

8 July 2022

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Dear Jessie,

Appin Mine - Longwalls 709 to 711 and 905 Extraction Plan

I refer to the Bulli Seam Operations (BSO) Project Approval Condition 5, Schedule 3 requiring the development of an Extraction Plan which must be approved by the Secretary prior to Illawarra Metallurgical Coal (IMC) undertaking secondary extraction at Appin Mine.

Attachments A to C are provided to the Department for consideration on the Appin Mine - Longwalls 709 to 711 and 905 Extraction Plan:

- IMC response to the advice from the Independent Advisory Panel for Underground Mining (IAPUM). See Table 1 of **Attachment A**.
- IMC response to Subsidence Advisory NSW's recent submission. See Table 2 of Attachment A. IMC is of the position that several of the SA NSW comments in the submission have been adequately addressed or IMC's position on the matter has been made clear. Therefore, a number of responses from earlier submissions have been restated.
- Additional groundwater and surface water assessment requested by the Department. See **Attachment B**.
- *Longwalls 709 Structures Management Plan* and *Longwalls 905 Structures Management Plan* have been attached to the Land Management Plan and contain clearly referenced structures with quantitative triggers and commitments to defined corrective actions. These documents will be updated on a longwall by longwall basis. They are available in **Attachment C**.

IMC is preparing to mine Longwall 905 which is scheduled to commence late July 2022 and is seeking the Departments timely approval of the Extraction Plan application to ensure continuity of mining.

Should the Department require additional information or further discussion please contact the undersigned.

Yours sincerely



Gary Brassington
Approvals Manager
South32 Illawarra Metallurgical Coal

ATTACHMENT A – Response to IAPUM Advice and SA NSW Submission

Table 1 IAPUM Advice (report dated June 2022)

ID	Comment	Response	Reference
Recommendations			
1	<p>The Panel recommends that:</p> <ul style="list-style-type: none"> GHD completes the last three objectives of its LRA as set out in Section 2.3 of its report. 	<p>IMC commits to completing the last three objectives of the LRA (outline a monitoring program, CMAs, assess cumulative impacts) on a longwall by longwall basis as set out in Section 2.3 of the GHD report.</p>	<p>GHD, 2021. <i>Appin Area 7 and 9 Proposed Longwalls Landslide Risk Assessment relating to Mine Subsidence Influences</i>, March 2021. Report for South32 Illawarra Metallurgical Coal</p>
2	<ul style="list-style-type: none"> provides advice on the expected range of effects associated with modification of groundwater due to mining-induced subsidence and how these effects can be mitigated. 	<p>The predominant mechanics of potential instability relate to the existing slope and slope forming processes that are endemic to the geomorphic setting. There is a general relationship of limiting stability where a wide range of pairs of data values (for shear strength and pore pressure within a natural slope) can apply to produce instability. Natural variability of the shear strength of the colluvium and residual clays is known to exist.</p> <p>Similarly, there is natural spatial variability of the permeability of the bedrock, and the residual and colluvial clays across the study area. Further, the extent of the materials is variable across the terrain. This means specific identification of a relationship between pore pressures across the study area, whilst theoretically identifiable on individual slopes, has tenuous applicability across the study area in general.</p>	<p>Coffey Geotechnics, 2013. <i>Landslide Risk Assessment from Mine Subsidence Effects - Appin Area 9 Proposed Longwalls, Razorback Range, Douglas Park, NSW</i>. Report prepared for BHP Billiton Illawarra Coal.</p> <p>GHD, 2021. <i>Appin Area 7 and 9 Proposed Longwalls Landslide Risk Assessment relating</i></p>

ID	Comment	Response	Reference
		<p>GHD's interpretation of the study by the University of Wollongong (reported by Coffey, 2013) is that it illustrated the relative insensitivity in the estimate of limiting instability due to groundwater variability when compared to the estimation of inherent shear strength.</p> <p>Recent observed instability of the natural slopes of the south-facing portions of the Razorback Escarpment confirmed that instability is widespread, and endemic to the study area, and though not of large-scale, is consistent with the slope-forming processes and the development of complex (i.e. multi-faceted) landslides. Identification of specific sites to monitor prior to possible instability is, however, impractical – and particularly in a setting of private ownership across the study area.</p> <p>Furthermore, recent, poorly engineered, man-made filling presents an identifiable landslide hazard, which it is considered is reasonable to propose has high likelihood of instability, and does so independent of mining.</p> <p>To date, and prior to specific site appraisals following the GHD (2021) desk-top study, specific areas that would benefit from detailed assessment of pore pressure monitoring have not been identified.</p> <p>Accordingly, whilst IMC would be willing to conduct such studies in the event sites are identified, it is not considered that such monitoring is valid.</p> <p>GHD note that a relationship could be established relating instability to rise of pore pressure within the natural slopes of the study area. However, GHD also consider shear strength variability works against a generic study of the impact of groundwater as a predictive general tool across the study area. Furthermore, private ownership works against application of wide-spread monitoring. Should specific sites be identified during the individual PSMPs development process, IMC will undertake these local studies with the agreement of the landowner.</p>	<p><i>to Mine Subsidence Influences</i>, March 2021. Report for South32 Illawarra Metallurgical Coal</p>
3	<p>The EP be refined to include the following:</p> <ul style="list-style-type: none"> Reconciliation of the number of potentially affected properties. 	<p>In the GHD desktop study report, there are two numbers used (112 and 114) for the number of houses appraised in the study.</p> <p>The number count is based upon the spreadsheet information which is reproduced in the desktop study report within Appendix B (PDF pp 105 to 108). Therein, the number of</p>	<p>GHD, 2021. <i>Appin Area 7 and 9 Proposed Longwalls Landslide Risk Assessment relating to Mine Subsidence</i></p>

ID	Comment	Response	Reference
		<p>structures within the property list is counted correctly as 114. However, the number of categorisations is also correctly counted as 112.</p> <p>This is because of the manner that the properties and structures were separately identified. In short, it is where two structures were present which were categorised on single properties several times in the list that led to the different counted sums.</p> <p>Table 4.3 is based on the spreadsheet, and reports the numbers correctly as 114 structures and 112 categorisations.</p> <p>By way of example: within the spreadsheet, Sites D12, D23, D31, F22 have two categories assigned (being typically identified as 'a' and 'b') though only one category has been attributed despite the presence of two structures on the property.</p> <p>Furthermore, Site F11 was not categorised as it could not be viewed during the drive-pass appraisal, whilst in counter-balance, D51h01 has two categories assigned to it.</p> <p>Consequently, the end result is that the numbers are correct, and have been verified by counting.</p> <p>The LMP has been amended to state that 114 structures have been appraised.</p>	<p><i>Influences</i>, March 2021. Report for South32 Illawarra Metallurgical Coal</p>
4	<ul style="list-style-type: none"> Provision in management plans, if need be, new significant matters arising out of the completion by GHD of the last three objectives of its LRA assessment and arising out of its advice on the expected range of effects associated with modification of groundwater due to mining-induced subsidence and how these effects may be mitigated. 	<p>IMC commits to completing the last three objectives of the LRA (outline a monitoring program, CMAs, assess cumulative impacts) on a longwall by longwall basis as set out in Section 2.3 of the GHD report.</p>	
5	<ul style="list-style-type: none"> A statement clearly identifying the limitations of the LRA being a desktop, first pass and/or 	<p>The landslide risk assessment undertaken by GHD, as stated in the report, was a desktop study with limited ground truthing by way of drive-by observations of the sites. The</p>	<p>GHD, 2021. <i>Appin Area 7 and 9 Proposed Longwalls</i></p>

