



# BRIHANMUMBAI MUNICIPAL CORPORATION



**ENVIRONMENT STATUS REPORT**

**2021 - 2022**





**Tansa Dam**



**Sharamik Gimkhana Ground, Currey Road**





# **ENVIRONMENT STATUS REPORT 2021 - 2022**

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महापालिका आयुक्त  
बृहन्मुंबई महानगरपालिका

## मनोगत

महानगरपालिका कायदा 1888 मधील कलम 61(अब) नुसार शहरातील वन, पर्यावरणाचे संरक्षण व निसर्गाचे संवर्धन करणे हे बृहन्मुंबई महानगरपालिकेचे कर्तव्य आहे. बृहन्मुंबई महानगरपालिकेच्या पर्यावरण विभागामार्फत बृहन्मुंबई 'पर्यावरण स्थितीदर्शक अहवाल' दरवर्षी सादर करण्यात येतो. सदर अहवालात बृहन्मुंबईतील पर्यावरणाचा मागील वर्षाचा चिकित्सक दृष्टिने सविस्तर आढावा घेण्यात आला असून भविष्यात शहराचे पर्यावरण सुधारण्यासाठी विविध विभागाच्या पर्यावरणस्नेही योजना व कार्यक्रमांचा देखील यात परामर्श घेण्यात आलेला आहे.

सन 2021-22 या वर्षाचा 'बृहन्मुंबई पर्यावरण स्थितीदर्शक अहवाल' मुंबईकरांना सादर करताना मला अत्यंत आनंद होत आहे. बृहन्मुंबई महानगरपालिकेच्या बृहत् अशा अर्थसंकल्पाचा विचार केल्यास बृहन्मुंबई महानगरपालिका हे राज्यातील एक 'लघु' राज्यच आहे! मुंबई शहराचे पर्यावरण समतोल राखण्यासाठी बृहन्मुंबई महानगरपालिका सदैव प्रयत्नशील आहे.

बृहन्मुंबई महानगरपालिकेने सन 2021-22 मध्ये विविध पर्यावरण स्नेही प्रकल्प हाती घेतले असून बरीच प्रकल्प कामे पूर्ण झालेली आहेत तर काही कामे प्रगतीपथावर आहेत. यामध्ये घन कचरा व्यवस्थापन, उद्यान व प्राणीसंग्रहालय, पर्जन्य जलवाहीन्या, मलनिःसारण प्रकल्प, वर्षा संचयन विनियोग, पाणीपुरवठा, बेस्ट उपक्रम, शिक्षण, पर्यावरण, आरोग्य, आपत्कालीन व्यवस्थापन इत्यादी विभाग पर्यावरण संवर्धनासाठी कटिबद्ध आहेत.

मला असे निदर्शनास आणून द्यावयाचे आहे की, बृहन्मुंबई महानगरपालिकेच्या घन कचरा व्यवस्थापन विभागामार्फत आज्ञादी का अमृतमहोत्सव वर्षानिमित्ताने 'स्वच्छ भारत अभियान-अर्बन टप्पा-II' अंतर्गत विविध योजना सुरु असून यामध्ये सर्व विभागातील डंपसाइटचे निराकरण, बांधकाम आणि निष्कासन संयंत्राची स्थापना, शहरातील रस्ते साफ सफाईकरीता यांत्रिक झाडूवर भर, साधन सामुग्रीची पुनर्प्राप्ती, सुविधा कचरा प्रक्रिया संयंत्राची स्थापना व बळकटीकरण यावर भर देण्यात येत आहे. स्वच्छ भारत अभियान योजना राबविण्यासाठी बृहन्मुंबई महानगरपालिका ही प्रशासकीय यंत्रणा असल्याने राज्य आणि केंद्र सरकारच्या मार्गदर्शानुसार व सहकार्याने शहरातील स्वच्छता राखण्यासाठी संयुक्त प्रयत्न केले जात आहेत. यासोबतच 'राष्ट्रीय स्वच्छ हवा' कार्यक्रमांतर्गत निवासी गृहसंकुले, व्यापारी संकुले, बाजारापेठा इ. ठिकाणाच्या परिसरातच ओला व सुक्या कचऱ्याचे वर्गीकरण, आवारातच खत निर्मिती करणे, इतरत्र कचरा न जाळणे, पाण्याचा जपून वापर करणे व प्लास्टिक पिशव्यांचा वापर टाळणे इ. बाबतीत रेडीओ जिंगल्स, बस थांब्यावरील होर्डिंग्स तसेच समाज माध्यमाद्वारे नागरिकांमध्ये जनजागृती करण्याचे प्रयत्न केले जात आहेत.



मुंबई महानगरातील अनेक समस्यांपैकी महत्त्वाची समस्या म्हणजे वाढत जाणाऱ्या वाहनांची संख्या आणि पर्यायाने वाहतूकीची कोंडी होय. मुंबई शहरातील वाहनांच्या संख्येत सन 2020 च्या तुलनेत सन 2021 मध्ये जवळपास 3.75% ने वाढ झालेली होती. तर सन 2021 च्या तुलनेत सन 2022 मध्ये हीच वाढ अंदाजे 6.14% इतकी आहे. आजमितीस मुंबईतील विविध वाहनांची संख्या 42,81,251 एवढी प्रचंड असून वाढत जाणारी वाहनांची संख्या ही शहरातील प्रदूषण वाढण्यास कारणीभूत ठरत आहे. यावर उपाययोजना म्हणून मुंबई शहराला स्वच्छ-सुंदर आणि प्रदूषणमुक्त करण्यासाठी बृहन्मुंबई महानगरपालिकेतर्फे सन 2021-22 या वर्षापासून इलेक्ट्रिक वाहन पॉलिसीच्या परिणामकारक अंमलबजावणीला सुरुवात करण्यात आली असून सिनेमागृहे, पेट्रोल पंप आणि बृहन्मुंबई महानगरपालिका वाहनतळाजवळ **इलेक्ट्रिक चार्जिंग स्टेशन** प्रस्तावित आहे. बृहन्मुंबई महानगरपालिकेच्या इलेक्ट्रिक वाहन धोरणाला मुंबईकरांचा वाढता प्रतिसाद बघता भविष्यात शहरातील वायु प्रदूषण कमी होण्यास निश्चितच मदत होईल.

बेस्ट उपक्रम मुंबई शहरातील वायु आणि ध्वनी प्रदूषणाची पातळी नियंत्रित ठेवण्यासाठी नेहमीच प्रयत्नशील राहिलेला आहे. पर्यावरणाचा एक भाग म्हणून बेस्ट उपक्रमातील एकूण 386 बसगाड्या ह्या विद्युत बसगाड्यांमध्ये प्रवर्तित करण्यात आलेल्या आहेत. बेस्ट उपक्रमाद्वारे विद्युत वाहनांना जास्तीत जास्त प्रोत्साहन मिळण्याकरीता मुंबईत बेस्ट उपक्रमाच्या वेगवेगळ्या बसआगार आणि बसस्थानाकांमध्ये **इलेक्ट्रिक चार्जिंग स्टेशन** स्थापन करण्याचे प्रस्तावित आहे. विद्युत वाहनांच्या चार्जिंगकरीता आवश्यक असणारी ऊर्जा ही सुद्धा अपारंपारिक स्रोतापासून (हरीत ऊर्जा) म्हणजेच सुर्यप्रकाश, जल ऊर्जा, पवन ऊर्जा अशा प्रदूषण न करणाऱ्या स्रोतांपासून उपलब्ध करण्याचा बेस्ट उपक्रमाचा मानस आहे. तसेच सन 2025-26 पर्यंत बेस्ट उपक्रमातील संपूर्ण बस ताफा 100% विद्युत बसगाड्यांचा करण्याचा बेस्ट उपक्रमाने धोरणात्मक असा निर्णय घेतलेला आहे.

देशाची आर्थिक राजधानी असलेल्या या महानगरातील जनतेला करमणूकीच्या सुविधा उपलब्ध करून देणे हे बृहन्मुंबई महानगरपालिकेचे प्रमुख कर्तव्य आहे. नागरिकांसाठी उद्याने परीरक्षित करणे, मनोरंजन मैदाने, क्रिडांगणे, उद्यानात शिल्पग्राम कला, वाहतूक नाक्यावर कारंजी, वाद्यवृंद पथकाद्वारे मनोरंजन, रोपवाटीका, रस्त्याच्या दुतर्फा व मध्यभागी हरीत पट्टा निर्मिती, मियावाकी उद्यानावर भर देणे इ. करमणुकीच्या सुविधा उपलब्ध करून देण्यात आलेल्या आहेत. या व्यतिरिक्त क्रिडा, कला, सांस्कृतिक कार्यक्रम यांना उत्तेजन देऊन नागरिकांचे आरोग्य शिक्षण व संवर्धन करण्यावर बृहन्मुंबई महानगरपालिकेने विशेष लक्ष केंद्रीत केलेले आहे.

अलिकडच्या काही वर्षात मुंबईचा विकास अत्यंत झपाट्याने झालेला आहे. देशातील अन्य भागातून मोठ्या प्रमाणावर लोक येऊन या शहरात स्थायिक झाल्यामुळे मुंबईची आजची लोकसंख्या अंदाजे जवळ जवळ एक कोटी तीस लाख एवढी प्रचंड आहे. अशा घनदाट वस्ती असलेल्या शहरात आरोग्याच्या दृष्टिने मलनिःसारणाला अत्यंत महत्त्व आहे. मुंबईच्या नागरिकांना स्वच्छ आणि आरोग्यदायी पर्यावरण उपलब्ध करून देण्याकरीता मलजल केंद्राची बांधणी, पुनर्बांधणी आणि मलजल बोगद्यांचे बांधकाम यासारखी प्रकल्प कामे हाती घेण्यात आलेली आहेत. याबरोबरच बृहन्मुंबई महानगरपालिकेतर्फे वरळी, वांद्रे, धारावी, वर्सावा, मालाड, भांडुप व घाटकोपर या सातही मलजल प्रक्रिया केंद्रात सांडपाण्यावर प्रक्रिया करून अंदाजे 2464 द.ल.लि. प्रतिदिन एवढ्या मलजलावर प्रक्रिया करण्यात येणार आहे. मलजल प्रक्रिया केंद्रात, तृतीय स्तरीय प्रक्रियेनंतर पाण्याचा पुनर्वापर करण्यासाठी एकूण क्षमतेच्या 50% एवढे पाणी पिण्याव्यतिरिक्तच्या औद्योगिक व इतर वापरासाठी उपलब्ध होईल. त्यामुळे पर्यावरणाचे संवर्धन होण्यास निश्चितच मदत होईल, असे मला इथे नमूद करावेसे वाटते.



प्राथमिक शिक्षणाची मुलभूत सुविधा उपलब्ध करुन देणे ही बृहन्मुंबई महानगरपालिकेचे बंधनकारक कर्तव्य आहे. कोरोना प्रादुर्भाव कालावधीत संपूर्ण जगात दैनंदिन जीवनातील जगण्याच्या पद्धतीत अमूलाग्र बदल झालेले आहेत. घरातून शिक्षण म्हणजे ऑनलाईन शाळा हा त्यापैकीच एक बदल आहे. यातून बृहन्मुंबई महानगरपालिकेच्या परिक्षेत्रातील प्रत्येक शाळाबाह्य बालकास शिक्षणाच्या मुख्य प्रवाहात आणून त्यांना गुणवत्तापूर्ण शिक्षण देण्यासाठी बृहन्मुंबई महानगरपालिका सतत प्रयत्नशील आहे. कोरोनाच्या आव्हानात्मक अशा विपरीत परिस्थितीत सुद्धा शिक्षण विभागाने हे कार्य नियोजनात्मकरित्या अखंडीत सुरु ठेवलेले आहे. बृहन्मुंबई महानगरपालिकेने 'मुंबई पब्लिक स्कूल' या इंग्रजी माध्यमाच्या शाळा सुरु केल्या असून त्यामध्ये छोटा शिशु ते इयत्ता 10 वी पर्यंतच्या विद्यार्थ्यांना दर्जेदार शिक्षण उपलब्ध करुन देण्यात येत आहे. 'मुंबई पब्लिक स्कूल' या योजनेस मुंबईकरांचा सद्या उत्स्फूर्त प्रतिसाद लाभत आहे, याचा मला सार्थ अभिमान आहे.

कोविड-19 या जागतिक विषाणूजन्य आजारावर भाष्य केले नाही तर पर्यावरण स्थितीदर्शक अहवालाचा संक्षिप्त आढावा घेण्याचा उद्देश पूर्ण होणार नाही असे येथे नमूद करावेसे वाटते. 'कोविड-19' अर्थात कोरोना विषाणुची लस उपलब्ध होऊन कोरोनाचा संसर्ग संपुष्टात येईल याची वाट न पाहता, बृहन्मुंबई महानगरपालिकेने मूलभूत गोष्टींवर लक्ष केंद्रीत केले आणि त्याअनुषंगाने सर्व उपाययोजना करण्यावर भर दिला. याचाच एक भाग म्हणून 'चेस द क्लायरस' म्हणजे 'विषाणूचा पाटलाग' हे धोरण आखून त्या अंतर्गत टेस्टिंग, ट्रेसिंग, ट्रॅकिंग, ट्रिटमेंट आणि क्वारंटाईन ही पंचसुत्री अवलंबून प्रत्यक्षरीत्या काम करण्यात आले. रुग्ण आढळलेल्या क्षेत्रास प्रतिबंधित क्षेत्र घोषित करुन कठोर उपाययोजना करण्यात आल्या. याचा एकत्रित परिणाम म्हणून बृहन्मुंबईतील कोरोना संसर्गाची स्थिती आता नियंत्रणात येत आहे. याचे श्रेय बृहन्मुंबई महानगरपालिका व प्रत्येक कोविड योद्ध्याच्या अथक मेहनतीला व समर्पणपणाला देणे ही बाब मला अभिमानास्पद आहे.

मला अशी खात्री आहे की, येणाऱ्या काही वर्षांमध्ये बृहन्मुंबई महानगरपालिकेच्या विविध खात्याने हाती घेतलेले प्रकल्प व योजना पूर्ण झाल्यावर, मुंबईकरांना स्वच्छ व आरोग्यदायी पर्यावरण निश्चितच उपलब्ध होईल. शेवटी नागरिकांचा पाठिंबा आणि सहकार्य यावर हे चैतन्यदायी शहर स्वच्छ आणि हरित राखण्यास सुजाण मुंबईकरांचा सहभाग सदैव राहिल अशी मला आशा आहे.

हवामान बदलास सामोरे जाणे व शहरातील जैवविविधता वाचविण्याच्या प्रयत्नांना गती यावी यासाठी सर्व मुंबईकर सुजाण नागरिकांकडून सहकार्य मिळेल अशी मला अपेक्षा आहे.

धन्यवाद!



डॉ. इ सि चहल

महापालिका आयुक्त  
बृहन्मुंबई महानगरपालिका







**डॉ. संजीव कुमार**

भा. प्र. से.

अतिरिक्त महानगरपालिका आयुक्त  
बृहन्मुंबई महानगरपालिका (पश्चिम उपनगरे)

## मनोगत

अद्ययावत सुधारित मुंबई महानगरपालिका अधिनियम, 1888 मधील कलम 63ब च्या तरतूदीनुसार बृहन्मुंबई महानगरपालिका क्षेत्रातील पर्यावरण स्थितीदर्शक अहवाल तयार करून दरवर्षी 31 जुलैपूर्वी बृहन्मुंबई महानगरपालिकेस सादर करणे अनिवार्य आहे. सन 2021-22 या वर्षाचा 'बृहन्मुंबई पर्यावरण स्थितीदर्शक अहवाल' मुंबईकरांना सादर करताना मला अत्यंत आनंद होत आहे. तथापि, अद्ययावत सुधारित मुंबई महानगरपालिका अधिनियम, 1888 मधील कलम 6क(1) अन्वये महानगरपालिका आणि महानगरपालिकेच्या इतर प्राधिकरणांचे सर्व अधिकार आता प्रशासकांकडे निहित आहेत. त्यामुळे सादर अहवाल मा. महानगरपालिका आयुक्त यांच्यामार्फत मुंबईकरांना सादर करण्यात येत आहे.

शहराचा विकास करणे हे शहरातील स्थानिक स्वराज्य संस्थेचे मुलभूत कर्तव्य आहे. परंतू हे कर्तव्य बजावत असताना शहरात निर्माण होणाऱ्या पर्यावरणीय समस्या व त्यावर उपाय योजना करून पर्यावरणाचे संरक्षण करणे हे देखील तितकेच महत्त्वाचे आहे. शहरातील विकास कामे करताना अनेक नवीन प्रकल्प उभारावे लागतात. नागरिकांना अनेक पायाभूत सुविधा उपलब्ध करून द्याव्या लागतात. हे सर्व करत असताना याचा प्रत्यक्ष वा अप्रत्यक्षपणे पर्यावरणावर परिणाम होत असतो, ही सर्व स्थिती दर्शविण्यासाठी पर्यावरण स्थितीदर्शक अहवाल तयार करणे गरजेचे आहे. त्यानुसार 'पर्यावरण स्थितीदर्शक अहवाल' तयार करण्याचे काम बृहन्मुंबई महानगरपालिकेचा पर्यावरण विभाग मागील 25 वर्षांपासून अविरतपणे करीत आहे.

बृहन्मुंबई महानगरपालिका आपल्या स्थापनेपासूनच सार्वजनिक आरोग्य क्षेत्रात समाधानकारक सुविधा पुरवित असून कोणत्याही आपत्तीच्यावेळी बृहन्मुंबई महानगरपालिकेची रुग्णालये सदैव सज्ज असतात. कोविड-19 या संसर्गजन्य आजाराचा यशस्वीपणे मुकाबला करण्यासाठी बृहन्मुंबई महानगरपालिका सन 2020 पासूनच सर्वोत्तम प्रयत्न करीत आहे. कोविड-19 महामारीच्या बिकट परिस्थितीत संपूर्ण जग झगडत असताना बृहन्मुंबई महानगरपालिकेने केंद्रीय तसेच विभागीय स्तरावर विविध योजना राबविलेल्या आहेत. यामध्ये कोरोना उपचार केंद्र, सुविधांचे विस्तारीकरण व बळकटीकरण, कोविड-19 जम्बो रुग्णालयाची व्यवस्था, ऑक्सिजनचा पुरवठा, पुरेसे वैद्यकीय मनुष्यबळ, औषधांची उपलब्धता तसेच 24x7 तत्वावर 'वार्ड वार रुम' इत्यादी सुविधा उपलब्ध करून देण्यात आल्या, अशा उत्तम व्यवस्थापनाद्वारे कोविड-19 ची परिस्थिती नियंत्रणात आणण्यात आपण यशस्वी झालो आहोत यात शंका नाही.

बृहन्मुंबईतील आपत्कालीन परिस्थिती प्रभावीपणे हाताळण्याकरिता महानगरपालिकेचा आपत्कालीन व्यवस्थापन कक्ष अत्याधुनिक सेवा सुविधांनी सुसज्ज करण्यात आला आहे. नैसर्गिक किंवा मानवनिर्मित आपत्तीच्यावेळी आपत्कालीन व्यवस्थापनाशी संबंधित सर्व बाबींसाठी एकाच मुख्य ठिकाणाहून व्यवस्थापन,

आपत्कालीन धोक्याची तीव्रता व जोखीम मुल्यमापन, प्रतिबंध व सज्जता, हानीची तीव्रता कमी होण्याच्या दृष्टिने जलदगतीने उपाययोजना, शिघ्र प्रतिसाद, मदत व पुनर्वसन यंत्रणासमवेत समन्वय साधणे, प्रशासन व स्थानिक कक्ष/क्षेत्रिय पथके यांना योग्य निर्देश व नियंत्रण, नागरिकांना पूर्व सूचना देणे, आपत्कालीन परिस्थितीमध्ये अन्न व पाणी व्यवस्थेसाठी समन्वय, तात्पुरते पुनर्वसन सहाय्यता तसेच अशासकीय सामाजिक संस्थाकडून मदतीसाठी समन्वय इ. सुविधा आपत्कालीन व्यवस्थापन कक्षामार्फत मुंबईकरांना तात्काळ उपलब्ध असल्याने आपत्कालीन परिस्थितीचा सामना करण्यासाठी बृहन्मुंबई महानगरपालिका समर्थ आहे असेच म्हणावे लागेल.

मुंबई शहरातील पर्यावरणाचे रक्षण व संवर्धन करण्यासाठी बृहन्मुंबई महानगरपालिकेने केंद्रीय प्रदूषण नियंत्रण मंडळाला सादर केलेल्या **मुंबई वायु प्रदूषण नियंत्रण कृती आराखड्यातील** मार्गदर्शक सूचनांची काटेकोरपणे अंमलबजावणी सुरु आहे. तसेच महाराष्ट्र शासनाच्या पर्यावरण व वातावरणीय बदल विभागाच्या सहकार्याने निसर्गाच्या पंच तत्त्वावर आधारीत 'माझी वसुंधरा' या अभिनव उपक्रमा अंतर्गत वातावरणीय बदलांच्या परिणामावर अनुकूलन (Adaptation) व उपशमन (Mitigation) उपाययोजनावर भर देण्यात येत आहे.

वातावरण बदलामुळे वारंवार उद्भवणारी नैसर्गिक संकटे आणि त्यामुळे होणाऱ्या परिणामांवर प्रभावीपणे उपाययोजना करण्यासाठी अलीकडेच आखण्यात आलेला 'मुंबई वातावरण कृती आराखडा' हा महत्वाकांक्षी उपक्रम दिनांक 13 मार्च 2022 रोजी मुंबईकरांना समर्पित करण्यात आलेला आहे. सदर कृती आराखड्यात सन 2050 पर्यंत हरीतगृह वायूंचे उत्सर्जन निव्वळ शून्य पातळीपर्यंत आणण्याचे लक्ष्य निर्धारित करण्यात आलेले आहे. त्या अनुषंगाने वीज आणि इमारती, शाश्वत वाहतूक, शाश्वत कचरा व्यवस्थापन, नागरी हरितीकरण आणि जैवविविधता, हवेचा दर्जा आणि शहरी पूरस्थिती व जलस्रोत व्यवस्थापन या महत्त्वाच्या सहा कृतींवर लक्ष केंद्रीत करण्यात येत आहे. **मुंबई वायु प्रदूषण नियंत्रण कृती आराखडा, मुंबई वातावरण कृती आराखडा व माझी वसुंधरा** या उपक्रमातील उद्दिष्टीत लक्ष्य पूर्ण होण्याच्या अनुषंगाने बृहन्मुंबई महानगरपालिकेचे विविध विभाग, महाराष्ट्र शासन व केंद्र शासनाच्या सहकार्याने व मार्गदर्शानुसार प्रयत्न करत आहे. आराखड्यातील मार्गदर्शक सूचनानुसार सहभागी विभागांनी योग्य अंमलबजावणीस प्राधान्य देण्याच्या दृष्टिकोणातून बृहन्मुंबई महानगरपालिकेच्या पर्यावरण विभागामार्फत विविध खात्याशी समन्वय साधून शहरातील वाढते वायु प्रदूषण कमी करण्यासाठी सर्वतोपरी प्रयत्न केले जात आहेत.

बृहन्मुंबई महानगरपालिकेच्या स्तरावरील विविध प्रयत्नाद्वारे शहरातील पर्यावरणीय समतोलासाठी, रक्षणासाठी व पर्यायाने संवर्धनासाठी बृहन्मुंबई महानगरपालिका कटिबद्ध आहे. तसेच हरित मुंबई, सुंदर व स्वच्छ मुंबईचे स्वप्न साकार होण्यास सुजाण मुंबईकरांचा सहभाग सदैव राहिल अशी मला खात्री आहे.

धन्यवाद!



डॉ. संजीव कुमार

अतिरिक्त महानगरपालिका आयुक्त  
बृहन्मुंबई महानगरपालिका (पश्चिम उपनगरे)





**अतुल शरद राव**

महानगरपालिका उप आयुक्त  
(पर्यावरण)

## आभार / अभिस्विकृती

'बृहन्मुंबई महानगरपालिका पर्यावरण स्थितीदर्शक अहवाल' तयार करण्यासाठी व विविध पर्यावरण पूरक उपक्रम राबविण्यासाठी वेळोवेळी केलेल्या मार्गदर्शनाबद्दल मा. महानगरपालिका आयुक्त तसेच मा. अतिरिक्त महानगरपालिका आयुक्त (पश्चिम उपनगरे) यांचे मी मनःपूर्वक आभार मानतो.

त्याचप्रमाणे महाराष्ट्र प्रदूषण नियंत्रण मंडळ, मुंबई विद्युत पुरवठा व परिवहन, महाराष्ट्र राज्य परिवहन खाते, राष्ट्रीय केमिकल्स अॅण्ड फर्टिलाइजर्स लिमिटेड, भारत पेट्रोलिअम कार्पोरेशन लि., टाटा पॉवर, मुंबई पोर्ट ट्रस्ट, अदानी इलेक्ट्रिसिटी मुंबई लिमिटेड, कांदळवन कक्ष आणि बृहन्मुंबई महानगरपालिकेचे विविध विभाग या सर्वांकडून माहिती उपलब्ध झाली. त्याबद्दल त्यांचा मी मनस्वी आभारी आहे.

**अतुल शरद राव**  
महानगरपालिका उप आयुक्त  
(पर्यावरण)

# पर्यावरण स्थितीदर्शक अहवाल 2021-2022

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# S T U D Y O F M U M B A I

Sr. No.	Subject	Page No.
	Manogat	
	Acknowledgement	
1	Introduction	1
2	Description of Area	1
3	Climate of Mumbai	2
4	Mumbai Population	3
5	Land Use	5
6	Mangroves in Mumbai	8
7	Urban Renewal Scheme	13
8	Udyan and Zoo	15
9	Water Supply	18
10	Rainwater Harvesting	29
11	Sewage Disposal	33
12	Storm Water Drains	36
13	Solid Waste Management	40
14	Power Supply and Consumption	51
15	Roads, Traffic and Transport	55
16	Bridges in Mumbai	58
17	Mumbai Coastal Road	63
18	Education	66
19	Air Quality Status	76
20	Maharashtra Pollution Control Board	85
21	Industries	87
22	Health	95
23	Disaster Management	110
24	Municipal Public Relations Department	117
25	The Action Plan For Control Of Air Pollution Of Mumbai	119
26	Mumbai Climate Action Plan	129
	Salient Features of Mumbai's Environment	132

# आद्याक्षरे



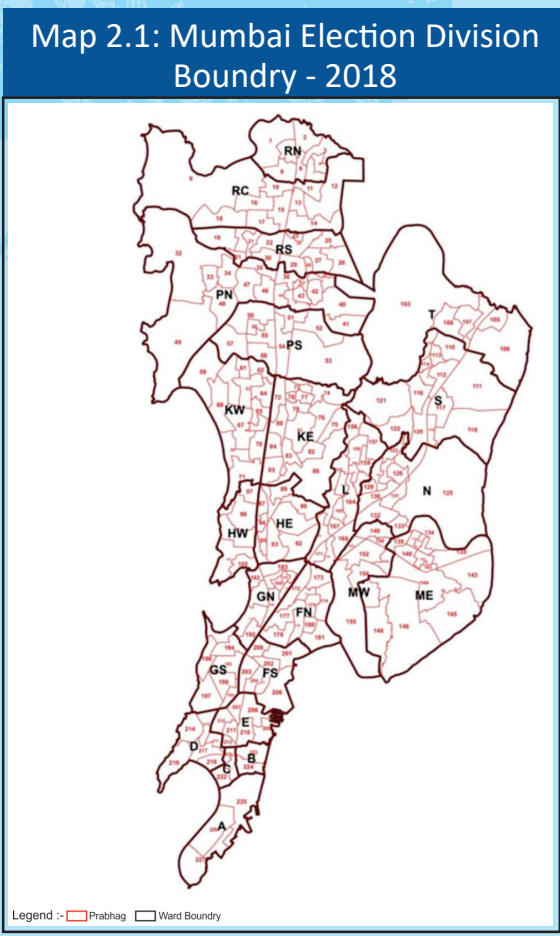
<b>ALM</b> Advanced Locality Management	<b>MRTS</b> Mass Rapid Transport System
<b>AMR</b> Automatic Meter Reading	<b>MRVC</b> Mumbai Railway Vikas Corporation
<b>ATC</b> Area Traffic Control	<b>MSDP</b> Mumbai Sewage Disposal Project
<b>BEST</b> Brihanmumbai Electric Supply & Transport	<b>MSEDCL</b>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

# 1. INTRODUCTION

The 74<sup>th</sup> 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 of the corporations. 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 (a b) in the year 1994. The Environment Status Report (ESR) of the city of Mumbai for the period from April 2021 to March 2022 is prepared by Air Quality Monitoring and Research Laboratory of Environment section in Solid Waste Management department to fulfill the obligation under the clause ‘63B’ of Mumbai Municipal Corporation (MMC) Act 1888. This report is based on the factual and statical data generated using parameters affecting the environment by different departments of BrihanMumbai Municipal Corporation and various departments of state/ central government and industries.

# 2. DESCRIPTION OF THE AREA

Mumbai is located on the western sea coast of India from 18o 53' North to 19o 16' North Latitude and from 72o East to 72o 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 (BrihanMumbai Municipal Corporation), however, was the Planning Authority of area that was more modest, since about 8.76% of the cited area fell under the jurisdiction of Special Planning Authorities (SPA). Three such SPA exist in Greater Mumbai- MMRDA, SRA, MIDC. The EDDP therefore prepared a development plan for 434.55 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).





### 3. CLIMATE OF MUMBAI

The city of Mumbai has Tropical Savanna climate. Generally South-West monsoon arrives in the city in the month of June and retreats in the month of September. As per data recorded by Regional Meteorological Centre, in the year 2021, Mumbai received a total rainfall measuring 2756.5 mm at Colaba & 3563.9 mm at Santacruz. The maximum rainfall of 1122.6 mm was recorded during July 2021 at Santacruz and it was 31.5% of total rainfall received. The maximum rainfall of 824.8 mm was recorded during July 2021 at Colaba and it was 29.9% of total rainfall received. So it is observed that there was less rainfall as compared to previous year. (In the year 2020 total rainfall received 3352.5mm at Colaba and 3864.7mm at Santacruz). In the month of April, May-2021 the maximum temperature of 33.5°C, and in the month of January 2022 minimum temperature of 19.4°C was recorded at Colaba. In the month of March 2022 the maximum temperature of 35.6°C and in the month of February 2022 minimum temperature of 18.0°C was recorded at Santacruz.

At Colaba the maximum Wind Speed of 6.3 Km/hr and minimum 0.6 Km/hr was recorded. At Santacruz the maximum Wind Speed of 8.9 Km/hr and minimum 1.7 Km/hr was recorded. The Relative Humidity was recorded maximum 88% and minimum 63% at Colaba. The Relative Humidity was recorded maximum 90% and minimum 44% was recorded at Santacruz.

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

Table No. 3.1 Meteorological Data of Mumbai (2021-2022)

Month	Average Temp °C				Rainfall in mm		Relative Humidity in %				Wind Speed Km/Hr	
	Colaba		Santacruz		Colaba	Santacruz	Colaba		Santacruz		Colaba	Santacruz
	Max	Min	Max	Min			Time 0830	Time 1730	Time 0830	Time 1730		
April 2021	33.5	25.8	33.9	25.1	0.00	Tr	85	73	73	62	2.5	5.2
May 2021	33.5	27.3	34.0	27.1	257.8	256.0	83	75	73	64	3.4	7.4
June 2021	31.3	25.6	31.9	25.3	694.8	961.4	88	81	85	75	4.2	5.5
July 2021	30.3	25.7	31.1	25.6	824.8	1122.6	87	80	85	78	6.3	8.9
August 2021	30.1	25.2	30.5	24.9	316.2	337.8	87	80	86	78	3.3	4.8
September 2021	30.1	24.9	30.5	24.7	496.5	744.2	87	84	90	82	3.7	6.0
October 2021	32.6	25.3	33.9	24.2	47.6	11.2	82	71	76	64	0.8	2.6
November 2021	33.2	24.3	34.8	23.8	21.2	30.1	77	70	67	56	0.6	1.8
December 2021	29.9	21.3	31.1	20.1	96.8	96.1	86	68	82	61	1.1	1.7
January 2022	29.2	19.4	30.1	18.2	0.8	4.5	78	65	73	53	1.4	1.7
February 2022	29.5	19.5	31.0	18.0	0.0	0.0	82	65	76	49	1.2	2.3
March 2022	33.2	23.6	35.6	23.0	0.0	0.0	81	63	65	44	1.2	2.4

Source: Regional Meteorological Centre, Colaba

## 4. MUMBAI POPULATION

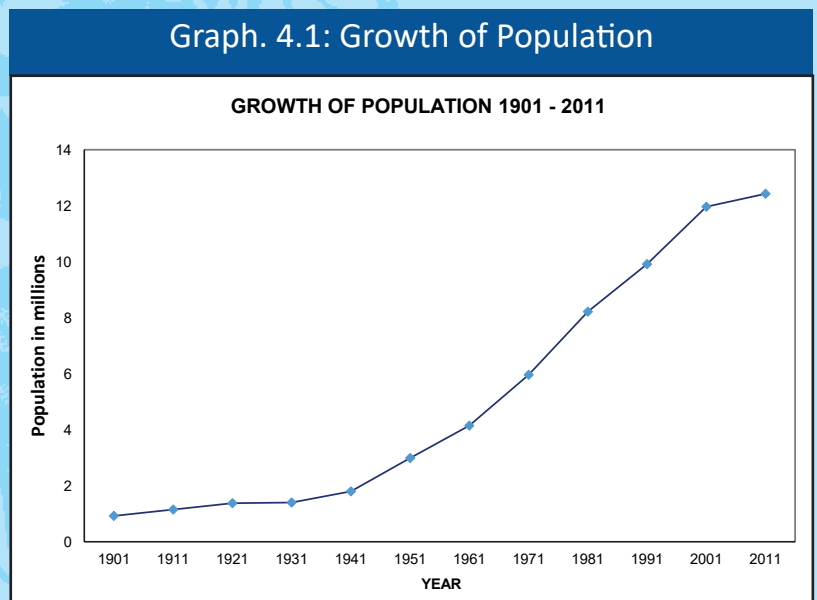
Mumbai is one of the important cities of the world, is also recognized as the most densely populated city. Inverse proportion of area and population causes serious impact on its environment.

As per data received from Health Department of BrihanMumbai Municipal Corporation the estimated population of Mumbai is 12.96 million (year 2022). The population density of 26,820 person per sq.km (excluding no development area). Administrative Ward-wise population indicates that 'P/North' ward has maximum population of 9,81,134 persons where as 'B' ward has minimum population of 1,32,667 persons.

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

Table No.4.1: Growth of Population and rate of Increase during year 1901-2011		
Year	Population in Million	% Growth
1901	0.93	-
1911	1.15	23.7
1921	1.38	20
1931	1.4	11.5
1941	1.8	28.6
1951	2.99	66.1
1961	4.15	38.8
1971	5.97	43.8
1981	8.22	38.0
1991	9.92	21.1
2001	11.97	20.6
2011	12.64	3.8

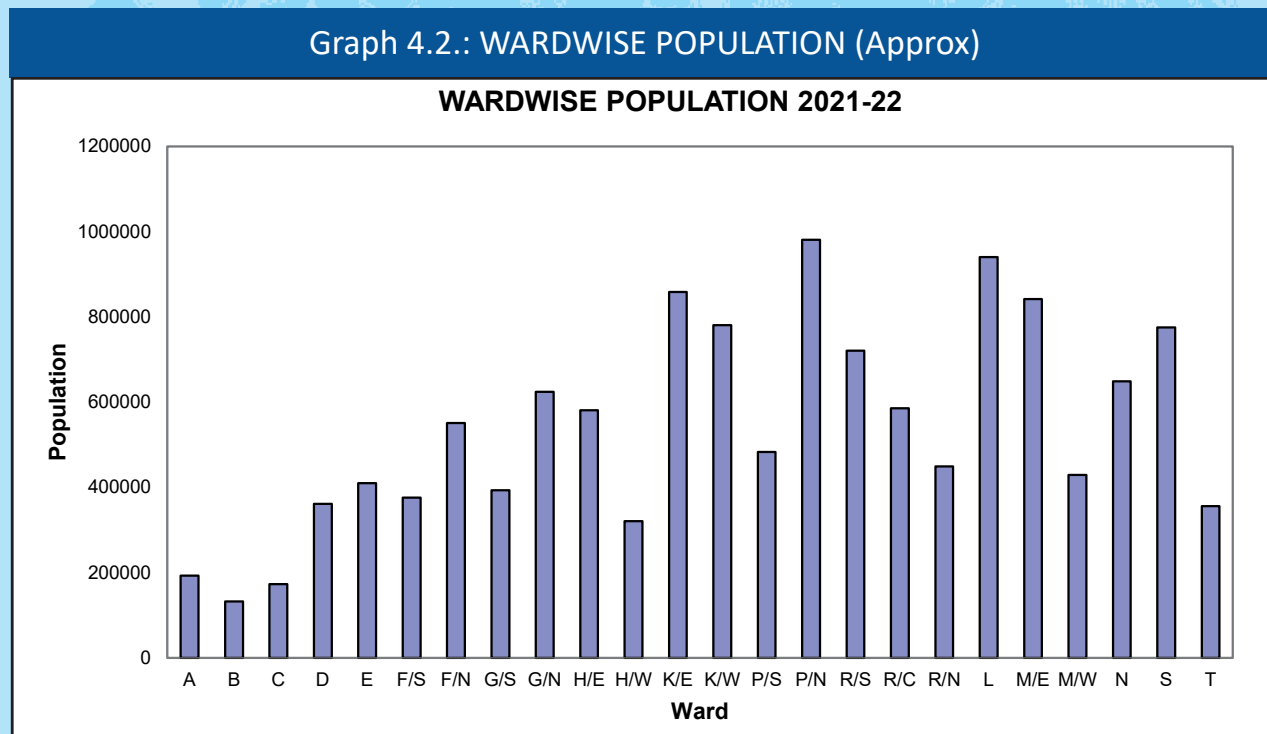
Source : Census Department of India



As per the mid-year election list of population in the year 2022, the wardwise area and population given by development planning and health shown in Table No. 4.2

Administrative Ward	Area in Sq.km	Population		Administrative Ward	Area in Sq.km	Population	
		2021	2022			2021	2022
A	11.20	192140	192830	P/S	25.19	481359	483088
B	2.65	132193	132667	P/N	46.70	977624	981134
C	1.91	172561	173180	R/S	18.31	717852	720430
D	8.30	360226	361519	R/C	47.95	583814	585910
E	7.27	408434	409900	R/N	14.17	447983	449591
F/S	9.87	374875	376221	<b>Western Ward</b>	<b>232.55</b>	<b>5739905</b>	<b>5760513</b>
F/N	12.85	549410	551383	L	15.62	936975	940339
G/S	9.74	392298	393707	M/E	38.19	838830	841842
G/N	8.31	622112	624345	M/W	17.62	427758	429293
<b>City Ward</b>	<b>72.1</b>	<b>3204249</b>	<b>3215752</b>	N	29.68	646843	649165
H/E	12.40	578702	580779	S	32.55	772431	775204
H/W	18.65	319428	320575	T	44.91	354614	355888
K/E	24.00	855618	858690	<b>Eastern Ward</b>	<b>178.57</b>	<b>3977451</b>	<b>3991731</b>
K/W	25.18	777525	780316	<b>BrihanMumbai Corporation</b>	<b>483.22</b>	<b>12921605</b>	<b>12967996</b>

Source: Development- Planning and Health Depts of BrihanMumbai Municipal Corporation



In the year 2022, if consider the area and population of BrihanMumbai, the area of Mumbai city is 72.1 sq. km Area of western suburb is 232.55 sq. km. and the area of the eastern suburb is 178.57 sq. km And the estimated population of the said division is 3215752; 5760513; 3991731 respectively.



