 567	matthew.montgomery@finance.nsw.gov.au



- LEGEND**
- ROCKBAR / VALLEY FLOOR CLOSURE LINES
 - EXISTING VALLEY CLOSURE LINES
 - PROPOSED VALLEY CLOSURE LINES
 - PROPOSED LINES WITH PEGS AT 20m SPACING
 - EXISTING FAR FIELD PEGS
 - EXISTING GNS5 UNITS
 - PROPOSED GNS5 UNITS
 - CRITICAL POWER POLES
 - EXISTING MONITORING PEGS
 - EXISTING MONITORED PEGS AROUND HOUSES
 - SURFACE LEVEL CONTOURS
 - DRAINAGE LINES

Grid to MGA co-ordinates

Appendix A



Suite 402, 13 Spring Street, Chatswood NSW 2067
 PO Box 302, Chatswood NSW 2057
 Tel +61 2 9413 3777
 www.minesubsidence.com



WESTERN DOMAIN EXTRACTION PLAN LW W3-W4 MONITORING

DATE: 12 Mar 2021	SCALE: as shown	DRAWING No: MSEC1112-30	Rev No A
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SIMEC

MEMBER OF



Tahmoor Coal Pty Ltd

RISK ASSESSMENT REPORT

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

Date Held: 23 September 2020

October 2020

simecgfg.com

Document Control

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

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1 Introduction

1.1 Background

Tahmoor Coal Mine is located approximately 80 kilometres south-west of Sydney in the township of Tahmoor NSW. It is managed and operated by Tahmoor Coal Pty Ltd, which is a subsidiary of SIMEC Mining Division (SIMEC). Tahmoor Coal has previously mined 32 longwalls to the north and west of the mine's current pit top location.

Tahmoor Coal proposes to extend underground coal mining to the north-west of the Main Southern Railway in the area referred to as the 'Western Domain', which will include Longwalls West 1 to West 4 (LW W1-W4) at Picton (refer to **Figure 1-1**). Longwall West 1 is currently being mined accordance with current Development Consent (DA 67/98) and Extraction Plan Approval for the extraction of Longwalls West 1 and West 2. First workings of development headings for LW W3 are about to commence.

Under Condition 13H of the Development Consent (DA 67/98), as modified, an Extraction Plan is required for all second workings from LW W1 and subsequent longwalls. An extraction plan for Longwalls West 3 and West 4 (LW W3-W4) is currently being prepared. The Extraction Plan will be required to be approved by the NSW Department of Planning, Industry and Environment (DPIE), and Infrastructure Management Plans are required to be approved by the relevant infrastructure owners.

The Extraction Plan shall address the Study Area for LW W3-W4, which is comprised of both the predicted 20 mm Total Subsidence Contour and the 35° Angle of Draw Line (refer to **Figure 1-1**). The Extraction Plan will provide detailed information on how the risks associated with mining under the Study Area will be managed by Tahmoor Coal during and following the extraction of LW W3-W4.

A Risk Assessment Workshop was held at Tahmoor Mine on 23 September 2020 to determine the major risks relating to built infrastructure and environmental features associated with LW W3-W4. In addition, this assessment also identified other risks that may impact on achieving timely approval for the commencement of LW W3-W4 extraction, as well as the completion of extraction of LW W3-W4.

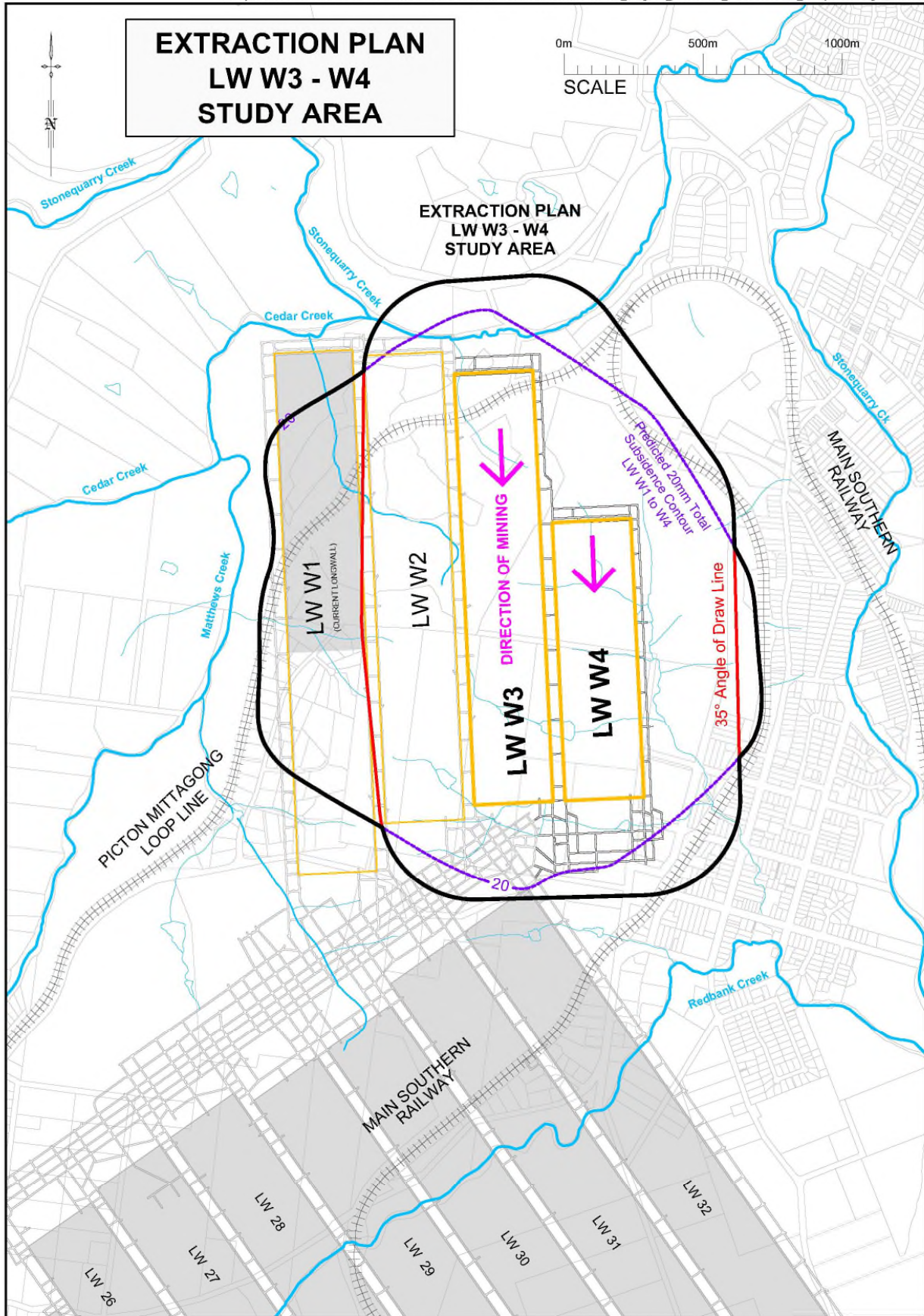


Figure 1-1 Study Area for LW W3-W4

1.2 Methodology

This risk assessment was completed using the Workplace Risk Assessment and Control methodology (WRAC).

It was compiled by a team of specialist personnel including:

- Diana Harris - Compliance Officer and Risk Assessment Facilitator, Tahmoor Coal;
- Zina Ainsworth - Environment and Community Manager, Tahmoor Coal;
- David Talbert - Project Manager – Environment and Community, Tahmoor Coal;
- April Hudson - Approvals Specialist, Tahmoor Coal;
- Amanda Francis - Community Engagement Specialist, Tahmoor Coal;
- Natalie Brumby - Environment and Community Graduate, Tahmoor Coal;
- Daryl Kay - Subsidence Engineer, MSEC;
- John Matheson - Structural Engineer, JMA Solutions;
- Adam Walker - Building Inspector, Building Inspection Services;
- Ken Mills - Geotechnical Engineer, Strata Control Technologies;
- Camilla West - Water Resources Scientist, Hydro Engineering Consultants;
- Andrew Dawkins – Hydrologist / Geochemist, GeoTerra;
- Roderick Haselden – Geotechnical Engineer, Douglas Partners;
- Matthew Russell - Aquatic Ecologist, Niche Environment and Heritage;
- Alex Christie – Ecologist / Accredited Assessor, Niche Environment and Heritage;
- Ryan Desic – Archaeologist, EMM Consulting; and
- Alex Parro - Environmental Scientist, Cardno.

The 12 step Risk Management process which forms part of the Tahmoor Coal Risk Management Standard has been adhered to in this risk assessment.

The risk matrix has been used to prioritise risk treatments.

Prior to this risk assessment any previous risk assessments, safety alerts and High Potential Risk incidents have been sourced and put forward for consideration within the risk assessment workshop.

1.3 Outcome

This risk assessment identified a total of 67 risks / hazards (refer to **Figure 1-2**), which included:

- One high risk, 14 medium risks and 52 low risks;
- Six risks that were satisfactory and did not require any further risk control, and 61 risks that required further improvement;
- Risk consequences included:
 - 28 risks with property damage consequences;
 - 13 risks with environmental impact consequences;
 - Nine risks with health and safety consequences;
 - Nine risks with financial consequences;
 - Six risks with legal and compliance consequences;
 - One risk with community / reputation consequences; and
 - One risk with investment return consequences.

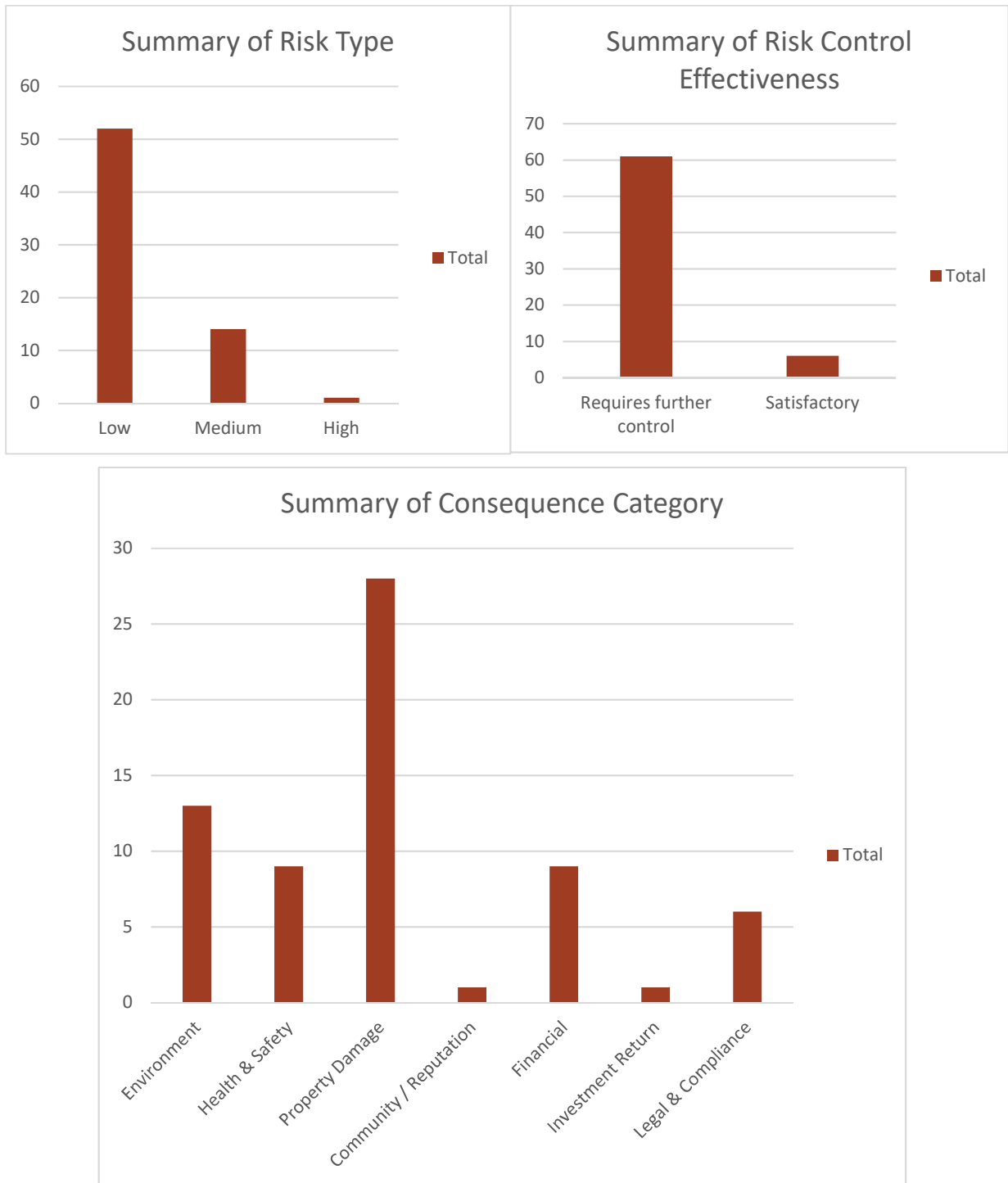


Figure 1-2 Graphs of Risk Type, Risk Control Effectiveness and Consequence Category

1.4 Further Actions

Further actions as identified in the Risk Assessment are identified in **Table 1-1**. Refer to **Appendix C** for figures showing the location of items discussed in the table below.

Table 1-1 Table of Further Actions

Treatment plans/tasks	Task Owner	Due Date
Adaptive management review following 800 m into LW W2 to review starting position for LW W3	April Hudson	01-Apr-21
Building Inspection Services to complete baseline tilt measurement of poles	April Hudson	01-Sep-21
Complete Stonequarry Creek Estate Water Management Plan including TARP	David Talbert	01-Sep-21
Complete Aboriginal Heritage Technical Report, and incorporate monitoring measures and TARP into Heritage Management Plan	April Hudson	30-Jan-21
Complete Aquatic Biodiversity Technical Report, and incorporate monitoring measures and TARP into Biodiversity Management Plan	April Hudson	30-Jan-21
Complete baseline gas detection survey (Macarthur Gas)	April Hudson	01-Sep-21
Complete Built Structures Management Plan including TARP for emergency evacuation procedures	April Hudson	01-Sep-21
Complete Endeavour Energy Management Plan including TARP	April Hudson	01-Sep-21
Complete Extraction Plan	April Hudson	30-Jan-21
Complete geotechnical assessment of Picton Tunnel	David Talbert	30-Dec-20
Complete geotechnical assessment of PMLL structures	David Talbert	01-Sep-21
Complete Geotechnical Report for landscape features (including steep slopes), and incorporate monitoring measures and TARP into Land Management Plan	April Hudson	30-Jan-21
Complete Groundwater Technical Report, and incorporate monitoring measures and TARP into Water Management Plan	April Hudson	30-Jan-21
Complete Historical Heritage Technical Report, and incorporate monitoring measures and TARP into Heritage Management Plan	April Hudson	30-Jan-21
Complete Jemena Management Plan including TARP and contact details for Jemena	April Hudson	01-Sep-21
Complete Land and Agricultural Resource Assessment, incorporate information into Land Management Plan, allocation of monitoring measures and TARP in Land Management Plan	April Hudson	30-Jan-21
Complete MSR Management Plan	David Talbert	01-Sep-21
Complete NBN Management Plan including TARP	April Hudson	01-Sep-21
Complete new PSMPs for other items for LW W3-W4	April Hudson	30-Jan-21
Complete PMLL Management Plan	David Talbert	01-Sep-21
Complete POSI application for W3 - W4.	April Hudson	01-Sep-21
Complete Public Safety Management plan to incorporate signage and communication regarding subsidence.	April Hudson	30-Jan-21
Complete structural assessment of Picton Tunnel	David Talbert	30-Dec-20
Complete structural assessment of PMLL structures	David Talbert	01-Sep-21

Complete structural assessment of Weatherboard Cottage	April Hudson	01-Sep-21
Complete structural engineering review of bridges	April Hudson	01-Sep-21
Complete Surface Water Technical Report, and incorporate monitoring measures and TARP into Water Management Plan	April Hudson	30-Jan-21
Complete Sydney Water Potable Water Management Plan including TARP	April Hudson	01-Sep-21
Complete Sydney Water Sewerage Management Plan including TARP	April Hudson	01-May-22
Complete Telstra Management Plan including TARP	April Hudson	01-Sep-21
Complete Terrestrial Biodiversity Technical Report, and incorporate monitoring measures and TARP into Biodiversity Management Plan	April Hudson	30-Jan-21
Complete Weatherboard Cottage Management Plan including TARP	April Hudson	01-Sep-21
Complete Wollondilly Shire Council Management Plan including TARP	April Hudson	01-Sep-21
Complete AHIP application and submission to DPIE	April Hudson	01-Mar-21
Conduct Dam Break study for the large dams	April Hudson	01-Sep-21
Consider completing a statement of heritage impacts for weatherboard cottage	April Hudson	01-Sep-21
Consider need for Heritage approval to install mitigation measures	April Hudson	01-Nov-20
Develop stakeholder engagement plans and implement	Amanda Francis	30-Dec-20
Endeavour Energy to complete Critical Poles Audit	April Hudson	01-Mar-21
Engagement with key stakeholders to be conducted.	David Talbert	30-Dec-20
Engineering assessment to be conducted	David Talbert	30-Dec-20
Engineering Review of Embankments, culverts, Picton Tunnel, Viaduct and other key infrastructure.	David Talbert	23-Dec-20
Finalise rail management plan and implement.	David Talbert	01-May-21
Implement monitoring from Infrastructure Management Plans.	Amanda Francis	02-Aug-21
Notify Spatial Services via POSI application of predicted subsidence movements of the permanent survey control marks	April Hudson	01-Sep-21
Obtain Environmental Approvals to complete engineering works on Picton Viaduct and Picton Tunnel	April Hudson	01-Nov-20
Prepare land access agreement plan and implement.	Amanda Francis	30-Dec-20
Review and update traffic control plan for emergency repairs	Amanda Fitzgerald	01-Sep-21
Risk review with rail regulators to be conducted	David Talbert	30-Dec-20
Separate risk assessment to be completed for rail infrastructure.	David Talbert	23-Dec-20
SMEC to complete survey of critical poles	April Hudson	01-Sep-21
Submission of Weatherboard Cottage Management Plan to Council.	April Hudson	01-May-22
Update Aboriginal Heritage Technical Report, and incorporate monitoring measures and TARP into Heritage Management Plan	April Hudson	30-Jan-21

2 Objective

The purpose of the Risk Assessment was to:

- Ensure the required approvals for the proposed longwalls are obtained in a timely manner to enable mining to commence;
- Ensure all environmental risks are appropriately eliminated or managed according to environmental legislation requirements;
- Ensure the safe and serviceable operation of all surface infrastructure and structures in the Study Area;
- Ensure that the health and safety of people who may be present in the Study Area are not put at risk due to mine subsidence;
- Assist in the establishment of procedures to measure, monitor, control, mitigate and repair infrastructure in the Study Area; and
- Ensure the required management plans for environmental features and built features are prepared and in place in a timely manner to manage potential impacts to environmental features or built features during mining.

The Risk Assessment will also be used to:

- Develop, review and improve the treatment plans / tasks identified as a result of the identified risks;
- Provide a basis to determine whether the identified risk management measures are sufficient to address the identified risks;
- Meet the statutory requirements of legislation and regulations that relate to impacts to environmental features and built features; and
- Identify those processes requiring a more detailed level of risk assessment due to the Potential Maximum Consequence (PMC) level of risk.

3 Context

3.1 Scope

The risk assessment considered the areas below:

- Obtaining LW W3-W4 Extraction Plan approval;
- Obtaining Aboriginal Heritage Impact Permit (AHIP) and/or Wollondilly Shire Council approval for proposed Weatherboard Cottage management;
- Impacts to utility infrastructure owned by Endeavour Energy (electrical), Sydney Water (potable water and sewer), Stonequarry Creek Estate Sewerage Plant (sewer), Jemena (gas), Telstra (telecommunications), NBN (telecommunications), Wollondilly Shire Council (roads, culverts and bridges), and Spatial services (survey marks);
- Impacts to rail infrastructure include the Main Southern Railway and Picton-Mittagong Loop Line;
- Impacts to rural properties and structures such as built structures, pools, septic tanks, and farm dams;
- Impacts to land owners and the community;

- Impacts to watercourses including pool water level, streamflow, water quality, and flood potential;
- Impacts to groundwater including groundwater level and water quality;
- Impacts to landscape features such as steep slopes and agricultural land capability;
- Impacts to aquatic ecology including aquatic habitat, macroinvertebrates, fish, and threatened aquatic species and habitat;
- Impact to terrestrial ecology including riparian vegetation, threatened ecological communities, threatened amphibians, threatened microbats, and groundwater dependent ecosystems;
- Impacts to Aboriginal heritage items including grinding groove sites, scarred trees, and surface scattered; and
- Impacts to historical heritage items including buildings of local heritage significance (Weatherboard Cottage, Picton Heritage Rail, Mushroom Tunnel) and sandstone and brick culverts associated with the Picton-Mittagong Loop Line.

Appendix C provides figures showing the locations of the above features that were discussed during the risk assessment.

3.2 Internal Context

This risk assessment was conducted for the Environment and Community Department of Tahmoor Coal to help identify the risks to environmental features associated with the extraction of LW W3-W4.

The risk assessment was conducted in accordance with the Risk Management Standard, utilising a cross-section of site personnel, relevant specialists and civil works experts, and an internal facilitator.

3.3 External Context

This risk assessment provides a process for ensuring that major risks to environmental features that may impact on approval by Government Agencies and stakeholders are identified and managed.

