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Date: 15 August 2016

NOISE AND VIBRATION MANAGEMENT PLAN

PURPOSE SCOPE

This Management Plan has been developed in accordance with SPV policies, with the commitments undertaken by SPV in the ESA, with Turkish regulatory framework, with IFC Performance Standards, IFC EHS General and Sector Specific Guidelines, EBRD Performance Requirements, OPIC Environmental and Social Policy Statement and EDC. The purpose of this plan is to provide a framework for construction noise and vibration management to ensure that noise and vibration levels at the site boundaries and at neighboring buildings remain within limits throughout the Construction phase.

This Plan includes guidelines and minimum requirements for EPC Contractor for defining its own procedures appropriate to the nature and scale of the Project Construction phase.

APPLICATION

This Management Plan applies to the Project Construction phase only. It applies to construction work activities under the control of SPV, of EPC Contractor and to all KIP employees.

DEFINITIONS

Kocaeli or SPV:	Kocaeli Hastane Yatırım ve Sağlık Hizmetleri A.Ş.
Kocaeli Integrated Health Campus Project (or "KIP" or simply "Project"):	Kocaeli Integrated Health Campus Project, being executed by SPV or its affiliates
EPC Contractor (or simply EPC):	Gama – Türkerler Kocaeli Adi Ortaklığı & Gama Türkerler Dubai
Site Management:	All key managerial roles involved in the Construction Site management, mainly referring to the EPC Contractor's personnel
Environmental and Social Management System (ESMS)	The complete set of documents (including but not limited to: policies, manuals, plans, procedures, work instruction and records) developed to address, manage, monitor, audit and review the environmental, social, health and safety aspects of the KIP, aimed at mitigating potential ESHS risks and impacts and improving ESHS performance
Guidelines to EPC Contractor	Guidelines to EPC Contractor for the development of its own ESMS and associated EPC Contractor Procedures appropriate to the nature and scale of the Project are contained in SPV ESMS documentation. SPV ESMS documentation, identify also minimum requirements and specific responsibilities for EPC Contractor in line with the EPC contract
Construction Site	The Construction Site includes all areas impacted in any manner by the construction activities.
Environmental and Social Management Plans (ESMPs)	Plans issued by SPV addressing significant Environmental and Social aspects (as identified in the ESA) by defining specific management methods, mitigation measures, monitoring activities, reporting, auditing and review.
EPC Contractor Procedure	A procedure to be prepared by EPC Contractor, to be used by EPC Contractor to describe how the mitigation and monitoring measures/actions outlined in SPV ESMPs are actually implemented.

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ACRONYMS

KİP	Kocaeli Integrated Health Campus Project
SPV	Kocaeli Hastane Yatırım ve Sağlık Hizmetleri A.Ş.
Golder	Golder Associates Turkey Ltd. Şti.
BAT	Best Available Technology
EAV	Exposure Action Value
EBRD	European Bank for reconstruction and Development
EDC	Export Development Canada
EHS	Environmental, Health and Safety
ELV	Exposure Limit Value
EPC	Engineering Procurement and Construction
EPRP	Emergency Preparedness and Response Plan
ES	Environmental and Social
ESHS	Environmental, Social Health and Safety
ESA	Environmental and Social Assessment
ESMP(s)	Environmental and Social Management Plan(s)
ESMS	Environmental and Social Management System
ESAP	Environmental and Social Action Plan
EU	European Union
GHG	Greenhouse Gas
GIIP	Good International Industry Practice
HAV	Hand Arm Vibration
HS (or OHS)	(Occupational) Health and Safety
IFC	International Finance Corporation
IFI	International Finance Institutions
ISO	International Organization for Standardization
KPI	Key Performance Indicators
OHSAS	Occupational Health and Safety Assessment Scheme
OPIC	Overseas Private Investment Corporation
PR	Performance Requirement (issued by EBRD)
PS	Performance Standard (issued by IFC)
QRA	Quantitative Risk Analysis
SEP	Stakeholder Engagement Plan
WBV	Whole Body Vibration
WHO	World Health Organization

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NOISE AND VIBRATION MANAGEMENT PLAN
1. PURPOSE AND SCOPE OF THE PLAN

This Management Plan has been developed in accordance with SPV policies, with the commitments undertaken by SPV in the ESA, with Turkish regulatory framework, with EBRD Performance Requirements (in particular PR1 and PR3), with IFC Performance Standards (in particular PS1 and PS3) and IFC General and Sector Specific EHS Guidelines, OPIC Environmental and Social Policy Statement and EDC. Where no national regulation or international standard/guideline applies, it considers the adoption of Good International Industry Practices (GIIP).