## 5. LAND USE

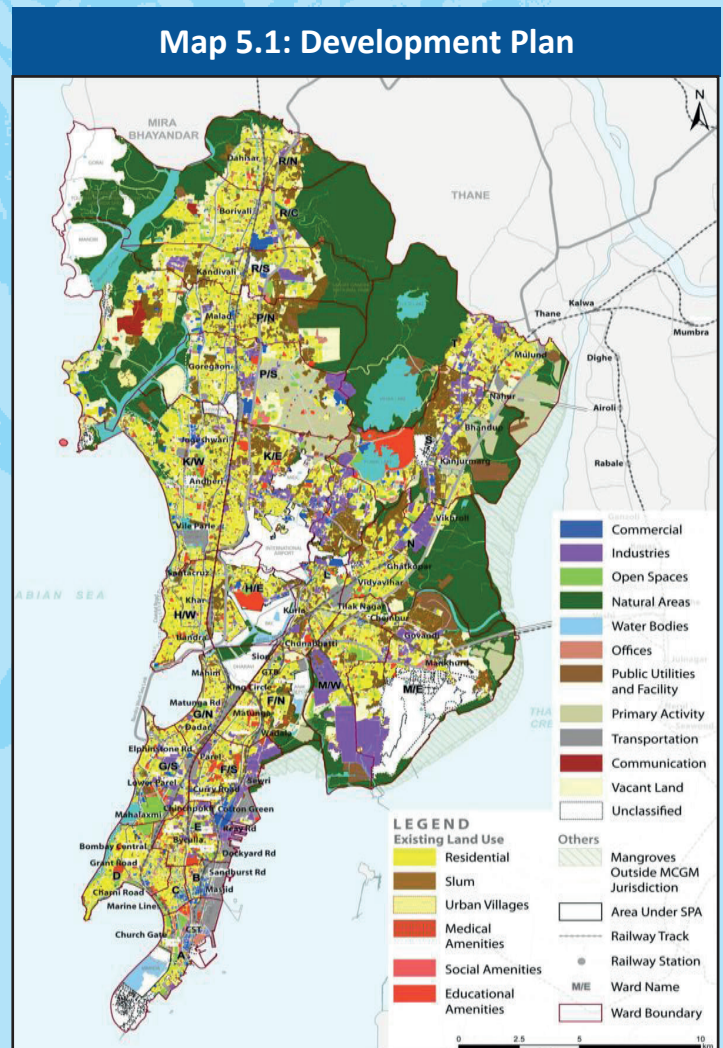
The Municipal Corporation of Greater Mumbai was the first Municipal Corporation to adopt the concept of a development plan. The first development plan was formulated in 1964 and was sanctioned in 1967. This development plan was revised as per the provisions of Maharashtra Regional and Town Planning Act, 1966. The Sanctioned Revised Development Plan 1991 came into force in 1991-94. This plan was valid up to 2014. BrihanMumbai Municipal Corporation revised the Sanctioned Revised Development Plan 1991 during the period 2014-2018. The Development Plan for 2014-2034 was submitted to State Government under provision of section 31(1) of said Act on 02.08.2017 for sanction.

The State Government in accordance with the sub section (1) of section 31 of the Maharashtra Regional and Town Planning Act, 1966 have accorded sanction to the Draft Development Plan of Greater Mumbai with modification show in schedule-A appended to the notification No.T.P.B.-4317/629/CR-118/2017/DP/UD-11 May-2018 excluding substantial modifications as shown in schedule-B appended thereto. As per the notification dt.22.06.2019 the sanctioned D. P. 2034 is in effect from dt.01.09.2018. As per notification dt.21.09.2018 the sanctioned excluded part of Development Control and Promotion Regulation 2034 is in effect from dt.13.11.2018. The State Government has sanctioned some of the EPs vide notification dt.22.01.2019, dt.25.01.2019, dt.31.01.2019, dt.17.9.2019, dt.23.11.2020, dt.12.03.2021, dt.12.04.2021, dt.04.05.2021, dt.28.05.2021 and on dt.31.05.2022. The balance Excluded Parts will be sanctioned by State Government in the due course.

### Planning Area:

The ELU 2012 located the emergence of an additional area of 14.96 Sq.km, probably due to siltation of Thane creek. This area which comprises of Mangroves in within the BrihanMumbai Municipal Corporation limits and is shown as Natural Area in Development Plan 2034.

The Coastal Road approved by GoM will add an



additional area of 1.80 sq.km through reclamation of the sea. The alignment of this Road is marked on the Proposed Land Use (PLU). 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 reclamation.

The addition of these land makes BrihanMumbai Municipal Corporation's total land area 476.24 sq.km. BrihanMumbai Municipal Corporation is Planning Authority for about 434.55 sq.m (91.24%) excluding the area coming under various Special Planning Authority (SPA). Following SPAs exist in Greater Mumbai :

1. Mumbai Metropolitan Regional Development Authority (MMRDA).
2. Slum Rehabilitation Authority (SRA) – for approval of Slum Rehabilitation projects.
3. Maharashtra Industrial Development Corporation (MIDC).
4. Mumbai Port Trust ( MbPT)
5. Maharashtra Housing Area Development Authority (MHADA) – for approval of MHADA projects

### **Coastal Regulation Zone:**

Ministry of Environment & Forest (MoEF) has issued CRZ notification vide No. S.O. 19 (E) dated 06.01.2011, in supersession of the earlier notification S.O. 114 (E) of 19.02.1991. This notification is superseded by the CRZ notification vide no. GSR 37(E) dt. 18.01.2019.

The objectives of the new CRZ Notification includes (1) ensure livelihood security to the fisher communities, (2) protect the Coastal environment, (3) promote sustainable development.

The new notification had made it obligatory on state Authority to demarcate High Tide Line (HTL) and Hazardous line (HL) and also to prepare new CZMP to the scale of 1:25000 through National Centre for Sustainable Coastal Management (NCSCM).

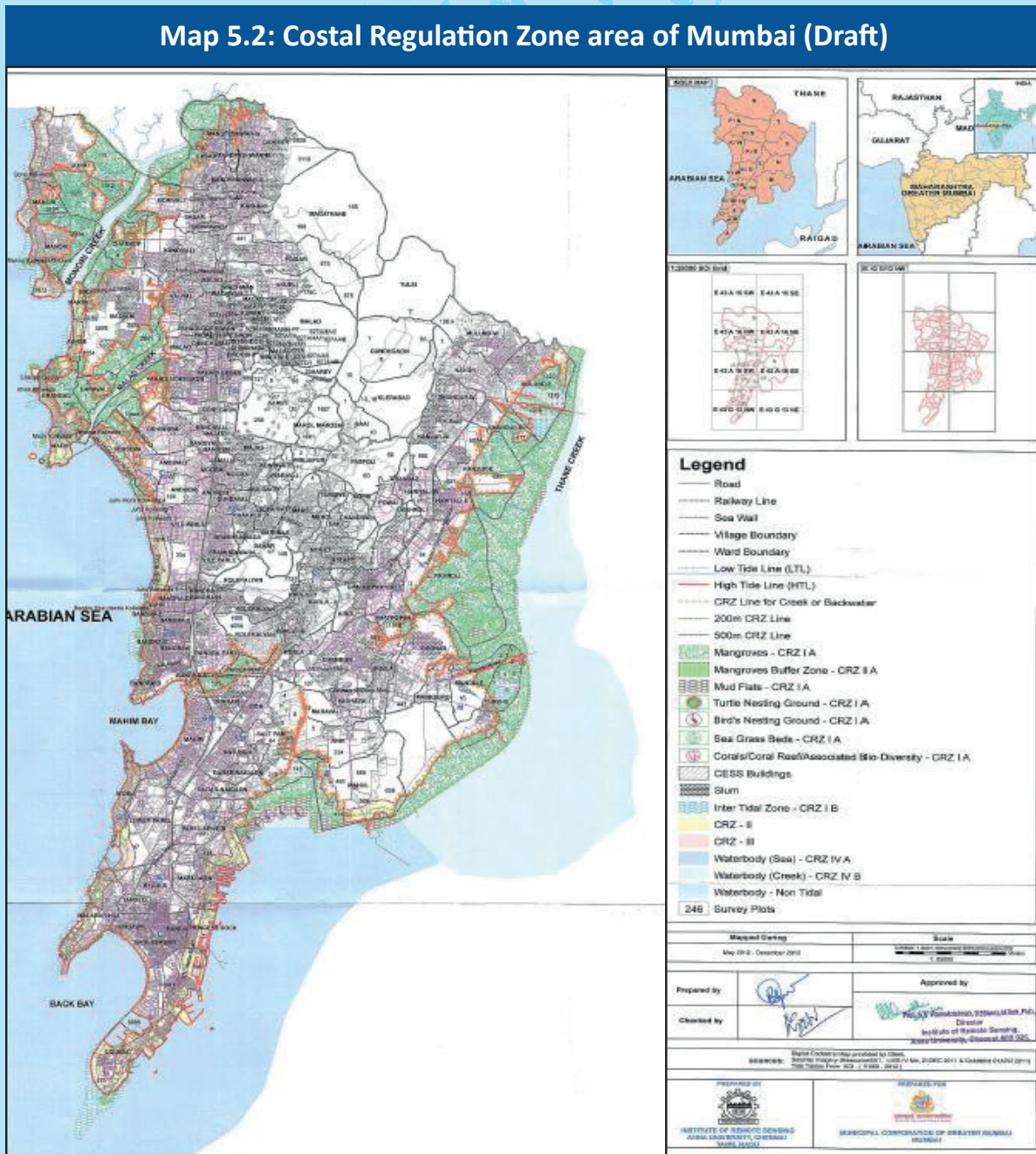
The work of preparing new Coastal Zone Management Plan as per C.R.Z. Notification dated 18th January 2019 was entrusted by GoM to the National Center for Sustainable Coastal Management (NCSCM), Chennai. NCSCM has prepared Draft CZMP with all relevant information using Satellite Imagery and Geographical Information System and as per provision of Coastal Zone Regulation guideline 2019. This draft CZMP has been published by MCZMA on the website of MCZA on 16/1/2020 for inviting suggestions/ objections from the stake holders. The further process is being carried out by MCZMA.

As per the Coastal Regulation Zone notification vide Gazette notification dtd.18.01.2019, it is stipulated that the said CRZ notification will come into force only after the CZMP plans framed under

CRZ notification-2011 will be revised or updated.

The Ministry of Environment and Forest (MoEF) vide their letter dtd.26.02.2019 has also issued clarification on implementation of the projects falling in CRZ area in Maharashtra stating therein that until the CZMPs of the Maharashtra prepared under the provisions of the CRZ Notification, 2011 are updated/ revised under the provisions of the CRZ Notification-2019, the provisions of this new notification shall not apply and the provisions of CRZ Notification-2011 shall be followed for appraisal and CRZ clearance of projects in CRZ areas.

Map 5.2: Costal Regulation Zone area of Mumbai (Draft)





## 6. MANGROVES IN MUMBAI

### Constitution of Mangrove Cell:

Mangrove Cell was constituted by the Government of Maharashtra in the wake of serious public concerns about mangrove loss in the state, particularly in Mumbai and surrounding areas. The establishment of the Mangrove Cell in 2012, initiated a series of measures for conservation of mangroves in Maharashtra. The Cell is headed by the Additional Principal Chief Conservator of Forests (APCCF). A Deputy Conservator of Forests (DCF) has been appointed to boost Mangrove Conservation in Maharashtra.

In 2013, the state government ramped up efforts and elevated the status of mangrove forests on Government land from 'Protected Forest' to 'Reserved Forest'. The Mangrove Cell also facilitated the establishment of Mumbai Mangrove Conservation Unit in 2014 to specifically check and prevent the destruction of mangroves in Mumbai and surrounding regions.

There was also an urgent need to promote research, education, ecotourism etc. to secure the biodiversity of our coastal and marine environment and to bring tangible benefits to the coastal communities. For the mission, creating an institution with the necessary skill set and the operational flexibility to address this complex task was under the consideration of the state government, that led to the establishment of a 'Mangrove and Marine Biodiversity Conservation Foundation of Maharashtra' (Mangrove Foundation, in short). The foundation was registered in the year 2015 under the Societies Registration Act, 1860.

### Function of Mangrove Cell:

Mangrove Cell functioned extensively for mangrove conservation by taking block by block approach from raising mangroves on nurseries and organizing regular large-scale plantations on degraded mangrove areas to conducting Clean Mangroves Campaigns and awareness programmes.

The Mangrove Cell also forged strong partnership with many leading national institutions and agencies, facilitating the introduction of state of the art technologies and best practices in sustainable livelihoods to the Maharashtra shores. National Institute of Oceanography (NIO), Central Marine Fisheries Research Institute (CMFRI), Central Institute of Fisheries technology (CIFT), Central Institute of Brackish Water Aquaculture (CIBA), Marine Produce Export Development Authority (MPEDA), Wildlife Institute of India (WII), Salim Ali Center for Ornithology and Natural History (SACON) and Bombay Natural History Society (BNHS) are just a few names in that long and illustrious list of partners. Mangrove Cell also works with several NGO's, Citizen's Groups, educational institutions and private research organizations.

Based on the 'International Climate Initiative' Agreement between Government of India and the



Federal Republic of Germany, a bilateral project towards improving conservation of marine biodiversity called 'Sustainable Management of Coastal and Marine Protected Areas' (SM-CMPA) was launched in Maharashtra with the help of the German development agency called GIZ. The project led to the notification of the Thane Creek Flamingo Sanctuary in 2015. Spread over an area of about 17 square kilometers with 896 Ha of Mangrove cover, it is home to over 200 species of birds, many of which are migratory like the splendidly – coloured flamingo which arrive in thousands in October – November. A 'Coastal and of Marine Biodiversity Centre' was set up at Airoli, Navi Mumbai, in 2017 as a part of the GIZ Project. This interpretation and orientation centre for mangroves and marine biodiversity serves as a gateway to the Thane Creek Flamingo Sanctuary for tourists and environmentalists.

### Activities of Mangrove Cell – Maharashtra Forest Departments

1. Mangrove Protection
2. Mangrove Conservation and Livelihood Generation Scheme
3. Mangrove Afforestation
4. Clean – up Campaign
5. Awareness generation
6. Coastal and Marine Biodiversity Central and mangrove Parks in Mumbai

#### 1. Mangrove Protection:

Mangrove Forests on Government land are declared either as 'Reserve Forest' as per the Indian Forest Act, 1927. Mangroves on private land are declared as 'Forest', hence provision of Forest Conservation Act 1980 is invoked for the diversion of these forests. In Mumbai Mangrove Conservation Unit (MMCUC) a total of 7447.202 hectares of land is declared as Reserve Forest.

- ◆ A specialized unit, called Mumbai Mangrove Conservation Unit (MMCUC), has been formed to diminish the increased pressure of development, waste dumping, pollution and encroachment in mangrove areas of the Mumbai Metropolitan Region.
- ◆ Patrolling is intensified in all mangrove areas.
- ◆ Considering the high vulnerability to encroachment and debris dumping in the mangrove area of Mumbai, Mumbai Suburban region and Thane the Mangrove Cell has employed the services of the Maharashtra State Security Corporation from December 2017 and a total of 158 Guards have been deployed for protection of mangroves in Mumbai and Mumbai Suburban.
- ◆ Thousands of illegal shanties, which had cropped up on mangrove lands in various parts of Mumbai, have been given notices for evacuation and many of them have been removed.

- ◆ In an effort to closely monitor the status of mangroves in Maharashtra, Satellite mapping of mangroves areas is carried out, district by district, on a 1:5000 scale and the areas in the possession of Forest Department were demarcated on the ground with a clear boundary.
- ◆ The Mangrove Cell has now engaged the Indian Institute of Space Science and Technology (IIST) which will monitor the health of mangroves in Maharashtra using near real time satellite remote sensing data.
- ◆ Implementation of 'Mangrove Conservation and livelihood Generation Scheme' for providing livelihood associated with mangrove habitats in order to establish sustainable mangrove conservation by local communities and enabling them to receive tangible benefits from protecting this ecosystem is being undertaken. Total 13 villages are taking advantage of the scheme.
- ◆ Capacity Building of Staff for effective conservation and protection measures.

## **2. Mangrove Conservation and Livelihood Generation Scheme:**

- ◆ The Scheme was initiated on 20th September 2017 by Government of Maharashtra in the coastal districts of Maharashtra, to conserve mangroves on both private and government lands. The Scheme aims to provide benefits to individuals and community members of selected villages.
- ◆ Based on the current mangrove cover, about 13 villages from coastal districts such as Thane have been selected for the implementation of the scheme activities by Mangrove Cell, Maharashtra Forest Department and the Mangrove Foundation.
- ◆ To ensure participation of the local communities, the Scheme is being implemented through village-based Mangrove Co-Management Committees (BrihanMumbai Municipal Corporation). Through this Scheme a group activity is entitled to 90:10% of subsidy while an individual (land owners with more than 1 acre of mangroves) will get 75:25% subsidy. through the scheme, the following activities are being implemented across various villages along the coastline of MMCU:
  - i. Crab Farming
  - ii. Fish Cage Culture (Asian Sea Bass)
  - iii. Oyster and Mussel Farming
  - iv. Ornamental Fish Culture
  - v. Mangrove Ecotourism
  - vi. Mangrove Seed Collection

### 3. Mangrove Afforestation:

- ◆ Mangrove sapling have been raised in nurseries for establishing mangrove plantation in different coastal districts of the state.
- ◆ Since 2012-13 to 2021-22 a total area of 739.60 hectares distributed over 69 locations across Mumbai and Thane has been covered under mangrove plantation programme and the a total of 34.54 lakh mangrove saplings have been planted.

### 4. Clean - up Campaign:

- ◆ Annual mangrove Clean – up programme are conducted to create awareness.
- ◆ The Clean Mangrove Campaign, a three – year initiative started in 2015, by the citizens of Mumbai city and Mangrove Cell, made it to the Limca Book of Record. This was one of biggest governments – citizen partnership projects. In this campaign 8,000 tonnes of garbage (mostly plastic) was cleared, covering 11.03 sq.km of mangroves across Mumbai.

### 5. Awareness generation:

- ◆ Development of ‘Coastal and Marine Biodiversity Centre’ (CMBC) at Airoli, Navi Mumbai.
- ◆ Regular Environment education and awareness talk for students and the public in general.
- ◆ Celebration of important Nature and Wildlife days to create awareness about the pressing subjects.
- ◆ Sensitizing young minds about the coastal and marine biodiversity of Maharashtra, through school programmes, at ‘Coastal and Marine Biodiversity Centre’ (CMBC) at Airoli, Navi Mumbai.

### 6. Coastal and Marine Biodiversity Central and mangrove Parks in Mumbai:

- ◆ The Mangrove Cell, Maharashtra Forest Department has developed a Coastal and Marine Biodiversity Centre (CMBC) at Airoli, Navi Mumbai in collaboration with the German agency GIZ under the Indo-German Biodiversity Programme.
- ◆ The major attraction at the Centre are:
  - i. Vibrant and colourful exhibits of the rich coastal and marine biodiversity observed in the Thane Creek Flamingo Sanctuary.
  - ii. Sounds of various birds like Flamingo, Kingfisher etc. and marine animals like Indian Ocean Humpback Dolphin and Blue Whale.
  - iii. Interactive computer screens and wide LED displays showcasing interesting information and photographs about coastal and marine biodiversity.

- iv. A theater room which shows documentary films and on the biodiversity of Thane Creek Flamingo Sanctuary.
- v. A tourist boat for flamingos safari is also operated from this centre for tourists.
- ◆ The Mangrove Cell will be establishing a Giants of the Sea museum at CMBC Airoli. This museum will house life-size exhibits of giants sea animals such as giant sea animals such as Giant Squid, Whale Sharks and also skeletons of blue whales and other Marine animals.
- ◆ In the near future the Mangrove Cell also plans to set up mangrove parks at Dahisar and Mahul which will have various attractions for tourists such as mangrove trails, bird trails and watch tower, kayaking, mangrove museum, glass bridge over mangroves, etc.
- ◆ Mangrove Park Gorai is developed the said project is to be completed in the financial year 2021-22 to 2022-23 under the District Annual Plan (General). An administrative order for the amount of Rs.25.30 crores has been received and the work of the said project is in progress.





## 7. URBAN RENEWAL SCHEME

The old dilapidated buildings of the Brihanmumbai Municipal Corporation and on rental basis will be redeveloped by the Development Regulations to take up the city renovation plan by the Brihanmumbai Municipal Corporation and Maharashtra Housing and Area Development Authority (MHADA), a government authority involved in the housing sector and make such open spaces available for various civic amenities.

**Table No. 7.1: Recreation Facilities Provided in the year 2021-22.**

Sr. No.	Particulars	City	Total No. (Up to 31.03.2022)		
			Western suburbs	Eastern Suburbs	Total
1	Garden (Except strip Gardens)/ Park	17	168	103	288
2	Recreation Grounds	166	204	98	468
3	Playgrounds	37	191	177	345
4	Shilpgram	00	01	00	01
5	Fountains	16	16	6	38
6	Band stands	3	1	1	5
7	Nurseries	12	8	4	24
8	Plant Sale Counter	3	4	7	14
9	Statues	18	11	10	39
10	Tree Plantations	1516	26569	11938	40023
11	Tree Plantations (Miyawaki)	14975	5025	205010	225010
12	Distribution of tress	3824	5444	25164	34432
	<b>Total No. of Tress</b>	<b>718589</b>	<b>1221737</b>	<b>1034957</b>	<b>2975283</b>

Source: Garden Department of MCGM

### RECREATIONAL FACILITIES:

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



Table No. 7.2: Recreation Facilities Created in the year 2021-22

Sr. No.	Details	Recreation Facilities							
		Zone-1	Zone-2	Zone-3	Zone-4	Zone-5	Zone-6	Zone-7	Total
1	Garden (Except strip Gardens)+ Park	4 + 1	12	41+6	65+8	46+2	55	43+5	288
2	Recreation Grounds	66	100	57	89	54	44	58	468
3	Playgrounds	17	20	40	68	58	59	83	345
4	ShilpgramFountains	7	9	3	4	2	4	9	38
5	Band stands	3	0	1	0	0	1	0	6
6	Nurseries	5	7	2	3	3	1	3	24
7	Plant Sale Counter	1	2	0	3	3	4	1	14
8	Statues	10	8	5	3	7	8	4	45
9	Tree Plantations	396 + 1100	1120 + 13875	976	10244+5025 (Miyawaki type)	946 + 177793	1458 + 45650	1912	260495
10	Distribution of tress (per Rs.1/-)	214	3610	879	8325	35233	1063	2200	51524
11	Number of dead and dangerous trees removed	80	203	52	111	70	163	59	738
12	Number of trees pruned to maintain tree balance	14378	30257	12476	16471	2735	13626	11503	101446
13	Number of trees which removed from surrounding concrete cement	336	1244	375	912	148	286	1151	4452



## 8. UDYAN AND ZOO

Veer mata Jijabai Bhosale Udyan & Zoo is one of the oldest zoos in the country & was established in 1862. This area was under the control of Agri-Horticultural Society of Western India. The management of this Udyan & Zoo was handed over to BrihanMumbai Municipal Corporation 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 Udyan-Zoo has been recognized as ‘Medium Zoo’ up to dt.19.08.2022 by Central Zoo Authority, New Delhi.

### Visitor data and revenue

Financial Year	No. of Visitors	Revenue (Rs.)
2019-20	10,57,215	4,40,14,695/-
2020-21 (dt.15.02.2021 onwards)	1,22,259	56,73,950/-
2021-22 (dt.01.11.2022 onwards)	7,25,101	3,00,59,995/-

Table No.8.1: Entry Fee Chart

Visitors Description	Entry Fees (from dt. 01.08.2017)
Adult	Rs. 50/-
Child (below 12 years)	Rs. 25/-
Family [2 Adults + 2 Children (below 12 years)]	Rs. 100/-
<b>Foreign Visitors</b>	
Adult	Rs. 400/-
Child (below 12 years)	Rs. 200/-
Private school students coming in group for educational trip (below 12 years)	Rs. 15/- (Per head)
Private school students coming in group for educational trip (above 12 years)	Rs. 25/- (Per head)
Accompanying adult	Rs. 50/- (Per head)
Still Camera	Rs. 100/-
Video Camera	Rs. 300/-

### Garden Department:

**For tree conservation, Garden department has done following work:**

- ◆ In year 2021-22, about 40023 no. of trees are planted on municipal roads and open spaces.
- ◆ Removal of concrete and cement around 4452 no. of trees.
- ◆ Spraying of insecticides and pesticides on infected trees.
- ◆ Trimming of branches of 101446 trees branches to balance the trees.
- ◆ Formation of Tree basins around the trees.

Chart No. 8.1: Wardwise Number of Trees

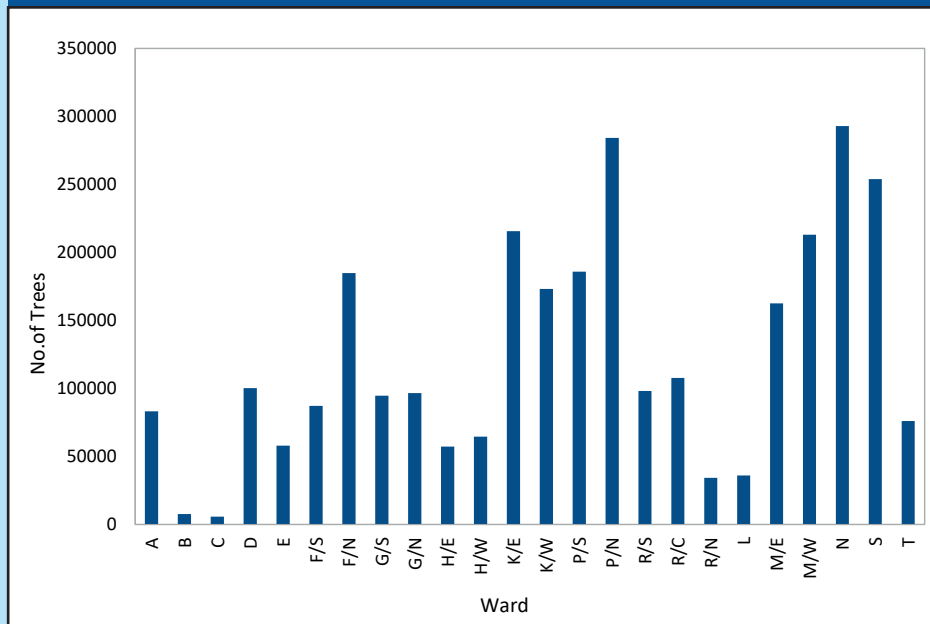


Table No. 8.2: Ward wise number of trees (2021-2022)

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

Source: Garden Department of MCGM.

- ◆ Removal of 738 no. of dead and dangerous trees.
- ◆ In the year 2022-23 around 25000 trees are proposed to be planted on roadside and on other places in BrihanMumbai Municipal Corporation jurisdiction.
- ◆ As per the Tree Census the total number of trees in 24 wards is 29,75,283.

### Veer mata Jijabai Bhosale Udyan and Zoo at present:

- ◆ As on 31st March 2022, there are in all 301 animals, which include 81 Mammals of 13 Species, 192 Birds of 16 Species and 28 Reptiles & Aquatic animals of 7 Species displayed in this Udyan & Zoo.
- ◆ As per the guidelines laid by the Central Zoo Authority, New Delhi, under the “National Zoo Policy 1998” the main objective of establishment of a Zoo is to protect, conserve & breed the rare and endangered animals.
- ◆ Various educational activities like Wildlife week, World Earth Day, World Environment Day, Animal keepers training programs, Zoo Awareness Programs, etc. are conducted for creating empathy, interest and awareness about Wildlife, Nature & Environment in the minds of citizens and school/college students & teachers.



### Modernization Project of Veermata Jijabai Bhosale Udyan and Zoo :

- ◆ As per Master (layout) Plan of this Udyan & Zoo, In second phase, construction of 10 animal exhibits has been completed and animals like Tiger, Leopard, Sloth bear, Hyaena, Jackal, Sambar, Spotted deer, Swamp deer, Madras pond turtle and Bird Aviary-2 are displayed for public viewing. The construction of remaining 5 animal exhibits of Bird Aviary-1, Otter, Indian Wolf, Sambar & Barking deer and Nilgai & Four horned antelope is in progress.
- ◆ Development of work of Landscape garden on the site of old offices of Zoo and Garden department and adjoining land is completed.
- ◆ A new facility comprising of miniature models of various iconic places in Mumbai like Gateway of India, National Park, Mangroves, beach etc. is developed at the first floor of Interpretation Center building wherein the visitors can take a virtual tour of these places by way of video walls, 3D films etc.
- ◆ In third phase, it is proposed to develop a Zoo extension facility on the two adjacent plots (around 10 acres) wherein exhibits for various exotic species like Giraffe, Zebra, White Lion, Jaguar etc. will be developed for which Request For Proposals (RFPs) are being invited.



Veermata Jijabai Bhosale Udyan

## 9. WATER SUPPLY

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

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



Table No. 9.1: Source of Water Supply

Source	Yield in MLD	Ownership	Distance from City	Treatment Plant
Tulsi	14	Brihanmumbai Municipal Corporation	City Limit	Tulsi
Vihar	99	Brihanmumbai Municipal Corporation	City Limit	Vihar
Tansa	569	Brihanmumbai Municipal Corporation	100 KM from City	Bhandup Complex
Modak Sagar	1758	Brihanmumbai Municipal Corporation	120 KM from City	Bhandup Complex
Upper Vaitarna Middle Vaitarna		Government of Maharashtra Brihanmumbai Municipal Corporation	173 KM from City	Bhandup Complex
Bhatsa	2108	Government of Maharashtra	100 KM from City	Bhandup Complex and Panjarapur
Subtotal	4548	-	-	-
Enroute + Losses	-604	-	-	-
Total Supply to City	3944	-	-	-

Source: BrihanMumbai Municipal Corporation Hydraulic Engineer

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

## 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 6535 MLD (including enroute supply and transmission losses). The process of developing Government allotted Gargai (440 MLD), Pinjal (865 MLD) and Damanganga-Pinjal River Link Project (1586 MLD) water supply sources to meet the future water demand. On completion of these projects, the water supply will be augmented by 2891 MLD.

Table No. 9.2: Present & Future Source of Water Supply

Sr. No.	Source	Year	Yield In MLD		Distance from city in KM	Remarks
			Up-lift	Commulative		
1.	Vihar	1860	90	90	Within City	Present Source
2.	Tulsi	1872	18	108	Within City	
3.	Tansa	1892-1945	500	608	106	
4.	Lower Vaitarna	1954	455	1063	119	
5.	Upper Vaitarna	1972	635	1698	163	
6.	Bhatsa	1980-2007	2020	3718	102	
7.	Middle Vaitarna	2014	455	4173	150	
8.	Gargai	2022-2027	440	4613	180	Future Source
9.	Pinjal	2024-2025	865	5478	195	
10.	Damanganga	2029-2030	1586	7064	-	

Source: BrihanMumbai Municipal Corporation Hydraulic Engineer

### Abhay Yojana:

'Abhay Yojana' is implemented from 15th February, 2020 which facilitated water connection holders to get relief from paying additional charges on the outstanding dues. Till March 2021, 1,37,978 connection holders have taken the benefit of 'Abhay Yojana' and the period of Abhay Yojana has been further extended till the declaration of end of the corona pandemic.

### Water Distribution Improvement Works:

#### a) Replacement

In the year 2021-22 in City, Eastern Suburb & Western Suburb 115.64 Kms of pipe lines have been replaced / laid new and it is proposed to undertake similar works for 89.625 Kms in 2022-23.

#### b) Renewal of Service connections in road improvement

To avoid frequent digging of roads and contamination problems 19386 no. of age old service connections have been renewed in 2021-22 and it is proposed to take up works for about 54615 connections in 2022-23.



**c) Removal of Bunch of Connections**

For the effective management and improvement of water supply in slum localities 17 bunch of connections have been removed in the year 2021-22 and it is proposed to take up such works at 49 new locations in the year 2022-23.

**d) Repairs and Reconstruction of Valve Chambers**

The work of Repairs and Reconstruction of 1686 valve chambers is completed in the year 2021-2022 and another Repairs and Reconstruction of 1917 valve chambers is to be undertaken in the year 2022-23.

**Water Supply Quality Control:****Pise Panjrapur Complex Water Treatment Plant Information:**

Approximately 50% of the total water supply to the Mumbai city is provided by the Pise Panjrapur Jal Yojana. For that, 2120 MLD daily water is lifted from Bhatsa Dam Department. Also 640 MLD impure water is sent to Bhandup every day for water purification. About 1365 MLD per day of the water among 2120 MLD is purified from the Panjrapur complex water treatment plant and supplied to the wards of Mumbai city and eastern suburbs.

After traveling about 48 km between Bhatsa Dam and Pise Dam, the water released from Bhatsa Dam reaches Pise Dam. Before this water reaches the Panjrapur Complex Water Treatment Plant, chlorine is added to the water through the process of pre-greening required at Pise pumping station.

After the chlorine mixed water arrives at Panjrapur Complex, this water is subjected to disinfection (chlorination) process after sediment filtration, and this water is distributed to the citizens of Brihanmumbai through the Mahasantulan Reservoir at Yewai.

By department-wise reservoirs, underground tunnels, water channels, etc. Water samples are taken and tested during different water treatment processes. Panjrapur complex has an upgraded laboratory for all these tests. It is ensured that the water supplied to the city of Mumbai conforms to the potable water standard of Indian Standards (IS)-10500:2012.

**Brief note regarding activities at Bhandup Complex Water Treatment Plant:**

Mumbai city and suburban areas are being supplied with @ 3944 million liters of water on a daily basis. This water is drawn from various lakes as well as river sources. Out of above 3944 MLD water, 2500 MLD is treated at Bhandup Complex and is supplied to city and western suburban wards.

Water is brought to Bhandup Complex by gravity mains originating from Tansa/ Vaitarna/ Upper Vaitarna lakes. This water is prechlorinated at Yewai @ 50 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 consumers through network of pipelines, tunnels, service reservoirs etc.

During all these activities, 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 within prescribed limits as per drinking water standards IS 10500:2012.

**Brief note regarding working activities at Bhandup Complex and Pise Panjarapore Complex Laboratory:**

Laboratory at Bhandup Complex and Pise Panjarapore was commissioned in the year 1980 for daily monitoring the quality of water having supplied to Mumbai.

Analysis of water for Physical, chemical and bacteriological parameters in order to supply safe potable water as per IS 10500 : 2012 to the Mumbai city.

Samples of raw water, clarifier water, filtered water and final water are tested for following parameters hourly.

1. Turbidity
2. pH
3. Residual Chlorine
4. Temperature
5. Colour

**Table No.9.3: Water Quality at Source (Raw) and Treated (Final) during April 2021 to March 2022**

Parameters	Tulsi		Vihar		Bhandup Complex		Panjarapur (Bhatsa)		BIS standards 10500:2012
	Raw	Final	Raw	Final	Raw	Final	Raw	Final	
Turbidity NTU	2.2-16	0.24-4.8	2.2-24.0	0.75-3.1	1.0-128.0	0.20-3.4	3.2-880	0.20-5.0	1-5
pH	6.80-8.50	6.60-7.90	7.00-9.00	6.90-8.00	7.00-7.80	6.75-7.60	6.7-8.0	6.7-7.5	6.5-8.5
Chlorides (mg/l)	9-18	11-22	10-19	13-24	09-12	10-14	7-28	10-29	250-1000
Total Alkalinity (mg/l)	26-42	22-40	34-47	30-44	30-47	30-45	36-98	30-94	200-600
Total Hardness (mg/l)	30-48	29-46	38-55	38-51	32-50	30-49	25-80	21-72	200-600
<b>Bacteriological examination (CFU/100ml)</b>									
Total Coliform	0-0	0-0	0-0	0-0	6-75*	0-0	≥ 1600	0-0	-
E-Coli	0-0	0-0	0-0	0-0	0-5	0-0	≥ 1600	0-0	-

Source: BrihanMumbai Municipal Corporation Hydraulic Engineer

\* Due to technical error at Yewai Chlorination Plant.

\* Total Coliform Organism MPN/100 ML shall not be detectable in final water.

\*\* E-coli MPN/100 shall not be detectable in final water.

Note :Raw water of Tulsi, Vihar and Bhandup complex plant is pre-chlorinated. Raw water Bhandup Complex contains water from sources Tansa, Modaksagar (Vaitarna), Middle Vaitarna and Upper Vaitarna. Results of all parameters for final water of Bhandup Complex, Tulsi Filtration Plant and Vihar Filtration Plant are within Permissible Limit as per IS 10500 : 2012. For raw water at Pise panjarapur water treatment plant, water source is Bhatsa. Treated final water parameters are within permissible limit as per IS 10500 : 2012.

Unit : NTU= Nephelometric Turbidity Unit

mg/l = milligram per litre

CFU/100ml=Colony forming unit per 100 ml

Jar test is conducted on Raw water sample in every shift for prescribing optimum Poly Aluminium Chloride dose. Complete analysis of water samples – Raw, Filter and Final is carried out for Total Alkalinity, Total Hardness, Calcium Hardness, Chlorides, Suspended solids, Total solids, Manganese, Iron, Aluminium, Dissolved Oxygen and Bacteriological examination for total coliform and E.coli once in a day.

### **Municipal Analyst Laboratory:**

Municipal Analyst laboratory is a Public Health Laboratory of BrihanMumbai Municipal Corporation and a State Food Testing Laboratory recognized by the Food Safety And Standard Authority Of India (FSSAI) located in G/North, Dadar. In December 2020 the Laboratory has been accredited with International Standard ISO17025:2017 by National Accreditation Board For Testing and Calibration (NABL).



### **Activities of Municipal Analyst Laboratory:**

- ◆ The laboratory provide testing service to BrihanMumbai Municipal Corporation and citizens for Chemical and Microbiological analysis of food and water samples using advance techniques as per National and International Standards.
- ◆ The Municipal Analyst laboratory support the Public Health Department, Epidemiology cell by testing drinking water sample, Hawkers and Ice water samples for Water quality surveillance.

### **Testing of Drinking Water surveillance samples:**

The treated drinking water is supplied all over Mumbai region through the piped distribution system. Drinking water in distribution system may get contaminated by infectious micro-organisms present in the environment. In order to protect public health as per the World health organization (WHO) guidelines verifying that safe drinking water is supplied till the consumer end, monitoring the drinking water supply throughout the distribution network is essential.

For Water quality surveillance daily around 200-250 water samples and in monsoon or emergency up-to 300-350 drinking water samples are jointly collected by the Public Health Department (PHD) and Hydraulic Engineering (HE) Department. The water samples are collected from the service reservoirs and sampling points throughout the distribution network across 24 wards of Mumbai by the Medical Officer Of Health (MOH) for PHD, Assistant Engineer Water Works - Quality Control and Leak Detection Department for HE Departments. These water samples are sent to the Municipal Analyst laboratory for Routine Bacteriological analysis.

In Municipal laboratory to test the Bacteriological Quality of all the drinking water samples taken

from the distribution system including consumers premises are tested in accordance of Indian Standard IS-15185:2016 to test bacteriological requirements prescribed in Indian Standard Drinking Water - Specification IS: 10500:2012 (Reaffirmed:2018). As per The Indian Standards IS 10500:2012 (Reaffirmed:2018) - Drinking Water Specification prescribes that E.coli and Total Coliform bacteria shall not be detectable in any 100 ml sample of Treated water entering the distribution system and Treated water in the distribution system. The Membrane Filtration Technique (MFT) is used to detect these water quality indicator bacteria. The MFT technique is performed as per the BIS standards. The confirm results are obtained within 24 hours. These results are sent to the Medical Health Officer (MOH) of 24 Wards, Deputy Executive Health Officer (Epidemiology Cell), AE(LD) ,AE(QC) and AE(WW) Departments by E-mail within 24 hours for taking remedial measure on unsafe water sample location.

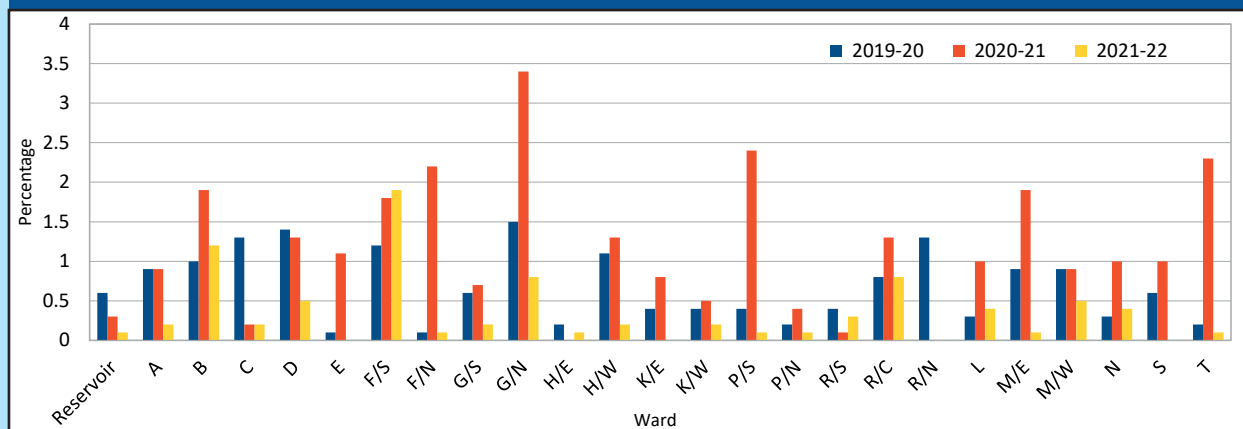
Table No. 9.4: Wardwise % of Unfit water Samples April 2019 – March 2022

Sr. No.	Ward	% of Unfit Samples			Sr. No.	Ward	% of Unfit Samples			
		2019-2020	2020-2021	2021-2022			2019-2020	2020-2021	2021-2022	
1	Reservoir	0.6	0.3	0.1	14	K/W	0.4	0.5	0.2	
2	A	0.9	0.9	0.2	15	P/S	0.4	2.4	0.1	
3	B	1	1.9	1.2	16	P/N	0.2	0.4	0.1	
4	C	1.3	0.2	0.2	17	R/S	0.4	0.1	0.3	
5	D	1.4	1.3	0.5	18	R/C	0.8	1.3	0.8	
6	E	0.1	1.1	0	19	R/N	1.3	0.0	0	
7	F/S	1.2	1.8	1.9	20	L	0.3	1.0	0.4	
8	F/N	0.1	2.2	0.1	21	M/E	0.9	1.9	0.1	
9	G/S	0.6	0.7	0.2	22	M/W	0.9	0.9	0.5	
10	G/N	1.5	3.4	0.8	23	N	0.3	1.0	0.4	
11	H/E	0.2	0.0	0.1	24	S	0.6	1.0	0	
12	H/W	1.1	1.3	0.2	25	T	0.2	2.3	0.1	
13	K/E	0.4	0.8	0.0	<b>Mumbai Average</b>			<b>0.7</b>	<b>0.9</b>	<b>0.3</b>

Source: This Information is received from G/N water Analyst Laboratory of BrihanMumbai Municipal Corporation

The Ward wise percentage of from April 2019 to March 2022 shows remarkable decreasing trend of unfit water samples comparing last two years than present year.