The external context for this Risk Management Process included consideration of:

- NSW DPIE as the approver of the Extraction Plan;
- NSW *Work Health and Safety (Mines and Petroleum Sites) Regulations 2014*;
- AS/NZS ISO 31000:2009 Risk Management - Principles and Guidelines; and
- Risk Management Handbook for the Mining Industry (MDG1010).

3.4 Exclusions / Assumptions

The participants in the risk assessment agreed to the following exclusions / assumptions:

- This risk assessment assumes that community effects will be managed as per Tahmoor Coal procedures (e.g. dust, lighting and noise).
- A risk assessment focusing in more detail on rail infrastructure likely to be impacted by LW W3-W4 will be completed separately.

4 Issue / Reason for Review

The risk assessment was completed to identify significant implications relating risks to approval, environmental features and built features, and to identify the controls necessary to effectively manage these risks.

5 Risk Analysis Method

5.1 Risk Management Standard

All risk assessments are conducted in accordance with Tahmoor Coal’s Risk Management Standard.

The Tahmoor Coal Risk Management Standard is based on the *ISO31000:2009 Risk Management – Principles and Guidelines International Standard*.

5.2 Risk Management Process

The risk management process is set out in the 12 Steps Risk Management Process (refer to **Figure 5-1**).

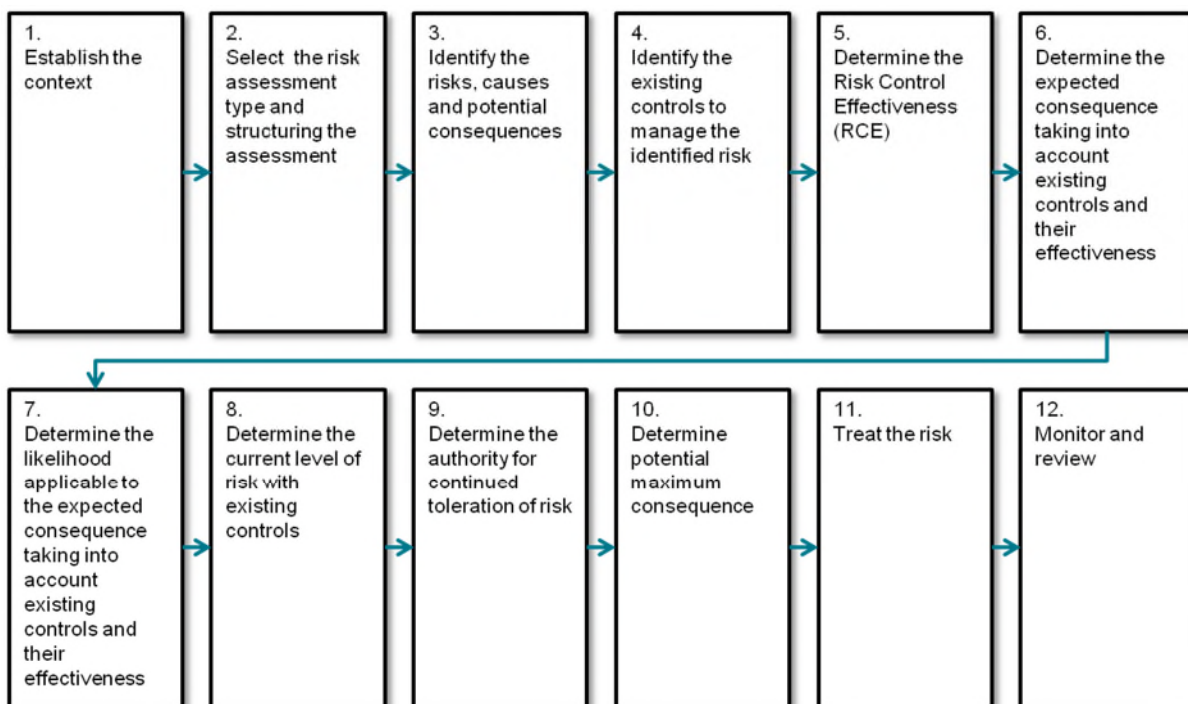


Figure 5-1 The 12 Steps Risk Management Process

5.3 Risk Matrix

The analyses of the risks identified in the workshop have undergone categorisation by the use of the risk matrix outlined within the Tahmoor Coal Risk Management Standard.

5.4 Hierarchy of Controls

During the risk management process additional treatments and controls have been categorised using the hierarchy of controls table (refer to **Figure 5-2**).

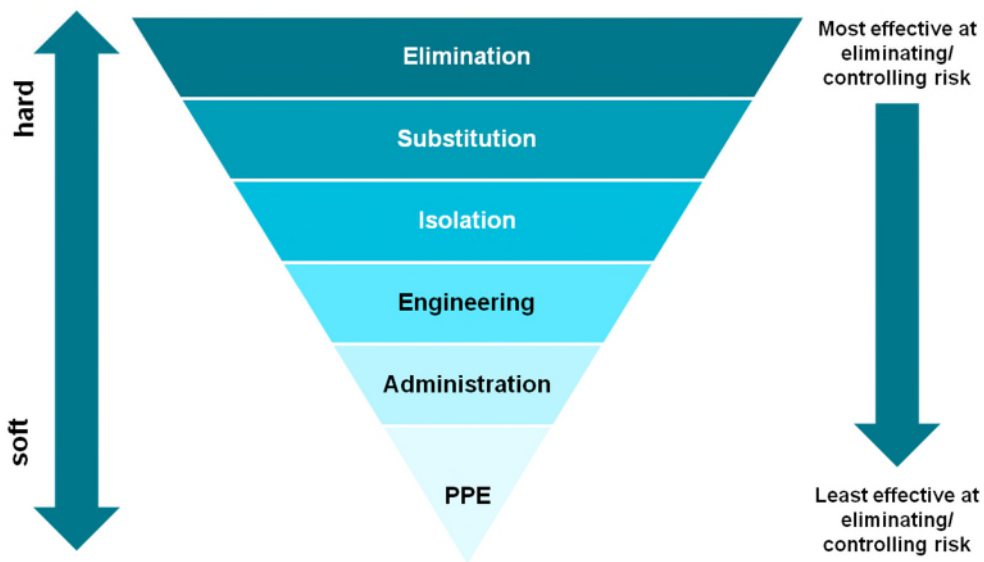


Figure 5-2 Hierarchy of Controls

5.5 Risk Assessment Team Members

Participating risk assessment team members are listed in **Table 5-1**.

Table 5-1 Participating Risk Assessment Team Members

Name	Position	Organisation
Diana Harris	Facilitator - Compliance Officer	Tahmoor Coal Pty Ltd
Zina Ainsworth	Environment and Community Manager	Tahmoor Coal Pty Ltd
David Talbert	Project Manager	Tahmoor Coal Pty Ltd
April Hudson	Approvals Specialist	Tahmoor Coal Pty Ltd
Amanda Francis	Community Engagement Specialist	Tahmoor Coal Pty Ltd
Natalie Brumby	Environment and Community Graduate	Tahmoor Coal Pty Ltd
Alex Parro	Environmental Scientist	Cardno
Daryl Kay	Subsidence Engineer	MSEC
John Matheson	Structural Engineer	JMA Solutions
Adam Walker	Building Inspector	Building Inspection Services
Ken Mills	Geotechnical Engineer	Strata Control Technologies
Camilla West	Water Resources Scientist	Hydro Engineering Consultants
Andrew Dawkins	Hydrologist / Geochemist	GeoTerra Pty Ltd
Roderick Haselden	Geotechnical Engineer	Douglas Partners
Matthew Russell	Senior Aquatic Ecologist	Niche Environment and Heritage
Alex Christie	Ecologist, Accredited Assessor	Niche Environment and Heritage
Ryan Desic	Archaeologist	EMM Consulting

Due to COVID-19 restrictions, team members attended via Skype conference call. A copy of the invitation to the conference call (as evidence of attendance) is attached in **Appendix A**.

6 Risk Assessment Register

The Risk Assessment Register is attached within **Appendix B**.

7 Treatment Plan

A treatment plan is provided in **Section 1.4.1**.

8 Risk Assessment Review Period

A review period for the risk assessment has not been identified.

Appendix A – Risk Assessment Attendance Sheet

To: Diana Harris, Zina Alinsworth, David Talbert, Amanda Francis, Natalie Brumber, Alex Parrs, TAH-Conference Room 2, Daryl Kay, John Matheron, Adam Walker

Subject: Risk Assessment (PART 1 - General and Infrastructure) - LW W3-W4 Extraction Plan

Location: TAH-Conference Room 2

Start time: Wed 23/09/2020 8:30 AM

End time: Wed 23/09/2020 12:30 PM

Hi all,

Please let me know if this meeting time works for you.

This risk assessment will be for general risks and infrastructure risks for the upcoming Longwalls West 3 and West 4.

Where possible, please join via Skype for Business. The room has a capacity of 4 according to our COVID-19 rules.

[Join Skype Meeting](#)

Trouble joining? [Try Skype Web App](#)

To: TAH-Conference Room 2, Diana Harris, Zina Alinsworth, David Talbert, Natalie Brumber, Alex Parrs, Daryl Kay, Ken Mills, Camilla West, Andrew Dawkins, Roderick Haselden, Alex Christie, Matthew Butsell, Ryan Desic

Subject: Risk Assessment (PART 2 - Environment) - LW W3-W4 Extraction Plan

Location: TAH-Conference Room 2

Start time: Wed 23/09/2020 1:00 PM

End time: Wed 23/09/2020 5:00 PM

Hi all,

Tahmoor Coal is holding a risk assessment for the upcoming LW W3-W4 Extraction Plan, and this part of the assessment will be regarding all environmental risks. I have invited 1-3 people from each company, however please nominate one person from each company (except perhaps Niche who will need a specialist for both aquatic and terrestrial ecology) to attend.

Due to COVID-19 restrictions, attendance in the meeting room will be restricted to Daryl Kay and some Tahmoor Coal staff. Could all other invitees please attend via skype.

We will be structuring the risk assessment according to the following running order:

- SUBSIDENCE - SCT (Ken Mills), SMEC (Daryl Kay)
- SURFACE WATER - HEC (Camilla West / Tony Marzalek)
- GROUNDWATER / CREEKS - Geoterra (Andrew Dawkins)
- GEO TECHNICAL - Douglas Partners (Roderick Haselden / Roshan Nair)
- BIODIVERSITY - Biosis (Luke Baker/Alex Christie, Matt Russell)
- HERITAGE - EMM (Pamela Chauvel/Ryan Desic)

I am happy to text those in the latter half of the session (biodiversity and heritage) on how the session is progressing so that you can drop in towards the end of the session.

I'll be sending out the drafted risk assessment document earlier in the week of the risk assessment.

Please let me know who will be attending.

Kind regards,

April Hudson

[Join Skype Meeting](#)

Trouble joining? [Try Skype Web App](#)

Appendix B – Risk Assessment Register

Major Project Risk Assessment: Tahmoor Underground - Extraction Plan LW W3-W4

Step 2: Assess Type; Key Elements-These change depending on TYPE of Risk Assessment		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			
Site	Type of Risk Assessment	Key Element (CURA Context/Catgory)	Sub Key Element (if applicable)	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	
Tahmoor Underground	Major Project			Extraction Plan Approval not received and delay in LW start	Approval not achieved in time, delay to LW production	* Poor planning and management * DPE delay in assessing application	* Extraction Plan for previous projects (LW W1-W2) approved and to be referenced as example (AC) * Approvals Specialist managing schedule and scope of works (AC) * Weekly Approvals Planning meeting to review schedule and tracking to meet timeframe (AC) * Consultation strategy implemented for Government Agencies (AC) * All specialist consultants engaged (AC)	2	Financial	4	D	14	4	Financial	Adaptive management review following 800 m into LW W2 to review starting position for LW W3	April Hudson	01-Apr-21		
Tahmoor Underground	Major Project	Approvals	Extraction Plan	Adequate baseline data not available	Approval not achieved in time, delay to LW production	Inadequate baseline data	* Sufficient baseline data gathered as part of LW W1-W2, currently being managed by Approvals Specialist (AC) * Consultation strategy implemented for Government Agencies (AC)	3	Financial	3	D	9	3	Financial					
Tahmoor Underground	Major Project	Approvals	Extraction Plan	DPE requires changes to mine layout	Approval not achieved in time, delay to LW production	* Concerns regarding impacts to creeks and tunnel * Independent expert panel report on impacts to streams in catchment areas	* Adaptive management plan for LW W3 (EC) * Consultation strategy implemented for Government Agencies (AC) * Implementation of CMAP and proven remediation success and dedicated Environmental Projects Coordinator (AC) * Design of Mine Plan layout conducted in consultation with Subsidence and Geotechnical Consultants to minimise impacts to creeks (EC) * Avoidance of directly mining under creeks and tunnels (E)	2	Financial	4	C	18	4	Financial	Adaptive management review following 800 m into LW W2 to review starting position for LW W3	April Hudson	01-Apr-21		
Tahmoor Underground	Major Project	Approvals	Extraction Plan	DPE does not accept proposed management actions as outlined in TARP for impacts to waterways	Delay in production	DPE Policy position on mining impacts to creeks	* Prior consultation with DPE (AC) * Implementation of CMAP and dedicated Environmental Projects Coordinator (AC) * Design of Mine Plan layout conducted in consultation with Subsidence and Geotechnical Consultants to minimise impacts to creeks (EC) * Avoidance of directly mining under creeks (E) * Adaptive management plan for Longwall W3 (EC)	2	Legal & Compliance	2	D	5	2	Legal & Compliance	Adaptive management review following 800 m into LW W2 to review starting position for LW W3	April Hudson	01-Apr-21		
Tahmoor Underground	Major Project	Approvals	Extraction Plan	Longwall West 2 completed earlier than scheduled	Approval not achieved in time, delay to LW production	LW W2 production exceeds budget	* Regular tracking of LW W2 schedule to meet extraction plan submission (AC) * Target date for start of LW W3 known (AC) * Extraction plan approval process developed in accordance with LW W2 schedule (AC) * Weekly Approvals Planning meeting to review schedule and tracking to meet timeframe (AC) * Technical Services provide monthly forecast to Senior Management Team for tracking and review (AC)	3	Financial	3	D	9	3	Financial					
Tahmoor Underground	Major Project	Approvals	Aboriginal heritage	AHP approval not received and delay in LW start	Approval not achieved in time, delay to LW production	Quality of application DPE processing delay Late submission of AHP	* Consultation with key government agencies to confirm application required for AHP (AC) * AHP prescriptive guidelines (AC) * Known process and previous history of receiving approvals (AC) * Engagement of experienced consultants (AC)	2	Legal & Compliance	2	D	5	2	Legal & Compliance	Completing of AHP application and submission to DPE	April Hudson	01-Mar-21		
Tahmoor Underground	Major Project	Approvals	Historical Heritage	Weatherboard Cottage approval not received by Wollondilly Shire Council before mining impacts	Delay in production	* Inadequate consultation with Council prior to submitting documentation * Delay in Council approval	* Existing plan completed and approved by Council for other similar Heritage features (AC) * Mine Plan set well back from Weatherboard Cottage (EC) * Pre Mining Inspection completed prior to mining impacts (EC)	2	Legal & Compliance	1	E	1	1	Legal & Compliance	Submission of Weatherboard Cottage Management Plan to Council	April Hudson	01-May-22		
Tahmoor Underground	Major Project	Subsidence Monitoring	Subsidence	Potential for greater than predicted subsidence over LW W3-W4 to cause greater subsidence than predicted	Impacts to surface and subsurface features	Geological movements due to subsidence	* Appropriate Coordinator managing report delivery to schedule (AC) * Weekly Approvals Planning meeting to review schedule and tracking to meet timeframe (AC) * Learnings from mining previous Longwalls LW W1-W2 (AC) * Adaptive management plan for Longwall W3 (EC) * Flexion subsidence monitoring (EC)	2	Legal & Compliance	2	D	5	2	Legal & Compliance	Complete Extraction Plan	April Hudson	30-Jan-21	Observed movements currently less than prediction	
Tahmoor Underground	Major Project	Subsidence Monitoring	Subsidence	Failure to implement management plan actions	Fines and prosecution	Poor planning and management	* Weekly subsidence meetings attended by Environmental and Community Team members and External Consultants (AC) * Subsidence Monitoring reports (EC) * Monthly Environmental Response Group Meeting attended by Environmental and Community Team members and External Consultants (AC)	3	Legal & Compliance	2	D	5	2	Financial	Adaptive management review following 800 m into LW W2 to review starting position for LW W3	April Hudson	01-Apr-21		
Tahmoor Underground	Major Project	Community Engagement	Land Owners	Stress to land owner/business owner from LW W3-W4	Health and Safety	* Impacts to business * Inconvenience to business * Concerns about mining * Previous relationships * Poor engagement * Mental health	* Infrastructure Management Plan for selected properties in area (AC) * Stakeholder Engagement Plan (education of subsidence) (AC) * Information packs (AC) * Pre Mining Inspections and Hazard Inspections offered to all land owners (AC) * Monthly newsletter to all residents including email contact for community (AC) * SA NSW guidelines (AC) * 24 hour emergency contact line for community (AC) * Prepared LW W3-W4 Resident Information Pack and Pre-Mining counselling services available to all stakeholders (AC)	3	Health & Safety	2	E	3	2	Health & Safety					
Tahmoor Underground	Major Project	Community Engagement	Land Owners	Community Action Group Forms	Community Reputation	* Impacts and inconvenience to business/property owners * Concerns about mining * Previous relationships * Poor engagement * Mental health	* Infrastructure Management Plan for selected properties in area (AC) * Stakeholder Engagement Plan (education of subsidence) (AC) * Information packs (AC) * Pre Mining Inspections and Hazard Inspections offered to all land owners (AC) * Monthly newsletter to all residents including email contact for community (AC) * SA NSW guidelines (AC) * 24 hour emergency contact line for community (AC) * Prepared LW W3-W4 Resident Information Pack and Pre-Mining counselling services available to all stakeholders (AC)	2	Community / Reputation	1	D	2	2	Community / Reputation	Develop stakeholder engagement plans and implement	Amanda Francis	30-Dec-20		
Tahmoor Underground	Major Project	Community Engagement	Land Owners	Land Owners will not sign Land Access License to meet monitoring requirements	Approval not achieved	* Land owner not agreeing with access agreement conditions * Poor management and consultation	* Consultation with landowner regarding monitoring and mining process ongoing (AC) * Previous history of stakeholder engagement plans and land access established procedures (AC) * A clear defined process for pre-mining inspections (AC) * Front of house pre mining inspections (EC) * Details list of ownership in areas (AC) * Draft monitoring plan submitted for discussion (AC)	2	Legal & Compliance	2	C	8	2	Legal & Compliance	Prepare land access agreement plan and implement	Amanda Francis	30-Dec-20		
Tahmoor Underground	Major Project	Community Engagement	Rural residences	Damage to infrastructure or buildings	Health and Safety	Subsidence	* Infrastructure Management Plans (AC) * Previous history of managing properties (AC) * Consultation and engagement with residents (AC) * Weekly subsidence meetings attended by Environmental and Community Team members and External Consultants (AC) * Subsidence Monitoring reports (EC) * Pre Mining Inspections and Hazard Inspections offered to all land owners (AC) * Front of house pre mining inspections (EC) * Weekly visual inspections conducted by building inspector (AC)	2	Health & Safety	2	D	5	2	Health & Safety	Implement monitoring from Infrastructure Management Plans	Amanda Francis	02-Aug-21		
Tahmoor Underground	Major Project	Built Infrastructure	Heritage Rail	Heritage Rail MP not completed prior to influence of Longwall mining	Delay in production	* Late submission by Tahmoor * Poor Project Management * Inadequate consultation with key stakeholders * Inadequate resources * Access to complete investigative works	* Heritage Rail MP prepared for review (AC) * Previous survey and management completed successfully (AC) * Learnings from mining beneath Main southern railway (AC) * Consultation with Transport Heritage NSW and key stakeholders prior to mining (AC) * Regular Meetings with Transport Heritage Rail Management Group (AC) * Project Schedule in place (AC) * Approvals Coordinator managing schedule and scope of works (AC) * Weekly Approvals Planning meeting to review schedule and tracking to meet timeframe (AC)	2	Financial	2	D	5	2	Financial	Finalise rail management plan and implement	David Talbert	01-May-21		
Tahmoor Underground	Major Project	Built Infrastructure	Main Southern Railway Infrastructure	* RR Embankments/Culverts and other infrastructure. * Picton Viaduct and Picton Tunnel * Resources Regulator does not accept proposed Management Reviews	Financial Impact	* RR conservative interpretation of Engineering Reports. * Poor Project Management * Inadequate consultation	* Learnings from mining beneath Main Southern Railway (AC) * Consultation with RR and key stakeholders (AC) * Regular Meetings with ARTC Rail Management Group (AC) * Project Schedule (AC)	2	Financial	3	C	13	3	Legal & Compliance	Engineering Review of Embankments, culverts, Picton Tunnel, Viaduct and other key infrastructure	David Talbert	23-Dec-20		
Tahmoor Underground	Major Project														Separate risk assessment to be completed for rail infrastructure	David Talbert	23-Dec-20		
Tahmoor Underground	Major Project														Finalise rail management plan and implement	David Talbert	01-Sep-21		
Tahmoor Underground	Major Project														Obtain Environmental Approvals to complete engineering works on Picton Viaduct and Picton Tunnel	April Hudson	01-Nov-20		

