



Acacia
Mining Operations

ACACIA MINE OPERATIONS GÖKIRMAK COPPER MINE

Noise and Vibration Management Plan 2017

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1. Purpose and Scope

This Noise and Vibration Management (NVM) Plan is prepared for the Gökırmak Copper Project (GCP) to set out (i) the applicable mitigation measures for the Project related noise emissions and vibration impacts, and (ii) the noise and vibration monitoring programme at the Project sensitive receptors in compliance with national legislation, requirements of international financing institutions (e.g. IFC Performance Standards, EBRD Performance Requirements) and other applicable Good International Industry Practices (GIIPs). The plan is applicable for the construction, operation and rehabilitation phases of the Project.

This Plan is a living document and should be updated as appropriate. It is the responsibility of the Environmental and Public Relations Coordinator to be fully aware of its contents, to provide relevant training to staff and to ensure that procedures are being implemented to achieve compliance with this Plan by all parties including contractors and subcontractors.

2. Project Standards

The applicable national and international noise standards are:

- Turkish Regulation on the Assessment and Management of Environmental Noise (RAMEN)
- IFC General EHS Guidelines: Noise Level Guidelines, April 30, 2007
- World Health Organization (WHO) Guidelines for Community Noise, 1999

The Project Standards are set taking into account the strictest amongst the available standards as given below.

Table 1. Noise Standards and Project Standards

Noise Limits				Project Limits at Residential Areas ³	
EU	IFC	WHO	RAMEN	Construction Period	Operation Period
Leq (dBA)	Leq (dBA)	Leq (dBA)	Leq (dBA)	Leq (dBA)	Leq (dBA)
N/A ¹			- 55 Nighttime		
	- 55 Daytime	- 45 Night (indoor with windows open) ²	-60 Evening	- 70 Daytime Construction Period	- 55 Daytime
	- 45 Nighttime		-65 Daytime	- 45 Nighttime	- 45 Nighttime
	- Background Level +3 dbA	-55 (interim Target)	-70 Construction Period		
			-Background Level +5 dbA		

¹ EU Legislation does not provide numerical limit value

² This is an external noise level and assumes that internal noise levels are in the order of 15 dBA lower with open windows and 27 dBA lower with closed windows (which would be the expected normality in the Project’s climate). In addition, WHO (1999) recommends that internal sound levels should not exceed approximately 45 dBA more than 10 to 15 times per night.

³ Project limits must be ensured at the residential areas

Table 2. Maximum Permissible Values of Ground Vibrations for Project

Vibration Limits as defined in RAMEN	
Vibration frequency (Hz)	Maximum Permissible Vibration Rate
	(Peak Value-mm/s)
1	5
4-10	19
30-100	50

3. Roles and Responsibilities

Roles and responsibilities for E&S management for the GCP are described in detail in the Project ESMS. The Environmental and Public Relations Coordinator (and the related department's sub-level personnel regarding the environmental subjects, including the Environmental Supervisor) will be responsible for the implementation of the Noise and Vibration Management Plan.

4. Noise and Vibration Management

The Project has the potential to affect the background noise levels at the nearby settlements as well as the Project site due to construction and operation activities that will involve earthworks, material extraction and transportation activities and blasting operations. Blasting operations additionally cause ground vibrations that would affect the Project personnel and local communities located within the blasting impact area (approximately 150 m radius area around the explosion point in open pit).

The following list of mitigation measures will be in place for noise and vibration management during the construction and operation phases of the Project to ensure compliance with regulatory limits, applicable international standards (IFC PS3, EBRD PR3) and GIIP.

Mitigation Measures for Noise Emissions:

- Apply noise mitigation technologies on individual equipment where necessary,
- Optimize the internal-traffic routing, particularly to minimize vehicle reversing needs (reducing noise from reversing alarm) and to maximize distances to the closest sensitive receptors,
- Select equipment with lower sound power levels,
- Ensure that equipment is regularly maintained,
- Limit noisier operations to normal work day hours to reduce or eliminate complaints,
- Manage any complaint in relation to noise emissions in accordance with Project's Grievance Mechanism;
- Investigate complaints to determine the source of the nuisance noise and take corrective actions where necessary,
- Implement the Noise and Vibration Monitoring Program (see Section 5).

Mitigation Measures for Vibration Impacts due to Blasting:

- Use specific blasting plans, correct charging procedures and blasting ratios, delayed/ microdelayed or and specific in-situ blasting tests (the use of downhole initiation with short-delay detonators improves fragmentation and reduces ground vibrations),
- Develop a blast design, including a blasting-surfaces survey, to avoid overconfined charges, and a drill-hole survey to check for deviation and consequent blasting recalculations,
- Monitor vibration level at Sepetcioglu while blasting,
- Establish baseline conditions of the houses located in the blasting impact area (approximately 150 m radius area around the explosion point in open pit; Sepetcioglu village is located in the blasting impact area) will be established before the start of operation phase.