Chart No. 9.1: Ward-Wise % of Unfit Water Samples: 2019 to 2022







Membrane filtration plant at Bhandup Complex

## Water Supply Projects

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

### Future Sources of Water Supply to Mumbai:

The gap between demand and supply for the year 2041 is 2840 MLD. To meet the gap and to increase the water supply to Mumbai City & Suburbs, it is proposed to undertake development of following sources for augmenting water supply of Mumbai.

Future allotted sources of water are shown in following Table 9.5.

Table No. 9.5: Future sources of water supply

Sources	Yield in MLD	Ownership
Gargai	440	BrihanMumbai Municipal Corporation
Pinjal	865	BrihanMumbai Municipal Corporation
Damanganga-Pinjal River Link Project	1586	Govt. of India/Govt. of Maharashtra/Govt. of Gujrat
<b>TOTAL</b>	<b>2891</b>	

Source: MCGM Hydraulic Engineer.

Gargai Project consist of construction of a dam and a tunnel of about 2.1 kms. The vetting of components of DPR by CDO Nashik is in progress along with process for obtaining MoTA clearance, Forest, Wildlife clearance form MoEFCC.



Pinjal project consist of construction of dam across Pinjal River, conveyance system and allied works like Water treatment plant, Master balancing reservoir, pumping station etc. BrihanMumbai Municipal Corporation has appointed Consultancy Services for obtaining Environmental, Forest/Wildlife clearances from Competent Authorities including socio and environmental impact assessment studies and enumeration of trees for Pinjal Project.

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 BrihanMumbai Municipal Corporation and this water will be conveyed into Pinjal reservoir after its completion.

BrihanMumbai Municipal Corporation, has now also planned to augment water supply by 200 MLD by construction of a Desalination plant which will provide a climate change resilient and reliable source of water for Mumbai. BrihanMumbai Municipal Corporation has appointed M/s IDE as original Project Proponent for the work of preparation of Detailed Project Report (DPR)

### Ongoing Projects in support for Improvement in Water Conveyance system:

#### Tunnels:

#### ◆ Construction of Tunnel Powai to Veravali & Powai to Ghatkopar

1. Powai to Veravali tunnel drive of 2.2 KM length is commissioned on Nov. 2018 and put in to operation.
2. Work for the balance works on the Powai to Ghatkoper tunnel drive expected to be commenced soon. LOA awarded to the lowest bidder.

◆ **Amar Mahal-Trombay reservoirs tunnel (2.5 mtrs dia, 5.5 kms length):** Tunneling activities form Hedgewar Udyan (Amar Mahal) towards TLLR expected to be completed by May 2022. Expected completion of project by October 2024.

◆ **Amar Mahal-Wadala-Parel tunnel (2.5 mtrs dia, 9.7 kms length):** Shafting activities at Hedgewar Udyan (Amar Mahal) & Pratiksha Nagar (Wadala) completed and Tail and Assembly tunnelling activity has been completed and tunnel boring by TBM is in progress while shafting activities at Parel is in progress. Expected completion by April 2026.

◆ **60 MLD Water Reclamation Plant in Panjrapur Complex:** The work for getting balance work of Water Reclamation Plant in Panjrapur Complex at the risk and cost of M/s Pratibha Industries Ltd. Awarded to lowest successful bidder on 03.03.2022.

◆ **Upgradation of Powai Lakefront:** Aerator fountain installation in progress at Powai lake.

◆ **Consultancy work for development of Hydro Electric Power Plant Project at 'Hinduhridaysamrat**

**Shivsenapramukh Balasaheb Thackeray Middle Vaitarna Dam':** Consultancy work completed, LOA is issued to lowest bidder M/s Shapoorji Pallonji and Company Private Limited- M/s. Mahalaxmi Konal Urja Private Ltd.(JV) ( SPCPL-MKUPL (JV)) on dt. 16.02.2021.

- ◆ **Development of Renewable Hybrid Energy Project Facilities of Hydro Electric Power Plant and Floating Solar PV Power Project at 'Hinduhridaysamrat Shivsenaprmukh Balasaheb Thackeray Middle Vaitarna Dam':** LOA is issued to lowest bidder M/s Shapoorji Pallonji and Company Private Limited – M/s. Mahalaxmi Konal Urja Private Ltd. (JV) [SPCL-MKUPL, (JV)] on dt.16.02.2021.
- ◆ **Replacement of valves and allied works at Trombay High Level Reservoir:** All inlet & outlet valves of valve gallery of THLR are replaced.

#### Pipelines Works:

- ◆ **Missing link of MV main betn. Chinchawali to Yewai (3 mtrs dia., 4.3 km):** Work is completed on 03.05.2022.
- ◆ **Replacement of twin Tansa main betn Balkum-Huzari bridge (3 mtrs dia, 4.5 km):** 99% work is completed. Expected date of completion is June 2022.
- ◆ **Replacement of twin Tansa main betn Huzari Bridge to Saddle Tunnel Bhandup complex (3 mtrs dia, 4.9 km):** 97% work is completed. Expected date of completion is July 2022.
- ◆ **Construction of Inter Connection by 4000 mm dia MS pipe from Bhandup tunnel shaft to 1910 MLD old WTP in Bhandup Complex and allied works (3 mtr dia and 4 mtrs dia, Total length 125 mtrs):** 84% work is completed.
- ◆ **Replacement of existing twin Tansa Mains (2x1800mm) from Bhandup to Maroshi by single 2400mm dia, 6.3km length:** Started in Nov. 2019. 50% work is completed. Expected completion by June 2023.

#### Structural repairs to existing reservoirs:

- ◆ **Malad hill Reservoir (50 MLD):** Work has been completed February 2021.
- ◆ **Trombay High Level Reservoir (55 MLD):** 55.5% completed. Expected completion by May 2022.
- ◆ **Trombay Low Level Reservoir (27MLD ):** 67% work completed. Expected completion by November 2022.
- ◆ **Structural Repair Works to Bhandup MBR (246MLD ):** 44% completed. Expected completion by September 2022.
- ◆ **Structural Repair Works to Yewai MBR (118 MLD):** Work started recently. 10% work is completed.

Expected completion by July 2023.

## **Water Supply Resources- Surface as well as Underground:**

### **Gargai project (440 MLD):**

Gargai project consist of construction of dam across Gargai River and construction of 2.1 Km long tunnel to convey water from Gargai dam to Modaksagar reservoir.

Vetting of Hydrological studies is completed & vetting of design component of DPR is in progress by Central Design Organisation (CDO), Nashik. CWC approval to the Hydrology of Gargai Project has already been received. The Site specific seismic study for Gargai project finalised by M/s Central Water & Power Research Centre (CWPRS), Pune have been approved by the National Committee on Seismic Design Parameters (NCSDP). Proposal for Wild Life & Forest Clearance has been submitted to the respective authorities and follow up action is in progress. Environmental clearance has been received from the Environment Department, Govt. of Maharashtra, this being purely a water supply project. The R & R Plan as per RFCTLARR, 2013 Act has been finalized and received approval from all stakeholders. A special land acquisition cell for acquisition of Private Land is made functional for the same. Joint Measurement survey is completed for the affected villages while that at R & R site is in progress.

### **Pinjal Dam Project (865 MLD):**

Pinjal project consist of construction of dam across Pinjal River, conveyance system and allied works like Water treatment plant, Master balancing reservoir, pumping station etc.

The work of preparation of Detailed Project Report (DPR) for Pinjal Project was entrusted to M/s. WAPCOS Ltd. by Water Resource Department (WRD) of Government of Maharashtra (GoM). There has been no further progress on the work of DPR preparation hence, BrihanMumbai Municipal Corporation will complete the DPR on its own. Meanwhile BrihanMumbai Municipal Corporation has appointed Consultants for obtaining Environmental, Forest/Wildlife clearances from Competent Authorities including socio and environmental impact assessment studies and enumeration of trees for Pinjal Project' and work for preparation of ToR of EIA is in progress.

### **Damanganga-Pinjal River link project (1586 MLD):**

The projects comprises construction of dams at Bhugad & Khargihill and 2 nos. of tunnels for diverting additional 1586 MLD Damanganga waters into Pinjal dam reservoir. This project will be implemented by Government of India (GoI). Central Water Commission (CWC)'s approvals to DPR have been received. Proposal for MoTA clearance has been submitted and as suggested by Ministry of Tribal affairs, preparation of revised R & R plan as per RFCTLARR act 2013 is in progress by NWDA. Further modalities of water sharing & project execution will be decided by the WRD, GoM in co-ordination

with GoI, GoM, Government of Gujarat (GoG) & BrihanMumbai Municipal Corporation.

### Proposed Tunnels/ Projects:

Proposed Tunnel from Balkum to Mulund- 9.66 Km: The consultant have been appointed for carrying out Feasibility studies and PMC services thereafter surveys and feasibility report preparation is under recent commencement.

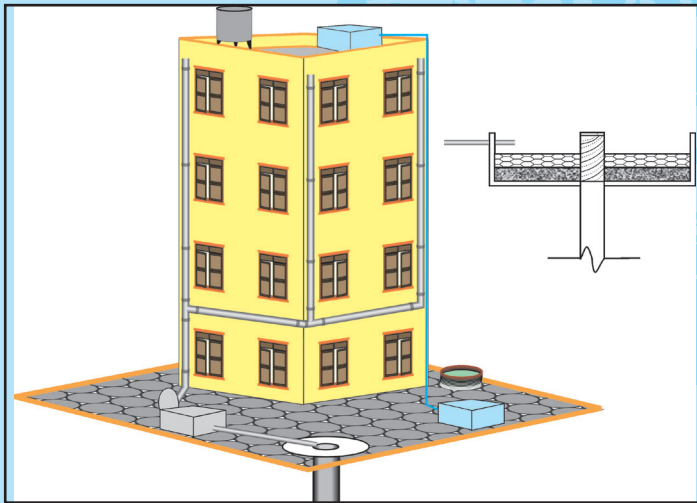
- ◆ **Transfer of Excess Water from Vehar Lake to inlet bay of WTP at Bhandup Complex:** The consultants have been appointed for carrying out Feasibility studies and the same is nearing completion.
- ◆ **Structural Repair to 1910MLD old WTP, Bhandup Complex:** Feasibility study for repair/rehabilitation has been completed. The work of repair/ rehalbilitation is undertaken by H. E. Department.
- ◆ **Reconstruction of Malabar Hill reservoir:** LoA is issued to the contractor and Purchase Order will be issued soon.
- ◆ **Reconstruction of Bhandarwada Hill reservoir:** Consultant is appointed & pre-tendering work is in process.





## 10. RAIN WATER HARVESTING

BrihanMumbai Municipal Corporation supplies 3850 million liters of water every day, against a demand of 4505 million liters per day to the Mumbai, the economic capital of our country. The purity of the water supplied to the citizens of Mumbai is very high on the “International Quality Standards Rating” and considerable expenditure is incurred for this purification. Unfortunately this water is being used for all secondary requirements also such as, flushing of latrines and washing of vehicles. In view of the indiscriminately rising population and comparatively limited resources there is an urgent need to search ways to save water and to put those to actual use. BrihanMumbai Municipal Corporation 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 and soil erosion is arrested. Entry of seawater in ground water can be prevented.

### Following methods can be deployed for Rain Water Harvesting.

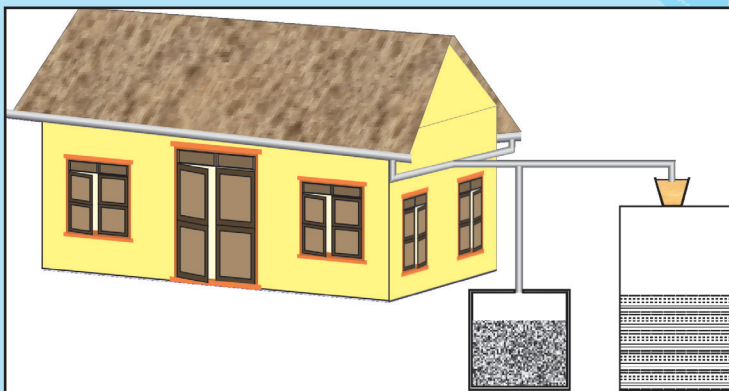
1. Storage in underground or above ground artificial tanks.
2. Direct recharging of the subsoil water strata (aquifer) through dug up wells or bore wells.
3. Recharging of the subsoil water by percolation.
4. Forcing rainwater in the ground through bore wells and thereby preventing entry of salty seawater in the subsoil strata.

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

Brihanmumbai Municipal Corporation is the 1st Municipal Corporation in Maharashtra to make Rain Water Harvesting mandatory. Rain Water Harvesting had been made mandatory to new properties coming for development from 1st Oct. 2002 having plot area 1000 sq.mt and more. This condition was extended to the properties which had come for development prior to 1st Oct. 2002 but are coming for occupation / completion from 1.9.2003. As per Government directives u/no. TPB -4307/396/CR-124/2007/UD -11 dtd. 6.6.2007 the condition was binding to all developments having plot area 300 Sq. Mts. & more. From 8.05.2018 as per DP 2034 the condition is binding to all developments having plot area 500 Sq. Mts. & more. The condition is applicable to the properties coming for addition alternation/ use of balance FSI etc. The condition is imposed as one of the I.O.D. (Intimation of Disapproval) conditions for installation of RWH scheme and occupation certificate is granted only after compliance of the same. RWH scheme is being designed by the RWH consultant appointed by the Architect. The completion certificate for the implemented scheme is also being issued by the RWH Consultant. Building Proposal department verifies the completion certificate issued by the Consultant before issuing Occupation Certificate.

RWH is being implemented in all the new developments of BrihanMumbai Corporation where RWH is mandatory. In addition all the departmental heads of BrihanMumbai Municipal Corporation have already been directed to get RWH schemes implemented in their premises.

To encourage existing private Co-op Housing Societies / Owners to implement RWH schemes in their premise Rain Water Harvesting & Water Conservation Cell of BrihanMumbai Municipal Corporation guide regarding implementation of RWH schemes free of cost. In addition BrihanMumbai Municipal Corporation while issuing new bore well permissions in private premises, a condition is incorporated to recharge such bore well with roof top rain water.



In view of the late monsoon in the year 2015, (RWH & Wat. Cons.) Cell has started Save Water Awareness Campaign to spread awareness amongst the citizen of Mumbai. As a part of the continuous awareness 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 BEST buses, Bus Queue Shelters, 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 Mumbaikars**' – mass awareness for water conservation" has been initiated by me2green NGO as

BrihanMumbai Municipal Corporation as concept partner.

Due to late monsoon in 2019, with the help of Public Relation Dept., Hydraulic Engineer's dept. printed 1,92,000 Save water awareness posters in Marathi, English & Hindi appealing Mumbaikars to use water judiciously and to avoid wastage of water. These posters were pasted in all the Municipal offices & some of the private premises all across Mumbai.

There are approximately 18911 identified wells (4638 dug up wells, 12561 tube wells & 1712 Ring wells) in Mumbai. Assuming average per day withdrawal of approx. 20,000 lit. of water (two tanker load) per well, it can be safely presumed that 378 MLD of ground water is available 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 wells situated in Municipal premises for fire Brigade to save fuel & precious time during emergencies.

Protecting wells in the city is very important considering future water crisis. BrihanMumbai Municipal Corporation has prohibited unauthorized burying of existing wells from Jan. 2003. The A.E. (B & F), A.E. (B.P.) as the case may be are required to take action under sec. 53 (1) of MRTP Act in case of unauthorized filling up of wells. Insecticide Officer Department of BrihanMumbai Municipal Corporation had informed on 28.04.2021 that the Insecticide Branch of Public Health Development issues permissions to dig new bore wells & ring wells (upto 5 ft. Diameter) and to use well water for non-portable purpose. Anopheles Stephensi, the vector mosquito responsible for transmission of Malaria prefers to breed in well water & therefore permissions are not issued for digging new surface wells of large diameters more than 05 ft. In case of existing surface wells, permissions are issued for use of well water for non potable purposes once the open well is provided with a RCC slab to convert the surface well into a Hermetical Cement Concrete (HCC) well, making it mosquito proof in condition.

### **Jal Shakti Abhiyan : Catch the Rain 2022**

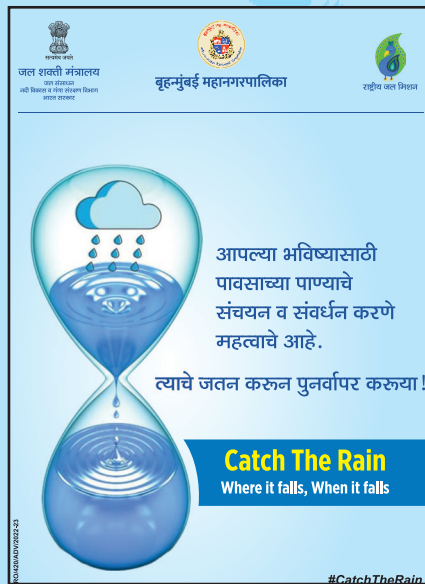
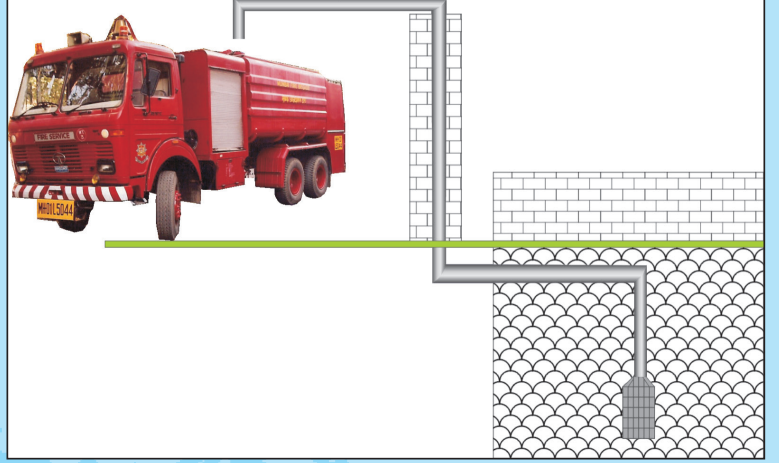
Central Government has launched a nation wide campaign "Jal Shakti Abhiyan: Catch the Rain 2022"- when it falls where it falls, focusing on saving & conserving rain water, covering both Urban & Rural Areas across the country. Hon'ble President Shri. Ramnath Kovind inaugurated the Jal Shakti Abhiyan on 29.03.2022. The staff of Hydraulic Engineer Department of BrihanMumbai Municipal Corporation has participated in this event through Facebook Live and took the water oath as per the guidelines of National Water Mission.

The aim of the campaign is to create awareness among the people through public participation as well as to create suitable Rainwater Harvesting Structures according to the weather and soil conditions for proper storage of Rain Water. Rainfall during the monsoon period is the only source of water for most

of the parts of the country. Hence, water needs to be used carefully & to be saved to meet the increasing demand & to avoid water scarcity. Jal Shakti Abhiyan, directs to motivate the local populace for active participation of each individual in water conservation by catching the rain when it falls & where it falls.

Under the circumstances, it is necessary to create awareness among the citizens of Mumbai through public participation for using the water judiciously, to avoid wastage of water etc., as well as to create awareness for suitable Rainwater Harvesting Structures by running mass Save Water Awareness Campaign. RWH Cell of BrihanMumbai Municipal Corporation has proposed Awareness Campaign consisting of an exhibition of posters, advertisements in local daily news papers, display of banners, street plays etc. As a part of the above said Awareness Campaign, it is proposed to publish save water messages through local daily newspapers in Marathi & English Languages on every Sunday from the month of May 2022 to August 2022. It is also proposed to display Digital posters & flex banners in all the 24 BrihanMumbai Municipal Corporation Wards Offices, Municipal Hospitals, Municipal Offices, CFCs centers etc.

BrihanMumbai Municipal Corporation. takes efforts in all directions to support Rain Water Harvesting which is one of the Best Management Practices (BMP) for a Corporation. It is the duty of all citizens to contribute their own efforts to this cause to help themselves.





## 11. SEWAGE DISPOSAL

Sewerage disposal work is carried out by three departments of BrihanMumbai Municipal Corporation in following ways :

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

BrihanMumbai Municipal Corporation has prepared second sewerage master plan known as Mumbai Sewage Disposal Project (Stage II) in the year 2002. In order to provide safe and clean environment to citizens various projects such as Upgradation of existing Waste Water Treatment Facility (WwTFs), Construction of new WwTFs, Reconstruction of Sewage Pumping Station, construction of Sewer Tunnels are planned.

The projects of WwTFs are undertaken as per effluent discharge standard prescribed by Hon'ble NGT in their order dated 30.04.2020 (BOD<10 mg/Ltr, TSS<20 mg/Ltr, Fecal Colliform<100 MPN/100 ml).

Table No. 11.1: The details of the WwTFs projects

Sr. No.	Name of WwTF	Plant capacity in MLD	Tertiary Treatment(Capacity in MLD for Reuse)	Design, Build Period in years	Expected date of Completion
1	Worli	500	250	5	04.07.2027
2	Bandra	360	180	5	04.07.2027
3	Dharavi	418	209	5	04.07.2027
4	Versova	180	90	4	04.07.2026
5	Malad	454	227	6	04.07.2028
6	Bhandup	215	108	4	01.09.2026
7	Ghatkopar	337	170	4	04.07.2026
	<b>Total</b>	<b>2464</b>	<b>1234</b>	-	-

The tenders for WwTFs at Worli, Bandra, Dharavi, Versova, Malad, Bhandup and Ghatkopar were invited on Design Build Operate (DBO) basis in which operation and maintenance of 15 years are included. Bids are received for all other projects and LOAs to successful bidders are issued for Worli, Bandra, Dharavi, Varsova, Malad and Ghatkoper WwTFs works.

The work of 37 MLD Colaba WwTF has been completed and same has been put in operation from April 2020.

BrihanMumbai Municipal Corporation has emphasized the need of recycle and reuse of treated waste water for non potable and industrial purposes.

There is a provision of 50% of plant capacity for tertiary treatment in WwTF. This tertiary treated water will be made available for non potable purposes. At present 10 MLD of treated waste water is available at Colaba WwTF for reuse. After completion of these seven STPs in Mumbai, not only 2464 MLD of sewage water will be recycled but also the much concerning issue of environmental preservation and degradation will get addressed.

List of proposed work to be carried by this department along with present status is listed below:

**Table No. 11.2: Works of construction of some tunnels in progress**

Sr. No.	Name of the Tunnel	Size of Tunnel in mm	Length of Tunnel in Km	Remarks
1	Versova: From D.N. Nagar old Versova Pumping station To new Versova Influent Pumping station (near Versova Lagoon)	2000	3.1	Work in progress. 1900m Tunnel Boring completed
2	S V Road: From Jai Bharat Pumping station Khar (West) To Bandra IPS along S.V. Road Bandra (West)	2600	1.9	Work in progress. 1900m Tunnel Boring completed
3	PST-1: From Don Bosco school, Borivali (West) To New Malad IPS	3200	5.8	Tender is in process
4	PST-2: From Goregaon Pumping Station To new Malad IPS	2600	4.8	Tender is in process
5	Mithi-IV: Construction of Sewer Tunnel From Bapat Nallah and Safed Pul Nallah To Dharavi WwTF	2600	6.7	Work of launching shaft at Dharavi is in progress.

**Table No. 11.3 : The Capacity of the Pumping Stations**

Sr. No.	Sewage Pumping Station	Plant Capacity in MLD	Remarks
1	Varsova IPS	540	Work in progress
2	Kadeshwari Pumping Station	5	Work completed
3	Malad IPS	1580	Work in progress
4	Mithi-I (STP)	8	Work in progress

**The benefits of various MSDP - II projects to the environment are as follows:**

1. Saving and Conservation of Drinking Water
2. Conservation of Environment
3. Improvement in Public Health of Mumbai City
4. Improvement in Sea aquatic Life & water quality.

**Sewage Operation (SO):**

Laboratory at Dadar under Sewerage Operation department has carried out monitoring of marine outfalls at Worli and Bandra. Marine water samples are collected at 1 km. peripheral area from outfall disposal point. The analytical reports are compared with the MPCB standards - SW II and it has been found that at Worli and Bandra, levels of pH, D.O., Turbidity and B.O.D. are within the prescribed standards. Levels of F. Coli are exceeding at all sites.

**Table No. 11.4: Water Quality at Marine Outfall 2021-22**

Sr. No.	Place	PH		D.O. (mg/l)		Turbidity (in NTU)		F-Coli (CFU)		B.O.D. (mg/l)	
		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
1	Worli	7.73	8.32	5.4	7.4	1.09	5.62	100	278	0.3	2.8
2	Bandra	7.84	8.32	4.9	7.8	1.02	6.55	63	286	0.35	2.4

D.O.: Dissolved Oxygen

B.O.D.: Biochemical Oxygen Demand

CFU: Colony Forming Unit

Source: This information is received from Sewerage Operation Department Dadar Laboratory.

**Table No. 11.5: Zone wise capacity and average dry weather flow capacity of sewage (2021-2022)**

Sr. No.	Name of Sewage Treatment Plant	Installed Capacity (In MLD)	Zonewise Average Dry Weather Flow Capacity of sewage (In MLD)
1	Colaba	37	25.39
2	Worli	757	282.32
3	Bandra	797	476.07
4	Versova	180	98.27
5	Malad	280	189.81
6	Bhandup	280	92.73
7	Ghatkopar	386	102.04
8	Charkop	6	4.29

M.L.D.: Million Liters Per Day

Source: This information is received from Sewerage Operation Department Dadar Laboratory.

## 12. STORM WATER DRAINS

Mumbai is lined on the west by Arabian Sea and intercepted by number of creeks. The tidal variation is a major concern in the system of storm water drains (SWD) to release rainwater as well as waste water 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.

Operation and maintenance of Storm Water Drain is done time to time. Length of open SWD in Mumbai is about 1987 km. The flow from the open SWD is discharged either into nallhas, culvert, creek or sea. This open SWD becomes an eyesore due to throwing of garbage by citizens especially in slum area and creates unhygienic conditions. Therefore, desilting is carried out through registered contractual agencies throughout the year. Due to the existing inadequate sewage system, open channels on the side of the road as well as underground channels (SWD) carry faecal/mixed water. The advisories suggest prevention of faecal/contaminated water in storm water channels. Sewage under JNNURM program of Government of India



There are 84 major out-falls in the city area which drain to Arabian sea directly, also 7 at Mahim creek and 11 at Mahul creek. There are 30 out-falls in western suburbs draining directly into Arabian sea while 15 drain into Mithi river which ultimately joins Mahim creek. In eastern suburbs, 14 out-falls discharge in Thane creek, while 5 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.

As per the price index of the year 1992, total cost of the project was worked out to Rs.616.30 crores. It was proposed to carry out improvements in the time span of 12 years. However, due to the shortage of funds and others reasons, only the works amounting to Rs.260 crores were completed. As per the price index of year 2006, total cost of remaining work is approximately Rs.1200 crores. As it was not possible to complete these balance work with the budget provision of BrihanMumbai Municipal Corporation withing stipulated period, Government of India had been requested for financial assistance.

The Government of India sanctioned a special grant of Rs.1200 crores as per detailed project report submitted to Government of India to implement BRIMSTOWAD Project in year 2007. Out of these, BrihanMumbai Municipal Corporation has received Rs.1000 crores till date. Fund received form Government of India is as follows:

Sr. No.	Date	Amount Received
1	23.08.2007	Rs.400 Crs.
2	17.02.2009	Rs.100 Crs.
3	31.03.2010	Rs.400 Crs.
4	31.03.2010	Rs.100 Crs.
<b>Total</b>		<b>Rs.1000 Crs.</b>

In the year 2005 On July 26 and 27, Mumbai city was hit by heavy rains with a record rainfall of 944 mm in a single day creating a flood-like situation in Mumbai city and suburbs. This resulted in the flooding, therefore, Government of Maharashtra had appointed a Fact Finding Committee to analyze the factors responsible for the situation that arose during July 26th and 27th, 2005 in Mumbai and to find out the remedial measures thereat, so as to avoid such incident in future. Based on the BRIMSTOWAD Master Plan Report and recommendations of Fact Finding Committee, the balance BRIMSTOWAD works for the improvement to the storm water drainage system are undertaken. As per suggestion of the Fact Finding Committee BRIMSTOWAD report is to be reviewed and upgraded for which BrihanMumbai Municipal Corporation has appointed M/s. MWH (I) Pvt. Ltd, as the consultant. The master plan is finalized by the consultant and same is submitted on 30.04.2018.

BRIMSTOWAD project is proposed to be implemented in 2 phases. There are 20 works in Phase-I and 38 works in Phase-II (Table No. 12.1). The scope of the BRIMSTOWAD project is as under.

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

**Table No.12.1: Present status of the BRIMSTOWAD Projection**

Details	Phase I				Phase II			
	City	W.S.	E.S.	Total	City	W.S.	E.S.	Total
Name of the Works	5	6	8	19	16	10	12	38
No. of completed works	5	6	7	18	12	4	6	22
No. of the works in progress	0	0	1	1	1	5	5	11
Tenders yet to be invited/ Tenders invited	0	0	0	0	0	1	1	2

Source: Storm Water Drain Dept of MCGM

**Table No.12.2: Status of Storm Water Pumping Stations under BRIMSTOWAD**

Sr. No.	Pumping Station	Status
1	Haji Ali	Completed and commissioned in the month of May 2011
2	Irla	Completed and commissioned in the month of May 2011
3	Cleaveland	Completed and commissioned in May 2015
4	Lovegrove	Completed and commissioned in May 2015
5	Britannia	Completed and commissioned in the month of June 2016
6	Gazdarbund	Completed and commissioned in the month of June 2019
7	Mogra	NOC from Collector (MSD) for construction of Storm Water Pumping Station is pending.
8	Mahul	Land acquisition is in progress.

Source: Storm Water Drain Dept of MCGM

Total expenditure incurred till April 2022 is approx Rs.2485.93 Crores. However, due to increased width and depth of the drains due to change in design parameters, requirement of unconventional technology specially in tidal zone and passage of time – particularly due to encroachment issues, total financial requirement of the project has seen a substantial rise and additional funds to the extent of Rs.2700 Crores are required.

### **Environmental Aspect:**

As regards cleaning and desilting of nallas, the same is carried out every year, prior to monsoon, within BrihanMumbai Municipal Corporation jurisdiction. The same are cleaned by specially appointed agencies. The work of desilting is carried out in various phases. About 75% of the work is carried out before monsoon, 15% during monsoon and balance 10% post monsoon.

The desilting of the underground storm water drains is carried out by deploying sufficient machinery 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 desilting of major nallas in suburbs.

Kurla-Kalina Bridge at Kurla on Mithi River under Brihanmumbai Municipal Corporation to CST. The widening and deepening of the rest of the river, except for the section between the bridges, is almost complete

BrihanMumbai Corporation has undertaken rejuvenation work of Dahisar, Poisar and Oshiwara River. Work of rejuvenation of Dahisar River is in progress. Work of designing is in progress for Poisar River and tenders for the same are invited. Oshiwara River rejuvenation work order cannot be issues as the matter is in Hon. High Court.

The rejuvenation work includes widening of river, improvisation of quality of river water, preventing contamination of rivers caused form river catchment area, network of sewage disposal line, construction of service road for sewage water process stations, beautification of river bays/ sides and installation of sewage water process stations etc.

### Development of Mithi River:

Government of Maharashtra has formed ‘Mithi River Development and Protection Authority’ under the Chairmanship of Honorable Chief Minister of Maharashtra State on 19th August 2005 for improvement of the Mithi River. Out of the total length of Mithi River 11 kms. is in the jurisdiction of Brihanmumbai Mahanagar Palika and the balance length of 6.00 kms. is under jurisdiction of MMRDA. The 95% work of widening and deepening work of Mithi River has been completed till date.

As on today, with 80% completion of retaining wall and 94% completion of widening and deepening of Mithi River, the carrying capacity of Mithi River has doubled and the carrying capacity has been tripled. A plan for development and pollution control of Mithi River has been prepared and its implementation is proposed in four phases.



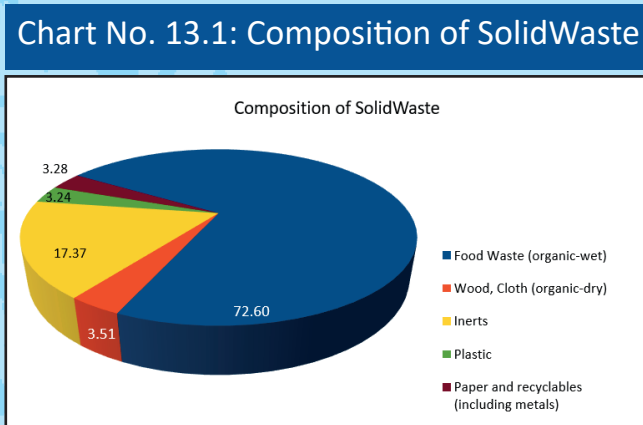
### 13. SOLID WASTE MANAGEMENT

Due to various projects and programs arranged by Brihanmumbai Municipal Corporation in the last 5 years of the quantum of waste collected in the year 2021 has been approx 6300 MT per day. Of the 6166 MT transported to disposal sites by vehicles in over 1565 trips/day, the waste is primarily collected separately as dry and wet waste. The waste can be broadly classified in various categories i.e. 72.60% Food waste (organic-wet), 3.51% wood, Cloth (organic-dry), 17.37% Sand, Stone & Fine earth, 3.24% Plastic, 3.28% Paper and recyclables (including metals).

**Table 13.1: Composition Of Garbage In Mumbai**

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

Source: Report of NEERI, 2016



The waste from all over the city is collected and at present, it is treated at Kanjur processing site using Bio-Reactor Technology and Windrow Composting and rest is disposed off at the Deonar dumping site by conventional method of dumping and leveling. The project for scientific Closure Project of the Gorai landfill site has been completed and its operation and maintenance is in progress. Deonar dumping ground is the oldest one, receiving approximately 12% & Kanjur receiving remaining 88% of waste generated on daily basis. The activity of receiving of fresh MSW at Mulund Dumping Ground is stopped w.e.f. 21.12.2018 and the project work of recovering the land by processing the existing waste with suitable technology is in progress. Scientific Closure Project of old site at Gorai has been completed in 2009 and operation and maintenance of the site is in progress. Area of different dumping grounds is given in table 13.2. Input loads of MSW at various dumping sites are given in Table 13.3.

**Table 13.2: Capacity of Various Disposal Sites in Mumbai**

Disposal Site	Area (Ha) Filling	No. of Years in Use
Deonar	120	88
Mulund	24	47**
Kanjur	65.96	4

\*\* - Receiving of fresh MSW at Mulund Dumping Ground is stopped w.e.f. 21.12.2018

**Table 13.3: Input Load of Waste**

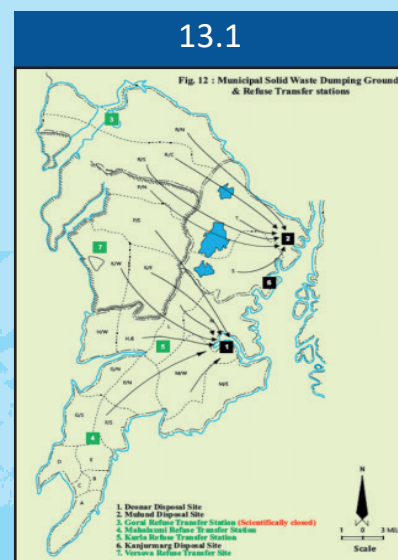
Sr. No.	Disposal Ground	Classification of Waste	Tonnes/day
1	Deonar	Municipal Solid Waste	Approx. 500-700 TPD
2	Mulund		The activity of receiving of fresh MSW at Mulund Dumping Ground is stopped w.e.f. 21.12.2018 and the project work of recovering the land by processing the existing waste with suitable technology is in progress.
3	Kanjur		Approx. 4500-5500



There are 2511 no. of 1.1-cubic meter containers, 12557 nos. of 120 Ltrs. Litter bins, 9658 nos. of 240 Ltrs. Litter bins, 949 community collection points and 100% of total waste is collected through House-to-House collection. The daily Municipal Solid Waste (MSW) is collected and transported by deploying various types of vehicles. Salient features of transportation are given in Table 13.4.

**Table 13.4: Type of Transportation Vehicals For Solid Waste**

Sr. No.	Type of Vehicle	Number of Services			
		2018-19	2019-20	2020-21	2021-22
1	Compactors	1228	1584	1432	1926
2	Skip Vehicles/ Dumper Placers	11	1	0	0
3	Dumpers/Refuse Vehicle	100	126	192	315
4	Bulk Refuse Carriers	--	--	--	--
5	Tempo/Jeeps	2933	4092	3358	5294
6	JCB Machines	50	63	61	127
7	Stationary Compactors	57	80	83	97
	<b>Total</b>	<b>4379</b>	<b>5946</b>	<b>5126</b>	<b>7759</b>



### Swaccha Bharat Mission:

The second phase of SBM-Urban has been launched by Hon'ble Prime Minister on 1st October 2021 during India's 75th anniversary of Independence, under Azadi ka Amrut Mahotsav. In the second phase greater focus has been given on issues such as remediation of all legacy dumpsites, setting up of Construction and Demolition (C & D) waste plants, procuring of mechanical sweepers, setting up of material recovery facilities and waste processing plants. BrihanMumbai Municipal Corporation being the prime administrative organization responsible for maintaining cleanliness in the city, a concerted and joint effort has been taken up along with the State and Central Govt. For achieving the desired level of cleanliness and sanitation under this Mission, the efforts and programs of Solid Waste Management department have been redesigned accordingly by BrihanMumbai Municipal Corporation.



### Open Defecation Free:

The city of Mumbai was earlier certified as Open Defecation Free (ODF). During Swachh Survekshan 2022,

### Swachhata App:

Swachhata App developed by Ministry of Housing and Urban Affairs (MoUHA) and 24 X 7 app of MCGM were integrated to resolve complaints about solid waste management in time. The resolution rate in Swachhata App complaints in Mumbai is more than 99%. The Swachhata App complaints are also being monitored regularly.

### Segregation and Composting of wet waste at Source:

To reduce the waste coming from bulk waste generators, identification of 2825 residential, commercial, market premises etc. (bulk waste generator) have been carried out and notices are issued to them to increase the level of 'segregation at source'. Brihanmumbai Municipal Corporation has provided guidance to introduce methods, technology & processes to be followed for disposal of solid waste at source for the bulk waste generators, so that they can adopt any one of the method/ technology suitable for them.

### Swachha Sarvekshan 2022

BrihanMumbai Municipal Corporation has actively participating in Swachh Survekshan 2022 conducted by Ministry of Housing & Urban Affairs (MoUHA) to assess SWM progress between 1st April 2021 to 31st March 2022. As a part of Information Education & Communication (IEC) activities, hoardings and banners were put up to encourage citizens waste segregation in their own premise. Also, banners were put up at the bus stand for public awareness of Swachh Survekshan 2022.

### National Clean Air Program (NCAP):

Awareness towards National Clean Air Program (NCAP) was carried out through advertisement at Bus Queue Shelters (BQS), Radio Jingles and Newspaper. This month-long intensive campaign included messages on awareness of citizens towards segregation, composting, no burning of waste etc.



### Capacity Building:

Brihanmumbai Municipal Corporation, in partnership with UNDP India and Hindustan Unilever, arranged Safai Mitra Sanman Samarambh during 'Azadi ka Amrit Mahotsav'. The week-long capacity building workshop to over 200 Safai Mitra in 7 Zones of Mumbai with information on their well-being, financial literacy, and access to government schemes was conducted. Safai Mitras were hailed as COVID warriors who continued to work in the pandemic despite the hardship. Their contribution in Maharashtra flood relief was also recognized as they made themselves available beyond the city boundaries. The efforts of Safai Mitras were celebrated by giving Appreciation Certificates & hygiene kits. 'Waste to Art' exhibition open to citizens was also arranged in October 2021 wherein recycling vendors demonstrated their arts/ materials.

### Solid Waste Management Rules, 2016:

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

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

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

SWM Rules 2016 provides for responsibility on the generation of the MSW by imposing penalty, if the same is not complied with in accordance with the Solid Waste Management Rules, 2016.

The chart showing the various compliances to be carried out by Brihanmumbai Municipal Corporation alongwith the compliances already carried out and which are in process on behalf of the Brihanmumbai Municipal Corporation is as below.

