

ILLAWARRA COAL HOLDINGS:

Appin Mine – Longwalls 711A and LW711B

The effects of the proposed modified LW711A and LW711B
on previous subsidence predictions and impact assessments

DOCUMENT REGISTER

Revision	Description	Author	Checker	Date
01	Draft issue	JB	-	27 Aug 25
02	Draft issue	JB	KK	28 Aug 25
A	Final issue	JB	KK	28 Aug 25

Report produced to: support an application for the proposed modified LW711A and LW711B to be submitted to the Department of Planning, Housing and Infrastructure.

Previous reports: MSEC1117 (Rev. B) – 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 in Support of the Extraction Plan Application (May 2021).
MSEC1318 (Rev. A) – The effects of the proposed modifications to the commencing ends of LW710A and LW711 on previous subsidence predictions and impact assessments (January 2023).

Background reports available at www.minesubsidence.com:-

Introduction to Longwall Mining and Subsidence (Revision A)
General Discussion of Mine Subsidence Ground Movements (Revision A)
Mine Subsidence Damage to Building Structures (Revision A)

1.0 INTRODUCTION	5
1.1. Background	5
1.2. Mining geometry	5
1.3. Surface and seam	6
2.0 MAXIMUM PREDICTED SUBSIDENCE EFFECTS FOR LW711A AND LW711B	7
2.1. Maximum predicted conventional subsidence effects	7
2.2. Predicted strains	8
2.3. Maximum predicted valley-related effects	9
3.0 PREDICTIONS AND IMPACT ASSESSMENTS FOR THE NATURAL AND BUILT FEATURES	10
3.1. The Study Area	10
3.2. Navigation Creek	10
3.3. First and second order tributaries	11
3.4. Cliffs	11
3.5. Steep slopes	12
3.6. Public roads	12
3.7. Electrical services	13
3.8. Telecommunications services	14
3.9. Houses	14
3.10. Other structures	15
3.11. Farm dams	16
3.12. Summary	16
APPENDIX A. FIGURES	17
APPENDIX B. TABLES	18
APPENDIX C. DRAWINGS	19

Tables

Tables are prefixed by the number of the chapter in which they are presented.

Table No.	Description	Page
Table 1.1	Dimensions of LW711 based the Previous Layout and LW711A and LW711B based on the Modified Layout	5
Table 2.1	Maximum predicted incremental conventional subsidence effects due to the mining of LW711 based on the Previous Layout and LW711A and LW711B based on the Modified Layout	7
Table 2.2	Maximum predicted total conventional vertical subsidence, tilt and curvature anywhere above the mining area based on the Previous Layout and Modified Layout	7
Table 2.3	Maximum predicted total conventional vertical subsidence, tilt and curvature within the Study Area based on the Previous Layout and Modified Layout	8
Table 3.1	Maximum predicted total vertical subsidence, upsidence and closure for Navigation Creek due to mining of LW702 to LW711B	11
Table 3.2	Maximum predicted total vertical subsidence, tilt and curvature for the steep slopes within the Study Area due to the mining of LW702 to LW711B	12
Table 3.3	Maximum predicted total conventional vertical subsidence, tilt and curvature along Burrells Road and Quirkies Lane due to mining of LW702 to LW711B	13
Table 3.4	Maximum predicted total vertical subsidence, tilt along and tilt across the alignments of the 11 kV powerlines due to mining of LW702 to LW711B	13
Table 3.5	Maximum predicted total vertical subsidence, tilt and curvatures for the houses within the Study Area due to mining of LW702 to LW711B	15
Table 3.6	Maximum predicted total vertical subsidence, tilt and curvatures for the farm dams within the Study Area due to mining of LW702 to LW711B	16
Table B.01	Predicted subsidence effects for the houses based on the Previous Layout	App. B
Table B.02	Predicted subsidence effects for the houses based on the Modified Layout	App. B

Figures

Figures are prefixed by the number of the chapter or the letter of the appendix in which they are presented.

Figure No.	Description	Page
Fig. 1.1	Surface and seam levels along the centrelines of LW711A and LW711B	6
Fig. 3.1	Maximum predicted vertical subsidence for the houses within the Study Area based on the Previous Layout (left-hand side) and Modified Layout (right-hand side)	15
Fig. A.01	Predicted profiles of total vertical subsidence, tilt and curvature along Prediction Line 1 due to the mining of LW702 to LW711B	App. A
Fig. A.02	Predicted profiles of total vertical subsidence, upsidence and closure along Navigation Creek due to the mining of LW702 to LW711B	App. A
Fig. A.03	Predicted profiles of total vertical subsidence, tilt and curvature along Burrells Road due to the mining of LW702 to LW711B	App. A
Fig. A.04	Predicted profiles of total vertical subsidence, tilt and curvature along Quirkies Lane due to the mining of LW702 to LW711B	App. A

Drawings

Drawings referred to in this report are included in Appendix C at the end of this report.

<i>Drawing No.</i>	<i>Description</i>	<i>Rev.</i>
MSEC1526-01	General layout of LW711A and LW711B at Appin Mine	A
MSEC1526-02	Surface level contours	A
MSEC1526-03	Bulli Seam Floor Contours	A
MSEC1526-04	Bulli Seam Thickness Contours	A
MSEC1526-05	Bulli Seam Depth of Cover Contours	A
MSEC1526-06	Natural features	A
MSEC1526-07	Built features	A
MSEC1526-08	Predicted additional subsidence contours due to LW711A and LW711B	A
MSEC1526-09	Predicted total subsidence contours after LW711B	A

1.1. Background

Illawarra Coal Holdings Pty Limited (ICHPL), a wholly owned subsidiary of Gear M Illawarra Met Coal Pty Ltd (trading as GM³), operates Appin Mine (the Mine), which is located in the Southern Coalfield of New South Wales (NSW). The Mine is located north of Douglas Park and south-west of Menangle.

ICHPL has completed the mining of Longwalls 701 to 710B (LW701 to LW710B) and is currently mining Longwall 711 (LW711) in Area 7. ICHPL has also completed the mining of Longwalls 901 to 905 (LW901 to LW905) in Area 9 at Appin Mine.

Mine Subsidence Engineering Consultants (MSEC) was previously commissioned by ICHPL to prepare subsidence predictions and impact assessments for LW709 to LW711 in Area 7 and LW905 in Area 9 at Appin Mine. Report No. MSEC1117 (Rev. B) was issued in May 2021 in support of the Extraction Plan Application for these longwalls.

The then Department of Planning and Environment (DPE) granted ICHPL approval for the mining of LW709 to LW711 and LW905 on 29 July 2022.

ICHPL then modified the commencing (i.e. western) ends of LW710A and LW711 by shortening them by 242 m and 225 m, respectively, from the positions adopted in the approved Extraction Plan and Report No. MSEC1117. MSEC prepared Report No. MSEC1318 (Rev. A) issued in January 2023 in support of that modification.

The DPE approved the modified commencing (i.e. western) ends of LW710A and LW711 on 15 March 2023. The longwall layout in Area 7 that includes the approved shortened commencing ends of LW710A and LW711 is referred to as the *Previous Layout* in this report.

ICHPL now proposes to modify LW711 by separating it into two shorter longwalls, referred to as LW711A and LW711B, and leave a coal block between them. The purpose of the modification is to allow the main headings to be moved eastwards and extend through the proposed coal block between LW711A and LW711B so as to avoid the development of first workings in areas of high depths of cover.

The longwall layout in Area 7 that includes the proposed modified LW711A and LW711B is referred to as the *Modified Layout* in this report. This subsidence report has been prepared to support the proposed modification of the Extraction Plan which will be submitted to the Department of Planning, Housing and Infrastructure (DPHI).

1.2. Mining geometry

The locations of the longwalls in Areas 7 and 9 are shown in Drawing No. MSEC1526-01 in Appendix C. The layout of LW711 based on the Previous Layout are shown by the magenta lines and the layout of LW711A and LW711B based on the Modified Layout are shown by the orange lines in this drawing.

A summary of the dimensions for LW711 based on the Previous Layout and for LW711A and LW711B based on the Modified Layout is provided in Table 1.1.

Table 1.1 Dimensions of LW711 based the Previous Layout and LW711A and LW711B based on the Modified Layout

Layout (Report No.)	Longwall	Overall void length including installation heading (m)	Overall void width including first workings (m)	Overall tailgate chain pillar width (m)
Previous Layout (MSEC1318)	LW711	4244	324	45
Modified Layout (MSEC1526)	LW711A	1376	324	45
	LW711B	2473	324	45

The proposed modification will leave a 395 m long coal block between LW711A and LW711B. The main headings will be developed through this coal block.

The length of longwall extraction excluding the installation headings are approximately 9 m less than shown in Table 1.1 and are approximately 4235 m for LW711 based on the Previous Layout, and 1367 m for LW711A and 2464 m for LW711B based on the Modified Layout.

The longwall face width excluding the first workings (i.e. secondary extraction) is 315 m for LW711 based on the Previous Layout and for LW711A and LW711B based on the Modified Layout. Similarly, the solid chain pillar widths are 70 m based on both layouts. That is, the longwall void width and solid chain pillar width are not proposed to be modified.

LW711A and LW711B will be mined within the Bulli Seam from the west towards the east.

1.3. Surface and seam

The surface and seam levels along the centrelines of LW711A and LW711B are shown in Fig. 1.1. The definition of the Study Area is provided in Section 3.1.

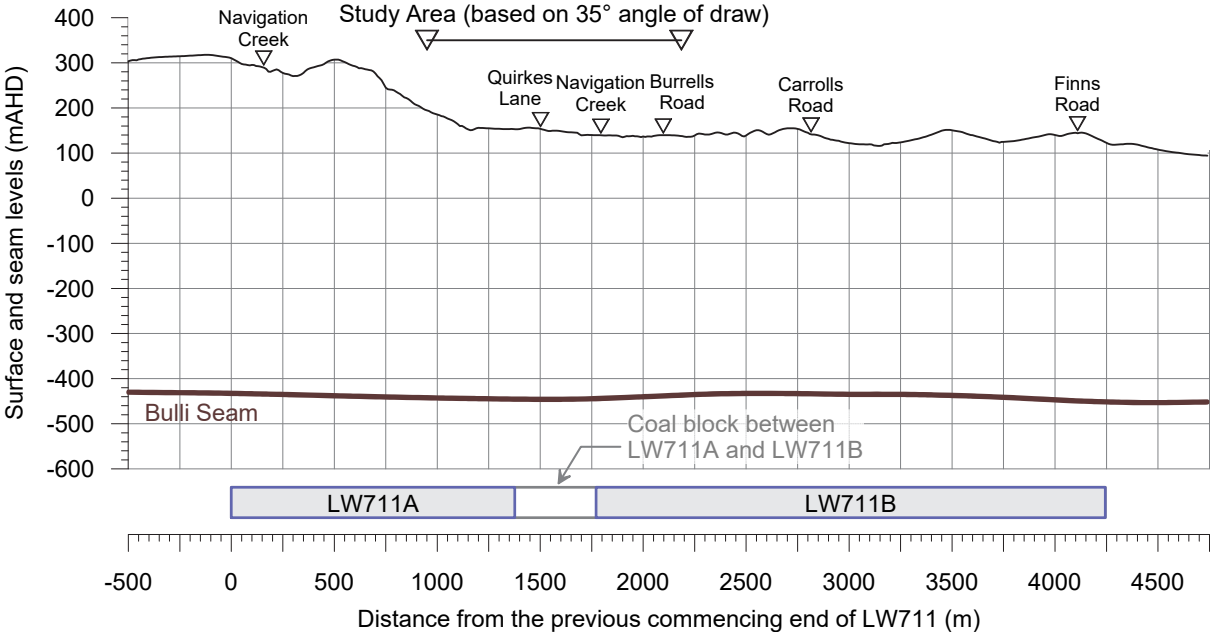


Fig. 1.1 Surface and seam levels along the centrelines of LW711A and LW711B

The surface level contours are shown in Drawing No. MSEC1526-02 in Appendix C. LW711A is located partially beneath Razorback Range and LW711B is located to the east of this range. Navigation Creek and its tributaries flow towards the north.

The seam floor contours, seam thickness contours and depth of cover contours for the Bulli Seam are shown in Drawing Nos. MSEC1526-03, MSEC1526-04 and MSEC1526-05, respectively. The contours are based on the information presented in Report Nos. MSEC1117 and MSEC1318 which supported the Extraction Plan and previous Modification Application.

The depths of cover to the Bulli Seam vary between a minimum of 550 m above LW711B along a tributary to Navigation Creek, and a maximum of 740 m above LW711A beneath Razorback Range. The thickness of the Bulli Seam within the extents of LW711A and LW711B varies between 3.0 m and 3.3 m. ICHPL proposes to extract the full seam thickness.

2.1. Maximum predicted conventional subsidence effects

The Incremental Profile Method (IPM) was previously used to predict the conventional subsidence effects due to the mining of LW702 to LW711 and LW901 to LW905, based on the Previous Layout, and these are provided in Report Nos. MSEC1117 and MSEC1318. The IPM has now been used to predict the conventional subsidence effects for these longwalls based on the Modified Layout.

The predicted additional subsidence contours due to the mining of LW711A and LW711B, based on the Modified Layout, are shown in Drawing No. MSEC1526-08. The predicted incremental 20 mm subsidence contour for LW711, based on the Previous Layout, is also shown in this drawing for comparison.

