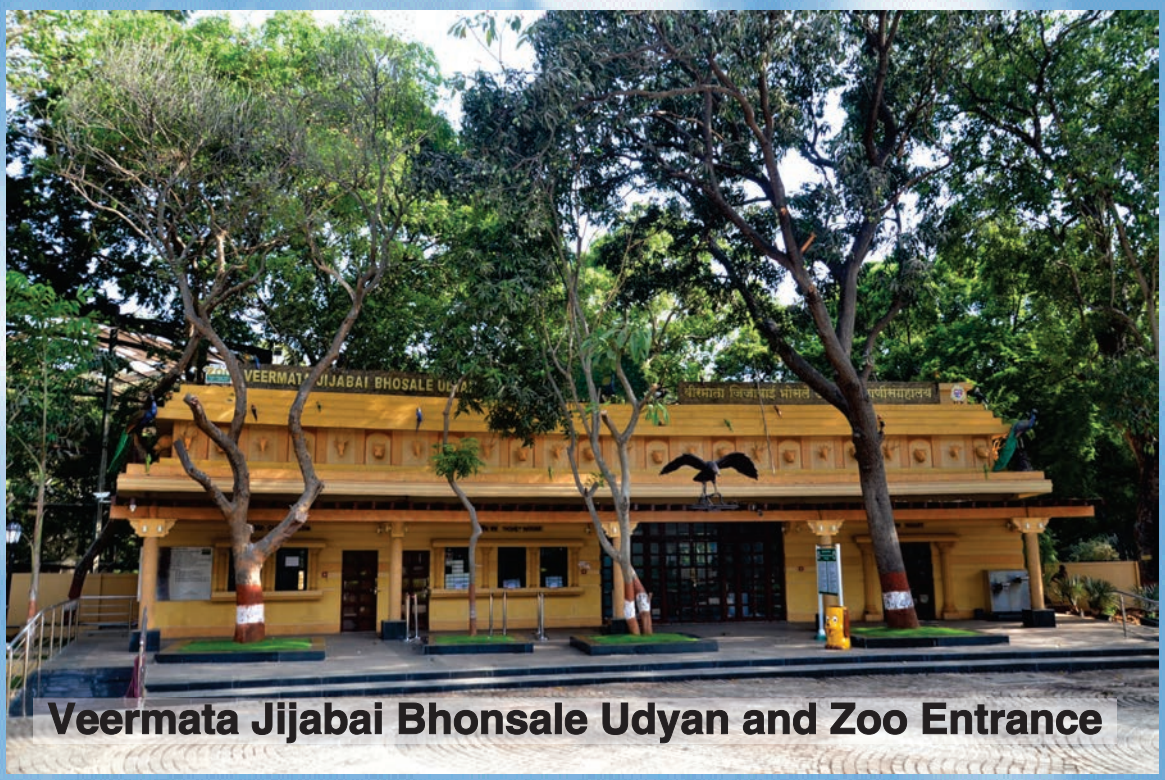
MUNICIPAL CORPORATION OF GREATER MUMBAI

ENVIRONMENT STATUS REPORT

2017 - 2018

Ladies Toilet, Tulsi Wadi, Tardeo



Veermata Jijabai Bhonsale Udyan and Zoo Entrance

MUNICIPAL CORPORATION OF GREATER MUMBAI

ENVIRONMENT STATUS REPORT 2017 - 2018

SCIENTIST IN-CHARGE

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बृहन्मुंबई महानगरपालिका

अजोय मेहता
महापालिका आयुक्त
बृहन्मुंबई महानगरपालिका

मनोगत

मुंबईकरांना नागरी सेवा-सुविधा देण्यासाठी कटीबद्ध असणाऱ्या बृहन्मुंबई महानगरपालिकेच्या कर्तव्यांमध्ये पर्यावरण संरक्षण आणि निसर्गाच्या संवर्धनाचाही समावेश आहे. बृहन्मुंबई महानगरपालिका कायद्यातील 'कलम 61 (अ ब)' नुसार आपल्या क्षेत्रातील वनांचे व पर्यावरणाचे संरक्षण करणे आणि निसर्गाचे संवर्धन करणे, हे महानगरपालिकेचे कर्तव्य आहे. बृहन्मुंबई महानगरपालिका कायदा 'कलम 63ब' नुसार बृहन्मुंबई महानगरपालिका क्षेत्रातील पर्यावरणाबाबत 'पर्यावरण स्थितीदर्शक अहवाल' महानगरपालिका सभागृहामध्ये दरवर्षी सादर करण्यात येत असतो. त्यानुसार आर्थिक वर्ष 2017-18 चा 'पर्यावरण स्थितीदर्शक अहवाल' सादर करण्यात येत आहे.

'पर्यावरण' हा आपल्या सगळ्यांशीच थेटपणे संबंध असणारा जिव्हाळ्याचा आणि संवेदनशील विषय आहे. बृहन्मुंबई महानगरपालिका क्षेत्रातील पर्यावरण विषयक संवर्धनासाठी महागनरपालिकेच्या वेगवेगळे प्रकल्प हाती घेतले असून त्यांची कामे प्रगतीपथावर आहेत. या वर्षीच्या अहवालानुसार दूषित पाण्याच्या घटलेल्या टक्केवारीचा उल्लेख याठिकाणी करायला हवा. गेल्या अहवाल वर्षात महानगरपालिका क्षेत्रातील दूषित पाणी नमुन्यांची टक्केवारी ही 3.00 टक्के एवढी होती. याबाबत जल अभियंता खाते आणि सार्वजनिक आरोग्य विभाग यांनी वेळोवेळी केलेल्या कार्यवाहींच्या परिणामस्वरुप ही टक्केवारी आता 1 टक्क्यांपर्यंत घटली आहे. दूषित पाण्याची टक्केवारी आणखी कमी करण्याच्या दृष्टिने आवश्यक ते प्रयत्न करण्याच्या सूचना सर्व संबंधितांना देण्यात आल्या असून त्यानुसार कार्यवाही करण्यात येत आहे.

मलनि:सारण प्रकल्प, मलजल वाहिन्या याबाबत हाती घेण्यात आलेल्या व पूर्ण झालेल्या कामांची माहिती या अहवालात आहे. त्याचबरोबर मुंबईतील पाणी पुरवठा, वर्षा जलसंचयन विनियोग, पर्जन्य जलवाहिन्या, घनकचरा व्यवस्थापन याबाबतची माहितीही या अहवालात नमूद करण्यात आली आहे. मलनि:सारण प्रचालन खात्यांतर्गत मलजल उदंचन केंद्राचे यांत्रिकीकरण करण्याच्या दृष्टिने स्काडा प्रणालीची टप्प्याटप्प्याने अंमलबजावणी करण्यात येत आहे. स्काडा प्रणालीच्या पाहिल्या टप्प्यात वांद्रे विभागातील 10 उदंचन केंद्रे व 7 मलजल प्रक्रिया केंद्रे मार्च 2018 मध्ये कार्यान्वित करण्यात आली.

बृहन्मुंबईतील नागरिकांना स्वच्छतेचे आवश्यक ती पातळी गाठण्यासाठी महागनरपालिकेचा घन कचरा व्यवस्थापन विभाग विविध अभियानाद्वारे प्रयत्न करीत असतो. केंद्र सरकारच्या 'स्वच्छता हीच सेवा' कार्यक्रमांतर्गत मुंबईतील प्रभागांमध्ये विविध स्वच्छता मोहिमा आयोजित करण्यात आल्या.

पर्यावरणीय प्रदूषण हा दिवसेंदिवस जागतिक चर्चेचा व चिंतेचा विषय ठरत आहे. पर्यावरणाचे संरक्षण व संवर्धन हा विषय केवळ राष्ट्रीय वा आंतरराष्ट्रीय पातळीवर महत्वाचा नसून तो स्थानिक पातळीवर देखील तेवढाच महत्वाचा विषय आहे. ही बाब लक्षात घेता, बृहन्मुंबई महानगरपालिका विविध स्तरावर पर्यावरण विषयक कार्ये करीत आहे. या अंतर्गत सन 2015 पासून 'उष्णदेशीय मौसम विज्ञान संस्था' (आयआयटीएम, पुणे) व 'भारत मौसम विज्ञान' (आयएमडी) या केंद्र सरकारच्या पृथ्वी विज्ञान मंत्रालयाच्या अखत्यारितील संस्थांच्या पुढाकाराने 'सफर मुंबई' हा प्रकल्प बृहन्मुंबई महापालिका क्षेत्रात राबविण्यात येत आहे. या प्रकल्पांतर्गत मुंबईतील 13 महत्वाच्या ठिकाणी हवामान व प्रदूषण विषयक माहिती 'एलईडी होर्डिंग्ज' द्वारे तात्कालिक स्वरुपात प्रदर्शित करण्यात आली आहे. ज्यामुळे पर्यावरण विषयक जनजागृतीसाठी निश्चितच मदत होत आहे. या प्रकल्पांतर्गत महत्वाच्या चौकांमध्ये वा वर्दळीच्या ठिकाणी 'एलईडी होर्डिंग्ज' बसविण्यासाठी जागा उपलब्ध करुन देण्यासोबतच या होर्डिंग्जसाठीचा विद्युत खर्च महापालिकेद्वारे केला जात आहे.

बृहन्मुंबई महानगरपालिका क्षेत्रातील पर्यावरण संवर्धन करण्यासाठी अनेक उपक्रम बृहन्मुंबई महानगरपालिका राबवित असते. या अंतर्गत एक महत्वाचा उपक्रम म्हणजे महानगरपालिकेद्वारे हाती घेण्यात येणारा वृक्षारोपणाचा कार्यक्रम!. आर्थिक वर्ष 2017-18 मध्ये रस्त्यालगत व महापालिकेच्या अखत्यारितील मोकळ्या जागांवर 12 हजार 497 झाडे लावण्यात आली आहेत.

पर्यावरण संवर्धनाचा एक महत्वाचा भाग म्हणून महापालिका वर्षा जलसंचयन व विनियोग याबाबत देखील काम करीत आहे. विशेष म्हणजे वर्षा जलसंचयन व विनियोग पद्धती सक्तीची करणारी बृहन्मुंबई महानगरपालिका ही राज्यातील पहिली महानगरपालिका आहे. महाराष्ट्र शासनाच्या टिपीबी-4707/396/ प्र.क्र.124/2007/नावि-11 दिनांक 06.06.2007 या आदेशानुसार बांधकामदृष्ट्या विकासासाठी नव्याने येणाऱ्या 300 चौ.मी. किंवा त्यापेक्षा अधिक आकाराच्या सर्व भूखंडांवर वर्षा जलसंचयन व विनियोग पद्धती राबविणे सक्तीचे करण्यात आले आहे.

रस्ते ही मुख्य व पायाभूत सुविधा आहे. वाढत जाणारी वाहतूकीची घनता व भार या संदर्भात असलेल्या प्रमाणकांचा दर्जा उंचविण्यात आला आहे. प्रकल्प दृष्टिकोन अंगीकारतांना सदर रस्त्यांच्या कामामध्ये पदपथांची सुधारणा महानगरपालिकेच्या उपयोगिता सेवांचे आवर्धन उदा. जलवाहिन्या, मलनि:सारण वाहिन्या, पर्जन्य जलवाहिन्या इ. गोष्टी अंतर्भूत करण्यात आल्या आहेत.

बृहन्मुंबई महानगरपालिका क्षेत्रात मार्च 2018 पर्यंत 33 लाख 52 हजार 640 एवढी वाहने नोंदविली गेली आहेत. या व्यतिरिक्त मुंबई शहरामध्ये दररोज बाहेरुन येणारी वाहने आणि नवीन वाहन नोंदणी यामुळे या संख्येत भरच पडत आहे. यामुळे महानगरपालिका क्षेत्रात वाहतूक कोंडी सोबतच वायु प्रदूषणाचा प्रश्न देखील बिकट होत चालला आहे.

पर्यावरणाच्या दृष्टिने शिक्षण विभागाच्या महानगरपालिका माध्यमिक शाळेतील इ. 8 वी ते 10 वी मधील विद्यार्थिनींना 159 इमारतींमध्ये 172 सॅनिटरी नॅपकीन वेंडींग मशिन्स व सॅनिटरी नॅपकीन बर्निंग मशिन्स बसविण्यात आल्या आहेत.

मला खात्री आहे की, येणाऱ्या काही वर्षामध्ये महानगरपालिकेच्या विविध खांत्यांनी हाती घेतलेले प्रकल्प पूर्ण झाल्यावर, तसेच विविध उपाययोजना राबविल्याने मुंबईच्या नागरिकांना चांगले पर्यावरण उपलब्ध होईल. मला असेही निदर्शनास आणून द्यावयाचे आहे की, वैश्विक उष्म्याचे दुष्परिणाम लक्षात घेता पर्यावरणाबाबत आधिक गांभिर्याने विचार होणे गरजेचे आहे. मुंबईच्या पर्जन्यमानात होत असलेला बदल हा जागतिक वातावरणात वाढत असलेल्या तापमानाचा परिणाम म्हणावा लागेल. जर आपण आपल्या सभोवलताच्या नैसर्गिक वातावरणाची वेळीच काळजी घेतली नाही तर पुढील पिढीला निसर्गाचा प्रकोप टाळता येणार नाही.

महापालिकेच्या विविध खात्यांद्वारे व सर्व प्रशासकीय विभागांद्वारे राबविण्यात येणारे नवीन प्रकल्प व अनुषंगाने कार्यवाहीमध्ये पर्यावरणाचा विचार आवर्जुन केला जात आहे. यामध्ये प्रामुख्याने पर्जन्यजल संवर्धन, सांडपाण्याचे पुनर्चक्रीकरण व त्याचे योग्य नियोजन, ऊर्जा बचतीचे प्रकल्प, सार्वजनिक वाहतूक व्यवस्था सुधारणे, घन कचऱ्याची शास्त्रीय पद्धतीने विल्हेवाट लावणे इत्यादी बाबींचा समावेश आहे.

वरील प्रकारच्या विविध स्तरावरील प्रयत्नांद्वारे बृहन्मुंबई महानगरपालिका क्षेत्राच्या पर्यावरण समतोलासाठी, संवर्धनासाठी कटीबद्ध आहे.

धन्यवाद !

अजोय मेहता
महापालिका आयुक्त
बृहन्मुंबई महानगरपालिका

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Add. Municipal Commissioner
(City) Municipal Corporation of Greater Mumbai

बृहन्मुंबई महानगरपालिका

ACRONYMS

ALM Advanced Locality Management
AMR Automatic Meter Reading
ATC Area Traffic Control
BEST Brihanmumbai Electric Supply & Transport
BMP Best Management Practices
BRIMSTOWAD Brihanmumbai Storm Water Drain
BOD Bio-Chemical Oxygen Demand
CBO Community Based Organization
CCRS Central Control Redressal System
CCTV Closed Circuit Television
CNG Compressed Natural Gas
CPCB Central Pollution Control Board
CRZ Coastal Regulatory Zone
CTRIC Civil Training Institute And Research Centre
dB Decibels (Unit of Sound Measurement)
DCR Development Control Regulations
DO Dissolved Oxygen
DPR Detailed Project Report
EIA Environment Impact Assessment
ETP Effluent Treatment Plant
FC Fecal Coliform
FFC Fact Finding Committee
FSI Floor Space Index
GVW Gross Vehicle Weight
IEC Information Education And Communication
lcpd Liters Per Capita Per Day
LPG Liquidified Petroleum Gas
MbPT Mumbai Port Trust
MCGM Municipal Corporation Of Greater Mumbai
MHADA Maharashtra Housing And Area Development Authority
MIDC Maharashtra Industrial Development Corporation
MLD Million Liters Per Day
MMC ACT Mumbai Municipal Corporation Act
MMR Mumbai Metropolitan Region
MMRDA Mumbai Metropolitan Regional Development Authority
MoEF Ministry of Environment And Forest
MOU Memorandum of Understanding
MPCB Maharashtra Pollution Control Board
MRTS Mass Rapid Transport System
MRVC Mumbai Railway Vikas Corporation
MSDP Mumbai Sewage Disposal Project
MSEDCL Maharashtra State Electricity Distribution Company Ltd
MSRDC Maharashtra State Road Development Corporation
MSW Municipal Solid Waste
MU Million Units
MUIP Mumbai Urban Infrastructure Project
MUTP Mumbai Urban Transport Project
NEERI National Environment Engineering Research Institute
NGO Non Governmental Organization
NSS National Social Service
NWDA National Water Development Agency
PAH Polynuclear Aromatic Hydrocarbon
PAP Project Affected People
PG Play Ground
PSI Pollution Standard Indx
PUC Pollution Under Control
RCF Rashtrya Chemicals & Fertilizers
RE Road Engineer
RG Recreation Ground
RMMS Road Maintenance Management System
RSPM Respirable Suspended Particulate Matter
RTO Regional Transport Office
SCADA Supervisory Control & Data Acquisition
SSP Slum Sanitation Programme
SPM Suspended Particulate Matter
SRA Slum Rehabilitation Authority
STP Sewage Treatment Plant
SW I Sewage Water Criteria I
SW II Sewage Water Criteria II
SWD Storm Water Drainage
TC Total Coliform
TDR Transfer of Development Rights
TSPTotal Suspended Particulates
VJBUVeermata Jijabai Bhosale Udyan
WSSDWater Supply & Sewage Disposal
WWTFWaste Water Treatment Facility

बृहन्मुंबई महानगरपालिका

CONTENTS

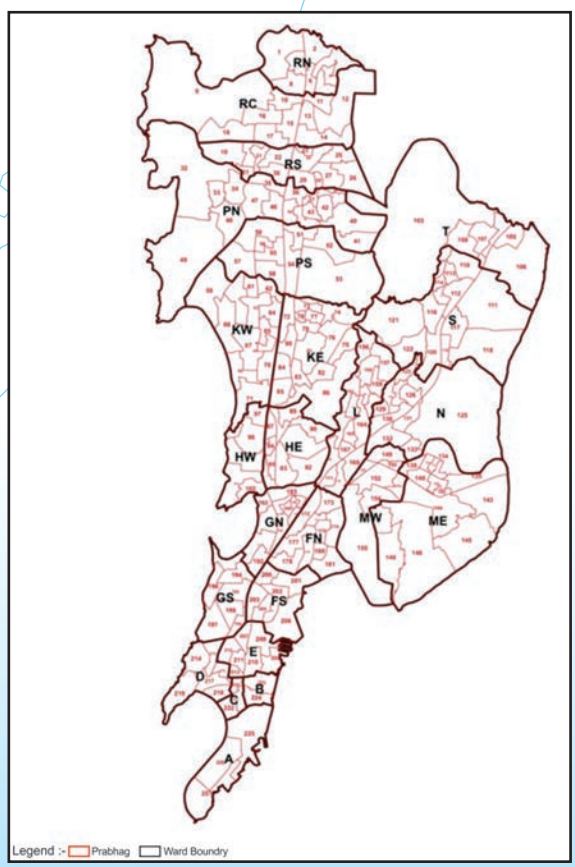
1. INTRODUCTION

The 74th amendment of the constitution of India in 1992 defines the role and duties of municipalities & municipal corporations. The 12th schedule to the amended constitution states the scope of the work. The scope includes environment protection, promotion of ecology & urban forestry. As a sequel to this, the Maharashtra state government issued an ordinance amend municipal act 1888, making "Environment Protection, Promotion of Ecology & Urban Forestry" as an obligatory duty vide section 61(ab) in the year 1994. The Environment Status Report (ESR) of the city of Mumbai for the period from April 2016 to March 2017 is prepared by Air Quality Monitoring and Research Laboratory of Environment section in Solid Waste Management department to fulfill the obligation under the clause 63-B of Mumbai Municipal Corporation (MMC) Act 1888. It is to be presented by the Commissioner of Municipal Corporation of Greater Mumbai (MCGM) before 31st July 2017 to the corporation. This report is based on the factual data generated using parameters affecting the environment by different departments of MCGM and various departments of state/central government and industries.

2. DESCRIPTION OF THE AREA

Mumbai is located on the western sea coast of India from 18° 53' North to 19° 16' North Latitude and from 72° East to 72° 59' East Longitude. It was originally a cluster of seven islands. Later on these islands were joined to form present Mumbai. The total land of Greater Mumbai identified in Earlier Draft Development Plan 2034 (EDDP)was 458.28 sq km. The Municipal Corporation of Greater Mumbai (MCGM), however, was the Planning Authority of area that was more modest, since about 9.43% of the cited area fell under the jurisdiction of Special Planning Authorities (SPA).Three such SPA exist in Greater Mumbai- MMRDA, SRA, MIDC. The EDDP therefore prepared a development plan for 415.05 sq.km. Total area specified by Surveyor General is 603 sq.km., which includes territorial waters extended into sea up to 12 nautical miles measured from appropriate base line. Its maximum width is 17 km. (East to West) and length is 42 km. (North to South).

Mumbai Election Division Boundry - 2018



3. CLIMATE OF MUMBAI

The city of Mumbai has Tropical Savanna climate. Generally South-West monsoon arrives in the city in the month of June and retreats in the month of September. As per data recorded by Regional Meteorological Centre, in the year 2017, Mumbai received a total rainfall measuring 2452.60 mm at Colaba & 3109.40 mm at Santacruz. The maximum rainfall of of 950.3mm was recorded during August 2017 at Santacruz and it was 30.6% of total rainfall received. The maximum rainfall of of 651.8mm was recorded during August2017 at Colaba and it was 26.6% of total rainfall received . So it is observed that there was less rainfall as compared to previous year.

In the month of May 2017 the maximum temperature of 34.5^{0}C, and in the month of January2017 minimum temperature of 20.1^{0}C was recorded at Colaba. In the month of May 2017 the maximum temperature of 34.1^{0}C and in the month of January 2017 minimum temperature of 17^{0}C was recorded at Santacruz.

At Colaba the maximum Wind Speed of 8.0 Km/hr and minimum 2.5 Km/hr was recorded ans at Santacruz. The maximum Wind Speed of 8.1 Km/hr and minimum 1.4 Km/hr was recorded. The Relative Humidity was recorded maximum 90% and minimum70% at Colaba. The Relative Humidity was recorded maximum 86% and minimum42% was recorded at Santacruz.

Monthly data of temperature, rainfall and wind speed for Mumbai is shown in Table No 3.1

TABLE NO. 3.1 METEOROLOGICAL DATA (2017-18)

Month	Average Temp ^{0}C				Rainfall in mm		Relative Humidity in %				Wind Speed Km/Hr	
	Colaba		Santacruz		Colaba	Santacruz	Colaba		Santacruz		Colaba	Santacruz
	Max	Min	Max	Min			Time 0830	Time 1730	Time 0830	Time 1730		
April17	33.7	26.4	33.7	23.7	0.0	0.0	81	74	72	59	3.4	3.2
May 17	34.5	28.1	34.1	26.3	0.0	3.5	80	76	71	65	4.3	5.1
June 17	32.1	26.6	32.8	26.1	559.0	523.3	85	81	80	74	6.1	8.1
July 17	30.3	25.9	30.9	25.0	523.6	869.7	86	82	85	81	8.0	8.2
August 17	30.0	25.2	30.5	25.1	651.8	950.3	87	82	86	80	5.5	5.5
Sept.17	31.0	25.5	31.5	25.6	519.0	603.2	90	85	86	76	3.4	4.2
October 17	32.8	25.7	33.6	24.9	94.4	83.6	89	82	80	68	2.8	2.5
Nov. 17	33.8	23.2	34.1	20.8	0.0	Traces	80	70	64	47	2.5	1.5
Dec. 17	30.9	21.2	31.2	18.3	104.8	75.8	83	74	77	60	2.8	2.0
January 18	30.6	20.1	31.6	17.0	0.0	0.0	82	71	79	47	2.8	1.4
February 18	31.7	21.4	33.2	18.5	0.0	0.0	83	72	72	42	3.2	2.5
March 18	32.2	23.8	33.8	21.7	Traces	Traces	83	70	73	48	3.6	3.3

Source: Regional Meteorological Centre, Colaba.

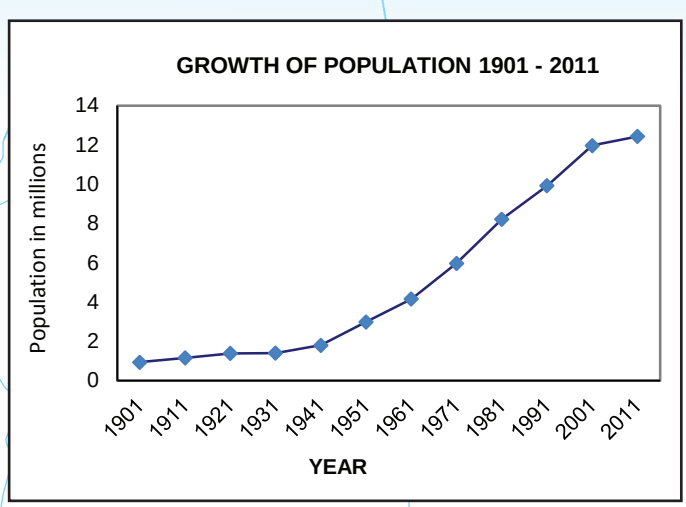
4. POPULATION

Mumbai is one of the important cities of the world, is also recognized as the most densely populated city. Inverse proportion of Area and Population causes serious impact on its environment.

Table No. 4.1: Growth of Population and rate of Increase during year 1901-2011

Year	Population in Million	% Growth
1901	0.93	-
1911	1.15	23.7
1921	1.38	20
1931	1.4	11.5
1941	1.8	28.6
1951	2.99	66.1
1961	4.15	38.8
1971	5.97	43.8
1981	8.22	38.0
1991	9.92	21.1
2001	11.97	20.6
2011	12.64	3.8

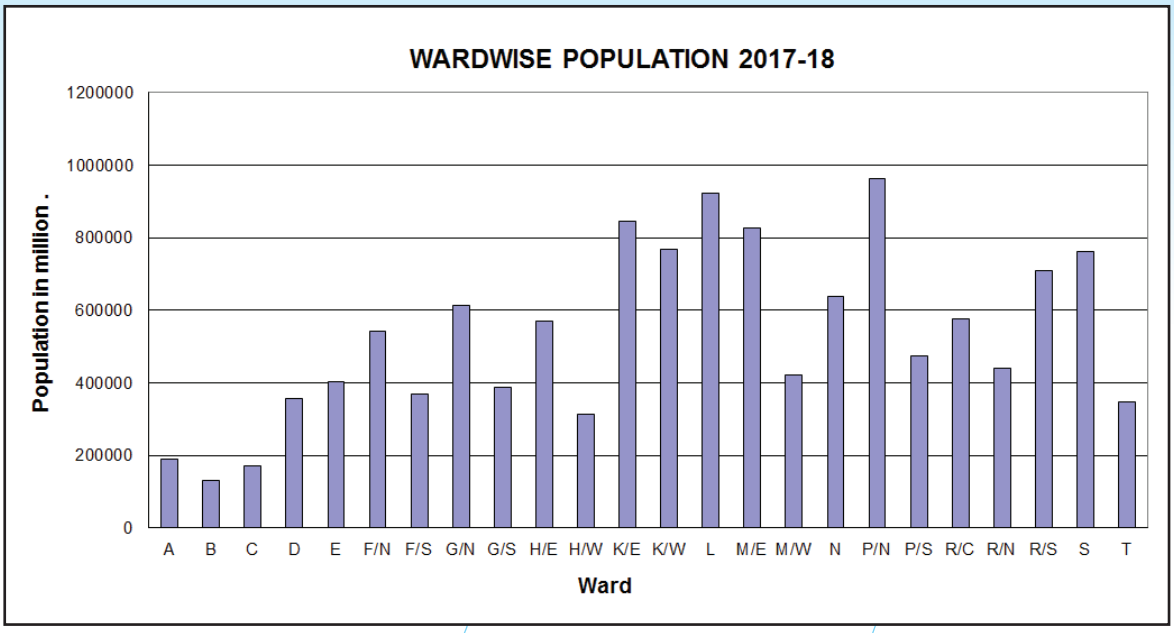
Source : Census Department of India



As per data received from Health Department of MCGM the estimated population of Mumbai is 12.73 million. The population density of 26357 person per sq.km (excluding no development area). Administrative Ward-wise population indicates that 'P/North' ward has maximum population of 9,63,584 persons where as 'B' ward has minimum population of 1,30,294 persons (Table No. 3.2)

Table No. 3.2: Wardwise Area & Population

Ward	Area in Sq.km.	Population	Ward	Area in Sq.km.	Population
A	11.2	189381	L	15.62	923519
B	2.65	130294	M/E	38.19	826784
C	1.91	170083	M/W	17.62	421614
D	8.3	355053	N	29.68	637553
E	7.27	402568	P/N	46.70	963584
F/N	12.85	541520	P/S	25.19	474447
F/S	9.87	369492	R/C	47.95	575430
G/N	8.31	613177	R/N	14.17	441549
G/S	9.74	386665	R/S	18.31	707543
H/E	12.40	570391	S	32.55	761338
H/W	18.65	314840	T	44.91	349523
K/E	24.00	843330	**TOTAL**	**483.22**	**12736036**
K/W	25.18	766358	Source: Development- Planning and Health Depts.		