The purpose of the plan is to provide a framework for construction noise and vibration management to limit emissions created by the construction activities and the measures to be carried out to verify at neighboring buildings the compliance with the limits established by Turkish legislation and/or IFI requirements.

This Management Plan applies to normal operating conditions during the Site construction activities and does not specifically address any emergency situation; this is addressed in the EPC Contractor Emergency Preparedness and Response Procedure.

2. BACKGROUND POLICIES AND STANDARDS

This section includes all those policies, standards and requirements of reference for this plan that are applicable for, but not limited to, the Project during Construction phase.

It also includes tables with noise limits derived from Turkish legislation and/or IFC requirements. These parameters will be taken into account to define the target/acceptance criteria of key performance indicators for the monitoring activities (ref. § 5.0).

A number of qualitative performance parameters have been identified in Section 4 and 5 below, derived from ESA commitments, Turkish legislation and/or IFC, EBRD and EHS Guidelines, OPIC Environmental and Social Policy Statement as well as from GIIP.

1. National standards and regulations

Title	Turkish Reg. Gaz. Date
Regulation on the Assessment and Management of Environmental Noise	27601, 04/06/2010
TS 9315 ISO 1996-1 - Acoustics - Description, measurement and assessment of environmental noise -Part 1: Basic quantities and assessment procedures	27/09/2005
TS ISO 1996-2 - Acoustics - Description, measurement and assessment of environmental noise - Part 2: Determination of environmental noise levels	26/03/2009
TS 9315 ISO 1996-1 / T1 - Acoustics - Description, measurement and assessment of environmental noise -Part 1: Basic quantities and assessment procedures / Amendments	29/06/2009
TS ISO 1996-2 / T1 - Acoustics - Description, measurement and assessment of environmental noise - Part 2: Determination of environmental noise levels / Amendments	29/06/2009

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Title	Turkish Reg. Gaz. Date
Regulation on Health and Safety Conditions regarding use of Work Equipment	28628, 25/04/2013
Regulation on Protection of Workers from Risks Related to Noise	28721, 28/07/2013
Regulation on Protection of workers from Risks Related to Vibration	28743, 22/08/2013
TS 2607 ISO 1999 - Acoustics - Determination of occupational noise exposure and estimation of noise-induced hearing impairment	12/04/2005
TS EN ISO 9612 - Acoustics - Determination of occupational noise exposure - Engineering method (ISO/FDIS 9612:2008)	29/06/2009
TS EN ISO 5349-2 - Mechanical vibration - Measurement and evaluation of human exposure to hand-transmitted vibration - Part 2 : Practical guidance for measurement at the workplace	29/04/2004
TS EN ISO 5349-1 - Mechanical vibration – Measurement and evaluation of human exposure to hand-transmitted vibration – Part 1 : General requirements	27/12/2005
TS ISO 2631-1 - Mechanical vibration and shock -- Evaluation of human exposure to whole-body vibration -- Part 1: General requirements	25/04/2013

2. International standards

Source	Document Title
The Equator Principles Association	The Equator Principles, June 2013
IFC - International Finance Corp.	IFC Performance Standards (PS) and Guidance Notes (GN)
IFC - International Finance Corp.	IFC PS1 and GN1: Assessment and Management of Environmental and Social Risks and Impacts
IFC - International Finance Corp.	IFC PS2 and GN2: Labor and Working Conditions
IFC - International Finance Corp.	IFC PS3 and GN3: Resource Efficiency and Pollution Prevention
IFC - International Finance Corp.	IFC PS4 and GN4: Community Health, Safety and Security
IFC - International Finance Corp.	IFC General EHS Guidelines: Environmental
IFC - International Finance Corp.	IFC General EHS Guidelines: Occupational Health and Safety
IFC - International Finance Corp.	IFC General EHS Guidelines: Community Health and Safety
IFC - International Finance Corp.	IFC General EHS Guidelines: Construction and Decommissioning
IFC - International Finance Corp.	IFC General EHS Guidelines: Health Care Facilities
EBRD – European Bank for Reconstruction and Development	EBRD PR 1: Assessment and Management of Environmental and Social Impacts and Issues
EBRD – European Bank for Reconstruction and Development	EBRD PR 2: Labour and Working Conditions
EBRD – European Bank for	EBRD PR 3: Resource Efficiency and Pollution Prevention and Control

