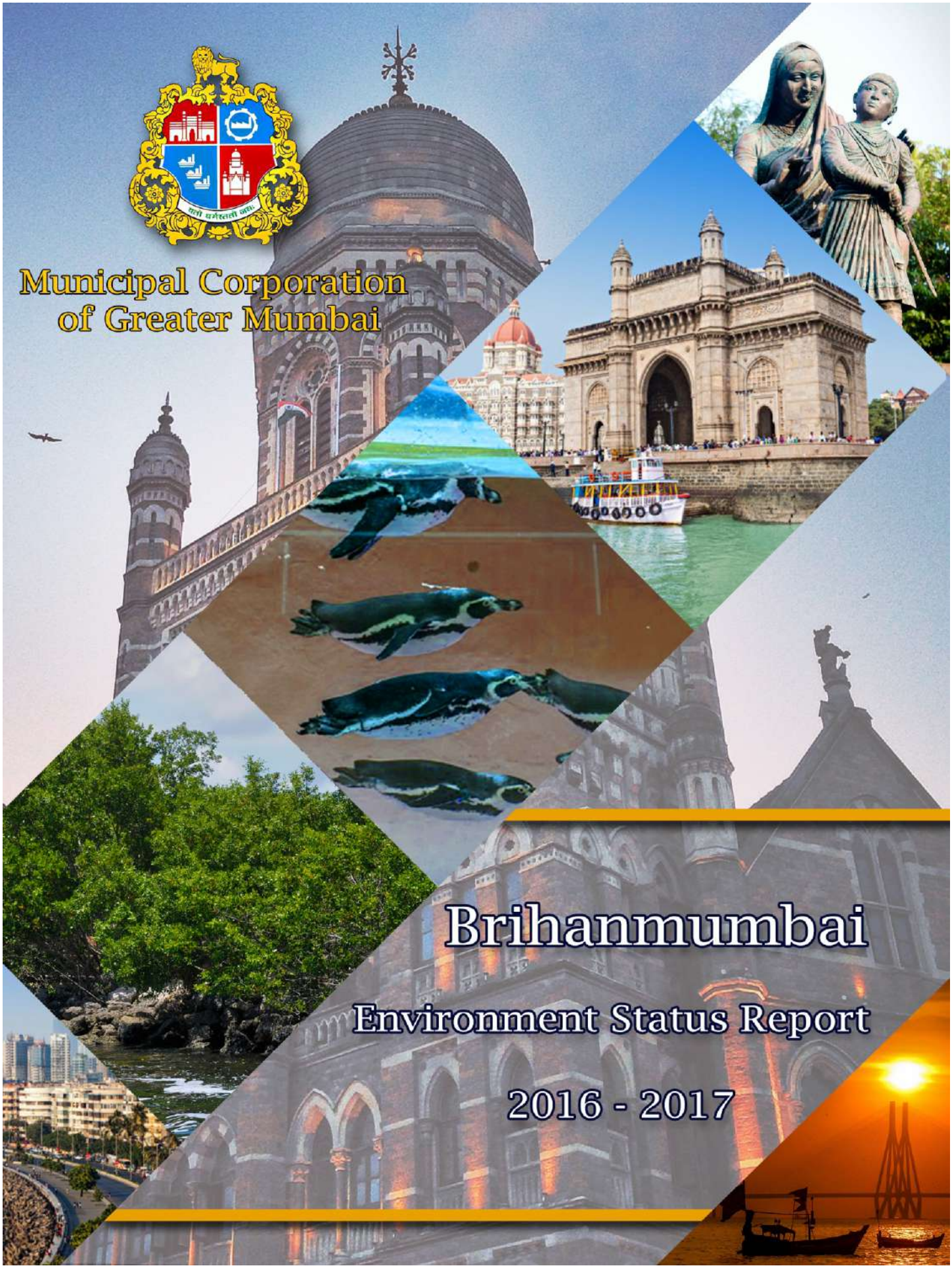
Municipal Corporation
of Greater Mumbai
Brihanmumbai
Environment Status Report
2016 - 2017

Penguins at Byculla Zoo

Municipal Corporation of Greater Mumbai

Environment Status Report of Brihanmumbai 2016 - 2017

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22nd Exhibition of fruits and vegetables at Veermata Jijabai Bhosale Udyan

Municipal Corporation of Greater Mumbai

मनोगत

मुंबईकरांना नागरी सेवा-सुविधा देण्यासाठी कटीबद्ध असणाऱ्या बृहन्मुंबई महानगरपालिकेच्या कर्तव्यांमध्ये पर्यावरण संरक्षण आणि निसर्गाच्या संवर्धनाचाही समावेश आहे. बृहन्मुंबई महानगरपालिका कायद्यातील 'कलम ६१(अ ब)' नुसार आपल्या क्षेत्रातील वनांचे व पर्यावरणाचे संरक्षण करणे आणि निसर्गाचे संवर्धन करणे, हे महापालिकेचे कर्तव्य आहे. तसेच बृहन्मुंबई महापालिका कायदा 'कलम ६३ ब' नुसार बृहन्मुंबई महानगरपालिका क्षेत्रातील पर्यावरणाबाबत 'पर्यावरण स्थितीदर्शक अहवाल'महापालिका सभागृहामध्ये दरवर्षी सादर करण्यात येत असतो. त्यानुसार वर्ष २०१६-१७ चा 'पर्यावरण स्थितीदर्शक अहवाल' सादर करण्यात येत आहे.

'पर्यावरण' हा आपल्या सगळ्यांशीच थेटपणे संबंध असणारा जिव्हाळ्याचा आणि संवेदनशील विषय आहे. बृहन्मुंबई महापालिका क्षेत्रातील पर्यावरण विषयक संवर्धनासाठी महापालिकेने वेगवेगळे प्रकल्प हाती घेतले असून त्यांची कामे प्रगतीपथावर आहेत. या वर्षीच्या अहवालानुसार दूषित पाण्याच्या घटलेल्या टक्केवारीचा उल्लेख याठिकाणी करायला हवा. गेल्या अहवाल वर्षात महापालिका क्षेत्रातील दूषित पाणी नमुन्यांची टक्केवारी ही ४.६ टक्के एवढी होती. याबाबत जल अभियंता खाते आणि सार्वजनिक आरोग्य विभाग यांनी वेळोवेळी केलेल्या कार्यवाहींच्या परिणामस्वरुप ही टक्केवारी आता ३ टक्क्यांपर्यंत घटली आहे.दूषित पाण्याची टक्केवारी आणखी कमी करण्याच्या दृष्टीने आवश्यक ते प्रयत्न करण्याच्या सूचना सर्व संबंधितांना देण्यात आल्या असून त्यानुसार कार्यवाही करण्यात येत आहे.

मलनिःसारण 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. यासोबतच महापालिका क्षेत्रातील कांदळवन, हरितपट्टा याविषयीची माहितीही या अहवालात देण्यात आली आहे. तसेच महापालिकेच्या व्यतिरिक्त इतर संस्थांनी केलेल्या पर्यावरण विषयक कामांची देखील दखल या अहवालाच्या माध्यमातून घेण्यात आली आहे.

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 २०१५ 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 राबविण्यात येत आहे. या प्रकल्पांसाठी मुंबईतील १३ महत्वाच्या ठिकाणी हवामान व प्रदूषण विषयक माहिती 'एलईडी होर्डिंग्ज' द्वारे तात्कालिक स्वरुपात प्रदर्शित करण्यात येत आहे. ज्यामुळे पर्यावरण विषयक जनजागृतीसाठी निश्चितच मदत होत आहे. या प्रकल्पांतर्गत महत्वाच्या चौकांमध्ये वा वर्दळीच्या ठिकाणी 'एलईडी होर्डिंग्ज' बसविण्यासाठी जागा उपलब्ध करुन देण्यासोबतच या होर्डिंग्जचा विद्युत खर्च महापालिकेद्वारे केला जात आहे.

बृहन्मुंबई महानगरपालिका क्षेत्रातील विविध परिसरांचे ध्वनी प्रदूषण संवेदनशीलतेच्या दृष्टीने विश्लेषण करण्यात आले होते. हे विश्लेषण करताना त्या-त्या परिसरातील शैक्षणिक संस्था, न्यायालये, रुग्णालये आणि धार्मिक स्थळांजवळील परिसर या बाबींचा विचार करण्यात आला. त्यानुसार सप्टेंबर २०१५ मध्ये महापालिका क्षेत्रातील १,५०३ ठिकाणे ही शांतता क्षेत्र म्हणून घोषित करण्यात आली आहेत. या शांतता क्षेत्रांचे नकाशे व यादी महापालिकेच्या संकेतस्थळाद्वारे यापूर्वीच उपलब्ध करुन देण्यात आली आहे.

तसेच ध्वनी प्रदूषणाच्या समस्येवर उपाययोजनेच्या दृष्टीने आराखडा तयार करण्यासाठी महापालिका क्षेत्रातील ध्वनी प्रदूषणदृष्ट्या संवेदनशील ठिकाणांच्या ध्वनी पातळीचे मापन (Noise Mapping) मे २०१५ पासून महापालिकेद्वारे करण्यात येत आहे. या अंतर्गत १,२०० ठिकाणांच्या ध्वनी पातळीचे शास्त्रीय पद्धतीने मापन करण्यात आले आहे. अंतिम निर्णायक अहवाल अद्याप सल्लागारांकडून प्राप्त झाला नाही.

बृहन्मुंबई महानगरपालिका क्षेत्रातील पर्यावरणाचे संवर्धन करण्यासाठी अनेक उपक्रम बृहन्मुंबई महानगरपालिका राबवित असते.या अंतर्गत एक महत्वाचा उपक्रम म्हणजे महानगरपालिकेद्वारे हाती घेण्यात येणारा वृक्षारोपणाचा कार्यक्रम ! या कार्यक्रमांतर्गतवर्ष २०१६–१७ मध्ये रस्त्यालगत व महापालिकेच्या अखत्यारितील मोकळ्या जागांवर ११ हजार ४७७ झाडे लावण्यात आली आहेत.

मुंबईची खरी संपत्ती ही मुंबईला लाभलेला विस्तीर्ण सागरी किनारा आहे. मुंबईच्या सागरी किना-याचे आणि सागरी पर्यावरणाचे संरक्षण करणे, संतुलन राखणे व संवर्धन करणे ही आपल्या सर्वांचीच जबाबदारी आहे. याच भूमिकेतून समुद्रात सोडले जाणारे मलजल हे अत्याधुनिक तंत्रज्ञानाचा वापर करुन प्रक्रिया करुनच सोडले जावे, यासाठी महापालिका आग्रही आणि प्रयत्नशील आहे. या बाबींमुळे बृहन्मुंबई महानगरपालिका क्षेत्रातील पर्यावरणाचा समतोल राखण्यास मदत होणार आहे.

यास्तव, बृहन्मुंबई महानगरपालिका हद्दीत गोळा होणा-या मलजलाची पर्यावरणीय दृष्टिकोनातून संवेदनशीलता लक्षात घेता महापालिका क्षेत्रामध्ये कुलाबा, वांद्रे, वरळी, घाटकोपर, भांडुप, वर्सोवा, मालाड अशा एकूण ७ ठिकाणी मलजल प्रक्रिया केंद्रे कार्यान्वित आहेत. या मलजल प्रक्रिया केंद्राची क्षमता दररोज सुमारे ३००० दशलक्ष लिटर एवढी आहे. या मलजल प्रक्रिया केंद्राच्या दर्जोन्नतीचे प्रस्तावित आहे. त्यापैकी कुलाबा मलजल प्रक्रिया केंद्राच्या दर्जोन्नतीचे काम सध्या प्रगतीपथावर आहे. याव्यतिरिक्त सर्व प्रमुख मलजल प्रक्रिया सुविधा केंद्र प्रकल्प दर्जोन्नतीचे काम झाल्यानंतर सुमारे २००० दशलक्ष लिटर एवढे प्रक्रिया केलेले पाणी पिण्याव्यतिरिक्तच्या उपयोगासाठी उपलब्ध करण्याचे प्रस्तावित आहे.

बृहन्मुंबई महापालिका क्षेत्रात मार्च २०१७ पर्यंत ३३ लाख ०९ हजार ९६६ एवढी वाहने नोंदविली गेली आहेत. या व्यतिरिक्त मुंबई शहरामध्ये दररोज बाहेरुन येणारी वाहने आणि नवीन वाहन नोंदणी यामुळे या संख्येत भरच पडत आहे. यामुळे महापालिका क्षेत्रात वाहतूक कोंडी सोबतच वायु प्रदूषणाचा प्रश्न देखील बिकट होत चालला आहे. ही बाब लक्षात घेता महापालिका क्षेत्रात वाहतुकीच्या दृष्टीने आमूलाग्र सुधारणा करण्याकरिता 'सर्वसमावेशक वाहतूक आराखडा' (Comprehensive Mobility Plan) बनविण्यासाठी सल्लागाराची नेमणूक वर्ष २०१४ मध्ये करण्यात आली होती. त्यानुसार विविध अत्याधुनिक साधनांच्या सहाय्याने वाहतुकीचे सर्वेक्षण व त्यावर आधारित विश्लेषण करण्यात येऊन त्याआधारे तयार करण्यात आलेला अहवाल महापालिकेकडे वर्ष २०१६ मध्ये सादर करण्यात आला आहे. सदर अहवालानुसार महापालिकेच्या २४ प्रशासकीय विभागांमध्ये कोणकोणती कार्यवाही करता येऊ शकते व त्याबाबत प्राधान्यक्रम काय असावा ? यानुसार विभागनिहाय कार्यवाही प्रस्तावित करण्याच्या सूचना सर्व विभाग कार्यालयांना देण्यात आल्या आहेत. याच अनुषंगाने सदर अहवाल सर्व संबंधित संस्थांना देखील पाठविण्यात आला आहे.

मला खात्री आहे की, येणा-या काही वर्षांमध्ये महानगरपालिकेच्या विविध खात्यांनी हाती घेतलेले प्रकल्प पूर्ण झाल्यावर, तसेच विविध उपाययोजना राबविल्याने मुंबईच्या नागरिकांना अधिक चांगले पर्यावरण उपलब्ध होईल. या अहवालाच्या निमित्ताने मला आवर्जून नमूद करावेसे वाटते की, वैश्विक उष्म्याचे दुष्परिणाम लक्षात घेता पर्यावरणाबाबत अधिक गांभिर्याने व सर्वसमावेषक विचार होणे गरजेचे आहे. मुंबईच्या पर्जन्यमानात होत असलेला बदल हा जागतिक वातावरणात वाढत असलेल्या तापमानाचाही 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 या अनुषंगाने करण्यात येणा-या कार्यवाहींमध्ये पर्यावरणाचा विचार आवर्जून केला जात आहे. यामध्ये प्रामुख्याने पर्जन्यजल संचयन, सांडपाण्याचे पुनर्चक्रीकरण व त्याचे योग्य नियोजन, ऊर्जा बचतीचे प्रकल्प, सार्वजनिक वाहतूक व्यवस्था सुधारणे, घन कच-याची शास्त्रीय पद्धतीने विल्हेवाट लावणे इत्यादी बाबींचा समावेश आहे. तसेच भविष्यात हरित इमारतींसारख्या संकल्पनांवर देखील कार्यवाही करण्याची बाब महापालिका प्रशासनाच्या विचाराधीन आहे.

महापालिकेद्वारे प्रस्तावित करण्यात आलेल्या 'सुधारीत प्रारुप विकास आराखडा २०३४' मध्ये पर्यावरणीय बाबींचा साकल्याने विचार करण्यात आला आहे. याबाबत आवर्जून नोंद घेण्यासारखी बाब म्हणजे सध्याच्या 'विकास नियंत्रण नियमावली (१९९१)'मध्ये ४ प्रकारचे क्षेत्र अंतर्भूत होते. यामध्ये निवासी, वाणिज्यिक, औद्योगिक, ना-विकास क्षेत्र (NDZ) यांचा समावेश होता.तथापि, 'सुधारीत प्रारुप विकास आराखडा २०३४' यामध्ये प्रथमच 'नैसर्गिक क्षेत्र' (Natural Area) या प्रकाराचा अंतर्भाव करण्यात आला आहे.

नैसर्गिक क्षेत्रामध्ये बृहन्मुंबई महापालिका क्षेत्रातील वने, तलाव, नद्या, जलाशय, ओढे, कांदळवन (खारफुटीचे वन) आणि किनारपट्टीवरील दलदलीचे प्रदेश इत्यादींचा समावेश करण्यात आला आहे. या प्रकारच्या प्रदेशांचा समावेश 'नैसर्गिक क्षेत्र' या प्रकारच्या भू-वापर क्षेत्रामध्ये (Zoning) करण्यात आल्याने भविष्यात या ठिकाणी कोणत्याही विकासाला परवानगी दिली जाणार नाही. ज्यामुळे स्वाभाविकपणे मुंबई महापालिका क्षेत्रातील पर्यावरण संवर्धनास चालना मिळण्यासोबतच जैववैविधतेची जोपासना होणार आहे. 'नैसर्गिक क्षेत्र' या अंतर्गत असणा-या जमिनीचे एकूण क्षेत्रफळ १२ हजार ८५९ हेक्टर्स इतके आहे. याचाच अर्थ बृहन्मुंबई महापालिका नियोजन क्षेत्राच्या एकूण जमिनीपैकी सुमारे २९.५९ टक्के एवढी जमिन 'नैसर्गिक क्षेत्र' या अंतर्गत असणार आहे.

याप्रकारे बृहन्मुंबई महानगरपालिका विविध स्तरीय प्रयत्नांद्वारे पर्यावरण समतोलासाठी आणि संवर्धनासाठी सदैव कटीबद्ध आहे.

धन्यवाद !

अजोय मेहता
महापालिका आयुक्त
बृहन्मुंबई महानगरपालिका

Municipal Corporation of Greater Mumbai

ACKNOWLEDGEMENT

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

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

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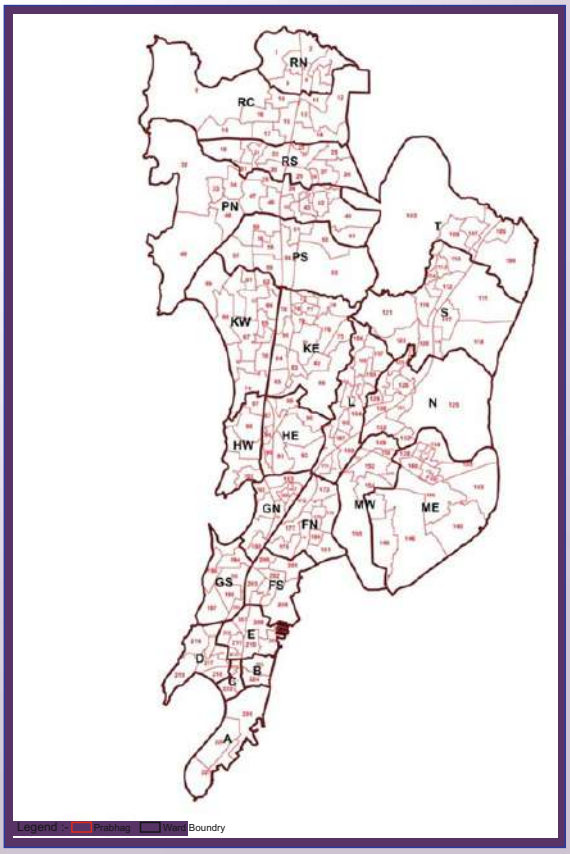
INTRODUCTION

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 (AQMRL) of Environment section in Solid Waste Management (SWM) 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. The ESR 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.

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 Fgreater 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).

Map No. 1 :
Mumbai Election Division Boundary 2017



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. The data recorded by Disaster Management Department of MCGM with the help of automatic weather monitoring stations installed at Colaba & Vile Parle. In the year 2016 Mumbai received a total rainfall measuring 1930.2 mm & 2755.9mm respectively. The maximum rainfall of of 923mm was recorded during July 2016 at Vile Parle, In the year 2015 Mumbai received a total rainfall measuring 1656 mm & 1881.7mm respectively. So it is observed that there was more rainfall as compared to previous year.

In Mumbai the maximum temperature of 35^{0}C and minimum temperature of 22^{0}C was recorded at Colaba.

Monthly data of temperature, rainfall and wind speed for Mumbai is shown in Table No. 1

TABLE NO. 1 : METEOROLOGICAL DATA 2016-17

MONTH	TEMPERATURE °C				RAINFALL in mm		WIND SPEED km/hr	
	COLABA		VILE PARLE		COLABA	VILE PARLE	COLABA	VILE PARLE
	MAX	MIN	MAX	MIN				
Apr-16	33	26	33	27	0	0	36	36
May-16	35	27	33	29	0	0	33	34
Jun-16	32	27	32	27	510	663	33	35
Jul-16	30	25	29	25	541	923	30	31
Aug-16	30	25	30	25	304	407	30	31
Sep-16	31	24	30	24	531	675	31	32
Oct-16	31	22	31	24	44.2	87.9	31	35
Nov-16	32	22	32	23	0	0	35	36
Dec-16	32	22	33	23	0	0	35	35
Jan-17	32	28	30	24	0	0	34	32
Feb-17	32	28	32	24	0	0	31	31
Mar-17	31	28	31	27	0	0	31	31

Source: Disaster Management Department of MCGM

Population of Mumbai

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.

As per data received from Health Department of MCGM the estimated population of Mumbai was 12.69 million. The population density of 26,645 person per sq.km (excluding no development area). Mumbai is the most densely populated city in India.