WARDWISE POPULATION 2017-18
Population In million .
1200000
1000000
800000
600000
400000
200000
0
A B C D E F/N F/S G/N G/S H/E H/W K/E K/W L M/E M/W N P/N P/S R/C R/N R/S S T
Ward

5. LAND USE

Mumbai was the first Municipal Corporation to adopt the concept of a development plan. The first development plan was formulated in 1964 was sanctioned in 1967. This development plan reformulated as per law of Maharashtra Regional and City development Act1966, which came into force in 1991-94 and was valid upto 2014. Now new Development Plan for 2014-2034 was submitted to State Government over provision of section 30(1) of said Act on 02.08.2017 for sanction. The State Govt. in Urban Development Department vide it's notification dated 08.05.2018 as per the provision of section 31(1) of said Act sanctioned the Development Plan partially.

Planning Area

The total land of Greater Mumbai identified in Earlier Draft Development Plan 2034 (EDDP) was 458.28 Sq.km. However, the Municipal Corporation of Greater Mumbai (MCGM) is the Planning authority of area that was more modest. Since about 8.76% of the cited area fell under the jurisdiction of Special Planning authorities (SPA). Following three such SPAs exist in Grater Mumbai–

Mumbai Metropolitan Region Development Authority(MMRDA),

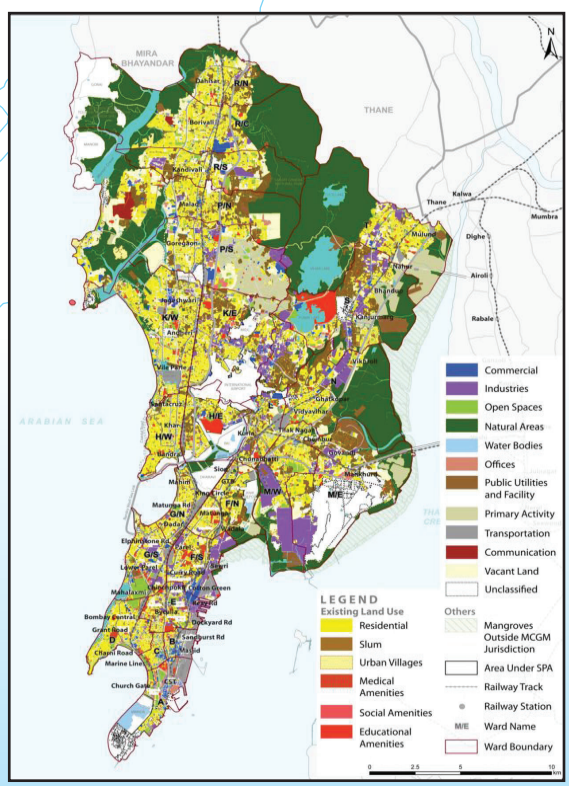
Slum Rehabilitation Authority (SRA) and

Maharashtra Industrial Development Corporation (MIDC).

The ELU 2012 located the emergence of an additional area of 14.96 Sq.km, probably due to siltation of mangroves in Thane creek. This area is outside the current MCGM limits which is shown as Natural Area in Development Plan 2034.

The Coastal Road approved by GoM adds a further area of 1.80 sq.km through reclaimation of the sea. The alignment of this Road is being marked on the Proposed Land Use (PLU). It is also proposed that any changes in the alignment of Coastal Road that would get necessitated during implementation would automatically become part of the DP-2034. Further, an area of 1.20 sq.km is proposed as green reclaimation. The addition of these land makes Greater Mumbai's total land area 476.24 sq.km.

Total area under M.C.G.M.'s jurisdiction is about 434.55 sq.km (91.24%) excluding the area Special Planning Authority (SPA).



State govt. vide its notification dtd. 08.05.2018 u/sec. 31(1) of said Act sanctioned the plan excluding the schedule 'B'. The process of sanction of remaining part is in progress.

Wardwise Area, Population as per Development Planning- (Area), Health- (Population) is given in Table No. 5.1

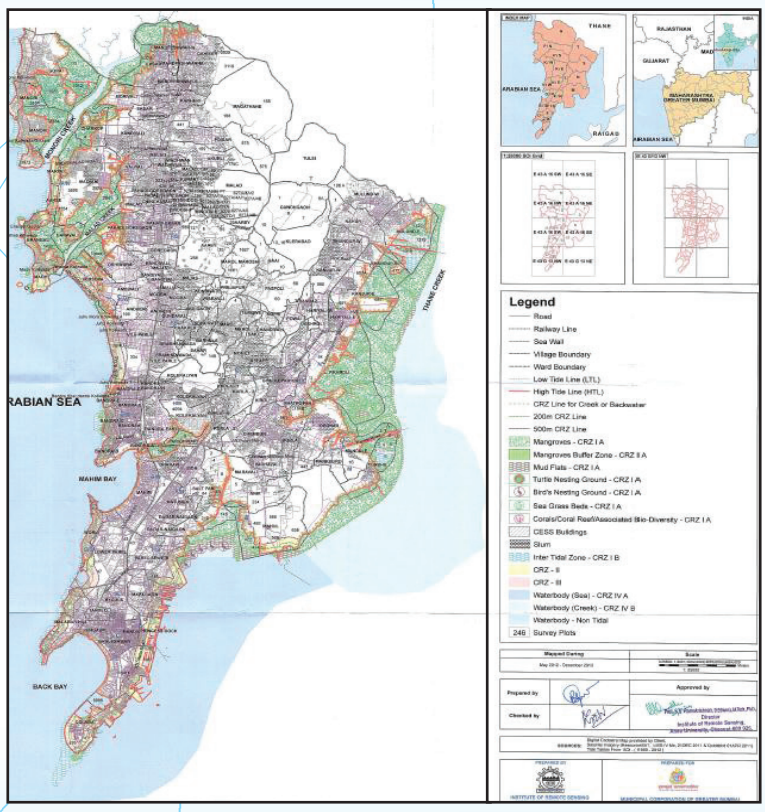
Coastal Regulation Zone

MoEF has issued CRZ notification vide No. S.O. 19(E) dated 06.01.2011, in super-session of the earlier notification S.O. 114(E) OF 19/02/1991.

The objectives of the new CRZ Notification includes; the need to ensure livelihood and security to the fisher communities, to protect the Coastal environment and to give impetus to economical undertakings in CRZ areas.

There is a specific provision under 8 of said notification for Mumbai, Sub para 5(1) regarding the redevelopment of housing for local communities, slums existing and near the Coastal region, and redevelopment of dilapidated buildings.

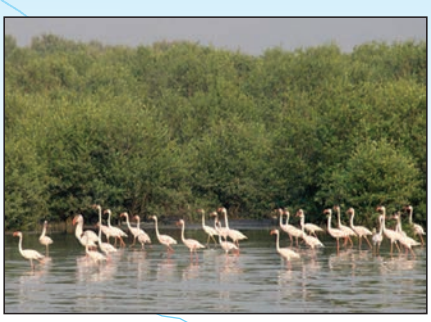
2: DRAFT CZMP GR. MUMBAI



The work of preparing new Coastal Zone Management Plan as per C.R.Z. Notification 2011 was entrusted by MCGM to the Institute of Remote Sensing Anna University, Chennai. The draft has been prepared with all relevant information using Remote Sensing, Globle Positioning System of Geographical Information System as per provision of Coastal Zone Regulation guideline 2011. This draft has been submitted by Maharashtra Coastal Zone Management Authority (MCZMA) to Ministry of Environment, Central Government.

Further, Ministry of Environment, Forest and Climate change vide public notice dtd.18.04.2018 has published new "Draft Coastal Regulation Zone notification, 2018", inviting suggestions/objections on the said draft notification by email or at their official address within sixty (60) days.

6. MANGROVES IN MUMBAI



The zone between sea and land is quite an inhospitable place for life to thrive. The water is salty, substratum is anoxic and the soil is alternately exposed and submerged due to tidal action. The only species of trees that can thrive in this organic environment are mangroves, which have developed special adaptation for this purpose. Every mangrove species is an ecosystem in itself. Its roots act as substrate for sessile organisms like oysters and barnacles, its crown a rookery for swamp birds and the flowers are a good source of honey. The leaves are raw material for ants engaged in nest building and when they fall, they form the basis of food chain in the surrounding waters.

Mangroves confer a variety of benefits to mankind. They are natural barriers against sea intrusion, as demonstrated well during the Tsunami that hit our coast in 2004. By breaking up large storm surges and strong tidal currents they protect sea coast from erosion. They are important land builders which filter sediments from land and expand the extent of land towards sea. The enormous productivity of mangrove swamps enables them to support a rich fauna diversity. The unique habitat acts as nursery grounds for many species of fish and shell fish and offer protection to many juveniles against predators. This way, the lives of millions of fishermen in our country are linked directly to the existence of healthy mangroves. Scientific studies prove that the ability of mangrove forest to absorb Carbon dioxide from atmosphere is six times that of other forest. This shows how important mangroves are in our effort to fight climate change and sea level rise.

According to forest survey of India, the total extent of mangroves in Maharashtra is 186sq.km, distributed along its six coastal districts. The thickly populated city of Mumbai alone has about 6000 hectares of mangroves, which is perhaps the largest extent of mangroves for any metropolitan city in the world. Mangroves are the green lungs for the city, which ensures abundant supply of oxygen to us. They also maintain the stability of the shoreline and prevent the release of toxic wastes into the waters around Mumbai, thus playing a silent life supporting role. Their ability to absorb large volumes of water is a great boon to a city, which is prone to heavy rain and flooding from time to time.

Unfortunately, the mangrove ecosystem of Mumbai is under severe threat due to several factors. Land in the coastal areas is in great demand, for expansion of real estate, setting up of industries and public utilities. A lot of construction debris gets dumped in these lands and tons of pollutants are released here, chocking the mangroves to death. Many mangrove areas have been converted into salt pans and aquaculture ponds in the past. In rural areas, mangroves are also felled for fuel wood and small timber. The rate of mangrove cover is a matter of great concern and the alarm bells are loud and clear.

On 6th October 2005, the Hon'ble High Court of Bombay issued a landmark order to save the mangroves of Maharashtra coast. This judgment mandated that mangroves on government land be declared as Protected Forests and those on private lands as "Forests". The Hon'ble High Court prohibited any

construction within 50 m from the boundary of the mangroves and also put a ban on dumping of debris in the mangrove areas. Following this order, Mumbai was notified as Protected Forest. To improve the protection status of mangroves on government, the state has decided to notify all such areas as Reserved Forest.

To give further fillip to the mangrove conservation efforts in Mumbai region a 'Mumbai Mangrove Conservation Unit' (MMCU) has been created on 17th May 2013. The Cell is headed by a Chief Conservator of forest and is functioning from its office in Bandra, Mumbai.

Chief Conservator, 'Mangrove Cell' carried out following works for conservation of mangroves:

- 3 lakh mangrove saplings were raised in nurseries.
- In Mumbai and New Mumbai areas 5 Mangrove nurseries have been formed on 56 Hectare land.
- Display of boards, signage etc. to create awareness for the need of mangrove conservation.
- Plantation programs in collaboration with NGO's.
- Promenades at the landward edge of mangrove areas being planned with the support MCGMandresidential association.
- Legal action to evict encroachments on mangrove land will be initiated by Mumbai Mangrove Conservation Unit in Mumbai.
- Training awareness generation and publicity works will be scaled up.

7. URBAN RENEWAL SCHEME

MCGM and Maharashtra Housing & Area Development Authority (MHADA), a State Government agency have undertaken city renewal scheme as per development rules. This provision will enable redevelopment of old dilapidated municipal and other tenanted buildings and to make available vacant land for various civic amenities.

Recreational Facilities:

Providing recreational amenities to the public is a discretionary duty of the Corporation under section 63 of MMC Act1888. For balanced environment, abatement of air pollution and Green Mumbai, beautiful and clean Mumbai, MCGM provides recreational amenities to the citizens of this city by way of maintaining gardens and providing playgrounds (PG), recreational centers, water fountains, etc. In addition to recreation, MCGM also encourages sports, art, cultural programs etc. Whereas health education and health promotion of citizens being its objective.(Table No.7.1) These facilities are utilized by citizens as well as others from different places.

Table No. 7.1: Recreation Facilities Provided in the year 2017-18 (Up to 31.03.2018)

Sr. No.	Particulars	City	Western suburbs	Eastern Suburbs	Total
1	Garden (Except strip Gardens)	14	133	82	229
2	Recreation Grounds	163	184	85	432
3	Playgrounds	42	182	95	319
4	Park	5	15	5	25
5	Fountains	16	2	8	26
6	Band stands	2	1	2	5
7	Nurseries	10	6	6	22
8	Plant Sale Counter	3	4	1	8
9	Statues	39	5	9	53
10	Tree Plantations	2460	4913	5124	12497
11	Distribution of tress	14984	13031	4365	32380
12	Total no. of tress	718589	1221737	1034957	2975283

Source: Garden Department

8. UDYAN AND ZOO

Veermata Jijabai Bhosale Udyan & Zoo is one of the oldest zoos in the country estab-lished in the year 1862. This area was under the control of Agri-Horticultural Society of Western India. The management of this Udyan & Zoo was handed over to MCGM by the then state govt. in 1873. The total area of this Udyan & Zoo is approx. of 53 acres and is declared as "Heritage Grade II (B)" site. This zoo is visited by a large number of visitors every year.

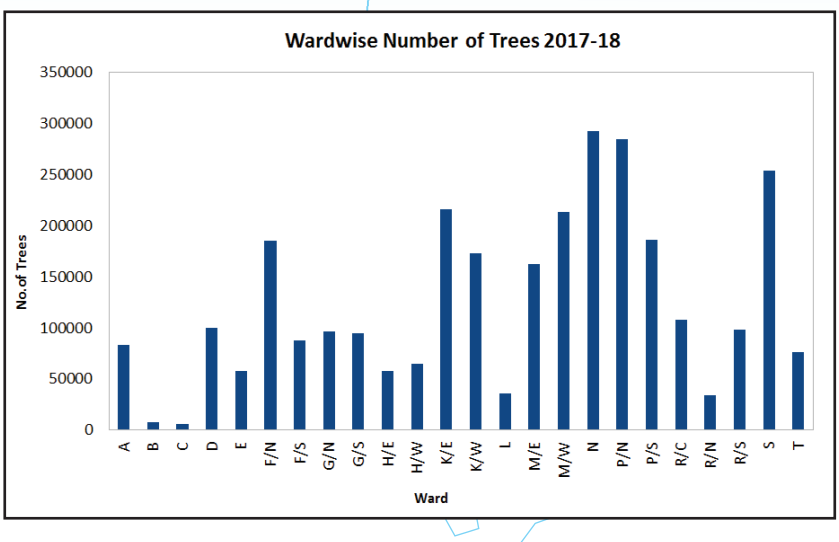


Table No. 8.1: Wardwise Number of Trees

Sr. No.	Ward	No. of Tress
1	A	83201
2	B	7816
3	C	5756
4	D	100317
5	E	58028
6	F/North	184837
7	F/South	87240
8	G/North	96620
9	G/South	94774
10	H/East	57314
11	H/West	64674
12	K/East	215728
13	K/West	173232
14	L	36023
15	M/East	162638
16	M/West	213084
17	N	292965
18	P/North	284271
19	P/South	186002
20	R/Central	107841
21	R /North	34370
22	R/South	98305
23	S	254038
24	T	76209
	Total	**2975283**

Source: Garden Department

Garden

For tree conservation, Garden department has done following work,

1. In year 2017-18, about 12497 no. of trees are planted on municipal roads and open spaces.
2. Removal of concrete and cement around 12789 tress.
3. Spraying of insecticides and pesticides on infected tress.
4. Trimming of branches of 78990 trees to balance them.
5. Formation of Tree basins around the tress.
6. Removal of 844 number of dead and dangerous tress.
7. During 2017-18 the Municipal Corporation of Greater Mumbai and the Tree Authority has rganised the 23rd exhibition of plants, flowers, fruits and vegetables from 9th to 11th February 2018 at

Veermata Jijabai Bhosale Udyan. The workshop on various horticultural subjects was also arranged to create consciousness and awareness about environment among the citizens.

8. It is proposed to plant around 20000 new trees in the year 2018-19 along roadside and on other places in MCGM jurisdiction.

9. As per the Tree Census the total number of trees in all 24 wards of MCGM is 29,75,283.

Zoo:

1. This Garden & Zoo is kept open for visitors from 9.30 am to 06.00 pm on all days of the year excluding Wednesday.

2. This Garden & Zoo is kept closed for visitors on every Wednesday as weekly off.

3. As per Corporation Resolution no.1319 dated 30-11-2002, if there is a public holiday on Wednesday, then this Garden & Zoo is kept open for visitors on the said Wednesday and is kept closed for visitors on the next day i.e. Thursday, as weekly off.

4. Free entry is given on every Friday for children below 12 years.

5. Divyang person are given free entry on all days (except Wednesday).

6. Children in Municipal Schools are given free entry on all days (except Wednesday)

Entry Fees:

Visitors description	Entry Fees (Till dt. 31.07.2017)	Entry Fees (From dt. 01.08.2017)
Adult	Rs. 5/-	Rs. 50/-
Child (below 12 years)	Rs. 2/-	Rs. 25/-
Family [2 Adults + 2 Children (Below 12 years)]	--	Rs. 100/-
Foreign visitors		
Adult (Above 12 years)	--	Rs. 400/-
Child (Below 12 years)		Rs. 200/-
Private school students coming in group for educational trip (Below 12 years)		Rs. 15/- (Per head)
Private school students coming in group for educational trip (Above 12 years)		Rs. 25/- (Per head)
Accompanying adult	Rs. 1/- (Per head)	Rs. 50/- (Per head)
Still Camera	Rs. 10/-	Rs. 100/-
Video Camera	Rs. 20/-	Rs. 300/-

Visitor Data and Revenue:

Financial Year	No. of Visitors	Revenue (Rs.)
2016-17	13,80,271	73,65,464/-
2017-18	17,22,656	4,37,53,398/-

Veermata Jijabai Bhosale Udyan & Zoo at present:

- As on 31st March 2018, there are in all 387 animals, which include 112 mammals of 12 Species, 244 Birds of 29 species and 31 Reptiles & aquatic animals of 6 species displayed in this Udyan & Zoo.
- As per the guidelines laid by the Central Zoo Authority, New Delhi, under the "National Zoo Policy 1998" the main objective of establishment of a Zoo is to protect, conserve & breed the rare and endangered animals
- Various educational activities like Wildlife week, World Earth Day, World Environment Day, Animal keepers training programs, Zoo Awareness Programs, etc. are conducted for creating empathy, interest and awareness about Wildlife, Nature & Environment in the minds of citizens and school/ college students & teachers.
- The post of Director (Zoo) has been created for the development and modernization of this Udyan & Zoo and the development works of this zoo are being carried out.

Modernization Project of Veermata Jijabai Bhosale Udyan & Zoo:

1. The Brihanmumbai Mahanagar Palika administration has taken up a Project of modernization of this Udyan & Zoo. A Master (layout) Plan of this Udyan & Zoo has been prepared. The Technical Committee of Central Zoo Authority has accorded final approval to the said Master (layout) plan on 05-12-2012.

2. New Entry plaza has been developed near the entrance gate of the Zoo, which contains facilities such as, ticket house, Drinking water fountains, Toilets, souvenir shop, cloak room, CCTV Camera. The Electronic Entry System is installed at the entrance gate.

3. The internal gardens (63 nos.) in the premises of this Udyan & Zoo have been developed which includes Japanese garden & Rose garden. Also the works such as asphalting of internal roads, restoration of heritage structures are completed. The name plates & numbers have been displayed on the trees in the premises for information of the Public.

4. The direction signage boards and information boards are displayed at various suitable places in the Zoo.

5. Various selfie points (7 nos.) are erected for the visitors – Doraemon, Mickey mouse, Goofy, Giant panda, Crocodile, Chimpanzee etc. Two artificial waterfalls, one at entry plaza and another near Jijamata statue are constructed.

6. Eight high quality drinking water fountains, four filtered cold water fountains and four normal

drinking water fountains are made available for facilitating the visitors.

7. The Humboldt penguin exhibit of international standard have been developed on the ground floor of the Interpretation center building. The said exhibit is opened for viewing of the visitors from 18-03-2017. The new Public address system has been developed in this exhibit area, for giving instructions to the visitors with the help of audio visual equipments. The facilities such as, display area, Holding area, Kitchen, A.H.U room Life Support System have been developed in the Humboldt penguin exhibit area. The temperature is maintained up to 13-15 degree celcius and 60% to 65% humidity is maintained.

8. Inside the Penguin exhibit, around 60% area is developed as rock work and water is kept in the remaining 40% area for the penguins to swim. Two glasses ad measuring 7*3 meter 50mm thick are fixed in the front area of the exhibit. The water level is 1.5 meter from the ground and the underwater activities of Penguins can be seen very nicely.

9. The Public amenities such as the Toilets (3), rain water shelters, food kiosks, child care centre are being constructed for the convenience of the citizens.

10. A house keeping agency is appointed for the proper maintenance and cleanliness of the said Amenities, due to which the premises is maintained clean.

11. A new “Water Distribution System” has been installed and activated.

12. The CZA, New Delhi has accorded its approval to the designs of various animal enclosures (19 no.) and accordingly enclosures are being constructed in the second phase of the modernisation project for which contractors have been appointed.

13. A Master (Layout) Plan is being prepared for the expansion of zoo on the adjoining Mafatlal Mill compound (7 acre plot) in the third phase of project.

9. WATER SUPPLY

Mumbai receives raw water from seven impounded water resources viz. Vihar and Tulsi within Mumbai and Tansa, Modak Sagar Upper Vaitarna, Bhatasa and Middle Vaitarna located at a distance of about 100 to 175 Kms from Mumbai.

Raw water available from these sources is conveyed with transmission main system ranging from 2235 mm to 5500 mm diameter pipe lines and tunnels to the state of the art water treatment facilities at Bhandup Complex (2810 MLD) and Panjrapor (1365 MLD). Water Treatment facilities for Tulsi (18 MLD) and Vihar (90 MLD) are located near to these sources. At these treatment plants, water is treated with processes such as coagulation, flocculation, settling, rapid sand filtration and post – chlorination and quality of the effluent water is maintained in accordance with IS 10500:2012 – Drinking Water- Specifications.

The treated water is stored in the Master Balancing Reservoirs (MBR) located near to treatment plants at Bhandup Complex (within Mumbai) and Yewai (Outside Mumbai). It is further distributed to 27 service reservoirs located throughout Mumbai City with complex water supply network of about 450 Kms this conveyance system remains charged for 24 hours and eliminates the chances of water quality deterioration because of intrusion of ground water / sewage etc. Presently 3850 MLD water is supplied to Mumbai City.

Population Projection, Demand and Augmentation of Water Supply:

The population growth trend of Mumbai is continued. The projected population of Mumbai is anticipated 17.24 million by the year 2041. The projected water demand for 2041 is 6424 MLD (including enroute supply and transmission losses). The shortfall in Demand and Supply will be 2520 MLD by 2041 (Presuming 655 MLD Bhatsa water temporarily allocated to be surrendered to GoM). The gap will be met by developing the Gargai (440 MLD), Pinjal (865 MLD) and Damanganga-Pinjal River Link Project (1586 MLD) water supply sources allocated to Mumbai by the Government. On completion of these projects, the water supply will be augmented by 2891 MLD.

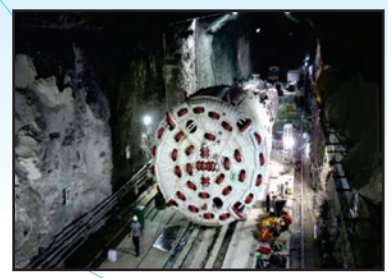
Table No. 9.1 :- Sources of Water Supply

Sr. No.	Source	Year	Yield in MLD		Distance from City in Kms	Remarks
				Cumulative		
1	Vihar	1860	90	90	Within City	Present Sources
2	Tulsi	1872	18	108	Within City	
3	Tansa	1892 - 1945	500	608	106	
4	Lower Vaitarna	1954	455	1063	119	
5	Upper Vaitarna	1972	635	1698	163	
6	Bhatsa	1980 - 2007	2020	3718	102	
7	Middle Vaitarna	2014	455	4173	150	
8	Gargai	2022 -2023	440	4613	180	Future Sources
9	Pinajal	2024 -2025	865	5478	195	
10	Damanganga	2029-2030	1586	7064		

Source: Hydrolic Engineers Dept.

Rehabilitation and Replacement of Water Supply Network

Secondary Network



- Phasewise replacement of Tansa (East) & Tansa (West) mains from Bhandup Anchor Block to Powai. Under Phase-I, the work of laying 2.0km water main of 2400mm diameter which was proposed from Bhandup Anchor Block to IIT-subway and the same is completed. Under Phase-II, the work of laying 1.85km. water main of 2400mm dia. from IIT-subway to Powai is completed & the balance work related to this work shall be completed by May 2018.
- 1200mm dia. Tansa mains and 800mm dia. Vihar main on Dr. Babasaheb Ambedkar Road, from King's Circle to Lalbaug have gone below embankment of series of flyover bridges on this road and have became inaccessible for repairs and maintenance works. Those mains are proposed to be replaced by laying 1500mm dia. new water main. The work is being executed in a phased manner. Under Phase-I, the work of laying water main from Deodhar Road junction to Hindmata Cinema about 2.2km length has been completed. Under Phase-II, the work of laying water main from Hindmata Cinema to Sane Guruji Road is in progress. Till date laying of 1.94km water main is completed out of 2.30 km.
- The inlet of Bhandarwada Hill Resevoir is in deteriorated condition and need to be replaced phase wise. So the following work has been undertaken:

1. The work of laying 4km. long water main of 1500mm dia along Rafi Ahmed Kidwadi Road from Sant Savta Junction to Jerbai Wadia is completed.
2. The work of laying 0.60km. water main of 900mm dia. along Rafi Ahmed Kidwai Marg from Futka Tank to Sion Hospital is completed.
3. The work of laying 3.1km water main of 1500mm dia. along Rafi Ahmed Kidwai Marg, from Futka Tank to Jerbai Wadia, is in progress. Till date laying of 2.3km water main is completed.
4. The work of laying 0.42km water main of 1500mm dia, tapped from 2750mm dia. Upper Vaitarna Trunk main up to 60ft road junction - Kemkar Chowk, is completed except nalla portion which shall be executed after bridge work.
5. The tender for the work of laying of 0.45km water main of 1500mm dia. along 60ft Rd., from Kemkar Chowk to Dharavi Road is invited and the same is in progress and the work will be started accordingly alongwith remaining work in Nalla portion.

Pramod Navalkar Viewing gallery

R.C.C. work completed. Electrical works, lift and procurement of binocular alongwith finishing items will be completed by end of June 2018 and the gallery will be put to use for public from the month of

July 2018.

Works under Water Distribution Improvement Program (WDIP)

1. In Western Suburbs, the work of laying of 80mm, 100mm, 150mm & 250mm dia water main to improve the water supply in H/West Ward at Gazdarband will be completed by 10.12.2019. At this stage, work of laying of 2.086km. water main, is completed out of 11.77km.
2. In Eastern Suburbs, the work of laying of water main to improve water supply in S-Ward at Raote Compound which is an elevated area will be completed by 24.01.2020. At this stage, work of laying 6.7km water main is completed out of 21.6km.

Measures to curtail Leakages and Contamination:

In contamination prone areas, rehabilitation and replacement of distribution Water Mains including renewal of consumer connections were proposed in 2017-18. These works along with replacement of bunch of connections is undertaken in City, Eastern Suburbs and Western Suburbs. This will help in reducing the contamination of water. The details of the works are as follows:

a) Water Mains Replacement

In 2017-18, in City, Eastern & Western Suburbs about 19.58km water mains are replaced.

b) Service connections Renewal in road improvement

The renewals of service connections of about 10,277 connections are renewed so far under Road Improvement Programme.

c) Bunch of Connection Removal

In 2017-18 total 42 no. of works for removal of bunch connections are completed.

d) Valve Chamber Repairs

The work of repairs and reconstruction of 766 Valve Chambers are completed in March 2018.

