

21 June 2022



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Melanie Dillon
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INT5319-9

Dear Melanie

INTEGRA UNDERGROUND: LONGWALL 17 AND 18 BI-MONTHLY SUBSIDENCE REPORT FOR APRIL AND MAY 2022

HV Coking Coal Pty Ltd (HVCC) have recently completed the mining of Longwall 17 and commenced mining of Longwall 18 in the Middle Liddell (ML) Seam at the Integra Underground (IUG) Mine near Camberwell, 12km northwest of Singleton in the Hunter Valley of NSW. The approved Extraction Plan (EP) for Longwalls 17-20 requires IUG to monitor and report subsidence impacts on a bi-monthly, six-monthly and annual basis. HVCC commissioned SCT Operations Pty Ltd (SCT) to review and analyse the subsidence monitoring conducted and prepare reports suitable for submission to the Department of Planning, Industry and Environment (DPIE) and the Resources Regulator, if required. This report presents the results of our review and analysis of subsidence monitoring for the mining in Longwall 17 and 18 during April and May 2022.

Our review indicates:

- No significant subsidence impacts to natural or built features have been observed.
- Subsidence effects and impacts have been generally consistent with those forecast for the management of the Mt Owen Railway Line/Bettys Creek bridges and associated infrastructure. No significant impacts have been recorded. Monitoring and management activities have been overseen by the Technical Committee to maintain this infrastructure in a safe and serviceable condition.

Minor subsidence impacts from the mining of Longwall 17 and previous longwall panels are consistent with or less than expectations presented in SCT Report INT5106 – “Integra Underground Mine: Subsidence Assessment for LW17-20 Extraction Plan” (SCT 2021). No impacts have been observed from the mining in Longwall 18 to date.

Our review considers the available monitoring data and observations for the April and May 2022 reporting period including:

- Weekly inspections for subsidence impacts from Longwalls 17 and 18, conducted by IUG personnel during the two-month period in accordance with the IUG Subsidence Monitoring Program for these longwall panels.

- Ongoing Technical Committee communications and a subsidence monitoring report by Mine Subsidence Engineering Consultants Pty Ltd (MSEC) for the monitoring and management of subsidence impacts to the Mt Owen Railway Line, Bettys Creek bridges and associated infrastructure.
- A site inspection of the surface features above and in the vicinity of Longwall 17 undertaken by SCT on 4 May 2022.

On this basis, the observed subsidence effects and impacts are considered compliant with the performance indicators and subsidence performance measures for the EP required under modified IUG Project Approval (PA08_0101). However, it should be recognised that assessment of compliance requires input from other specialists.

1. BACKGROUND AND SITE DESCRIPTION

Consent for the recent mining of Longwalls 17 and 18 in the ML Seam at IUG is provided by Modification 8 (MOD8) to Project Approval (PA) 08_0101 for the Integra Underground Project. The EP for Longwalls 17-20, with supporting subsidence management plans for natural and built features, required by PA08_0101 was approved on 1 March 2021.

Figure 1 shows the longwall mining areas, superimposed onto an aerial image of the surface from January 2021. This figure is a copy of Figure 1 from SCT (2021) amended to show the completed mining in Longwalls 15 and 16 with the mining in Longwalls 17 and 18, during the bi-monthly reporting periods, up to the end of May 2022. The image of the surface has also been updated since SCT (2021).

Longwall 17 started mining on 11 May 2021 at approximate CH1677m and completed mining on 14 April 2022 at CH0m. Longwall 18 started mining on 16 May 2022 at approximate CH1634m and had retreated to CH1547m by the end of May 2022.

During the April and May 2022 reporting period, Longwall 17 mined a distance of 8m from CH8m to the finish line at CH0m and Longwall 18 mined a distance of 87m from CH1634m to CH1547m. The total longwall retreat for the period was 95m.

At the end of mining in Longwall 17, the void length including the 9m installation roadway width, was approximately 1686m. At the end of May 2022, the total void length for Longwall 18, including the 9m installation roadway width, was approximately 96m. Void widths for Longwall 17 and Longwall 18 are the same, at nominally 257m.

Maximum total overburden depth for the 8m section of Longwall 17 mined during April 2022 is approximately 430m below the Glendell Haul Road. This depth below the haul road includes about 5m of foundation material above the natural surface level. The depth includes up to approximately 10m of waste rock fill material emplaced in Mt Owen Stage 5 Tailings Dam (also known as TP2). The minimum depth for this 8m section of Longwall 17 is at the edge the Ravensworth East – West Pit excavation. The minimum rockhead here is approximately 310m with approximately 40m of tailings emplaced above this at this location.