The information received from Health Department of MCGM , Administrative Ward-wise population indicates that 'P/North' ward has maximum population of 9,60,074 persons where as 'B' ward has minimum population of 1,29,820 persons (Table No 2)

Graph No. 1 : Population Decadle Growth

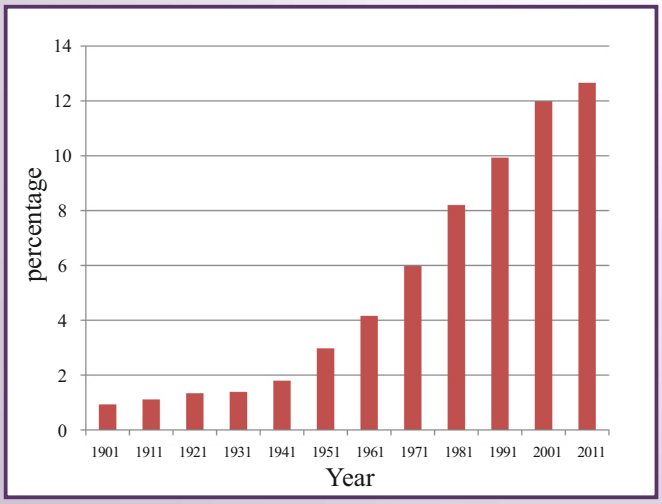


Table No. 2 : Growth of Population and rate of Increase during year 1901-2011

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
1991	9.92	21.1
2001	11.97	20.6
2011	12.64	3.8

Source : Census Department of India

LAND USE

Mumbai was the first city Municipal Corporation to adopt the concept of a development plan and the first development plan was formulated in 1964 and was sanctioned in 1967. The second development plan came into force in 1991-94 and was valid upto 2013 and now new plan for 2014-34 was submitted for approval. Municipal Corporation of Greater Mumbai has sanctioned the resolution no.307 dated 27.05.2016 as per the provisions of Section 26 (1) of MR & TP Act 1966, for inviting

suggestions and objections from public within stipulated time period of 60 days and to cancel earlier submitted Draft Development Plan (2034) which was published on 23.02.2015.

Planning Area

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 SPAs exist in Greater Mumbai – MMRDA (Mumbai Metropolitan Region Development Authority), SRA (Slum Rehabilitation Authority) and MIDC (Maharashtra Industrial Development Corporation). The EDDP therefore, prepared a Development Plan for 415.05 sq. km.In the interim, however, several fresh additions have either happened or are proposed. The ELU 2012 located the emergence of an additional area of 14.96 sq. km, full of mangroves, in Thane creek, probably due to siltation. This area is outside the current MCGM limits. It is proposed, however, by the Revised Draft Development Plan 2034 (RDDP) for merger in the MCGM boundary and will be shown as Natural Area.

The Coastal Road approved by GoM adds a further area of 1.80 sq. km through reclamation of the sea. The alignment of this Road is being marked on the PLU (Proposed Land Use). 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 reclamatio. The addition of these land marks Greater Mumbai's total land area 476.24 sq. km.

Table No. 3 : Additional Areas accruing to MCGM.

Sr. No.	SOURCE	TOTAL AREA	AREA IDENTIFICATION	DATE
1.	Land Mass through siltation	14.96 sq. km	Thane Creek	ELU 2012
2.	Coastal Road + Green Reclamation	3.059 km	Reclaimation from sea	GoM 2015
	Total area	17.96 sq. km		

Source : Development and Planning Department of MCGM

Moreover, Government of Maharashtra (GoM) transferred three pieces of land from MMRDA to MCGM adding a total of 111.58 Hectares (approx. 1.11 sq. km) to the area of this Planning Authority (MCGM).

Table No. 4 : Recently Added Area to MCGM from MMRDA

Sr. No.	TRANSFERRED FROM	TOTAL AREA	AREA IDENTIFICATION	DATE
1	MMRDA	27.36 Ha	Between Mithi River and LBS marg at BKC	30 Aug. 2014
2	MMRDA	47.37 Ha	'A' Block comprising MHADA layout at BKC	18 Nov. 2015
3	MMRDA	36.85 Ha	West side of Swami Vivekananda Rd. Oshiwara	18 Nov. 2015
	ALL AREAS	111.58 Ha	Approx. 1.11 sq. km	

Source : Development and Planning Department of MCGM

These cited additions and deletions leading to changes in area and percentages are as follows.

Table No. 5 : MCGM and SPA Areas

AREA CLASSIFICATION	MCGM AREA	MCGM (PLANNING AUTHORITY) AREA	SPA AREA
EDDP AREA	458.28 sq. km	415.48 sq. km	42.80 sq. km
NEW LAND MASS IN ELU	14.96 sq. km	14.96 sq. km	
COASTAL ROAD + GREEN RECL	3.00 sq. km	3.00 sq. km	
FROM SPA TO MAGM		1.11 sq. km	-1.11 sq. km
TOTAL	476.245 sq. km	434.55 sq. km (91.24%)	41.69 sq. km (8.76%)

Source : Development and Planning Department of MCGM

The cited changes, as Table 5. shows, would make MCGM's DP area as 434.55 sq. km (91.24%) leaving area with SPA at 41.69 sq. km (8.76%).

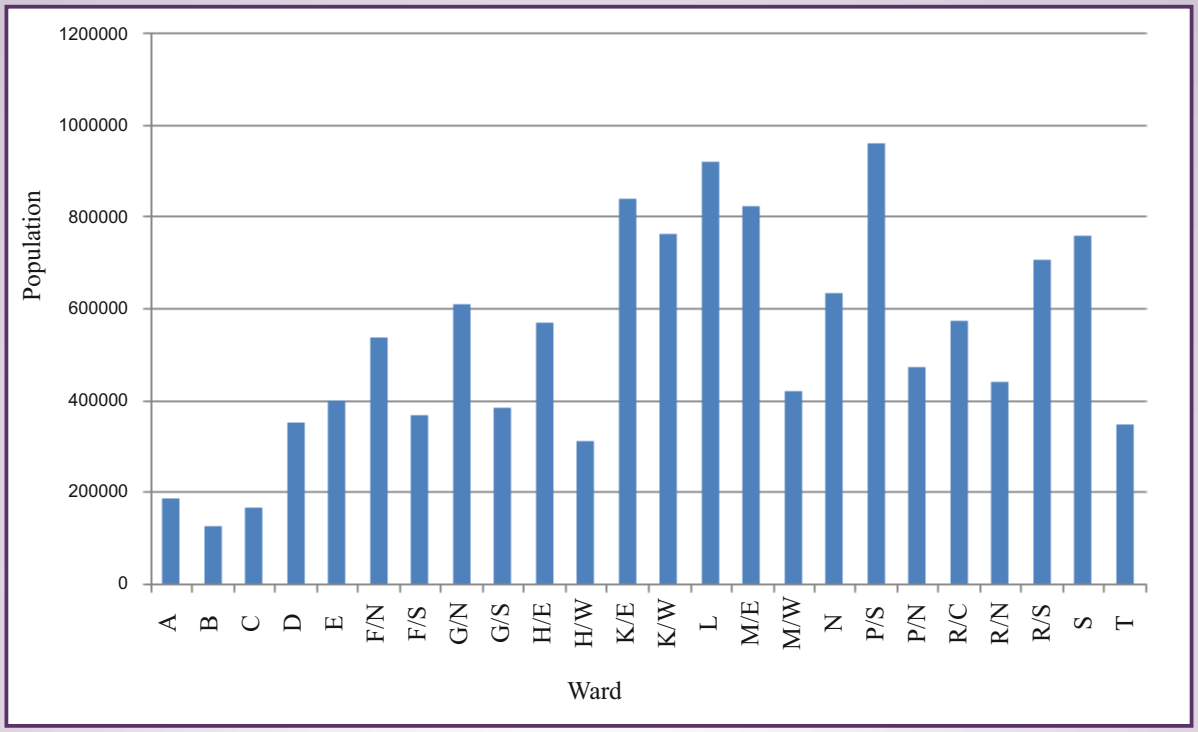
Greater Mumbai with population of 12.69 million, is India's most populous city. It is country's financial centre, it serves as the core city of Mumbai Metropolitan Region and is amongst the top ten largest Urban agglomerations in the world. Wardwise Area, Population as per Development Planning- (Area), Health- (Population) is given in Table No. 6

Table No 6: Wardwise Area, Population

Administrative Ward	Area in Sq.km.	Population
A	11.20	188691
B	2.65	129820
C	1.91	169463
D	8.30	353759
E	7.27	401102
F/N	12.85	539548
F/S	9.87	368146
G/N	8.31	610944
G/S	9.74	385256
H/E	12.41	568313
H/W	8.65	313694
K/E	24.00	840258
K/W	25.18	763567
L	15.62	920155
M/E	38.19	823772
M/W	17.62	420079
N	29.68	635231
P/S	46.70	960074
P/N	25.19	472718
R/C	47.95	573334
R/N	14.17	439941
R/S	18.31	704966
S	32.55	758564
T	44.91	348249
Coastal Road	3.00	
TOTAL	**476.24**	**12689644**

Source: This information is received from Development Planning- (Area), Health- (Population) and Garden - (no. of trees) Depts of MCGM

Graph No. 2: Wardwise Population



In the draft D. C. Regulation 2034, rules have been incorporated for environmental sustainability e.g. Grey Water recycling, rain water harvesting, sewage treatment plant and it is compulsory & encouraged for proposed residential complexes, new buildings and redevelopments.

Coastal Regulation Zone

Greater Mumbai is an island and hence, Mumbai city is surrounded by sea on all sides. As such, most of the Greater Mumbai areas are affected by Coastal Regulation Area and this is related to the environment of the City. Hence, No objection Certificate from M.C,Z.M.A. is necessary for development of land Around 6000 hectares of land is available in the form of 'mangrove forest' along Coastal Line of Mumbai City and it is a great blessing for Mumbai City.

MoEF has issued CRZ Notification vide No. S.O.19 (3) dated 06.01.2011, in super-cession of the earlier notification S.O. 114 (E) of 19.02.1991.

The objectives of the new CRZ Notification include the need to ensure livelihood and security to the fishing communities, to protect the Coastal Environment and to give impetus to economical

undertakings in CRZ areas. There is specific mention in para 8, sub para 5(1) of the notification regarding the need for redevelopment of housing for local communities, slums existing near coastal region, as well as redevelopment of dilapidated buildings considering importance of Mumbai city.

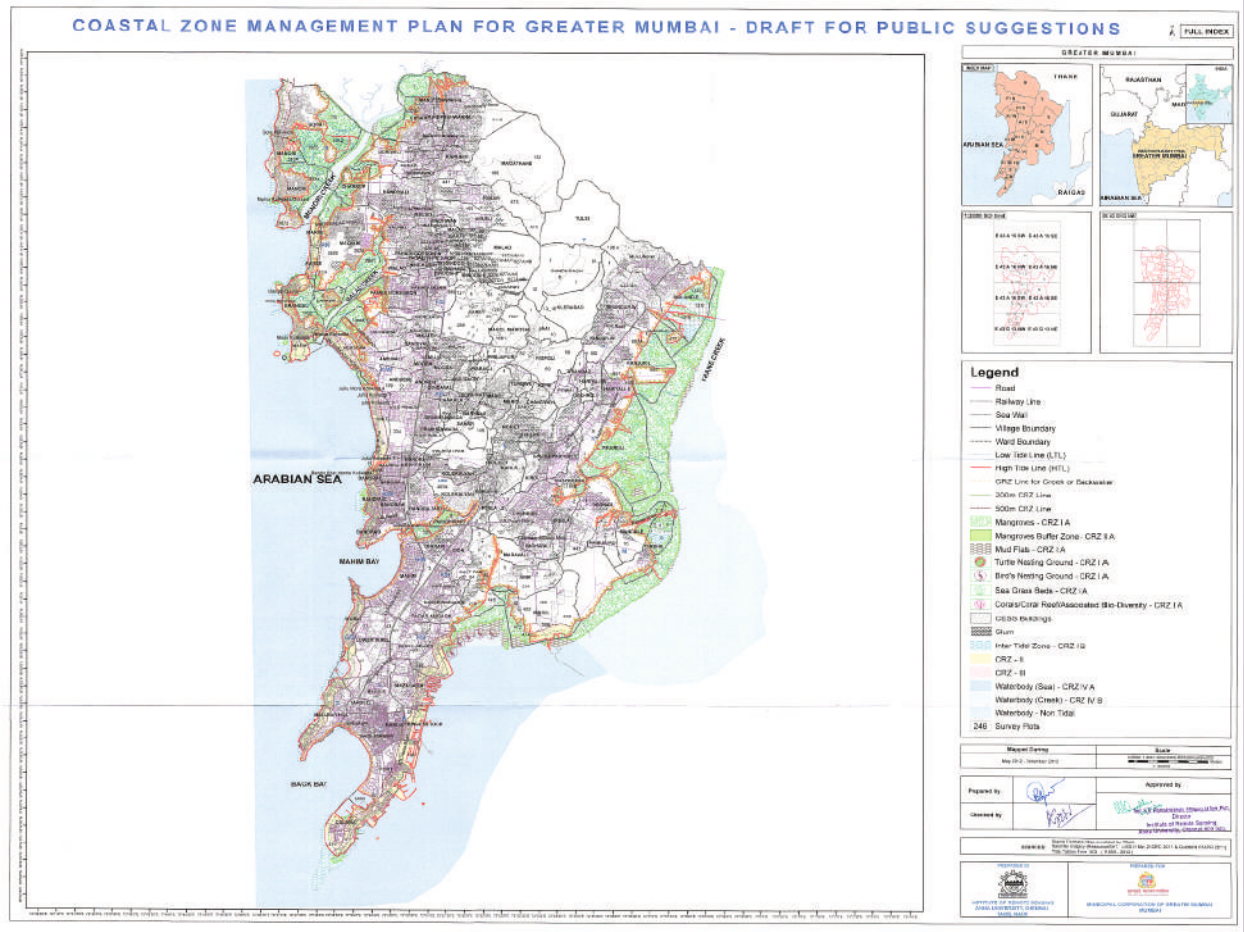
The new notification has made it obligatory on State Authority to demarcate HTL and Hazard line and also to prepare new CZMP within 24 months through authorized agencies of Central Govt. This aspect is being separately dealt with by the D.P. department.

The work of preparing new Coastal Zone Management Plan as per CRZ notification dated 6th January 2011 has been entrusted by MCGM to the institute of Remote Sensing, Anna University, Chennai. Director (IRS) has prepared Draft CZMP with all relevant information using Remote Sensing, Global Positioning System of Geographical Information System as per provision of Coastal Zone Regulation Guideline 2011. The Draft CZMP has been published by MCZMA on the website of MCZMA 29.03.2017 for inviting the suggestion / objection all stake holders

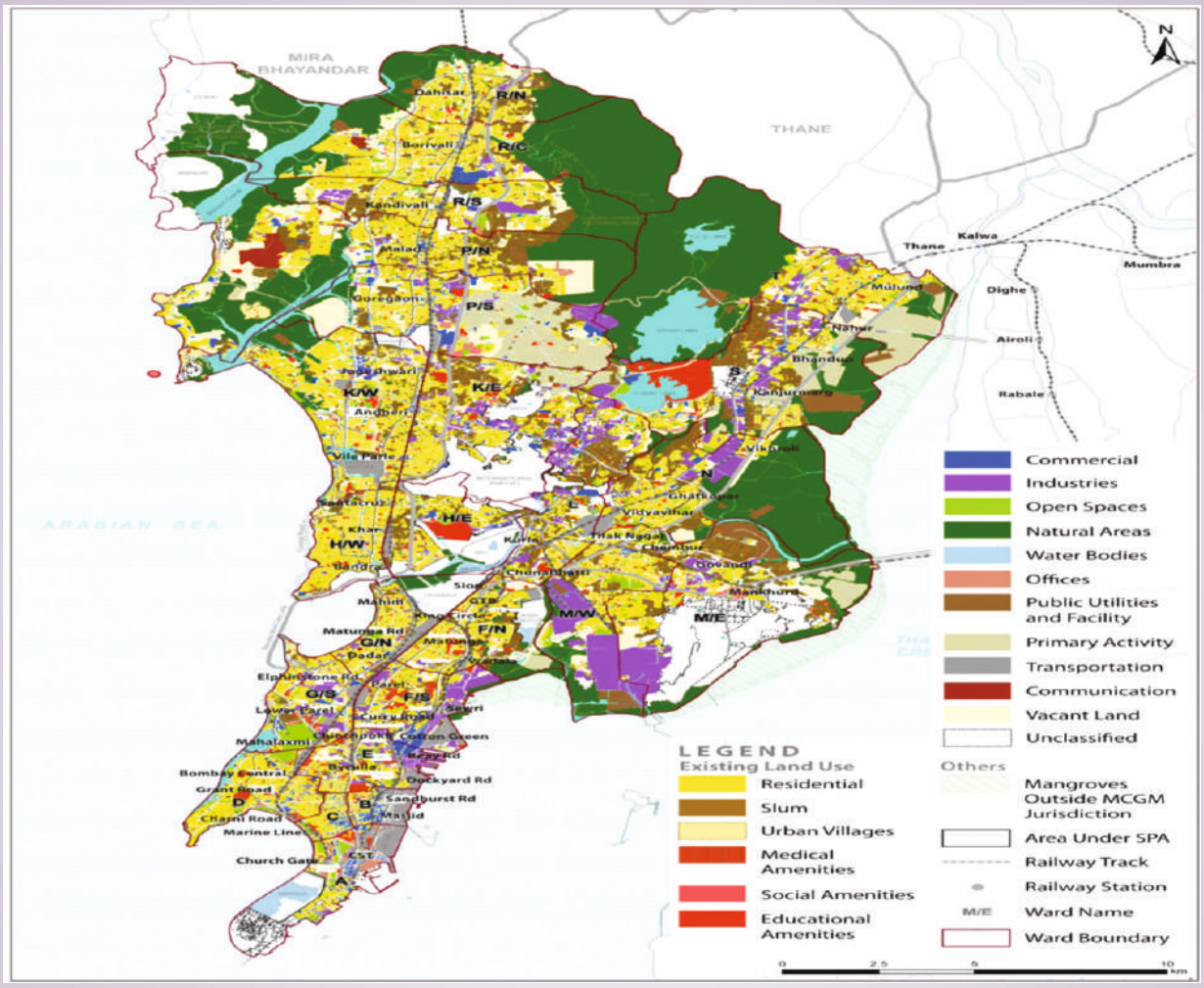
CRZ details of Greater Mumbai Municipal Corporation.

Total HTL Length	-	433.22 km
HTL along creek	-	297.40 km
Total area of Mangroves	-	54.14 Sq.km
Mangrove buffer zone (CRZ I)	-	76.85 Sq.km
CRZ II	-	33.91 Sq.km
CRZ III	-	9.20 Sq.km
CRZ-IVB	-	41.74 Sq.km
Mudflats	-	11.59 Sq.km
Salt-pan	-	2.0 Sq.km
PG, RG, Green Areas, Park. etc.	-	2.62 Sq.km

Map No. 2 : DRAFT CZMP GR.MUMBAI, Scale 1:25000



Map No. 3



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 faunal 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.

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

- 3 lakh mangrove saplings were raised in nurseries.
- In Mumbai and New Mumbai areas 5 Mangrove nurseries have been formed on 56 Hectare land.
- Assisted natural re-generation works in Mumbai at 3 locations namely, Bhandup, Mahul and Gorai extending to 22 hectares to facilitate tidal water flow in mangrove areas.
- Display boards, signage etc. to create awareness about the need for mangrove conservation.
- Plantation programs in collaboration with NGO's.
- Promenades at the landward edge of mangrove areas being planned with the support MCGM and residential association.
- Legal action to evict encroachments on mangrove land will be initiated by MNCU in Mumbai.
- Training awareness generation and publicity works will be scaled up.

Santacruz Municipal school students participating in plastic cleaning campaign at Carter Road, Bandra, 27th December 2016

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 Act 1888. 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) These facilities are utilized by citizens as well as others from different places.

Table No. 7 : Recreational Facilities 2016-2017 (Total no. as on 31.03.2017)

Sr. No.	Particulars	City	W. S.	E. S.	TOTAL
1	Garden (except greenbelts)	14	133	82	229
2	Recreation Grounds	163	184	85	432
3	Playgrounds	42	182	95	319
4	Parks	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 counters	3	4	1	8
9	Statues	39	5	9	53
10	Tree Plantation	2255	5845	3377	11477
11	Distribution of Trees	18850	3942	5290	27452
12	Total No. of Trees	718589	1313609	1074670	3106868

Source: This information is received from Garden Department of MCGM.

Veermata Jijabai Bhosale Udyan & Zoo

Veermata Jijabai Bhosale Udyan & Zoo is one of the oldest zoos in the country established 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.

Garden:

For tree conservation, Garden department has done following work in the year 2016-17,

- About 11477 no. of trees are planted on Municipal roads and open spaces.
- Spraying of insecticides and pesticides on infected trees.
- Trimming of 67698 tree branches to balance the trees.
- Formation of Tree basins around the trees.
- Removal of 858 no of dead and dangerous trees.
- During 2016-17 the Municipal Corporation of Greater Mumbai and the Tree Authority has organized the 22nd exhibition of plants, flowers, fruits and vegetables from 13th to 15th January 2017 at Veermata Jijabai Bhosale Udyan. To create consciousness and awareness about environment among the citizens, the Workshop on various horticultural subjects was also arranged during the same period.
- In the year 2017-18around 25000 trees are proposed to plant on roadside and on other places in MCGM jurisdiction.