The extent of vertical subsidence decreases due to the proposed modification. The surface area located within the predicted additional 20 mm subsidence contour for LW711A and LW711B based on the Modified Layout is 545 hectares (ha), where as the area within the predicted incremental 20 mm subsidence contour for LW711 based on the Previous Layout is approximately 567 ha.

A summary of the maximum predicted values of incremental vertical subsidence, tilt and curvature due to the mining of LW711 based on the Previous Layout and due to the mining of each of LW711A and LW711B based on the Modified Layout is provided in Table 2.1. The predicted strains directly above the longwalls are discussed in Section 2.2.

Table 2.1 Maximum predicted incremental conventional subsidence effects due to the mining of LW711 based on the Previous Layout and LW711A and LW711B based on the Modified Layout

Layout (Report No.)	Longwall	Maximum predicted incremental vertical subsidence (mm)	Maximum predicted incremental tilt (mm/m)	Maximum predicted incremental hogging curvature (km ⁻¹)	Maximum predicted incremental sagging curvature (km ⁻¹)
Previous Layout (MSEC1318)	LW711	950	6.5	0.07	0.14
Modified Layout (MSEC1526)	LW711A	850	6.5	0.07	0.14
	LW711B	950	6.5	0.06	0.12

The maximum predicted incremental subsidence effects for LW711A and LW711B, based on the Modified Layout, are the same as the maximum predicted values based on the Previous Layout. That is, the introduction of a coal block in LW711 does not affect the maximum predicted incremental values. The reason is that the maximum predicted incremental effects occur away from the coal block where the depths of cover are shallowest.

The predicted total subsidence contours due to the mining in Areas 7 and 9, based on the Modified Layout, are shown in Drawing No. MSEC1526-09. The predicted total 20 mm subsidence contour, based on the Previous Layout, is also shown in this drawing for comparison.

A summary of the maximum predicted values of total vertical subsidence, tilt and curvature due to the mining of LW702 to LW711 and LW901 to LW905, based on the Previous Layout and Modified Layout, is provided in Table 2.2. The values are the maximum predicted subsidence effects anywhere above the mining area.

Table 2.2 Maximum predicted total conventional vertical subsidence, tilt and curvature anywhere above the mining area based on the Previous Layout and Modified Layout

Layout (Report No.)	Longwalls	Maximum predicted total vertical subsidence (mm)	Maximum predicted total tilt (mm/m)	Maximum predicted total hogging curvature (km ⁻¹)	Maximum predicted total sagging curvature (km ⁻¹)
Previous Layout (MSEC1318)	LW702 to LW711 and LW901 to LW905	1550	7.0	0.08	0.15
Modified Layout (MSEC1526)	LW702 to LW711B and LW901 to LW905	1550	7.0	0.08	0.15

The maximum predicted total subsidence effects within the mining area, based on the Modified Layout, are the same as the maximum predicted values based on the Previous Layout. That is, separating LW711 into two shorter longwalls (i.e. LW711A and LW711B) with a coal block between them does not affect the maximum predicted total values. The reason is that the maximum predicted total effects occur near the middle of the mining area (i.e. away from the coal block) where the depths of cover are less.

While the maximum predicted total subsidence effects above the mining area do not change, the predicted vertical subsidence above and around the coal block reduces. This results in a reduction in the tilts and curvatures transverse to the longwall but an increase in the longitudinal tilts and curvatures either side of the coal block.

The Study Area represents the surface area where the predicted subsidence effects change due to the proposed modification. The Study Area is further defined in Chapter 3 and it is illustrated in Drawing No. MSEC1526-01.

A summary of the maximum predicted values of total vertical subsidence, tilt and curvature within the Study Area, based on the Previous Layout and Modified Layout, is provided in Table 2.3. The values are the maximum predicted subsidence effects within the Study Area due to the mining of all longwalls.

Table 2.3 Maximum predicted total conventional vertical subsidence, tilt and curvature within the Study Area based on the Previous Layout and Modified Layout

Layout (Report No.)	Longwalls	Maximum predicted total vertical subsidence (mm)	Maximum predicted total tilt (mm/m)	Maximum predicted total hogging curvature (km ⁻¹)	Maximum predicted total sagging curvature (km ⁻¹)
Previous Layout (MSEC1318)	LW702 to LW711 and LW901 to LW905	1000	7.0	0.07	0.14
Modified Layout (MSEC1526)	LW702 to LW711B and LW901 to LW905	1000	6.5	0.07	0.14

The maximum predicted total subsidence effects within the Study Area, based on the Modified Layout, are the same or slightly less than the maximum predicted values based on the Previous Layout. While the maximum predicted values essentially remain the same, the tilts and curvatures around the coal block locally increase or decrease due to the proposed modification.

This is illustrated along Prediction Line 1 taken along the centrelines of LW711A and LW711B. The location of this prediction line is shown in Drawing Nos. MSEC1526-08 and MSEC1526-09 in Appendix C.

The predicted profiles of total vertical subsidence, tilt and curvature along Prediction Line 1 are illustrated in Fig. A.01 in Appendix A. The profiles based on the Previous Layout and Modified Layout are shown by the red lines and blue lines, respectively, in this figure.

The predicted longitudinal tilts either side of the coal block increase due to the proposed modification. However, these tilts are less than the maximum tilts that occur transverse to the longwalls. The predicted tilts transverse to the longwall reduce adjacent to the coal block.

The maximum predicted total tilt within the Study Area is 6.5 mm/m (i.e. 0.65 %, or 1 in 154). The maximum predicted total curvatures are 0.07 km⁻¹ hogging and 0.14 km⁻¹ sagging and they represent minimum radii of curvature of 14 km and 7 km, respectively.

2.2. Predicted strains

The prediction of strain is more difficult than the prediction of subsidence, tilt and curvature. The reason for this is that strain is affected by many factors, including ground curvature and horizontal movement as well as local variations in the near surface geology, the locations of pre-existing natural joints at bedrock, and the depth of bedrock. Survey tolerance can also represent a substantial portion of the measured strain, in cases where the strains are of a low order of magnitude. The profiles of observed strain, therefore, can be irregular even when the profiles of observed subsidence, tilt and curvature are relatively smooth.

The maximum predicted conventional strains within the Study Area, based on applying a factor of 15 to the maximum predicted conventional curvatures, are approximately 1 mm/m tensile and 2 mm/m compressive based on both the Previous Layout and Modified Layout. These strains represent typical values when the ground subsides regularly with no localised or elevated strains due to near-surface geological structures or valley-related effects. The maximum strains can be much greater than these typical values, especially in the locations of near-surface geological structures, on steep slopes or within valleys.

At any point, however, there can be considerable variation from the linear relationship, resulting from non-conventional movements or from the normal scatters which are observed in strain profiles. When expressed as a percentage, observed strains can be many times greater than the predicted conventional strain for low magnitudes of curvature. In this report, therefore, we have provided a statistical approach to account for the variability, rather than just providing a single predicted conventional strain.

The range of potential strains above the mining area has been determined using monitoring data from the extracted longwalls at Appin Mine and other nearby collieries, where the mining geometry and overburden geometry are similar. The method of prediction is outlined in Section 4.3 of Report No. MSEC1117 and Section 2.2 of Report No. MSEC1318.

The maximum predicted strains above the mining area, based on both the Previous Layout and Modified Layout, are 1.0 mm/m tensile and 1.6 mm/m compressive based on the 95 % confidence levels, and are 1.5 mm/m tensile and 3.3 mm/m compressive based on the 99 % confidence level.

2.3. Maximum predicted valley-related effects

The predicted valley-related effects along the streams at Appin Mine have been determined using the methods outlined in ACARP Research Project No. C9067, which were published in the handbook entitled "*Management Information Handbook on the Undermining of Cliffs, Gorges and River Systems*", issued in September 2002. Details on the ACARP 2002 Prediction Method are provided in the background report entitled "*General Discussion on Mine Subsidence Ground Movements*" which can be obtained from www.minesubsidence.com.

The predicted upsidence and closure effects along the streams have been determined from the empirical database based on their lateral and longitudinal distances from the extracted longwalls, the depths of the valleys and the maximum predicted incremental subsidence resulting from the extraction of each longwall.

Navigation Creek and its tributaries are located within the Study Area. The predicted valley-related effects for these streams are discussed in Chapter 3. The predicted valley-related effects for other streams located further outside the Study Area do not change due to the proposed modification.

3.1. The Study Area

The *Study Area* has been defined as the surface area where the predicted subsidence effects, based on the Modified Layout, are different to those predicted based on the Previous Layout. The Study Area has been based on the following:

- 35° angle of draw line around the proposed coal block between LW711A and LW711B; and
- the limit where the change in the predicted vertical subsidence, due to the proposed modification, is greater than 20 mm.

The depths of cover contours for the Bulli Seam are shown in Drawing No. MSEC1526-05. The depths of cover above the coal block vary between 580 m and 620 m. The 35° angle of draw, therefore, has been determined by drawing a line that is a horizontal distance varying between 406 m and 434 m around the proposed coal block between LW711A and LW711B.

The predicted limit of vertical subsidence, taken as the predicted additional 20 mm subsidence contour for LW711A and LW711B, has been determined using the Incremental Profile Method (IPM). This method is described in Report No. MSEC1117 which supported the Extraction Plan Application. The predicted 20 mm change in vertical subsidence contour is located outside the 35° angle of draw on the southern side of the coal block but is otherwise located inside of the angle of draw on other sides of the coal block.

The Study Area is therefore defined by the 35° angle of draw and the change in the predicted 20 mm subsidence contour and it is shown in Drawing Nos. MSEC1526-01 to MSEC1527-07 in Appendix C. The Study Area is referred to as the “*Study Area based on the 35° degree angle of draw*” in this report for simplicity.

Surface features that are located within 600 m of the proposed coal block between LW711A and LW711B may experience changes in the predicted valley-related effects and could be sensitive to these effects. These features have therefore also been included in the assessments provided in this report.

The Study Area based on the 600 m boundary is also shown in Drawing Nos. MSEC1526-01 to MSEC1527-07 in Appendix C.

The natural and built features that are located within or adjacent to the Study Areas based on the 35° degree angle of draw and based on the 600 m boundary are shown in Drawing Nos. MSEC1526-06 and MSEC1527-07.

The surface features that have been included in the assessments provided in this report are:

- Navigation Creek;
- first and second order tributaries;
- steep slopes;
- Burrells Road and Quirkies Lane;
- 11 kV and low voltage powerlines;
- copper telecommunications cables;
- houses;
- non-residential and other structures; and
- farm dams.

The effects of the proposed modification of LW711 on the subsidence predictions and impact assessments for these features are provided in the following sections.

3.2. Navigation Creek

The streams are shown in Drawing No. MSEC1526-06.

The upper reaches of Navigation Creek are located above LW711A, LW711B and the proposed coal block between these two longwalls. The section of creek within the Study Area is third order. The length of creek above the mining area is 1.6 km based on the Previous Layout and 1.1 km based on the Modified Layout. The length of creek above the mining area reduces as it is partially located above the proposed coal block between LW711A and LW711B.

The predicted profiles of total vertical subsidence, upsidence and closure along Navigation Creek are illustrated in Fig. A.02 in Appendix A. The profiles based on the Previous Layout and Modified Layout are shown by the red lines and blue lines, respectively, in this figure.

A summary of the maximum predicted total vertical subsidence, upsidence and closure for Navigation Creek, based on the Previous Layout and Modified Layout, is provided in Table 3.1. The values are the maximum predicted subsidence effects for the section of creek located within the Study Area due to the mining of LW702 to LW711B.

Table 3.1 Maximum predicted total vertical subsidence, upsidence and closure for Navigation Creek due to mining of LW702 to LW711B

Layout (Report No.)	Maximum predicted total vertical subsidence (mm)	Maximum predicted total upsidence (mm)	Maximum predicted total closure (mm)
Previous Layout (MSEC1318)	950	350	525
Modified Layout (MSEC1526)	900	350	525

The maximum predicted total vertical subsidence for the section of Navigation Creek within the Study Area, based on the Modified Layout, is slightly less than the maximum predicted value based on the Previous Layout. The predicted vertical subsidence decreases where the creek crosses above the proposed coal block between LW711A and LW711B. Similarly, the maximum predicted conventional tilts and strains slightly reduce due to the proposed modification.

The maximum predicted total upsidence and closure for the section of Navigation Creek within the Study Area, based on the Modified Layout, are the same as the maximum predicted values based on the Previous Layout. While the maximum values do not change, the predicted upsidence and closure for the section of creek above the coal block slightly reduce.

The assessed levels of potential impact for Navigation Creek, based on the Modified Layout, are the same as those based on the Previous Layout. The assessments and recommended management strategies for the creek, therefore, are the same as those previously provided in Report Nos. MSEC1117 and MSEC1318 and the approved Extraction Plan.

3.3. First and second order tributaries

The tributaries are shown in Drawing No. MSEC1526-06.

There are first and second order tributaries to Navigation Creek located within the Study Area. There are no third order tributaries within the Study Area nor within 600 m of the proposed coal block between LW711A and LW711B.

The tributaries to Navigation Creek are located above LW711A and LW711B and the proposed coal block between these two longwalls. These tributaries could experience the full range of predicted subsidence effects, as summarised in Table 2.3.

The maximum predicted subsidence effects within the Study Area, based on the Modified Layout, are the same or slightly less than the maximum predicted values based on the Previous Layout. The predicted subsidence effects for the tributary above the proposed coal block (NavC26) reduce due to the proposed modification. The predicted subsidence effects for the other tributaries remain the same or slightly reduced.

