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INT5184-2

Dear Chloe

INTEGRA UNDERGROUND: LONGWALL 16 BI-MONTHLY SUBSIDENCE REPORT FOR OCTOBER AND NOVEMBER 2020

HV Coking Coal Pty Ltd (HVCC) are currently mining Longwall 16 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 15 and 16 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 of Longwall 16 during October and November 2020.

Our review indicates:

- No significant subsidence impacts to natural or built features have been observed.
- No significant subsidence effects or impacts to the Mt Owen Railway Line/Bettys Creek bridges and associated infrastructure have been reported. Ground monitoring, inspections and minor maintenance activities have been overseen by the Technical Committee to maintain this infrastructure in a safe and serviceable condition.

Minor subsidence impacts recorded during the mining of Longwall 16 to date are consistent with or less than expectations presented in SCT Report INT4852 – “Integra Underground Mine: Subsidence Assessment for LW15 and LW16 Extraction Plan” (SCT 2018).

Our review considers the available monitoring data and observations for the October and November 2020 reporting period including:

- Weekly inspections for subsidence impacts from Longwall 16 conducted by IUG personnel during the two-month period in accordance with the IUG Subsidence Monitoring Program in the Longwalls 15 and 16 Extraction Plan.
- Ongoing Technical Committee communications and subsidence monitoring reports 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.

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 current mining of Longwall 16 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 15 and 16, with supporting subsidence management plans for natural and built features, required by PA08_0101 was approved in August 2019.

Figure 1 shows the longwall mining areas, superimposed onto a Google Earth image of the surface from August 2018 (the Mt Owen - North Pit has not extended over the extracted longwall panels since this time). This figure is a copy of Figure 4 from SCT (2018) amended to show the completed mining in Longwall 14 and the mining in Longwalls 15 and 16, during the bi-monthly reporting periods, up to the end of November 2020.

Longwall 16 commenced secondary extraction on 9 June 2020 at CH1738m, approximately 120m to the southwest of the start line location approved by MOD8 to PA08_0101 (SCT 2017) and included in SCT (2018).

During the October and November 2020 reporting period, Longwall 16 mined from CH1000m to approximately CH725m, at total of 275m.

At the end of November 2020, the total void length for Longwall 16, including the 9m installation roadway width, was approximately 1022m. The void for Longwall 16 is nominally 257m wide.

The overburden thickness above the face line of Longwall 16 at the end of November 2020 varies from 445m to 475m. The depth to the ML Seam is 475m in areas of natural ground along the Mt Owen Railway Line corridor. The thickness below the base of the section of the Eastern Rail Pit (ERP) above the face line is 445m.