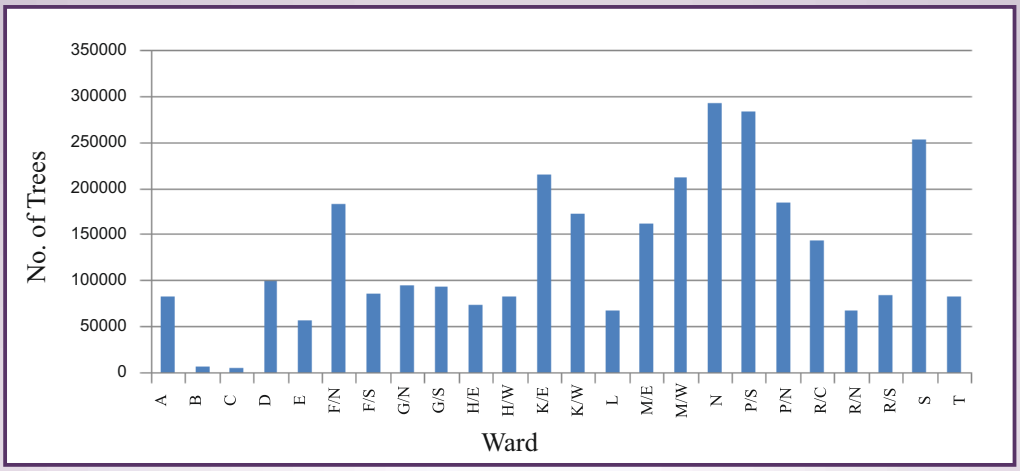
Work of Tree Census in 20 wards is completed work of tree census in 4 wards is partiablly pending. As per Tree Census Report there are 31,06,868 no. of trees in the city. Ward wise chart is attached herewith. (Table No. 8)

Table No 8 : Wardwise Area, No. of Trees

Administrative Ward	Area in Sq.m.	Trees
A	11.20	83201
B	2.65	7816
C	1.91	5756
D	8.30	100317
E	7.27	58028
F/N	12.85	184837
F/S	9.87	87240
G/N	8.31	96620
G/S	9.74	94774
H/E	12.41	74092
H/W	8.65	83176
K/E	24.00	215728
K/W	25.18	173232
L	15.62	67758
M/E	38.19	162638
M/W	17.62	213084
N	29.68	292965
P/S	46.70	284271
P/N	25.19	186002
R/C	47.95	144790
R/N	14.17	67808
R/S	18.31	84510
S	32.55	254038
T	44.91	84187
Coastal Road	3.00	
TOTAL	**476.24**	**3106868**

Source: This information is received from Garden Department of MCGM.

Graph No. 3 : Wardwise No. of Trees



Zoo

Veermata Jijabai Bhosale Udyan and Zoo is one of the oldest zoos in the country and was established in 1862. This area was under the control of Agri-Horticultural Society of Western India. The management of this Udyan and Zoo was handed over to MCGM by the then state government in 1873. The total area of this Udyan and Zoo is approx. of 53 acres and is declared as "Heritage Grade II (B)" site.

V.J.B. Udyan and Zoo at present :

1) As on 31st march 2017 there are in all 388 animals which include 112 mammels of 12 species, 245 birds of 28 species and 31 reptiles of 6 species displayed in this Udyan and Zoo.
2) As per the guidelines laid by the Central Zoo Authorityu, New Delhi, under the "National Zoo Policy 1998" the main objective of establishment of a zoo is to protect, conserve and breed the rare and endangered animals.
3) Various educational activities like wildlife week, World Earth Day, World Environment Day, Animal Keepers training programs, Zoo awareness Programs etc. are conducted at V.J.B. Udyan and Zoo for creating empathy and awareness about wildlife, nature and environment in the minds of citizens and school/college students.

Modernization Project of Veermata Jijabia Bhosale Udyan & Zoo :

Various Development works undertaken:

1) Construction works of Entry Plaza, Interpretation Center building Humboldt Penguin exhibit, zoo hospital, quarantine area, peripheral wall and service roads asphalting of internal roads, development of 35 internal pocket gardens restoration of heritage structures, are completed under first phase of the project.
2) Various public amenities (Toilet blocks, Food kiosks, Rain water shelters, drinking water fountains, etc.) are being developed. Two drinking water fountains and one toilet are already functional.
3) In second phase, Tender-I and Tender-II for development of 17 animal enclosures are under finalization wherein enclosures for Tiger, Lion, Sambar and Barking deer, Nilgai and Four horned antelope, Block buck, Swamp deer, Bird Aviary – 02 and Muggar and Ghariyal Madras pond turtle, Hyena, Wolf, Jackal, Otter, Sloth bear, Cat complex, Bird Aviary – 1, Reptile House will be developed.
4) The animal such as Giraffe, Zebra, Wallaby, Hippopotamus will be displayed on the area of Mafatlal Mill. A Master Plan for the said area has been prepared and submitted to Central Zoo Authority, New Delhi for approval.

Main attraction in Zoo :

Veermata Jijabai Bhosale Udyan and Zoo has procured total 8 (eight) Humboldt penguins from Coex Aquarium, Seoul, South Koera on 26.07.2016. These birds are kept in an indoor exhibit (approx. 1800 Sq ft.) on the ground floor of Interpretation Center building in this Zoo. This exhibit is designed adhering to the biological, physiological and behavioral needs of the Humboldt penguins. The exhibit incorporates holding area, quarantine area, quarantine area, kitchen and shelter places for the said birds.

The facility was started from 18.03.2017 since then around 10 lakh people have enjoyed the observation of these birds.

Contribution of other Industries towards improvement of "Green Belt" in Mumbai

Mumbai Port Trust:

Mumbai Port has a long history of significant contribution to the economic development of Mumbai city and the nation. The Port Trust was established in 1873 and has been one of the premier major Port of India and has a major contribution in development of the city of Mumbai as financial capital of the country. Mumbai Port has continuous commitment to the issues related to the environmental concern and has strived to contribute its share. Few such efforts are listed here below-

Port proudly feels to state that it has developed and maintained, one of the best \Botanical Gardens named 'Sagar Upvan' in the Port area near Colaba, which has received 'Best Garden Award' in its category for nine years successively. Apart from this several green patches are developed by the Port, thousands of trees have been planted and maintained by the Port. It has also developed a mangrove part at Sewree Timber Pond under the name 'Emerald Project' for protection of various species of mangroves and migrating birds. Bombay Natural History Society (BNHS) have started the project "Saving Flamingoes, Mangroves and mud flats of Sewree and adjoining areas". In this connection, BNHS also organizes Flamingo festival every year.

NEERI has prepared Environmental Management Monitoring Plan (EMMP) and Green Port Plan for Mumbai Port.

Every year there is certain amount of budget provision for environmental upgradation activities in the port. MbPT operates three small boats, everyday throughout the year, to clean/remove the floating garbage, oil, jetsam, flotsams from the harbour water by employing private contractors.. Under National Oil Spill- Disaster Contingency Plan (NOS-DCP) purchase of oil spill instruments is under process.

Rashtriya Chemicals & Fertilizers Limited:

Keeping in view the climatic conditions, status of soil spices of plants are selected for plantation. Mangium trees are planted along the boundary wall as it grows better in humid costal climatic conditions. Available open pace in the premises is also covered by plantation of fruits and shade trees. Fruit plants like Sapota, Guava and Coconut trees are planted near Effluent & Sewage treatment plant. Karanj trees are planted along the roads to stop soil erosion.

In the year 2016-17 RCF has implemented following innovative schemes.

Compost pit:

Horticulture waste is now treated in compost plant at RCF trombay unit. This compost fertilizer will be used in-house greenery development.

Installation of a new STP Plant of capacity of 23MLD of municipal sewage and generates 15 MLD treated water for industrial uses. Thus RCF has become self sufficient in terms of water requirement of Industry, and has become part of "Swachha Bharat Abhiyan" .Major cleanliness drive was organized in all the plants, township and hospital. Cleanliness drive is being carried out by all plants and departments regularly.

Public Awareness Programme:

RCF provides horticulture advice to the needy persons free of cost. Many informative sessions for farmers and other institutes are also arranged on a regular basis.

Reliance Infrastructure Limited:

The Company along with Management of Sanjay Gandhi National Park at Borivali, organized a campaign involving the collection of plastic and other waste with the participation of employees and local people. More than 320 kilogram of plastic and other solid waste was collected and safely disposed with the help of Park authorities. In similar programmes 1919 sapling were created in their Nurseries at Thane, Mulund and Rabale. More than 343 Company employees participated in the aforesaid voluntary labour activity. In another colaboration activity arranged by ICC on 17 Sept 2016 at Juhu & Dahanu beach, 300 kg of plastic and other solid waste generated during immersion activity was collected/retrieved from the beach, along with coastal guards officials and handed over to Municipal Authorities for disposal.

WATER SUPPLY

Mumbai gets water supply from 7 sources namely Tulsi, Vihar, Tansa Modak Sagar, Middle Vaitarna, Upper Vaitarna and Bhatsa. Net supply to Mumbai is 3750 MLD (excluding en-route supply and transmission losses).

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 5940 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

Rehabilitation and Replacement of Water Supply Network

Secondary Network

Tansa (East) & Tansa (West) mains from Bhandup Anchor Block to Powai are being replaced in phased manner. Under Phase-I, the work of laying 2400 mm dia., 2.0 km water main is proposed from Bhandup Anchor Block to IIT subway and the same is completed. Under Phase-II, the work of laying 2400 mm dia, 2 km water main from IIT subway to Powai is proposed, out of which laying of 1.45 km. water main has been completed and the balance work shall be completed by November, 2017.

1200 mm dia. Tansa mains and 800 mm dia. Vihar main on Dr. Babasaheb Ambedkar Road, from King"s Circle to Kala Chowky have gone below embankment of series of road bridges on this road and have became inaccessible for repairs and maintenance works. Those mains are proposed to be replaced by laying a 1500 mm dia. new water main. The work will be executed in a phased manner. Under Phase-I, the work from Deodhar Road junction to Hindmata Cinema about 2.2 K.M. length has been completed. Under Phase-II, the work from Hindmata Cinema to Sane Guruji Road is in progress. Till date 0.80 k.m. is completed out of 2.30 k.m.

The 1500 mm dia. 4.12 km long water main of Bhandarwada Hill Reservoir Arm from R.A. Kidwai Marg, Rey Road to Jerbai Wadia, Sewree have been completed. The work of laying of 900 mm dia. 0.70 km long water main from R.A. Kidwai Marg from Futka Tank to Sion Hospital have been completed.

The tender for the work of replacement 1500 mm dia 0.42 km in length for Bhandarwada Hill Reservoir Arm tapped from 2750 mm dia. Upper Vaitarna Trunk main up to Temkar Chowk, 60 ft. road is in progress. 80% work is completed and remaining 20% is expected to be completed after bridge work.

Measures to curtail Leakages and Contamination:

Rehabilitation and Replacement of distribution Water Mains including renewal of consumer connections were proposed in 2016-17 in contamination prone areas. 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 Rehabilitation

In 2016-17, 0.55 km water mains are rehabilitated with internal Cement Mortar lining.

b) Water Mains Replacement

In 2016-17, works of replacement of 50.29 km long water mains in City, Eastern Suburbs and Western Suburbs have been replaced and rehabilitated.

c) **Service connections Renewal in road improvement**

The renewals of service connections of 32,875 are renewed so far under Road Improvement Programme.

d) **Bunch of Connection Removal**

In 2016-17 total 136 no. of works for Removal of bunch connections are completed.

e) **Valve Chamber Repairs**

The work of repairs and reconstruction of 1002 Valve Chambers are completed up to March 2017.

Water Audit

Consumer Connections and Increase in Service Coverage

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 unmetered 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 1.1.2000 as per P/L No10 of 2012, and necessary circular are now in force for granting water connection to those affected slums.. In the year 2016-17 about 8892 new water connections were granted to the consumers. Total metered consumer connection count in March 2017 increased to 391308. As directed by the Hon. High Court, the policy for granting water connections to all slum dwellers, irrespective of tenure is in force from 10.01.17

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 presented during Budget 2016 -17 Pilot Project in H/west and T wards are progressing and present project status is as under –

- Network Survey of Primary System from source to Master Balancing Reservoir & Tertiary system in pilot wards has been completed. Network Survey for Secondary System is in progress. Total Station Survey (TSS) of roads is completed in H/West & T wards. TSS of roads in K/West, K/East, S, N, M/East, M/West, H/East, P/South, P/North, R/South wards is in progress.
- Hydraulic Model of water supply zones in pilot H/west & T wards is completed & execution of recommended works is in progress.
- 1st round of Visible & Invisible leak detection and their repairs is completed in pilot wards. This has helped in attending leaks and contamination problems.

- Customer Survey i.e. data collection work in pilot wards is completed. This has helped in identifying zone wise location of customers and allocation of water demand in zones. Customer survey is in progress in wards adjoining to pilot wards.
- Activity for physical survey of above ground assets is almost completed and uploading of asset data in asset software is in progress.
- On pilot basis, detailed Study of Gazdarbandh slum in H/West and slum areas on the west of Guru Govind Singh Marg road in T ward have been undertaken. TSS work is completed in Gazdarbandh slum in H/West & recommended slum solutions, are being studied.
- On completion of above studies, hours of water supply in different water supply zones will be improved progressively towards achieving 24X7 supply.

Other notified works –

i) Solar Power Generation at Bhandup Complex –

Work of installation of 2.5 MWp solar power generation plant is under progress at Bhandup Complex Treatment Plant. The said work is expected to be completed by January 2018. The power generated will be used to meet the requirements of power supply at Bhandup Complex, thereby will save the cost of Rs.3 Crs per year in power supply expenditure.

ii) Renovation of Master Control Centre (MCC) at Bhandup Complex –

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 taken in hand and at present civil work is under progress.

Awareness on Economic Use of Water

We have been undertaking various measures to increase public awareness on sustainable use of water and its impact on the environment. In 2016-17, several advertisements has been published in various publications, BEST buses, etc. Students in municipal schools were sensitised using Virtual Classrooms of the Corporation. In the current year, we intend to extend our reach through various innovative media including social networking, electronic media, in additional though the traditional modes.

Table No. 9 : SOURCE OF WATER SUPPLY

Sources	Yield in MLD	Ownership	Distance from City	Treatment Plant
Tulsi	18	MCGM	City limit	Tulsi
Vihar	90	MCGM	City limit	Vihar
Tansa	472	MCGM	100 km from City	Bhandup Complex
Modak Sagar+ Upper Vaitarna+ Middle Vaitarna	1600	MCGM	100 km from City	Bhandup Complex
		GoM	173 km from City	Bhandup Complex
		MCGM	137 km from City	Bhandup Complex
Bhatsa	2020	GoM	100 km from City	Panjrapur / part at Bhandup Complex
SubTotal	4200	-	-	--
Enroute + losses	-450	-	-	--
Total Supply to City	3750	-	-	--

Source: This information is received from Hydraulic Engineer dept. of MCGM

Mumbai city and suburban areas are being supplied with 3800 million liters of water on a daily basis. This water is drawn from various lakes as well as river sources. Out of above 3800 MLD water, 2100 MLD is treated at Bhandup Complex and is supplied to Mumbai.

Water is brought to Bhandup Complex by gravity mains originating from Tansa, Vaitarna, Middle Vaitarna & Upper Vaitarna lakes. This water is Pre-chlorinated at Yewai from 25/50/33.1 kms upstream of Bhandup Complex. Water received at Bhandup Complex is then treated using conventional treatment methods such as pretreatment/filtration/post chlorination and is then distributed through Master Balancing Reservoir (MBR) to consume through pipelines, tunnels, service reservoirs etc.

During all these activities at Bhandup Complex, water samples at each stages of treatment are collected and tested for various parameters. The laboratory at Bhandup Complex is working round the clock for this purpose and quality of final water leaving Bhandup Complex is always maintained with in prescribed limits as per drinking water standards IS 10500:2012. The water quality before and after filtration is given in (Table No. 10) along with drinking water standards.

Table No. 10 : Water Quality Before and After Filtration during 2016-17

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	1.2– 68	0.27– 5.0	0.8 – 8.4	0.44– 3.5	1.2– 80	0.24– 3.2	3-605	0.11-1.9	1-5
pH	6.55– 9.20	6.50 – 7.65	7.0– 8.80	6.5– 8.5	6.85– 7.6	6.70 – 7.30	6.9-7.5	6.7-7.3	6.5-8.5
Total Alkalanity (mg/l)	32– 47	25– 45	37-52	33– 50	32– 46	28– 43	30-87	22-83	200-600
Chlorides (mg/l)	12 – 18	14 – 22	12– 18	13– 20	10 – 18	11 – 20	8-22	10-24	250-1000
Total Hardness (mg/l)	37– 57	33– 54	40– 58	38– 54	36– 55	35– 53	21-75	20-70	200-600
Bacteriological Examination (CFU/100ml)									
Total Coliform	10 – 294	0-0	30 – 510	0-0	0-0	0-0	NT	*	*
E-Coli	4 – 150	0-0	5– 220	0-0	0-0	0-0	NT	**	*

Source: This Information is received from Hydraulic Engineer Dept of MCGM

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

The treated water is stored in the master balancing reservoirs (MBR) namely MBR-I at Bhandup Complex with a capacity of 246 million litres (ML) and MBR-II at Yewai with a capacity of 123 ML. It is further distributed to 27 service reservoirs. The pressure in distribution system is in the range of 1 to 1.5 bars during water supply hours. In 'L, N, S & T' ward, some of the areas are converted into 24X7 supplies under improvement program.

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.

- Turbidity (NTU) – hourly
- pH – alternate hour
- Residual Chlorine (mg/L) – alternate hour
- Temperature (°C) – alternate hour
- Colour (Hazen Unit) – alternate hour

Jar test is conducted on raw water sample 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.

The Municipal Laboratories is a Public Health Laboratory of MCGM . For monitoring MCGM drinking water supply , daily around 200-250 water samples from 24 wards and 27 service reservoirs of Mumbai region are analysed in the laboratory. In Monsoon or in emergency upto 300-350 water samples are analysed. Bacteriological analysis is done to meet the standards prescribed in IS10500:2012 for drinking water standards. The 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 IS10500:2012 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.

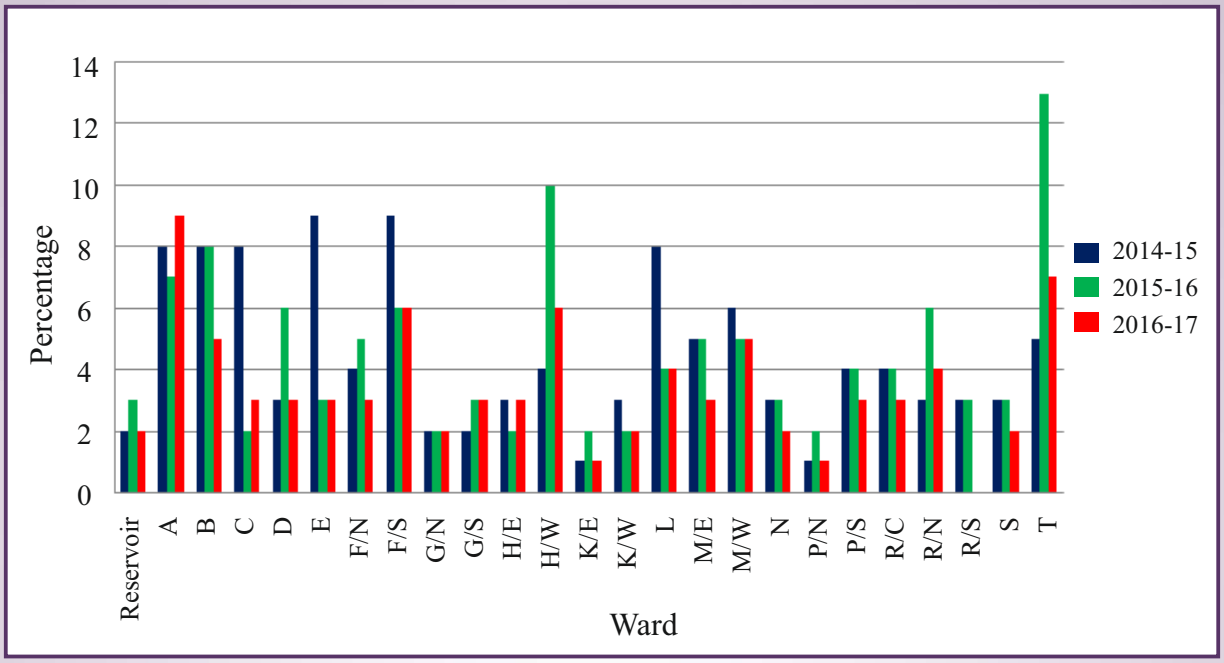
The Ward wise percentage of Unfit Water Sample from April 2014 to March 2017 is shown in table no. 11

Table No.11 : Wardwise % of Unfit water Samples 2014 -2017

Sr.No.	Ward	% of Unfit Samples		
		2014-15	2015-16	2016-17
1	Reservoir	2	3	2
2	A	8	7	9
3	B	8	8	5
4	C	3	2	3
5	D	9	6	3
6	E	7	3	3
7	F/N	4	5	3
8	F/S	9	6	6
9	G/N	2	2	2
10	G/S	2	3	3
11	H/E	3	2	3
12	H/W	4	10	6
13	K/E	1	2	1
14	K/W	3	2	2
15	L	8	4	4
16	M/E	5	5	3
17	M/W	6	5	5
18	N	3	3	2
19	P/N	1	4	1
20	P/S	4	2	3
21	R/C	1	4	3
22	R/N	3	6	4
23	R/S	3	3	0
24	S	3	3	2
25	T	5	13	7
Mumbai Average		**4.4**	**4.0**	**3.0**

Source: This Information is received from G/N water testing Laboratory of MCGM

Graph 4 : Wardwise % of contaminated water samples



Water Supply Project

Present status of project of Middle Vaitarna dam and conveyance system:

Middle Vaitarna project is completed and total 455 MLD water is made available in the year 2014 which is of full capacity of dam. Five sub-projects of Middle Vaitarna projects have also completed and Mumbai city receives 455 MLD of water supply from the year 2014.

