SUBJECT: STATUS REPORT ON ACTION PLAN ON NOISE MANAGEMENT IN INDIA

REFERENCE: OA NO. 681 OF 2018 BEFORE NGT IN THE MATTER OF NEWS ITEM PUBLISHED IN "THE TIMES OF INDIA" AUTHORED BY SHRI VISHWA MOHAN TITLED "NCAP WITH MULTIPLE TIMELINES TO CLEAN AIR IN 102 CITIES TO BE RELEASED AROUND AUGUST 15"

1.0 BACKGROUND

Hon'ble National Green Tribunal vide its order dated 15.03.2019 in above said matter directed CPCB as follows:

Para 12: We also direct CPCB to prepare noise pollution map and identify hotspots and categorize the cities with specified hotspots and propose a remedial action plan. Such report may be furnished within three months by e-mail at ngt.filing@gmail.com. We are informed that in 7 cities noise monitoring mechanism has already been established by the CPCB which is functioning on continuous basis and is connected to the server of CPCB. The CPCB may consider setting up such mechanism in all the cities which are found to be having noise level above approved the threshold.

Para 14: The State PCBs may undertake noise level monitoring in conjunction with the Police Department and take remedial action. The Police Departments of all the States/UTs may obtain the noise monitoring devices within a period of three months and specification of such devices may be finalized in consultation with the respective State PCBs/Pollution Control Committees (PCCs). The Police Department of all the State/UTs may also train their staff regarding the use of such devices and develop a robust protocol for taking appropriate action against the defaulters.

The CPCB may explore the possibility in consultation with the leading manufacturers of public address systems and other manufacturers of such instruments, to manufacture such equipment wherein the noise meters with data loggers are fitted therein so that as and when the prescribed parameters are violated, the same gets recorded and retrieved by the regulators for fixing the responsibility on the violators. The Chief Secretary may finalize action plans in this regard within three months and submit the same to CPCB. CPCB may give its report by July 15, 2019

Para 15: The CPCB may also lay down scale of compensation to be recovered including conditions on which equipment seized is to be released within one month.

Para 16: Copies of this order be sent to the Chief Secretaries of all the States/UTs and DGPs by e-mail.

2.0 FOLLOW-UP ACTION TAKEN BY CPCB

In compliance to directions issued at para 12 14, 15 and 16, CPCB has taken following action:

A. *Para 12: We also direct CPCB to prepare noise pollution map and identify hotspots and categorize the cities with specified hotspots and propose a remedial action plan. Such report may be furnished within three months by e-mail at ngt.filing@gmail.com.*
We are informed that in 7 cities noise monitoring mechanism has already been established by the CPCB which is functioning on continuous basis and is connected to the server of CPCB. The CPCB may consider setting up such mechanism in all the cities which are found to be having noise level above approved the threshold.

ACTION TAKEN BY CPCB

Noise mapping provides information on sound level at particular grid of city along with probable sources. It requires specified software and further, software has prerequisites related to infrastructure, base level data, traffic flow etc.

CPCB has identified 46 metropolitan cities in 17 States / Union Territories to carry out noise mapping and identification of hot spots by respective State Pollution Control Boards / Committees. List of such 46 cities is attached at **Annexure-I**. In order to assist, it was decided to prepare methodology to carry out Noise Mapping. Accordingly, CPCB has taken following actions:

1. CPCB convened meeting on 07/05/2019 with experts of National Environmental Engineering Research Institute (NEERI), National Physical Laboratory (NPL) and Central Road Research Institute (CRRI). Experts of respective organizations shared their experiences of Noise mapping and agreed to developed methodology for noise mapping. Minutes of meeting is placed as **Annexure-II.**
2. CPCB developed methodology for formulation of noise mapping in consultation with NPL, NEERI and CRRI and a copy of the same is placed at **Annexure-III**.
3. CPCB issued directions under section 18 1 (b) of the Air (Prevention and Control of Pollution) Act, 1981 to 17 SPCBs / PCCs for Noise Mapping,

Identifying Hot Spots and Preparation of Mitigation Plan for control of Noise Pollution vide letter no. A-14011/1/2015-Mon dated 21/06/2019. CPCB forwarded methodology and directed SPCBs/PCCs as follows:

i. **Action plan for preparation of Noise Mapping for the metropolitan city(ies) under their jurisdiction be prepared and executed by 30.11.2019 as per methodology formulated by CPCB.**

ii. **Hot spots having violation of prescribed norms be identified and mitigation plans be prepared by 31.12.2019 so as to ensure compliance of Noise Pollution (Regulation and Control) Rules, 2000.**

iii. **Reports on Noise Map(s) and Noise Mitigation action plan(s) be provided to CPCB by 31.12.2019 for submission to Hon'ble NGT**

Copy of directions is attached as **Annexure-IV.**

4. NEERI has informed that they have conducted noise mapping of 27 cities in Maharashtra in approximately 18-months. NEERI has developed GIS based noise simulation software (N-GNOIS) to simulate the noise scenarios due to point and mobile sources considering the impact of geographical features and meteorological parameters. Copy of NEERI's report for Mumbai city is attached as **Annexure-V.**

5. CPCB in association with State Pollution Control Boards has laid down National Ambient Noise Monitoring Network in 07 metropolitan cities and installed 70 no. of Noise Monitoring System in Mumbai, Delhi, Kolkata, Chennai, Bangalore, Lucknow and Hyderabad (10 stations in each) under Phase-I and Phase-II of the programme. Ambient noise data available with CPCB can be used for generating noise maps. It was proposed that noise mapping in 07 cities for 70 locations based on available data shall be initiated jointly with NEERI, NPL and IIT Kanpur to understand the subject and same may be replicated in large scale with SPCBs/PCCs.

Accordingly, CPCB convened meeting on 04/07/2019 with NPL, NEERI and IIT Kanpur to discuss methodology, strategy and outcomes for proposal of Noise Mapping. Minutes of Meeting is attached as **Annexure-VI.**

It was decided that NEERI, NPL and IIT Kanpur shall submit comprehensive proposal within a period of 01 week. The scope of work for the project shall include the following:

a. Source Profiling

b. Hot Spot Identification

c. Noise Mapping

d. Remedial Action Plan

6. After receiving proposal, CPCB shall award projects to NEERI, NPL and IIT Kanpur for conducting study in 07 cities.

7. CPCB has prepared the proposal of installation of 156 Noise Monitoring Station in 39 cities and proposal submitted to MoEF&CC for consideration and release of funds. MoEF &CC has considered the proposal and allocation of funds is under process.

B. ***Para 14: The State PCBs may undertake noise level monitoring in conjunction with the Police Department and take remedial action. The Police Departments of all the States/UTs may obtain the noise monitoring devices within a period of three months and specification of such devices may be finalized in consultation with the respective State PCBs/Pollution Control Committees (PCCs). The Police Department of all the State/UTs may also train their staff regarding the use of such devices and develop a robust protocol for taking appropriate action against the defaulters.***
The CPCB may explore the possibility in consultation with the leading manufacturers of public address systems and other manufacturers of such instruments, to manufacture such equipment wherein the noise meters with data loggers are fitted therein so that as and when the prescribed parameters are violated, the same gets recorded and retrieved by the regulators for fixing the responsibility on the violators. The Chief Secretary may finalize action plans in this regard within three months and submit the same to CPCB. CPCB may give its report by July 15, 2019

ACTION TAKEN BY CPCB

1. CPCB emailed directions of Hon'ble NGT to Chief Secretary of all States / Union Territories vide email dated 08/05/2019. CPCB requested that necessary follow-up action by the State Govt. may kindly be taken to meet the time lines indicated by the Hon'ble Tribunal. Copy of email is attached as **Annexure- VII.**
   Hon'ble NGT directed State Governments to prepare action plan on following issues:
   a) The State PCBs may undertake noise level monitoring in conjunction with the Police Department and take remedial action.
   b) The Police Departments of all the States/UTs may obtain the noise monitoring devices within a period of three months and specification of such devices may be finalized in consultation with the respective State PCBs/Pollution Control Committees (PCCs).
   c) The Police Department of all the State/UTs may also train their staff regarding the use of such devices and develop a robust protocol for taking appropriate action against the defaulters.

Action plan on the matter has been received from 10 States (Assam, Chhattisgarh, Daman Diu & Dadra Nagar Haveli, Delhi, Jammu & Kashmir, Madhya Pradesh, Odisha, Telangana, Tripura and West Bengal).

Action plan from remaining 25 States / UTs (Andhra Pradesh, Arunachal Pradesh, Bihar, Gujarat, Goa, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Maharashtra, Manipur, Mizoram, Meghalaya, Nagaland, Punjab, Rajasthan, Sikkim, Tamil Nadu, Uttar Pradesh and Uttarakhand) - UTs (Andaman & Nicobar, Chandigarh, Lakshadweep and Pondicherry) are yet to received.

Action points submitted by 09 State Governments in compliance to Hon'ble NGT directions are summarized below:

Sl. No.	State	Action points		
		State PCBs may undertake noise level monitoring in conjunction with the Police Department and take remedial action.	**Police Departments of all the States/UTs may obtain the noise monitoring devices within a period of three months and specification of such devices may be finalized in consultation with the respective State PCBs/Pollution Control Committees (PCCs).**	**The Police Department of all the State/UTs may also train their staff regarding the use of such devices and develop a robust protocol for taking appropriate action against the defaulters.**
1.	**Assam**	Complying; Monitoring being carrying out by Assam Pollution Control Board on monthly basis since November, 2017 at 14 locations.	Complying; Time line for procurement of sound level meter for Police Department (06 months) and Pollution Control Board (03 months) is mentioned.	Non- Complying; • Timelines for training of regulatory machine is mentioned (03 months). • Protocol was not framed
2.	**Chhattisgarh**	Non-Complying No such monitoring being carried out. However, action being taken against violation of Kolahal Act, 1985.	Complying; 469 instruments being provided to Police Department through Chhattisgarh Environment Conservation Board	Non-Complying; • Training provided to 340 officials of Police Department. • Protocol was not framed
3.	Daman Diu & Dadra Nagar Haveli	Complying; Monitoring conducted at 08 locations	No information provided	No information provided
4.	Delhi	Complying; 05 nos. of Real time Ambient Noise Monitoring Stations is being operated.	Complying; DPCC provided specification of sound level meter to Police Department and ULBs. Procurement of Sound level meters is under	Non-Complying; • Workshop was conducted on 16.04.2019 for ULBs and Delhi police departments.

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Sl. No.	State	Action points		
		State PCBs may undertake noise level monitoring in conjunction with the Police Department and take remedial action.	**Police Departments of all the States/UTs may obtain the noise monitoring devices within a period of three months and specification of such devices may be finalized in consultation with the respective State PCBs/Pollution Control Committees (PCCs).**	**The Police Department of all the State/UTs may also train their staff regarding the use of such devices and develop a robust protocol for taking appropriate action against the defaulters.**
			process and finalized by September, 2019	• Protocol was not framed
5.	Jammu & Kashmir	Complying; Monitoring being carried out by SPCB on random basis at 03 locations in Jammu and 10 locations in Srinagar	Complying; Specification are finalized and procurement is under process and no time line provided for procurement.	Non-Complying • Time line is provided for training of police Departments. Training will be provided in months of July, 2019. • Protocol was not framed
6.	Madhya Pradesh	Complying; Monitoring being carried out by SPCBs on regular basis	No information provided	No information provided
7.	Odisha	Complying; Odisha SPCBs carrying out Noise monitoring during specific occasions.	Complying; Specification provided by SPCB to Police Departments and 259 sound level meters issued to different districts.	Non-Complying • Protocol was not framed • Training was not provided
8.	Tripura	Complying; Tripura SPCBs carrying out Noise monitoring on regular basis at different urban and semi-urban areas.	Complying; Action on above aspects being already being taken by State Government in compliance to directions of Hon'ble High Court of Tripura. Tripura Government has notified policy for mandatory use of Sound Limiter(s) in all sound system / public address system for effective control of Noise Pollution in whole state of Tripura "Use of loudspeakers are permitted only when amplifier(s) are attached to sound limiter(s).	
9.	Telangana	Complying; 11 nos. of Real Time Ambient Noise Monitoring Stations is being operated	No information provided	No information provided

Sl. No.	State	Action points		
		State PCBs may undertake noise level monitoring in conjunction with the Police Department and take remedial action.	**Police Departments of all the States/UTs may obtain the noise monitoring devices within a period of three months and specification of such devices may be finalized in consultation with the respective State PCBs/Pollution Control Committees (PCCs).**	**The Police Department of all the State/UTs may also train their staff regarding the use of such devices and develop a robust protocol for taking appropriate action against the defaulters.**
10.	West Bengal	Complying; SPCBs is regular carrying out noise monitoring and submitting its report to Hon'ble NGT in the matter of Subhas Dutta vs State of West Bengal & Ors in O. A no. 158/2016 (EZ)	Complying: 527 Sound Level Meter and 527 Sound Limiters are provided to Police Departments.	Complying; Action on above aspects being already being taken by State Government in compliance to directions of Hon'ble NGT in the matter of Subhas Dutta vs State of West Bengal & Ors in O. A no. 158/2016 (EZ). West Bengal State Government has notified policy for mandatory use of Sound Limiter(s) in all sound system / public address system for effective control of Noise Pollution in whole state of W.B "Use of loudspeakers are permitted only when amplifier(s) are attached to sound limiter(s).

Summary of detailed action plan received is attached as **Annexure-VIII.**

2. INTEGRATION OF NOISE METER WITH PUBLIC ADDRESS SYSTEM

CPCB convene meeting on 08/05/2019 with leading manufacturer of Public Address System to discuss the issue of integration of Noise Meters with Loud Speakers for the purpose of recording and retrieving of data by the regulators for fixing the responsibility on the violators.

During meeting, manufactures explained that integration of Noise Meters with Loud Speakers for the purpose of recording and retrieving is not possible. Copy of minutes is attached as **Annexure-IX.**

3. Consumers Electronics and Appliances Manufacturer Association (CEAMA) vide letter dated 07.05.2019 informed CPCB that such integration is economically not feasible. Copy of letter is attached as **Annexure-X. However, State Government of Tripura and West Bengal has introduced policy for mandatory use of Sound Limiter(s) in all sound system / public address system for effective control of Noise Pollution.** ***Use of loudspeakers are permitted only when amplifier(s) are attached to sound limiter(s).***
Same policy may practice by other state government to mitigate noise pollution.

C. ***Para 15: The CPCB may also lay down scale of compensation to be recovered including conditions on which equipment seized is to be released within one month.***

ACTION TAKEN BY CPCB

CPCB has constituted committee to constitute a mechanism for laying down scale of compensation to be recovered for violation of Noise Pollution (Regulation and Control) Rules, 2000 vide Office order no. A-19014/50/09-UPC-I dated 10.05.2019.

Committee is finalizing the report for assessing the scale of compensation on equipment seized.

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ANNEXURE-I

LIST OF 46 METROPOLITAN CITIES

Sl. No. (City)	City	Sl. No. (State)	State
1.	Vishakapatnam	1	Andhra Pradesh
2.	Vijaywada		
3.	Patna	2	Bihar
4.	Raipur	3	Chhatishgarh
5.	Delhi	4	Delhi
6.	Ahmedabad	5	Gujrat
7.	Rajkot		
8.	Surat		
9.	Vadodra		
10.	Faridabad	6	Haryana
11.	Dhanbad	7	Jharkhand
12.	Ranchi		
13.	Srinagar	8	Jammu & Kashmir
14.	Bengaluru	9	Karnataka
15.	Bhopal	10	Madhya Pradesh
16.	Gwalior		
17.	Indore		
18.	Jabalpur		
19.	Thane	11	Maharashtra
20.	Mumbai		
21.	Navi Mumbai		
22.	Pimpri-Chinchwad		
23.	Kalyan Dombivali		
24.	Aurangabad		
25.	Nagpur		

Sl. No. (City)	City	Sl. No. (State)	State
26.	Nashik		
27.	Pune		
28.	Vasai-Virar		
29.	Amritsar	12	Punjab
30.	Ludhiana		
31.	Jaipur	13	Rajasthan
32.	Jodhpur		
33.	Kota		
34.	Hyderabad	14	Telangana
35.	Coimbatore	15	Tamil Nadu
36.	Chennai		
37.	Madurai		
38.	Agra	16	Uttar Pradesh
39.	Allahabad		
40.	Ghaziabad		
41.	Kanpur		
42.	Lucknow		
43.	Meerut		
44.	Varanasi		
45.	Kolkata	17	West Bengal
46.	Howrah		

ANNEXURE-II

CENTRAL POLLUTION CONTROL BOARD
PARIVESH BHAWAN EAST ARJUN DELHI-110032

MINUTES OF THE FIRST MEETING WITH EXPERTS OF NOISE MAPPING IN THE MATTER O.A. NO. 681/2018 TITLED "TIMES OF INDIA" AUTHORED BY SHRI VISHWA MOHAN TITLED "NCAP WITH MULTIPLE TIMELINES TO CLEAN AIR IN 102 CITIES TO BE RELEASED AROUND AUGUST 15"

In compliance to directions of Hon'ble NGT in above said matter, a meeting convened with expert's members on Noise Mapping from NEERI, NPL and CRRI at Central Pollution Control Board (CPCB) on 07/05/2019. List of participant is attached at **Annexure-I.**

Sh Vishal Gandhi, Scientist 'D' welcomed the participants and explained the directions of Hon'ble NGT as mentioned below:

> We also direct CPCB to prepare noise pollution map and identify hotspots and categorize the cities with specified hotspots and propose a remedial action plan. Such report may be furnished within three months by e-mail at ngt.filing@gmail.com. We are informed that in 7 cities noise monitoring mechanism has already been established by the CPCB which is functioning on continuous basis and is connected to the server of CPCB. The CPCB may consider setting up such mechanism in all the cities which are found to be having noise level above approved the threshold.

Sh Vishal Gandhi mentioned that noise mapping shall be carried out in 46 metropolitan cities with coordination of respective State Pollution Control Board. He further requested the expert members to share their experience on Noise Mapping and respective mitigation plan. During the course of meeting, following issues were discussed:

1. Dr Ritesh Vijay, Principle Scientist, NEERI has mentioned that they have conducted noise mapping of 27 cities in Maharashtra in approx 18-month time. NEERI has developed GIS based noise simulation software (N-GNOIS) to simulate the noise scenarios due to point and mobile sources considering the impact of geographical features and meteorological parameters. The methodology developed based on workshop, discussion held with stakeholders and number of stations are selected considering probable noise sources (source-receptor) and designated land use.

2. Dr Nasim Akhtar, CRRI mentioned his experience of noise mapping and noise monitoring. He further mentioned that there are certain traffic hotspots where noise level ranges with 70-75 dB(A). Accordingly, some spots can be labeled considering such sound level and need of noise monitoring at all locations can be minimized.
3. Dr Naveen Garg, NPL suggested to have strategy and methodology for formulation of Noise map.

Based on above discussion, following decisions were made:

1. It was agreed that a methodology of Noise Mapping shall be developed with collaborative efforts of NEERI, NPL, and CRRI and submitted to CPCB by 15.05.2019. Accordingly, CPCB will finalize the methodology considering inputs of all experts.
2. It was agreed that only Indian models/ Software for Noise Mapping will be used for task of Noise mapping in 46 cities.
3. Dr Nasim Aktar, CRRI also agreed to carry out noise mapping for CPCB with the ambient noise data available with CPCB.

The meeting ended with thanks to the chair.

ANNEXURE-I

LIST OF PARTICIPANTS

1. Dr Nasim Akhtar, CRRI
2. Dr Ritesh Vijay, Principle Scientist, NEERI
3. Dr Raman Sharma, Senior Scientist, NEERI
4. Dr Navin Garg, NPL
5. Sh Vishal Gandhi, Scientist 'D', CPCB
6. Sh Danish Meena, Scientist 'B', CPCB

ANNEXURE-II

METHODOLOGY FOR FORMULATION OF NOISE MAPPING IN INDIA

1. BACKGROUND

Hon'ble NGT vide order dated 15.03.2019 in the matter of OA no. 681/2018 titled "Times of India" Authored by Shri Vishwa Mohan Titled "NCAP with multiple timelines to clean air in 102 cities to be released around August 15" has issued numerous directions related to noise pollution. Hon'ble NGT in para 12 directed CPCB as:

> *We also direct CPCB to prepare noise pollution map and identify hotspots and categorize the cities with specified hotspots and propose a remedial action plan. Such report may be furnished within three months by e-mail at ngt.filing@gmail.com. We are informed that in 7 cities noise monitoring mechanism has already been established by the CPCB which is functioning on continuous basis and is connected to the server of CPCB. The CPCB may consider setting up such mechanism in all the cities which are found to be having noise level above approved the threshold.*

2. INTRODUCTION TO NOISE MAPPING

Noise map is a graphic representation of the sound Level distribution existing in a given region, for a defined period. It is similar to a contour map indicating the noise levels at different boundaries in an area. It is normally generated using computer software that calculates noise levels from input data such as traffic volume, speed, characteristics of road surface and nearby buildings as well as topography. Mapping can be made about individual noise sources i.e. road traffic, railway traffic, aircraft in flight or industry.

Noise maps are created not only to assess the environmental impact of traffic noise, but also for preliminary assessments of the effectiveness of noise control alternatives that can be adopted. Thus, the noise maps created are helpful for the management of environmental noise. The concept of noise mapping is a model shift from traditional methods of noise monitoring and control as it simulates the noise scenario and can be helpful in deciding noise control measures for reducing noise pollution in urban cities. In recent years, it has become an important and useful tool for environmental noise assessment and control.

3. AIMS AND OBJECTIVES

The objective of the Noise Mapping process is to establish country wide approach to avoid, prevent or reduce environmental noise where necessary and particularly

where exposure levels can induce harmful effects on human health, and to preserve existing good quality environmental noise levels. Noise pollution (Regulation and Control) Rules, 2000 are notified by MoEF & CC and responsibilities and restrictions are defined with authorities for further implementation. Under Noise Pollution (Regulation and Control) Rules, 2000, responsibilities are vested with State Governments, District Magistrate, Police Commissioner, or any other officer not below the rank of Deputy Superintendent of Police, as per detail given below:

1. Restriction on the use of Loud Speakers/Public Address system.
2. Restriction on the use of Horns, Sound emitting construction equipment and bursting of Fire crackers.
3. Prohibition of continuance Music Sound or Noise.

The Regulations identify and assign responsibilities to the particular organizations required to produce strategic noise mapping, and to those organizations responsible for the development of action plans. The Action Plan will endeavor to manage the existing noise environment and protect the future noise environment within the action planning area. Management of the existing noise environment may be achieved by prioritizing areas for which further assessment and possible noise mitigation may be required. Protection of the future noise environment may be achieved by acoustical planning, which further incorporates noise into the planning process via measures such as land-use planning, development planning, sound insulation measures, traffic planning and control of environmental noise sources. The benefits of noise mapping are as follows:

- To integrate Noise Action Plans into the City and Country Development Plan.
- To ensure compliance of Noise Rules, 2000 and mitigation are considered during the planning process.
- To ensure compliance with current and future policy and guidelines relating to environmental noise.
- To identify hot spots in the city and incorporation of noise mitigation measures.

4. LEGAL FRAMEWORK: EXISTING LEGAL PROVISIONS

1) Regulations

Standards have been fixed for most of the major sources of noise, as well as ambient level of noise in different category areas such as Silence Zone, Commercial, and Industrial & Residential Area.

The maximum permissible levels of Noise in Indian Cities notified by Ministry of Environment & Forests vide its notification no. S.O. 123 (E), (14-02-2000), Noise Pollution (Regulation & Control) Rules, 2000 is as follows:

Area Code	Category of Area/Zone	Limit in dB (A) Leq	
		Day	Night
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Note:

1. Day time shall mean from 6 AM to 10 PM
2. Night time shall mean from 10 PM to 6 AM
3. Silence Zone is defined as areas up to 100 meters around such premises as hospitals, educational institutes and courts. The Silence Zones are to be declared by competent authority. Use of Vehicular horns, loudspeaker and bursting of crackers shall be banned in these zones.
4. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.
5. Leq: It is an energy mean of the noise level over a specific period.

2. **Noise limits for vehicles at manufacturing stage is attached at Annexure-I.**

3. **Rule 5A (1) of the Noise Pollution (Regulation and Control) Rules, 2000**
   Use of sirens and multi-toned horns on vehicles should be continued to be prohibited in the silence zone and during night time in the residential zone as prescribed under the Noise Pollution (Regulation and Control) Rules, 2000 except during a public emergency

4. **Rule 119(1) and (3) of the Motor Vehicles Rules, 1989**
   The sirens and multi tone horns shall be continued to be banned except for Police Van, Ambulance and Fire Brigades

5. **Status of Vehicular Noise Standards w.r.t Horns & Sirens is attached at Annexure-II.**

5. METHODOLOGY

The concept of noise mapping involves the use of the validated noise model and a GIS software [10, 14] for developing noise maps [9, 13]. In Indian scenario, there is no authorized model that can be used for noise predictions. In such a case, the simulation

process is sometimes difficult as the foreign models like CoRTN, RLS 90, FHWA TNM, HARMONOISE, Nord 2000 etc. may not predict the exact results [1]. Thus, in such case, it is vital to calibrate these models in Indian scenario or to develop noise prediction model based on Indian heterogeneous traffic conditions including honking for using them for noise mapping process [2, 3, 4, 6, 11, 12].