Major Project Risk Assessment: Tahmoor Underground - Extraction Plan LW W3-W4

Step 2: Assess Type; Key Elements-These change depending on TYPE of Risk Assessment		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		
Site	Type of Risk Assessment	Key Element (CURA Context/Catagory)	Sub Key Element (if applicable)	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
Tahmoor Underground	Major Project	Built Infrastructure	Endeavour Energy Infrastructure	Adverse impacts to power poles	Reduction in clearance heights and / or excessive tilting of power poles	Subsidence	* Successful completion of management plan for LW 22-W2 (AC) * Previous ground survey, pole survey and visual inspection as part of LW 22-W2 management (AC) * Previous consultation, coordination and cooperation with Endeavour Energy (AC)	2	Health & Safety	3	E	6	3	Health & Safety	Complete Endeavour Energy Management Plan including TARP	April Hudson	01-Sep-21	
Tahmoor Underground	Major Project														Endeavour Energy to complete Critical Poles Audit	April Hudson	01-Mar-21	
Tahmoor Underground	Major Project														SMEC to complete survey of critical poles	April Hudson	01-Sep-21	
Tahmoor Underground	Major Project														Building Inspection Services to complete baseline tilt measurement of poles	April Hudson	01-Sep-21	
Tahmoor Underground	Major Project	Built Infrastructure	Endeavour Energy Infrastructure	Adverse impacts to consumer cables to houses	Loss of serviceability, emergency repair of powerline	Subsidence	* Management Plans prepared for previous longwalls (AC) * Previous ground survey, pole survey and visual inspection as part of LW 22-W2 management (AC) * Previous consultation, coordination and cooperation with Endeavour Energy (AC)	2	Property Damage	1	E	1	1	Property Damage	Complete Endeavour Energy Management Plan including TARP	April Hudson	01-Sep-21	
Tahmoor Underground	Major Project	Built Infrastructure	Sydney Water Potable Water Infrastructure	Leakage of the joints	Reduced water supply requiring emergency repair or replacement of pipework	Subsidence	* Management Plans prepared for previous longwalls (AC) * Previous ground survey and visual inspection as part of LW 22-W2 management (AC) * Previous consultation, coordination and cooperation with Sydney Water (AC)	2	Property Damage	1	D	2	1	Property Damage	Complete Sydney Water Potable Water Management Plan including TARP	April Hudson	01-Sep-21	
Tahmoor Underground	Major Project		Sydney Water Sewer Infrastructure	Leakage of the joints	Leakage of sewage requiring repair or replacement	Subsidence	* Management Plans prepared for previous longwalls (AC) * Previous ground survey and visual inspection as part of LW 22-32 management (AC) * Previous consultation, coordination and cooperation with Sydney Water (AC)	2	Property Damage	1	D	2	1	Property Damage	Complete Sydney Water Sewerage Management Plan including TARP	April Hudson	01-May-22	
Tahmoor Underground	Major Project	Built Infrastructure	Stonequarry Creek Estate Sewerage Plant	Reduction of grade below self-cleaning	Loss of serviceability, requiring emergency repair or replacement of pipework	Subsidence	* Management Plans prepared for previous longwalls (AC) * Previous ground survey and visual inspection as part of LW W1-W2 management (AC) * Previous consultation, coordination and cooperation with Bradcorp (AC)	2	Property Damage	2	D	5	2	Property Damage	Complete Stonequarry Creek Estate Water Management Plan including TARP	David Tabert	01-Sep-21	
Tahmoor Underground	Major Project	Built Infrastructure	Stonequarry Creek Estate Sewerage Plant	Damage to pipeline	Loss of serviceability, requiring emergency repair or replacement of pipework	Subsidence	* Management Plans prepared for previous longwalls (AC) * Previous ground survey and visual inspection as part of LW W1-W2 management (AC) * Previous consultation, coordination and cooperation with Bradcorp (AC)	2	Property Damage	2	D	5	2	Property Damage	Complete Stonequarry Creek Estate Water Management Plan including TARP	David Tabert	01-Sep-21	
Tahmoor Underground	Major Project	Built Infrastructure	Stonequarry Creek Estate Sewerage Plant	Damage to pipeline	Leakage of sewage into waterway	Subsidence	* Management Plans prepared for previous longwalls (AC) * Previous ground survey and visual inspection as part of LW W1-W2 management (AC) * Previous consultation, coordination and cooperation with Bradcorp (AC)	2	Environment	2	D	5	2	Environment	Complete Stonequarry Creek Estate Water Management Plan including TARP	David Tabert	01-Sep-21	
Tahmoor Underground	Major Project	Built Infrastructure	Stonequarry Creek Estate Sewerage Plant	Damage to Wastewater Treatment Plant	Loss of serviceability, requiring emergency repair or replacement of pipework	Subsidence	* Management Plans prepared for previous longwalls (AC) * Previous consultation, coordination and cooperation with Bradcorp (AC)	2	Property Damage	2	D	5	2	Property Damage	Complete Stonequarry Creek Estate Water Management Plan including TARP	David Tabert	01-Sep-21	
Tahmoor Underground	Major Project	Built Infrastructure	Jemena gas infrastructure	Damage to gas infrastructure	Gas leak, emergency repair	Subsidence	* Management Plans prepared for previous longwalls (AC) * Previous ground survey and visual inspection as part of LW 22-W2 management (AC) * Previous consultation, coordination and cooperation with Jemena (AC) * Design of gas line flexible pipework (EC) * Gas is odourous - community more likely to report gas leaks if below ground (EC)	2	Health & Safety	1	D	2	1	Health & Safety	Complete Jemena Management Plan including TARP and contact details for Jemena	April Hudson	01-Sep-21	
Tahmoor Underground	Major Project														Complete baseline gas detection survey (Maccarthur Gas)	April Hudson	01-Sep-21	
Tahmoor Underground	Major Project	Built Infrastructure	Telstra / NBN Infrastructure	Damage to copper local cable	Loss of serviceability, emergency repair or replacement of cable	Subsidence	* Management Plans prepared for previous longwalls (AC) * Previous ground survey and visual inspection as part of LW 22-W2 management (AC) * Previous consultation, coordination and cooperation with Telstra and NBN Co (AC)	2	Property Damage	1	E	1	1	Property Damage	Complete Telstra Management Plan including TARP	April Hudson	01-Sep-21	
Tahmoor Underground	Major Project														Complete NBN Management Plan including TARP	April Hudson	01-Sep-21	
Tahmoor Underground	Major Project	Built Infrastructure	Telstra / NBN Infrastructure	Damage to conduit, manhole, pit and pole network	Loss of serviceability, emergency repair or replacement of cable	Subsidence	* Management Plans prepared for previous longwalls (AC) * Previous ground survey and visual inspection as part of LW 22-W2 management (AC) * Previous consultation, coordination and cooperation with Telstra and NBN Co (AC)	2	Property Damage	1	E	1	1	Property Damage	Complete Telstra Management Plan including TARP	April Hudson	01-Sep-21	
Tahmoor Underground	Major Project														Complete NBN Management Plan including TARP	April Hudson	01-Sep-21	
Tahmoor Underground	Major Project	Built Infrastructure	Telstra / NBN Infrastructure	Damage to optical fibre cables	Loss of serviceability, emergency repair or replacement of cable	Subsidence	* Management Plans prepared for previous longwalls (AC) * Previous ground survey and visual inspection as part of LW 22-W2 management (AC) * Previous consultation, coordination and cooperation with Telstra and NBN Co (AC)	2	Property Damage	2	E	3	2	Property Damage	Complete Telstra Management Plan including TARP	April Hudson	01-Sep-21	
Tahmoor Underground	Major Project														Complete NBN Management Plan including TARP	April Hudson	01-Sep-21	
Tahmoor Underground	Major Project	Built Infrastructure	Council Infrastructure	Minor cracking or heaving of pavement, kerbs and gutters	Slight damage to road, requiring repair. Reduced maintenance life	Subsidence	* Management Plans prepared for previous longwalls (AC) * Previous ground survey and visual inspection as part of LW 22-W2 management (AC) * Previous consultation, coordination and cooperation with Wollondilly Shire Council (AC)	2	Property Damage	2	E	3	2	Property Damage	Complete Wollondilly Shire Council Management Plan including TARP	April Hudson	01-Sep-21	
Tahmoor Underground	Major Project	Built Infrastructure	Council Infrastructure	Major cracking or heaving of pavement, kerbs and gutters	Extensive damage to road, requiring emergency repair and extension rehabilitation	Subsidence	* Management Plans prepared for previous longwalls (AC) * Previous ground survey and visual inspection as part of LW 22-W2 management (AC) * Previous consultation, coordination and cooperation with Wollondilly Shire Council (AC)	2	Property Damage	3	E	6	3	Property Damage	Complete Wollondilly Shire Council Management Plan including TARP	April Hudson	01-Sep-21	
Tahmoor Underground	Major Project	Built Infrastructure	Council Infrastructure	Slope instability causing loss of support to road	Tension cracking in road surface requiring repair or damage to roadway barriers (Tension to cables)	Subsidence	* Previous ground survey and visual inspection as part of LW 31-W2 management (AC) * Previous consultation, coordination and cooperation with Wollondilly Shire Council (AC) * Pre mining Geotechnical assessment conducted for LW 32 (EC) * Traffic management plan for any work on Thimera Way to the satisfaction of WASC (AC)	2	Health & Safety	2	D	5	2	Health & Safety	Complete Wollondilly Shire Council Management Plan including TARP	April Hudson	01-Sep-21	
Tahmoor Underground	Major Project														Review and update traffic control plan for emergency repairs	Amanda Fitzgerald	01-Sep-21	
Tahmoor Underground	Major Project	Built Infrastructure	Council Infrastructure	Damage to bridges	Loss of serviceability	Subsidence	* Management Plans prepared for previous longwalls (AC) * Previous ground survey and visual inspection as part of LW W1-W2 management (AC) * Previous consultation, coordination and cooperation with Wollondilly Shire Council (AC)	2	Financial	2	E	3	2	Financial	Complete structural engineering review of bridges	April Hudson	01-Sep-21	
Tahmoor Underground	Major Project														Complete Wollondilly Shire Council Management Plan including TARP	April Hudson	01-Sep-21	
Tahmoor Underground	Major Project	Built Infrastructure	Council Infrastructure	Damage to culverts and stormwater infrastructure	Reduced maintenance life, sealing / localised repair or loss of serviceability requiring emergency repair and/or replacement of culverts	Subsidence	* Management Plans prepared for previous longwalls (AC) * Previous ground survey and visual inspection as part of LW 22-W2 management (AC) * Previous consultation, coordination and cooperation with Wollondilly Shire Council (AC)	2	Property Damage	2	E	3	2	Property Damage	Complete Wollondilly Shire Council Management Plan including TARP	April Hudson	01-Sep-21	
Tahmoor Underground	Major Project	Built Infrastructure	Survey Control Marks	Movement of survey control marks	Errors in measurements	Subsidence	* Preparation of POSI application of predicted subsidence movements of the permanent survey control marks (AC)	2	Property Damage	2	D	5	2	Property Damage	Notify Spatix Services via POSI application of predicted subsidence movements of the permanent survey control marks	April Hudson	01-Sep-21	
Tahmoor Underground	Major Project	Built Infrastructure	Survey Control Marks	Movement of PCTN Picton Station	Errors in measurements	Subsidence	* POSI application of predicted subsidence movements of the permanent survey control marks completed for LW 32 - W2 (AC) * Ongoing monitoring and review of far field monitoring network, including GNSS network (EC)	2	Property Damage	2	D	5	2	Property Damage	Complete POSI application for W3 - W4.	April Hudson	01-Sep-21	
Tahmoor Underground	Major Project	Built Infrastructure	Survey Control Marks	Use of survey control marks by general surveyors during and after mining, affecting results (prior to re-robustness)	Errors in measurements	Subsidence	* POSI application of predicted subsidence movements of the permanent survey control marks completed for LW 32 - W2 (AC) * Ongoing monitoring and review of far field monitoring network, including GNSS network (EC)	2	Property Damage	2	D	5	2	Property Damage	Complete POSI application for W3 - W4.	April Hudson	01-Sep-21	
Tahmoor Underground	Major Project	Built Infrastructure	Built Structures	Impact on health and safety of people	Injury to person	Subsidence resulting in failure of a structural element	* Management Plans prepared for previous longwalls (AC) * Previous ground survey and visual inspection as part of LW 22-W2 management (AC) * Previous consultation, coordination and cooperation with residents (AC) * Completion of Pre-mining and subsidence hazard inspections (EC)	2	Health & Safety	3	E	6	3	Health & Safety	Complete Built Structures Management Plan including TARP for emergency evacuation procedures	April Hudson	01-Sep-21	

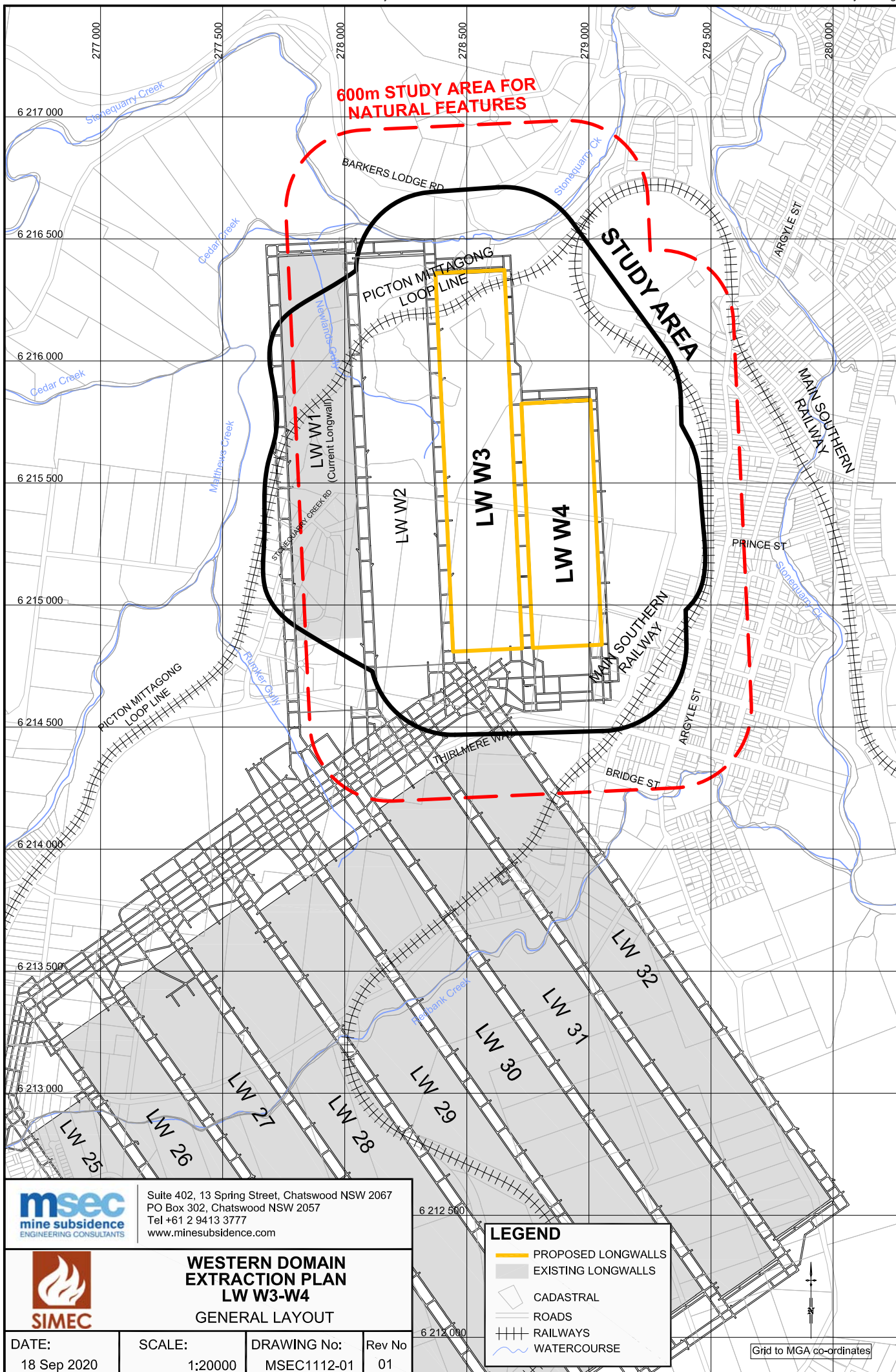
Major Project Risk Assessment: Tahmoor Underground - Extraction Plan LW W3-W4

Step 2: Assess Type; Key Elements-These change depending on TYPE of Risk Assessment		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		
Site	Type of Risk Assessment	Key Element (CURA Context/Catagory)	Sub Key Element (if applicable)	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
Tahmoor Underground	Environmental	Aboriginal heritage	Grinding groove sites	Fracturing of Stonequary Creek beds	Loss of heritage values	Subsidence	* Mine design (EC) * Adaptive management (AC) * Management Plans prepared for previous longwalls (AC) * Previous monitoring completed for previous longwalls (AC)	2	Environment	3	D	9	1	Environment	Complete Aboriginal Heritage Technical Report, and incorporate monitoring measures and TARP into Heritage Management Plan * Completing of "APM" application and submission to DPE	April Hudson	30-Jan-21	
Tahmoor Underground	Major Project															April Hudson	01-Mar-21	
Tahmoor Underground	Major Project	Aboriginal heritage	Scarred tree	Tree tilts and falls over	Loss of heritage values	Subsidence	* Visual inspections conducted (AC) * Management Plans prepared for previous Longwall W1 - W2 (AC)	2	Environment	1	E	1	1	Environment	Update Aboriginal Heritage Technical Report, and incorporate monitoring measures and TARP into Heritage Management Plan	April Hudson	30-Jan-21	
Tahmoor Underground	Major Project	Aboriginal heritage	Surface scatters	Disturbance of scatters	Loss of heritage values	Subsidence	* Visual inspections conducted (AC) * Management Plans prepared for previous Longwall W1 - W2 (AC)	2	Environment	1	E	1	1	Environment	Update Aboriginal Heritage Technical Report, and incorporate monitoring measures and TARP into Heritage Management Plan	April Hudson	30-Jan-21	
Tahmoor Underground	Environmental	Historical heritage	Local and State heritage items (Weatherboard Cottage, Picton Heritage Rail)	Cracking of heritage buildings, impacts to archaeological site, impacts to rural landscape	Loss of heritage values	Subsidence	* Management Plans prepared for previous longwalls for similar structures (AC)	2	Property Damage	2	D	5	2	Property Damage	Complete Historical Heritage Technical Report, and incorporate monitoring measures and TARP into Heritage Management Plan	April Hudson	30-Jan-21	
Tahmoor Underground	Major Project														Complete new PSMs for other items for LW W3-W4	April Hudson	30-Jan-21	
Tahmoor Underground	Environmental	Historical heritage	PMLL Railway culverts	Cracking of heritage culverts along Picton Mitagong Loop Line	Loss of heritage values	Subsidence	* Concrete sleeves inserted into culverts for LW W1-W2 (EC) * Management Plans prepared for previous longwalls (AC) * Previous ground survey and visual inspection as part of LW W1-W2 management (AC) * Previous consultation, coordination and cooperation with Transport Heritage (AC) * Existing surveys conducted (AC)	2	Property Damage	2	C	8	2	Property Damage	Complete Historical Heritage Technical Report, and incorporate monitoring measures and TARP into Heritage Management Plan	April Hudson	30-Jan-21	
Tahmoor Underground	Major Project														Complete PMLL Management Plan	David Talbert	01-Sep-21	
Tahmoor Underground	Major Project														Complete structural assessment of PMLL structures	David Talbert	01-Sep-21	
Tahmoor Underground	Major Project														Complete geotechnical assessment of PMLL structures	David Talbert	01-Sep-21	
Tahmoor Underground	Major Project	Historical heritage	MSR Picton Tunnel	Minor cracking to MSR Picton Tunnel	Loss of heritage values	Subsidence	* Preliminary engineering reviews (AC) * Preliminary heritage reviews (AC)	2	Property Damage	2	C	8	2	Property Damage	Complete Historical Heritage Technical Report, and incorporate monitoring measures and TARP into Heritage Management Plan	April Hudson	30-Jan-21	
Tahmoor Underground	Major Project														Complete MSR Management Plan	David Talbert	01-Sep-21	
Tahmoor Underground	Major Project														Complete structural assessment of Picton Tunnel	David Talbert	30-Dec-20	
Tahmoor Underground	Major Project														Complete geotechnical assessment of Picton Tunnel	David Talbert	30-Dec-20	
Tahmoor Underground	Major Project														Consider need for Heritage approval to install mitigation measures	April Hudson	01-Nov-20	
Tahmoor Underground	Major Project				Property Damage	Subsidence	* Preliminary engineering reviews (AC) * Preliminary heritage reviews (AC)	2	Financial	3	C	13	3		Engineering assessment to be conducted	David Talbert	30-Dec-20	
Tahmoor Underground	Major Project														Engagement with key stakeholders to be conducted	David Talbert	30-Dec-20	
Tahmoor Underground	Major Project														Risk review with rail regulators to be conducted	David Talbert	30-Dec-20	
Tahmoor Underground	Major Project	Historical heritage	Mushroom Tunnel	Cracking of Mushroom Tunnel	Loss of heritage values	Subsidence	* Management Plans prepared for previous longwalls (AC) * Previous ground survey and visual inspection as part of LW W1-W2 management (AC) * Previous consultation, coordination and cooperation with Council * Existing surveys conducted (AC)	2	Property Damage	3	E	6	3	Property Damage	Complete Historical Heritage Technical Report, and incorporate monitoring measures and TARP into Heritage Management Plan	April Hudson	30-Jan-21	
Tahmoor Underground	Major Project	Historical heritage	MSR Railway culverts	Cracking of heritage culverts along Main Southern Railway	Loss of heritage values	Subsidence	* Management Plans prepared for previous longwalls (AC)	2	Property Damage	3	E	6	3	Property Damage	Complete Historical Heritage Technical Report, and incorporate monitoring measures and TARP into Heritage Management Plan	April Hudson	30-Jan-21	