Budget provision for Capital work for the year 2015-16 was Rs. 990.60Crores while for the year 2016-17 is Rs. 608.90Crores.

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 it is proposed to undertake schemes to develop sources like Gargai and Pinjal for abstracting 440 MLD and 865 MLD of water respectively.

The consultants have been appointed for obtaining various clearances e.g. environmental, forest, biodiversity studies, compensatory afforestation, PAP rehabilitation, land acquisition, environmental impact assessment etc. The consultant 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 No. 12

Table No. 12 : FUTURE SOURCES OF WATER SUPPLY

Sources	Yield in MLD	Ownership	Expected year of completion
Gargai	440	MCGM	2021-22
Pinjal	860	MCGM	2024-25
Damanganga	1586	GoM/GoI	To be decided by GoM/GoI
Total	**2891**		

Source: This information is received from Hydraulic Engineer dept. of MCGM

Water Supply Resources- Surface as well as Underground:

The Gargai scheme involves construction of dam on Gargai River and underground tunnel of length 2.5 km for conveyance of water from Gargai dam to Modak sagar reservoir.

In case of Pinjal project, the work of construction of Pinjal Dam would be executed by MCGM. It will also include rest of the works like conveyance through proposed 64 km long tunnel and other allied works like treatment plant, pumping station, storage reservoir etc. This project involves conveyance of water from dam site through under ground tunnel of 64 km length upto Gundavali. Accordingly survey and geological studies are in progress in this regards.

Gargai Project is expected to start by 2016-17 and expected to be completed by 2021-22 and Pinjal project is expected to start by 2016-17 and expected to be completed by 2024-25.

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 MCGM and this water will be conveyed into Pinjal reservoir after its completion. This project will be implemented by joint board of representative of National Water Development Agency (NWDA)/Government of India/Government of Gujarat, Government of Maharashtra & MCGM. Detailed Project Report of this project is completed and furnished with Central Water Commission (CWC) for scrutiny.

Ongoing & recently completed projects in support for improvement in water conveyance system :-

Alternatives to age old water mains in terms of safety, enhancement in conveyance system and to increase its capacity.

- Gundavali to Bhandup Complex tunnel (**15.1 km long x 5500 mm dia.)** work is completed on 31.3.2017.
- 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 excavation of 2.2 km. long tunnel from Powai to Veravali is completed and tunnel lining of the same is in progress. Due to adverse geological condition encountered along Powai Ghatkopar drive, the

work of excavation of tunnel by TBM from Powai to Ghatkopar is progressing cautiously. The work of construction of shaft at Ghatkopar High Level Reservoir / Low Level Reservoir is completed. The Tunnel work is likely to be completed by 14 Dec. 2018.

- Work of construction of effluent treatment plant at Panjrapur for treating backwash water (65MLD) generated after washing filters from existing Water Treatment Plants thereby making it suitable for reuse is in progress. The work is likely to complete by 31 August 2017.
- The work of providing and laying proposed pipe line from Bhandup Complex Tunnel shaft to water treatment plant at propose B.P.T. is in progress and is likely to be completed by by 31 August 2017.
- Re-engineering of 90 Mld Vihar water treatment plant work is in progress and is likely to be completed by 29.05.2019.
- The work of laying 1200 mm.dia. pipeline from Adarsh Nagar to J.P. Road, Andheri (W) is in progress and is likely to be completed by 20.05.2017.
- Reinstatement of the said work is in progress and is likely to be completed by 09.06.2017.
- Structural repairs to Malad Hill Reservoir-I – (49.50 ml) work is in progress and is likely to be completed by 01.02. 2019
- Structural repairs to Ghatkopar High Level Reservoir – (31.00 ml) work is in progress and is likely to be completed by 31.05. 2020
- Work of beuatification of Powai Lake is in progress and likely to is likely to be completed by Oct.2019.
- Work of Design, Supply , Installation, Testing & Commissioning of 7 Nos. of existing Stage -II Pump with motors & H.T.panels at Pise Pumping Station is in progress and is likely to be completed by 6.1.2018.
- The work of Interconnection of stage I and Stage II sumps at Panjrapur Pumping Station is in progress and is likely to be completed by 03.04.2018.
- The work of Replacement of Stage-I Main Transformer 100KV/ 3.3 KV, 7.5 MVA Capacity at Pise Switchyard is in progress and is likely to be completed by 06.01.2018.

Proposed projects to be undertaken :

A- Proposed tunnel

- **Tunnel from Amarmahal to Trombay- 5.5km**

  M/s TCE Ltd. has been appointed as a consultant for the captioned work. Permission for access through Anushakti Nagar are received vide MoU dt.7.11.16. Further the feasibility studies of Amar Mahal-Trombay tunnel are completed, tender preparation is in final stage and tender will be called by May 2017.

- **Tunnel from Amarmahal to Wadala and further upto parel.-9.66 Km**

  Survey work has completed. Alignment of proposed Amar Mahal Parel Tunnel interferes with existing operational water supply tunnel . Feasibility for lowering the level of the proposed tunnel is in progress by CDO, Govt. of Maharashtra.

- **Gargai project(440 MLD)**

  Gargai project consist of construction of dam across Gargai river and construction of 2.5 km long tunnel to convey water from Gargai dam to Modaksagar reservoir.

  The work of demarcation of submergence area and demographic survey for Gargai project has been completed. M/s WAPCOS Ltd. has been appointed as a consultant for the work of ' Preparation of Detailed project report(DPR) for the Gargai dam project' and said DPR expected to be completed by October 2017.M/s NERIL has been appointed as a consultant for obtaining permissions from Environment, forest and National Board of Wildlife dept. and Tree enumeration for Gargai project.

  Gargai dam project expected to be commenced by 2018-19 and will be completed by 2023-24.

- **Pinjal Dam Project**

  Pinjal project consist of construction of dam across Pinjal river and construction of 64 km long tunnel to convey water to MCGM's establishment at Gundavali and allied works like Water treatment plant, Master balance reservoir, pumping station etc..

  Tender preparation for appointing consultant for preparation of Detailed Project Report, demarcation of submergence area & demographic survey for Pinjal project is in progress and will be invited in May 2017.

  Pinjal dam project expected to be commenced by 2018-19 and will be completed by 2026-27

- **Damanganga-Pinjal River link project**

  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. Modified DPR of the project prepared by National Water Development Authority (NWDA) is submitted for approval of Central Water Commission(CWC). The five out of six mandatory clearances from different Directorates of the Central Water Commission (CWC) have been obtained in the year 2016-17. The project was discussed and approved in the Technical Advisory Committee meeting of CWC on 8th July, 2016. Similarly, the project proposal is furnished with Ministry of Tribal Affairs in June 2016.

B - Proposed works :-

- Laying of 2235 mm dia single main across NH-3 by micro tunneling / Jacking pushing – 0.16 km

- Providing & Laying 3000 mm dia missing link of Middle Vaitarana Main between Chinchvali - ARVC - Yewai with flow control Valves at ARVC & mortar lining work. - 4 km
- Replacement of "Twin Tansa Mains (2- 1800 mm dia) to be replaced by single 3000 mm dia main between Balkum to Saddle Tunnel.- 10 km
- Rehabilitation of Upper Vaitarna Main by any suitable technology from Aghai to Gundavali.- 44 km
- Design, Supply , Installation, Testing & Commissioning of 7 Nos. of existing Stage -II Pump with motors & H.T.panels at Panjrapur Pumping Station.
- Construction of storage structure at 100KV Sub Station & Pumping Station of Mumbai-IIIA Panjrapur.
- 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- 7850 ML
- Construction of new administrative building for MCGM staff of 900 MLD Middle Vaitarna WTP at Bhandup Complex.
- Work of Structural repairs to a) Veravali High Level Reservoir, b) Trombay High Level Reservoir at BARC c) Trombay Low Level Reservoir d) MBR at Bhandup Complex e) Malbar Hill Reservoir.
- Procurement, installation, testing and commissioning of flow meter including civil and mechanical works.
- Renovation / Modification of Vihar, Tulsi, Powai Dams as per the suggestion by Dam Safety Organization.

Budget provision:

Budget provision for Capital work of the Water Supply projects Department

for year 2016-17 - **Rs.608.90 Crs**

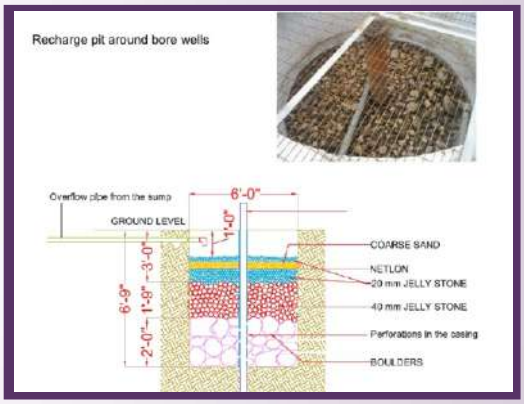
and for the year 2017-18 - **Rs.296.06 Crs.**

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.

Rain Water Harvesting in Mumbai

MCGM supplies 3750 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.

- Storage in underground or above ground artificial tanks.
- Direct recharging of the subsoil water strata (aquifer) through dug up wells or bore wells.
- Recharging of the subsoil water by percolation.
- 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 and having plot area 1000 sq.mt and more. 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.

"Rain water harvesting helps to improve groundwater level, its quality. It controls Land erosion and protects infiltration of sea water in ground water."

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.

Laboratory at Dadar under Sewerage Operation department has carried out monitoring ofcoastal water at Colaba, Worli and Bandra (Table 14). Based on the report of the same in comparison with SWII/4 Standards it has been found that at Colaba, Bandra and Worli, levels of pH are around the prescribed standards while Turbidity and B.O.D. levels are below the standards. D.O. levels are exceeding standards which is a good sign in terms of dissolved Oxygen. MPN is exceeding standards at all sites. Levels of e-coli are exceeding at all site (except Colaba).

Table No. 13 : Coastal Sea water quality of Mumbai 2016-2017

Place	pH		DO		Turbidity (in NTU)		E-Coli (No./100ml		BOD (in ppm)	
Standard: SW-II	6.5-8.5		≥4 mg/		l≤30 NTU		≤100/100 ml		≤3 mg/l	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Colaba	7.5	8.0	2.6	7.9	5.4	25	20	90	0.6	2.4
Bandra	7.6	8.0	4.1	7.8	3.5	16	9	130	1.0	2.8
Worli	7.6	7.9	3.6	7.2	3.4	14.4	4	320	0.6	2.8

DO: Dissolved Oxygen BOD : Biological Oxygen Demand MPN : Most Probable Number

Source: This information is received from SO laboratory of MCGM

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

- Sewerage Projects (SP) department looks after the work of sewer planning, laying new sewers, upsizing the existing sewers and elimination of missing links in existing sewer.
- The Sewerage Operation (SO) Section maintains the sewer lines to keep them in working condition.
- Mumbai Sewerage Disposal Project (MSDP) carries out the sewerage treatment and disposal work. MSDP along with concern Ward office also looks after the work of providing toilets in the slum area. (Temporary mobile toilets during public functions are provided by Solid Waste Management department).

The sewage generated in the MCGM limit is collected through network of various small and big size sewers, treated and disposed off. In 2011, Consultants M/s Mott McDonald and M/s R.V. Anderson had prepared detailed report for Mumbai Sewerage Disposal Project, considering the probable population of Mumbai in 2025.

The work of information regarding network of sewer lines in the form of printed records is nearly 90% completed by Geographic information system. The precision of this work is in process to bring level less than 1 meter. For this purpose MCGM is purchasing 25 D.G.P.S. rolling rovers.

It is proposed for the information of systematic cleaning work of sewer lines should be uploaded on sewer line map for central control. Similarly information regarding repair work of sewer lines will be uploaded on G.I.S.

It is proposed that various pumping stations of this department will be online controlled with the help of SCADA system. This system will be commissioned in the next financial year.

Mumbai Sewerage Disposal Project :

Mumbai known as the commercial capital of India and attracts millions of people for their better livelihood. The population of greater Mumbai has increased from 9.9 million in 1991 to 12.64 million in 2011.

Municipal Corporation of Greater Mumbai has to extend infrastructure facilities such as water supply, waste water collection % treatment, Solid Waste Management etc. in order to cover basic civic needs of the ever-increasing urban population.

The waste water collection and treatment facilities were provided since, 1980 and were extended with growth of the city.

The first sewerage master plan came up in 1979 and the water collection and treatment facilities were further developed. The waste water collection & treatment facilities for the city are grouped in seven service zones viz. Colaba, Lovegrove, Bandra, Versova, Malad, Bhandup & Ghatkhopar. Under MSDP-I which was completed in 2003, aerated lagoons were constructed at Versova, Bhandup & Ghatkopar and Marine outfalls were implemented at Colaba, Lovegrove & Bandra locations. The decision for Malad service zone was kept in abeyance due to sensitive issues of mangroves.

At present sewerage infrastructure consist of 1636 km of sewers, 25 pumping stations, preliminary treatment facilities and Marine outfalls at 3 location, 3 Stage lagoons at one place and single stage lagoons at two places.

Issues remarks for new sewer connections, septic tank and STP for the Government, Semi-government, private property and bungalows, etc. While implementing development project of area above 20,000 sq.m as per MoEF guidelines, it is mandatory to provide STP for the lay-out. The proposals for the STPs are scrutinized and permissions for the same are granted after receipt of the NOC from the Environment Department of Government of Maharashtra.

The work of marine outfalls at Colaba and Worli was completed in the year 1988 and 1999 respectively. The Worli outfall system consists of RCC lined tunnel outfall of 3.5 meter internal diameter and 3.4 km length. This is constructed at Lovegrove in Worli. The outfall-line passes at about 65 meters below the ground level and about 53 meters below the seabed. The sewage flows through this tunnel and disperses into the seawater through the risers at the end of the tunnel. A preliminary treatment and aerated de-gritting is imparted to the sewage before it is let into the tunnel. The work of

3.7 km. long and 3.5 meters diameter tunnel was completed at Bandra and the Bandra outfall system was commissioned in May 2003. The aerated lagoon at Versova with capacity of 90 MLD was commissioned in 1996. The aerated lagoons at Bhandup with 280 MLD capacity and at Ghatkopar with 300 MLD capacity were commissioned in June 2002 & May 2003 respectively. The effluent is discharged into adjacent Thane creek.

Earlier there existed only Effluent Standards for discharge of effluent into marine coastal areas under Environmental (Protection) Act 1986. There were Water Quality Criteria for coastal waters as published by Central Pollution Control Board (CPCB) in 1993. Accordingly, Ministry of Environment & Forests, Government of India issued a notification under No. GSR 7 dated 22nd December 1998 regarding Water Quality Standards for coastal water marine outfalls.

The sewage disposal arrangement of Mumbai City is divided into seven zones viz. Colaba, Worli, Bandra, Versova, Malad, Bhandup & Ghatkopar. The sewer line leading to pumping stations & sewerage treatment plan are lead by this department by Open cut and Trenchess method. The planning, designing & e-tendering of new sewer lines where sewer lines are not existing and upsizing of existing sewer lines as per requirement is done by dy.Ch.E.(SP) P and D section.

Sewer project (Planning and Design) department offer remarks for street connections, Septic Tanks and the plots belonging to Govt., Semi Govt., Private Properties & Bungalows etc.

The execution of laying new/ upsize sewer line works as per tender conditions is done under Dy. Ch. E. (SP) Construction. Both above sections are under control of Ch.E.(SP).

Projects Proposed in Financial year 2017-2018 :

In financial year 2017-2018 budget provisions of Rs.136.41Cr. is proposed for laying new sewer lines in unsewered area and upsizing of existing sewer line in City, Eastern and Western suburbs whenever required.

The list of some of the major works are as under:-

1) R/North Ward :

The work of providing & laying new sewer line from Seven Seas CHS Ltd. To Lohagad CHS along Sai Baba Mandir Road to Lohagad C.H.S. near Shiv Vallabh Road, Dahisar (E) is proposed and after completion of said sewer line works the sewage disposal facility will be available to this area.

2) P/South Ward :

The work of providing and laying new sewer line near Manav Kalyan Bldg., Bangur Nagar Goregoan (W) is proposed and after completion of said sewer line work the sewage disposal facility will be available to this area.

3) P/North Wards :

The work of providing and laying new sewer line along Ali Talao Road, Khordi Village Malad (W), is proposed and after completion of said sewer line work the sewage disposal facility will be available to this area.

4) R/South :

The work of providing and laying new sewer line on Mahatma Jotiba Phule Road from Cambridge School upto PSC Block in Thakur Complex, Kandivali (E), is proposed and after completion of said sewer line work the sewage disposal facility will be available to this area.

The work of providing and laying new sewer line on D. P. Road from Gokul Garden CHS to Vrindavan CHS and from Gokul Accord CHS to Resort View CHS in Thakur Complex, Kandivali (E), are proposed and after completion of said sewer line works the sewage disposal facility will be available to this area.

The work of providing and laying new sewer line on D. P. Road from Mahatma Jotibal Phule Road Junction upto Thakur Vidya Mandir School in Thakur Complex Kandivali (E), are proposed and after completion of siad sewer line works the sewage disposal facility will be available to this area.

5) K/West Ward :

The work of providing and laying new sewer line by Micro Tunneling and Pipe Jacketing method from Andheri Subway to S. V. Road, Ceasor Road, Veera Desai Road, Jeevan Nagar Road, Relief Road to Versova Pumping Station are proposed and after completion of said sewer line work the sewage disposal facility will be available to the area adjacent to the roads and area of Andheri (E).

Review of proposed works in year 2016-17 is as follows :

In Financial year 2016-17, sewer line works of Rs. 131.64 Cr. were proposed and out of which works of Rs.114.21 Cr. are completed.

The present status of works proposed in 2016-17 are as under -

1) H/West Ward:

It is proposed to provide & lay sewer line at Kadeshwari, Pinglewadi Road Bandra (W), e-tender for the same was invited. However, due to no response tender for the same is being re-invited.

2) K/East Ward:-

It is proposed to provide & lay sewer line on Sahar Road upto Sahar Cargo, Andheri (E) by Micro tunneling method. Tender procedure for the same is in progress.

3) P/North Ward:

The work order is issued for the work of providing and laying sewer line in phase-1 by Micro tunneling method on Rani Sati Marg, Malad (E). The work is is progress and 10% of the work is completed.

4) T-Ward:

It is proposed to provide and lay sewer line along Marathon Avenue Road, Mulund (W), e-tender for the same was invited. Further procedure is in progress.

Submitted for information please.

The Budget Provision proposed for MSDP works for the year 2017-18 is Rs.444 crore:

The work of providing sewerage network in conformity with drainage zones and sewerage infrastructure development plan is implemented under Sewerage Projects in Mumbai. We have currently a network of 1915 km sewer lines in MCGM limits. With the objective of 100% coverage of Greater Mumbai with sewerage network, it is proposed to implement Mumbai Sewerage Improvement Programme (MSIP) under which it is planned to rehabilitate, augment, upsize existing sewer lines and provide new sewer lines for unsewered areas.

We have decided to provide 100% sewer network through MSIP which has three Components. Under Component – I, it is proposed to lay sewer lines on existing DP/ Municipal Road. Under Component – II, it is proposed to lay sewer lines on undeveloped DP/ Municipal Road after such roads are constructed and under Component – III sewer facility will be extended for slum areas. All the 3 Components will be implemented simultaneously.

Component – I:

We have decided to provide piped sewer facility to entire Greater Mumbai Jurisdiction. To achieve the target, we have planned to provide sewer lines on all the D. P. Roads and Municipal roads. About 143 km of DP/ Municipal road stretced are encorached out of the proposed 236.68 km stretch and 93.68 km stretch of road is constructed as on date. In Component – I, it was planned to undertake works of laying of 93.68 km sewer lines on these roads. The work order for 8.7 km length is already issued and work is started. The tenders for 26.49 km length of sewer line works are invited and work orders will be issued shortly. I would like to mention here that the detail survey and estimates for the remaining 48.28 km sewer lines is also in progress. Priority Sewer Tunnel I & II at malad Zone (8.21 km) and SV road Tunnel at Bandra (2 km) are planned for execution under MSDP (stage II) works as mention earlier. These sewer line works for a total length of 93.68 km are planned to be completed in next 5 years. There are certain sewer lines which are old and require rehabilitation or require upsizing. Such works are also planned, based on condition assessment, under component – I. The sewer lines in Juhu partly carry sewage to Bandra Zone and partly carry sewage to Versova Zone. On completion of these works included in Component – I, the coverage of area sewered will increase from 74.67% to 86.27%.

Component – II:

Sewer lines on undeveloped roads will be undertaken step by step by MCGM or concerned SRA developer or private layout developer as and when development is approved.