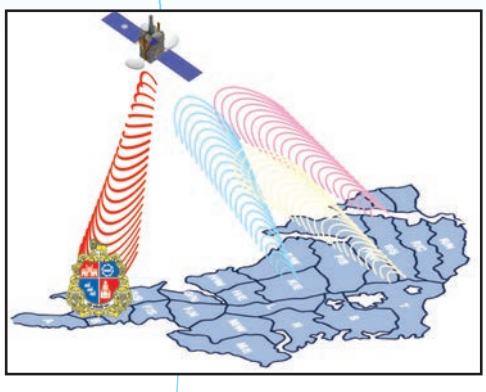
Service Improvement

Increase in Service Coverage Mandated: Municipal Water is the only source for drinking water for citizens of Mumbai. MCGM has mandate for granting metered water connections, and levy water charges against consumed water quantity. The premerger structures in island city having un-metered water supply are levied water tax in the property tax bill. In Jan 2017, the policy of eligibility criteria for granting water connection in slums was changed for the hutments in existence after 01.01.2000 as per PIL No.10 of 2012, and necessary circular is now in force for granting water connection to those affected slums. In the year 2017-18 about 1010 new water connections were granted to such slum dwellers. Total metered consumer connection count in March 2017 increased upto 391308.

To enable ease of doing business, the application form for water connection has been simplified and made available on the portal along with the list of documents required. Also the online application process for new connections has been developed and launched. The application process is user friendly with online tracking feature. It is made mandatory to take decision on the application within 15 working days.

Mumbai-Water Distribution Improvement Programme (M-WDIP)

As stated in Budget 2017-18, Pilot Project in "H/west" and "T" ward is in progress and present status is as under –



- Under Service of Network Survey & GIS Mapping, migration of AUTOCAD water-main Network of Primary & Secondary network & Tertiary network in all wards of MCGM is completed & put up on "One-MCGM" App.
- Diagnostic report on Secondary network is under review.
- Customer survey in adjoining wards of Pilot wards i.e. 'K/W' and 'S'ward is completed. Customer survey of Non-Slum area in K/E ward is completed & balance survey in Slum area is in progress.
- Under Service of Water for Slums, detailed study of Gazdarbandh slum in "H/West" is completed & implementation of recommended works are in progress. Also recommendations for Hanuman-pada slum in "T" ward is under review for implementation.
- The Training modules are approved & training to concerned staff for implementation of 24X7 is planned to commence by June 2018.
- Under Quality Assurance Service, Processes of Water Quality & SCADA are under detailed study for standardization of process, documentation for obtaining ISO certification.
- Recommended works of providing & installation of PRV in Pilot wards are started & are expected to be completed by August 2018. After completion of these works, commissioning will start for stabilization of system for which minimum three months time will be required. Flow meters tender have been called & D.L. is put up for approval.
- On completion of above PRV & FM works, hours of water supply in different supply zones of pilot wards, will be improved progressively towards achieving 24X7 supply.

Other Notified Works

1) Solar Power Generation at Bhandup Complex- (2017-18)

Supply, Installation, Testing & Commissioning of 2.5MW photovoltaic PV solar power generation

plan at Bhandup Complex is completed. This is the pilot project under taken by MCGM. The project work was started in January 2017 and now the plant is installed and commissioned. The solar power generation is used for captive consumption of Bhandup Complex. There will be savings of about Rs.3.00Crore per annum in electrical energy consumption.

2) Renovation of Master Control Centre (MCC) at Bhandup Complex – (2017-18)

The Master Control Centre at Bhandup Complex is working round the clock and MCGM's water supply to various parts of City/Suburbs is monitored from this centre. The work of renovation of this Master Control Centre is now completed. Due to this the vital information of Mumbai Water Supply system, Water Treatment Process etc. can be viewed with advance audio visual presentation by students, visitors, foreign delegates under single roof.

Awareness on Economic Use of Water

Bhandup Compex is undertaking various measures to increase public awareness on sustainable use of water and its impact on the environment. In 2017-18, several advertisements have been published in various publications, BEST buses, etc. Students in municipal schools were sensitized using Virtual Classrooms of the Corporation. In the current year, it is intended to extend the reach through various innovative media including social networking, electronic media, in additional though the traditional modes.

Project 'Green Wheels' along Blue Lines i.e. Mumbai Cycle Track Project

The Project "Green Wheels along Blue Lines" i.e. Mumbai Cycle Track Project is being carried out by Hydraulic Engineer Department for the length of approx. 36km, spread across various areas under MCGM Jurisdiction. The work is to be carried out along trunk mains on encroachment free zone for width of 10meters. In this Project, there is a Cycle Track (3mtr)and Walkway (3mtr)on one side and Service road (4mtr) and plantation on other side. The project estimated cost is approximately 350Crore.

The theme of this project is to keep water trunk mains encroachment free by developing the green corridor. The design of cycle track has been done in accordance with IRC Guidelines also the targets is to create smooth profile, continuous and dedicated alignment of Cycle Track for hassle less and eco-friendly mode of transport.

The entire work is expected to be completed within three years. It is to be mentioned that the work of pilot project in Mulund is completed and is open for public.

The work is proposed to be executed in phases as mentioned below:-

1) **Phase I:** From MCGM Boundary at Mulund (T-Ward) to Sahar Road in Andheri admeasuring 14.10km. Work is in progress.

2) **Phase II-A:** From Parsekar Chowk, Ghatkopar to King's Circle, Matunga and from Airport Boundary, Santacruz to Ali Yawar Jung Road, Bandra admeasuring total 12.09 km.

3) **Phase II-B:** From JVLR, Powai to Asalpha and Kurla Station and from Bandra Station to Mahim, admeasuring total 9.88km.

Quality control in water supply:

Laboratory at Bhandup Complex was commissioned in the year 1980 for daily monitoring the quality of water having supplied to Mumbai. Quality of water is checked for 24 hours as per BIS 10500:2012 for drinking water.

Activities:

Analysis of water for Physical, Chemical and Bacteriological parameters in order to supply safe potable water as per BIS 10500:2012 to the Mumbai city. Samples of raw water, clarified water, filtered water and final water are tested for following parameters.

1) Turbidity (NTU) – hourly
2) pH – alternate hour
3) Residual Chlorine (mg/L) – alternate hour
4) Temperature (^{0}C) – alternate hour
5) Colour (Hazen Unit) – alternate hours.

Jar test is conducted on raw water samples in every shift for prescribing optimum Poly Aluminum Chloride (PAC) dose. Complete analysis of water samples – Raw and final is carried out for Turbidity, pH, Colour, Total Alkalinity, Total Hardness, Calcium Hardness, Chlorides, Suspended solids, Total solids and Manganese, Iron, Aluminum, Dissolved Oxygen and Bacteriological examination for Total coliform and E.coli once in a day.

Table No 9.2: Water Quality Before and After Filtration During 2017-18

Parameters	Tulsi		Vihar		Bhandup Complex (Tansa, Vaitarna & Upper Vaitarna)		Panjrapur (Bhatsa)		BIS standards 10500:2012
	Raw	Final	Raw	Final	#Raw	Final	Raw	Final	Permissible Range
Turbidity NTU	1.5-26	0.20-3.2	1.0-6.4	0.63-3.3	1.4-55	0.18-2.2	3.0-461	0.15-3.2	1-5
pH	6.9-9.10	6.65-8.30	7.2-8.95	7.20-8.30	7.1-7.8	6.9-7.5	6.6-7.7	6.6-7.5	6.5-8.5
Total Alkalanity (mg/l)	9-17	11-19	10-16	11-18	8-14	8-17	-	-	250-1000
Chlorides (mg/l)	33-46	30-44	38-49	36-47	34-47	29-45	21-82	21-79	200-600
Total Hardness (mg/l)	32-48	30-46	43-54	40-55	37-54	34-50	-	-	200-600
Bacteriological examination (CFU/100ml)									
Total Coliform	40*-560*	0-0	28*-352*	0-0	0-0	0-0	0-0	0-0	*
E-Coli	10*-215*	0-0	0-180*	0-0	0-0	0-0	0-0	0-0	**

Source: Hydraulic Engineer Dept

Note :Raw water of Tulsi and Vihar lakes is untreated water
Unit : NTU= Nephelometric Turbidity Unit
mg/l = miligram per litre
CFU/100ml=Colony forming unit per 100 ml
NT:- Not tested
#Bhandup complex raw water denotes Quality of pre-chlorinated waterfrom sources Tansa, Modaksagar (Vaitarna), Middle Vaitarna Upper Vaitarna. Panjrapur raw water denotes Quality of pre-chlorinated water from Bhatsa.
* Coliform organism should not be detectable in 100 ml of any two consecutive samples for more than 50% of the samples collected for the year
** E Coli count in 100 ml of any sample should be zero

Municipal Water Testing Laboratory:

Municipal Corporation's Water testing laboratory comes under Public Health department is situated at G/N ward, Dadar. Chemical and Bacteriological testing of food and water samples are carried out in this laboratory.

The treated drinking water is supplied to Mumbai region through water distribution pipe system. Drinking water distribution system may get contaminated by infectious micro-organisms present in the environment.

In order to protect public health as per World Health Organization (WHO) guidelines it is necessary to verify the pure drinking water is supplied till the consumer end. For monitoring the Municipal drinking water supply, around 200-250 water samples from 24 wards and 27 service reservoirs of Mumbai region are analysed daily in this laboratory. In Monsoon period or in emergency upto 300-350 water samples are analysed. Bacteriological analysis is done to meet the standards prescribed in BIS10500:2012 for drinking water standards. The water sample analysis is carried out as per WHO guidelines using Membrane Filtration Technique. By using this technique water quality indicator bacteria such as Coliforms and E coli are detected. As per Indian Standards BIS 10500:2012 water intended for drinking purpose should be free from E coli in 100 ml water samples. The results are obtained within 24 Hrs. These results are send to Medical Health Officer(MOH) of 24 wards DEHO, AEQC and AEWW departments by e-mail within 24 hrs for taking remedial measures on unfit water samples location.

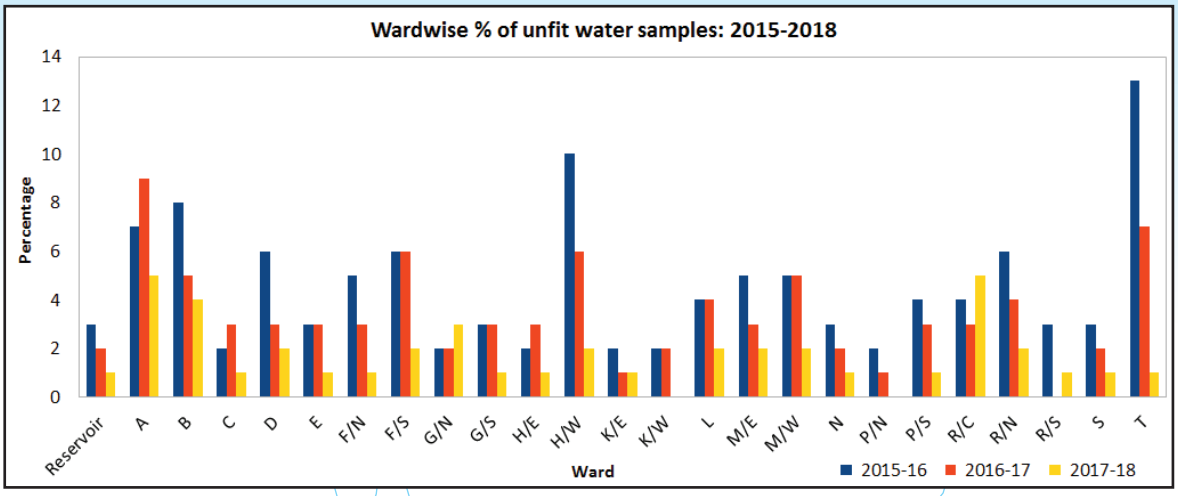
The Ward wise percentage of Unfit Water Sample from April 2015 to March 2018 is shown in table 9.3.

Table No. 9.3: Wardwise % of Unfit water Samples during April 2015 to March 2018

Sr. No.	Ward	% of Unfit Samples			Sr. No.	Ward	% of Unfit Samples		
		2015-16	2016-17	2017-2018			2015-16	2016-17	2017-2018
1	Reservoir	3	2	1	14	K/W	2	2	Less than 1
2	A	7	9	5	15	L	4	4	2
3	B	8	5	4	16	M/E	5	3	2
4	C	2	3	1	17	M/W	5	5	2
5	D	6	3	2	18	N	3	2	1
6	E	3	3	1	19	P/N	2	1	Less than 1
7	F/N	5	3	1	20	P/S	4	3	1
8	F/S	6	6	2	21	R/C	4	3	5
9	G/N	2	2	3	22	R/N	6	4	2
10	G/S	3	3	1	23	R/S	3	0	1
11	H/E	2	3	1	24	S	3	2	1
12	H/W	10	6	2	25	T	13	7	1
13	K/E	2	1	1	**Mumbai Average**		**4.6**	**3**	**1**

Source: G/N water tasting Laboratory of MCGM

The Ward wise percentage of from April 2015 to March 2018 shows decreasing trend of unfit water samples comparing last two years than present year.



Water Supply Projects

Middle Vaitarna Project is completed and the total 455 MLD water is made available in the year 2014, which is of full capacity of dam. Further, five sub-projects of Middle Vaitarna Project have also completed and hence Mumbai City & Suburbs receives additional 455 MLD of water supply since 2014.

Future sources of Water Supply to Mumbai :

Even after commissioning of Middle Vaitarna Project, the gap between demand and supply for the year 2041 is 2840 MLD. To meet the gap and to increase the water supply to Mumbai City & Suburbs, it is proposed to undertake development of sources like Gargai & Pinjal for abstracting 440 & 865 MLD of water respectively.

The consultants have been appointed for obtaining various clearances e.g. environmental, forest, compensatory afforestation, PAP rehabilitation, land acquisition etc. The biodiversity studies are completed by M/s. Bombay Natural History Society (BNHS) and environmental impact assessment studies are completed by M/s. National Environmental Engineering Research Institute (NEERI). The consultants will take all necessary steps to fulfill above requirements pertaining to environmental and forest clearance as carried out during Middle Vaitarna project.

Future allotted sources of water are shown in following Table

Table No. 9.4: FUTURE SOURCES OF WATER SUPPLY

Sources	Yield in MLD	Ownership	Expected year of completion
Gargai	440	MCGM	2023 - 2024
Pinjal	865	MCGM	2025 - 2027
Damanganga-Pinjal River Link Project	1586	GoI /GoM / GoG	To be decided by GoI/ GoM/ GoG.
TOTAL	**2891**		

Source: Hydraulic Engineers Dept.

Water Supply Resources- Surface and Underground:

Gargai Project is expected to start by 2019 and expected to be completed by 2023-2024 and thereafter Pinjal project is proposed to be taken up for development.

Pinjal project consist of construction of dam across Pinjal River, conveyance system and allied works like Water treatment plant, Master balance reservoir, pumping station etc. The work of preparation of Detailed Project Report (DPR) of Pinjal Project is being entrusted to M/s. WAPCOS Ltd. by Water Resource Department (WRD) of Government of Maharashtra (GoM). On receipt of DPR, further works will be decided.

Under 'River Linking Programme' initiated by Government of India; it is proposed to link Damanganga & Pinjal rivers and thereby 1586 MLD water would be made available to M.C.G.M. and this water will be conveyed into Pinjal reservoir after its completion. This project will be implemented by Government of India (GoI). Central Water Commission (CWC)'s approvals have been received. The MoU for water transfer will be inked shortly by & between GoI, GoM & Government of Gujarat (GoG).

Ongoing projects in support for improvement in water conveyance system :-

- Tunnels from Powai to Ghatkopar high and further upto low level reservoir and Powai to Veravali reservoirs for replacement of old water pipe line on ground and for improvement in distribution of water supply system are in progress. The work of construction of shafts at Ghatkopar High Level Reservoir/Low Level Reservoir is completed. The tunnel lining from Powai to Veravali is completed. It is proposed to commission Powai-Veravali section by June 2018. Due to adverse geological conditions encountered along 4.4 km Powai-Ghatkopar drive, 1.1 km excavation of tunnel by TBM is completed. The work is hampered due to adverse geological condition and progressing slowly for taking precautionary measures.
- Work of construction of Effluent Treatment Plant at Panjrapur for treating backwash water approximately 65 MLD generated after washing filters from existing water treatment plants thereby making it suitable to reuse, is in progress.
- Re-engineering 90 MLD Vihar water treatment plant work is in progress. New technology of filtration is adopted by using Aquadaf and Densadeg clarifier replac-ing old conventional clarifier technology. Phase I commissioned in February 2018. The work is likely to be completed by May 2019.
- Structural repairs of Malad Hill Reservoir-I(49.50 MLD)- Work is in progress and is likely to be completed by April 2019.
- Structural repairs of Ghatkopar High Level Reservoir (31.00 MLD)- Work is in progress and is likely to be completed by April 2019.
- Work of beautification of Powai Lake is in progress and is likely to be completed by October 2019.
- Work of design, supply, installation, testing and commissioning of 7 Nos. of existing Stage-II pumps with motors and H.T. Panels at Pise Pumping Station is in progress and is likely to be completed by

March 2020.

- Design, Supply, Installation, Testing & Commissioning of 7 Nos. of existing Stage-II Pump with motors & H.T. Panels at Panjrapur Pumping Station and Work is in progress and likely to be completed by December 2019.
- Replacement of Valves & Allied Accessories at Ghatkopar High Level Reservoir - Work is in progress and likely to be completed by November 2018 subject to isolation of reservoir compartment by user department.
- Replacement of Valves & Allied works at Trombay Low Level Reservoir- Work is in progress and likely to be completed by November 2018, subject to isolation of reservoir compartment by user department.
- Laying of 2235 mm dia single main across NH-3 by micro tunneling / Jacking pushing (0.16 km.)- Work commenced from 07.12..2017 and is in progress.
- Work of Structural repairs to- a) Veravali High Level Reservoir, b) Trombay Low Level Reservoir will be started soon.

Recently completed projects for improvement in water conveyance system :-

- For the safety and enhancement in conveyance system of age old water mains and to increase its capacity, tunnel building work (15.1 km. long x 5500 mm dia.) from Gundavali to Bhandup Complex has been completed on 31.3.2017.
- The work of providing and laying of pipe line from Bhandup Complex tunnel shaft to water treatment plant at BPT has been completed on 31.12. 2017.
- The work of laying 1200 mm. dia. pipeline from Adarsh Nagar to J.P. Road, Andheri (W) has been completed on 30.06.2017.
- The work of pipeline along with 2 BFVs of stage-I & stage-II sumps at Panjrapur Pumping station is completed on 30.04.2018.
- The work of replacement of Stage I main transformer 100 kV/3.3 kV, 7.5 MVA capacity at Pise Switch Yard is completed on 15.12.2017.

Proposed projects to be undertaken:

A- Proposed Tunnels/Projects :

Tunnel from Amar mahal to Trombay (5.5 Kms): Tenders were invited in October, 2017 and process of award of work will be finalized by May 2018. The actual work will start from June, 2018.

Tunnel from Amarmahal to Wadala and further upto parel (9.66 Km): As the alignment of proposed Amar-Mahal-Wadala-Parel tunnel interferes with existing operational water supply tunnel, feasibility

for lowering of the proposed tunnel has been checked by Central Designing Organisation(CDO),Nashik (Govt. of Maharashtra). On receipt of their remarks in the month of October2017, tenders were invited in October 2017. Award of work will be finalized by May 2018 and actual work will start from June, 2018.

Gargai project (440 MLD): Gargai project consists of construction of dam across Gargai River and construction of 2.5 Km long tunnel to convey water from Gargai dam to Modak sagar reservoir. M/s. WAPCOS Ltd. has submitted the draft in March 2018. Central Water Commission's approval to the Hydrology of Gargai Project has been received. Proposal for Wild Life Clearance has been submitted in February 2018. R & R Plan is being finalized as per RFCTLARR, 2013 Act. Proposal for acquisition of Private Land is being moved. Gargai dam project expected to be commenced in 2019 and will be completed by 2023-2024.

Pinjal Dam Project (865 MLD): Pinjal project consists of construction of dam across Pinjal River, conveyance system and allied works like Water treatment plant, Master balance reservoir, pumping station etc.The work of preparation of Detailed Project Report of Pinjal Project is being entrusted to M/s. WAPCOS Ltd. by Water Resource Department (WRD) of Government of Maharashtra. On receipt of DPR, further works will be decided. Pinjal dam project expected to be commenced by 2020 and will be completed by 2026-27.

Damanganga-Pinjal River link project (1586 MLD): The projects comprises construction of dams at Bhugad & Khargihill and 2 nos. of tunnels for diverting additional 1586 MLD Damanganga waters into Pinjal dam reservoir. This project will be implemented by Government of India. Central Water Commission's approvals have been obtained and MoU for water transfer will be inked shortly amongst GoI, GoM & Government of Gujarat (GoG).

B - Proposed works :-

- Providing & Laying (3000 mm dia.) missing link of Middle Vaitarana Mains be-tween Chinchvali - ARVC - Yewai with flow control Valves at ARVC & mortar lining work - 4 km.
- Replacement of "Twin Tansa Mains" (1800 mm dia.) to be replaced by single 3000 mm dia. Mains between Balkum to Saddle Tunnel - 10 km.
- Rehabilitation of Upper Vaitarna Mains by some suitable technology from Aghai to Gundavali - 44 km.
- Construction of storage structure at 100KV Sub Station & Pumping Station at Panjrapur Mumbai IIIA.
- Structural repairs to Master Balancing Reservoir (MBR) at Yewai Panjrapur.– 116.50 ML.
- Construction of new administrative office building at Pise.
- Structural repairs to Bhandarwada Reservoir- 78.21 MLD
- Construction of new administrative building for the staff (900 MLD Middle Vaitarna WTP, Bhandup

Complex).

- Work of Structural repairs to: a) Trombay High Level Reservoir at BARC, b) MBR at Bhandup and c) High Level Reservoir at Malbar Hill.
- Procurement, installation, testing and commissioning of flow meter including civil and mechanical works.
- Renovation / Modification of Vihar, Tulsi, Powai Dams as per the suggestions from "Dam Safety Organization".
- Replacement of existing Tansa (East & West) two 1800 mm dia. mains by 2400 mm dia. between Bhandup Anchor Block to Maroshi Anchor Block.
- Inter Connection of 4000 mm dia. MS pipe line at WTP, Bhandup Complex and other allied works.
- General & Structural repairs to Pre-treater tanks, sludge chambers, pump houses and open steams at Bhandup Complex.

Budget provision: Budget provision for Capital work of the Water Supply projects Department:

Year 2017-18 - Rs.296.06 Crs

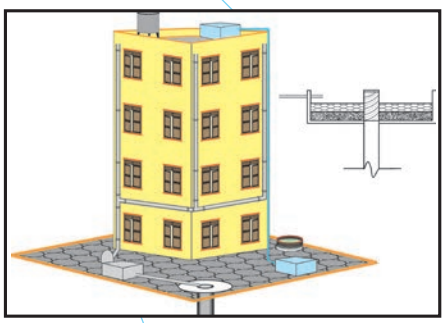
Year 2018-19 - Rs.409.70 Crs.

To meet the gap and to increase the water supply to Mumbai, it is proposed to undertake schemes to develop sources like Gargai & Pinjal for abstracting 440 ml & 865 ml of water respectively.

10. RAIN WATER HARVESTING

MCGM supplies 3850 million liters of water every day, against a demand of 4505 million liters per day to the Mumbai, the economic capital of our country. The purity of the water supplied to the citizens of Mumbai is very high on the "International Quality Standards Rating" and considerable expenditure is incurred for this purification. Unfortunately this water is being used for all secondary requirements also such as, flushing of latrines and washing of vehicles. In view of the indiscriminately rising population and comparatively limited resources there is an urgent need to search ways to save water and to put those to actual use. MCGM may not be able to supply water for secondary requirements such as flushing, gardening, vehicle washing swimming pools, air conditioning etc. and it is expected that Citizens have to generate the water for secondary requirements through rain water harvesting or recycling.

Rain Water Harvesting (RWH) is an ancient and convenient method. It implies storage of rainwater in man made tanks or recharging ground water and utilization as per requirements. Since, rainwater within our own compound is to be stored; anybody is entitled to do so. Most importantly, the capital expenditure and maintenance cost involved in this method is quite low. Rain Water Harvesting contributes in raising the ground water level, the quality of the ground water improves, soil erosion is arrested. Entry of seawater in ground water can be prevented.



Following methods can be deployed for Rain Water Harvesting.

1) Storage in underground or above ground artificial tanks.

2) Direct recharging of the subsoil water strata (aquifer) through dug up wells or bore wells.

3) Recharging of the subsoil water by percolation.

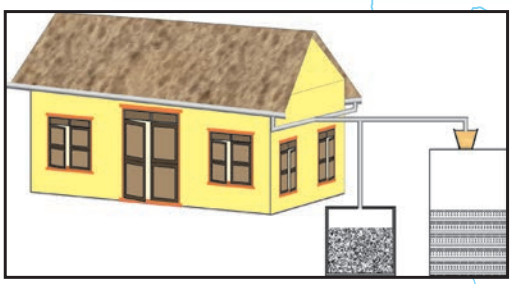
4) Forcing rainwater in the ground through bore wells and thereby preventing entry of salty seawater in the subsoil strata.

Very large quantities of water can be stored because of the large roof areas of industrial buildings. Those who buy water in tankers can save on their expense by using rainwater. House owners or tenants can store rainwater with a little bit of effort. MCGM is making all efforts to actually practice Rain Water Harvesting/ water conservation.

Municipal Corporation of Greater Mumbai is the first Municipal Corporation in Maharashtra to make Rain Water Harvesting Mandatory. Rain Water harvesting has been made mandatory to new properties coming for development from 1st Oct. 2002. These conditions were extended to the properties which had come for development prior to 1st Oct. 2002 but are coming for occupation/ completion from 01.09.2003. As per Government directives u/no. TPB-4307/396/CR-124/2007/UD-11 dtd. 06.06.2007 the condition

is binding to all developments having plot area more than 300sq.mt and more. The condition is applicable to the properties coming for addition alteration/use of balance FSI etc. The condition is imposed as one of the Intimation of Disapproval (IOD) conditions for installation of RWH scheme and occupation certificate is granted only after compliance of the same. Recycling is also mandatory to centrally air-conditioned buildings to meet their chilling requirement.

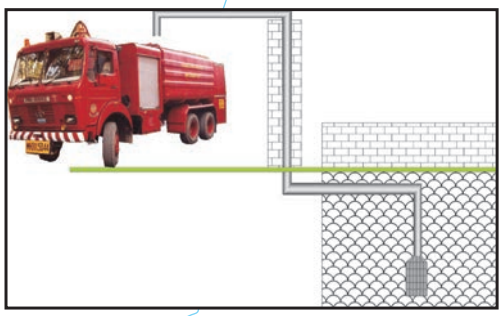
Mumbai receives an average of 2000 mm of rainfall. Considering 458.53 Sq.km area of Mumbai the rain water falling in city works to approximately 2512 MLD. Even if 20% of this is saved and put to use at the rate 502 MLD of Municipal water can be saved.



As rain water harvesting was not being practiced in city prior to Oct. 2002 there was absolute ignorance amongst citizens including professionals like – Architects, Plumbers, Builders, Developers etc. In order to provide proper guidance to all and set up examples, MCGM Formulated a technical cell – "Rain Water Harvesting cell" in Nov. 2002 headed by Asst. Engineer, (Rain Water Harvesting) Cell. The cell organized first 2 days technical seminar with A.I.I.L.S.G. and I.W.W.A. on 28th Feb./ 1st Mar. 2003. The seminar comprised of 17 lectures and the 130 participants were apprised of various aspects of Rain Water Harvesting. The cell has participated in most of the major seminars in Mumbai & conducted many awareness programmes to appraise various section of society. To involve citizens, essay competition on "My way of Water Conservation" was organized in July 2003 in four group and four languages. An information booklet on "Rain Water Harvesting and Water Conservation" was released in its prize distribution ceremony by Hon. Mayor of Mumbai. The booklet is appreciated even by Government of Maharashtra & circulated to many Municipal Corporations/Councils. Municipal Calendar 2004 was dedicated to Rain Water Harvesting so that the message is conveyed to people at large. Drawing competition for Municipal school children was also conducted in Jan./Feb. 2004 to create awareness amongst teachers, students and their parents. NSS students are involved in awareness campaigns to reach more citizens. Since 2005, awareness campaign is conducted from 22nd March to draw specific attention of citizens. Techniques like "Jalmelas" in each Administrative Ward & open grounds, training Ward staff for spreading basic information, painting BEST buses, relaying messages through TV sets, on Railway Stations, in BEST buses & private premises, putting message on Municipal bills, advertisement hoardings at prominent locations, informative documentaries in CST subway are being adopted to reach masses. NGOs are also involved in this activity. TV channels & FM radios are also being used for communicating message. As a part of awareness campaign MCGM has published school books series titled 'प...पाण्याचा' on water conservation & rain water harvesting for Std. I to X, in Marathi in 2012 & distributed it to each Municipal Marathi medium school students. Moreover, another activity titled '"आजी आजोबांचे बोल" has been introduced to rope in senior citizens in this campaign. It is expected that senior citizens would use their energy in convincing people in their nearby locality to save water. They would also interact with school children and even read out books to them & explain the ideas incorporated thereat.

