

REPORT ON MONITORING OF NOISE AND AIR POLLUTION DURING DIWALI, 2006



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FOREWORD

This report is based on the measurement of the noise level by the Board in 12 cities and at 115 locations during the Diwali, 2006. Air quality monitoring was done at 15 locations 9 cities.

It was observed that noise levels were exceeding the permissible limits in all cities and almost at all locations. The emission of smoke arising out of bursting of fire crackers added into increased levels of air pollution, particularly in terms of Nitrogen Oxides (NO_x) and Respirable Suspended Particulate Matter (fine dust).

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Member Secretary
October 25, 2006

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1. Introduction

Diwali festival is the important festival celebrated all over. This is festival of lights and celebrated with bursting of fire crackers. There is concern over increased noise and air pollution caused due to bursting of the fire crackers during Diwali. The fire cracker bursting cause high noise levels typically more than 100 dB. The important air pollutants generated during the fire crackers bursting are SO₂, NO_x and smoke / dust containing respirable suspended particulates. The problems of pollution due to fire crackers can best be tackled by creating a public awareness. Enforcement of the rules alone would not suffice.

In order to elucidate the environmental issues concerning noise and air pollution during Diwali, noise monitoring was carried out in 12 cities and 115 locations in the state and air monitoring was conducted in 9 cities at 15 locations.

2. Effects of noise pollution on Human Health

Noise pollution is undesirable sound. One measure of noise pollution is the danger it poses to health. Noise causes stress, can be the cause of illness and create annoyance. Therefore, any form of noise can be considered pollution if it causes annoyance, sleeplessness, fright, or any other stress reaction.

Noise is transient; once the pollution stops, the environment is free of it. This is not the case for chemicals, sewage, and other pollutants introduced into the air, soil, or water.

Other forms of pollution can be measured, and scientists can estimate how much material can be introduced into the environment before harm is done. We can measure individual sounds that may damage human hearing, but it is difficult to monitor cumulative exposure to noise.

The response to noise pollution itself is highly subjective. To some people the roar of an engine is satisfying or thrilling; to others it is an annoyance. Loud music may be enjoyable or a torment, depending on the listener and the circumstances

3. Measurement and Standards

3.1 Noise

Noise is often measured in decibels (dBA). A symbol indicates a measurement of a logarithmic scale. In each case, the actual measurement 'a' is compared to a fixed reference level 'r' and the "decibel" value is defined to be $10 \log_{10} (a/r)$. 'A' weighing filters out lower frequencies very severely. Fast responses closely match to the simulations of Human ear

sensitivity. Fast response (125 to 200 milli-second) was selected to measure noise levels. The human response to Noise depends upon the frequency of the sound, the type of noise (continuous, intermittent or impulsive) and the time (day or night) it occurs.

Noise has been recognised as ambient air pollutant. 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 as given below:

Area Code	Category of Area	Limits in dB(A) , Leq	
		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 in between 6 a.m and 9 p.m.
2. Night time is reckoned in between 9 p.m and 6 a.m.

3. Silence zone is referred as areas up to 100 meters around such premises 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.

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 standards for the fire crackers

The standards for the fire crackers have been stipulated under the provisions of the Environmental (Protection) Act, 1986, which are reproduced below:

- A. (i) The manufacture, sale or use of fire-crackers generating noise level exceeding 125 dB(AI) or 145 dB(C)_{pk} at 4 meters distance from the point of bursting shall be prohibited.

(ii) For individual fire-cracker constituting the series (joined fire-crackers), the above mentioned limit be reduced by 5 $\log_{10}(N)$ dB, where N = number of crackers joined together.
- B. The broad requirements for measurement of noise from fire-crackers shall be -

(i) The measurements shall be made on a hard concrete surface of minimum 5 meter diameter or equivalent.

(ii) The measurements shall be made in free field conditions i.e., there shall not be any reflecting surface upto 15 meter distance from the point of bursting.

(iii) The measurement shall be made with an approved sound level meter.

C. The Department of Explosives shall ensure implementation of these standards.

Note: dB(AI) A-weighted impulse Sound Pressure Level in decibel
dB(C)_{pk} C-weighted Peak Sound Pressure Level in decibel.".

3.2 Ambient Air Quality

Ambient air quality is measured by High Volume Sampler (HVS). Air monitoring was done for measurement of SO₂, NO_x and respirable Suspended Particulate Matter (RSPM). Ambient air quality is measured continuously at 15 locations in 9 cities to compare with National Ambient Air Quality Standards.

National Ambient Air Quality Standards

Sr. No.	Parameter	Daily (24hr) aximum concentration in residential area ugm/ cum
1	Sulphur dioxide (SO ₂)	80
2	Oxides of Nitrogen (NO _x)	80
3	Respirable Particulate Matter	100

4. The Survey

Sound level monitoring has been carried out in 12 cities in Maharashtra to measure the resultant sound levels during 7 to 10 pm and 10 pm to midnight. This time schedules have been worked out to understand the compliance of Hon'ble Mumbai High Court's order banning bursting of the crackers after 10 pm, which violate the norms.

The noise pollution due to fire crackers is observed in most of the urban areas of the state. Considering the resources, and also to develop a data base for possible trend analysis, noise monitoring has been conducted at 12 cities. The following table illustrates the cities and the number of noise monitoring stations in each city covered during the survey:

Sr. No.	Region	No. of Stations
1.	Mumbai	45
2.	Navi Mumbai	10
3.	Thane	5
4.	Kalyan	3
5.	Dombivali	3
6.	Ambarnath	3
7.	Ulhasnagar	3
8.	Pune	15
9.	Kolhapur	8
10.	Nashik	5
11.	Aurangabad	5
12.	Nagpur	10
	Total no. of stations	115

Focus of the measurement was monitoring the noise levels, covering Diwali related activities¹ and its effect on citizens. Measurement were carried out at each location on 21, 23 and 24th October, 2006. First set of readings cover 7 pm to 10 pm and the second between 10 pm to 12 midnight. Half hourly averages were taken for reporting Leq.

1 Fire cracker, functions, increased traffic.

Min.: Minimum value observed during the measurement.

Max.: Maximum value observed during the measurement. This is due to cracker noise, vehicular traffic, etc.

Leq: Energy equivalent noise level. It is a time-averaged sound level; a single-number value that expresses the time-varying sound level for the specified period as though it were a constant sound level with the same total sound energy as the time-varying level. Its unit is the decibel (dB).

The data collected is presented in the enclosed tables and graphs.

5. Results

The results of measurements of noise levels in 12 cities and 115 locations are presented in Table 1, 2 and 3 with graphic representation in Figure 1 to 4.

Ambient air quality monitoring in terms of SO₂, NO_x and respirable suspended particulate matter (RSPM) was carried out specially at 9 cities round the clock at 15 locations. These results are presented in Table 4.

