

INTEGRA UNDERGROUND

GLENCORE



Public Safety Management Plan Longwalls 17-20

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1. Purpose

The purpose of this plan is to outline the management measures to minimise surface safety risks to the public during mining within the Extraction Plan Area (LW 17-20). This Plan has been prepared to meet the requirements of the Project Approval and Extraction Plan Guidelines. This plan has remained in the same format as the previously approved *Public Safety Management Plan* for LW 13 and 14, as well as LW 15 and 16.

2. Scope

Section 4 of the Extraction Plan Guidelines outlines that the *Public Safety Management Plan* must address all potential safety hazards to the public. The scope of the Plan should include management of health and safety risks due to:

- Potential subsidence impacts on built features;
- Potential instability of cliff formations or steep slopes caused by subsidence;
- Deformations or fracturing of any land caused by subsidence; and
- Any other impacts of subsidence.

3. Planning

3.1 Project Approval

Schedule 3, Condition 20(f) of PA 08_0101 outlines the requirement to prepare a *Public Safety Management Plan* to accompany the Extraction Plan.

Schedule 3, Condition 17 of the Project Approval outlines the key public safety performance measure being 'no additional risk due to mining'.

The land within the Extraction Plan Area is owned by Glencore, with consultation undertaken with Mount Owen Glendell Operations (MGO) for the Extraction Plan for Longwalls 17 to 20.

3.2 Work Health and Safety Regulations

Mining of LW 17-20 will be completed in accordance with the requirements of Work Health and Safety legislation. A separate High Risk Notification is being prepared for LW 17-20 to meet the health and safety requirements. Condition 67 of the *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014* states the following.

- a) So far as is reasonably practicable, the rate, method, layout, schedule and sequence of mining operations do not put the health and safety of any person at risk from subsidence;*
- b) Monitoring of subsidence is conducted, including monitoring of its effects on relevant surface and subsurface features;*
- c) Any investigation of subsidence and any interpretation of subsidence information is carried out only by a competent person;*

- d) All subsidence monitoring data is provided to the regulator in the form and at the times required by the regulator; and
- e) So far as is reasonably practicable, procedures are implemented for the effective consultation, co-operation and co-ordination of action with respect to subsidence between the mine operator and relevant persons conducting any business or undertaking that is, or is likely to be, affected by subsidence.

3.3 Extraction Plan Requirements

Table 3-1 outlines the requirements for the preparation of management plans (Component Plans) which form part of the overall Extraction Plan.

Table 3-1 - Extraction Plan – Component Plan Requirement

Requirement	Section Addressed in Document/Comment
Overview of all landscape features, heritage sites, environmental values, built features or other values to be managed under the component plan.	Section 4.2 – Public safety risks only
Setting out all performance measures included in the consent or project approval relevant to the features or values to be managed under the component plan.	Section 3.1
Setting out clear objectives to ensure the delivery of the performance measures and all other relevant statutory requirements (including the <i>Work Health and Safety (Mines and Petroleum Sites) Act 2013</i>).	Section 3.2
Proposing performance indicators to establish compliance with these performance measures and statutory requirements.	Section 4.3, Appendix A
Describing the landscape features, heritage sites and environmental values to be managed under the component plan, and their significance. It should be noted that a full description of such features, sites and values would commonly have been provided and considered in a recent environmental impact assessment (ie an environmental assessment or EIS). Consequently, this section can be relatively brief, and focus on the presentation of appropriate figures and/or plans.	N/A to this plan
Fully describing all currently-predicted subsidence impacts and environmental consequences relevant to the features, sites and values to be managed under the component plan.	Section 4.1
Fully describing all measures planned to remediate these impacts and/or consequences, including any measures proposed to ensure that impacts and/or consequences comply with performance measures and/or the mine's commitments.	Section 3.2
Describing the existing baseline monitoring network and the current baseline monitoring results, including pre-subsidence photographic surveys of key landscape features and key heritage sites which may be subject to significant subsidence impacts (such as significant watercourses, swamps and Aboriginal heritage sites).	See <i>Subsidence Monitoring Program</i> and specific Asset Management Plans
Fully describing the proposed monitoring of subsidence impacts and environmental consequences.	See <i>Subsidence Monitoring Program</i>
Describing the proposed monitoring of the success of remediation measures following implementation.	Section 4.4
Fully describing adaptive management proposed to avoid repetition of unpredicted subsidence impacts and/or environmental consequences.	Section 4.5