ID	Comment	Response	Reference
	<p>preliminary assessment and, therefore, the degree of reliance that can be placed upon it.</p>	<p>study had the advantage of high-quality satellite imagery and Lidar coverage – refer to imagery provided in Appendix A of GHD (2021).</p> <p>It also had the advantage of the wealth of experience provide by the authors of the report.</p> <p>The inability to enter the individual sites during the study clearly limited the ability to appraise the geomorphology of the specific sites, let alone specific sub-surface information.</p> <p>Nevertheless, GHD is confident that the remote data provided, and the experience of the authors, provides a sound basis for the way-forward to conducting pre-mining assessments and development of individual PSMPs.</p>	<p><i>Landslide Risk Assessment relating to Mine Subsidence Influences</i>, March 2021. Report for South32 Illawarra Metallurgical Coal</p>
6	<ul style="list-style-type: none"> Provision for undertaking site inspections (ground truthing) prior to the commencement of mining in the subject area of at least some of the Category E and Category F structures possibly affected by longwall mining in the EP. This is for the purpose of providing a level of confidence in GHD's preliminary assessments and the appropriateness of the associated advice provided on the likelihood and magnitude of damage, especially irreversible damage, and proposed triggers and corrective actions. 	<p>A summary of the assessments and management process which will be undertaken for the 11 houses identified as Category F in GHD (2021) and some Category E sites that are suitable is as follows (subject to landowner agreement):</p> <ul style="list-style-type: none"> Structural Assessment - a pre-mining inspection of the property and any dwellings is undertaken by a suitability qualified structural engineer. This report is used as a baseline for the condition of the property (including photographs) and to refer to during active subsidence and post active subsidence to determine if any impacts related to mining have occurred. The structural assessment will indicate if there are any opportunities to complete early structural works to the property to mitigate potential impacts and ensure the property remains safe and serviceable Geotechnical Assessment - a pre-mining inspection of the property and dwellings will be undertaken by a suitability qualified geotechnical engineer. The purpose of the assessment is to investigate natural landslide risk and condition of existing ground surface features within the property boundary and to identify existing hazards, as well as potential new hazards that may be created as a result of possible mining induced surface movement; including, subsidence influence, tilting impacts, strain, strength reduction of a slope profile, water concentration and regional landslide processes and mechanisms. A qualitative risk assessment will be undertaken to assess the potential hazards of slope instability to the property during the mining 	<p>GHD, 2021. <i>Appin Area 7 and 9 Proposed Longwalls Landslide Risk Assessment relating to Mine Subsidence Influences</i>, March 2021. Report for South32 Illawarra Metallurgical Coal</p>

ID	Comment	Response	Reference
		<p>influence period. This will be used to assess acceptability and appropriate treatments and/or monitoring requirements for the identified slope hazards.</p> <ul style="list-style-type: none"> Survey of ground and residence – a pre-mining high resolution 2D survey will be undertaken of the property and residence. Fixed survey marks are placed on the grounds and structures to capture a pre-mining baseline profile. During active subsidence and post mining, repeat surveys of the fixed marks will indicate the magnitude of subsidence experienced at the property. This will also inform the structural and geotechnical assessments. <p>The pre-mining assessments are used to inform and establish a set of monitoring triggers and management actions for each property. The monitoring data which is routinely collected is assessed by the IMC Structural Review Group to determine the trigger level and if additional monitoring, management or mitigation measures are required to keep properties safe and serviceable.</p>	
7	<ul style="list-style-type: none"> Identification by GHD of “the techniques and management tools available and previously employed in similar geotechnical circumstances” referred to in its LRA report, where each has been adopted, why it was adopted and how successful it was. 	<p>The monitoring tools that have been adopted previously with success include:</p> <ul style="list-style-type: none"> Pre-mining visual appraisal of the structure and its surroundings to appraise the geomorphologic setting of the site, and identify ground and structure responses to the natural environment and setting prior to mining. Examples include Harris Creek Cliff-line and the 3 dwellings on Gibraltar Drive, and the natural slopes of the Razorback Escarpment for the retreat of Longwall 904. The initial observations provide sound identification of geohazards and their setting in regard to the elements-at-risk. Specific geohazards are identified during this process, and specific and particular monitoring established – such as survey about the site using total stations, and local displacement measurements (including crack monitoring and/or displacement monitoring). Examples include: detailed survey of and about the 3 dwellings on Gibraltar Drive; and dressed sandstone block dry-stone 100 year old retaining walls beneath Douglas Park Drive for Longwall 901 to 904). Routine geotechnical observation visits will be conducted to appraise changes on observed conditions across individual sites – as for Harris Creek Cliff-line and Longwall 904 impact upon the properties of Gibraltar Drive and the steep slopes of 	

ID	Comment	Response	Reference
		<p>the Razorback Escarpment during retreat of Longwall 904. Site observations provide fundamental benefit in identification of developing issues.</p> <ul style="list-style-type: none"> • Remote sensing GNSS units, which provide effectively continuous x,y,z data providing a means to not only monitor vertical subsidence but also lateral displacements with time. The establishment of trends is a valuable support to interpretation of ground responses. The drawback of dependency upon atmospheric conditions to precision is balanced by the large volume of data that is available. Eight of these have been used for monitoring of the crest area and steep slopes of the Razorback Escarpment during Longwall 904, as routinely reported to the mining regulator. This equipment was not available at the time of the UoW study (2013). • Downhole inclinometer (manual and automatic) are tools used at Harris Creek Cliff-line to the appraisal of valley closure. An instrument is proposed near the crest of Razorback Escarpment for this project, though is subject to landowner approval for access. Approval has been sought but at this point in time has not been provided by landowners to permit installation at the study area. • Other downhole and surface instruments employed for mine subsidence monitoring include: TDR monitoring (Harris Creek Cliff-line for Longwall 901 to 904) and underground mining approach to Sandy Creek (Dendrobium Area 3); continuity loops (Harris Creek Cliff-line). These techniques have been particularly successful for specific tasks. They are currently not proposed for the study area, but remain an option if required. • Continuous weather station monitoring will be conducted, using the Appin Colliery weather station at Vent Shaft 6 (near Douglas Park) and two weather stations on the Main Southern Railway (MSR chainage 69.0 km and MSR chainage 74.7 km). Rainfall trigger levels similar to those for both Harris Creek Cliff-line and Longwall 904 will be established for the study area for initiation of observation visits – as recently occurred in early July 2022 for the 1% AEP event. Rainfall is one of the prime triggers for site observations and review of instrumentation additional to routine verification of responses. 	
8	<ul style="list-style-type: none"> • A commitment to the installation of any piezometers or inclinometers, including documented past usage 	<p>IMC has committed to installing any monitoring equipment or systems required to monitor and manage properties, including piezometers or inclinometers where the pre-mining assessments that form the PSMP indicates that they are required. This</p>	<p>MSEC (2022) <i>Appin – Area 9 – Longwall 905 Management</i></p>