Successful implementation of these measures will be supported by provision of training for the operators of equipment and truck drivers. A summary of Project's noise and vibration impacts and proposed mitigation measures are given below. It should be noted that impacts of noise and vibration from the construction and operation phases of the Project on terrestrial flora and fauna are discussed under the Biodiversity Management Plan.

Table 3. Project Impacts due to Generation of Noise and Vibration on Residential Areas

Impact Description	Receptors	Proposed Mitigation Measures
Noise from Construction	Sepetcioglu Hanonu, Vakif Cayli Derekoy Geymene Asagikurecay Bagdere Kupeli Yilanli	<ul style="list-style-type: none"> – Apply general Noise Control Mitigations given above, Reschedule construction activities based on monitoring results to ensure compliance with set limits for daytime and night-time works (e.g. avoid night time activities near sensitive receptors if recorded noise levels are above 50 dB)
Noise from Operation	Sepetcioglu Kupeli Derekoy Vakif Geymene Bagdere	<ul style="list-style-type: none"> – Apply general Noise Control Mitigations given above, – Reschedule operation activities based on monitoring results to ensure compliance with the set limits for daytime and night-time works (e.g. avoid night time activities near sensitive receptors if recorded noise levels are above 50 dB)
Noise from ore haulage, unpaved roads and/or trucks	Sepetcioglu Kupeli Bagdere Vakif Derekoy Geymene	<ul style="list-style-type: none"> – Apply general Noise Control Mitigations given above – Use the ore transfer road only during the daytime – Maintain the surface of haul roads in good condition and impose a speed limit for vehicle traffic – Implement maintenance and operation procedures to minimise nuisance noise emissions from equipment, including servicing and maintenance of exhaust systems on mine equipment.
Noise from Blasting	Sepetcioglu Hanonu, Vakif Cayli Derekoy Geymene Asagikurecay Bagdere Kupeli	<ul style="list-style-type: none"> – Apply general Noise Control Mitigations given above – Take applicable safety measures prior to blasting, such as warning signs and siren alarm – Careful control of blasting to reduce noise and vibration, e.g. timing and proximity to receptors – Provide personnel training on explosives handling and safety management. Only certified blasters or explosives experts shall conduct blasting activities – Conduct blasting only during the daytime period (between 08:00 and 18:00) (as is the current case) – Plan to blast during the middle of the day when background noise levels are higher than at other times of day

Impact**Description Receptors Proposed Mitigation Measures**

Vibration	Sepetcioglu	<ul style="list-style-type: none">– Use specific blasting plans, correct charging procedures and blasting ratios, delayed /microdelayed or and specific in-situ blasting tests (the use of downhole initiation with short-delay detonators improves fragmentation and reduces ground vibrations)– Develop a blast design, including a blasting-surfaces survey, to avoid overconfined charges, and a drill-hole survey to check for deviation and consequent blasting recalculations– Monitor vibration level at Sepetcioglu while blasting– Establish baseline conditions of the houses located in the blasting impact area (approximately 150 m radius area around the explosion point in open pit; Sepetcioglu village is located in the blasting impact area) before the start of operation phase
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5. Noise and Vibration Monitoring Program

Noise and vibration measurements will be conducted at selected receptors during the construction and operation period of the Project as summarized below:

Table 4. Noise and Vibration Monitoring Locations

Monitoring Location	Parameters and Frequencies	
	Noise ¹	Vibration
Hanonu	Monthly	-
Yozlu	Monthly	-
Sepetcioglu	Monthly (minimum 48hr) ²	at the time of blasting
Derekoy	Monthly (minimum 48hr) ²	-
Geymene	Monthly	-
Asagikurecay	Monthly	-
Bagdere	Monthly	-
Kupeli	Monthly (minimum 48hr) ²	-
Yilanli	Monthly ³ (minimum 48hr)	-

¹ *Leq dB(A) LAeq, LA10, LA90*

² *Continuously for at least 48 hours*

³ *Only construction Period of TSF.*

6. Training

AMI will provide training to all its staff and subcontractors to ensure that they are aware of the relevant aspects of this Plan and follow the measures proposed in line with their specific job tasks. Training of staff will be recorded in personnel records.

7. Audit and Reporting

Regular internal inspections will be made throughout the Project life to ensure that the mitigation measures put in place are applied at all times by all site staff including contractors and subcontractors.

Monitoring results will be recorded and reported to AMI management to ensure that the Project is in line with the standards. Depending on the results the Plan will be reviewed and updated accordingly.

8. Review and Update

This Plan will be reviewed as required by potential changes in Project activities and/or results of monitoring activities. In case any noncompliance with existing project standards is identified or any corrective measure is required, the Plan will be updated accordingly. The Environmental and Public Relations Coordinator will be responsible of review and update of the MP. The Plan will be recommunicated to AMI personnel and will be shared with contractor/subcontractor management following any such update.