Requirement	Section Addressed in Document/Comment
Fully describing contingency plans proposed to prevent, mitigate or remediate unpredicted subsidence impacts and/or environmental consequences which substantially exceed predictions or which exceed performance measures.	Section 3.3 and Appendix A
Listing responsibilities for implementation of the plan.	Section 6.1
An attached Trigger, Action, Response Plan (effectively a tabular summary of most of the above).	Appendix A

Section 4 of this Plan addresses, in line with **Section 4** of the Extraction Plan Guidelines, management measures such as:

- Monitoring of areas posing safety risks;
- Erection of warning signs and possible entry or use restrictions;
- Backfilling of surface cracks and/or re-profiling of humps and swales on tracks and roads;
- Infilling of pot holes;
- Securing of potentially unstable structures and rock masses;
- Identification of potential flood-related impacts that may pose a risk to public safety; and
- Provision of regular updates regarding mining progress to the community where management of public safety is a significant issue.

3.4 Risk Management

A risk assessment was completed for the LW 17-20 Extraction Plan Area on 4 March 2020. A copy of the full risk assessment and methodology is included as **Volume 1 – Appendix A** of the *Extraction Plan for Longwalls 17 to 20*. The risk assessment determined one risk to public safety, with this outlined in **Table 3-2** below. The risk assessment team ranked the risk rating as Low.

Table 3-2 - Risk Management - Public Safety

Risk to Public Safety	Controls from Risk Assessment
Unauthorised access into subsidence zone causing injury to persons	<p>Current controls include:</p> <ul style="list-style-type: none"> • Fencing; • Locked gate; • Signage; • Weekly inspections; • Depth of cover; • Subsidence predictions; and • Nature of subsidence and cracking expected (minimal in size). <p>No additional controls are proposed.</p>

4. Implementation

4.1 General Public Safety Controls

Integra Underground's general approach to public safety management is outlined below:

- **Baseline Monitoring and Inspections** – Establishing baseline data for the Extraction Plan Area by completing inspections and subsidence monitoring. Liaison with key stakeholders;
- **Mitigation Measures Prior to Mining** – Fences and gates have been used to minimise the potential for public access to the Extraction Plan Area;
- **Monitoring and Inspections During Mining** – Continue inspections and monitoring as mining progresses. Liaison with key stakeholders;
- **Assessment and Interpretation of Impacts** – Monitoring and inspection data is analysed to identify variations from subsidence predictions. Assessment of impacts/risks to public safety. Liaison with key stakeholders;
- **Implement Remediation Measures** – Implement actions to effectively manage any risks to public safety. Liaison with key stakeholders; and
- **Re-assessing Impacts and Review of Effectiveness of Remediation Measures** – Re-assessment of impacts through inspection and monitoring. Review of the effectiveness of remedial measures. Liaison with key stakeholders.

4.2 Management of Impacts to Public Safety

Table 4-1 outlines the management of impacts relating to public safety including proposed timing and responsibility.

4.3 Contingency Plans

Public safety risk is significantly reduced as there is minimal potential for the public to access the Extraction Plan Area as it is privately owned by Glencore subsidiaries. There are predicted to be no additional risks to public safety from the mining of LW 17-20.

Where an unexpected and uncontrolled public safety risk presents itself, Integra Underground will provide the necessary resources to prevent access to the affected area, as well as notify key stakeholders and remediate the public safety risk. A Trigger Action Response Plan (TARP) has been prepared to manage the unexpected public safety risks.

In the event that observed subsidence impacts exceed the performance measures a general contingency response includes:

- The observation will be reported to the Environment and Community Manager within 24 hours;
- The observation will be recorded;
- Integra Underground will report any exceedance of the performance measure to the relevant government departments and stakeholders;
- Integra Underground will assess the exceedances referred to in the relevant TARP and where appropriate, implement measures in accordance with the appropriate Management Plan/s;

- The Environment and Community Manager will investigate any potential contributing factors and identify an appropriate action plan to manage the identified impact(s), in consultation with specialists and/or relevant agencies if necessary;
- Integra Underground will identify an appropriate action plan to manage the identified impact(s), in consultation with other specialists and/or key stakeholders;
- Integra Underground will consult with DPIE and other relevant government agencies/stakeholders to develop a course of action; and
- Integra Underground will continue to monitor performance with the new action plan in place and, if successful will formalise these actions as part of a revised Extraction Plan.