ID	Comment	Response	Reference
	<p>and effectiveness and clear triggers for when and where these would be installed.</p>	<p>commitment is subject to landowner agreement; however, if this cannot be obtained, IMC will investigate other remote monitoring methods to ensure the property remains safe and serviceable during mining. If such a case was to arise for property within the study area, IMC will discuss with the Department prior to the property being influenced by mining.</p> <p>As an example, shallow geotechnical monitoring boreholes have been installed at a property (reference O18 of the <i>Longwalls 905 Structures Management Plan</i>) to assist with the management of uncertainties around the eight properties at the top of Razorback Range.</p> <p>Piezometers have been used to monitor stability of Harris Creek Cliff Line adjacent to Douglas Park Drive, the piezometers provide secondary information to the technical committee, primary monitoring data includes survey, inclinometers and rainfall. Extensometers have been used to monitor horizontal dilation at a Morton Park Road private property adjacent to the Nepean River Cliff Line.</p>	<p><i>Plan for Potential Impacts to Building Structures</i>, MSEC 1263, Rev 2, June 2022.</p>
9	<ul style="list-style-type: none"> Revision of the LMP TARP to clearly reference structures with quantitative triggers and commitments to defined corrective actions. 	<p>The LMP has been updated to include the <i>Longwall 709 Structures Management Plan</i> and <i>Longwalls 905 Structures Management Plan</i>. These subordinate documents clearly reference structures with quantitative triggers and commitments to defined corrective actions. Both management plans are considered “live” documents which may be subject to changes by the IMC Structural Review Group to allow for decisive response in managing structures which are subject to subsidence influence to ensure they remain safe and serviceable. The Resource Regulator maintains oversight of potential subsidence impacts through this process and maintains the authority under the <i>Mining Act 1992</i> to halt or stop mining if an impact, realized or predicted occurs.</p> <p>The Structures Management Plans will be updated prior to the commencement of each longwall included in the Extraction Plan application.</p> <p>It should be noted that sections of the Structures Management Plans will be redacted for privacy and confidentiality prior to being uploaded to the South32 website in accordance with Condition 11, Schedule 6 of the BSO Approval. The complete unredacted versions have been included in Attachment C of this document for consideration by the Department.</p>	<p>MSEC (2022) <i>Appin – Area 7 – Longwall 709 Management Plan for Potential Impacts to Building Structures</i>, MSEC 1064, Rev 3, February 2022.</p> <p>MSEC (2022) <i>Appin – Area 9 – Longwall 905 Management Plan for Potential Impacts to Building Structures</i>, MSEC 1263, Rev 2, June 2022.</p>

ID	Comment	Response	Reference
10	<ul style="list-style-type: none"> Clarification in the LMP on accountability for the costs of responding to structural damage. 	The LMP has been updated to state “Under the NSW WHS legislation the mine proprietor is responsible for managing the safety of any landholders in the area of subsidence influence. This would include responding to and managing structural damages. Any financial costs incurred will be paid by IMC once the transitional provisions under the <i>Coal Mines Subsidence Compensation Act 2017</i> expire at the end of 2020”.	

Table 2 SA NSW Response (letter dated 22 June 2022)

ID	Comment	Response	Reference
1	<p>Slope Stability</p> <p>Our initial response requested clarification of non-conventional subsidence risks and a full appraisal of the slope stability risks associated with the extraction plan. IMC’s response has maintained that its report addresses these issues. Subsidence Advisory sought further clarification regarding the accuracy of these predictions.</p>	IMC is of the view that this matter has been satisfactorily resolved in the IAPUM Advice.	
2	We understand further information on the slope stability report has been provided from IMC to the Independent Panel for their assessment.	See the response provided for Table 2 - ID1.	
3	<p>PSMP’s and Survey Data</p> <p>IMC’s outlined approach to PSMP’s provides no certainty on the compensation assessment process.</p>	SA NSW manage the compensation assessment process for improvements at the cessation of subsidence and detailed ‘certainty’ of this process is beyond the scope of the PSMP.	

ID	Comment	Response	Reference
4	Subsidence Advisory has requested PSMP's for private residences.	IMC can provide copies of completed PSMP's for each property upon request in relation to claims. Completed PSMP's and survey data can be requested at subsidence@south32.net	
5	The claims process to date has demonstrated difficulties managing customer expectations due to the absence or completeness of data. The information being requested will ensure Subsidence Advisory are able to provide informed communication that supports homeowners. This communication is key to managing homeowner expectations and reducing emotional strain during all phases of mining.	<p>Completed PSMP's and survey data in relation to claims can be requested at subsidence@south32.net</p> <p>Structural Engineers and Geotechnical Engineers undertake inspections during the active mining period and the homeowner can discuss issues directly.</p> <p>IMC has a 24hr Community Call line which the landowners are referred to in the PSMP.</p> <p>IMC and consultants meet with landowners on request.</p> <p>IMC provides updates on longwall progress (start and end of longwall and Active Subsidence Letters)</p> <p>SA NSW should refer the landowner to IMC during active subsidence.</p> <p>Under the Mining Act and WH&S Legislation the miner is responsible managing the Subsidence High Risk Activity.</p>	
6	PSMP's will inform the claim assessment process and Subsidence Advisory's responses to enquiries from homeowners. Data is required during all stages of mining not only on completion of subsidence to manage homeowner enquiries & expectations.	Completed PSMP's and survey data in relation to claims can be requested at subsidence@south32.net	
7	IMC has confirmed completed PSMP's and survey data can be provided upon request as relevant to private property claims. This information should be shared with Subsidence Advisory on	No requests have been raised with regards to any specific claims.	

ID	Comment	Response	Reference
	completion. No PSMP's have been provided to date.		
8	Subsidence Advisory's Quarterly Meetings with Mine Proprietors provides opportunity to share high-level updates on survey data, however a more systematic approach is required in the provision of relevant information.	<p>IMC suggests that this matter could be discussed further between IMC and SA NSW at the agreed upon workshop.</p> <p>In addition to the private property survey data additional subsidence survey information can be provided to SA NSW upon receipt of a request in relation to a claim. E.g. Menangle Road survey</p>	
9	Subsidence Advisory's strong recommendation is that a formal commitment be made to provide the PSMP's and survey data once completed to ensure comprehensive claim assessments and ongoing support to homeowners.	See response provided for Table 2 – ID4.	
10	<p>Acquisition process</p> <p>IMC's outlined approach provides no detail or certainty to homeowners or Subsidence Advisory NSW.</p>	<p>The IMC approach of collaboration with effected landholders, seeks their buy-in and builds consensus with the best management approach to suit their circumstances, such as the implementation of progressive repairs or the completion of early settlements. We consider this approach to provide the best-practice impact management for the communities in which we operate. Additionally, we note this exceeds the minimum requirements under the CMSC Act (notwithstanding the Early Claim Settlement Policy) which generally requires landholders to wait until the completion of subsidence for any impacts to be assessed and compensated.</p> <p>It should also be noted that in our experience, the majority of landholders do not wish to relocate, and in these circumstances alternative arrangements would need to be applied. Again, we have requested a workshop with SA NSW to further consider an appropriate strategy to manage subsidence impact timeframes associated with the consolidated AA7 mining domain.</p>	