The assessed levels of potential impact for the first and second order tributaries, based on the Modified Layout, are similar to or slightly less than those based on the Previous Layout. The assessments and recommended management strategies for the tributaries, therefore, are the same as those previously provided in Report Nos. MSEC1117 and MSEC1318 and the approved Extraction Plan.

3.4. Cliffs

The cliffs are shown in Drawing No. MSEC1526-06.

There are no cliffs identified within the Study Area nor within the 600 m boundary around the proposed coal block between LW711A and LW711B.

There are cliffs located outside and near to the 600 m boundary around the proposed coal block between LW711A and LW711B. The predicted subsidence effects for these cliffs, based on the Modified Layout, are the same as the predictions based on the Previous Layout.

The assessed levels of potential impact for the cliffs, based on the Modified Layout, are the same as those based on the Previous Layout. The assessments and recommended management strategies for the cliffs, therefore, are the same as those previously provided in Report Nos. MSEC1117 and MSEC1318 and the approved Extraction Plan, including approval of the requirements for Conditions 2 and 3 of the Extraction Plan on 17 June 2025.

3.5. Steep slopes

The steep slopes are shown in Drawing No. MSEC1526-06.

Steep slopes are located above LW711A and LW710A which are associated with the lower part of Razorback Range. There are also localised steep slopes associated with the banks of Navigation Creek and its tributaries located above the mining area and the proposed coal block.

A summary of the maximum predicted total vertical subsidence, tilt and curvatures for the steep slopes within the Study Area, based on the Previous Layout and Modified Layout, is provided in Table 3.2. The values are the maximum predicted subsidence effects within 20 m of the mapped extents of the steep slopes due to the mining of LW702 to LW711B.

Table 3.2 Maximum predicted total vertical subsidence, tilt and curvature for the steep slopes within the Study Area due to the mining of LW702 to LW711B

Layout (Report No.)	Location	Maximum predicted total vertical subsidence (mm)	Maximum predicted total tilt (mm/m)	Maximum predicted total hogging curvature (km ⁻¹)	Maximum predicted total sagging curvature (km ⁻¹)
Previous Layout (MSEC1318)	Razorback Range	950	7.0	0.07	0.14
	Valleys of streams	1000	7.0	0.07	0.14
Modified Layout (MSEC1526)	Razorback Range	925	6.5	0.07	0.14
	Valleys of streams	1000	6.5	0.07	0.14

The maximum predicted subsidence effects for the steep slopes, based on the Modified Layout, are the same or slightly less than the maximum predicted values based on the Previous Layout. The predicted longitudinal tilts and curvatures for the steep slopes located outside and adjacent to the proposed coal block slightly increase; however, they are less than the maximum predicted tilts and curvatures transverse to the longwalls. The predicted subsidence effects for the steep slopes above the proposed coal block reduce due to the proposed modification.

The assessed levels of potential impact for the steep slopes, based on the Modified Layout, are the same or slightly less than those based on the Previous Layout. The assessments and recommended management strategies for the steep slopes, therefore, are the same as those previously provided in Report Nos. MSEC1117 and MSEC1318 and the approved Extraction Plan, including approval of the requirements for Conditions 2 and 3 of the Extraction Plan on 17 June 2025.

3.6. Public roads

The public roads are shown in Drawing No. MSEC1526-07.

Burrells Road and Quirkies Lane are located within the Study Area based on the 35° angle of draw and are located above the western end of LW711B and the proposed coal block. Top Ridge Road, Gibraltar Drive, Hawkey Road, Carrolls Road and Cummins Road are all located outside the Study Area. Small sections of Hawkey Road and Cummins Road are located within the 600 m boundary around the proposed coal block.

The predicted profiles of total vertical subsidence, tilt and curvature along Burrells Road and Quirkies Lane are illustrated in Figs. A.03 and A.04, respectively, in Appendix A. The profiles based on the Previous Layout and Modified Layout are shown by the red lines and blue lines, respectively, in this figure.

A summary of the maximum predicted values of total vertical subsidence, tilt and curvature along Burrells Road and Quirkies Lane, based on the Previous Layout and Modified Layout, is provided in Table 3.3. The values are the maximum predicted subsidence effects for the sections of road within the Study Area due to the mining of LW702 to LW711B.

Table 3.3 Maximum predicted total conventional vertical subsidence, tilt and curvature along Burrells Road and Quirkles Lane due to mining of LW702 to LW711B

Layout (Report No.)	Road	Maximum predicted total vertical subsidence (mm)	Maximum predicted total tilt (mm/m)	Maximum predicted total hogging curvature (km ⁻¹)	Maximum predicted total sagging curvature (km ⁻¹)
Previous Layout (MSEC1318)	Burrells Road	975	6.0	0.06	0.11
	Quirkles Lane	1000	6.5	0.07	0.13
Modified Layout (MSEC1526)	Burrells Road	950	6.0	0.06	0.11
	Quirkles Lane	1000	4.0	0.06	0.11

The maximum predicted subsidence effects for Burrells Road and Quirkles Lane, based on the Modified Layout, are the same or slightly less than the maximum predicted values based on the Previous Layout. The predicted subsidence effects along the roads slightly reduce where they are located above the proposed coal block. The predicted tilts and curvatures slightly increase adjacent to the proposed coal block; however, these are less than the maximum predicted values where the roads cross the longwall maingates.

The remaining local roads are located outside the Study Area based on the 35° angle of draw. The maximum predicted subsidence effects for these roads, based on the Modified Layout, are the same as the maximum predicted values based on the Previous Layout.

The assessed levels of potential impact for the public roads, based on the Modified Layout, are the same or slightly less than those based on the Previous Layout. The assessments and recommended management strategies for the roads, therefore, are the same as those previously provided in Report Nos. MSEC1117 and MSEC1318 and the approved Extraction Plan.

3.7. Electrical services

The electrical services are shown in Drawing No. MSEC1526-07.

There are 11 kV and low voltage powerlines along Burrells Road and Quirkles Lane that are located above the western end of LW711B and the proposed coal block. These powerlines service the residential properties along these roads.

The predicted profiles of total vertical subsidence, tilt and curvature along Burrells Road and Quirkles Lane and, therefore, the alignments of the 11 kV powerlines are illustrated in Figs. A.03 and A.04, respectively, in Appendix A. The profiles based on the Previous Layout and Modified Layout are shown by the red lines and blue lines, respectively, in this figure.

A summary of the maximum predicted values of total vertical subsidence, tilt along and tilt across the alignments of the 11 kV powerlines, based on the Previous Layout and Modified Layout, is provided in Table 3.4. The values are the maximum predicted subsidence effects for the section of powerline within the Study Area due to the mining of LW702 to LW711B.

Table 3.4 Maximum predicted total vertical subsidence, tilt along and tilt across the alignments of the 11 kV powerlines due to mining of LW702 to LW711B

Layout (Report No.)	Location	Maximum predicted total vertical subsidence (mm)	Maximum predicted total tilt along alignment (mm/m)	Maximum predicted total tilt across alignment (mm/m)
Previous Layout (MSEC1318)	Burrells Road	975	6.0	3.5
	Quirkles Lane	1000	6.5	5.5
Modified Layout (MSEC1526)	Burrells Road	950	6.0	2.5
	Quirkles Lane	1000	4.0	5.0

The maximum predicted subsidence effects for the 11 kV powerlines, based on the Modified Layout, are the same or slightly less than the maximum predicted values based on the Previous Layout. The predicted subsidence effects along the powerlines slightly reduce where they are located above the proposed coal block. The predicted tilts slightly increase adjacent to the proposed coal block; however, these are less than the maximum predicted values where the powerlines cross the longwall maingates.

The remaining 11 kV and low voltage powerlines are located outside the Study Area based on the 35° angle of draw. The maximum predicted subsidence effects for these powerlines, based on the Modified Layout, are the same as the maximum predicted values based on the Previous Layout.

The assessed levels of potential impact for the 11 kV and low voltage powerlines, based on the Modified Layout, are the same or slightly less than those based on the Previous Layout. The assessments and recommended management strategies for the powerlines, therefore, are the same as those previously provided in Report Nos. MSEC1117 and MSEC1318 and the approved Extraction Plan.

3.8. Telecommunications services

The telecommunications services are shown in Drawing No. MSEC1526-07.

There are underground copper telecommunications cables located along Burrells Road and Quirkies Lane that are located above the western end of LW711B and the proposed coal block. These telecommunications cables service the residential properties along these roads. There are no optical fibre cables located within the Study Area nor the 600 m boundary around the proposed coal block.

The predicted profiles of total vertical subsidence, tilt and curvature along Burrells Road and Quirkies Lane and, therefore, the alignments of the copper telecommunications cables are illustrated in Figs. A.03 and A.04, respectively, in Appendix A. The profiles based on the Previous Layout and Modified Layout are shown by the red lines and blue lines, respectively, in this figure.

A summary of the maximum predicted values of total vertical subsidence, tilt and curvature along Burrells Road and Quirkies Lane and, therefore, the alignments of the copper telecommunications cables is provided in Table 3.3. The values are the maximum predicted subsidence effects for the sections of the cables within the Study Area due to the mining of LW702 to LW711B.

The maximum predicted subsidence effects for copper telecommunications cables, based on the Modified Layout, are the same or slightly less than the maximum predicted values based on the Previous Layout. The predicted subsidence effects along the cables slightly reduce where they are located above the proposed coal block. The predicted tilts and curvatures slightly increase adjacent to the proposed coal block; however, these are less than the maximum predicted values where the roads cross the longwall maingates.

The remaining copper telecommunications cables and optical fibre cables are located outside the Study Area based on the 35° angle of draw. The maximum predicted subsidence effects for these cables, based on the Modified Layout, are the same as the maximum predicted values based on the Previous Layout.

The assessed levels of potential impact for the telecommunications services, based on the Modified Layout, are the same or slightly less than those based on the Previous Layout. The assessments and recommended management strategies for these services, therefore, are the same as those previously provided in Report Nos. MSEC1117 and MSEC1318 and the approved Extraction Plan.

3.9. Houses

The houses are shown in Drawing No. MSEC1526-07.

There are 26 houses located within the Study Area based on the 35° angle of draw. The houses are based on those mapped as part of Report No. MSEC1117 and the approved Extraction Plan. While additional structures have been built within the Study Area since mapping of these structures, the potential impacts on these new structures are the same as the existing structures.

The maximum predicted values of total vertical subsidence, tilt and curvature for the houses within the Study Area are provided in Table B.01 for the Previous Layout and Table B.02 for the Modified Layout in Appendix B. The values in these tables are based on the maximum predicted subsidence effects within 20 m of the perimeter of each house due to the mining of LW702 to LW711B.

A summary of the maximum predicted subsidence effects for the houses within the Study Area, based on the Previous Layout and Modified Layout, is provided in Table 3.5. The values are the maximum predicted subsidence effects within 20 m of the mapped extents of the houses due to the mining of LW702 to LW711B.

Table 3.5 Maximum predicted total vertical subsidence, tilt and curvatures for the houses within the Study Area due to mining of LW702 to LW711B

Layout (Report No.)	Maximum predicted total vertical subsidence (mm)	Maximum predicted total tilt (mm/m)	Maximum predicted total hogging curvature (km ⁻¹)	Maximum predicted total sagging curvature (km ⁻¹)
Previous Layout (MSEC1318)	925	7.0	0.07	0.06
Modified Layout (MSEC1526)	900	5.5	0.06	0.06

The maximum predicted subsidence effects for the houses within the Study Area, based on the Modified Layout, are the same or slightly less than the maximum predicted values based on the Previous Layout.

The distributions of the maximum predicted vertical subsidence for the houses within the Study Area are illustrated in Fig. 3.1 based on the Previous Layout (left-hand side) and Modified Layout (right-hand side).

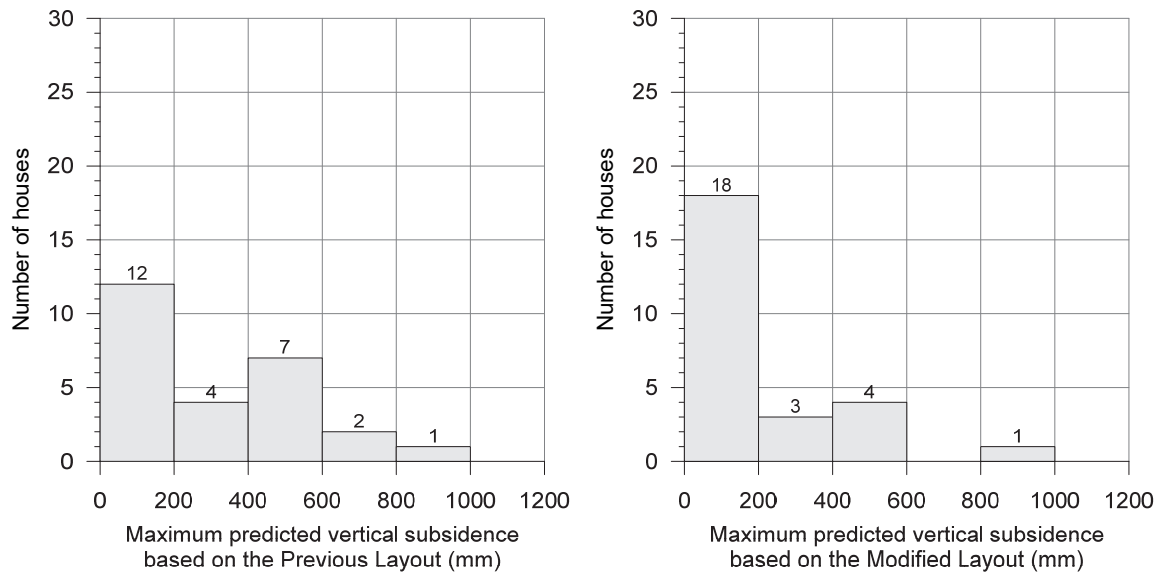


Fig. 3.1 Maximum predicted vertical subsidence for the houses within the Study Area based on the Previous Layout (left-hand side) and Modified Layout (right-hand side)

The predicted vertical subsidence for the houses located above and adjacent to the proposed coal block (Refs. F20h01, F31a, F43a, K04a, K05a and S14h01) reduces due to the proposed modification. The predicted tilts and curvatures for the houses on the eastern side of the proposed coal block (Refs. F21a, F22a and F22b) slightly increase; however, these are less than the maximum predicted values for the other houses within the Study Area.