Sr. No	Activity	Time limit from the date of notification of rules.	Action taken by MCGM
1	Identification of suitable sites for setting up solid waste processing facilities.	1 year	<p>In January 2015, Brihanmumbai Municipal Corporation had already identified the land for setting up processing and disposal of Municipal Solid Waste (MSW) and requested Govt. of Maharashtra to allot to Brihanmumbai Municipal Corporation the land at Mauje Karvale, near Taloja which is in compliance with SWM Rules 2016.</p> <p>GoM has allotted about 52.10 Ha land to Brihanmumbai Municipal Corporation at village Karavale (Kh.), Tal – Ambarnath, Dist – Thane, for development of scientific waste processing facilities. Out of which about 39.90 Ha is government land and 12.20 Ha is private land. Out of 39.90 Ha Government land, the physical possession of about 12 Ha land has been given to Brihanmumbai Municipal Corporation on 16.02.2019.</p> <p>Acquisition of remaining government land and 12.20 Ha. private land is being carried out by Collector, Thane. After receiving actual physical possession of this land, Brihanmumbai Municipal Corporation will undertake works of development of site. Also Brihanmumbai Municipal Corporation has identified land at Mulund East (near Airoli bridge) and requested GoM to handover the same.</p> <p>Complied within the time stipulated.</p>
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	<p align="center">Same as above,</p>
3	Procurement of suitable sites for setting up solid waste processing facility and sanitary landfill facilities.	2 years	<p>Is in process.</p> <p>The Hon’ble Bombay High Court in order dtd. 02.11.2018 has directed Government to hand over the vacant possession of about 30 Acres out of the 52.10 ha. land at Village Karavale to Brihanmumbai Municipal Corporation on or before 31st January 2019.</p> <p>Out of the 52.10 ha. land 30 acres of Govt. land at Karavale has been handed over to Brihanmumbai Municipal Corporation on 16.02.2019 after rehabilitation of 8 PAP families by giving temporary accommodation of 500 Sq.ft. and compensation of Rs. 50,000/- to each PAP family residing on this 30 acres of land. Brihanmumbai Municipal Corporation has also deposited Rs.25, Lakh- on 12.06.2019 to state Govt. for acquisition process of private land at Karavale.</p> <p>Complied within the time stipulated.</p>
4	Enforcing waste generators to practice segregation of bio degradable, recyclable, combustible, sanitary waste domestic hazardous and inert solid wastes at source.	2 years	<p>Notices are already issued. Enforcement is being implemented in phased manner. Brihanmumbai Municipal Corporation has taken various initiatives for encouraging the segregation by bulk generator and the action against the defaulter has been taken.</p> <p>Brihanmumbai Municipal Corporation, against 1325 defaulting bulk generators has taken action under section 368 of MMC Act. Out of 1325 cases, in which prosecution was launched, and fine of Rs.42,93,000/- is recovered. Also under section 53 (1) of MRTP Act, out of 326 notices issued, in 44 cases prosecution is launched against non-compliance. Further, Brihanmumbai Municipal Corporation has identified 207 Bulk generators having area more than 20,000 Sq.M. and in 7 cases Maharashtra Pollution Control Board (MPCB) has launched prosecution.</p> <p>Brihanmumbai Municipal Corporation has established 47 dry waste segregation centers in 24 wards for segregating collected dry waste from various establishments. Brihanmumbai Municipal Corporation has further proposed total 4 nos. of plots for setting up dry waste segregations centers to be developed under Development Plan – 2034.</p> <p>For collection and transportation of dry waste, Brihanmumbai Municipal Corporation has deployed 96 vehicles in 24 wards, which carry the dry waste to segregation centers. For establishing three modern segregation centers (Each in City, Eastern Suburbs and Western Suburbs) is proposed. Brihanmumbai Municipal Corporation has floated new zonal contract for collection of waste in line with SWM Rules 2016, in which 399 nos. of large compactors, 531 small close vehicles and 251 nos. of mini compactors vehicles having separate compartment for collection and transportation of dry waste, e-waste and wet waste are to be provided.</p> <p>Complied within the time stipulated.</p>



Sr. No	Activity	Time limit from the date of notification of rules.	Action taken by MCGM
5	Ensure door to door collection of segregated waste and its transportation in covered vehicles to processing or disposal facilities.	2 years	<p>Brihanmumbai Municipal Corporation has taken various initiatives thereby and has achieved almost 100% house to house collection, 86% segregation.</p> <p>Brihanmumbai Municipal Corporation has floated new zonal contract for collection of waste line with SWM Rules 2016, in which 399 nos. of large compactors, 531 small close vehicles and 251 nos. of mini compactors vehicles having separate compartment for collection and transportation of dry waste, e-waste and wet waste are to be provided.</p> <p>Complied within the time stipulated.</p>
6	Ensure separate storage, collection and transportation of construction and demolition wastes.	2 years	<p>As of date, BrihanMumbai Municipal Corporation collects and transports separately the construction and demolition waste. However, tender is being invited for processing C and D waste generated. As per the direction in Hon'ble Supreme Court of India in Special Leave Petition (Civil) no. 23708 of 2017, Brihanmumbai Municipal Corporation has devised Special Software System to ensure safe disposal of C and D generated by bulk generator complying with C and D Rules 2016.</p> <p>As of date, for small scale C and D generators (less than 20 tons in one day or 300 tons per project in a month), Brihanmumbai Municipal Corporation has 'debris on call' services. Brihanmumbai Municipal Corporation collects and transports separately the construction and demolition waste to disposal site of Deonar.</p> <p>Brihanmumbai Municipal Corporation has also invited tender for Collection, Transportation, Processing and Disposal of 1200 TPD C and D Waste. Currently, it is in stage of finalisation. As regards to small scale C and D generators, BrihanMumbai Municipal Corporation has 'debris on call' services.</p> <p>Complied within the time stipulated.</p>
7	Setting up Solid waste processing facilities by all local bodies having 100000 or more population.	2 years	<p>Brihanmumbai Municipal Corporation has already setup Solid Waste Processing facility at Kanjur Landfill site. The MSW processing facility has a capacity of processing 1000 TPD of MSW with composting technology and 3000-6500 TPD with bioreactor technology for period of 25 years and has been operational since 13.12.2011. Presently, around 5500 TPD is being processed and can be further enhance to 6000 TPD in near future, if needed.</p> <p>Further, the work for Waste to Energy project at Deonar is awarded. About 600 TPD MSW will be processed scientifically and 4 MW energy will be generated from this project. LOA is issued to the contractor on 24.12.2020.</p> <p>Feasibility &amp; capacity for the development of Waste to Energy (WtE) project at Deonar – Second Phase is under discussion and Technical Expert Committee is constituted for the same.</p> <p>In Process.</p>
8	Setting up common or stand alone sanitary landfills by or for all local bodies having 0.5 million or more population of the disposal of only such residual wastes from the processing facilities as well as un-treatable inert wastes as permitted under the Rules.	3 years	<p>At Kanjur site, there is provision of sanitary landfilling.</p> <p>There is provision at Deonar Dumping Ground in Waste to Energy project for sanitary landfilling.</p> <p>After getting possession of the land at Mauje Karavale, there is plan for setting up sanitary landfill site also at Mauje Karavale.</p> <p>Timeline not expired, In process,</p>
9	Bio-remediation or capping of old and abandoned dump sites.	5 years	<p>The work of scientific closure of Dumping Ground at Gorai is completed in 2009 by Brihanmumbai Municipal Corporation. Work of Dumpsite Reclamation at Mulund Dumping Ground (MDG) has been awarded and the project work has started from 01.10.2019. The project period is 6 years and will bio-mine the existing waste of around 7 Million tons at Mulund Dumping Ground.</p> <p>Contractor has scientifically processed and disposed off about 4,35,000 MT of legacy waste till 31.12.2021 and further work is under progress. M/s MITCON Consultancy &amp; Engineering Services Ltd. has been appointed as Project Management Consultant (PMC) for this project.</p> <p>As regards to Deonar Dumping Ground, the existing dump thereat is about 18.35 million MT. The Hon'ble High Court, Mumbai vide Order dated 26th &amp; 29th February 2016 directed BrihanMumbai Municipal Corporation to engage the services of IIT or NEERI as consultants to suggest the measures for properly maintaining the site till proper facility is created thereon as per MSW Rules.</p> <p>NEERI is in-principally appointed for closure plan at Deonar Dumping ground for the study to develop the closure plan for Deonar dumpsite, including advice on appropriate technologies to be used for the dumped waste at Deonar as per SWM Ruels 2016.</p> <p>Timeline not expired, In process,</p>

## Dry Waste Collection and Sorting Centers:

BrihanMumbai Municipal Corporation has set up 47 dry waste collection and sorting centers in 24 wards. Other than these, BrihanMumbai Municipal Corporation has decided to set up 4 more dry waste collection and sorting centers and at some places work of setting up of additional dry waste centers is in progress. 94 Nos. of separate vehicles are deployed for collection and transportation of dry waste to dry waste sorting centers, in all the 24 wards of BrihanMumbai Municipal Corporation.



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.

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

### Scientific processing of MSW:

The scientific processing of MSW at Kanjur MSW Processing facility is 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 Hon. Supreme Court, the Government of Maharashtra handed over a plot admeasuring 141.77 hectares area at Kanjur to BrihanMumbai Municipal Corporation on 24.10.2005 for developing MSW disposal site. Out of said 141.77 Ha. area, mangroves area admeasuring 23.36 ha. was retained by the Government of Maharashtra vide notification dtd.02.04.2012.

Kanjur MSW Processing facility has received Environment Clearance from State Environment Impact Assessment Authority Maharashtra (SEIAA) on 05.12.2014 for 65.96 ha. non CRZ area.

Further, Kanjur MSW Processing facility has received Environment Clearance from State Environment Impact Assessment Authority Maharashtra (SEIAA) on 29.10.2018 for Scientific processing of MSW in

the 52.45 ha. of CRZ –III area.

Also the authorization letter has been renewed on 19.08.2017 by Maharashtra Pollution Control Board. A total of 118.41 Ha. Of such land is available

At present, processing of about 4800 TPD of MSW with bioreactor technology and about 1000 TPD of MSW with windrow composting technology is being carried out at Kanjur MSW Processing facility.

### **New Projects for scientific processing of MSW:**

#### **1. Development of Waste to Energy (WTE) Project at Deonar:**

The tendering process for Waste to Energy project is completed and the work is awarded to the contractor. About 600 TPD MSW will be processed scientifically and 4 MW energy will be generated from this project. LOA is issued to the contractor on 24.12.2020. Feasibility and capacity for the development of Waste to Energy (WtE) project at Deonar – Second Phase is under discussion and Technical Expert Committee is constituted for the same.

#### **2. Project of Dumpsite Reclamation at Mulund Dumping Ground (MDG) in Mumbai by adopting suitable technology for existing waste dump:**

Work of Dumpsite Reclamation at Mulund Dumping Ground (MDG) has been awarded to the contractor. Commencement of the project is started from 01.10.2019. Contractor has scientifically processed and disposed off about 4,35,000 MT of legacy waste till 31.12.2021 and further work is under progress. M/s MITCON Consultancy & Engineering Services Ltd. has been appointed as Project Management Consultant (PMC) for this project.

#### **3. Collection, Transportation, Processing and Disposal of Construction and Demolition (C and D) Waste in Mumbai:**

Brihanmumbai Municipal Corporation is planning to process 1200 TPD C and D waste scientifically. The tenders for Collection, Transportation, Processing and Disposal of C and D Waste were invited on 31.10.2021. On due date 10.12.2021, three bids are received. Scrutiny of the received bids has been completed and further bidding process is under process.

#### **4. Scientific processing and disposal of Waste at village Karavale, near Taloja:**

GoM has allotted about 52.10 Ha land to BrihanMumbai Municipal Corporation at village Karavale (Kh.), Tal – Ambernath, Dist. – Thane, out of which about 39.90 Ha. is government land and 12.20 Ha. is private land. Out of the government land, the physical possession of about 12 Ha. of land has been given to BrihanMumbai Municipal Corporation on 16.02.2019. This land is used for Solid Waste Management Projects of BrihanMumbai Municipal Corporation Acquisition of remaining government land and about 12.20 Ha. private land is being carried out by Collector,

Thane. After receiving physical possession of the said land, BrihanMumbai Municipal Corporation will undertake works for development of scientific waste processing facilities.

### 5. Scientific processing of waste at Mulund (E) Near Airoli Bridge:

GoM has allotted about 32.77 Ha land to BrihanMumbai Municipal Corporation at Mulund (E) near Airoli Bridge for development of scientific waste processing facilities. However, physical possession of the land is not yet given. After receiving the actual physical possession of the said land, BrihanMumbai Municipal Corporation will undertake works of development of scientific waste processing facilities.

#### Pelletisation Project:

M/s. Godrej Industries have started green waste processing Pelletisation plant in Ghatkopar (N Ward) through CSR. 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 Pelletisation process. In this plant approx 3-4 MT per day green waste (from 24 wards) is processed and converted into pellets. The capacity of the plant is 10MT/Day.

#### Service Level Benchmarking:

1. To monitor the performance of any ULB regarding its Service Delivery to the Citizens, MoUD has devised benchmarks for each service delivered.
2. For Solid Waste Management Department there are 08 such benchmarks.

Description of service	Target	Achieved
Coverage of SWM services through Door to Door collection	100%	100%
Efficiency of Collection	100%	100%
Extent of Segregation of Municipal Solid Waste	100%	81%
Extent of Municipal Solid Waste Recovered	80%	35%
Extent of Scientific Disposal of Waste at Landfill site	100%	88%
Efficiency in Redressing Customer Complaints	85%	94.93%
Extent of Cost Recovery in SWM Services	100%	100%
Efficiency in Collection of SWM Charges	90%	100%

#### Bio-Medical Waste (Management and Handling) Rules, 2016:

Bio Medical Waste (Management and Handling) Rules, 2016 are notified by Ministry of Environment and Forest, Government 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.

BrihanMumbai Municipal Corporation owns major hospitals, maternity homes, dispensaries and clinics. BrihanMumbai Municipal Corporation 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 BrihanMumbai Municipal Corporation to collect and 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 BrihanMumbai Municipal Corporation 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.

The provisions under BMW Rules, states that the prescribed authority is Maharashtra Pollution Control Board and 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.

As such, BrihanMumbai Municipal Corporation 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 health care establishments. Those Health Care Establishments who are registered with the BMW treatment facility are being provided the services of BMW collection and disposal by M/s. SMS Envoclean (P) Ltd. As of now 14000 nos. of health care establishments are registered with the centralized facility. Daily approx 20 M.T. of BMW is being collected and treated at Deonar BMW treatment facility.

### **E-Waste (Management) Rules 2016:**

1. To avoid mixing of e-waste with municipal solid waste, BrihanMumbai Municipal Corporation has proposed to appoint MPCB authorized e-waste recycling agency to set up e-waste collection centers in 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.

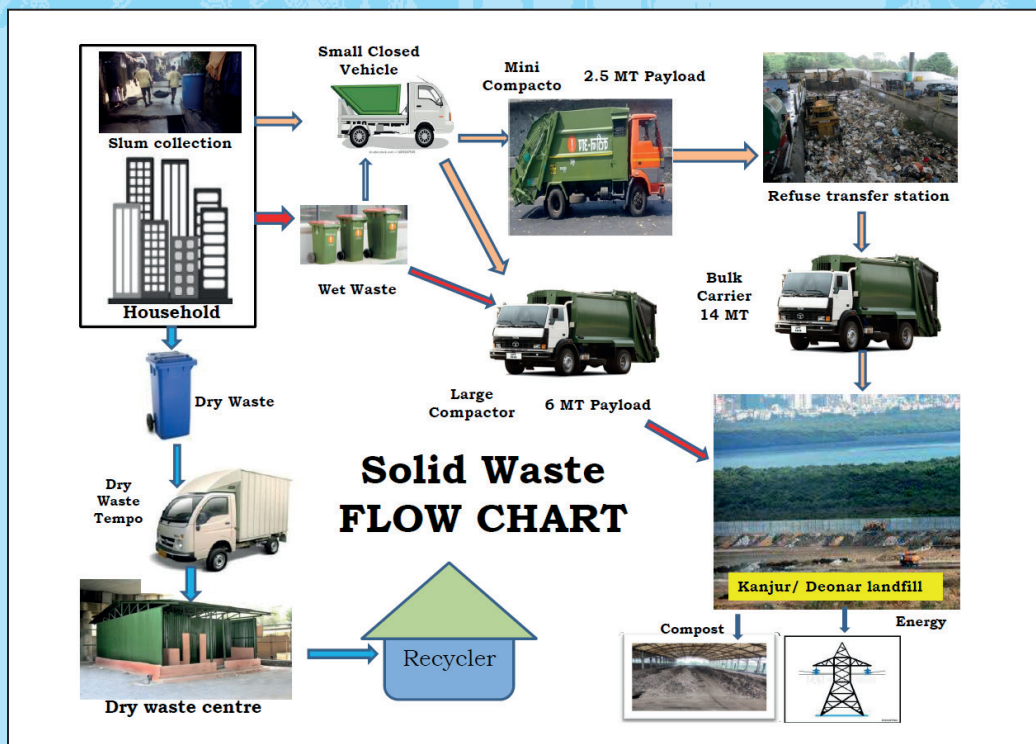
### Plastic Waste (Management) Rules, 2016:

BrihanMumbai Municipal Corporation has set up 47 dry waste collection and 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. Plastic shredding machines are installed at few DWSC locations in the city. Under EPR, companies like Bisleri and Coca Cola are setting up plastic processing units across city.

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. SWM dept has developed banned plastic collection and storage facilities for the convenience of citizens. Use of media for spreading awareness about active public participation in minimizing use of banned plastic is being done. Around 325 MT of plastic waste has been collected since the ban has come into effect.

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

Hazardous Waste Management Rules are notified to ensure safe handling, generation, processing, treatment, package, storage, transportation, use reprocessing, collection, conversion, and offering for sale, destruction and disposal of Hazardous 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 responsibilities touching across almost every aspect of Hazardous wastes generation, handing and their disposal.



## 14. POWER SUPPLY AND CONSUMPTION

Bombay Electric Supply and Transport (BEST), an undertaking of BrihanMumbai Municipal Corporation, supplies electric supply to city area while Reliance Infrastructure Limited and Maharashtra State Electricity Distribution Company Limited (MSEDCL) supply to eastern and western suburbs. 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 72 sq.km. (area from Colaba to Sion and Mahim). The maximum demand of Mumbai City was 779 MW (due to COVID-19 lockdown, the maximum demand dipped to 779 MW in F.Y. 2021-22. Generally, the maximum demand of BES&T Undertaking is in the range of 900 to 950 MW) and power purchased was around 4267 MUs in FY 2021-22. To meet this demand, power is purchased in major from Tata Power Company, Manikaran Power Ltd. and remaining from bilateral sources, Power exchanges and environment friendly renewable source.

### As steps towards pollution control

#### 1) Fulfilling of RPO Obligations:

As per MERC (RPO-REC) Regulation 2019 BEST, as a distribution licensee has to procure Renewable energy of 17.5% (Solar 6.50% & Non-Solar 11.50%) of total procurement of energy for FY 2021-22. BEST has procured of solar energy of 60.49 MUs from Walwhan Solar, Net metered Consumers and Power Exchange and also has achieved the RPO targeted for FY 2021-22.

#### 2) Singing of Power Supply Agreement with Solar Energy Corporation of India for procurement of 400 MW Solar – Wind Hybrid power:

BEST has signed Power Supply Agreement with Solar Energy Corporation of India (SECI) on 25.06.2021 for procurement of 400 MW Solar- Wind Hybrid power at a rate of Rs 2.48 per unit from Solar Energy Corporation of India (SECI) for a period of 25 years. The above projects are scheduled to be commissioned in February 2023 and will enable BEST in meeting our Solar and Non solar Renewable Purchase Obligation (RPO) apart from providing power at very economical rates from FY 2023-24 onwards.

#### 3) Implementation of MNRE Phase-II scheme for promotion of grid-connected rooftop solar PV projects:

Ministry of New and Renewable Energy (MNRE), Government of India, has launched Phase-II scheme for promotion of grid-connected rooftop solar PV projects (RTS) in residential and group housing societies. BEST Undertaking had conducted the bidding process for empanelment of agencies and issued “Letter of Empanelment” to the successful bidders for installation and

commissioning of Rooftop Solar system in Residential sector of the licensed area of BEST Undertaking.

BEST has developed a dedicated online portal of BEST and integrated BEST’s portal with MNRE SPIN portal for grid connected RTS projects. BEST has formed Rooftop Solar cell at each ward of Customer Care dept. for effective implementation of RTS projects in BEST’s licensed area. Uploaded the details of MNRE RTS Phase II scheme on BEST’s website. Sent SMS and emails to all our residential consumers informing the Rooftop Solar Scheme of MNRE. Advertised MNRE RTS Phase II scheme on electricity bills, on Facebook and Twitter. Total installed capacity of Rooftop Solar system (all categories) in BEST’s licensed area as on 31.05.2022 is 12.45 MW.

**4) Electric Vehicle Charging:**

Under Faster Adoption and Manufacturing of Electric Vehicles (FAME India phase II) scheme. Department of Heavy Industries (DHI) has approved 340 nos. of Electric vehicles for BEST. These 340 buses were wet leased from TATA Motors and for charging of these buses, 71 nos. of electric charging points of 240 kW/ 200 kW are installed at 4 locations viz. Backbay, Shivaji Nagar, Malwani & Worli Depot.

**Table No.14.1: BEST Consumers, Connected load and Consumption for the year 2021-22**

Sr. No.	Consumers Category	Mumbai City			
		Consumers #	Connected Load in kW	Consumption in Million Units (MUs)	Avg. Monthly Consumption (MUs) = e/12
1	HV Consumers	197	437635.53	581.54	48.46
2	LV Consumers	1046516	4028323.19	3496.89	291.41
	<b>Total</b>	<b>1046713</b>	<b>4465958.72</b>	<b>4078.43</b>	<b>339.87</b>

**Table No.14.2: Category wise Consumers, Connected Load and Consumption (2021-22)**

Sr. No.	Consumers Category	Mumbai City			
		Consumers #	Connected Load in kW	Consumption in Million Units (MUs)	Avg. Monthly Consumption (MUs) = e/12
1	Residential	767524	2454141.18	2014.27	167.86
2	Commercial	269499	1807179.42	1727.81	143.98
3	Industrial	9192	199558.64	321.10	26.76
4	Agriculture	1	25.00	0.02	0.00
5	Public Lighting	497	5054.48	15.23	1.27
	<b>TOTAL</b>	<b>1046713</b>	<b>4465958.72</b>	<b>4078.43</b>	<b>339.87</b>

# Meters installed on site





**Providing and Fixing LED Street Lights:**

As per the Government of India policy regarding energy conservation it was proposed to convert all the conventional HPSV/ MH Street lights of Mumbai by energy efficient LED Street lights. This conversion of conventional HPSV/ MH Street lights by LED Street lights has resulted in savings of minimum 47% energy consumption in various wards of BrihanMumbai Municipal Corporation. As on 31.03.2022, BEST had completed the 97% of replacement work, the balance being majorly the flood lights, which are being replaced.

**Maharashtra State Electricity Distribution Company Limited**

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

**Table No. 14.3: MSEDCL’s Consumers, Connected Load and Consumption in MU’s for F.Y. 2021-22**

Sr. No.	Category	Division Name					
		Bhandup			Mulund		
		Total Consumers	Connected load (KW)	Consumption (MU’s)	Total Consumers	Connected load (KW)	Consumption (MU’s)
1.	High Voltage Consumers	60	62031	181	45	32263	38
2.	Low Voltage Consumers	181465	389986	435	130222	407535	376
	<b>Total</b>	<b>181525</b>	<b>452017</b>	<b>616</b>	<b>130267</b>	<b>439797</b>	<b>414</b>

**Table No. 14.4: MSEDCL Category wise Consumers, Connected Load and Consumption in MU's for F.Y. 2021-22**

Sr. No.	Category	Division Name					
		Bhandup			Mulund		
		Total Consumers	Connected load (KW)	Consumption (MU's)	Total Consumers	Connected load (KW)	Consumption (MU's)
1.	Residential	158497	248251	274	112757	299237	270
2.	Commercial	17661	63125	120	15215	71677	78
3.	Industrial	4657	131867	149	1200	57017	50
4.	Others	710	8774	74	1095	11867	17
	<b>Total</b>	<b>181525</b>	<b>452017</b>	<b>616</b>	<b>130267</b>	<b>439798</b>	<b>414</b>

**Table No. 14.5: MSEDCL's Consumers Average Consumption of energy in MU's for F.Y. 2021-22.**

LT Categorywise consumers	Average Consumption in MU's		
	Bhandup Division	Mulund Division	Total Avg. Consumption
High Voltage Consumers	15	3	18
Low Voltage Consumers	36	31	68
<b>Total</b>	<b>51</b>	<b>34</b>	<b>86</b>

**Table No. 14.6: MSEDCL's Categorywise Average Consumption of energy in MU's for F.Y. 2021-22**

LT Categorywise consumers	Average Consumption in MU's		
	Bhandup Division	Mulund Division	Total Avg. Consumption
Residential	23	23	45
Commercial	10	6	16
Industrial	12	4	17
Others	6	1	8
<b>Total</b>	<b>51</b>	<b>34</b>	<b>86</b>

## 15. ROADS AND TRANSPORT

### Roads

#### 1) Road Reforms:

About 2049 kilometres of roads is maintained by BrihanMumbai Municipal Corporation. As per provisions of D.P 2034, recommendations of Comprehensive Mobility Plan (CMP), the intensity of rain fall and compounding increase in vehicular traffic, the special emphasis has been given to improve roads in C.C. and Road junctions in Mastic.

Tender conditions are upgraded, project approach has been adopted. In road improvement projects and the scope of works includes improvement of footpath, provision/ augmentation of utilities like water-mains, sewer-lines, S.W. Drains etc. Further, the provision for traffic amenities, beautification etc. have also been integrated. Trenching condition are made stringent have to reduce frequent digging. BrihanMumbai Municipal Corporation produces in house coldmix to attend the pothole in rainy season. The Quality of cold-mix is recommended by Technical experts minimize chances of development of potholes. Footpath are being improved in stamped concrete from aesthetic and durability point of view.



#### 2) Footpath policy:

New footpath improvement policy has now been finalized with the aim to avoid illegal digging, focus on improvement of quality of footpath and increase their lifespan. Now onwards, all the footpaths will be improved with Stencil Concrete, CC with marble chips finishing or Plain CC instead of Paver Blocks.

#### 3) Information technology integrated with works:

All roads, underground utilities etc are integrated in GIS. This will facilitate to monitor:

- a. Real time progress of work.
- b. Avoid duplication of work.

c. Capital expenditure incurred can be viewed location wise.

Website/ app helps to track the potholes and bad patches for which immediate remedial measures can be taken. Further, it provides a heatmap of most of potholes and badpatch prone roads. It help to precautions to be taken to improvement of such patches.

## TRAFFIC

### 1) Traffic Engineering:

The work of Traffic Planning and Traffic Co-Ordination department is carried out under the control of Dy.Ch.Eng. (Traffic) who works under Ch.Eng. (Roads and Traffic). This office look after the matters pertaining to prescription of regular line of road, design and construction of traffic islands, Providing and Fixing Signage works. Also, this office scrutinized and approves parking layout proposals received from Building proposals and Slum Rehabilitation Authority. This office also look after the work of the signal maintenance along with new signal installation work.

This office prepares policy for providing street light on newly constructed roads as well as improvement of existing street lighting and making co-ordination with all Ward offices to get the above works done through three service provider electric companies viz. BEST, Adani Electricity and MSEB Co. Ltd. The budget provision for the same is made by traffic department.

### 2) Parking Policy:

In order to avoid traffic congestion due to unauthorized parking on roads tender procedure has been initiated for execution of on-street and off-street parking schemes. Out of 69 pay and park schemes on roads contractors have been appointed for 44 sites to start pay and park scheme. Similarly contractors have been appointed of 29 Public Parking Lot and out of 32 Public Parking Lot which have been handed over Brihanmumbai Muncipal Corporation under DC Regulation no. 33 (24) of 1991 and Regulation no. 33 (18) of DCPR 2034. There are 29 nos. of amenity parking places handed over to Brihanmumbai Muncipal Corporation.

### 3) Parking Authority:

As per the recommendations in DP and provision in DCPR-2034, creation of Parking Authority is initiated by BrihanMumbai Municipal Corporation for regulation and management of parking in Mumbai. This Parking Authority shall decide the Parking Charges in various regions / zones in Mumbai. Accordingly, committee has been formed to create the Parking Authority.

M/s. Tata Institute of Social Science (TISS) is appointed to collect the information and GIS mapping of various parking locations for this authority. Under MPA it is proposed to implement pilot project in G/South, D, K/West, S wards.



#### **4) LED Lights:**

BrihanMumbai Municipal Corporation has started the implementation of fixing LED street lights in 2020-21. There are about 1,41,145 Sodium vapor lamps in Mumbai out of which 1,36,379 conventional lamps have been replaced by LED. It is proposed to complete balance 4,766 LED lights in Mumbai for year 2022-23. This causes more savings in energy bill. This savings in energy will go up as more lights will be converted to LED. The budget provision for LED conversion is Rs.5 crore for the year 2022-23.

#### **5) Traffic Signages:**

BrihanMumbai Municipal Corporation has invited tender for modern signages with upgradation of signages for major road networks for 200 km. Further BrihanMumbai Municipal Corporation is planning to invite zonewise tender for singage work in all severn zones in the year 2022-23.

#### **6) Initiative on Road Safety and Black Spots:**

There are 39 Black Spots in Mumbai, out of which 17 black spots are under BrihanMumbai Municipal Corporation jurisdiction. For long term measures in road accident prone BrihanMumbai Municipal Corporation road area, this office has appointed consultant M/s. Bloomberg Philanthropis for 11 Black Spot. Out of 11 Black Spots, M/s. Bloomberg has submitted the report of 10 Black Spots. This report has been forwarded to concerned Dy.Ch.Eng. (Roads) department to take long term measures accordingly. Further the office Dy.Ch.Eng. (Roads) Planning department has initiated to appoint the consultant for the remaining 7 black spots.

#### **7) Area Traffic Control (ATC):**

At present 258 Signals in Greater Mumbai has already been converted into fully adaptive automated Signal System and are working satisfactorily. The maintenance of remaining 395 conventional system and 208 flashing beckons are being carried out.

## 16. BRIDGES IN MUMBAI

### Major works completed during year 2020-21:

Construction of Flyover along Ghatkopar Mankhurd Link Road spanning Shivaji nagar Junction, Bhainganwadi Junction & Deonar Dumping Junction in M/East Ward

### Major works undertaken during year 2021-2022:

1. Construction of R.O.B. at Vidyavihar Railway Station connecting LBS Marg to RC Marg in 'N' Ward.
2. Construction of R.O.B in lieu of L.C.No.14C at Vikhroli Railway Station (Excluding Railway Span and Slip road)
3. Widening and Reconstruction of ROB at Nahur Railway station ( Excluding Railway Span).

### Surface Transport

There are different types of vehicles plying on the roads of Mumbai every day. They consist of cars, taxis, trucks, buses, three-wheelers, two-wheelers etc. The total number of vehicles in Mumbai as on March 2022 is 42,81,251. Their composition is 59.35% two-wheelers, 29.25% cars, jeeps and station wagons, 2.9% taxis/cabs, 5.45% auto rickshaws, 0.07% buses, 0.15% Goods vehicles, 0.01% tractors/trailers and others 2.82%. As previous year increasing number of vehicles is 6.14% in Mumbai city. Table no. 16.1 shows number of different vehicle in Mumbai.

There are 1,24,115 metered taxis in Mumbai operating on petrol, diesel, CNG and LPG as on 31st March 2022. CNG, LPG and Electric which are regarded as clean fuel. More than 47% meter taxis and 97.12% rickshaws are running on clean fuel CNG, LPG and Electric.

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.

Table No. 16.1 Category-wise comparison of vehicle with numbers 2020-22

Sr. No.	Category	As on 31st March		
		2020	2021	2022
1	Two Wheelers	2294599	2407016	2541033
2	Cars, Jeep, Station wagons	1128180	1156465	1252246
3	Taxi/Cabs	126241	127993	124115
4	Auto-rikshaws	227054	222801	233325
5	Buses	19050	19682	3086
6	Trucks & Lorries	87481	94280	6514
7	Tractor/ Trailors	840	354	384
8	Other	4277	4906	120548
	<b>Total</b>	<b>3887722</b>	<b>4033497</b>	<b>4281251</b>

Source : This information is received from RTO, GoM

Chart No. 16.1 (A): Category wise Vehicle Population in Mumbai

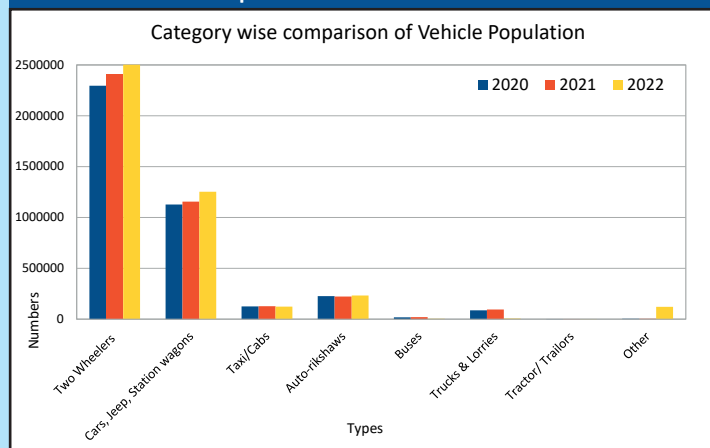


Chart No. 16.1 (B): Types of Vehicles

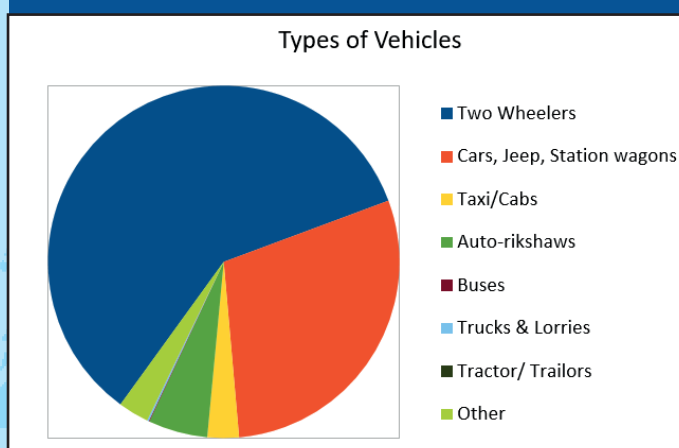


Table No 16.2 – Category-wise vehicles using various fuel types as on 31 March 2022

Sr. No.	Category	Disel	Petrol	LPG	CNG	Electric	Others	Total
1	Motor Cycles	143	1838338	0	4	5391	214	1844090
2	Scooters	4	664948	0	0	0	0	664952
3	Moped	0	31991	0	0	0	0	31991
	<b>Total Two Wheelers</b>	<b>147</b>	<b>2535277</b>	<b>0</b>	<b>4</b>	<b>5391</b>	<b>214</b>	<b>2541033</b>
4	Cars	322522	777560	9948	102573	2639	3679	1218921
5	Jeeps	29038	482	4	87	0	0	29611
6	Stn. Wagons	3007	707	0	0	0	0	3714
7(a)	Taxis meter fitted	1791	1412	536	40355	0	77	44171
7(b)	Luxury/ Tourist Cabs	38316	22485	361	17692	210	880	79944
8	Auto-rikshaws	56	429	2	226607	0	6231	233325
9	Stage carriages	3891	517	0	2026	0	0	6434
10	Contract carriages/ Mini Bus	7672	173	1	578	194	328	8946
11	School Bus	2334	156	1	593	0	2	3086
12	Private Service Vehicle	981	7	2	88	0	0	1078
13	Ambulances	1482	356	0	128	0	1	1967
14	Articulated/ Multi	103	0	0	0	0	0	103
15	Truck and Lorries	5994	415	0	105	0	0	6514
16	Tanker	717	2	0	0	0	0	719
17	Delivery Van (4 wheelers)	56721	7281	9	2791	33	110	66945
18	Delivery Van (3 wheelers)	23293	4695	10	1474	64	106	29642
19	Tractors	224	4	0	0	0	0	228
20	Trailors	124	2	0	0	0	0	30
21	Others	4036	462	0	191	1	24	4714
	<b>Total</b>	<b>502449</b>	<b>3352422</b>	<b>10874</b>	<b>395292</b>	<b>8532</b>	<b>11682</b>	<b>4281251</b>

Source : RTO, GoM

In Mumbai region about 1,89,931 various types of vehicles are registered during April 2021 to March 2022. In this 60.4% of two wheelers, 30.33% of cars, jeeps and station wagons, 1.89% of taxi/cabs, 0.72% of Auto rikshwa's, 0.45% of buses, 5.62% goods vehicles 0.01% of Tractors/Trailors and 0.57% of other vehicles.

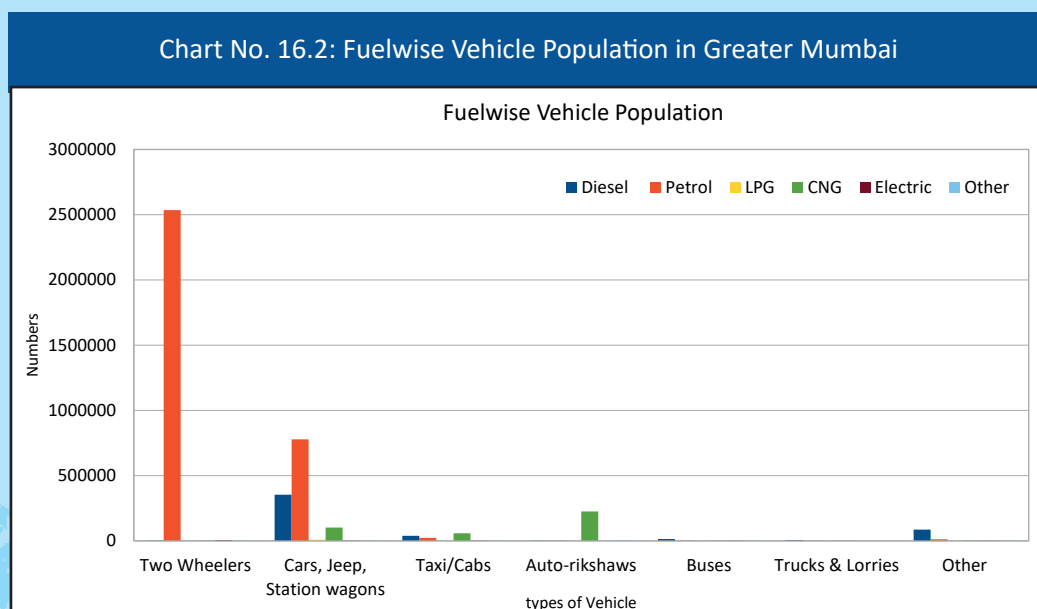


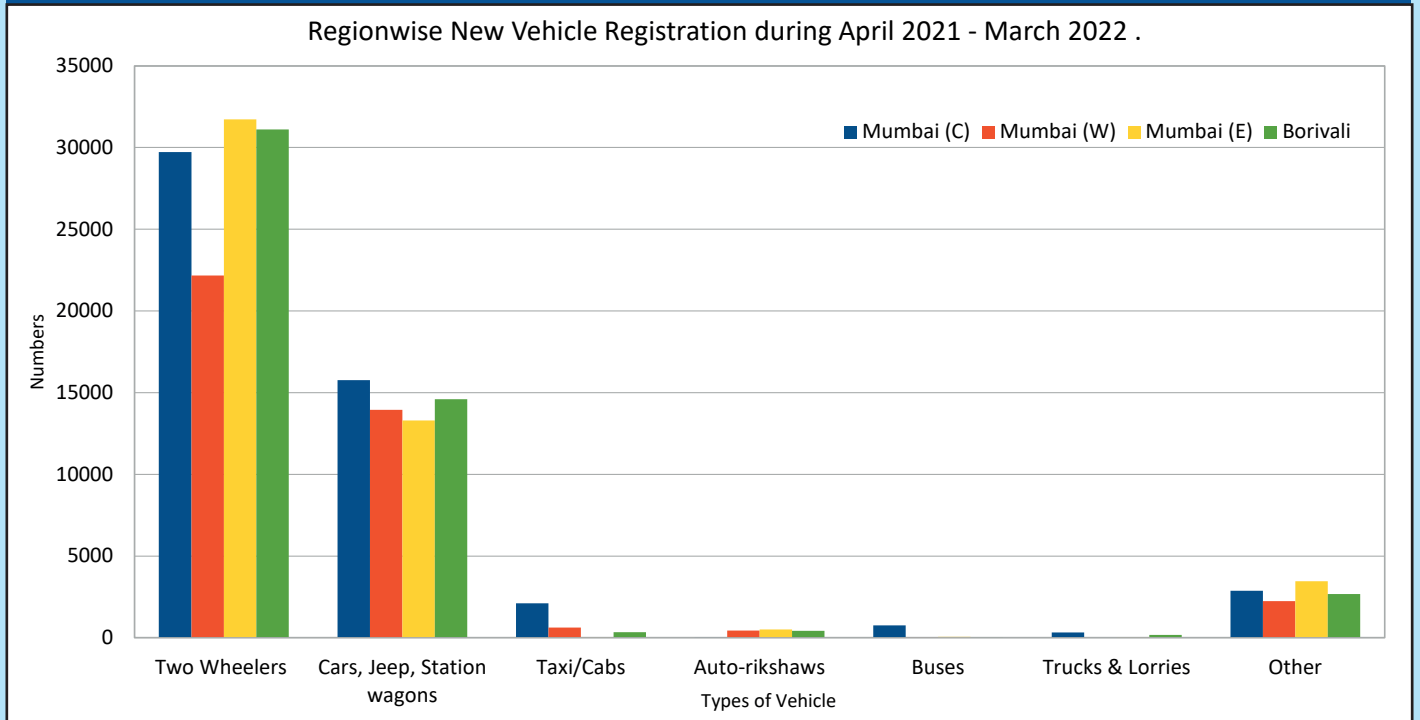
Table No 16.3 –New Vehicles Registration during April 2021 to March 2022

Sr. No.	Category	Mumbai (C)	Mumbai (W)	Mumbai (E)	Borivali	Gr. Mumbai
1	Motor Cycles	29706	22159	31701	31101	114667
2	Scooters	0	4	0	3	7
3	Moped	12	11	16	3	42
	Total Two Wheelers	29718	22174	31717	31107	114716
4	Cars	15765	13946	13301	14600	57612
5	Jeeps	0	0	0	0	0
6	Stn. Wagons	0	0	0	0	0
7(a)	Taxis meter fitted	235	0	22	0	257
7(b)	Luxury/ Tourist Cabs	1880	622	479	345	3326
8	Auto-rikshaws	1	439	512	418	1370
9	Stage carriages	418	0	0	0	418
10	Contract carriages/Mini Bus	330	1	56	28	415
11	School Bus	2	11	1	0	14
12	Private Service Vehicle	8	3	6	0	17
13	Ambulances	80	44	29	39	192
14	Articulated/ Multi	31	0	0	0	31
15	Truck and Lorries	331	0	29	179	539
16	Tanker	34	0	0	0	34
17	Delivery Van (4 wheelers)	2090	1677	2767	1600	8134
18	Delivery Van (3 wheelers)	251	331	527	825	1934
19	Tractors	7	3	0	0	10
20	Trailors	0	5	4	4	13
21	Others	375	183	135	206	899
	<b>Total</b>	<b>51566</b>	<b>39439</b>	<b>49585</b>	<b>49351</b>	<b>189931</b>

Source : RTO, GoM



Chart No. 16.3: Regionwise Vehicle Population



**BEST – Transport:**

BEST undertaking have sole right to operate Stage Carriage System in Mumbai. BEST undertaking operates 3,586 buses on 444 Routs, around 5.50 Lakhs Kilometers daily. Around 30 Lakhs passengers commuting daily in the area of Brihanmumbai Municipal Corporation and it’s align cities like Navi Mumbai, Thane and Mira-Bhayander.