Table 4-1 - Summary of Public Safety Management

Aspect	Mitigation Summary	Timing	Responsibility
Ponding and General Subsidence Remediation	<p>No public access.</p> <p>Fences and gates have been used to minimise the potential for public access to the Extraction Plan Area.</p> <p>Integra Underground will carry out any works that are required to return the land surface, including surface water drainage systems to a similar state which existed prior to subsidence. This may include, but is not limited to, filling of cracks, stabilising slopes, draining ponded areas, re-establishing drainage paths and/or diverting surface water flows away from areas of potential ponding. Seeding may be required for areas affected by subsidence.</p> <p>Weekly inspections will be completed within the Extraction Plan Area.</p> <p>Monitoring and management of ponding is completed in accordance with Section 5.3 of the <i>Water Management Plan</i>.</p>	<p>Weekly surface inspections.</p> <p>Where there is a risk to public safety from general subsidence impacts, remedial works will be undertaken immediately. Consultation will be undertaken with relevant stakeholders, such as MGO.</p> <p>Other areas which do not pose a risk to public safety will be remediated as soon as possible. Consultation will be undertaken with relevant stakeholders, such as MGO.</p> <p>Timing as per Section 5.3 of the <i>Water Management Plan</i>.</p> <p>Where subsidence impacts greater than predicted, the Public Safety TARP (Appendix A) will be implemented.</p>	<p>Environment and Community Manager</p> <p>Note: In liaison with Technical Services Manager and/or MGO where required.</p>
<p>Mount Owen Active Mining Area, including</p> <p>North Pit</p> <p>Ravensworth East – West Pit</p> <p>Glendell Haul Road</p> <p>Eastern Rail Pit</p> <p>Tailings Pit 1 and 2</p> <p>Overburden Emplacement Areas</p>	<p>No public access.</p> <p>Monitoring and management is completed in accordance with the <i>Mount Owen Glendell Mine Key Features Asset Management Plan</i>. Subsidence monitoring is to be completed prior to LW 17 commencing and at the end of mining of LW 17-20.</p> <p>Weekly inspections will be undertaken in the Extraction Plan Area.</p>	<p>Where subsidence impacts greater than predicted, the Public Safety TARP (Appendix A) will be implemented.</p>	<p>Environment and Community Manager</p> <p>Note: In liaison with Technical Services Manager and/or MGO where required.</p>

Aspect	Mitigation Summary	Timing	Responsibility
Mount Owen Rail Line and associated infrastructure	No public access. Monitoring and management is completed in accordance with the <i>Mount Owen Rail Infrastructure Asset Management Plan</i> . Subsidence monitoring as per <i>Subsidence Monitoring Program</i> .	See <i>Mount Owen Rail Infrastructure Asset Management Plan</i> for detailed timings. Where subsidence impacts greater than predicted, the Public Safety TARP (Appendix A) will be implemented.	A full list of roles and responsibilities are outlined in the <i>Mount Owen Rail Infrastructure Asset Management Plan</i> .
Roads and Tracks	No public access. Subsidence monitoring as per <i>Subsidence Monitoring Program</i> . The management of roads and tracks within the Extraction Plan Area is outlined in the <i>Land Management Plan</i> . Signage is erected at entrance to Extraction Plan Area from public roads. Weekly inspections will be completed within the Extraction Plan Area. Subsidence repairs on roads and tracks will be completed as per the timing column.	Weekly surface inspections. Subsidence impacts to roads and tracks within the Extraction Plan Area will be remediated as soon as possible. Alternatively, roads and tracks with subsidence impacts will be closed to traffic and then remediated after subsidence impacts have ceased. Where subsidence impacts greater than predicted, the Public Safety TARP (Appendix A) will be implemented.	Environment and Community Manager Note: In liaison with Technical Services Manager and/or MGO where required.
Sediment Dams	Key controls include: <ul style="list-style-type: none"> Subsidence monitoring and inspections; Remediation of cracking to sediment dams; and Reporting results of inspections and any remediation measures. 	Weekly surface inspections. Repair of cracking to sediment dams after subsidence impacts have ceased. Where subsidence impacts greater than predicted, the Public Safety TARP (Appendix A) will be implemented.	Environment and Community Manager Note: In liaison with Technical Services Manager and/or MGO where required.
Fences Note: Only applicable in the event of stock being within the Extraction Plan Area.	Weekly inspections will be completed within the Extraction Plan Area.	Weekly surface inspections. Where subsidence impacts greater than predicted, the Public Safety TARP (Appendix A) will be implemented.	Environment and Community Manager Note: In liaison with Technical Services Manager and/or MGO where required.