ID	Comment	Response	Reference
		<p>In relation to the provision of acquisition rights, these matters are defined in the primary development consent, and the Bulli Seam Operations Project Approval (MP 08-0150) does not require acquisition rights for subsidence impacts. Accordingly, we consider the provision of acquisition rights to be beyond the scope of the secondary Extraction Plan process.</p> <p>We note this matter of property acquisition was discussed recently at our October 2021 meeting, with SA NSW advising:</p> <p>“Decision to purchase the property is generally only made under extenuating circumstances or where the damage is so severe that a business case can be made that determines acquisition to be a viable option.”</p> <p>In this context where SA NSW has not been operating under this basis of undertaking routine property acquisitions for residual claims under the 1961 Act, and in-light of IMC's proactive track record, we request the Department reconsider imposing any such conditions, unless there are extenuating landholder circumstances, or the impacts have reached an R5 impact level (consistent with SA NSW's advice in October 2021).</p>	
11	Homeowners whose properties are impacted by multiple longwalls can face many years of uncertainty whilst living with damage to their home, causing emotional strain over a prolonged period.	<p>SA NSW historic and current policy is for landowners to wait until mining and subsidence is complete and then undertake the claim assessment process.</p> <p>SA NSW and IMC have recently developed an Early Settlement Policy for extended delay between subsidence events, However this is only fit for purpose when there is sufficient time to undertake the claim assessment process (including review rights) and allow the landowner to effect repairs before the next subsidence event.</p>	
12	Subsidence Advisory strongly recommends that additional protections be provided to homeowners where their properties have been affected by long term subsidence periods and require substantial repair in accordance with the damage classification. The emotional	As stated in an earlier response, IMC considers the provision of acquisition rights to be beyond the scope of the secondary Extraction Plan process.	

ID	Comment	Response	Reference
	impact on some homeowners in these situations cannot be overstated.		
13	In the absence of this condition being applied, homeowners are provided with no certainty and may be expected to live with damage to their home for long periods of time.	See response provided for Table 2 – ID12.	
14	Where significant damage is confirmed, acquisition should be offered and progressed to a valuation process. The acquisition process being applied in non-active mining areas demonstrates a fair and efficient process. We note this process was recently applied to SIMEC Tahmoor Coking Coal's, Tahmoor South Project.	See response provided for Table 2 – ID10.	
15	The recommended acquisition process is compatible with Subsidence Advisory's position outlined in the Approved Procedures and is an added protection for homeowners who will be adversely affected by the operations.	See response provided for Table 2 – ID10.	
16	IMC's example provided for Wrightson Ave, highlights that damage can be identified at a property irrespective of mining influence. In accordance with the Approved Procedures under the Act, a comprehensive claim assessment would be undertaken prior to any acquisition	<p>IMC considers this to be a new and separate issue.</p> <p>Currently, the triggering point to commence claim assessments is only when subsidence is completed from the last influencing longwall; or alternatively, when requested by the Mine Proprietor under the Early Settlement Policy (such as our requested early settlements in Douglas Park Village (McWilliam Drive & Camden Road) or our current request to manage the nominal two-year delay between Longwalls 709 and 710B).</p>	

ID	Comment	Response	Reference
	<p>determination, to confirm whether damage is attributable to mine subsidence. Pre-Mining Inspections are carried out at properties prior to mining commencing to document the condition of a property prior to mining and facilitate a straightforward claims process.</p>	<p>The Claim Guidelines currently do not permit claim progression in any other circumstances; and the SA NSW's current acquisition proposal in effect only provides an alternative to the provision of compensation (either by monetary or non-monetary means).</p> <p>Accordingly, SA NSW would need to develop a new policy to determine a triggering point when a claim should be progressed for assessment, determination and settlement – irrespective of outcome – either refused, or settled by compensation (either by monetary or non-monetary means) or by acquisition in collaboration with effected landholders.</p> <p>The determination of this triggering point is the key missing item and is the subject of the requested workshop with SA NSW.</p>	
17	<p>The Early Claim Settlement Policy was devised in 2019 when longwall sequencing was modified by IMC for its mining operations, and certain properties faced extended subsidence timeframes. The policy does not define a particular outcome for the homeowner and the recommended condition provides additional certainty.</p>	<p>IMC considers this to be a new and separate issue.</p> <p>The current claims process does not provide any certainty to landholder, beyond any damages that are attributable to mine subsidence will be compensated (either by monetary or non-monetary means).</p> <p>The key item that requires “certainty” is the triggering point when a claim will be progressed for Early Settlement. The “outcome” of the claim assessment process is never certain and will ultimately be determined by SA NSW's appointed independent expert claim assessors.</p>	
18	<p>IMC has outlined that survey installation take up has increased. To ensure an effective property specific claim assessment and to assist in managing customer expectations Subsidence Advisory require complete survey data be provided during all stages of mining upon request. Complete survey data is considered to include incremental recorded values of vertical subsidence, as well as calculated tilts, strains and</p>	<p>IMC offers survey monitoring of private properties to landholders, with take-up now routinely over 90%. However, this commitment remains subject to landholder agreement for access.</p> <p>IMC will provide all available survey data relevant to claims to SA NSW upon request.</p> <p>In relation to the reference to “complete survey data”, as per previous correspondence, IMC raises concern that SA NSW continues to attempt to derive ground curvature from three ground survey marks surrounding individual structures.</p> <p>Meaningful ground curvature surveys require long-lines of multiple survey marks in both horizontal axes which is not practically achievable in residential settings. IMC requests</p>	

ID	Comment	Response	Reference
	curvatures, in addition to an overall plan outlining all survey locations.	SA NSW seek their own advice from a suitably qualified and experience subsidence engineer to review the application of “curvature” in its claim assessment processes.	
19	Subsidence Advisory has agreed to a workshop with IMC, no further information regarding the workshop has been provided to date.	IMC is willing to attend a workshop with SA NSW to improve the process in relation to trigger point for progression of the claim process.	

ATTACHMENT B – Appin Longwall 709-711 and 905: Groundwater and surface water effects

To:	Cody Brady Illawarra Metallurgical Coal (IMC)	cc:
From:	Stuart Brown	
Subject:	Appin Longwall 709-711 and 905: Groundwater and surface water effects	
Date:	4 July 2022	Ref: D22183

Illawarra Metallurgical Coal (IMC) is currently seeking Subsidence Management Plan (SMP) approval for Longwall 709 to 711 and 905 at the Appin Mine. In the Bulli Seam Operations (BSO) Approval (base plan), Areas 7 and 9 were separate mining domains with non-subsiding headings dividing the areas. IMC proposes a new mine plan which includes longer single longwalls spanning the two areas, with Longwall 711 the first in this series (Figure 1). In assessing the new mine plan, the Department of Planning and Environment (DPE) has requested clarification in relation to potential impacts to surface water. Specifically, DPE requested:

- *discussions of surface and groundwater impacts and environmental consequences of the full range of subsidence predicted by MSEC likely to be experienced by third order sections of Navigation Creek traversing LW711*
- *comparison of these impacts against the impacts assessed in the original EA and the PPR*
- *confirmation that the assessed impacts would not exceed the performance measures for watercourses included in the BSO consent (Condition 1 of Schedule 3).*

This memorandum addresses these questions and assesses relative impact of the proposed mine plan compared with assessment included in the original BSO Environmental Assessment (EA) and Preferred Project Report (PPR) as well as the performance measures for watercourses in the BSO Consent.

1. Navigation Creek

Navigation Creek is a third order stream that traverses above Longwall 711. The catchment area of Navigation Creek to its confluence with the Nepean River is approximately 24.9 km². Approximately 1.2 km length of Navigation creek overlies proposed Longwall 711. In the original BSO base plan, approximately 830 m of that length overlay the non-subsiding headings between longwalls of Areas 7 and 9. Therefore, under the revised mine plan, that length of Navigation Creek will be subject to additional ground subsidence and associated effects compared with the original BSO base plan in the EA (Figure 1). The area is highlighted as a red rectangle ["Area of Interest"] on the attached map reproduced from MSEC (2009) (Drawing 404-201), and the attached map (Drawing APNSVY00112A) of the proposed mine layout.