Transportation has importance for mobility of passengers and freight in developed as well as developing countries. Through the necessity of this factor is unavoidable, the activities of this factor are adversely affecting the environment. As the growth of passengers has freight mobility has expended the role of transportation, a source of emission of pollutants and their multiple impacts on the environment has increased. Noise and carbon monoxide emissions are direct harmful effects of the transportation. Indirect impacts on the health system are respiratory and cardiovascular problems.

The Undertaking has always kept it’s priority to keep pollution level under control. For this the Undertaking has taken various measures as follows -

1. At present the BEST Undertaking is operating 386 Electric buses, which are the largest number in the country as on today. Also the Undertaking is operating 2345 CNG buses. The percentage of CNG buses which is around 60% of the fleet. To reduce air and noise pollution in the city, we have introduced Electric buses first in the country since 2017 and gradually increased the fleet of Electric buses, Presently, 386 electric buses are in operation. Which is 12% of the fleet.

2. Considering the necessary of reduction in air pollution in the Mumbai City, we have placed order procurement of 900 Electric Double Decker AC buses. Besides this procurement for another 1400 Electric buses is in process.
3. BEST is committed to reduce Air and Noise pollution in Mumbai and accordingly a policy decision is taken to induct more than 50% of fleet of Electric buses and by 2025-26, entire fleet will be of Electric buses. Besides this, Jeeps/Vans/Cars used by the Undertaking are also being replaced by electric vehicles.
4. The present fleet of the Undertaking is of 3573 buses, the details of the same are as follows :-

Fleet	CNG	Diesel	Electric	Total Fleet
BEST owned	1581	292	6	1879
Wet Lease	764	550	380	1694
TOTAL	2345	842	386	3573

5. In order to promote electric vehicle policy, BEST is in process of commissioning Electric vehicle charging section at various bus depots and terminus.
6. Undertaking is planning to procure electricity required for charging of Electric vehicles through non-conventional energy sources (e.g. Sunlight, Wind, Water Hydraulic). Thus, pollution due to energy developed by plants running on conventional sources like coal will be reduced. In this way, more effectively air pollution will reduce.
7. Transportation Engineering Department has recently developed ' Test Bed ' for testing BS-IV Diesel Engine. With the help of this ' Test Bed ' Transportation Engineering Department is able to check the performance of Diesel Engine and accurately control the emission.
8. BEST has scrapped old buses, which have completed 15 years of life in 2019-20 , 167 ;in 2020-21, 899 and in 2021-22 ,312 buses scrapped respectively.



## 17. MUMBAI COASTAL ROAD

### Mumbai costal road (South) project:

The Mumbai coastal road project (South) is one of the most prestigious projects undertaken by BrihanMumbai Municipal Corporation This Southern Coastal Road Project of 10.58 km from Princess Street Flyover to Worli End of Bandra Worli Sea Link is proposed to resolve the traffic congestion in Mumbai. In addition this road will provide several environmental friendly features to the city. The proposed Coastal Road is having eight lanes (4+4) configuration comprising road based on reclamation, Bridges, elevated roads and tunnels.

The Mumbai coastal Road Project will reduce the travel time, decongest existing roads, reduce the air and noise pollution levels, improve public transport facility due to proposed dedicated BRTS lane and also generate much needed additional green spaces which will also decrease Coemission.

The Ministry of Environment, Forest and Climate Changes ( MoEF&CC) has issued CRZ Clearance for the Project on 11.05.2017 and amendment on 18.05.2021. Also, the NOC's from other concerned departments of Central Government and State Government have been obtained for Mumbai Coastal Road (South) Project.

The total Estimated Project Cost is Rs. 12,721 Cr. This Project is divided into three packages viz. Package-IV( From Princess Street Flyover to Priyadarshini Park), Package-I (From Priyadarshini Park to Baroda Palace) and Package-II (From Baroda Palace to Worli End of Bandra Worli Sea Link). The design and Build work for Package I and Package IV is under progress through the contractor M/s. Larsen and Toubro Ltd. and for Package II through the contractor M/s. H.C.C.- H.D.C. (Joint Venture). For each Package one Project Management Consultant (PMC) has been appointed as Employer's Personnel for supervisions and other allied works. Accordingly M/s Yooshin Engineering Corporation+ M/s Tec Cuatros. A(JV), M/s Louis Berger Consulting Pvt. Ltd. and M/s

**Table No.17.1: The salient feature of the Coastal Road Project**

1.	Length	10.58 km
2.	Road on reclamation	4.35 km
3.	Tunnel (3 Lanes, 11m internal dia.) x 2 Tubes	2.07 km
4.	Bridges (4+4 Lanes)	2.19 km
5.	Interchanges (Amarson, Haji Ali and Worli)	3 nos.
6.	Seawall Length	7.47 km
7.	Reclamation area	111 hectare
8.	Reclamation area (Garden, Landscape, Parks etc.)	70 hectare
9.	Promenade (8 m to 20 m wide)	8.50 km
10.	Pedestrian Underpassess	16 nos.
11.	Underground Carparks	4 Locations (about 1800-Lots)
12.	Generation of approximately employment opportunity due to proposed Coastal Road	1,00,000
13.	BRTS, dedicated lanes for Ambulance	
14.	Sophisticated Saccardo Nozzle Ventilation system and special fire protective coating in tunnel.	
15.	Flood risk minimizes due to better designed drainage system along with automate anti-flood gates and box culverts of total length 1,650m.	

Egis India Consulting Engineers Pvt. Ltd + Cullen Grummit and Roe (UK) Ltd., (JV) have been appointed as PMCs for Package IV, I and I respectively. Also one General Consultant M/s AECOM Asia Co. Ltd is appointed as Employer's representative for co-ordination and monitoring the entire project through all PMCs and other allied works.

This work is in progress since October 2018 and proposed to be completed upto November 2023. The required Budget Provision of Rs.3500 Cr. has been made in the financial year 2021-2022.

### **Salient Features of Site Environment Management Plan for the Project**

BrihanMumbai Municipal Corporation has awarded Civil Contracts of all the three Packages of Coastal Road to International Contractors recognized like L&T, HCC-HDC (JV).

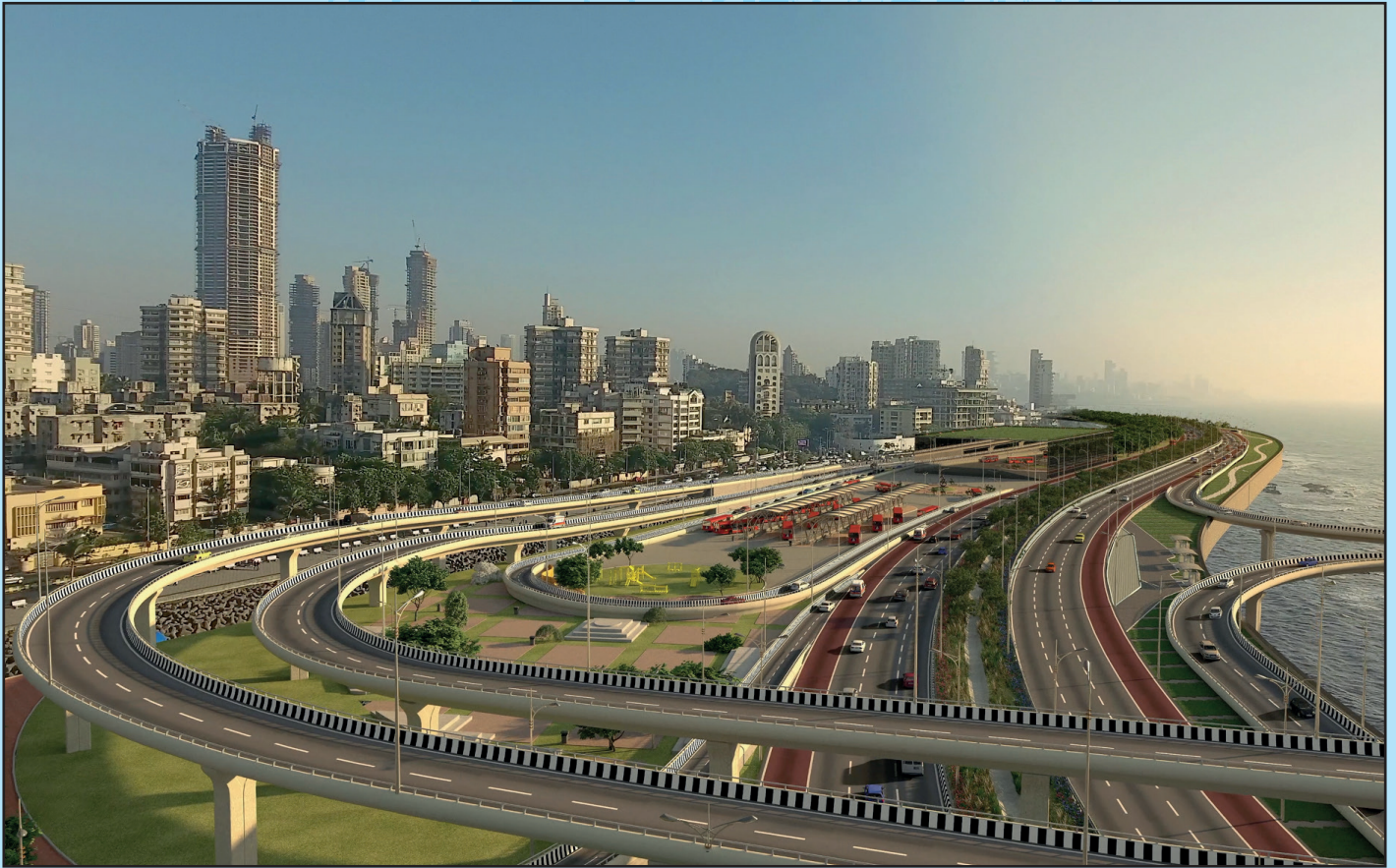
The following compliance are done/ in progress through all contractors regarding Environmental Compliance mentioned in Site specific Environment Plan as well as requirements of MOEF&CC applicable to them

1. Air & Noise Monitoring is being done on sites and compared with Pre construction results (Base-LineData) and Standards of MOEF and MPCB
2. For controlling dust, Contractors are doing Water Sprinkling on their sites during construction work. Wheel Wash Facilities is also provided at every Main Entrance and Exit of site where Vehicle Movement is there.
3. Noise Barriers are being provided at all Critical Locations like Near Schools and Hospitals etc. during Construction.
4. All Construction vehicles are provided with Noise Mufflers, Good Silencers onsite.
5. All Construction sites are barricaded by barricading boards in addition to Noise Barriers to Control Noise and demarcate site from General Public and Road users.
6. Preventive Maintenance schedule for all construction Machinery at site. All construction machinery is having PUC certificates. Preventive Maintenance of Machinery will also reduce noise from Machinery.
7. All rotating parts of construction machineries have provided with canopies and grills to control rotating parts noise during construction phase.
8. Contractors have provided Bio Toilets onsite.
9. The corals noticed along the Mumbai coast in Worli region & in Haji Ali region covering an area of 0.251 m and 0.11 m respectively. BrihanMumbai Municipal Corporation has taken the necessary



permit from the Chief Wildlife Warden to translocate the Corals and appointed CSIR-NIO a Govt. agency through Contractors to carry out the work of Translocation of Corals and successfully carried out trans location of corals by BrihanMumbai Municipal Corporation through the CSIR-NIO agency in the presence of authorized officers of Mangrove cell of Forest department. No damage was found to the other wildlife species during translocation process Further regular monitoring to observe coral health and survival in the region has been carried out by CSIR-NIO for one year & as mentioned in monitoring report of NIO, it is found that survival rate of Corals is 100% in May 2021.

10. National Institute of Oceanography (NIO), Dona Paula, Goa is engaged for investigation on impact of Coastal Road project waves, water levels, seawater quality and related environmental aspects during progress of work & 2 years in operation phase.



## 18. EDUCATION

As per the directives laid under Section 61 (Q) of the MMC ACT 1888, providing free Primary Education to the Children of Mumbai, is obligatory and binding duty of the Municipal Corporation of Greater Mumbai. Since 1907, BrihanMumbai Municipal Corporation Education Department has been accomplishing this responsibility.

During the COVID-19 outbreak and pandemic period, there were major changes in the way people lived around the world. We can observe huge and unexpected changes in our daily life.

Out of which Digital/Online School is one of them. We strive to provide quality education to every child within the jurisdiction of BrihanMumbai Municipal Corporation and to bring them into the mainstream of education. Even in this challenging and difficult situation of COVID-19, BrihanMumbai Municipal Corporation Education Department planned extensively to ensure uninterrupted and efficient learning.

During this COVID-19 pandemic period, Brihanmumbai Municipal Corporation has launched 40 YOUTUBE channels in four language and standard wise under the programme of 'Education for All Initiative' to provide free and quality home-based education for students all over the country.

With the help of Information Technology, efforts are being made by teachers from their creativity to provide online education. The help of NGO's volunteers, various educational institutes and 'Shikshanmitra' is taken for the same. As a result, 29,000 new students from all mediums have been enrolled in the academic year 2021- 2022.

Pre-Primary, Primary & Secondary BrihanMumbai Municipal Corporation Schools have commenced on both the platforms, viz. ONLINE & OFFLINE with taking precautionary measures for student's health & education as per the guidelines issued by State Government. From January 2021 Offline schools were re-opened in phases.

As per the guidelines laid down by Central Government dated 03.01.2022, the process of vaccination has initially started for 37,963 BrihanMumbai Municipal Corporation students within the age group of 15 to 18 years via BrihanMumbai Municipal Corporation Vaccination Centres. Students are also provided with masks.

In the academic year (2021-22) 2,42,899 children of Mumbai are the beneficiaries of our 964 primary schools. We cater them through 8 mediums of instruction, for which 6831 highly proficient &





dedicated teachers are imparting primary school education. Also, our 81 teachers are engaged in the services of our 730 specially-abled students from 17 BrihanMumbai Municipal Corporation special schools. From the academic year 2007-08 BrihanMumbai Municipal Corporation has launched English medium schools under the name of 'MUMBAI PUBLIC SCHOOL' in which education facility from Jr. Kg. to 10th STD has been provided.

In the academic year 2021-22, BrihanMumbai Municipal Corporation Education Department is rendering education services through 49 aided and 140 unaided total 189 along with 54 MUMBAI PUBLIC SCHOOL (English Medium) secondary schools. As a result, total 243 secondary schools are running efficiently.

The student strength in 2021 is as follows. Aided-17425, Unaided-22976 and MPS-7808. Total Student Strengths is 48209. Secondary Education is provided in Marathi, Hindi, English, Urdu, Gujrathi, Telugu, Kannada, Tamil medium.

### **Digital Classroom:**

In the year 2021-22, tender process has been completed through MNE (Maintenance & Electrical Dept.) (E.I.) for the digitalization of 1300 classrooms with LED interactive panels. Electrification work of installing Digital Classrooms in BrihanMumbai Municipal Corporation schools has commenced by the appointed contractor, M/S. Bennet Coleman & Company PVT. LTD. The contractor will soon supply the schools with the Digital Classroom equipment

### **Virtual Classroom (VTC):**

In the year 2011, BrihanMumbai Municipal Corporation Education Department established Virtual Classrooms. At present, 480 BrihanMumbai Municipal Corporation schools (360 primary and 120 secondary) of Marathi, Hindi, Urdu and English mediums are benefited with the live teaching by our technically expert and dedicated teachers. Not only BrihanMumbai Municipal Corporation school students but also students of STD 1st to 10th from all over the state are beneficiaries of this online teaching via 40 YouTube channels which have started on basis of both standard and medium wise for all 4 mediums of instructions (Marathi, Hindi, Urdu and English).

Due to the expiration of the original contract period of VTC project, tender process based on VSAT projection technology is under process in the year 2021-22.

### **Competitive Exams:**

BrihanMumbai Municipal Corporation conducts various examinations such as Scholarship Examination, Talent Search Examination, Mathematics, Science, English Olympiad (IFO) etc. for the betterment and enhance the quality of students from Municipal schools.

In the academic year 2021-22, the Talent Search Final Exam was conducted on 05.04.2022 and 08.04.2022. 7,818 students appeared for this exam out of which 7,242 students passed out with flying colours. Also, 2,547 students appeared for Primary Olympiad (English Mathematics, Science) out of which 350 students were enrolled for National Level. A total of 54 students appeared for the International Finance Examination, out of which 16 students were enrolled for the national level.

### **District Training Center:**

In the Educational year 2021-22, upto December 2021 due to the COVID-19 pandemic period and Lockdown, all teachers were continuing their work of teaching through 'Work from Home' by ONLINE means. Hence DTC provided the guidance seminars to teachers about Zoom, Google App, Google Meet, WhatsApp, Google forms etc. to resolve any kind of problems occurred in online teaching and to make the process of teaching and learning efficient as well as to become techno-friendly.

Online trainings were imparted to the teachers regarding video making and PPT making for scholarship exams of STD. 5th & STD. 8th. Even NAS practice test papers were also provided online by DTC. On the occasion of World Marathi Language Pride Day, in the month of February 2022, an online program was presented for the trainers from the City Zone, East Suburban Zone, West Suburban Zone.

On 27th of February 2022, on the occasion of birth anniversary of Dnyaanpeeth Award winner, Poet. Shri. V. V. Shirwadkar (Kavi Kusumagraj), Marathi Language Pride Day Book was published by DTC.

Students have benefited a lot from this training while studying online. Marathi Student Daily Calendar (2022-23) was also printed by DTC.

### **Scout and Guide Section:**

Scout-Guide is an 'International Movement', based on the four pillars of scouting i.e. Character building, Service to Mankind, Intelligence and Health and Craftsmanship respectively.

BrihanMumbai Municipal Corporation Scout-Guide Department is an independent sub-section of BrihanMumbai Municipal Corporation Education Department. Scout-Guide Department is working continuously since 1925 It works on quality education for all the BrihanMumbai Municipal Corporation students and 100% enrolment of all BrihanMumbai Municipal Corporation students in the movement.

All the activities and projects of Scout-Guide department for the academic year 2021-22 were conducted online due to Covid-19 pandemic.

International Yoga Day was celebrated online on 21.06.2021 with the participation of BrihanMumbai Municipal Corporation students.

Supervisor's workshop was conducted offline at BrihanMumbai Municipal Corporation Scout-Guide Training Centre, Powai from 28.06.2021 to 02.07.2021.



Margarshak Shibir (Secondary Section) and Sub-Centre Incharge workshop were conducted respectively on 27.07.2021 and 28.07.2021.

On 01.08.2021, Tree Plantation was organized at Ambernath with the help of Badlapur Forest Department. About 100 saplings were planted during the programme.

Bulbul Margadarshak Shibir on 06.08.2021, Scout Margadarshak Shibir on 10.08.2021, Cub Margadarshak Shibir on 23.08.2021, Guide Margadarshak Shibir on 03.09.2021 and Trainer's Workshop on 07.09.2021 were conducted online.

State level Chaturth Charan and Heerak Pankh Shibir was conducted on 04.10.2021 and 05.10.2021 by Maharashtra State Bharat Scouts and Guides. 56 Cubs and 24 Bulbuls from BrihanMumbai Municipal Corporation schools participated in the camp.

### **Housekeeping:**

For the years 2016 to 2019, to provide BrihanMumbai Municipal Corporation schools with maintenance, cleaning and security as well as avoiding harassment by trespassers in BrihanMumbai Municipal Corporation school buildings etc. M/S. B.V.G. PVT. LTD. Company for City Zone, M/S. Brisk India PVT. LTD. For Eastern Suburban Zone and Krystal Integrated Services PVT. LTD. For Western Suburban Zone have been appointed.

For the year 2021-24, the tender process for the maintenance, cleanliness and security of all 467 school buildings under the BrihanMumbai Municipal Corporation is being carried out by the Deputy Chief Engineer (CPD) for the appointment of external contractors per square foot in all seven zones.

### **Road Safety Patrol (RSP):**

In the year 2021-22, a total of 1210 employees, including the Headmaster and Physical Education teacher of the Municipal Schools under BrihanMumbai Municipal Corporation, were given online detailed information about the road safety rules, traffic signals by the police officers and expert people from the Mumbai Traffic Police Cell through the Road Safety Force.

Later on, 18500 BrihanMumbai Municipal Corporation school students were imparted with the training on road safety rules and traffic signals via online means by the physical education teachers who took the training prior as a Resource Person.

### **Water Purifiers and Maintenance:**

Water purifiers have been installed in the BrihanMumbai Municipal Corporation schools to provide safe drinking water to the students. The safety of such devices requires annual maintenance. Accordingly, a contractor has been selected for the annual maintenance of a total of 1600 water purifiers for the period of 2022-23 and 2023-24. This work will commence from April 2022.

Procurement of new 326 water purifiers is being done by Deputy Chief Engineer (Mechanical and Electrical), Conservation. Out of these 326 devices, 281 devices have been installed in the schools.

### **Distribution of free Scholastic material:**

The majority of students enrolled in BrihanMumbai Municipal Corporation schools are from economically backward sections of society. In such a situation, free scholastic materials are distributed from the year 2007- 08, to ensure that the parents of the those students do not have to bear the financial burden of purchasing all such school supplies.

During the pandemic period in the year 2021-22, scholastic materials were distributed by calling all the parents to the school. In the year 2022-23, school children will be provided with Uniform Sets, Note-Books, Shoes & Socks, Stationery, Sandals, School Kits (Lunch-Box, Water-Bottle, School Bag), Canvas shoes and Sports uniforms.

### **Welfare schemes for the specially Able / Divyang students:**

A) Scholarships: A Divyang students studying in std.1st to 10th are eligible for an Annual Scholarship of Rs.1000/- to Rs.2000/- on securing a 'B' grade or above in both the semester examination.

In the year 2021-22, a total of 4031 students were awarded this Annual Scholarship for the academic year 2020-21.

B) Attendance Allowance Scheme: In the year 2021-22, the payment of Attendance Allowance of Rs.20/- per day to 4881 students for the academic year 2020-21 is in process.

These schemes will continue in the year 2022-23.

### **Mid – Day Meal Scheme:**

As per the instructions prescribed by the Central Government and the State Government, a 'MID – DAY MEAL' scheme is being implemented for the students of STD. 1st to STD. 5th standard in BrihanMumbai Municipal Corporation Primary Schools. Under this scheme students are provided with 400 to 450 grams of cooked food containing 450 calories and 12 grams of protein for at least 222 days in a year. Similarly, under the scheme of "NATIONAL MID – DAY MEAL' students off std. 6th to 8th are provided with 700 to 750 grams of cooked food containing 700 calories and 20 grams of protein for at least 222 days in a year.

Although the schools were actually closed in the academic year 2020-21 due to the outbreak of Covid-19, lentils and Bengal gram were distributed to the students for 222 days out from the food security allowance.

Apart from this, 100 grams of rice per day / per student and 150 grams per day / per student was

distributed to STD 1st to 5th class students and STD 6th to 8th class students respectively.

Under the same MID-DAY MEAL Scheme, an innovative initiative was taken to distribute nutritive slices to students in schools of the Municipal Corporation of Greater Mumbai jurisdiction. Under this scheme, the nutritive slices distributed consists of Jowar, Bajra, Nachni, Rice and Soyabean as the main ingredients and whole wheat flour, refined wheat flour with iron enrichment, sugar powder, edible oil, skimmed milk powder, flavour and other essential ingredients as sub components.

For 189 working days from June 2021 to February 2022 through the Central Kitchen System, under the Central Government & State Government sponsored Brihanmumbai Municipal Corporation Education Department MID DAY MEAL Scheme, orders have been issued to the newly appointed women's Self-Help groups / institutions for distribution of food grains like Toordal and Harbhara for the BrihanMumbai Municipal Corporation school students.

### **Medical Officer (Schools) Section:**

#### **School Health services:**

School Health Department conducts annual medical screening of students of the all BrihanMumbai Municipal Corporation schools from Std. 1st to 10th According to the need, these students are referred to BrihanMumbai Municipal Corporation dispensaries and school clinics in hospitals for further management. In academic year i.e from June to April, the medical screening is being conducted successively visiting each school by medical team. Each medical team consist of one Medical Officer, one Health Visitor and one Peon. School students, parents and teachers are being imparted health education by arranging parents-teachers meeting in schools and through virtual classroom.

Deworming tablets are given under the observation of class teachers at every six months on National Deworming days to the students of Std. 1st to 10th For the prevention of anaemia in school students 'National Iron Plus Initiative Programme' (NIPI) has been implemented in schools since November 2017. Under this programme students of 1st to 10th standard are given Iron tablet once a week under the observation of class teachers.

In the 2021-22 academic year from October 2021 to March 2022 annual medical screening of students has been conducted. In this period 29725 boys, 29773 girls so total 59498 students were medically screened.

#### **Balkotsav:**

Annual Day program is organised every year across all our BrihanMumbai Municipal Corporation schools. Dance, Dramatization and Cultural program competition are conducted in our BrihanMumbai Municipal Corporation school hall. Approximately 20,520 students participating in this Annual

Day program / Balkotsav and thus availed the opportunity to represent their dance, music and dramatization skills.

The folk dance competition is conducted at ward and from this the selected first rank dance groups are given opportunity at our BrihanMumbai Municipal Corporation school city level. The final dance competition is organized in a huge auditorium and the first three winners are felicitated with Trophy, certificates and cash prizes, while all the participant students are given participation certificates.

Owing to Covid 19, pandemic situation program was not conducted this year. In year 2022-2023 school are reopened from month of January. Street-Play Competition were held as per planning

### **Street-Play Competition:**

Street-Play Competition are conducted in the memory of Hindu Hriday Samrat Balasaheb Thackeray. Street-Play Competition are conducted in our three zones on three different topics based on Social Problems / issues. The street plays that are selected for first rank from every three topic are nominated for the final round of competition.

However, due to the pandemic situation program was not conducted this year. In year 2022-2023 school are reopened from month of January. Street-Play Competition will be held as per planning.

### **Secondary Education Section:**

A total number of 48,209 students are enrolled in the BrihanMumbai Municipal Corporation secondary schools. Out of which 17,425 students are from Aided section, 22,976 from Unaided section and 7,808 students from M.P.S. English section. Secondary education is imparted through 8 (Marathi, Hindi, English, Urdu, Gujrati, Telugu, Kannada and Tamil) mediums of instruction.

Out of 15,515 students appearing in the examination held in March 2021 from the aided section and Unaided section secondary schools of BrihanMumbai Municipal Corporation all 15,515 students have passed. Hence, the result of S.S.C. of BrihanMumbai Municipal Corporation schools was 100%. A total number of 155 students from secondary schools scored 90% and more than 90% marks in then examination.

### **Career Counselling programs for higher secondary students:**

Taking career Awareness program a step further, BrihanMumbai Municipal Corporation, in partnership with Antarang Foundation, started out a WhatsApp Chatbot for class 9th and 10th students from March 2021 onwards to ensure that the students are well-informed with career option and on going update about education and also they help student for std 11th online admission. After regular reopening of schools after covid situation is under control, they are going to set up career Ten Lab in schools with computer lab for individual guidance on career option.



### **D.Ed / Science Junior College (Sec):**

Facility of two D.Ed Colleges namely R.C. Urdu D.Ed college, Imamwada & R.C. Urdu D.Ed. College, Mahim are run by Municipal Corporation of Greater Mumbai on Grant in aid basis.

Currently, without any financial burden on BrihanMumbai Municipal Corporation, three Junior Science College are run by Vidyalankar - 1) Bhavani Shankar Road School Dadar (W), 2) Ratanbai Walbai Mun. School, Mulund (W), & one by Ideal Education Trust - 1) Dixit Road Vileparle (W). These three science Junior Colleges are conducted on partnership basis and provide free education to students of BrihanMumbai Municipal Corporation Sec. Schools admitted in std. 11Th & 12th and 153 students are pursuing their D.Ed. Course.

### **Music and Art Academy:**

#### **Music:**

Formation of ward wise 24 Sangeet Academies is in progress with provision of all required musical instruments and other accessories essential for music training. A well equipped sangeet Academy in each ward is waiting to welcome students. Well qualified music teachers are being appointed on contract basis to impart Indian classical music training to the students.

In this current pandemic situation also online music education by Music teachers of all the students is going on uninterruptedly with commendable participation of BrihanMumbai Municipal Corporation students. Music teachers are equally active in conducting state wide live music lectures with overwhelming response from the students all over Maharashtra (State level). YouTube Link has been prepared with the help of Teachers And Students for Annual Music Syllabus. Got Thousands of viewers Worldwide.

On the occasion of world music day, Online musical event was organized by Music and art academy to enhance the hidden talent of BrihanMumbai Municipal Corporation students and also Online music competitions were organised with commendable response of students. Hobby Classes are conducted to boost and entertain Students.

Ex. commissioner Late.M.V.Desai – In the Memory of Former Commissioner Late. M.V.Desai and on the occasion of Desai's Memorial Day, Swaranjali and Chitranjali Programs were organised Live Online on 05 August 2021.The Students participated in this and created excellent painting and sculptures along with Music.

## ART:

### Lord Ganesha Idol Pottery Workshop:

The use of plaster of Paris idols is harming the environment and causing water pollution. In order to create awareness among the students, it would be appropriate to make Lord Ganesha Idols from Shadu clay or Terracotta clay.

The workshop is also organized to impart the message of environmental awareness to the citizens through Lord Ganesha Idol made by the students themselves with the concept of developing pottery skills and vocational education among the students.

In the year 2021-22, due to the outbreak of Covid-19, under the concept of 'School closed but Education continued', an online workshop named Shri Ganesha Idol Pottery Workshop was organized for the students of BrihanMumbai Municipal Corporation schools at the central level. This workshop received positive feedbacks from students.

### Work Experience:

Due to the outbreak of Covid 19 in the year 2021-22, the Work Experience Department of BrihanMumbai Municipal Corporation Education Department, it was not practically possible to conduct various competitions, workshops, activities, exhibitions and prize distribution ceremonies, but still many of the activities were carried out online. These included activities like making Rakhi from beads and pearls, silk thread and cloth, Origami, cutting-pasting, Making gift cards from quilling paper, Making bags, Lanterns, Decorating oil lamps, Making cutwork rangoli and for intermediate students activities included were Pottery, Origami, activities like Making cutting and pasting frames, Making flowers, making wallpapers, Making Gift boxes, wooden seating plank, Making pillowcases in tailoring, Making masks, Making kites etc. were carried out from class 3rd to 8th.

### Special Work:

Various activities are undertaken in the work experience department to develop the artistic qualities of the students, for which a special Hobby Class workshop has been organized for the students to double their happiness and to ensure their art development.

Online Education was being imparted to the students at the State Level by the BrihanMumbai Municipal Corporation education department, in which the teachers of the work experience department were teaching their subject to maximum number of students in Maharashtra through the link.

### Scholarship Exam:

Pre-upper primary Scholarship examination (PUP) (std.5th), Pre secondary Scholarship examination (PSS) (std.8th) is an external competitive examination conducted by (MSEC), Maharashtra State

Examination Council, Pune.

Students from BrihanMumbai Municipal Corporation school and all other aided and private schools appear for this scholarship examination.

Owing to Covid 19, pandemic situation examination was not conducted this year for Mumbai city. For year 2021-2022 school are reopened from month of January and instruction receive from Maharashtra State Examination Council, Pune , will convey date for Scholarship examination.

In 2021- 2022 , 2569 Students of PUP(std5th) and 2594 Students Of PSS (std8th) will appear for scholarship examination after the date is declared.



## 19. AIR QUALITY STATUS

### Air Quality Monitoring and Research Laboratory:

As per 74th amendment of the constitution of India in 1992 (12th schedule) the Maharashtra State Government issued an ordinance amend Municipal Corporation Act-1888 making “environment protection, promotion of ecology and urban forestry” as an obligatory duty vide section 61 (ab) in the year 1994.

In view of fulfillment of the above Act, Air Quality Monitoring and Research Laboratory working under environment department of Brihanmumbai Mahanagarपालिका to measure the levels of air pollutants in Brihanmumbai Municipal Corporation jurisdiction has established a fixed air monitoring station in different location. Also measured air pollution level with the help of automatic van (Mobile Van) in dumping ground and traffic junctions. Whenever the complaints are received from citizens, special monitoring is carried out and the reports are submitted. Also under the section ‘63 B’ of Mumbai Municipal Corporation (MMC) Act. 1888 Environmental Status Report is prepared and submitted every year before 31st July to the Corporation. This laboratory established in the year 1976 this the only one environmental laboratory to monitored ambient air pollutant.

There are 4 working units in Air Quality Monitoring & Research Laboratory like Air Monitoring, Gaseous, Instrumentation & Mobile Monitoring Van.

- 1 **Air Monitoring Unit:** To collect the samples of various pollutants from 3 fixed monitoring Sites with the help of High Volume Samplers by this unit like Sulphur dioxide (SO<sub>2</sub>), Nitrogen dioxide (NO<sub>2</sub>), Amonia (NH<sub>3</sub>), temperature and relative humidity daily. The Air Quality monitoring is carried out as per the CPCB guidelines.
- 2 **Gasesous Unit:** In this section samples of gaseous pollutants collected are analysed with the help of UV Spectrophotometer and result of pollutants are compared with standards set by Central Pollution Control Board (CPCB) and Monthly/Annual report is forwarded to respective Departments. Also this report is included in Environment Status Report (ESR) yearly.
- 3 **Instrumentation Unit:** Analysis of Polynuclear Aromatic Hydrocabans (Phenanthrene, Anthracene, Fluoranthere, Pyrene, Benzo (α) anthracene, Chrysene & Benzo (α) Pyrene) extracted from suspended particulate matter are analysed with the help of Gas Chromatograph. The Benzo (α) pyrene is one of the carcinogenic pollutant. The analysis of heavy metals [Arsenic (AS), Cadmium (Cd), Chromium (Cr), Copper (Cu), Iron (Fe), Nickel (Ni) & Lead (Pb)] extracted from suspended particulate matter are analysed with the help of Atomic Absorption Spectrophotometer. Pollution levels of Lead, Nickel & Arsenic are compared with standards prescribed by Central Pollution Control Board. This work has been stopped due to technical problems.



4 Mobile Van Monitoring Unit: With the help of Mobile Van, monitoring is carried out at traffic junctions namely Wadala and Andheri. Similarly at the dumping grounds namely Deonar & Kanjur Marg. The pollutants analysed are SO<sub>2</sub>, NO<sub>2</sub>, CO, O<sub>3</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, Hydrocarbons, VOC etc. Result of pollutants are compared with standards set by Central Pollution Control Board (CPCB) and Monthly/Annual report is forwarded to concern Department. The annual report is included in Environment Status Report (ESR) yearly. Whenever the complains are received from citizens, special monitoring is carried out with the help of Mobile Van

The important project of SAFAR-Mumbai is a joint venture of BrihanMumbai Municipal Corporation (BMC), Indian Meteorology Department (IMD) Mumbai and Indian Institute of Tropical Meteorology (IITM) Pune. Data received from 'SAFAR-Mumbai' is further analysed by Air Quality Monitoring and Research Laboratory for NO<sub>2</sub>, CO, O<sub>3</sub>, PM<sub>10</sub>, PM<sub>2.5</sub> pollutants. Weather Forecast & Air Quality Index is now available to citizens on mobile app namely 'SAFAR-Air'.

### Fixed Air Monitoring Sites of Environment Department

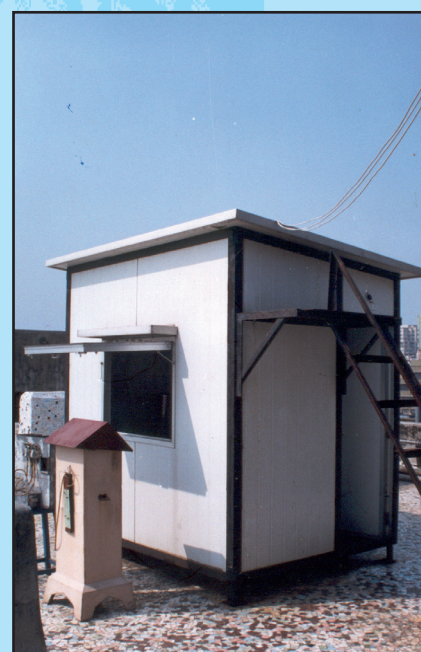
Sr. No.	Site	Located at
1	Worli	Transport building, E. Moses Road, Worli.
2	Andheri	Nityanand Marg Municipal School building, Koldongari, Andheri (W).
3	Bhandup	S Ward office building, L.B.S. Road, Bhandup (W).