Table 1 : Noise monitoring in Mumbai

Sr.	Location	Sound level dB(A)Leq: Date 21.10.2006 Saturday						Sound level dB(A)Leq: Date 23.10.2006 Monday						Sound level dB(A)Leq: Date 24.10.2006 Tuesday					
		19 - 22 hr			22 - 24 hr			19 - 22 hr			22 - 24 hr			19 - 22 hr			22 - 24 hr		
		SPL Max	SPL Min	SPL Leq	SPL Max	SPL Min	SPL Leq	SPL Max	SPL Min	SPL Leq	SPL Max	SPL Min	SPL Leq	SPL Max	SPL Min	SPL Leq	SPL Max	SPL Min	SPL Leq
	MUMBAI																		
1	Colaba	104.1	68.5	72.3	86.4	69.0	72.5	83.3	63.4	66.4	82.9	69.1	77.1	83.9	68.2	70.5	83.1	60.2	67.9
2	Mazgan	98.8	65.5	69.0	94.8	69.2	77.0	90.4	69.3	74.1	83.9	71.9	74.9	88.8	65.5	72.1	86.9	58.4	69.0
3	Mantralay	103.2	65.5	69.5	94.2	71.0	78.6	75.0	69.8	68.8	88.1	71.6	73.6	88.2	70.1	74.8	108.8	55.8	63.1
4	Girgaon	112.3	79.2	77.8	102.5	77.3	95.6	100.1	69.2	74.0	82.2	76.1	75.6	80.2	75.1	77.8	105.2	61.6	60.1
5	Malbar Hill	99.3	66.7	76.7	88.7	71.7	75.7	88.2	68.8	73.2	80.4	68.3	82.6	116.1	72.8	72.1	77.2	60.1	56.7
6	Worli - Haji Ali	92.8	77.0	74.3	82.3	75.4	79.3	106.2	56.4	72.1	76.1	69.7	76.0	76.2	61.1	62.8	91.6	59.8	56.2
7	Prabhadevi	86.5	72.1	77.7	80.4	69.3	76.0	90.1	61.9	73.3	74.0	61.3	69.5	82.8	69.0	75.1	77.2	69.2	73.5
8	Mahim	94.7	70.4	73.8	83.0	72.7	73.2	88.3	65.4	71.7	73.2	59.3	63.3	76.5	63.9	71.3	81.5	66.5	64.1
9	Parel-Lalbaug	85.2	72.0	79.4	86.4	76.2	79.5	73.5	60.5	67.3	78.4	69.8	73.6	72.6	62.4	70.7	72.8	68.2	73.0
10	Bhyculla	89.1	72.0	79.3	80.5	73.2	77.7	77.3	71.2	68.9	74.2	66.0	63.4	85.3	61.2	65.7	87.3	67.3	71.8
11	Dadar Esat	87.9	73.4	88.1	81.7	72.0	74.1	87.7	60.9	64.9	74.0	61.3	69.5	76.6	62.2	71.8	94.5	70.2	79.6
12	Sion	89.9	75.2	78.6	84.9	70.2	67.4	91.2	62.3	67.1	87.2	61.6	68.2	95.2	66.1	70.8	89.4	70.1	76.6
13	Hindu Colony	82.1	72.7	74.8	74.0	68.0	69.8	67.0	56.0	62.8	73.2	59.3	63.3	78.6	61.4	68.5	77.4	62.9	67.2
14	Matunga - Parsi Colony	61.4	50.4	55.8	69.7	58.3	62.8	75.2	62.8	70.7	72.8	60.2	67.3	78.1	68.4	76.0	70.2	62.7	74.2
15	Kamathipura	80.3	67.5	71.4	87.4	72.3	78.4	81.2	70.4	74.8	81.2	68.4	76.2	79.4	68.3	72.4	76.6	64.8	70.4
16	Dharavi	79.5	58.5	69.7	88.4	64.3	72.8	82.7	67.6	72.9	76.4	58.2	63.2	85.9	65.9	72.4	89.1	69.5	71.7
17	Wadala	82.9	62.8	73.3	91.2	78.4	79.2	85.5	66.6	63.5	88.4	72.4	62.4	92.2	64.5	72.3	88.4	66.3	69.8
18	Sewree	78.7	63.3	73.3	85.5	77.2	82.4	74.8	69.2	70.8	86.1	65.4	67.7	96.7	65.1	74.7	93.4	67.4	72.3
19	Chembur	96.3	71.2	74.5	76.1	67.1	73.1	76.7	68.4	66.2	78.3	73.7	59.1	70.4	68.2	69.6	74.6	64.5	66.2
20	Trombay	74.2	61.3	68.3	77.3	62.1	74.2	74.2	63.3	68.7	74.8	61.7	69.4	70.6	61.3	62.2	70.2	62.6	64.2
21	Kurla	92.3	72.6	76.5	80.4	70.2	75.5	76.4	67.2	74.0	67.7	59.6	63.5	80.8	68.2	73.6	85.9	66.2	61.8
22	Ghatkopar East	78.5	69.2	73.2	70.1	64.5	69.2	72.5	66.7	62.1	68.4	63.1	62.1	81.2	78.3	78.4	78.4	64.5	67.2
23	Ghatkopar West	81.4	68.5	69.1	72.4	70.1	70.4	78.5	61.3	65.5	81.2	61.9	63.4	72.1	62.8	64.4	71.3	61.9	64.6
24	Tata Memorial Hospital	85.2	69.7	74.1	82.7	70.1	68.8	84.9	68.4	74.2	78.9	59.3	66.4	94.2	68.0	72.6	72.8	68.2	73.0
25	Saki Naka	73.5	68.1	73.5	67.3	63.4	70.5	76.6	69.7	75.2	71.3	63.4	65.2	71.2	68.4	65.5	73.7	63.4	67.2
26	Mulund East	95.2	69.2	80.8	76.7	67.6	71.8	82.1	68.8	76.8	70.2	57.3	64.6	80.2	72.3	71.7	86.3	68.2	72.3

27	Mulund West	79.1	72.5	75.8	78.2	70.5	73.5	91.2	69.3	76.4	92.3	64.4	70.8	82.8	65.7	70.9	89.0	65.2	70.1
28	Bhandup	79.6	66.8	71.5	73.6	64.0	66.3	80.1	64.4	71.2	70.1	64.3	67.6	81.2	64.9	70.9	88.2	64.9	70.6
29	Vikhroli - Kannamwar Nagar	87.9	70.0	72.9	70.4	62.3	67.7	75.7	63.9	67.8	67.7	63.9	65.8	85.7	65.7	71.8	88.7	68.2	75.3
30	Powai	61.2	57.3	60.1	64.0	53.0	63.2	68.2	54.9	57.2	83.2	55.7	58.3	70.1	53.2	61.8	85.0	56.1	62.1
31	Sahar	80.3	71.2	74.1	90.3	75.3	81.1	79.4	72.0	76.6	75.0	71.1	72.7	82.2	76.4	74.5	85.7	77.2	79.7
32	Santacruz West	83.4	73.4	79.5	88.5	75.1	79.3	79.0	70.6	77.7	80.3	72.3	78.3	85.7	78.0	79.3	76.3	70.5	76.1
33	Vile Parle East	80.1	69.5	73.6	84.2	75.2	76.2	88.6	74.0	78.4	87.6	76.6	78.0	84.4	68.1	80.5	85.0	80.3	82.8
34	Bandra East Kalanagar	65.5	58.2	61.1	85.2	68.5	63.3	70.5	62.8	67.9	74.9	69.5	68.4	69.9	60.1	63.4	72.6	70.9	69.0
35	Varsova	89.3	76.1	79.8	98.3	85.3	87.2	82.6	73.3	76.6	78.0	75.5	75.1	81.1	73.4	73.3	71.6	66.6	73.8
36	Marve	73.2	68.4	69.7	68.1	61.4	62.4	78.6	67.5	72.3	75.0	68.2	70.5	79.2	71.0	66.7	74.0	64.0	63.4
37	Juhu	75.5	65.3	69.8	75.3	58.5	59.7	75.0	69.9	77.0	73.1	65.0	75.2	78.0	65.3	75.3	82.0	67.0	68.2
38	Borivali West	74.3	70.1	75.0	90.5	81.1	74.8	85.0	72.1	77.0	77.5	76.2	81.3	80.0	77.6	75.6	78.6	77.3	79.3
39	Dindoshi	71.2	64.7	72.1	95.4	80.3	77.9	75.2	73.1	76.2	80.0	77.3	75.6	74.8	72.9	77.2	77.9	75.3	76.7
40	Kandivali	88.4	71.1	75.1	82.3	77.5	79.6	77.4	68.4	72.4	91.1	83.4	78.8	79.6	78.8	76.0	80.8	78.6	75.0
41	Dahisar	85.3	75.4	75.5	90.3	79.4	71.7	76.1	74.0	75.7	79.2	72.5	65.3	78.2	73.7	79.0	78.6	72.7	74.8
42	Borivali East	83.8	77.3	75.4	95.5	82.5	76.2	71.3	66.4	72.7	85.6	75.3	76.6	81.3	77.5	76.1	74.5	72.1	78.3
43	Goregaon	82.0	68.8	70.7	98.1	81.7	75.2	77.1	74.2	77.0	79.5	76.8	76.3	78.6	73.6	75.2	75.8	72.2	78.0
44	Gorai	78.5	69.2	70.2	80.5	68.2	69.0	76.2	74.1	75.6	79.2	72.7	75.4	80.4	71.8	75.4	79.9	73.3	79.1
	Median	83.2	69.4	73.7	82.9	70.4	74.2	78.6	68.4	72.6	78.4	68.3	69.5	80.3	68.2	72.4	80.4	66.8	71.2
	Mean	84.2	68.8	73.3	83.0	70.9	73.9	80.6	67.1	71.5	78.5	67.5	70.3	81.5	68.3	72.1	82.0	67.1	70.6
	Standard Deviation	10.7	5.7	5.5	9.2	7.1	6.8	8.0	4.9	4.9	6.3	6.7	6.2	8.4	5.8	4.7	8.7	5.7	6.4
	Maximum	112.3	79.2	88.1	102.5	85.3	95.6	106.2	74.2	78.4	92.3	83.4	82.6	116.1	78.8	80.5	108.8	80.3	82.8
	Minimum	61.2	50.4	55.8	64.0	53.0	59.7	67.0	54.9	57.2	67.7	55.7	58.3	69.9	53.2	61.8	70.2	55.8	56.2
	Count - No. of readings in column	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0