In view of the late monsoon in the year 2014, RWH & Water Conservation Cell has started "Save Water Awareness Campaign" to spread awareness amongst the citizen of Mumbai. As a part of the campaign, advertisements in local newspapers were published appealing Mumbaikars to use water judiciously and to avoid wastage of water. Save water awareness posters, short videos were prepared with the help of Tata Trust. Save Water appeals/advertisements were also displayed on TV, in BEST buses & in local trains. Lectures on water conservation in various Municipal schools via virtual classroom were delivered through Marathi Vidnyan Parishad. A yearlong initiatives "Water smart Mumbaikers – mass awareness for water conservation" has been initiated by "me 2 green" NGO with MCGM as concept partner.

As an awareness initiative amongst the citizen and to understand the RWH scheme, the Municipal Corporation had set up number of pilot RWH schemes which include projects in Godrej Soaps and Housing Colony, Nirmala Niketan, Tata Institute of Social Science, Sane Guruji Udyan & many other in the existing buildings with joint initiative, MC's bungalow, Mayor's bungalow, CTIRC, Bhagwati Hospital, Marol Fire Brigade, Santacruz Transport Garage, M-ward office building, Kasturba Hospital, Cement Go-down Building, Five Gardens & Malad Transport Garage with own resources. Proposals for many Municipal establishments are in process. There is a target to set up least one pilot project in each Municipal Wards.



There are in all 17993 identified wells (6559 dug up wells, 10807 tube wells & 627 Ring wells) in Mumbai. Assuming average per day water withdrawal of appx. 20,000 lit. (two tanker load) per well, it can be safely presumed that 359 MLD of ground water is being extracted every day in Mumbai.

Wells are known sources of ground water & can act as line of defense in case of emergency. Fire engines have to travel considerable distance for filling water before attending fire spot. Filling points are being set up on Municipal wells for fire Bridge to save fuel & precious time during emergencies.

Protecting wells in the city is very important considering future water crisis. RWH Cell with the help of staff of Insecticide Officer has prepared list of wells & bore wells in each locality and identified the danger zones from ground water extraction considerations. MCGM has also prohibited unauthorized burying of existing wells from Jan. 2003. The A.E. (B and F), A.E. (B. P.) as the case may be required to take action under sec. 53(1) of MRTP Act in case of unauthorized filling up of wells.

In order to study the effects of ground water extraction, MCGM has taken up pilot Impact Analysis Studies in 'M/E' and 'P/S' wards with the help of GSDA, Pune.

MCGM has decided to preserve existing ponds & a policy for the same is being formulated involving MMRDA, NEERI & NGOs.

Thus the Corporation makes efforts in all directions to support Rain Water Harvesting, which is one of the Best Management Practices (BMP) of MCGM. It is the duty of all citizens to contribute their own efforts to this cause to help themselves.

11. SEWAGE DISPOSAL

It is an obligatory duty of MCGM to provide sanitation and waste water disposal facilities to the citizens of Mumbai. Proper and safe sewage disposal is essential, as 80% of diseases in India are caused by water borne pathogens. In addition to the health problems, inadequate sewage disposal causes severe environmental degradation.

Sewerage disposal work is carried out by three departments in following ways,

1. **Sewage Operation (SO):** It Operates & maintains Municipal sewage systems comprising of conveyance systems i.e. sewer lines, collection system i.e. Sewage Pumping Stations & Sewage Treatment Facility & disposal system.
2. **Sewage Projects (SP):** This department looks after the work of sewer planning, laying of new sewers, up-sizing the existing sewers and elimination of missing links in existing sewer network.
3. **Mumbai Sewerage Disposal Project (MSDP):** It carries out the work of sewerage treatment and disposal.

Sewage Operation (SO)

Laboratory at Dadar under Sewerage Operation department has carried out monitoring of marine outfalls at Colaba, Worli and Bandra (Table 11.1). Marine water samples are collected at 1 Km. peripheral area from outfall disposal point.

Table No. 11.1: Coastal Sea water quality of Mumbai 2017-2018

Sr. No.	Place	PH		D.O. (mg/l)		Turbidity (in NTU)		E-Coli (CFU)		B.O.D. (mg/l)	
	Standard: SW-II	6.5-8.5		> 4mg/l		< 30NTU		< 100/100 ml		< 3mg/l	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
1	Colaba	7.5	7.9	2.6	5.8	0.5	9.6	10	600	0.7	2.2
2	Bandra	7.2	7.9	3.1	7.8	0.2	12.0	24	1890	0.6	2.8
3	Worli	7.2	7.9	3.0	6.8	0.2	7.7	32	350	0.5	2.6

D.O.: Dissolved Oxygen B.O.D.: Biological Oxygen Demand MPN : Most Probable Number CFU: Colony Forming Unit

Source: Sewage Operation Laboratory

Reports obtained when compared with SWII/4 Standards, shows that at Colaba, Bandra and Worli coastal area, levels for pH are around the prescribed standards while Turbidity and B.O.D. levels are below the standards. D.O. levels are exceeding the standards which is a good sign in terms of dissolved Oxygen. MPN is exceeding the standards at all sites. Levels of e-coli are exceeding at all site except Colaba.

The work of up-gradation and expansion of Dadar Sewage Laboratory was successfully completed by S.O. department in the year 2017 and the laboratory has received recommendation for acquiring accreditation by National Accreditation Board for testing and calibration Laboratories(NABL); Quality

Council of India on 1st April 2018. The Certificate of Accreditation is awaited.

The sewer network of entire Mumbai is now mapped and available on Geographic Information System (GIS) through Web Application on MCGM domain. Further, an exercise of improving on-ground accuracy of sewer asset location, to sub-meter, is undertaken by SO department using GPS Hand Held Rovers.

The repair work of sewer lines, manholes, vent shafts etc. are systematically being updated/recorded in GIS by following Data Updation Protocol. The yearly plan of Systematic Cleaning Programme of sewer lines and its progress is also regularly updated in GIS database and monitored through GIS Web Application.

Under the initiatives of Automation of Sewerage Pumping Stations; SCADA system has been implemented in phased manner. In Phase I, total 10 pumping stations of Bandra Sewage Zone & Seven Waste Water Treatment Plants are commissioned in March 2018. With the help of this project Real Time online monitoring of discharged treated flow is now achieved. Online Monitoring of various parameters of pumping stations i.e. status of pumps, levels in wet wells, energy consumed is achieved.

Sewage Projects

Sewage disposal system of Mumbai City is divided into seven zones viz. Colaba, Worli, Bandra, Versova, Malad, Bhandup & Ghatkopar. The sewer lines leading to pumping stations & sewerage treatment plants are laid by this department by open cut method and trench-less method. The planning, designing & e-tendering of new sewer lines in un-sewered area and up-sizing existing sewer lines when required is done by Dy.Ch.E. (SP) P&D section. Work of laying of the sewer lines is carried out by Dy.Ch.E.(SP)Construction. Dy.Ch.E. (SP) P&D & Dy.Ch.E. (SP) Constructions are working under Ch.E. (SP).

Sewerage Project (Planning & Design) section offers remarks on sewerage systems for street connections or Septic tanks to the plots belonging to Govt., Semi Govt., Private Properties etc. Besides this, NOC for laying of sewer lines along proposed D.P. Roads are being issued to private developers and are being laid under supervision of construction department. After implementation of "Ease of Doing Business" by MCGM, all the remarks earlier issued by SP department to the project proponents are now become autogenerated. Architect/Consultants Appointed by IOD holder are empowered to comply sewerage related remarks through online system.

Financial year 2017-2018:

Total of Rs. 73.83 Cr. were proposed in financial year 2017-2018 for laying of new sewer lines in Un-sewered areas and Up-sizing of existing sewer line in City, Eastern and Western suburbs. This department has completed the work of laying/Up-sizing sewers at some locations. Total cost incurred in the year is Rs. 72.79 cr. This department has now issued some work orders to the contractor to carry the work of laying sewer by Trenchless/Open cut method. Some tenders were non responsive so this department is now in procedure of invitation of tenders.

Proposed works at various locations in the year 2018-19:

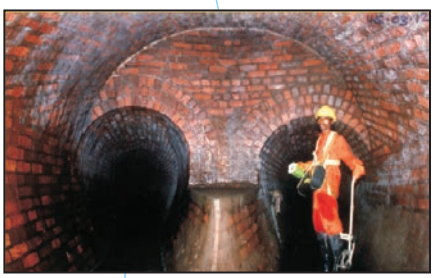
Total budget provision for the financial year 2018-2019 is Rs. 25.32 Cr. which is proposed for laying of new sewer lines in un-sewered area and Up-sizing of existing sewer lines in City, Eastern and Western suburbs.

1. R/South Ward: P/L Pipe sewer line on 13.40mt. Wide D.P road from Neptune Building upto Bhoomi Hills Society, Thakur Complex, Kandivali (E).
2. P/North Ward: P/L Pipe sewer line along Mahalkari Road and 350 mm dia RCNP3 class Pipe sewer line along Shivaji Nagar road in Kurar Village, Malad (E).
3. G/S ward : P/L Pipe sewer line in place of existing 230 mm dia. damages sewer line by Trenchless method i.e. Manual Pipe Jacking Method along Sakharam Balaji Pawar marg from Curry road station to Ovoid sewer on N. M. Joshi Low level raod.
4. K/W Ward: P/L along 13.4 mtr. wide on D.P. road, Jogeshwari(W) from Global Chambers upto Parsi Colony.
5. K/W ward: P/L along 36.6 mtr wide D.P. road, Jogeshwari (W) (Ext. of Jogeshwari Vikhroli express way) from Millat School to Vastu Shilpa Complex designers, SRA Project Scheme and from Global Chambers upto Aksa Masjid.

12. STORM WATER DRAINS

Mumbai is lined on the west by Arabian Sea and intercepted by number of creeks. The tidal variation is a major concern in the system of storm water drains (SWD) to release rainwater as well as wastewater into sea. The present SWD system in the city area is more than 100 years old and about 525 km long. This network consists of underground drains, laterals and water entrances built on the basis of area and weather conditions. The old SWD system is capable of handling rain intensity of 25 mm per hour at low tide with runoff coefficient of 0.50.

The flow from the open SWD is discharged either into nallhas, culvert, creek or sea. This open SWD becomes an eyesore due to throwing of garbage by citizens especially in slum and creates unhygienic conditions. Therefore, desilting is carried out through registered contractual agencies throughout the year.



There are 85 major out-falls in the city area which drain out to the Arabian sea directly, 8 at Mahim creek and 12 at Mahul creek. There are 29 out-falls in western suburbs draining directly into Arabian sea while 14 drain into Mithi river which ultimately joins Mahim creek. In eastern suburbs, 14 out-falls discharge in Thane creek while 6 discharge in Mahul creek and 8 into Mahim creek. In suburbs and extended suburbs area, open SWD are constructed on both sides of road.

In June 1985, heavy rain had resulted into flood like situation in Mumbai city, which paralyzed the road and railway traffic and there was heavy economic loss. In view of this, Corporation decided to carry out the study of the storm water drainage system of the city. A master project was planned to help to drain out Storm Water immediately and reduce floods. In the year 1989 M/s Watson Hawksley International Pvt. Ltd. and their Indian sister concern M/s AIC was appointed as a consultant for this project. The consultants had inspected existing storm water drainage system and nallas, identified 121 catchments areas of the city and studied the deficiencies in cleaning and maintenance. They have also studied the preparation of map and its scale again. In year 1993, to improve the storm water drainage system, they prepared a master plan, which is known as BRIMSTOWAD Master Plan. This plan suggested improvements in SWD system with design criteria, of rainfall intensity of 50 mm/hr with runoff coefficient of 1.00.

As per the price index of year 2006, total cost of remaining work is approximately Rs.1200 crores. As it was not possible to complete these work with the budget provision of Municipal Corporation of Greater Mumbai within stipulated period, Government of Maharashtra/ Government of India had been requested for financial assistance. Government of India sanctioned a special grant of Rs, 1200crores out of which MCGM received Rs.1000 crores till date.

Subsequently in the year 2005 Mumbai faced unprecedented rains on 26th and 27th July 2005 and 944 mm rainfall was recorded in one day. This resulted in the flooding, therefore, Government of Maharashtra had appointed a Fact Finding Committee to analyze the factors responsible for the situation that arose

during July 26th and 27th, 2005 in Mumbai and to find out the remedial measures thereat, so as to avoid such incident in future. Based on the BRIMSTOWAD Master Plan and the recommendations of Fact Finding Committee, the balance BRIMSTOWAD works for the improvement to the storm water drainage system were undertaken. As per the suggestion of Fact Finding Committee BRIMSTOWAD report is to be reviewed and upgraded for which MCGM has appointed M/s. MWH (I) Pvt. Ltd. as a consultant. The master plan is under preparation by the said consultant.

BRIMSTOWAD project is proposed to be implemented in two phases. There are 20 works in Phase-I and 38 works in Phase-II. The scope of the BRIMSTOWAD project is as under.

1. Rehabilitation and augmentation of underground drains in city.
2. Construction of new drains in RCC.
3. Training of nallhas in RCC M-40.
4. Widening and deepening of nallhas.
5. Construction of access road along the nallha.
6. Construction of Strom Water Pumping Stations.

Total expenditure incurred till Feb 2018 is Rs. 2189.88 Crore.

Table No. 12.1: Present Status of BRIMSTOWAD Project

Details	Phase I				Phase II			
	City	Western Sub.	Eastern Sub.	Total	City	Western Sub.	Eastern Sub.	Total
No of Works	5	7	8	20	16	10	12	38
No of Complited Works	4	6	6	16	9	1	2	12
No of Work in Progress	1	1	2	4	6	8	9	23
Tenders yet to be invited / Tenders invited	0	0	0	0	1	1	1	3

Sourec: Storm Water Drain Dept.

Table No. 12.2: Status of Pumping Stations under BRIMSTOWAD

Sr. No.	Pumping Station	Status
1	Haji Ali and Irla	Completed and commissioned in the month of May 2011
2	Cleaveland Lovegrove	Completed and commissioned.
3	Britannia	Completed and commissioned in the month of June 2016
4	Gazdarbund	Work is in progress and expected to be completed before monsoon.
5	Mogra	Land acquisition of private land is in progress.
6	Mahul	On receipt of MCZMA clearance, land acquisition from Government of Maharashtra will be initiated.

Source: Storm Water Drain Dept.

Environmental Aspect :

As regards cleaning and desilting of nallas, the same is carried out every year, prior to monsoon, within MCGM jurisdiction. The same are cleaned by specially appointed agencies. The work of desilting is

carried out in various phases. About 60% of the work is carried out before monsoon, 20% during monsoon and balance 20% post monsoon. Further, silt from all the water inlets are also removed. About 50% of the water inlets are cleaned by Municipal Ward Staff while balance 50% are cleaned by NGO Labourers.

The desilting of the underground storm water drains is carried out by deploying sufficient machineries such as firex, suction, Recycling machine, jetting, suction cum jetting machine in deep chambers, where man entries are prohibited. The road side drains are desilted by means of rodding and dredgers. JCB, poclain, pantoon mounted poclain, machineries are engaged for desilitng of major nallas in suburbs.

Development of Mithi River :

Government of Maharashtra has formed 'Mithi River Development and Protection Authority' under the Chairmanship of Honorable Chief Minister of Maharashtra State on 19th August 2005 for improvement of the Mithi River. Total length of Mithi River is 17.8km., out of which a length of 11.84 km. is in the jurisdiction of Brihanmumbai Mahanagar Palika and the remaining 6 km. is under MMRDA. 95% widening and deepening of Mithi river has been completed till date. This has doubled water capacity and increased the water carrying capacity three-fold.

Out of 21.588 km. length of retaining wall to be constructed, construction work for the length admeasuring 14.319 km is completed by MCGM till date. Length of 1937 mtr. is within Airport jurisdiction of AAI is to be constructed and maintained by MIAL. against about 386mtr. However, work order for construction of retaining wall of a length of 1527 mtr is given and work is in progress. For balance length of 3500 mtr tenders will be invited only after removal of encroachment/ acquisition of affected land.

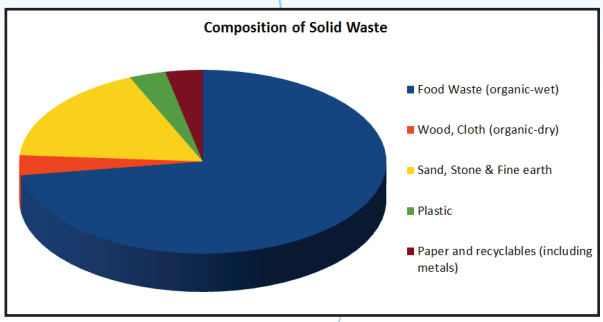
13. SOLID WASTE MANAGEMENT

Solid waste generated in Mumbai is over 7200-7500 Metric Tonnes per day (MTPD). Categories of waste that are separately collected in terms of types and quantity of waste generated are; 72.6% organic-wet waste i,e. food, vegetable & fruit waste; 3.51% organic-dry waste i.e. wood & cloths; 17.37% Sand, Stone & Fine earth; 3.24% plastic and 3.28% paper & recyclables like metals (Table 13.1). Total of 7200-7500 tonnes of waste is transported by vehicles in 4846 trips per day.

TableNo. 13.1: Composition of Garbage In Mumbai

Sr. No.	Type of Solid Waste	Percentage
1	Food Waste (organic- wet)	72.6%
2	Wood, Cloth (organic-dry)	3.51%
3	Sand, Stone & Fine earth	17.37%
4	Plastic	3.24%
5	Paper and recyclables (including metals)	3.28%
	Total	**100.00**

Source: Solid Waste Managment Dept.



Urban environment gets effected due to the solid waste which contains bio-degradable, non-bio-degradable, construction, demolition and hazardous waste. All major metropolis faces the problem of solid waste disposal. Dumping of garbage is not only gives an ugly sight but also poses health hazard as it is a breeding ground for mosquitoes, flies, rodents etc. which may carry diseases-causing pathogens. It also aggravates air pollution, ground water pollution and soil pollution; affecting the fragile ecosystem.

The garbage from all over Mumbai is collected and disposed off at the 2 dumping sites at Deonar and Mulund by simple dumping and leveling method. The garbage is treated at Kanjur processing site using Bio-methenation Technology. Scientific Closure Project of Gorai dumping has been completed and operation and maintenance of the site is in progress. Deonar dumping ground is the largest dumping ground, receiving approximately 32.40% of the garbage. Kanjur receives 42.25% & Mulund receives 25.35% of the total garbage. Mulund and Deonar dumping grounds have nearly exhausted its capacity to receive the garbage.

Table No. 13.2: Capacity of Various Dumping Sites in Mumbai

Sr. No.	Disposal Site	Area (Ha) Filling m*	No. of Years in Use
1	Deonar	120	87
2	Mulund	24	46
3	Kanjur	65.96	3

Source: Solid Waste Managment Dept.

Table No. 13.3: Input Load of Waste

Sr. No.	Dumping Ground	Classification of Waste	Tonnes/day
1	Deonar	Municipal Solid Waste	Approx. 2200-2500
2	Mulund	Municipal Solid Waste	Approx. 1700-1800
3	Kanjur	Debris	Approx. 600
		Municipal Solid Waste	Approx. 3000

Source: Solid Waste Managment Dept.

There are 2574 no. of 1.1-cubic meter containers and 7 Dumper Placer containers kept at 941 community collection points in Mumbai. About 98.69% of total garbage is collected through House-to-House

collection. The daily Municipal Solid Waste (MSW) is collected and transported by deploying various types of vehicles. Area of different dumping grounds are given in table 13.2. Input loads of MSW at various dumping sites are given in Table 13.3. Salient features of transportation are given in Table 13.4.

Table No. 13.4: Salient Features of Transportation For Solid Waste

Sr. No.	Type of Vehicle	Number of Services 2015-16	Number of Services 2016-17	Number of Services 2017-18
1	Compactors	1654	1632	1811
2	Skip Vehicles	130	74	11
3	Dumpers	247	146	192
4	Bulk Refuse Carriers	35	35	-
5	Tempo/Jeeps	1315	1982	3238
6	JCB Machines	62	59	60
7	Stationary Compactors	57	57	57
	Total	**3465**	**3985**	**5369**

स्त्रोत: घन कचरा व्यवस्थापन विभाग

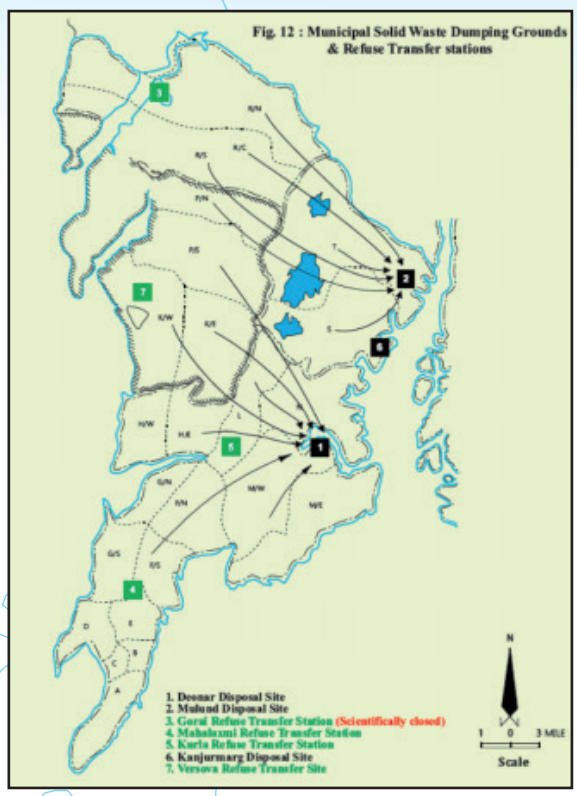


Fig. 12 : Municipal Solid Waste Dumping Grounds & Refuse Transfer stations

Swaccha Bharat Mission :

In order to pay a tribute to Mahatma Gandhi on his 150th birth anniversary, India has pledged to free of "Open Defecation" and cleanliness by 2nd October 2019. It is under the mandate of the Swachh Bharat Mission (SBM), launched on 2nd October 2014, that this objective is slowly but steadily being pursued and achieved, while gradually evolving into a 'Jan Andolan' in the process. MCGM being the prime agency, responsible for maintaining cleanliness in the city, a concerted and joint effort has been taken up along with the State and Central Govt. for achieving the desired levels of cleanliness and sanitation under this Mission. The efforts and programs of Solid Waste Management department have been redesigned accordingly by MCGM.

"Swachhata App":

To facilitate fast disposal of complains regarding solid waste, MCGM's "Swacchata 24X7 App" has been integrated with Ministry of Urban Housing Authority(MoUHA)'s "Swachchhata App". The rate of disposal of the complaints is more than 98%. The Swachhata App complaints are regularly being monitored.

Segregation & Composting of wet waste at Source:

1. To reduce the garbage coming from bulk waste generator, 3364 identification of all residential,

commercial, market premises etc. have been carried out & notices are issued to them to increase the level of "segregation at source". It was necessary to introduce methods, technology & processes to be followed for disposal of solid waste at source for the bulk waste generators, so that they can adopt one of the method/ technology suitable for them.

2. In view of above, MCGM had organized city level 3 day sexhibition from 1st to 3rd Sept. 2017 at National Sport Club of India (NSCI), Worli. As per the direction of Hon. More than 70 companies dealing in the field of source segregation, waste processing at source & around 12000 societies/ bulk waste generators/ hotel representatives etc. participated in the exhibition. Apart from this, 10-12 wards have organized exhibition at the ward level. Currently segregation percentage in Mumbai is 65% & at 1064 bulk waste generator places, composting have started at source. Waste going at dumping ground has been reduced from 9700MT in January 2015 to current year becomes 7200 MT.

"Swacchata Hich Seva Programme":

As per the directives of Central government, various cleanliness drives were arranged in all MCGM wards under Swacchata Hich Seva from 15.9.2017 to 2.10. 2017.

"Pelletisation" Project at N -Ward:

Pellatisation 'Green Coal' Project is in operation since May 2014 through Private Operator M/s. CIPL Resurge. In this project, tree cuttings, green waste from gardens, coconut leaves and coconut shells are processed and converted into Briquettes/ Pellets i.e. 'Green Coal' by Pellatisation process. Approximately, 20 MT/Day green waste collected from 24 wards of MCGM is processed in this project.

Kanjur MSW Processing Site

As per orders of Hon'ble High court and Hon.Supreme Court, the Government of Maharashtra handed over a plot admeasuring 141.77 hectares area at Kanjur to MCGM on 24.10.2005 for developing MSW landfill site. Thereafter, Environmental Clearance from Ministry of Environment & forest for the land of 65.96Ha. which is free from Costal Regulation Zone Rules and Mangroves was received for project activities. On the recommendation of Technical Appraisal Committee of Central Pollution Control Board in its meeting held on 25.07.2011, Maharashtra Pollution Control Board has issued the authorization under MSW (M&H) Rules 2000 on 21st October 2011.

Revised Environmental Clearance for the project needed due to change in technology is received from State Environment Impact Assessment Authority Maharashtra (SEIAA) on 05.12.2014. Also renewed authorization from MPCB is received on 19.08.2017.

The work of installation of 1000 MT Capacity compost plant is in progress, receiving of MSW in Bio-reactor Landfill Cell is started from 6th March 2015. At Present, processing of approx. 3000 TPD of MSW with bioreactor technology, 1000 TPD capacity compost plant is competed and about 250 TPD of MSW with Windrow Composting Technology is being carried out at Kanjur MSW Processing facility.

Future planning for processing daily generated Municipal Solid Waste is as below:

1. **Compost plant of 1000 TPD capacity at Kanjur:-** The work of installation of 1000 TPD capacity compost plant is completed. At present, processing of about 250 TPD of MSW with windrow composting technology is being carried out at Kanjur MSW Processing facility and full fledged commissioning of compost plant is expected in due course of time.

2. **Scientific processing of approx. 1000 TPD MSW at 52.45 ha. land at Kanjur site:-** Environment Department of State Government has been requested to give Environment Clearence for processing of MSW on additional land of approx. 52.45 ha. at Kanjur, which is under CRZ-III. Once this request is granted, additional quantity of 1000 TPD of MSW can be processed at Kanjur with bio-reactor technology.

3. **Development of Waste To Energy (WTE) Project at Deonar:-** Consultant is appointed for preparation of DPR and tender documents of this project.

4. **Dump-site Reclamation at Mulund Dumping Ground (MDG) by adopting suitable technology for existing garbage dump:-** Tender for the proposed dump-site reclamation project by adopting suitable technology at Mulund dumping ground is in process.

5. **Scientific processing of waste at Mulund (E) Near Airoli Bridge :-** GoM has allotted around 32.77 Ha land to MCGM at Mulund (E) near Airoli Birdge for development of scientific waste processing facilities. However, physical possession of the site is not yet given. After receiving physical possession of the said land, MCGM will undertake works for development of scientific waste processing facilities.

    1. **Scientific processing and disposal of Waste at village Karwale, near Taloja:-** GoM has allotted around 52.10 Ha land to MCGM at village Karwale (Kh.) near Taloja, Tal-Ambarnath, Dist – Thane for development of scientific waste processing facilities. Out of 52.10 ha. Land, State Govt. had given advance possession of Government land about 38.87 ha. to MCGM along with existing encroachments thereon. Remaining land about 12.20 ha. is private land and acquisition of the same is to be done by Collector, Thane. Also, removal of encroachments from the govt. land is to be done by Collector, Thane. After receiving physical possession of the said land, MCGM will undertake works for development of scientific waste processing facilities.

Municipal Solid Wastes (Management and Handling) Rules, 2016:

On 8th April, 2016, the new SWM Rules 2016 issued by Ministry of Environment, Forest and Climate Change have come into effect and the said rules applies to the entire Country of India.