High Vallume Sampler



UV Spectrophotometer



Monitoring Chowki

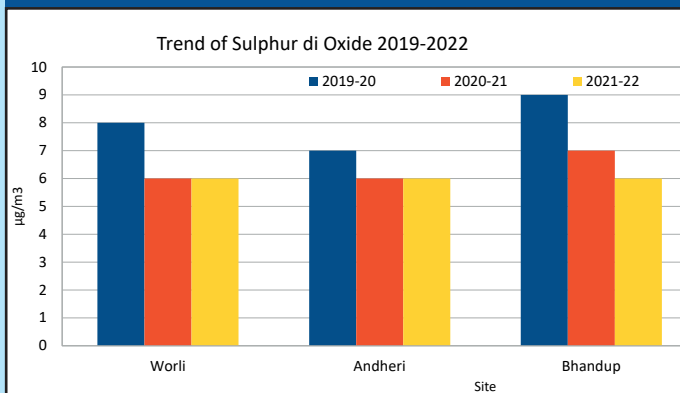
Air Quality Monitoring and Research Laboratory of Environment department monitors ambient air quality in Mumbai for criteria air pollutants namely; Sulphur Dioxide (SO<sub>2</sub>), Nitrogen Dioxide (NO<sub>2</sub>), Ammonia (NH<sub>3</sub>) etc. regularly. Air quality levels are evaluated in the year 2021-2022 for its compliance with ambient air quality standards set by Central Pollution Control Board (CPCB) for Sulphur Dioxide

**Table No. 19.1: Ambient Air Quality Levels at fixed monitoring sites (Annual average) April 2019 to March 2022**

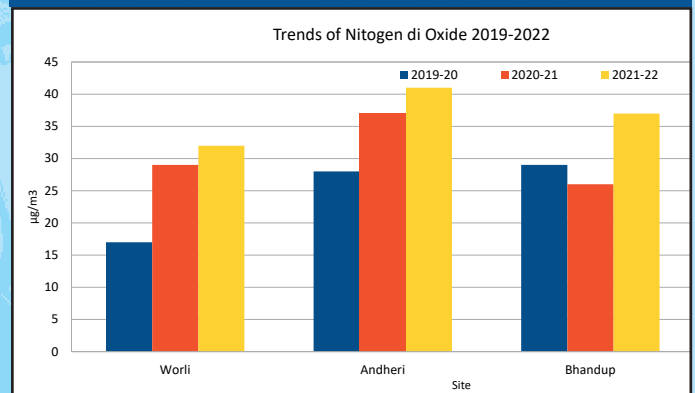
Sr. No.	Site	Unit µg /m <sup>3</sup>								
		Sulphur dioxide			Nitrogen dioxide			Ammonia		
		2019-20	2020-21	2021-22	2019-20	2020-21	2021-22	2019-20	2020-21	2021-22
1	Worli	8	6	6	17	29	31	66	84	87
2	Andheri	7	6	6	28	37	41	80	106	87
3	Bhandup	9	7	6	29	26	37	84	93	91
CPCB Standards µg /m <sup>3</sup>		50			40			100		

Source: Air Quality Monitoring and Research Laboratory of MCGM

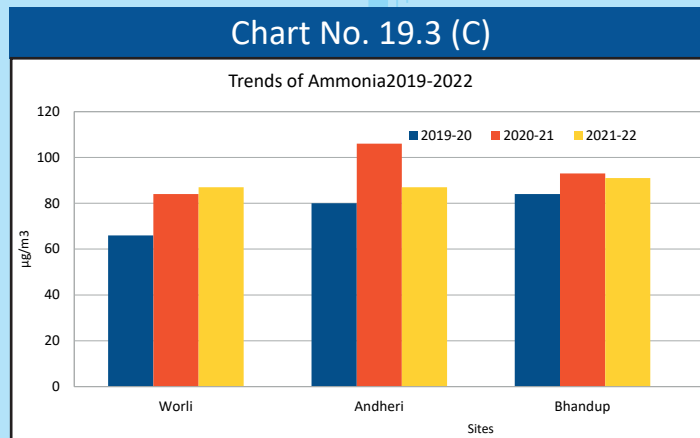
**Chart No. 19.1 (A)**



**Chart No. 19.2 (B)**



**Chart No. 19.3 (C)**



(SO<sub>2</sub>), Nitrogen Dioxide (NO<sub>2</sub>), Ammonia (NH<sub>3</sub>).

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

Levels of air pollutants SO<sub>2</sub>, NO<sub>2</sub> and NH<sub>3</sub> measured during 2019-22 when compared with prescribed standards by Central Pollution Control Board (CPCB) observations are as follows,

- 1) SO<sub>2</sub> levels are found less than prescribed annual standards at all fixed monitoring stations.
- 2) NO<sub>2</sub> levels are found less than prescribed annual standards at all fixed monitoring stations except at Andheri site; The levels of NO<sub>2</sub> is 41 µg/m<sup>3</sup> at Andheri site which is slightly more than prescribed annual standards.

**Table No.19.2: Range of the annual averages of pollutants at fix monitoring site (2021-22)**

Sr. No.	Unit µg /m <sup>3</sup>	Sulphur dioxide	Nitrogen dioxide	Ammonia
1	Range	6-6	31-41	87-91
2	Maximum at	All Stations	Andheri	Bhandup
3	CPCB standards	50	40	100
4	Comparison with CPCB standards	Not exceeded	below prescribed standard at all sites except at Andheri	Not exceeded

Source : Air Quality Monitoring & Research Laboratory

- 3) NH<sub>3</sub> levels are found less than prescribed annual standards at all fixed monitoring stations.

**Observations of annual averages:**

When compared with CPCB standards following observations are noted.

- 1) SO<sub>2</sub> levels are found to be in the range of 6-6 µg/m<sup>3</sup> and are below prescribed standard (50µg/m<sup>3</sup>) at all sites.
- 2) NO<sub>2</sub> levels are found to be in the range of 31-41 µg/m<sup>3</sup> and are below prescribed standard (40µg/m<sup>3</sup>) at all sites, except at Andheri site; The levels of NO<sub>2</sub> is 41 µg/m<sup>3</sup> found at Andheri site .
- 3) NH<sub>3</sub> levels are found to be in the range of 87-91 µg/m<sup>3</sup> are below prescribed standard (100µg/m<sup>3</sup>) at all sites. Maximum level of NH<sub>3</sub> is 91 µg/m<sup>3</sup> found at Bhandup.

**Table No.19.3: Percentage exceeding CPCB standards (24 hours average) from the year 2019 to 2022**

Sr. No.	Site	Sulphur dioxide			Nitrogen dioxide			Ammonia		
		2019-20	2020-21	2021-22	2019-20	2020-21	2021-22	2019-20	2020-21	2021-22
1	Worli	0	0	0	0	0	5	0	0	0
2	Andheri	0	0	0	0	1	12	0	0	0
3	Bhandup	0	0	0	0	0	2	0	0	0

Source : Air Quality Monitoring & Research Laboratory.

### Comparison of Percentage exceeding 24 hours average with CPCB standards:

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

- 1) SO<sub>2</sub> levels: No percentage exceeding the standards at all monitoring sites.
- 2) NO<sub>2</sub> levels: 5% samples are exceeded the standards at Worli , 12% samples are exceeded the standards at Andheri & 2% samples are exceeded the standards at Bhandup.
- 3) NH<sub>3</sub> levels: No percentage exceeding the standards at all monitoring sites.

**Table No.19.4: National Ambient Air Quality Standards central pollution control board, new Delhi (18th November, 2009)**

Parameter	Exposure Period	Industrial, Residential, Rural & Other Area	Sensitive Area
Sulphur Dioxide, SO <sub>2</sub> µg/m <sup>3</sup>	Annual avg. *	50 µg/m <sup>3</sup>	20 µg/m <sup>3</sup>
	24 Hrs. avg. **	80 µg/m <sup>3</sup>	80 µg/m <sup>3</sup>
Nitrogen Dioxide, NO <sub>2</sub> µg/m <sup>3</sup>	Annual avg. *	40 µg/m <sup>3</sup>	30 µg/m <sup>3</sup>
	24 Hrs. avg. **	80 µg/m <sup>3</sup>	80 µg/m <sup>3</sup>
Particulate Matter (Size less than 10µm) PM <sub>10</sub> µg/m <sup>3</sup>	Annual avg. *	60 µg/m <sup>3</sup>	60 µg/m <sup>3</sup>
	24 Hrs. avg. **	100 µg/m <sup>3</sup>	100 µg/m <sup>3</sup>
Particulate Matter (Size less than 2.5 µm) PM <sub>2.5</sub> µg/m <sup>3</sup>	Annual avg. *	40 µg/m <sup>3</sup>	40 µg/m <sup>3</sup>
	24 Hrs. avg. **	60 µg/m <sup>3</sup>	60 µg/m <sup>3</sup>
Ozone, O <sub>3</sub> , µg/m <sup>3</sup>	8 Hrs. **	100 µg/m <sup>3</sup>	100 µg/m <sup>3</sup>
	1 Hr. **	180 µg/m <sup>3</sup>	180 µg/m <sup>3</sup>
Lead, Pb, µg/m <sup>3</sup>	Annual avg. *	0.5 µg/m <sup>3</sup>	0.5 µg/m <sup>3</sup>
	24 Hrs. avg. **	1 µg/m <sup>3</sup>	1 µg/m <sup>3</sup>
Carbon Monoxide, CO, µg/m <sup>3</sup>	8 Hrs. **	2.0 µg/m <sup>3</sup>	2.0 µg/m <sup>3</sup>
	1 Hr. **	4.0 µg/m <sup>3</sup>	4.0 µg/m <sup>3</sup>
Ammonia, NH <sub>3</sub> , µg/m <sup>3</sup>	Annual avg. *	100 µg/m <sup>3</sup>	100 µg/m <sup>3</sup>
	24 Hrs. avg. **	400 µg/m <sup>3</sup>	400 µg/m <sup>3</sup>
Benzene, C <sub>6</sub> H <sub>6</sub> , µg/m <sup>3</sup>	Annual avg. *	5.0 µg/m <sup>3</sup>	5.0 µg/m <sup>3</sup>
Benzo alpha Pyrene, Particulate Phase only BaP, ng/m <sup>3</sup>	Annual avg. *	1.0 ng/m <sup>3</sup>	1.0 ng/m <sup>3</sup>
Arsenic, As, ng/m <sup>3</sup>	Annual avg. *	6.0 ng/m <sup>3</sup>	6.0 ng/m <sup>3</sup>
Nickel, Ni, ng/m <sup>3</sup>	Annual avg. *	20 ng/m <sup>3</sup>	2 ng/m <sup>3</sup>

Source: Central Pollution Control Board, New Delhi

\* Annual arithmetic 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.



## SAFAR – Mumbai

System of Air Quality and Weather Forecasting and Research - ‘SAFAR’ for Mumbai was launched and dedicated to country in the year 2015.

### Background:

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

Sr. No.	Types of Instruments	Nos.
1	Air Quality Monitoring Stations (AQMS)	09 nos.
2	Automatic Weather Stations (AWS)	16 nos.
3	LED, Digital Display Boards (DDS)	13 nos.

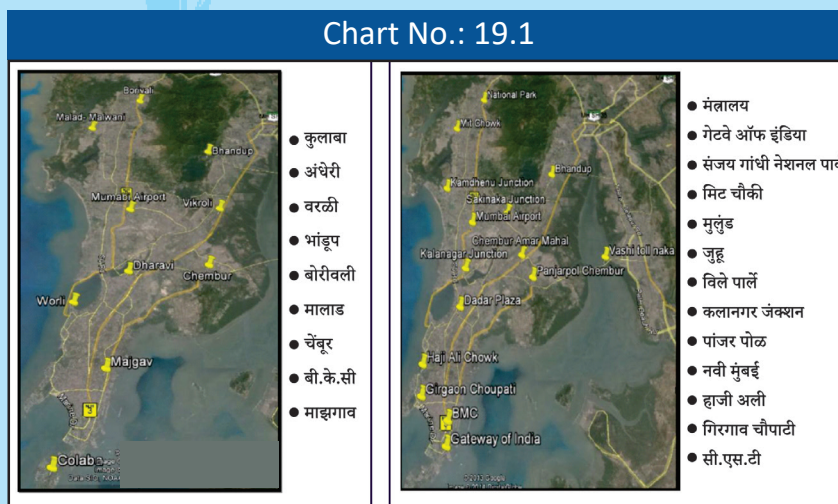
Earlier SAFAR was launched for metro cities in 2010 & 2012 in Delhi and Pune respectively, which is in operation. SAFAR-Mumbai was launched in June 2015, which is a joint venture of BrihanMumbai Municipal Corporation (BMC ) Indian Meteorology Department (IMD) Mumbai & Indian Institute of Tropical Meteorology (IITM) Pune. 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.

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

### SAFAR-Mumbai Information to Public:

Air pollutants namely PM<sub>2.5</sub>, PM<sub>10</sub>, Ozone (O<sub>3</sub>), Carbon monoxide (CO), Nitrogen dioxide (NO<sub>2</sub>) etc. are quantified and displayed on LED boards in terms Air Quality Index (AQI) along with health advisories. The real time AQI and forecasted AQI will help people to plan their outdoor activities so that they can prevent themselves from its adverse effects.

Meteorological parameter like temperature, rainfall, relative humidity, wind speed and wind direction, high & low and alerts of



severe weather conditions will be helpful to public, specially to fishermen.

Communication Media for benefit of society:

**SAFAR-Mumbai communicates with the society via,**

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

**1) 'SAFAR-Air' (Mobile Application):**

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

**2) 'SAFAR-India' (Website):**

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

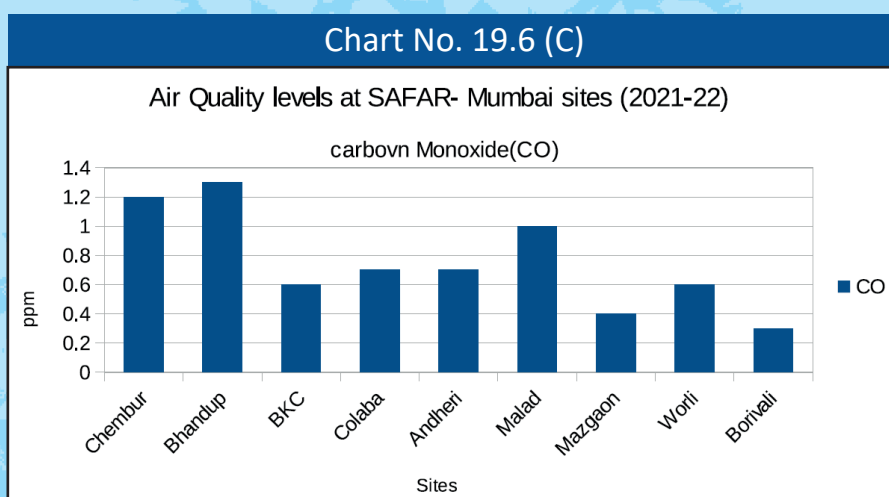
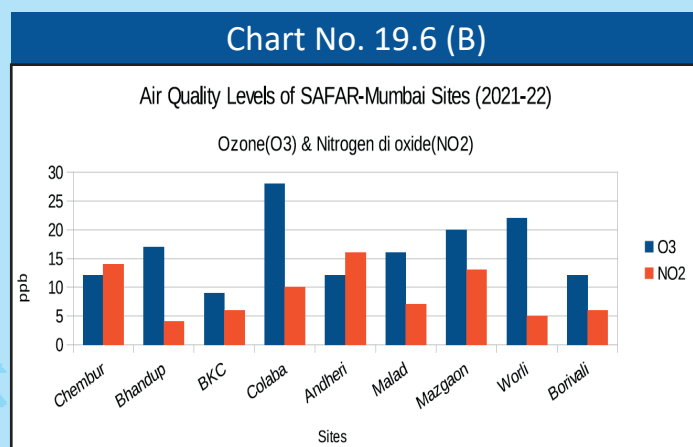
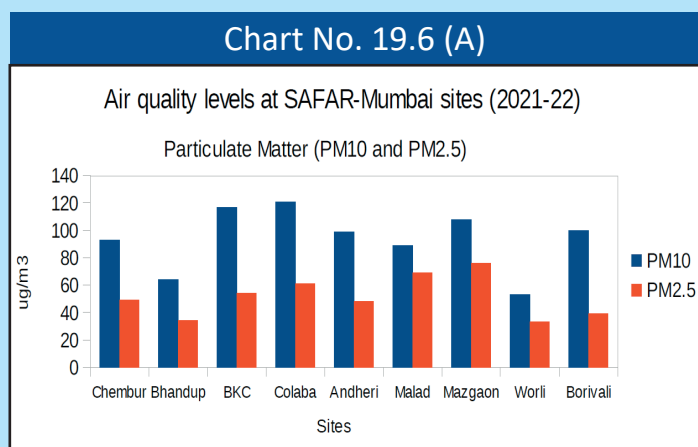
**3) LED Digital Display Boards (DDB):**

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

Table No. 19.5: Air quality levels at "SAFAR-Mumbai" sites (2019 to 2022)

Sr. No.		2019-20					2020-21					2021-22				
		PM <sub>10</sub>	PM <sub>2.5</sub>	O <sub>3</sub>	CO	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	O <sub>3</sub>	CO	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	O <sub>3</sub>	CO	NO <sub>2</sub>
1	Chembur	99	42	16	0.7	17	94	54	22	0.6	17	93	49	12	1.2	14
2	Bhandup	59	31	26	0.8	14	63	32	24	0.6	12	64	34	17	1.3	4
3	BKC	114	67	9	0.8	10	122	57	6	0.7	18	117	54	9	0.6	6
4	Colaba	66	34	28	0.8	14	90	41	31	1.0	8	121	61	28	0.7	10
5	Andheri	110	51	13	0.8	26	110	51	13	0.8	26	99	48	12	0.7	16
6	Malad	95	58	14	0.9	12	115	57	12	0.6	18	89	69	16	1.0	7
7	Mazgaon	82	46	26	0.9	24	73	48	27	0.6	17	108	76	20	0.4	13
8	Worli	81	42	21	0.7	21	58	35	22	0.7	5	53	33	22	0.6	5
9	Borivali	86	42	14	0.6	11	97	39	13	0.5	8	100	39	12	0.3	6
	<b>Average</b>	<b>93</b>	<b>54</b>	<b>23</b>	<b>0.9</b>	<b>23</b>	<b>91</b>	<b>46</b>	<b>19</b>	<b>0.7</b>	<b>14</b>	<b>94</b>	<b>52</b>	<b>16</b>	<b>0.8</b>	<b>9</b>
	CPCB Std. Annual Avg	60 (µg / m <sup>3</sup> )	40 (µg / m <sup>3</sup> )	51 (8Hrs) (ppb)	1.75 (8Hrs) (ppm)	21 (ppb)	60 (µg / m <sup>3</sup> )	40 (µg / m <sup>3</sup> )	51 (8Hrs) (ppb)	1.75 (8Hrs) (ppm)	21 (ppb)	60 (µg / m <sup>3</sup> )	40 (µg / m <sup>3</sup> )	51 (8Hrs) (ppb)	1.75 (8Hrs) (ppm)	21 (ppb)

Source: 'SAFAR-Mumbai'



**Annual Averages:**

Comparison of annual levels with standards prescribed by Central Pollution Control Board observations is as follows;(Table No.19.6)

1. Levels of Suspended Particulates (PM<sub>10</sub>) are found to be in the range of 53-121 µg/m<sup>3</sup> during 2021-22. Maximum level of PM<sub>10</sub> is observed at Colaba (121 µg/m<sup>3</sup>) .
2. Levels of Suspended Particulates (PM<sub>2.5</sub>) are found to be in the range of 33-76 µg/m<sup>3</sup> during 2021-22. Maximum level of PM<sub>2.5</sub> is observed at Mazgoan (76 µg/m<sup>3</sup>).
3. Levels of Ozone (O<sub>3</sub>) are found to be in the range of 9-28 ppb during 2021-22. Maximum level of O<sub>3</sub> is observed at Colaba (28 ppb).
4. Levels of Carbon Monoxide (CO) are found to be in the range of 0.3-1.3 ppm for the year 2021-22. Maximum level of CO is observed at Bhandup (1.3 ppm).
5. Levels of Nitrogen di-oxide (NO<sub>2</sub>)are found to be in the range of 04-16 ppb during 2021-22. Maximum level of NO<sub>2</sub> is observed at Andheri (16 ppb).

**Air Quality Index (AQI) :**

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

The current measurement of index is made comprehensive by the addition of 5 more parameters to the existing 3 parameters, i.e. in total 8 parameters are considered. AQI is a tool for effective dissemination of air quality of that area to common person. The information provided on air quality is in simple linguistic terms that is easily understood by people. The AQI is calculated by comparing the measured ambient concentration of the pollutant to the National Ambient Air Quality Standards (NAAQS).

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

**Classification of AQI:**

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

**Control of Air Pollution-Legal Aspects:**

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





## 20. MAHARASHTRA POLLUTION CONTROL BOARD

The state of Maharashtra was the first state in the country to enact a Water Pollution Control Act and under the provisions of the Maharashtra Water (Prevention and Control of Pollution) Act, 1969, Maharashtra Pollution Control Board was established on September 07, 1970. The central government has enacted various laws for pollution control as well as protection and conservation of environment. Some of the main laws are as follows;

1. Water (Prevention and Control of Pollution) Act, 1974,
2. Air (Prevention and Control of Pollution) Act, 1981,
3. Water (Prevention and Control) Cess Act, 1977
4. Environmental (Protection) Act, 1986,

some of the provisions under this act

- Biomedical Waste (Management & Handling) Rules, 1998,
- Hazardous Waste (Management & Handling) Rules, 2000,
- Solid Waste Management Rules, 2016
- Biomedical Waste (Management & Handling) Rules, 2016
- E-waste (Management) Rules, 2016
- Plastic waste (Management) Rules, 2016

Maharashtra Pollution Control Board (with the help of ULB & other Board) is entrusted with the task of implementing the above Act and rules the advice and cooperation of the Department of Environment and Climate Change of the State Government.

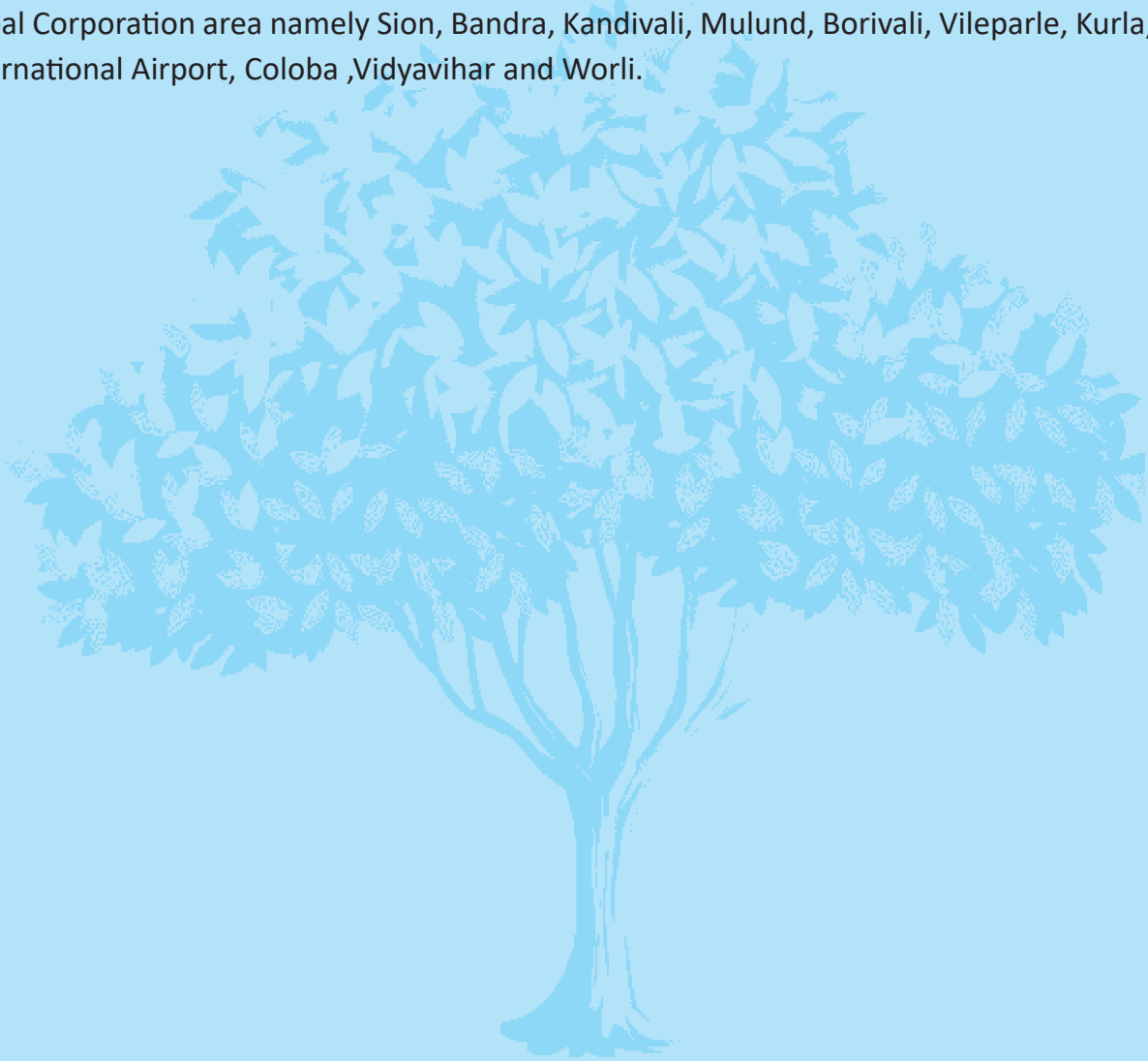
### Functions of Maharashtra Pollution Control Board are:

1. To check the quality of water used for domestic commercial industries and agricultural use and to control it properly so that the quality does not deteriorate.
2. Monitoring of air quality and control of air pollution.
3. To carry out the tasks assigned by the State Government and the Central Government under the Environment (Protection) Act 1986.
4. Implementation of central initiative programs and schemes such as The Action Plan for Control of Air Pollution of Mumbai, Majhi Vasundhara, Swachh Bharat Abhiyan etc. as per the advice of Central

Pollution Control Board and submission of project reports.

5. To carry out environmental pollution control works through regional and sub-regional divisions of the board.

Fixed Air Monitoring Stations as well as Continuous Air Monitoring Stations are located in many cities of Maharashtra State under the jurisdiction of Maharashtra Pollution Control Board. The Maharashtra Pollution Control Board has a total 12No's of Continuous Air Monitoring Stations in the Brihanmumbai Municipal Corporation area namely Sion, Bandra, Kandivali, Mulund, Borivali, Vileparle, Kurla, Powai, CST International Airport, Coloba ,Vidyavihar and Worli.



## 21. INDUSTRIES

Environmental pollution is a by-product of industrialization. However, with the modern technologies, pollution potential of industries/factoroies are lowering. There are 25332 no. of industries are covered under section 390 of Mumbai Municipal Corporation Act 1888. These industries pay Air Pollution Prevention Fees on the basis of horsepower of the connected load. There are 7560 industries/factories are located in the city area, 11857 in Western Suburbs and 5915 in Eastern Suburbs. Maximum industries 4281 are in P-South ward. Ward-wise distribution of industries are shown in table 21.1.

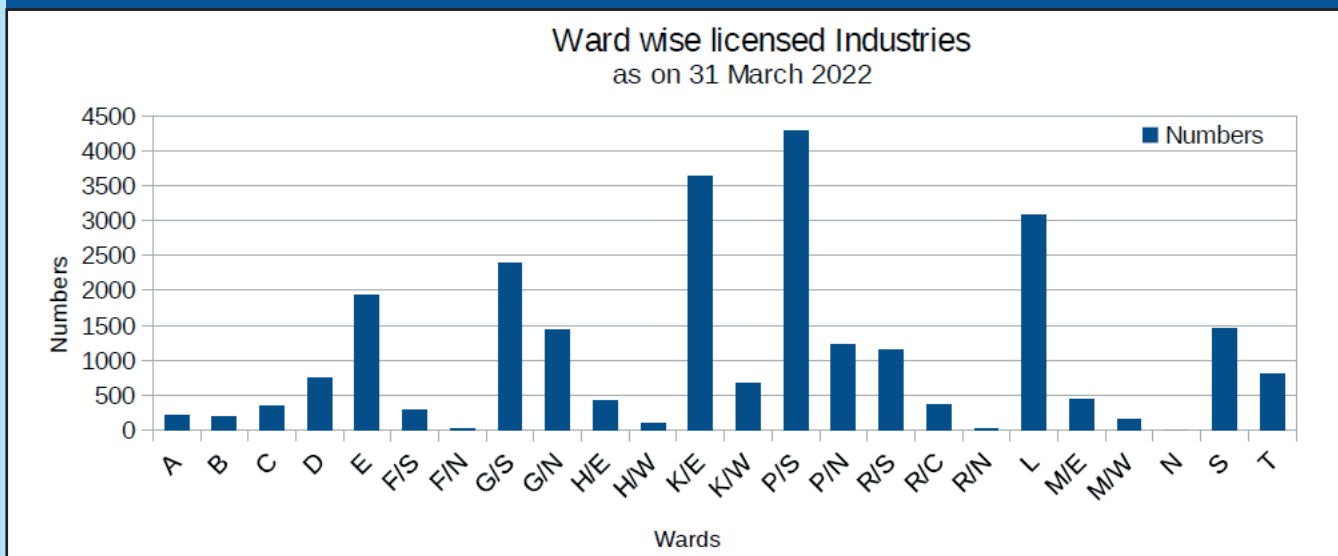
Table No. 21.1: Wardwise Licensed Industries

Sr. No.	Ward	upto 31.03.2022	Sr. No.	Ward	upto 31.03.2022
1	A	211	14	P/S	4281
2	B	191	15	P/N	1225
3	C	339	16	R/S	1143
4	D	750	17	R/C	365
5	E	1935	18	R/N	16
6	F/S	285	19	L	3084
7	F/N	15	20	M/E	428
8	G/S	2399	21	M/W	143
9	G/N	1435	22	N	2
10	H/E	413	23	S	1447
11	H/W	97	24	T	811
12	K/E	3645	<b>Total</b>		<b>25332</b>
13	K/W	672			

Source : Environment Department of BrihanMumbai Municipal Corporation

\* Data from previous ESR-2019-2020

Chart No.: 21.1 Ward wise Licensed Industries



## Ecofriendly Contribution of Industries

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

### Rashtriya Chemicals and Fertilizers Limited

Rashtriya Chemicals and Fertilizers Limited (RCF) endeavors for excellence in environmental management and strives towards sustainable business development. RCF continues to be committed to develop and implement Environmental Management System (ISO 14001:2015), occupational health safety (ISO 45001:2018) and quality management system (ISO 9001:2015) throughout by measure, control and reduce environmental impact.

Adhering to the regulatory requirements and standards of the Maharashtra Pollution Control Boards, RCF incorporates appropriate ambient air quality monitoring, plant stack monitoring, effluent handling and disposal systems through constant monitoring are as follows:

1. Four nos. of continuous ambient air quality monitoring stations to monitor ammonia, NOx, SO2, Particulate matter (PM10 and PM2.5) and metrological parameters are installed at RCF Trombay unit.
2. Continuous online stack monitoring is being done for SO2 form Sulphuric Acid plant, NOx from Nitric Acid plant and NH3 from Suphala plant and data is being transmitted to MPCB and CPCB server.
3. Continuous online monitoring of pH, Ammonical Nitrogen and Flow of treated effluent from Effluent treatment plant are monitored continuously and data is being transmitted to MPCB and CPCB server.
4. Various schemes with state of the are technologies and modernization schemes are implanted for environment protection also waste streams from the plants are recycled/ reused for useful purpose by 4-R strategy (Reduce, Reuse, Reuse and Recycle).
5. In-built pollution control systems are in place at RCF Trombay plants.

### Green Belt Development at RCF Trombay Unit:

1. In the year 2021-22 at factory premises planted total 14,706 nos. trees namely Karanj, Kanchan, Satvin, Neem, Rain tree, Bahava, Bakul, Tabubia, Badam, Baoganiveiilia, Tikoma, Areca palm Different Hedges like eranthemum, Exora, Lantena, Tagar and plumbago etc.
2. Under the corporate social responsibility and create awareness regarding environment, RCF



management have been arranged saplings distribution drive every year. This year total 4500 nos, of trees sapling were distributed in nearby school and societies.

**RCF Trombay unit was implemented various schemes during the years 2020-21 in plant/ department like:**

1. At RCF Trombay there are two nos. of Sewage Treatment Plant (STP). Sewage treatment capacity of each plant is 22.75 Million liters per day (MLD) of Municipal Sewage. Each STP produces 15 MLD of treated water ensuring water availability for RCF Trombay process which is critical for the smooth functioning of the Trombay Unit. Both STPs are in operation. A portion of the treated water is supplied to M/s Bharat Petroleum Corporation Ltd. (BPCL).
2. Ministry of Environment, Forest and Climate Change (MoEFCC) has accorded Environmental Clearance for following projects of RCF Trombay Unit.

Regularization of existing AN melt plant along with Production enhancement from 1.4 LMT to 1.9 LMT per year.

**Mumbai Port Trust**

1. Mumbai Port has long been the principal gateway to India and has played a pivotal role in the development of the national economy, trade and commerce and prosperity of Mumbai city in particular. The port has achieved this position through continuous endeavor to serve the changing needs of maritime trade. Though traditionally designed to handle general cargo, over the years, the port has adapted to changing shipping trends and cargo packaging from break bulk to unitization/ palletization and containerization. Besides, it has also developed specialized berths for handling POL and chemicals. For decades, Mumbai Port was India's premier port. Even today, with the development of other ports, it caters to 8.61 percent of the country's seaborne trade handled by Major Ports of the country in terms of volume. It caters to 16.07 percent of POL Traffic handled by Major Ports.
2. Mumbai Port Authority has its own Environment Management Cell (EMC) and has following ongoing activities related to Environmental Protection and Conservation.
  - i. Environmental Monitoring such as Marine Water Quality, Ambient Air Quality and Noise Level Monitoring with regular intervals.
  - ii. Collection of Floating Debris from sea water in Port Limits.
  - iii. Providing reception facilities Debris from sea water in Port Limits.
  - iv. Mumbai Port Authority had developed Botanical Garden Sagar Upavan at Colaba in Port area, which has received Best Garden award in its category for nine Years successively.

- v. Mumbai Port Authority has Oil Spill Response Plan in place in joint efforts with JNPA and Oil Companies to combat with Oil Spills.

### **Bharat Petroleum Corporation Ltd. Mumbai Refinery, Chembur**

BPCL Mumbai Refinery (MR) has taken initiatives in year 2021-22 for environment protection. The status of these initiatives is mentioned below:

- ◆ Continuous Ambient Air Monitoring at AMS, stack monitoring for SOX, NOZ, CO and SPM ETP outlet parameters for BOD, COD, TSS and pH with real time data transmission to CPCB/ MPCB servers.
- ◆ N2 blanketing and double seals has been provided to Benzene and Toluene tanks for reduction in VOC emission.
- ◆ Bottom loading facility has been provided to Benzene and Toluene product dispatch for reduction in VOC emission. Same will be extended to other products like ATF/SBP/Hexane dispatched through lorry loading.
- ◆ Benzene and Toluene Vapor Recovery (BTVR) System is installed at Dispatch Unit at Mr. Benzene and Toluene Vapor recovery system is used to recover hydrocarbon vapours during Benzene and Toluene lorry loading.
- ◆ Effluent Treatment Plant (ETP) subunits (TPI, TPI Sump, Neutralization Tank, CPI and DAF) are covered and provided with Vapour Recovery System to reduce VOC emission by 90%.
- ◆ Planted 1000 tree sampling of native species using MIYAWAKI method through M/s Green Yatra at LTT Railway Station on 05th June 2021 World Environment Day.
- ◆ BPCL MR has started to sell Used Cooking Oil (UCO) from canteen to FSSAI approved Party for manufacturing Bio Diesel.
- ◆ Dispersion modelling study was carried out through IIT-B. Final report is awaited.
- ◆ Solar power of 1471 MWH has been generated in 2021-22.
- ◆ Around 33 thousand KL of Rain water has been harvested in 2021-22.

### **Tata Powers**

The following measures are taken by Tata Power to maintain the balance of the environment.

#### **1. Fuel Quality and Emission:**

- ◆ Use of low sulphure (0.1 to 0.2%) low ash (5%) imported coal for power generation.

- ◆ Stringent SO<sub>2</sub> emission limit of 24 MT/Day from the entire station.

## 2. Air Pollution Control:

- ◆ Stack Height of 275 m for wider dispersion of pollutants.
- ◆ ESP for Unit # 5 and Unit # 8.
- ◆ FGD for Unit # 5 and Unit # 8.
- ◆ Low NO<sub>x</sub> burner for Unit # 7, Over fired dampers for other units.
- ◆ Use of imported low Sulphur (0.1 to 0.2%) low ash coal (5%).

## 3. Fugitive dust control:

- ◆ Screw Unloader (State of Art) for unloading coal at coal berth.
- ◆ Pipe conveyor for carrying coal from coal berth to boiler.
- ◆ Stacker Reclaimer for handling of coal.
- ◆ Green belt around coal yard and coal berth.
- ◆ Water sprinkling system around coal yard for dust suppression.

## 4. Pollution Control and Treatment:

- ◆ ETP for treatment of effluent generated from DM plant.
- ◆ STP (2x125 CMD) at station A and station B for treatment of domestic effluent.
- ◆ Coal Pile run off system at Coal Yard and Coal Berth.
- ◆ Cooling water channel and aerators to reduce the temp of discharge water.
- ◆ Online Effluent Monitoring (Temp)
- ◆ STP water reused for gardening.

## 5. Solid Waste and Hazardous Waste:

- ◆ Minimal Ash generation due to use of imported low Ash (5%) coal; 100% fly ash and bottom ash utilization.
- ◆ Used Oil is disposed to MPCB approved agency in accordance with HW Rules, 2016. Submission of HW Manifest.
- ◆ E-waste is disposed to MPCB approved recycler/ dismantler. Submission of form-2 and form-3

- ◆ Used batteries are disposed to MPCB approved agency.
- ◆ BMW is disposed to MPCB approved agency.

## Adani Electricity

Adani Electricity Mumbai Limited (AEML) is committed to achieving excellence in environment performance, preservation and promotion, to maintain a clean and healthy environment. AEML's initiative under the realm of environment-preservation have been outlined as follows:

### Renewable energy

- ◆ AEML plans to increase its renewable power procurement mix percentage to 30% by FY 2023. AEML's ultimate goal is to reach a renewable power mix of 60% by end of FY 2027.
- ◆ AEML has entered into Power purchase Agreement (PPA) of 700 MW of hybrid power (solar + wind) with minimum guaranteed capacity utilization factor of 50%, from FY 2022 onwards, for 25 years.
- ◆ AEML offers consumers to opt for Green power (renewable power) voluntarily and provide with green energy certificates. Green power opted by 2160 nos. of consumers and total of 19.1 MU's of green power supplied.
- ◆ AEML-D encourages and provide technical support to its consumers to install roof top solar plants through empaneled Roof top Solar PV Plant vendors.
- ◆ AEML contributions toward roof top solar power in Mumbai – Cumulative installed capacity up to March 2022 is 24 MW. 1099 nos. of AEML Consumers have install roof top Solar PV plant with net metering with 22.88 MU renewable energy generated in FY 2021-22.

### Demand Side Management (DSM)

- ◆ AEML provides value added service of walk through energy audit services at no cost to all consumers, under this initiative company has covered over 61 consumers and identified potential saving of around 0.9 million units (Mus).
- ◆ AEML offer's subsidy to it's residential customers on purchase of energy efficient 5 star rated BLDC ceiling fan under regulator approved DSM scheme. In this financial year the Company has distributed 750 nos. of 5 Star ceiling FAN, resulting in annual savings of 0.16 million units (MUs). Till date total replacements are 1543 fans resulting in saving of 0.36 million units (MUs).
- ◆ AEML offer's subsidy to it's residential customers on purchaser of energy efficient 5 star rated Refrigerator under regulatory approved DSM scheme. In this financial year, Company has replaced



658 old refrigerators with 5 star refrigerators, which resulted in saving of 0.7 million Units. Till date total replacements are 2342 refrigerators resulting in savings of 2.1 million units (MUs).

- ◆ AEML through its Urja Samvardhan Upakaram programme, continued to conduct awareness session on energy conservation in various academic institutions, offices, banks, hospitals industrial estates, housing societies, slum areas, etc. In FY 2021-22 company conducted awareness session covering around 650 participants.

### Green Technology and Process Automation

- ◆ AEML has carried various automation process to reduce use of paper and also encourages all its consumers to opt for paperless bill for reducing environmental impact.
- ◆ AEML has carried out initiative for Replacement of High-pressure Sodium Vapour (HPSV) lamps with LED lamps in streetlights across entire distribution area.
- ◆ AEML has opted to use non-carcinogenic biodegradable silica gel in transformers across AEML distribution area.
- ◆ AEML plans to replace entire existing fuel operated vehicles with electric vehicles. AEML currently uses 15 nos. of Electric vehicle deployed for carrying daily operational activity across distribution area.
- ◆ AEML has replaced oil type switch gears with dry type maintenance free switchgears and it also uses environmental friendly ester filed transformers to reduce environmental pollution.
- ◆ AEML has committed to become Single Use Plastic (SUP) free and also aim's to achieve Zero Waste to Landfill.