Thus, in Indian scenario, the following aspects pertaining to developing of noise maps for cities is recommended as follows:

a) Noise monitoring will be carried out as per Noise Pollution (Regulation & Control) Rules, 2000 and Amended in 2017.

b) Collection of primary data comprising of Traffic volume data, Vehicular Speed, road details (type, number of lane, surface material etc.)[5], Building Layout, metrological data and topographical data [7, 9].

c) Honking incidence should also be taken under consideration for manifest of hotspot of respective cities.

d) Sound level data for selected site shall include day equivalent level, L_{day} and night equivalent level, L_{night} as per the ambient noise standards. Other Noise indicators viz. L_{max}, L_{min}, L_{10}, L_{50}, L_{90} shall be considered. Traffic Noise Index (TNI) and Noise pollution Level (N_{LP}) shall also be measured [8]. Measurements will be made with a Type 1 integrating sound level meter with free-field microphone which meets the Accuracy of noise measurement as per IEC 804 (BS 6698) Grade I or ANSI Type I or equivalent IEC 61672-1(2002-05) Class-I.

e) A combined approach involving the use of noise monitoring terminals for noise monitoring of various sites and prediction of ambient noise levels for some points using interpolation algorithms may be exercised. The Nose Monitoring Terminals (NMTs) should be calibrated and traceable to the national standards for accurate and precise results.

f) The sampling of the number of points for mapping the city may be decided on the basis of various aspects such as identification of the sensitive receptors and noise generating sources; dividing the area into suitable hot spots, grid based sampling and considering etc. In any case, the agency involved in noise mapping should present the selection of number of points in consultation with Municipal Corporations, State Police and State Pollution Control Boards, Research and Academic Institutes and Non-Government Organization.

g) Site in a city shall be selected such that each category (Industrial Commercial/ Residential/ Silence zone) of zone covered. At locations close to the major site activities (construction/vehicular traffics/industrial/trains/crackers) which are likely to have noise impacts. Close to the any domestic premises, hotel, hostel, temporary housing accommodation, hospital, medical clinic, educational institution, place of public worship, library, court of law, performing arts center etc. shall be considered for monitoring.

h) The development of noise maps should be helpful in deciding the noise control measures for reducing the ambient noise levels within the prescribed limits.

i) The use of foreign models needs to be validated as per Indian Scenarios for developing noise maps. In such scenario, the simulated results or noise map must be verified with actual measurements for at least some sites.

j) An assessment point is a physical location at which noise levels need to be calculated or measured for the purpose of producing data to comply with the requirements of the ambient noise standards of India. Such assessment points should reasonably provide a basis for noise scenario for all the four different zones in a particular city of India identified in ambient noise standards.

Exercise of Noise mapping is being carried out first time in such scale and therefore, it is recommended that maps shall be created considering above aspects and accordingly mitigation plan shall be devised.

After implementation of mitigation plan, noise map shall be revised with more precise scaling. This exercise shall be repeat every after 02 years to check the effectiveness of mitigation plan.

6. MAPPING AREA

Each time the Transport Agency initiates strategic noise mapping, the first decision will be the extent of the area to be mapped. There is not a set process for this, but relevant considerations may include:

a) Strategic importance: Areas of high strategic importance may warrant mapping.

b) Availability of data: Areas with high-quality geospatial data available may be better to group together.

c) Source of data: Minimizing the number of data sources may reduce the amount of pre-processing. (e.g. avoid crossing territorial authority boundaries).

d) Type of area: Urban areas defined by statistics or national census will include the areas of highest population density where strategic noise mapping might provide the most benefit. In other countries where strategic noise maps have been developed, they have primarily been for urban areas. This is because the greatest noise exposures and need for noise management generally occur in those areas.

e) Grid based sampling of area into equal sub-units

f) Area segmentation based on both source and sensitive receptors especially the silence zone and residential zone areas

g) Division of area based on road size/traffic flow/highway road/residential and other zones etc.

The strategy adopted can be either of the above approaches depending upon the city, site-specific conditions, economic, political and infrastructural constraints.

7. NOISE CONTROL MEASURES

The noise maps should be helpful in deciding the optimum noise control measures for reducing the ambient noise levels within the recommended ambient noise standards of India. The control measures could be: erection of noise barriers, application of poroelastic road surfaces, management of road traffic volume, prohibition of honking noise etc.

8. DELIVERABLES AND ENVISAGED BENEFITS

The agency involved in noise mapping should present the noise map of complete city in terms of the day and night equivalent noise levels. Also, a comprehensive report mentioning the hot spots identified, the range of ambient day and night levels and their compliance with the recommended ambient noise standards of India should be clearly pointed out.

The control measures should also be clearly identified and effect of such measures on the ambient noise levels using a simulated noise scenario should be presented so that suitable remedial measures can be planned by authorities. The control measures can be helpful in controlling the noise pollution in Indian cities and serve truly the purpose of noise mapping as directed by National Green Tribunal in orders dated 15.03.2019.

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ANNEXURE-I

Noise limits for vehicles applicable at manufacturing stage from year 2003

S.No.	Type of vehicle	Noise Limits from 1st January, 2003, dB(A)	Date of implementation
(1)	(2)	(3)	(4)
1.	Two wheeler		
	Displacement upto 80 cm^3	75	
	Displacement more than 80 cm^3 but upto 175 cm^3	77	1st January, 2003
	Displacement more than 175 cm^3	80	
2.	Three wheeler		
	Displacement up 175 cm^3	77	1st January, 2003
	Displacement more than 175 cm^3	80	
3.	Passenger car	75	1st January, 2003
4.	Passenger or commercial vehicle		
	Gross vehicle weight upto 4 tonne	80	
	Gross vehicle weight more than 4 tonne but upto to 12 tonne	83	1st July, 2003
	Gross vehicle weight more than 12 tonne	85	

Noise Limits for vehicles applicable at manufacturing stage applicable from 1st April, 2005

S.No.	Type of vehicle	Noise Limits from 1st January, 2003, dB(A)
1.0	**Two wheeler**	
1.1	Displacement more than 80 cc	75
1.2	Displacement more than 80 cc but upto 175 cc	77
1.3	Displacement more than 175 cc	80
2.0	**Three wheeler**	
2.1	Displacement upto 175 cc	77
2.2	Displacement more than 175 cc	80

3.0	**Vehicles used for carriage of passengers and capable of having not more than nine seats, including the driver's seat**	74
4.0	**Vehicles used for carriage of passengers having more than nine seats, including the driver's seat, and a maximum gross Vehicle Weight (GVW) of more than 3.5 tonnes**	
4.1	With an engine power less than 15 KW	78
4.2	With an engine power of 150 kW or above	80
5.0	**Vehicles used for carriage of passengers having more than nine seats, including the driver's seat: Vehicles used for carriage goods.**	
5.1	With maximum GVW not exceeding 2 tonnes	76
5.2	With maximum GVW greater than 3 tonnes but not exceeding 3.5 tonnes	77
6.0	**Vehicles used for transport of goods with a maximum GVW exceeding 3.5 tonners.**	
6.1	With an engine power less than 75 KW	77
6.2	With an engine power of 75 kW or above but less than 150 KW	78
6.3	With an engine power of 150 KW or above,	80"

ANNEXURE-II

STANDARDS FOR HORNS

Vehicular Noise Sources	VEHICULAR NOISE STANDARDS		Standard Code	Noise Limits/Standard
	Norms notified by	To be Implemented & complied by		
Horn as a component	Specification for horns etc (manufacturing & installation) by MoRTH	MoRTH (Traffic Police)	IS 1884-1992	85 dB for Type 1 horns 90 dB for Type 2A horns 100 dB for Type 2B horns and 105 dB for Type 3 horns
Horn Installation			IS 15796-2008 (AIS 014)	Maximum sound pressure level when determined in accordance with method of test shall meet the following: a) between 83 dB(A) for horns fitted on 2 wheelers or 3 wheelers of a power less than or equal to 7 kW and b)between 93 dB(A) to 112 dB(A) for the horn fitted on all other motor vehicles including tractor, 2 wheelers and 3 wheelers of a power greater than 7 kW
Sirens			AIS 125 (National Ambulance Code)	Noise limits for sirens fitted on Ambulance are in the range of 110 dB (A) to 120 dB (A).

ANNEXURE -IV

SPEED- POST

File No. A-14011/1/2015-MON

Date: 21-06-2019

To,

The Chairman
SPCBs/PCCs (List Enclosed)

DIRECTIONS UNDER SECTION 18 (1) B OF THE AIR (PREVENTION AND CONTROL OF POLLUTION) ACT,1981 REGARDING NOISE MAPPING, IDENTIFYING HOT SPOTS AND MITIGATION PLAN FOR CONTROL OF NOISE POLLUTION.

WHEREAS, Under Section 17 (1) (a) of the Air (Prevention and Control of Pollution) Act, 1981, one of the functions of the State Pollution Control Boards (SPCBs)/Pollution Control Committees (PCCs) is to plan a comprehensive programme for prevention, control or abatement of air pollution in the State and to secure the execution thereof; and

WHEREAS, Under section 2(a) of Air (Prevention and Control of Pollution) Act, 1981 noise is defined as air pollutant; and

WHEREAS, as per the Noise Pollution (Regulation and Control) Rules, 2000 notified under Environment (Protection) Act, 1986, following responsibilities are vested with CPCB and SPCBs:

1. The noise levels in any area/zone shall not exceed the ambient air quality standards in respect of noise as specified in the Schedule, and
2. The respective State Pollution Control Boards (SPCBs) or Pollution Control Committees (PCCs) in consultation with the Central Pollution Control Board shall collect, compile and publish technical and statistical data relating to noise pollution and measures devised for its effective prevention, control and abatement.

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3. The designated authority shall be responsible for the enforcement of noise pollution control measures and the due compliance of the ambient air quality standards in respect of noise.

WHEREAS, Hon'ble NGT vide order dated 15.03.2019 in the matter of OA no. 681/2018 titled "Times of India" Authored by Shri Vishwa Mohan Titled "NCAP with multiple timelines to clean air in 102 cities to be released around August 15" has directed as follows:

> ***We also direct CPCB to prepare noise pollution map and identify hotspots and categorize the cities with specified hotspots and propose a remedial action plan. Such report may be furnished within three months by e-mail at ngt.filing@gmail.com. We are informed that in 7 cities noise monitoring mechanism has already been established by the CPCB which is functioning on continuous basis and is connected to the server of CPCB. The CPCB may consider setting up such mechanism in all the cities which are found to be having noise level above approved the threshold.***

WHEREAS, CPCB has identified 46 metropolitan cities for noise mapping and subsequently identification of hot spots. List of such 46 cities is annexed; and

WHEREAS, CPCB has developed a methodology for formulation of noise mapping in consultation with NPL, NEERI and CRRI and a copy of the same is annexed. This methodology be adopted for noise mapping for further execution.

NOW, THEREFORE, in view of the above stated facts and compliance of Hon'ble NGT directions, following directions are hereby issued to the Chairman, SPCB / PCC in exercise of the powers delegated to the Chairman, CPCB under Section 18 1(b) of Air (Prevention and Control of Pollution) Act, 1981:

1. Action plan for preparation of Noise Mapping for the metropolitan city(ies) under your jurisdiction be prepared and executed by 30.11.2019 as per methodology formulated by CPCB.
2. Hot spots having violation of prescribed norms be identified and mitigation plans be prepared by 31.12.2019 so as to ensure compliance of Noise Pollution (Regulation and Control) Rules, 2000.

3. Reports on Noise Map(s) and Noise Mitigation action plan(s) be provided to CPCB by 31.12.2019 for submission to Hon'ble NGT.

State Pollution Control Board shall acknowledge the receipt of this direction within 15 days and shall communicate the action plan in the matter by 30.06.2019.

(S P Singh Parihar)
Chairman

Copy for kind information:

1. The Secretary,
   Ministry of Environment, Forests, & Climate Change
   Indira Bhawan, Aliganj, Jorbagh Road,
   New Delhi-110003.

2. Regional Director,
   Regional Directorate-Bangalore
   Zonal Office (CPCB),
   Nisarga Bhawan, A-Block,
   Thimmaiah Road, 7th D Main, Shivanagar,
   Opp. Pushpanjali Theatre,
   Bangalore-560 010.

3. The DH-IT Division, CPCB

4. The DH- IPC-VII, CPCB

28/6
(B. Vinod Babu)
Member Secretary

3032/UP&J
08/7/19

D/C

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LIST OF 46 METROPOLITAN CITIES

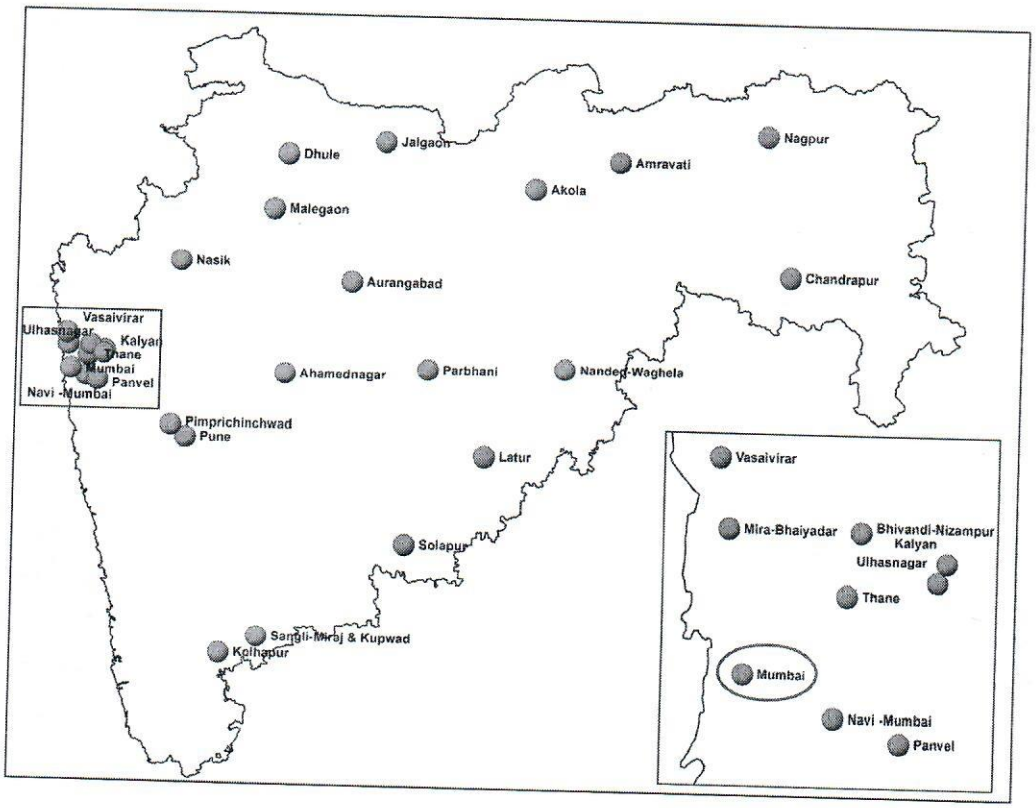
Sl. No. (City)	City	Sl. No. (State)	State
1.	Vishakapatnam	1	Andhra Pradesh
2.	Vijaywada		
3.	Patna	2	Bihar
4.	Raipur	3	Chhatishgarh
5.	Delhi	4	Delhi
6.	Ahmedabad	5	Gujrat
7.	Rajkot		
8.	Surat		
9.	Vadodra		
10.	Faridabad	6	Haryana
11.	Dhanbad	7	Jharkhand
12.	Ranchi		
13.	Srinagar	8	Jammu & Kashmir
14.	Bengaluru	9	Karnataka
15.	Bhopal	10	Madhya Pradesh
16.	Gwalior		
17.	Indore		
18.	Jabalpur		
19.	Thane	11	Maharashtra
20.	Mumbai		
21.	Navi Mumbai		
22.	Pimpri-Chinchwad		
23.	Kalyan Dombivali		

Sl. No. (City)	City	Sl. No. (State)	State
24.	Aurangabad		
25.	Nagpur		
26.	Nashik		
27.	Pune		
28.	Vasai-Virar		
29.	Amritsar	12	Punjab
30.	Ludhiana		
31.	Jaipur	13	Rajasthan
32.	Jodhpur		
33.	Kota		
34.	Hyderabad	14	Telangana
35.	Coimbatore	15	Tamil Nadu
36.	Chennai		
37.	Madurai		
38.	Agra	16	Uttar Pradesh
39.	Allahabad		
40.	Ghaziabad		
41.	Kanpur		
42.	Lucknow		
43.	Meerut		
44.	Varanasi		
45.	Kolkata	17	West Bengal
46.	Howrah		

ANNEXURE-V

Noise Mapping in 27 Municipal Corporations in the State of Maharashtra

Mumbai City



Sponsor

Maharashtra Pollution Control Board, Mumbai

CSIR- National Environmental Engineering Research Institute
Nagpur – 440 020

July 2018

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Foreword

Hon'ble High Court, Bombay has directed Government of Maharashtra to undertake exercise of noise mapping which will help all the concerned authorities to discharge their duties under Sub-Rule (4) of Rule (3) of Noise Pollution, Regulation and control, Rules 2000, amended in 2010. Maharashtra Pollution Control Board (MPCB) has undertaken the task to carry out noise mapping of 27 municipal corporations in the state of Maharashtra viz. ***Ahmednagar, Akola, Amravati, Aurangabad, Bhiwandi-Nizampur, Chandrapur, Dhule, Jalgaon, Kalyan-Dombivli, Kolhapur, Latur, Malegaon, Mira-Bhayandar, Mumbai, Nagpur, Nanded-Waghala, Nashik, Navi–Mumbai, Panvel, Parbhani, Pimpri-Chinchwad, Pune, Sangli Miraj & Kupwad, Solapur, Thane, Ulhasnagar, Vasai-Virar***. CSIR-National Environmental Engineering Research Institute (NEERI), Nagpur has undertaken this exercise with MPCB and their team across 27 cities.

This report presents the details of the noise pollution monitoring and mapping. The location and number of monitoring points was decided based on the land use pattern, noise generating sources and geographical area of the municipal corporation. The monitoring was carried out continuously for 48 hours during working (Day and Night) and non-working (Day and Night) days at each monitoring location. An innovative approach was also used wherein a cycle based noise monitoring was also carried out in 10 major cities of Maharashtra (***Aurangabad, Kalyan-Dombivli, Kolhapur, Mumbai, Nagpur, Navi-Mumbai, Pune, Solapur and Thane***) to cover more number of monitoring locations and better representation of noise pollution in the city. Strategic noise maps have been generated using Geographical Information System for identification of hot spots in the city. It is observed that noise pollution has now become a problem in almost all the cities and proper attention towards mitigation of noise pollution is required. Looking to this perspective and on the basis of ground observations, the report also presents recommendations and suggestive measures to reduce noise pollution in the cities.

The institute wishes to place on record the cooperation and very useful scientific inputs by the Member Secretary Dr. P. Anbalagan, Joint Director (Air) Dr. V. M. Motghare and all Regional Officers (ROs), Sub-Regional Officers (SROs), Field Officers (FOs) of MPCB, Municipal Commissioners of Municipal Corporations and Councils, City Police and Traffic Police for successfully carrying out the monitoring activity in the 27 cities of Maharashtra and completing this study.

Rakeshkumar

(Rakesh Kumar)

CONTENT

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ABBREVIATIONS

CNPCC	City Noise Pollution Control Committee
CPCB	Central Pollution Control Board
CSIR	Council of Scientific and Industrial Research
dB(A)	Measurement of sound in Decibel using 'A' weighting
GIS	Geographic Information System
Hz	Hertz
L_{eq}	Equivalent Continuous Sound Pressure Level
L_p	Sound Pressure Level
LULC	Land use Land Cover
MH	Maharashtra
MIDC	Maharashtra Industrial Development Corporation
MPCB	Maharashtra Pollution Control Board
MRSAC	Maharashtra Remote Sensing Application Centre
MU	Mumbai
NEERI	National Environmental Engineering Research Institute
NGO	Non-governmental organizations
NH	National Highway
SH	State Highway
TOR	Terms of Reference

1. Introduction

The pressure variation in a medium; such as air, originates sound. The fluctuations of pressure above and below the atmospheric pressure are sensed by human ear and thus we hear the sound. Though sound is an integral part of our life, the undesirable and unwanted sound is termed as noise because it negatively affects the quality of life. Human sensitivity to noise is variable and the characterization of sound as noise is often subjective and depends on the individual being exposed. Noise can cause different emotions among the receiver but the physiological impacts are broadly similar. Adverse effects associated with the exposure to noise can range from sleep disturbance, restlessness and annoyance to hearing impairment and even cardiovascular diseases. Rapid urbanization and increased human settlement in a restricted space causes a much noisier environment. People residing in cities as well as changing rural landscapes are now experiencing the detrimental effects of noise pollution.

1.1 Project Description

Noise pollution in metropolitan cities of the Maharashtra state has increased due to varied sources such as road traffic, air craft, rail networking, construction noise etc. Hon'ble High Court, Bombay has directed State Government to undertake exercise of Noise Mapping which will help all the concerned authorities to discharge their duties under Sub-Rule (4) of Rule 3 of Noise Pollution (Regulation and Control) Rules, 2000 amended in 2010. Sub-rule (4) of Rule 3 states: "Development authorities, local bodies and other concerned authorities while planning developmental activity or carrying out functions relating to town and country planning shall take into consideration all aspects of noise pollution as a parameter of quality of life to avoid noise menace and to achieve the objective of maintaining the ambient air quality standards in respect of noise." In this regard, Maharashtra Pollution Control Board (MPCB) has directed Municipal Commissioners of the cities (**Ahmednagar, Akola, Amravati, Aurangabad, Bhiwandi-Nizampur, Chandrapur, Dhule, Jalgaon, Kalyan-Dombivli, Kolhapur, Latur, Malegaon, Mira-Bhayandar, Mumbai, Nagpur, Nanded-Waghala, Nashik, Navi–Mumbai, Panvel, Parbhani, Pimpri-Chinchwad, Pune, Sangli Miraj & Kupwad, Solapur, Thane, Ulhasnagar, Vasai-Virar**) and approached CSIR-NEERI to submit the detailed Terms of Reference (TOR) for completion of Noise Mapping of 27 city municipal corporations. The selected 27 cities are depicted in **Figure 1.1**.

1.2 *Relevant Project Information*

As per suggestion from **Hon'ble Additional Chief Secretary** (Environment), CSIR-NEERI organized zone wise workshops on **Noise Pollution and its adverse effects on Human Health and Environment** to sensitize the issue amongst officials of local bodies and MPCB.

The workshops have been conducted in four zones, i.e. in Mumbai, Nagpur, Pune and Aurangabad. The details of the zone wise workshop are given in **Table 1.1**. After discussing with the officials of Municipal Corporations and MPCB the number of locations for noise monitoring was finalized. In the workshops, the Municipal officials were requested to provide with the data required to develop database for individual cities. Based on the data and information received from the Municipal Corporations, database was developed for individual cities. For each city Base Map, Ward Map, Land Use Land Cover (LULC) and LULC Statistics were created. The Base map depicts the Railway Network, National Highway, State Highway, Major & Minor Roads spread through the entire city. Also, the tentative noise monitoring locations were identified.

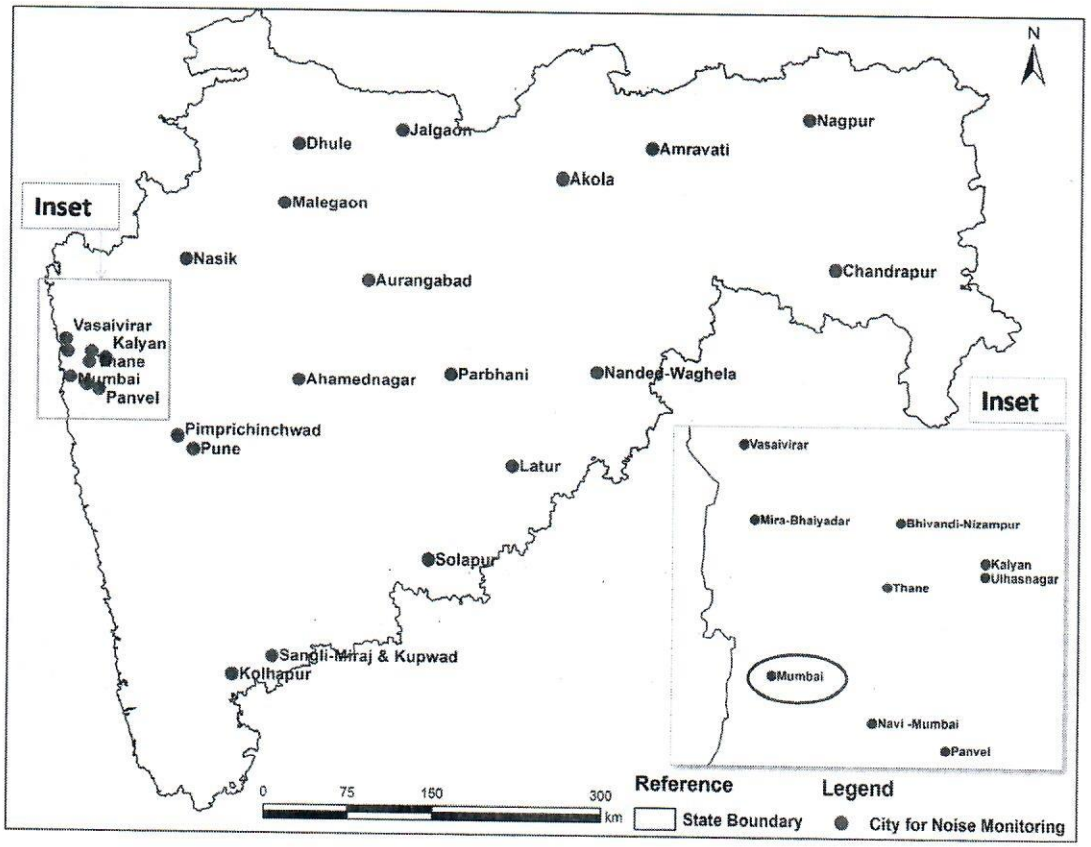

Figure 1.1 Noise Monitoring in 27 Municipal Corporations of Maharashtra

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Table 1.1 Noise pollution Workshop at Mumbai

Workshop	Zone I	Cities
Details	Location: Mumbai Date: 10/03/2017 Number of Participants: 33	1. Mumbai 2. Navi-Mumbai 3. Kalyan-Dombivli 4. Panvel 5. Vasai-Virar 6. Mira Bhayandar 7. Thane 8. Bhiwandi-Nizampur 9. Ulhasnagar

2. Sound

Sound is a result of pressure variations in a medium - typically air. Pressure fluctuations above and below the atmospheric pressure are detected by human ear and this results in the sensation of hearing. All sound wave have three fundamental characteristics; frequency, amplitude and wavelength.