SWM Rules, 2016 also deals with the duty of manufacturers or brand owners of disposal products & sanitary napkins and diapers. Such manufacturers have been directed to provide necessary financial assistance to local authorities for establishment of Waste Management System. They have been also directed to put in place a system to collect back the packaging waste generated due to their production. In addition to the above, such manufacturers have been directed to explore the possibility of using all recyclable materials in their products and to educate masses for wrapping and disposal of their product.

In addition to the above, SWM Rules 2016 deals with the duties of waste generator. All resident welfare & market association Gated communities and institutions with more than 5000 sq. meter area, all hotels and restaurants, shall within one year from date of Notification of these rules and in partnership with local bodies, ensure segregation of waste at source by the generators as prescribed in this rule, facilitate collection of segregated waste in separate streams, handover recyclable materials to either the authorized waste picker or the authorized recyclers. The bio-degradable waste shall be processed, treated and disposed off through composting or bio-methanation within the premises as far as possible. The residual waste shall be given to the waste collectors or agency as directed by the local body.

SWM Rules 2016 provides for responsibility on the generation of the MSW by imposing penalty, if the same is not complied with in accordance with the Solid Waste Management Rules, 2016. SWM Rules 2016 provides for the various compliance to be carried out by the Municipal Bodies within time frame mentioned therein.

No.	Activity	Time limit	Action taken by MCGM
1	Identification of suitable sites for setting up solid waste processing facilities.	1 year	Already identified the land at Mauje karvale, near Taloja and Mulund (E), near Airoli Bridge.
2	Identification of suitable sites for setting up common regional sanitary landfill facilities for suitable clusters of local authorities under 0.5 million population and for setting up common regional sanitary landfill facilities or stand alone sanitary landfill facilities by all local authorities having a population of 0.5 million or more.	1 year	Same as above,
3	Procurement of suitable sites for setting up solid waste processing facility and sanitary landfill facilities.	2 years	Is in process.
4	Enforcing waste generators to practice segregation of bio degradable, recyclable, combustible, sanitary waste domestic hazardous and inert solid wastes at source.	2 years	Already enforced.
5	Ensure door to door collection of segregated waste and its transportation in covered vehicles to processing or disposal facilities.	2 years	Same as above,
6	Ensure separate storage, collection and transportation of construction and demolition wastes.	2 years	As of date MCGM collects & transports separately the construction & demolition waste. However Tender is being invited for processing C&D waste generated.
7	Setting up Solid waste precessing facilities by all local bodies having 100000 or more population.	2 years	At Kanjur Landfill site 3000 tonnes per day are being processed scientifically. During next three months, additional 1000 tonnes will be processed with the help of composting. After receipt of electric supply, the compost plant will be commissioned in few months. Further after receipt of Environment Clearance, MCGM will be able to process additional 1000 Metric Tonnes per day of MSW by way of existing bio-reactor technology as phase I
8	Setting up solid waste processing facilities by local bodies and census towns below 100000 population.	3 years	Not applicable
9	Setting up common or stand alone sanitary landfills by or for all local bodies having 0.5 million or more population of the disposal of only such residual wastes from the processing facilities as well as un-treatable inert wastes as permitted under the Rules.	3 years	At Kanjur site, there is provision of sanitary landfill after commissioning of compost plant. As well as there is provision of sanitary landfill at Deonar dumping ground in Waste to Energy project. After getting possession of land at mauje karvale, there is plan for Sanitary landfill site.
10	Setting up common or regional sanitary landfills by all local bodies and census towns under 0.5 million population for the disposal of permitted waste under the rule.	3 years	Not applicable
11	Bio-remediation or capping of old and abandoned dump sites.	5 years	The work of scientific closure of dumping ground at Gorai is completed in 2009 by MCGM. Tenders are invited for Land recovery project at Mulund.

Service Level Benchmarking :

1. To monitor the performance of any ULB regarding its Service Delivery to the Citizens, MoUD has devised benchmarks for each service delivered.

2. For Solid Waste Management department there are 08 such benchmarks.

The benchmarks are elaborated below.

Description of service	Target	Achieved
Coverage of SWM services through Door to Door collection	100%	98.69%
Efficiency of Collection	100%	100%
Extent of Segregation of Municipal Solid Waste	100%	65.4%
Extent of Municipal Solid Waste Recovered	80%	35%
Extent of Scientific Disposal of Waste at Landfill site	100%	32%
Efficiency in Redressing Customer Complaints	85%	95%
Extent of Cost Recovery in SWM Services	100%	100%
Efficiency in Collection of SWM Charges	90%	100%

Bio-Medical Waste (Management & Handling) Rules, 2016

Bio Medical waste (Management and Handling) Rules, 2016 are notified by Ministry of Environment and Forest, Govt. of India, under Environment Protection Act 1986 vide Notification dated 28/03/2016. As per rules it is the duty of 'Occupier/Generator' to ensure that BMW is handled without any adverse effect to human health and environment by way of segregation, packing, transportation, storage, final treatment and disposal. An 'Occupier' is defined as an institutions like hospital, nursing home, clinic, dispensary, veterinary institution, animal house, pathological laboratory, blood bank etc. which generate BMW.

MCGM owns major hospitals, maternity homes, dispensaries and clinics. MCGM is therefore considered to be an 'Occupier' and is required to dispose of the BMW generated in these institutions as per BMW Rules 2016. Moreover as per the BMW sub rule 6, it is not an obligatory duty of M.C.G.M. to collect & treat the BMW generated from private health care establishments. However, as per amended BMW Rules 2016, sub Rule no.7, Municipal Corporations should provide suitable sites to private medical institutions for installation of common treatment facility without prejudice to the duty of 'Occupier'. Accordingly M.C.G.M. has provided suitable land at Deonar dumping ground for installation of bio-medical waste treatment plant for disposal of bio-medical waste generated in Mumbai jurisdiction.

As such, M.C.G.M. has installed integrated bio-medical waste treatment facility under the guidance of M.P.C.B. at Ghatkoper-Mankhurd-Link Road near Deonar dumping ground through M/s. SMS Envoclean (P) Ltd. The said facility has started its operation from May 2009. In all M/s. SMS Envoclean (P) Ltd has put 46 nos. of specialized vehicles for collection of bio-medical waste from all heath care establishments. Those Heath Care Establishments who are registered with the BMW treatment facility are being provided the services of BMW disposal by M/s. SMS Envoclean (P) Ltd. As of now 11500 nos. of health care establishments are registered with the centralized facility. Daily 18 M.T. of BMW is being

collected & treated at Deonar BMW treatment facility.

The provisions under BMW Rules, states that the prescribed authority is Maharashtra Pollution Control Board & they are supervising the operation of the plant. An 'Authorization' to the plant operator of BMW treatment plant is issued by MPCB. As per rule, it is also necessary to obtain an authorization from MPCB as a "Generator" who are generating the bio-medical waste.

E-Waste (Management) Rules 2016:

1. To avoid mixing of e-waste with municipal solid waste, MCGM has set up one e-waste collection center in K/W ward, near Mithibai College. Apart from this, MCGM has planned to set up e-waste collection centers in remaining 23 wards.
2. The work of setting up of e-waste collection centers can be given to MPCB authorized electronic producers/ e-waste collectors/ dismantlers/ recyclers.
3. MCGM has given the work of setting up of e-waste collection centers to MPCB authorized e-waste recycler M/s. Ecoreco. The collected e-waste is disposed off as per the e-waste (Management) Rules, 2016.

Dry Waste Collection & Sorting Centers:

MCGM has set up 37 dry waste collection & sorting centers in 24 wards. Other than these, MCGM has decided to set up 24 more dry waste collection & sorting centers and at some places work of setting up of additional dry waste centers is in progress. Separate 96 vehicles are deployed for collection and transportation of dry waste to dry waste sorting centers, in all the 24 wards of MCGM. Waste / Rag Pickers' Associations are appointed to carry out the collection and segregation of dry waste. Dry Waste is segregated into paper, cardboard, thermacol, plastic, metal & glass and then sent to the recyclers for recycling directly by the rag pickers' associations.

MCGM framed its own Bye-laws in 2006, named as "Greater Mumbai Cleanliness & Sanitation Bye-laws". These Bye-laws are applicable to every public place within the limits of Greater Mumbai, to every generator of Municipal solid waste and to every premise under the ownership or occupation of any person within the limits of MCGM.

Plastic Waste (Management) Rules, 2016:-

MCGM has set up 37 dry waste collection & sorting centers for segregation of collected dry waste. The plastic waste is segregated from collected dry waste and is sent to the recyclers directly by the engaged waste pickers' association. MCGM has banned the use of plastic carry bags below 50 microns. The use and manufacturing of plastic carry bags below 50 microns is prohibited by law. The monitoring authority for the same is Maharashtra Pollution Control Board. The enforcement squads of MCGM under Shops & Establishment department conduct periodic raids and take penal actions against defaulters.

Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2016

Hazardous Waste Management Rules are notified to ensure safe handling, generation, processing, treatment, package, storage, transportation, use reprocessing, collection, conversion, and offering for sale, destruction and disposal of Hasardous Waste. The Rules lay down corresponding duties of various authorities such as MoEF, CPCB, State/UT Govts., SPCBs/PCCs, DGFT, Port Authority and Custom Authority while State Pollution Control Boards/ Pollution Control Committees have been designated with wider responsibilites touching across almost every aspect of Hazardous wastes generation, handing and their disposal.

14. POWER SUPPLY AND CONSUMPTION

Bombay Electric Supply and Transport (BEST), an undertaking of MCGM, supplies elecric supply to city area while Reliance Infrastructure Limited and Maharashtra State Electricity Distribution Company Limited (MSEDCL) supply to eastern and western subburbs. Tata Power Company Ltd. (TPC) supplies bulk power to some industrial units and railways.

Bombay Electric Supply and Transport (BEST)

BEST is the distribution licensee to supply electricity in the old city limits of Mumbai. It covers 69 sq. km area from Colaba to Sion and Mahim. The maximum demand of Mumbai City is 914 MW. To meet this demand, power is purchased in bulk from Tata Power Company under Power Purchase Agreement and balance is met from other sources. BEST Undertaking has established 62 RSS, 2357 DSS, 7858 distribution pillars, 75327 services position, 40976 street lights and 1122 bill collection counters at 48 centers as on today.

BEST Undertaking has 10.26 lakh consumers. Out of the total consumers, BEST is supplying electricity to about 73% residential consumers at a subsidized rate. BEST has provided ECS facility for payment of bills. In addition to this consumers can pay the bills through 60 post offices, various branches of 5 banks, credit/debit cards, NEFT/RTGS and through various outlets of private service providers. From 7th August 2013, the facility of bill payment through mobile is also provided to the consumers.

Table No. 14.1: BEST Consumers, Connected load and Consumption for the year 2017-18

Sr. No.	Consumers Category	Mumbai City			
		Consumers #	Connected Load in kW	Consumption in Million Units (MUs)	Avg. Monthly Consumption (MUs)
1	HV Consumers	180	394884	687.06	57.25
2	LV Consumers	1026157	3589840	3857.13	321.43
	Total	**1026337**	**3984724**	**4544.19**	**378.68**

Meters installed on site
Source: BEST

Table No. 14.2: Category wise Consumers, Connected Load and Consumption (2017-18)

Sr. No.	Consumers Category	Mumbai City			
		Consumers #	Connected Load in kW	Consumption in Million Units (MUs)	Avg. Monthly Consumption (MUs)
1	RESIDENTIAL	746336	3107766	1999.83	166.65
2	COMMERCIAL	269832	1619073	2150.15	179.18
3	INDUSTRIAL	7943	193138	319.73	26.64
4	Others	2226	64747	74.48	6.21
	TOTAL	**1026337**	**3984724**	**4544.19**	**378.68**

Meters installed on site
Source: BEST

During interrupted power supply, various departments of BEST Undertaking functions round the clock in restoring them. For co-ordinating and supervising these departments, 3 supervisory controls, 4 fault controls and 8 fuse controls are working round the clock. No load shedding is in the distribution area of BEST Undertaking..

Maharashtra State Electricity Distribution Company Limited

Maharashtra State Electricity Distribution Company Limited Thane urban zone supplies electricity to Bhandup and Mulund area of MCGM. Bhandup and Mulund Zonewise information is as follows.

Table No. 14.3: MSEDCL Zonewise Consumers, and Consumption (2017-18)

Sr. No.	Category	Division Name					
		Bhandup			Mulund		
		Total Consumers	Connected load (KW)	Consumption (Mus)	Total Consumers	Connected load (KW)	Consumption (Mus)
1.	High Voltage Consumers	87	167679	81.69	48	37844	18.61
2.	Low Voltage Consumers (Domestic, Commercial, Industrial & Others	170502	334168	568.23	125869	368378	411.85
	Total	**170589**	**501847**	**649.92**	**125917**	**406222**	**430.46**

Source : Maharashtra State Electricity Distribution Company Limited

Table No. 14.4: Category wise Consumers, Connected Load and Consumption

Sr. No.	Category	Division Name					
		Bhandup			Mulund		
		Total Consumers	Connected load (KW)	Consumption (Mus)	Total Consumers	Connected load (KW)	Consumption (Mus)
1	Residential	147908	197239	248.100	109020	263406	264.060
2	Commercial	17705	63146	148.290	14873	68986	101.810
3	Industrial	4316	68137	94.340	1088	27976	31.460
4	Others	573	5646	77.500	888	8010	14.520
	Total	**170502**	**334168**	**568.23**	**125869**	**368378**	**411.85**

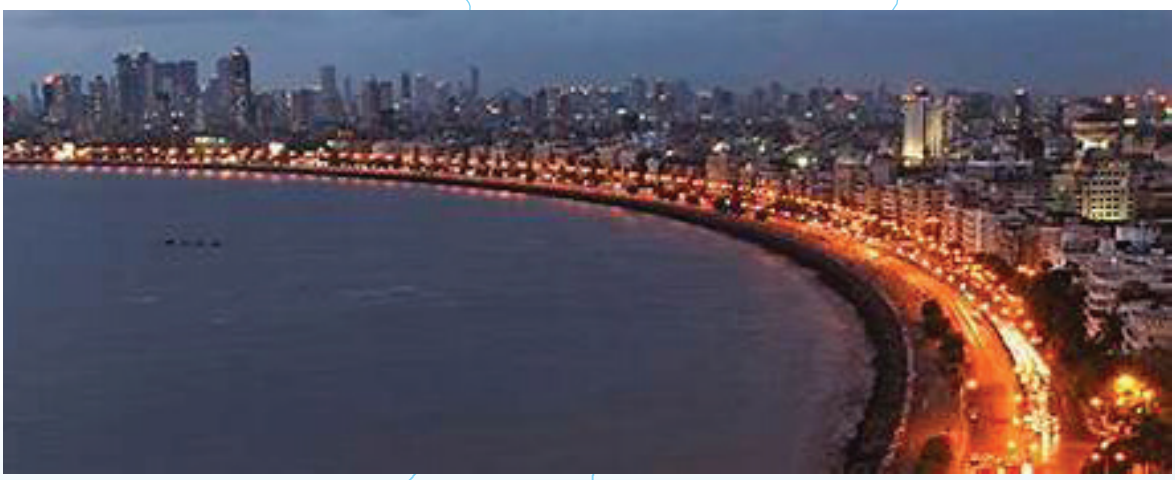
Source : Maharashtra State Electricity Distribution Company Limited

Reliance Infrastructure:

R-Infra implements various energy efficiency and energy conservation measures implemented across various company offices. This includes LED tube lights, application of thermo conductive fluid for air conditioners, smart end use management system technology in air conditioning units and motion sensors etc for energy conservation. This resulted in saving of a 0.57 Million Units (Kwh) approximately.

The company has launched various MERC approved DSM programs for all consumer categories. The ongoing programs implemented earlier include 5 Star Ceiling Fans Programme for replacing old fans, AC Automation programmer for commercial and industrial consumers, with the objective of automation in

air conditioning for chiller plant, ductable split, cassette and package air conditioners, 5 Star Refrigerator Programme for residential/commercial consumers for replacing old refrigerator with new energy efficient refrigerators. 5-Star split Air conditioner (AC) programme residential consumers for replacing old window AC units with energy efficient 5-star rated split ACs. Also, promotion of 9 Watt LED Bulb/20 Watt Tube Light through Government approved vendor M/s EESL is ongoing for various categories of consumers. These programme have resulted in saving of a 10.24 Million Units Kwh. approximately.



15. Roads, Traffic and Transport

Roads

Road is an important and visible infrastructure. With the increase in traffic intensity & loading, related norms have been upgraded and project approach has been adopted. As per new approach road works also include the provision/improvement of footpath, provision/ augmentation of municipal utilities such as water mains, sewer lines, SW drains etc. as per necessity, provision of traffic amenities, beautification etc.

In Mumbai, the total length of the roads is 1941.15 Km. Out of which, 506.46 Km. length is in City division, 927.64 Km. length is in Western Suburbs division and 507.06 Km. length is in Eastern Suburbs.

As per the consultation with STAC Committee, the norms for repair/ reconstruction of roads are fixed in 56th STAC on 28 Dec 2016 and circular is issued to utilized the budget in most efficient and economical way & more road can be taken up now for repairs. In this view, if particular road need to be reconstructed then only such roads shall be undertaken for reconstruction with design crust, this new approach shall substantially reduce the cost of repairs and time needed for completion..

Based on the strategy, the roads are being improved based on the priority depending on the condition of roads. Also, at certain roads where utilities are in existence C.T.B.T. is applied for improvement of the side strips.

As per the policy approved by MCGM, optimum utilisation of the budget is done for the better quality the roads. Cement concretization of major roads and junctions are taken up on priority basis.

Cement Concrete Roads:

1. In City area approximately 2.827 k.m of road were concretised in the year 2017-18. In city, Major roads such as Balaram Street in D ward, R.S.Nimkar Road in E Ward, Loop Road Wadala in F/North Ward, Shirodkar Road in F/South Ward have been concretised.
2. In Eastern Suburbs approximately 4.636 of roads were concretised in year 2017-18. In Eastern Suburb, Hari Om Nagar Road in T Ward have been concretised.
3. In western suburbs approximately 15.67 k.m of ward were concretised in 2017-18. It includes important roads such as Viceroy Park Road, Thakur Village road in R/S ward; 13th Road Khar (West) in H/W ward and Ramkrishna Paramahans road in H/E ward have been concretized.

Asphalt Roads:

1. In City section, 21.634 km of Asphalt roads were improved /widened in the year 2017-18. important

roads such as Temkar Street in E Ward, Sai Baba Road in F/South Ward, L.T. Marg- Mohd. Ali Road Junction in B Ward, Rajni Patel Chowk in G/South Ward, R.K.Vaidya Marg in G/North Ward are completed.

2. In Eastern Suburbs around 35.612 km of Asphalt roads were improved/widened in the year 2017-18. In eastern suburbs, important roads such as L.B.S Marg from Madhuban Garden to Bhandup Station Road, Bhandup(West) & Swami Narayan Mandir Marg Powai in S-Ward are completed.

3. In western Suburbs around 35.14 km of Asphalt roads were improved/widened in the year 2017-18. In western suburbs Road no.16 Khar (West), North Avenue Road in H/west ward are completed.

TRAFFIC

Traffic Engineering:

Traffic Planning and Traffic Co-ordination Department is headed by the Dy.Chief Engineer(Traffic) under the control of Chief Engineer (Roads & Traffic). This department works in co-ordination with Traffic Police Department and applies engineering techniques for effective control of road traffic and enforcement of traffic regulations. This office also look after the matters pertaining to prescription of Road/regular line, design and construction of traffic islands and the traffic amenities i.e. providing & applying Thermoplastic paint for painting of Zebra Crossings, Edge Lines, Stop Lines & Arrow markings & fixing Road studs before speed breakers, beautification of roads. Also, this office scrutinize & approves parking layout proposals received from Building Proposal department and Slum Rehabilitation Authority. This office also look after the work of inviting e-tending for public parking lots, amenity parking & on street parking etc. The signal maintenance and new signal installation work shall be carried out.

This office also offer remarks for providing street light on newly constructed roads as well as improvement of existing street lighting & co-ordination with all Ward Offices to get the above works done through three service provider electric companies viz. BEST, Reliance Energy Ltd. and MSEDCL. The budget provision for the same is made by traffic department.

Parking Policy

MCGM has finalized implementation of new parking policy. As per the new policy, the parking lots are categorized in A, B & C category depending upon the location of parking lot, its vicinity to government office/private offices/commercial centers audit license fees. This will encourage the public transport system instead of private transport and will be effective for resolving traffic congestion across Mumbai. The parking charges/tariff for each vehicle is finalized as per category A, B & C of parking lot.

In the said policy, Parking for on-street vehicles & off-street parking vehicles are included. Wherein, the concession is given for "Monthly Passes, Local residents scheme, public parking scheme, taxi & buses". Further, vehicles free area near school & promotion for tourism is also recommended in the parking policy. Moreover, all the pay & park lots will be connected to centralized server through cordless system in future for better control.

In order to avoid unauthorized parking and traffic congestion on roads, MCGM has processed tenders to run 88 on-street parking schemes, 17 public parking lots under DCR 33 (24), 29 amenity parking schemes for pay & park schemes. These 134 schemes has total parking capacity of around 24144 vehicles. Out of which new contractors are appointed for 17 sites & for remaining pay & park sites tendering is in process.

In order to avoid unauthorized parking and traffic congestion on roads, new list of 478 on-street "pay & park" schemes has issued from the Traffic Police department. The total vehicle capacity of the said parking lots is about 33,852. The said new "pay & park" schemes will run initially on experimental basis by inviting e-quotations through respective ward offices by checking its feasibility.

Providing & Fixing Street Name Boards, Directional Boards / Zebra Crossing Marking / Lane marking / Dividers / Share-E-Taxi Stand and Share-E-Rikshaw stand boards:

125 no. of Directional boards, 1200 street name boards & 200 Junctional boards are already fixed by the appointed contractors. For the work of zebra crossing, lane marking etc. tenders are invited & contractors have already been appointed for all VII zones. These zebra crossing works are being executed at ward level & same are in progress. About 10% of work is completed & remaining work is in progress. Further, providing & fixing dividers in city & suburb is also in progress, about 60% of work is completed. Contractors for the work of providing & fixing Share-E-Taxi Stand, Share-E-Rickshaw stand boards has been appointed & work order is also issued. The work will be started soon. It will become some kind of relief in controlling the traffic in Mumbai city.

Providing & Fixing LED Street Lights

As per Government Of India policy, regarding energy conservation, it is proposed to convert conventional street lights of Mumbai into LEDs. The cost of the conversion of conventional street lights into LED street lights will result into savings in electricity bills. Initially, 10% of Street Lights has been converted into LED through BEST and asked to convert 20% more street lights into LED upto March 2018. However, the other electric companies such as Reliance & MSEDCL have appointed as contractors for conversion of 20% street light in LED.

Comprehensive Mobility Plan for the first time in the Mumbai City

MCGM has completed the work of "Preparation of Comprehensive Mobility Plan" for the improvement in the traffic management and traffic congestion in Mumbai city.

Objective of Comprehensive Mobility Plan is,

a. To identify travel pattern of the citizens.

b. To collect and study the information of existing & proposed land use transport patterns of MCGM, MMRDA, PWD, Railways, BEST etc.

c. Simulation study of various of traffic areas, number, its type, timing etc. to prepare computerized model.

d. To monitor parking lots, direction sign boards, incomplete work of traffic junctions and roads.

e. To verify traffic signals on various junctions and to check feasibility for new traffic signals.

Comprehensive Mobility Plan has recommended short, medium & long term strategies (upto 2034) for existing Roads, Missing Links, Parking Management, SATIS, ROB & RUB, FOB, Skywalks, Subways, Ramp & Elevators Road, Flyovers, Improvement of Junctions, exclusive Bus Lanes, Cycle Tracks etc.

Final prints of comprehensive mobility plan are issued to all stake holders i.e. MMRDA, BEST, Railway etc. and various departments of MCGM for implementation. Policy decision in this regard will be taken after studying this short, medium and long term measures recommended for traffic and transport infrastructure facilities in final plan.

Area Traffic Control System (ATC)

Out of 610 existing Traffic signals, 256 has already upgraded into Area Traffic Control System (Real time adaptive system) & they are working satisfactorily. Regular maintenance of 354 conventional Road Traffic Signals & 223 flashing Beacons is also done properly.

As recommended by appointed consultant for Comprehensive Mobility Plan, upgradation of 354 conventional signals into ATC system in phased manner will be carried out. Accordingly, the Request For Proposal are invited for appointment of the consultant in this field. After completion of the process, consultant will be appointed.

The Digital Countdown Timers have already been installed on conventional traffic signal (Non ATC) in City, Western & Eastern Suburbs. Maintenance of 241 CCTV at traffic signal junctions utilized for traffic regulation and vehicle detection cameras for ATC signal system are properly carried out.

The maintenance of Control Room installed for ATC system at TPHQ & Engineering Hub are carried out properly. The Automatic Number Plate Recognition (ANPR) camera installed at Eastern free way to detect the over speeding vehicles are working satisfactorily. ANPR cameras are installed at 37 accident prone locations in Greater Mumbai.

Total No. of Road Lamps	1,36,392
Total No. of High Masts	352
Total No. of Traffic Signals	610
Total No. of Flash Beacons	223
Road Length in Kms	**1941.16 Kms**

BRIDGES IN MUMBAI

List of Major works completed in the year 2017-18

1) The work of construction of Kurla subway in L-ward
2) Widening of bridge on Nehru Nagar Nalla at Bunter Bhavan in L- ward
3) Resurfacing work of flyover opposite Sion Hospital, Tulpule flyover, Nanalal D. Mehta flyover, Hindamata flyover, Belasis and Diana Bridge (Tardeo), Chinchpokali ROB, 'Y' Bridge and Byculla ROB.

List of Major projects undertaken in the year 2018-19

1) Widening of approach road of bridge over Mithi River at CST road at Kurla(W) in L- ward
2) Demolition & Reconstruction of Hancock Bridge at Shivdas Chapsi Marg, Mazgaon in B- ward
3) Construction of ROB at Vidyavihar Railway Station connecting LBS marg in N- ward .
4) Construction of ROB in lieu of Level Crossing No.14-C at Vikhroli Railway Station (Excluding Railway Span and Slip road).

16. Surface Transport

There are different types of vehicles plying on the roads of Mumbai every day. They consist of cars, taxis, trucks, buses, three-wheelers, two-wheelers etc. The total number of vehicles in Mumbai as on March 2018 is 3352640. Their composition is 59.45% two-wheelers, 32.07% cars, jeeps & station wagons, 3.48% taxis/cabs, 4.20% auto rickshaws, 0.44% buses, 0.25% Goods vehicles, 0.01% tractors/ trailers and others 0.10%. Table 16.1 shows number of different vehicles in Mumbai.

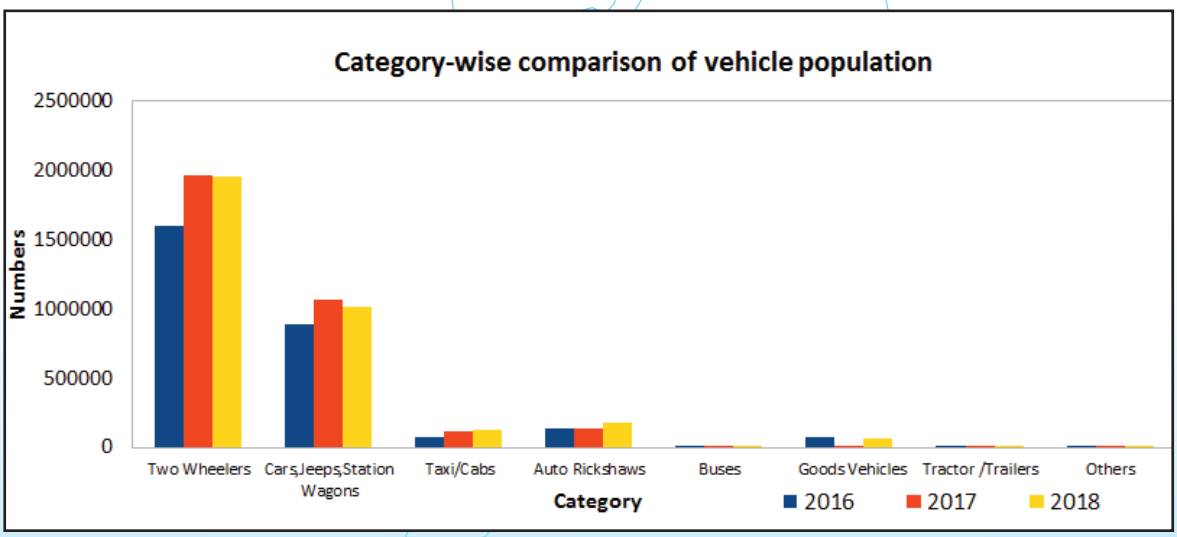
There are 93,013 metered taxis in Mumbai operating on petrol, diesel, CNG and LPG as on 31st March 2018. CNG and LPG which are regarded as clean fuel. More than 90% meter taxis and 92% rickshaws are running on clean fuel CNG and LPG.