Maximum total overburden depth for the 87m section of Longwall 18 mined during May 2022 is approximately 580m, below the peak of the West Dump emplacement area. This 580m includes up to 65m of waste rock fill material emplaced on top of the natural ground level at this location.

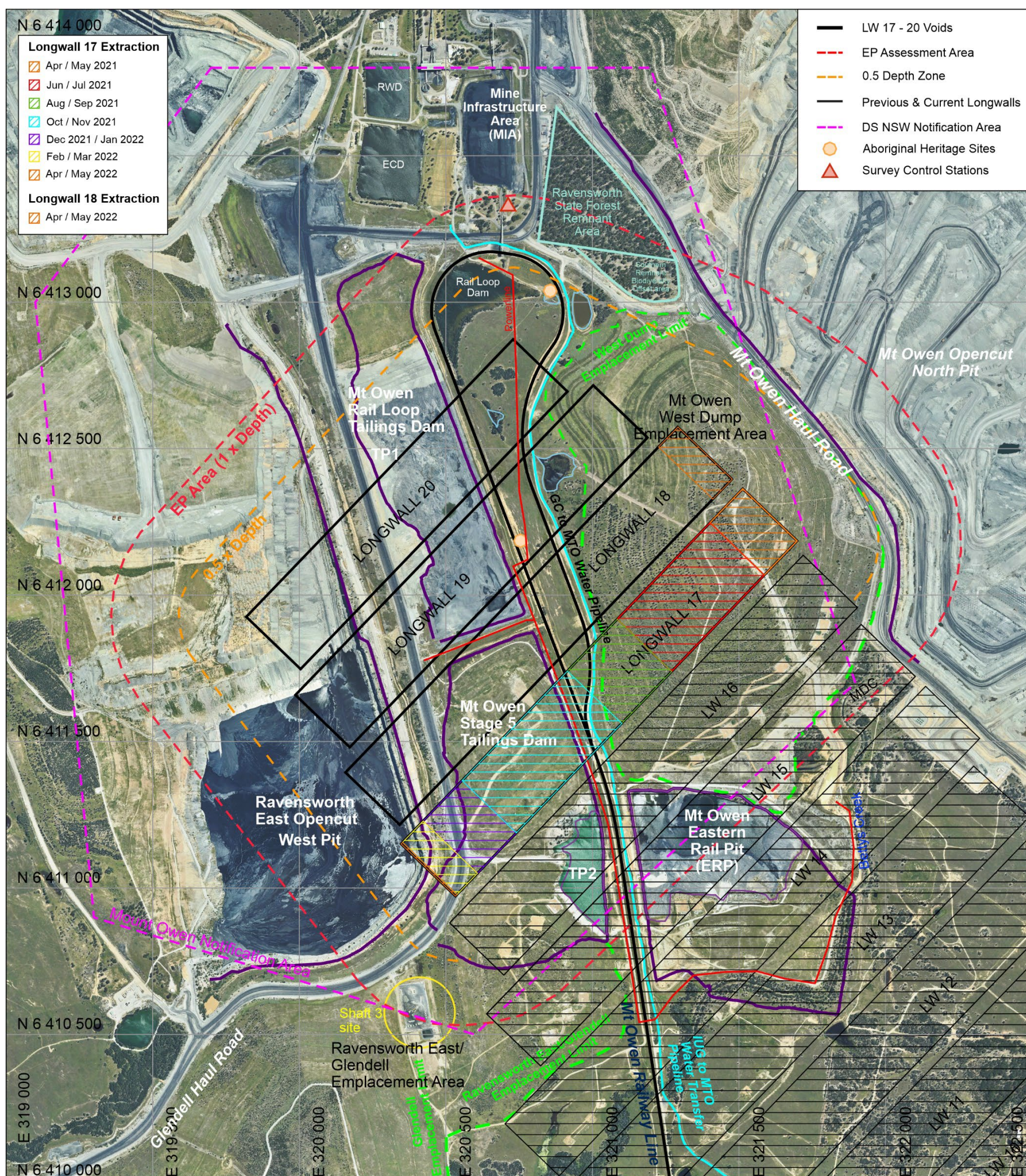


Figure 1: Site plan showing Longwalls 17-20 voids, the EP Area, major surface features and bi-monthly mining areas.

The surface above and in the vicinity of Longwalls 17 and 18 comprises areas modified by surface mining activities and items of mining related infrastructure for the Mt Owen Glendell Operations (MGO) mines; Mt Owen, Ravensworth East and Glendell. Natural features are limited to small sections of natural ground along the Mt Owen Railway Line corridor.

The main surface features above Longwalls 17 and 18 include sections of the West Dump emplacement area, Mt Owen Railway Line loop, Mt Owen Stage 5 Tailings Dam (also known as Ravensworth East Tailings Pit or TP2), the open void of Mt Owen Rail Loop Tailings Dam (also known as TP1), the Glendell Haul Road and the exposed highwall and open void of Ravensworth East - West Pit.