98 62 66 66 Subtotal CountA (ignoring hidden values) 67 98 97

Tahmoor Underground	Broad Brush																	#N/A
Tahmoor Underground	Use of Mine																	#N/A
Tahmoor Underground	Business																	#N/A
Tahmoor Underground	Major Project																	#N/A
Tahmoor Underground	Environmental/Heritage/Processes																	#N/A
Tahmoor Underground	Equipment																	#N/A

Appendix C – Figures Reviewed During Risk Assessment



600m STUDY AREA FOR NATURAL FEATURES

STUDY AREA

LW W1
(Current Longwall)

LW W2

LW W3

LW W4

MAIN SOUTHERN RAILWAY

PICTON MITTAGONG LOOP LINE

THIRLMERE WAY

BRIDGE ST

LW 25

LW 26

LW 27

LW 28

LW 29

LW 30

LW 31

LW 32



Suite 402, 13 Spring Street, Chatswood NSW 2067
 PO Box 302, Chatswood NSW 2057
 Tel +61 2 9413 3777
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**WESTERN DOMAIN
 EXTRACTION PLAN
 LW W3-W4
 GENERAL LAYOUT**

LEGEND

- PROPOSED LONGWALLS
- EXISTING LONGWALLS
- CADASTRAL
- ROADS
- RAILWAYS
- ~ WATERCOURSE

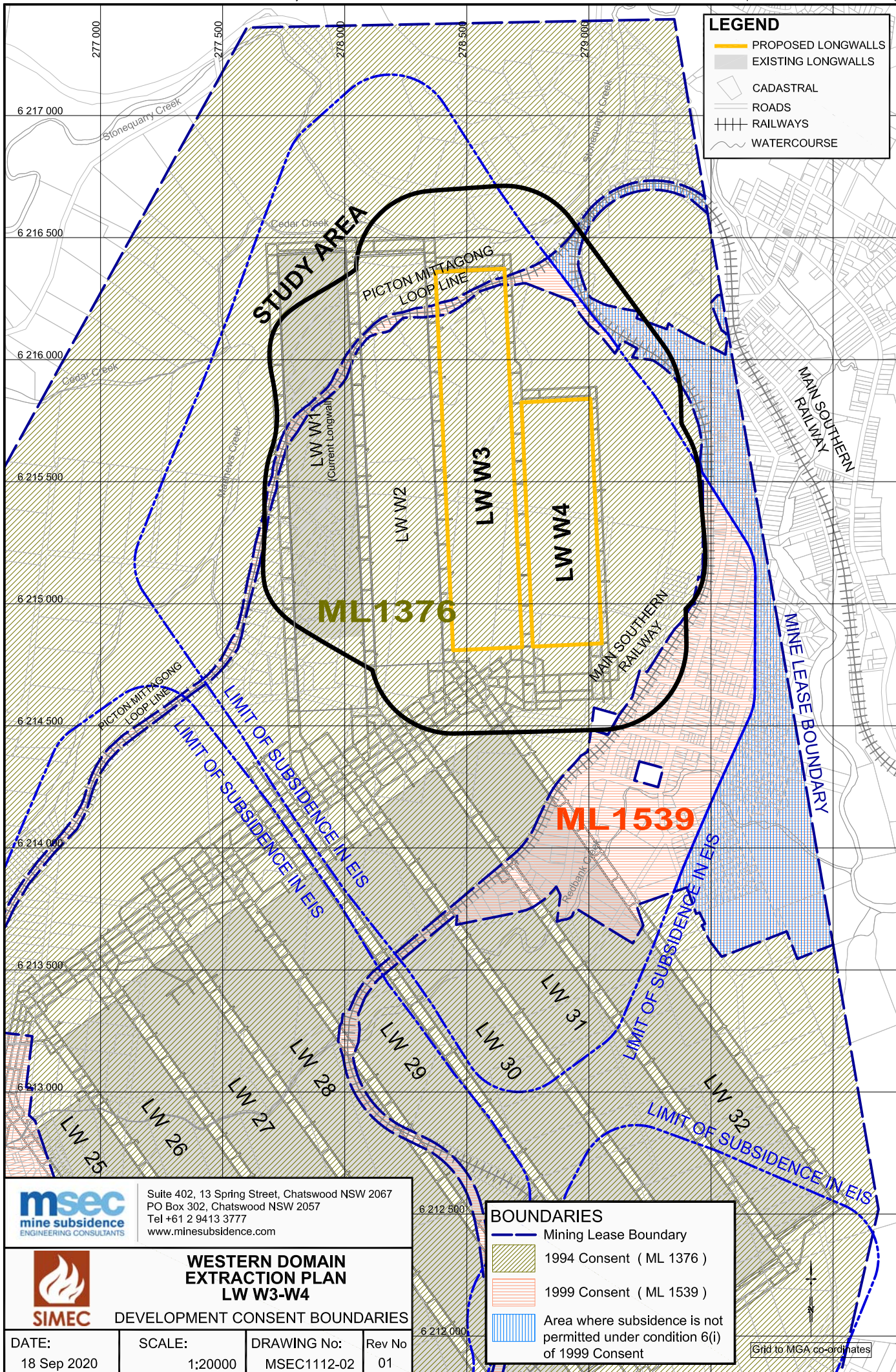
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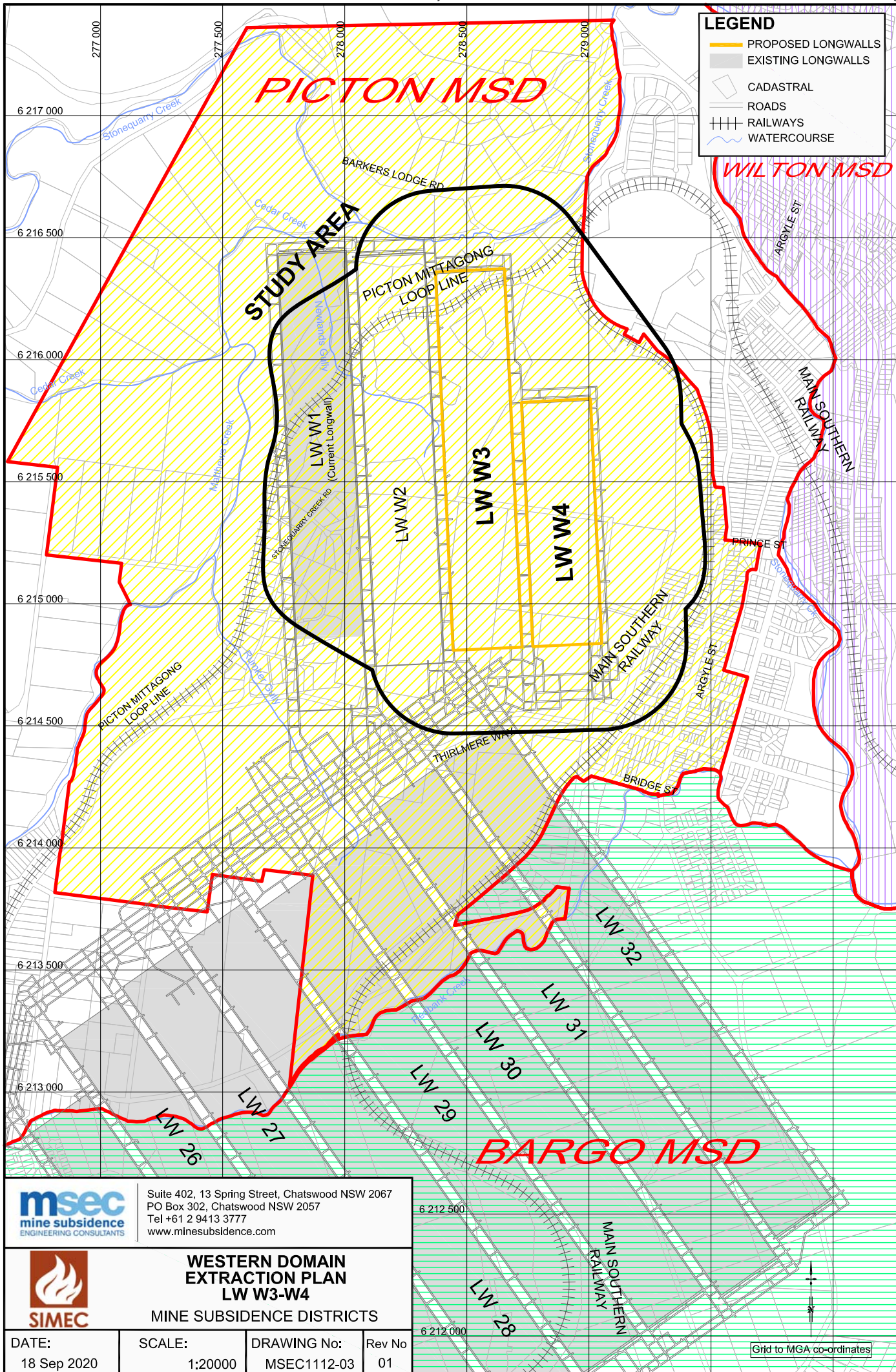
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DRAWING No:
MSEC1112-01

Rev No
01

Grid to MGA co-ordinates





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mine subsidence
ENGINEERING CONSULTANTS

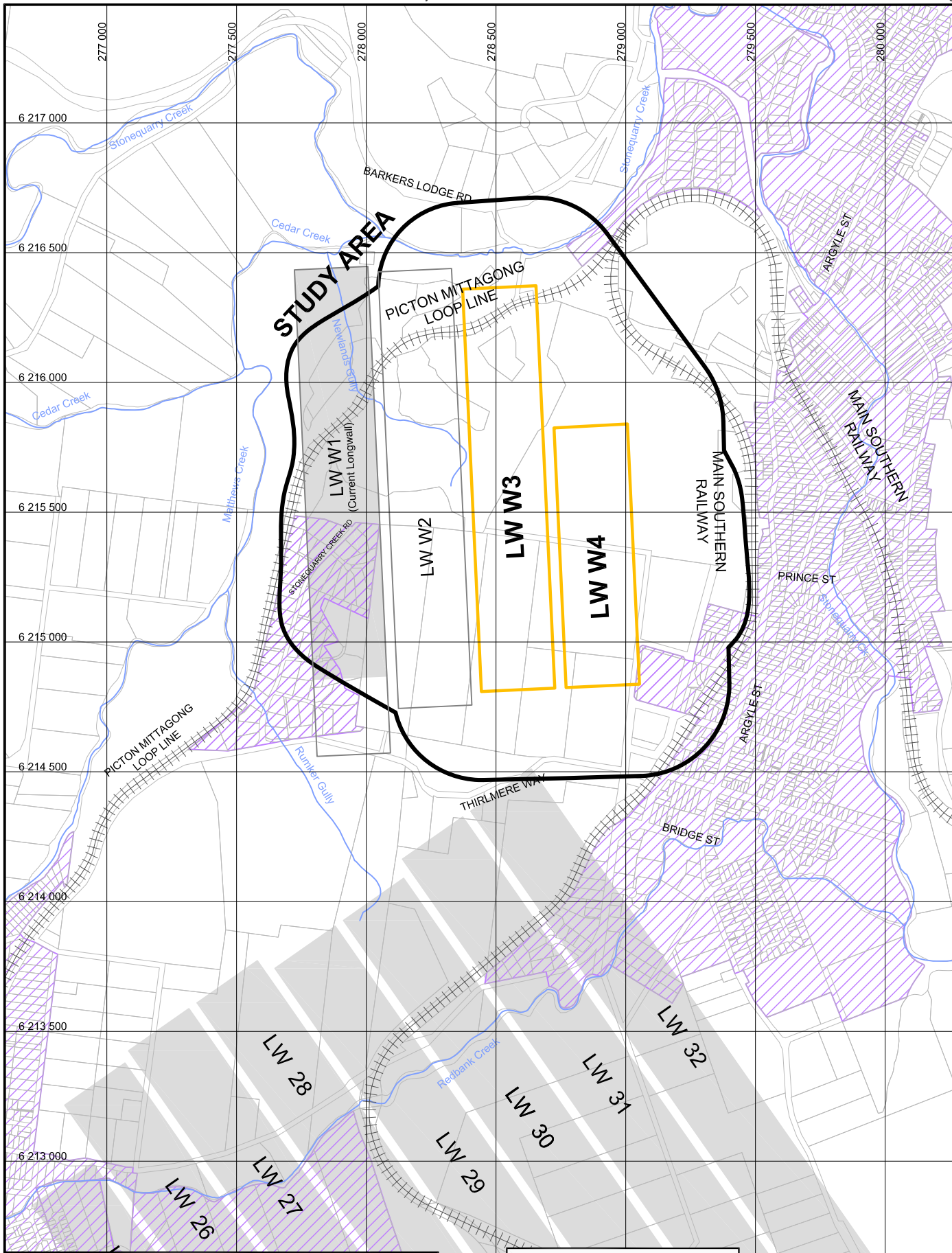
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**WESTERN DOMAIN
EXTRACTION PLAN
LW W3-W4**

MINE SUBSIDENCE DISTRICTS

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**WESTERN DOMAIN
EXTRACTION PLAN
LW W3-W4
URBAN AREAS**

DATE: 18 Sep 2020	SCALE: 1:20000	DRAWING No: MSEC1112-04	Rev No: 01
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LEGEND

- PROPOSED LONGWALLS
- EXISTING LONGWALLS
- CADASTRAL
- ROADS
- RAILWAYS
- WATERCOURSE
- URBAN AREA
(WOLLONDILLY LEP 2011)

Grid to MGA co-ordinates

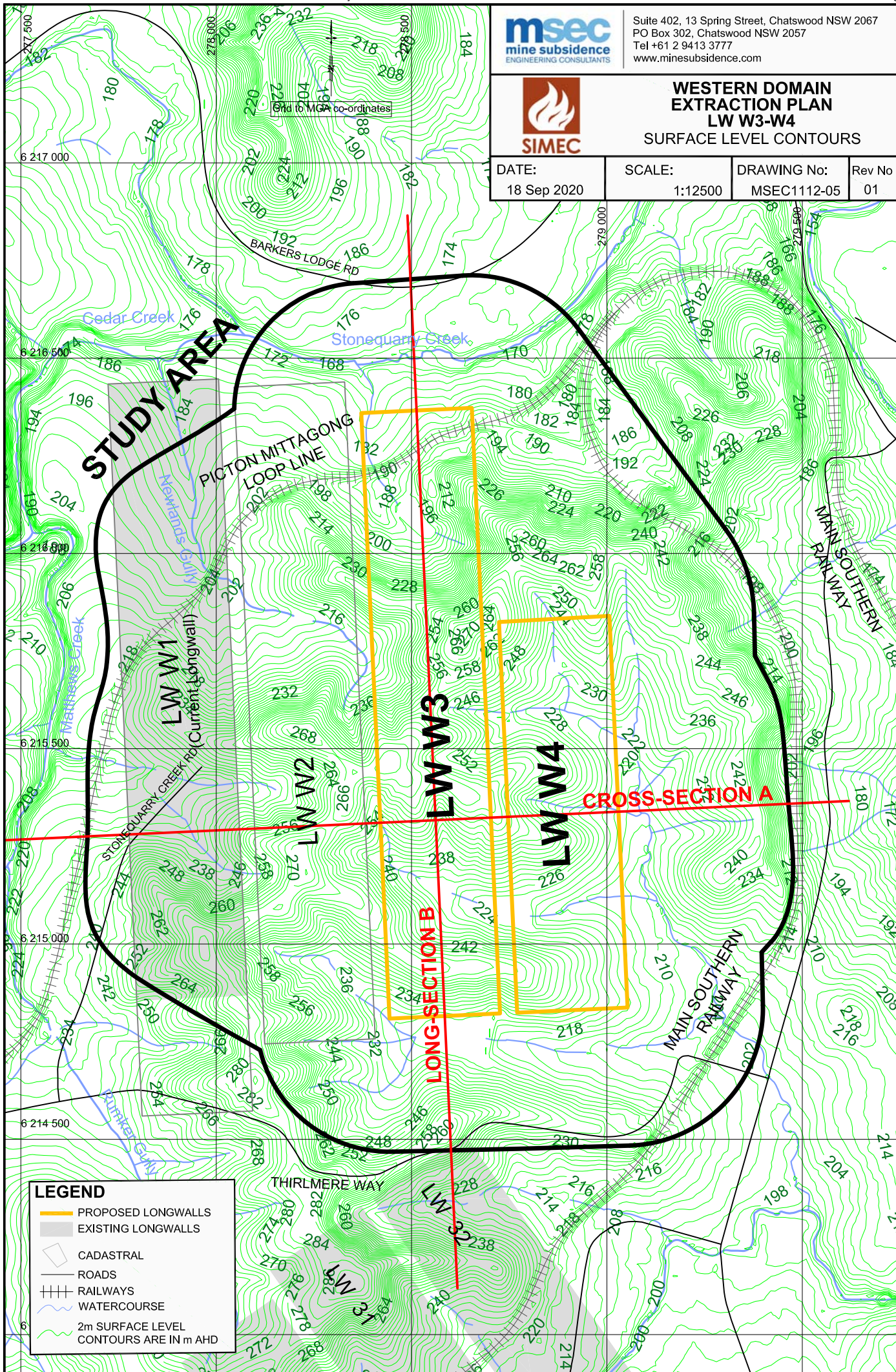


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**WESTERN DOMAIN
 EXTRACTION PLAN
 LW W3-W4
 SURFACE LEVEL CONTOURS**

DATE: 18 Sep 2020	SCALE: 1:12500	DRAWING No: MSEC1112-05	Rev No 01
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LEGEND

- PROPOSED LONGWALLS
- EXISTING LONGWALLS
- CADASTRAL
- ROADS
- RAILWAYS
- WATERCOURSE
- 2m SURFACE LEVEL CONTOURS ARE IN m AHD



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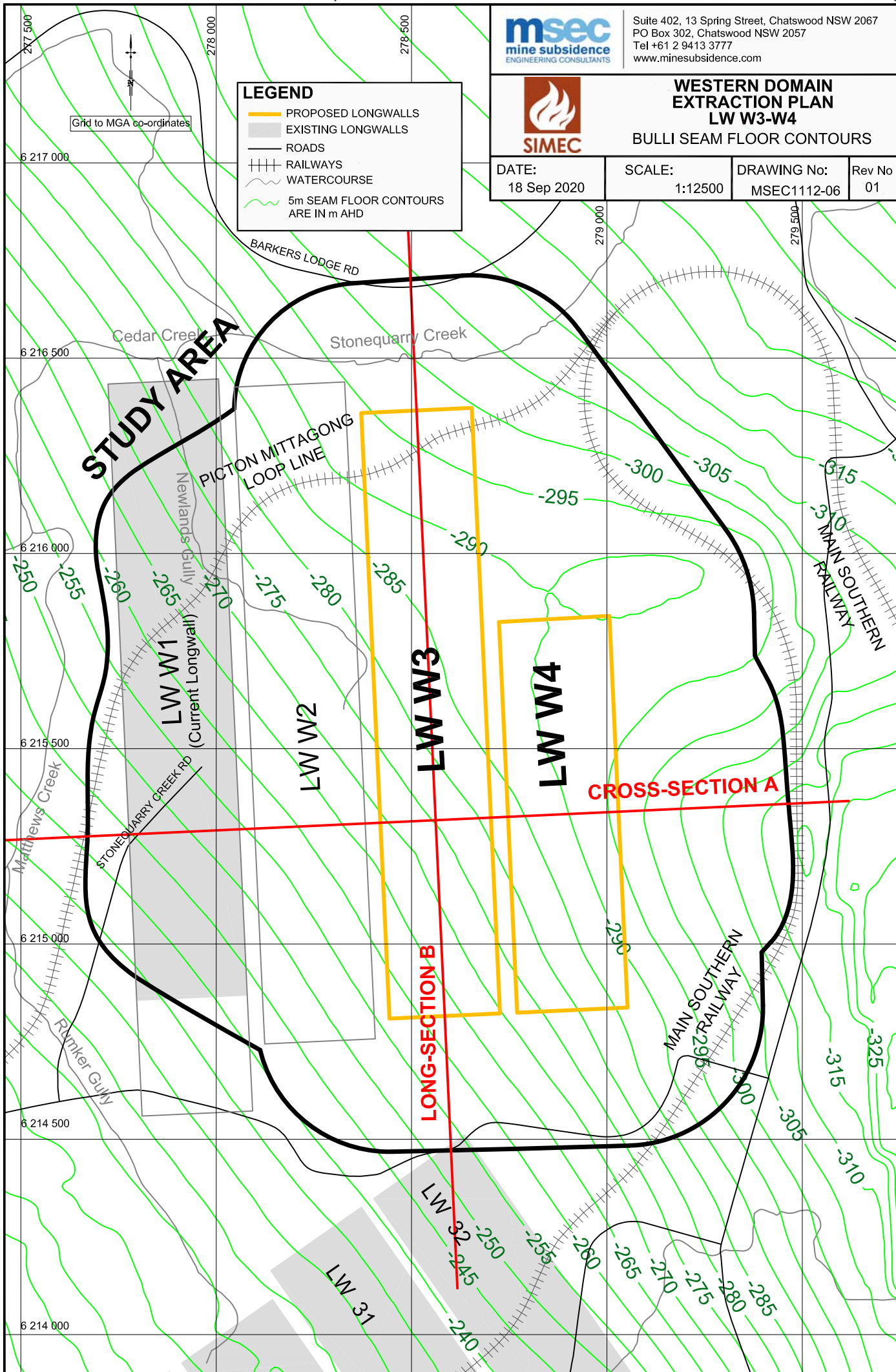