The predicted curvatures for the houses within the Study Area, based on the Modified Layout, are the same or slightly less than the maximum predicted values based on the Previous Layout. Similarly, the predicted strains for the houses are the same or slightly less.

The assessed levels of potential impact for the houses within the Study Area, based on the Modified Layout, are the same or slightly less than those based on the Previous Layout. The assessments and recommended management strategies for the houses, therefore, are the same as those previously provided in Report Nos. MSEC1117 and MSEC1318 and the approved Extraction Plan.

3.10. Other structures

The structures are shown in Drawing No. MSEC1526-07.

There are other non-residential building structures (i.e. sheds, garages, etc.) and other structures (i.e. tanks and pools) that are located within the Study Area. The predicted subsidence effects for these structures are similar to the houses, as described in Section 3.9.

The predicted subsidence effects for these structures, based on the Modified Layout, are the same or slightly less than the predicted values based on the Previous Layout. The predicted tilts and curvatures slightly increase in some locations and slightly decrease in other locations. However, the overall level of predicted movement does not change due to the proposed modification.

The assessed levels of potential impact for the non-residential structures within the Study Area, based on the Modified Layout, are the same or slightly less than those based on the Previous Layout. The assessments and recommended management strategies for these structures, therefore, are the same as those previously provided in Report Nos. MSEC1117 and MSEC1318 and the approved Extraction Plan.

3.11. Farm dams

The farm dams are shown in Drawing No. MSEC1526-07.

There are 24 farm dams located within the Study Area based on the 35° angle of draw. The dams are situated along the alignments of Navigation Creek and its tributaries.

A summary of the maximum predicted subsidence effects for the farm dams within the Study Area, based on the Previous Layout and Modified Layout, is provided in Table 3.6. The values are the maximum predicted subsidence effects within 20 m of the mapped extents of the dams due to the mining of LW702 to LW711B.

Table 3.6 Maximum predicted total vertical subsidence, tilt and curvatures for the farm dams within the Study Area due to mining of LW702 to LW711B

Layout (Report No.)	Maximum predicted total vertical subsidence (mm)	Maximum predicted total tilt (mm/m)	Maximum predicted total hogging curvature (km ⁻¹)	Maximum predicted total sagging curvature (km ⁻¹)
Previous Layout (MSEC1318)	1000	4.5	0.05	0.14
Modified Layout (MSEC1526)	1000	4.0	0.05	0.12

The maximum predicted subsidence effects for the farm dams within the Study Area, based on the Modified Layout, are the same or slightly less than the maximum predicted values based on the Previous Layout.

The assessed levels of potential impact for the farm dams, based on the Modified Layout, are the same or slightly less than those based on the Previous Layout. The assessments and recommended management strategies for the dams, therefore, are the same as those previously provided in Report Nos. MSEC1117 and MSEC1318 and the approved Extraction Plan.

3.12. Summary

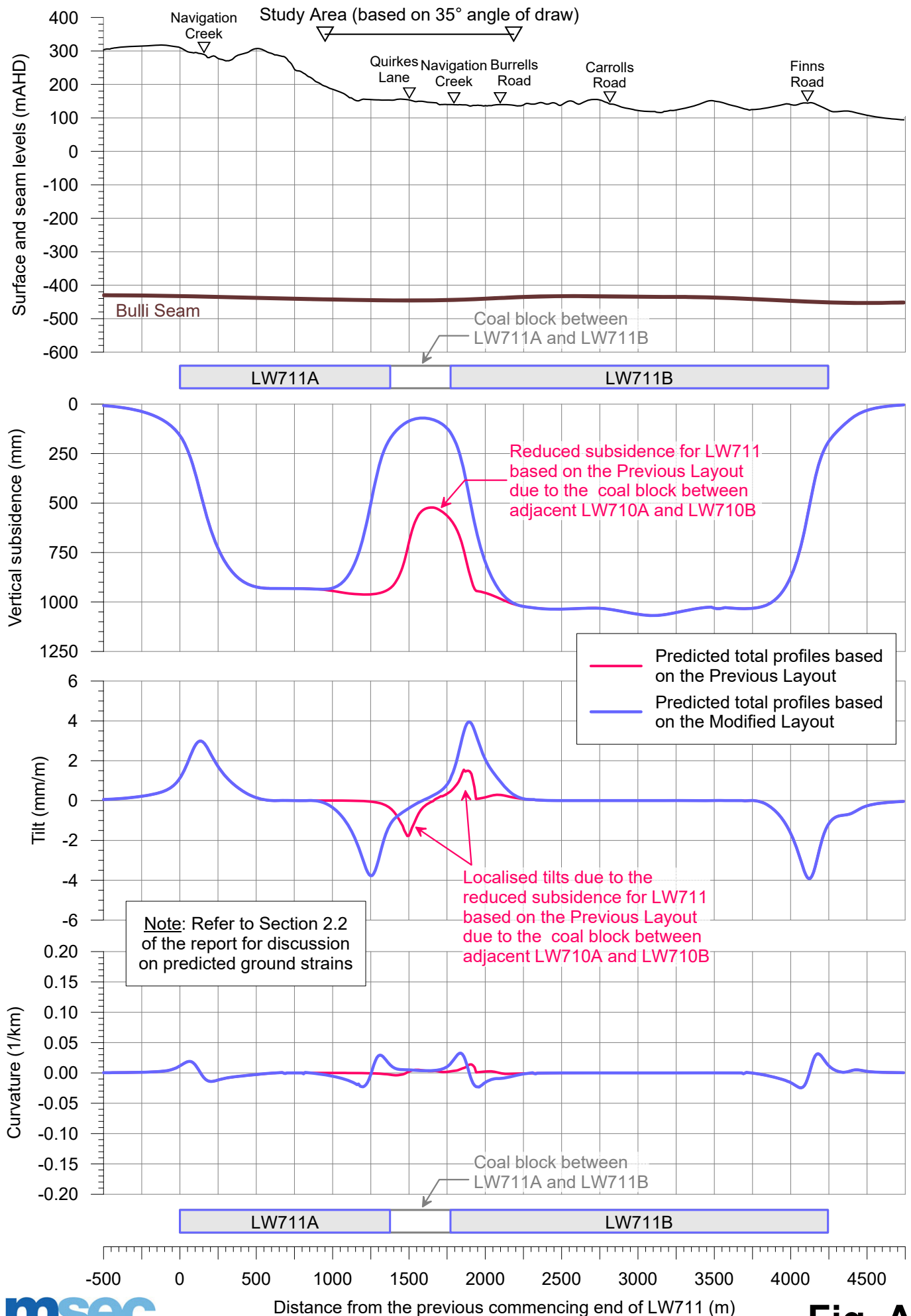
The maximum predicted total subsidence effects due to the mining of LW702 to LW711B, based on the Modified Layout, are the same as the maximum predicted values based on the Previous Layout. That is, separating LW711 into two shorter longwalls (i.e. LW711A and LW711B) with a coal block between them does not affect the maximum predicted total values.

The maximum predicted total subsidence effects for the natural and built features within the Study Area, based on the Modified Layout, are also similar to or slightly less than the maximum predicted values based on the Previous Layout. The predicted subsidence effects for the surface features located above the proposed coal block reduce due to the proposed modification. The predicted tilts and curvatures for some surface features located adjacent to the proposed coal block slightly increase, but these are less than the maximum predicted values for other features located elsewhere in the Study Area.

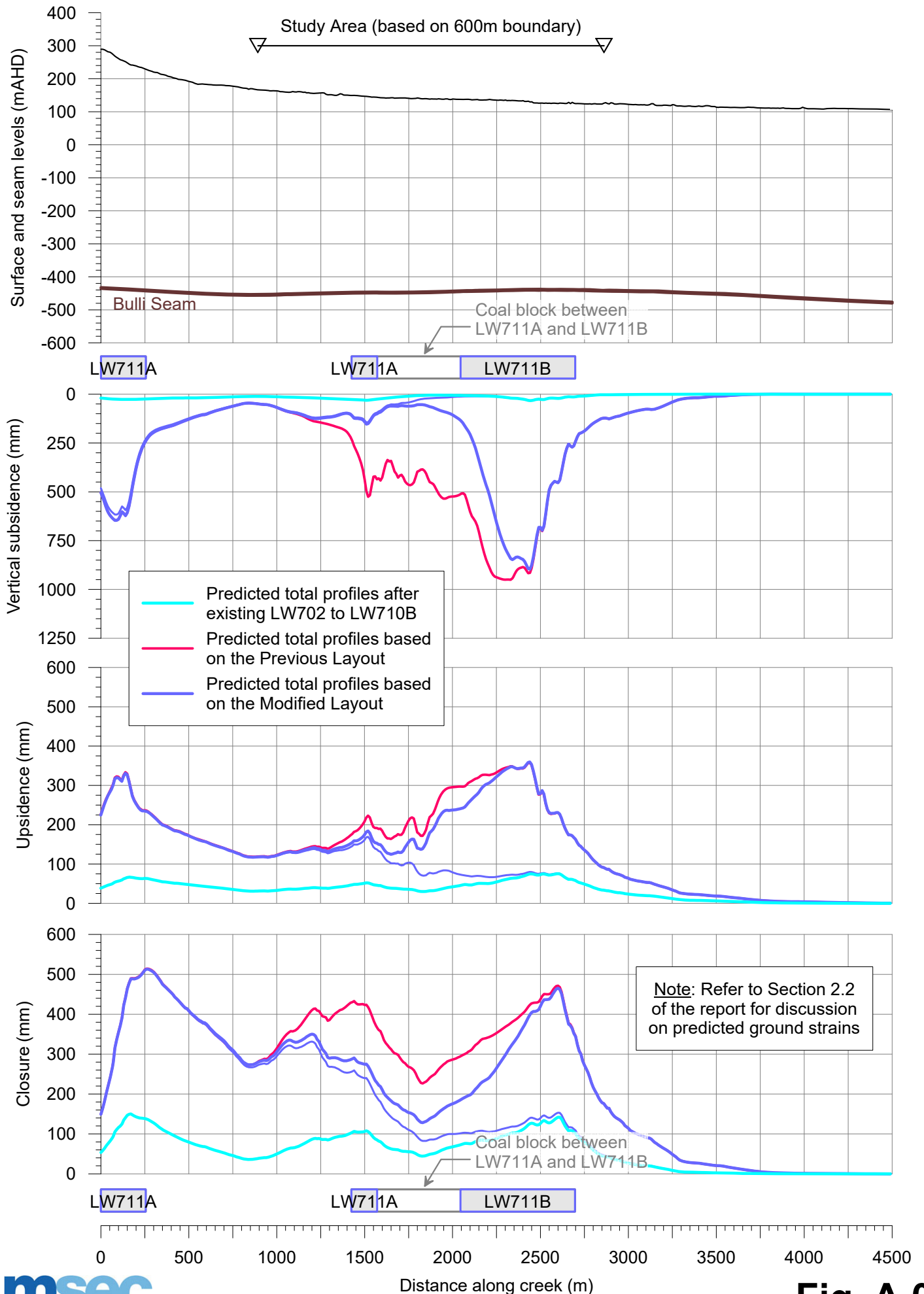
The assessed levels of potential impact for natural and built features, based on the Modified Layout, are the same or slightly less than those based on the Previous Layout. The assessments and recommended management strategies for the surface features, therefore, are the same as those previously provided in Report Nos. MSEC1117 and MSEC1318 and the approved Extraction Plan, including approval of the requirements for Conditions 2 and 3 of the Extraction Plan on 17 June 2025.