Mining related infrastructure includes the maintenance road and communications cables associated with the railway line. Water supply and transfer pipelines, an 11kV overhead powerline, gas drainage boreholes and related equipment associated with IUG, and access roads/four-wheel drive tracks are also located above or cross the surface above Longwalls 17 and 18. A small section of haul road for the Mt Owen – North Pit is adjacent to the start lines of Longwalls 17 and 18 in the northeast.

The Eastern Rail Pit (ERP) and the open void of TP2 are located to the southeast of Longwall 17 above Longwalls 13-16.

Natural and built features above the area mined by Longwalls 17 and 18 during April and May 2022 are limited to:

For Longwall 17:

- A section of TP2, backfilled with waste rock material (but not tailings).
- A section of the Glendell Haul Road.
- A section of the perimeter and exposed highwall of the Ravensworth East – West Pit.

For Longwall 18:

- A section of the West Dump.
- Gas drainage installations.
- Access roads/four-wheel drive tracks.

2. MONITORING AND REVIEW

The Subsidence Monitoring Program for the Longwalls 17-20 EP require weekly visual inspections for subsidence impacts to the various surface features above and in the vicinity of these panels. IUG personnel reported no significant subsidence impacts from the mining in Longwalls 17 and 18 in the weekly inspections during April and May 2022.

No significant subsidence impacts from longwall mining have been reported to:

- TP2.
- Glendell Haul Road.
- Ravensworth East – West Pit.
- West Dump.
- Gas drainage installations with associated equipment and access roads/four-wheel drive tracks.

No significant changes to previous impacts were reported during April and May 2022.

Management of subsidence impacts to the Mt Owen Railway Line, Bettys Creek bridges and associated infrastructure has continued during the reporting period consistent with the IUG Built Features Management Plan for Longwalls 17 to 20. Inspections, monitoring and meetings of the Technical Committee continued as required by the asset management plan for this infrastructure. No significant additional subsidence effects and impacts have been recorded. The final ground survey for Longwall 17 and baseline survey for Longwall 18 are yet to be reported.

Results from the ground survey conducted on 29 March 2022, reported by MSEC on 7 April and included in the previous bi-monthly subsidence report for February–March 2022, indicate maximum incremental vertical subsidence from Longwall 17 of 771mm and additional vertical subsidence at the Bettys Creek bridges of 18mm.

Subsidence behaviour has been regular, and the effects and impacts have been generally consistent with the low-levels predicted within the built features management plan for this infrastructure. The predictions of subsidence effects in the asset management plan are less than those forecast in SCT (2021) more generally for all features over the broader EP Area for Longwalls 17-20 and much less than the values recommended as performance indicators for subsidence effects.

A summary of this MSEC report for monitoring of subsidence effects and impacts to the Mt Owen Railway Line and associated infrastructure from the mining of Longwall 17 is attached in Appendix 1.

To assist with formal reporting requirements, a summary of the monitoring for this reporting period has been prepared. The summary uses a pro-forma checklist for all features assessed for subsidence impacts in the preparation of the EP for Longwalls 17-20 with comparisons to forecasts in SCT (2021). This data is arranged generally in the order of impact assessment in SCT (2021) and not the direction of mining and is recorded as a reference for reporting or auditing purposes. The checklist is provided in Table 1.

Observations of subsidence effects or impacts and management measures in Table 1 cover the area above the active panel, as well as the previous panel. Where features are currently outside the subsidence zone of the active panel longwall face position (within half overburden depth, for Longwalls 17 and 18 this is 200-300m) they are marked 'n/a' (not applicable).

If you have any queries, or require further clarification of any of these issues, please don't hesitate to contact me directly.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'S. Wilson', with a small blue mark above it.

Stephen Wilson
Mine Planner

3. REFERENCES

SCT 2017 'Integra Underground Mine: Subsidence Assessment for Modification to PA08_0101' SCT Report INT4648 – 22 November 2017.

SCT 2021 'Integra Underground Mine: Subsidence Assessment for LW17-20 Extraction Plan' SCT Report INT5106 – 2 February 2021.

