

## **CHAPTER 15 MITIGATION AND MONITORING**

### **15.1 INTRODUCTION**

SLR Consulting Ireland Ltd was commissioned by Boliden Tara Mines DAC (BTM) to collate the mitigation and monitoring measures that have been proposed by the technical specialists as a result of their assessments. This chapter is intended to provide clarity to the An Bord Pleanála and to assist it in its decision-making role and in identifying any necessary planning conditions.

### **15.2 INHERENT AND DESIGNED IN MITIGATION**

A number of elements of the proposed development have been incorporated with the specific purpose of ensuring that the proposed buttressing works result in minimal environmental impacts while still providing the best possible Factor of Safety in line with GISTM standards.

Inherent mitigation includes the enhanced climate change resilience that will be facilitated through implementation of the works, design mitigation to minimise leaching of the TSF by rainwater and the re-use of on-site greenfield soil materials as construction materials (dependent on Article 27 determination to the EPA). The construction of the embankment buttress onto the perimeter of the existing tailings facility will be located within a relatively well-contained rural area that avails of considerable existing hedgerow screening, which is also an inherent mitigation feature of the proposals.

### **15.3 LEGISLATION AND BEST PRACTICE**

The operation of the TSF is currently covered by legislation and industry best practice that is followed by BTM in all of its operations.

For example, operations at the site will adhere to the Health and Safety Authority Safe Quarry Guidelines in relation to the Safety Health and Welfare at Work (Quarries) Regulations 2008 and this will limit the potential for unplanned events such as instability. Planning legislation enforced through the planning conditions associated with previous planning permissions at the site have required implementation of environmental mitigation and monitoring there.

Current best practice guidance followed include, but is not limited to the following:

- EPA Environmental Management Guidelines (2006): Environmental Management in the Extractive Industry (Non-Scheduled Minerals); and
- DoEHLG (Department of the Environment, Heritage and Local Government) April 2004: Quarries and Ancillary Activities Guidelines for Planning Authorities.

In addition, all company activities are carried out and governed by the Company's Industrial Emissions License (IEL) P0516-04 which is managed by the Environmental Protection Agency (EPA).

#### **15.4 SPECIFIC MITIGATION MEASURES**

Table 15-1 below sets out the specific mitigation measures that are proposed to be implemented through the proposed development

**Table 15-1** Schedule of Site-Specific Mitigation Measures to be Implemented

	<b>Mitigation Measure Proposed</b>	<b>Timeframe</b>
<b>General</b>	<ul style="list-style-type: none"> <li>▪ A Construction Environmental Management Plan (CEMP) will be prepared by the appointed contractor in conjunction with the BTM environmental management team</li> </ul>	Prior to Construction
<b>Landscape and Visual</b>	No significant effects were identified with the proposed development, and therefore no mitigation measures are proposed apart from the inherent design which takes advantage of existing hedgerow screening opportunities	
<b>Material Assets (Roads and Traffic)</b>	No significant effects were identified with the proposed development, and therefore no mitigation measures are proposed	
<b>Biodiversity</b>	<ul style="list-style-type: none"> <li>▪ An Ecological Clerk of Works (ECoW) must be assigned to the project prior to any commencement of construction in order to oversee works and ensure the implementation of mitigation measures to avoid any impacts to biodiversity features that may be present</li> <li>▪ Prepare and implement an Alien Invasive Plant Species Management and Control Plan as soon as a contractor is appointed</li> </ul>	Prior to and during Construction