APPENDIX A. FIGURES

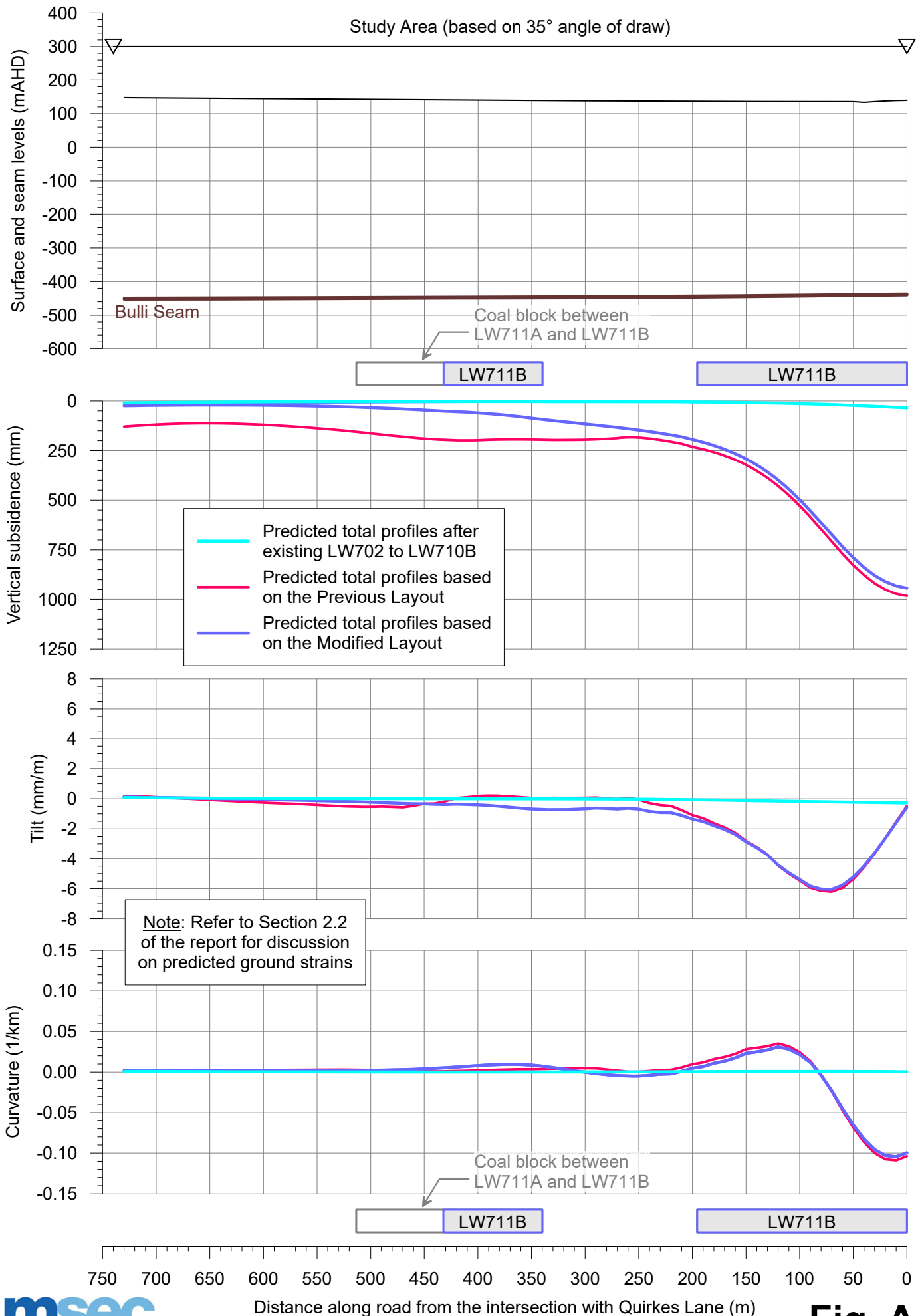
Predicted profiles of total vertical subsidence, tilt and curvature along Prediction Line 1 due to the mining of LW702 to LW711B



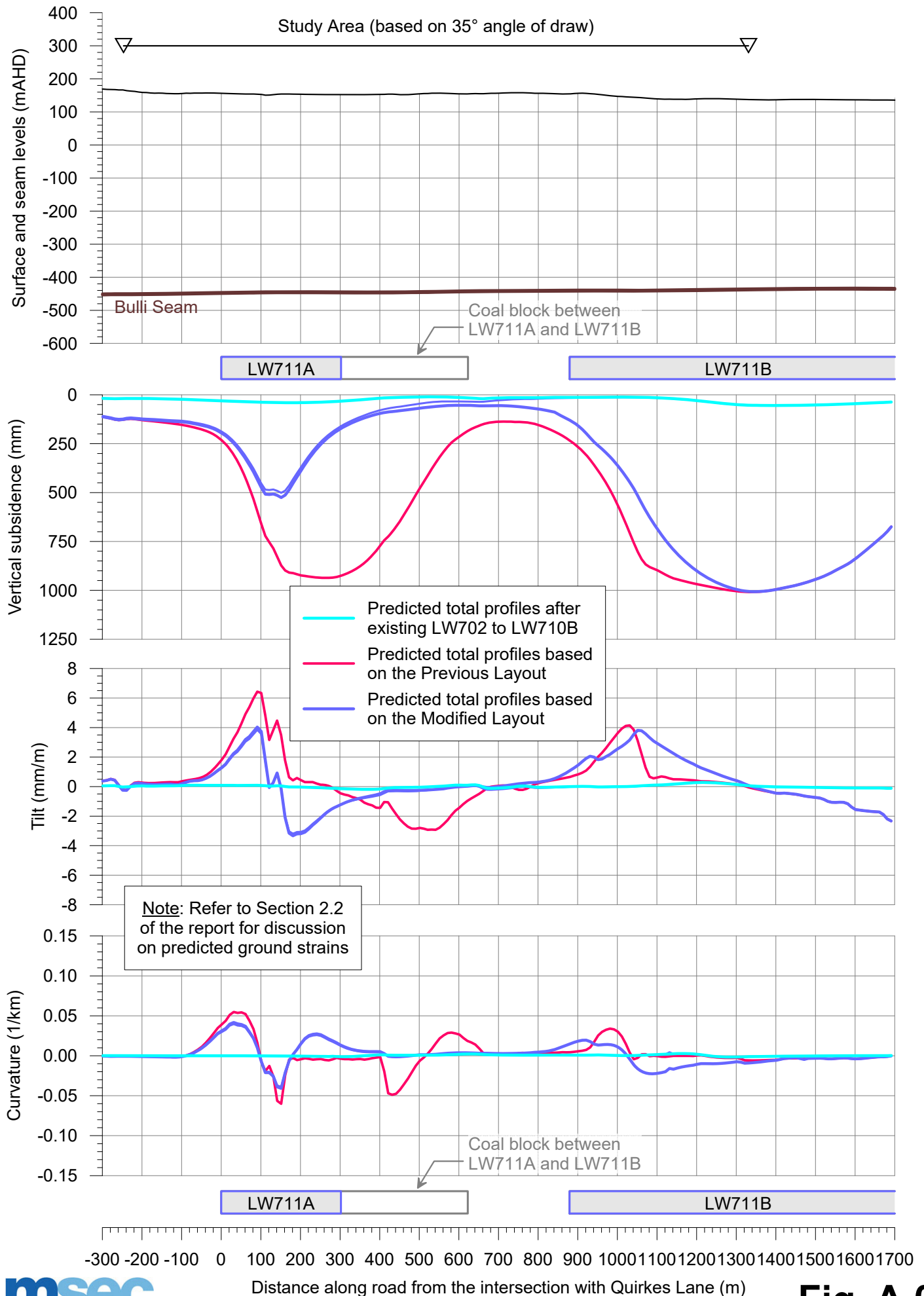
Predicted profiles of total vertical subsidence, upsidence and closure along Navigation Creek due to the mining of LW702 to LW711B



Predicted profiles of total vertical subsidence, tilt and curvature along Burrells Road due to mining of LW702 to LW711B



Predicted profiles of total vertical subsidence, tilt and curvature along Quirk's Lane due to mining of LW702 to LW711B



APPENDIX B. TABLES

Table B.01 - Predicted subsidence effects for the houses based on the Previous Layout

Structure Reference	Centroid MGA Easting	Centroid MGA Northing	Structure Type	Predicted total subsidence after LW711 (mm)	Predicted total tilt after LW711 (mm/m)	Predicted total hogging curvature after LW711 (1/km)	Predicted total sagging curvature after LW711 (1/km)	Predicted Probability of Nil or Category R0 Impact for Houses (%)	Predicted Probability of Category R1 or R2 Impact for Houses (%)	Predicted Probability of Category R3 and R4 Impact for Houses (%)	Predicted Probability of Category R5 Impact for Houses (%)
F18h01	287951.6292	6217265.562	House	60	< 0.5	< 0.01	< 0.01	87.3	9.6	2.8	0.3
F19h01	287893.6514	6217467.287	House	225	1.5	0.02	0.01	79.4	14.5	5.3	0.7
F20h01	287760.9016	6217693.084	House	425	3.0	0.04	< 0.01	61.9	24.5	11.1	2.4
F21a	288154.4709	6217721.205	House	500	2.0	0.02	< 0.01	78.8	14.9	5.5	0.8
F21f	287977.0204	6217609.447	House	130	< 0.5	< 0.01	< 0.01	91.1	7.1	1.7	0.2
F22a	288134.5809	6217799.812	House	575	2.0	0.02	< 0.01	75.2	17.0	6.7	1.1
F22b	288158.044	6217795.036	House	600	2.0	0.02	< 0.01	78.3	15.2	5.7	0.8
F23a	288357.971	6217771.069	House	925	5.0	0.02	0.06	50.7	30.0	14.9	4.3
F31a	287787.107	6217792.398	House	525	3.0	0.01	0.06	50.2	30.3	15.0	4.5
F43a	288016.8124	6217833.019	House	500	3.5	0.04	< 0.01	59.7	25.6	11.8	2.8
F52h01	287829.7275	6218391.427	House	50	< 0.5	< 0.01	< 0.01	93.1	5.7	1.0	0.2
F52h02	287888.5539	6218372.41	House	60	< 0.5	< 0.01	< 0.01	93.0	5.8	1.1	0.2
K01a	288147.8028	6218210.425	House	300	3.5	0.06	< 0.01	50.2	30.3	15.0	4.5
K02a	288023.0574	6218183.04	House	200	2.0	0.04	< 0.01	57.8	26.6	12.4	3.1
K03a	287915.017	6218124.619	House	170	1.5	0.03	< 0.01	62.8	24.1	10.8	2.3
K04a	288018.1407	6218052.561	House	700	7.0	0.07	0.04	48.2	31.6	15.1	5.2
K04h01	288062.9865	6218076.964	House	725	7.0	0.07	0.04	48.2	31.6	15.1	5.2
K05a	287876.5542	6217971.18	House	500	4.0	0.02	0.04	56.5	27.3	12.9	3.4
S01h01	287848.3168	6218089.536	House	150	1.5	0.03	< 0.01	65.5	22.7	9.9	1.8
S02h01	287733.4539	6218066.912	House	110	1.0	0.02	< 0.01	75.4	16.9	6.7	1.0
S03h01	287611.5826	6218032.575	House	100	0.5	0.01	< 0.01	84.4	11.6	3.7	0.4
S04h01	287688.2142	6218264.617	House	50	< 0.5	< 0.01	< 0.01	94.0	5.1	0.8	0.1
S05h01	287547.0858	6218230.097	House	50	< 0.5	< 0.01	< 0.01	93.8	5.2	0.8	0.1
S05h02	287522.2513	6218235.759	House	50	< 0.5	< 0.01	< 0.01	93.8	5.2	0.8	0.1
S09a	287313.3326	6218064.823	House	80	0.5	< 0.01	< 0.01	93.0	5.8	1.1	0.2
S14h01	287636.8743	6217927.681	House	275	3.5	0.04	< 0.01	56.6	27.2	12.9	3.4

Maximum 925 7.0 0.07 0.06

Table B.02 - Predicted subsidence effects for the houses based on the Modified Layout

Structure Reference	Centroid MGA Easting	Centroid MGA Northing	Structure Type	Predicted total subsidence after LW711A (mm)	Predicted total subsidence after LW711B (mm)	Predicted total tilt after LW711A (mm/m)	Predicted total tilt after LW711B (mm/m)	Predicted total hogging curvature after LW711A (1/km)	Predicted total hogging curvature after LW711B (1/km)	Predicted total sagging curvature after LW711A (1/km)	Predicted total sagging curvature after LW711B (1/km)	Predicted Probability of Nil or Category R0 Impact for Houses (%)	Predicted Probability of Category R1 or R2 Impact for Houses (%)	Predicted Probability of Category R3 and R4 Impact for Houses (%)	Predicted Probability of Category R5 Impact for Houses (%)
F18h01	287951.6292	6217265.562	House	40	40	< 0.5	< 0.5	< 0.01	< 0.01	< 0.01	< 0.01	89.3	8.3	2.2	0.2
F19h01	287893.6514	6217467.287	House	120	130	1	1.0	0.01	0.01	0.01	0.01	80.7	13.8	4.9	0.6
F20h01	287760.9016	6217693.084	House	60	70	< 0.5	< 0.5	< 0.01	< 0.01	< 0.01	< 0.01	90.3	7.6	1.9	0.2
F21a	288154.4709	6217721.205	House	70	400	0.5	2.5	< 0.01	0.02	< 0.01	< 0.01	77.1	15.9	6.1	0.9
F21f	287977.0204	6217609.447	House	50	80	< 0.5	< 0.5	< 0.01	< 0.01	< 0.01	< 0.01	90.3	7.6	1.9	0.2
F22a	288134.5809	6217799.812	House	30	450	< 0.5	2.5	< 0.01	< 0.01	< 0.01	0.01	81.2	13.5	4.7	0.6
F22b	288158.044	6217795.036	House	40	475	0.5	2.5	< 0.01	< 0.01	< 0.01	0.01	81.2	13.5	4.8	0.6
F23a	288357.971	6217771.069	House	475	900	4.5	3.5	0.02	0.02	0.05	0.06	50.9	30.0	14.9	4.3
F31a	287787.107	6217792.398	House	40	70	< 0.5	< 0.5	< 0.01	< 0.01	< 0.01	< 0.01	90.0	7.8	2.0	0.2
F43a	288016.8124	6217833.019	House	< 20	275	< 0.5	3.0	< 0.01	0.03	< 0.01	< 0.01	68.6	20.9	8.9	1.6
F52h01	287829.7275	6218391.427	House	< 20	20	< 0.5	< 0.5	< 0.01	< 0.01	< 0.01	< 0.01	93.8	5.2	0.8	0.1
F52h02	287888.5539	6218372.41	House	< 20	40	< 0.5	< 0.5	< 0.01	< 0.01	< 0.01	< 0.01	93.6	5.4	0.9	0.1
K01a	288147.8028	6218210.425	House	< 20	275	< 0.5	3.5	< 0.01	0.06	< 0.01	< 0.01	50.5	30.1	15.0	4.4
K02a	288023.0574	6218183.04	House	< 20	170	< 0.5	1.5	< 0.01	0.04	< 0.01	< 0.01	62.2	24.4	11.0	2.4
K03a	287915.017	6218124.619	House	< 20	90	< 0.5	1.0	< 0.01	0.02	< 0.01	< 0.01	78.0	15.3	5.8	0.8
K04a	288018.1407	6218052.561	House	< 20	475	< 0.5	5.0	< 0.01	0.04	< 0.01	0.03	61.5	24.8	11.3	2.5
K04h01	288062.9865	6218076.964	House	< 20	600	< 0.5	5.5	< 0.01	0.05	< 0.01	0.03	55.8	27.6	13.1	3.5
K05a	287876.5542	6217971.18	House	< 20	130	< 0.5	1.5	< 0.01	0.02	< 0.01	< 0.01	78.8	14.9	5.5	0.8
S01h01	287848.3168	6218089.536	House	< 20	50	< 0.5	0.5	< 0.01	< 0.01	< 0.01	< 0.01	85.6	10.7	3.3	0.3
S02h01	287733.4539	6218066.912	House	< 20	20	< 0.5	< 0.5	< 0.01	< 0.01	< 0.01	< 0.01	92.1	6.4	1.3	0.2
S03h01	287611.5826	6218032.575	House	< 20	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 0.01	< 0.01	93.8	5.2	0.8	0.1
S04h01	287688.2142	6218264.617	House	< 20	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 0.01	< 0.01	94.2	5.0	0.7	0.1
S05h01	287547.0858	6218230.097	House	< 20	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 0.01	< 0.01	94.8	4.6	0.5	0.1
S05h02	287522.2513	6218235.759	House	< 20	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 0.01	< 0.01	94.7	4.6	0.5	0.1
S09a	287313.3326	6218064.823	House	40	40	< 0.5	< 0.5	< 0.01	< 0.01	< 0.01	< 0.01	92.9	5.8	1.1	0.2
S14h01	287636.8743	6217927.681	House	30	40	< 0.5	< 0.5	< 0.01	< 0.01	< 0.01	< 0.01	91.5	6.8	1.5	0.2
Maximum				475	900	4.5	5.5	0.02	0.06	0.05	0.06				