Graph 1 : Sound Level - Diwali 2006 - Mumbai

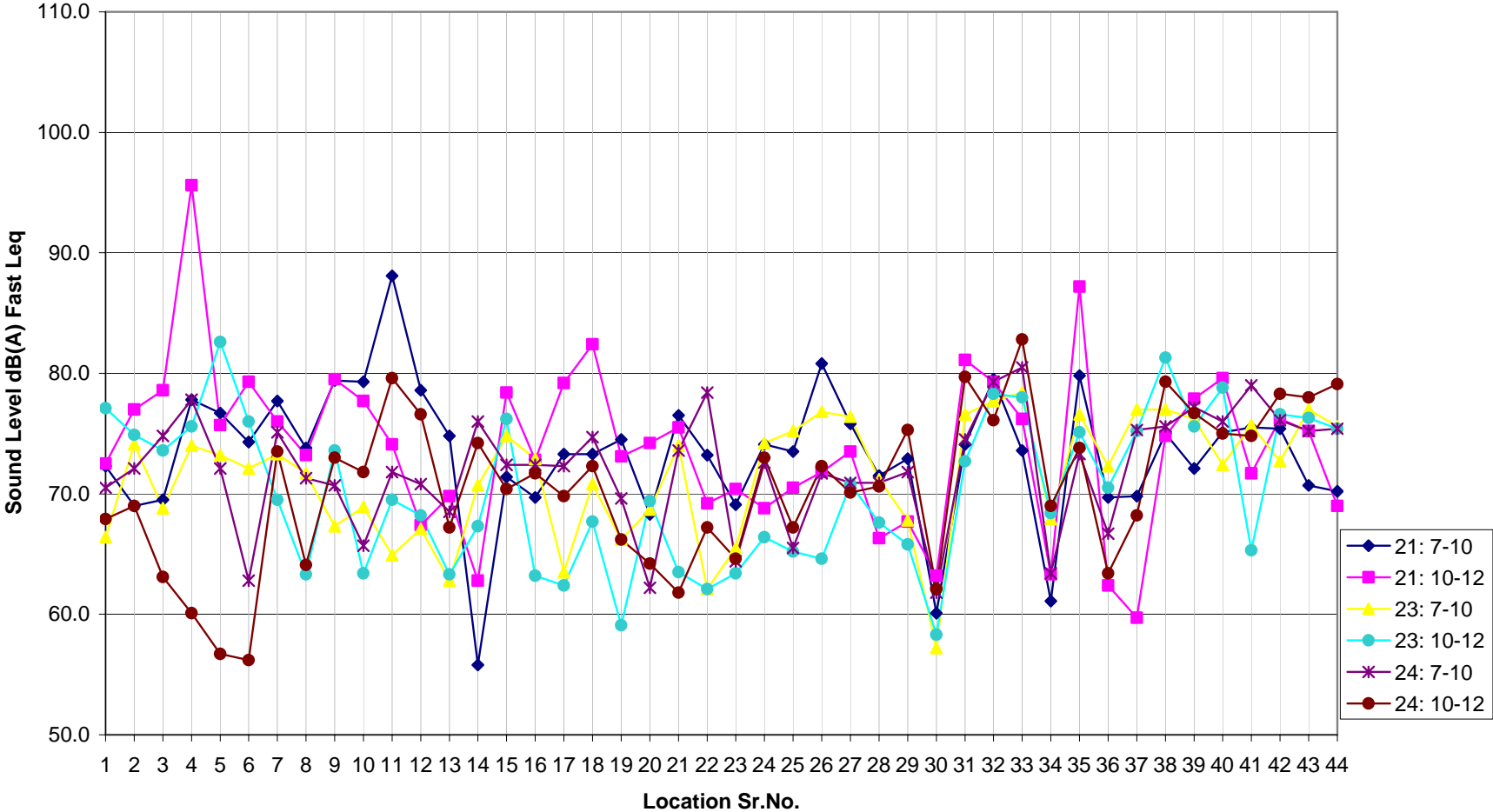


Table 2 : Noise Monitoring at Thane, Ulhasnagar, Kalyan, ambernath Dombivali and Navi Mumbai

