IRMA

Initiative for Responsible Mining Assurance

EXCERPT FROM THE

IRMA Standard

for

Responsible Exploration, Extraction, and Processing of Minerals

2nd DRAFT

for public consultation

CHAPTER 3.7 – **Noise and Vibration**

IRMA Standard v2.0 DRAFT 2

July 2025

English Version

Disclaimer and Context on this Draft

The 2nd DRAFT Version of the IRMA Standard for Responsible Exploration, Extraction, and Processing of Minerals V2.0 (hereafter referred to as the "2nd DRAFT") is being released for public consultation, inviting the world to join once again in a conversation around expectations that drive value for greater environmental and social responsibility in mining and mineral processing.

The 2nd DRAFT does not represent content that has yet been formally endorsed by IRMA's equally-governed multi-stakeholder Board of Directors. IRMA's Board leaders seek the wisdom and guidance of all readers to inform this through an inclusive revision process one more time, to improve the Standard.

This draft document builds on the 1st DRAFT Version published in October 2023, and invites a global conversation to improve and update the 2018 IRMA Standard for Responsible Mining V1.0. This 2nd DRAFT is intended to provide as final of a look-and-feel as possible, although input from this consultation will result in final edits, and consolidation to reduce overall number of requirements (more on this on page 6), for a version that will be presented to IRMA's equally-governed multi-stakeholder Board of Directors for adoption and implementation.

This 2nd DRAFT has been prepared and updated by the IRMA Secretariat based on:

- learnings from the implementation of the current IRMA Standard (V1.0)
- experience from the first mines independently audited (as of July 2025, 24 sites have completed audits or are in the process of being audited)
- evolving expectations for best practices in mining to reduce harm
- comments and recommendations received from stakeholders and Indigenous rights-holders
- the input of subject-specific Expert Working Groups convened by IRMA between 2022 and 2024
- all comments and contributions received during the public-comment period of the 1st DRAFT version (October 2023-March 2024)

Please note that Expert Working Groups were created to catalyze suggestions for solutions on issues we knew most needed attention in this update process. They were not tasked to come to consensus nor make formal recommendations. Their expertise has made this consultation document wiser and more focused, but work still lies ahead to resolve challenging issues. We encourage all readers to share perspectives to improve how the IRMA system can serve as a tool to promote greater environmental and social responsibility, and create value for improved practices, where exploration, extraction, and processing of minerals happens.

IRMA is dedicated to a participatory process including public consultation with a wide range of affected people globally and seeks feedback, comments, questions, and recommendations for improvement of this Standard. IRMA believes that diverse participation and input is a crucial and determining factor in the effectiveness of a Standard that is used to improve environmental and social performance in a sector. To this end, every submission received will be reviewed and considered.

This current 2nd DRAFT is based on content already in practice in the IRMA Standard for Responsible Mining V1.0 (2018) for mines in production, and its accompanying normative Guidance document and Supplementary Guidance, combined with the content drafted in the IRMA Standard for Responsible Mineral Development and Exploration ('IRMA-Ready' Standard – Draft v1.0 December 2021) and in the IRMA Standard for Responsible Minerals Processing (Draft v1.0 June 2021), and offers an updated version of the 1st DRAFT Version of the IRMA Standard V2.0 that received over 2,500 unique points of comments between 2023 and 2024.

Please note: The IRMA Standard V2.0 is new in its approach in that it now covers more phases of the mining and mineral supply chain, from exploration and development, through mining, closure, and mineral processing. IRMA also, separately, oversees a Chain of Custody Standard for tracking materials through the supply chain from mine-to-market end use products.

Disclaimer on Language and Corrections

For this public consultation, only an English version is available. A Glossary of Terms used in this Standard is provided at the end of the full version of the document (see below). IRMA reserves the right to publish corrigenda on its web page, and readers of this document should consult the corresponding web page for corrections or clarifications.