**WESTERN DOMAIN
 EXTRACTION PLAN
 LW W3-W4
 BULLI SEAM FLOOR CONTOURS**

DATE: 18 Sep 2020	SCALE: 1:12500	DRAWING No: MSEC1112-06	Rev No 01
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LEGEND

- PROPOSED LONGWALLS
- EXISTING LONGWALLS
- ROADS
- RAILWAYS
- WATERCOURSE
- 5m SEAM FLOOR CONTOURS ARE IN m AHD





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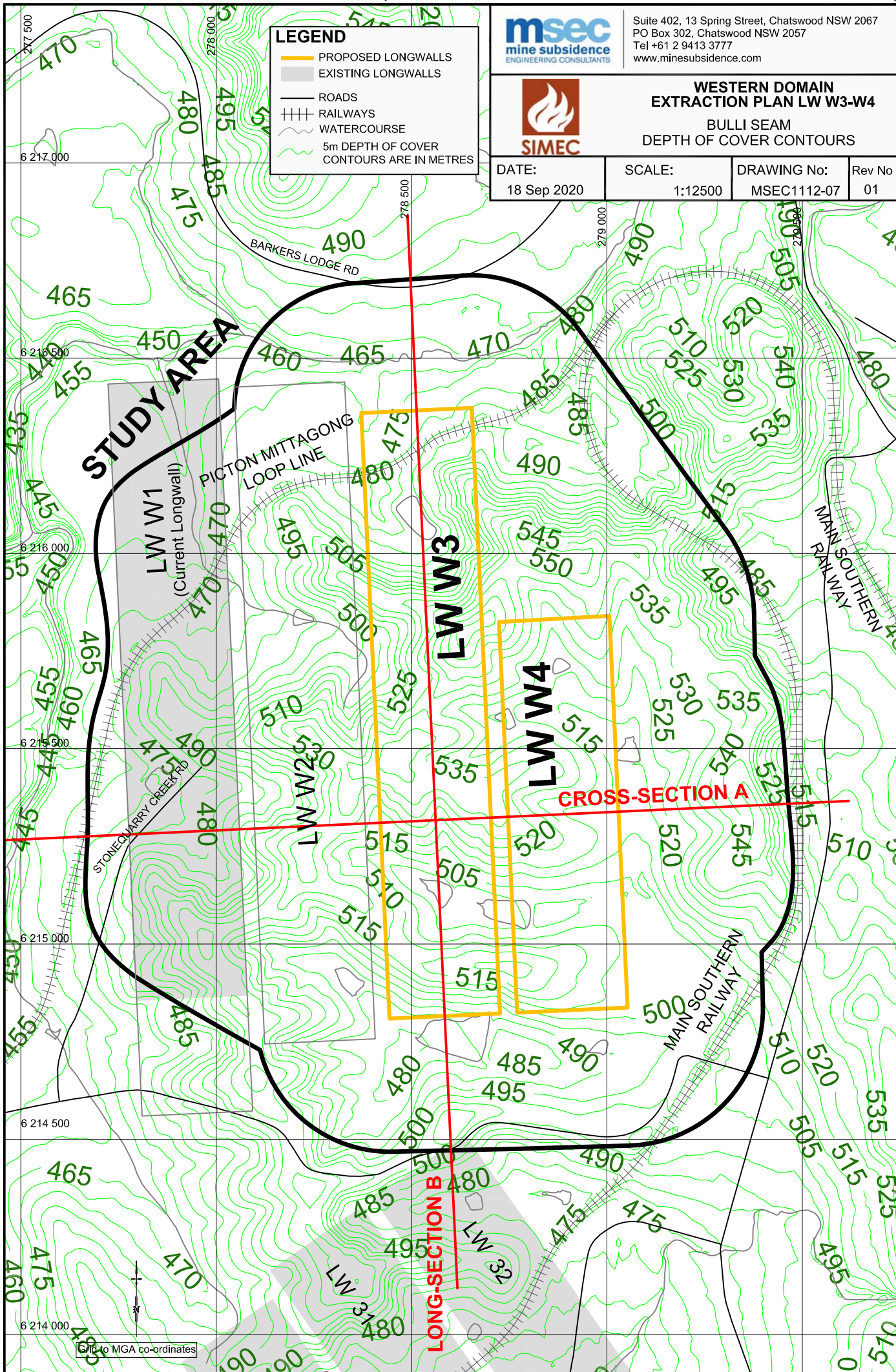


**WESTERN DOMAIN
 EXTRACTION PLAN LW W3-W4
 BULLI SEAM
 DEPTH OF COVER CONTOURS**

DATE: 18 Sep 2020	SCALE: 1:12500	DRAWING No: MSEC1112-07	Rev No 01
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LEGEND

- ▬ PROPOSED LONGWALLS
- EXISTING LONGWALLS
- ROADS
- RAILWAYS
- WATERCOURSE
- 5m DEPTH OF COVER CONTOURS ARE IN METRES



STUDY AREA

LW W1
(Current Longwall)

LW W3

LW W4

CROSS-SECTION A

LONG-SECTION B

Grid to MGA co-ordinates



— Mapping of Nepean Fault & associated strcutres by SCT (2018)

STUDY AREA

LW W1
(Current Longwall)

LW W2

LW W3

LW W4

LW 32

FIRST ORDER FAULT ZONE

MAIN SOUTHERN RAILWAY

MAIN SOUTHERN RAILWAY



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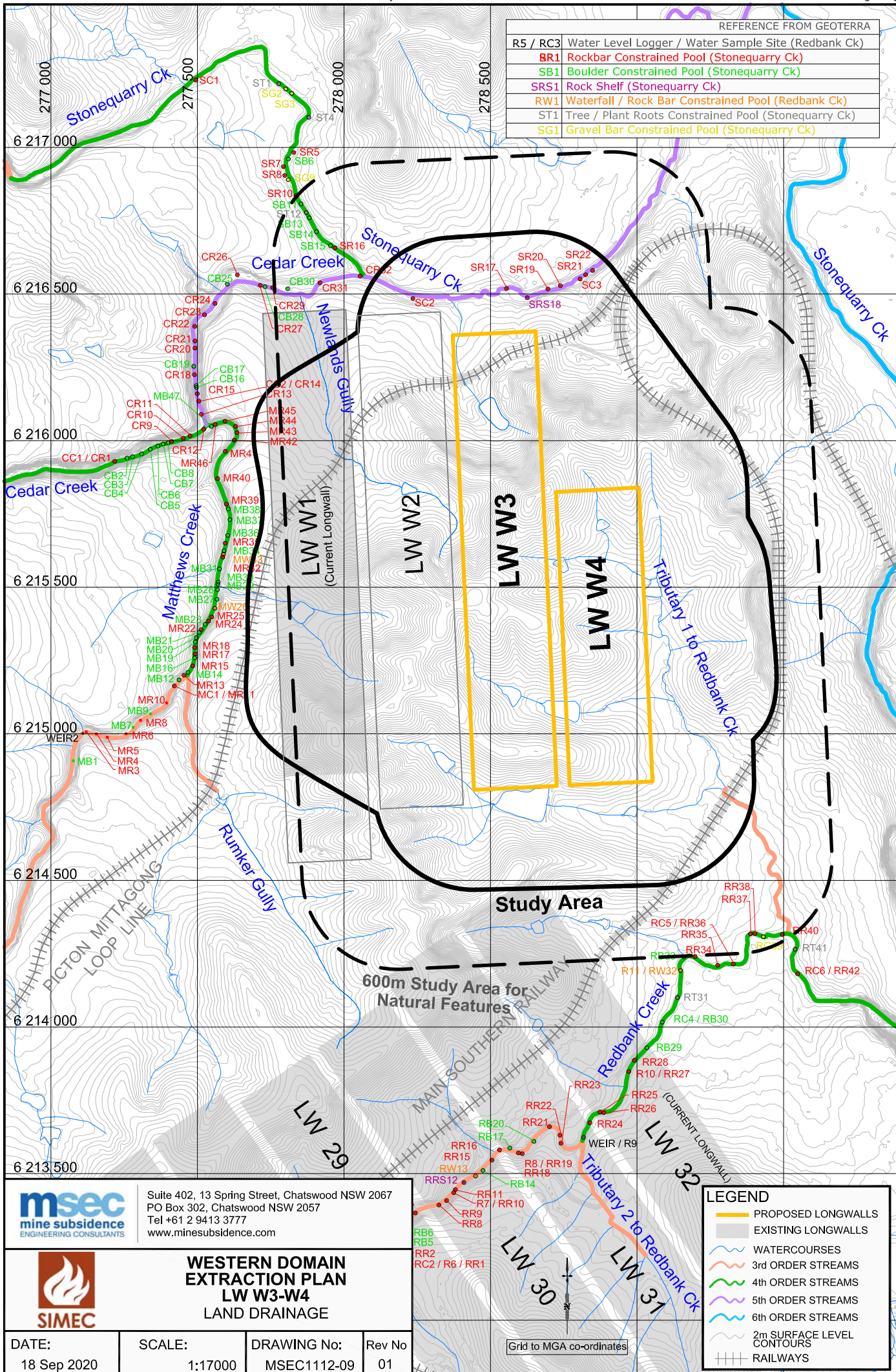
**WESTERN DOMAIN
 EXTRACTION PLAN
 LW W3-W4
 GEOLOGICAL STRUCUTRES**

LEGEND

- PROPOSED LONGWALLS
- EXISTING LONGWALLS
- ROADS
- RAILWAYS
- WATERCOURSE

Grid to MGA co-ordinates

DATE: 18 Sep 2020	SCALE: 1:12500	DRAWING No: MSEC1112-08	Rev No: 01
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REFERENCE FROM GEOTERRA	
R5 / RC3	Water Level Logger / Water Sample Site (Redbank Ck)
BR1	Rockbar Constrained Pool (Stonequarry Ck)
SB1	Boulder Constrained Pool (Stonequarry Ck)
SRS1	Rock Shelf (Stonequarry Ck)
RW1	Waterfall / Rock Bar Constrained Pool (Redbank Ck)
ST1	Tree / Plant Roots Constrained Pool (Stonequarry Ck)
SG1	Gravel Bar Constrained Pool (Stonequarry Ck)

LEGEND	
	PROPOSED LONGWALLS
	EXISTING LONGWALLS
	WATERCOURSES
	3rd ORDER STREAMS
	4th ORDER STREAMS
	5th ORDER STREAMS
	6th ORDER STREAMS
	2m SURFACE LEVEL CONTOURS
	RAILWAYS



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**WESTERN DOMAIN
 EXTRACTION PLAN
 LW W3-W4
 LAND DRAINAGE**

DATE: 18 Sep 2020	SCALE: 1:17000	DRAWING No: MSEC1112-09	Rev No: 01
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Grid to MGA co-ordinates

LEGEND

- PROPOSED LONGWALLS
- EXISTING LONGWALLS
- CADASTRAL
- ROADS
- RAILWAYS
- HIDDEN CREEKS
- WATERCOURSES
- STRUCTURES OVER HIDDEN CREEKS
- SURFACE LEVEL CONTOURS

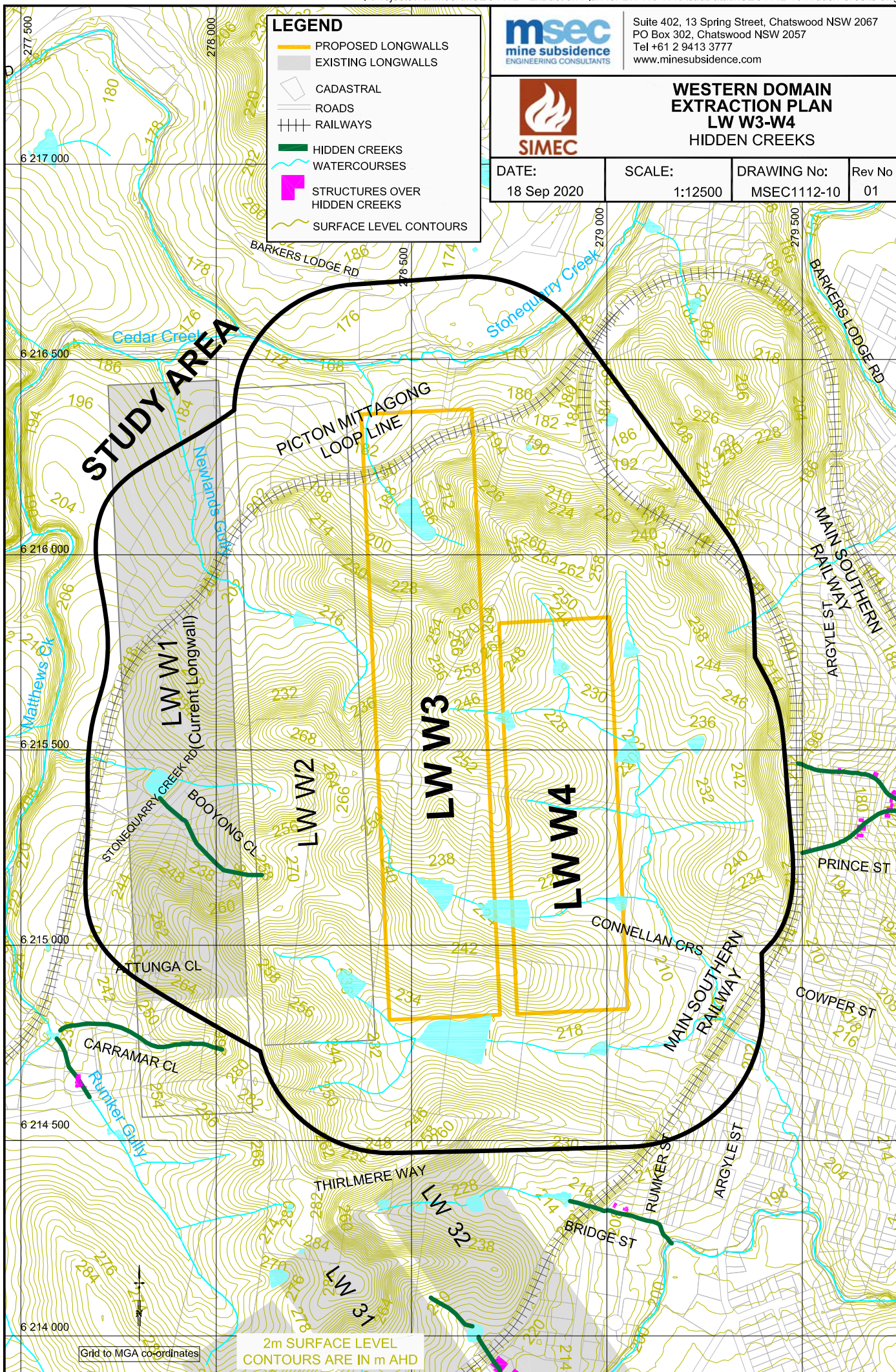


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**WESTERN DOMAIN
 EXTRACTION PLAN
 LW W3-W4
 HIDDEN CREEKS**

DATE: 18 Sep 2020	SCALE: 1:12500	DRAWING No: MSEC1112-10	Rev No 01
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Grid to MGA co-ordinates

2m SURFACE LEVEL
 CONTOURS ARE IN m AHD

LEGEND

- STEEP SLOPES
- CLIFFS (LABELLED)
- ROCK OUTCROPS
- 1m SURFACE LEVEL CONTOURS
- WATERCOURSE
- STRUCTURES ON STEEP SLOPES
- BUILT STRUCTURES
- DRIVEWAYS
- PROPOSED LONGWALLS
- EXISTING LONGWALLS
- CADASTRAL
- ROADS
- RAILWAYS

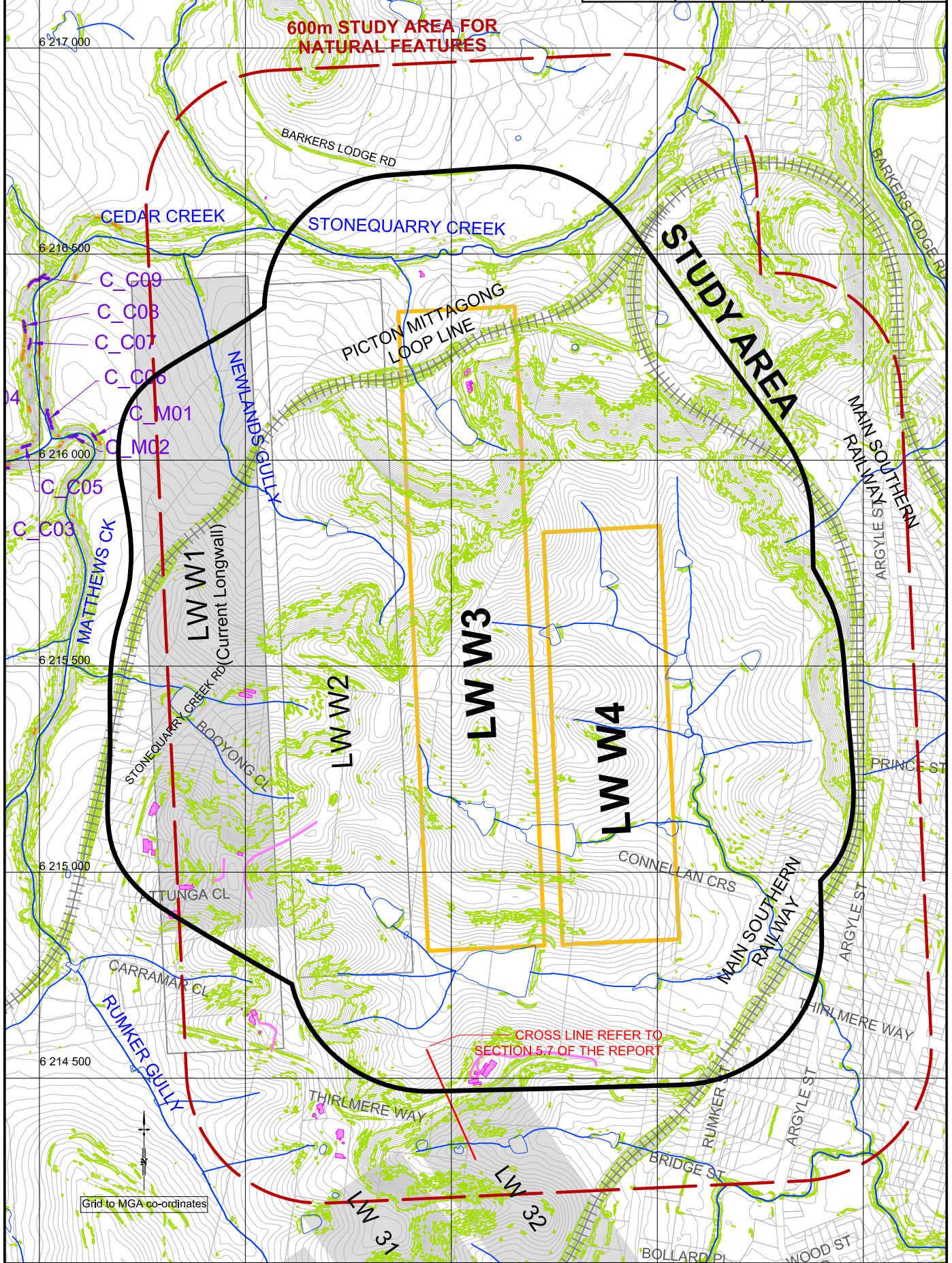


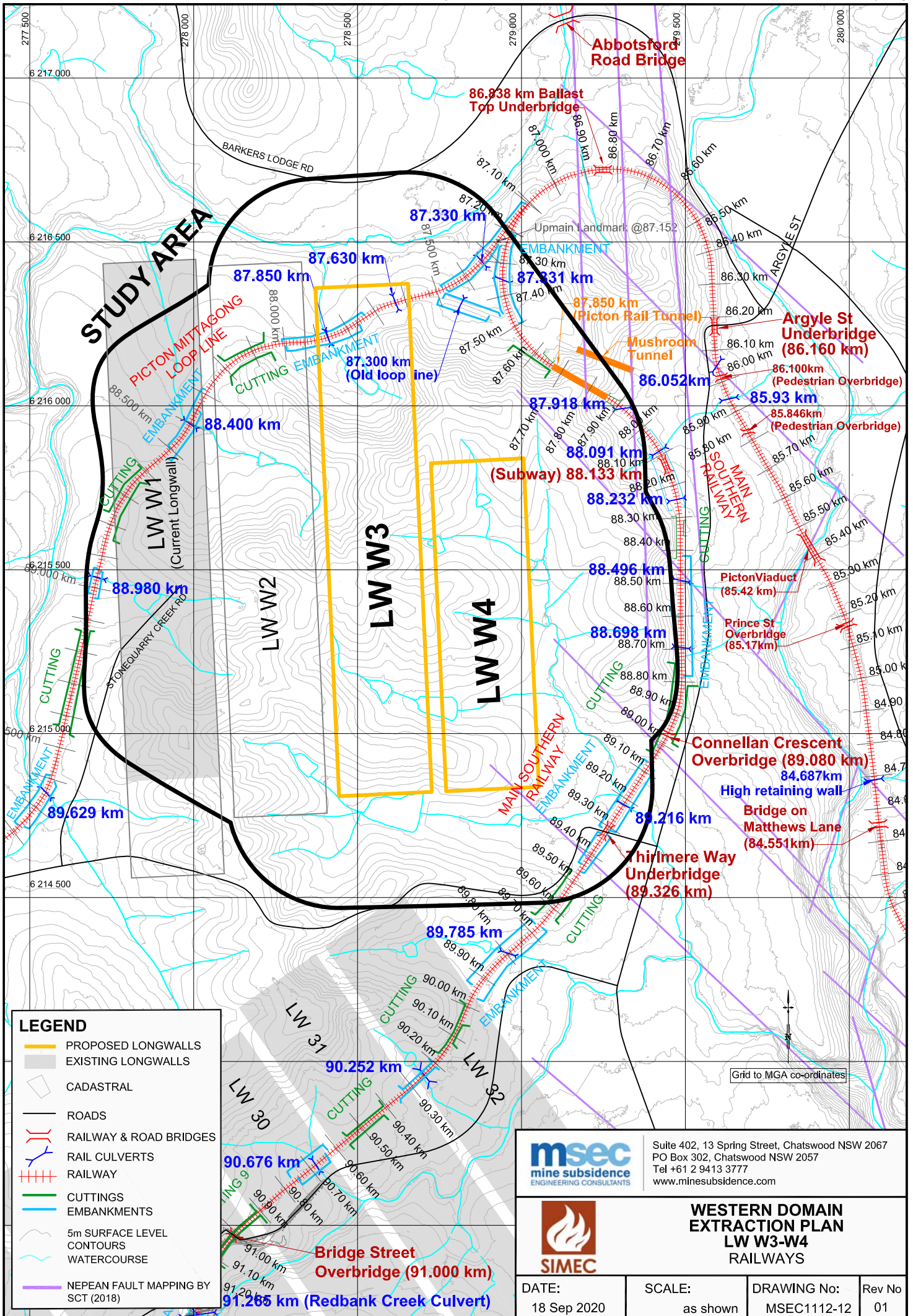
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**WESTERN DOMAIN
 EXTRACTION PLAN
 LW W3-W4
 CLIFFS & STEEP SLOPES**