Sr.	Location	Sound level dB(A)Leq: Date 21.10.2006 Saturday						Sound level dB(A)Leq: Date 23.10.2006 Monday						Sound level dB(A)Leq: Date 24.10.2006 Tuesday					
		19 - 22 hr			22 - 24 hr			19 - 22 hr			22 - 24 hr			19 - 22 hr			22 - 24 hr		
		SPL Max	SPL Min	SPL Leq	SPL Max	SPL Min	SPL Leq	SPL Max	SPL Min	SPL Leq	SPL Max	SPL Min	SPL Leq	SPL Max	SPL Min	SPL Leq	SPL Max	SPL Min	SPL Leq
	THANE																		
45	Station Road - Shiv Mandir	76.1	61.4	69.6	72.3	59.1	66.1	72.4	64.4	68.9	68.3	63.2	61.1	84.6	78.9	68.4	79.8	66.1	68.3
46	Tembhi Naka	85.3	65.2	73.7	79.3	62.7	69.5	89.1	66.7	71.2	73.1	64.1	67.1	92.4	67.9	70.1	86.3	65.7	69.4
47	Gokhale Road	91.6	67.2	68.2	84.9	63.1	64.9	82.1	63.4	66.1	79.9	62.3	67.9	91.3	67.1	67.9	83.8	63.7	64.3
48	Pokharan	96.1	65.1	71.9	93.2	67.4	69.1	90.3	68.1	70.1	86.2	65.1	71.2	95.6	64.9	70.9	94.1	63.9	69.6
49	Wagle Estate	92.9	62.1	69.1	86.7	61.4	73.1	83.1	63.4	67.1	76.9	61.2	68.3	96.3	65.7	72.3	93.7	67.9	71.1
	ULHASNAGAR																		
50	Shivaji Chowk No.3	82.3	72.5	75.4	85.4	73.5	77.3	94.8	71.3	77.5	90.3	69.1	78.3	93.3	75.8	78.9	91.6	68.4	71.0
51	Camp No.5 Bus stop	76.5	64.2	68.2	81.1	67.2	64.2	88.2	65.8	70.3	91.4	73.4	75.5	90.0	71.7	79.8	96.3	72.8	65.7
52	Camp No.1 Gol Mandir	78.1	66.1	70.5	81.3	68.3	69.5	90.3	61.2	68.5	85.6	66.3	73.1	88.2	65.1	67.8	90.5	68.2	70.8
	KALYAN																		
53	Birla College	92.3	68.1	78.3	87.5	66.1	75.2	82.9	64.1	67.8	85.9	75.8	77.7	87.0	71.5	78.3	84.9	69.8	78.2
54	Bail Bazar	82.5	65.4	69.2	90.3	77.3	83.5	79.3	65.4	69.3	89.7	64.8	68.8	90.5	70.7	74.9	86.7	67.3	76.1
	AMBERNATH																		
55	Kamse station	85.7	76.1	75.0	82.3	73.8	67.6	85.2	66.7	79.6	89.5	76.0	82.3	81.4	68.7	73.5	107.6	95.2	87.0
56	Near Railway Sation (W)	98.1	87.1	73.7	86.7	81.2	72.8	84.9	69.6	78.4	85.3	74.9	79.2	95.2	85.4	76.5	98.7	87.2	82.0
57	Sai Section	87.4	79.2	70.7	84.4	78.4	65.6	90.2	81.5	85.7	86.3	68.7	76.0	81.4	72.3	76.4	99.3	87.8	80.8
	DOMBIVALI																		
58	Municipal Office (E)	86.8	77.2	76.1	81.4	72.5	66.4	83.5	68.6	70.5	85.3	66.7	75.3	89.7	70.2	75.3	92.7	76.5	80.2
59	Kopar Village	98.3	87.4	74.2	75.5	68.9	62.5	79.9	65.3	70.2	81.1	68.4	78.0	93.5	74.3	80.1	95.6	78.3	90.5
60	Navpada	88.5	79.8	71.2	84.5	72.4	68.1	85.7	64.5	76.7	84.4	68.1	73.3	97.2	76.3	85.2	94.8	70.3	76.6
61	Katemanivali	98.2	86.1	73.7	84.4	72.1	68.3	85.7	68.1	75.0	98.1	68.1	74.2	90.9	70.4	78.3	91.2	72.5	87.0
	NAVI MUMBAI																		

62	Swami Vivekanand Nagar (CBD)	89.4	62.1	75.4	85.3	58.1	68.3	73.4	56.1	54.8	72.3	54.9	53.9	78.3	60.2	64.8	75.2	58.8	60.9
63	Nerul Sector -11	90.1	63.4	72.1	82.1	60.5	66.5	79.3	61.8	60.5	78.1	65.7	58.2	82.9	63.5	69.1	80.2	60.9	64.2
64	Vashi Sector -01	87.3	60.2	70.3	80.5	57.2	68.2	76.8	57.3	60.8	69.5	53.4	54.7	84.5	61.8	66.2	76.7	59.2	60.8
65	Vashi Sector -09	84.2	59.4	68.5	78.2	56.4	64.1	74.3	56.8	58.1	72.9	58.2	56.9	80.9	60.7	65.4	79.5	61.2	62.8
66	Vashi Sector -15	82.5	58.2	66.2	74.3	57.3	66.5	77.9	59.1	56.3	70.7	55.8	54.1	80.7	59.1	64.2	80.5	60.2	61.3
67	Kopar Khairne Sector - 10	88.1	60.5	76.4	85.1	59.2	72.2	80.1	57.3	62.9	75.3	58.6	57.8	86.9	63.5	68.1	82.9	64.7	64.2
68	Kopar Khairne (Balaji Appartment)	90.3	61.1	72.5	82.4	56.1	63.5	81.3	62.5	65.7	76.7	58.9	59.3	84.3	62.6	67.9	80.5	60.1	62.9
69	Airoli	88.2	61.3	71.2	78.1	57.5	62.2	80.1	55.4	61.3	72.7	54.3	57.1	84.8	64.5	68.2	75.2	59.3	62.9
70	Rabale	89.4	58.2	68.1	76.5	57.5	64.1	73.2	53.1	56.8	70.8	52.5	55.2	80.3	60.5	63.7	75.9	56.8	60.2
71	Ghansoli	94.1	62.5	76.3	90.3	60.4	70.5	78.7	60.4	65.1	75.5	57.8	60.7	86.1	62.6	67.2	80.9	60.2	63.8
	Median	88.2	65.1	71.9	82.4	63.1	68.1	82.1	64.1	68.5	79.9	64.8	68.3	87.0	67.1	70.1	86.3	66.1	69.4
	Mean	88.2	68.0	72.1	82.7	65.4	68.5	82.3	63.6	68.0	80.4	63.9	67.2	87.7	68.0	71.8	87.2	68.3	70.8
	Standard Deviation	6.1	9.2	3.2	5.0	7.6	4.8	5.8	5.9	7.7	8.0	6.9	9.3	5.5	6.4	5.8	8.6	9.7	9.1
	Maximum	98.3	87.4	78.3	93.2	81.2	83.5	94.8	81.5	85.7	98.1	76.0	82.3	97.2	85.4	85.2	107.6	95.2	90.5
	Minimum	76.1	58.2	66.2	72.3	56.1	62.2	72.4	53.1	54.8	68.3	52.5	53.9	78.3	59.1	63.7	75.2	56.8	60.2
	Count - No. of readings in column	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0