SLR (2021) described the current conditions as follows: Navigation Creek is ephemeral and likely only flows during periods of extended, moderate or high rainfall. The headwaters of Navigation Creek are located within the Project Area with first and second order streams within the steep ridgeline of remnant bushland to the northwest of Appin Mine. The majority of the remaining catchment, including that of the third order stream, is comprised of agricultural land. Navigation Creek is predominantly highly disturbed and in poor condition. Stream banks are often steep with vegetation often consisting of weeds, and areas of minimal native vegetation with evidence of erosion and scouring. Some pools have naturally established along the reaches, however the majority of the upper reaches consist of depressions and minor drainage lines intersected by a number of farm dams with little to no signs of flow. Any surface water flows from the upper reaches are predominantly captured within these

established farm dams with runoff likely to only contribute to the downstream Nepean River during periods of extended or significant flow. The influence of the watercourse on flow and water quality in the receiving Nepean River is minimal. Recent photos of the Navigation Creek channel are attached.

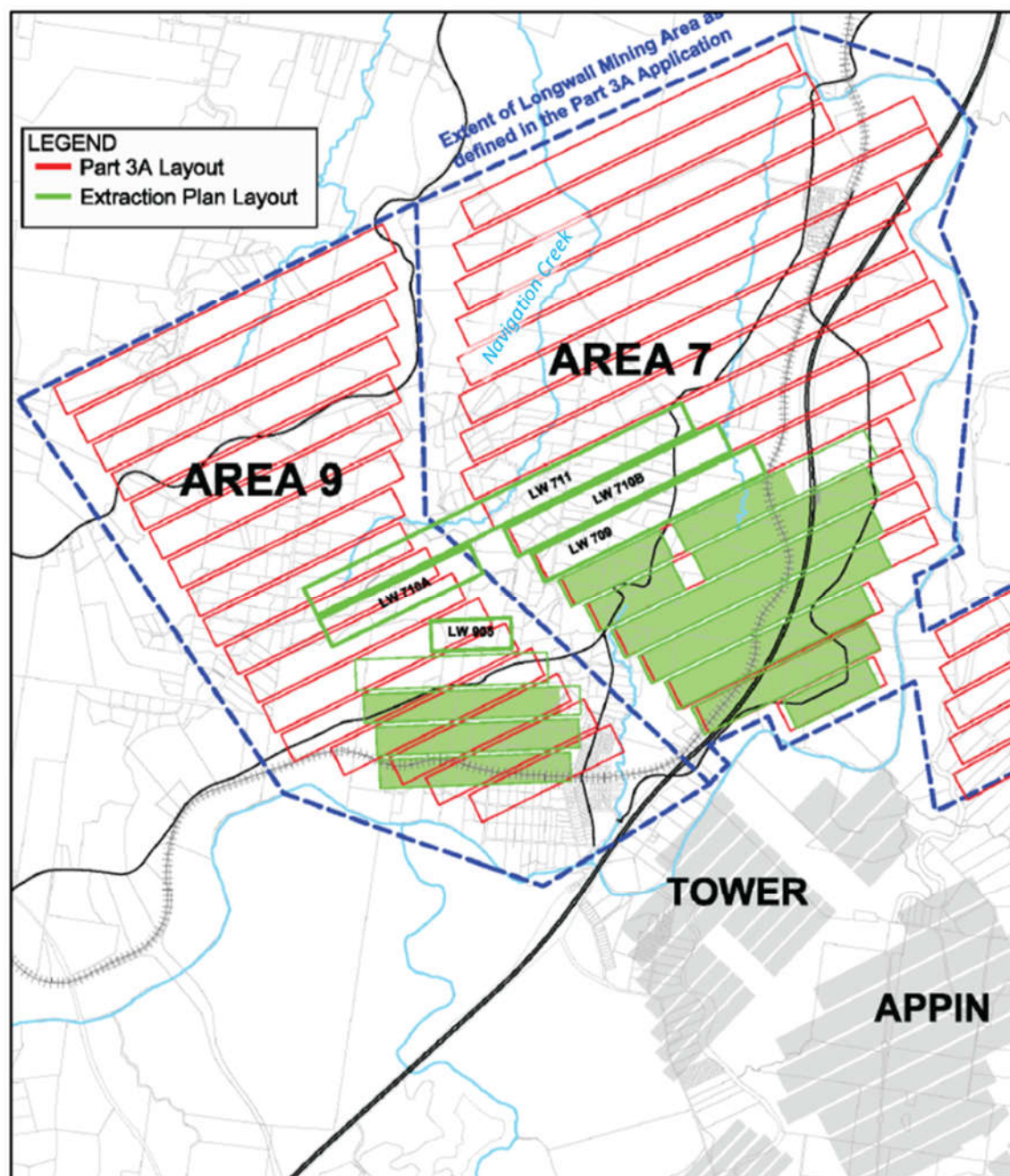


Figure 1. Comparison of BSO "base plan" and the proposed Extraction Plan layout

2. Comparison of surface water and groundwater impacts

Predicted groundwater and surface water impacts on third order sections of Navigation Creek where they traverse proposed Longwall 711 are summarised in Table 1, below. Impacts as assessed in the 2022 SMP for Longwalls 709 to 711 and 905 (SLR, 2022; SLR, 2021; MSEC, 2021) are compared

against impacts predicted for the original BSO base plan included in the EA (Gilbert & Associates, 2009; Heritage Computing, 2009; MSEC, 2009).

Table 1. Comparison of predicted impacts to Navigation Creek

Effect	Original BSO Environmental Assessment (base plan)	Assessments for Longwalls 709 to 711 and 905 (proposed mine plan)
Subsidence	MSEC (2009): The maximum predicted subsidence effects along Navigation Creek: total subsidence ~1600 mm; closure 1450 mm. Maximum predicted changes in stream gradient: between 6.5 mm/m (0.65%) and 11 mm/m (1.1%). Most streams are unlikely to experience increased ponding due to the mining, regardless of the final orientation of the longwalls... may result in substantial differences in subsidence at each point within the Study Area. However, the predicted maximum subsidence movements for any alternative layout will be similar [to the base case] provided that the longwall panel and pillar widths are similar.	Maximum predicted subsidence effects on Navigation Creek is 1,350 mm vertical subsidence and 800 mm total closure (MSEC, 2021). Possible cracking of the creek bed with fractures extending 10 m to 20 m depth. No predicted reversals in stream gradient. Localised ponding could develop. No large-scale changes in ponding levels nor increases in scouring predicted.
Surface water	Gilbert and Associates (2009): Impacts to stream headwaters expected to be limited to localised iron staining and possibly cracking and enhanced leakage from farm dams and stream pools. There may be some changes to pool levels and extent; however subsidence is not expected to significantly alter stream hydrology.	SLR (2021): Surface water flow: Surface fracturing may result in diversion and loss of flow, most notably during low flow periods. Navigation Creek is ephemeral and therefore impacts to flow are expected to be negligible. Surface water quality: The Project is not anticipated to have any significant impacts on surface water quality. Near-surface strata dilation and fracturing may result in the occurrence of ferruginous springs. However these are expected to have negligible influence on ecological health and downstream water quality in the Nepean River.
Groundwater	Heritage Computing (2009): Groundwater modelling indicates no more than 1 m of drawdown in shallow groundwater systems (Upper Hawkesbury sandstone / Wianamatta Shale). Negligible reduction in stream baseflow due to groundwater drawdown. Shallow strata fracturing may result in short-term changes in groundwater level and diversion of stream flow. There are not expected to be any changes in the quality of groundwater as a consequence of mining.	SLR (2022): Groundwater modelling (and previous mining experience at Appin) indicates that depressurisation of coal seams and deeper strata due to mining will not propagate to the surface and will not affect shallow groundwater levels within the Wianamatta Group shales which directly underly watercourses. No landholder bores are within the Area of interest above Longwall 711.