APPENDIX C. DRAWINGS



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



GM3
APPIN COLLIERY
MODIFIED LW711
GENERAL LAYOUT OF LW711A & LW711B

DATE: 28 Aug 2025	SCALE: as shown	DRAWING No: MSEC1526-01	Rev No: A
----------------------	--------------------	----------------------------	--------------

6219000

LEGEND

- MODIFIED LAYOUT
- PREVIOUS LAYOUT

Study Area based on 600m Boundary

Study Area based on 35° Angle of Draw

395m

6218000

6217000

TOP RIDGE RD

LW 711A

LW 710A

LW 905

LW 904

CUMMINS RD

BURRELLS RD

QUIRKES LANE

HAWKEY ROAD

LW 711B

LW 708A

LW 709

LW 710B

LW 707A

LW 706

LW 705

LW 704

LW 708B

LW 707B

MENANGLE ROAD

MENANGLE ROAD

FINNS ROAD

MENANGLE ROAD

CARROLLS ROAD

Navigation Ck

Navigation Ck

Foot Orlow Ck

288000

289000

290000



GDA2020



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

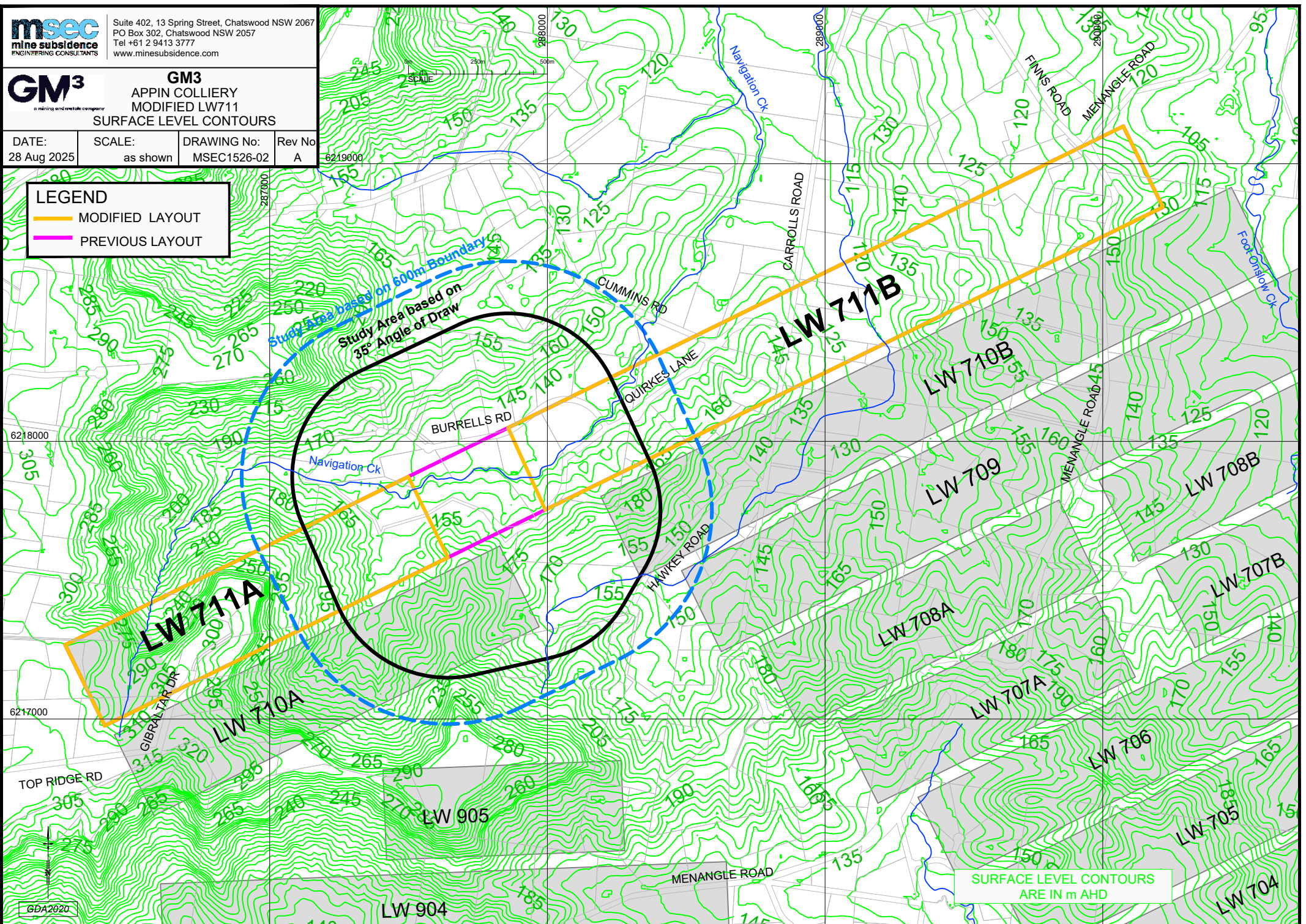


GM3
APPIN COLLIERY
MODIFIED LW711
SURFACE LEVEL CONTOURS

DATE: 28 Aug 2025	SCALE: as shown	DRAWING No: MSEC1526-02	Rev No: A
----------------------	--------------------	----------------------------	--------------

LEGEND

- MODIFIED LAYOUT
- PREVIOUS LAYOUT



SURFACE LEVEL CONTOURS
ARE IN m AHD

GDA2020

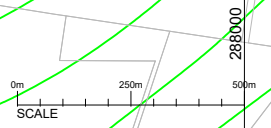


Suite 402, 13 Spring Street, Chatswood NSW 2067
PO Box 302, Chatswood NSW 2057
Tel +61 2 9413 3777
www.minesubsidence.com



GM3
APPIN COLLIERY
MODIFIED LW711
BULLI SEAM FLOOR CONTOURS

DATE: 28 Aug 2025	SCALE: as shown	DRAWING No: MSEC1526-03	Rev No: A
----------------------	--------------------	----------------------------	--------------

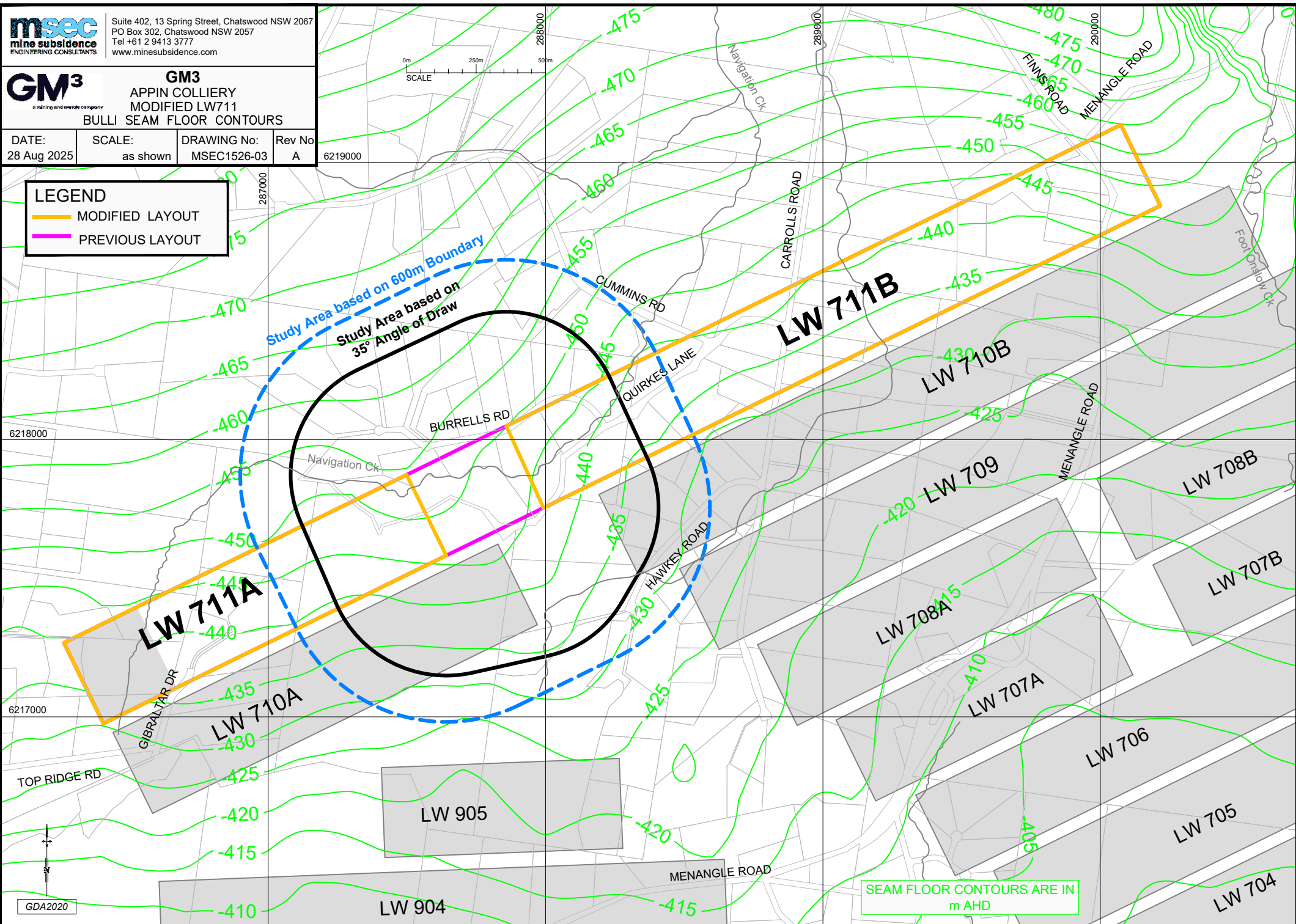


LEGEND

- MODIFIED LAYOUT
- PREVIOUS LAYOUT

Study Area based on 600m Boundary

Study Area based on 35° Angle of Draw



SEAM FLOOR CONTOURS ARE IN
m AHD



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



GM3
APPIN COLLIERY
MODIFIED LW711
BULLI SEAM THICKNESS CONTOURS

DATE: 28 Aug 2025	SCALE: as shown	DRAWING No: MSEC1526-04	Rev No: A
----------------------	--------------------	----------------------------	--------------