	<b>Mitigation Measure Proposed</b>	<b>Timeframe</b>
<b>Biodiversity (Contd)</b>	<ul style="list-style-type: none"> <li>▪ Implementation of a Habitat and Biodiversity Management and Conservation Plan to include measures such as the following:                             <ul style="list-style-type: none"> <li>○ Restoration of disturbed grounds with the original seedbank</li> <li>○ Ensuring no loss of biodiversity post construction through use of fertiliser, commercial reseeded or inappropriate grazing</li> </ul> </li> <li>▪ Implementation of measures identified in the CEMP in relation to water management</li> <li>▪ Mitigating against disturbance to Kingfisher and Otter through monitoring of the watercourses occurring proximate to the proposed buttressing works on an ongoing basis during the proposed development in order to assess activity, which must inform a post-works Conservation Management Plan for each species</li> <li>▪ To mitigate against disturbance of over-wintering bird populations the works should be minimised, with no supplementary artificial illumination during the months October – March inclusive</li> </ul>	During and Post Construction
<b>Water (Hydrology and Hydrogeology)</b>	<ul style="list-style-type: none"> <li>▪ The CEMP, following best practice guidelines as identified in Chapter 7 of the EIAR, will include a detailed groundwater and surface water management plan for the duration of the construction works. This will be a live document and updated as necessary as the embankment construction progressed and groundwater and/ or surface water levels change</li> <li>▪ Specific measures will include:                             <ul style="list-style-type: none"> <li>○ Prevention of deposition of fine sediment etc in any existing waterbody</li> <li>○ Where possible, earthworks will be undertaken during drier months</li> </ul> </li> </ul>	During Construction

	Mitigation Measure Proposed	Timeframe
<b>Water (Hydrology and Hydrogeology) (Contd)</b>	<ul style="list-style-type: none"> <li>○ Where possible and to protect waterbodies from fine sediment and other pollutant runoff, all construction works will be undertaken at 10m or one channel width, whichever is greater, as a minimum distance from any watercourses. Where construction works are at less than 10m from watercourses, additional mitigation measures will be put in place, to protect the waterbody from fine sediment and other pollutant runoff, such as installation of silt traps, minimising the time that works take, avoiding working close to the watercourse during wet conditions when the risk of runoff is likely to be much greater, and to protect the river banks directly from physical damage</li> <li>○ To protect waterbodies from fine sediment runoff, topsoil/ subsoil will be stored a minimum of 20m from watercourses on flat lying land (and further if the ground is sloping, subject to on-site risk assessment and observational monitoring). Where this is not possible, and it is to be stockpiled for longer than a two-week period, the material will either be covered with geotextile mats, seeded to promote vegetation growth or banded. In all situation, runoff from the stockpile will be prevented from draining to a watercourse without prior treatment.</li> <li>○ Wheel washing facilities and / or road sweepers will operate during earthworks activities or other times as considered necessary.</li> <li>○ Equipment and plant will be washed out and cleaned in designated areas within the construction works area where runoff can be isolated for treatment before drainage to the interceptor channel</li> <li>○ Debris and other material will be prevented from entering surface water drainage, through maintenance of a clean and tidy site, provision of clearly labelled waste receptacles, grid covers and the presence of site security fencing</li> </ul>	

	Mitigation Measure Proposed	Timeframe
<b>Water (Hydrology and Hydrogeology) (Contd)</b>	<ul style="list-style-type: none"> <li>○ A Pollution Prevention Plan will be prepared to include spill response training and toolbox talks for all workers. Spill kits and oil absorbent material will be carried by mobile plant and located at high-risk locations across the construction works area and regularly topped up</li> <li>○ All hydrocarbons, chemicals, oils, etc. will be stored in a dedicated bunded area at least 30m from watercourses and capable of storing 110% of the container/ tank capacity. All re-fuelling will be carried out in a designated refuelling area at least 30m from watercourses</li> <li>○ All spills to be cleaned up immediately, with resultant wastes (soils, rags, and absorbent material) appropriately stored and disposed of by an appropriately licensed waste contractor</li> <li>○ All spills reported and investigated as required.</li> <li>○ Safety Data Sheets (SDSs) for all chemicals stored on-site will be kept on file and made available on-site</li> <li>○ Drip trays to be used on stationary equipment if not internally bunded (e.g. generators).</li> <li>○ All plant and equipment will be regularly serviced to reduce emissions and the chance of leaks/spillage, ideally off-site. If servicing is required to be completed on-site, then control measures must be implemented to contain potential hydrocarbon leaks during servicing (e.g., drip trays when changing oil)</li> <li>○ Temporary environmental screens will be erected sufficient to prevent construction debris oils, chemicals, or other construction materials from entering any watercourse/ drain for the duration of the works. The Contractor's method statement should make specific reference to measures for the protection of river quality</li> </ul>	