DATE: 18 Sep 2020	SCALE: 1:12500	DRAWING No: MSEC1112-11	Rev No 01
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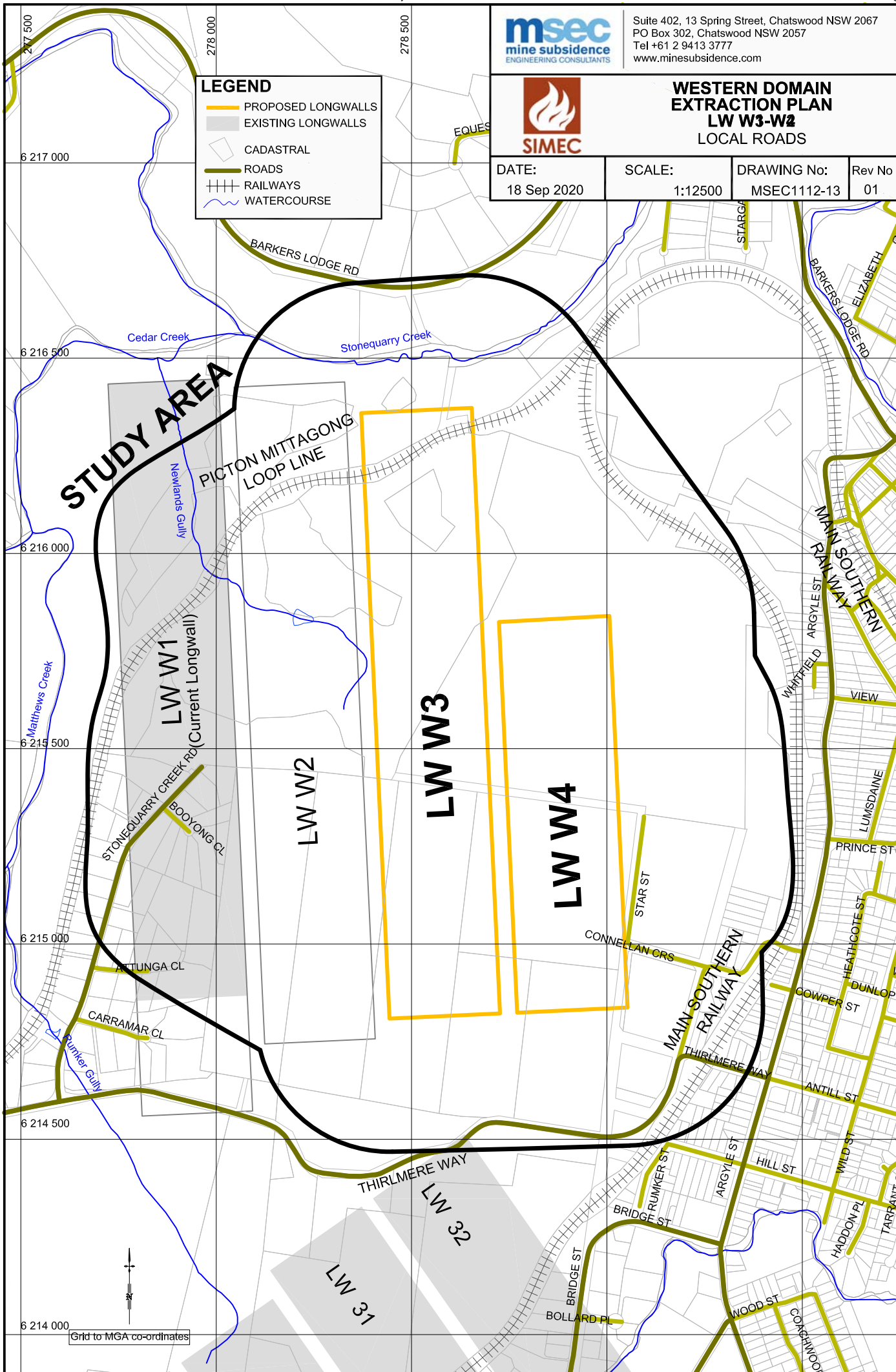


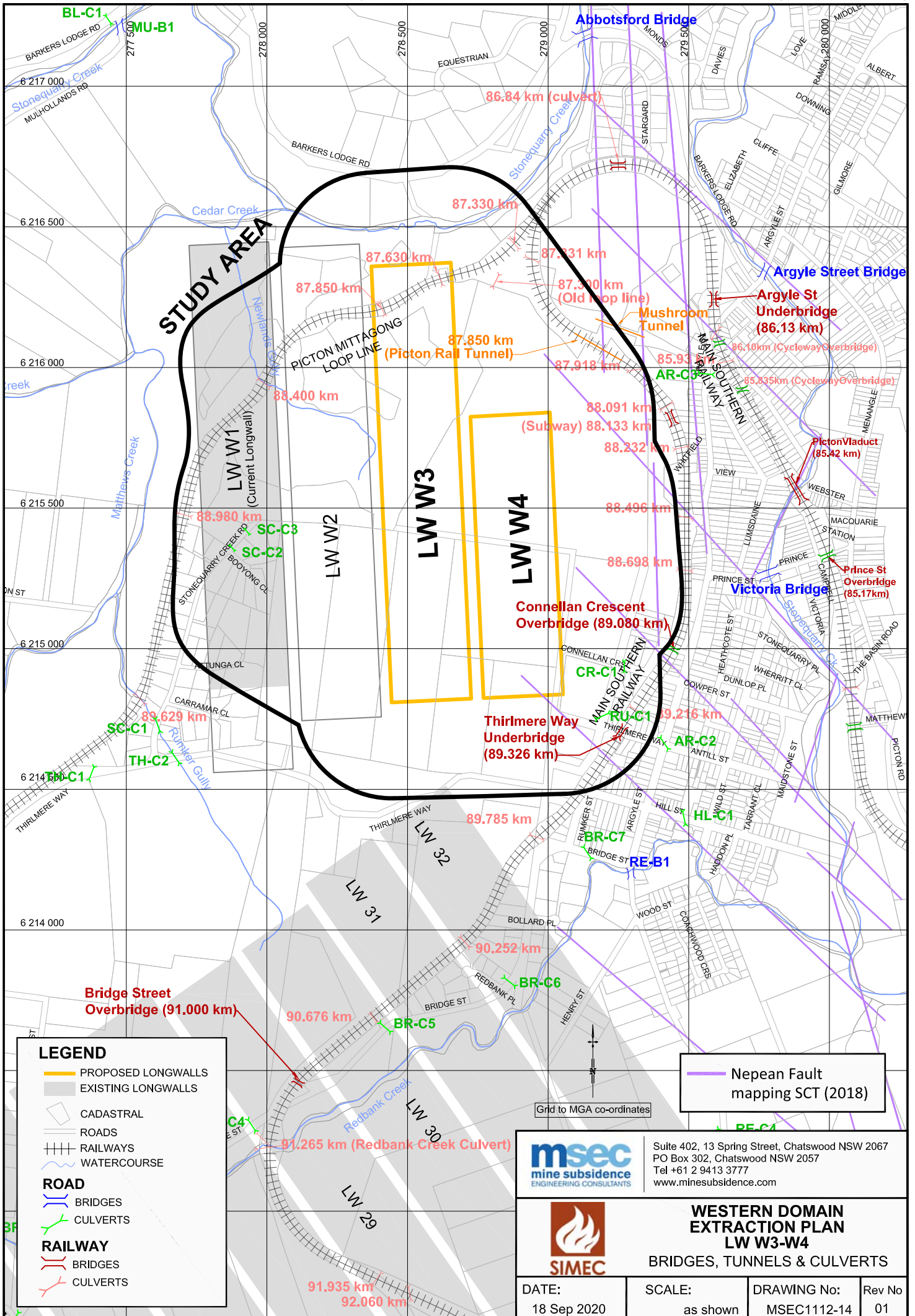
**WESTERN DOMAIN
 EXTRACTION PLAN
 LW W3-W2
 LOCAL ROADS**

DATE: 18 Sep 2020	SCALE: 1:12500	DRAWING No: MSEC1112-13	Rev No 01
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LEGEND

- ▬ PROPOSED LONGWALLS
- EXISTING LONGWALLS
- CADASTRAL
- ▬ ROADS
- ▬ RAILWAYS
- ~ WATERCOURSE





LEGEND

- PROPOSED LONGWALLS
- EXISTING LONGWALLS
- CADASTRAL
- ROADS
- RAILWAYS
- WATERCOURSE

ROAD

- BRIDGES
- CULVERTS

RAILWAY

- BRIDGES
- CULVERTS

Nepean Fault mapping SCT (2018)



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**WESTERN DOMAIN
 EXTRACTION PLAN
 LW W3-W4**
 BRIDGES, TUNNELS & CULVERTS

DATE:
 18 Sep 2020

SCALE:
 as shown

DRAWING No:
 MSEC1112-14

Rev No
 01



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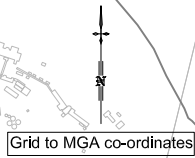
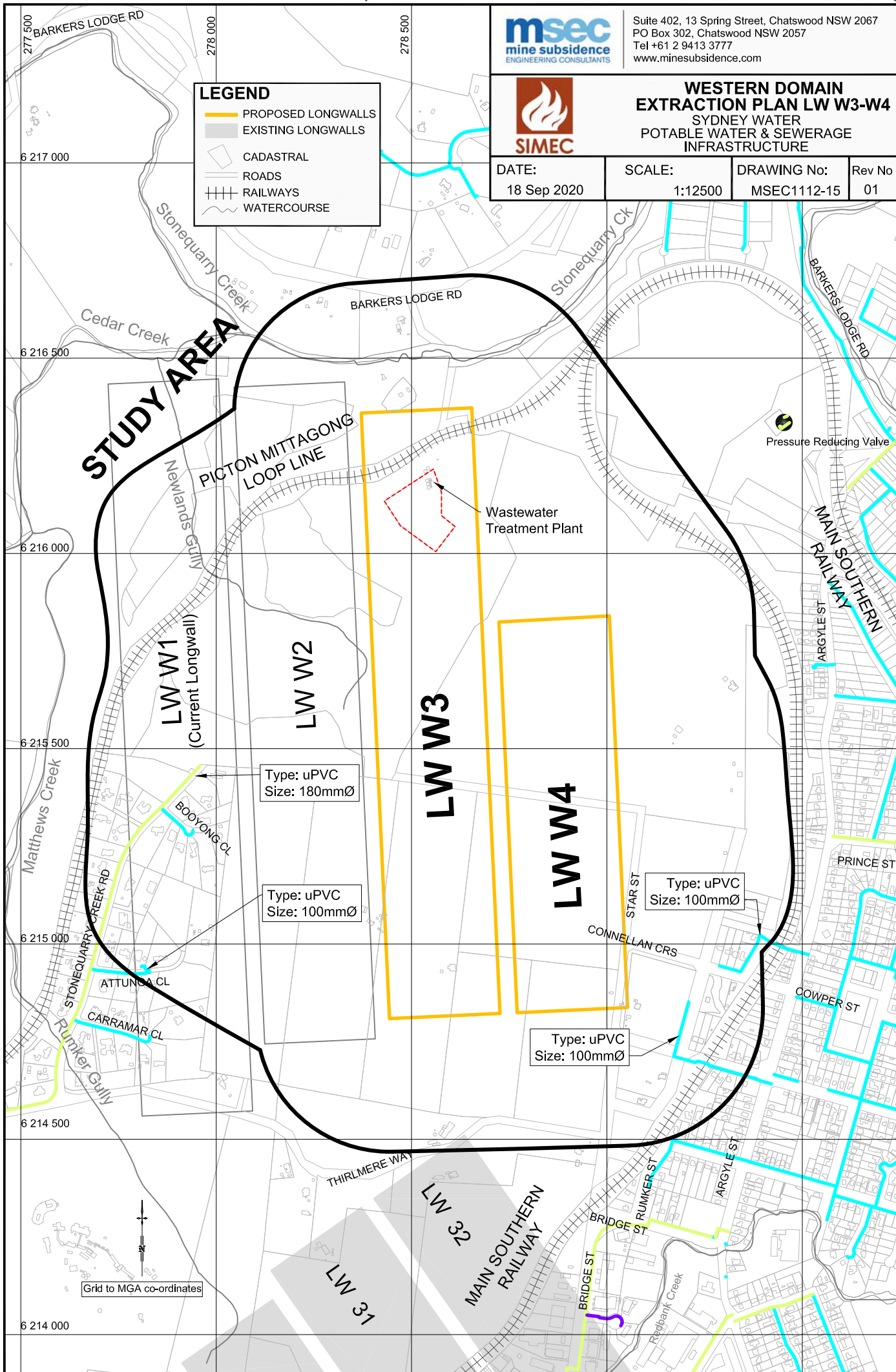
**WESTERN DOMAIN
 EXTRACTION PLAN LW W3-W4**
 SYDNEY WATER
 POTABLE WATER & SEWERAGE
 INFRASTRUCTURE

DATE: 18 Sep 2020	SCALE: 1:12500	DRAWING No: MSEC1112-15	Rev No 01
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LEGEND

- PROPOSED LONGWALLS
- EXISTING LONGWALLS
- CADASTRAL
- ROADS
- RAILWAYS
- WATERCOURSE

STUDY AREA




LEGEND


- PROPOSED LONGWALLS
- EXISTING LONGWALLS
- CADASTRAL
- ROADS
- RAILWAYS
- WATERCOURSE

GAS PIPELINES

- Ø 32mm NY
- Ø 50mm NY
- Ø 63mm NY
- Ø 75mm NY
- Ø 160mm PE

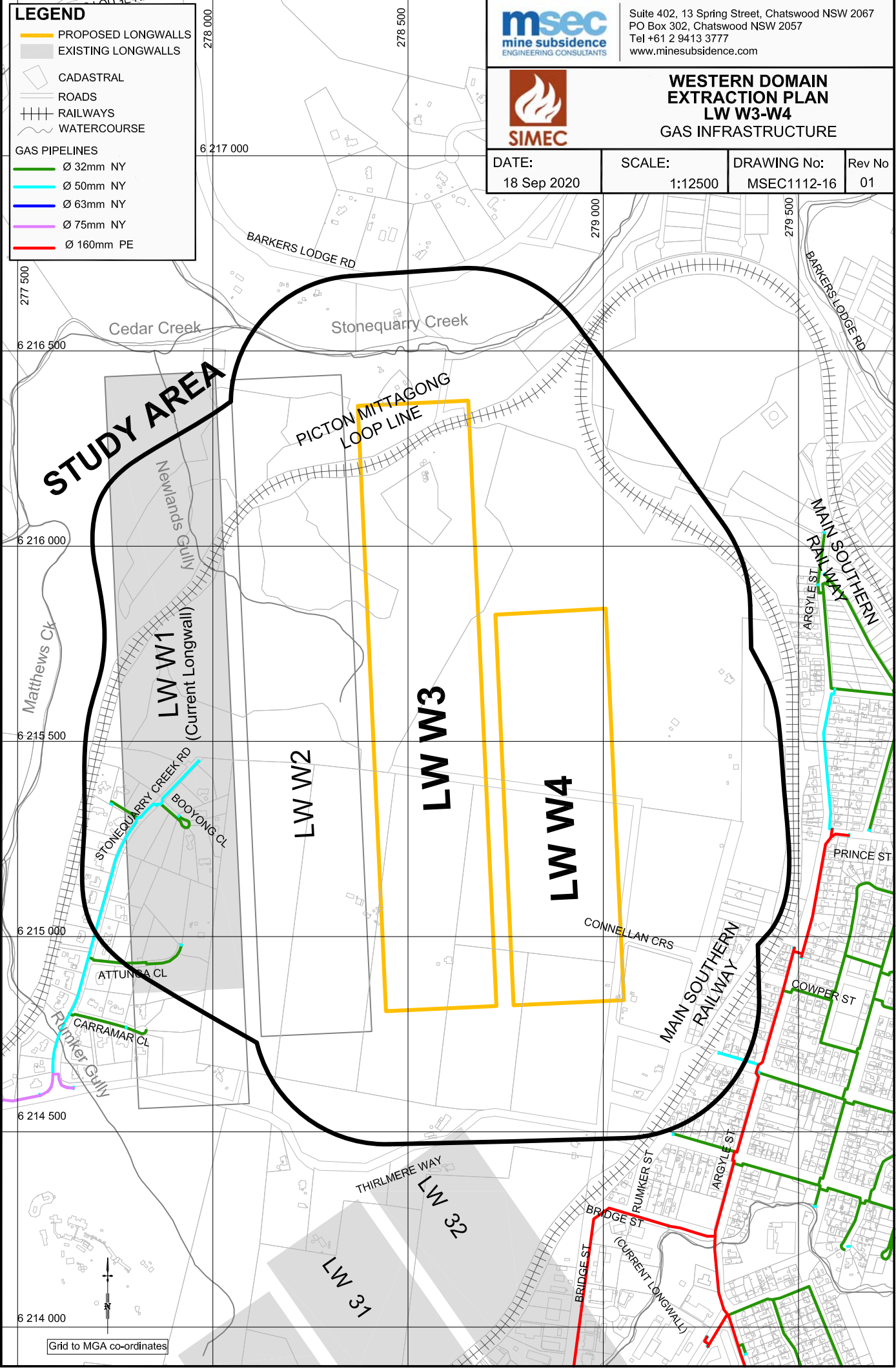


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**WESTERN DOMAIN
EXTRACTION PLAN
LW W3-W4
GAS INFRASTRUCTURE**

DATE: 18 Sep 2020	SCALE: 1:12500	DRAWING No: MSEC1112-16	Rev No 01
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STUDY AREA

LW W1
(Current Longwall)

LW W2

LW W3

LW W4

LW 31

LW 32


Grid to MGA co-ordinates

LEGEND


- PROPOSED LONGWALLS
- EXISTING LONGWALLS
- ▭ CADASTRAL
- ROADS
- +++ RAILWAYS
- ~ WATERCOURSE
- ▭ BUILDINGS

ELECTRICAL

- LOW VOLTAGE
- 11 kV
- 66 kV
- ⊠ SUBSTATION
- ⊠ POWER POLE

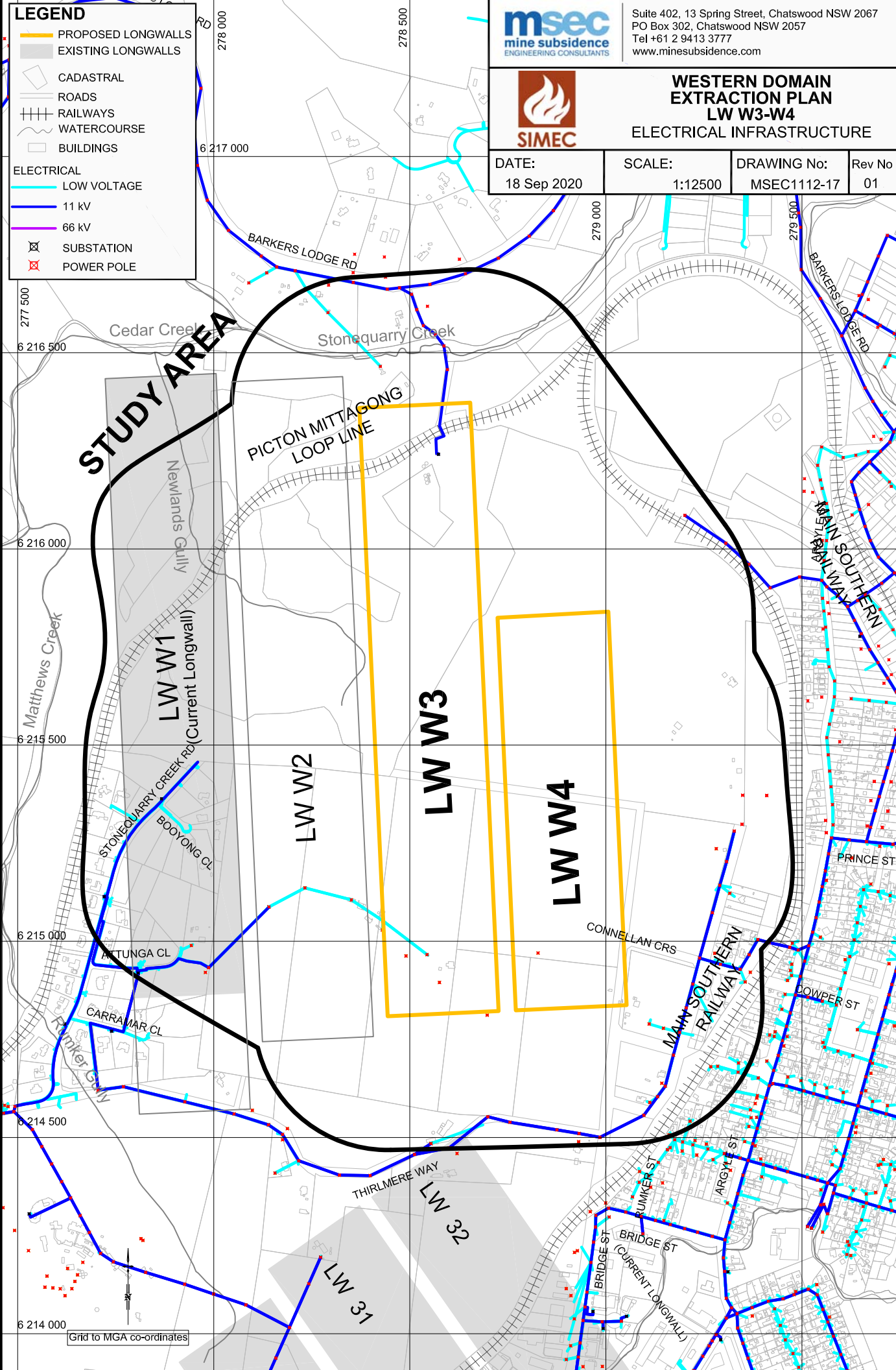


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**WESTERN DOMAIN
EXTRACTION PLAN
LW W3-W4
ELECTRICAL INFRASTRUCTURE**