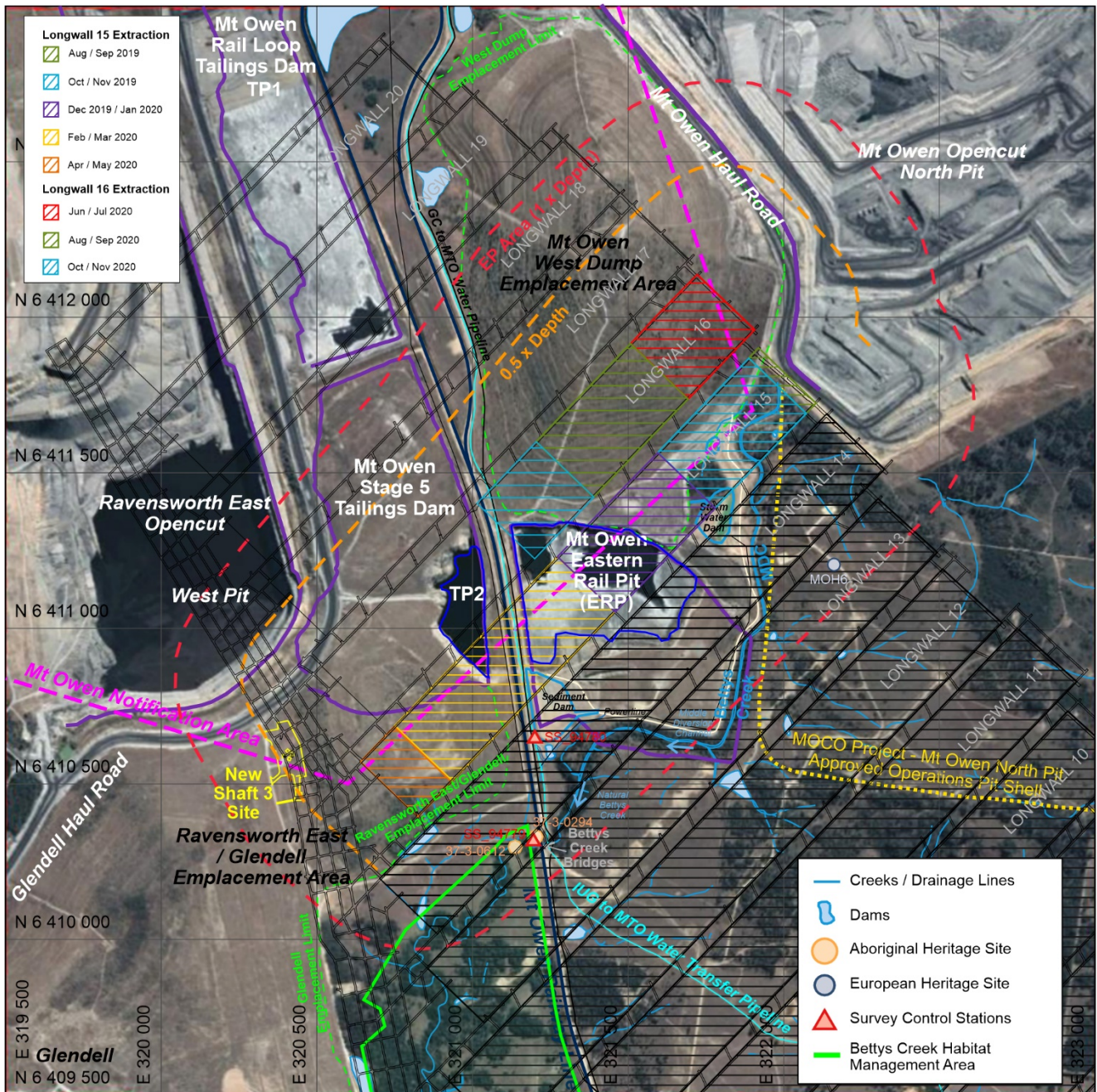


Figure 1: Locations of surface features and Bi-monthly mining areas.

Full subsidence movements above the north eastern section of Longwall 16 and the adjacent Longwall 15-16 chain pillars are expected to be developing by the end of November 2020.

The surface above Longwalls 15 and 16 comprises areas modified by surface mining and items of mining related infrastructure. Natural features are limited to small sections of native and planted vegetation adjacent to the remaining upper reaches of the Bettys Creek middle diversion channel (MDC), small farm dams and the natural ground surface along the Mt Owen Railway Line corridor.

A section of open void and capped portion of the ERP, a section of the Mt Owen Railway Line with associated infrastructure and parts of the open void and filled portion of the Mt Owen Stage 5 Tailing Dam (also known as TP2) are located above Longwalls 15 and 16. Sections of the rehabilitated Mt Owen West Dump and Ravensworth East/Glendell emplacement areas are located above the areas to be mined by Longwalls 15 and 16. Parts of the surface water management system including the eastern storm water dam for the West Dump (Dam4) and ERP sediment dam with associated pumping and power supply equipment are located above Longwall 15. Water supply and transfer pipelines, an 11kV overhead powerline, gas drainage boreholes and related equipment associated with IUG, are also located above, or cross the surface above Longwalls 15 and 16.

Other natural or built features within the EP Assessment Area for Longwalls 15 and 16, but generally above the area mined by Longwall 14, include natural dams (ponds), minor drainage lines, Aboriginal and historical (European) heritage sites, survey control stations, the natural section of Bettys Creek and adjacent floodplain, and an area of natural land set aside as the Bettys Creek Habitat Management Area (BCHMA). The rail and road bridges over Bettys Creek are positioned between Longwalls 13 and 14.

Longwall 16 started mining below the eastern slope of the rehabilitated West Dump approximately 120m short of the approved location. This actual start line position increased the offset distance between the mining of Longwall 16 underground at IUG and the surface operations at Mt Owen – North Pit.