	Mitigation Measure Proposed	Timeframe
<b>Air Quality</b>	<ul style="list-style-type: none"> <li>▪ Site roads shall be regularly maintained and cleaned/watered (water bowser) as appropriate during extended dry and/or windy conditions</li> <li>▪ Hard surface roads shall be swept to remove mud and aggregate materials</li> <li>▪ Any un-surfaced roads shall be restricted to essential site traffic only</li> <li>▪ Rigid enforcement of speed restrictions to 25 km per hour</li> <li>▪ Vehicles exiting the site shall make use of wheel wash facility</li> <li>▪ Public roads outside the site shall be regularly inspected for cleanliness and cleaned as necessary</li> <li>▪ Aggregates, mine rock, fine sized material with dust potential will be delivered in covered trucks</li> <li>▪ Material handling systems and site stockpiling of materials shall be designed and laid out to minimise exposure to wind. The double handling of material will be avoided where possible and drop heights will be minimised during material loading and unloading</li> <li>▪ Diesel engines or plant machinery and trucks shall be properly maintained</li> <li>▪ Traffic and dust management plan will be implemented into CEMP</li> <li>▪ The dust management plan will be reviewed at regular intervals and will include additional mitigation measures where any sensitive habitats are located at a distance of less than 25m from the emission source</li> <li>▪ Temporary stockpiles of filter sand will be covered. In addition, where deemed necessary, binding agents will be applied to the surface of material to prevent wind dust blow</li> </ul>	During Construction

	Mitigation Measure Proposed	Timeframe
<b>Air Quality</b> <b>(Contd)</b>	<ul style="list-style-type: none"> <li>▪ Continuation of existing air quality control features at TSF, including:                             <ul style="list-style-type: none"> <li>○ Use of irrigation system</li> <li>○ Spigotting of water over tailings surface from perimeter deposition lines</li> <li>○ A CCTV system in operation which allows continuous 24-hour manned surveillance from the Mill Central Control Room</li> <li>○ Availability of a trained mine rescue team on a 24 hour call out basis</li> <li>○ Rehabilitation trials to vegetate areas more susceptible to dust blow</li> <li>○ Application where necessary with suitable dust binding additives to minimise dust blow</li> <li>○ Controlled tailings deposition and maintenance of adequate moisture content in the deposited tailings</li> <li>○ The rapid establishment of temporary vegetation cover on the surface of non-operational parts of the Tailings Facility</li> <li>○ The controlled dewatering of the tailings to ensure that a minimum area of tailings beaches is exposed</li> </ul> </li> </ul>	During Construction and Operation
	<ul style="list-style-type: none"> <li>▪ When constructed the embankment walls of the buttress will be seeded and vegetated as is current practice</li> </ul>	Post Construction
<b>Noise</b>	<ul style="list-style-type: none"> <li>▪ Noise control measures identified in BS 5228-1:2009 'Code of practice for noise and vibration control on construction and open sites' regarding the supervision, planning, preparation and execution of works will be incorporated into the CEMP</li> </ul>	During Construction and Operation



	Mitigation Measure Proposed	Timeframe
<b>Noise (Contd)</b>	<ul style="list-style-type: none"> <li>▪ Construction workers will have induction training course to include environmental controls as set out in the CEMP</li> <li>▪ Implementation of least noisy options available for plant and activities</li> <li>▪ Restriction of working hours to Monday to Friday 07:00-19:00 for noisier activities and Monday to Friday 19:00-22:00, Saturday 08:00-16:30 and Sundays/Bank Holidays 08:00-16:00 for quieter activities</li> <li>▪ All construction traffic to be used on site should have effective well-maintained silencers</li> <li>▪ All workers will be requested to avoid unnecessary revving of machinery and instructed to throttle down or turn off plant when not in use</li> <li>▪ Equipment will be well maintained</li> <li>▪ Site plant will have tonal reversing horns substituted by white noise systems according to Health and Safety Standards to avoid continuous tonality on the development site</li> </ul>	
<b>Population and Human Health</b>	Mitigation measures identified within the technical assessments and specified elsewhere in this Table will ensure that potential disturbance to the local community will be kept to a minimum	
<b>Climate</b>	<ul style="list-style-type: none"> <li>▪ Contractor will be required to mitigate against the potential effects of climate related weather events such as extreme rainfall /flooding extreme wind/storms, temperature extremes through site risk assessments and method statements</li> <li>▪ Design will be optimised to minimise the requirements for raw materials</li> </ul>	Prior to and during Construction