Graph 2 : Sound Level - Diwali 2006 - Thane

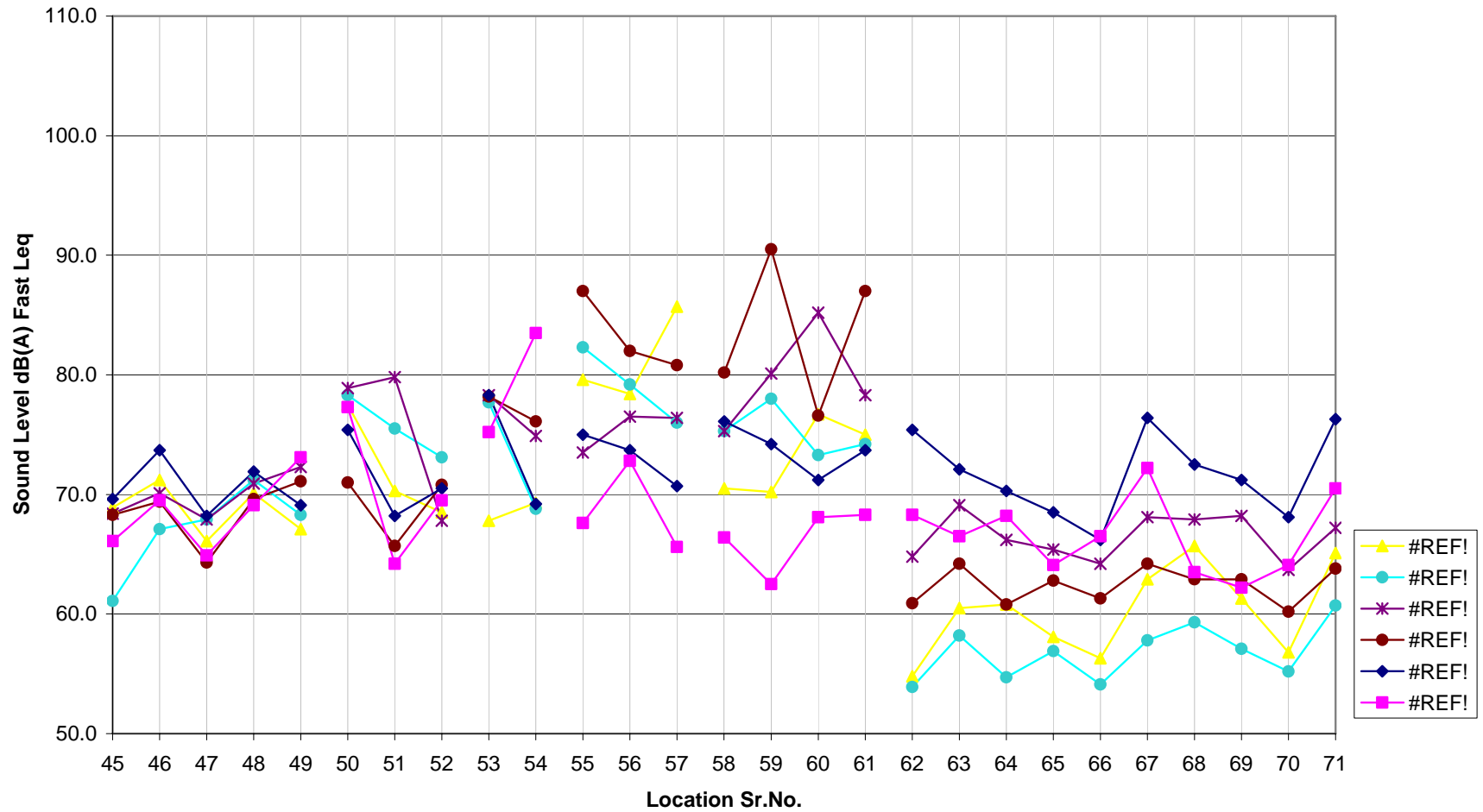


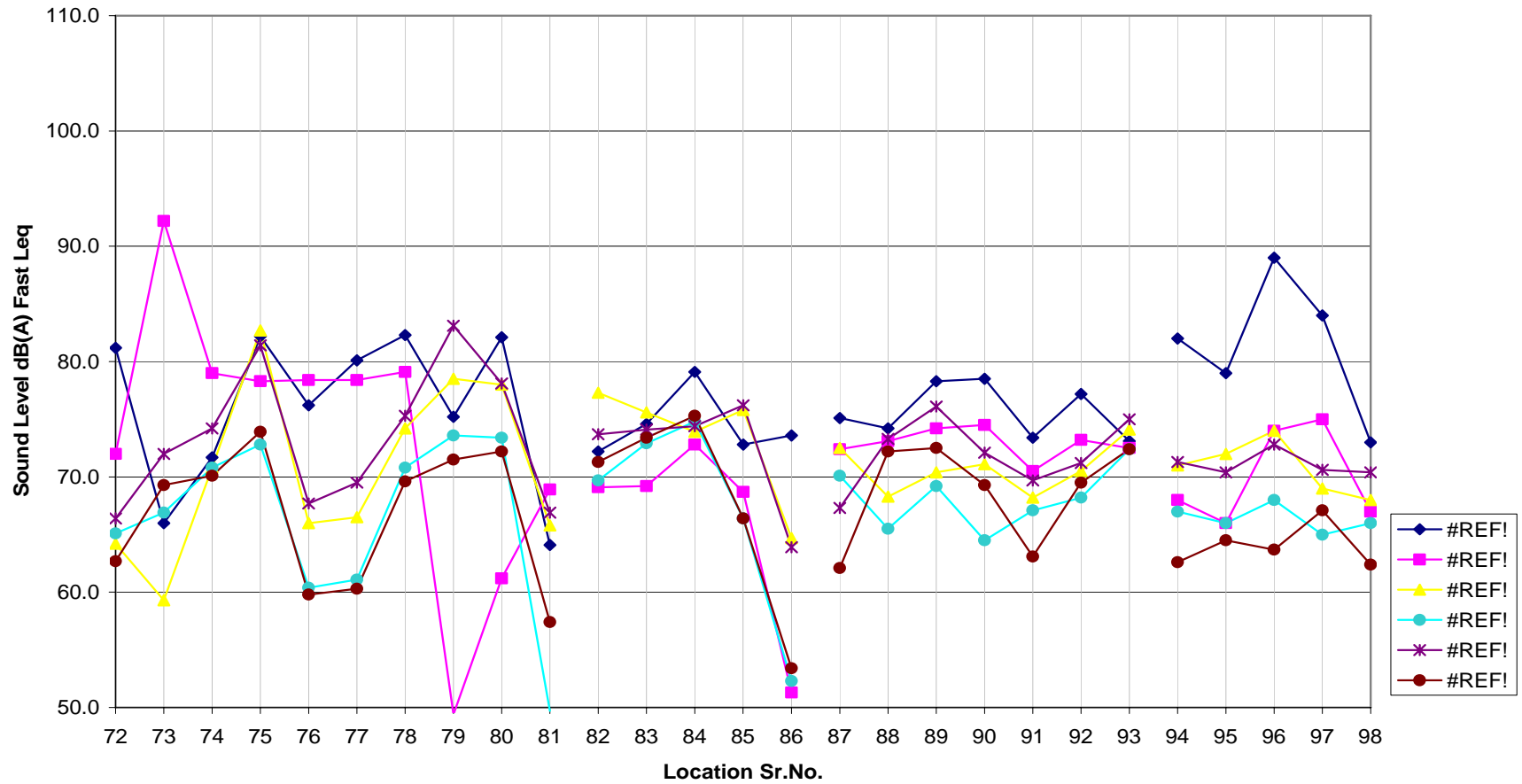
Table 3 : Noise monitoring at Nagpur, Nashik, Jalgaon and Aurangabad