In summary, compared with the original BSO base plan:

- The proposed mine plan will result in overall lower total subsidence in Areas 7 and 9, including above Navigation Creek.
- The ~850 m reach of Navigation Creek that traversed the non-subsiding headings in the original BSO Mine Plan will experience subsidence effects in the proposed layout that are similar to other third-order watercourses that overlie longwalls.
- Fracturing and dilation of shallow geological strata may result in diversion of stream flow in the third order reaches of Navigation Creek; however, given that Navigation creek is ephemeral, impacts to long-term average flow will be negligible.
- Assessments of the effects on surface water flow and surface water quality due to the proposed mine plan are not materially different from those assessed for the original BSO Mine Plan. Both assessments predict negligible effects on stream flow and downstream surface water quality.
- Assessments of groundwater effects due to the proposed mine plan are not materially different from those assessed for the original BSO base plan. No additional landholder bores are likely to be impacted as a result of the proposed mine plan

3. Performance measures

The original BSO mining consent (Consolidated Consent, April 2012) includes the following performance measures in relation to watercourses other than the Nepean and Georges Rivers (Condition 1, Schedule 3):

Other watercourses: No greater subsidence impact or environmental consequences than predicted in the EA and PPR.

Comparison of predicted environmental effects in Table 1 indicates that the proposed mine plan will not result in greater subsidence impact or environmental consequences than those assessed under the BSO EA, including those predicted for the original BSO base plan. Therefore, compliance with the performance measure would be maintained.



Stuart Brown

Principal Hydrogeologist

MSc (Hydrogeology), PhD (Geology)

Attachments:

1. MSEC (2009) Drawing 404-201 (annotated)
2. IMC Drawing APNSVY00112A (annotated)
3. Recent field photographs of Navigation Creek.

4. References

- Gilbert & Associates, 2009, Bulli Seam Operations Surface Water Assessment: Appendix C of the Environmental Assessment for Billi Seam Operations, BHPBilliton.
- Heritage Computing, 2009, Bulli Seam Operations Groundwater Assessment: Appendix B of the Environmental Assessment for Billi Seam Operations, BHPBilliton.
- MSEC, 2021, Subsidence Predictions and Impact Assessments, Subsidence Predictions and Impact Assessments for the Natural and Built Features due to the Extraction of the Proposed Longwalls 709, 710A, 710B, 711 and 905 at Appin Colliery: Report by Mine Subsidence Engineering Consultants for Illawarra Metallurgical Coal,.
- MSEC, 2009, The prediction of subsidence parameters and the assessment of mine subsidence impacts on natural features and surface infrastructure resulting from the Bulli Seam Operations in support of the part 3a application: Report by Mine Subsidence Engineering Consultants for BHPBilliton Illawarra Coal,.
- SLR, 2022, Appin Mine Extraction Plan groundwater impact assessment: Report by SLR Consulting Australia for Illawarra Metallurgical Coal.
- SLR, 2021, Appin Mine Extraction Plan surface water assessment, Longwalls 709 to 711 and 905: Report by SLR Consulting Australia for Illawarra Metallurgical Coal.



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ILLAWARRA COAL
BULLI SEAM OPERATIONS PART 3A
WATERCOURSES & FEATURES IN
APPIN AREAS 8 & 9