To control the air pollution due to automobiles, various measures are initiated. One of them is to carry out "Pollution Under Control" (PUC) test. This is mandatory for vehicles every six months. Transport department of government of Maharashtra detects cases of violation of pollution laws and fines the defaulters.

Table No. 16.1: Category-Wise Comparison of Vehicle Population 2016-18

Sr. No.	Category	As on 31st March		
		2016	2017	2018
1	Two Wheelers		1968019	1952955
2	Cars, Jeep, Station wagons	884882	1061395	1011878
3	Taxi/Cabs	78473	115260	127892
4	Auto-rikshaws	132424	139065	182069
5	Buses	14282	14498	14839
6	Trucks & Lorries	72309	8307	61040
7	Tractor/ Trailors	298	336	304
8	Other	2846	3086	1663
	Total	**2786512**	**3309966**	**3352640**

Source : This information is received from RTO, GoM



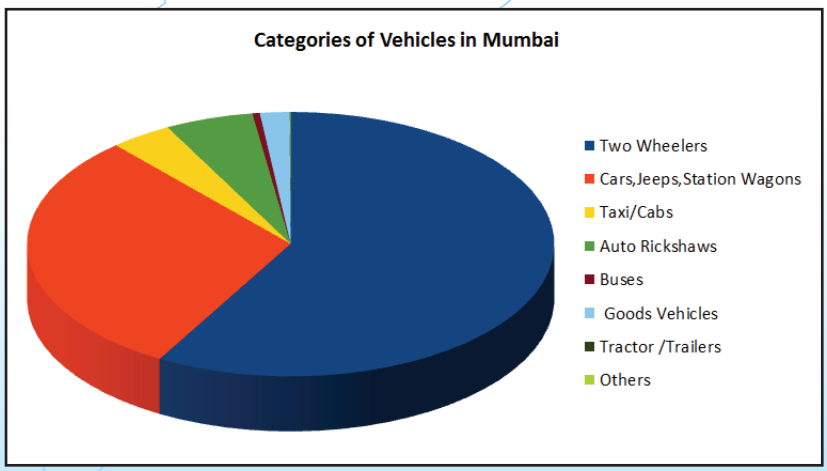
In Mumbai to reduce auto exhaust pollution central government has introduced registration of vehicles fulfilling Bharat-IV norms and in rest of areas vehicles fulfilling Bharat-III norms will be registered.

Table No. 16.2: Category-wise vehicles using various fuel types as on 31st March 2018

Sr. No.	CATEGORY	DIESEL	PETROL	LPG	CNG	OTHERS	TOTAL	VEHICLES FITTED WITH CATALYTIC COVERTERS
1	Two Wheelers	6	1784598	0	0	53	1784657	0
2	Cars, Jeep, Station wagons	321903	549569	16440	56875	296	945083	129958
3	Taxi/Cabs	34440	20178	1371	62520	53	118562	53300
4	Auto-rikshaws	1	10536	0	127113	0	137650	1
5	Stage carriages	2751	502	0	1698	0	4951	4449
6	Contract carriages, Mini buses	2969	466	0	489	0	3924	1804
7	Trucks, Lorries & Tankers	4211	7	0	103	0	4321	2039
8	Ambulance	812	188	0	163	0	1163	573
9	School Buses	386	920	1	1310	1	2618	121
10	Private Service Vehicles	729	86	9	197	0	1021	469
11	Trailors	191	0	0	0	0	191	131
12	Tractor	96	0	0	0	6	102	91
13	Delivery Van (4-Wheelers)	21908	2724	5	1819	0	26456	13983
14	Delivery Van (3-Wheelers)	16288	3690	9	386	0	20373	2563
15	Ulti-Multi Vehicles	11	0	0	0	0	11	11
16	Others	1290	35	0	28	2	1355	451
	TOTAL	**408453**	**2373501**	**17835**	**252701**	**411**	**3052901**	**210073**

Source : RTO, GoM

The PUC checks, unleaded petrol, low Sulphur diesel and catalytic converters have been found to be very effective in controlling air pollutants like particulates, Lead, Sulphur dioxide, Carbon Monoxide, Hydrocarbons, Oxides of Nitrogen, etc.



To reduce the air pollution in Mumbai, it is essential to encourage public transport like railways and buses, follow the system of car-pooling by car owners, introducing bicycle lane and regular checkup of vehicles for PUC.

BEST - Transport

Since 1984 BEST undertaking operates 3404 buses on 413 Routes, in the area of Mumbai and it's align cities like Navi Mumbai, Thane and Mira-Bhayander, commuting around 26 Lakhs passengers daily.

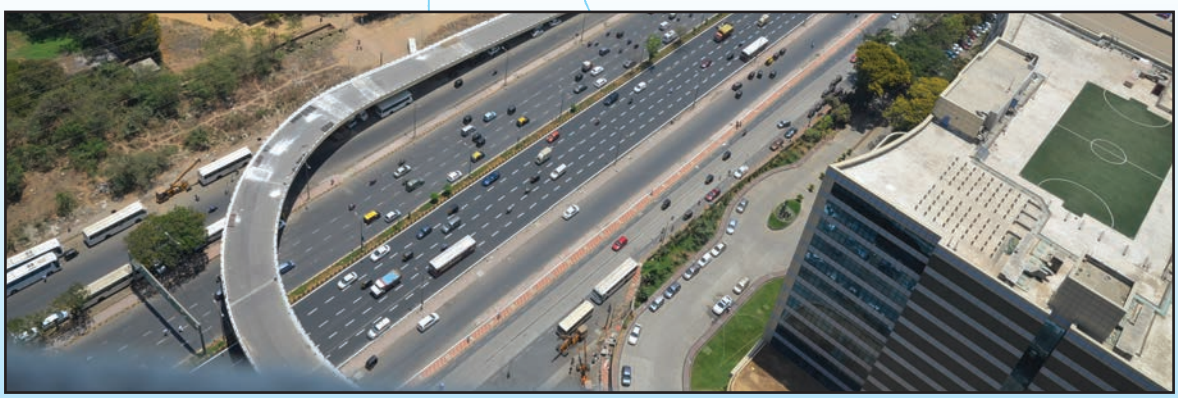
In order to reduce the pollution in the city, the Undertaking has implemented fleet up-gradation programme, under which buses operated on "Compressed Natural Gas" are being included in the fleet. At present 60% i.e. 2038 buses are operated on 'CNG'. The CNG pumps are made available in 15 Bus depotes to facilitate easy fueling of the buses. It is ensured that smoke emission of all diesel vehicles is kept below self imposed limit of 45 HSI (Hat-ridge Smoke unit). In the year 2017-18, Undertaking had included low polluting 185 Euro IV compliant buses in it's fleet.

In November 2017 for the first time in India, BEST Undertaking has included 4 new zero emission electric buses into it's fleet and also 2 more electric buses were put into operation from February 2018. As electric buses are zero emission vehicles, Undertaking has decided to induct more number of electric buses into it's fleet to reduce the vehicular pollution in Mumbai. Accordingly, BEST Undertaking has placed an order of 80 numbers of electric buses. In addition to this it intends to further increase the fleet of electric buses substantially in the year 2018-19.

Further BEST Undertaking in collaboration with Mumbai Mahanagar Region Development Authority (MMRDA) has introduced 25 Hybrid Buses in Bandra-Kurla Complex area. These buses are operated on Electric supply which is Environment friendly type of fuel. With this initiative, BEST is striving to achieve reduction in the air pollution in the city and improve the air quality.

The BEST undertaking have a well established a Workshop, equipped with latest techniques, where entire fleet is tested regularly for controlling the air pollution. Further, the buses of the Undertaking are regularly tested for PUC.

The Undertaking has an established a "Training Centre" where two separate vehicle are provided for importing training on Fuel conservation and Bus Driving to the drivers and technical staff of the Undertaking.



17. HOUSING AND SLUMS

The population of the city of Mumbai has crossed the 12.73 million mark, out of which more than 50% resides in the hutments. It creates problems to our health and the environment. Mumbai Slum Improvement Board provides amenities in various slums in Mumbai city and suburbs. Majority of the people residing in the hutments are from economically and socially weaker stratum. Span of slum redevelopment plan of State Government is extended to provide permanent residence and civic amenities. The main purpose of this project is to provide residence, basic amenities and other related civic amenities.

Mumbai Slum Development Board has construction program regarding basic amenities is as given below.

1) Construction of protection wall.
2) Improvement plan for civic backward colony.
3) Development plan for slum area.
4) Plan for beautification.
5) Development plan for crematorium.
6) To provide facilities to citizens in area under MCGM.
7) Development of tourist places.
8) New plans/ Ladies saving group/ Water tank protection/ Borewell.

18. EDUCATION

Education is an important basic need to increase general awareness. Education at school level improves the knowledge of student about protection and conservation of environment which makes them responsible citizens.

Under Section 61 (q) of the Mumbai Municipal Corporation Act 1888 it is an obligatory duty of the Corporation to provide primary education. MCGM Is carrying out this responsibility since 1907.

In the academic year 2017-18, there are 1038 Municipal primary Schools of 8 different medium and 2,66,022 students are studying in these schools. In addition to this, free education is imparted to 800 differently abled students by 91 teachers in 17 MCGM special schools.

MCGM has started English medium Mumbai Public Schools since year 2007-2008, wherein the educational facility is made available right from Junior K.G. Education Department also regulates the Private Primary Schools by giving them recognition through registration.

As per rules and directives of Maharashtra State Government, Right of Children to Free and Compulsory Education Act, 2009 is being implemented.

In addition to primary education, MCGM runs Secondary schools since 1965 in Mumbai. At present, 49 MCGM Aided secondary schools provides free secondary education. Efforts are being taken to provide additional facility of free secondary education by starting 99 secondary schools on Un-Aided basis, since 2008-09. 20 new secondary schools have been started in the academic year 2017-18. In all, 40132 students are studying in 119 secondary schools.

MCGM runs 2 D.T.Ed colleges.

Students who score high percentage in SSC examination, 3 Junior colleges of Science facility have been started for higher education since 2009-10.

Activities emphasizing the importance of health and environment are included in day-to-day learning -teaching process for the students in MCGM Schools.

- The school staff takes care to maintain healthy school atmosphere under the supervision of supervising officers.
- Necessary items required for school children are provided by the MCGM free of cost. The tender process of such articles for the year 2018-19 is in process.

- Education related to Environment and Health is given to students through study subjects.
- Drawing competition was organised for Std I to Std X students in all MCGM, Private and Aided schools, by Hon Mayor of Mumbai on 14th January 2018. This was in view to commemorate the birth anniversary of world's renowned cartoonist Hindu Hriday Samrat Hon. Late Balasaheb Thackeray. The competition was held in 39 MCGM recreation grounds/ gardens. In all 53,846 students participated in this competition.
- 'Balakostav' programme is being conducted in MCGM schools every year. This year, Balakotsav was organised at Ward levels during the month of December and January.
- MCGM has appointed contractors for security provision and for maintenance and cleanliness, health and Hygiene. Thus, fostering healthy and secure atmosphere for school students in each MCGM school.
- There will be medical check-up of MCGM school students ranging between 3 to 16 years of age under "Rashtriya Bal Swasthya Karyakram"(RBSK).
- Students of Municipal Schools undergo regular free medical check-up by the Medical Officers of MCGM. Students with minor ailments are treated in the School or referred to nearby municipal dispensaries. Those with major ailment are referred for medical /surgical treatment to nearby municipal hospitals or school clinics situated at Nair hospital/Cooper hospital or Nair Dental hospital where they are treated free of Cost. Students with defective vision are provided Spectacles free of Cost. Students with heart ailments are provided financial assistance for corrective surgeries. Children with disability are identified and corrective aids such as hearing aid, wheel Chair, Jaipur foot etc. are given with the help of funds from 'Sarva Shiksha Abhiyan'
- Services and facilities are provided to 3212 students under "Children with special need" on Medical check up (CWSN) during the period of 2017-18. Blind, dumb and deaf, mentally challenged, handicapped, physically disordered etc. are provided with spectacles, travelling allowance, assistance allowance, therapy service, M.R. Kit, hearing aid, wheel chairs, crutches, Braile books, tricycles, rotator as per their requirements. As per recommendation of Medical Officer, 1475 students received 2917 numbers of types of aids and appliances.
- 172 sanitary napkin vending machines and sanitary incinerators are installed in 159 MCGM Secondary School buildings for Std.VIII to Std.X girl students.

19. AIR QUALITY STATUS

To measure the levels of pollutants in Mumbai, MCGM has established fixed air pollution monitoring sites at Worli, Khar, Andheri, Bhandup and Maravali. Monitoring at Worli, Wadala and Andheri Traffic Junctions are done by Automatic Mobile monitoring.

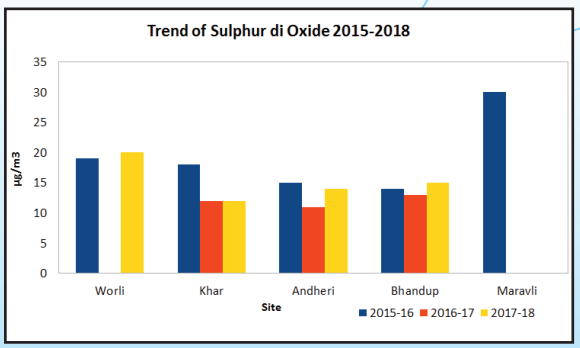
Air Monitoring Sites		
Sr. No.	**Site**	**Located at**
1	Worli	Transport building, E.Moses Rd, Worli
2	Khar	Municipal Dispensary building, S.V.Rd, Khar(W)
3	Andheri	Nityanand Marg Municipal School building, Koldongari, Andheri (W)
4	Bhandup	S Ward office building, L.B.S. Rd, Bhandup (W)
5	Maravali	Maravli Municipal School building, Kurla Mahul Rd, opp RCF, Chembur.

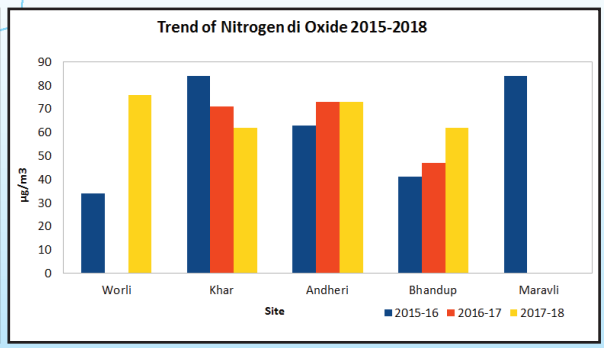
Air Quality Monitoring and Research Laboratory of Environment department monitors ambient air quality in Mumbai for criteria air pollutants namely; Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2), Ammonia (NH_3) etc. regularly. Air quality levels are evaluated in the year 2017-18 for its compliance with ambient air quality standards set by Central Pollution Control Board (CPCB) for SO_2, NO_2 and NH_3 (Table 19.1)

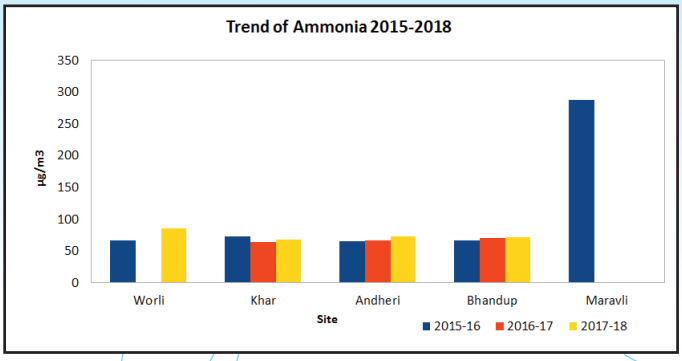
Table No. 19.1: Ambient Air Quality Levels at fixed monitoring sites (Annual average) April 2015 to March 2018

Sr. No.	Site	Unit µg/m³								
		Sulphur Dioxide			Nitrogen Dioxide			Ammonia		
		2015-16	2016-17	2017-18	2015-16	2016-17	2017-18	2015-16	2016-17	2017-18
1	Worli	19	-	20	34	-	76	66	-	85
2	Khar	18	12	12	84	71	62	73	64	68
3	Andheri	15	11	14	63	73	73	65	66	73
4	Bhandup	14	13	15	41	47	62	67	70	72
5	Maravali	30	-	-	84	-	-	287	-	-
CPCB Standards g/m3		50			40			100		

Source : Air Quality Monitoring & Research Laboratory of MCGM Note: Values of Maravali for the year 2016 -17 & 2017 - 18 not available







Comparison of annual levels with standards prescribed by Central Pollution Control Board:

Levels of air pollutants SO_2, NO_2 and NH3 measured during 2017-18 when compared with prescribed standards by Central Pollution Control Board (CPCB) observations are as follows,

1) SO_2 levels are found less than prescribed annual standards at all fixed monitoring stations.
2) NO_2 levels are found more than prescribed annual standards at all fixed monitoring stations .
3) NH_3 levels are found less than prescribed annual standards at all fixed monitoring stations.

Table No. 19.2: Range of the annual averages of pollutants at fix monitoring site (2017-18)

Sr. No.	Unit µg/m³	Sulphur dioxide	Nitrogen dioxide	Ammonia
1	Range	12 – 20	62 – 76	68 – 85
2	Maximum at	Worli	Worli	Worli
3	CPCB standards	50	40	100
4	Comparison with CPCB standards	Not exceeded	Exceeded at all stations	Not Exceeded

Source : Air Quality Monitoring & Research Laboratory

Observations of annual averages:

When compared with CPCB standards following observations are noted.

1) SO_2 levels are found to be in the range of 12-20 µg/m³ and are below prescribed standard (50µg/m³) at all sites. Maximum level found at Worli.
2) NO_2 levels are found to be in the range of 62-76µg/m³ and have exceeded standard (40µg/m³) values at all sites . Maximum level found at Worli.
3) NH_3 levels are found to be in the range of 68-85 µg/m³ are below prescribed standard (100µg/m³) at all sites. Maximum level found at Worli.

Table No. 19.3: Percentage exceeding CPCB standards (24 hours average) from the year 2015 to 2018

Sr. No.	Site	Sulphur Dioxide			Nitrogen Dioxide			Ammonia		
	Year		2016-17	2017-18	2015-16	2016-17	2017-18	2015-16	2016-17	2017-18
1	Worli	0	-	0	1	-	26	0	-	0
2	Khar	0	2	0	60	36	41	0	12	0
3	Andheri	0	0	0	33	31	33	1	0	0
4	Bhandup	0	0	0	7	19	30	0	0	0

Source : Air Quality Monitoring & Research Laboratory.

Table No. 19.4: NATIONAL AMBIENT AIR QUALITY STANDARDS CENTRAL POLLUTION CONTROL BOARD, NEW DELHI (18th November, 2009)

Parameter	Exposure Period	Industrial, Residential, Rural & Other Area	Sensitive Area
Sulphur Dioxide, SO_2 µg/m³	Annual avg. *	50 µg/m³	20 µg/m³
	24 Hrs. avg.**	80 µg/m³	80 µg/m³
Nitrogen Dioxide, NO_2 µg/m³	Annual avg. *	40 µg/m³	30 µg/m³
	24 Hrs. avg.**	80 µg/m³	80 µg/m³
Particulate Matter Size less than 2.5 µm) $PM_{2.5}$ µg/m³	Annual avg. *	60 µg/m³	60 µg/m³
	(Size less than 10µm) PM10 µg/m3	100 µg/m³	100 µg/m³
Particulate Matter (Size less than 2.5 µm) $PM_{2.5}$ µg/m³	Annual avg. *	40 µg/m³	40 µg/m³
	Particulate Matter	60 µg/m³	60 µg/m³
Ozone, O_3, µg/m³	8 Hrs.**	100 µg/m³	100 µg/m³
	1 Hr.**	180 µg/m³	180 µg/m³
Lead, Pb, µg/m³	Annual avg. *	0.5 µg/m³	0.5 µg/m³
	24 Hrs. avg.**	1 µg/m³	1 µg/m³
Carbon Monoxide, CO, µg/m³	8 Hrs.**	2.0 mg/m³	2.0 mg/m³
	1 Hr.**	4.0 mg/m³	4.0 mg/m³
Ammonia, NH_3, µg/m³	Annual avg. *	100 µg/m³	100 µg/m³
	24 Hrs. avg.**	400 µg/m³	400 µg/m³
Benzene, C_6H_6, µg/m³	Annual avg. *	5.0 µg/m³	5.0 µg/m³
Benzo alpha Pyrene, Particulate Phase only BaP, ng/m³	Annual avg. *	1.0 ng/m³	1.0 ng/m³
Arsenic, As, ng/m³	Annual avg. *	6.0 ng/m³	6.0 ng/m³
Nickel, Ni, ng/m³	Annual avg. *	20 ng/m³	20 ng/m³

Source: Central Pollution Control Board, New Delhi

* Annual arithmatic mean minimum 104 measurements in a year at a particular site taken twice a week 24 hrly at uniform interval.
** 24 hrly/ 8 hrly values should be met 98% of the time in a year, however, 2% of the time, it may exceed but not on two consecutive days.

NOTE:
1. National Ambient Air Quality Standard: The levels of air quality necessary with an adequate margin of safety, to protect the public health, vegetation and property.
2. Whenever and wherever two consecutive values exceed the limit specified above for the respective category, it would be considered adequate reason to institute regular/ continuous monitoring and further investigations.
3. The State Government/ State Board shall notify the sensitive and other areas in the respective states within a period of six months from the date of Notification of National Ambient Air Quality Standard.

Comparison of Percentage exceeding 24 hours average with CPCB standards shows that,

1) SO_2 levels: No percentage exceeding the 24 hrs standards at all monitoring sites.
2) NO2 levels: Percentage exceeding the 24 hrs standards at all monitoring sites. At Worli 26%, Khar 41%, Andheri 33% and Bhandup 30% samples are exceeded the standard.
3) NH3 levels: No percentage exceeding the 24 hrs standards at all monitoring sites.

SAFAR – Mumbai

System of Air Quality and Weather Forecasting and Research - 'SAFAR' for Mumbai was launched and dedicated to country on 23.06.2015.

Background:

Air is a mixture of gases, is indispensable for survival of life on the earth. The imbalance of the constituents of this mixture results in deterioration of air quality and increases pollution. When the levels of pollutants exceed threshold limit, it affects human health, plants and animals. Indian Institute of Tropical Meteorology (IITM) Pune designed a specialized system to monitor air quality and disseminate the information to public.

Earlier SAFAR was launched for metro cities in 2010 & 2012 in Delhi and Pune respectively, which is in operation. SAFAR-Mumbai was launched in June 2015, which is a joint venture of MCGM, IITM Pune and IMD. It provides location specific information on current and 1 to 3 days forecast for air quality and weather parameters along with UV index in a public friendly format along with health advisories.(Table 19.5)

Table No. 19.5: SAFAR Mumbai Ccomprises of following products.

Sr. No.	Name of the Product	Nos.
1	Air Quality Monitoring Stations (AQMS)	10 nos.
2	Automatic Weather Stations (AWS)	16 nos.
3	LED, Digital Display Boards (DDS)	13 nos.

Air Quality Monitoring Stations (AQMS), Automatic Weather System (AWS) and LED Boards are installed at various locations in Mumbai to received information about current air quality and 1 to 3 days forecast.

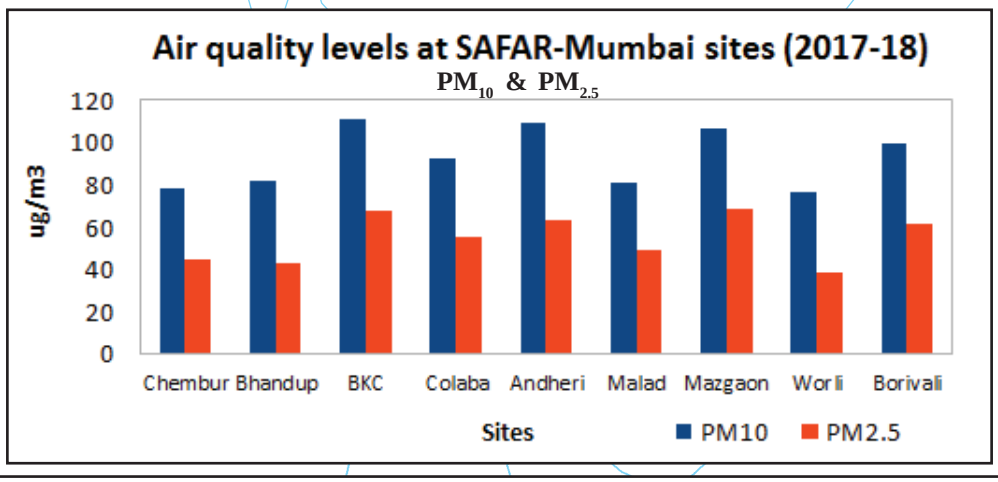
SAFAR-Mumbai Information to Public:

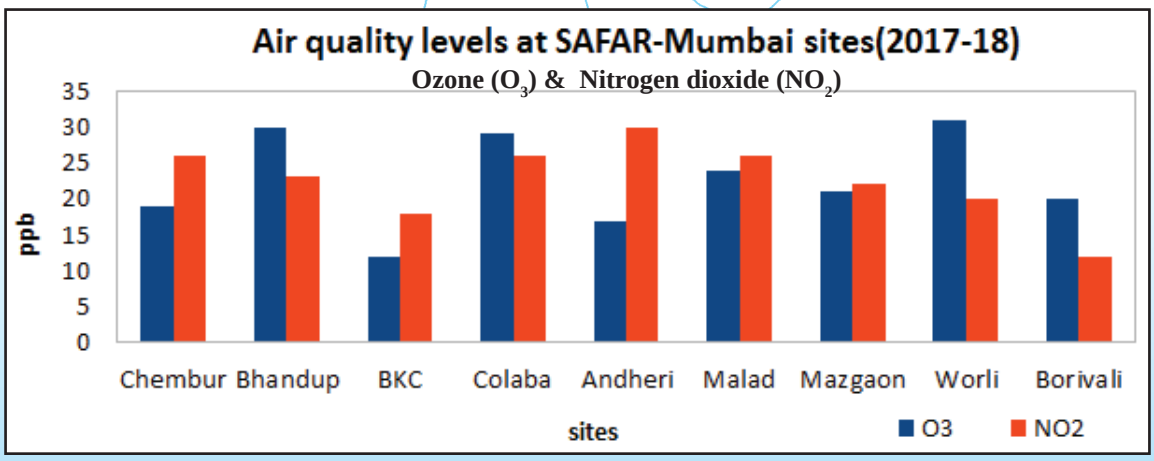
Air pollutants namely; PM_1, $PM_{2.5}$, PM_{10}, Ozone (O_3), Carbon monoxide (CO), Nitrogen dioxide (NO_2), Sulphur dioxide (SO_2) Benzene, Toulene, Xylene, Mercury etc. are quantified and displayed on LED boards in terms Air Quality Index (AQI) along with health advisories (Table 19.6). The real time AQI and forecasted AQI will help people to plan their outdoor activities so that they can prevent themselves from its adverse effects.

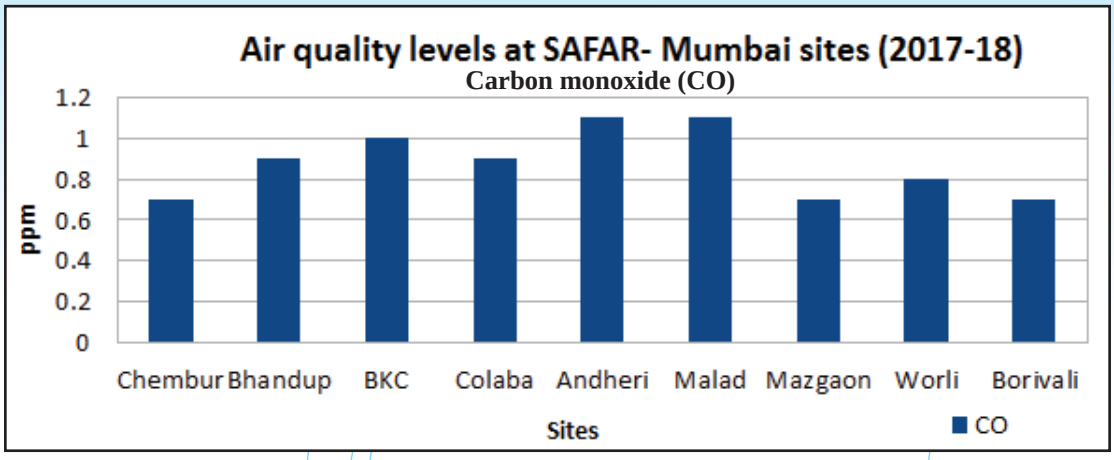
Meteorological parameter like Temperature, Rainfall, Relative humidity, Wind speed and Wind direction, High & low and alerts of severe weather conditions will be helpful to public, specially to fishermen.