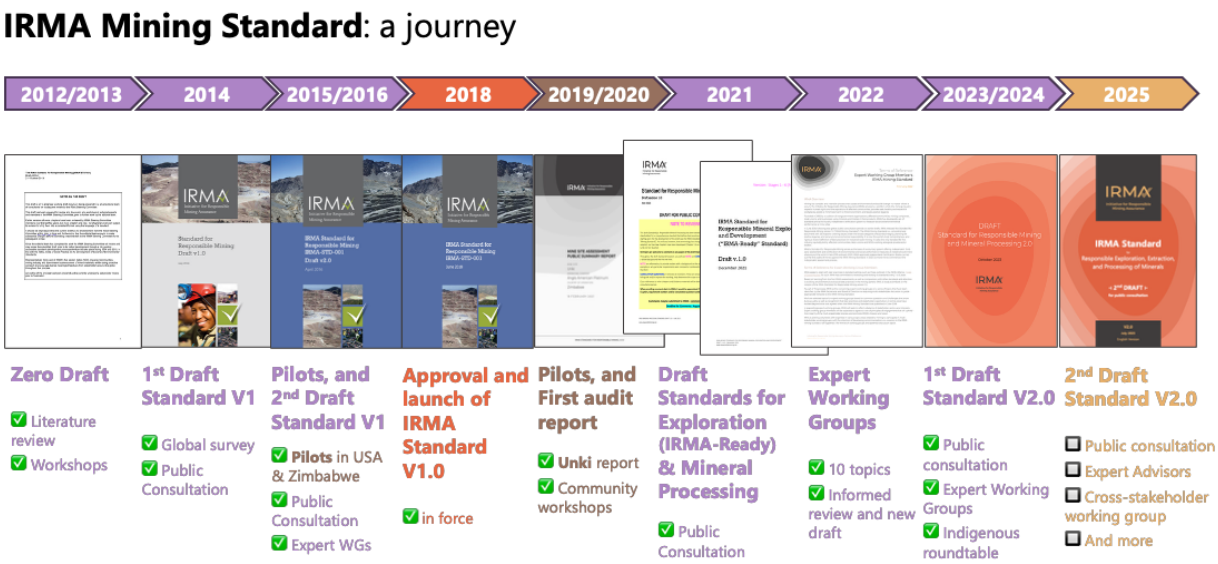
This document provides only one chapter excerpt from the IRMA Standard v2.0 DRAFT 2.

The full version contains 27 Chapters, click here to view it.

Objectives of this 2nd public consultation

Following the release of a 1st DRAFT of the IRMA Standard V2.0 in October 2023 for a 90-day public consultation, the IRMA Secretariat received more than 2,500 points of comments from 82 organizations, then organized additional engagement with stakeholders and Indigenous rights-holders, and solicited complementary guidance from multiple topic-specific Expert Working Groups.

We anticipated release of this 2nd DRAFT for a second round of public consultation as early as Q3 2024, then subsequently announced that more time was needed to support engagement of diverse stakeholders; the revised release date was July 2025. We provided more detailed explanation for the extended process here and here.



The release of this 2nd DRAFT marks a significant milestone on the road to the revision of the IRMA Standard: this public consultation will be the last of this revision cycle on V2.0.

Informed by the outcomes of this public consultation, along with guidance from Expert Advisors and IRMA Working Groups (see more below), and additional engagement with Indigenous rights-holders and stakeholders as requested, the IRMA Secretariat will prepare a final version. This final version will be discussed by the IRMA Board and refined to reach consensus for adoption by all six governing houses of IRMA: Affected Communities including Indigenous Rightsholders; Environmental and Social NGOs; Organized Labor; Finance and Investment Professionals; Mining Companies; Purchasers of Mined Materials.

In IRMA's strategic decision-making, Board members work to achieve consensus. IRMA believes a majority vote is not a model of equal governance. Instead, any motion that results in both of the two representatives from the same governing house voting "no" must go back to the full group for further discussion. In other words, a proposed course of action cannot proceed if both representatives from one of our six governing houses are opposed. Board members will keep talking until a resolution that works for all groups is found. It is a model that has worked for IRMA for nearly two decades and is fundamental to IRMA's credibility, accountability and service to all six houses of governance.

What is IRMA seeking guidance on?

Comments, feedback, and suggestions are welcome on any aspect of this 2nd DRAFT version (including intent and text of the requirements, endnotes, annexes, format and structure, design, readability, etc.).