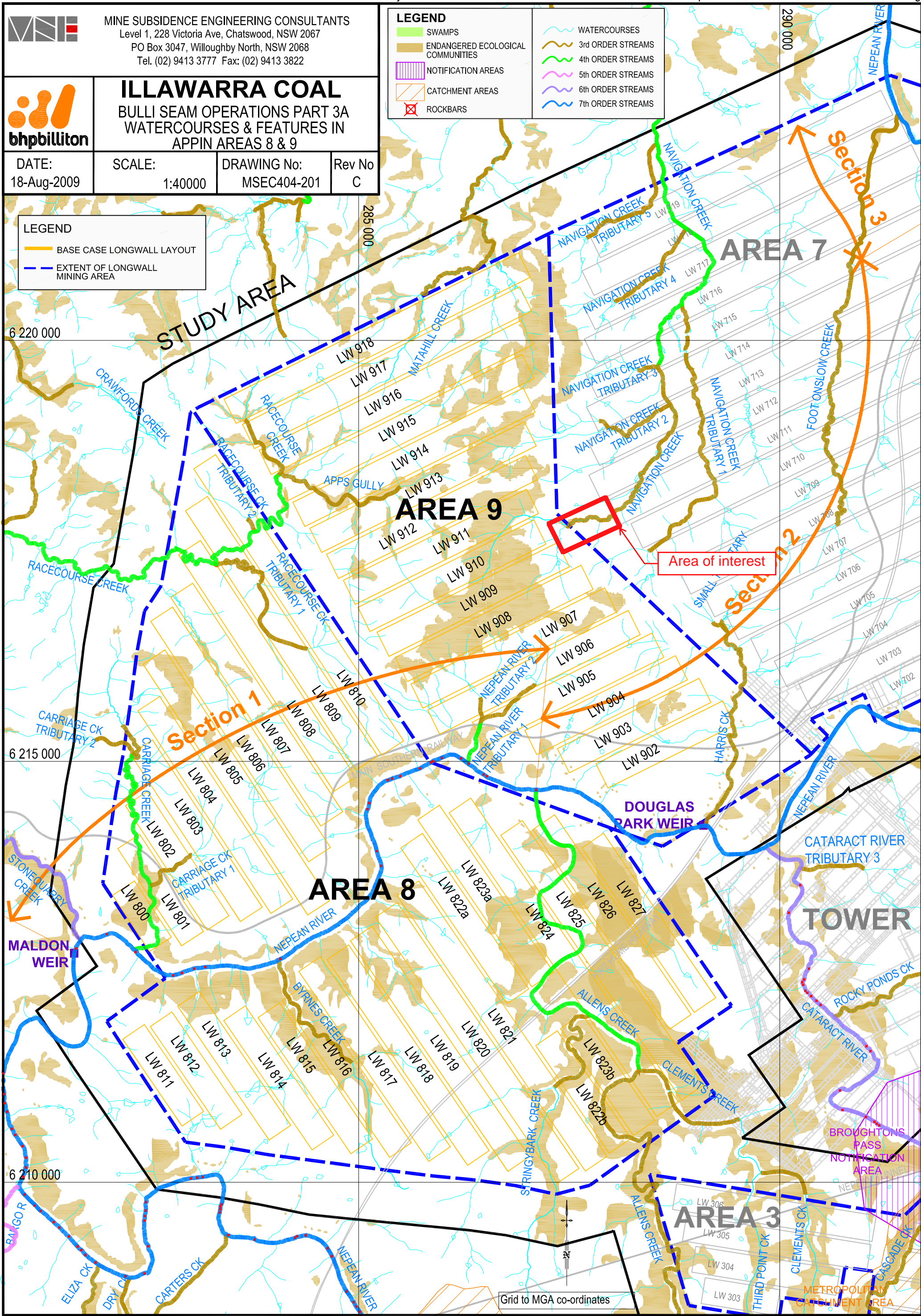
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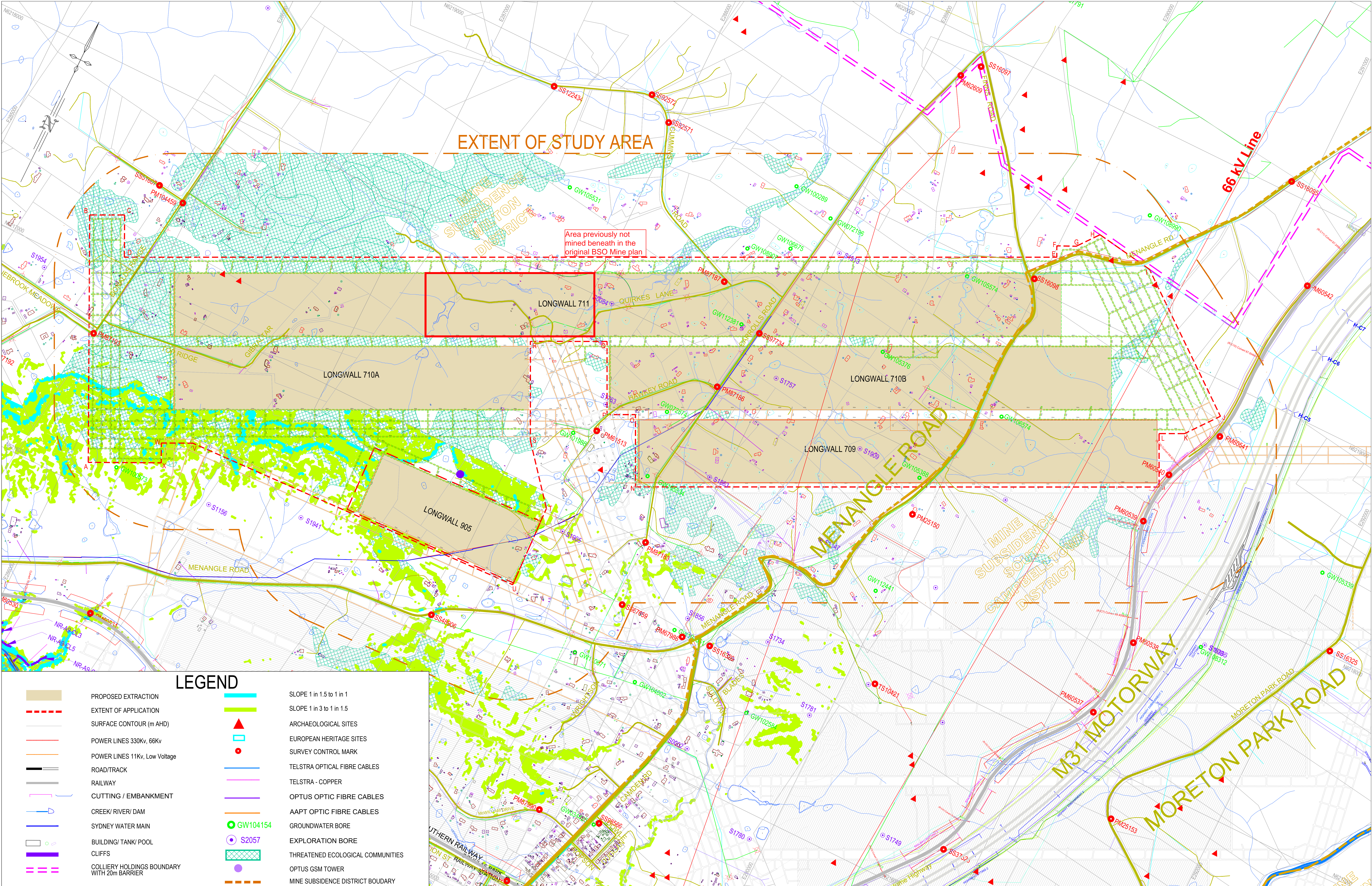
LEGEND

- | | |
|-----------------------------------|-------------------|
| SWAMPS | WATERCOURSES |
| ENDANGERED ECOLOGICAL COMMUNITIES | 3rd ORDER STREAMS |
| NOTIFICATION AREAS | 4th ORDER STREAMS |
| CATCHMENT AREAS | 5th ORDER STREAMS |
| ROCKBARS | 6th ORDER STREAMS |
| | 7th ORDER STREAMS |

LEGEND

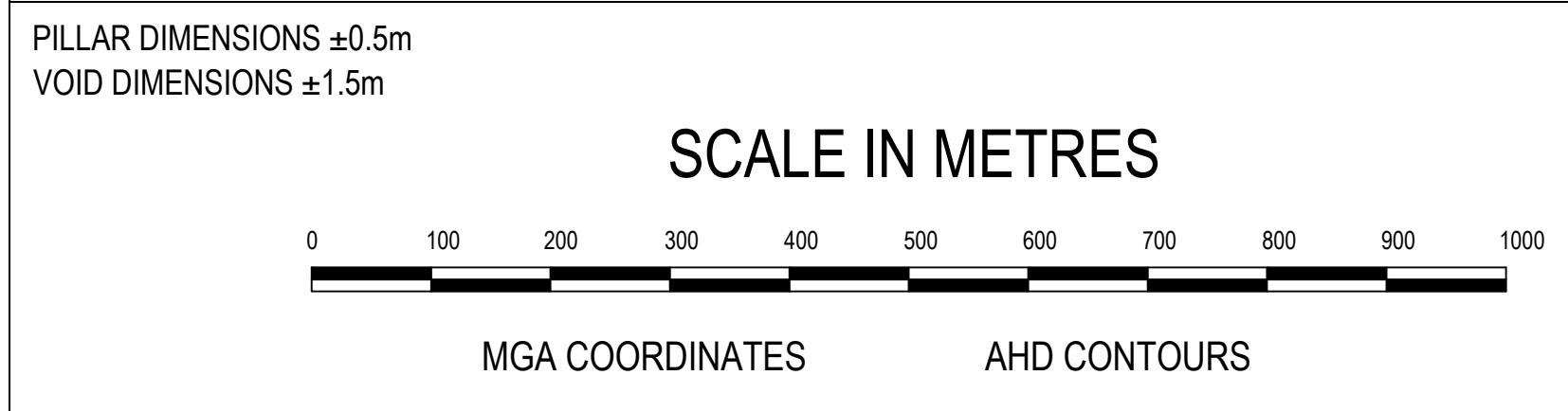
- | |
|--------------------------------|
| BASE CASE LONGWALL LAYOUT |
| EXTENT OF LONGWALL MINING AREA |