5. Measurement and Evaluation

5.1 Predicted Subsidence

Detailed subsidence predictions are outlined within the SCT Subsidence Assessment (2020) – **Volume 2, Specialist Assessment 1** and the **Extraction Plan Main Document**.

In areas that have been filled with waste rock such as above part of the Eastern Rail Pit, subsidence is expected to be of greater magnitude than in areas of natural ground. Tilts are expected to be less than those predicted for undisturbed ground due to the softening effects of the backfill. Strains are expected to be approximately double the magnitude of strains in undisturbed ground, especially in areas where there is a free surface available for horizontal movement.

Previous monitoring indicates that the subsidence from LWs 17-20 are likely to represent typical subcritical width behaviour with the maximum subsidence controlled primarily by panel geometry consistent with consideration of the subsidence mechanics (Mills 1998).

Predictions of strains and tilts are based on the empirical relationships developed by Holla (1991) adjusted for the Integra Underground site-specific subsidence monitoring results. Previous monitoring experience provides a cross-check on the values determined and the approach appears to provide a reasonable basis for estimating the maximum values likely to occur.

Table 5-1 summarises the main subsidence parameters expected above the four panels in the Extraction Plan area as a basis for developing performance indicators.

Table 5-1 - Predicted Subsidence

Longwall Panel	Max Subsidence (m)	Maximum Tilt (mm/m)	Maximum Strain Tension (mm/m)	Maximum Strain Compression (mm/m)
Natural or Undisturbed Ground				
LW 17-20	2.0	14	7	10
Disturbed or Modified Overburden (fill material or emplacement areas)				
LW 17-20	2.5	14	14	20

SCT (2020) predicts there to be no additional risk to public safety is envisaged with Extraction Plan and controls in place. Notwithstanding, a TARP has been developed (**Appendix A**) outlining public safety management based on different triggers.

5.2 Flood Related Impacts

Flood related impacts related to subsidence were reviewed by Engeny (2020) for the LW 17-20 Surface Water Assessment (SWA). The SWA stated that there are no significant areas of the Bettys Creek Floodplain within the Extraction Plan Area. The predicted subsidence was considered unlikely to generate additional cumulative impacts within the MOC or the IUG areas due to the minor influence of subsidence from PA 08_0101 Modification 8 (MOD 8) on surface drainage at a catchment scale.

A portion of the middle Bettys Creek Diversion (approximately 330 m) falls within a distance equal to the overburden depth around the proposed mining voids (i.e. a 45° angle of draw) but is outside the

half depth zone (26.5° angle of draw). The SCT Subsidence Assessment (May 2020) notes that no significant impacts are expected to occur outside the half depth zone.

The bed of the Middle Bettys Creek Diversion was predicted to be lowered by undermining from LW13 to 15. This was expected to result in a shallow depression within the channel of up to approximately 1 m deep and 400 m long. The previous assessment concluded that this section of the diversion would likely be removed and/or substantially modified as part of the approved operations at MGO (resulting from final landform and mine closure arrangements).

The previous assessment also concluded that the impacts would likely be short term due to the likely infilling of these depressions during flow events. As such it was concluded that the predicted subsidence would be expected to have limited or no regional impact on geomorphic processes in Bettys Creek and that impacts would be short term and limited to a local scale.