During the October and November 2020 reporting period, Longwall 16 mined below:

- A section of the south eastern slope of the West Dump emplacement area.
- Part of the north western corner of the open void of the ERP.
- A small section of the Mt Owen Railway Line and associated infrastructure.
- Mining related infrastructure including water supply and water transfer pipelines and other surface water management equipment.
- Gas drainage installations and equipment.
- Other minor built features such as access roads and four-wheel drive tracks.

As at the end of November 2020, Longwall 16 was still below the ERP and had approximately 150m to complete mining directly below the Mt Owen Railway Line and other infrastructure within the railway corridor including the 11kV overhead powerline. The open void and filled sections of TP2 and part of the Ravensworth East/Glendell emplacement area are further to the southwest above the area yet to be mined by Longwall 16.

2. MONITORING AND REVIEW

The Subsidence Monitoring Programs for Longwalls 15 and 16 require a minimum of weekly visual inspections for the various surface features above and in the vicinity of these panels. IUG personnel reported no significant subsidence impacts from the mining of Longwall 16 in the weekly inspections during October and November 2020.

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

- the West Dump emplacement area
- the ERP
- the Mt Owen Railway Line and associated infrastructure
- surface infrastructure and built features
- gas drainage installations and associated equipment.

A minor surface crack was reported on 19 October 2020. This feature is within expectations presented in SCT (2018) and does not represent an exceedance of predicted subsidence impacts.

The crack was observed in fill material on the south eastern slope of the West Dump. This crack was located in the centre of the panel, above the longwall face position at the time, in an area where the maximum transient stretching (tensile strain) of the ground would be expected with the passage of the longwall. The fill material in the West Dump is approximately 5-10m thick at this location. The crack is about 2m long and 50mm wide and does not appear to be out of character with the surrounding landform. The crack was monitored for the following six week period with only minor changes, mainly from erosion after heavy rainfall, recorded. Figure 2 shows the crack at the time of the initial observation and on 16 November 2020 after periods of rain.

Areas of erosion, slumping and settlement of areas excavated for gas drainage installations above Longwall 16 recorded in the previous bi-monthly reporting period, remained largely unchanged, from a subsidence impact perspective, during this reporting period. As discussed previously, these changes to the surface are unlikely to be related to subsidence from longwall mining. The areas of slumping have now been remediated.

Ongoing monitoring and 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 asset management plan for this infrastructure.

Summaries from MSEC reports for the mining of Longwall 16 during this reporting period, are included in Appendix 1. Monitoring, inspections, reporting and meetings of the Technical Committee continued during this reporting period with weekly ground surveys and other inspections and maintenance activities undertaken.



a) Surface crack on 19 October 2020.



b) Surface crack on 16 November 2020.

Figure 2: Minor surface crack on West Dump above LW16.

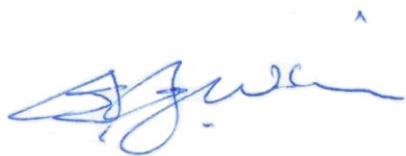
Results from the ground surveys for the Mt Owen Railway Line and Betty Creek bridges conducted on 24 November 2020, indicates subsidence effects for ground movements, rail geometries and rail status to date have been of a low magnitude. Incremental vertical subsidence over Longwall 16 was 40mm and additional vertical subsidence at the bridges was 10mm. There have not been any significant impacts and no trigger action response plan (TARP) triggers have been activated. The Technical Committee has planned maintenance activities to effectively mitigate subsidence impacts and maintain this infrastructure in a safe and serviceable condition to avoid operating restrictions during this reporting period.

To assist with formal reporting requirements, a summary of the monitoring for the reporting period has been prepared. This summary uses a pro-forma checklist for all features assessed for subsidence impacts in the preparation of the EP for Longwalls 15 and 16 and comparison with forecasts in SCT (2018). This data is arranged in the order of impact assessment in SCT (2018) 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 15 and 16 this is 200-250m) 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



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 2018 'Integra Underground Mine: Subsidence Assessment for LW15 and LW16 Extraction Plan' SCT Report INT4852 – 24 December 2018.