6219000

LEGEND

- MODIFIED LAYOUT
- PREVIOUS LAYOUT

Study Area based on 600m Boundary
Study Area based on 35° Angle of Draw

6218000

6217000

TOP RIDGE RD



GDA2020

LW 905

LW 904

LW 711A

LW 710A

LW 711B

LW 709

LW 708A

LW 707A

LW 706

LW 705

LW 704

LW 708B

LW 707B

BURRELLS RD

CUMMINS RD

QUIRKES LANE

HAWKEY ROAD

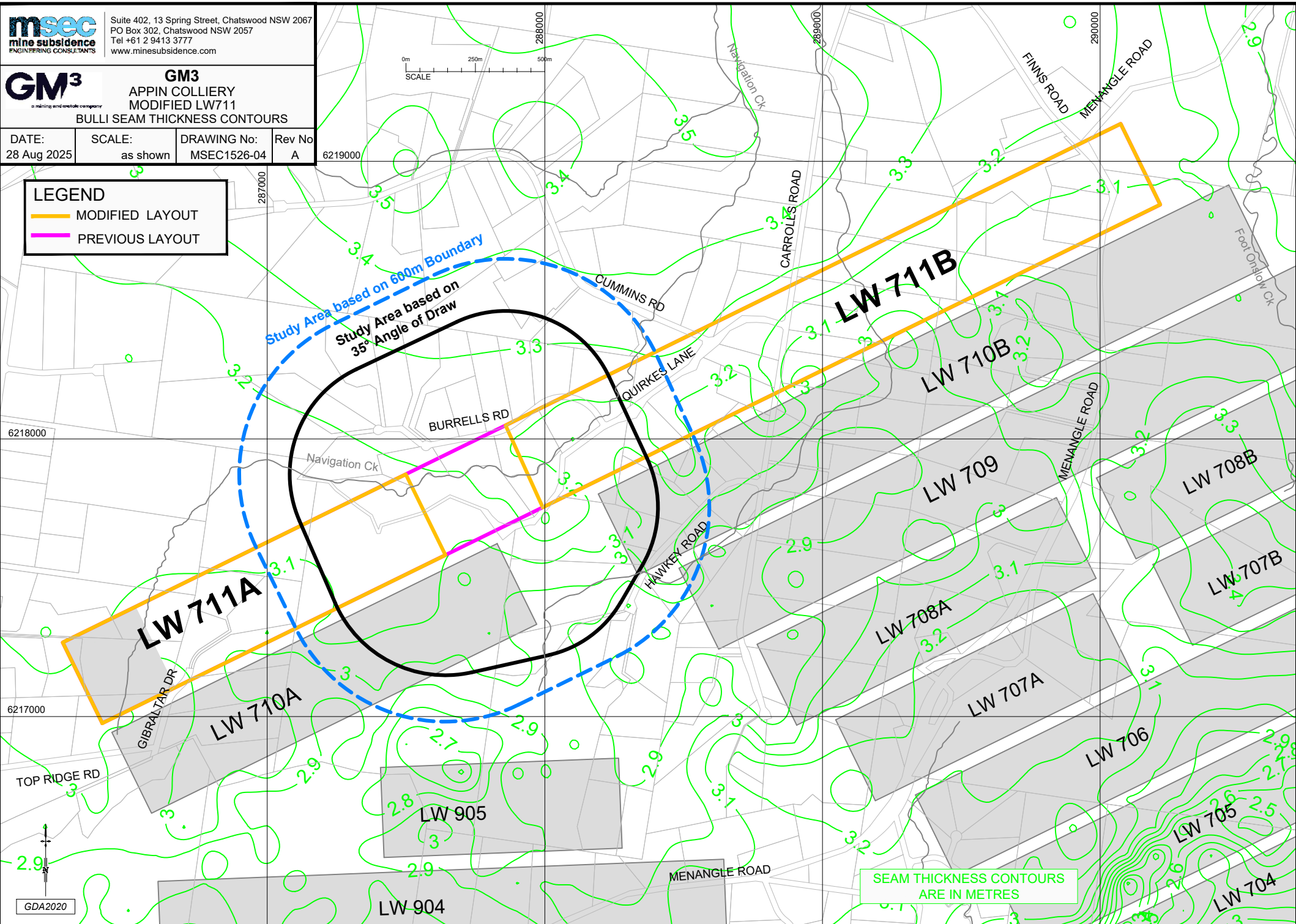
MENANGLE ROAD

CARROLLES ROAD

FINNS ROAD

MENANGLE ROAD

SEAM THICKNESS CONTOURS
ARE IN METRES







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



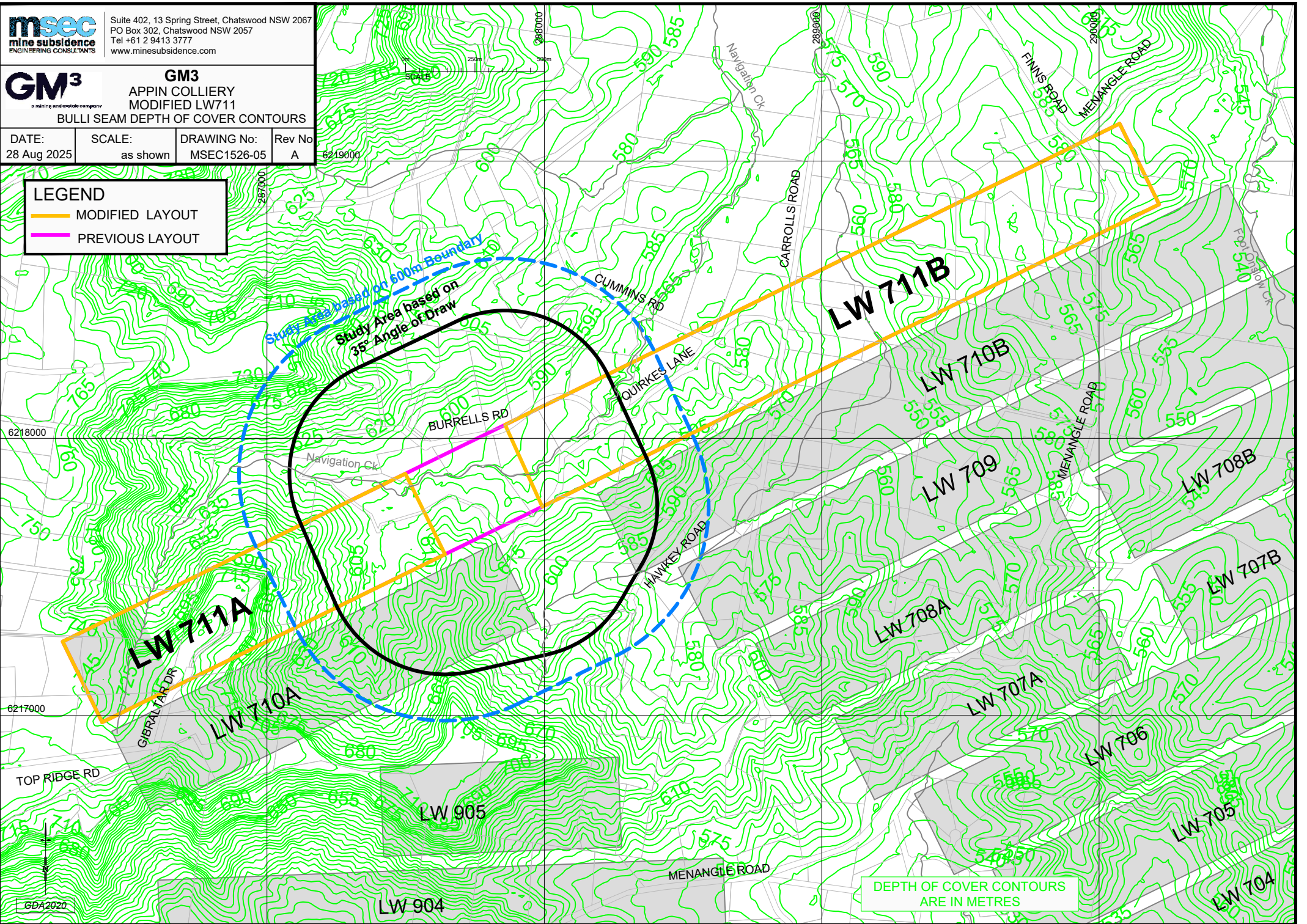
GM3
APPIN COLLIERY
MODIFIED LW711
BULLI SEAM DEPTH OF COVER CONTOURS

DATE: 28 Aug 2025	SCALE: as shown	DRAWING No: MSEC1526-05	Rev No: A
----------------------	--------------------	----------------------------	--------------

LEGEND

-  MODIFIED LAYOUT
-  PREVIOUS LAYOUT

Study Area based on 500m Boundary
Study Area based on 35° Angle of Draw



DEPTH OF COVER CONTOURS ARE IN METRES

GDA2020

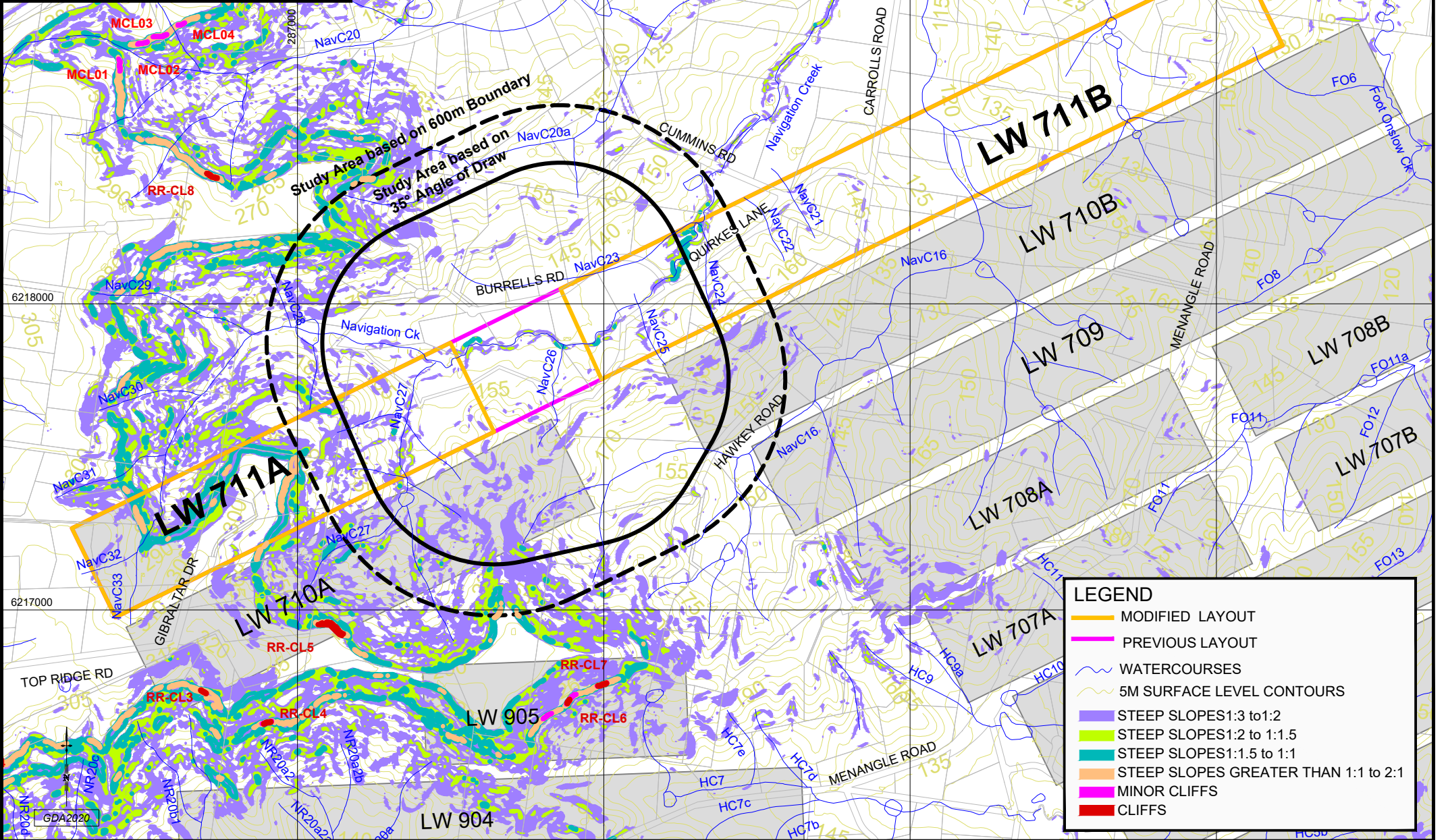
msec
mine subsidence
ENGINEERING CONSULTANTS

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

GM³
a mining and resource company

GM3
APPIN COLLIERY
MODIFIED LW711
NATURAL FEATURES

DATE: 28 Aug 2025	SCALE: as shown	DRAWING No: MSEC1526-06	Rev No: A
----------------------	--------------------	----------------------------	--------------



LEGEND

- MODIFIED LAYOUT
- PREVIOUS LAYOUT
- ~ WATERCOURSES
- ~ 5M SURFACE LEVEL CONTOURS
- █ STEEP SLOPES 1:3 to 1:2
- █ STEEP SLOPES 1:2 to 1:1.5
- █ STEEP SLOPES 1:1.5 to 1:1
- █ STEEP SLOPES GREATER THAN 1:1 to 2:1
- █ MINOR CLIFFS
- █ CLIFFS



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



GM3
APPIN COLLIERY
MODIFIED LW711
BUILT FEATURES

DATE: 28 Aug 2025	SCALE: as shown	DRAWING No: MSEC1526-07	Rev No: A
----------------------	--------------------	----------------------------	--------------