	Mitigation Measure Proposed	Timeframe
<b>Climate (Contd)</b>	<ul style="list-style-type: none"> <li>▪ Embodied carbon associated with construction materials will be reduced during detailed design, by incorporating the IEMA GHG Management Hierarchy</li> <li>▪ Contractor to prepare Waste Management Plan to incorporate measures such as avoiding waste of materials due to poor timing or over ordering to minimise the embodied carbon footprint of the site</li> <li>▪ Contractor to undertake waste audits detailing resource recovery best practice and to allow time in the construction programme for determining reuse and recycling opportunities for construction waste</li> <li>▪ Sourcing materials locally where possible to reduce transport related CO2 emissions</li> <li>▪ Management of construction traffic to ensure efficiency of loads and minimise overall traffic levels</li> <li>▪ Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods</li> <li>▪ Ensure all plant and machinery are well maintained and inspected regularly</li> <li>▪ Integration and maintenance of measures to manage construction surface water runoff</li> <li>▪ Potential use of Hydrotreated Vegetable Oil (HVO) instead of diesel to be investigated</li> </ul>	
	<ul style="list-style-type: none"> <li>▪ Implementation of a Habitat and Biodiversity Management and Conservation Plan to include measures such as restoration of disturbed grounds with the original seedbank. The aim will be to restore and enhance biodiversity levels at the site, and sequester carbon through a system of natural, sustainable ecosystem such as is currently present (semi-natural grassland grazed primarily by small mammals and invertebrates)</li> </ul>	During Construction and Operation

	Mitigation Measure Proposed	Timeframe
<b>Land and Soils</b>	<ul style="list-style-type: none"> <li>▪ Mitigation measures that are required are standard best practice and include the following:                             <ul style="list-style-type: none"> <li>○ Responsibilities of the Engineering and Construction (E&amp;C) Contractor under the Safety, Health and Welfare at Work Act 2005 and the Control of Substances Hazardous to Health (COSHH) Regulations 2002 will be followed</li> <li>○ The CEMP will detail the measures necessary to avoid, prevent and reduce adverse effects where possible upon soil and geological receptors</li> <li>○ The Contractor will implement measures to minimise the amount of dust produced during the construction phase, including the preparation of a Dust Management Plan (DMP)</li> <li>○ Personal Protective Equipment (PPE) will be worn by ground workers</li> <li>○ Waste Rock and Soil materials will be stored temporarily within the site in managed stockpiles that will not be allowed to dry out, to avoid generation of wind-blown dust and to avoid impacts to soil structure and quality</li> <li>○ Any stockpiled material will be managed in accordance with best practise guidelines (such as Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (2009)). When required, pre-earthwork drainage will be put in place to avoid sediment being washed off site</li> <li>○ The Contractor will be required to prepare a Construction Traffic Management Plan (CTMP) to minimise site traffic and, if relevant, damage to soil structure from smearing and compaction</li> <li>○ Water quality monitoring will be undertaken pre and during-construction, details of which will be included in the CEMP. This will be based on a combination of visual observations, in situ testing using handheld water quality probes, and periodic sampling for laboratory analysis</li> </ul> </li> </ul>	<p>During Construction and Operation</p>