IRMA is particularly interested in hearing the views of rights-holders and stakeholders on **the provisions in the Standard that are substantially new compared to the IRMA Standard for Responsible Mining V1.0.** These provisions (requirements or at a sub-requirement level) are highlighted in yellow throughout this Draft, to ensure they are easily identifiable.

We ask readers to assist us in weighing these potential new provisions, and also hold awareness that, prior to adoption of the final version, many of these will be consolidated and reduced in overall number.

Although these new requirements have each been drafted in response to lessons learned, the current state of best practices, emerging expectations, and/or in response to requests and suggestions made during the previous public consultation, collectively they represent substantive increased expectations for both implementing entities and audit firms. The IRMA Board of Directors seeks to ensure that the IRMA Standard, while recognized the world's most rigorous and comprehensive mining standard, continue to welcome and support uptake of newcomer companies engaging from the mineral supply chain around the world.

Thus, in this consultation, we seek guidance from all on **the new provisions that seem most urgent** to be integrated in the final version of the Standard V2.0, so that the revised Standard's expectations are paced at a realistic level to support engagement of mineral operations of a range of sizes, materials and global contexts.

It is important to note that all new requirements and sub-requirements, including those not retained in the final V2.0, will serve as the basis for the ongoing review process once the V2.0 is approved and released by our Board, and will provide fodder for future revisions, when it is decided that a V2.1 or V3.0 is needed.

Chapter 3.7
Noise and Vibration

SECOND DRAFT (JULY 2025): SUMMARY OF CHANGES

- Moved expectations related to information-sharing to response to grievance (3.7.4.1).
- Grouped all maximum acceptable noise and vibration levels to a normative Annex which is referred to in Section 3.7.3.
- Created a section and requirement dedicated to a Monitoring Program (3.7.2).
- Risks and impacts on wildlife are now integrated into the scoping processes required in Chapter 4.4 on Biodiversity, Ecosystem Services, and Protected and Conserved Areas. This is more consistent, and coherent with the fact that the Chapter on Noise and Vibration mainly focuses on risks and impacts on people and structures (and now moved under Principle 3 on Social Responsibility)
- Minor structural changes to increase clarity and consistency with the rest of the Standard.

RESPONSE TO CONSULTATION QUESTIONS OUTLINED IN FIRST DRAFT

Question #	Question	Feedback and Proposed Decision
4.4-01	(**General**) **Question**: Currently, we do not have a requirement for noise monitoring. Do entities typically carry out regular or even periodic monitoring of noise levels, e.g., at site boundaries, or is monitoring more typically only done in response to complaints or other indications that there may be noise-related issues?	**Feedback received**: 6 responses received (4 mining, 1 purchaser, 1 consultant). General support that monitoring should occur IF impacts have been identified. **Proposed Decision**: Based on input on this consultation question, which was overall supportive of a noise monitoring requirement, we are proposing to add a monitoring requirement. We had already included requirements to measure noise/vibration levels and compare them to specific maximum allowable noise/vibration limits. The addition of a specific monitoring requirement allows us to move those limits into a table, and simply require that monitoring results be compared to the values in those tables. The outcome of that comparison will determine if additional monitoring and mitigation is required. (See proposed new requirement 3.7.2.1).
4.4-02	(**4.4.1.1 - Scoping**) **Background:** In the 2018 Mining Standard, existing operations were not expected to carry out noise scoping unless there was a change to the operation that could increase noise levels. If there was a noise-related complaint at the existing site, however, the operation would be required to take action as per the requirements in the rest of the chapter. We are proposing here that all sites (proposed projects and existing operations) demonstrate that they have carried out a scoping of potential noise and vibration impacts. The rationale is that without such evidence, it is difficult for entities to know if there may be impacts that are being overlooked. Also, the 2018 Mining Standard (and this proposed updated version of the Standard) expects that noise-related impacts on human and wildlife receptors would be considered as part of the Environmental and Social Impact Assessment (ESIA) process in Chapter 2.1 and if significant impacts are identified then mitigation options are developed as per the ESIA process. Therefore, in many cases, scoping of potential noise/vibration-related impacts will already have been done. However, for projects or operations that either have not/did not go through ESIA or did not do a comprehensive assessment of the range of potential impacts during	**Feedback received**: 7 responses received (4 mining, 1 NGO, 1 purchaser, 1 consultant). Results are spilt on whether or not to require scoping. Four (4, cross-stakeholders) support, two (2 mining) do not support requiring scoping for existing operations unless there is a trigger. A rationale from one in support is that "An existing operation could be impacting receptors through noise/vibrations without them knowing." **Proposed Decision**: We are proposing to leave the requirement as is, which means that it will be assessed at both new projects and at existing operations. However, we are proposing that at existing operations, if noise scoping was not covered in an ESIA, entities could demonstrate that they have met the intent of this requirement by producing evidence that they have conducted consultations with affected communities that included specifically asking community members about any issues with noise/vibrations, and consultations with wildlife experts (e.g., could be government representatives, local/regional wildlife biologists, academics) to understand if there may be impacts on wildlife of which the ENTITY was unaware. If only grievances (or lack of grievances) are produced as