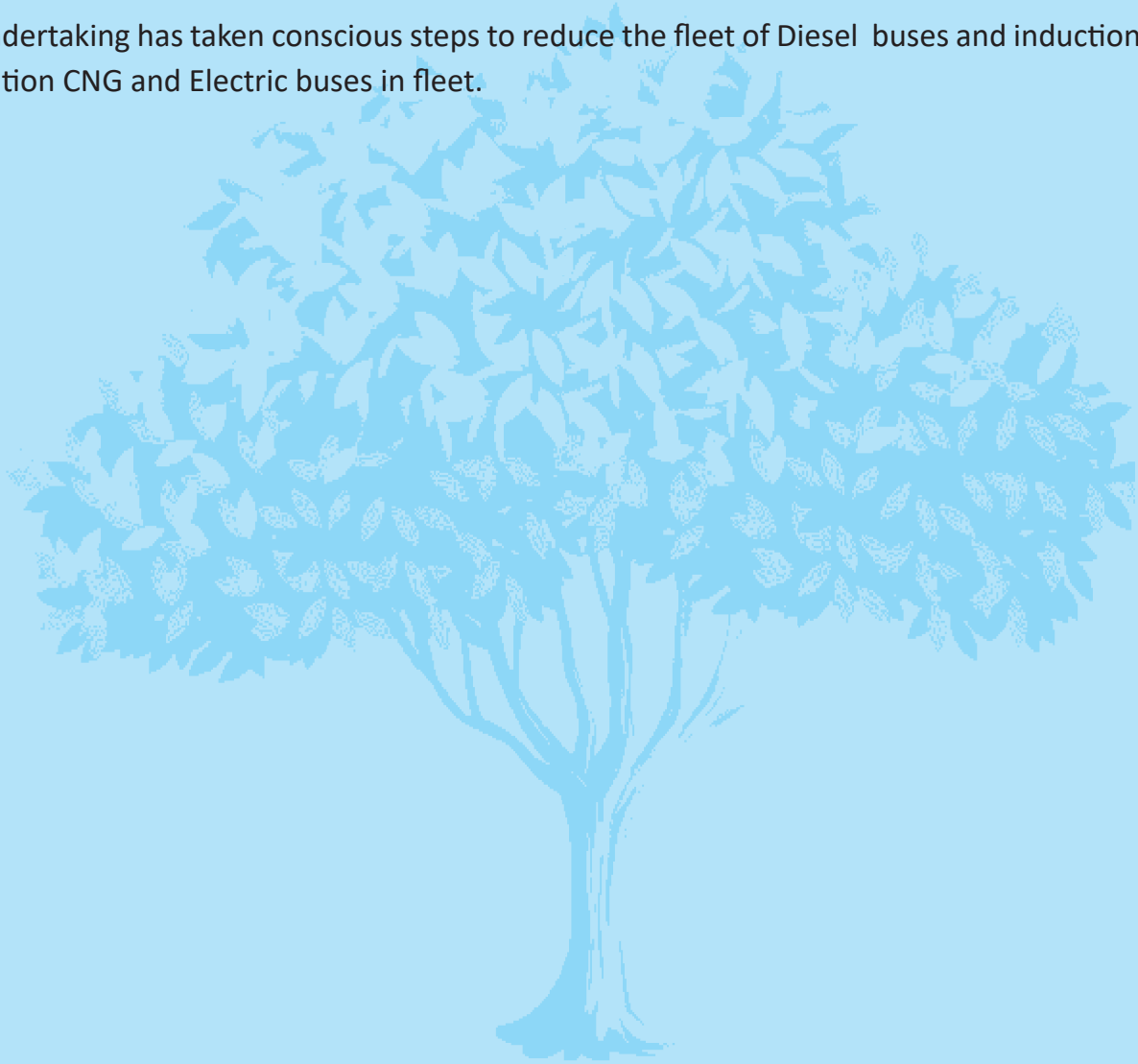
### Best Undertaking

1. BEST Undertaking is a PSU into public city transport and electric supply for citizens of Mumbai city. The hazardous waste generated that is the drained engine oils, grease, batteries, etc which are used for preventive maintenance of buses and the Transformer oil, lead etc, used by Electric supply department ,is collected at there centralized location at Oshiwara Depot and is disposed off through registered recycling firms, as per the guidelines of Pollution Control Board by our Material Management Department. The summary of hazardous waste disposed off through registered recycling firms; for the period of January -2021 to December-2021 is as follows:-

Sr. No.	Description	Approx. Toatal Qty.
1	Used oil/ Waste oil	310570 litres (275.513 MT)
2	Lead sheets	10MT
3	Used batteries (Apr-21 to sept-21)	1789 nos.(88.114 MT)
4	Used batteries (Oct-21 to March-22)	1674 nos. (90.816 MT)

2. BEST are member of M/s Mumbai Waste Management Pvt. Ltd., taloja the authorized firm of Maharashtra Pollution Control Board under membership no. MWML-MUMHZW-MUM-2899 for disposal of used filter. Periodically the used oil filter accumulated at Depots are send to this disposal facility. In 2021-22, total 5.82 MT of used oil filters are sent to this facility for disposal .
3. All the buses in the fleet of Undertaking are pollution norms compliant. Day to day maintenance of these buses are carried out to upkeep these buses for prevention of air pollution in city .

BEST Undertaking has taken conscious steps to reduce the fleet of Diesel buses and induction of zero air pollution CNG and Electric buses in fleet.



## 22. HEALTH

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

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

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

The health services are provided in two ways. There are hospitals, dispensaries and maternity homes all over the city catering to the medical needs of the people, while on the other hand there are Outreach Services. Under National Urban Health Mission 30 new health centers are started too. 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.22.2. It shows Birth & Death Rates and also Infant & Maternal mortality in the year 2019 to 2021. In Year 2021 Birth rate in Mumbai was 8.81/1000 population and the Death rate was 8.37/1000 population in the year 2021. Infant mortality rate was 22.86/1000 Live Births and Maternal Mortality rate 83/100000 Live Births for mothers.

(These rates are as per Central Government New CRS System- Provisional)

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

PRIMARY	Health posts	211
	Dispensaries	190
	Maternity Homes	29
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.	5

Source: Health Dept.

**Table No. 22.2: Health Statistics - Birth and Death Rates**

	Year 2019	Year 2020	Year 2021
Birth (Registered)	148898	120188	113792
Birth Rate/1000 population	11.61	9.33	8.81
Death (Registered)	91223	111942	108113
Death Rate/1000 population	7.11	8.69	8.37
Infant Mortality	3430	2649	2601
Infant Mortality Rate/1000 live birth	23.04	22.04	22.86
Maternal Death	131	110	95
Maternal Mortality Rate/1000 live birth	88	92	83

Source: Health Dept.

### Function of Kasturba Hospital:

- 1) Kasturba Hospital is a Infectious Diseases hospital wherein patients suffering from Malaria, Dengue, Leptospirosis, Hepatitis, Rabies, Swine Flu, Measles, Mumps, Diphtheria and Covid 19 are isolated in different wards & treated.
- 2) In 2021-22 patients with Covid 19 are being treated on OPD basis as well as admitted in ward for treatment.
- 3) Started new Screening OPD at ward no. 9, Isolation wards with 200 beds and 10 ICU for Covid 19 patients.
- 4) New equipment purchased for Covid 19 to aid in the testing and whole genome sequencing (WGS) in PCR Lab at Kasturba Hospital.
- 5) Kasturba hospital been carrying out vaccination for COVID 19.

Sr. No.		Cases	Death
1	Dengue	1153	03
2	Swine Flu H1N1	–	–
3	Lepto	57	02
4	Malaria	1548	02
5	Covid 19	1585	146

### Measures taken to control the increasing spread of corona virus infection

The first Corona-infected patient in Brihanmumbai arrived in the second week of March 2020. At that time, Mumbai had the only hospital with 28 beds for such patients & only one laboratory was available for corona testing. This facility was increased in a phased manner as per requirement.

Without waiting for the availability of a vaccine for 'Covid 19' i.e. Corona Virus, the Brihanmumbai Municipal Corporation focused on the basic things. Based on that, all measures were taken. "Chase the virus" means "Chasing the virus" and worked directly on the five principles of Testing, Tracing, Tracking, Treatment and Quarantine. Strict measures were taken by declaring the area where the patient was found as a restricted area. As a result of this, the situation of corona infection in Mumbai is now coming under control.

Brief information about this issue wise is as follows:

#### A) Expansion and strengthening of Corona treatment center facilities

##### Hospitals and Beds -

A total of 84,192 beds have been immediately provided on war footing in Mumbai city for Covid 19 patients. Also necessary facilities were provided such as 2000 Intensive Care beds, 940 Ventilator beds, 8034 Ventilator beds with Oxygen; 750 Ambulances were made available for timely transportation of patients 24 hours and recruited sufficient manpower for patient treatment.



**Magnificent facilities i.e. Jumbo Facility:**

Jumbo Hospitals were set up at different places. NSCI Dome at Worli, BKC Ground at Bandra, Nesco Exhibition Ground at Goregaon, Richardson Crudas, Byculla, Richardson Crudas, Mulund, Dahisar Check Naka, Dahisar Kanderpada, Somaya Jambo Center, Malad Jumbo Center, Kanjurmarg Jumbo Center has developed a total capacity of 13197 beds. 1173 ICU beds were provided in Jumbo facilities.

**Oxygen Supply –**

Hon. Commissioner, of BrihanMumbai Municipal Corporation ordered to appoint a team on 16.04.2021 to ensure oxygen supply to various hospitals in Mumbai & a team of officials of the Food and Drug Administration Department and nodal officials of the Municipal Corporation has been appointed. 79 oxygen concentrator plants have been set up and operational in different hospitals. In the first wave, the daily requirement of oxygen was around 210 Metric Ton, in the second wave, the daily requirement of oxygen increased to 275 Metric Ton, but there was no shortage due to planning. Today, the overall capacity of oxygen has reached 500 Metric Ton. In the second wave, oxygen supply was smooth in Mumbai as compared to other states.

**Adequate Manpower:**

While increasing the number of beds in hospitals, the Municipal Administration has undertaken a drive to fill up the vacant posts of Doctors, Medical Specialists, Nurses and Ward Boys etc. Apart from this, the authority to appoint manpower as per requirement was given to the heads of the respective hospitals. About thousands of Doctors and Nurses in different cadres were recruited by providing additional manpower.

**Medicines:**

From time to time updated medicines like Tocilizumab, Ramdesivir, Flavipiravir, Amphotericine – B etc. were made available to the patients free of cost.

**'Project Victory' for Dialysis Patients:**

120 for dialysis patients with covid and 33 for suspected dialysis patients in various hospitals to provide dialysis services to covid affected dialysis patients, a total of 153 such dialysis analyzers were provided. An online platform was created for the management of dialysis patients. Several Urologists from Mumbai and Engineers from IIT Mumbai came together to develop this system. This initiative greatly reduced the mortality rate among dialysis patients.

**B) Ward War Room:**

Ward War Room i.e. Divisional Control Room was operationalized at the level of all 24 Divisional Offices. 30 channels of the same telephone number were activated in each 'Ward War Room'.

Necessary staff of medical officers working uninterruptedly in three sessions on 24 x 7 basis was appointed. Department wise 15 ambulances have been made available and 10 medical teams have been deployed in each ward war room.

Details of Corona Centers					
Sr. No.	Fascility	Status as on 8th April 2020	Status as on 8th May 2020	Status as on 1st September 2020	Status as on 1st March 2022
1	Total covid beds		29,282	84,173	58,332
	(a)DCH/DCHC	3362	3,743	12,928	22,150
	(b)CCC2	224	4,030	23,457	13,782
	(c)CCC1	-	21,509	47,788	22,400
2	Total ICU	145	480	1,401	2,850
3	Total Ventilator	105	248	927	1,420
4	Total Oxygen	10	2,739	8,374	11,427
5	Independent dialysis machine	-	48	132	108
6	Ambulance	Regular	80	750	750
7	Hearse	Regular	4	36	36

### C) Control of excessive charges levied by private hospitals

Patients affected by Covid-19 in Brihanmumbai Municipal Corporation area should get more effective medical care facilities. Therefore, according to the instructions of the state government, 80 percent of the beds in private hospitals have been regulated by the Municipal Corporation. Appointment of Chartered Officers should be done properly to ensure that private hospitals are charged as per Government rates. For this purpose, a total of 76 officers have been appointed at the departmental level under the supervision of five Chartered Officers, 2 officers each in the Chief Auditor Department of the Municipal Corporation. Between 6 June 2020 and 07 December 2020, 11 thousand 302 cases were investigated. Out of that, an amount of about Rs.164.45 crores was reduced to Rs.151.52 crores at the end of the examination, which means that the patients have got a relief of about Rs.12.93 crores.

**Result:** Due to the various main and innovative measures as mentioned above, the corona infection has come under control in Mumbai.

Year	Testing	Cases	Death
2020	2376994	290289	4.10%
2021	11341246	477607	1.47%
2022	3242744	267143	0.23%

## Tuberculosis (TB):

### Group of TB Hospital and city TB Control Programme:

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

In Mumbai city there are total 249 PHI treatment centers along with various other run by the teaching institutes and peripheral hospitals which are working primarily as the diagnostic and treatment centers. In addition 7 DR.T.B. centers (Nodal), 35 gene expert, 3 LPA, 9 BDQ centers as modern technology laboratory are provided. GTB Hospital Laboratory up gradation has been started on 30 March, 2021 & likely to be completed very soon. 16 module CBNAAT machine has been procured to process more samples Laboratory upgrade is being done to increase testing capacity to thrice present work load, to provide early and rapid diagnosis of T.B. with universal DST to patients and thus early initiation of T.B. treatment to enable favorable outcome.

The Group of T.B. Hospitals at sewri is admitting and treating the emergency T.B. cases and the 5 T.B. Clinics attached to this hospital are working as diagnostics and treatment centres on OPD basis. 1) Shamaldas Gandhi Marg TB Clinic, 2) Balaram Street TB Clinic, 3) Ramkunwar Daftary TB Clinic, Dadar 4) Smt. & Shri. M. M. Munshi TB Clinic, Khar and 5) Nawab tank TB Clinic, Dockyard Road.

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

Group of TB Hospitals Sewri is recognized for degree courses in M.D.( Tuberculosis and Chest Diseases) by the Maharashtra University of Health Science Nashik under G.S. Medical college and KEM Hospital Parel Mumbai. Also clinical experience is given for Nursing and undergraduate students from the Municipal Medical Colleges. The major lung thoracic surgeries are being carried out at this hospital by the surgeons on selected cases. Diploma course of Tuberculosis is started by 'College of Physician and Surgeon Mumbai'.

As per suggestion of the Mumbai Districts AIDS Control Society (MDACS), the Voluntary Counseling and Testing Center (V.C.T.C) has been started from January 2022 at this hospital for the testing of indoor and OPD TB patients & their relatives are given counseling for prevention of TB & side effects of medicines.

As per the guidelines of DOT-PLUS program, the separate ward of M.D.R. TB Patients (males & females) have been started from 26th July 2010. Supra major thoracic surgery is started from March 2012 at G.T.B. Hospital. Till date 262 major surgeries and 14339 minor surgeries are carried out.

From May 2012 protein diet is started daily for all on duty employees working under Group of TB

Hospitals Sewri in three shifts.

Infection Control Committee is framed in June 2011. Since then periodical medical checkup done every 3 months for Group of TB Hospitals employees. Personal Protective Equipment like N-95 Masks are given to all employees under 12 point preventive measures to prevent the Tuberculosis Infection.

In November 2013, 200 bedded separate hospital at Bahadurji Block under Group of TB Hospitals Sewri was started for MDR and XDR TB patients. Services of advance technology like LPA machine, Gene Expert and Liquid Culture Laboratory were started for early diagnosis of MDR & XDR TB patients. Rapid Culture (M.G.I.T.) & Liquid Culture Machine is purchased & patients tests are done accordingly.

For Bedaquiline novel drug on tuberculosis under Conditional Access Program, clinical trial was held by Directorate- Ministry of Health and Family Welfare, Government of India during 2016 to 2019 at Group of TB Hospitals Sewri Mumbai which is one of the six selected center for India. After successful trial, now Bedaquiline- novel anti TB drug is being given all over India to MDR and XDR TB patients through National TB Elimination Program.

BEAT Trial (short term TB treatment) a clinical trial for TB treatment was started in 2019 at Group of TB Hospitals Sewri Mumbai by ICMR- NIRT Chennai.

In COVID-19 epidemic Group of TB Hospitals Sewri started Tuberculosis Covid Co-infection Ward in April 2020. But as COVID 19 case rate decline, that ward was closed on 04/12/2021 and if Tuberculosis Covid Co-infection patients are found, they are send to Seven Hill Hospital which is under Municipal Corporation.

For Covid 19 Vaccination, on 21/05/2021 vaccination center started at Group of TB Hospitals, Sewri, Mumbai. Total 28164 beneficiaries vaccinated at center. Vaccination Center was shut down on 11/04/2022.

Pulmonary Rehabilitation Center was started on 01/12/2021 at Group of TB Hospitals Sewri Mumbai. Pulmonary Physiotherapy is being done to increase pulmonary capacity of patients with weaken lungs due to TB or other chest diseases. Facility of Pulmonary Function Test is available at center. Patients with weaken lungs due to post Covid can also take help of this center. Till date total 377 patients visited the center. All the treatment at center is free of cost.

Alcoholics Anonymous Organization gives counseling to chronic alcoholic TB patients at least once in a week at OPD and indoor wards of Group of TB Hospitals Sewri Mumbai. Psychiatrist of organization visit different wards of hospital. Name of patients is being kept confidential by organization and such patients keep themselves away from alcohol along with helping other patients for quitting alcohol by moral support. Such patients cure faster by regular medicine after quitting alcohol.



## Acworth Municipal Hospital for Leprosy:

Mr. H.A. Acworth founded Acworth Municipal Hospital for Leprosy on 7th November 1890 the then Municipal Commissioner of Mumbai.

Since 1st April 1991, the hospital has been taken over by Brihanmumbai Municipal Corporation as one of the specialized hospitals under the administrative control of the Executive Health Officer.

Services provided by Acworth Municipal hospital for leprosy:

Acworth Hospital provides comprehensive care to the leprosy affected patients.

- 1) **Inpatient Service:** Total indoor capacity of the hospital is of 240 beds. At present average occupancy are around 91. The most of the patients are admitted in the hospital due to the old leper Act. Old, deformed and abandoned patients are provided shelter in the hospital. Majority of the patients living here more than 20 years almost on a permanent basis. Presently patients are admitted for ulcers and lepra reaction.
- 2) **Outpatient Services:** Out-patient services include physiotherapy, social service, laboratory, dressing and pharmacy. Daily average OPD attendance is about 45 patients per day.
- 3) **Field Work:** Under National Leprosy Elimination Programme, the hospital carries out I E C activities in its project area i.e. Brihanmumbai Municipal Corporation wards (E, F/South and F/North) covering about 16 lacs population.
- 4) **Training:** The hospital provides training in leprosy to post-graduate and under-graduate allopathy and non-allopathy medical students as well as to student nurses, Social Science and O.T./ P.T. student. The hospital also offers training to Government Medical Officers, Non-medical assistants.
- 5) **Medical Records:** The hospital maintains statistical records and generates various reports thereby assessing the progress of N.L.E.P. in entire Mumbai.
- 6) Collaborative Programme of Acworth Municipal Hospital and NGO's:
  - ◆ Acworth Leprosy Museum: Provides scientific information about all aspects of leprosy.
  - ◆ Footware Unit: MCR footwear, Splints are provided to the leprosy patients at concessional rates.

## Health Education :

Acworth Municipal Hospital provide health education at E, F/S and F/N Wards. Which helps to eradicate misconceptions about leprosy. On the occasion of death anniversary of Mahatma Ghandhiji from 31st January to 13th February, leprosy fortnight is arranged by this hospital every year. During

this fortnight all active organizations effectively carry out public awareness and health education movement in their work premises.

	2019-20	2020-2021	2021-22
Total Leprosy Patients	166	19	335
MB patients among total patients	123	13	254
PB patients among the total patients	43	6	81
PR for Mumbai (Per 10000 population)	0.12	0.09	0.2

Total Leprosy Patients in the Project area (E, F/S & F/N Ward)	23
MB patients among total patients	15
PB patients among the total patients	08
PR for AMHL (Per 10000 population)	0.14

### Mumbai District AIDS Control Society:

Mumbai District AIDS Control Society (MDACS) registered under Charitable Trust Act is established by Brihanmumbai Municipal Corporation under the guiding principles of National AIDS Control Organization for prevention and control of HIV / AIDS in Mumbai. Major responsibilities of MDACS are as follows:

- ◆ Prevent the spread of HIV / AIDS
- ◆ To provide care, support and treatment services to people living with HIV / AIDS (Infected and affected).

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

#### Basic Services:

- ◆ Integrated Counseling and HIV Testing Centres (ICTCs) are established across the city in all Government / Municipal Hospitals / Maternity Homes. These services are freely available to all Walk-in / referred clients. Trained Counselors and Laboratory Technicians perform HIV Counseling and testing using standardized testing protocols with robust quality control.
- ◆ Early detection of HIV infection in pregnant woman is the mainstay of the program for preventing the transmission of infection from infected mother to baby. For this, Multi Drug Antiretroviral treatment is initiated during first trimester of pregnancy.
- ◆ Early Infant Diagnosis: All infants born to HIV infected mothers are screened at 6th week after birth and regularly till 18 months for HIV infection.
- ◆ There are 349 ICTCs which includes 45 stand-alone ICTCs, 5 mobile vans and 170 Facility Integrated ICTCs, 7 Metro sites and 35 (770 Private Nursing Home/ Corporate Hospital) Public Private partnership (PPP) providing facilities of counseling and HIV testing to ensure the access and availability of HIV counseling and diagnosis services.

**Anti Retroviral Therapy (ART):**

Treatment for HIV positive patients is made available through 20 ART Centres set up in various Hospitals in Mumbai. These centers are in 7 Medical Colleges, 6 Peripheral Hospitals, 5 are in public private partnership viz. Godrej, L&T, Wadia, K. J. Somiya and Mumbai Port Trust (MbPT), 2 in BrihanMumbai Municipal Corporation special hospitals (STD Clinic and TB Hospital). ART center for pediatric patients is operated through Pediatric Centre of Excellence, LTMG, Sion Hospital. Total 37462 patients living with HIV / AIDS are registered in active care of which 37410 patients are on lifelong treatment.

**Blood Safety:**

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. 21 Government, 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 born infections. Regular Voluntary Blood Donation Camps are organized in collaboration with Blood Banks and NGOs. Over the years, the number of voluntary blood donors has increased significantly reducing the risk of HIV infection through blood transfusion.

**Sexually and Reproductive Health Services:**

Unsafe sexual behavior leads to transmission of Sexually Transmitted Diseases (STDs) and HIV. STDs can be easily diagnosed and effectively treated by 'syndromic management treatment' approach. 27 designated STI/RTI clinics (DSRC) are set up in public health hospitals throughout the city with trained doctors and counselors who give treatment and counseling, condom promotion, partner notification and partner treatment. Effective management of STDs and counseling on responsible sexual behavior at STI clinics helps in prevention of HIV transmission. Regional STI training Reference Laboratory at B.Y.L. Nair Hospital is set up for etiological diagnosis of STI.

**Targeted Intervention:**

Targeted Interventions are aimed at offering prevention and care services to high-risk groups viz 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. 35 Targeted Intervention projects through NGOs/CBOs provide prevention services including HIV/STI screening and treatment services to these high risk groups in the city.

**Information, Education and Communication:**

Various awareness campaigns are held using mass media and outdoor approach among 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.

**Achievements:**

HIV positivity trend has witnessed a significant decline among the general clients (from 5.4% in 2011 to 0.79% in 2020) and Pregnant Women (from 0.36% in 2011 to 0.06% in 2020) in Mumbai.

Table No. 22.6: HIV/AIDS Control Programme Report (March 2020)						
HIV testing at Integrated Counseling and Testing Centers in Mumabi	Tested	Positive	Treatment for HIV positive patients at ART Centers in Mumbai	Adult	Children	Total
General Clients	391885	3078	Number of HIV Positive patients registered in active care	36006	1456	37462
Pregnant Women	149667	92	Number of HIV Positive patients on Anti-Retroviral Treatment (ART)	35956	1454	37410

**Environmental Pollution Research Center (EPRC):**

**Seth G.S. Medical College & King Edward Memorial Hospital**

**Executive Summary:-**

The year 2022 marks completion of fifty years since the Stockholm Conference which led to the designation of 5th June as the World Environment Day. The erstwhile theme ‘Only one earth’ holds true even today, probably more so now than ever before. There is great impetus to protecting what we have, conserving nature, getting climate change under some control and importantly predicting, and preventing, adverse health outcomes resulting from the rapid velocity of the changing climatic conditions.

As per the mandate in year 2021-22, Department of Pulmonary Medicine and Environmental Pollution Research Centre, completed the (1) study regarding analyzing presence of airway irritants in household cleaning agents and disinfectants, (2) Study of fungal spores in outdoor air, (near residential area of people who had mucormycosis).

In the year 2022 EPRC team will continue to study National Environmental Health Profile till year 2024.

A pilot study has been undertaken to evaluate effect of roadside vegetation near western express highway as an adaptation measure to combat vehicular pollution in year 2022.

1. Study of 26 commonly used Cleaning agents and disinfectant: gas liquid chromatography
2. Mass spectrophotometric analysis ( EPRC & GSMC MRU)



## Background:

The world has faced the COVID-19 pandemic for a couple of years. As we go back to normal, or in some cases, the new normal, there is an increasing use of cleaning and disinfectant agents in our households which may affect indoor air quality. Cleaning and disinfection in house hold was seen to trigger respiratory symptoms like wheezing, chest tightness. Hence in the year 2021, a study of commonly used floor cleaning agents, disinfectants was undertaken in collaboration with Multidisciplinary Research unit at KEM Hospital.

It was observed that there were multiple household cleaning agents used by citizens. A number of people reported symptoms suggestive of airway disorders, such a wheezing & chest tightness after using these agents. On enquiring regarding ‘trigger’ factor for respiratory symptoms, the use of multiple disinfectants & cleaning agents was identified as a contributing factor. In households, the frequency of cleaning and amount of cleaning product use has increased significantly as reported in literature. (1), (2)

A study of household cleaning agents and disinfectants was undertaken to know the concentrations of volatile organic compounds and other ingredients using gas liquid chromatography and mass spectrophotometry. 26 Commercially available cleaning agents purchased over the counter were studied.

## Aims:

1. To identify common active ingredients in household disinfectants.
2. To prepare an advisory for public awareness to avoid misuse and over exposure of chemicals.

## Results:

Sr. No.	Product Purpose	No. of products	Common Active ingredients
1	Surface/floor cleaner	13	Cresol, xlenol, Phenol, Cyclopentasiloxane derv. Cyclohexasiloxane derv., Tetrakis, Linalool tetrahydride, Trimethyl silanol, methyle salicylate, toluene, cyclotrisiloxane derv., Carbon tetrachloride, Trichloromethane eucalyptol, Dihydromyrcenol, camphor, careen, Butyl glycol, pinene, limonene, Terpinolene, camphene
2	Sanitizers	2	Ethanol, Isopropyl alcohol, cresol, trimethyl silanol, trisiloxane derv. Cyclohexasiloxane derv.
3	Disinfectants	11	Cyclopentasiloxane derv, cyclohexasiloxane derv, tetrakis, Linalool tetrahydride, cycloheptosiloxane derv., trimethylsilane, dihydromyrcenol, terpineol Benzyl alcohol, Tetraki, Rootanol, Eucalyptol, Camphor, Cymane.

Common active ingredients in floor cleaners (13), disinfectants (11) & sanitizers (2) are listed below in Table 1.

**Table 1 : Classification and common active ingredients in analyzed products**

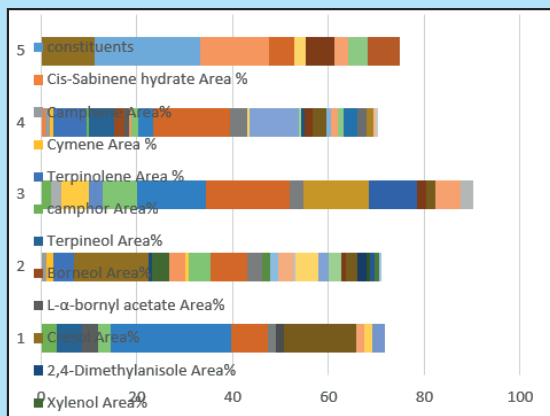


Figure 1 Chemical constituents of commonly used cleaning agents. (1: all-purpose cleaners; 2: floor cleaners; 3: bathroom cleaners; 4: surface cleaners; 5: sanitizers)

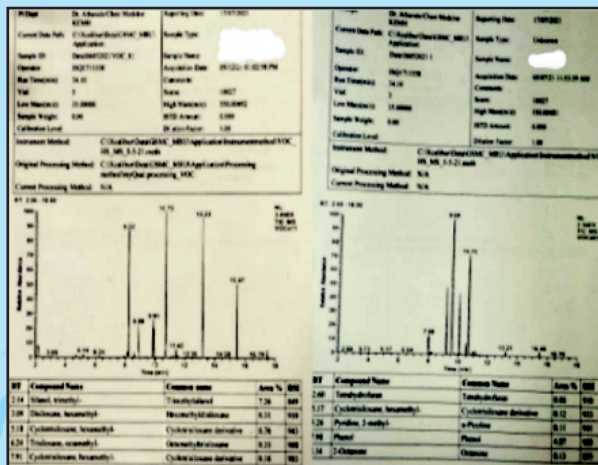


Figure 2 Mass spectrophotometry results of cleaning agents from Multidisciplinary Research Unit, Seth G S Medical College and KEM Hospital- performed on Xcalibur.

ON ANALYSING THE RESULTS OF CONSTITUENTS IN CLEANING AGENTS AND DISINFECTANTS IT IS OBSERVED THAT VARIOUS GROUPS OF CHEMICALS LIKE ACIDS, BLEACHING AGENTS CONTAINING CHLORINE CAN REACT WITH ORGANIC MATTER AND PRODUCE CHLORINATED COMPOUNDS WHICH CAN ACT AS ASMAGENS.

DO NOT MIX DIFFERENT CLEANING AGENTS USED FOR HOUSE HOLD PURPOSE.

**Advisory on use of cleaning and disinfection agents.**

1. Read the label of cleaning materials prior to use.
2. Limit the amount of cleaning products in use, as per amount written on the label.
3. Use as per instructions regarding dilution of the product.
4. Use personal protective equipment while using cleaning products (masks, gloves, eye protection)
5. Cross ventilation in home, bathroom has to be ensured, while using cleaning products.
6. Keep the cleaning products out of reach of children.
7. Store cleaning products away from fire, sunlight in cool place.
8. Hand washing is a good practice after use of cleaning products.
9. Check the date of expiry while buying the cleaning products.
10. Do not use floor cleaning, disinfection products for wiping packaged food, vegetables, fruits and greens.

11. When chemicals are mixed together, they may react and form a toxic gas and cause adverse health effects. For example, bleach when mixed with ammonia or quaternary ammonium compounds can form chloramine gas which is toxic.

**2. Study of Outdoor Environment for presence of fungal spores:**

Mucormycosis Outbreak post covid 19 in May-June 2021.

**Background:**

Mucormycetes, the fungi that cause mucormycosis live in the environment. Clinically important fungi of the Mucorales group can grow & are found in diverse ecological spaces such as soil dust, water, decomposing vegetation, on & in food etc. they are less represented in mycobiome studies of outdoor & indoor air. Occasionally Mucorales are found in water damaged buildings (Biotic environments supporting persistence of clinically Relevant mucoromycetes).

Though there is increase in number of human cases reported over past decade, environmental microbiology literature provides limited clue to how people with Mucormycosis acquire their infection. To understand the prevalence of fungi in outdoor surroundings of patients having mucormycosis, a study was undertaken at 69 outdoor locations around residential premises of patients with diagnosis of mucormycosis between 19th May to 15th June 2021.

**Method of Study:**

Outdoor air sampling was done outside residential areas of people diagnosed with Mucormycosis reporting to KEM Hospital. There were 639 patients with Mucormycosis during this period and 10% purposive sampling was done in 69 outdoor samples. High media filter was used with agar strips. Analysis of Agar strips was done by Department of Microbiology.

In 48 samples there was no growth of filamentous fungi, indicating that presence of outdoor environmental fungal spores may not have contributed to Mucormycosis outbreak during second wave of COVID-19 pandemic in Mumbai city. However, it is known that molds can cause worsening of respiratory symptoms in patients with underlying respiratory disease and therefore, adequate mitigation measures must be undertaken to prevent mold growth in indoor spaces.

BrihanMumbai Municipal Corporation ward	Nos.
E	1
F/N	5
F/S	14
G/N	1
G/S	7
H	4
K	12
L	2
M/W	6
R	9
S	8

**Molds and Indoor Environment:**

Molds produce tiny spores, similar to some plants producing seeds. Fungi of the genera, mucor, penicillium, aspergillus, Rhizopus, Alternaria and Cladosporium are indoor fungi.

Development of fungal spores is accelerated by limited ventilation, & high humidity and poor light. Fungal toxins in mold infected premises can lead to symptoms of sore throat, flu-like symptoms, chronic fatigue, headaches, skin changes etc. A single mold can produce 40 or more proteins that can cause allergy.

#### **Microbial volatile organic compounds:**

Compounds produced by molds are volatile and are released directly into air these are known as microbial volatile organic compounds (mVOCs) Because these compounds have unpleasant, strong odor, they can be source of odors associated with molds.

Fungal cell wall components are known as Glucans. They are small pieces of cell walls of molds which can cause lung and airway reactions.

Mumbai is a coastal megacity and flooding in low lying areas can lead to mold infestation. Health education of the public at large is undertaken by Environmental Pollution Research Centre through Asthma education programme to create awareness about mold remediation.

#### **For mold Remediation:**

- 1) Evaluate and investigate for moisture.
- 2) Identify source of water damage/moisture.
- 3) Clean with caution (using personal protective equipment) water damaged materials.
- 4) In areas with air conditioning air handling units need to be checked.
- 5) Dry, wet non moldy materials within 2 days to prevent mold growth.
- 6) Discard mouldy items that cannot be cleaned.

#### **Questionnaire-based study near access road of Western Express Highway:**

##### **Aim:**

To study potential effect of roadside vegetation on mitigation of air pollution exposure in localities near highways.

##### **Method:**

A pilot study was undertaken in an area of approximately 500 meters with roadside vegetation and without green cover. A questionnaire-based survey of respiratory morbidity and people's perception about presence of air pollution was conducted.



**Results:**

There was a significant difference in the perception of air pollution in residences immediately next to green cover and those within the gaps in the green cover. 6% of residents in the area with green cover perceived air pollution versus 40 % of residents in the areas without green cover. This was statistically significant (Chi square test,  $p < 0.001$ ). However, there was difference in the reported symptoms was not statistically significant.

This study shall be expanded and carried forward this year.



Figure 3 View of the area studied. Map from Google Earth. Yellow arrows indicate gaps in vegetation.

## 23. DISASTER MANAGEMENT

### DISASTER MANAGEMENT AND CENTRAL COMPLAINT REGISTRATION DEPARTMENT:

The Disaster Management Department (DMD) was set up in 1999 at the Municipal Head Office managed disaster in Mumbai. Department is upgraded with modern equipments situated on second floor in BrihanMumbai Municipal Corporation Head Office.

#### District Disaster Management Authority:

In the year 2011 Greater Mumbai Disaster Management Authority was constituted in exercise of the powers conferred by Sub-sections (1), (2) and (4) of section 25 of the Disaster Management Act, 2005 (53 of 2005) and rule 2 of the Maharashtra District Disaster Management, by appointing Municipal Commissioner of Municipal Corporation of Greater Mumbai as ex-officio Chairman of the Authority.

In the year 2018 as per the Government Resolution followed by the orders of the Hon'ble High Court the Districts Disaster Management Authority for the Mumbai City and Mumbai Suburban are constituted. Senior Most Additional Municipal Commissioner for Mumbai City and Mumbai of Suburban of Brihanmumbai Municipal Corporation are appointed as ex-officio Chairman of the District Disaster Management Authorities.



**Disaster Management Control Room**

#### Functions of Disaster Management Department:

1. Single – point source for all issues related to disaster management.
2. Hazard Vulnerability and Risk Assessment

3. Prevention and Preparedness
4. Coordinate with relevant agencies for reducing the severity of damage.
5. Response
6. Coordinate with relevant agencies for help and rehabilitation.
7. Command and Control agency between administration and field units.
8. Coordinate for early warning to citizens.
9. Coordinate for arrangement of food and water during emergency situations.
10. Coordinate the transportation of stranded and injured people during disastrous situation.
11. Coordinate for the transportation of critically injured people on high priority.
12. Coordinate for setting up temporary shelters.
13. Coordinate with NGOs.

**Objectives of Disaster Management Department:**

1. Coordinate for rapid and effective response during any disaster.
2. Improve coordination among all the responding agencies.
3. To utilize social media through Public Relation Office for disseminating disaster related information among citizens.
4. To encourage preparedness on every level.
5. To encourage for helping disaster affected people.
6. Impart Training to the Citizens and stakeholders.

**Emergency Operations Centre (EOC):**

The Disaster Management Department works 365 days x 24 hours throughout the year. It serves as a Command & Control agency between the administration and field units. It is a single-point source for all issues related to disaster management. It coordinates with various stakeholders for quick and effective response during a disaster.

1. Direct telephone line facility.
2. Television sets which are tuned to major news channels to keep abreast of the latest news.

3. In case of interruption in communication system HAM radio is used as alternative communication system.
4. '1916' helpline with 30 hunting lines are available for Citizens registered complaints related to major/ minor accidents, fire, earthquakes, bomb blast etc.
5. 24 Administrative ward control rooms, Back Up Control Room, 3 major and 2 peripheral hospitals and 25 outside agencies are connected with 55 hotlines provides regular updates about the situation in the Mumbai City and suburbs.
6. For monitoring disaster management activities a video wall of size 6200 mm long and 1744mm height has been installed. Video wall receives feed from 5361 CCTV cameras installed by Mumbai Police.
7. DMR is an advance communication system implemented by DM dept in January 2022. This system is installed in 24 ward control rooms, 37 stakeholders and on vehicles of designated Municipal officers. Total 326 DMR sets installed. This system has advance features like Broadcast Call, Emergency Call, Pre Recorded Messages, Intelligent Audio, Blue Tooth / Wi-Fi, Man Down & Loan Worker, Secured Encrypted Voice Communication, Better Spectrum Efficiency, Integrated Voice & Data (Speech to text & text to speech), Double Capacity Per Frequency Spectrum, Longer Battery Life, Facility for Group Call, Individual Call, Enabling Data Application viz. Dispatcher, GPS Location Tracking, Geo Fencing, Data & Voice Logger, Over the Air Programming, Text Messaging, etc.

**The following types of complaints are registered in Disaster Management Department:**

32 types of manmade and natural disasters are identified which are likely prone to Mumbai City and Suburbs which is categorized into 102 sub-major disasters like major/ minor accidents, landslides, felling of trees or unauthorized cutting of trees, water logging, house collapses, short circuits, floods, earthquakes, bomb explosions etc. On registration, these incidents are communicated to the concerned agencies for providing necessary assistance.

**Automatic Weather Stations (AWS):**

- ◆ 60 Automatic Weather Stations have been installed in Mumbai to get real time weather parameters.
- ◆ Weather Parameter data is refreshed after every 15 minutes.
- ◆ The data is monitored, analyzed and the warnings are issued accordingly.



### Flow Level Sensors:

- ◆ Flow Level Sensors are installed to monitor water level in rivers and lakes. It gives real time information in Disaster Control Room.
- ◆ This will help to initiate early evacuation action low lying areas in the vicinity. Flow Level Censors are installed at Dahisar, Poiser, Wakola, Mithi, Oshiwara rivers and Powai, Vihar Lake.

### Disaster Management Website:

The website 'dm.mcgm.gov.in' shows following information: High Tide-Low Tide time table, Weather forecast obtained from India Meteorological Department, Live weather parameters updated every 15 minutes, Traffic updates, Status of Local Trains, Status of Air Traffic etc.

### Disaster Management App:

Disaster Management Department, BrihanMumbai Municipal Corporation launched a new android phone application to aid in citizens response to disaster management and control. The app, Disaster Management BrihanMumbai Municipal Corporation, will provide real time information of whether parameters as well as help available at hand within a radius of 500 meters from the distressed person.

Though the application, on clicking on a landmark in the vicinity of the crisis, the app will automatically generate a list of police stations, hospitals, fire brigaded station and numbers of ward offices within a radius of 500 meters.

The app will also allow the user to save emergency personal contacts in a separate list in the app and calls to numbers will be made through the app in the person chooses to notify the contacts of the disaster.

### Emergency Support Functions (ESF):

- ◆ 14 Emergency Support Functions have been identified as an integral part to carry out emergency response activities, including preparedness, response during the event, and immediate recovery.
- ◆ In the events of major disaster or emergency where quick response is required, the lead agency will take action as per SOPs and work in coordination with the support agencies and other ESF's to mobilize and deploy resources to the affected area in Mumbai.
- ◆ In peace time, each ESF Plan and prepare for emergencies through review of the planning assumptions, drills, table top exercises and preparation and reviews of the Standard Operating Procedures.
- ◆ Preparedness and planning activities are essentials to ensure adequate response and to identify areas of actions that would ultimately reduce disaster risk.

### GIS based Command and Control System:

Disaster Management is shifting from reactive to proactive nature and approach. Therefore risk reduction before disaster is really very important aspect in modern days.

It has been also learned from the previous disasters that, prediction, early warning are also playing vital role in disaster management along with prevention, mitigation, preparedness, planning, relief & rehabilitation. GIS based technology provides best platform for development of such system. GIS has emerged as an effective tool in disaster management since GEO spatial data and socio economic information needs to be amalgamated for the decision making and in handling a disaster or to plan for tracking disasters in scientific manner.



Disaster Management Control Room

### Prime objective of developing GIS is to help DMD for:

- ◆ Prediction and Early Warning
- ◆ Risk reduction, planning and preparedness in pre-disaster phase
- ◆ Decision Support System
- ◆ Damage Assessment & Relief Management

GIS combines layer of information on various themes to enable DMD to take the most appropriate decisions under given circumstances.

1. DMD generate maps both at macro and micro level indicating vulnerability at different extends under different threats perception.
2. Locations likely to remain unaffected or remains comparatively safe could be identified.
3. Alternated routes to relief camps and important locations in the event of disruptions of normal surface communication could be worked out.
4. Smooth rescue and evacuations operation can be properly planned.