Frequency of a wave, 'f', is the number of oscillations per second or cycles per second and commonly measured by an unit called **Hertz**, abbreviated as **Hz**. The time taken to complete one oscillation is called the **Period** '**T**' and $f = 1/T$ Hz.

The **Wavelength**, 'λ' is the distance travelled by a wave during one oscillation. **Amplitude** is the fluctuation or displacement of sound wave from its mean value and this amplitude of sound or sound amplitude is experienced as the loudness of sound.

Average healthy human ear can detect sound from about 20 Hz – 20 kHz. Certain situations require an analysis of the frequency content of a noise instead of overall noise level. Frequency information is displayed in a graph called frequency spectrum. It shows amplitude of different frequencies content in a sound source.

Sound is commonly measured in **decibel** [**dB**] scale. The decibel scale is logarithmic thus reduces a large range of information down to manageable data. The sound pressure range varies from 20μPa- 100 Pa and it can be expressed on a scale based on the log of the ratio of measured sound pressure and a reference standard pressure. The sound pressure level (L_p) is expressed as,

$$L_P = 10\, log_{10}\left(\frac{P}{P_0}\right)^2 [\text{dB}]$$

P is the measure quantity of sound pressure,

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P_0 is the reference standard quantity of sound pressure (20×10^{-6} Pa)

The reference sound pressure corresponds to the lowest sound pressure a healthy human ear can detect at 1000 Hz.

The human ear response to noise depends upon the frequency of the sound. A sound level meter theoretically has a flat response, in other words it responds exactly the same at different frequencies. Unlike a sound level meter, the human ear responds differently at different frequencies, so a weighting, or filter, can be used so that the meter responds more like the human ear. A weighted sound level provides an acceptable correlation with human response to different sound source.

The most commonly used weighting is referred to as the '**A**' weighting which tries to replicate the performance of human ear. '**C**' weighting is used while measuring noise peaks and '**B**' filter is between **A** and **C**. **B** and **C** weightings are seldom used. '**Z**' filter indicates no weighting was applied. Noise level is measured in fast response.

It means that fast time constant has been used which is 0.125 sec (125 milliseconds). Whereas, slow response 1 sec time constant is used.

3. Noise Pollution

Noise is a subset of sound. Environmental noise is an unwanted sound created by human activities that is considered harmful or detrimental to human health and quality of life. Characterization of sound as noise is often subjective and varies across individuals. Most common sources of noise pollution are railway and road traffic, construction activities, airplanes and helicopters and industrial machinery. Additional noise pollution is contributed by office machines, sirens, power tools, and other equipment. Intermittent noise, that stops and starts, is considered to be more annoying than continuous noise. Significant increase in the number of vehicles, expansion of road network, industrialization and urbanization has caused serious noise pollution problems in last few decades in major Indian cities.

Adverse effects associated with exposure to environmental noise includes, annoyance and aggression, hypertension, high stress levels, tinnitus, hearing impairment, sleep disturbances and even cardiovascular disorders. Exposure to moderately high noise levels during a single 8 hour period causes a rise in blood pressure by 5-10 points. Subsequently increase in stress

leads to increased incidence of coronary artery diseases. Also physiological features like breathing amplitude, heart-beat rate, pulse rate, blood cholesterol are affected.

Noise has the potential to affect wildlife in a variety of ways, varying between different types of animals. Migration of birds from a noisy habitat is a common phenomenon. Other effects of noise pollution include change in food habits and mating behaviour in animals.

4. Noise Pollution (Regulation and Control) Rules, 2000, Amendment 2010

Noise has been recognized as ambient air pollutant. Increasing ambient noise level in public places from various sources, industry activity, construction activity, generators sets, public address systems, vehicular horns and aircraft noise have detrimental effects on human health and also the animal welfare. Therefore, it is considered necessary to regulate and control of noise generating sources with the objective of maintaining the ambient air quality standards in respect of noise. Standards in this regard are laid down under The Environment (Protection) Act, 1986 (and rules made there under) and under the Model Rules of the Factories Act, 1948 for occupational health and safety purposes. The Central Pollution Control Board constituted a National Committee of Experts on Noise Pollution Control. The Committee recommended noise standards for ambient air and for automobiles, domestic appliances and constructions equipment, which were later notified under The Environment (Protection) Act, 1986. The limits of ambient noise levels under different category are given in **Table 4.1** as per Noise Pollution (Regulation and Control) Rules, 2000, Amended in 2010 **(Annexure II).**

Table 4.1 Ambient noise level as per Noise Pollution (Regulation and Control) Rules, 2000, Amendment 2010

Area Code	Category of Area / Zone	Limit in dB(A) L_{eq}	
		Day Time	Night Time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Note:

1. Day time is reckoned from **6 A.M.** to **10 P.M.**
2. Night time is reckoned in from **10 P.M.** to **6 A.M.**
3. Silence zone is referred as areas within 100 meters around premises such as hospitals, educational institutions and courts. The Silence zones are to be declared by the Competent Authority.
4. Use of vehicular horns, loudspeakers and bursting of crackers shall be banned in these zones.
5. Mixed categories of areas should be declared as one of the four above mentioned categories by the Competent Authority and the corresponding standards shall apply.

Noise Pollution (Regulation and Control) Rules, 2000, Amendment 2017

As per the amendment made in August 2017, these rules may be called the Noise Pollution (Regulation and Control) Amendment Rules, 2017 (**Annexure III**). "The State Government may subject to such terms and conditions as are necessary to reduce noise pollution, permit use of loud speakers or public address systems and the like during night hours (between 10.00 p.m. to 12.00 mid night) on or during any cultural, religious or festive occasion of a limited duration not exceeding fifteen days in all during a calendar year and the concerned State Government or District Authority in respect of its jurisdiction as authorised by the concerned State Government shall generally specify in advance, the number and particulars of the days on which such exemption should be operative. For the purposes of this sub-rule, the expressions-

(i) "festive occasion'' shall include any National function or State function as notified by the Central Government or State Government; and

(ii) "National function or State function shall include: (A) Republic Day; (B) Independence Day; (C) State Day; or (D) such other day as notified by the 'Central Government' or the 'State Government.'

5. Methodology

The methodology adopted for ambient noise monitoring is divided in the four sections as discussed below.

5.1 Study Area and Noise Monitoring Locations

The study area is selected according to the municipal boundary provided by the corresponding Municipal Corporations. The number of monitoring locations in Mumbai city is decided according to the area of city. Total area of the Mumbai city is 511 km_2 and the number of noise monitoring locations is 55.

The locations for noise monitoring is strategically identified with the help of base map (which includes the railway network, national and state highways, also the major and minor roads) and land use pattern of the city. The locations are identified according to noise sources (aircraft, traffic, railway, industrial, commercial, construction activity) and the receivers (residential and silence zones) in the city. The locations are spatially distributed within the area of the city to ensure proper representation of noise levels throughout the city. The locations are identified and finalized in consultation with officials of Mumbai Municipal Corporation and MPCB.

5.2 Noise Monitoring

In order to assess the ambient noise level in the environment, noise monitoring has been carried out in selected locations for 48 hours, during working and non-working days. As noise standards for ambient noise level during day and night are different; hence noise levels are measured during day time (06:00 hrs. to 22:00 hrs.) and night time (22:00 hrs. to 06:00 hrs.) as specified in Noise Pollution Rules.

The noise measurements are carried out using calibrated Sound Level Meters with fast response mode keeping in view the quickly changing nature of noise levels. 'A' weighting is applied for measuring the sound level as it replicates the response of human ear to noise and the measuring unit is denoted as dB (A). Data is logged at an interval of 1 second.

The sound level meter was mounted on tripod stand and wind-ball was used to minimize the effect of wind. The instrument was mounted at a height of 1.5 meters from the ground. The

helpful to identify noise pollution affected areas and this would be instrumental for the decision makers to formulate legislative measures for noise abatement.

5.5 Previous study

Maharashtra Pollution Control Board (MPCB) has conducted Noise Level Monitoring at 10 locations Mumbai city for 24 hours continuously over working and non-working day for the day time (0600 to 2200 hours) and the night time (2200 to 0600 hours). Links for the study reports from 2008 to 2014 can be found below:

http://mpcb.gov.in/images/pdf/metronoise09.pdf

http://mpcb.gov.in/images/pdf/noiseofmetro2011.pdf

http://mpcb.gov.in/envtdata/pdf/MetropolitanCitiesNoiseMonitoringReport_2014.pdf

Also, the following **Table 5.1** summarizes the compiled data of noise monitoring study carried out in Mumbai city:

microphone on the sound level meter should generally be positioned at least 3 meters away from the hard surface or walls to minimize the effect of reflections.

5.3 Analysis of Noise levels

The monitored noise levels at the identified locations are analysed and the corresponding L_{eq}, L_{max}, L_{min}, L_{10}, L_{50}, L_{90} in dB (A) during day and night time are calculated.

The equivalent continuous sound level ($\mathbf{L_{eq}}$) is the sound pressure level of a steady sound that has, over a given period, the same energy as a fluctuating sound. It is calculated using following equation:

$$L_{eq,T} = 10log\left(\frac{1}{n}\sum_{i=1}^{n} 10^{\left(\frac{L_i}{10}\right)}\right)$$

Where, L_i = levels observed at n equally spaced times during interval T.

$\mathbf{L_{max}}$: The maximum Sound Pressure Level (SPL) value measured during the duration of monitoring.

$\mathbf{L_{min}}$: The minimum Sound Pressure Level (SPL) value measured during the duration of monitoring.

$\mathbf{L_{10}}$: The sound level that exceeded during 10% of the measuring time in dB (A).

$\mathbf{L_{50}}$: The sound level that exceeded during 50% of the measuring time in dB (A)

$\mathbf{L_{90}}$: The sound level that exceeded during 90% of the measuring time in dB (A).

The sound level data is compared with Ambient Noise Standards. The extent of violation with respect to prescribed standards is also assessed.

5.4 Noise Mapping

In order to develop a noise map of the city, digital information of the city, mapping of GPS locations along with monitored noise levels are required. This will help in prediction of noise level in the city through spatial modelling based on limited number of sample points. Based on the spatial modelling, maps of noise level and noise risk zones in the city will also be generated. Noise maps showing noise levels at different locations of the city was generated for each individual city with the help of latest state-of-the-art GIS software. These maps are

helpful to identify noise pollution affected areas and this would be instrumental for the decision makers to formulate legislative measures for noise abatement.

5.5 Previous study

Maharashtra Pollution Control Board (MPCB) has conducted Noise Level Monitoring at 10 locations Mumbai city for 24 hours continuously over working and non-working day for the day time (0600 to 2200 hours) and the night time (2200 to 0600 hours). Links for the study reports from 2008 to 2014 can be found below:

http://mpcb.gov.in/images/pdf/metronoise09.pdf

http://mpcb.gov.in/images/pdf/noiseofmetro2011.pdf

http://mpcb.gov.in/envtdata/pdf/MetropolitanCitiesNoiseMonitoringReport_2014.pdf

Also, the following **Table 5.1** summarizes the compiled data of noise monitoring study carried out in Mumbai city:

Table 5.1 Noise Level Monitoring in Mumbai City carried out by MPCB

Area Category	Location	Day / Night Time	Dec-08		Dec-09		Dec-10		Dec-11		Dec-12		Dec-13		Dec-14	
			NWD	WD	NWD	WD	NWD	WD	NWD	WD	NWD	WD	NWD	WD	NWD	WD
Silence	High Court	Day	64.8	65.1	73.9	64.5	67.6	71.1	53.4	69	53.4	69	72.7	74.8	68.2	64.8
		Night	60.5	60.7	72.5	62.7	59.9	59.9	47.2	67.2	47.2	59.9	54	53.3	64.4	55.6
	Mumba devi	Day	75	72.5	74.1	70.3	68.3	67.7	71.7	70.6	71.7	70.6	67.6	70.5	69.6	56.3
		Night	69.5	69.2	70.2	62.9	51.8	51.8	71.6	72.4	71.6	51.8	60.3	56.2	68	54.2
	National Park	Day	76.5	75.2	71.3	71.1	76.9	81.3	68.6	65.2	68.6	65.2	72.4	72.5	69.5	64.8
		Night	68.4	69.2	72.4	67.2	71.9	71.9	68.1	67.1	68.1	71.9	57.2	71.5	63.1	54.6
Residential	Antop Hill	Day	71.6	70.6	72.6	68.1	58.6	59.4	67.4	65.7	67.4	65.7	72.5	73.3	67.1	63.6
		Night	70.4	68.8	70.5	57	52.4	52.4	67.3	64	67.3	52.4	61.1	59	63.4	60.1
	Shivaji Park	Day	71	69.2	69.2	65.3	59.6	59.5	63.9	63.9	63.9	63.9	73.7	68.4	67.9	68.3
		Night	64.3	67.7	55.3	52.3	48.5	48.5	55.4	54.3	55.4	48.5	57.1	53.2	57.6	57
Commercial	Airport	Day	74.6	74.5	73.3	64.2	74.6	72.2	67	71.1	67	71.1	74.2	74.8	67.3	73
		Night	72.6	73.4	71.1	56.9	73.2	73.2	64.2	68.3	64.2	73.2	70.6	71.6	65.1	76.5
	Vasi Naka	Day	79.2	79.2	71.2	68.2	81	83.3	70.6	73.1	70.6	73.1	71	70.1	71.8	60.7
		Night	70.4	80.9	70.4	65.3	69.8	69.8	67.6	65.6	67.6	69.8	65.2	65.5	68.2	50.7
	Ghatkopar	Day	78.8	77.7	71.7	80.4	76.3	75.4	75	74.1	75	74.1	80.5	81	68.2	68.5
		Night	71.2	70	70.4	75.8	67.1	67.1	69.9	67.7	69.9	67.1	71.4	71.3	62.1	56
Industrial	Goregaon	Day	72.9	73.4	76.2	73.7	75.2	74.7	59.5	69.5	59.5	69.5	75.2	73.8	68.4	67.1
		Night	71.1	69.2	72.7	67.9	53	53	40.1	60.6	40.1	53	55.9	52.1	64.1	58.2
	Charkop	Day	73	73.6	77.7	77.6	68.1	73.8	68.8	69.1	68.8	69.1	68	69	67.7	72.3
		Night	67.9	74.1	68.3	68.7	52	52	63.9	66.2	63.9	52	62.1	58.7	65.2	63.4

6. Noise Monitoring and Mapping

Mumbai

Background: Mumbai lies on the west coast of Konkan division in the state of Maharashtra. Formerly known as Bombay, Mumbai gained its name in 1995 after the goddess Mumba-Devi worshipped by the Agris and Kolhis who are native to the city. Mumbai also known as city of dreams due to its status of being financial, commercial and entertainment capital of India, was named Alpha World City in 2008. Reclaimed and reshaped, Mumbai is made of 7 islands which are now locally divided in Mumbai city and Mumbai suburbs. Mumbai Metropolitan Region (MMR) is an agglomerate of metropolitan cities that includes Mumbai, Thane, Palghar and Raigad districts.

Geography: At an elevation of 14 m, the city is spread over a geographical area of 603 sq. km and falls on the western coast of Maharashtra state in Konkan division. The Global Positioning System (GPS) coordinates of the city are 18° 58' 30" N latitude and 72° 49' 33" E longitude. Arabian Sea lies on the west, Thane creek to the eastern side and Madh Marve creek to the western side, Mumbai being a coastal city mainly has sandy soil and towards the suburbs has alluvial or loamy soil. Rich in biodiversity, mangrove swamps are found near the eastern side of the city. City consist 4 lakes such as Powai, Vihar and Tulsi lakes and 4 small rivers namely Ohiwara, Mithi, Dahisar and Poisar.

Demography: According to Census of 2011, the population of Mumbai was 12,442,373. Amongst this, the population of males was 6,715,931 and population of females was 5,726,442. The city has an average literacy rate of 89.73%.

Climate and Rainfall: Being a coastal city, Mumbai experiences a tropical climate with abundant humidity. The southwest monsoon begins from June and lasts until October. Summer season from March to May is moderate with an average maximum temperature of 34 °C. December – January are the coldest months in winter season with average minimum temperature as low as 14 °C. The average annual rainfall is 2250 mm.

Transportation: Roadways consist of 5 national highways namely NH 3, NH 4, NH 8, NH 17 and NH 222 amongst other 3 major expressways namely Eastern Epxress Highway (EEH), Western Express Highway (WEH) and Sion-Panvel Highway that links south island of Mumbai city with the other Mumbai suburbs. Bandra Worli Sea Link connects Mumbai city

with its western suburbs. Railways play an integral part of the transportation services for every day commute. Central, Western and Harbor Railway lines connect all the city and suburbs with hundreds of local trains running every few minutes. Metro lines and Mono Rails are being constructed for faster commute between different sections of the city. Mumbai also has various terminals for inter and intra city railway routes. City consists of an international airport, Chhatrapati Shivaji International Airport which is 2nd busiest in the country for passenger traffic. Mumbai Port Trust and Jawaharlal Nehru Port are 2 ports that support 65% of cargo container traffic.

6.1 Noise Monitoring

Noise monitoring has been conducted in 55 spatially distributed locations in Mumbai. Each location is assigned with a unique ID starting from MU1 to MU55.A GIS based map showing the noise monitoring locations is developed considering noise generating sources and receivers. Each category is assigned a particular colour and displayed in the map which differentiates one category from the other. The base map of the study area and location of monitoring points are shown in **Figure 6.1and 6.2** respectively.

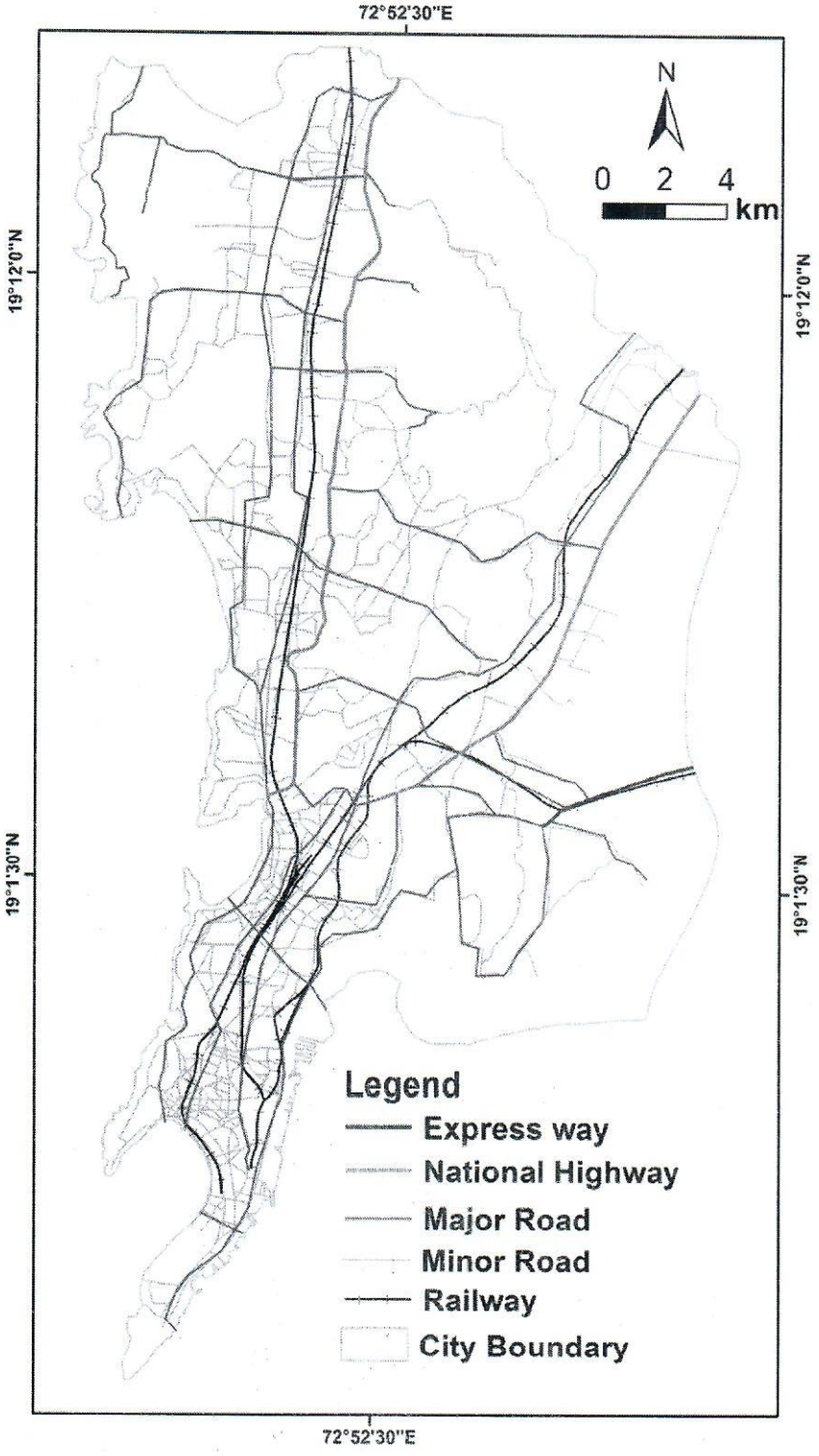

Figure 6.1 Base map of the study area (Mumbai City)

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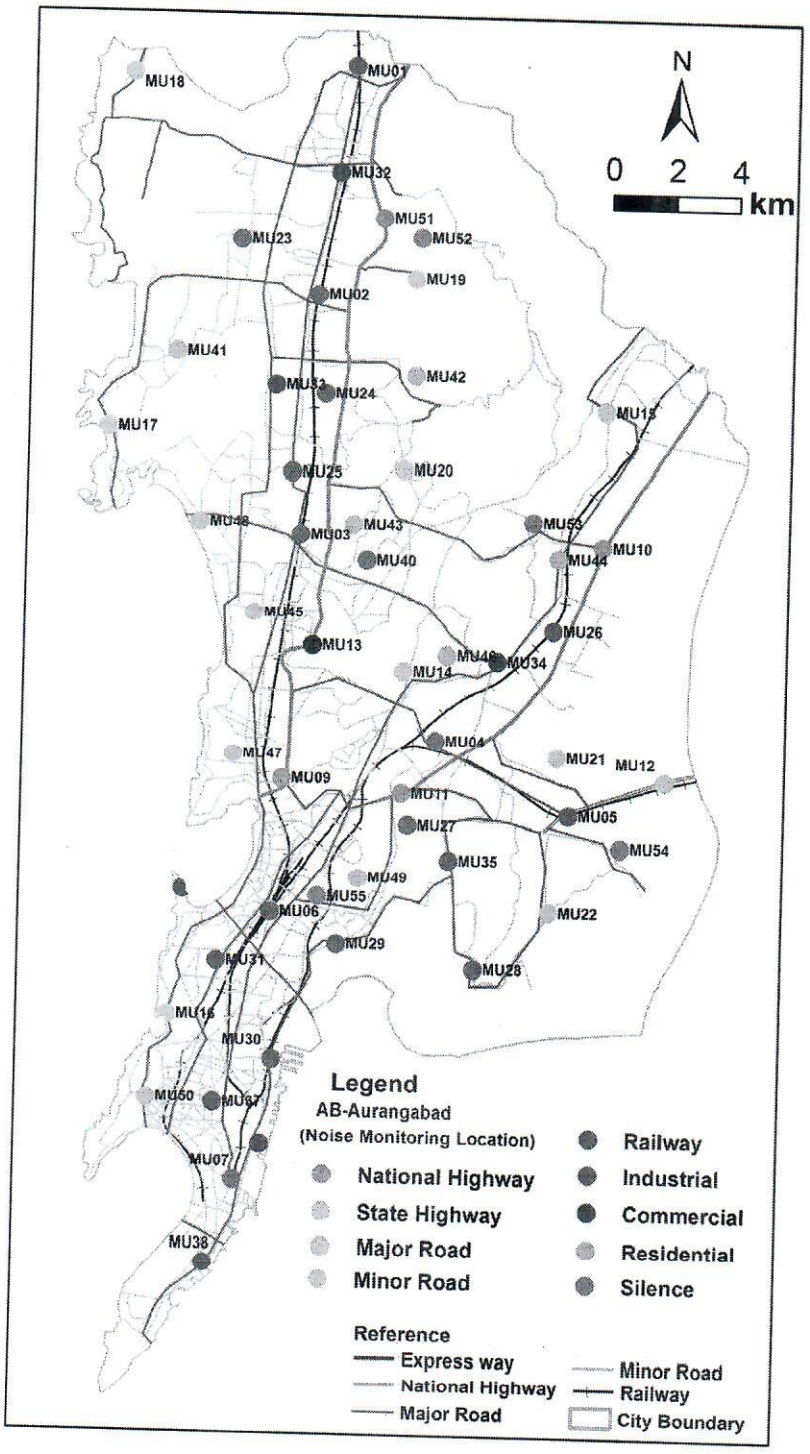