	the ESIA, then it seems reasonable that these issues be scoped as a standalone exercise so that all entities are held to the same expectations. Question: **Do you agree with this new approach requiring that all sites demonstrate that they have scoped noise issues? Or should a scoping only be triggered at existing operations if there is a complaint or a change in potential noise sources?**	evidence, then existing sites would not meet this requirement, because the intent is that there needs to be proactive effort to fully understand if there may be impacts or not.
4.4-03	(**4.4.2.2 – Blasting-induced impacts**) **Question**: As with the 2018 Mining Standard, the blasting measures are only required if there are human receptors who may be affected by the noise or vibrations from blasting. While wildlife may be affected by blasting, it is not clear if the measures outlined in 4.4.2.4 would even prevent impacts on them. If there are special mitigation measures that can reduce blasting-related impacts on wildlife (for example, maybe cessation of blasting during particularly sensitive calving times, etc.) then it is our presumption that those specific actions would be incorporated into the management plan (requirement 4.4.2.1). Do you agree with this approach?	**Feedback received**: 5 responses received (3 mining, 1 purchaser, 1 consultant). General support that blasting impacts on wildlife should be mitigated, and included in management plan **Proposed Decision**: Risks and impacts on wildlife are now integrated into the scoping processes required in Chapter 4.4 on Biodiversity, Ecosystem Services, and Protected and Conserved Areas. This is more consistent, and coherent with the fact that the Chapter on Noise and Vibration mainly focuses on risks and impacts on people and structures (and now moved under Principle 3 on Social Responsibility)

BACKGROUND

Mineral exploration and development, mining, and mineral processing, can all create significant noise and/or vibration. Noise and vibration may result from airborne and ground-based geophysics, drilling, blasting during construction or at open pit and underground mines, ore stockpiling, screening, and crushing, handling and movement of materials on-site, emission treatment processes, fans and filtration systems, electrical substations and cooling towers, truck or rail traffic bringing consumables to the site and shipping final products from the site.

Studies have shown that there are direct links between noise and health. Problems related to noise include stress-related illnesses, high blood pressure, speech interference, hearing loss, sleep disruption, and lost productivity for humans,[1] but there are also noise-related impacts on wildlife (covered in Chapter 4.4).[2] Studies have also demonstrated that vibrations, such as those created by blasting, can sometimes be felt in nearby communities, and even cause damage to buildings or the contents of buildings, such as items on walls or shelves.[3]

Many noises and vibrations can be moderated or partially managed by employing mitigation measures to reduce a noise or vibration at its source, or by eliminating or minimizing the pathways for transmission of noise and screening sensitive receptors. Measures include installing new low noise/vibration equipment or retrofitting existing equipment, using acoustic enclosures and sound-absorbing materials to limit transmission and constructing berms and planting trees to screen sensitive receptors from noise.

Vibration impacts from blasting can be mitigated, for example, by controlling charge weight diameter and charge coupling within boreholes or controlling the direction or sequence of blast initiation.[4]

Planning and timing of activities and communications with affected rights-holders and stakeholders are also important management measures. However, effective control may be challenging when a project or operation is located near communities and/or structures of high social, cultural, religious or spiritual values.