Table 1: Surface Features and Subsidence Impact Monitoring

October – November 2020			
Longwall 16 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
Bettys Creek	n/a	n/a	n/a
-natural drainage line tributaries	n/a	n/a	n/a
Bettys Creek (MDC)	NO	no	n/a
Bettys Creek (natural)	n/a	n/a	n/a
Natural Dams (Ponds)	n/a	n/a	n/a
Natural Vegetation	NO	no	n/a
BC Habitat Management Area	n/a	n/a	n/a
Aboriginal Heritage	n/a	n/a	n/a
Historical Heritage	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	n/a	n/a	n/a
Embankments/Cuttings	NO	no	n/a
-causeway ERP-TP2	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	n/a	n/a	n/a
Glendell haul road	n/a	n/a	n/a
ERP (and 500m past)	NO	no	n/a
TP2 (to End of Panel)	NO	no	n/a
Emplacement area (West dump)	YES	NO	n/a
Emplacement area (Ravensworth/Glendell)	n/a	n/a	n/a
Sediment Dam	n/a	n/a	n/a
Storm Water Dam	n/a	n/a	n/a
Gas Drainage equipment	NO	no	n/a
Agricultural land	n/a	n/a	n/a

October – November 2020			
Longwall 16 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
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
Shaft 3 and infrastructure	n/a	n/a	n/a
Subsidence Impacts:			
Surface cracks or steps	YES	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	NO	no	n/a
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 16

Monitoring Report No.	MSEC1127-R01
Latest survey date	27 October 2020
Longwall chainage	884 m on 26 October 2020
Extracted length since previous report	-
Closest distance of extraction face from the railway	145 m from the railway above the longwall maingate 310 m from the railway above the longwall tailgate
Closest distance of the extraction face from the bridges	1040 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)	19	650	Low level subsidence only
Additional subsidence since last survey (mm)	-	-	First survey for LW16
Maximum incremental tensile strain (mm/m)	0.2	1.0*	Low level strains similar to the order of survey tolerance
Maximum incremental comp. strain (mm/m)	0.3	2.0*	
Maximum opening over 100m long bays (mm)	1	60	Low level shortening over long bays, opening less than survey tolerance
Maximum shortening over 100m long bays (mm)	5	90	

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)	< 3	N/A	No measurable vertical subsidence at the bridges
Maximum total subsidence (mm)	772		
Total differential long. horizontal movement between abutments (i.e. extension, mm)	+14	+40 -75	No measurable change since the completion of LW15
Total differential transverse horizontal movement between abutments (i.e. shear, mm)	5	25	No measurable change since the completion of LW15
Total differential vertical movement between abutments (i.e. vertical step, mm)	< 3	25	No measurable change since the completion of LW15
Total differential transverse tilt between abutments (i.e. longitudinal twist, mm/m)	< 1	1	No measurable change since the completion of LW15
Total differential horizontal movement across expansion joint at southern abutment (mm)	+11	+20 -10	Minor changes (± 1 mm or less) similar to the order of survey tolerance

Inspections, geometry and status for the railway and bridges

Parameter	Status	Comments
Visual inspection	N/A	Hump in track near the bridges is increasing and the track profile nearby is deteriorating with a very evident dip, requires tamping as soon as practical
Track geometry survey		Survey not carried out this week
Rail stress monitoring		Rail stresses currently in the green zone
Rail switch monitoring		Rail switches are currently 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	Minor changes only
Visual and track geometry survey	Track requires tamping as soon as practical
Rail stress	No track adjustments recommended this week
Bridges geometry	No temporary works recommended this week

Glencore: Mt. Owen Complex

Subsidence monitoring review report for the Mt. Owen Railway
due to the extraction of Integra Longwall 16

Monitoring Report No.	MSEC1127-R02
Latest survey date	3 November 2020
Longwall chainage	861 m on 2 November 2020
Extracted length since previous report	23 m since 26 October 2020
Closest distance of extraction face from the railway	120 m from the railway above the longwall maingate 285 m from the railway above the longwall tailgate
Closest distance of the extraction face from the bridges	1020 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)	17	650	Low level subsidence only
Additional subsidence since last survey (mm)	< 3	-	Low level additional subsidence
Maximum incremental tensile strain (mm/m)	0.3	1.0*	Low level strains similar to the order of survey tolerance
Maximum incremental comp. strain (mm/m)	0.3	2.0*	
Maximum opening over 100m long bays (mm)	2	60	Low level shortening over long bays, opening less than survey tolerance
Maximum shortening over 100m long bays (mm)	5	90	