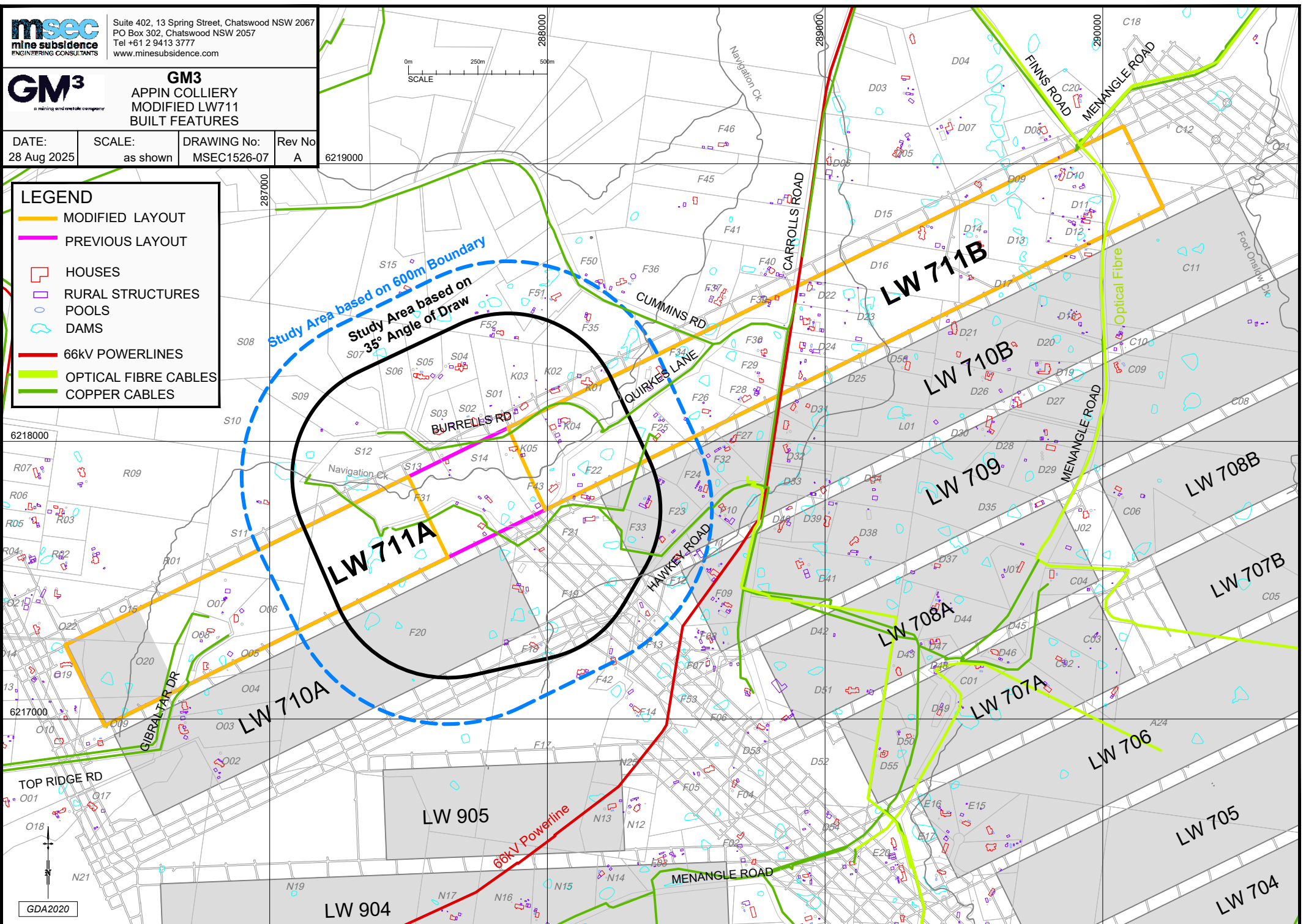


LEGEND

- MODIFIED LAYOUT
- PREVIOUS LAYOUT
- HOUSES
- RURAL STRUCTURES
- POOLS
- DAMS
- 66kV POWERLINES
- OPTICAL FIBRE CABLES
- COPPER CABLES

Study Area based on 600m Boundary

Study Area based on 35° Angle of Draw



GDA2020



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

GM³

GM3

APPIN COLLIERY MODIFIED LW711 PREDICTED ADDITIONAL SUBSIDIENCE CONTOURS DUE TO LW711A AND LW711B

DATE: 28 Aug 2025	SCALE: as shown	DRAWING No: MSEC1526-08	Rev No: A
----------------------	--------------------	----------------------------	--------------



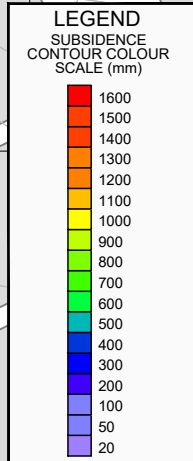
LEGEND

— MODIFIED LAYOUT

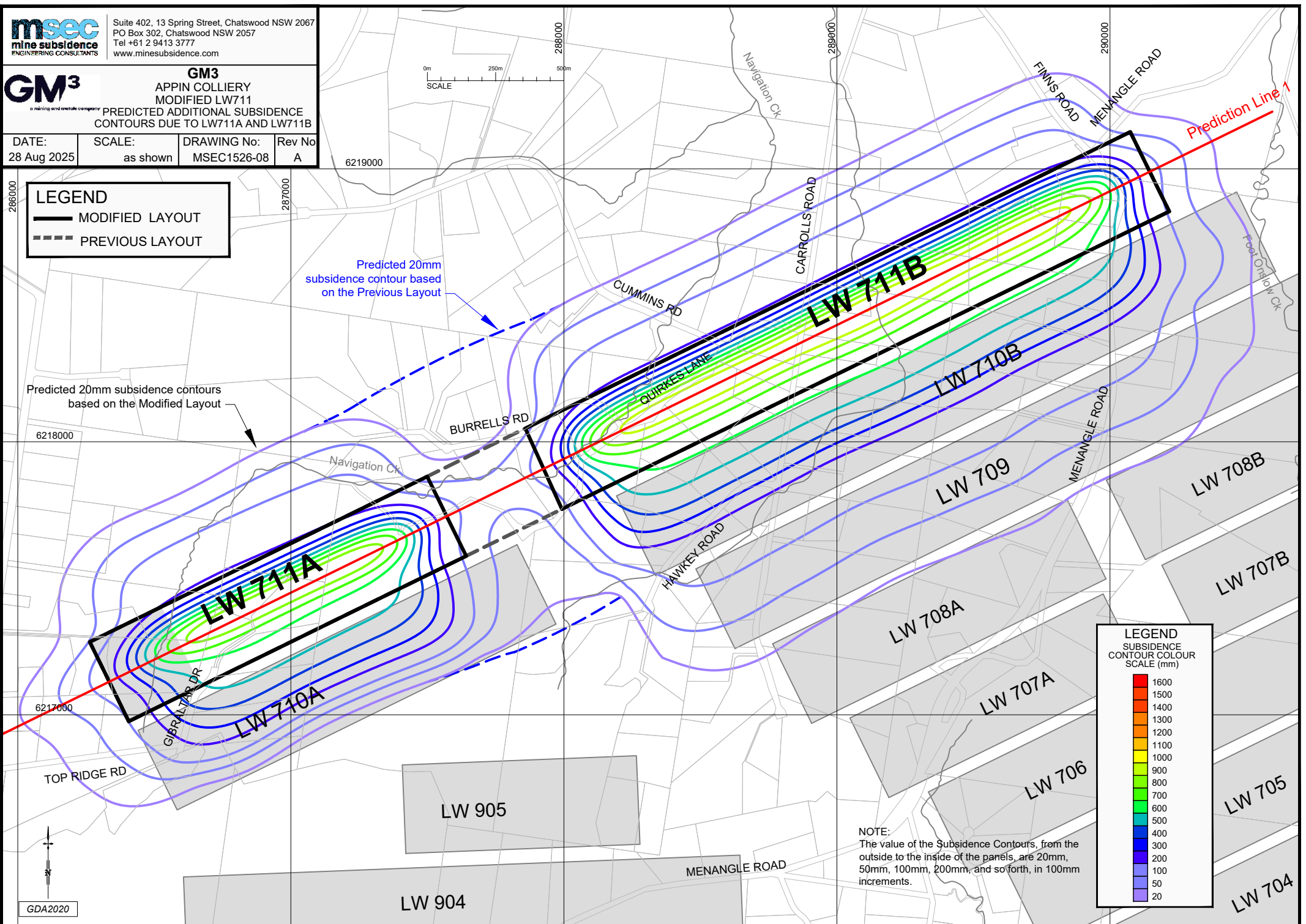
- - - PREVIOUS LAYOUT

Predicted 20mm
subsidence contour based on
the Previous Layout

Predicted 20mm subsidence contours
based on the Modified Layout



NOTE:
The value of the Subsidence Contours, from the outside to the inside of the panels, are 20mm, 50mm, 100mm, 200mm, and so forth, in 100mm increments.



GDA2020

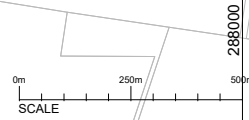


Suite 402, 13 Spring Street, Chatswood NSW 2067
PO Box 302, Chatswood NSW 2057
Tel +61 2 9413 3777
www.minesubsidence.com



GM3
APPIN COLLIERY
MODIFIED LW711
PREDICTED TOTAL SUBSIDIENCE
CONTOURS AFTER LW711B

DATE: 28 Aug 2025 SCALE: as shown DRAWING No: MSEC1526-09 Rev No: A

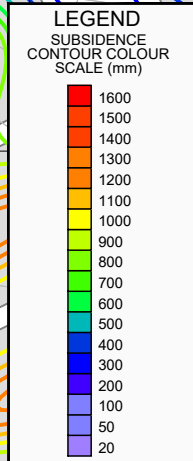


LEGEND

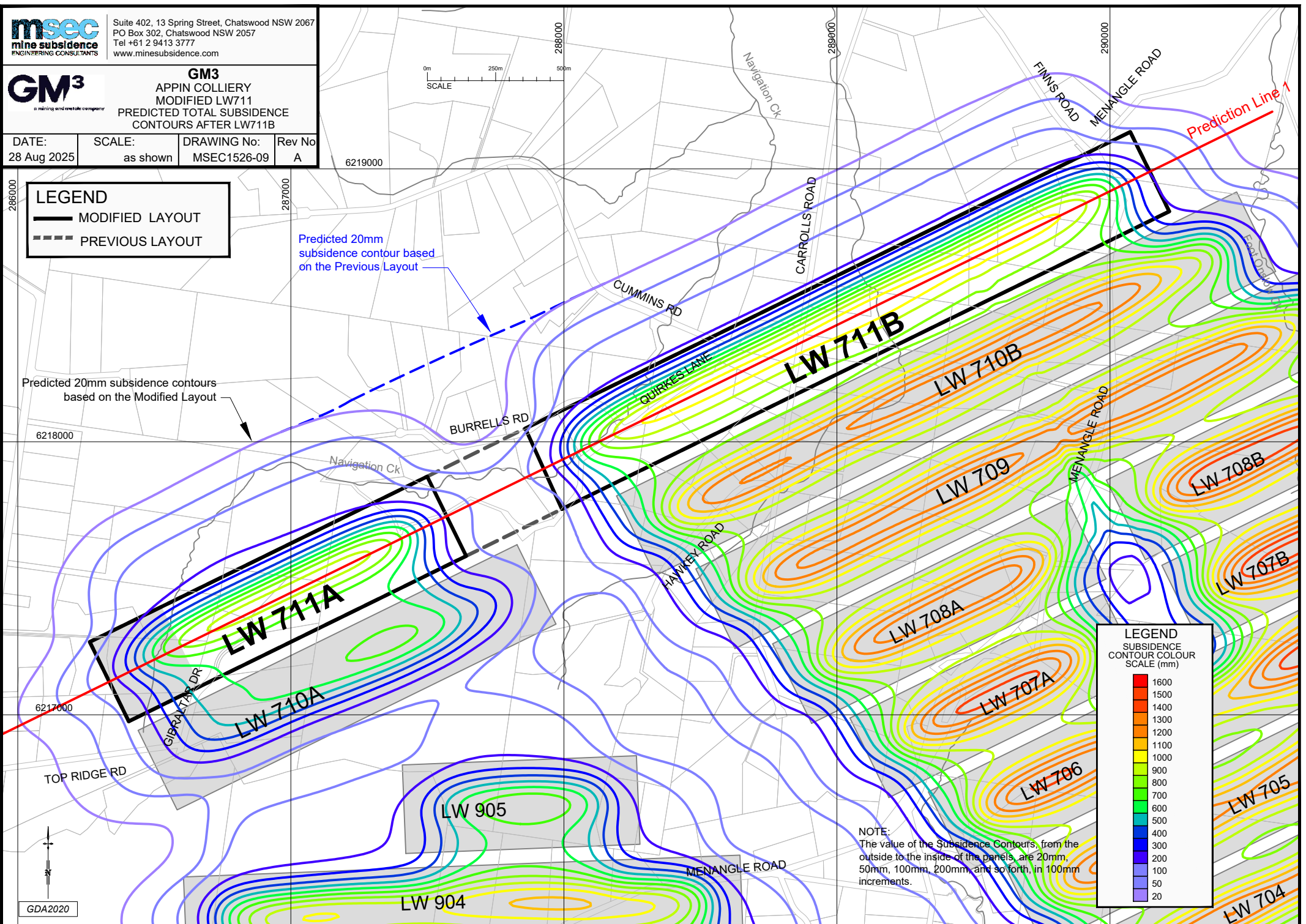
- MODIFIED LAYOUT
- PREVIOUS LAYOUT

Predicted 20mm subsidence contour based on the Previous Layout

Predicted 20mm subsidence contours based on the Modified Layout



NOTE:
The value of the Subsidence Contours, from the outside to the inside of the panels, are 20mm, 50mm, 100mm, 200mm, and so forth, in 100mm increments.



GDA2020