Table No. 19.6: Air quality levels at "SAFAR-Mumbai" sites (2015 to 2018)

Sr. No.		2015-16					2016-17					2017-18				
		PM_{10}	$PM_{2.5}$	O_3	CO	NO_2	PM_{10}	$PM_{2.5}$	O_3	CO	NO_2	PM_{10}	$PM_{2.5}$	O_3	CO	NO_2
1	Chembur	135	86	22	0.8	32	99	63	20	0.6	22	78	44	19	0.7	26
2	Bhandup	138	89	29	0.7	28	93	60	31	1.0	19	82	43	30	0.9	23
3	BKC	135	104	18	1.1	42	121	86	14	1.0	12	111	67	12	1.0	18
4	Colaba	88	56	62	0.9	12	85	54	32	0.9	14	92	55	29	0.9	26
5	Andheri	148	104	21	1.2	22	116	83	19	1.0	21	109	63	17	1.1	30
6	Malad	98	75	25	0.8	16	112	76	28	0.9	25	81	49	24	1.1	26
7	Mazgaon	125	97	20	0.5	44	127	82	21	0.7	25	106	68	21	0.7	22
8	Worli	95	58	32	0.8	22	89	58	37	0.7	20	76	38	31	0.8	20
9	Borivali	105	62	23	0.5	27	96	49	24	0.6	17	99	61	20	0.7	12
	Average	118	81	28	0.8	27	104	68	25	0.8	19	93	54	23	0.9	23
	CPCB Std. Annual Avg	60 (µg/m3)	40 (µg/m3)	51 (8 Hrs) (ppb)	1.75 (8 Hrs) (ppm)	21 (ppb)	60 (µg/m3)	40 (µg/m3)	51(8 Hrs) (ppb)	1.75(8 Hrs) (ppm)	21 (ppb)	60 (µg/m3)	40 (µg/ m3)	51(8 Hrs) (ppb)	1.75(8 Hrs) (ppm)	21 (ppb)







- Colaba
- Andheri
- Worli
- Bhandup
- Borivali
- Malad
- Chembur
- BKC
- Mazgaon

- Mantralaya
- Gateway of India
- Sanjay Gandhi National Park
- Meet Chouki
- Mulund
- Juhu
- Vile Parle
- Kalanagar Jn.
- Panjarpol
- Navi Mumbai
- Haji Ali
- Girgaon Choupati
- CSTM

Communication Media for benefit of society:

SAFAR-Mumbai communicates with the society via,

1) SAFAR-AIR (Mobile App)
2) SAFAR-INDIA (Website)
3) LED System (Digital Display Boards)

1) SAFAR-AIR (Mobile Application):

This is a "Mobile App" which can be downloaded free of cost. The "Mobile App" provides location specific current and forecaste Air Quality Index (AQI) and UV-index. This "Mobile App" is user friendly and will benefit the common man.

2) SAFAR-India (Website):

This is a web portal (http://safar.tropmet.res.in) which can be accessed by people to collect location specific information.

3) LED Digital Display Boards (DDB):

3x1.80 Meter LED digital display boards are installed at various sites for public viewing. The colour coded AQI, UVI and Health advisories and environmental slogans will educate the citizens of Mumbai.

Air quality levels are measured at various "SAFAR-Mumbai" sites during July 2015 to March 2018 for PM10, $PM_{2.5}$, O_3, CO and NO_2 etc. as shown in table no.32.

Annual Averages:

1. Levels of Suspended Particulates (PM_{10}) are found to be in the range of 76-111µg/m3 during 2017-18. Maximum level of PM10 is observed at BKC. Annual average levels of Suspended Particulates (PM_{10}) are showing decreasing trend.
2. Levels of Suspended Particulates ($PM_{2.5}$) are found to be in the range of 38-68µg/m^3 during 2017-18. Maximum level of $PM_{2.5}$ is observed at Mazgaon. Annual average levels of Suspended Particulates ($PM_{2.5}$) are showing decreasing trend.
3. Levels of Ozone (O_3) are found to be in the range of 12-31 ppb during 2017-18. Maximum level of O_3 is observed at Worli. Annual average levels of Ozone (O_3) are showing decreasing trend.
4. Levels of Carbon Monoxide (CO) are found to be in the range of 0.7-1.1 ppm for the year 2017-18. Maximum level of CO is observed at Malad. Annual average levels of Carbon Monoxide (CO) are not showing noticible difference .
5. Levels of Nitrogen di-oxide (NO_2)are found to be in the range of 12-30 ppb during 2017-18. Maximum level of NO_2 is observed at Andheri. Annual avg levels of Nitrogen di-oxide (NO_2) are not showing noticeable difference.

Air Quality Index (AQI) :

Honourable Minister for Environment, Forests and Climate change, launched the national Air Quality Index (AQI) in New Delhi, on 17th September 2014 under the 'Swachh Bharat Abhiyan'. It is outlined as 'One number-One colour-One description' for the common man to judge the air quality in his vicinity.

The current measurement of index is made comprehensive by the addition of 5 more parameters to the

existing 3 parameters, i.e. in total 8 parameters are considered. AQI is a tool for effective dissemination of air quality of that area to common person. The information provided on air quality is in simple linguistic terms that is easily understood by people. The AQI is calculated by comparing the measured ambient concentration of the pollutant to the National Ambient Air Quality Standards (NAAQS).

There are six AQI categories namely; Good, Satisfactory, Moderately polluted, Poor, Very poor and Severe. The categories are shown in following table.

Classification of AQI:

0-50	- Green	- Good
51-100	- Light green	- Satisfactory
101-200	- Yellow	- Moderately polluted
201-300	- Orange	- Poor
301-400	- Red	- Very poor
401-500	- Brown	- Severe

Control of Air Pollution-Legal Aspects:

Municipal Commissioner has been vested with power as per MMC Act 1888, under sections 381, 390, 471, 472 to discharge certain obligatory and discretionary duties. MPCB is empowered to enforce the provisions of different Acts like Water Act, Environment Act, etc. Both agencies co-ordinates with each other to control pollution using these powers.

20. NOISE POLLUTION

As per directions given by hon. High Court of Bombay dated 16-8-2016, in the Public Interest Litigation No. 173 of 2010, Dr. Mahesh Bedekar V/s. State of Maharashtra & others, complaint redress mechanism is created in all wards of M.C.G.M, for filing complaints regarding nuisance due to Noise Pollution. A facility is also made available to submit complaint by e-mail & on telephone. The Complaint Officers appointed in every ward office to receive complaint of Noise Pollution. The redress system & its operation is uploaded on the MCGM website. The complaint register is maintained for the complaint received from all modes & forwarded to respective Police Stations /Police control department. In every ward, Disaster Control Units are in operation. Noise Pollution Complaints can be filed at these units. The telephone numbers of respective Disaster Control Unit are uploaded on the MCGM website.

The Noise Pollution Complaints filed by Public are received by Disaster Control Unit of MCGM on toll free telephone number 1916. The complaint number is given to the complainant to track the progress. Anonymous complaint is also registered on this number.

MCGM has also made provision to lodge complaints on website. In addition to this, MCGM. has developed Mobile Application, 'MCGM 24 X 7' for public to lodge complaints, which is in operation for 24 Hours.

Before the commencement of every major festival like Ganeshotsav, all Ward Assistant Commissioners from MCGM convene the meeting of all major organizations holding such functions, officials of various Mandals, local political leaders, concerned police officers & appraise them of the provisions of Noise Pollution (Regulation & Prevention) Rules-2000 & provisions of law & consequences of breach of the Noise Pollution rules.

As per the Government of Maharashtra resolution**ध्वनीप्र-२००९/प्र. क्र.९५/ तांक-१ दिनांक२१ एप्रिल २००९,** Police Authorities are responsible for initiating further legal actions in respect of enforcement & violation of Noise Pollution (Regulation & Prevention) Rules-2000.

For enforcement of Noise Pollution (Prevention & Regulation) Rules-2000, for filing the complaint by public against noise pollution, Mumbai Police Commissioner & Police Commissioner of Railway has appointed officer not below the rank of Inspector of the respective police station as an authority for the purpose of control of noise pollution for all police station under them. The name, addresses, telephone numbers & e-mail of theses authorities are displayed on the Municipal website & notice board of the Ward offices.

21. INDUSTRIES

Environmental pollution is a by-product of industrialization. However, with the modern technologies, pollution potential of industries/factoroies are lowering. There are 28994 no. of industries are covered under section 390 of Mumbai Municipal Corporation Act 1888. These industries pay Air Pollution Prevention Fees on the basis of horsepower of the connected load. There are 8449 industries/factories are located in the city area, 14084 in Western Suburbs and 6440 in Eastern Suburbs. Maximum industries 5062 are in P-South ward. Ward-wise distribution of industries are shown in table 21.1.

Industries are categorized by MPCB on the basis of emission levels. Heavily polluting industries are in "RED" category. "ORANGE" category industries are comparatively less polluting industries like Hotels and Restaurants, Fruit & Vegetable processing, Fish processing, Stone crushers etc. Industries which are not in above two categories are included in "GREEN" category. Some of the GREEN category industries are Mineral water, Salt mills, Ice cream, Handlooms, Candle industries, etc.

To control air pollutio measures such as cyclones, scrubbers, filters, electrostatic precipitators, etc. are adopted by existing industries. They also use clean fuel and High end technology to produce the products. Treatment of effluent is carried out to control water pollution.

Table No. 21.1: Wardwise Licensed Industries

Sr. No.	Ward	Licensed industries upto 31.03.2018
1	A	128
2	B	262
3	C	432
4	D	746
5	E	1946
6	F/S	1204
7	F/N	275
8	G/S	2455
9	G/N	1001
10	H/E	453
11	H/W	142
12	K/E	3663
13	E/W	1055
14	L	3039
15	M/E	406
16	M/W	252
17	N	606
18	P/S	5062
19	P/N	1257
20	R/S	1146
21	R/C	383
22	R/N	923
23	S	1242
24	T	895
	Total	28994

Source : Environment Department

Generation of Electrical Energy From Wet Waste:

Environment section has proposed to generate about 800units per day of untraditional electricity from approximately 10 Ton wet waste generated in Late Minatai Thakarey Flower Market. Generated electricity will be utilised for Late Promod Mahajan Udyan, Flower Market, Fisht Market, Dadar Garage and Dadar Sewerage Treatment Plant for illumination.

MCGM will get benefits as fallows:

- Segregation and disposal of waste at source,
- Saving in transportation cost,
- Generation of untraditional electricity.

Reuse of Tender Coconut Waste:

Environment section has proposed a pilot project of processing 1 ton tender coconut shells for manufacturing environment friendly products as office cubical partition walls, office trays, dry dust bins, biomedical dust bins, black board dusters etc. On success, the project will be augmented to cater about entire 4 ton tender coconut shells waste generated in Mumbai.

Ecofriendly Contribution of Industries

In addition to the efforts of Municipal Corporation of Greater Mumbai to reduced environmental pollution, other major industries in Mumbai also contribute in development of green cover in Mumbai and reduction in environmental pollution.

Bharat Petroleum Corporation Ltd. Mumbai Refinery, Chembur

BPCL Mumbai Refinery (MR) has a vision for environment and have always focused on environment protection and creating awareness for sustaining these efforts. They continuously innovate their processes and try to improve operational efficiency towards energy conservation, reduction in water consumption and tree plantation every year as a part of green initiative.

Few major Initiative taken towards environment during the year 2017-18 are listed below:

Auto Fuel Policy:

BPCL is delivering BS IV compliant HSD & MS with effect from 1 st April 2017 as per Government mandate. For supplying BS IV HSD to the Nation, Diesel Hydro-treator (DHT) unit was commissioned in June 2017. By successfully commissioning this facility, product sulphur was brought down to 10 ppm and thus “Mumbai Refinery” is in a position to produce 100% HSD meeting BS-IV standard (50 ppm).

To supply the nation with BS-IV grade petrol, BPCL MR has already taken actions and received consent to establish Gasolene Treatment Unit and the project is under implementation.

Renewable Energy:

As a part of environment Protection, BPCL MR has taken new initiatives in the area of sustainability and for generation of clean energy. In view of this initiative, BPCL MR had installed Solar Photo Voltaic (PV) power unit with a capacity of 40 KVA at roof top of BPCL MR administrative building south block in the month of August 2014. Subsequently in 2017-18 also, as energy conservation measure and commitment for environment, The objective of this project is to utilize renewable solar energy for electricity generation and use in refinery.

Also, installation of energy efficient LED light fitting is currently under way at the BPCL MR. During the year 2017-18, 5315 of such fittings were installed with a cumulative saving of 115.54 KW. Further, during the year 2018-19, all the 125 Watt and 250 Watt HPMV (FLP) Fittings in the entire refinery will be replaced with 45 Watt AND 105 Watt LED fittings respectively, with an overall savings of 1452.5 KW.

Rainwater Harvesting:

Water being a scarce but essential resource, it is necessary to conserve the same. At Mumbai refinery, several projects have been implemented for rain water harvesting (RWH) for conservation of raw water during the Monsoon. Mumbai Refinery has installed rain water harvesting system for rooftops with over 67,000 square meters of catchments area. Total rainwater harvested during the year 2017-18 is more than 66,000 KL. An area of 3200 square meters will be added during the year 2018-19 with a potential to harvest 6,160 KL per year of rain water.

Campaign Green Earth:

BPCL MR launched the "Green Earth Campaign" in the year 2013 and 20,000 tree samplings were planted/distributed to school, colleges, institutions, Gram Panchayat, in and around Mumbai in the Monsoon season of 2013 and 2014. in the year 2014, four acres of green belt was developed in collaboration with APMC at Vasai. Navi Mumbai and total 3000 tree samplings were planted by BPCL MR and handed over to APMC for maintenance thereafter.

In the financial year 2016-17. total 3200 tree samplings were planted at Mumbai waste Management site at MIDC, Taloja. Overall total, of 10,055 trees were planted in the financial year 2016-17 at various locations.

On 1st July-2017, BPCL participated in tree plantation Drive with Maharashtra Government's mission to plant four Crore trees in 2017-18 to celebrate 'Vanmohostav'. BPCL Environment Department and HR Team actively participated in the this drive and planted 5000 saplings at Village Kolshet, Park 5, Ghodbunder road, Thane. Also on the occasion of "World Environment Day" celebration, 200 saplings were planted in BPCL Staff Colony, Chembur.

Rashtriya Chemicals & Fertilizers Limited

RCF'S objective is to produce and market fertilizers and industrial chemicals efficiently, economically and in an environmental friendly manner. So RCF Trombay unit takes the following initiative the environment.

Commercialization of NPK Composite Bio-fertilizer:

Use of bio-fertilizers is one of the important of integrated nutrient management, as they are cost effective and renewable source of plant nutrients and supplement the chemical fertilizers for sustainable agriculture .

Several micro-organism and association with crop plants are being exploited in the production of bio-fertilizers. NPK composite Biola- a product that contains Nitrogen- fixing, phosphate solubilising and potash -mobilising bacteria . It contains all the beneficial microbial strains in a single highly effective pack . This product was launched in the state of Maharashtra.

Revolution in Nano Technology:

The upcoming fertilizers revolution – Nanoparticles fertilizer based field trial, Nanotechnology has been term as the "Future Technology" and has being applied in various fields viz.. Medicine, pharmaceuticals, Food, sensors, electronics and agriculture.

Reliance Infrastructure

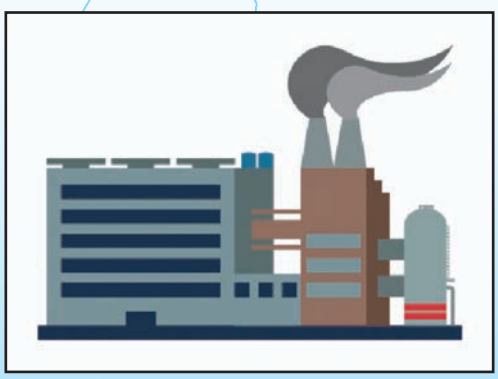
Reliance infrastructure company conducts energy conservation and energy efficiency programmes to create awareness in the society on its importance and promotes smart usage of energy. The company through "Let's Turn Around" campaign celebrates major environmental events to created wide scale employee and customer sensitization to raise the environmental awareness amongst them.

The company through the "Urja Sanvardhan Upakaram Programme", conducted workshops in various academic institutions, offices, banks, hospitals, industrial estates, housing societies, slum areas etc. reaching out to more than 11,000 consumers and educated them on 'Why and how to conserve energy'. The ultimate goal is to make every citizen of Mumbai a part of the programme and make it a citizen's movement.

Environment Initiatives

1) On the occasion of World Environment Day 2017 (5th June 2017) company sponsored the entry fee for all visitor at Sanjay Gandhi National Park, in support of United Nation Environment theme and company theme- "Connect with Nature". Around 4000 visitors took the benefit of free entry in Sanjay Gandhi National Park on 5th June 2017.

2) In another collaboration activity, the company provided co-sponsorship to the annual event of International Coastal Clean-up arranged by Indian Coast Guard on 16th September 2017 at Juhu beach. Waste generated during immersion activity was collected/retrieved from the beach on the day by around 120 R-Infra employees along with Indian Coast Guard officials and handed over to Municipal authorities for disposal. On account of these cleanliness drives, more than 400 kilogram of plastic and other solid waste has been collected and handed over to Municipal authorities at the respective places for its safe disposal.



22. HEALTH

Health is the level of functional or metabolic efficiency of a living being. In layman terms, health usually means to be free from illness, injury or pain. The World Health Organization (WHO) defines health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. To lead and enjoy a wholesome life one must have sound health.

MCGM largely takes care of citizen health through Health Care Services. The State Government, Private organizations and Private medical practitioners also contribute in providing the health care services. Health care is a primary the responsibility of Municipal Corporation of Greater Mumbai.

MCGM's health infrastructure in Mumbai is a 3-tier system as shown in the table below.

Table No. 22.1 Health Infrastructure 3-Tier System in MCGM

PRIMARY	Health posts	208
	Dispensaries	185
	Maternity Homes	28
SECONDARY	Peripheral hospitals	17
	Speciality hospitals	5
TERTIARY	Major hospitals (Medical & Dental colleges) (5 main hospitals and 1 H.B.T. hospital joint with Cooper hospital.	5

Source: Health Dept.

Environment contributes to the health of human being both in positive and negative ways. Better nutrition and clean environment will help to increase life span whereas, polluted environment will cause deterioration of health. Environmental hazards are responsible for as much as a quarter of the total of diseases world wide and more than one third among children. Environment plays a major role in etiology of numerous diseases like water borne diseases (Gastroenteritis, Jaundice), vector borne diseases (Malaria, Dengue, Chikun gunya, Nipah) and non-communicable diseases like Hypertension, Diabetes, etc.

The health services are provided in two ways. There are hospitals, dispensaries and maternity homes all over the city catering to the medical needs of the people, while on the other hand there are Outreach Services. Under National Urban Health Mission 21 new health centres are started too. Objective of establishing health centres is to provide health service for implementation of family welfare program and outreach services for mother and child.

Table No. 22.2 shows Birth & Death Rates and Infant & Maternal mortality in the year 2015 to 2017.

In year 2017, Birth rate in Mumbai was 12.14/1000 population and the Death rate was 6.98/1000 population. Infant mortality was 26.33/1000 and 1.53/1000 for mothers in the year 2017.

Table No. 22.2: Health Statistics- Birth & Death Rates

	Year 2015	Year 2016	Year 2017
Birth (Registered)	174902	152952	154642
Birth Rate/1000 population	13.83	12.05	12.14
Death (Registered)	94706	86642	88845
Death Rate/1000 population	7.49	6.83	6.98
Infant Mortality	4575	3998	4071
Infant Mortality Rate/1000 live birth	23.16	26.14	26.33
Maternal Death	314	305	236
Maternal Mortality Rate/1000 live birth	1.79	1.99	1.53

Source: Health Dept.

Role of Kasturba Hospital:

1. Kasturba Hospital on regular basis treats cases of Malaria, Dengue, Lepto, Swine flue. Separate wards are designated for

treatment of infectious disease in-patients.

2. In face of current threat of Ebola Virus disease it has been decided that confirmed cases of Ebola Virus will be admitted for isolation and management in ward no.30 of Kasturba hospital.

3. Facility for diagnosis of Swine Flue virus is available in Molecular Diagnostic laboratory.

Report of different diseases
April 2017 to March 2018

Sr. No.	Disease	Number of Patient	Death
1	Dengue	2217	02
2	H1N1	403	23
3	Lepto	25	01
4	Malaria	1708	0

4. Developing ward no.26 as "isolation room" of 10 cots in Kasturba hospital.

Epidemiology Cell

Epidemiology Cell is situated in the campus of Kasturba Hospital in ward no.11 started functioning from 25th April 2007.

Key activities of Epidemiology Cell:

- Reporting of communicable diseases is done on weekly and daily basis. Information of admitted patients is received from all Municipal hospitals, Government Hospitals and major Private Hospitals. The reports are analyzed for monitoring the diseases trend and feedback is given to respective MOH for preventive measures to be undertaken in the community.
- Regular drinking water quality surveillance is undertaken daily by Municipal laboratory by collecting samples from all 24 wards, water from the hawkers and ice-water surveillance. Reports of unfit water are submitted to the Wards along with the preventive measures.
- Continuous liaison with other departments like Insecticide Office, Municipal Analyst, IEC, Training and MIS as well as State and National authorities for prevention and control of communicable diseases.
- Training of the Health Staff working under MCGM and sensitization of Private Health care providers.
- During any outbreak of communicable disease the Mobile Health Unit (MHU) team is made available to control further spread and containment of disease in community.

Additional activities during monsoon:

1) Control room- In Monsoon, control room is activated from 1st of June every year for monitoring the disease surveillance activities.

2) Health Camps – "Special Sunday camps" are organized in collaboration with Secondary and Tertiary hospitals in high risk area of Mumbai. The reports of the same are analyzed and compiled to monitor the disease morbidity in the high risk pockets.

3) Medicines are made available for controlling the outbreak of communicable disease, as per need.

4) Co-ordination is established between Tertiary hospitals, Peripheral hospitals and major private hospitals for disease surveillance.

Preventive Measures for Monsoon related illness:

Five point program 'Mumbai Mantra' is implemented for prevention and control of Vector Borne Diseases (Dengue, Malaria, Chicken guniya):

1) Vector control measures – Source reduction, Engineering measures, Biological control, Chemical application and Legislative measures.
2) Early Diagnosis complete treatment: Finding out of Fever patients by observation and treatment as per 2013 National Medicine Work System.
3) Micro Mapping and Micro Planning.
4) Inter-sectoral and Intra-sectoral coordination.
5) Public awareness.

In addition to already existing 5 point programme for vector borne disease control measures, following special 5 point programme is implemented since 2012 for prevention and control of Dengue.

1) Work place intervention.
2) Contact tracing.
3) Public awareness by coordination with housing societies and advance locality management groups.
4) Co-ordination with private health care providers.
5) Special awareness in non-slum areas.

Under Mumbai Arogya Abhiyan, special 'Sunday Health Camps' are organized in high risk areas. In the year 2017, total 188 camps were held where 38504 beneficiaries attended the camp. At the camp site, IEC corner is established in which exhibition consisting of posters, live mosquito breeding, biological anti larval measures (Guppy fish) and models of mosquito breeding places are displayed for public awarness.

Water Borne Diseases (Gastroenteritis, Typhoid and Hepatitis A, E):

Common water born diseases occurs due to contaminated water and food. To avoid water and food contamination following measures are taken.

- The drinking water samples are tested on daily basis from all 24 Wards by MOH, Assistant Engineer (Water Work) QC & AEWW-LD.
- The Assistant Engineer Water Works at Ward level is informed about the unfit water samples and corrective steps for leak detection and repair is ensured by them and additional chlorination for water

purification is carried out as per necessity.

- Areas reporting cases are surveyed by health post staff and following activities are carried out. Public awareness campaigns are carried out. Oral Rehydration Solution (ORS) & Chlorine tablets for additional chlorination is distributed. The patients detected during survey are refereed to nearby dispensary for treatment.
- To control water borne diseases adequate stock of medicines and packets of Oral Re-hydration Solution are available in MCGM hospitals and dispensaries.
- For the public awareness, publicity in newspaper about water borne diseases and their remedies. Unwholesome food, cut and open vegetables, fruits, sweets, liquids are destroyed as per section 412 of MCGM Act by Junior Oversears (Food).

H1N1 Influenza:

H1N1 is caused by its virus spreads through air. In 2015, two outbreaks of H1N1 Influenza reported in Mumbai.

Treatment facility such as Oseltamivir medicine, isolation ward, personal protective equipments and ventilators are available at MCGM Health Institutes and Public Sectors.

Testing facility available in P.C.R. Laboratory Kasturba Hospital, Haffkine Institute. Also at accredited private laboratories like, SRL Diagnostics, Metropolis Lab, Kokilaben Hospital Lab, Suburban Lab, Sunflower Lab, Holy Spirit Hospital Lab, Dr. Lal Path Lab, Qualilife Lab (Mulund).

H1N1Vaccination :

As per the Government of India guidelines H1N1 vaccine is made available free of cost to High Risk Groups which includes Pregnant females in 2nd and 3rd Trimester, patients with co morbidity and health Care Workers. H1N1 Vaccination facility for pregnant women of 2nd and 3rd trimester is made available at all 28 maternity homes and all 4 Medical Collages (Sion, KEM, Nair and J.J.). H1N1 vaccination for high risk group of DM, HT patients is available at 7 MCGM dispensaries i.e. one each for 7 zone and this year 8 centres at Peripheral Hospitals have also been started.

In the year 2017, H1N1 vaccination given to total 7596 beneficiaries, out of which 5985 are ANC of 2nd & 3rd trimester, 539 were patients having co-morbidities like DM and HT and 1072 MCGM health care workers. In 201, 2795 ANC, 121 Health Care Workers and 408 patients with co-morbidity are vaccinated.

Malaria

Surveillance Department works for prevention and control of Malaria in Mumbai

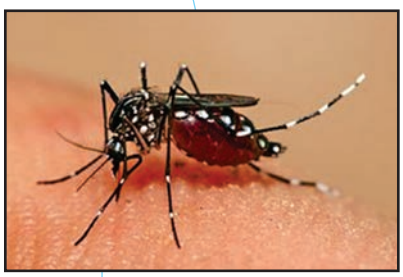
Key activities of Surveillance Department

- Early detection of cases and correct treatment.

- Early and accurate diagnosis
- Treatment of cases and Follow up
- Regular Review Meetings
- Training
- IEC activities
- Joint action by MOH/PCO

Following the surge of cases in 2010 the surveillance department has strengthened control measures of malaria by implementing "Mumbai Mantra" Five Point Programme.

- Effective vector control
- Early diagnosis, correct and complete treatment
- Micro-mapping and Micro Planning
- Inter and Intra Sectoral response
- Community awareness and action.



1. Early detection of cases and correct treatment :

- Strengthening Active and Passive Surveillance by detecting suspected cases through House Survey, surveys at construction sites, surveys at suspected malaria death case area, dispensaries and hospitals.
- Special camps on Sunday for fever cases and Baseline surveys at construction sites.
- Establishment of Linkage between health post, dispensaries and surveillance staff for detecting cases to give prompt and correct treatment and verification of Radical treatment. This activity is supervised by Senior Officers.
- All Malaria patients get radical treatment with follow-up and verification of Radical treatment.

2. Early and accurate diagnosis:

- For Diagnosis of Malaria, Laboratory facilities are available at 63 upgraded dispensaries, 18 peripheral hospitals, 4 medical college Hospitals, 5 Urban Health Centers. Apart from this, at Central Malaria Laboratory approx. 3500 blood slides daily examined and if required pre designated private labs are identified for maintaining ZERO BACK LOG Policy and within 24 hours timely reporting to MOH and PCO.
- To ensure quality of slide examination, some percent of blood slides are cross checked at central malaria lab and at Regional Government Lab.

3. Regular review meetings :

- To give feedback and proper guidance to ground level staff.
- To take review of preventive and curative activities.