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Source	Document Title
Reconstruction and Development	
EBRD – European Bank for Reconstruction and Development	EBRD PR 4: Health and Safety
EBRD – European Bank for Reconstruction and Development	EBRD Sub-sectoral Environmental and Social Guidelines: Health Services and Clinical Waste Disposal
OPIC - Overseas Private Investment Corporation	OPIC - Environmental and Social Policy Statement
International Organization for Standardization	ISO 14001:2004 - Environmental management systems -- Requirements with guidance for use
OHSAS Project Group	OHSAS 18001 - Occupational health and safety management systems – Requirements

3. Source documents

This section presents source documents, i.e. documents where SPV commitments are sourced from and that are the trigger for the development and implementation of the ESMP's and in general of the ESMS documentation. They are in turn based on Turkish regulatory framework, EBRD Performance Requirements, IFC Performance Standard and Guidelines and OPIC Environmental and Social Policy Statement.

Document ID	Document Title
ESA Report	Environmental Social Assessment (January, 2016)

4. Environmental Noise Limits

The Regulation on Assessment and Management of Environmental Noise (Official Gazette No. 27601, 04/06/2010) provides ambient noise standards in Annex-VII Table 5 for Construction Site. The corresponding noise limits are provided in the following Table.

Activity type (construction, demolition and repair)	L _{day} [dB(A)]
Structures	70
Roads	75
Other Sources	70

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In order to ensure the absence of complaints from the population, it is recommended to adopt the requirements of IFC Noise Guidelines. As a consequence, noise impacts should not exceed the levels presented in the following Table, or result in a maximum increase in background levels of 3 dB(A) at the closest receptor location.

Receptor	One Hour L_{Aeq} [dB(A)]	
	Daytime 07.00÷22.00	Nighttime 22.00÷07.00
Residential; institutional; educational	55	45
Industrial; commercial	70	70

5. Occupational Noise Limits

The Regulation on protection of workers from risks related to noise (Official Gazette No. 28721, 28/07/2013) transposes Noise at Work Directive 2003/10/EC. The Regulation determines the minimum requirements for protecting employees exposed to noise and to risk associated such as loss of hearing.

In the Regulation, the following limit and action values are defined:

1. lower exposure action values: $LEX,8h = 80$ dB(A) and $L_{peak} = 135$ dB(C);
2. upper exposure action values: $LEX,8h = 85$ dB(A) and $L_{peak} = 137$ dB(C);
3. exposure limit values: $LEX,8h = 87$ dB(A) and $L_{peak} = 140$ dB(C).

Where:

4. The daily noise exposure level ($LEX,8h$) is the average noise exposure level for a nominal 8-hour working day as defined by TS 2607 ISO 1999 Standard;
5. The peak sound level (L_{peak}) is the maximum value of the 'C'-frequency weighted instantaneous noise pressure level.

According to the Regulation, employers have the following obligations:

6. Risk assessment (in accordance with TS 2607 ISO 1999 and TS EN ISO 9612);
7. Information of the workers concerning the risks and noise;
8. Noise reduction (concept of minimization);
9. Provision of hearing protectors if the lower action values are exceeded;
10. Health surveillance (audiometric testing) if the lower action values are exceeded.

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The Regulation is in substantial accordance with IFC - Environmental, Health, and Safety (EHS) Guidelines, which prescribe the following procedures:

11. Noise surveys at workplace according to Standard TS EN ISO 9612.
12. No employee should be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day without hearing protection. In addition, no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C).
13. The use of hearing protection should be enforced actively when the equivalent sound level over 8 hours reaches 85 dB(A), the peak sound levels reach 140 dB(C), or the average maximum sound level reaches 110 dB(A). Hearing protective devices provided should be capable of reducing sound levels at the ear to at least 85 dB(A).
14. Although hearing protection is preferred for any period of noise exposure in excess of 85 dB(A), an equivalent level of protection can be obtained, but less easily managed, by limiting the duration of noise exposure. For every 3 dB(A) increase in sound levels, the 'allowed' exposure period or duration should be reduced by 50 percent.
15. Prior to the issuance of hearing protective devices as the final control mechanism, purchase of silenced equipment, use of acoustic insulating materials, isolation of the noise source, and other engineering controls should be investigated and implemented, where feasible.
16. Employer should provide workers with information, training and periodic medical hearing checks (if exposed to high noise levels)

1. Environmental Vibration Limits

According to ESA Report Paragraph 9.1.7, effect of vibration is not expected to go beyond the construction site considering the machinery and equipment to be used in construction. Hence, environmental vibration limits are not considered.