Sr.	Location	Sound level dB(A)Leq: Date 21.10.2006 Saturday						Sound level dB(A)Leq: Date 23.10.2006 Monday						Sound level dB(A)Leq: Date 24.10.2006 Tuesday					
		19 - 22 hr			22 - 24 hr			19 - 22 hr			22 - 24 hr			19 - 22 hr			22 - 24 hr		
		SPL Max	SPL Min	SPL Leq	SPL Max	SPL Min	SPL Leq	SPL Max	SPL Min	SPL Leq	SPL Max	SPL Min	SPL Leq	SPL Max	SPL Min	SPL Leq	SPL Max	SPL Min	SPL Leq
NAGPUR																			
72	Sadar	88.3	72.1	81.2	89.3	67.1	72.0	73.4	55.8	64.2	54.3	70.8	65.1	76.0	59.2	66.4	66.8	58.1	62.7
73	Civil Hospital	74.4	60.2	66.0	61.0	57.4	92.2	79.0	76.4	59.3	56.8	72.9	66.9	77.3	61.9	72.0	76.4	57.9	69.3
74	Civil Lines	84.1	63.4	71.7	84.1	72.2	79.0	77.2	65.5	70.8	58.8	77.8	70.8	84.4	69.5	74.2	74.3	59.7	70.1
75	Dharampeth	98.2	73.0	82.2	79.2	64.4	78.3	98.2	75.8	82.7	63.7	78.4	72.8	99.2	73.6	81.4	81.7	69.5	73.9
76	Shankar Nagar Square	83.4	70.2	76.2	95.4	70.1	78.4	71.2	59.8	66.0	54.3	61.1	60.4	73.4	63.9	67.7	62.9	56.4	59.8
77	Mahal	100.4	74.3	80.1	98.0	69.4	78.4	78.1	53.9	66.5	53.4	69.0	61.1	82.1	64.3	69.5	67.4	51.1	60.3
78	Itwari	100.1	75.3	82.3	92.2	74.4	79.1	79.7	65.3	74.2	61.4	76.4	70.8	82.4	74.8	75.3	73.7	57.4	69.6
79	Kalamna	89.4	72.1	75.2	57.3	39.1	49.4	93.3	72.6	78.5	69.4	77.2	73.6	99.7	79.8	83.1	79.4	66.9	71.5
80	Deshpande Lay Out	99.3	72.3	82.1	69.0	52.3	61.2	80.7	70.8	78.0	68.4	76.3	73.4	81.4	73.9	78.1	74.3	67.8	72.2
81	Ajani Square	75.4	61.2	64.1	79.4	63.1	68.9	84.3	61.8	65.8	40.9	57.6	49.7	82.1	63.8	66.9	59.9	39.6	57.4
NASHIK																			
82	Panchavati	78.7	69.6	72.2	72.7	64.2	69.1	90.7	73.7	77.3	79.4	66.8	69.7	80.9	67.2	73.7	78.6	65.4	71.3
83	C.B.S.	91.2	74.0	74.6	75.8	63.3	69.2	88.4	71.1	75.6	76.3	64.6	72.9	84.9	65.4	74.1	77.4	63.2	73.4
84	Dahi Pool	88.4	72.4	79.1	83.3	65.2	72.8	86.8	70.8	73.9	82.9	67.4	74.8	82.5	69.7	74.4	80.7	66.2	75.3
85	Bitco Chowk	87.2	69.8	72.8	74.2	62.4	68.7	85.4	71.4	75.8	74.3	63.6	66.4	84.2	68.3	76.2	73.4	63.1	66.4
86	CIDCO Residentia	79.3	70.4	73.6	56.4	44.4	51.3	84.6	63.3	64.7	56.4	48.7	52.3	79.8	64.4	63.9	57.7	50.3	53.4
JALGAON																			
87	Neri Naka	85.2	78.3	75.1	84.2	73.1	72.4	79.2	66.3	72.5	74.5	61.3	70.1	71.2	61.2	67.3	60.4	70.0	62.1
88	Subhash Chowk	87.3	80.5	74.2	83.1	77.5	73.1	80.1	77.5	68.3	77.4	73.1	65.5	69.1	64.4	73.3	61.2	66.3	72.2
89	Tower Chowk	90.5	81.1	78.3	85.3	76.3	74.2	71.5	67.3	70.4	69.2	65.5	69.2	74.3	68.7	76.1	65.6	71.0	72.5
90	Nehru Chowk	101.2	90.3	78.5	89.1	81.5	74.5	70.4	66.1	71.1	68.1	62.3	64.5	81.0	73.5	72.1	69.2	79.2	69.3
91	Shiwaji Chowk	85.3	74.4	73.4	80.4	71.3	70.5	73.1	68.5	68.2	71.3	67.2	67.1	89.5	76.3	69.7	74.3	85.7	63.1
92	Savarkar Chowk	98.1	87.3	77.2	86.2	72.4	73.2	76.4	71.2	70.5	75.1	69.1	68.2	85.2	78.6	71.2	71.1	83.4	69.5
93	Akashwani Chowk	92.5	83.4	73.1	82.4	75.3	72.5	81.3	78.3	74.1	79.5	76.5	72.4	81.3	68.1	75.0	62.2	79.0	72.4
AURANGABAD																			
94	Osmanpura	90.0	69.0	82.0	74.0	61.0	68.0	87.0	67.0	71.0	70.0	64.0	67.0	81.2	65.4	71.3	71.2	59.4	62.6

95	Kranti Chowk	85.0	68.0	79.0	74.0	59.0	66.0	86.0	68.0	72.0	68.0	65.0	66.0	80.5	66.8	70.4	72.8	61.7	64.5
96	Gulmandi	105.0	70.0	89.0	85.0	65.0	74.0	89.0	70.0	74.0	71.0	67.0	68.0	84.6	65.2	72.8	70.5	60.4	63.7
97	City chowk	102.0	69.0	84.0	86.0	64.0	75.0	84.0	66.0	69.0	68.0	64.0	65.0	82.9	68.4	70.6	73.6	65.1	67.1
98	CIDCO (Residential)	92.0	68.0	73.0	71.0	61.0	67.0	82.0	65.0	68.0	76.0	61.0	66.0	80.2	66.1	70.4	67.7	58.9	62.4
	Median	89.4	72.1	76.2	82.4	65.0	72.5	81.3	68.0	71.0	69.2	67.0	67.1	81.4	67.2	72.1	71.2	63.2	69.3
	Mean	90.1	72.9	76.7	79.6	65.4	71.4	81.9	68.1	71.2	67.4	67.6	67.0	81.9	68.2	72.5	70.5	64.2	67.0
	Standard Deviation	8.3	7.1	5.4	10.5	9.6	8.4	7.0	6.0	5.1	10.0	7.0	5.9	6.8	5.3	4.4	6.7	10.1	5.7
	Maximum	105.0	90.3	89.0	98.0	81.5	92.2	98.2	78.3	82.7	82.9	78.4	74.8	99.7	79.8	83.1	81.7	85.7	75.3
	Minimum	74.4	60.2	64.1	56.4	39.1	49.4	70.4	53.9	59.3	40.9	48.7	49.7	69.1	59.2	63.9	57.7	39.6	53.4
	Count - No. of readings in column	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0
	PUNE	SPL Max	SPL Min	SPL Leq	SPL Max	SPL Min	SPL Leq	SPL Max	SPL Min	SPL Leq	SPL Leq	SPL Max	SPL Min	SPL Leq	SPL Max	SPL Min	SPL Leq	SPL Max	SPL Min
99	Khadki	91.0	70.1	73.7	90.0	66.7	75.2	91.1	68.3		74.4	87.2	69.9	75.2	84.4	73.2	77.4		89.9
100	Shivajinagar	102.0	65.0	78.9	86.0	67.0	70.2	84.5	62.6		69.5	80.1	69.0	71.1	89.2	69.1	75.4		86.6
101	Shanivar Peth	105.0	66.0	80.9	82.5	61.0	75.0	91.4	61.2		67.0	88.0	73.0	76.2	90.1	66.5	72.5		92.2
102	Laxmiroad	108.0	75.5	78.6	86.1	66.0	74.0	97.7	74.6		78.7	93.2	75.1	75.0	95.6	74.0	79.8		98.7
103	MG Road	112.0	71.1	81.1	73.0	60.4	71.0	94.1	69.7		75.2	84.0	74.0	76.2	89.1	72.0	76.0		92.6
104	Swargate	112.0	71.0	81.3	82.0	68.0	77.0	85.1	70.2		79.0	84.2	67.6	72.6	93.6	78.0	79.9		96.0
105	sarasbaug	88.6	72.5	79.3	80.2	61.6	73.1	89.1	73.7		77.3	79.2	64.0	70.1	82.3	68.0	71.2		82.0
106	Parvati	110.2	71.6	79.9	83.0	62.0	72.6	80.1	69.9		71.3	78.0	66.6	72.1	92.5	72.0	76.8		93.0
107	Kothrud	112.6	77.0	80.0	86.0	64.2	71.9	88.2	69.9		76.6	85.5	70.1	74.2	92.5	70.0	79.2		86.6
108	Karve Road	114.0	65.0	82.0	91.6	61.0	67.8	81.6	69.4		75.0	82.9	64.5	71.0	91.3	75.3	78.2		88.1
109	Mahatma Phule Mandai	115.0	71.0	80.3	83.0	65.0	72.2	88.2	66.7		75.7	85.9	71.2	73.0	92.5	69.0	78.8		90.1
110	Yervada	113.0	75.0	78.1	101.0	75.0	79.1	90.1	74.6		76.2	92.0	75.1	79.1	92.3	69.9	76.1		91.0
111	Koregaon Park	85.0	65.0	81.0	85.1	61.0	73.2	86.6	67.2		73.0	81.0	66.2	69.9	84.0	66.2	72.4		80.1
112	Hadapsar	115.0	70.0	83.0	102.0	66.0	68.9	95.6	72.9		76.9	90.1	71.1	74.4	91.2	65.4	76.0		89.0
113	Satara Road	110.0	72.0	79.7	80.0	60.7	73.0	82.6	74.4		76.2	80.1	73.2	74.0	86.4	67.0	72.3		85.1