Component – III:

Some parts of Greater Mumbai area are occupied by slums. In this component the sewer network for slums will be developed under Swatch Bharat Mission. The respective wards ware identifying and laying sewer network for such slums for conveying the sewage generated in such slums to the nearby sewerage network which ultimately will enable conveying the sewage for treatment before disposal. Diversion of dry weather flow from storm water network will also be carried out under this component.

On completion of all these Component – I, II and III the entire Mumbai will be 100% sewered.

The Budget Provision proposed for MSIP works for the year 2017-18 is Rs. 136.41 crore:

New concepts, procedures and equipment are, proposed to be introduced for systematic cleaning and maintenance of sewer network. A number of sewer cleaning equipment and machines are already in use for systematic cleaning and maintenance of sewer lines and some new equipment are planned to be purchased and put into service. Our target is to achieve 100% elimination of human intervention with sewage in next one year and we plan to take all the necessary measures which shall enable us to achieve this target.

With this objective we have already procured 4 Sewer cleaning recycler units and they are already put in operation. Purchase order for 4 more recycler units are already given and delivery of the same is expected soon. Another 7 recycler units are, therefore, proposed to be procured in the year 2017-2018 for which budget provision of Rs. 30.80 crocre is proposed.

Under the Mumbai Sewerage Project 1 7 services areas of sewage collection facilities for the city Colaba, Lovegrow, Bandra, Versova, Bhandup and Ghatkopar were completed in 2003. Aerated pools were constructed at Versova, Bhandup and Ghatkopar, and the work of the sea-heads was also completed in Colaba, Lovegrow and Bandra.

STORM WATER DRAIN SYSTEM

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. If the rain intensity exceeds more than 25 mm per hour during high tide, there is always possibility of water logging in low lying areas of the city.

In practice however, in addition to storm water, they also carry sewage overflow from septic tank, surface water, etc. Length of open SWD in Mumbai is about 1987 km. The flow from the open SWD is discharged either into nallas, culvert, creek or sea. This open SWD becomes an eyesore due to throwing of garbage by citizens especially in slum area 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 to 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 Mithi river. In suburbs and extended suburbs area, open SWD are constructed on both sides of road.

Heavy rain in Mumbai city in June 1985 had resulted into flood like situation, which paralyzed the roads 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

The Government of India sanctioned a special grant of Rs.1200 crores as per detailed project report submitted to Government of India for implement BRIMSTOWAD Project in year 2007. Out of these, MCGM has received Rs. 1000 crores till date.

In the year 2005 Mumbai faced unprecedented rains on 26th & 27th July and 944mm rainfall was recorded in one day. This resulted in the flooding; therefore, Government of Maharashtra had appointed a Fact Finding Committee (FFC) to analyze the factors responsible for the situation and to suggest remedial measures so as to avoid such calamities 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 2 phases. There are 20 works in Phase-I and 38 works in Phase-II. The scope of the BRIMSTOWAD project is as under.

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

Table No. 14 : Present status of the BRIMSTOWAD Project

Details	Phase I				Phase II			
	City	W. S.	E. S.	**Total**	City	W. S.	E. S.	**Total**
No. of the works	5	7	8	**20**	16	10	12	**38**
No. of completed works	4	6	6	**16**	9	1	2	**13**
No. of the works in progress	1	1	2	**4**	6	8	9	**23**
Tenders yet to be invited	0	0	0	**0**	1	1	1	**3**

Source: Storm Water Drain Dept of MCGM

Table No. 15 : Status of Pumping Stations in 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 June2016
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 of MCGM

Total expenditure incurred till Feb 2017 is Rs. 2159.59cr.

Cleaning and desilting of nallas:

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 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 is cleaned departmentally by Wards 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 established 'Mithi River Development and Protection Authority' under the Chairmanship of Honorable Chief Minister of Maharashtra state on 19th August 2005 for improvement of Mithi river. Total length of Mithi river is 17.8km, out of which a length of 11.84 km. is in the jurisdiction of MCGM and the remaining 6 km. is under MMRDA. 95% work of widening and deepening of Mithi river has been completed till date.

Out of 18.96 km. length of retaining wall to be constructed, construction work for the length admeasuring 14.04 km is completed by MCGM till date. Length of 1937 mtrs. ss within Airport jurisdiction, about 386mtrs. length is to be constructed by private developers. The work of training of mithi river in group no.3 at KBM compound (from Karuna Nagar, Pipeline road to Ashoknagar Bridge) for a length of 326 mtr is in progress. However tenders for a length of 1527 mtrs are invited and tenders for balanced length of 2922 mtrs can be invited only after removal of encroachment / acquisition of affected land.

SOLID WASTE MANAGEMENT

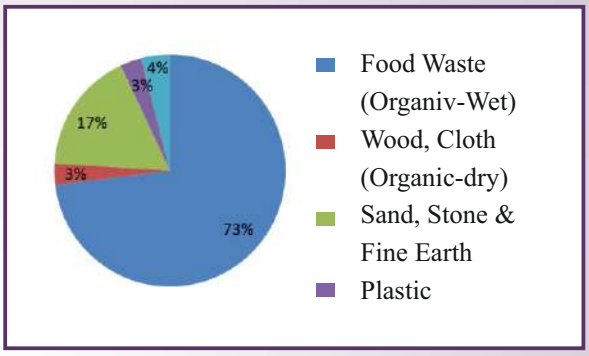
The approximate quantity of solid waste generated in Mumbai is over 9400 metric tonnes per day (MTPD) Categories of waste that are separately collected in terms of types and quantity of waste generated i.e. Food, vegetable & fruit waste 73%, Recyclable i.e. paper, plastic, metals and glasses 10 %, inert matter 17% (Table 16) of the 9400 tonnes transported by vehicles in 3746 trips/day.

Table No. 16:
COMPOSITION OF GARBAGE IN MUMBAI

Sr.No.	Type of Solid Waste	Percentage
1	Food Waste (organic- wet)	73%
2	Wood, Cloth (organic-dry)	3%
3	Sand, Stone &Fine earth	17%
4	Plastic	3%
5	Paper and recyclables (including metals)	4%
	Total	100.00

Source : Solid Waste Management Department of MCGM

Graph No. 5 : Types Of Solid Waste



Urban solid waste contains biodegradable, non-biodegradable, construction, demolition and hazardous waste. The major metropolis all over the country are facing the problem of solid waste disposal. The dumping of garbage not only gives an ugly sight when it is visible, but also poses health hazard as it is a breeding ground for mosquitoes, flies, rodents etc. which are the carriers for diseases-causing pathogens. It also aggravates air pollution, ground water pollution and soil pollution affecting the fragile ecosystem.

The garbage from all over city is collected and at present, the garbage is treaed at Kanjur processing side using Bio-methenation Technology and rest is disposed off at the 2 dumping sites in Deonar and Mulund by simple dumping and leveling Scientific Closure Project at Gorai has been completed and operation and maintenance of the site is in progress. Deonar dumping ground is the largest one, receiving approximately 34.05%, Kanjur receiving 31.91% & Mulund receiving 34.04% of the total garbage. Mulund and Deonar dumping ground have nearly exhausted its capacity to receive the garbage.

Map No. 4 :
Solid Waste collection Areas and Transfer Centers

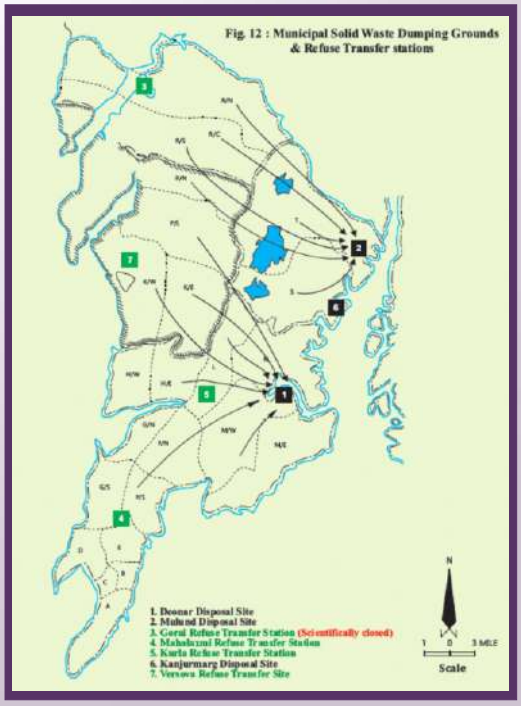


Table No. 17 : INPUT LOAD OF WASTE

Sr.No.	Dumping Ground	Classification of Waste	Tonnes/day
1	Deonar	Municipal Solid Waste	Approx. 3200
2	Mulund	Municipal Solid Waste	Approx. 2200-2400
		Debris	Approx. 600-800
3	Kanjur	Municipal Solid Waste	Approx. 3000

Source : Solid Waste Management Department of MCGM

There are 5171 no. of 1.1-cubic meter containers and 79 Dumper placer containers at 1299 community collection points and 95.00% 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 and input loads of MSW at various dumping sites are given in Table 18. Salient features of transportation are given in Table No. 18.

Table No. 18 : CAPACITY OF VARIOUS DUMPING SITES IN MUMBAI

Disposal Site	Area (Ha) Filling m*	No. of Years
Deonar	120	86
Mulund	24	45
Kanjur	65.96	2

Source : Solid Waste Management Department of MCGM

Table No. 19 : SALIENT FEATURES OF TRANSPORTATION FOR SOLID WASTE

Sr.No.	Type of Vehicle	Number of Services 2012-13	Number of Services 2013-14	Number of Services 2014-15	Number of Services 2015-16	Number of Services 2016-17
1	Compactors	1284	1853	1869	1654	**1632**
2	Skip Vehiclas	604	321	269	130	**74**
3	Dumpers	467	182	242	247	**146**
4	Bulk Refuse Carriers	48	49	51	35	**35**
5	Tempo/Jeeps	514	1322	1370	1315	**1982**
6	JCB Machines	98	53	80	62	**59**
7	Stationary Compactors	18	19	46	57	**57**
	Total	3033	3799	3907	3465	**3985**

Source : Solid Waste Management Department of MCGM

Swaccha Bharat Mission :

In response to the appeal made by Hon. Prime Minister for implementing the Clean India Mission (Swaccha Bharat Mission), various authorities under control of the State Govt and Central Govt have taken up activities to clean the City of Mumbai. 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 agencies which occupy large spaces through their commercial and residential premises. The efforts to make this mission a success has been started from 02nd Oct 2014 on the occasion of Gandhi Jayanti under "Swaccha Bharat- Swaccha Mumbai Abhiyan". For achieving the desired level of cleanliness and sanitation under this Mission, the efforts and programs of Solid Waste Management department have been redesigned accordingly.Under this drive, various programs undertaken as below:

Public Awareness:-

A key aspect of Swachh Bharat Mission campign was launched of fortnightly thematic drive taken up across wider variety of sectors and involving more number of ministries.Ministry of Urban Development (MOUD) started publishing yearly calendar for thematic cleanliness drive as a part of Swachh Bharat Mission.This thematic drive provide an apportunity of involvement of people from various sectors to create awareness about cleanliness under Swachh Bharat Mission.These fortnightly thematic cleanliness drive are conducted in all 24 wards of city through all A.C. / A.E. (SWM) wards and the report of the same are submitted to MOUD regularly.

Further to create awareness amongst the general public about the cleanliness drive taken up by MCGM, "Shramadan" programmes are carried out every Saturday between 11:00 am and 1:00 pm, simultaneously in the 227 Councilor ward areas.

In addition to above Municipal Corporation of Greater Mumbai has carried out following activities which are noteworthy.

- In all 21000 nos of banners about asli taraki , Swachh Survekshan 2017 and "Swachata App" were displayed in Mumbai at various locations including CT & PT during Swachh Survekshan 2017
- About 800 nos of posters on seat back rest and slide shows on LCD screen were displayed on 20 BEST buses for the period of 1 month for the boost of the awareness of Swachh Bharat Abhiyan among the citizen of Mumbai
- For spreading awareness about SBM Wall painting on various MCGM /Govt, Offices,Schools/Colleges , bridges etc was carried out in Mumbai city
- The Mumbai "Toilet Locator App" was launched in the month of January 2017 to facilitate the easy location of CT/ PT for Mumbai city
- In order to get proper citizen feedback about clinliness in public toilets, the feedback polling machines are fitted at 58 location in Mumbai city
- Two nos each of sanitary napkin vending machine and incinerator machine are installed at 2 public toilets in A ward as poilet project.

Pelletisation 'Green Coal' Project:

Pellatisation 'Green Coal' Project is in operation since May 2014 through Private Operator M/s. CIPL Research in N Ward. 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.

Integrated Solid Waste Management Projects :

MCGM has undertaken Integrated Solid Waste Management Projects at Deonar & Mulund Dumping Ground and Kanjur Landfill Site the year 2008-09 in order to process daily received garbage in a scientific manner in accordance with the MSW (Management & Handling) Rules 2000. MCGM had awarded these projects on Designing, Build, Own, Operate & Transfer (DBOOT) basis and a public-private partnership format for a period of 25 years. However, due to the failure of private operator of Deonar project to complete the project works within the stipulated period as per the terms & conditions of the concession agreement, MCGM has terminate the contract of Deonar project from 30.01.2016 after the sanction of the standing committee during the meeting of 22.12.2015.

For the same reasons the contract of Mulund project was terminated on 08.09.2015 with immediate effect.

The Kanjur Processing and Landfill project in progress and the current status of Kanjur project is as follows:

Kanjur MSW Processing Site:-

As per orders of Hon'ble High court and Supreme Court, the Government of Maharashtra handed over a plot admeasuring 141.77 hectares area at Kanjur to MCGM in dt.24.10.2005 for developing MSW landfill site. Thereafter, Environmental Clearance from Ministry of Environment & forest for the land of 65.96 Ha. 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 in dt.25.07.2011 Maharashtra Pollution Control Board gave the authorization under MSW (M&H) Rules 2000 in 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.

The work of installation of 1000 MT Capacity compost plant is in progress. Receiving of MSW in Bioreactor Landfill Cell is started from 6th March 2015. At Present, processing of approx. 3000 TPD of MSW is being done scientifically using bioreactor technology. In addition, Environment Department of State Govt. has been requested to **give Environment Clearance for** processing of MSW on land of approx. 52.45 Ha. At Kanjur, which is under CRZ-III. Once this request is granted, approx. 1000 MT additional quantity of MSW can be processed by bioreactor technology at Kanjur site.

Hon. High Court, Mumbai vide it's order dtd. 29.02.2016 has granted permission to receive daily Municipal Solid Waste at Deonar & Mulund upto 30.06.2017.

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

1. Compost plant of 1000 TPD capacity at Kanjur:- Compost plant is expected to commission in due course of time.

Wet Waste Treatment Plant

2. Scientific processing of approx. 1000 TPD MSW at 52.45 ha. land at Kanjur site:- Environment Dept. of State Govt. has been requested to allow 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 MSW can be processed at Kanjur with bioreactor technology.

Future planning of SWM **New** Projects**, for processing daily generated MSW is as below:**

3. Waste to Energy plant of 3000 TPD capacity at Deonar:-

consultant has been appointed for the project **for preparation of DPR and tender documents**. The E-tender **is** invited.

4. Recovery of land at Mulund Dumping Ground by processing existing dump with the help of suitable technology:- Tender by using suitable technology for the said project is received and scrutiny of tender is in progress.

5. Scientific processing of waste at Mulund (E) Near Airoli Bridge:- It is planed to processed approx 5000 **TPD waste** in the land of 32.77 ha. allotted by State Govt. after receiving physical possession from State Govt., at initial stage 2000 **TPD** capacity processing plant will be installed and the capacity will be increased upto 5000 **TPD** in phases. **cusultant being** appointed **for getting Environmental clerances.**

6. Scientific processing and disposal of Waste **at village Karavale, near Taloja:-** Out of 51.07 ha. land State Govt. had given advance possession of Govt. land about 38.87 ha. to MCGM and **acquisition** of private land of approx. 12.20 ha. is expected from **C**ollector**, Thane.**

At present, approximately 3000 MT daily wastes from Kanjur are being processed by scientifically bioreactor technology.

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 (Rule No. 17) deals with the duty of manufacturers or brand owners of disposal products & sanitary napkins and diapers are concerned. 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. mtr 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 provided for responsibility on the generation of the MSW fixed 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 compliances to be carried out by the Municipal Bodies within time frame mentioned therein.

The below chart showing the various compliances to be carried out by MCGM alongwith the compliances already carried out and which are in process on behalf of the MCGM.

Sr.	Activity	Time	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,

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
8	Setting up solid waste processing facilities by local bodies and census towns below 100000 population.	3 year	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 year	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	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 Dept. there are 08 such benchmarks.
3. The benchmarks are elaborated below. (Current achieved values are mentioned in bracket)

Description of service	Target	Achieved
Coverage of SWM services through Door to Door collection	100%	95%
Efficiency of Collection	100%	100%
Extent of Segregation of Municipal Solid Waste	100%	53%
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 M.P.C.B. As per rule, it is also necessary to obtain an authorization from M.P.C.B. 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.

इकोरेकोने विलेपार्ले येथील मिठीबाई कॉलेजच्या जंक्शन येथे ई-कचरा संकलन केंद्र उभारले आहे.

Dry Waste Collection and Segregation Centers:-

MCGM has set up 34 dry waste collection & sorting centers in 24 wards. Other than these, MCGM has decided to set up 37 more dry waste collection & sorting centers and at some places work of setting up of additional dry waste centers is in progress. 46Nos. of separate 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 34 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 and 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.

A total of 34 dry waste collection and classification centers have been set up in 24 divisions of Municipal Corporation of Greater Mumbai.

POWER SUPPLY AND CONSUMPTION

Brihanmumbai Electric Supply and Transport (BEST), an undertaking of MCGM, Reliance Infrastructure Limited and Maharashtra State Electricity Distribution Company Limited (MSEDCL) supply the electric power to Greater Mumbai. 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 924 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 61 RSS, 2335 DSS, 7729 distribution pillars, 74949 services position, 41125 street lights and 52 bill collection centers as on 31.03.2017.

BEST Undertaking has 10.15 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 61 post officers, various branches of 6 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. 20 : FY 2016-17 (1st April to 31st March) Zonewise Consumers, and Consumption.

Sr. no	Consumers Category	Mumbai City			
		Consumers	Connected Load in kW	Consumption in Million Units (MUs)	Avg. Monthly Consumption (MUs)
1	HV Consumers	187	372701.44	708.15	59.01
2	LV Consumers	1014566	3494190.6	3694.81	307.90
	Total	1014753	3866892.04	4402.96	366.91

Source : Data received from BEST

Table No. 21 : Category wise Consumers, Connected Load and Consumption for FY 2016-17 (1st April to 31st March)

Sr.no	Consumers Category				
		Consumers #	Connected Load in kW	Consumption in Million Units	Avg. Monthly Consumption (MUs)
1	RESIDENTIAL	736828	2000099.66	1887.19	157.27
2	COMMERCIAL	266687	1548451.26	2095.97	174.66
3	INDUSTRIAL	8578	191766.98	338.95	28.24
4	Others	2660	126574.14	80.85	6.74
	TOTAL	1014753	3866892.04	4402.96	

Meters installed on site

Source : Data received from BEST

During interruption in power supply, various departments of BEST Undertaking functions round the clock in restoring the same. For coordinating and supervising these departments, 3 supervisory controls, 4 fault controls and 8 fuse controls are working round the clock. No load shedding is given to the consumer in the distribution area of BEST Undertaking..

Reliance Infrastructure Limited:

Reliance Infrastructure Limited supplies uninterrupted electric supply to all the suburbs spanning 400 sq.km except Kanjurmarg, Bhandup and Mulund. It includes Residential, Commercial and Industrial power procurement contracts and the rest is on short term basis. Mandatory 11% of the total energy requirements is renewable, procured as per MERC regulations.

Reliance infrastructure company conducts energy conservation and energy efficiency (EC and EE) programmes to create awareness in the society on the importance and promotes smart usage of energy. The ultimate goal is to make every citizen of Mumbai a part of the programme and make it a citizen's movement.

The Company through "Urja Samvardhan Upakaram programme", conducted workshops in various academic institutions, officers, 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 Company through "Let's Turn Around Campaign" sensitized employees and other stakeholders on environmental issues by conducting environmental management programmes. The Company celebrates major environmental events to create wide scale employee and customer sensitization and to further raise the environmental awareness amongst them.

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. 22 : Zonewise Consumers, and Consumption.

Sr. No.	Category	Division Name					
		Bhandup			Mulund		
		Total Consumer	Connected load (KW)	Consumption (Mus)	Total Consumers	Connected load (KW)	Consumption (Mus)
1.	High Voltage Consumers	86	174488	219.64	42	35285	3.29
2.	Low Voltage Consumers (Domestic, Commercial, Industrial &Others	165421	314306	404.41	123490	357366	421.78
	Total	165507	488794	624.05	123532	392651	425.07

Source : This information is received from MSEDCL

Table No. 23 : Category wise Consumers, Connected Load and Consumption

Sr. No.	Category	Division Name					
		Bhandup			Mulund		
		Total Consumer	Connected load (KW)	Consumption (Mus)	Total Consumers	Connected load (KW)	Consumption (Mus)
1.	Residential	143480	183047	232.590	106941	255670	285.059
2.	Commercial	17151	58908	62.822	14609	66046	81.204
3.	Industrial	4270	66946	99.220	1114	28215	45.625
4.	Others	520	5405	90777	826	7435	90892
	Total	165421	314306	401.41	123490	357366	421.78

Source : This information is received from MSEDCL

Roads, Traffic and Transport

Road

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.