2. Occupational Vibration Limits

The Regulation on protection of workers from risks related to vibration (Official Gazette No. 28743, 22/08/2013) transposes the Human Vibration Directive 2002/44/EC. The Regulation distinguishes between vibration affecting the hand-arm-system and vibration being transmitted to the whole body. It defines exposure limit values on basis of a standardized eight hour reference period, simulating a work day.

For Hand Arm Vibration (HAV):

17. Exposure Action Value (EAV): 2.5 m/s² A(8)

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18. Exposure Limit Value (ELV): 5 m/s² A(8)

For Whole Body Vibration (WBV):

19. Exposure Action Value (EAV): 0.5 m/s² A(8)

20. Exposure Limit Value (ELV): 1.15 m/s² A(8)

According to the Regulation, employers have the following obligations:

21. Risk assessment (in accordance with TS EN ISO 5349-1/2 and TS ISO 2631);
22. Information of the workers concerning the risks of vibration;
23. Vibration reduction (concept of minimization);
24. Provisions aimed at avoiding or reducing exposure;
25. Health surveillance if EAV are exceeded.

26. ROLES AND RESPONSIBILITIES

Principal roles and responsibilities for the implementation of this plan are outlined below.

1. EPC Contractor & Subcontractors

27. EPC Contractor has to ensure sufficient and qualified resources are allocated on an ongoing basis to achieve effective implementation of this Management Plan.
28. EPC Contractor have to ensure the effective implementation of this plan by issuing its own procedure addressing, detailing and customizing specific actions, measures and monitoring activities under the EPC Contractor's responsibility. The EPC Contractor Procedure has to include a description of allocated resources, responsibilities and communication procedures to relevant personnel.
29. EPC Contractor has to provide relevant monitoring data and monitoring reports to SPV as indicated in section 7 "Reporting" of this plan.
30. If any Subcontractor is involved, it is responsible for duly implementing requirements included in EPC Contractor Procedure under the EPC Contractor supervision.

1. SPV

SPV Management has to ensure sufficient and qualified resources are allocated on an ongoing basis to achieve effective implementation of actions, measures and monitoring activities under SPV's responsibility.

SPV Management is responsible for:

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31. Final approval of the Management Plan;
32. taking appropriate actions to address major Non-Conformities, based on audit reports, performance monitoring reports and on SPV HSE Manager proposed approach an actions.

SPV HSE Manager is responsible for:

33. ensuring that this Management Plan is up to date and appropriate to the nature and scale of the the Project and ensuring that this Management Plan is implemented effectively by EPC Contractor;
34. ensuring that action/measures and monitoring activities directly under SPV responsibilities are carried out timely and adequately according to this Management Plan requirements;
35. proposing to SPV Management, if necessary, amendments and/or updates to this Management Plan and issuing plan revisions;
36. programming inspections and audit activities to ensure the correct implementation of this Management Plan and of EPC Contractor Procedure;
37. addressing Non-Conformities through the definition of Preventive/Corrective actions;
38. bringing major Non-Conformities immediately to the attention of SPV Management;
39. collecting, organizing and reviewing monitoring data and performance monitoring reports and providing summary results of such reports to SPV Management, to stakeholders and to the Lenders.

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40. Management methods and Mitigation measures

1. Introduction

This section firstly presents the construction activities, which could generate noise and vibration impact on environment and occupational health. The noise sources are identified from the source documents (the ESA in particular) related to the construction phase.

The emissions may arise from activities such as:

41. Site preparation;
42. Excavation;
43. Material handling;
44. Material transportation;
45. Construction.

1. Specific management methods and mitigation measures

This section presents the management methods and mitigation measures that the Plan aims to implement for mitigating noise and vibration emissions, which are related to the construction activities and the use of construction equipment, machinery and vehicles.

For each method and measure/action identified, the table shows:

1. The identification code (ID)
2. the reference (or source) documents (i.e. ESA, Turkish Regulations, permits, IFC Performance Standards, EBRD Performance Requirements and EHS Guidelines, OPIC or other GIIP)
3. frequency/timing of the measure/action, as applicable
4. Key Performance Indicator (KPI), if applicable, and related quantitative target or qualitative acceptance criteria;
5. related responsibility for implementing the measure/action.