KOLHAPUR																		
114	Tararani Putla	73.4	67.5	72.7	64.0	58.0	60.4	86.9	69.3	69.4	82.2	64.3	67.6	85.6	70.7	72.0	77.6	61
115	Rajarampuri	77.0	70.3	76.8	54.0	50.0	54.2	86.5	69.2	73.5	80.9	59.4	62.7	74.3	66.2	71.8	90.6	61
116	Mahalaxmi Mandir	74.6	67.7	74.1	63.0	60.0	59.2	81.3	72.2	75.5	71.9	61.0	63.2	79.7	71.0	75.8	83.4	64
117	Bhavani Mandap	72.5	65.5	70.9	67.0	60.0	61.0	70.5	65.4	68.5	60.6	54.4	62.7	77.7	68.1	73.6	75.4	61
118	Shivaji Chowk	76.0	68.0	75.6	68.0	62.0	67.4	85.5	71.5	73.1	94.6	68.6	71.5	83.3	71.0	75.6	82.8	64
119	Papachi Tikti	78.0	71.0	77.7	64.0	55.0	64.0	84.0	68.2	73.7	75.5	63.3	70.6	84.4	71.7	75.4	70.3	63
120	Bindu Chowk	81.0	73.0	77.0	64.0	60.0	63.0	85.3	69.3	74.8	76.2	66.6	70.4	87.3	71.2	74.8	102.0	68
121	Khasbag Maidan	74.0	68.0	75.0	72.0	66.0	68.6	80.5	74.2	77.8	75.5	63.3	69.4	82.5	75.5	75.7	81.2	66
	Median	102.0	70.3	78.9	82.0	61.6	71.0	86.5	69.7	75.0	82.2	67.6	71.5	87.3	70.7	75.7	88.1	66
	Mean	95.6	69.9	78.2	78.6	62.5	69.2	86.4	69.8	74.3	82.1	67.5	71.4	87.0	70.5	75.5	87.1	67
	Standard Deviation	16.9	3.4	3.2	12.5	4.9	6.3	5.8	3.6	3.3	7.6	5.3	4.3	5.5	3.3	2.6	7.5	4
	Maximum	115.0	77.0	83.0	102.0	75.0	79.1	97.7	74.6	79.0	94.6	75.1	79.1	95.6	78.0	79.9	102.0	76
	Minimum	72.5	65.0	70.9	54.0	50.0	54.2	70.5	61.2	67.0	60.6	54.4	62.7	74.3	65.4	71.2	70.3	61
	Count - No. of readings in column	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23

Graph 3: Sound Level - Diwali 2006 - Nagpur, Nashik, Jalgaon, Aurangabad



Graph 4 : Sound Level - Diwali 2006 - Pune, Kolhapur

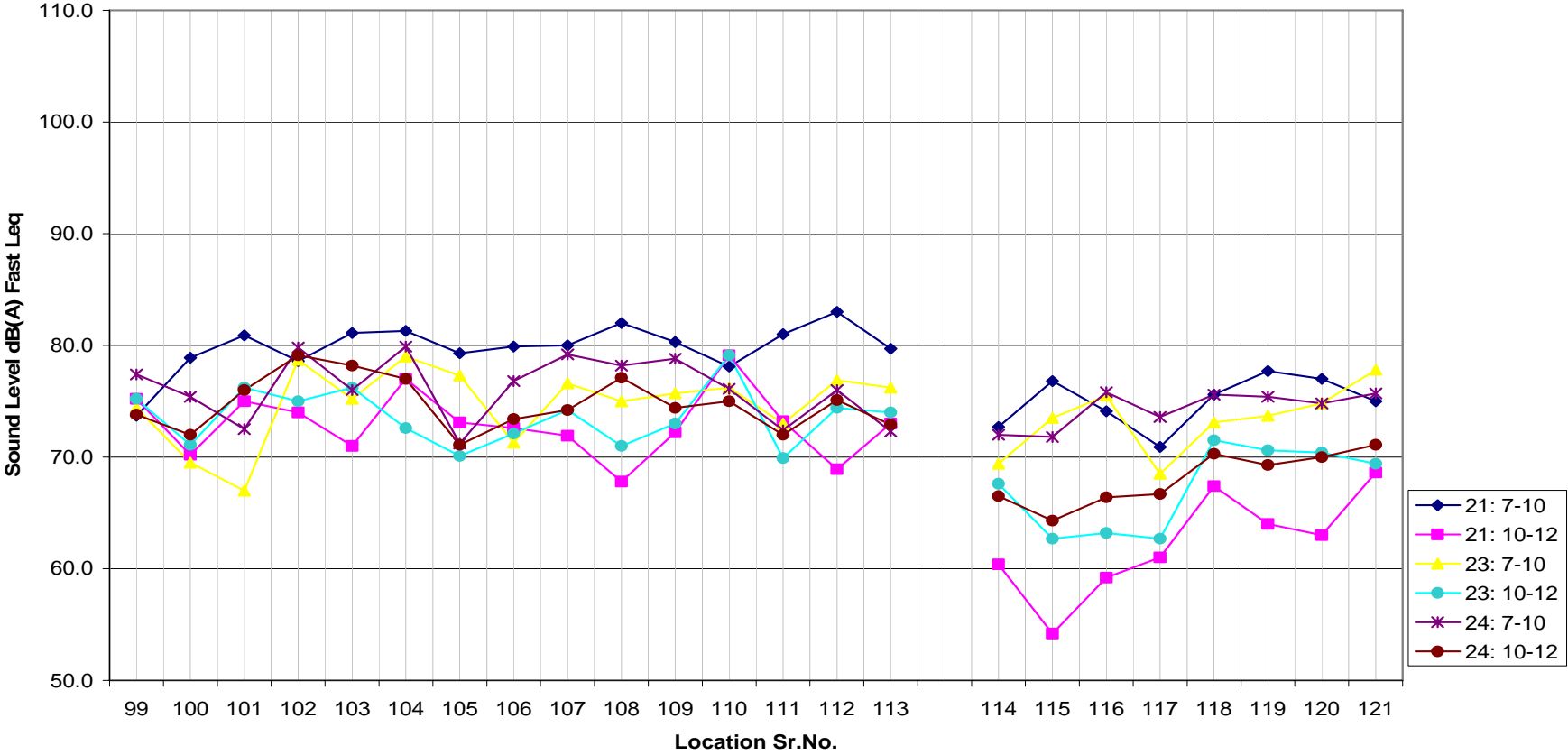


Table 4 : AMBIENT AIR QUALITY AT DIFFERENT CITIES DURING DIWALI-2006

Sr.No.	CITY	21 OCT-06			23 OCT-06			24 OCT-06		
		SO ₂	NO _x	RSPM	SO ₂	NO _x	RSPM	SO ₂	NO _x	RSPM
1	Mumbai									
	a) Sion	26	146	299	25	148	282	25	136	309
	b) Mulund	79	25	279	71	28	224	94	23	296
2	Pune									
	a) Karve Road	28	45	160	29	48	146	25	42	132
	b) Pimpri-Chinchwad	25	43	149	24	43	136	19	40	131
	c) Swargate	--	--	--	25	46	129	---	---	---
	d) Bhosari	23	40	119	--	--	--	--	--	--
	e) Nall Stop	--	--	--	--	--	--	27	42	124
3	Nashik									
	Udyog Bhavan	21	24	149	15	23	130	14	22	139
4	Kalyan									
	a) Ambernath	18	43	113	23	36	255	18	35	220
	b) Dombivali MIDC	22	38	130	23	49	152	22	32	171
	c) Low Collage Ulhasnagar	26	40	153	26	37	143	27	41	146
5	Nagpur									
	Daga Memorial Govt. Hospital, Gandhibagh	80	88	638	51	72	461	58	78	403
6	Thane									
	Tarapur MPCB Office	23	26	141	--	--	--	--	--	--
	Kombagvali Police Station, Tarapur				22	21	90	23	21	98
7	Navi Mumbai									
	a) Vashi	65	96	188	54	71	89	50	85	105
	b) D.Y.Patil Collage Nerul	42	28	104	48	36	212	20	29.	265
8	Aurangabad									
	P.B.P. RO. MPCB, A'bad	20	31	85	22	29	89	17	24	90
	Bibikamakbara	06	14	346	06	13	206	--	--	--
	C.A.D.A Office Garkheda	06	23	408	06	22	187	--	--	--
	S.B.E.S. Collage, Aurangpura, A'bad.	06	19	514	07	19	131	----	--	--
9	Kolhapur									
	Mahadava Road	08	25	139	---	---	---	---	---	---