Figure 6.2 Noise Monitoring Locations (Mumbai City)

The point ID, latitude, longitude, ward, description and other details of the monitoring locations are listed in **Table 6.1.**

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Table 6.1 Noise Monitoring Locations in Mumbai City

Sr. No.	Point ID	Latitude (N)	Longitude (E)	Ward	Description	Remarks
1.	MU1	19°15'30.5"	72°51'31"	R	Railway	Western line railway & CS Link Road Junction
2.	MU2	19°11'32.6"	72°51'0.2"	P	Railway	Near Manchubhai Road
3.	MU3	19° 7' 29.7"	72°50'51.2"	K/W	Railway	Near Society Road
4.	MU4	19° 4'10.74"	72°53'29.76"	N	Railway	Lokmanya Tilak Terminus
5	MU5	19° 2'53.1"	72°55'54"	M/E	Railway	Mankhurd Railway Station
6	MU6	19° 1'5.2"	72°50'36.9"	G/N	Railway	Dadar Central Railway
7	MU7	18°56'38.8"	72°50'8.4"	A	Railway	ChhatrapatiShivaji Terminus
8	MU8	19°15'43.9"	72°52'24.1"	R	National Highway	National Highway 8
9	MU9	19° 3' 48.9"	72°50'48.4"	H/E	National Highway	National Highway 8
10	MU10	19° 7'27.6"	72°56'18.2"	S	National Highway	JogeshwarVikhroli link road and NH3 Junction
11	MU11	19° 3'10.8"	72°52'52.7"	L	National Highway	National Highway 3
12	MU12	19° 3'31.4"	72°57'32.5"	M/E	Express way	Sion-PanvelExpy
13	MU13	19° 5'34.45"	72°51'2.76"	K/E	Major Road	Service Road
14	MU14	19° 4'46.96"	72°52'27.89"	K/E	Minor road	Air india Road
15	MU15	19° 9'49.7"	72°56'15.5"	T	Major Road	Goregaon Mulund Link Road
16	MU16	18°59'16.2"	72°48'49.7"	G/S	Major Road	Dr. Annie Besant Road
17	MU17	19° 9'15.3"	72°47'19.2"	P	Major Road	Madh Marve Road
18	MU18	19°15'16.2"	72°47'29.1"	R	Minor road	Uttan Road
19	MU19	19°11'50.2"	72°52'43.1"	R/S	Minor road	Damupada Road near Green Hills

Sr. No.	Point ID	Latitude (N)	Longitude (E)	Ward	Description	Remarks
20	MU20	19° 8'40.4"	72°52'40.1"	K/E	Minor road	Aarey Road
21	MU21	19° 3'53.7"	72°55'39"	M	Minor road	Near Adasa Nagar Residential area
22	MU22	19° 1'13.4"	72°55'37.2"	M	Minor road	BARC area
23	MU23	19°12' 29"	72°49'35.2"	R/S	Industrial	Charkop Industrial Estate, Kandivali (W)
24	MU24	19° 9'53.2"	72°51'11.8"	K/E	Industrial	Royal Pack Industries, Goregaon (E)
25	MU25	19° 8'36.1"	72°50'40.5"	K/W	Industrial	Sanjivan Industries
26	MU26	19° 5'58.5"	72°55'32.6"	N	Industrial	Godrej and Boyce Plant
27	MU27	19° 2'32.7"	72°53'5.9"	M/W	Industrial	Trombay Industrial Area
28	MU28	19° 0'14.4"	72°54'16.9"	M/E	Industrial	Tata Power Trombay Thermal Plant
29	MU29	19° 0'30.2"	72°51'50.5"	F/S	Industrial	BPCL Terminal
30	MU30	18°58'32.5"	72°50'47.9"	E	Industrial	Britania Industries Limited
31	MU31	19° 0'11.2"	72°49'41.3"	G/S	Industrial	LIoyds Steel Industries Limited
32	MU32	19°13'48.5"	72°51'20.4"	R	Commercial	Borivali West Vegetables Market
33	MU33	19°10'0.3"	72°50'20.3"	K/E	Commercial	Fish Market
34	MU34	19° 5' 28"	72°54'28.8"	N	Commercial	Ghatkopar (W)
35	MU35	19° 2'1.1"	72°53'46.9"	M	Commercial	Vasi Naka, Chembur
36	MU36	19° 1'25.4"	72°49' 1"	G/S	Commercial	Worli Fort
37	MU37	18°57'38.8"	72°49'47.1"	E	Commercial	Chor Bazaar
38	MU38	18°54'59.5"	72°49'42.4"	A	Commercial	Colaba Market
39	MU39	18°57'4.3"	72°50'39.1"	B	Commercial	Victoria Docks

Sr. No.	Point ID	Latitude (N)	Longitude (E)	Ward	Description	Remarks
40	MU40	19° 7'12.04"	72°52'4.51"	K/E	Industrial	Chakala Industrial Area (MIDC)
41	MU41	19°10'31.9"	72°48' 29.5"	P	Residential	Ambujwadi Slum Area
42	MU42	19°10'13.6"	72°52'47.9"	P	Residential	Krishna Society
43	MU43	19° 7'44.2"	72°51'50.1"	K/E	Residential	Madhukunj Society
44	MU44	19° 7'15.1"	72°55'30.1 "	S	Residential	Chandan Nagar
45	MU45	19° 6'7.9"	72°50'5.6"	K/W	Residential	Nehru Nagar slum area
46	MU46	19° 5'36.2"	72°53'35.7"	L	Residential	Govind Nagar
47	MU47	19° 3'49.2"	72°49'49.7"	H/W	Residential	Pali Village
48	MU48	19° 7'38.7"	72°49'3.1"	K/W	Residential	RatanKunj
49	MU49	19° 1' 43"	72°52'10.1"	F/N	Residential	Antop Hill
50	MU50	18°58'14.2"	72°48'21.7"	D	Residential	Cumbala Hill
51	MU51	19°12'57.1"	72°52'8.2"	R	Silence	Sanjeevan Hospital
52	MU52	19°12'48.8"	72°54'37.5"	R	Silence	Sanjay Gandhi National Park, Borivali
53	MU53	19° 7'51.8"	72°55'1.1"	S	Silence	IIT Bombay
54	MU54	19° 2'20.6"	72°56'49.2"	M	Silence	Noorul Islam Sunnath Jamath Masjid
55	MU55	19° 1' 26.2"	72°51'27.7"	F/N	Silence	Institute of Chemical Technology

The category of above stated 55 locations are summarized in **Table 6.2**. The number of locations in each category is also given in the table.

Table 6.2 Summary of Noise Monitoring Locations in Mumbai City

Sr. No.	Descriptions	Number of Locations
1	**Roads**	**15**
	• National Highway	4
	• Expressway	1
	• Major & Minor Road	10
2	**Railway**	**7**
3	**Land use pattern as per CPCB**	**33**
	• Industrial	10
	• Commercial	8
	• Residential	10
	• Silence	5
	Total	**55**

6.2 Land Use Land Cover Analysis

Land use refers to "man' activities and various uses which are carried on land. Land cover refers to "natural vegetation, water bodies, rock/soil, artificial cover and other resulting due to transformation" the term land use and land cover is closely related and interchangeable. Location of noise monitoring is also dependent on the existing land use of an area. The LULC map of Mumbai city was procured from Maharashtra Remote Sensing Application Centre (MRSAC), Mumbai.The LULC class considered in the present study is agriculture, ash/cooling pond, Barren land, built-up, Forest, industrial, Mangrove, Saltpan, Scrub land, vegetation and water body. The LULC map of Mumbai city is shown in **Figure 6.3** and its inventory is presented in **Figure 6.4**.The total area of Mumbai city is 511.3 km2. The highest percentage of LULC class is observed to be built-up (41.0%) followed by vegetation (22.9%), water body (14.0%), Mangrove (12.0%), Scrub land (4.0%), industry (2.5%), Saltpan (2.0%), agriculture (1.3%), barren land (0.3%) and ash pond (0.0%).

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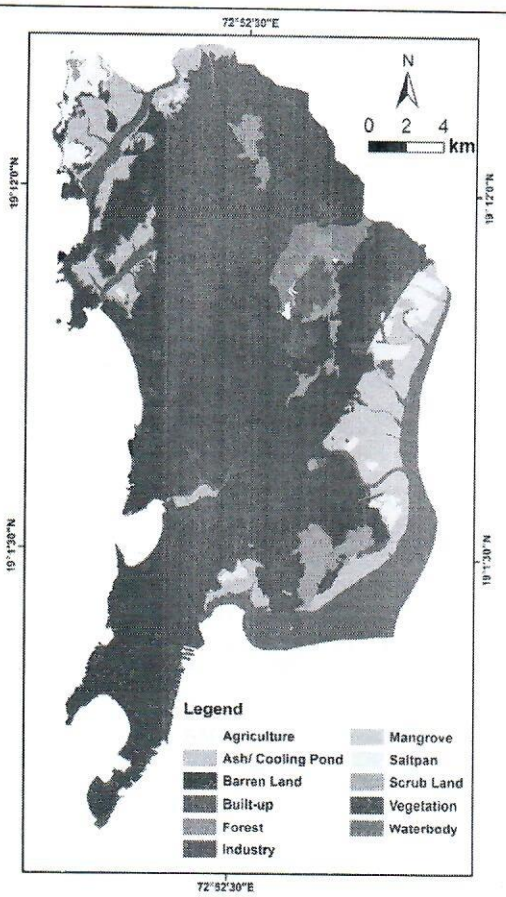


Source: MRSAC, Nagpur

Figure: 6.3 LULC map of Mumbai city

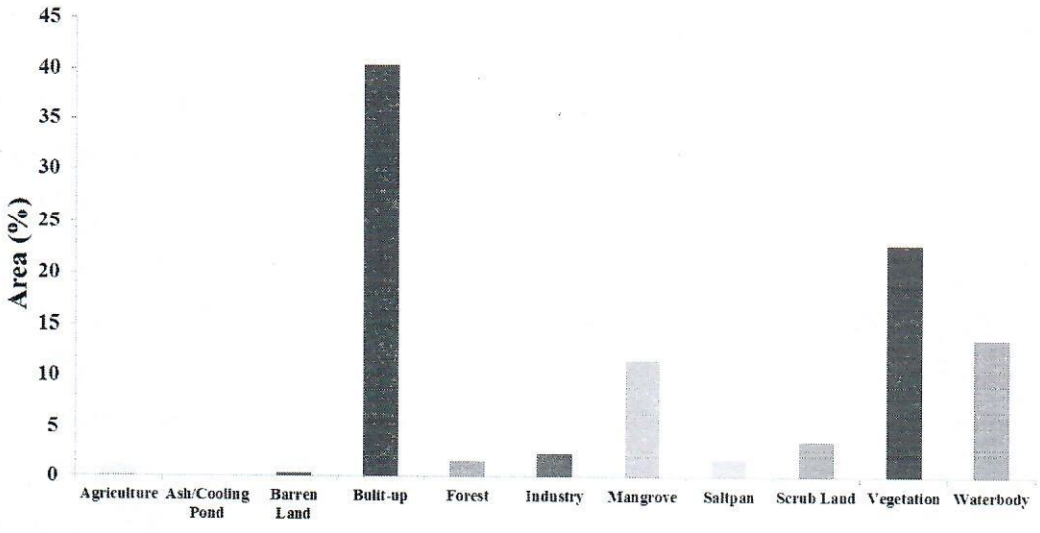


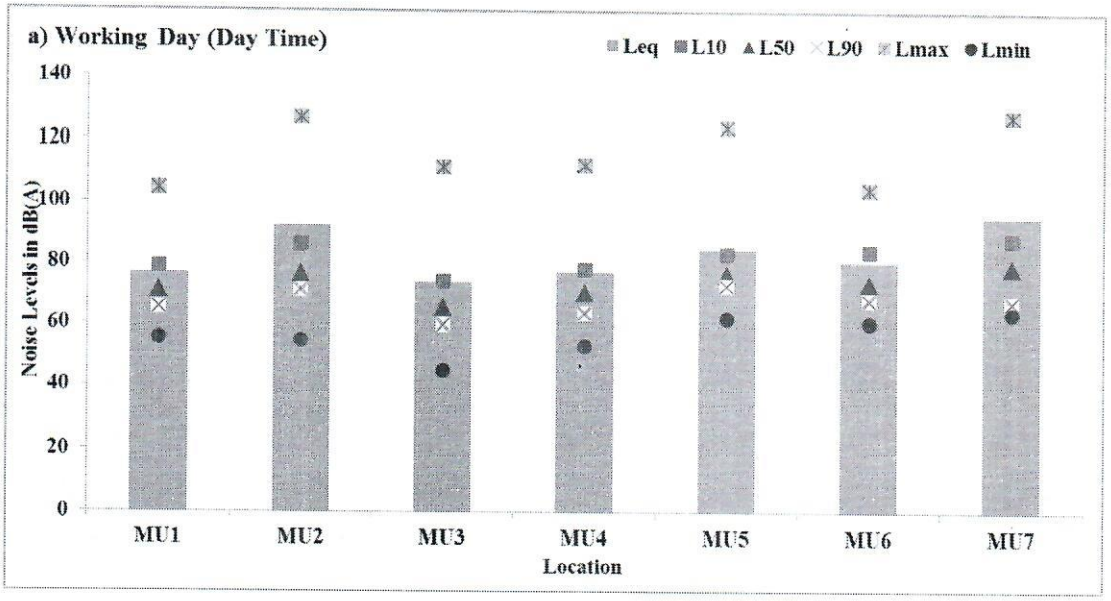
Figure 6.4 Inventory of LULC in Mumbai city

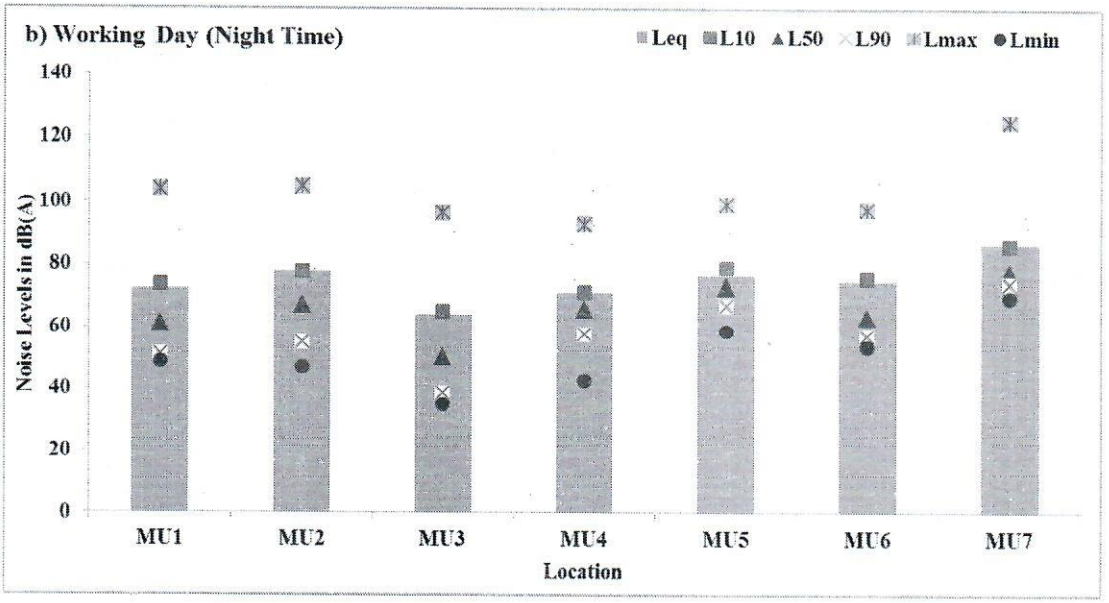
6.3 Noise levels

As stated above the noise monitoring in Mumbai has been carried out for 48 hours on a working day and a non-working day. The noise level data is analysed and the values of the relevant parameters are calculated day (6:00 to 22:00) and night time (22:00 – 6:00). In total 55 noise monitoring locations are divided in 9 categories namely, railway, expressway, National Highway, major road, minor roads, industrial area, commercial area, residential area and silence zone.

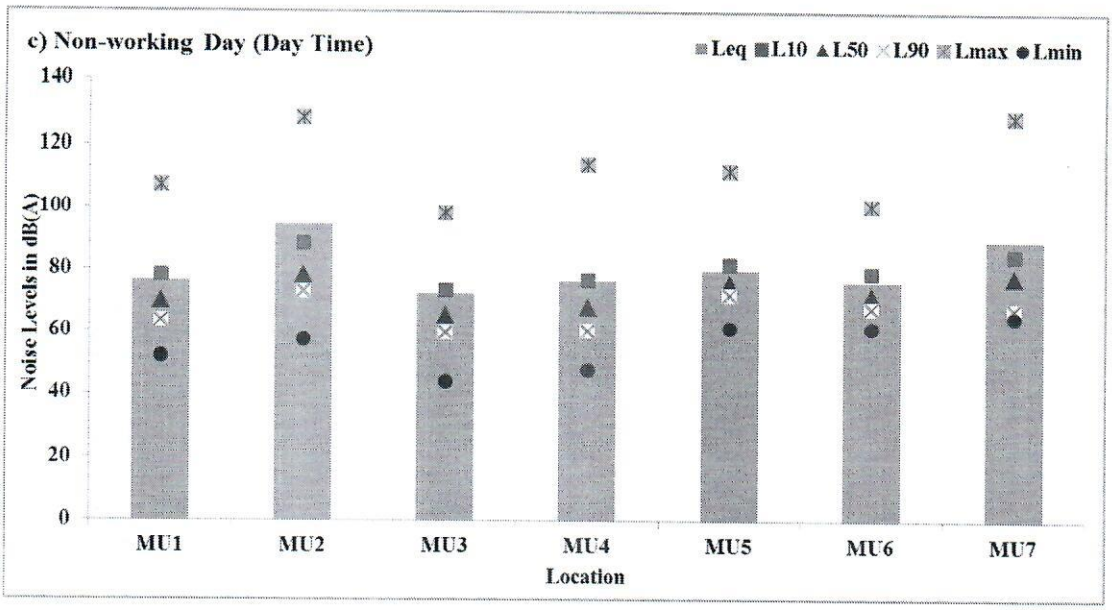
The noise levels are presented graphically in each category in **Figure 6.5 to Figure 6.13.** The other noise indicator metrics like L_{10}, L_{50}, L_{90}, L_{max} and L_{min} are also presented. Furthermore, the noise level in the industrial, commercial, residential and silence zones are compared with the ambient noise standard. The extent of violation with respect to prescribed standard are also assessed and depicted in the graphs.

The noise levels along railway during day and night time of working and non-working daysare shown in **Figures 6.5 (a)** to **(d)** respectively. Higher L_{eq} values are observed at day time as compared to night time at all the locations along the railway for both working and non-working day. As far as individual sampling locations are concerned, highest noise value at MU 7 (ChhatrapatiShivaji Terminus) during day time of working day as compared with all the location of both cases in working and non-working days.


a) Working Day (Day Time)
Leq L10 L50 L90 Lmax Lmin
Noise Levels in dB(A)
140
120
100
80
60
40
20
0
MU1
MU2
MU3
MU4
MU5
MU6
MU7
Location


b) Working Day (Night Time)
Leq L10 L50 L90 Lmax Lmin
Noise Levels in dB(A)
140
120
100
80
60
40
20
0
MU1
MU2
MU3
MU4
MU5
MU6
MU7
Location

295



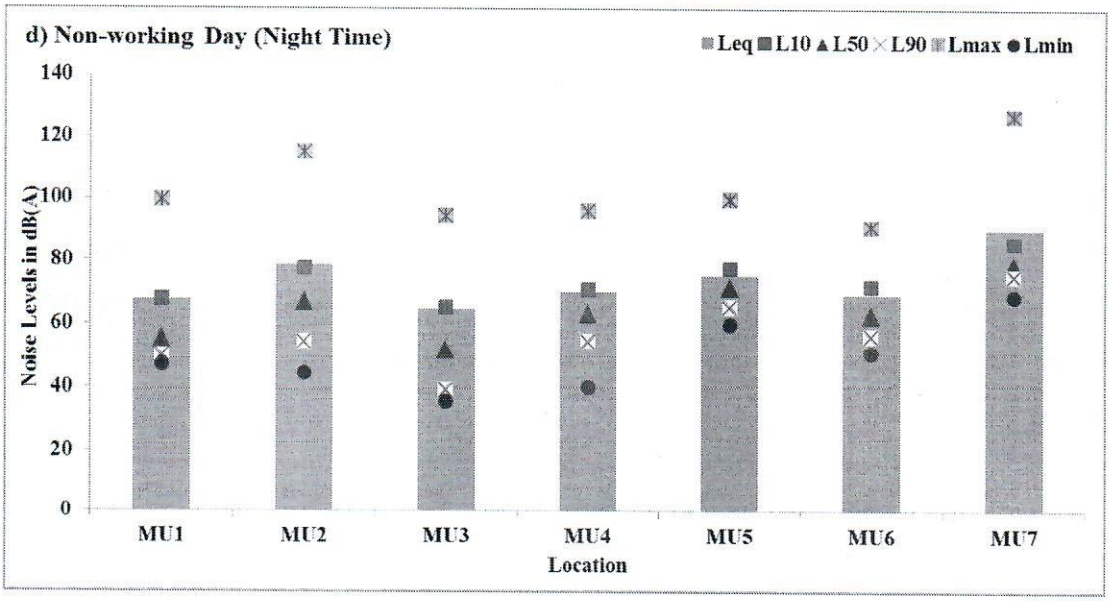


Figure 6.5 Noise level along railways in Mumbai City on a) Working Day (Day Time), b) Working Day (Night Time), c) Non-Working Day (Day Time) and d) Non-Working Day (Night Time)

The noise levels along expressway during day and night time of working and non-working days are shown in **Figure 6.6**. Higher L_{eq} values are observed at day time as compared to night time for both working and non-working day.

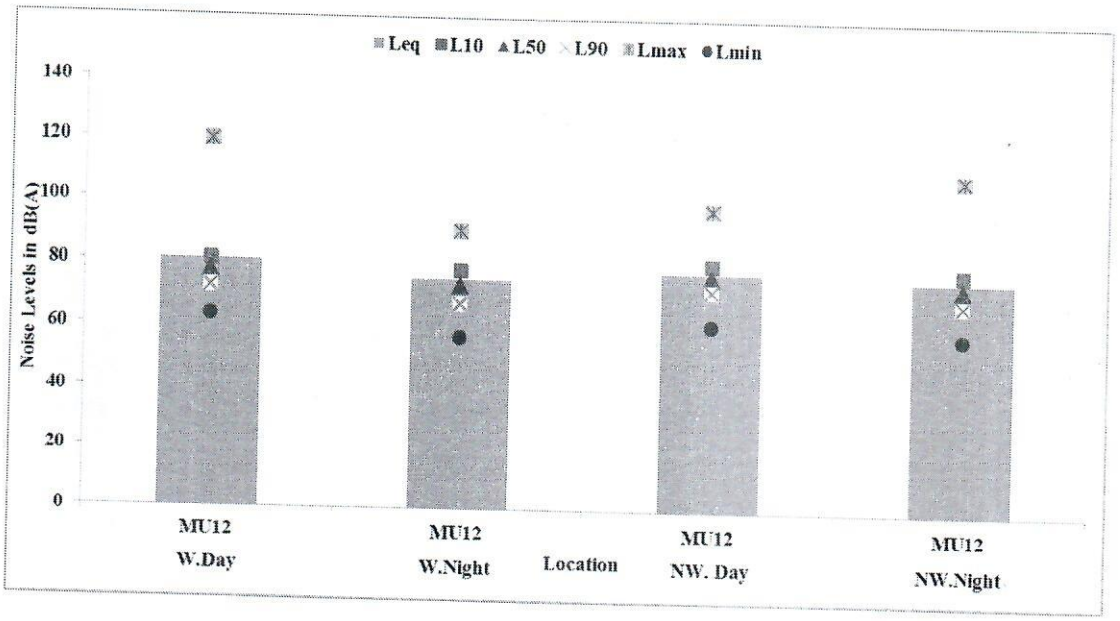


Figure 6.6 Noise level along Expressway in Mumbai City on for Working Day and Non-Working Day

The noise levels along National highway during day and night time of working and non-working days are shown in **Figures 6.7 (a)** and **(b)** respectively. Higher L_{eq} values are observed at day time as compared to night time at all the locations along the national highway for both working and non-working day. There is no significant difference in L_{eq} values found during working and non-working days for day time and night time.