DATE: 18 Sep 2020	SCALE: 1:12500	DRAWING No: MSEC1112-17	Rev No 01
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LEGEND


- PROPOSED LONGWALLS
- EXISTING LONGWALLS
- CADASTRAL
- ROADS
- RAILWAYS
- WATERCOURSE
- BUILDINGS

TELECOMMUNICATIONS

- NBN OPTICAL FIBRE CABLES
- OPTICAL FIBRE CABLES
- COPPER CABLES

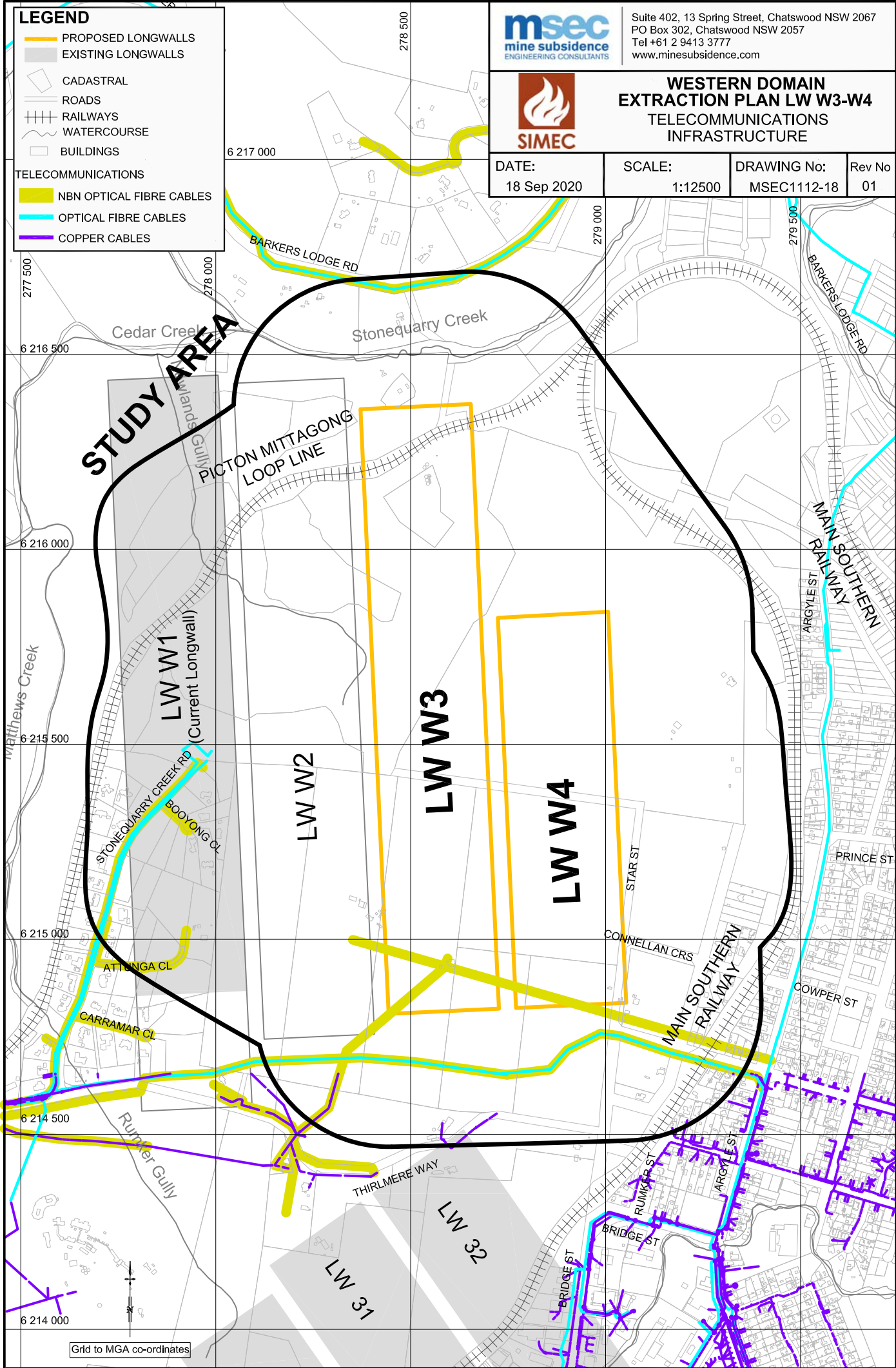


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**WESTERN DOMAIN
EXTRACTION PLAN LW W3-W4
TELECOMMUNICATIONS
INFRASTRUCTURE**

DATE: 18 Sep 2020	SCALE: 1:12500	DRAWING No: MSEC1112-18	Rev No 01
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Grid to MGA co-ordinates

LEGEND

- HERITAGE SITES
- ARCHAEOLOGICAL SITES
- AXE GRINDING GROOVES
- SHELTER WITH ART; SHELTER WITH DEPOSIT
- SHELTER AND GRINDING GROOVE
- OPEN SITE
- ▲ MODIFIED TREE
- ▲ POTENTIAL ARCHAEOLOGICAL DEPOSIT
- PROPOSED LONGWALLS
- EXISTING LONGWALLS
- CADASTRAL
- ROADS
- RAILWAYS
- WATERCOURSE



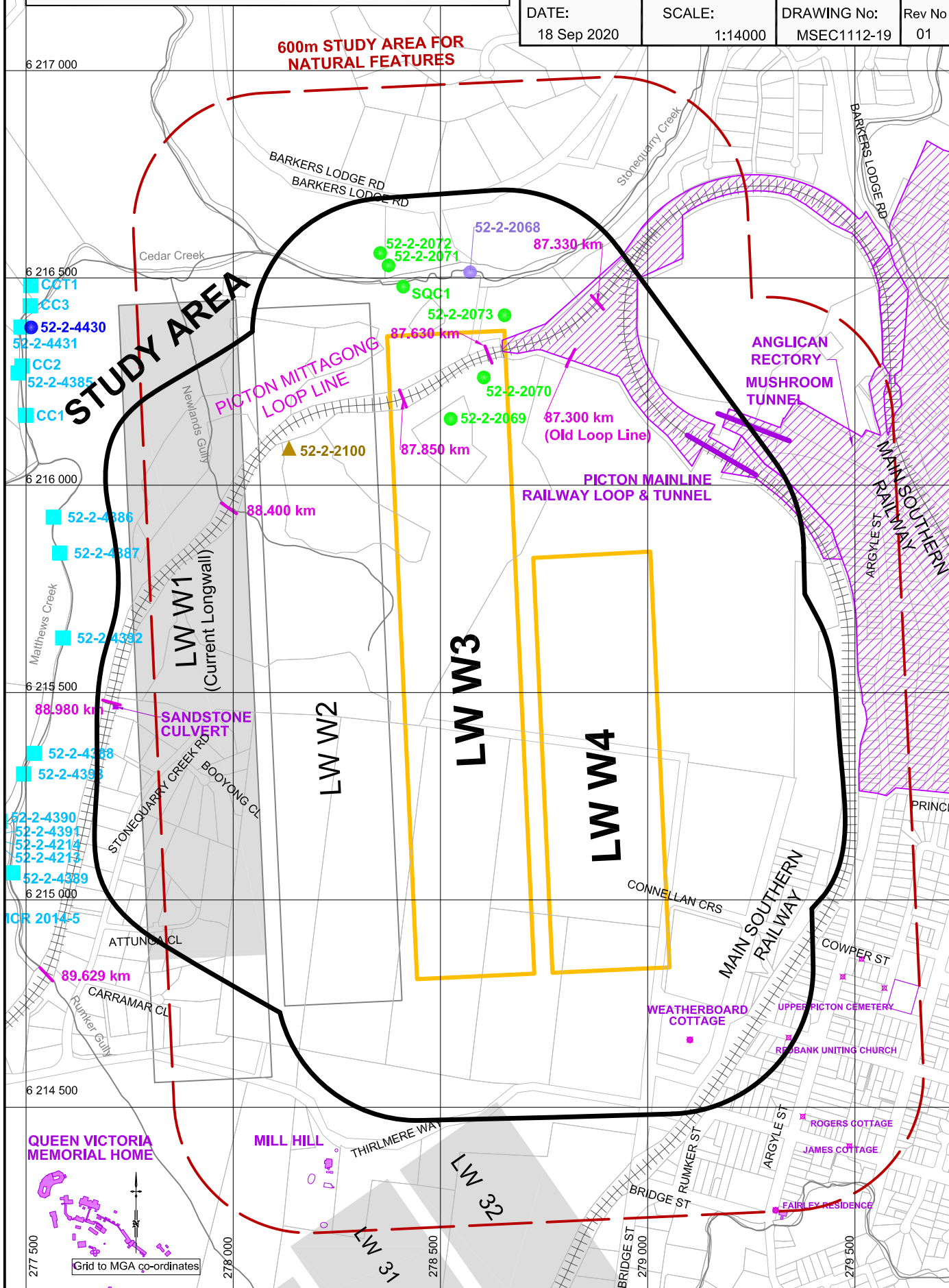
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**WESTERN DOMAIN
 EXTRACTION PLAN
 LW W3-W4**

HERITAGE & ARCHAEOLOGICAL SITES

DATE: 18 Sep 2020	SCALE: 1:14000	DRAWING No: MSEC1112-19	Rev No 01
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QUEEN VICTORIA MEMORIAL HOME


Grid to MGA co-ordinates

LEGEND

- ▬ PROPOSED LONGWALLS
- EXISTING LONGWALLS
- CADASTRAL
- ROADS
- RAILWAYS
- ~ WATERCOURSE
- GROUNDWATER BORES
- ⊙ EXPLORATION DRILL HOLES
- SURVEY MARKS

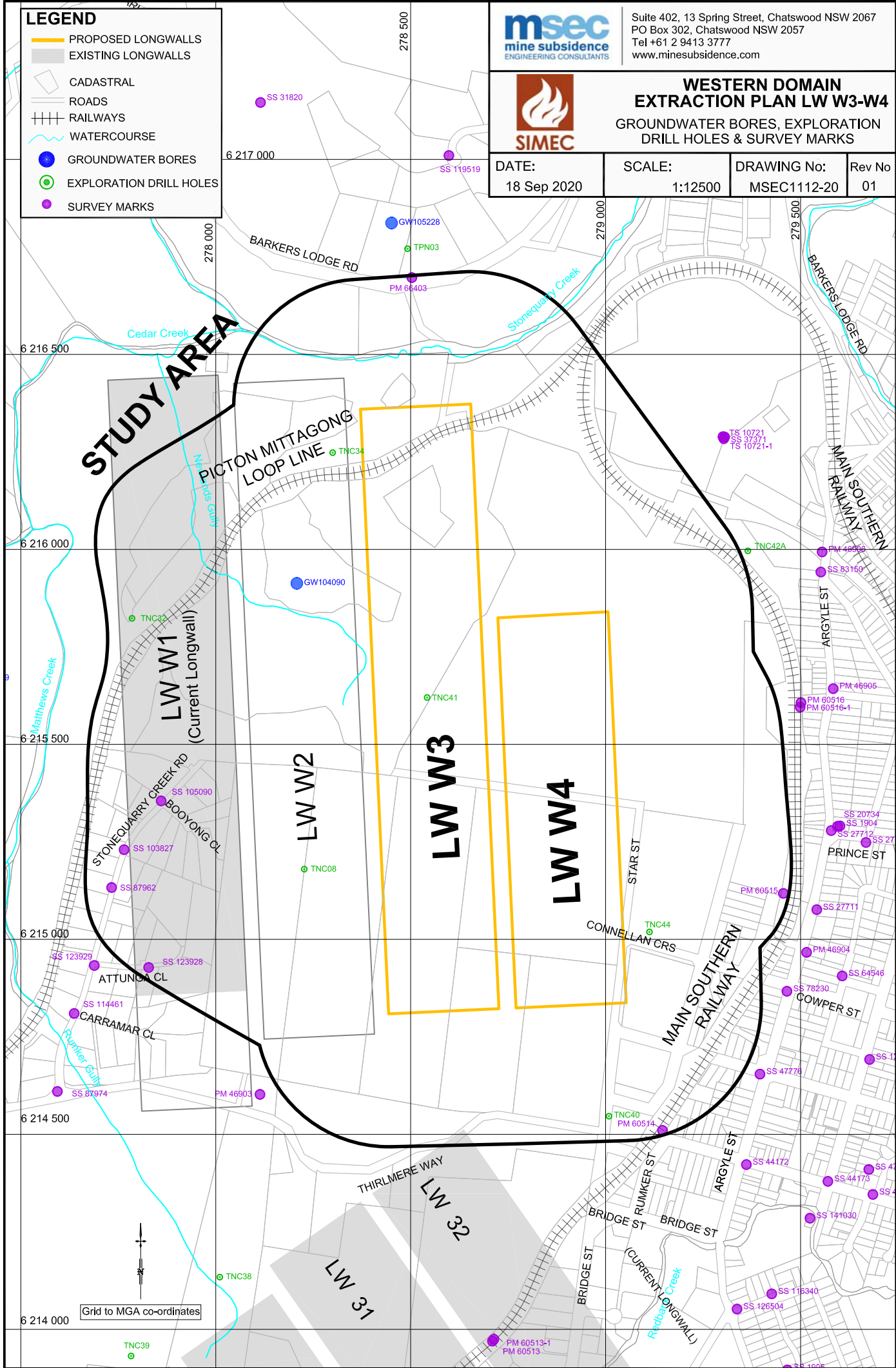


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**WESTERN DOMAIN
EXTRACTION PLAN LW W3-W4**
GROUNDWATER BORES, EXPLORATION
DRILL HOLES & SURVEY MARKS

DATE: 18 Sep 2020	SCALE: 1:12500	DRAWING No: MSEC1112-20	Rev No 01
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LEGEND

- PROPOSED LONGWALLS
- EXISTING LONGWALLS
- ▭ CADASTRAL
- ROADS
- RAILWAYS
- WATERCOURSE
- ▭ COMMERCIAL
- ▭ PUBLIC AMENITIES
- ▭ PUBLIC UTILITIES
- ▭ HOUSES
- ▭ RURAL STRUCTURES
- POOLS
- DAMS



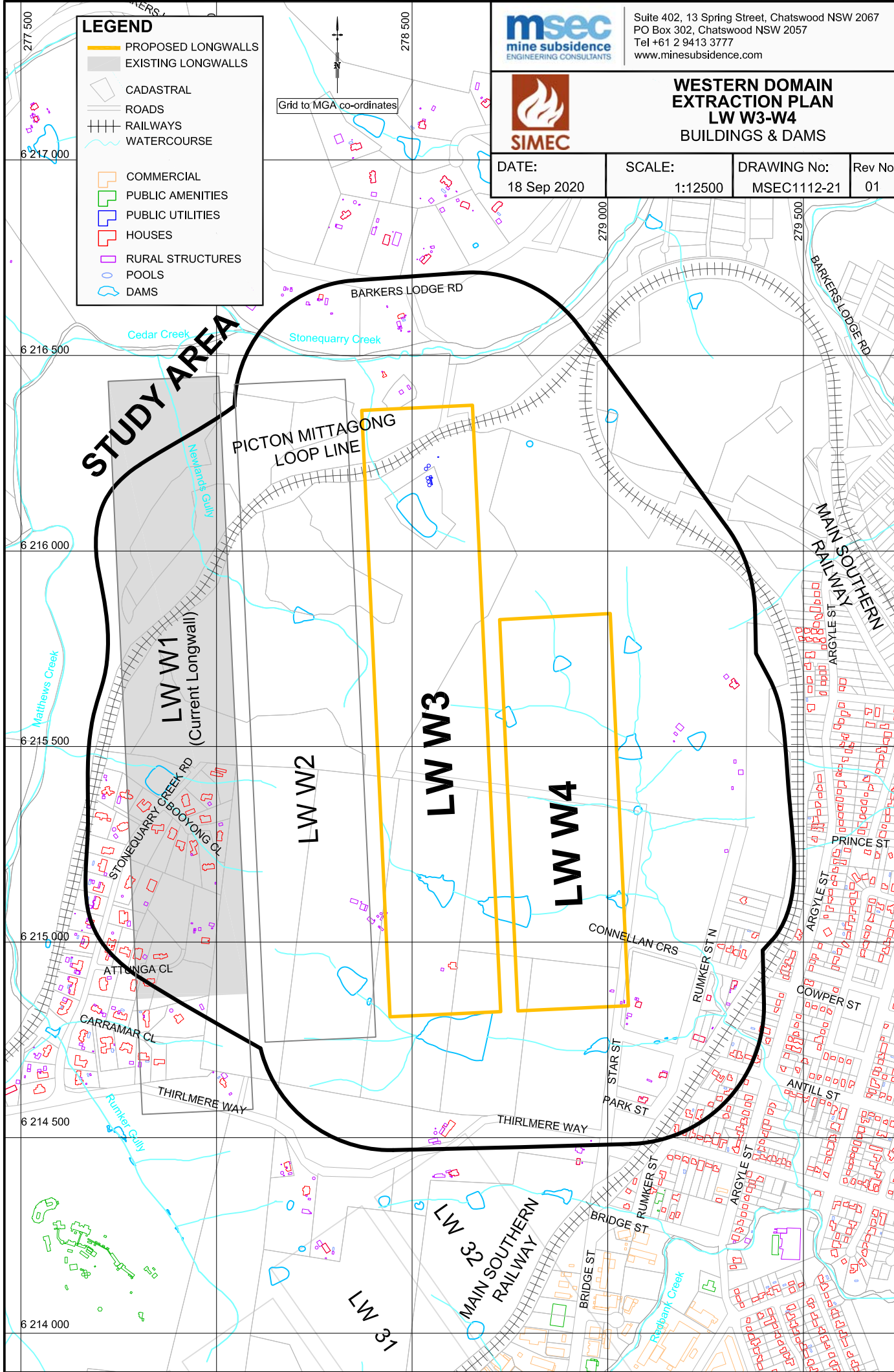
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**WESTERN DOMAIN
 EXTRACTION PLAN
 LW W3-W4
 BUILDINGS & DAMS**

DATE: 18 Sep 2020	SCALE: 1:12500	DRAWING No: MSEC1112-21	Rev No 01
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Grid to MGA co-ordinates



LEGEND

- ▬ PROPOSED LONGWALLS
- EXISTING LONGWALLS
- ROADS
- RAILWAYS
- WATERCOURSE

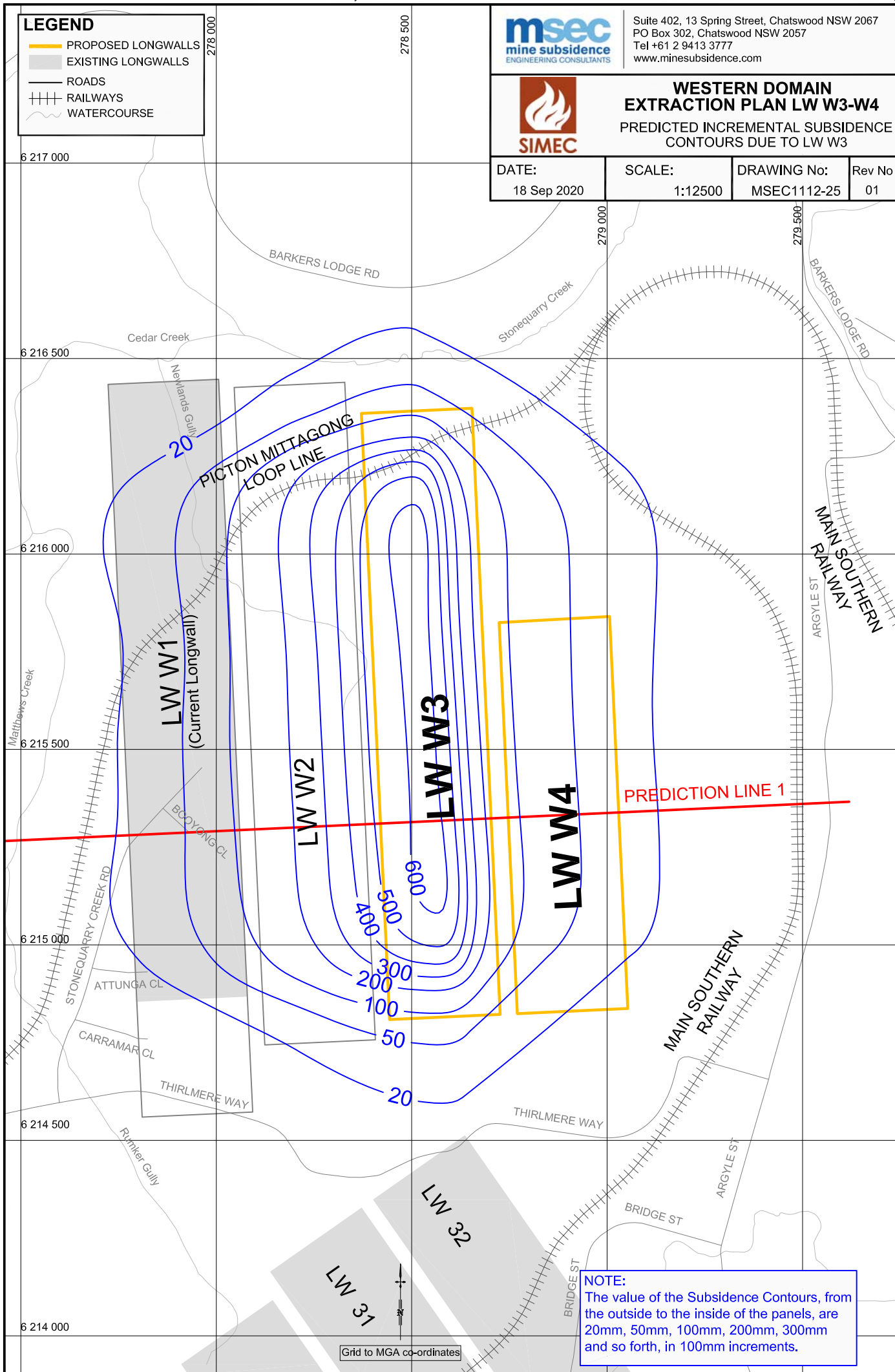


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**WESTERN DOMAIN
 EXTRACTION PLAN LW W3-W4**
 PREDICTED INCREMENTAL SUBSIDENCE
 CONTOURS DUE TO LW W3

DATE: 18 Sep 2020	SCALE: 1:12500	DRAWING No: MSEC1112-25	Rev No 01
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NOTE:
 The value of the Subsidence Contours, from the outside to the inside of the panels, are 20mm, 50mm, 100mm, 200mm, 300mm and so forth, in 100mm increments.