Road Reformation:

Roads are an important part of Mumbai city planning and management, as is the visual infrastructure. By considering the features of Mumbai city and the problems of roads and ways to make proper roads with the recommendations of the Standing Technical Advisory Committee (STAC) for roads, major changes have been made in the approach to road constructions, improvement and maintenance. With increase in traffic intensity & loading, related norms have been upgraded and project approach has been adopted as per which road work also includes provision/improvement of footpath, provision/augmentation of municipal utilities such as water-mains, sewer lines, S.W.Drains etc. as per necessity, provision of traffic amenities, beautification etc. Trenching & reinstatement procedures have also been modified to reduce frequent digging. New technologies are introduced to effectively attend to road repair and maintenance.

Cement Concrete Roads:

In City area approximately 4.520 k.m of road were concretised in 2016-17. In Eastern Suburbs approximately 4.48 of roads were concretized in year 2016-17. Part of Ghatkopar-Mankhurd Link Road in M/W ward and part of RC Marg, M/W in Eastern Suburbs are concretized.

In western suburbs approximately 3.876 k.m of ward were concretised in 2016-17. It includes major roads such as important roads such as Dr.B.A Road,Borivali(W) & TPS 16th Road Borivali (W) in Western Suburbs are concretized.

Asphalt Roads:

In City section 18.568 km of Asphalt roads were improved /widened in the year 2016-17 in that improvement of important roads such as S. H. Paralkar Marg was completed.

In Eastern Suburbs around 16.167 km of Asphalt roads were improved/widened in the year 2016-17. In eastern suburbs important roads such as Anand Bhavan Road (Bail Bazarre) in L ward, Arif Market Road, Pascal Church Road, Road from Shiv Prabha to Shiv Prerana have been completed.

In western Suburbs around 15.782 km of Asphalt roads were improved/widened in the year 2016-17. In western suburbs Achyutrao Patwardhan Road, Goregaon Mulund link Road, Millat Nagar road works are completed.

New Trenching guidelines:

New guidelines have been framed for trenching work so that the trenching work is synchronized with the ongoing road works so as to minimize interrupted traffic movement. Horizontal Direction Drilling (HDD) is insisted and encouraged to minimize the open cut in road. A new technology of micro-trenching which is less invasive is also introduced. Depending upon the status of DLP, rates of reinstatement of trenches have been revised.

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 close Co-ordination with Traffic Police Department and applied 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 scrutinized & approves parking layout proposals received from Building Proposal department and Slum Rehabilitation Authority. This office also look after the work of inviting e-tendering for public parking lots, amenity parking & on-street parking etc.

This office also offer remarks for providing street light on newly constructed roads as well as improvement of existing street lighting & making co-ordination with all Ward Offices to get the above works done through three service provider electric companies viz. BEST, Reliance Energy Ltd. And M.S.E.D. Co. Ltd. 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 offices / private offices / commercial centers / its 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 vehicle & off-street parking vehicles are included. Wherein, the concession is given for "Monthly passes. Local residents scheme, public parking scheme, taxi & buses. Further, the 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 91 on-street parking schemes, 17 public parking lots under DCR 33 (24), 29 amenity parking schemes for pay & park schemes & will be made available to the citizens. These 137 schemes has total parking capacity of around 22,126 vehicles.

In order to avoid unauthorized parking and traffic congestion on roads a new list of 471 on-street pay & park schemes is received from traffic police. The total vehicle capacity of the said parking lots is about 33,852. The said new pay & park schemes will be run initially on experimental basis by inviting e-quotations through respective ward offices by checking the feasibility.

Providing & Fixing Street name boards, Direction boards / Zebra crossing marking / Lane marking / Dividers

Contractors have been appointed to provide & fix street name boards, directional boards, to mark zebra crossing strips / lane marking on major roads in Mumbai city & suburb and the work is in progress. Also in order to appoint separate contractor at ward level for the work of zebra painting, lane marking, tenders have been invited the work order will be issued after sanction of competent authority. The work of providing and fixing of dividers is in progress and 40% is completed. This will help for better traffic management.

Providing and Fixing LED Street Lights

As per the policy of Govt. of India regarding energy conservation, it is proposed to convert conventional street lights of Mumbai into LED's. The cost of the conversion of conventional street lights into LED street lights will result into savings in electricity bills. Accordingly, Initially 10% of Street lights converted into LED through BEST and further BEST has submitted a proposal to convert 20% more street lights into LED's. Same is in progress.

Comprehensive Mobility Plan for the first time the Mumbai city

MCGM has completed the work of "Preparation of Comprehensive Mobility Plan" for the Mumbai city, for the improvement in the traffic management and traffic congestion and the same has been completed. In this various factors related to traffic volumes, speed etc. has been studied to suggest the solution for the safe & smooth traffic movement to develop the network. Station areas for sub-urban railway and Metro commuters are also being studied as a part of Mobility Plan. Besides this, it would be proper to make utilization of the revenue & the humans resources.

The 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. After studying various

short, medium and long term measures recommended in above final plan regarding option of traffic and transport infrastructure facilities, policy decision in this regard will be taken.

Area Traffic Control System (ATC)

The existing 256 Traffic Signals has already upgraded into Area Traffic Control System (Real time adaptive system) & they are working satisfactorily. Further the maintenance of 348 Road Traffic Conventional Signal & 224 flashing Beacons are properly carried out.

As per the recommendation received from the consultant approved for Comprehensive Mobility Plan, the work of conversion of 346 conventional signals into ATC system will be taken in phased manner. Accordingly EOI was invited from the consultant who are specified in this field and shortlisted two consultants amongst them and further the process of "Request for Proposal" from short listed consultants is in progress.

The digital countdown timers are already been installed on conventional traffic signal (Non ATC) at City, Western & Eastern Suburb. The maintenance of 244 CCTV installed at traffic signal junction 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. Further the installation of 50 ANPR cameras work at various accidents spot areas in Greater Mumbai is in progress.

Updated important statistical information

Total No. of Roads Lamps	1,42,208
Total No. of Flash beacons	207
Total No. of High Masts	206
Total No. of Traffic Signals	610
Road Length in Kms	1941.16 Kms

BRIDGES IN MUMBAI

List of Major works completed in the year 2016-17

1) Jogeshwari (North) ROB in P/South Ward (contract cost ₹255.83 crore).

2) Renovation of Churchgate Subway 'A' Ward (contract cost ₹2.05 crore).

3) Renovation of Sion Subway F/North Ward (contract cost ₹2.59 crore).

List of Major projects undertaken in the year 2016-17

1) Ghatkopar Mankhurd Link Road, M/East Ward (contract cost ₹467.68 crore).

2) Flyover along N.S. Phadke Marg at Teli Galli Junction, Andheri (East) in K/East Ward (Telli Galli) (contract cost ₹101.23 crore).

Surface Transport

There are different types of vehicles plying on the roads of Mumbai. They consist of cars, taxis, trucks, buses, three-wheelers, two-wheelers etc. The total number of vehicles in Mumbai as on March 2016 is 27,86,512. Their composition is 57.46% two-wheelers, 31.76% cars, jeep & station vegan, 2.82% taxis/cabs, 4.75% auto rickshaw, 0.51% buses, 2.60% Goods vehicles, 0.01% tractors/trailers and others 0.10%. Table no. 24 shows number of different vehicles in Mumbai.

Table No. 24 :
Category-wise comparision of vehicle population 2015-17

Sr. No.	Category	As on 31st March 2017		
		2015	2016	2017
1	Two Wheelers	1448759	1600998	1968019
2	Cars, Jeep, Station wagons	819828	884882	1061395
3	Taxi/Cabs	66130	78473	115260
4	Auto-rikshaws	128120	132424	139065
5	Buses	12754	14282	14498
6	Trucks &Lorries	68115	72309	8307
7	Tractor/ Trailors	299	298	336
8	Other	2744	2846	3086
	Total	**2546749**	**2786512**	**3309966**

Source : This information is received from RTO, GOM

Graph No. 6 : Categories of Vehicles

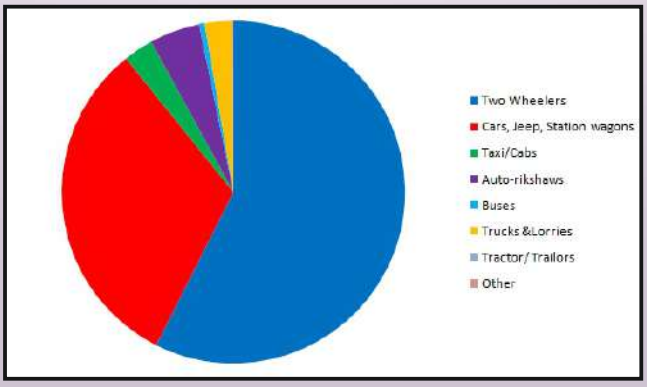


Table No. 25 : CATEGORY-WISE VEHICLES USING VARIOUS FUEL TYPES AS ON 31st MARCH 2017 (PROVISIONAL)

Sr.No.	CATEGORY	DIESEL	PERTROL	LPG	CNG	OTHERS	TOTAL
1	TWO - WHEELERS	29	1628152	2	0	137	1628320
2	CARS,JEEPS,STATION WAGONS	250876	567634	9950	65425	1	893886
3	TAXI/CABS	16637	18098	1128	51950	0	87813
4	AUTO RICKSHAWS	0	0	0	119245	0	119245
5	STAGE CARRIAGES	2671	0	0	1779	0	4450
6	CONTRACT CARRIAGES	4267	354	0	580	0	5201
7	TRUCKS,LORRIES,TANKERS	8421	5	0	100	0	8526
8	AMBULANCES	1019	528	1	72	0	1620
9	SCHOOL BUSES	763	538	0	2022	0	3323
10	PRIVATE SERVICE VEHICLES	832	82	9	180	0	1103
11	TRAINLORS	96	0	0	0	0	96
12	TRACTORS	203	0	0	0	0	203
13	DELIVERY-VAN(4-WHEELERS)	25841	1204	3	563	0	27611
14	DELIVERY-VAN(3-WHEELERS)	31826	4509	7	656	0	36998
15	OTHERS	1199	19	0	28	0	1246
	TOTAL	**344680**	**2221123**	**11100**	**242600**	**138**	**2819641**

Source : This information is received from RTO,GOM

There are 87,813 metered taxis in Mumbai operating on petrol, diesel, CNG and LPG as on 31st March 2017. CNG and LPG which are regarded as clean fuel. More than 60.4% meter taxis and 100% 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.

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

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

BEST undertaking operates 3775 buses on 482 Routes, commuting around 27 Lakhs passengers daily in the area of Brihan Mumbai Municipal Corporation and it's align cities like Navi Mumbai, Thane and Mira-Bhayander.

To save the fuel, which is a valuable natural resource of the Nation, it is necessary to reduce the no. of private vehicles on road. Considering this aspect the Undertaking has taken initiative to operate "Air-conditional buses", so as to attract the Private Car Owners to Bus service from their private cars. As such 266 Air-conditioned buses are inducted in the fleet.

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 the total bus fleet of the undertaking is 3775buses, having 2495 buses operated on 'CNG'. The CNG pumps are made available in 15 Bus depots to facilitate easy fueling of the buses.

The BEST undertaking have a well established "Workshop" equipped with latest techniques, where entire fleet of the Undertaking is tested regularly for controlling the polluted air. Further, the buses of the Undertaking are regularly tested for PUC by 'M/s Welankani PUC Centre' authorized by the Government of Maharashtra. The Undertaking uses the best quality Engine Oil of wel known compaines after testing it in the 'Chemical Lab' of the Undertaking.

The Undertaking has an established "Training Centre" where the two separate vehicle are provided for importing Fuel conservation training to the Bus Drivers of the Undertaking.

CNG and L.P.G. are clean fuels. Taxis of more than 60.4 percent and 100 percent of autos use CNG and LPG fuels.

HOUSING AND SLUMS

The population of the city of Mumbai has crossed the 12 million mark, out of which 60% of the population resides in the hutments. It creates burden on environment and many health problems. 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 planned construction program regarding basic amenities for the year 2015-16 as given below.

- Construction of protection wall.
- Improvement plan for civic backward colony.
- Development plan for slum area.
- Plan for beautification.
- Development plan for crematorium.
- To provide facilities to citizens in area under MCGM.
- Member of parliament/MLA/Apposite party members.
- Development of tourist places.
- New plans/ Ladies saving group/ Water tank protection/ Borewell.

The proposed by MP/MLA as per the above plan. Administrative sanctions for these works is received from the office of collector city district/urban district. The works done under the Mumbai slum development board are carried out by the financial source from D.P.D.C., M.M.R.D.A and Government special fund.

EDUCATION

Education is the important basic need to increase general awareness. Education at School level improves the knowledge of students about protection and conservation of Environment which makes them responsible citizens.

Under Section 61 (q) of the Mumbai Municipal Corporation Act 1888 is an obligatory duty of the Corporation to provide primary education. Education Department of the M.C.G,M. has been carrying out this responsibility since 1907.

In the academic year 2016-17, Education Department of MCGM runs 1048 Municipal primary Schools in 8 different medium and 287979 students are studying in these schools. There are 803 students in 17 schools. There are schools for mentally challenged. MCGM 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 ruls 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. At present, 49 aided secondary schools are providing free secondary education. Efforts are being made to provide additional facility of free secondary education by starting 99 secondary schools on Un-Aided basis, since 2008-09. In all 35926 students are studying in secondary schools. MCGM runs 2 D.T.Ed colleges. For higher education students who score high percentage in SSC examination, 3 Junior colleges of Science facility have been started since 2009-10. For the students in MCGM Schools activities emphasizing the importance of health and environment are included in day-to-day learning –teaching process.

Students of Municipal Schools undergo regular free medical check-up by the Medical Officer of MCGM students with minor ailments are treated in the School or referred to near by municipal dispensaries. Those with major ailment are referred for medical /surgical treatment to nearyby municipal hospitals or school clinics situated at Nair hospital/Coopar hospital and 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 2016-17 services and facilties for 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 Chair, Crutches, Braile Books, Tricycle, Rotator as per requirements.

AIR QUALITY STATUS

To measure the levels of pollutants in Mumbai, Air Quality Monitoring & Research Lab of MCGM has established manual and fixed air pollution monitoring sites at, Worli, Khar, Andheri, Bhandup and Maravali. Automatic monitoring sites are at Worli, Wadala and Andheri Traffic Junctions through mobile vans.

Air Monitoring Sites

Sr. No.	Sites	Located at
1	Worli	Transport dept. Building, E.Moses Rd.,Worli
2	Khar	Municipal Dispensary Bldg., S.V.Rd, Khar(W)
3	Andheri	Nityanand Marg Municipal School Bldg., Koldongari, Andheri (W)
4	Bhandup	S ward office Bldg.m,L.B.S.Rd, Bhandup (W)
5	Maravali	Maravli Municipal School bldg.,Kurla Mahul Rd., opp RCF, Chembur.

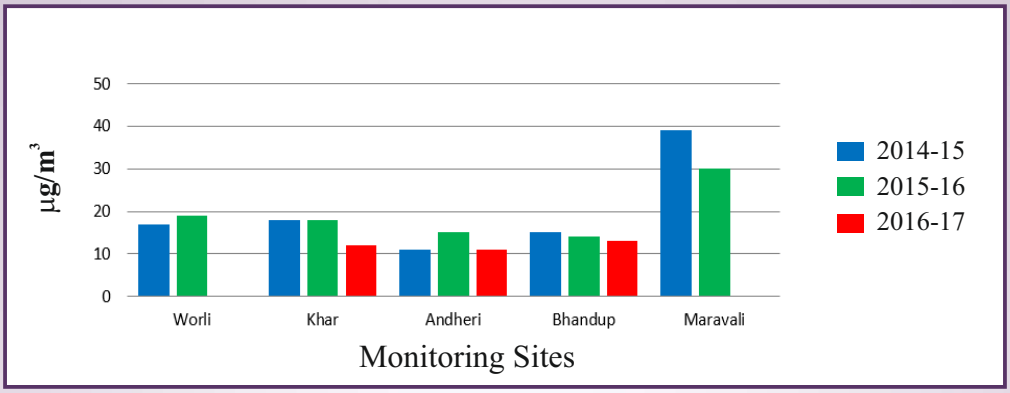
Environment department of MCGM monitors ambient air quality for criteria air pollutants namely Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2), Ammonia (NH_3) parameters regularly. Air quality levels are evaluated in the year 2016-2017 for its compliance with ambient air quality standards set by Central Pollution Control Board for SO_2,NO_2 and NH_3.

Table No. 26 : Ambient Air Quality Levels at fixed monitoring sites (Annual average) April 2014 to March 2017.

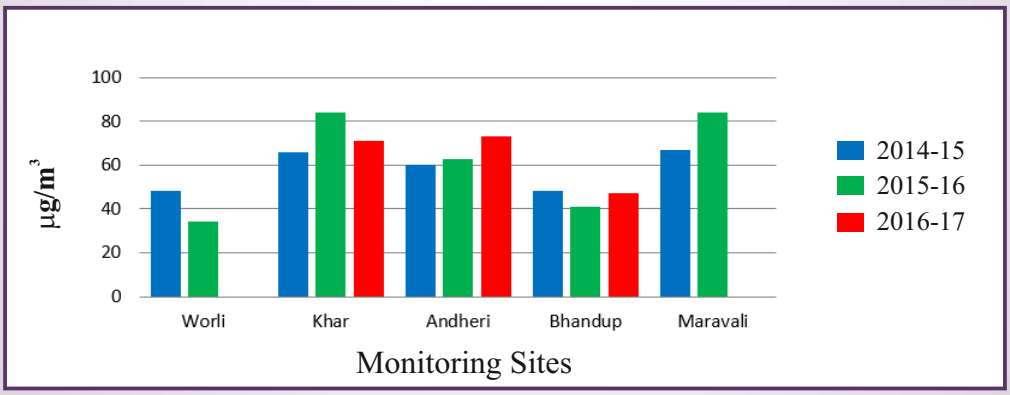
Sr. No.	Site	Unit µg/m³								
		Sulphur dioxide			Nitrogen dioxide			Ammonia		
		2014-15	2015-16	2016-17	2014-15	2015-16	2016-17	2014-15	2015-16	2016-17
1	Worli	17	19	-	48	34	-	71	66	-
2	Khar	18	18	12	66	84	71	96	73	64
3	Andheri	11	15	11	60	63	73	56	65	66
4	Bhandup	15	14	13	48	41	47	60	67	70
5	Maravali	39	30	-	67	84	-	186	287	-
CPCB Standards µg/m³		50			40			100		

Source : Air Quality Monitoring & Research Laboratory of MCGM

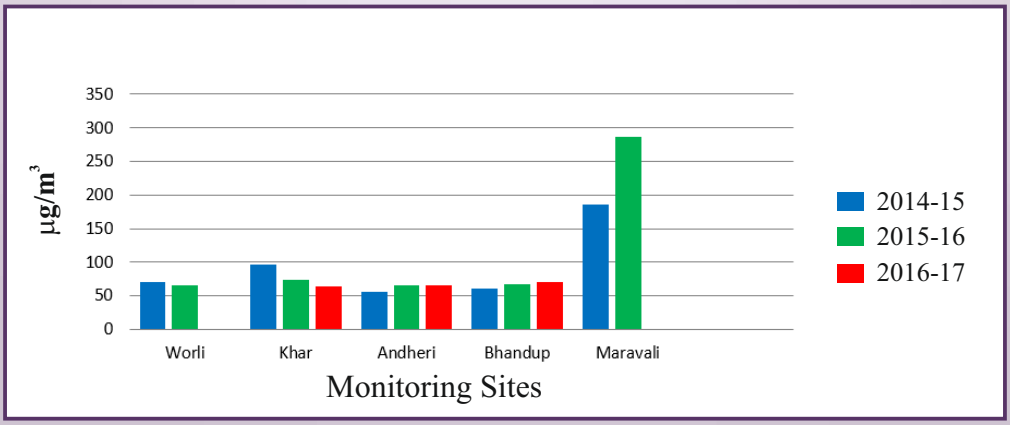
Graph No. 7 : SO_2 Levels



Graph No. 8 : NO_2 Levels



Graph No. 9 : NH_3 Levels



Comparison with standards prescribed by Central Pollution Control Board :

Levels of air pollutants SO_2, NO_2 and NH_3 measured during 2016-17 are compared with standards set by Central Pollution Control Board (CPCB) observations are as under.

- SO_2 levels are found less than prescribed annual standards at all fixed monitoring stations.
- NO_2 levels are found more than prescribed annual standards at all fixed monitoring stations .
- NH_3 levels are found less than prescribed annual standards at all fixed monitoring stations.

Table No. 27 : Comparison with CPCB standards(2016-17) at fix monitoring site (Annual Avg)

Sr. No.	Unit µg/m^3	Sulphur dioxide	Nitrogen dioxide	Ammonia
1	Range	11 – 13	47– 73	64– 70
2	Maximum	Bhandup	Khar, Bhandup	Bhandup
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

Comparison of Annual Averages with CPCB Standards :

When annual average are compared with CPCB standards following observations are noted.

- SO_2 levels are found to be in the range of 11-13 µg/m^3 and are below prescribed standard (50µg/m$^{3)}$ at all sites. Maximum SO_2level is found at Bhandup.
- NO_2 levels are found to be in the range of 47-73 µg/m^3 and have exceeded standard 40µg/m^3 values at all sitesand found maximum at Maravali. Maximum NO_2level is found at Andheri.
- NH_3levels are found to be in the range of 64-70 µg/m^3 are below prescribed standard (50µg/m$^{3)}$ at all sites. Maximum NH_3level is found at Bhandup.