Table 1: Surface Features and Subsidence Impact Monitoring

April – May 2022			
Longwalls 17 and 18 Bi – Monthly Subsidence Monitoring			
Surface feature, subsidence effect or management measure	New effect or impact observed Yes/No	Exceedance of predictions Yes/No	Exceedance within performance measure and/or performance indicator Yes/No
Natural Vegetation	NO	no	n/a
Aboriginal Heritage	n/a	n/a	n/a
MOC-Mine Infrastructure Area	n/a	n/a	n/a
Mt Owen Railway Line	YES	NO	n/a
Bettys Creek Bridges	YES	NO	n/a
Communication Cables	NO	no	n/a
Maintenance Road	NO	no	n/a
Cuttings and Embankments	NO	no	n/a
Surface Drainage	NO	no	n/a
Water Supply Pipeline	NO	no	n/a
Water Transfer Pipeline	NO	no	n/a
Powerlines	NO	no	n/a
Mt Owen – North Pit	NO	no	n/a
Ravensworth East - West Pit	NO	no	n/a
Glendell haul road	NO	no	n/a
TP1	NO	no	n/a
TP2	NO	no	n/a
ERP	NO	no	n/a
Emplacement area (West Dump)	NO	no	n/a
Sediment Control Dams	n/a	n/a	n/a
Gas Drainage Equipment	NO	no	n/a
Shaft 3 and Infrastructure	n/a	n/a	n/a
Access Roads	NO	no	n/a
General:			
Fences/Gates	NO	no	n/a
Access Roads	NO	no	n/a
Farm dams	n/a	n/a	n/a
Forest Road	n/a	n/a	n/a

April – May 2022			
Longwalls 17 and 18 Bi – Monthly Subsidence Monitoring			
Surface feature, subsidence effect or management measure	New effect or impact observed Yes/No	Exceedance of predictions Yes/No	Exceedance within performance measure and/or performance indicator Yes/No

Subsidence Impacts:			
Surface cracks or steps	NO	no	n/a
Surface humps	NO	no	n/a
Slope instability	NO	no	n/a
Surface water (ponding)	NO	no	n/a
Management measures:			
Warning signage			
(Glendell Haul Road)			
Remediation measures:	n/a	n/a	n/a

APPENDIX 1

Glencore: Mt. Owen Complex

Subsidence monitoring review report for the Mt. Owen Railway
due to the extraction of Integra Longwall 17

Monitoring report no.	MSEC1180-R27
Latest survey date	29 March 2022
Longwall chainage	5 m on 4 April 2022
Extracted length since previous report	55 m since 28 February 2022
Closest distance of extraction face from the railway	920 m beyond the railway above the longwall maingate 680 m beyond the railway above the longwall tailgate
Closest distance of the extraction face from the bridges	960 m from bridges at closest point

Measured ground movements for the railway

PH-Line	Current measured value	Predicted final value	Comments
Maximum incremental subsidence (mm)	771	700	Final vertical subsidence anticipated to be approximately 800 mm
Additional subsidence since last survey (mm)	13	-	Rate of subsidence is reducing
Maximum incremental tensile strain (mm/m)	0.8	1.0*	Localised compressive strain has developed between PH16_04 and PH16_05, only minor changes
Maximum incremental comp. strain (mm/m)	1.9	2.0*	
Maximum opening over 100 m long bays (mm)	38	60	Only very small changes in the 100 m long bays during the reporting period
Maximum shortening over 100 m long bays (mm)	74	100	

Note: * denotes maximum predicted conventional strains. The measured strains could exceed these values due to localised irregular ground movements or due to disturbed survey marks. Refer to the main report for further discussions.

Measured ground movements for the bridges

Bridges monitoring points	Current measured value	Monitoring review trigger	Comments
Maximum incremental subsidence (mm)	18	N/A	Low-level subsidence due to LW17
Maximum total subsidence (mm)	819		
Total differential long. horizontal movement between abutments (i.e. extension, mm)	+17	+40 -75	No measurable change due to LW17
Total differential transverse horizontal movement between abutments (i.e. shear, mm)	6	25	No measurable change due to LW17
Total differential vertical movement between abutments (i.e. vertical step, mm)	< 3	25	No measurable change due to LW17
Total differential transverse tilt between abutments (i.e. longitudinal twist, mm/m)	< 1	1	No measurable change due to LW17
Total differential horizontal movement across expansion joint at southern abutment (mm)	+11	+20 -10	No measurable change due to LW17

Inspections, geometry and status for the railway and bridges

Parameter	Status	Comments
Visual inspection and track geometry	N/A	No new visual defects observed
Rail stress monitoring		Rail stresses within the green zone
Rail switch monitoring		Rail switches are within the green zone
Signal line		Minor changes only, total strain less than trigger
Bridges geometry		Bridges are within the design parameters

Triggers, forecasts and actions

Parameter	Comments
Alarms or real-time monitoring system faults	No alarms during the reporting period
Ground monitoring	Rate of development of subsidence is continuing to reduce
Visual inspection and track geometry	Next visual inspection will be carried out on Friday 8 April
Rail stress	Recommended adjustments by mid-April 2022 to lower SFT along both the arrival and departure roads
Bridges geometry	No temporary works recommended this week