	Mitigation Measure Proposed	Timeframe
<p><b>Land and Soils (Contd)</b></p>	<ul style="list-style-type: none"> <li>○ The E&amp;C Contractor will be required to ensure the safe storage of any hazardous materials or chemicals required onsite. Storage areas for flammable/ toxic/ corrosive materials will be located in a separate, locked, impermeable bunded and fenced off area. Material data sheets will be available for all these materials and the COSHH (Control of Substances Hazardous to Health) assessments kept within the relevant Risk Assessment for the task, all subject to the Applicant’s approval. Storage will not be within 50m of a watercourse and designated storage areas will be bunded to 110% of storage capacity to contain the effects of any spills. These areas will be cleared and re-instated following completion of works</li> <li>○ The EPA will be notified of the intention to utilise alternative waste materials at the TSF, in accordance with the Licence. The environmental protections built into the IE Licence will continue to apply to the Proposed Development</li> <li>○ Should significant contamination occur as a result of construction stage activities or be discovered during works, Meath County Council and the EPA will be notified, and appropriate corrective actions will be agreed and undertaken</li> <li>○ The works will be undertaken under geotechnical supervision to ensure construction is robust and the effectiveness of the proposed buttruss</li> </ul>	

	Mitigation Measure Proposed	Timeframe
<b>Land and Soils (Contd)</b>	<ul style="list-style-type: none"> <li>▪ The TSF will continue to operate in line with appropriate standards and the operator will implement and maintain an Environment Management System (EMS) which will be certified to International Standards Organisation (ISO) 14001. The EMS will outline requirements and procedures required to ensure that the Proposed Development is operating to the appropriate standard</li> </ul>	Post Construction
<b>Cultural Heritage</b>	<ul style="list-style-type: none"> <li>▪ Built Heritage Survey to be carried out for architectural heritage sites and/or elements that may be impacted by the works, such as St Anne's Church and associated features</li> <li>▪ Townland Boundary Surveys shall be carried out at the following locations: <ul style="list-style-type: none"> <li>○ CH99 (townland boundary); and,</li> <li>○ CH103 (townland, civil parish and barony boundary)</li> </ul> </li> <li>▪ Protective fencing/barriers along the southwestern section of the scheme to prevent accidental damage to St Anne's Church and associated features</li> <li>▪ Vibration monitoring shall be undertaken of the following receptors during the construction phase: <ul style="list-style-type: none"> <li>○ CH22 (St Anne's Church; ME025-002001); and,</li> <li>○ CH24 (burial vault; ME025-002003).</li> </ul> </li> <li>▪ It is recommended that the continued development of this site is offset through dissemination of knowledge (e.g. through publication of reports, similar to that published by Tara Mines in 1973). Updated findings from</li> </ul>	Prior to Construction

	Mitigation Measure Proposed	Timeframe
<b>Cultural Heritage (Contd)</b>	additional surveys such as the built heritage survey recommended for St. Anne’s Church (CH22) and burial vault (CH24) would be in the interests of the community.	
	<ul style="list-style-type: none"> <li>▪ Vibration monitoring shall be undertaken of the following receptors during the construction phase:                             <ul style="list-style-type: none"> <li>○ CH22 (St Anne’s Church; ME025-002001); and,</li> <li>○ CH24 (burial vault; ME025-002003).</li> </ul> </li> <li>▪ It is recommended that the continued development of this site is offset through dissemination of knowledge (e.g. through publication of reports, similar to that published by Tara Mines in 1973). Updated findings from additional surveys such as the built heritage survey recommended for St. Anne’s Church (CH22) and burial vault (CH24) would be in the interests of the community</li> </ul>	During Construction

## **15.5 MONITORING MEASURES**

All company activities are carried out and governed by the Company's Industrial Emissions License (IEL) P0516-04 which is managed by the Environmental Protection Agency (EPA). An extensive monitoring programme is already in place to ensure compliance with this.

Environmental monitoring requirements for the proposed works have been identified in the specific chapters of the EIAR. The monitoring requirements and proposed frequency is identified below, and an indicative schedule is displayed in Table 15-2.

### **15.5.1 Landscape and Visual**

No monitoring is required.

### **15.5.2 Material Assets (Road and Traffic, Waste Management)**

It is proposed to monitor potential construction traffic issues through the Construction Environmental Management Plan (CEMP) and undertake remedial action should any problems arise.