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)	< 3	N/A	No measurable change due to LW16
Maximum total subsidence (mm)	772		
Total differential long. horizontal movement between abutments (i.e. extension, mm)	+15	+40 -75	Minor changes (± 1 mm or less) similar to the order of survey tolerance
Total differential transverse horizontal movement between abutments (i.e. shear, mm)	5	25	No measurable change due to LW16
Total differential vertical movement between abutments (i.e. vertical step, mm)	< 3	25	No measurable change due to LW16
Total differential transverse tilt between abutments (i.e. longitudinal twist, mm/m)	< 1	1	No measurable change due to LW16
Total differential horizontal movement across expansion joint at southern abutment (mm)	+11	+20 -10	Minor changes (± 1 mm or less) similar to the order of survey tolerance

Inspections, geometry and status for the railway and bridges

Parameter	Status	Comments
Visual inspection and track geometry	N/A	Track north of the bridge is moving under load. There has been little change since last week but it requires tamping as soon as practical
Rail stress monitoring		Rail stresses currently in the green zone
Rail switch monitoring		Rail switches are currently 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	Minor changes only
Visual inspection and track geometry	Track requires tamping and lifting, planned for 8 December 2020
Rail stress	No track adjustments recommended this week
Bridges geometry	No temporary works recommended this week

Glencore: Mt. Owen Complex

Subsidence monitoring review report for the Mt. Owen Railway
due to the extraction of Integra Longwall 16

Monitoring Report No.	MSEC1127-R03
Latest survey date	10 November 2020
Longwall chainage	825 m on 9 November 2020
Extracted length since previous report	36 m since 2 November 2020
Closest distance of extraction face from the railway	85 m from the railway above the longwall maingate 250 m from the railway above the longwall tailgate
Closest distance of the extraction face from the bridges	1990 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)	27	650	Low level subsidence due to LW16
Additional subsidence since last survey (mm)	10	-	Low level additional subsidence
Maximum incremental tensile strain (mm/m)	0.3	1.0*	Low level strains similar to the order of survey tolerance
Maximum incremental comp. strain (mm/m)	0.3	2.0*	
Maximum opening over 100m long bays (mm)	3	60	Low level shortening over long bays, opening less than survey tolerance
Maximum shortening over 100m long bays (mm)	7	90	

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)	4	N/A	Low level subsidence due to LW16
Maximum total subsidence (mm)	775		
Total differential long. horizontal movement between abutments (i.e. extension, mm)	+14	+40 -75	Minor changes (± 1 mm or less) similar to the order of survey tolerance
Total differential transverse horizontal movement between abutments (i.e. shear, mm)	6	25	Minor change (+1 mm) similar to the order of survey tolerance
Total differential vertical movement between abutments (i.e. vertical step, mm)	< 3	25	No measurable change due to LW16
Total differential transverse tilt between abutments (i.e. longitudinal twist, mm/m)	< 1	1	No measurable change due to LW16
Total differential horizontal movement across expansion joint at southern abutment (mm)	+10	+20 -10	Minor changes (± 1 mm or less) similar to the order of survey tolerance

Inspections, geometry and status for the railway and bridges

Parameter	Status	Comments
Visual inspection and track geometry	N/A	Track north of the bridge is moving under load. There has been little change since last week but it requires tamping as soon as practical
Rail stress monitoring		One false red alarm due to train wheels parked above a sensor (MOC investigated after alarm). Rail stresses currently in the green zone
Rail switch monitoring		Rail switches are currently 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	One false red alarm due to train wheels parked above a sensor
Ground monitoring	Minor changes only
Visual inspection and track geometry	Track requires tamping and lifting, planned for 8 December 2020
Rail stress	No track adjustments recommended this week
Bridges geometry	No temporary works recommended this week

Glencore: Mt. Owen Complex

Subsidence monitoring review report for the Mt. Owen Railway
due to the extraction of Integra Longwall 16