For the measures, actions where no KPI can be identified the cells reports "n.a." (not applicable). In this case an on/off acceptance criteria will apply; in other words the acceptance criteria set is a qualitative one, such as "the measure/action has been implemented effectively".

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ID.	SOURCE DOC.	MONITORING ACTION/MEASURE DESCRIPTION	FREQUENCY/ TIMING	KPI	TARGET/ ACCEPTANCE CRITERIA	RESPONSIBILITIES
NOM-01	ESA 9.1.7 Turkish Reg. Gaz. No. 27601	Construction activities will not be conducted during night time	Continuous	Stop of construction activities during nighttime	Action Implemented	EPC Contractor
NOM-02	Turkish Reg. Gaz. No. 27601	Start and completion dates of construction, working hours and information about permits obtained from local municipalities will be announced to public on a board in construction site.	Continuous	Announcement of related information on a board	Action Implemented	SPV EPC Contractor
NOM-03	IFC-EHS GL Constr. & Decommissioning EBRD PR1 OPIC	In order to reduce the potential noise impacts on the residential areas and hospitals, truck transportation in residential areas during construction phase will be avoided at night time.	Continuous	Nighttime traffic reduction	Action Implemented	EPC Contractor
NOM-04	IFC-EHS GL Environmental - 1.7 Turkish Reg. Gaz. No. 28721 EBRD PR1 OPIC	Selecting equipment with lower sound power levels Noise emission of equipment used in the Construction Site, expressed in terms of sound power level (L_{WA}) has to comply with noise limits according to the power (kW) of equipment	Construction site planning / purchase of new equipment	L_{WA} Sound Power Level	Bulldozer, Truck, Excavator, Crane $L_{WA} \leq 101$ dB(A) Generator, Welding Machine $L_{WA} \leq 97$ dB(A) Loader $L_{WA} \leq 103$ dB(A) Road Roller $L_{WA} \leq 106$ dB(A)	EPC Contractor
NOM-05	IFC-EHS GL Constr. & Decommissioning EBRD PR1 OPIC	Planning activities in consultation with local communities so that activities with the greatest potential to generate noise are planned during periods of the day that will result in least disturbance	Continuous	n.a.	Action Implemented	SPV EPC Contractor
NOM-06	IFC-EHS GL Environmental - 1.7 EBRD PR1 OPIC	Installing silencers for fans	Continuous	$L_{pA,1m}$ Sound Pressure Level @ 1m	$L_{pA,1m} \leq 85$ dB(A)	EPC Contractor

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ID.	SOURCE DOC.	MONITORING ACTION/MEASURE DESCRIPTION	FREQUENCY/ TIMING	KPI	TARGET/ ACCEPTANCE CRITERIA	RESPONSIBILITIES
NOM-07	IFC-EHS GL Environmental - 1.7 EBRD PR1 OPIC	Installing suitable mufflers on engine exhausts and compressor components	Continuous	$L_{pA,1m}$ Sound Pressure Level @ 1m	$L_{pA,1m}$ ≤ 85 dB(A)	EPC Contractor
NOM-08	IFC-EHS GL Environmental - 1.7 EBRD PR1 OPIC	Installing acoustic enclosures for equipment casing radiating noise	Continuous	$L_{pA,1m}$ Sound Pressure Level @ 1m	$L_{pA,1m}$ ≤ 85 dB(A)	EPC Contractor
NOM-09	IFC-EHS GL Environmental - 1.7 EBRD PR1 OPIC	Installing vibration isolation for mechanical equipment	Continuous	Vibration Isolation	Isolation $\geq 90\%$	EPC Contractor
NOM-10	IFC-EHS GL Environmental - 1.7 EBRD PR1 OPIC	Limiting the hours of operation for specific pieces of equipment or operations, especially mobile sources operating through community areas	Continuous	Limitation of noisy equipment and operation	Action Implemented	EPC Contractor
NOM-11	Turkish Reg. Gaz. No. 27601	Reducing project traffic routing through community areas wherever possible	Construction site layout planning	Reducing traffic in community areas and verify compatibility of noise emissions of motor vehicles	Action Implemented	EPC Contractor
NOM-12	IFC-EHS GL Environmental - 1.7 EBRD PR2	Developing a mechanism to record and respond to complaints	Continuous	Grievance Mechanism	100% of complaints solved	EPC Contractor