KEY REFERENCES

This chapter strongly builds on, or aligns with, the following international or multilateral frameworks, conventions, and guidance:

- ILO Convention C148 - Working Environment (Air Pollution, Noise and Vibration), 1977
- IFC General Environmental, Health, and Safety Guidelines, 2007

OBJECTIVES/INTENT OF THIS CHAPTER

To preserve the health and wellbeing of nearby noise receptors and the amenity of properties and community values, and to protect offsite structures and cultural sites from vibration impacts.

SCOPE OF APPLICATION

This chapter is applicable to all exploration, mining and mineral processing projects and operations. Note that worker-related noise or vibration issues are covered under Chapter 3.2—Occupational Health and Safety.[5]

For each requirement, the following colors are displayed in the margin to indicate the phases for which it is required:

E1	Exploration – Stage 1
E2	Exploration – Stage 2
E3	Exploration – Stage 3
D	Project Development and Permitting
M	Operating Mine
P	Operating Mineral Processor

CRITICAL REQUIREMENTS IN THIS CHAPTER

Throughout the Standard, critical requirements are identified using a red frame.
There is no (0) critical requirement in this Chapter.

OPTIONAL IRMA+ REQUIREMENTS IN THIS CHAPTER

Throughout the Standard, optional IRMA+ requirements are identified using a dotted blue frame. There is no (0) optional IRMA+ requirement in this Chapter.

In this second draft, IRMA introduces a new category of requirements: IRMA+. These requirements are aspirational and forward-looking. They reflect emerging expectations and recommendations from stakeholders, but currently go above and beyond existing and established best practice. IRMA+ requirements are entirely optional, and they will not affect the scores and achievement levels obtained by the entities choosing to be assessed against them.

IRMA Requirements

3.7.1 Scoping and Baseline Data

E3 D M P

3.7.1.1 A scoping process (or equivalent) is carried out and documented by competent professionals, as follows:

a. It determines if there may be significant noise and/or vibration impacts on human receptors[6] or structures from mining-related activities and/or associated facilities;

b. It builds on relevant existing baseline data;

c. Is informed by consultations with affected rights-holders and stakeholders; and

d. It is updated without undue delay after a significant change that may result in a new source of noise or vibration or an increase in existing noise or vibration levels.

E3 D M P

3.7.1.1 If the scoping process identifies that human receptors or structures may be significantly affected by noise and/or vibration from mining-related activities or associated facilities, baseline ambient noise and vibration levels in potentially-affected and affected areas[7] are gathered and documented by competent professionals.

3.7.2 Monitoring Program

E3 D M P

3.7.2.1 When the scoping required in 3.7.1, or other credible information including grievance filed, indicate that there are human receptors or structures that may be significantly affected by noise or vibration from mining-related activities, a monitoring program is developed and implemented by competent professionals to monitor noise and/or vibration levels (as relevant), as follows:

a. The monitoring program uses credible methods at relevant location/s and with appropriate equipment[8];

b. If levels exceed those in Annex 3.7, the ENTITY develops and implements corrective measures, remediation measures if relevant, and updates management plan accordingly, and continues to monitor noise/vibration; and

c. If levels do not exceed those in Annex 3.7, or when exceedance has been corrected[9], monitoring may be discontinued[10].

3.7.3 Management Plan

E3 D M P

3.7.3.1 If the scoping required in 3.7.1, and/or results from the monitoring program required in 3.7.2, and/or any other credible information[11], indicate that there are human receptors or structures that may be significantly affected by noise or vibration from mining-related activities, a noise and vibration management plan (or equivalent) is developed and documented by competent professionals, as follows:

a. The plan is informed by consultations with affected rights-holders and stakeholders, in a manner that is inclusive of different genders, ages, ethnicities, and any potentially underserved and/or marginalized people;

b. It outlines specific measures that strictly align with the mitigation hierarchy to avoid and, where not possible, minimize and remediate or compensate adverse impacts related to noise and vibration;