Monitoring Report No.	MSEC1127-R04
Latest survey date	16 November 2020
Longwall chainage	779 m on 16 November 2020
Extracted length since previous report	46 m since 9 November 2020
Closest distance of extraction face from the railway	40 m from the railway above the longwall maingate 205 m from 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)	33	650	Low level subsidence due to LW16
Additional subsidence since last survey (mm)	6	-	Low level additional subsidence
Maximum incremental tensile strain (mm/m)	0.4	1.0*	Low level strains similar to the order of survey tolerance
Maximum incremental comp. strain (mm/m)	0.4	2.0*	
Maximum opening over 100m long bays (mm)	5	60	Changes in long bays continuing to develop
Maximum shortening over 100m long bays (mm)	12	90	

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)	5	N/A	Low level subsidence due to LW16
Maximum total subsidence (mm)	776		
Total differential long. horizontal movement between abutments (i.e. extension, mm)	+15	+40 -75	Minor changes (± 1 mm or less) similar to the order of survey tolerance
Total differential transverse horizontal movement between abutments (i.e. shear, mm)	5	25	Minor change (1 mm) similar to the order of survey tolerance
Total differential vertical movement between abutments (i.e. vertical step, mm)	< 3	25	No measurable change due to LW16
Total differential transverse tilt between abutments (i.e. longitudinal twist, mm/m)	< 1	1	No measurable change due to LW16
Total differential horizontal movement across expansion joint at southern abutment (mm)	+10	+20 -10	Minor changes (± 1 mm or less) similar to the order of survey tolerance

Inspections, geometry and status for the railway and bridges

Parameter	Status	Comments
Visual inspection and track geometry	N/A	Track north of the bridge is moving under load, continuing to visually monitor
Rail stress monitoring		Rail stresses currently in the green zone
Rail switch monitoring		Rail switches are currently 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	Changes in long bays continuing to develop
Visual inspection and track geometry	Track requires tamping and lifting, planned for 8 or 9 December 2020
Rail stress	No track adjustments recommended this week
Bridges geometry	No temporary works recommended this week

Glencore: Mt. Owen Complex

Subsidence monitoring review report for the Mt. Owen Railway
due to the extraction of Integra Longwall 16

Monitoring Report No.	MSEC1127-R05
Latest survey date	24 November 2020
Longwall chainage	752 m on 23 November 2020
Extracted length since previous report	27 m since 16 November 2020
Closest distance of extraction face from the railway	10 m from the railway above the longwall maingate 175 m from the railway above the longwall tailgate
Closest distance of the extraction face from the bridges	940 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)	40	650	Subsidence developing above LW16
Additional subsidence since last survey (mm)	7	-	Low level additional subsidence
Maximum incremental tensile strain (mm/m)	0.2	1.0*	Low level strains similar to the order of survey tolerance
Maximum incremental comp. strain (mm/m)	0.3	2.0*	
Maximum opening over 100m long bays (mm)	5	60	Changes in long bays continuing to develop
Maximum shortening over 100m long bays (mm)	12	90	

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)	10	N/A	Low level subsidence due to LW16
Maximum total subsidence (mm)	781		
Total differential long. horizontal movement between abutments (i.e. extension, mm)	+14	+40 -75	Minor changes (± 1 mm or less) similar to the order of survey tolerance
Total differential transverse horizontal movement between abutments (i.e. shear, mm)	5	25	Minor change (1 mm) similar to the order of survey tolerance
Total differential vertical movement between abutments (i.e. vertical step, mm)	< 3	25	No measurable change due to LW16
Total differential transverse tilt between abutments (i.e. longitudinal twist, mm/m)	< 1	1	No measurable change due to LW16
Total differential horizontal movement across expansion joint at southern abutment (mm)	+10	+20 -10	Minor changes (± 1 mm or less) similar to the order of survey tolerance

Inspections, geometry and status for the railway and bridges

Parameter	Status	Comments
Visual inspection and track geometry	N/A	Track north of the bridge is moving under load, continuing to visually monitor
Rail stress monitoring		Rail stresses currently in the green zone
Rail switch monitoring		Rail switches are currently 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	Changes in long bays continuing to develop
Visual inspection and track geometry	Track requires tamping and lifting, planned for 8 or 9 December 2020
Rail stress	The rail temperature is predicted to go above 60°C on Sunday 26 November 2020 resulting in an exceedance of the Blue compressive stress trigger. Technical Committee to discuss and agree on the appropriate management measures in the teleconference
Bridges geometry	No temporary works recommended this week