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ID.	SOURCE DOC.	MONITORING ACTION/MEASURE DESCRIPTION	FREQUENCY/ TIMING	KPI	TARGET/ ACCEPTANCE CRITERIA	RESPONSIBILITIES
NOM-13	IFC-EHS GL – OHS IFC PS2 EBRD PR2 OPIC Turkish Reg. Gaz. No. 28721	Appropriate personal protective equipment and materials be provided to workers	Continuous	LEP,8h Worker's daily noise exposure level	LEP,8h ≤ 85 dB(A)	SPV EPC Contractor each for their own employees
NOM-14	Turkish Reg. Gaz. No. 28721 Turkish Reg. Gaz. No. 28628	Regular maintenance will be carried out on construction equipment to ensure noise levels are maintained within requirements	Six-monthly	Equipment and vehicles check	100% of equipment and vehicles checked	EPC Contractor
NOM-15	IFC-EHS GL Environmental - 1.7 EBRD PR1 OPIC	Re-locating noise sources to less sensitive areas to take advantage of distance and shielding	Construction site layout planning	Noise sources localization	Photographic records prove the mitigation measure application	EPC Contractor
NOM-16	IFC-EHS GL Environmental - 1.7 IFC-EHS GL Constr. & Decommissioning EBRD PR1 OPIC	Installing acoustic barriers without gaps and with a continuous minimum surface density of 10 kg/m ² in order to minimize the transmission of sound through the barrier. Barriers should be located as close to the source or to the receptor location to be effective	Construction site layout planning	Acoustic barriers localization	Photographic records prove the mitigation measure application	EPC Contractor
NOM-17	IFC-EHS GL Environmental - 1.7 EBRD PR1 OPIC	Siting permanent facilities away from community areas if possible	Construction site layout planning	Permanent facilities localization	Photographic records prove the mitigation measure application	EPC Contractor
NOM-18	IFC-EHS GL Environmental - 1.7 EBRD PR1 OPIC	Taking advantage of the natural topography as a noise buffer during facility design	Construction site layout planning	Taking advantage of the natural topography	Photographic records prove the mitigation measure application	EPC Contractor

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ID.	SOURCE DOC.	MONITORING ACTION/MEASURE DESCRIPTION	FREQUENCY/ TIMING	KPI	TARGET/ ACCEPTANCE CRITERIA	RESPONSIBILITIES
NOM-19	Turkish Reg. Gaz. No. 28721	Information about construction equipment will be given to workers and trainings for use of them will be conducted.	On going	Providing information and training to workers about equipment	Trainings to all workers	SPV EPC Contractor
NOM-20	Turkish Reg. Gaz. No. 28721	Periodic medical hearing checks will be conducted to the workers.	On going	Conduction of hearing tests	Hearing checks to all workers	SPV EPC Contractor each for their own employees

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6. MONITORING

1. Noise and Vibration Occupational Exposure

According to the Regulation on Protection of Workers from Risks Related to Noise (Official Gazette No. 28721, 28/07/2013), Regulation on Protection of Workers from Risks Related To Vibration (Official Gazette No. 28743, 22/08/2013), IFC - Environmental, Health, and Safety (EHS) Guidelines - Occupational Health and Safety and OPIC Environmental and Social Policy Statement, employers have the following obligations:

7. Noise Risk assessment (ref. TS 2607 ISO 1999 and TS EN ISO 9612)
8. Vibration Risk assessment (ref. TS EN ISO 5349-1/2 and TS ISO 2631)

1. Levels at the Project Area and Sensitive Receptors

Noise monitoring will be carried out in order to verify compliance of noise emissions with the Turkish Regulation, IFC standards, OPIC and EBRD requirements. The standards are not fully comparable, so that the stricter one cannot be identified. For this reason, both standards have to be met.

Measurements will be made at the site boundary and among sensitive receptors. Noise measurements should be performed in accordance to TS 9315 ISO 1996-1 and TS ISO 1996-2 Standards. The procedure that must be used for measuring environmental noise is described below.