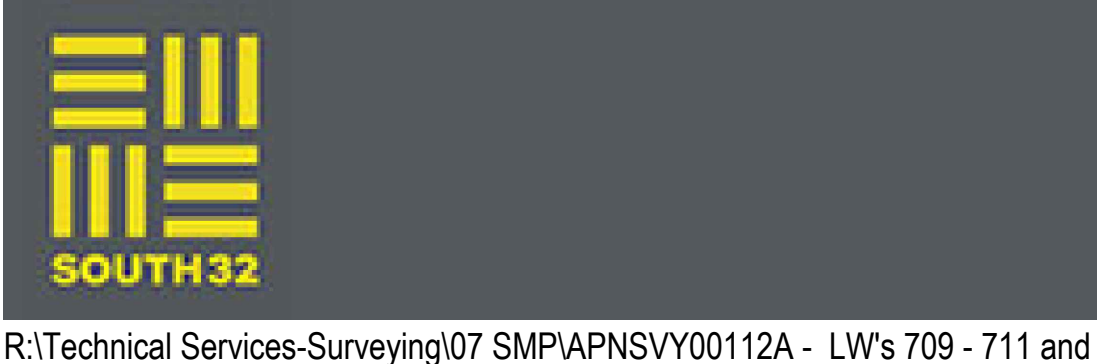
LEGEND

- PROPOSED EXTRACTION
- EXTENT OF APPLICATION
- SURFACE CONTOUR (m AHD)
- POWER LINES 330Kv, 66kv
- POWER LINES 11Kv, Low Voltage
- ROAD/TRACK
- RAILWAY
- CUTTING / EMBANKMENT
- CREEK/ RIVER/ DAM
- SYDNEY WATER MAIN
- BUILDING/ TANK/ POOL
- CLIFFS
- COLLIERY HOLDINGS BOUNDARY WITH 20m BARRIER

SLOPE 1 in 1.5 to 1 in 1SLOPE 1 in 3 to 1 in 1.5ARCHAEOLOGICAL SITESEUROPEAN HERITAGE SITESSURVEY CONTROL MARKTELSTRA OPTICAL FIBRE CABLESTELSTRA - COPPEROPTUS OPTIC FIBRE CABLESAAPT OPTIC FIBRE CABLESGROUNDWATER BOREEXPLORATION BORETHREATENED ECOLOGICAL COMMUNITIESOPTUS GSM TOWERMINE SUBSIDENCE DISTRICT BOUDARYGW104154S2057

CERTIFICATION ENDORSEMENT

THE INFORMATION SHOWN ON THIS PLAN IS THE RESPONSIBILITY OF THE RELEVANT COLLIERY OFFICIAL TO BE A TRUE AND CORRECT RECORD, AND IS DRAWN BY THE SURVEYOR, AND IS DEEMED CORRECT AT THE DATE SHOWN, TO THE BEST OF OUR KNOWLEDGE.

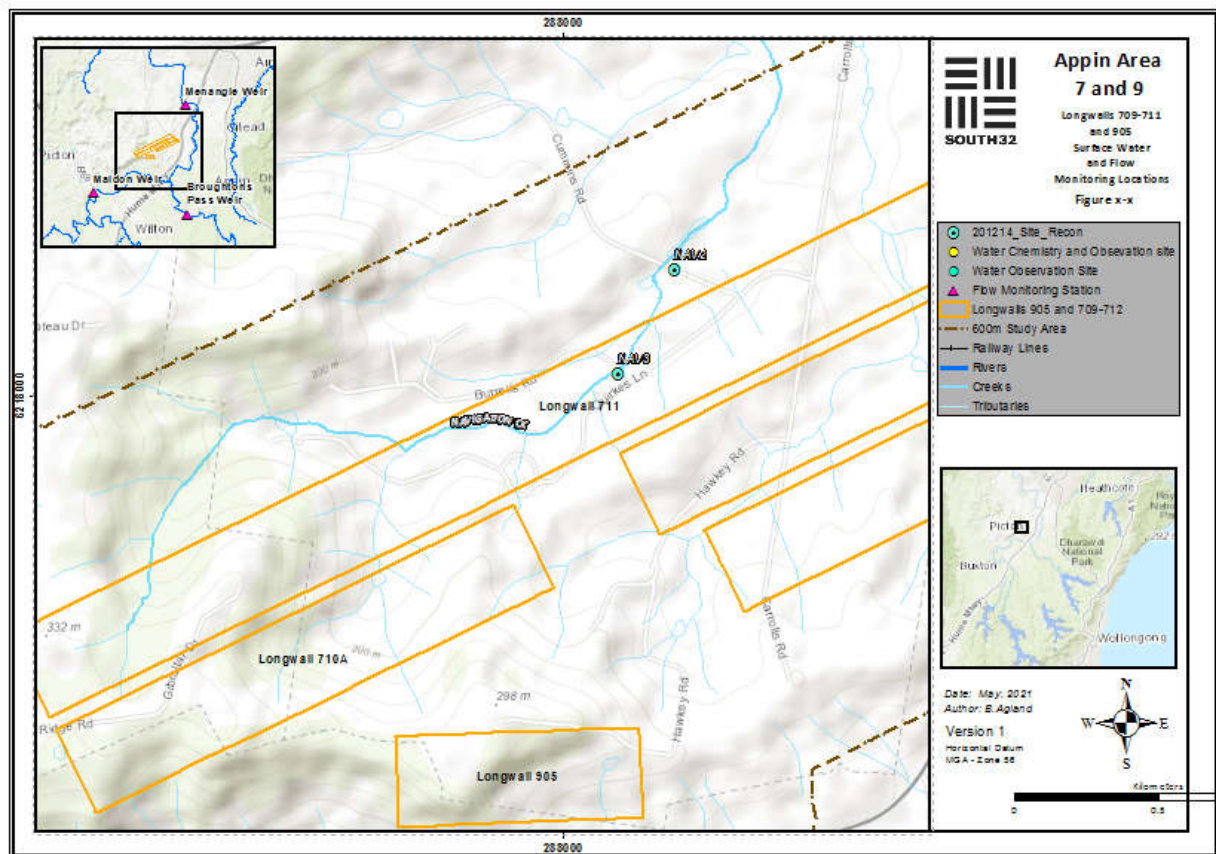


Appin Mine
Illawarra Metallurgical Coal
South32

R:\Technical Services-Surveying\07 SMP\APNSVY00112A - LW's 709 - 711 and LW905 Extraction Plan - Plan 2 Surface Features.dwg

	Name	Date	Title	
DRN	D.Jolliffe	22/6/2021	Appin Longwall 709 to 711 and Longwall 905 Extraction Plan	
REV			Plan 2 - Surface Features	
APP				
SCALE	A0	1 : 6,000	DRAWING NUMBER	REV
			APNSVY00112A	0

Attachment 3: Site photographs of Navigation Creek (14/12/2020)



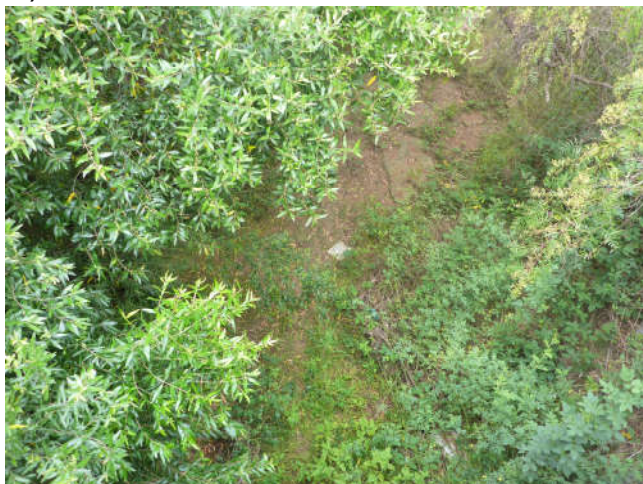
A) Site NAV2



B) Site NAV2



C) Site NAV3



D) Site NAV3



ATTACHMENT C – Longwalls 709 Structures Management Plan and Longwall 905 Structures Management Plan