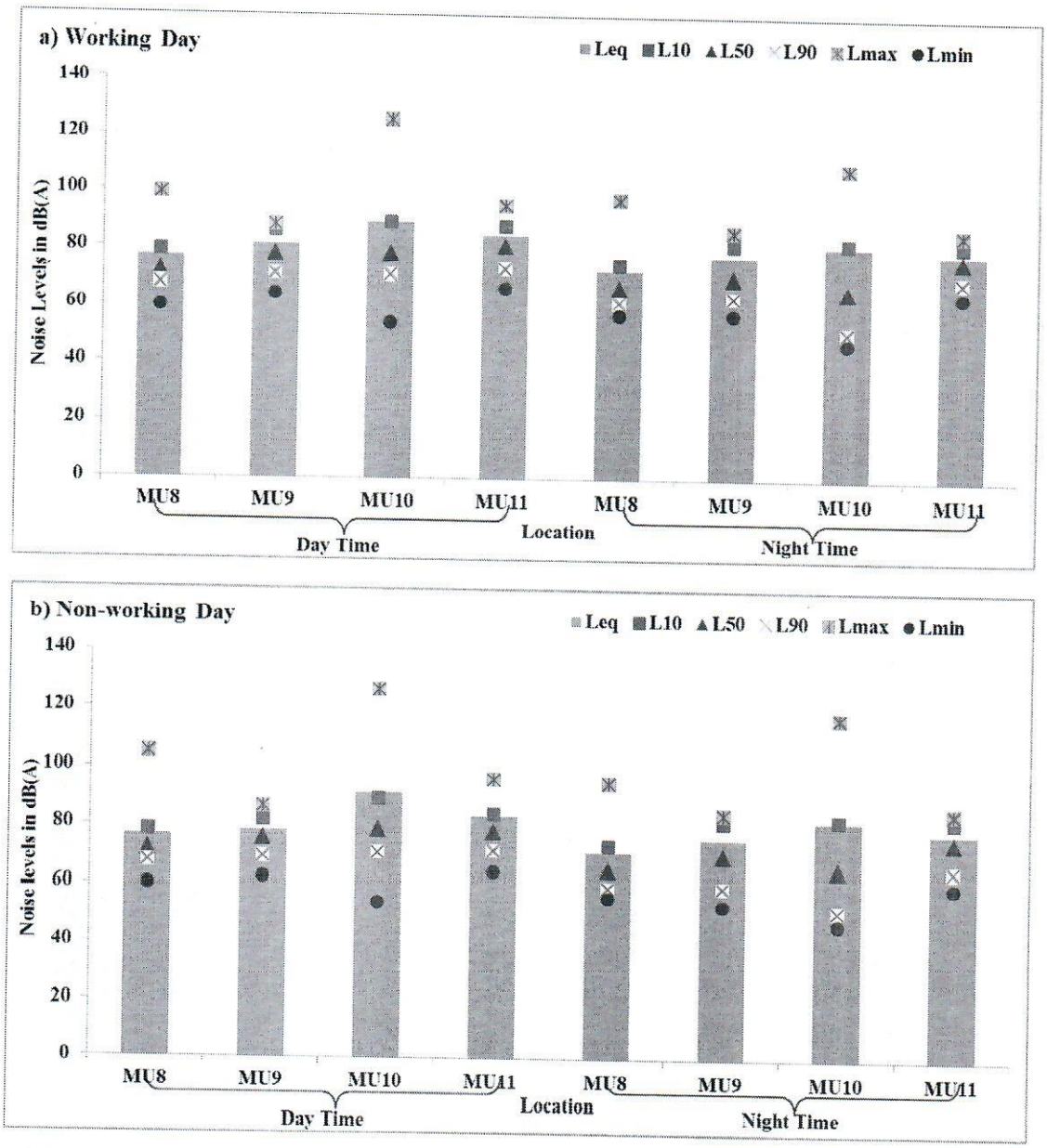


Figure 6.7 Noise level along national highways in Mumbai City ona) Working Day b) Non- Working Day

The noise levels along major road during day and night time of working and non-working days are shown in **Figures 6.8 (a)** and **(b)** respectively. Higher L_{eq} observed during day time and night time of working day as compared to non-working day. There is no significant difference in L_{eq} values found during working and non-working days for day time and night time.

20 8

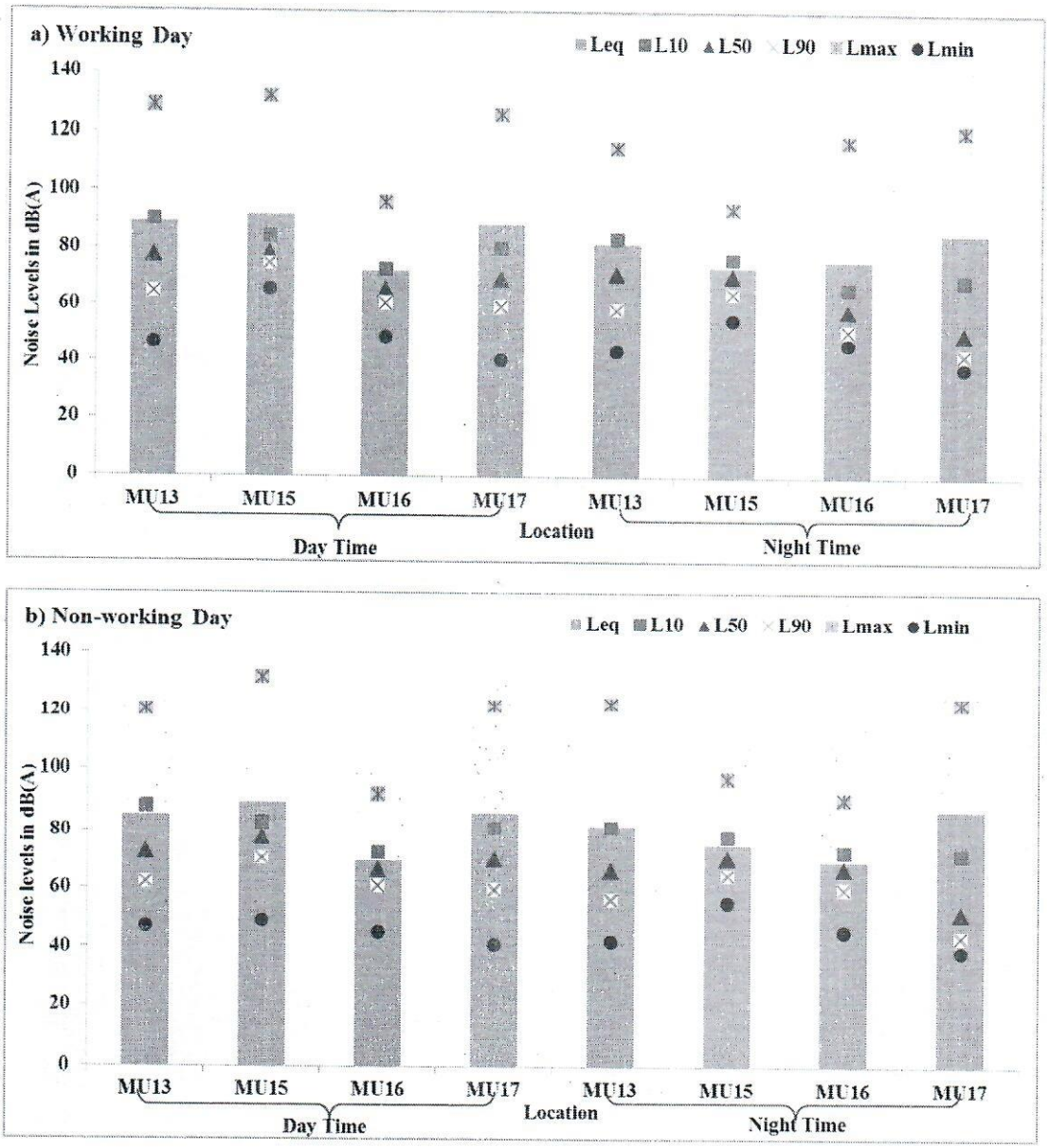
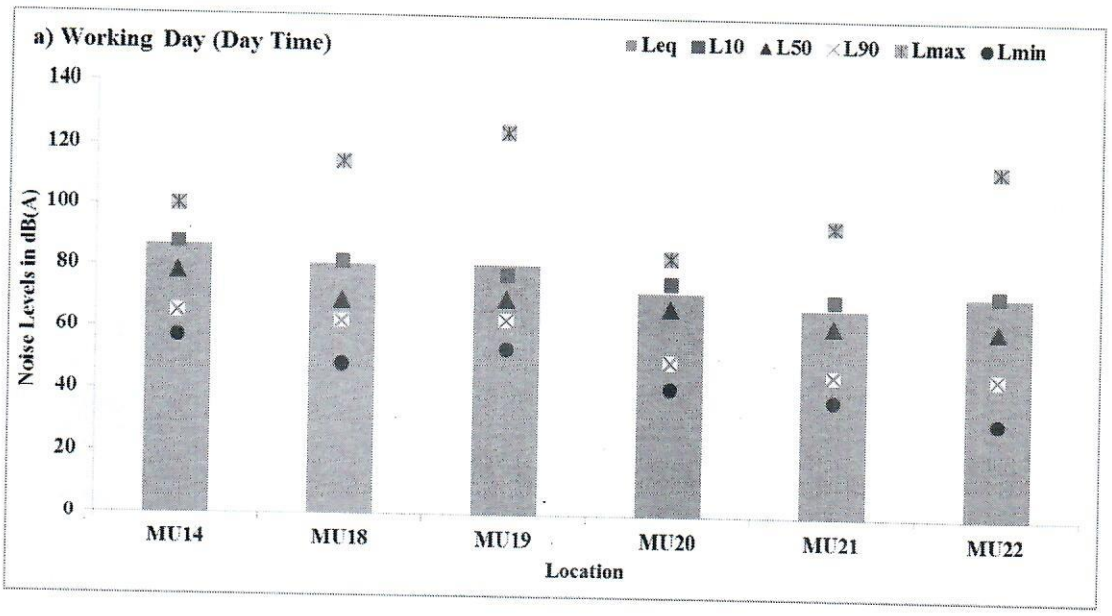
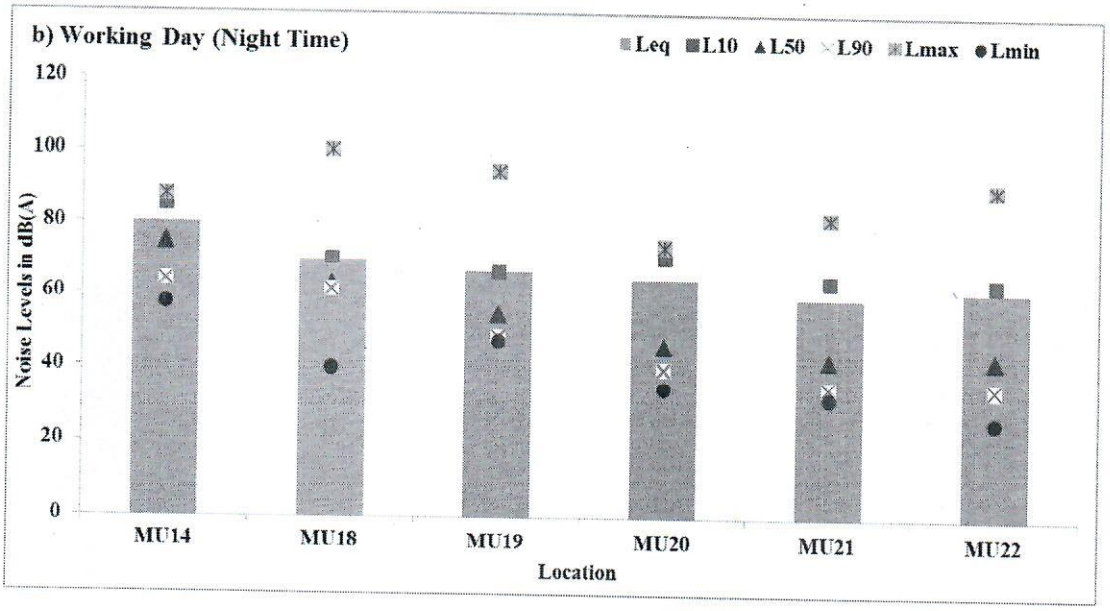


Figure 6.8 Noise level along major roads in Mumbai City on a) Working Day, b) Non-Working Day

The noise levels along minor road during day and night time of working and non-working days are shown in **Figures 6.9 (a)** to **(d)** respectively. Higher L_{eq} values are observed at day time as compared to night time for both working and non-working day. As far as individual sampling locations are concerned, MU 18 showed high values of L_{eq} at day time during both working and non-working days and night time of non-working day.

204


a) Working Day (Day Time)
Leq L10 L50 L90 Lmax Lmin
Noise Levels in dB(A)
140
120
100
80
60
40
20
0
MU14
MU18
MU19
MU20
MU21
MU22
Location


b) Working Day (Night Time)
Leq L10 L50 L90 Lmax Lmin
Noise Levels in dB(A)
120
100
80
60
40
20
0
MU14
MU18
MU19
MU20
MU21
MU22
Location

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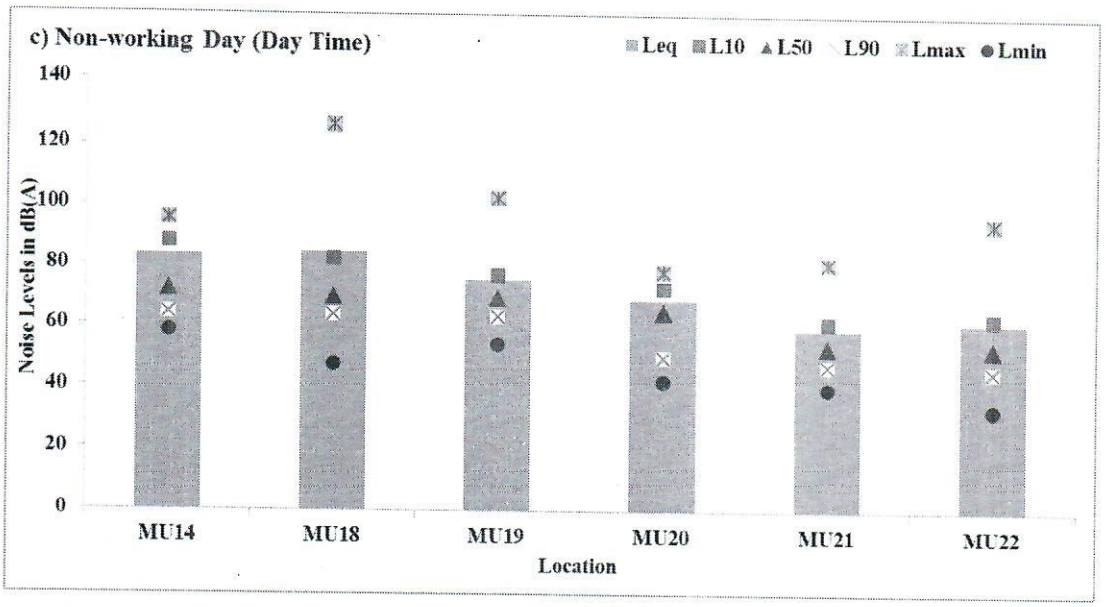

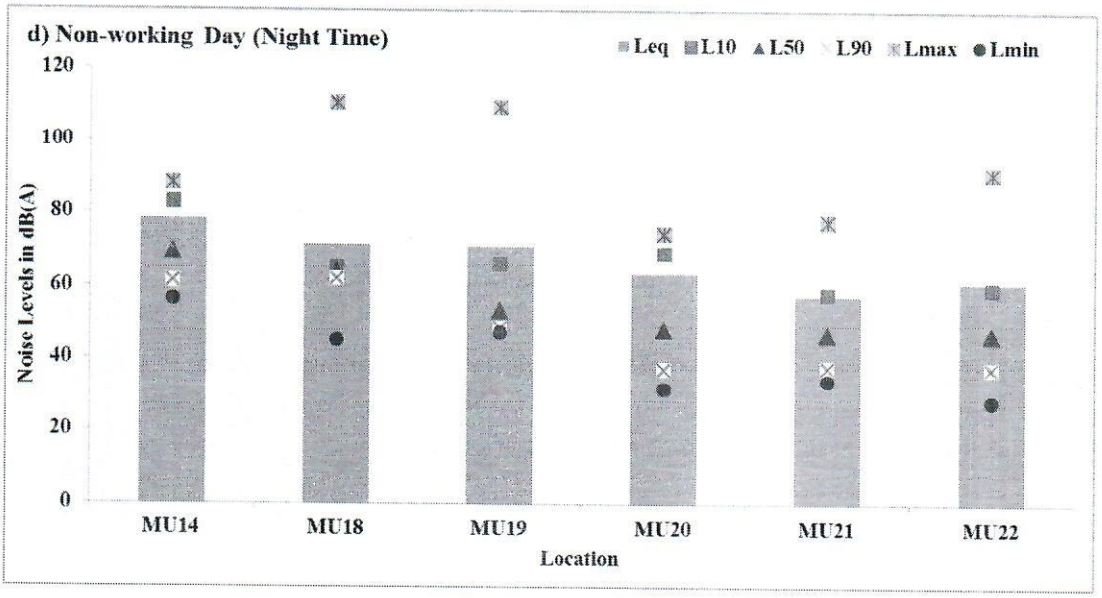

Figure 6.9 Noise level along minor roads in Mumbai City ona) Working Day (Day Time), b) Working Day (Night Time), c) Non-Working Day (Day Time) and d) Non-Working Day (Night Time)

The noise levels in industrial zone during day and night time of working and non-working days are shown in **Figures 6.10 (a)** to **(d)** respectively. According to Noise Pollution (Regulation and Control) Amendment Rules, 2017, noise limits in industrial area are 75 dB (A) and 70 dB (A) at day time and night time respectively. None of the sampling location crossed the standard limit at day and night times of working and non-working day except

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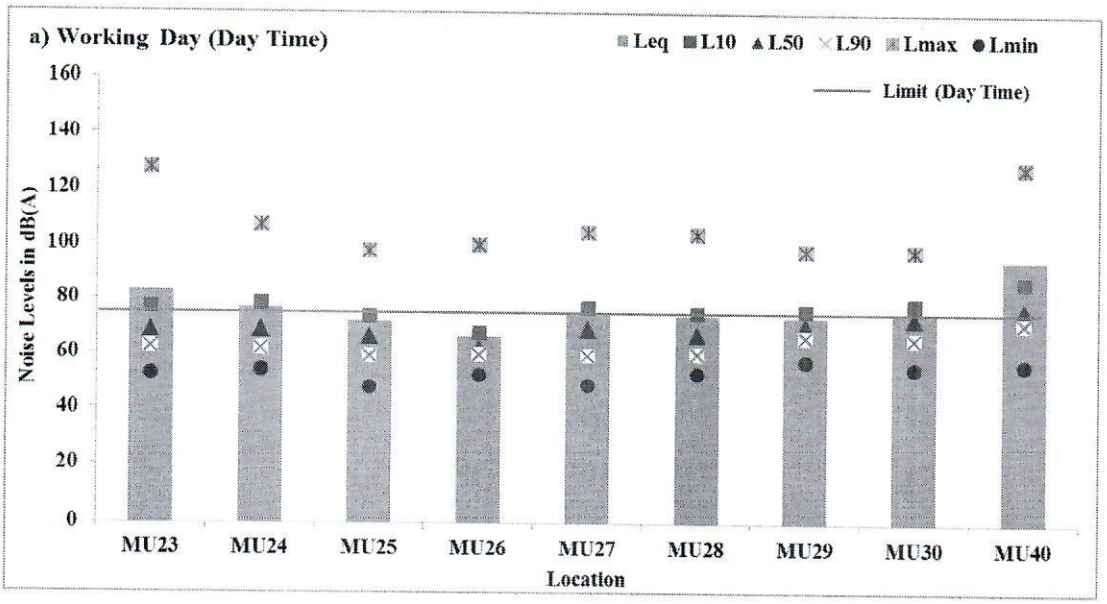
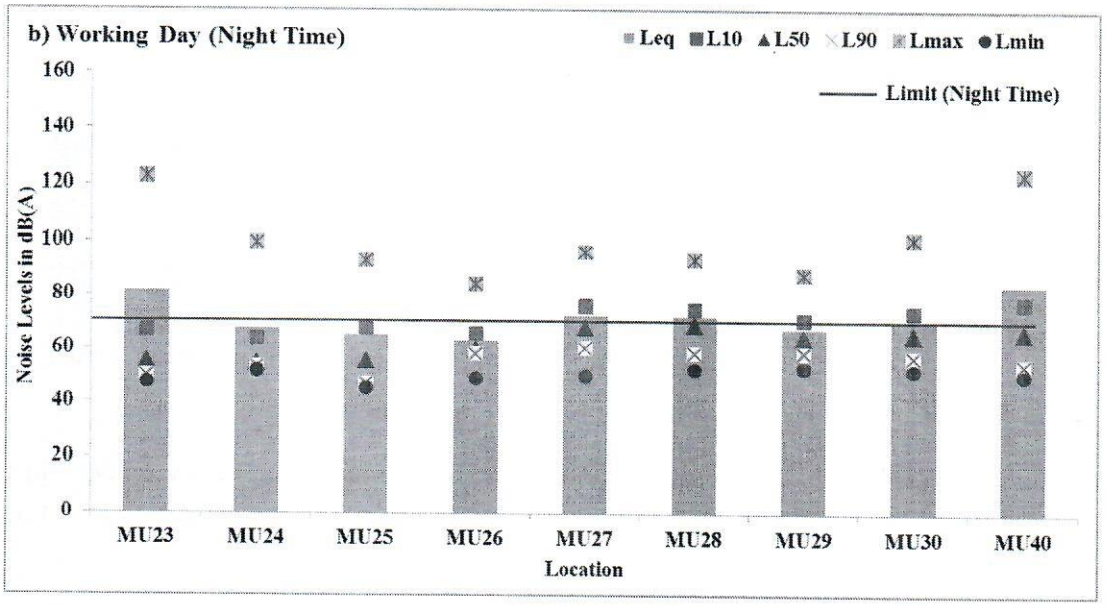
MU23 (Charkop Industrial Estate, Kandivali) and MU40 [Chakala Industrial Area (MIDC)]. Highest L_{eq} observed at MU 40 [Chakala Industrial Area (MIDC)] in both cases day and night time of working and non-working day. Working day is noisier than non-working day.