The measurements will be carried out by using a sound level meter according to TS EN 61672 Type 1 Standard. The sound level meter and portable sound level calibrator must be calibrated at least every two years by a calibration laboratory accredited by TÜRKAK or by any other international agency which is signatory of EA, IAF, and ILAC Mutual Recognition Agreement. The performance of the sound level meter will be checked periodically with a portable sound level calibrator according to TS EN 60942, immediately before and after measurements are made. For extended measurement periods, these checks should be performed before and after each measurement sequence. If the instrumentation system registers a calibration discrepancy equal to or greater than ± 0.5 dB between consecutive checks, any measurements in the interval between the two checks will be considered invalid.

Measurements will be taken outdoors. The microphone of the sound level meter will be protected by a windscreen and supported on suitable stands, located at the height of 1.5 meters above the ground. The measurement point will be no closer than 3 m to any reflecting surface (e.g. wall). Where it is not possible it must be noted on the noise measurement data sheet.

Measurements will not be carried out when wind velocity is more than 5 m/s or when it is raining or snowing. Daily weather conditions during the measurement period (temperature, humidity, wind direction and wind velocity) will be recorded.

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The technician taking sound pressure level measurements must be familiar with the use of the sound level measuring instrumentation and the relevant procedures in accordance to the above mentioned noise standards.

Noise measurements will be performed over a sufficiently long time to be representative of the background noise of the sensitive area.

Measurements will be carried out in different locations:

9. along the Project boundary
10. inside the project area
11. at the sensible receivers (i.e. residential areas)

Below figure shows these measurement locations.

During the field activity, if the necessary safety or technical conditions to undertake the measurement will not be verified for one or more of the selected measurement points, the point should be relocated as much as possible closer to the original location in a location where the required conditions are ensured. For this reason the measurement positions shown in the figure have to be considered just an indication and may be subject to modifications.

The location of the measurements points will be identified after an inspection of the monitoring areas. Some factors may be taken into account as follows:

12. Interfering sources
13. Security
14. Access
15. Visibility of the site in relation to its surroundings
16. Safety of the public and operators
17. Planning requirements.

The location (including the coordinates) of the following monitoring points is representative of the following sensitive receptors and shown in below figure:

NOM-POI-01 (below figure): The down side of the Project area, located at north-west direction from the construction site and nearby the (upper) Trans European Motorway (TEM)-O4 section

NOM-POI-02 (below figure): Residential buildings of the Yeşilova quarter, located at the north side of construction site and nearby the O-4 highway

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NOM-POI-03 (below figure): TOKİ buildings of the Tavşantepe Quarter, located at the eastern side of O-4 highway

NOM-POI-04 (below figure): Hacı Bektaş Veli Middle School of the Tavşantepe Quarter, located at the southern side of the construction site

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1. Monitoring program

Monitoring program will apply national/international methods for sample collection and analysis. Measurements and analysis will be performed by qualified personnel.

Below table details the monitoring (measurement) activities identified for noise monitoring in the Construction phase. For each monitoring activity identified, the table shows:

The identification code (ID.)

the reference (or source) documents (i.e. ESA, Turkish standard, permits, IFC Performance Standards and EHS Guidelines, EBRD Performance Requirements, OPIC Environmental and Social Policy Statement or other GIIP)

A description of the monitoring activity including parameters to be monitored and monitoring locations.

frequency/timing of the measurement,

Key Performance Indicator (KPI), and related quantitative target, if the target consist of a regulatory limit this will be indicated;

the related responsibility for implementing the monitoring activity.

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ID.	SOURCE DOC.	MONITORING ACTION/MEASURE DESCRIPTION	FREQUENCY/ TIMING	KPI	TARGET/ ACCEPTANCE CRITERIA	RESPONSIBILITIES
NOM-21	ESA App. N GIP	Noise measurements (monitoring) at NOM-POI-01, NOM-POI-02, NOM-POI-03 and NOM-POI-04	Monthly	$L_{Aeq,10'}$ A-Equivalent Sound Pressure Level	$L_{Aeq,10'}$ ≤ 85 dB(A)	EPC Contractor
NOM-22	IFC-EHS GL - OHS Turkish Reg. Gaz. No. 28721	Noise Monitoring at workplace	At the beginning of the Construction Phase/ Every year	$L_{EP,8h}$ Worker's daily noise exposure level	$L_{EP,8h}$ ≤ 85 dB(A) L_{Cpeak} ≤ 140 dB(C)	EPC Contractor
NOM-23	IFC-EHS GL -OHS Turkish Reg. Gaz. No. 28743	Vibration Monitoring at workplace HAV - Hand Harm Vibration	At the beginning of the Construction Phase/ Every year	A(8) Worker's daily vibration exposure level	A(8) ≤ 5 m/s ² (ELV)	EPC Contractor
NOM-24	IFC-EHS GL -OHS Turkish Reg. Gaz. No. 28743	Vibration Monitoring at workplace WBV - Whole Body Vibration	At the beginning of the Construction Phase/ Every year	A(8) Worker's daily vibration exposure level	A(8) ≤ 1.15 m/s ² (ELV)	EPC Contractor

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18. AUDIT AND REVIEW

The correct implementation of this Management Plan is verified through internal inspections and audits to be carried out according to the requirements included in section “Internal audit” of the “ESMS Manual”.