5.3 Monitoring the Success of Remediation Measures

Regular inspections will be undertaken following the implementation of remediation measures. The success of subsidence remediation will be recorded in key reports to stakeholders and government departments (including the Department of Regional NSW – Resource Regulator and the DPIE).

5.4 Adaptive Management

Integra Underground's approach to managing subsidence and environmental impacts at the mine includes using past performance to guide and improve future monitoring and management actions.

Monitoring of the environment and the subsequent response to mining induced subsidence has been in place at Integra Underground prior to mining and has led to an improved understanding of the environment and site specific subsidence behaviour. Updated information from subsidence monitoring is then considered in preparation and review of Integra Underground's management plans to improve preventative and remedial actions.

6. Review and Improvement

6.1 Reporting

Reporting related to the Extraction Plan is outlined within **Section 7.1** of the Extraction Plan Main Document. This includes reporting for:

- Annual Review;
- Reporting of impacts as per the Asset Management Plans; and
- Incident reporting if required.

6.2 Review

Review of this *Public Safety Management Plan* will occur where significant unpredicted impacts to public safety are identified through the monitoring and management strategies proposed in this plan. This plan would be reviewed immediately if an impact or new risk to public safety is identified and when required under Schedule 5 Condition 6 of PA 08_0101.

Any revision to the Extraction Plan including component sub-plans must be completed to the satisfaction of the Secretary of the DPIE where required.

7. Document Information

This *Public Safety Management Plan* forms part of the *Extraction Plan for Longwall 17 to 20*, with this including a main document and other management plans. A list of the full documentation is outlined in the Extraction Plan Main Document.

7.1 Related Documents

Related documents, listed in **Table 7-1** below, are *documents* directly related to or referenced from within this document.

Table 7-1 – Related documents

Number	Title
INTUG-793190785-3013	Extraction Plan for Longwalls 17 to 20 – Main Document
INTUG-793190785-68	Water Management Plan

7.2 Reference Information

Reference information, listed in **Table 7-2** below, is *information* that is directly referred to for the development of this document.

Table 7-2 – Reference information

Reference	Title
SCT (2020)	Integra Underground Mine: Subsidence Assessment for LW17-20 Extraction Plan
Engeny (2020)	Extraction Surface Water Assessment

7.3 Change Information

Full details of the document history are recorded in the document control register, by version. A summary of the current change is provided in **Table 7-3** below. Example detail shown below.

Table 7-3 – Change information

Version	Date	Change Details
1.0	August 2020	New document for Longwalls 17 to 20

Appendix A - Trigger Action Response Plan for Public Safety

Note: TARP's have been prepared for the following built features, and outlined as appendices to the Built Features Management Plan:

- *Mount Owen Rail Infrastructure Asset Management Plan;*
- *Mount Owen Glendell Mines Key Features Asset Management Plan.*

The TARP below covers general public safety risks within the Extraction Plan Area and does not repeat the information outlined within the specific Asset Management Plans.

A.1 Public Safety

Normal State	<p><i>Normal – Subsidence as expected. Public safety risks are effectively managed.</i></p> <p><i>Continued implementation of Subsidence Monitoring Program. Implementation of remedial measures as required (Integra Underground Technical Services Manager).</i></p>	
Trigger Action Response Plan	Level 1 Trigger – Alert / Investigate	Level 3 Triggers – Stop – Withdrawal / Removal
	<p>Some subsidence impacts greater than predicted. New public safety risk identified.</p>	<p>Large sections of the Extraction Plan Area has subsidence impacts greater than predicted. Potential risk identified to public safety.</p>
Persons affected	Action / Response	Action / Response
<p>Integra Underground Technical Services Manager</p>	<p>Review of subsidence impacts and risks to public safety.</p> <p>Liaison with stakeholder.</p> <p>Implementation of remedial measures.</p> <p>Continued implementation of <i>Subsidence Monitoring Program</i>.</p>	<p>Review of subsidence impacts and risks to public safety.</p> <p>Liaison with stakeholder.</p> <p>Implementation of remedial measures. Completion of risk assessment.</p> <p>Continued implementation of Subsidence Monitoring Program.</p> <p>Determine if an incident has occurred.</p> <p>Reporting of Incident in accordance with Project Approval and WHS Act.</p>