Comparison of 24 hours average with CPCB Standards :

Table No. 28 : Percentage at monitoring sites exceeding CPCB standards (24 hours average) 2016-17: Unit µg/m^3

Sr. No.	Site/ Year	Sulphur dioxide			Nitrogen dioxide			Ammonia		
		2014-15	2015-16	2016-17	2014-15	2015-16	2016-17	2014-15	2015-16	2016-17
1	Worli	0	0	-	19	1	-	0	0	-
2	Khar	0	0	2	32	60	36	0	0	12
3	Andheri	0	0	0	36	33	31	0	1	0
4	Bhandup	0	0	0	15	7	19	0	0	0
5	Maravali	0	1	-	33	52	-	10	16	-

Source : Air Quality Monitoring & Research Laboratory of MCGM.

Comparison of Percentage exceeding 24 hours average with CPCB standards:

Comparison of Percentage exceeding 24 hours average with CPCB standards shows fallowing observations :

- SO_2 levels in ambient air have not exceeded the 24 hrs standards set by at all monitoring stations except Khar. At Khar 2% samples are exceeding standards.
- NO_2 levels exceeded standards set by CPCB at all monitoring stations. At Khar 36%, Andheri 31% and Bhandup 19% samples are exceeding standard.
- The levels of NH_3 exceeded at Khar by 12% and at Andheri and Bhandup is below prescribed standard.

Table No. 29 : 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, $SO_2 \mu g/m^3$	Annual avg.*	50 $\mu g/m^3$	20 $\mu g/m^3$
	24 Hrs. avg.**	80 $\mu g/m^3$	80 $\mu g/m^3$
Nitrogen Dioxide, $NO_2 \mu g/m^3$	Annual avg.*	40 $\mu g/m^3$	30 $\mu g/m^3$
	24 Hrs. avg.**	80 $\mu g/m^3$	80 $\mu g/m^3$
Particulate Matter (Size less than $10\mu_m$) $PM_{10} \mu g/m^3$	Annual avg.*	60 $\mu g/m^3$	60 $\mu g/m^3$
	24 Hrs. avg.**	100 $\mu g/m^3$	100 $\mu g/m^3$
Particulate Matter (Size less than 2.5 μ_m) $PM_{2.5} \mu g/m^3$	Annual avg.*	40 $\mu g/m^3$	40 $\mu g/m^3$
	24 Hrs. avg.**	60 $\mu g/m^3$	60 $\mu g/m^3$
Ozone, $O_3 \mu g/m^3$	8Hrs.**	100 $\mu g/m^3$	100 $\mu g/m^3$
	1Hr.**	180 $\mu g/m^3$	180 $\mu g/m^3$
Lead, Pb, $\mu g/m^3$	Annual avg.*	0.5 $\mu g/m^3$	0.5 $\mu g/m^3$
	24 Hrs. avg.**	1 $\mu g/m^3$	1 $\mu g/m^3$
Carbon Monoxide,CO, $\mu g/m^3$	8Hrs.**	2.0 mg/m^3	2.0 mg/m^3
	1Hr.**	4.0 mg/m^3	4.0 mg/m^3
Ammonia,$NH_3 \mu g/m^3$	Annual avg.*	100 $\mu g/m^3$	100 $\mu g/m^3$
	24 Hrs. avg.**	400 $\mu g/m^3$	400 $\mu g/m^3$
Benzene, $C_6H_6 \mu g/m^3$	Annual avg.*	5.0 $\mu g/m^3$	5.0 $\mu g/m^3$
Benzo alpha Pyrene, Particulate Phase only BaP, ng/m^3	Annual avg.*	1.0 ng/m^3	1.0 ng/m^3
Arsenic, As, ng/m^3	Annual avg.*	6.0 ng/m^3	6.0 ng/m^3
Nickel,Ni, ng/m^3	Annual avg.*	20 ng/m^3	20 ng/m^3

Source: CPCB 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.

Automatic air quality monitoring at Traffic junctions:

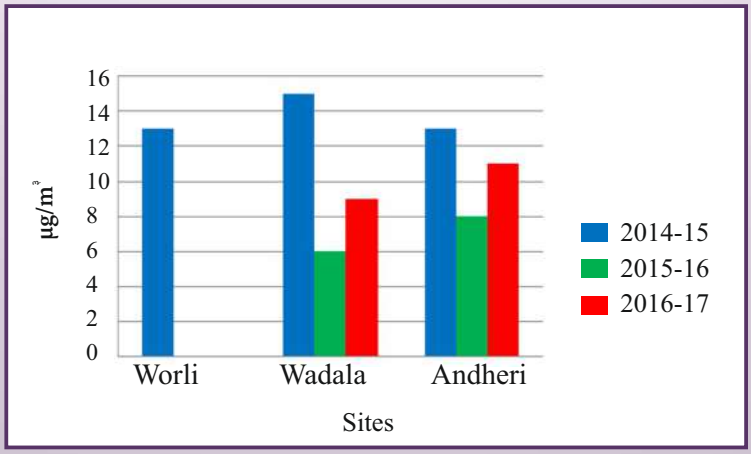
Air quality levels have been monitored at various traffic junctions using mobile air quality monitoring van. The study indicates (Table.30) following variations in their annual levels when compared to previous year.

Table No. 30 : Annual levels of SO_2, NO_2, RSPM, CO at traffic junctions 2014-2017

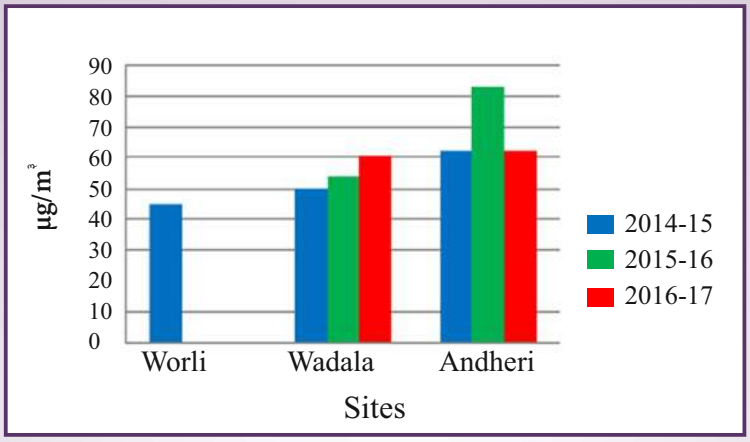
Site	Sulphur dioxide			Nitrogen dioxide			PM_{10}			$PM_{2.5}$			Carbon Monoxide		
	2014-15	2015-16	2016-17	2014-15	2015-16	2016-17	2014-15	2015-16	2016-17	2014-15	2015-16	2016-17	2014-15	2015-16	2016-17
Worli	13	-	-	45	-	-	148	-	-	52	-	-	1.1	-	-
Wadala	15	6	9	50	54	61	194	211	143	56	284	115	1.1	1	1.9
Andheri	13	8	11	62	83	62	190	194	273	80	244	88	1	1.1	1.2

Unit: Carbon Monoxide– (mg/m^3)Unit: Other Pollutants- ($\mu g/m^3$)
Source : This information is received from Environment Dept of MCGM

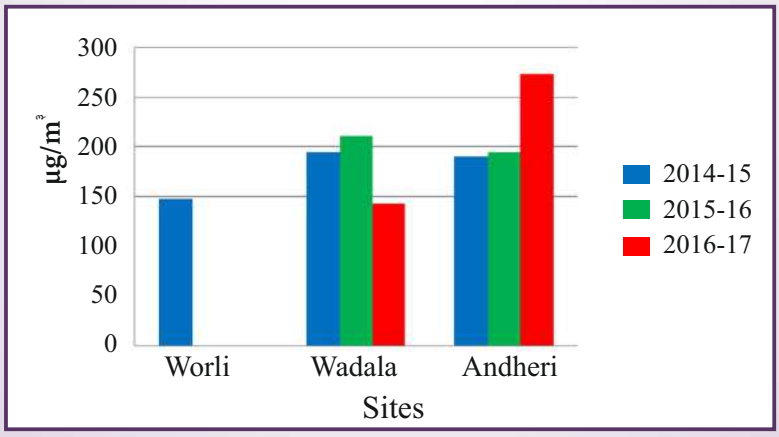
Graph No. 10 : Annual levels of SO_2 at traffic junctions 2014-2017



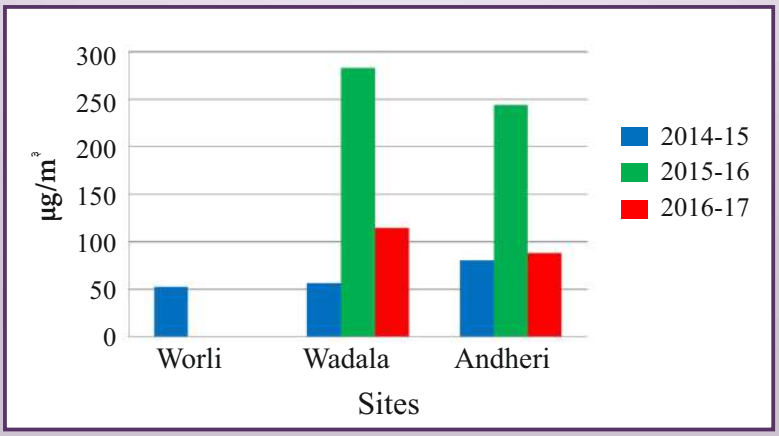
Graph No. 11 :Annual levels of NO_2 at traffic junctions 2014-2017



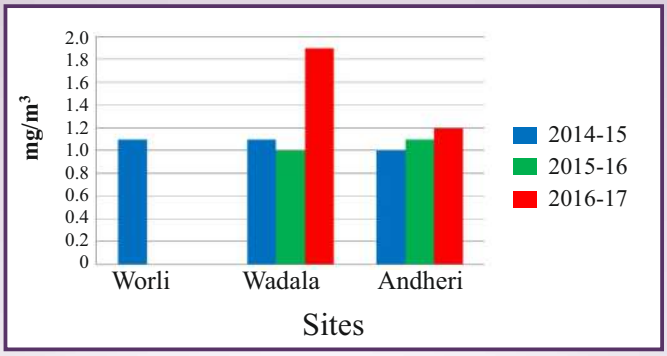
Graph No. 12 :Annual levels of PM_{10} at traffic junctions 2014-2017



Graph No. 13 : Annual levels of $PM_{2.5}$ at traffic junctions 2014-2017



Graph No. 14 : Annual levels of CO at traffic junctions 2014-2017



Levels of Sulpher dioxide are less compared to last year.

- Sulpher dioxidelevels have increased compare to last year.
- Nitrogen dioxide levels have increased at Wadala and decrease at Andheri compare to last year.
- Levels of $RSPM_{10}$ have decreased at Wadala and at increased Andheri and Levels of $RSPM_{2.5}$ have decrease at all sites compare to last year. Compare to CPCB standards Levels of $RSPM_{2.5}$ and $RSPM_{10}$ are exceeding in the year 2016-17.

In case carbon monoxide the levels have increased at Wadala compared to last year and at Andheri there is no significant difference.

Generally levels of air pollutants show decreasing trend in monsoon and increasing trend in winter season. Air pollutants are washed out along with rain water and south west direction of wind arriving from sea. Due to low speed of the wind and less temperature in winter season mixing of the pollutants from ground level to air at higher level is minimum. There are more industries in North East part of Mumbai. Because direction of the wind is North, East in winter season pollution levels show rise in Mumbai.

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, 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 respectively in Delhi and Pune 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.

In Mumbai at various locations AQMS, AWS and LED Boards are installed to received information about current air quality and 1 to 3 days forecast

Table No. 31 : SAFAR Mumbai comprises of following products.

Sr. No.	Name of the Product	Nos.
1	Air Quality Monitoring Stations (AQMS)	10 nos.
2	Automatic Weather Stations (AWS)	30 nos.
3	LED, Digital Display Boards (DDS)	13 nos.

Map No. 5 :Air Monitoring Centers in Mumbai 'Safari-Mumbai' air quality Testing Centers

- Colaba
- Andheri
- Warli
- Bhandup
- Borivali
- Malad
- Chembur
- B.K.C
- Majgav

Map No. 6 : Digital Display Centers in Mumbai: 'Safari-Mumbai' air quality

- Mantralay
- Gateway of India
- Sanjay Gandhi National Park
- Mit Chowki
- Mulund
- Juhu
- Vile parle
- Kalanagar Junction
- Panjarpol
- Navi Mumbai
- Haji Ali
- Girgaon Choupati
- C.S.T

SAFAR-Mumbai Information to Public:

Air pollutants viz. 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 no……). 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 tides and alerts of severe weather conditions will be helpful to public, specially to fishermen.

Communication Media for 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 App):

This is a mobile app which can be downloaded free of cost. The app provides location specific current and forecasted air quality index and UV index. The app is user friendly and will benefit 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):

3 x 1.80 Meter LED digital display boards are installed at sites for public viewing. Along with colour coded AQI, UVI and Health advisories environmental slogans will educate the citizens of Mumbai.

During July 2015 to March 2016 air quality levels are measured at various monitoring sites by 'SAFAR-Mumbai'. i.e. PM_{10}, $PM_{2.5}$, O_3, CO and NO_2 etc. as shown in (Table No. 32)

Table No. 32 : air quality levels at various monitoring sites by 'SAFAR-Mumbai in the year 2016-17

Sr. No.	Site	SPM		Ozone (O_3)	Carbon Monoxide (CO)	Nitrogen dioxide (NO_2)
		PM_{10}	$PM_{2.5}$			
		µg/m^3	µg/m^3	ppb	ppm	ppb
1	Chembur	99	63	20	0.6	22
2	Bhandup	93	60	31	1.0	19
3	BKC	121	86	14	1.0	12
4	Colaba	85	54	32	0.9	14
5	Andheri	116	83	19	1.0	21
6	Malad	112	76	28	0.9	25
7	Mazgaon	127	82	21	0.7	20
8	Worali	89	58	37	0.7	17
9	Borivali	96	49	24	0.6	21
CPCB Standard Annual Average		60	40	51(8hrs)	1.75 (8hrs)	21

- The annual average levels of Suspended Particulates (PM_{10}) are found to be in the range of 85-127mg/m^3. The maximum level of PM_{10} is observed at Mazgaon air monitoring station.
- The annual average levels of Suspended Particulates ($PM_{2.5}$) are found to be in the range of 49-86 mg/m^3. The maximum level of $PM_{2.5}$ is observed at BKC air monitoring station.

- The annual average levels of Ozone (O_3) are found to be in the range of 14-37 ppb. The maximum level is observed at Worli
- The annual average levels of Carbon Monoxid (CO) are found to be in the range of 0.6-1.0 PPM. The maximum level of Carbon Monoxide is observed at Bhandup BKC and Andheri.
- The annual average levels of Nitrogen Dioxide (NO_2) are found to be 12-25 ppb. The maximum level of Nitrogen Dioxide is observed at Malad.

Air Quality Index (AQI) :

Honerable 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 AQIë

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

Contribution of various major industries in Environment Conservation :

RCF

RCF has emission monitoring system which helps to take timely preventive/ corrective action during upset/ abnormal condition. For emission monitoring, a three tier system is in place. Installation of four sophisticated fixed ambient air quality monitoring system, online stack monitoring system, workplace monitors keeps us vigilant all the time. Also after treatment of effluents generated in the plants in the integrated Effluent treatment plant, effluents are discharged after meeting the norms.

Continuous online stack data of SO_2 from Sulphuric Acid, NOx from Medium Pressure and High pressure Nitric Acid Plant, NH_3 from Suphala Plant, pH and flow and Ammonical Nitrogen of ETP are provided with connectivity to statutory authorities.

ISO certification:

RCF Trombay unit is certified with upgraded new standards of ISO 9001:2015, ISO 14001:2015 & OHSAS 18001:2007 from January 2017 by M/S. IRQS (M/s Indian Registrar of Quality System).

RCF is also certified with Protect & Sustain Certification from International Fertilizer Association.

IN addition to this RCF has also implemented Energy Management System.

Mumbai Port Trust:

Coal mint for MAHAGENCO Power Plant at Bhusawal is transported by dumper from Haji Bunder to 'S' Plot (short distance) and subsequently delivered to MAHAGENCO power plant by railway wagons. The air pollution caused due to the transportation of coal through dumpers is minimized by following methods.

- The transportation through dumper is reduced and maximum transportation is done by railway.
- Water is sprinkled at storage plants as well as on the roads where the dumpers carry coal to and fro.
- Screen and curtains are provided at all the storage plants to prevent any coal dust emission in the air and the areas in the vicinity.

Air samples are collected by a MoEF approved laboratory in Port's operational area and tested for RSPM-$PM_{2.5}$, RSPM-PM_{10}, Sulphur Dioxide, Oxides of Nitrogen and Carbon Monoxide levels by using High Volume Air Samplers (HVAS). The level for VOC's in air are got tested at Chemical handling berths. The analysis of air and water samples is carried out as per CPCB norms and the reports are sent to MPCB every month.

Bharat Petroleum Corporation Ltd. Mumbai Refinery, Mahul Chembur

To be a role model for Environment is an integral part of BPCL Mumbai Refinery (MR) vision. We are focusing our efforts on constant innovating our process and operational efficiency to be less resource energy and water intensive and result in minimal emission and waste. Initiatives made towards environmental improvement during the year 2014-15 are listed below.

1) Flare Gas Recovery System:

Flare is an essential system in refineries for safe venting of hydrocarbons during normal operations and also during abnormal conditions during emergencies, start-ups and shutdown of units. In September 2013, BPCL MR had commissioned its 125 m high demountable flare which enables better dispersion of flare emissions. Further, in order to minimize the flare emissions, flare gas recovery system was commissioned in the month of October 2014 at a capital cost of Rs. 13.6crore. The system has a liquid ring compressor with a capacity of recovering 20MT/day of hydrocarbons. With this, BPCL MR has contributed in reducing air pollution to very minimal levels of flare emissions.

2) Renewable Energy:

As an initiative for generation of clean green sustainable energy, a Solar Photo Voltaic (PV) power plant with a capacity of 40kVA was commissioned at the rooftop of BPCL MR administrative

building south block in the month of August 2014. The plat set u at a capital cost of Rs. 40Lakh in the single largest grid connected system installed at BPCL. It is our endeavor to increase energy production and in-house consumption from renewable sources in the future.

3) LPG pipeline - Uran:

For the first time this company was operationalized from Mumbai-Chembur Refineries to Uran LPG Bottling and domestic LPG pipeline in October 2014. The 28.3-km LPG pipeline has been put in place with the participation of BPCL and HPCL in Chembur. Due to this, filling the LPG tank lorry and vagen helped to improve the environment and improve the environment.

4) Rainfall:

Water conservation is important considering the water scarcity and the important sources of water. BPCL has implemented several projects for rain harvesting in Mumbai-based refineries. The company has increased the total area of 30,000 square meters for rain harvest in 2014. In this, the water storage on the surface of the Sport Club and the storage of the central engineering workshop building has been substantially accumulated.

NOISE

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 M.C.G.M. 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 M.C.G.M. website.

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

M.C.G.M. has also made provision to lodge complaints on website. In addition to this, M.C.G.M. has developed Mobile Application, 'MCGM 24 X 7' for public to lodge the complaint., 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 number ध्वनीप्र-२००९/प्र. क्र.९५/ तांक-१ दिनांक२१ एप्रिल २००९,2000, the 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, the Mumbai Police Commissioner & Police Commissioner Railway has appointed officer not below the rank of Inspector of the respective police station as a authorities 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.

As per directives issued by Urban Development department of GOM, with reference to the meeting between Hon. Chief Minister of Maharashtra and Citizen Action Group held in the year 2011, noise / sound level mapping at 1200 Nos. locations in all 24 wards of MCGM has been carried out for suggesting the suitable measures for reduction of noise along with the cost estimate for the same. The locations were categorised as Courts, Major Hospitals, Govt/Semi Govt/Corporate Offices, Schools, Colleges, Traffic Junctions, Major Chowks, Tourists Spots, Industrial Areas, Religious Places, Markets, Railway Stations, Air Ports, Malls, Recreational Places, Residential Areas and Tourist Spots, etc.

Noise measurement on field has been done using pre calibrated sound level meters for consecutive working and non working days at an interval of every second in decibel unit, dB. The logical noise disturbing each of locations was recorded by providing four sound level meters placed at different sub locations. Measured readings processed for averaging intensity in Equivalent Loudness (Leq). Leq (equivalent), Lmin (minimum), Lmax (maximum) & Lavg (average) of each sub location are recorded in 1200 reports, which also suggest the remedial measures for reduction of noise. Environment section is planning to make available the observations obtained from above project to all citizens with the help of MCGM-GIS Map.