The schedule, the frequency, the scope and objectives of the audit as well as the responsible internal auditors are indicated in the Audit Program that is developed and updated by SPV HSE Department.

Internal auditing will address:

1. The correct implementation of this Management Plan;
2. The correct development and implementation of EPC Contractor Procedure(s);
3. The correct and timely implementation of an auditing and review system by the EPC Contractor;
4. Each of the point indicated in the tables in section 4 (mitigation actions/measures) and 5 (monitoring/measurements) of this plan.

Internal inspections frequency have to be increased when activities with a high potential to produce noise are being carried out.

Evidences and results of the inspection and audit activities are included in the audit reports and in the “Non-Conformity and Preventive/Corrective actions” records.

SPV Management reviews results of inspections and audits and the progress of the Preventive/Corrective actions and takes additional appropriate actions if necessary according to the indications included in section “Management Review” of the “ESMS Manual”.

5. REPORTING

1. Audit reports (by SPV)

Evidences of the implementation of the mitigation actions/measures and related results are collected through inspection and auditing activities as detailed in section 6 “Audit and Review” of this plan; these evidences are described in the audit reports.

2. EPC Contractor Reporting

1. EPC Contractor monitoring reports

Evidences and results of the each monitoring (measurement) activity have to be included in specific noise monitoring reports to be provided by EPC Contractor; these reports have to include the following minimum information/data:

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6. model, type and serial number of all measurement apparatus used;
7. date and number of the latest calibration certificate of each measurement apparatus;
8. weather conditions during the measurement period;
9. drawing/photograph, description and coordinates for each measurement location;
10. date, time and duration of the noise measurements;
11. A-equivalent sound pressure level (L_{Aeq}) and spectrum of the measurement in 1/3 octave band frequency;
12. time history of L_{pA} ;
13. statistical levels (L_{A10} , L_{A50} , L_{A90});
14. a table/form for each point measure including all the necessary information as listed above and noise limits;
15. notes on any abnormal noises during the measurement.

The monitoring reports will be provided by the EPC Contractor to SPV within 15 days from the monitoring activity.

1. EPC Contractor mitigation measures report

Evidences and results of the mitigation measures/actions (detailed in section 4 of this plan) have to be included in specific noise mitigation measures reports to be provided by EPC Contractor; these reports have to include the following minimum information/data:

16. The list of the mitigation measures implemented, including the ID code (see section 4), a description, and their aim;
17. The noise source as construction activity (e.g. demolition, excavation, transportation, etc.) related to the mitigation measure;
18. The period of the measure application (start date and end date);
19. The achievement (or not) of the target/acceptance criteria for key the performance indicator.

The mitigation measures report will be provided by the EPC Contractor to SPV on a six monthly basis within December and June.

1. Noise quality reporting (SPV)
 1. Collection of noise monitoring data

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The noise monitoring results provided by EPC Contractor have to be documented and reported by SPV on an ongoing basis. The documentation includes the following items for each monitoring measure:

20. The identifying code of the monitoring measure and location applied;
21. The description of the monitoring measure applied;
22. The noise source related to the monitoring measure;
23. The period of the monitoring measure (start date and end date);
24. The KPI results;
25. The achievement (or not) of the target/acceptance criteria for KPI.

1. Six monthly reporting on noise

A six monthly report on noise will be done by SPV, based on the reports provided by EPC Contractor and on the audit reports, summarizing:

26. synthetic description of the mitigation measures applied by the EPC Contractor;
27. monitoring activities and their results compared to target criteria;
28. conclusions and recommendations (if any).

The report will provide the basis to verify the effectiveness of this Management Plan by the external public and stakeholders which should be informed on the results of monitoring and on the project environmental performance related to noise prevention. This report constitutes the basis for the monitoring report to be available for the Lenders.

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