4. Training :

- Organized for lab technician, malaria inspectors and investigator, Medical, Para-Medical staff and Private Medical Practitioners.
- Public Representatives, Safety officers and Supervisors at construction sites are sensitized for prevention and control of malaria.

5. IEC activities :

- Public awareness is carried out through display of Hoardings, Banners, Poster distribution of leaflets in the community. Electronic media such as Television, Short films and digital electronics board are used for public awareness.
- Malaria/Dengue Awareness Programme carried out with help of approx. 1000 to 1200 N.S.S. students of Mumbai University and an N.G.O. - United Ways during August 2015.

6. Joint Action by MOH/PCO:

- Line list of malaria cases is informed to PCO for mosquito control activity.
- Breeding sites are reported by PCO to MOH for detecting suspected cases from there.
- Before monsoon, at construction sites distribution of mosquito nets and instructions are given for medical examination of all workers to Developers as well as Health cards distribution and IRS is done by PCO.

Tuberculosis (TB):

Group of TB Hospital and city TB Control Programme:

To bring Tuberculosis under control is one of the main aim of the MCGM and it works effectively with the association of various agencies including voluntary organizations and with research work in the field as well as in the hospital area.

There are total 267 TB treatment centers along with various others run by the Teaching Institutes and Peripheral Hospitals, which are working primarily as the diagnostic and treatment centres in addition to 110 PMP “DOTS” centres.

The Group of TB Hospitals at Sewree is admitting and treating the emergency TB cases and the 5 TB Clinics, 1) Shyamaldas Gandhi Marg TB Clinic, 2) Balaram Street TB Clinic, 3) Ramkunwar Daftary TB Clinic, Dadar 4) Smt. & Shri. M. M. Nunshi TB Clinic, Khar and 5) Nawab Tank TB Clinic, Dockyard

Road; attached to this hospital are working as diagnostic and treatment centers on OPD basis.

The non-TB Chest diseases department is functioning on OPD level. All the investigations such as Pulmonary function testing, Fiber optic Bronchoscopy and E.C.G. are done.

This Institute is recognized for degree courses in M.D. (Tuberculosis and Chest Diseases) by the Maharashtra University Health Science, Nashik under G.S.M. Collage, so also clinical experience is given for Nursing and undergraduate students from the Municipal Medical Colleges. The Major lung thoracic surgeries are being carried out at this hospital by the surgeons on selected cases. The Major lung thoracic surgeries are being carried out at this hospital by the surgeons on selected cases. Diploma course TB has also been started by the College of Physician & Surgeon, Mumbai.

The Pilot project of Revised National TB Control Programme under WHO with World Bank is implemented all over Mumbai and also at this hospital to eradicate the Tuberculosis Disease.

As per suggestion of the Mumbai Districts AIDs Control Society (MDACS), the Voluntary Counseling and Testing Centre (VCTC) has been started in separate male and female wards from January, 2002 at this hospital for the testing of Indoor and OPD Patients.

Supra major thoracic surgery is started form March 2012 at G.T.B. Hospital. Till date 246 major surgeries and 14475 minor surgeries are carried out.

From May 2012 protein diet is started daily for all on duty employees working under G.T.B. Hospital in three shifts.

Infection Control Committee is framed in 2011 since then periodical medical check up done every 3 month for G.T.B. hospital employees. Personal protective equipments, N-95 masks are given to all employees to prevent the Tuberculosis infection.

In November 2013, 200 bedded Bahadurji Block under G.T.B. Hospital was started for MDR, XDR and XXDR patients. Services of advance technology of L.P.A. machine, Gene expert and Liquid culture laboratory were started for early diagnosis of MDR TB patients.

A new medicine, Bedaquiline was started in August 2016, through Conditional Access Programme under Public health department, Municipal Corporation of Greater Mumbai and Government of India.

Acworth Municipal Hospital for Leprosy:

It was founded by the then Municipal Commissioner Mr. H. A. Acworth and is located at R. A. Kidwai road, Wadala (West) on 7th November 1890. It is under MCGM since 1st April 1991 as one of the specialized hospitals under the administrative control of Executive Health Officer.

Services provided by Acworth Municipal hospital for leprosy:

Services provided by Acworth Hospital for comprehensive care to the leprosy affected patients are as

follows,

1) In Patient Service:

Presently the capacity of the hospital is of 240 beds. At present average occupancy are around 91 i.e. 38%. Most of the patients are admitted in the hospital due to the old Leper Act. Old deformed and abandoned are provided shelter in the hospital. Majority of the patients living here more than 20 years almost on a permanent basis. Presently patients are admitted for ulcers and lepra reaction.

2) Out Patient Services:

Outpatient services include physiotherapy, social service, laboratory, dressing and pharmacy. Daily average OPD attendance is about 45 patients.

3) Field Work:

Under National Leprosy Elimination Programme, the hospital carries out leprosy monitoring, health, education and communication activities in municipal wards like 'E', 'F/South' & 'F/North', covering 16 lakh population.

4) Reconstructive Surgeries:

Acworth Municipal Leprosy hospital is recommended and referred by state government where reconstructive surgeries are carried out for correction of deformities on leprosy patient.

5) Training :

Acworth Municipal Leprosy hospital provides training in leprosy is provided to allopathic and non allopathic graduates and post graduate also to nurses, microbiologists, welfare officers, physiotherapists and business therapists, sanitary inspectors etc. Government medical officers, non medical inspectors and laboratories also get trainings by this hospital.

6) Medical Records :

Hospital prepares and preserves statistical audit to account the progress of National Leprosy Elimination programme.

7) Collaborative Programme of Acworth Municipal Hospital and NGO's:

i. **Acworth Leprosy Museum :** This is the only museum in India which maintain scientific information of leprosy.

ii. Footware Unit: Patient are provided with footware and splints in subsidized rates.

iii. Central Registry: Helps to prepare programmes and micro-action programmes for Mumbai District.

Mumbai District Statistics 2017-18

New Leprosy Patients found	401
Contagious patients out of new Patients	247
Non-contagious patients out of new Patients	154
PR (per 1000 population)	0.24

Acworth Hospital Statistics 2017-18

New Leprosy Patients found (E, F/S & F/N Wards)	35
Contagious patients out of new Patients	23
Non-contagious patients out of new Patients	12
PR (per 1000 population)	0.21

Health Education :

Acworth Municipal Hospital provide health education at E. F/S and F/N Wards. Which helps to eradicate misconceptions about leprosy. On the occasion of death anniversary of Mahatma Ghandhiji from 31st January to 5th February, leprosy education week is arranged by this hospital every year. During this week all active organizations effectively carry out public awareness and health education movement in their work premises.

Mumbai District AIDS Control Society:

Mumbai District AIDS Control Society (MDACS), an Autonomous body registered under Charitable Trust Act was established on 27th July 1998 for prevention and control of HIV/AIDS in Mumbai.

Services provided by MDACS are as follows.

1) Prevent the spread of HIV / AIDS
2) Reduce the vulnerability of individuals and communities to HIV/AIDS.
3) Provides care and support to the infected and affected.

Mumbai district AIDS control society provides services free of cost through below mentioned divisions.

Basic Services:

Integrated counseling and HIV testing centers (Shakti Clinic) are established across the city in all Government/Municipal Hospitals/ Maternity Homes. These services are freely available to all walk-in / referred clients. Trained counselors and Laboratory Technicians perform HIV counseling and testing using standardized testing protocols with robust quality control

- Early detection of HIV infection in pregnant woman is the mainstay of the program for preventing the transmission of infection from infected mother to baby. For this, Multi Drug Anti-retroviral treatment is initiated from 4th month of pregnancy.
- Early Infant Diagnosis: All infants born to HIV infected mothers are screened immediately after the birth and periodically till 18 months of age for HIV infection.
- There are 54 stand-alone ICTCs, 3 mobile vans and 170 facility integrated counselling and testing centres (FICTs) in the city.

Anti Retroviral Therapy (ART):

Patients have availed of free ART services through 17ART centers in the 6 medical colleges in Mumbai, 7 Peripheral Hospital, 2 private hospitals (Godrej and L & T) and a specialized ART centre for children at Sion hospital. So far, 38137 patients are registered in HIV care and 36601 patients are on ART treatment in Mumbai.

Blood Safety Programme:

Preventing HIV transmission through infected blood by ensuring access to safe and adequate blood for the needy patients is one of the important services of MDACS.

21Government, Municipal and Trust blood banks in Mumbai are supported by provision of trained manpower, HIV testing kits and grants. All the blood units collected in the blood banks are tested for HIV, Hepatitis B, Hepatitis C and other blood borne infections. Regular voluntary Blood Donation Camps are organized in collaboration with Blood Banks and NGOs. Over the years, the numbers of voluntary blood donors have increased significantly reducing the risk of HIV infection through blood transfusion.

Clinics to Control Sexually Transmitted Infections (STI):

Unsafe sexual behavior leads to transmission of Sexually Transmitted Diseases (STD) and infections including HIV. STDs can be easily diagnosed and effectively treated by syndrome treatment approach. For this, 27 Designated STI / RTI clinics (DSRC) are set up throughout the city with trained doctors and counselors who educate the clients about complete treatment, condom usage, partner notification and partner treatment. The patients are also referred to ICTC for blood testing for HIV and STDs. Effective management of STDs and counseling on responsible sexual behavior at STI clinics helps in prevention of HIV transmission.

Targeted Intervention (TI):

Targeted interventions are aimed at offering prevention and care services to high risk populations of Female Sex Workers, Men having Sex with Men, Transgender and Injecting Drug Users. The bridge population of slum migrants and Long Distance Truckers are also provided with the information, means and skills to minimize HIV transmission. These high risk groups through their 34 NGOs / CBOs are linked to appropriate testing and Treatment services.

Information, Education & Communication:

IEC plays an important role in all prevention efforts. Various awareness campaigns are held using mass media and outdoor approach. Specially designed street plays and musical drama (Infotainment) activities are organized for slum migrants and high risk groups for reducing risk behavior.

Events are organized to increase the awareness among general population, especially for women and youth on various days viz. National Voluntary Blood Donation Day, National and International Youth Day, World AIDS Day, Women's Day. Saadhan Helpline - Confidential Tele-counseling is provided on phone no. 022-24114000.

HIV/AIDS Present Status :

HIV prevalence trend has witnessed a significant decline among general clients (11% in 2007 to1.51% in 2017) and pregnant Women (0.87% to 0.29% in 2017) in Mumbai.

Table No. 22.3: HIV/AIDS Control Programme Report, 2017

HIV testing at Integrated Counseling and Testing Centers of Mumabi	Tested	Positive		Treatment for HIV positive patients at ART Centers in Mumbai	Adult	Children	Total
General Clients	352102	5333		Birth (Registered)	174902	152952	154642
Pregnant Women	133334	142		Birth Rate/1000 population	13.83	12.05	12.14

Environmental Pollution Research Center (EPRC):

Human beings are the centre of concern for sustainable development. They are entitled to a healthy and productive life in harmony with nature. Environmental burden of disease is linked to outdoor as well as indoor air pollution. A review of environment and health decision making in a developing country can be taken based on scientific data.

Department of Chest medicine and Environmental Pollution Research Centre (EPRC) at KEM Hospital carries out studies to assess respiratory morbidity related to air quality.

Respiratory Morbidity survey is a tool which allows to understand the confounding factors related to pulmonary health.

Table No. 22.4
EPRC Survey Report 2017-18

Area	Group Surveyed	Total
Chereshwar Society Mahulgaon	Medical Checkup	29
Ambapadagaon Chembur	Medical Checkup	25
Bhuvneshwar Building Parelgaon	Census – 413 residents	579
	Questionnaire - 127	
	Medical Checkup - 39	
MMRD Vasahat Mahulgaon Chembur	Census – 336 residents	622
	Questionnaire - 206	
	Medical Checkup - 80	
PremAmrut Society, Mahul,Chembur	Census – 49 residents	115
	Questionnaire - 42	
	Medical Checkup - 24	
MMRD Vasahat Mahulgaon Chembur,, Building no. 38	Census	591
	Total	1961
Asthama Education		1230

Source: Dept of Chest Medicine and Environmental Pollution Research Centre

Census is carried out by community development officers. Details regarding type of housing, cross ventilation, overcrowding, cooking fuel, sanitation and occupation are noted. A questionnaire is distributed to understand people's perception regarding environmental issues and health effects.

The Chest Medicine Department at KEM Hospital has a facility to undertake specialized diagnostic investigations like Arterial blood gas analyses, detailed spirometry, diagnostic and therapeutic Bronchoscopy and offers treatment for pulmonary disorders.

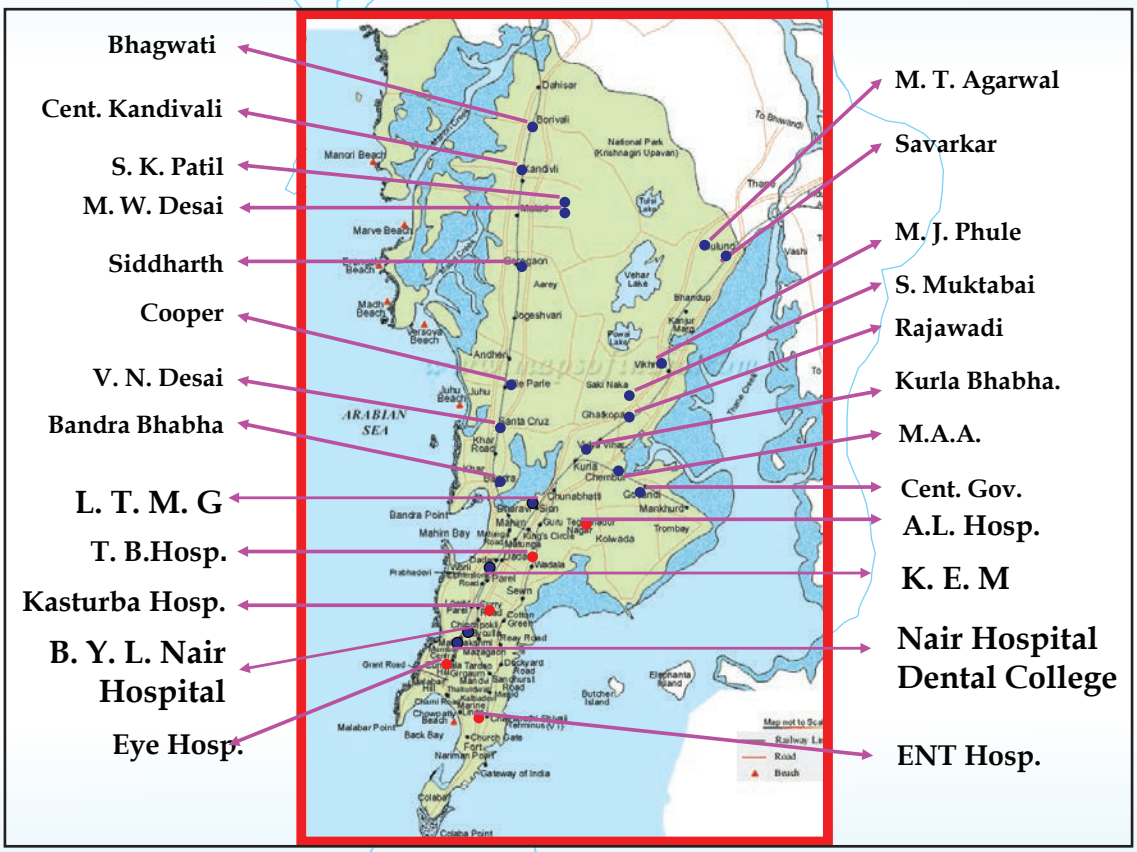
This study was aimed at identifying association between environmental factors, prevalence of asthma and respiratory morbidity in relation to air quality levels in a mega city. Positive family history, these being the non-modifiable factors.

On reviewing the data from study conducted by EPRC it is observed that respiratory morbidity is higher in areas with high levels of Suspended Particulate matter (SPM).

Educating patients regarding environmental control measures and use of appropriate treatment leads to better symptom control in patients with Asthma. In the year 2017-18, Asthma education was imparted to 1230 patients.

It is proposed to establish a "Post Graduate Research Institute of Pulmonary Care and Environmental Health Effects" for translational Research.

Hosptlas in Mumbai



23. DISASTER MANAGEMENT

DISASTER MANAGEMENT & CENTRAL COMPLAINT REGISTRATION DEPARTMENT:

In the beginning a separate unit viz. 'Disaster Management Department' was established in the year 1999 at the Municipal Head Office Building on a small basis. After the devastating floods of 26th July 2005, this Unit was modernized by providing ultramodern facilities and put back to service again on 30th May 2006. Thereafter, Disaster management was shifted from basement of the Municipal head office to the spacious space on 2nd floor of the same building with ultra modern facilities on 28th November 2016. The Unit works round the clock for 24 hours on all 365 days of the year.

The Prime aims of the Disaster Management Department:

1. The prime aim of the Department is to be prepared to tackle man-made and natural disasters in the Mumbai City and Suburbs. In this exercise, it ensures effective co-ordination with the various supportive services in preventing and minimizing loss to life and property.
2. This Department gives quick response at the time of disaster and effectively co-ordinates the resources involved in this work.
3. To inform Additional Commissioner / Commissioner / Government of Maharashtra officials, consolidated report information received after coordination with various agencies after every emergency at every stage.

This Department works round the clock on all 365 days of the year and is provided with the following facilities.

1) Four Direct Telephone Lines
2) 51 M.T.N.L. Hotlines.
3) PRI line assigned with short digit code 1916 for Civic complaints & Emergency Help
4) Wireless set Installed at 58 various locations (VHF)
5) 60 Nos. Automatic Weather Stations (AWS) installed at various location in Mumbai City and suburbs.
6) Facility of Video Wall streaming live feed from 231 Nos. of CCTV cameras installed at important traffic signals, 7 Nos. of CCTV cameras installed at chronic flooding spots by MCGM and 4968 Nos.

of CCTV cameras installed by Government of Maharashtra under Mumbai CCTV Camera surveillance Project.

The following types of complaints are registered in Disaster Management Department.

1) Minor and Major mishaps,

2) Landslides.

3) Tree falling or unauthorized cutting of tree,

4) Water logging,

5) House Collapse,

6) Potholes on road,

7) Missing of manhole cover,

8) Fire,

9) Short-circuit,

10) Flooding,

11) Earthquake,

12) Bomb-blasts etc.

Prompt note of above occurrences is taken and instructions are immediately conveyed to the officers concerned so as to provide essential services at the spot of occurrence.

MCGM has installed Automatic Weather Stations at various 60 locations all over Mumbai and one flow meter at Mithi River, Powai. Out of these, 58 AWS are connected to Emergency Operation Centre at MHO by dedicated WAN network. The data received from AWS includes rain fall, temperature, humidity, wind speed, wind direction etc. at an interval of 15 minutes. This data can also be received at a preset interval of time. The rainfall data is most important during monsoon, as warnings and alerts are issued to the staff and citizens of Mumbai on the basis of it. In the year 2009, during monsoon period a website having URL "dm.mcgm.gov.in" was launched by MCGM to display rainfall data. From this year, this website will be available throughout the year inclusive monsoon period. The information received from 60 AWS viz. rainfall, humidity, temperature, wind speed, wind pressure etc. In order to facilitate the information to citizens a mobile application **"Disaster Management MCGM"** has been developed. This mobile application can be downloaded free of cost from Android & IOS operating systems.

Central Complaint Registration System(CCRS):

This system was introduced in the year 2000. The Control Room working for 365 days receives the complaints on short digit helpline No.1916. The civic complaints are registered in CPWM module of SAP,

complaint number is conveyed to the complainant and sent to concerned ward online and Complaints are attended by concerned staff of Ward offices. The complainant can also register the civic complaint on MCGM website viz.portal.mcgm.gov.in.

The complaints regarding emergencies like fire, earthquake, bomb-blast, land slide, house collapse, major accidents etc. are also received on '1916'. The emergency complaints received subsequently disseminated to various agencies for quick response.

Emergency Support Function (ESF):

The Disaster Management Department has introduced the Emergency Support Function (ESF). The ESFs provide the co-ordination mechanisms among the various agencies. They provide the organization and process to plan, manage and co-ordinate specific response and preparedness activities common to any hazardous event that can result in an emergency, from the most frequent one to the most extreme one. Each ESF is headed by a lead agency and is supported by identified support agencies. These ESFs form an integral part of the Emergency Operation Centers, each of which will co-ordinate its activities from the Municipal Corporation of Greater Mumbai Emergency Operations Centre.

GIS Based Command and Control System:

Disaster management department has developed a GIS application name Command and Control System (CCS) for quick and quality response to the any disasters in Mumbai and Suburbs. The system is in-corporate with Standard Operating Procedures defined for 32 main and their 107 subtypes. The phase- I of this system has been implemented at EOC level to register and response to any disaster in a organized manner.

All the recourses may needed in case of disasters e.g. ward offices, Fire stations, Hospitals, Police stations etc. with their attributes such as available equipments, machinery, man power is being mapped on MCGM GIS map to get the information of resourses needed at a glance.

City Institute of Disaster Management & Research Centre (CIDM), Parel:

In case of any mishap happens at MHO and EOC at 2nd floor is not accessible or cannot be operated, a backup control room has been setup at CIDM, Parel. This backup control is equipped with Hotlines, Wireless communication, HAM Radio, Video Wall, ESF similar to EOC at MHO. CIDM provides comprehensive training on disaster management and first response to employee of MCGM/ Government / Private companies, School and College students, Medical practitioners, Police etc to aware them about scientific ways of disaster management.

This department had proposed a 3D Auditorium and an art gallery at CIDM for showing 3D films and to show realistic exhibition of various disasters respectively. The major objective of these facilities is to make the visitors aware of disaster and its preparedness. The work of 3D Auditorium is completed and the work of Art gallery is in process. Art gallery at CIDM will have interactive dioramas, display, photographs and information boards spreading awareness of various disasters.

Post Graduate Diploma in Disaster, Fire & Industrial Safety Management (PGDDFISM):

Considering the importance of Disaster Management and ever increasing impacts of Disasters, CIDM has commenced a one year PGDDFISM course in coordination with Garware Institute of Career Education and Development and Mumbai University. This course offers scientific learning of concepts of natural and manmade disaster and techniques of every stage in DM. The Primary aim of this course is to educate personal from Government agencies, industries regarding appropriate response to the impending disaster and reduce the impact on mortality and economy.

City Disaster Response Force (CDRF):

On the basis of National Disaster Response Force (NDRF) at National level and State Disaster Response Force (SDRF) at State level it was proposed to establish City Disaster Response Force (CDRF) at City level. The objective of formulating CDRF for Mumbai is to develop self sustainability for responding disasters like major fire, collapse structure, CBRN etc. Presently 20 medical officers/, 16 fire officers, 200 Security guards are included in this force.

Disaster Management Control Room

CHALLENGES BEFORE US

1) Day to day from mega-cities to villages facing dreadful problems due to solid waste, plastics, e-waste etc. The quantity of solid waste reaching dumping grounds will be reduced, if segregation of dry/wet waste is done at source and wet waste is used for generating fertilizers. Every citizen should take this responsibility.

2) Plastic bags and wrappers are thrown on the street carelessly; consequently chocking sewer lines and storm water drainage arteries. Every body should think and co-operate with MCGM.

3) It is our social responsibility to take care for proper use of natural resources, tree plantation and maintenance, protection and conservation of wildlife and aquatic animals.

4) In future, if "Green Environment of Global" is managed properly, challenge warming can be solved definitely.

5) Students are our strong and healthy citizens of future. It is necessary to develop culture in their school life for management of green environment. Proper awareness is necessary for saving water, management and planning.

6) With the coordination of government and NGO's working on social levels and with participation of common man, the environmental pollution problems can be resolved effectively.

7) For protection of nature lot of things can be done on domestic levels such as preventing wastage of water and saving electricity.

8) Along with the development of cities, there is sheer negligence of nature which causes environmental problems. Laws are existing for controlling pollution protection of environment. It is necessary to change the mentality of every citizen.

SALIENT FEATURES OF MUMBAI'S ENVIRONMENT

- The Humboldt penguin exhibit of international standard have been developed at Veer Jijamata Bhonsale Udyan , Byculla. The said exhibit is opened for viewing of the visitors from 18-03- 2017.
- It is proposed to plant around 20,000 new trees in the year 2018-19 along roadside and on other places in MCGM jurisdiction.
- Presently 3850 MLD water is supplied to the city of Mumbai.The population growth trend is continued and the projected population of Mumbai is anticipated 17.24 million by the year 2041. The projected water demand for 2041 is 6424 MLD .
- For the citizens of Mumbai, to enable ease of doing business, simplified application forms for water connections are made available on the portal along with the list of documents required. Also the online application process for new connections has been developed and launched.
- The Project "Green Wheels along Blue Lines" i.e. Mumbai Cycle Track Project is being carried out by MCGM for the length of approx. 36km. The theme of this project is to keep water trunk mains encroachment free by developing the green corridor.
- In the year 2017- 18 , ward wise percentage of unfit water samples are negligible as compared to last two years,which is remarkable.
- To increase the water supply to Mumbai City & Suburbs, it is proposed to undertake development of sources like Gargai & Pinjal for abstracting 440 & 865 MLD of water respectively.
- To facilitate fast disposal of complaints regarding solid waste, MCGM's "Swacchata 24X7 App" has been integrated with Ministry of Urban Housing Authority(MoUHA)'s "Swachchhata App".
- 172 sanitary napkin vending machines and sanitary incinerators are installed in 159 MCGM Secondary School buildings for Std.VIII to Std.X girl students.
- The " SAFAR AIR" mobile app, provides location-specific current and forecast of Air Quality Index (AQI) and UV-index. This "Mobile App" is user friendly and will benefit the common man. The "Mobile App" which can be downloaded free of cost.

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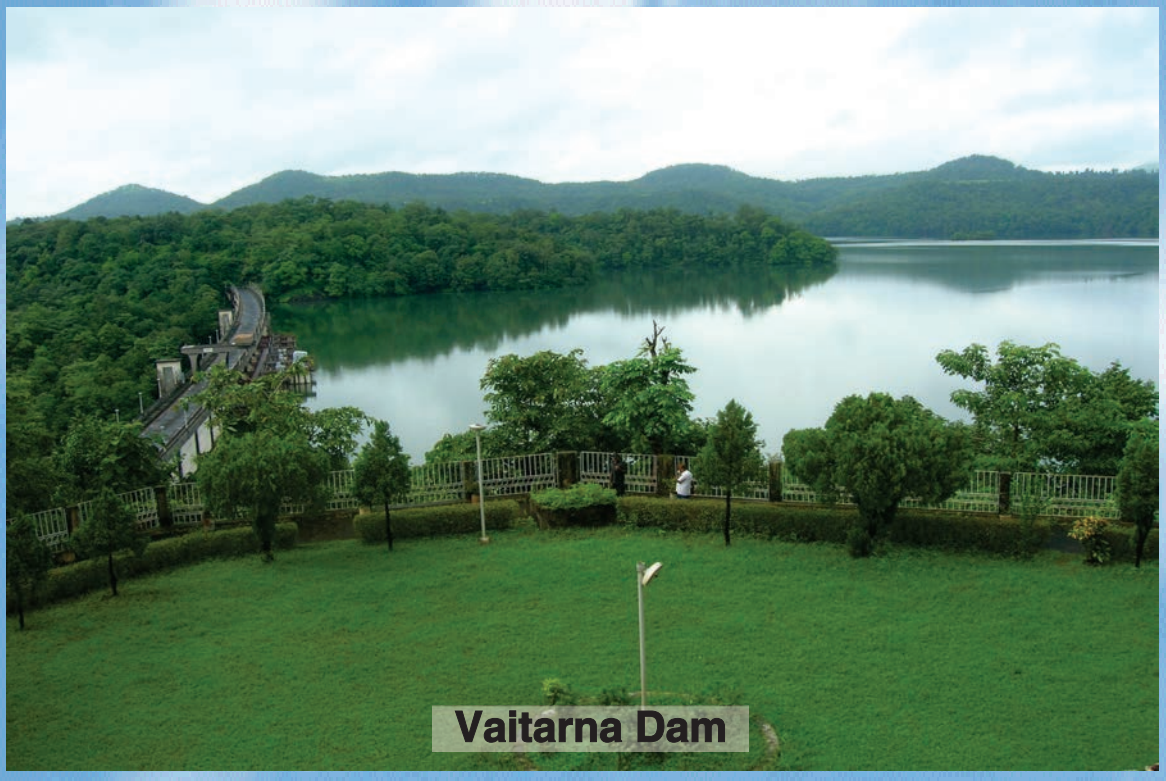
Mrinaltai Gore Flyover



Vaitarna Dam

Kurla Subway

Quick Response Vehicle, Mumbai Fire Brigade