c. It includes appropriate qualitative and quantitative performance indicators[12] (including gender-disaggregated indicators where appropriate), that have been agreed upon with affected rights-holders and stakeholders, to enable evaluation of the effectiveness of mitigation measures over time;

d. It assigns implementation of measures to responsible staff with adequate skills and expertise;

e. It assigns responsibility to its top management level to oversee plan implementation, monitoring, and recordkeeping[13];

f. It includes clearly-defined timelines and an implementation schedule that specifies the expected outcomes for the affected people;

g. It maintains estimates of human resources and budget required; and

h. It includes a financing plan in place to ensure that funding is available for the effective implementation of the plan.

3.7.4 Response to Grievances

E3 D M P

3.7.4.1 If the ENTITY receives a credible, supported grievance that noise or vibration is adversely impacting human receptors or structures, the ENTITY:

a. Initiates monitoring in accordance with 3.7.2 to determine noise and/or vibration levels at the receptor or other appropriate monitoring location;

b. It proactively shares relevant data and information, including the monitoring results, with the complainant/s and any affected rights-holders and stakeholders;

c. If there are exceedances of the limits in Annex 3.7, it develops, in collaboration with affected rights-holders and stakeholders, mitigation strategies or other specific measures to resolve the grievance; and

d. It collaborates with affected rights-holders and stakeholders to monitor, evaluate, and review, the effectiveness of these mitigation strategies or measures in resolving the grievance, and to develop, if necessary, corrective measures.

CROSS REFERENCES TO OTHER CHAPTERS

This table will be added when the new content for all chapters is finalized and approved.

CHAPTER ENDNOTES

[1] For example, see various documents on US EPA Noise Pollution Clearinghouse website: www.nonoise.org/epa.htm; Also, see various publications on World Health Organization website: www.euro.who.int/en/health-topics/environment-and-health/noise/publications

[2] U.S. National Parks Service. 2014. Annotated Bibliography – Impacts of Noise on Wildlife. https://www.nhsec.nh.gov/projects/2014-04/documents/150420pastoriza.pdf

[3] See, for example: Victoria (Australia) State Government. Ground Vibration and Airblast Limits for Blasting in Mines and Quarries. http://earthresources.vic.gov.au/earth-resources-regulation/licensing-and-approvals/minerals/guidelines-and-codes-of-practice/ground-vibration-and-airblast-limits-for-blasting-in-mines-and-quarries; and U.S. Office of Surface Mining Reclamation and Enforcement: https://www.osmre.gov/programs/regulating-active-coal-mines/blasting; and the Pennsylvania Department of Environmental Protect Blasting Research page: https://www.dep.pa.gov/Business/Land/Mining/BureauofDistrictMining/SurfaceBlasting/Training/Pages/Blasting-Research-Papers-.aspx

[4] See e.g., Controlling the Adverse Effects of Blasting. OSMRE Presentation, available at: https://www.osmre.gov/resources/blasting/docs/WYBlasterCertModules/8AdverseEffectsBlasting.pdf

[5] The structural vibration issues in this chapter (4.4) relate to buildings and structures. Chapter 3.2 includes job related vibration such as caused by sitting on a vibrating seat (such as operating heavy machinery) or hand vibration while working on a vibrating machine with one's hands. See e.g., http://www.ohsrep.org.au/hazards/vibration/effects-of-vibration; and https://www.ccohs.ca/oshanswers/phys_agents/vibration/vibration_effects.html

[6] If there is the potential that wildlife may be affected by noise or vibration, scoping and mitigation are undertaken in Chapter 4.4.

[7] Including at the location(s) of human receptors and structures that are closest to the noise/vibration sources, and also at locations of other relevant human receptors and structures. Relevant receptors should include the closest receptors to where exploration, mining or processing activities will take place, but also any others that have the potential to be affected by noise or vibrations. Topography and meteorology (e.g., prevailing wind directions, temperature inversions) should be considered, when evaluating which receptors might be relevant. (Australian Department of Industry, Innovation and Science. Leading Practice Sustainable Development Program: 3.0 Noise. https://www.industry.gov.au/sites/default/files/2019-04/lpsdp-airborne-contaminants-noise-and-vibration-handbook-english.pdf)

[8] The selection of locations for monitoring noise/vibration levels should be based on the identification of sensitive receptors, so that noise can be monitored in the appropriate locations. Noise monitoring methods would be expected to follow a credible methodology, such as that outlined in the IFC Environmental Health and Safety Guidelines which outline monitoring periods, as well as type and positioning of monitoring equipment.