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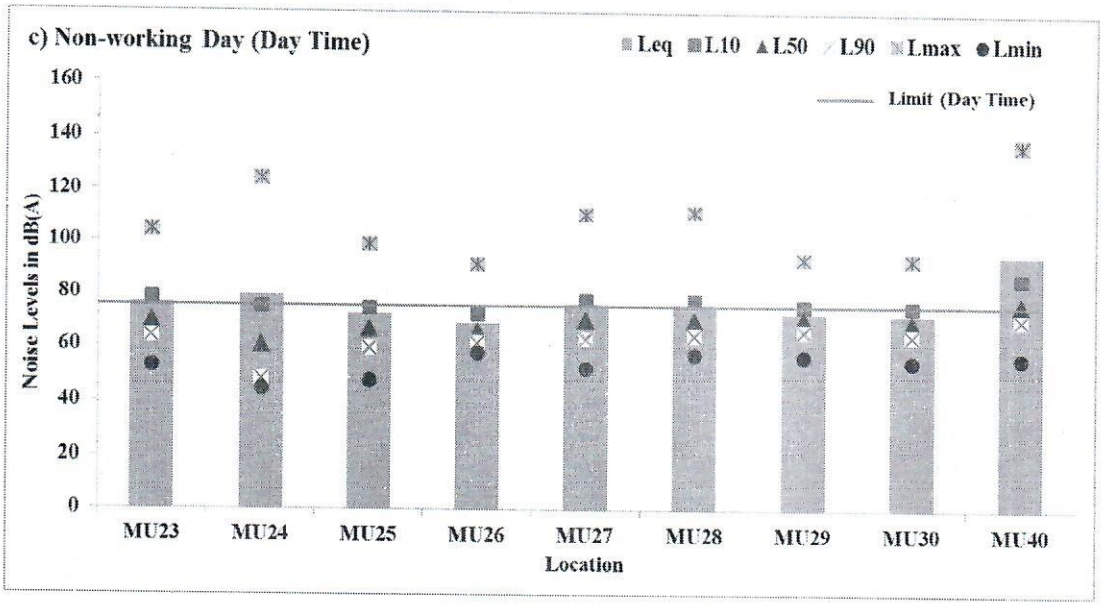

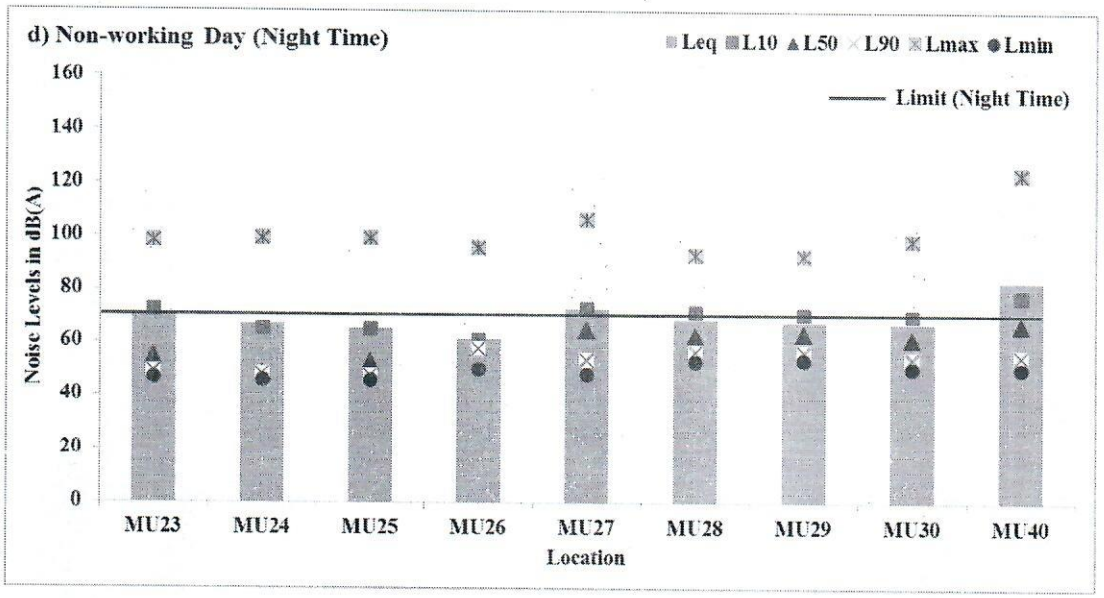

Figure 6.10 Noise level in industrial areas in Mumbai City on a) Working Day (Day Time), b) Working Day (Night Time), c) Non-Working Day (Day Time) and d) Non-Working Day (Night Time)

The noise levels in commercial zone during day and night time of working and non-working days are shown in **Figures 6.11 (a)** to **(d)** respectively. According to Noise Pollution (Regulation and Control) Amendment Rules, 2017, noise standard limits in commercial area are 65 dB (A) and 55 dB (A) at day time and night time respectively. In case of commercial zone, the Noise levels at all the sampling locations are above the specified standards at day

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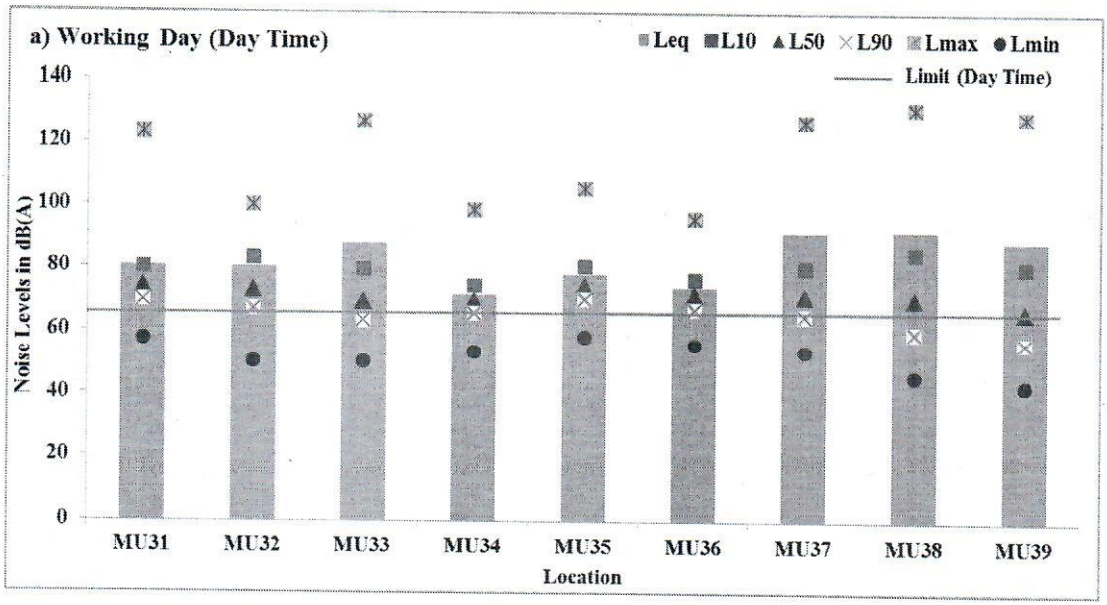
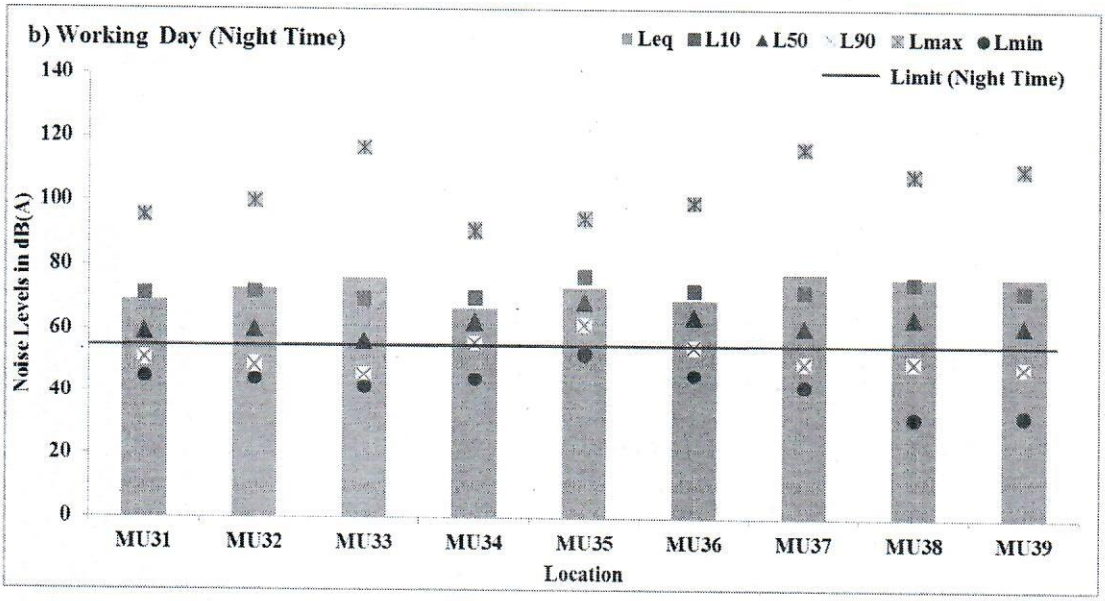
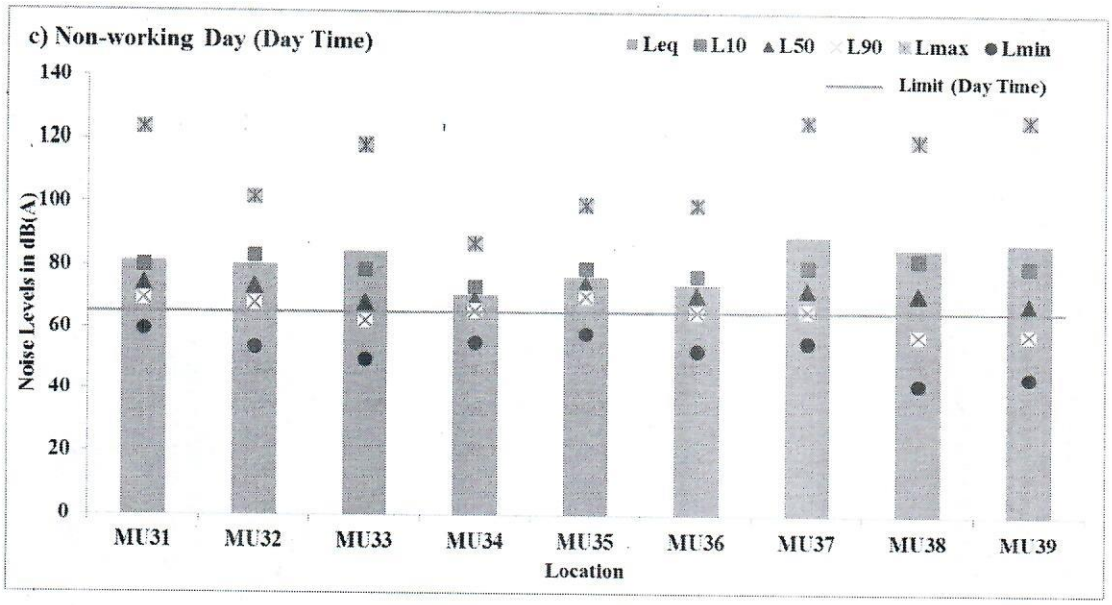
time and night time of both working and non-working days. Day time is noisier than night time in both cases working and non-working days.







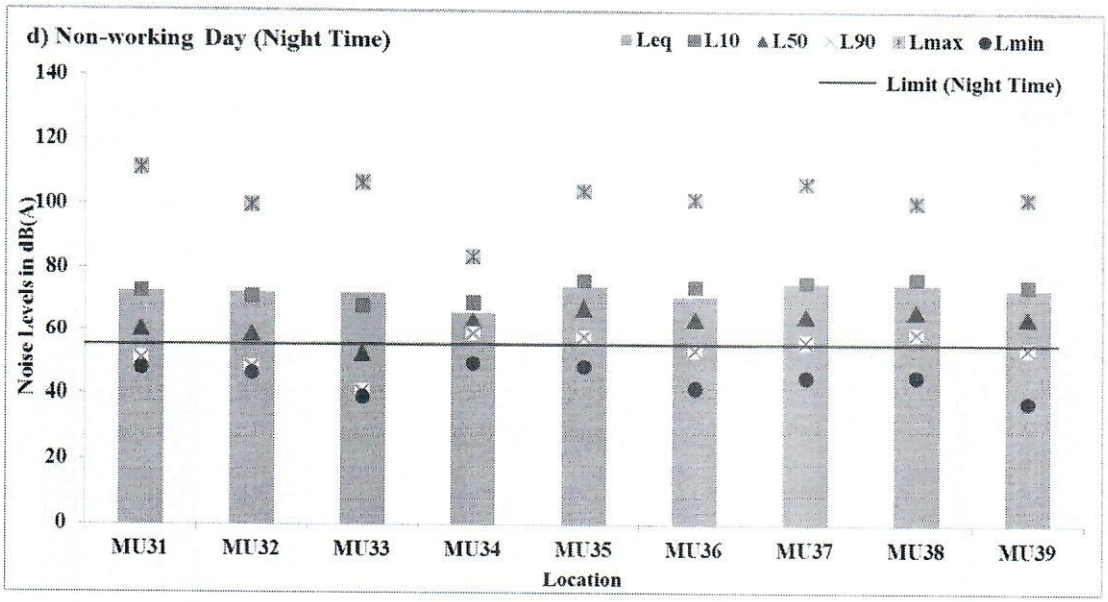
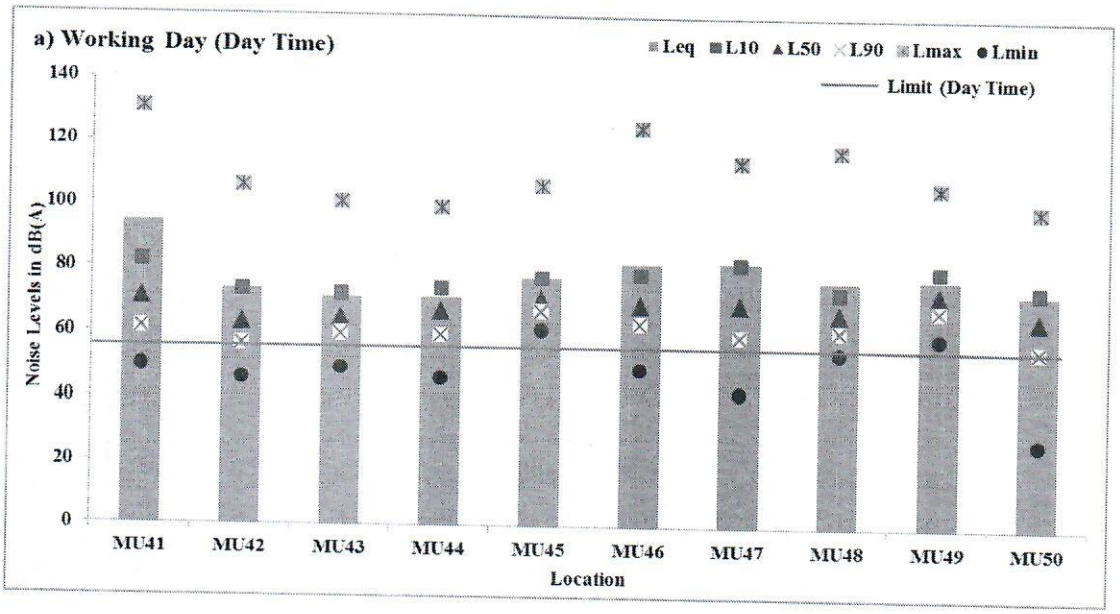
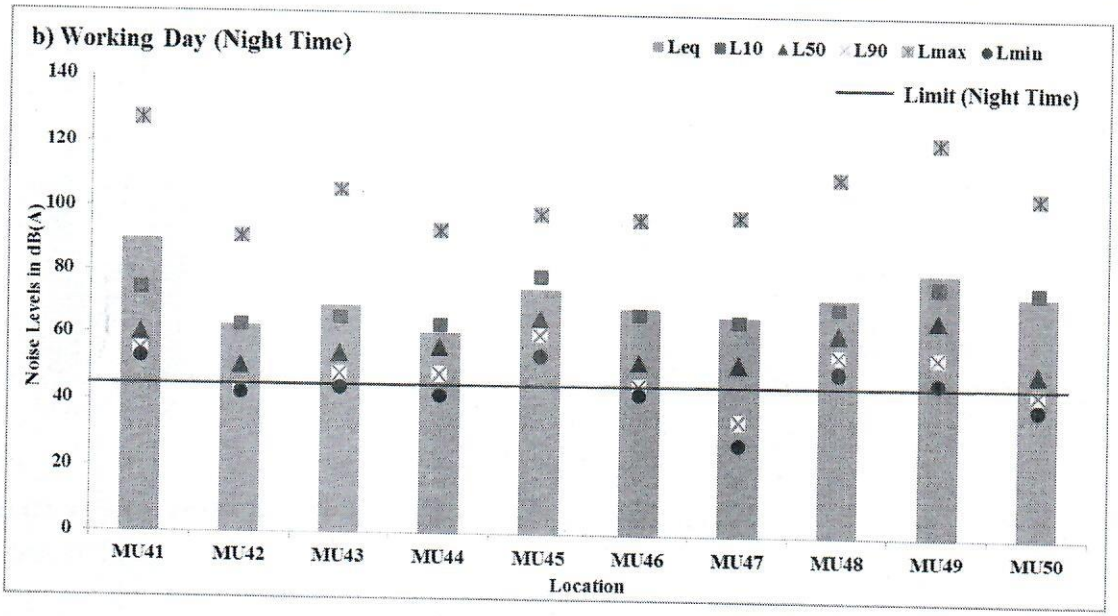


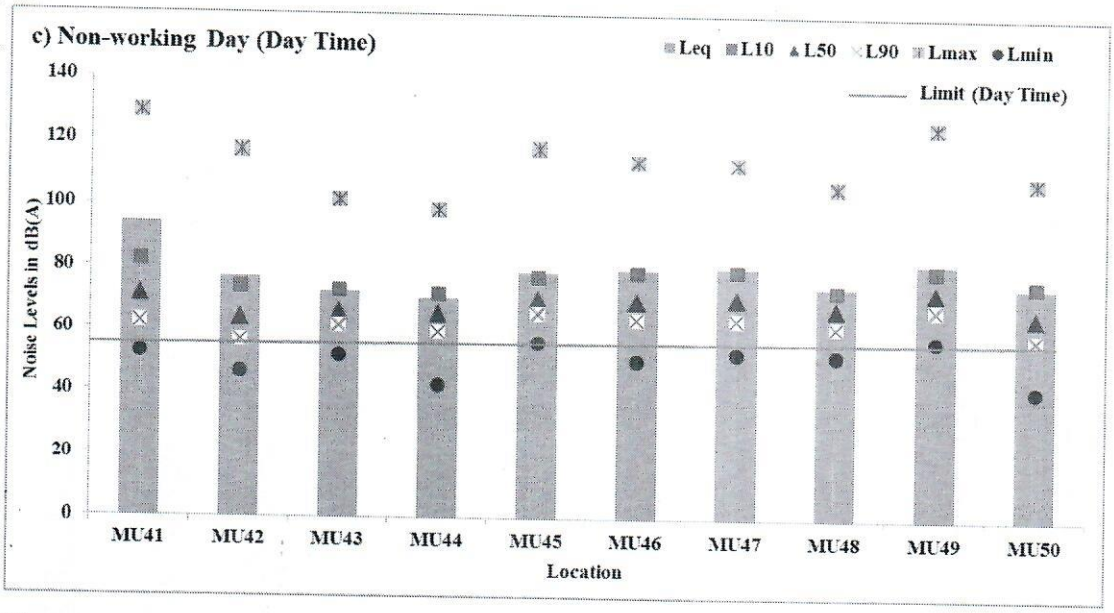
Figure 6.11 Noise level in commercial areas in Mumbai City on a) Working Day (Day Time), b) Working Day (Night Time), c) Non-Working Day (Day Time) and d) Non-Working Day (Night Time)

The noise levels in residential area during day and night time of working and non-working days are shown in **Figures 6.12 (a)** to **(d)** respectively. According to Noise Pollution (Regulation and Control) Amendment Rules, 2017, noise standard limits in residential area are 55 dB (A) and 45 dB (A) at day time and night time and respectively. In case of residential area, the Noise levels at all the sampling locations are above the specified standards at day time and night time of both working and non-working days. Day time is

noisier than night time in both cases working and non-working days. Higher L_{eq} are observed at MU 41 (Ambujwadi Slum Area) as compare to all the sampling location at day and night time of working and non-working days.







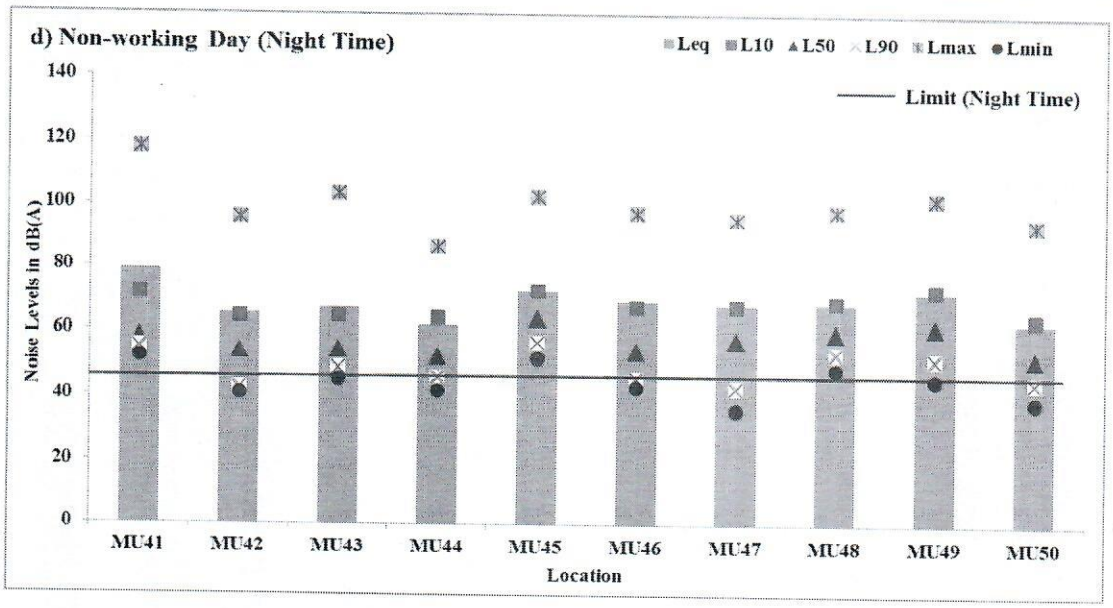
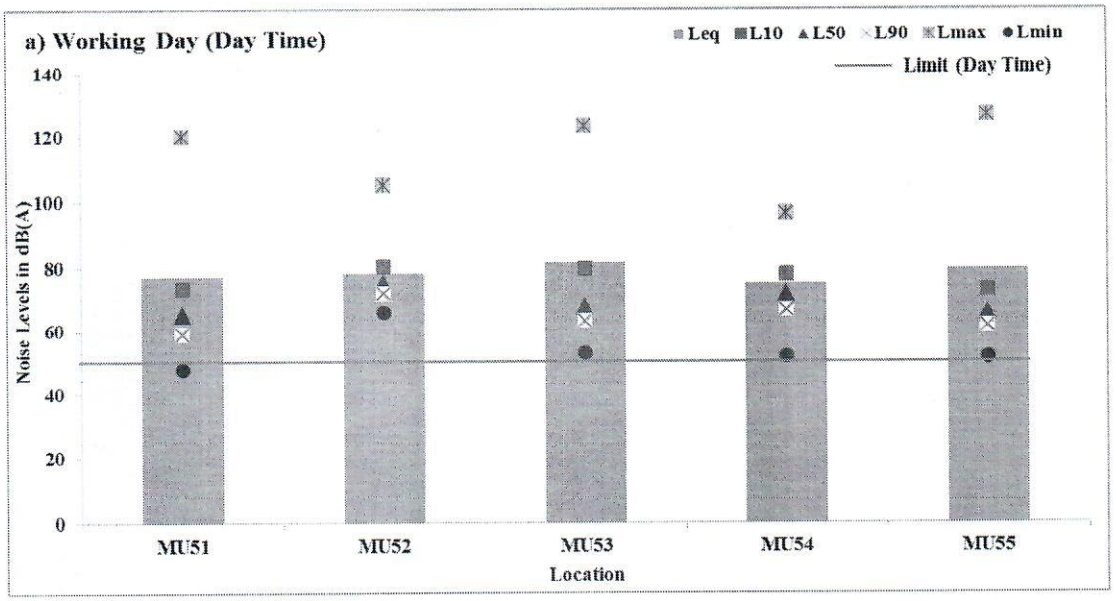
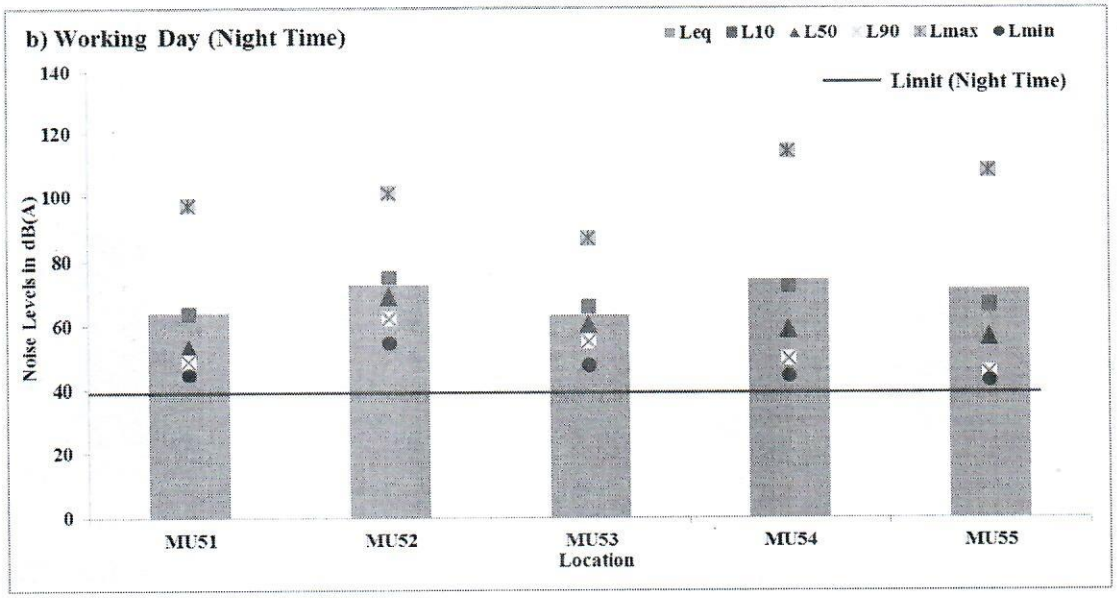


Figure 6.12 Noise level in residential areas in Mumbai City on a) Working Day (Day Time), b) Working Day (Night Time), c) Non-Working Day (Day Time) and d) Non-Working Day (Night Time)

The noise levels in silence zone during day and night time of working and non-working days are shown in **Figures 6.13 (a)** to **(d)** respectively. According to Noise Pollution (Regulation and Control) Amendment Rules, 2017, noise standard limits in silence zone are 50 dB (A) and 40 dB (A) at day time and night time respectively. In case of silence zone, the Noise levels at all the sampling locations are above the specified standards at day time and night

time of both working and non-working days. Day time is noisier than night time in both cases working and non-working days.