Grid to MGA co-ordinates

LEGEND

- ▬ PROPOSED LONGWALLS
- EXISTING LONGWALLS
- ROADS
- RAILWAYS
- WATERCOURSE

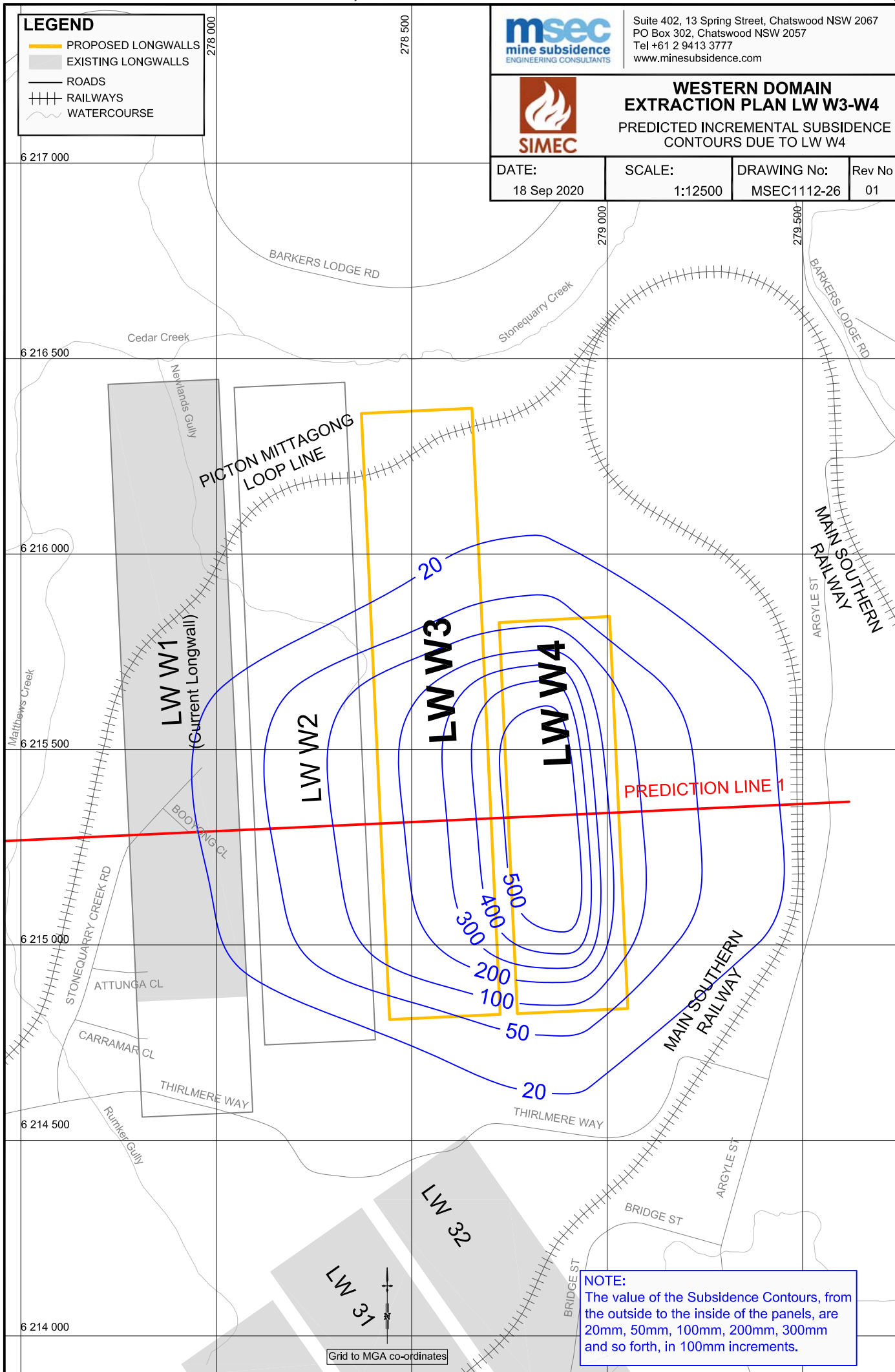


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**WESTERN DOMAIN
 EXTRACTION PLAN LW W3-W4**
 PREDICTED INCREMENTAL SUBSIDENCE
 CONTOURS DUE TO LW W4

DATE: 18 Sep 2020	SCALE: 1:12500	DRAWING No: MSEC1112-26	Rev No 01
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NOTE:
 The value of the Subsidence Contours, from the outside to the inside of the panels, are 20mm, 50mm, 100mm, 200mm, 300mm and so forth, in 100mm increments.

Grid to MGA co-ordinates

LEGEND

- ▬ PROPOSED LONGWALLS
- EXISTING LONGWALLS
- ROADS
- RAILWAYS
- WATERCOURSE



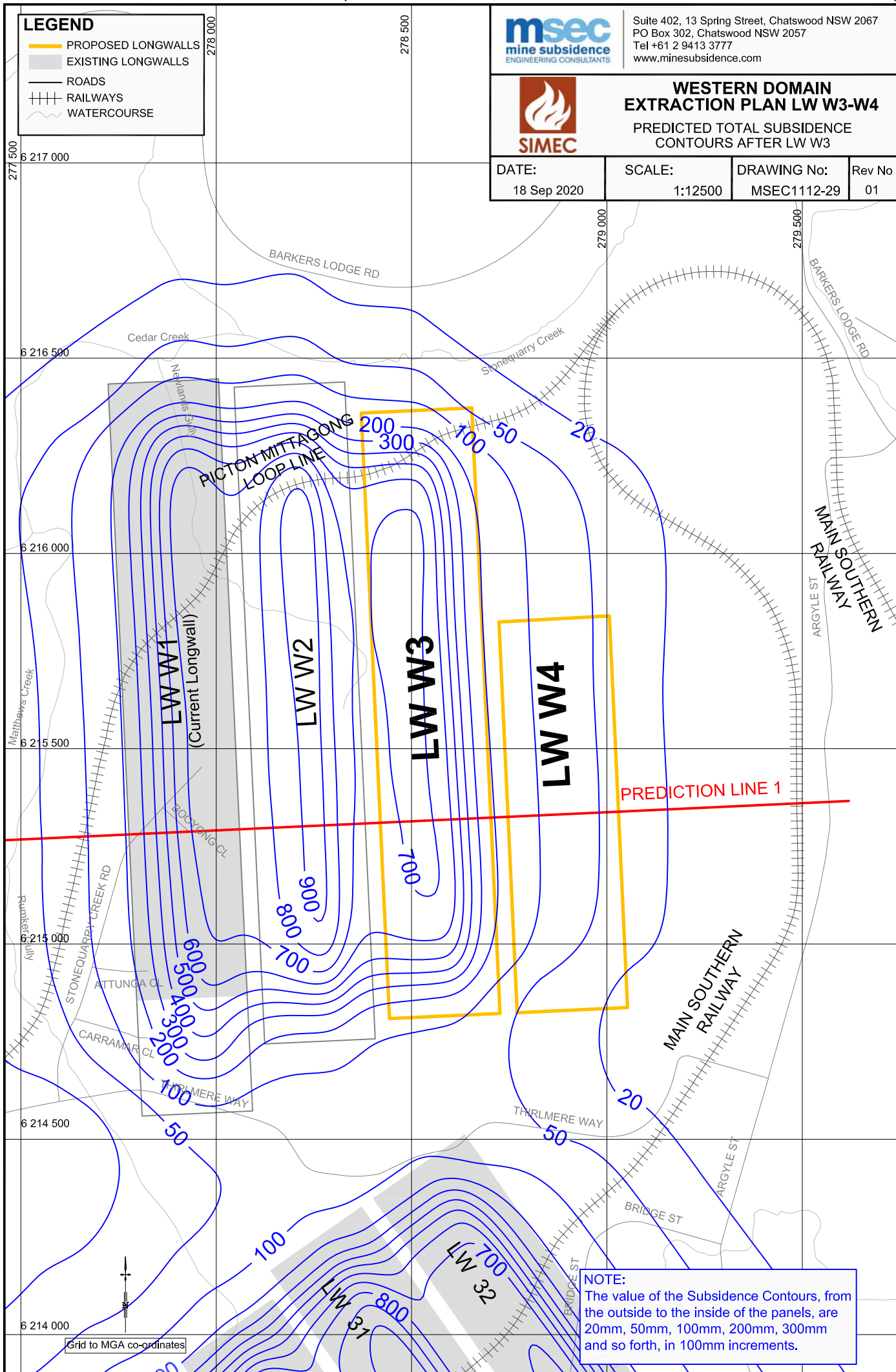
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**WESTERN DOMAIN
 EXTRACTION PLAN LW W3-W4**

PREDICTED TOTAL SUBSIDENCE
 CONTOURS AFTER LW W3

DATE: 18 Sep 2020	SCALE: 1:12500	DRAWING No: MSEC1112-29	Rev No 01
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NOTE:
 The value of the Subsidence Contours, from the outside to the inside of the panels, are 20mm, 50mm, 100mm, 200mm, 300mm and so forth, in 100mm increments.

Grid to MGA co-ordinates

LEGEND

- ▬ PROPOSED LONGWALLS
- EXISTING LONGWALLS
- ROADS
- RAILWAYS
- WATERCOURSE



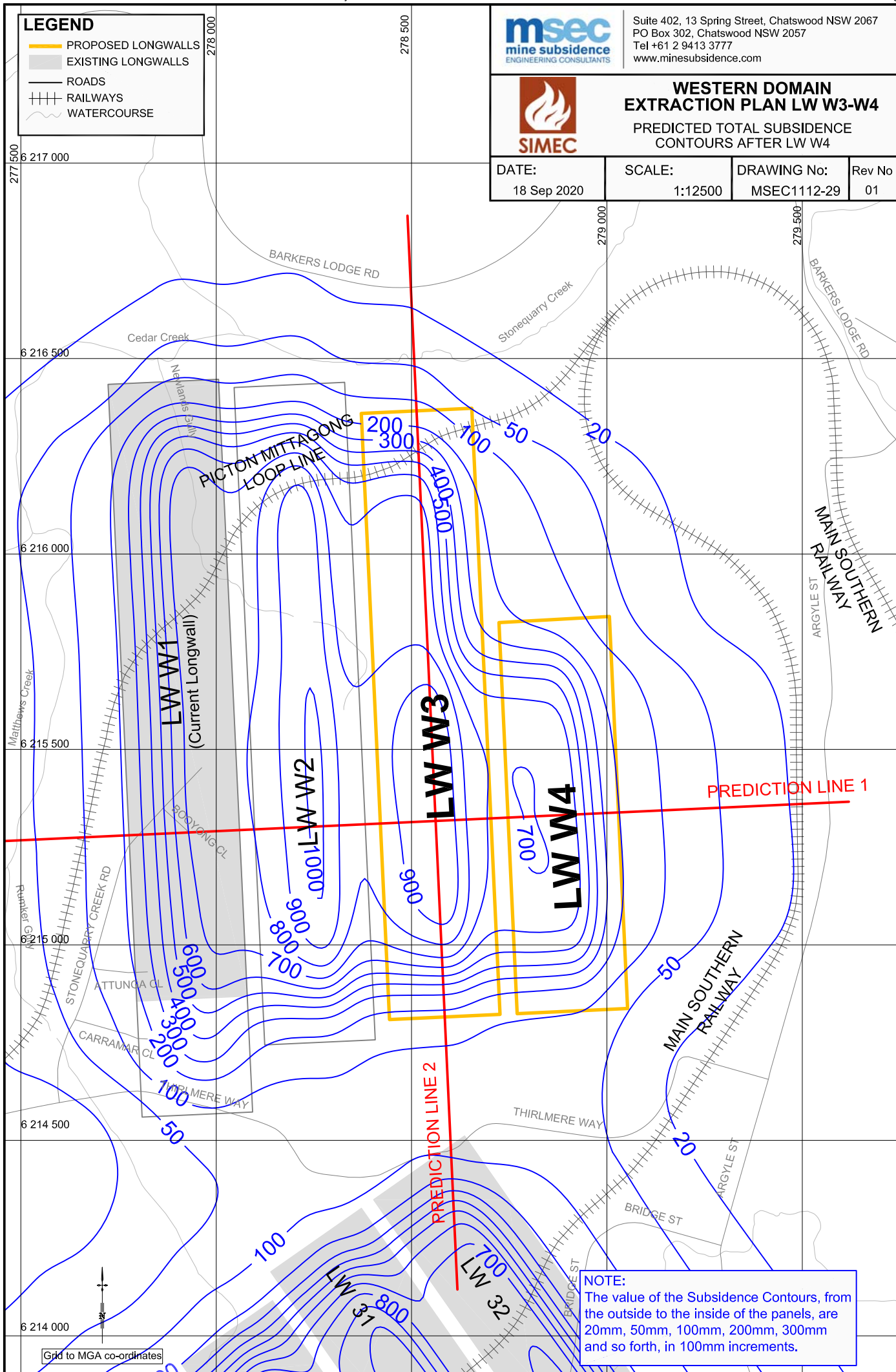
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**WESTERN DOMAIN
 EXTRACTION PLAN LW W3-W4**

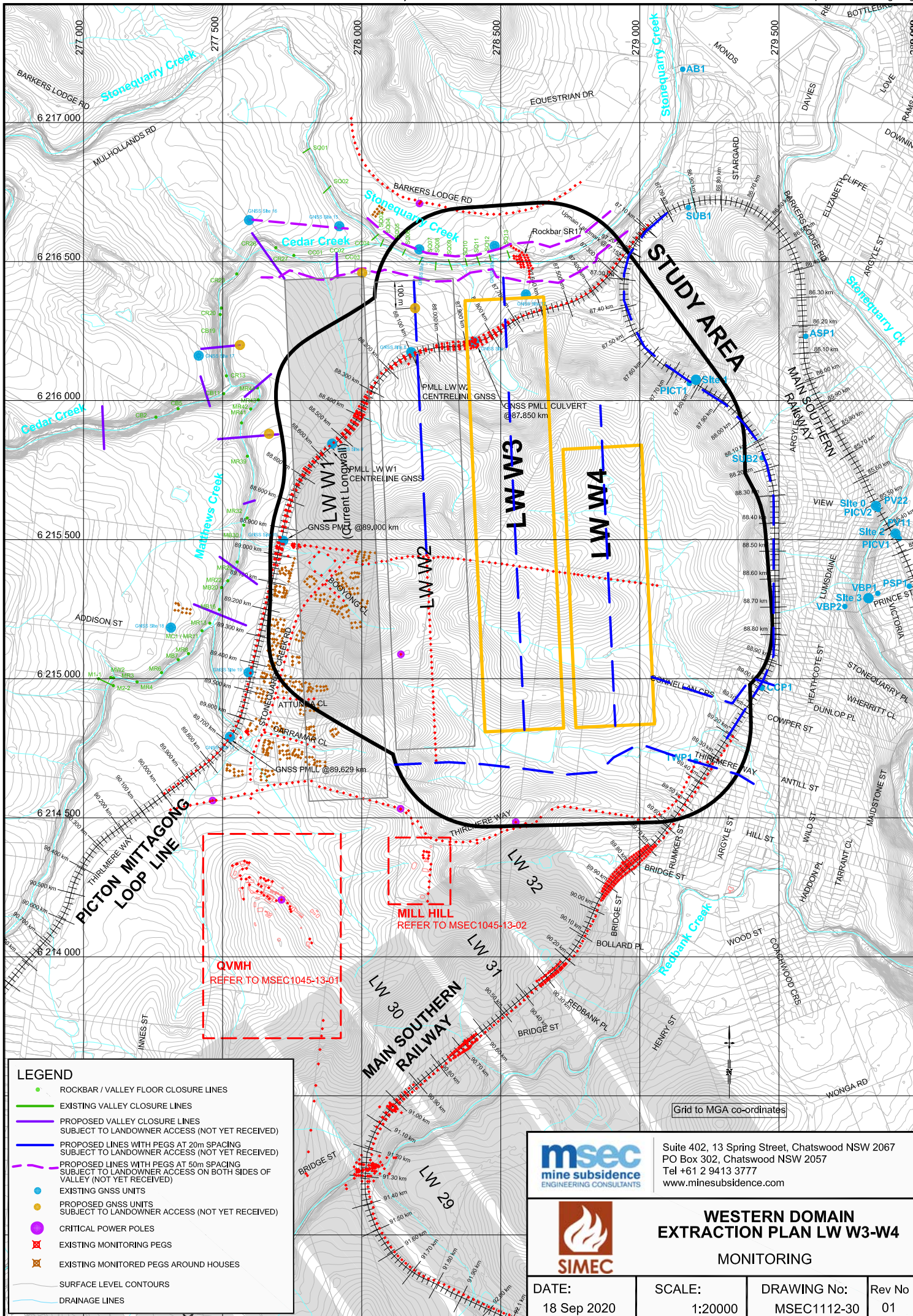
PREDICTED TOTAL SUBSIDENCE
 CONTOURS AFTER LW W4

DATE: 18 Sep 2020	SCALE: 1:12500	DRAWING No: MSEC1112-29	Rev No 01
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NOTE:
 The value of the Subsidence Contours, from the outside to the inside of the panels, are 20mm, 50mm, 100mm, 200mm, 300mm and so forth, in 100mm increments.

Grid to MGA co-ordinates



LEGEND

- ROCKBAR / VALLEY FLOOR CLOSURE LINES
- EXISTING VALLEY CLOSURE LINES
- PROPOSED VALLEY CLOSURE LINES
SUBJECT TO LANDOWNER ACCESS (NOT YET RECEIVED)
- PROPOSED LINES WITH PEGS AT 20m SPACING
SUBJECT TO LANDOWNER ACCESS (NOT YET RECEIVED)
- PROPOSED LINES WITH PEGS AT 50m SPACING
SUBJECT TO LANDOWNER ACCESS ON BOTH SIDES OF VALLEY (NOT YET RECEIVED)
- EXISTING GNSS UNITS
- PROPOSED GNSS UNITS
SUBJECT TO LANDOWNER ACCESS (NOT YET RECEIVED)
- CRITICAL POWER POLES
- EXISTING MONITORING PEGS
- EXISTING MONITORED PEGS AROUND HOUSES
- SURFACE LEVEL CONTOURS
- DRAINAGE LINES

Grid to MGA co-ordinates

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SIMEC

**WESTERN DOMAIN
EXTRACTION PLAN LW W3-W4
MONITORING**

DATE: 18 Sep 2020	SCALE: 1:20000	DRAWING No: MSEC1112-30	Rev No: 01
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