[9] And that it is demonstrated that levels are now within the acceptable range (see Annex 3.7).

[10] If, after monitoring is discontinued, there is a new scoping exercise as a result of project modification that identifies new potentially significant impacts, or there is a new noise-related complaint, then the ENTITY would be expected to start/re-start monitoring.

[11] Other credible information could come from affected communities, local governments, academics, etc. and could include complaints, research studies, etc.

[12] Appropriate performance criteria and indicators must include those required by the country of operation's law (e.g., regulator maximum concentrations of certain chemicals in air or water), and, as relevant, those associated with external standard (e.g., IRMA water quality criteria), those agreed with stakeholders, or indicators that are tied to an identified baseline (e.g., levels of lead in hair samples before a mineral processing facility begins operating).

[13] If work is carried out by third party contractors, then there needs to be a staff employee responsible for overseeing the quality of work, timelines, etc.

CHAPTER ANNEXES

ANNEX 3.7: Maximum Acceptable Noise and Vibration Levels per Receptor Type

Receptor Type	Maximum Acceptable **Noise** Levels	**Noise** monitoring location/s	Maximum Acceptable **Vibration** Levels	**Vibration** monitoring location/s
Residential (includes homes, educational, medical and religious facilities)	**DAY:** Maximum one-hour LAeq (dBA) of 55 dBA during the hours of 07:00 to 22:00 (i.e., day) **NIGHT:** maximum one-hour LAeq (dBA) of 45 dBA during the hours of 22:00 7:00	At minimum, at the nearest off-site receptors and/or locations related to complaints. Locations are outdoors.	1) A maximum level for air blast overpressure of 115 dB (Lin Peak) is exceeded for no more than 5 % of blasts over a 12-month period, and never exceeds 120 dB (Lin Peak) for any blast. 2) Ground vibration (peak particle velocity) neither exceeds 5 mm/second on 9 out of 10 consecutive blasts, nor exceeds 10 mm/second at any time; and 3) Blasting only occurs during the hours of 09:00 to 17:00 on traditionally normal working days.	At minimum, at the nearest off-site receptor and/or locations related to complaints. 1) Locations for air blast measurements are between 3.5 and 30 meters away from buildings. 2) At least the longest dimension of the foundations of a building or structure away from such building or structure.
	Exceptions 1) The hours during which elevated noise levels are allowed may be adjusted if the ENTITY can justify that alternative hours are necessary and/or appropriate because of local, cultural, or social norms. 2) If baseline ambient noise levels exceed 55 dBA (day) and/or 45 dBA (night), then noise does not exceed 3 dB above baseline as measured at relevant off-site noise receptors. 3) During periods of blasting, the dBA levels may be exceeded, as long as the other vibration requirements are met.		**Exceptions** Blasting outside of the hours of 09:00 to 17:00 on traditionally normal working days may be allowed if: 1) Alternative hours are necessary and/or appropriate because of local, cultural, or social norms; and/or 2) Potentially affected human receptors have given voluntary approval for the expanded blasting hours.	
Commercial and Industrial	**DAY AND NIGHT:** noise levels measured at the monitoring location/s do not exceed 70 dBA.	At the project/ operation boundary, or nearest industrial or commercial receptor	Same as above	Same as above

Sources:
Maximum noise levels are from: IFC. 2007. General Environmental, Health and Safety Guidelines. 1.7. Noise Management. https://www.ifc.org/content/dam/ifc/doc/2000/2007-general-ehs-guidelines-noise-en.pdf

Maximum air blast overpressure and ground vibration levels are from: Australian and New Zealand Environmental Council. 2007. "Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration. https://www.environment.nsw.gov.au/resources/noise/anzecblasting.pdf

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