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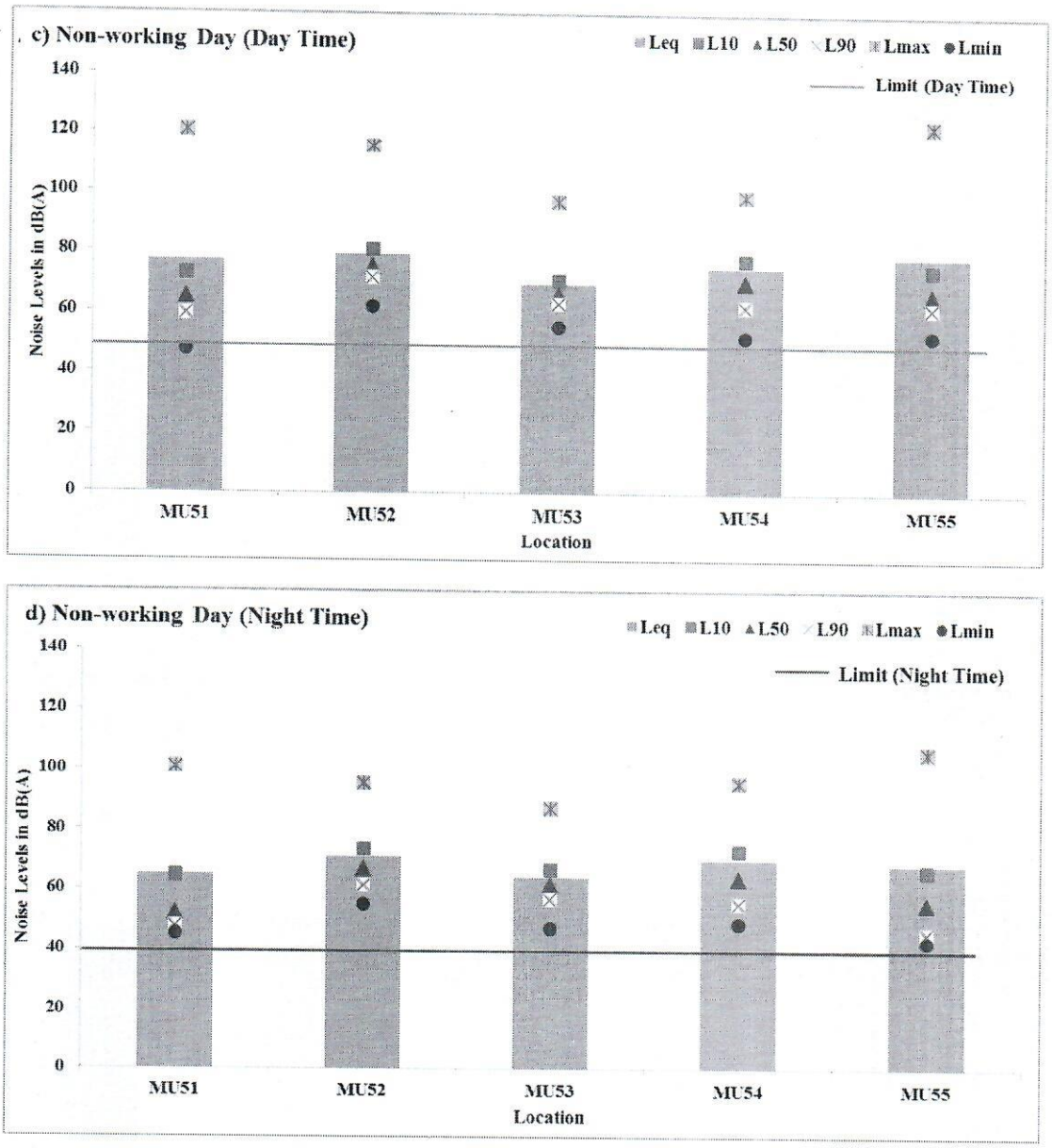


Figure 6.13 Noise level in silence zones in Mumbai City on a) Working Day (Day Time), b) Working Day (Night Time), c) Non-Working Day (Day Time) and d) Non-Working Day (Night Time)

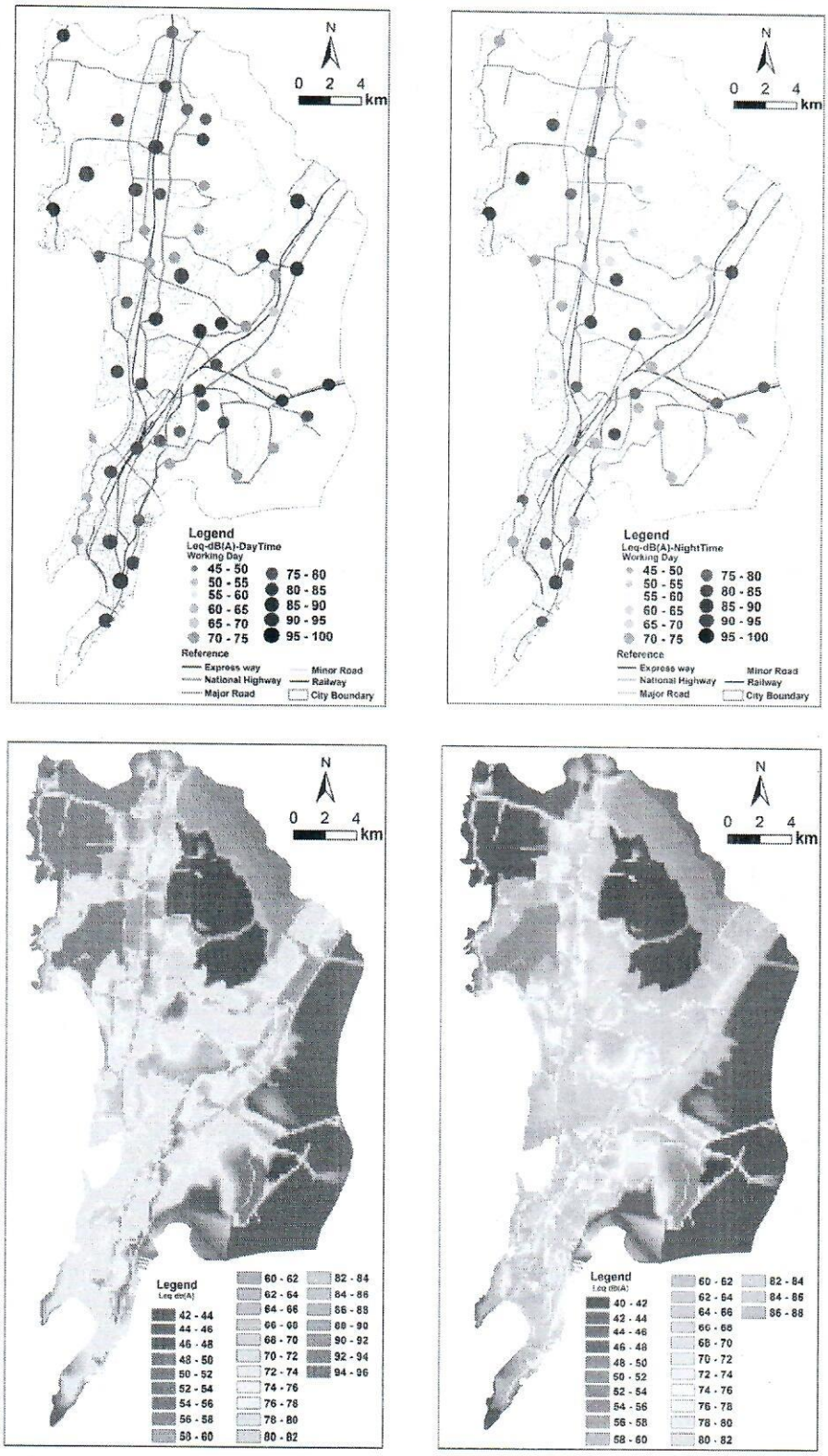
Noise levels of each category are given in the **Table 6.3**.

Table 6.3 Category wise summary of Noise levels

Categories	Working day		Non-Working day	
	Day	Night	Day	Night
	L_{eq} dB(A)	L_{eq} dB(A)	L_{eq} dB(A)	L_{eq} dB(A)
Railway	89.0	79.6	87.3	82.1
National Highway	85.0	78.4	76.5	78.4
Major Road	88.7	82.1	85.9	82.5
Minor Road	77.7	66.3	77.9	68.1
Industrial	85.8	76.9	85.3	74.9
Commercial	87.2	74.4	85.1	73.0
Residential	85.1	80.7	85.1	71.7
Silence	78.8	71.1	76.9	68.4

6.4 Noise Map

Noise maps are generated with the help of latest state-of-the-art GIS software. Spatial map of the noise level in the city is prepared based on the noise level at the noise monitoring location while strategic noise maps of the city is generated using geo-statistical analysis. These maps are generated for working and non-working days for both day and night time as shown in **Figure 6.14 (a)** and **(b)** respectively.



Working Day (Day Time) Working Day (Night Time)

Figure 6.14 (a) Spatial and Strategic Noise Map of Mumbai City during (Working Day)

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During day time, minimum and maximum values of noise are observed as 66.1 dB (A)at MU26 (Godrej and Boyce Plant) and 95.3 dB (A) at MU7 (ChhatrapatiShivaji Terminus) respectively. During night time, minimum and maximum values are observed as 59.9 dB (A) at MU21 (Near Adasa Nagar Residential area) and 89.8 dB (A) at MU41 (Ambujwadi Slum Area) respectively.

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ANNEXURE-VI

CENTRAL POLLUTION CONTROL BOARD
PARIVESH BHAWAN EAST ARJUN DELHI-110032

MINUTES OF MEETING FOR PROPOSAL ON NOISE MAPPING IN THE MATTER O.A. NO. 681/2018 TITLED "TIMES OF INDIA" AUTHORED BY SHRI VISHWA MOHAN TITLED "NCAP WITH MULTIPLE TIMELINES TO CLEAN AIR IN 102 CITIES TO BE RELEASED AROUND AUGUST 15"

In compliance to directions of Hon'ble NGT in above said matter, a meeting convened with Expert's members on Noise Mapping from NEERI, NPL and IIT Kanpur at Central Pollution Control Board (CPCB) on 04/06/2019. List of participant is attached at **Annexure-I.**

Shmt Divya Sinha, Additional Director welcomed the participants and explained the background about meeting agenda. During the course of meeting, following issues were discussed:

1. Sh Vishal Gandhi, Scientist 'D' mentioned that Central Pollution Control Board (CPCB) in association with State Pollution Control Boards has laid down National Ambient Noise Monitoring Network in 07 metropolitan cities and installed 70 no. of Noise Monitoring System in Mumbai, Delhi, Kolkata, Chennai, Bangalore, Lucknow and Hyderabad (10 stations in each) under Phase-I and Phase-II of the programme. Ambient noise data available with CPCB can be used for generating noise maps.

   It is proposed that noise mapping in 07 cities for 70 locations based on available data shall be initiated jointly to understand the subject and same may be replicated in large scale with SPCBs/PCCs.

2. Dr Ritesh Vijay, Principle Scientist, NEERI made brief presentation on study conducted on noise mapping of 27 cities in Maharashtra in approx 18-month time. NEERI has developed GIS based noise simulation software (N-GNOIS) to simulate the noise scenarios due to point and mobile sources considering the impact of geographical features and meteorological parameters.

   NEERI informed that the methodology developed was based on workshop in which discussion was held with stakeholders. Number of stations were decided based on the probable noise sources (source-receptor) and designated land use.

3. It was informed by NEERI that Noise Mapping of a city shall not be possible with existing 10 stations. For Mumbai city, NEERI had set up 55 Noise Monitoring Stations. Accordingly, it will be required to set up additional stations for conducting noise mapping. It was further informed that approximately 03 months shall be required to set up these stations and one month shall be required for noise monitoring

Based on above discussion, it was decided that NEERI, NPL and IIT Kanpur shall submit comprehensive proposal within a period of 01 week. The scope of work for the project shall include the following:

a. Source Profiling
b. Hot Spot Identification
c. Noise Mapping
d. Remedial Action Plan

The project proposals should clearly specify the objectives, methodology, cost involved and the time frame for execution of the project.

The meeting ended with thanks to the chair.

ANNEXURE-I

LIST OF PARTICIPANTS

1. Dr Ritesh Vijay, Principle Scientist, NEERI
2. Dr Raman Sharma, Senior Scientist, NEERI
3. Dr Navin Garg, Principle Scientist, NPL
4. Dr Abubha Goel, Associate Professor, IIT Kanpur
5. Smt Divya Sinha, Additional Director, CPCB
6. Sh Vishal Gandhi, Scientist 'D', CPCB
7. Sh Danish Meena, Scientist 'B', CPCB

Gmail

Vishal Gandhi <vishalcpcb@gmail.com>

Compliance in the Matter of OA No. 681/2018 related to Noise Pollution filed before Hon'ble NGT

1 message

Member Secretary <mscb.cpcb@gov.in> Wed, May 8, 2019 at 12:41 PM
To: administrator-dd-dnh@nic.in, pers-dd@nic.in, dit.silvassa-dnh@nic.in, cs-andaman@nic.in, diragri@gmail.com, cs-uttarakhand@nic.in, admr-chd@nic.in, lk-admin@nic.in, cs@mp.nic.in, cs@ap.gov.in, cs-bihar@nic.in, cs-goa@nic.in, csguj@gujarat.gov.in, cs-jandk@nic.in, cs-jharkhand@nic.in, cs@karnataka.gov.in, chiefsecy@kerala.gov.in, chiefsecy@maharashtra.gov.in, rvsddd@gmail.com, cso-meg@nic.in, cs-manipur@nic.in, csngl@nic.in, csori@nic.in, cs@punjab.gov.in, csraj@rajasthan.gov.in, cs-skm@hub.nic.in, cs@tn.gov.in, cs@telangana.gov.in, csup@nic.in, cs-westbengal@nic.in, cs.pon@nic.in
Cc: vishalcpcb@gmail.com

Respected Sir/Madam,

I wish to draw your kind attention to the order dated 15.03.2019 issued by Hon'ble NGT **in the matter of OA no. 681/2018 titled "Times of India" Authored by Shri Vishwa Mohan Titled "NCAP with multiple timelines to clean air in 102 cities to be released around August 15", wherein** following directions were issued;

(i) The State PCBs may undertake noise level monitoring in conjunction with the Police Department and take remedial action. The Police Departments of all the States/UTs may obtain the noise monitoring devices within a period of three months and specification of such devices may be finalized in consultation with the respective State PCBs/Pollution Control Committees (PCCs). The Police Department of all the State/UTs may also train their staff regarding the use of such devices and develop a robust protocol for taking appropriate action against the defaulters.

(ii) The Chief Secretary may finalize action plans in this regard within three months and submit the same to CPCB.

It is, therefore, requested that action by the State Govt. may kindly be ensured and action plan may be submitted by 30th June 2019.

With regards,

Dr. Prashant Gargava

Member Secretary

Central Pollution Control Board

Parivesh Bhawan, East Arjun Nagar,

Delhi - 110032

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OA No. 681 of 2018.pdf
227K

ANNEXURE-VIII

SUMMARIZED ACTION PLANS OF SPCBs/PCCs

1. ACTION PLAN OF ODISHA

Environment and Forest Department Govt. of Odisha has submitted action plan on 29.06.2019. Action plan provided is summarised below:

S.no	Activities to be undertaken as per direction of Hon'ble NGT .	Action taken/ to be taken by the concerned Authority.
1	Training of regulatory machinery and identifying accountable officers and preparing action plan and monitoring mechanism.	As per the provisions of Noise Pollution (Regulation and Control) Rules, 2000 and amendments, District Magistrate, Police Commissioner, or any other officer, not below the rank of DSP is the Prescribed Authority for maintenance of AAQ standards with reference to Noise. Direction has been issued to all District Superintendents of Police Including SsRP, Cuttack/Rourkela, DCPs, Bhubaneswar/Cuttack to train officers of their jurisdiction to handle Noise Level Monitoring device (Sound Level Meter) in order to control noise pollution
2	The State Pollution Control Board may undertake noise level monitoring in conjunction with the Police Department and take remedial action.	State Pollution Control Board, Odisha monitors ambient noise levels during Dusehra, Deepawali and other festive occasions to assess the impact of such festivals on ambient noise level. The reports of such measurement are displaced at the website of the Board (www.ospcboard.ors). The State Pollution Control Board, Odisha provides technical support to the Police Department for issuance of license to the Band Parties having installed sound limiters to limit the Noise Level to 65 db (A) leq.
3	The Police Departments of all the States/UTs may obtain the noise monitoring devices within a period of three months and specification of such devices may be finalised in consultation with the respective State PCBs/ Pollution Control Committees	The specification of Noise Level Meters as provided by SPCB is attached as Annexure-1. So far 259 Sound Level Meters have been issued to different districts. There are 551 jurisdictional P.Ss in the State which may be provided with Sound Level Meter at least @ 1 for each Police Station. Step is taken to procure more number of Sound Level Meter to provide to all Police Stations of the States as per Specification.
4	The Police Department of all the State /UTs may also train their staff regarding the use of such devices and develop a robust protocol for taking appropriate action against the defaulters.	Direction has been issued to all District Superintendents of Police including SRPs, Cuttack/Rourkela, DCPs, Bhubaneswar/Cuttack to train officers of their jurisdiction Directed all concerned to develop a robust protocol for taking appropriate action against the defaulters. State Pollution Control Board, Odisha will impart training as and when required to police personnel regarding the use of Noise Level Meters with data loggers.

2. ACTION PLAN OF STATE OF TRIPURA

Department of Science Technology and Environment submitted action plan on 17.06.2019 to CPCB. Action on above aspects being already being taken by State Government in compliance to directions of Hon'ble High Court of Tripura.

Tripura Government has notified policy for mandatory use of Sound Limiter(s) in all sound system / public address system for effective control of Noise Pollution in whole state of Tripura "Use of loudspeakers are permitted only when amplifier(s) are attached to sound limiter(s).

Action plan submitted with time lines is mentioned below:

S.no	Action	Responsibility	Target period
1	Procurement of devices for police stations in consultation with TSPCB	TSPCB	3 MONTHS
2	Training of police on use of sound level meter	Home department (Police)	Within one month after procurement
3	Noise monitoring at identified locations	TSPCB	Continuous activity
4	Awareness by district administration by Local Cable TV	DM& Collector	Within one month
5	Meeting with Sound system owners	ULBs	Within 03 months
6	Grievance cell at DM, SP, SDM & SDPOs to address noise pollution	DM, Collector, SP, SDM& SDPOs	Within 02 months
7	Regulation of loud speaker	DM, Collector, SP, SDM& SDPOs	Continuous activity
8	Vigilance against pressure horns	Transport Department	Continuous activity
9	Wide publicity of ban crackers list	TSPCB	Continuous activity
10	Completion of cultural program by 10 PM to ensure no public address after 1:00 pm	Home Department (Police)	Continuous activity
11	Planting green trees and shrubs along roads, hospitals, educational, intuitions etc. help in noise reduction	Forest and Urban Dev Dept.	Continuous activity
12	Mass awareness programme about noise pollution	TSPCB	Continuous activity

S.no	Action	Responsibility	Target period
13	Awareness campaign through print & electronic media about rules and regulations	ICA Department & TSPCB	Continuous activity

3. ACTION PLAN OF DAMAN DIU & DADAR NAGAR HAVELI.

Daman Diu and Dadar Nagar Haveli Pollution Control Committee has submitted only ambient noise monitoring data vide letter dated 03.07.2019. No action plan was received.

4. ACTION PLAN OF STATE OF CHHATTISGARH

Chhattisgarh Environment Conservation Board have submitted report vide letter dated 28.06.2019. Detailed action plan not submitted and action taken by Chhattisgarh Police department is mentioned below:

1. Chhattisgarh Environment Conservation Board have provided 469 noise monitoring devices to police department.
2. 340 police personnels have been given training for operation of sound monitoring devices.
3. Action were taken in 164 cases in 2018 and 26 cases in 2019 (January to May) under Kolahal Adhinium 1985.
4. 4454 vechiles were prosecuted under motor vechile act in 2018 and 631 in 2019 (January to May) for using pressure/ musical horns

5. ACTION PLAN OF JAMMU AND KASHMIR

Department of Forest Environment and Ecology has submitted action plan vide letter dated 09.07.2019. Detail of action plan submitted is mentioned below:

1. Action plan to be implemented by SPCB:

a. Proposal to establish online ambient noise monitoring stations in Jammu and Sringar capitals as per CPCB criteria. under National Network. as desired by CPCB vide letter dated 22/09/16

b. Proposal for manual noise monitoring for all districts of the state.

2. Action plan to be implemented by SPCB to undertake noise monitoring in conjunction with police department.

a. With respect to monitoring of vehicular pollution in conjunction with police department mechanism is defined. Joint monitoring is being done regularly.

b. Frequent checks of motor echoes will be done to ensure implementation of provisions of rules.

c. Inclusion of status of pressure horns in the vehicle at the level of issuing pollution control certificates by the pollution checking centres.

d. Issuance of guidelines for marriage halls/ banquet halls/ lawn and club houses. to be brought under consent mechanism.

e. Declaration of silence zones in compliance to Noise Pollution (Regulation and Control) Rules, 2000.

3. Action plan to be implemented by police department.

The specification of Noise Monitoring Devices to be procured by the police department finalised by the SPCB. A training schedule is devised from 15 July 2019 to 23 July 2019 and 24 July 2019 to 31 August 2019.

6. ACTION PLAN OF MADHYA PRADESH

No action plan submitted and copy of communication received from Madhya Pradesh SPCB to Police Department.

7. ACTION PLAN OF NCT OF DELHI

Department of Environment, Government of NCT of Delhi has submitted action plan vide letter dated 27.06.2019. Action taken are summarized below:

Points	Compliance	Department
The State PCBs may undertake noise level monitoring in conjunction with the Police Department and take remedial action.	DPCC has installed five numbers Real DPCC Time Automatic Noise Monitoring Systems at R.K. Puram, Punjabi Bagh, Mandir Marg, Civil Lines & Anand Vihar in collaboration with CPCB. The data of these stations are linked with CPCB and DPCC server.	DPCC
The Police Departments of all the States/UTs may obtain the noise monitoring devices within a period of three months and specification of such devices may be finalized in consultation with the respective State PCBs/Pollution Control Committees '(PCCs).	DPCC has provided the specification of hand held noise meter and Real Time Automatic Noise Monitoring System as followed in CPCB. Processing of the procurement of the systems by Delhi Police and Local Bodies are in process.	Local Bodies and Delhi Police
The Police Department of all the State/UTs may also train their staff regarding the use of such devices and develop a robust protocol for taking appropriate action against the defaulters.	For awareness purpose workshop was organized on 16.04.2019 on "Implementation of the Noise Pollution (Regulation & Control) Rules" at Delhi Secretariat and participated by officers from DPCC, Delhi Police including Traffic Police, Health Department, GNCTD, Revenue Department, GNCTD, Students from Eco-Club Schools/Colleges and other Govt. Depts. /Agencies. The workshop was inaugurated by Chief Secretary, Delhi.	Department of Environment/ DPCC

8. ACTION PLAN OF STATE OF WEST BENGAL

Department of Environment, Government of West Bengal vide letter dated 20.06.2019 submitted action plan. Action on above aspects being already being taken by State Government in compliance to directions of Hon'ble NGT in the matter of Subhas Dutta vs State of West Bengal & Ors in O. A no. 158/2016 (EZ).

West Bengal State Government has notified policy for mandatory use of Sound Limiter(s) in all sound system / public address system for effective control of Noise Pollution in whole state of W.B "Use of loudspeakers are permitted only when amplifier(s) are attached to sound limiter(s).