Results obtained from Noise Mapping Project are –

Map No. 7 Silence Area

Table No. 33 : Noise Level During Working Day

L(A)eq Range (in dB)	Locations in City Area	Locations in WS Area	Locations in ES Area	Total no. of Locations	Location Percentage
50-60	0	4	3	7	0.15
60-70	28	231	122	381	7.94
70-80	490	1230	911	2631	54.81
80-90	289	690	651	1630	33.96
90-100	10	45	42	97	2.02
ABOVE 100	11	16	27	54	1.13

Source : Environment Department of MCGM

Table No. 34 : Noise Level During Working Night

L(A)eq Range (in dB)	Locations in City Area	Locations in WS Area	Locations in ES Area	Total no. of Locations	Location Percentage
50-60	4	79	22	105	2.19
60-70	195	543	290	1028	21.42
70-80	558	1282	1061	2901	60.44
80-90	62	249	320	631	13.15
90-100	3	50	37	90	1.88
ABOVE 100	6	13	26	45	0.94

Source : Environment Department of MCGM

Table No. 35 : Noise Level During Non-Working Day

L(A)eq Range (in dB)	Locations in City Area	Locations in WS Area	Locations in ES Area	Total no. of Locations	Location Percentage
50-60	0	1	4	5	0.10
60-70	38	246	106	390	8.13
70-80	540	1282	974	2796	58.25
80-90	226	632	598	1456	30.33
90-100	12	39	46	97	2.02
ABOVE 100	12	16	28	56	1.17

Source : Environment Department of MCGM

Table No. 36 : Noise Level During Non-Working Night

L(A)eq Range (in dB)	Locations in City Area	Locations in WS Area	Locations in ES Area	Total no. of Locations	Location Percentage
50-60	6	57	20	83	1.73
60-70	155	525	278	958	19.96
70-80	577	1341	1079	2997	62.44
80-90	81	272	314	667	13.90
90-100	2	8	37	47	0.98
ABOVE 100	7	13	28	48	1.00

Source : Environment Department of MCGM

Broad observations of the result obtained indicates that, at maximum places the noise level i.e. L(A)eq is between 70 to 80 dB. The detailed report will be available shortly.

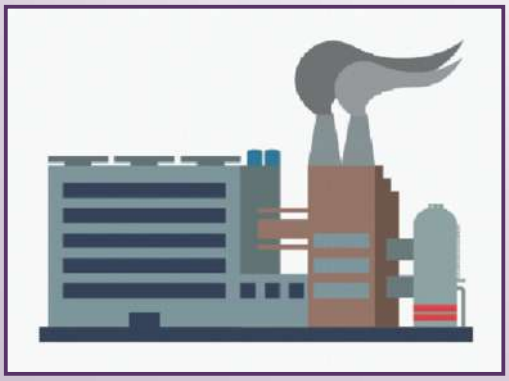
As per the reports most prominent noise sources are road traffic, industrial & construction activities, railways, aircrafts, etc.

The report will be handed over to respective authorities for further needful in the subject.

To suggest measures to reduce noise pollution in the city, the sound has been measured in 1200 locations of all the 24 departments of the Mumbai Municipal Corporation.
Complaints of noise pollution from citizens of the Greater Mumbai Municipal Corporation, received complaints from citizens of 1916. A complaint number is given to the complainant, so it can be possible to track the complaint.

INDUSTRIES

Environmental pollution is a by-product of industrialization. However, with the modern technologies, pollution potential of industries / factoroies are lowering. Total 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. The total amount of fees collected in the year 2016 – 17 is Rs. 2,48,53,301/- There are 8570 industries / factors located in the city, 14,176 in Western Suburbs and 7,406 in Eastern Suburbs, maximum industries 5,064 are in P-South ward. Ward-wise distribution of industries are shown in table



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

Table No. 37 : Wardwise industries in Mumbai- March 2017

Sr. No.	Ward	No. of industries till 31.03.2017
1	A	128
2	B	262
3	C	432
4	D	746
5	E	1956
6	F/Soth	1204
7	F/North	275
8	G/South	2455
9	G/North	1001
10	H/East	453
11	H/West	142
12	K/East	3663
13	K/West	1055
14	L	3039
15	M/East	406
16	M/West	252
17	N	606
18	P/South	5064
19	P/North	1257
20	R/South	1155
21	R/Central	383
22	R/North	923
23	S	1242
24	T	895
	Total	28994

Source : Environment Department of MCGM

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 ı 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.

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) defined 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.

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 burden of disease world wide and more than a third of the burden 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) and non-communicable diseases like Hypertension, Diabetes, etc.

In Mumbai, the MCGM largely takes care of 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 responsibility of MCGM. MCGM's health infrastructure in Mumbai is a 3-tier system as shown in the table below.

Table No. 38 : Health Infrastructure 3 - Tier System in MCGM

PRIMARY	Health posts	204
	Dispensaries	169
	Maternity Homes	29
	Post-Partum centers	21
SECONDARY	Peripheral hospitals	16
	Specialty hospitals	5
TERTIARY	Major hospitals (Medical & Dental colleges) (5 main hospitals and 1 H.B.T. hospital joint with Cooper hospital.	6

Source: This information is received from Health Dept of MCGM

The health services are provided in two ways. On one hand 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 centre are started.

Objective of establishing health centers is to provide health service for implementation of family welfare program and outreach services for mother and child.

Table no. 39 shows Birth & Death Rates and also Infant & Maternal mortality in the year 2014to 2016. In year 2015 Birth rate in Mumbai was 12.05/1000 population and the Death rate was 6.50/1000 population in the year 2016 Infant mortality was 12.96/1000 and 2.0/1000 for mothers.

Table No. 39 Health Statistics- Birth & Death Rates 2014 - 2016

	Year 2014	Year 2015	Year 2016
Birth (Registered)	174084	174902	152881
Birth Rate/1000 population	13.83	13.83	12.05
Death (Registered)	93254	94706	82528
Death Rate/1000 population	7.41	7.49	6.50
Infant Mortality	4883	4575	1982
Infant Mortality Rate/1000 live birth	28.05	23.16	12.96
Maternal Death	299	313	305
Maternal Mortality Rate/1000 live birth	1.72	1.79	2.00

Source: This information is received from Health Dept of MCGM

Epidemiology Cell

Kasturba Hospital located at Sane Guruji Marg, is an Infectious Diseases Hospital linked to TNM Medical College & BYL Nair Cahritable Hospital.

This is only infectious diseases hospital in the city of Mumbai for Isolation and Treatment of patients suffering form Infectious diseases except Rabies, Tetanus, Tuberculosis and Leprosy is affiliated to T.N.M. college. Hospital is having well equipped Laboratory with Clinical Micro Biology, Bio-Chemistry and Serology section. Hospital is having Radiology Department to support clinicians in managing and treating indoor patients.

In the year 2006-2007 the Molecular Diagnostic Laboratory has been commissioned at Kashturba Hospital for Infectious Diseases was upgraded to tests Throat Swab/ Nasal Swab for suspected H1N1 patient.

Health Care Facilities provided at Kasturba Hospital as fallows:

Kasturba Hospital is a infectious diseases hospital in the city of Mumbai for isolation and treatment of patients suffering form infectious diseases except Rabies and Tetanus. Patients are admitted with free stay and food.

Laboratory Services:

1) Emergency Ward Laboratory : There is emergency ward laboratory for the routine investigation of the spot for the speedy treatment to the patients. This laboratory is looked after by the Resident Pathologist and the Medical Staff. The various investigations carried out in this laboratory.

2) Clinical
3) Micro Biological
4) Biochemistry
5) Serology
6) Molecular Reference Laboratory to test blood sample for Leptospirosis, Dengue, HIV viral load, H1N1 test, EID.

Radiology Department:

1) X-ray
2) USG
3) ECG

New Emerging and Re-Emerging Diseases:

Kasturba Hospital is the designated for isolation and management of following diseases:

Re-emerging Diseases :

1) Dengue
2) Leptospirosis
3) Malaria
4) Viral Hepatities

New Emerging Disease :

1) Sub Acute Respiratory Syndrome (SARS)
2) Avian Influenza (Bird Flu)
3) H1N1 Influenza A (Swine Flu)
4) Middle East Respiratory Syndrome (MERS-CoV)
5) Ebola Virus Diseases.

Role of Kasturba Hospital:

1. Kasturba Hospital on regular basis treats cases of Malaria, Dengue, leptospirosis and Viral Hepatitis. Separate wards are designated for Fever and Viral hepatitis cases.
2. In H1N1 Pandemic year 2009 Kasturba Hospital played major role in isolation, diagnosis, treatment and follow up of H1N1 cases.
3. Patient were attended to on OPD Basis in Ward No. 9 and were admitted for Indoor Management in Ward No. 30.
4. Facility for diagnosis of H1N1 Virus is available in Molecular Diagnostic laboratory.
5. In face of current threat of Ebola Virus diseases it has been decided that confirmed cases of Ebola Virus will be admitted for isolation and management in Kasturba Hospital. Ward No. 30 has been identified and kept ready for management of such cases.
6. Ward No. 27 will be developed into a isolation ward; with 11 beds (Self contained room with washroom facilities).

7. Training of Medical and Para Medical Staff has been conducted for management of patients, use of PPE (Personal Protective Equipment) Collection and Transport of Blood Samples.

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

Key activities of Epidemiology cell:

1) Disease Surveillance - 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 in the community.

2) Water Quality Surveillance – Reporting of drinking water quality surveillance is monitored on daily basis from all 24 Wards.

3) Continuous liaison with other departments like IO, Municipal Analyst, IEC, Training and MIS as well as State & National authorities for prevention and control of communicable diseases.

4) Training of the Health Staff working under MCGM and sensitization of Private Health care providers.

5) During any outbreak of communicable disease, the Mobile Health Unit (MHU) team is made available to control further spread and containment of the disease in community.

Additional activities during Monsoon:

1) Control Room - In Monsoon, control room is set up on 1st of June every year for monitoring the monsoon related disease surveillance activities.

2) Health Camps - Special Sunday camps are organized in collaboration with secondary & tertiary hospital 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 diseases.

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

Preventive measures for monsoon related illness:

Vector borne diseases (Malaria/Dengue/Chikun gunya) :

Five Point Program 'Mumbai Mantra' is implemented for prevention and control of vector borne diseases.

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 root treatment as per 2013 National Medicine work system.

3) Micro mapping and planning
4) Intersectoral and Intrasectoral coordination.
5) Public awareness and implementation.

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 co-ordination with Housing Societies.
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 2015, total 83 camps were held covering 34034 beneficiaries. 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 awareness.

Table No. 40 :Dengue report 2014 - 2017

Year	Cases	Deaths
2014	861	12
2015	919	8
2016(upto 31March2017)	1952	Nil

Source : This information is received from health department of MCGM

Water Borne Diseases:

Outbreak and spreading of the common water borne diseases (Gastroenteritis, Typhoid and Hepatitis- A, E) occurs due to polluted water and food stuffs. To avoid water and food pollution following measures are taken.

- The drinking water samples are tested on daily basis from all 24 Wards by MOH, AEWW-QC & AEWW-LD.
- The A. E. 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. In each ward food stuff kept open, over ripened fruits and food polluted by dust & flies, cold drinks regularly destroyed by Junior Investigator (Food)

H1N1 Influenza:

In 2015, two outbreak of H1N1 Influenza was reported in Mumbai, first in month of February and March and second in month of July and August.

Table No. 41 : H1N1 Report 2013 - 2017

Year	Cases	Deaths
2013	77	1
2014	11	1
2015	3029	52
2016(upto 31March2017)	1	0

Source : This information is received from health department of MCGM

Table No. 42 : Laprosi Report 2016

Year	Cases	Deaths
2016(upto 31March2017)	20	2

Source : This information is received from health department of MCGM

Treatment facility such as Ventilators, Isolation ward, Oseltamivir medicine, personal protective equipments are made available.

Testing facility available in P.C.R. Laboratory Kasturba Hospital, Haffkine Institute and private lab (SRL Diagnostics, Metropolis lab, Dr Lal Path Lab). H1N1 vaccine is made available for medical and para medical staff working in isolation wards in Municipal hospitals.

H1N1Vaccination :

H1N1 vaccination facility for pregnant women of 2nd & 3rd trimester is made available at all 28 maternity homes and all 4 Medical college (Sion, KEM, Nair, & JJ) Kasturba Hospital of MCGM. H1N1 vaccination for high risk group of DM, HT patients is available at 7 MCGM dispensaries i.e. one each for 7 zone. H1N1 vaccination is also available for all health care worker of MCGM who are at risk.

Till 31.03.2016, H1N1 vaccination given to total 7756 beneficiaries, out of which 6201 are ANC of 2nd & 3rd trimester, 994 are Patient having both DM and HT, 22 are Patient having HT only, 98 were patient having DM only 441 were Health care worker of BMC.

Malaria

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

- Effective Mosquito 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.

1. Regular review meetings :

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

2. 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.

1. 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.

2. 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.

Table No. 43 : Malaria Cases and Deaths 2014 - 2017

Year	B.S. Collection	Cases	S.P.R.	Total Deaths
2014	1321977	9068	0.6	18
2015	1428265	7517	0.5	16
2016	1529875	5845	0.3	12
2017 (Up to March)	201818	762	0.3	0*

* Jan to March 2017 deaths are yet to be confirmed.

Source: This information is received from Health Dept of MCGM

Acworth Municipal Hospital for Leprosy:

It was founded in the year 1890 by the then municipal commissioner Mr. H. A. Acworth and is located at R.A.Kidwai road, Wadala (West). It is under MCGM since 1991 as one of the specialized hospitals under the administrative control of Executive Health Officer.

Services provided by Acworth Municipal hospital for leprosy:

1)In Patient Service:

Presently the capacity of the hospital is of 240 cots. Majority of the abandoned, old and deformed inpatients are living in this hospital since many years. Hospital provides them food, clothes and place. The new patients not only get medical aid for leprosy and related diseases but also rehabilitation and welfare services by this hospital.

2) Out Patient Services:

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

3) Occupational Programme:

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

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 Audit:

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

7) Joint Project of Acworth Municipal Hospital and NGO's:

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

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

Leprosy Index Information and collection centre :

This centre helps to prepare programmes and micro action programmes.

Health Education :

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

Mumbai District AIDS Control Institute :

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

In a nutshell, MDACS's mission can be summed up as follows. All services are free of cost for the beneficiaries.

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

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

Basic Services:

Integrated counseling and HIV testing centers (ICTC) are established across the city in all Government/Municipal Hospitals/ Maternity Homes. These services are feely available to all walk – in/referred clients. Trained counselors and Laboratory Technicians perform HIV counseling and testing using standardized testing protocols with roubust 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 Antiretroviral treatment is initiated from 4th month of pregnancy.
- Early Infant Diagnosis : All infants born to HIV infected mothers are screened early and periodically , till 18 months of age for HIV infection.

Anti Retroviral Therapy (ART):

Patients have availed of free ART services through 15ART centers in the 6medical colleges in Mumbai, 7 Peripheral Hospital, 2 private hospitals (Godrej hospital and L & T Hospital) and a specialized ART center for children at Sion hospital. So far 40383 patients are currently registered in HIV care and 33087 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, 26 Designated STl/ RTl 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 28 NGOs /47CBOs 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

Present Status :

HIV prevalence trend has witnessed a significant decline among general clients (11% in 2007 to 2.68% in 2015), Pregnant women (0.87% in 2007 to 0.21% in 2015) in Mumbai.

Table No. 44 : HIV/AIDS Control Program Report 2016

HIV testing at Integrated Counseling and Testing Centers of Mumabi	Tested	Positive
General Clients	283256	7590
Pregnant Women	110643	231

Treatment for HIV positive patients at ART Centers in Mumbai	Adult	Children	Total
Number of HIV Positive patients registered in active care	42914	2260	45174
Number of HIV Positive patients on Anti-Retroviral Treatment (ART)	29736	1458	31194

Source : This information is received from health department of MCGM

Environmental Pollution Research Center (EPRC):

During the year 2016-17, the health of 839 people was reviewed by checking the ratio of deaths due to respiratory disorders through Oro Drugs and Environmental Pollution and Research Centers (Health Survey Groups) of KEM. At the same time 2056 people were trained to stay safe from asthma. 2942 people were tested for lung function tests. Blood transfusion of 78043 people has been done.

Table No. 45 : EPRC surveys 2016-2017:

Sr. No.	Area	Group surveyed	Nos.
1	Shrivardhan C.H.S, Mulund	Residents	109
2	Sadguru Sharan Society 2, Mulund	Residents	156
3	Bhandup Emergency Center	Workers	80
4	Tata Power Colony, Chembur	Residents	435
5	Charheswar Society, Mahul	Residents	59
	Total		839
	Asthma Training		2056
	Lung performance test		2942
	Blood Oxygen Measures (Arterial blood gas study)		78043

Source : The above information is received from the Department of Higher Drugs and Environmental Pollution and Research Center of the Corporation.

DISASTER MANAGEMENT

DISASTER MANAGEMENT AND CENTRAL COMPLAINT REGISTRATION SYSTEM :

In the beginning a separate unit viz. 'Disaster Management Unit' 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 form 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 Cell:

1) The prime aim of the unit to be prepared to tackle man-made and natural disasters in the city and suburb. In this exercise, it ensures effective co-ordination with the various utility service in preventing and minimizing loss to life and property.
2) To take efforts to minimize the disastrous situations.
3) This unit gives quick response at the time of disaster and effectively co-ordinates the resources involved in this work.
4) To consolidate & forward the information regarding any disaster as requested by Additional Municipal Commissioners/ Municipal Commissioner/ Mantralaya in co-ordination with various utilities.

This cell 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 and emergency help.
4) Wireless set

5) Facility of video wall streaming live feed 231 Nos. of CCTV cameras installed at important traffic signals by Mumbai traffic police, 7 nos. of CCTV cameras installed at chronic flooding spots by MCGM and 4800+ Nos. of CCTV cameras installed in Mumbai city and suburbs by Mumbai police.

The following types of complaints are registered in this Disaster Management Cell :

Minor and Major mishaps, Landslides, Tree falling or unauthorized cutting of tree, Water logging, House Collapse, Pot-holes on roads, Missing of manhole covers, Fire, Short-circuits, Flooding, Earthquakes and Bomb-blast 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 them 58 AWS are connected to Emergency Operation Centre at MHO by dedicated WAN network. The data received from AWS includes rain intensity, 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 based 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. Humidity, temperature, wind speed, wind pressure etc. Climate, traffic, forecast, tide etc. related information will be made available on this website. 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 and IOS operating systems.

Central Complaint Registration System:

This system was introduced in the year 2000. The control room working for 365 days receives the complaints on the telephone No.1916 . The civic complaints are registered on computer, 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 complaint on MCGM website viz. portal.mcgm.gov.in.

The complaints regarding emergencies like 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 unit 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, form 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.

Challenges Before Us

1) Day to day from megacity Mumbai to villages various problems generated due to solid waste are becoming terrible/terrific. The quantity of solid waste will be reduced, if segregation of waste into dry/wet is done at source and fertilizer will be generated. Every citizen should take this responsibility.
2) We should not depend on government for everything but should discharge our responsibility taking into account the best example of tolerant nature and wild life. All wild lives are struggling to survive with changing climate.
3) Plastic bags less than 50 microns are thrown on the street carelessly consequently there is closing of sewer lines and storm water drainage arteries. Every body must thought over it and cooperative to MCGM.
4) The nature provides us lot of things. Therefore it is our duty to keep nature flourishing and protect its conservation.
5) 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.
6) In future, if "Green Environment of Global" is managed properly challenge warming can be solved definitely.
7) In future, today's students are our strong and healthy citizens. It is necessary to develop culture in their school. Life for management of green environment. The public awareness is necessary for saving water, proper management and planning.
8) NGO's working on social levels for problems regarding environment and pollution or obeying laws passed on government levels and public awareness program. Participation of general public is very important.
9) For earth protection lot of things can be done on domestic levels such as preventing wastage of water and saving electricity.
10) Whole state from city to village is facing problems like solid waste, plastic bags, e-waste, cutting down trees, shortage of water, discharge of sewage water in nalla etc.
11) If dry and wet solid waste is segregated at source only 20% solid waste will be carried dumping ground. Then it is easy for MCGM to dispose off such solid waste properly.
12) Along with the development of cities, there is sheer negligence of nature which causes environmental problems. Even though laws are existing for controlling pollution protection of environment through law is becoming impossible. So it is necessary to change the mentality of every citizen.

SALIENT FEATURES OF MUMBAI'S ENVIRONMENT

- In the year 2016-17, 11477 trees were set up in the open spaces and roads of the municipal corporation.
- In the year 2016-17, all the trees in Greater Mumbai area have been calculated and according to the total number of trees in the city of Mumbai, 3106868. In this, the calculation of the trees in 20 sections has been completed. In the remaining 4 divisions, tree counting is in progress.
- Even after the implementation of the Central Vaitarna Project, till 2041, the demand and supply of water is 2840 MLD per day. There will be variation of. It is planned to replenish the gap and to develop the Gargaiyani and Pinjal sources to increase Mumbai's water supply.
- Mumbai receives an average rainfall of 2000 mm per meter. Considering Mumbai's area, Mumbai has about 2512 MLD. Get water Though only 20 percent of the water is saved by saving it, 502 MLD So much water can be saved from the municipal corporation.
- In Mumbai aboute 1914 km of Sewerage Discharge channels have been generated.
- In 2016-17 in the area of Municipal Corporation of Greater Mumbai , approximately 12.88 km Cement concrete roads was constructed and about 50.517 kms asphalt roads was constructed .
- Under the 'Mumbai Traffic Control Area' implemented under the Mumbai Urban Transport Project, the completion of modernization of 256 traffic controllers in the areas of Municipal Corporation of Greater Mumbai.
- In the academic year 2016-17, Municipal Corporation of Greater Mumbai Started1048 schools which are till eight standard and the number of students are 2,87,979.
- Information about present and estimated guides about ultraviolet radiation and air quality is shown area wise by SAFAR air (mobile app), free of charge to the general public.
- As per report road traffic, industrial works and constructions, trains and airports etc. are the main sources of noise pollution.