Note : All the values are in ugm/cum

6. Observations

1. The ambient noise levels in Mumbai during the monitoring period at all time were above specified ambient noise standards. The levels in other cities are comparatively low as compared with that of Mumbai, however they were still exceeding the ambient noise standards.
2. The noise level readings show a significant variation from the last year. The Leq max, min and median are greater than last year.
3. The fire cracker bursting and traffic are two important contributors of ambient noise.
4. Cracker noise was marginally lower in some areas mostly found exceeding the stipulated limits.
5. Residential areas were affected significantly by higher noise levels.
6. The noise readings show a significant variation from the last year. The Leq max, min and median were more than last year. However, there is need to consider traffic noise contribution also.
7. At all places the noise levels are exceeding the specified standards at all times of the day and night. This exceedance is more in Mumbai 72 to 73.7 dB and 69 to 74.2 dB (evening and night) and MMR 69 to 71 dB and 68 dB evening and night. The max values are considerably higher than last year in Mumbai 95.6 and MMR 85.7 dB. Last year it was in range of 80-82 dB.
8. The emission of smoke arising out of bursting of fire crackers added into increased levels of air pollution, particularly in terms of Nitrogen Oxides (NOx) and Respirable Suspended Particulate Matter (fine dust).

9. It is said that a social mission is required to make the people aware of the noise and air pollution and its adverse effects on environment and health. This needs to be supported by capacity building in the regulatory agencies for effective implementation of the noise standards. Role of NGOs and voluntary agencies is crucial and they can cause the process of improvement.

Annexure 1 : Definitions

Acoustic barrier	Solid walls or partitions, solid fences, earth mounds, earth berms, buildings, etc used to reduce noise, without eliminating it.
Air-borne noise	This refers to noise which is fundamentally transmitted by way of the air and can be attenuated by the use of barriers and walls placed physically between the noise and receiver.
Ambient sound	The totally encompassing sound in a given situation at a given time, usually composed of sound from all sources near and far.
Assessment period	The period in a day over which assessments are made.
Assessment point	A point at which noise measurements are taken or estimated.
Audible range	The limits of frequency which are audible or heard as sound. The normal ear in young adults detects sound having frequencies in the region 20 Hz to 20 kHz, although it is possible for some people to detect frequencies outside these limits.
Background noise	Background noise is the term used to describe the noise measured in the absence of the noise under investigation. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L ₉₀ noise level (see below).

Barrier See "Acoustic barrier", a solid object used to attenuate sound.

Character, acoustic The total of the qualities making up the individuality of the noise. The pitch or shape of a sound's frequency content (spectrum) dictate a sound's character.

Decibel [dB] The level of noise is measured objectively using a Sound Level Meter. This instrument has been specifically developed to mimic the operation of the human ear. The human ear responds to minute pressure variations in the air. These pressure variations can be likened to the ripples on the surface of water but of course cannot be seen. The pressure variations in the air cause the eardrum to vibrate and this is heard as sound in the brain. The stronger the pressure variations, the louder the sound is heard.

The range of pressure variations associated with everyday living may span over a range of a million to one. On the top range may be the sound of a jet engine and on the bottom of the range may be the sound of a pin dropping.

Instead of expressing pressure in units ranging from a million to one, it is found convenient to condense this range to a scale 0 to 120 and give it the units of decibels. The following are examples of the decibel readings of every day sounds;

- 0dB the faintest sound we can hear

- 30dB a quiet library or in a quiet location in the country
- 45dB typical office space. Ambience in the city at night
- 60dB Martin Place at lunch time
- 70dB the sound of a car passing on the street
- 80dB loud music played at home
- 90dB the sound of a truck passing on the street
- 100dB the sound of a rock band
- 115dB limit of sound permitted in industry
- 120dB deafening

dB(A): A-weighted decibels

The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter. The sound pressure level in dB(A) gives a close indication of the subjective loudness of the noise.

Diffraction

The distortion around solid obstacles of waves travelling past.

Fluctuating noise

Noise that varies continuously and to an appreciable extent over the period of observation. It can also include intermittent noise. As a guide, when the level varies noticeably by more than 5 dB over a

period of less than one minute, the noise is considered to be fluctuating.

Frequency Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.

Heavy vehicle Heavy vehicles are assumed to be buses, rigid trucks and semi trailer trucks with a tare weight greater than 3 tonnes. Also heavy vehicles can be defined in terms of length as buses, or trucks with a length exceeding 5.25 metres.

Impulsive noise Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.

Intermittent noise The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.

Lnn noise descriptors Because noise varies with time, a single noise value cannot adequately define the noise ambient. For this reason, the acoustic environment is described using a number of noise level descriptors as follows;

L1 The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.

L10 The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.

L10(1hr)	The L10 level measured over a 1 hour period.
L10(18hr)	The arithmetic average of the L10(1hr) levels for the 18 hour period between 6am and 12 midnight on a normal working day. It was a common traffic noise descriptor. For traffic noise it is usually about 3dB(A) higher than Leq (24 hours).
L90	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
Leq	Equivalent sound pressure level - the steady sound level that, over a specified period of time, would produce the same energy equivalence as the fluctuating sound level actually occurring.
Leq(1hr)	The Leq noise level for a specific one-hour period.
Leq(8hr)	The continuous noise level during any one hour period between 10pm and 6am.
Leq(9hr)	The Leq noise level for the period 10pm to 7am.
Leq(15hr)	The Leq noise level for the period 7am to 10pm.
Leq (24hr)	The equivalent continuous noise level during a 24 hour period, usually from midnight to midnight.
Loudness	A rise of 10 dB in sound level corresponds approximately to a doubling of subjective loudness. That is, a sound of 85 dB is twice as loud as a sound of 75 dB which is twice as loud as a sound of 65 dB and so on. That is, the sound of 85 dB is 400% times the loudness of a sound of 65 dB.
Low-frequency	Containing major components within the low frequency range (20Hz - 250Hz) of the frequency

noise	spectrum.
Microphone	An electro acoustic transducer which receives an acoustic signal and delivers a corresponding electric signal.
Nature, acoustic	The innate or essential quality of the noise. That which makes one noise distinguishable from another (e.g. the spoken voice from the sound of a dog barking, a telephone ringing from the sound of a gun).
Noise	Sound which a listener does not wish to hear.
Noise monitor	See "sound level meter".
Quality, acoustic	An attribute, characteristic or property of the noise, its duration, its time-varying characteristics or its frequency content. Examples are the "screech" of screaming, the "rumble" of an airconditioner, the "dripping" of a tap.
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound	The level of noise, usually expressed in decibels, as

pressure level measured by a standard sound level meter with a microphone.

Sound power level Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.

STC Sound Transmission Class. This is a measure of the extent of sound reduction of noise going through a building element, presented as a rating or class. It denotes the sound attenuation properties of walls, floors and ceilings used to construct building spaces. The higher the STC the better the sound reducing performance of the construction.

Structure-borne noise This refers to noise which is generated by vibrations induced in the ground and/or structure. These vibrations excite walls and slabs in buildings and cause them to radiate noise. This type of noise can not be attenuated by barriers or walls but requires the interposition of a resilient (neoprene, springs etc.) break between the source and the receiver.



[click here](#) to download Schematic Representation of Airborne and Structureborne Noise Transmission (151kb).

Tonal noise Containing a prominent frequency and characterised by a definite pitch.

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