9. ACTION PLAN OF STATE OF TELANGANA

Telangana SPCB has submitted action plan vide email dated 12.07.2019. Action plan focused only on Hyderabad City. Summary of action plan is mentioned below:

S. No.	Action points	time frame for implementation from the date of approval	Responsible Departments / agency	Any other information (Status on implementation of the action plan in Hyderabad)
i)	Noise Rules and Prescribed Authorities	Already G.O issued	Police, Transport, Urban and Rural Local Bodies and TSPCB	G.O MS No.172 was issued by the State in the year 2010 in conformity with the Noise Pollution (Regulation and Control) mendment) Rules, 2010. The Prescribed authorities has been designated for implementation of the noise rules.
ii)	Launch public awareness campaign for air pollution control, vehicle maintenance, minimizing use of personal vehicles, lane discipline, etc.	Continuous activity at regular intervals	**Transport, Traffic, GHMC, PR&RD & TSPCB**	• To Launch Public Awareness campaign for reducing the noise pollution in regular scale • Awareness to include on honking of horns unnecessarily, usage of speakers and loud speakers, sensitisation on the silence zones, machinery noise etc
iii)	Launch extensive drive against vehicles using multi horns and higher noise levels than that of the prescribed to ensuring strict compliance	Continue as regular activity.	**Transport & Traffic**	• special drives on the usage of non-designated or prohibited horns and initiate actions

S. No.	Action points	time frame for implementation from the date of approval	Responsible Departments / agency	Any other information (Status on implementation of the action plan in Hyderabad)
iv)	Fiscal measures – Penalties and other to notify the penalties for using non-designated horns for all category of vehicles	Continue as regular activity	**Transport & Traffic**	• Stricter implementation of the noise rules and levy of penalties as included in the G.O.Ms.172 of 12-10-2010
v)	Reduction of Community traffic noise by developing green corridors along the roads	Continue as regular activity	**GHMC, HMDA & Forest department**	• Development of the green corridors • GHMC has planted 4.58 Lakhs (in Avenue Plantations, Central Medians, Institutions, Open Spaces, Lakes, Green Ways, Green Curtains) which will act as absorbing surfaces and assist in mitigating the noise pollution
vi)	Verifying the compliance of the vehicles noise as per the standards given by CPCB under Environment (Protection) Act at the manufacturing stage	Continue as regular activity	**Transport**	• Random Checks of the different category of the Vehicles will be conducted by the Transport authority at the Dealers and manufacturers located in the State of Telangana as per the Test Method IS:3028-1998.
vii)	Air Port Noise	Continue as regular activity	**TSPCB and Air Port Authority**	• The Hyderabad International Air Port has installed continuous Real time noise monitoring instrument and TSPCB will be carrying out random verification of the compliance and the functioning of the Real Time Noise Monitoring system.

S. No.	Action points	time frame for implementation from the date of approval	Responsible Departments / agency	Any other information (Status on implementation of the action plan in Hyderabad)
viii)	Generators noise	Continue as regular activity	**GHMC & PRRD TSPCB**	• To verify the standards prescribed by CPCB at the manufacturing stage for the Noise standards and random verification at different places
ix)	Fire crackers	Continue as regular activity	**Explosives department**	• PESO is the authority for ensuring the implementation of the standards at the manufacturing stage • TSPCB is monitoring the AAQ and noise levels during the Diwali period and conducting awareness programs.
x)	Industrial Noise Consent Condition and compliance	Already under implementation	**TSPCB and Factories Dept**	• TSPCB is stipulating the noise standards while issue of the CFO and the compliance verification is being carried out.
xi)	Implementation of the MV act section 119 and 120 with regards to horns and silencers respectively	Already under implementation	**Transport Department**	• Transport department is carrying out the implementation.
xii)	Noise pollution from the Domestic appliances and Construction equipment	Continue as regular activity	**GHMC & PR&RD**	• Implementation of the noise rules to reduce the domestic and construction equipment noise

S. No.	Action points	time frame for implementation from the date of approval	Responsible Departments / agency	Any other information (Status on implementation of the action plan in Hyderabad)
xiii)	Strengthening of the monitoring activity of the noise		**Transport, Police, GHMC, PR&RD and TSPCB**	• TSPCB over all ambient noise monitoring and Cinema theatres • Police and transport to carry out the compliance verification of the vehicles • Police Department to verify the noise levels at the public address systems • GHMC & PR&RD to monitor the noise levels at construction sites and domestic appliances.
xiv)	Cinema Theatres		**TSPCB**	• To carry out the monitoring
xv)	Dissemination of the Noise Quality data	Being implemented and to Continue the activity	**TSPCB**	• Website • Electronic Display Boards
xvi)	Set-up and publicize helpline in Hyderabad City for complaints against reported non-compliance.	Already established and to Continue the activity	**TSPCB& GHMC**	TSPCB established online public grievance redressal system in its website to receive online complaints. In addition, a 24x7 toll free number 10741 and 040-23887500. 'My GHMC' mobile application and helpline number 040-2111111 was set-up for the purpose of reporting grievances.
xvii)	Strengthening of Noise Monitoring Network	Proposal submitted to CPCB and the proposed time line is two years	**TSPCB**	CPCB has established 10 Real time noise monitoring stations and TSPCB has one station in the GHMC area. These stations are placed to cover the four zones in GHMC area. Police Transport TSPCB is carrying out the monitoring at some of the districts with manual noise measuring instruments.

10. ACTION PLAN OF STATE OF ASSAM

Department of Environment and Forest, Government of Assam vide letter dated 09.07.2019 submitted action plan. Summary of action plan is summarized below:

S. No	Action/Activity	Authority	Timeline
1	Identification and classification of areas/Zones	District Administration and Development Authorities	31st August 2019
2	Preparation of noise pollution map	Pollution control board Assam	90 days
3	Establishment of noise level monitoring stations	Pollution control board Assam	9 months for phase 1
4	Procurement of instruments for sound level monitoring (SLM-1 Type -1 12 Nos. for PCBA & 66 Nos for state police department.	State Police Department & PCBA.	6 month
5	Training of regulatory machinery. Training shall be provided to state Police personals and officers from District Administration	PCBA	3 Months
6	Restrictions and regulations on use of loud speakers, horns, vehicular engine noise, fire crackers during festivals and social gathering, sound emitting construction equipment.	District Administration, State Police Department, Transport Department and ULBs	Continuous activity
7	Strengthening of monitoring mechanism in industry w.r.t Noise	PCBA	Continuous activity
8	Preparation of framework for prosecution , penal provisions.	District Magistrates	immediately
9	Preparation of guidelines for Environmental Compensation under polluters pay principle	PCBA	3 Months
10	Establishment of online public grievances of redressal system	PCBA	3 Months
11	Health survey in areas with high noise levels for assessment of impacts of noise pollution on human health and publication of data.	Health and Family welfare department	Annually

ANNEXURE-IX

CENTRAL POLLUTION CONTROL BOARD
PARIVESH BHAWAN EAST ARJUN DELHI-110032

MINUTES OF THE FIRST MEETING WITH LEADING MANUFACTURERS OF PUBLIC ADDRESS SYSTEM IN THE MATTER O.A. NO. 681/2018 TITLED "TIMES OF INDIA" AUTHORED BY SHRI VISHWA MOHAN TITLED "NCAP WITH MULTIPLE TIMELINES TO CLEAN AIR IN 102 CITIES TO BE RELEASED AROUND AUGUST 15"

In compliance to directions of Hon'ble NGT in above said matter, a meeting convened with Leading Manufacturers of Public Address System at Central Pollution Control Board (CPCB) on 08/05/2019. List of participant is attached at **Annexure-I.**

Sh Vishal Gandhi, Scientist 'D' welcomed the participants and explained the directions of Hon'ble NGT as mentioned below:

> ***The CPCB may explore the possibility in consultation with the leading manufacturers of public address systems and other manufacturers of such instruments, to manufacture such equipments wherein the noise meters with data loggers are fitted therein so that as and when the prescribed parameters are violated, the same gets recorded and retrieved by the regulators for fixing the responsibility on the violators***

Discussion on feasibility of integrating a Public Address System with sound level meter -data logger was held with leading manufacturers of Public address system. During the course of meeting, following issues were discussed:

1. Representative from M/s Ahuja Radio mentioned that public address system comprising of Mic, Amplifier and Speaker. Each such system is having atleast 02-03 speakers at different locations. In order to monitor noise value, Sound Level Meter need to installed at each speaker and same shall be integrated to data logger. In such case integration is possible, then cost of sound level monitor is much higher than public address system and make the system un-economical.
2. He further explained that worldwide technology of integrating public address system with sound level meter and data logger is not present.

3. It was also discussed that Public Address System is a necessity on various occasions like Kumb Mela, Natural Disaster (Flood, Cyclone etc).

Based on above discussion, it was concluded that integration of Noise Meters with Loud Speakers for the purpose of recording and retrieving is not possible.

The meeting ended with thanks to the chair.

ANNEXURE-I

LIST OF PARTICIPANTS

1. Sh. Rupesh Kumar Singh, General Manager, Capital Radio Company.
2. Sh. Niraj Bakshi, Head of Works, Ahuja Radio
3. Sh. Suresh Madan, Director, Ahuja Radios
4. Sh. Sonu Khurana, Dy GM , Marketing, Ahuja Radios
5. Sh Vishal Gandhi, Scientist 'D', CPCB
6. Sh Kedarnath Das, Scientist 'C', CPCB
7. Sh Danish Meena, Scientist 'B', CPCB

ANNEXURE-X

(7)

Consumer Electronics and Appliances Manufacturers Association

CEAMA/2019/8/210

May 7, 2019

Mr. Vishal Gandhi
Scientist D UPC-I
Central Pollution Control Board
'Parivesh Bhavan'
East Arjun Nagar, Delhi110 032

In the matter of OA No. 681/2018 titled "Times of India" Authored by Shri Vishwa Mohan Titled "NCAP with multiple timelines to clean air in 102 cities to be released around August 15"

Dear Sir,

Consumer Electronics and Appliances Manufacturers Association (CEAMA), established in the year 1978 is an all India body representing Consumer Electronics, Home Appliances and Mobile Industry. This apex body aims to enhance the development of Consumer Electronics & Appliances Industry and its components to maintain fair competition and healthy practices among manufacturers, dealers and other stakeholders. With a strong foothold since past 39 years, this non-profit organization constantly strives to look after the common interests of its members, for sustainable growth in the sector. The members include manufacturers of TV sets, Air Conditioners, Refrigerators, Washing Machines, Mobiles, Microwave Ovens, Audio & Video Systems, PA Systems, Set Top Boxes and Small Appliances and its inputs. The membership spectrum comprises of Domestic Corporates and MNCs, includes large, medium & small-scale sectors.

This has reference to your Letter No. A-19014/50/19-UPC-I, dated May 3, 2019, titled "Time of India" Authored by Shri Vishwa Mohan Titled "NCAP with multiple timelines to clean air in 102 cities to be released around August 15", where CPCB expressed the opportunity to explore manufactures of such equipment's wherein the noise meters with data loggers may be fitted with the Public Address System and other such instruments which can help in fixing the violations beyond dedicated noise parameters.

While the intent of the government is to reduce the noise pollution and to put a check on violators, which is a welcome step. But at the same time, we would like to seek your attention towards some facts which are crucial for consideration before implementing any such measure:-

1. **Data Loggers:** CPCB in its letter mentioned about fitting DATA Loggers in PA system. We would like to highlight that based on our discussions with the PA system manufacturers, there is no such device being used worldwide to control the noise.
2. **Do not Control/Store noise level:** A data logger is used to monitor and store the up and down performance of a system, but it does not help in controlling or storing the noise level generated.

F-4/23, 4th Floor, Wave 1st Silver Tower, Plot No. D-6, Sector-18, Noida - 201 301 (U.P.)
Telefax.: +91-120-4265697 E-mail : info@ceama.in Website : www.ceama.in

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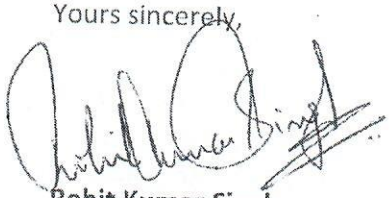
3. **No Best Practice Available:** There is no such practice being followed internationally which can be referred as a case study.

Considering the points mentioned above, we believe that this subject need further research and deliberation with the Audio equipment manufacturers before CPCB reaches to any conclusion. We also request CPCB to share with us any such material (practice being followed nationally/internationally) related to the use of data loggers in audio products, as these best practices will act as a guiding principle and benchmark for Indian audio industry.

We look forward to your favourable response.

With kind regards,

Yours sincerely,



Rohit Kumar Singh
Associate Secretary General

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ANNEXURE-XI

Item No. 08 Court No. 1

BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI

Original Application No. 681/2018

News item published in "The Times of India" Authored by Shri Vishwa Mohan Titled "NCAP with multiple timelines to clean air in 102 cities to be released around August 15"

Date of hearing: 15.03.2019

CORAM: HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON
HON'BLE MR. JUSTICE S.P. WANGDI, JUDICIAL MEMBER
HON'BLE MR. JUSTICE K. RAMAKRISHNAN, JUDICIAL MEMBER
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER

For Respondent (s): Mr. Rajkumar, Advocate for CPCB

ORDER

1. The issue for consideration is the remedial measures to be taken to bring the air quality of 102 cities identified as 'non-attainment cities', which do not meet the National Ambient Air Quality Standards (NAAQS), prescribed under Section 16(2)(h) of the Air (Prevention and Control of Pollution) Act, 1981.

2. The matter was considered by this Tribunal on the administrative side on 05.09.2018 and thereafter by way of a judicial order dated 08.10.2018 in light of news item mentioned above.

3. The Tribunal noticed the reports that there are large number premature deaths on account of air pollution

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and other diseases. As per survey in the year 2016, pre-mature deaths in Delhi are reported to be 15000. Premature deaths in Mumbai, Kolkata, Bangalore and Chennai are reported to be between 5,000-10,000 in 2016[1]. The Tribunal also noted the directions of the Hon'ble Supreme Court on control of vehicular pollution[2], industrial and construction sector pollution[3], power sector pollution[4] and agricultural sector pollution[5]. Notice was also taken of Comprehensive Action Plan (CAP) for air pollution control. It provides for Graded Response Action Plan (GRAP) envisaging specific steps for different levels of air quality. Strategies include reducing number of vehicles, traffic management, closing of polluting power plants and polluting industries, control of DG sets, stopping open burning, use of coal/wood open eateries, road dust, construction dust, entry of trucks, stopping construction activities, odd and even scheme for private

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[1]https://www.ndtv.com/delhi-news/delhis-air-pollution-has-caused-of-death-of-15-000-people-study-1883022.

[2] M.C. Mehta v. Union of India (1985)2 SCC 431, M.C. Mehta v. Union of India (2001) 3 SCC 756, M.C. Mehta v. Union of India (1998) 6 SCC 63, M.C. Mehta v. Union of India (2002) 3 SCC 356, M.C. Mehta v. Union of India (1998) 6 SCC 60

[3] M.C. Mehta v. Union of India (1997) 2 SCC 353, M.C. Mehta v. Union of India and Shriram Foods and Fertilizer Industries and Anr. (1986) 2 SCC 235, Rural Litigation and Entitlement Kendra, Dehradun v. State of U.P. (1985) 2SCC 431, Mohd. Haroon Ansari v. District Collector (1998) 6 SCC 60, Union of India v. Union Carbide Co. (1989) 1 SCC 674, M.C. Mehta v. Union of India (1992) 4 SCC 256, Sterlite Industries (India) Ltd. etc. v. Union of India & Ors.(2013) 4SCC 575 , M.C. Mehta v. Union of India (2004) 6 SCC 588, M.C. Mehta v. Kamal Nath (2000)6 SCC 213

[4] Consumer Education and Research Centre v. Union of India (1995)3 SCC 42, Dahanu Taluka Environment Protection group and Ors. v. Bombay Suburban Electricity Supply Company Ltd. and Ors (1991) 2SCC 539

[5] Arjun Gopal and Ors v. Union of India and Ors (2017) 16 SCC 280, Dr. B.L Wadhera v. Union of India and Ors (1996) 2 SCC 594

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vehicles, shutting of schools, closing of brick kilns, stone crushers, hot mix plants, power plants, intensifying public transport services, mechanised cleaning of road, sprinkling of water, stopping the use of diesel generator sets. The Tribunal noted that the Central Pollution Control Board (CPCB) has dealt with National Ambient Air Quality Monitoring Programme (NAAQM) with reference to notified air quality standards.

4. Accordingly, all the States and Union Territories with non –attainment cities were directed to prepare action plans to bring the air quality upto the prescribed norms. The action plans were to be forwarded by 31.12.2018 to the CPCB to be evaluated by a Committee constituted by the Tribunal. The Chief Secretaries of all the States and Administrators/ Advisors of Union Territories were to be personally accountable. The CPCB and State PCBs were to work out and design National Ambient Air Quality Monitoring Programme and to be connected to the central server of CPCB. The directions are:

> *"15. Accordingly, we consider it appropriate to take cognizance of the alarming situation and issue directions as follows:*
>
> *i. All the States and Union Territories with non-attainment cities must prepare appropriate action plans within two months aimed at bringing the standards of air*

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quality within the prescribed norms within six months from date of finalization of the action plans.

ii. *The Action Plans may be prepared by six-member committee comprising of Directors of Environment, Transport, Industries, Urban Development, Agriculture and Member Secretary, State Pollution Control Board or Committee of the concerned State. The Committee may be called Air Quality Monitoring Committee (AQMC). The AQMC will function under the overall supervision and coordination of Principal Secretary, Environment of the concerned State/Union Territory. This may be further supervised by the Chief Secretaries concerned or their counterparts in Union Territories by ensuring intra-sectoral co-ordination.*

iii. *The Action Plans may take into account the GRAP, the CAP and the action plan prepared by CPCB as well as all other relevant factors. The Action Plans may be forwarded to the CPCB by 31.12.2018. The same may be placed before the Committee as directed in direction no.*

iv. *The Action Plan will include components like identification of source and its apportionment considering sectors like vehicular pollution, industrial pollution, dust pollution, construction activities, garbage burning, agricultural pollution including pollution caused by burning of crop residue, residential and indoor pollution etc. The action plan shall also consider measures for strengthening of Ambient Air Quality (AAQ) monitoring and steps for public awareness including issuing of advisory to public for prevention and control of air pollution and involvement of schools, colleges and other academic institutions and awareness programmes.*

v. *The Action Plan will indicate steps to be taken to check different sources of pollution having speedy, definite and specific timelines for execution.*

vi. *The Action Plan should be consistent with the carrying capacity assessment of the non-attainment cities in terms of vehicular pollution, industrial emissions and population density, extent of construction and construction activities etc. The carrying capacity assessment shall also lay*

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emphasis on agricultural and indoor pollution in rural areas. Depending upon assessed carrying capacity and source apportionment, the authorities may consider the need for regulating number of vehicles and their parking and plying, population density, extent of construction and construction activities etc. Guidelines may accordingly be framed to regulate vehicles and industries in non-attainment cities in terms of carrying capacity assessment and source apportionment.

vii. *The Committee comprising of (a) Shri. Prashant Gargava, Member Secretary, CPCB, (b) Dr. Mukesh Khare, Professor, IIT Delhi, and (c) Dr. Mukesh Sharma, Professor, IIT Kanpur shall examine the Action Plans and on the recommendations of the said Committee, the Chairman, CPCB shall approve the same by 31.01.2019.*

viii. *The Chief Secretaries of the State and Administrators/ Advisors to Administrators of the Union Territories will be personally accountable for failure to formulate Action Plans, as directed.*

ix. *The CPCB, SPCBs and State Pollution Control Committees shall develop a public grievance redressal portal for redressal of public complaints on air pollution along with a supervisory mechanism for its disposal in a time bound manner. Any visible air pollution can be reported at such portal by email/SMS.*

x. *The CPCB and all the State Pollution Control Boards and Pollution Control Committees shall collectively workout and design a robust nationwide ambient air quality monitoring programme in a revised format by strengthening the existing monitoring network with respect to coverage of more cities/towns. The scope of monitoring should be expanded to include all twelve (12) notified parameters as per Notification No B-29016/20/90/PCI-L dated 18th November, 2009 of CPCB. The continuous Ambient Air Quality Monitoring Stations (AAQMS) should be preferred in comparison to manual monitoring stations. The CPCB and States shall file a composite action plan with timelines for its execution which shall not be more than three months. It is expected that all such AAQMS shall be*

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connected to central server of CPCB for reporting analysis of results in a form of Air Quality Bulletin for general public at regular intervals atleast on weekly basis and ambient air quality on continuous basis on e-portal. MoEF&CC will provide requisite funds for the purpose. MoEF&CC in consultation with Ministry of Housing and Urban Affairs, MoRTH, Ministry of Petroleum and Natural Gas, Ministry of Agriculture, Cooperation and Farmers Welfare or any other Ministry to lay down such guidelines as may be considered necessary for improvement of air quality in the country."

5. In pursuance to the above, the CPCB has filed compliance report vide e-mail dated 15.02.2019. An updated status report has been furnished during the hearing by the learned counsel for the CPCB which is as follows:-

> *"Action Plan received: 83 cities*
> *Action plan not received: 19 cities*
> *Action Plan approved by CCB: 46*
> *Action Plan not approved by CCB: 11*
> *Action Plan under Review: 26+3 (three revised plan of Telangana received)*
> *Monitoring Network worked out in consultation with SPCBs".*

6. The question is the action to be taken for non-compliance by the States in not preparing action plans or incomplete plans and further directions for execution of plans.

7. Non-compliance of order of this Tribunal is a criminal offence under Section 26 of the National Green Tribunal Act, 2010 and in case of Government, Head of the

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Department is deemed to be guilty for such an offence. Punishment provided is sentence upto three years or fine upto Rs. 10 crores or both with additional fine for the every day's failure. Under Section 25 of the NGT Act, 2010, order of the Tribunal is decree of Civil Court to be executed as per Civil Procedure Code. Section 51 Civil Procedure Code provides civil imprisonment as a mode for enforcing the decree. Alternatively, such further order can be passed as may be necessary to secure compliance.

8. Vide order dated 16.01.2019 in O.A. No. 606/2018, the Tribunal directed Chief Secretaries of all the States to appear in person and furnish compliance of various orders of this Tribunal, including the above order dated 08.10.2018 with regard to non-attainment cities. The Chief Secretaries of five States have already appeared and most of the States have are still non-compliant. They have been directed to take necessary steps with improved institutional mechanism and approach.

9. In view of non-compliance of orders of this Tribunal, on an important issue adversely affecting public health and lives of citizens, inspite of serious consequences statutorily provided by the Parliament, we direct Chief Secretaries of the States in respect of which action plans have not been filed i.e. Assam, Jharkhand,

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Maharashtra, Punjab, Uttarakhand and Nagaland to forthwith furnish such action plans. If such action plans are not furnished till 30.04.2019, the States will be liable to pay environment compensation of Rs. 1 crore each. The States, where action plans are found to be deficient and deficiencies are not removed till 30.04.2019, will be liable to pay Rs. 25 lacs each. The timeline for execution of the action plans is six months from the date of finalization of action plan. Budgetary provision must be made for execution of such plans.

10. If action plans are not executed within the specified timeline mentioned above, the defaulting States will be required to pay Environmental Compensation and may also be required to furnish performance guarantee for execution of plans in extended timeline as per recommendations received from CPCB. The CPCB may make its recommendation in the matter before the next date.

11. The CPCB is directed to update the number of cities. If on parameters applied, there are other cities, not included in list of 102, such cities may be also included.

12. We also direct CPCB to prepare noise pollution map and identify hotspots and categorize the cities with

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specified hotspots and propose a remedial action plan. Such report may be furnished within three months by e-mail at ngt.filing@gmail.com. We are informed that in 7 cities noise monitoring mechanism has already been established by the CPCB which is functioning on continuous basis and is connected to the server of CPCB. The CPCB may consider setting up such mechanism in all the cities which are found to be having noise level above approved the threshold.

13. We have considered the issue of noise pollution with reference to NCT of Delhi in Original Application No. 519 of 2016, *Hardeep Singh & Ors. v. SDMC* and found that effective monitoring mechanism is necessary to give effect to Noise Pollution (Regulation and Control) Rules, 2000 and law laid down inter-alia "In Re: *Noise Pollution - Implementation of the Laws for restricting use of loud speakers and high volume producing sound systems*[6]". As noted by the Hon'ble Supreme Court, absence of implementation of such norms affects health of citizens, especially infants and senior citizens. It also affects sleep, comfort, studies and other legitimate activities. Steps required to be taken include:

[6] (2005) 5 SCC 733

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i. Training of regulatory machinery and identifying and notifying accountable officers and preparing action plan and monitoring mechanism.

ii. Awareness, particularly among students through Education Department and involvement of Resident Welfare Associations (RWAs), social and religious institutions and volunteers.

iii. Prosecution of violators, seizer of equipment and recovery of compensation from violators.

iv. Requiring installation of noise, measurement meters by those using equipment capable of producing noise higher than the prescribed limit.

14. The State PCBs may undertake noise level monitoring in conjunction with the Police Department and take remedial action. The Police Departments of all the States/UTs may obtain the noise monitoring devices within a period of three months and specification of such devices may be finalized in consultation with the respective State PCBs/Pollution Control Committees (PCCs). The Police Department of all the State/UTs may also train their staff regarding the use of such devices and develop a robust protocol for taking appropriate action against the defaulters. The CPCB may explore the possibility in consultation with the leading manufacturers of public address systems and other manufacturers of such instruments, to manufacture

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such equipments wherein the noise meters with data loggers are fitted therein so that as and when the prescribed parameters are violated, the same gets recorded and retrieved by the regulators for fixing the responsibility on the violators. The Chief Secretary may finalize action plans in this regard within three months and submit the same to CPCB. CPCB may give its report by July 15, 2019.

15. The CPCB may also lay down scale of compensation to be recovered including conditions on which equipment seized is to be released within one month.

16. Copies of this order be sent to the Chief Secretaries of all the States/UTs and DGPs by e-mail.

List for further consideration on 19.07.2019

Adarsh Kumar Goel, CP

S.P. Wangdi, JM

K. Ramakrishnan, JM

Dr. Nagin Nanda, EM

March 15, 2019
Original Application No. 681/2018
A