The volume of construction material (waste LoW 17 05 04 (soil and stone from greenfield development sites) and LoW 01 01 01 (mine rock – waste from mineral metalliferous excavation) accepted at the site will be reported to the EPA in annual Environmental Performance Report (EPR) return.

### **15.5.3 Biodiversity**

An Ecological Clerk of Works (ECoW) will be assigned to the project prior to any commencement of construction in order to oversee works and monitor the progress of recolonisation inform the Habitat and Biodiversity Management and Conservation Plan.

Habitats will be surveyed through quadrant sampling on an annual basis in May/June for a minimum of five years post construction. This monitoring will permit the degree of success of the habitat restoration to be assessed, informing the management of the habitat as to whether additional measures are required.

Two breeding bird surveys separated by a minimum of two weeks should be undertaken annually within the zone of the works for a minimum of five years, such as to establish the degree of success of mitigation measures and to inform the management of the site.

The TMF is an Internationally Important site for Whooper Swan. The use of the facility by this species should be monitored on a bimonthly basis between the months October – March inclusive for a minimum of three years post construction in order to inform any management measures required to support the continued use of the habitat by this species.

#### **15.5.4 Water (Hydrology and Hydrogeology)**

The routine ground and surface water monitoring programme, including the interceptor channel, as mandated in IE Licence No. P0516-04, will continue to be implemented for the duration of the works.

#### **15.5.5 Air Quality**

The current continuous programme of depositional dust and ambient air monitoring (PM<sub>10</sub>, PM<sub>2.5</sub>, Arsenic, Cadmium, Lead and Zinc) around the tailings facility as carried out under conditions of IE License (IEL) P0516-04 will be continued.

#### **15.5.6 Noise**

The predicted noise levels are well within the guidelines considered acceptable for construction noise and monitoring over and above that already undertaken under the conditions of Industrial Emissions License (IEL) P0516-04 is not considered necessary.

#### **15.5.7 Population and Human Health**

No specific monitoring is proposed. Implementation of the CEMP and continued implementation of the company's complaints procedure will provide a framework for any issues arising to be resolved.

#### **15.5.8 Climate**

During the detailed design phase opportunities will be sought to reduce greenhouse gas emissions from the works.



The successful contractor should monitor and report GHG emissions during construction. The obligations will be included as part of the CEMP. The elements to be monitored include:

- Embodied carbon from products
- Transportation of staff, materials, waste etc
- Water use
- Raw material extraction
- Fuel usage
- Waste

### **15.5.9 Land and Soils**

The current monitoring as carried out under conditions of IE License (IEL) P0516-04 will be continued. Further sampling and analysis of pollutants will occur as and when required by the EPA under licence requirements and in the Article 27 Determination process.

### **15.5.10 Cultural Heritage**

Monitoring during construction shall be carried out in areas of archaeological potential or significance identified during the walkover survey and assessment. These include:

- The southwestern and western sections of the proposed scheme in order to monitor works in proximity to Recorded Monument CH21 (enclosure; ME025-002), CH22 (St Anne's Church; ME025-002001), CH23 (graveyard; ME025-002002), CH24 (burial vault; ME025-002003), CH41 (Yellow River; AAP-watercourse) and CH99 (townland boundary); and,
- Works in the vicinity of CH103 (townland, civil parish and barony boundary).

This allows adjustments of operations to be made to ensure compliance with consent conditions and detection of unexpected mitigation failures.

As noted during the walkover survey, St Anne's Church (CH22) and St Anne's Well (CH31) continue to be visited each year. It would be in the interests of the community to maintain and enhance access to these cultural heritage receptors and improve these amenities (e.g. clearing the brush around the church or signage to share the history of the area), providing a positive effect.

**Table 15-2** Monitoring Schedule During and Post Construction

	Q1			Q2			Q3			Q4		
CEMP (Material Assets/Traffic, Population/Human Health, Climate)												
Dust monitoring												
Surface and Ground Water												
Ground Conditions												
Quadrant Surveys (annually)												
Breeding Birds (2 Surveys separated by min 2 weeks)												
Whooper Swan (Bimonthly)												
Archaeological Monitoring during construction works and *annual visits to cultural features of St Anne's complex						*						