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

If main EOC at MHO is breaks down due to any reason, a backup control room has been setup at CIDM, Parel for continuous coordination. This backup control is equipped with Hotlines, Wireless communication, HAM Radio, Video Wall, ESF etc. similar to EOC at MHO. CIDM provides comprehensive training on disaster management and first responder to employee of BrihanMumbai Municipal Corporation/ Government/ Private companies, School and College students, Medical practitioners, Police etc to aware them about scientific methods of disaster management.

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

3D Auditorium and an Art gallery is developed to show realistic information about of various disasters. The major objective of these facilities is to make visitors aware of disaster and its preparedness. In this Art gallery has interactive dioramas, display, photographs and information boards for awareness generation of various disasters.

### **Post Graduate Diploma in Disaster, Fire and Industrial Safety Management (PGDDFISM):**

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

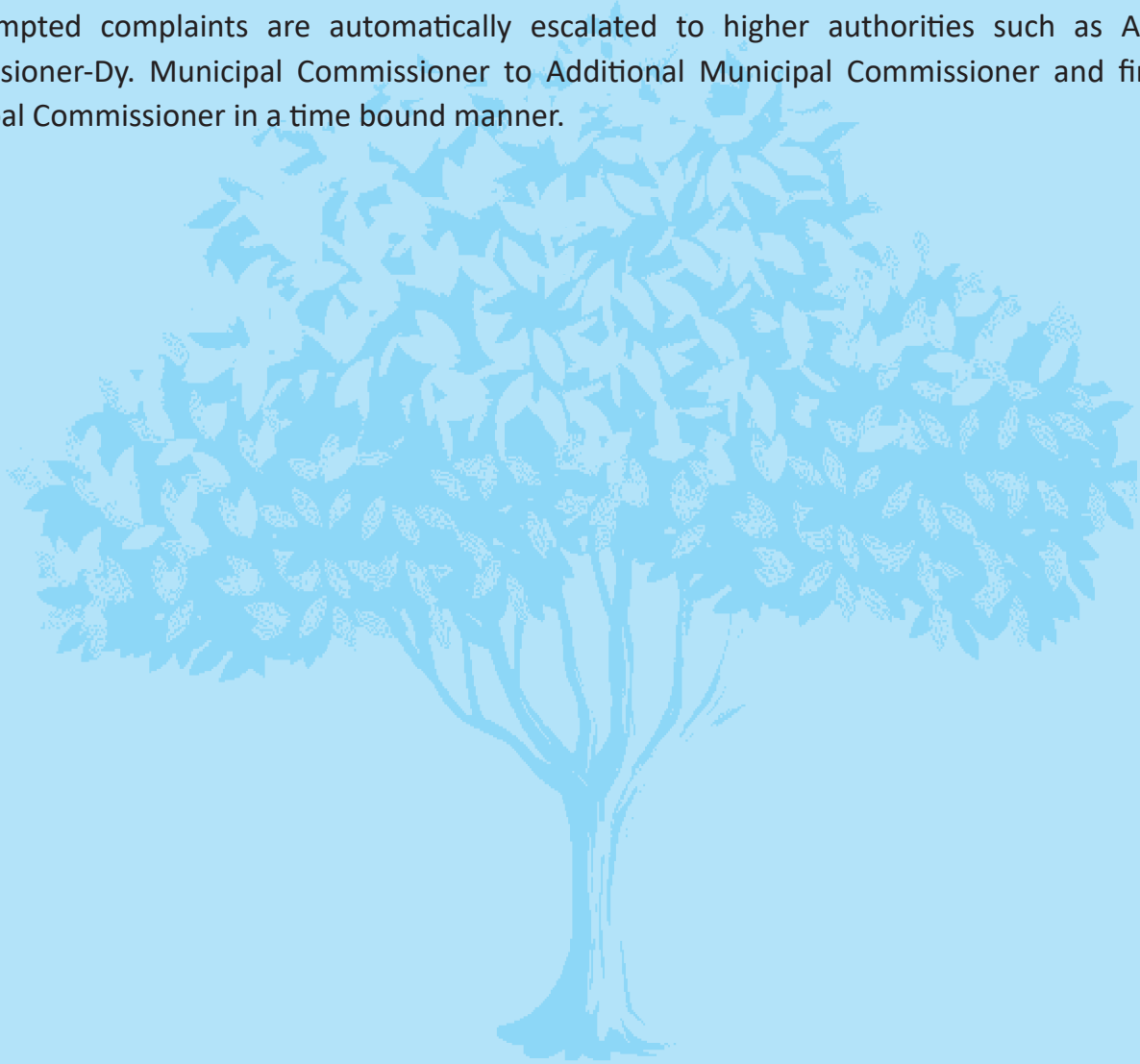
### **City Disaster Response Force (CDRF):**

On the basis of National Disaster Response Force (NDRF) at National level and State Disaster Response Force (SDRF) at State level, a City Disaster Response Force (CDRF) is establish at City level for Mumbai. The objective of formulating CDRF for Mumbai is to develop self sustainability for responding disasters like major fire, collapse structure, Chemical-Biological-Radiological-Nuclear etc. The personnel appointed for CDRF are from existing Security Force, Mumbai Fire Brigade, Doctors & Paramedics of BrihanMumbai Municipal Corporation are trained by National Disaster Response Force (NDRF).

### **Central Complaint Registration System (CCRS):**

On-line complaint management system (CPWM Module) has been started from year 2000 to register civic complaints. Central Complaint Registration System is working 24X7. Civic Complaints pertains to BrihanMumbai Municipal Corporation are registered on phone no.1916 in the central control room and sent to the concerned department through online system. Citizen can lodged their complaints on line on BrihanMumbai Municipal Corporation portal i.e. <http://portal.mcgm.gov.in>

Un-attempted complaints are automatically escalated to higher authorities such as Assistant Commissioner-Dy. Municipal Commissioner to Additional Municipal Commissioner and finally to Municipal Commissioner in a time bound manner.





## 24. PUBLIC RELATIONS DEPARTMENT

Efforts are being made by the Public Relations Department to better the image of BrihanMumbai Municipal Corporation in the minds of the citizens. Various ceremonies, programs, projects, activities, events, happenings, civic services and facilities provided by the municipal corporation in the year 2021-22 were publicized through several newspapers, news channels and also through social media. The department has taken steps to disseminate information through newsletters, photographs, video footage, interviews of office bearers and officials, newspaper advertisements, radio jingles, posters, billboards and other mediums of publicity. In particular, the department has been instrumental in providing daily updated health information to Mumbaikars in the wake of Covid-19 pandemic. The department has also carried out the work of disseminating factual information of various events taking place in the Mumbai Metropolitan City, especially during the monsoon and more so on heavy rain events or at times of disasters.

In the year 2021-2022, the department has issued a total of 640 newsletters. Also, more than 100 clarifications were given to counter criticism published in some newspapers about civic services and facilities rolled out by the corporation. This has helped the citizens to be aware of the facts and to refrain from believing any misconceptions and prejudices about the services provided by the corporation. News-releases, clarifications, messages about daily happenings and other useful information was also sent daily to the media through e-mails and whatsapp. Photography & videography of daily programs, ceremonies, tours, meetings, activities, projects etc. of the municipal corporation were done by the Public Relations Department.

About 2,697 advertisements of various departments of the corporation were given for publication in various newspapers. Civic Diary and Calendar of the year 2022, Ganeshotsav-2021 Information Booklet and 'BharatRatna Dr. Babasaheb Ambedkar Mahaparinirvana Day Information Booklet – 2021' was published by this department.

Press conferences of Hon. Mayor and other office bearers, Hon. Municipal Commissioner and other senior officers were organized on important civic issues of the municipal corporation. Daily news published in various newspapers of Mumbai, were compiled and scanned everyday and then sent by email and whatsapp to Hon. Mayor, Hon. Municipal Commissioner, Hon. Additional Municipal Commissioners and various Heads of the Departments. The Coffee-Table Book, based on the biography of BharatRatna Dr. Babasaheb Ambedkar, was also sold during the year along with the Civic Diary as well.

On the occasion of BharatRatna Dr. Babasaheb Ambedkar's Mahaparinirvana Day, on 6th December 2021, a photo exhibition was held at Chaityabhoomi (Dadar). Mahaparinirvana Day was broadcasted live on Social Media and on Doordarshan's National Channel too.

On the occasion of Marathi Language Fortnight, a total of four thousand colorful posters were published and distributed. Distribution of first year awards of Hinduhrudaysamrat Balasaheb Thackeray Gaurav Awards on the lines of State Government's Panchayat Raj Abhiyan Awards was organized at the hands of Honourable Mayor. The function was co-ordinated by the Public Relations Department along with the Chief Personnel Officer and Chief Labour Officer.

This department has also launched a public awareness campaign to inform citizens about the contact numbers of the 24 Ward War Rooms set up at ward level for the management of Covid-19 patients. The documentary in Marathi and English was also produced about the 'Project Victory', the project which was implemented for management of covid positive and covid suspect dialysis patients. As per the directions of the Central Government, a special public awareness campaign regarding National Clean Air Program was also implemented. Thus, the Brihanmumbai Municipal Corporation Public Relations Department is always ready to coordinate with the administrative of all wards of BrihanMumbai Municipal Corporation, the Government of Maharashtra and the Central Government as a link to various information sources

**ह्या आहेत प्लास्टिकच्या प्रतिबंधित वस्तू !**



प्लास्टिकपासून बनविल्या जाणाऱ्या पिशव्या (हॅडल असलेल्या व नसलेल्या)



द्रव्य पदार्थ साठविण्यासाठी वापरात येणारे प्लास्टिक पाऊच, कप



थर्मोकॉल व प्लास्टिकपासून बनविण्यात येणाऱ्या एकदाच वापरल्या जाणाऱ्या डिस्पोजेबल वस्तू उदा. ताट, कप्स, प्लेट्स, ग्लास, काटे, वाटी, चमचे, भांडे इ.



थर्मोकॉल व प्लास्टिकचा वापर सजावटीमध्ये करण्यास मनाई आहे



हॉटेलमध्ये अन्नपदार्थ पॅकेजिंगसाठी वापरले जाणारी भांडी व वाट्या, स्ट्रॉ, नॉन वोवन, पॉलिप्रोपीलीन बॅग्स्



**प्लास्टिकमुक्त मुंबई**  
प्लास्टिकमुक्त मुंबई हेच महापालिकेचे ध्येय!

आता, प्लास्टिक विरोधातील कारवाई अधिक प्रभावीपणे...



## 25. THE ACTION PLAN FOR CONTROL OF AIR POLLUTION OF MUMBAI

The issue of air pollution in Brihanmumbai is becoming more and more complex and the National Green Tribunal has directed the polluted cities to submit an Air Action Plan to bring the air pollution in the city within the prescribed standards. The Corporation prepared an Air Action Plan to control air pollution in the Mumbai city and submitted it to the Central Pollution Control Board for approval. The Air Action Plan has been approved by the Central Pollution Control Board on 9th October 2019 with some recommendations.

The Mumbai Air Pollution Control Action Plan places special emphasis on traffic congestion, air pollution and alternatively noise pollution. It also includes widening of roads, keeping roads in order, disciplining traffic, developing traffic control systems, creating green belts along traffic routes, etc. It is intended that various departments of the Corporation, Government of Maharashtra and Central Government will make joint efforts to achieve the objectives set out in the approved Air Action Plan. Every effort is being made to reduce the rising air pollution in the city by coordinating with various departments through the Environment Department of the Corporation with a view to prioritizing proper implementation by the Stake holders as per the guidelines in the plan.

It is important for the Stake holders Department of the Mumbai Air Pollution Control Action Plan to focus on the following issues and give priority to reducing air pollution within a specified period.

Sr. No.	Sub No.	Action	Responsible agency (ies)	Remarks
<b>1. Source Group: Vehicle Emission</b>				
1	(i)	Regular Checking of vehicular emission and issue of pollution under control (PUC) certificate.	RTO,	UC checking in every 6 months for BEST buses. 2. RTO approved agency appointed for issuing the PUC certificate. Certificate displayed inside every bus. 3. Random PUC check planned by RTO. 4. As per the provision of Motor Vehicle Act 1988, 1379 cases have been registered in year 2017 and 464 cases have been registered in year 2018 (up to 31st august) by the Traffic control Branch of Mumbai Police for non-compliance of PUC norms.
	(ii)	Promoting Green mode of transport by creating Cycle tracks.	MCGM	1. Promoting Cycle tracks -To promote the green mode of transport, 36 Km Cycle Track Works along with walkway and other infrastructure have been initiated in three Phases. Work of the Pilot project for 2 Kms has been completed in Mulund & from NITIE gate to Vijay Nagar Bridge in Marol.
	(iii)	Minimizing use of personal vehicles with promotion of public transport by bus fare reduction policy, GPS bus tracking mobile application development.	BEST	<ul style="list-style-type: none"> <li>• BEST declared reduction in the bus fare to promote maximum use of public transport on 8th July, 2019.</li> <li>• Intelligent Traffic Management System (ITMS) program launched by BEST. Under this program Mobile Application development is in progress for passengers to get information related about expected arrival of buses, route. It enables GPS tracking of the buses.</li> </ul>



Sr. No.	Sub No.	Action	Responsible agency (ies)	Remarks
	(iv)	Public awareness campaigns, workshops, VMS boards, Auto Expo for promoting Eco friendly Mobility	RTO, Traffic Police, MPCB	<p>1. MPC Board has organized "Eco friendly Mobility for Clean Air" workshop in collaboration with NEERI, Mumbai first where innovative solutions like commuter's choice program, retro fitment, introduction of Metro, etc. were discussed. With stakeholders including other government agencies, NGOs, expert from Industries, research institutes,</p> <p>2. Public Awareness message to observe lane discipline and air pollution control have been displayed on 36 VMS boards installed across the City. Similarly, various awareness programs are organized time to time especially during Road Safety Week.</p>
	(v)	Providing pay & park, PPL (Public Private Lot), multilayer parking and amenity sites for parking of vehicles to avoid parking at Non designated areas	Ch.E.(Roads & Traffic)_MCGM, MMRDA, RTO, Traffic Police,	<p>77 locations across Mumbai identified for Pay and Park. It may provide parking for around 15000 vehicles. Details of the identified locations, vehicle type, operating agency provided in the Annexure B 1.8.</p> <ul style="list-style-type: none"> <li>Also, 26 PPL (Public Private lot) and 29 amenity parking sites are identified. Hon'ble M.C. has approved the proposal for initiation of Mumbai Parking Authority by appointing Parking Commissioner, Mumbai along with support staff to enable the Parking Commissioner to lead the process of formation &amp; operationalization of Mumbai Parking Authority.</li> </ul> <p>The work is commenced under the guidance of Shri Ramakant Zhasir (OSD-MPA)</p> <ul style="list-style-type: none"> <li>To tackle the parking issues, MMRDA has identified 11 multi level parking locations within BKC.</li> <li>Traffic Control Branch of Mumbai has taken action against 2,99,721 and 3,23,324 vehicles in the year 2018 from (1st Sept. 2018 to Dec. 2018) and 2019 (upto 19th Aug.) respectively for traffic violation regarding illegal parking.</li> </ul>
	(vi)	Initiate steps for retrofitting of particulate filters in Diesel vehicles, when BS-VI fuels are available.	RTO, Vehicle Mfg. Industries	Letter issued to NEERI for conducting feasibility study for retrofitting of ECD (Emission Control Devices) and to evaluate effect of temperature. Based on the outcome of the study, results will be implemented.
	(vii)	Checking fuel adulteration and random monitoring of fuel quality data	Ministry of Petroleum & Natural Gas & Oil marketing Companies	<ul style="list-style-type: none"> <li>Government of India has formed Anti- Adulteration Cell headed by Director General. Having four deputy directors for four Zones of India. The authority is responsible for Prevention of adulteration &amp; other malpractices in the sale. In a Auto fuel Policy report, the problem of Fuel Adulteration is taken into consideration. Directions are given to oil companies.</li> </ul>
	(viii)	Widening of road and improvement of Infrastructure for decongestion of Roads.	Ch. Eng(DP)_MCGM, Assistant Commissioner (All wards)_MCGM	<ul style="list-style-type: none"> <li>Widening and Improvement of existing road of 2.8 km. from Oberoi Mall to Film City and 2.5 km. of Tansa Pipe</li> </ul> <p>Widening and reconstruction of bridge across Mithi River at Mahim Causeway awarded at the Contract Cost of ₹103.27 cr.</p> <ul style="list-style-type: none"> <li>As a part of the Transportation network, the Draft DP 2034 has provided the following roads on the revised Draft DP sheets: I. Newly proposed DP roads not in existence earlier, II. Sanctioned Revised Development Plan 1991 (SRDP1991) DP roads not developed till date and hence shown as proposed DP roads III. SRDP1991 DP roads partly developed and hence shown as existing roads with widening as per SRDP1991 road width, and IV. New DP roads proposed in NDZ and salt pan lands for better connectivity and integrated development. The construction of bridges, subways, FOB's, ROB's, tunnels etc., are not shown separately in Draft DP. Any such road structures would be constructed wherever required by MCGM as per feasibility and technical requirement, and will automatically form part of DP. Apart from these roads shown in the Draft DP 2034, the MMC Act 1888 has robust provisions in regard to roads, the details of these roads are with Dy.Ch.E.(traffic). The above proposals are for the horizon period 2014-2034. The implementation of these proposals is to be carried out by Roads department after taking over the land from the landowners after payment of compensation to the landowners.</li> </ul>
	(ix)	Construction of expressways/ bypass road to avoid congestion : a. Coastal Road. Gurgaon-Mulund link road	MMRDA, MSRDC	<ul style="list-style-type: none"> <li>The Coastal Road is an under construction 8-lane, 29.2-km long freeway that would run along Mumbai's western coastline connecting Marine Lines in the south to Kandivali in the north. The Coastal Road is projected to be used by 130,000 vehicles daily and is expected to reduce travel time between South Mumbai and the Western Suburbs from 2 hours to 40 minutes.</li> <li>Goregaon-Mulund link road project work is in process</li> </ul>



Sr. No.	Sub No.	Action	Responsible agency (ies)	Remarks
	(x)	Promoting Battery operated vehicles by addition of new buses for public transport and providing tax exemption for encouraging use of E-buses.	RTO, MMRDA, MCGM, BEST	<ul style="list-style-type: none"> <li>• Currently 6 buses are operated by BEST.</li> <li>• Under FAME India program 80 new buses will be included.</li> <li>• To improve air quality further BEST undertaking has made efforts to introduce buses with no emissions. With help of MMRDA shortly 25 Hybrid electric buses will be inducted into BEST fleet (15 Nos. buses already received) 4 Nos. of electric buses with zero emission are already in operation and 2 Nos. additional buses will be inducted shortly.</li> <li>• To promote electric Vehicles 50% of Tax exemption is under consideration of the State Government.</li> </ul>
	(xi)	Installation of weigh in Motion bridges at the Mumbai-Gujrat State border to prevent overloading of vehicles.	RTO, Transport Ministry	<p>5) There are 24 Check post with weigh bridges in Maharashtra. The eighteen (18) number are modernized &amp; automated. The work of modernization of three is in process.</p> <ul style="list-style-type: none"> <li>• Out of 24 only one is in Mumbai at the border of Mumbai &amp; Gujarat, located at Achad. It is automated &amp; fully modernized.</li> </ul>
	(xii)	Good traffic management with Synchronize Traffic movements by introducing Intelligent Traffic Management systems and installation of new signals.	Ch. E. (Roads and Traffic)_MCGM, Traffic Police, RTO	<p>Installation of new traffic signals (48 Nos.)</p> <ol style="list-style-type: none"> <li>1. Appointed consultant for preparation of Comprehensive Mobility plan.</li> <li>2. Currently, Mumbai Traffic control branch using 256 ATC signals and 371 non ATS for synchronized traffic movement.</li> <li>3. Proposal for Intelligent Management System (IMS) Implementations for the Mumbai city is sanctioned by GoM and procedure of selection of vendors for IMS installation is in process.</li> </ol> <ul style="list-style-type: none"> <li>• Installation of ATC (Area Traffic Control System) compatible signals planned (247 Nos.)</li> <li>• Addition of direction boards (70 Nos), Mandatory boards (11300 Nos) Mobility of vehicles increased by 20%. Thus resulting in reduced emission from vehicles.</li> </ul>
	(xiii)	Installation of Remote Sensor based PUC systems	RTO	<p>The Transport Commissioner office vide its letter dated 20.03.2019 informed all the head of the offices to start the PUC checking of the vehicles electronically and online from 01.04.2019.</p> <p>However this order of Transport Commissioner is challenged in the High Court Bombay vide Writ Petition no 5704/2019, All PUC Owners Association V/s Union of India and ors.</p> <ul style="list-style-type: none"> <li>• In Mumbai total 20 PUC centers have been computerized</li> </ul>
	(xiv)	Efforts for Sulphur reduction in diesel by providing low sulphur content Diesel.	Petroleum Industry, Transport Ministry	<p>City is supplied with BS IV stage diesel which has low sulphur content.</p>
	(xv)	Introduction of CNG, Hybrid Electric buses for public transport. Providing Metro and Monorail transport services.	RTO, Transport Ministry, Chairman (BEST), Chairman (Railway Authority), MRTS, MMRDA,	<ul style="list-style-type: none"> <li>• To improve the air quality BEST introduced CNG buses for the first time in India in 1997. The fleet of CNG was increased gradually and presently 62% of our fleet is operated on green fuel i.e. on CNG</li> <li>a) CNG buses of Nos. 1851 are already in BEST fleet since 1997. This technology has already established.</li> <li>b) Newly developed 25 Nos. of hybrid electric and 6 Nos. of pure electric is available.</li> <li>c) Commuter choice program is planned providing efficient public transport in the Mumbai City. To improve the air quality BEST Undertaking introduced CNG buses for the first time in India in 1997. The fleet of CNG was increased gradually and presently 62% of BEST fleet is operated on green fuel i.e. on CNG.</li> <li>d) To improve air quality further BEST Undertaking has made efforts to introduce buses with less / no emissions. With the help of MMRDA shortly 25 hybrid electric buses will be inducted into our fleet (15 buses already received)</li> <li>e) 4 nos. of electric buses with zero emission are already in operation and 2 nos. of more buses will be inducted shortly.</li> <li>f) AC buses procured by MMRDA and operated by BEST are in service from Bandra/ Kurla to BKC throughout the peak periods</li> </ul>

Sr. No.	Sub No.	Action	Responsible agency (ies)	Remarks
				<p>g.) Metro system is designed to reduce traffic congestion in the city. Project is built in three phases over a 15-year period, with overall completion expected in 2025</p> <p>h.) Monorail of 20.21 kilometres line is fully elevated, and connects Jacob Circle in South Mumbai with Chembur in eastern Mumbai.</p> <p>i) MMRDA also decided to appoint Indian Port Rail and Ropeway Corporation Ltd to prepare a project report for ropeways from Malad to Marve and Gorai to Borivli, each of 4.5km. The projects can boost east-west connectivity, along with connectivity to Malad Metro station on Metro-2A corridor and Marve; and further, to Borivli station on Western Railway, Metro-2A and Gorai jetty.</p>
	(xvi)	Implementing scrapping policy for old vehicles.	RTO, Transport Ministry,	<ul style="list-style-type: none"> <li>• BS II and BS III bus scrapping policy developed. Currently 425 BS II vehicles will be scrapped by 2021.</li> <li>• As per Section 59 of the Motor Vehicle Act the Central Government empowered to fix the age limit of Motor Vehicles, having regard to public safety and convenience, after the expiry of which the registration is required to be cancelled. The Central Government has not issued any notification under this section till date.</li> <li>• However, The State Transport Authority vide its resolution no 7/2013 has taken decision to restrict the age of taxis plying in the MMR for 20 years and 16 years for Auto rickshaws.</li> </ul>
	(xvii)	Installation of Waste to Energy projects and promoting Solar energy/ alternative energy sources in the Mumbai City.	RTO, Transport Ministry	<ul style="list-style-type: none"> <li>• Development of 600 TPD Waste to Energy project at Deonar, Mumbai on DBO basis is proposed.</li> <li>a) Consultant is appointed for preparation of DPR and tender documents of Waste to Energy project.</li> <li>2.5 MW Solar Energy Installation commissioned by H.E. department in Bhandup Complex of M.C.G.M. &amp; another 2.5mw is in process. Solar energy project executed by Building Construction department of M.C.G.M. is as follow 1) Cochin Street Award 25kw commissioned, Hawker Plaza Dadar-100kw commissioning awaited, Khataw Market Bldg.-25kw commissioning awaited, Engineering Hub Worli-360 kw work order issued. Byculia Fire Brigade 25KW in process for commissioning.</li> </ul>
	(xviii)	Implementation of BS – VI norms for procurements of new buses	Transport Ministry	<ul style="list-style-type: none"> <li>• Directly procuring BS VI vehicles. For new 1500 no. of buses with BS VI norms procurement tenders floated.</li> <li>• The Emission standards Bharat Stage VI will be applicable to passenger and goods vehicle having Gross Vehicle Weight not exceeding 3500 kgs, Two Wheelers, and Three Wheelers manufactured on or after 01.04.2020 for all models.</li> <li>• The Emission standards Bharat Stage-VI will be applicable to Two Wheelers Vehicle models manufactured on or after 01.04.2020</li> <li>• The Emission standards Bharat Stage-VI will be applicable to Three Wheelers Vehicle models manufactured on or after 01.04.2020</li> <li>• New Motor vehicles conforming to Emission Standard Bharat Stage-IV, manufactured before the 01.04.2020 will not be registered after the 30.06.2020</li> <li>• New Passenger and Goods Motor vehicles conforming to Emission Standard Bharat Stage-IV, and sold in the form of Drive and Chassis will not be registered after 30.09.2020.</li> </ul>
	(xix)	Providing good Inspection/ maintenance services to all BSII & BSIII	RTO, Transport Ministry	<ul style="list-style-type: none"> <li>• BEST having 27 Nos. of Depos and Central Workshops where high tech maintenance infra- structure is available.</li> </ul>

Sr. No.	Sub No.	Action	Responsible agency (ies)	Remarks
<b>2. Source Group: Re-Suspension Dust</b>				
2	I	Creation of green buffers along the Traffic corridors & installation of WAYU (Wind Augmentation and Purifying Units) at urban traffic intersection.	Superintendent of Garden_MCGM, Assistant Commissioner (Wards)_MCGM, Ch. E. (Roads and Traffic)_MCGM, MMRDA, MSRDC Ch. E. (DP)_MCGM	<ul style="list-style-type: none"> <li>•Garden Dept. has achieved the tree plantation target given by government time to time. In year 2016, 7800 trees have been planted in city and about 5000 saplings distributed free of cost. over 1000 garden, R.G. P.G. plots have been developed.</li> <li>•12 no. of spaces below flyover have been cleared of encroachments and developed by providing greenery (6cr)</li> <li>•23 number of spaces below flyover have been identified for beautification at the cost of ₹19 crore. This has resulted in providing additional area of around 35000 sq. Mtrs green space to Mumbai City</li> <li>•To mitigate the flood vulnerability of the city, the RDDP 2034, has demarcated buffers along rivers, creeks and nallas, on either side of the water courses, which are to be maintained as development free zones. This buffer zone will help reduce flooding risks by permitting water bodies to flood their banks without affecting people. These buffers, wherever possible, will be city wide open spaces that would be walkable along with their use for environment.</li> <li>•M.P.C.Board, IIT (B) and NEERI have come together to develop and install WAYU (Wind Augmentation and Purifying Units) to improve Ambient Air Quality at Urban traffic intersections. Initially, these (25 no) systems have been installed at 5 locations in Mumbai.</li> </ul>
	II.	Maintain Pothole Free Roads for Free Flow Traffic by implementing Road Maintenance management system (RMMS)	Ch. E. (Roads and Traffic)_MCGM, MMRDA, MSRDC, Assistant Commissioner (Wards)_MCGM	<p>To ensure that the roads are regularly maintained and to achieve longevity of the roads with lesser expenditure, Road Maintenance Management System (RMMS) is implemented in MCGM where every road is numbered and a small group of these roads are formed.</p> <ul style="list-style-type: none"> <li>•Responsibility of each road is put under a Sub-Engineer designated as Road Engineer (RE). RE prepares estimates and look after the maintenance of each road under his jurisdiction.</li> <li>• Priority list of the roads to be repaired is prepared.1.City Division- No. of roads=177, Cost 385.62Cr2. Eastern Suburb Division (E.S)- No. of road=125, Cost 285.22Cr3. Western Suburb Division (W.S)- No. of roads=137, Cost 234.96Cr</li> </ul>
	III	Introduce water fountains at Major Traffic intersection, wherever feasible by establishing Garden Infrastructure Cell (GIC).	Ch. E.(Roads and Traffic)_MCGM,MMRDA, MSRDC,Assistant Commissioner (Wards)_MCGM, Superintendent of Garden_MCGM	Regarding installation of fountains; Garden Infrastructure Cell (GIC) of MCGM is established. However, it is to state that it is not feasible as it could need additional area which may result in reduction of space for vehicles.
	IV	Greening of open areas, garden, community places, schools and housing societies	Ch. E. (DP)_MCGM, Assistant Commissioner (Wards)_MCGM, Ch. E. (Roads and Traffic)_MCGM, MMRDA, MSRDC	<p>An area of 300 acres at Cuff Parade is being developed as Green Park for which Tata Consultancy Engineering (TCE) has been appointed as Consultants</p> <ul style="list-style-type: none"> <li>•Special emphasis been paid to implementation of D.P.under which 29 plots have been developed as garden and parks at the cost of ₹11 crore.</li> <li>•The Draft DP 2034 has proposed following to be counted as Public Open Spaces viz. RGs, PGs, public/semi- community spaces, layout RGs, designated public open spaces, open spaces in educational institutions and other public institutions. The quantum of existing open spaces and proposed open spaces proposed in the Draft DP 2034 is as follows:- Reservations of PG/Garden/Green Belt etc.</li> </ul> <p>1892.22 Designations of RG/PG/Garden etc. 1633.67 Layout RG's which will be available after development of lands under layout. 964.78 NDZ +Tourism Development Area +Salt Pan 850 Aarey POS 800 Sanjay Gandhi National Park RG 588 Buffer for the Rivers/nallas 472.05 Open Spaces in the jurisdiction of Special Planning Authorities Viz. MIDC/MMRDA 428.05Out of proposed Conversion of Industrial lands 117.64Proposed Coastal Road Promenade 88</p>

Sr. No.	Sub No.	Action	Responsibl eagency (ies)	Remarks
	V	Blacktopping of metaled Roads including pavement of Road shoulders	Ch. E. (Roads and Traffic)_MCGM, MMRDA, MSRDC	<ul style="list-style-type: none"> <li>Asphalt and resurfacing of roads of 98 km. has been completed at the cost of ₹1148 crore</li> <li>In the year 2019-20 about 370 kms roads are proposed to be improved. Of this, about 106 kms roads are proposed in CC and 172 kms in Asphalt and resurfacing of about 92 kms roads is proposed.</li> </ul>
	VI	Providing Wall to wall paving (brick) by finalizing footpath improvement policy under which footpaths will be improved with Stencil Concrete, CC with marble chips finishing or Plain CC instead of Paver Blocks	Ch. E. (Roads and Traffic), MMRDA, MSRDC	<ul style="list-style-type: none"> <li>New footpath improvement policy has now been finalized with the aim to avoid illegal digging, focus on improvement of quality of footpath and increase their lifespan. Now onwards, all the footpaths will be improved with Stencil Concrete, CC with marble chips finishing or Plain CC instead of Paver Blocks.</li> <li>To minimize excavation of footpath, carriage way for maintaining underground utilities. The necessary actions for the same is made by providing online trenching permissions and adopting advance machinery and technology.</li> </ul>
	VII	Road design improvement by using C & D waste, fly ash in road construction.	Ch. E. (Roads and Traffic), MMRDA, MSRDC	<ul style="list-style-type: none"> <li>Use of C &amp; D waste, fly ash in road construction project is under evaluation. The policy of resurfacing, change in design, change in tender condition and registration rules has resulted in a major improvement in road conditions.</li> </ul>
<b>3. Source Group: Biomass/trash burning, landfill waste burning</b>				
3	(i)	<p>Launch extensive drive against open burning of biomass, crop residue, garbage, leaves by appointing Nuisance Detectors and Clean-up Marshals are appointed.</p> <p>Providing door to door garbage collecting services.</p>	Ch. E. (SWM)_MCGM	<ul style="list-style-type: none"> <li>As majorly Door to Door collection is being practiced, no occurrences are reported. Moreover to monitor and control these kinds of lapses, Nuisance Detectors and Clean-up Marshals are appointed.</li> </ul>
	(ii)	Providing Organic Waste Compost machines , decentralization of processing of Waste, dry waste collection centers.	Ch. E. (SWM)_MCGM	<p>The system of separate collection is in place. Organic Waste Compost machines are proposed to be installed in all Municipal markets.</p> <ul style="list-style-type: none"> <li>Efforts are being taken to motivate decentralization of processing of waste. Dry waste is segregated at 32 dry waste centers operated by NGOs.</li> <li>Bulk waste Generators are encouraged to install compost pits/OWC machines. Total 247 compost pits are developed all over Mumbai.</li> <li>Nuisance Detectors and Clean-up Marshals are appointed. The horticultural waste generated at plots with garden department is collected regularly and converted into compost within plot or nearby plot. The compost generated through this is utilized as manure in MCGM gardens. Total 247 compost pits are developed all over Mumbai.</li> <li>Development of 600 TPD Waste to Energy project at Deonar, Mumbai on DBO basis.</li> <li>Tenders are floated for installing OWC machines in Markets. Composting pits are being erected in Gardens.</li> </ul>
	(iv)	Strict compliance of ban on open burning	Ch. E. (SWM)_MCGM	<ul style="list-style-type: none"> <li>Ban on burning of waste on land, littering/throwing of waste is imposed in MCGM limits and the provisions are enforced through Bye-Laws and Nuisance detectors, clean-Up Marshals appointed specially for that.</li> <li>Burning of garbage is prohibited in the jurisdiction of MCGM, as per provisions of Greater Mumbai Cleanliness and Sanitation Bye- Laws, 2006 under clause no. 5.10. For violation of above clause, the fine upto Rs. 100/- is imposed against the nuisance creators/defaulters</li> <li>For effective implementation of Greater Mumbai Cleanliness and Sanitation MCGM has also authorized the section Junior Overseer to impose the fine for nuisance creators/defaulters.</li> </ul>



Sr. No.	Sub No.	Action	Responsible agency (ies)	Remarks
<b>4. Source Group: Industries</b>				
4	i	MPC Board has issued appropriate direction to the defaulting industries time to time for non complying industrial units. Regular surveillance performed based on randomized sampling plan.	MPCB	Board has issued appropriate direction to the defaulting industries time to time.
	ii	Sulphur reduction in fuel by using low sulphur content Imported coal in Thermal Power plant. Installation of FGD to reduce SO <sub>2</sub> emission from TPP.	Industry (Thermal Power Plant), MPCB	Already FGD were provided at M/s. TATA power company ltd. For reduction of sulphur as well as they are using 100% imported coal with 0.15 % of sulphur and 5% ash content.
	iii	Improved Combustion technology	Industry (Thermal Power Plant), MPCB	M/s. TATA power company installed and operated a state of art technology for coal handling i.e. Screw conveyer with closed the pipeline system.
	iv	Alternate fuel- Hotel industry directed to change fuel pattern from HSD to Natural Gas.	Industry (Hotels), MPCB	Most of the Hotel industry change fuel pattern from HSD to Natural Gas.
	v	Promoting cleaner industries	MPCB, Industries Dept	MPCB promoting use cleaner fuel in various hotel industries. Accordingly consents to be prescribed with condition to change to cleaner fuel pattern to industries & new proposed industries to opt cleaner fuel.
	vi	Location specific Emission reduction. Petrochemical Industries are directed for VOC emission control.	Industry (Petroleum Refinery), MPCB	MPCB directed to all industries in Mahul area to provide continuous VOC monitoring stations as well as provide advance VOC control measures. Refer Annexure A for details.
	vii	RMC industries directed for Fugitive emission control	Industry (Petroleum Refinery, RMC), MPCB	MPCB had issued gazette notification regarding guidelines for RMC
	viii	Industries allowed with stringent Environmental norms only.	MCGM, MI DC, MMRD & Industries Dept.	Industries allowed with stringent Environmental norms only.
	ix	Installation/ up gradation of air pollution control systems in Thermal and Petrochemical industries.	Industry (Thermal Power Plant, Petroleum Industry, Hotels, etc.), MPCB	<ol style="list-style-type: none"> <li>1. MPCB had issued gazette notification regarding guidelines for RMC</li> <li>2. M/s. TATA power company installed and operated a state of art technology for coal handling i.e. Screw conveyer with closed the pipeline system.</li> <li>3. Already FGD were provided at M/s. TATA power company ltd. For reduction of sulphur as well as they are using 100% imported coal with 0.15 % of sulphur and 5% ash content.</li> <li>4. All refinery and petrochemical handling industries in Mahul area had improved their VOC handling process with necessary control measures to reduce VOC. 5. Most of the Hotel industry change fuel pattern from HSD to Natural Gas.</li> </ol>
	x	Use of high grade coal made compulsory in Tata thermal power plant.	Industry (Thermal Power Plant), MPCB	M/s. TATA power company installed and operated a state of art technology for coal handling i.e. screw conveyer with closed the pipeline system.
	xi	Regular audit of stack emissions for QA/QC	MPCB	<p>All 17 category industries in suburban area has provided continuous source monitoring and ambient air monitoring system. Real time data connected to MPCB &amp; CPCB server. The Maharashtra Pollution Control Board (MPCB) launched India's first star-rating programme for industries in 2017. The</p> <p>Star-rating programme is a distinctive transparency initiative which leverages existing regulatory data on emissions to increase industrial compliance towards norms. At least one stack monitoring performed per quarter.</p>

Sr. No.	Sub No.	Action	Responsible agency (ies)	Remarks
<b>5. Source Group: Construction and Demolition Activities</b>				
5	(i)	Enforcement of construction & demolition rules. Setting up of C&D Waste processing facility.	Ch. E. (SWM)_MCGM	<ul style="list-style-type: none"> <li>•MCGM is already implementing C&amp;D(M&amp;H) Rules,2016 in city. Also C&amp; D Rules 2016 is being complied w.r.t. provision of separate facility for collection and storage, payment of charges.</li> <li>•A processing facility is to be set up. Tenders are invited.</li> <li>1) C &amp; D transport NOC is issued by Auto-DCR (web based system developed under Ease of Doing Business scheme).</li> </ul> <p>As regards to the Dust mitigation, the condition is incorporated in I. O. D. conditions, while approving the building construction permissions. As per the condition, the 'Debris Management Plan' shall not be get approval from Zonal Executive Engineer (SWM) if the conditions therein is not complied with.</p>
	(ii)	Control measures for fugitive emissions from material handling, conveying and screening operations through water sprinkling, curtains, barriers and suppression units	Ch. E. (SWM)_MCGM	<p>MCGM is already implementing C&amp;D(M&amp;H) Rules,2016 in city, which insists on control measures at site, before work commences. The approved Debris Management Plan includes such control measures.</p> <ul style="list-style-type: none"> <li>•The construction permit is granted only after teh builder/developer obtains valid C &amp; D waste management permission from Solid Waste Management department. The whole process is ONLINE, on 'Auto-DCR' portal.</li> <li>•Wheel washing facility has been provided for cleaning of vehicle tyres before entry and exit at various construction work sites except at few sites</li> <li>•Regular washing of carriageway, footpath within the construction sites and vicinity of the work area is being carried through the water sprinkling.</li> <li>•All soil and mucktransportation trucks/dumpers covered by tarpaulin sheet during transportation.</li> </ul>
	(iii)	Better construction practices with PM reduction for MMRCL construction.	Ch. E. (DP)_MCGM, Ch.E(Road s and Traffic)_MCGM, MMRDA, MSRDC, MPCB, SIC_MCGM	<p>MMRCL Construction Policy:</p> <ul style="list-style-type: none"> <li>•Regular water sprinkling carried out at all raw material /muck storage and on internal/ affected public roads at all construction work sites (1Cr)</li> <li>•Storage silo of cement are equipped with dust catcher (0.5 CR)</li> <li>•Raw material storage at the batching plant covered by close shed and provided with roof top sprinkling and fogging system. (0.6 CR)</li> <li>•All conveyer belts at batching plant covered with claddings. Material transfer points are covered with GI tin sheets and water sprinkling arrangement. (0.3 CR)</li> <li>• Strengthening of water sprinkling system for control of air pollution control. (0.2 CR) Regular air monitoring of RSPM, PM2.5, NOx, SOx and CO is being carried out by MoEF and NABL approved third party at construction and RMC/ casting yard sites as per CPCB guidelines.</li> <li>•The Draft Development Promotion &amp; Control Regulation 2034 has proposed that the DCRs should grant permissions consistent with the policies and objectives of the Draft DP.</li> </ul>
	(iv)	Ensure carriage of construction material in closed /covered Vessels	Ch. E. (SWM)_MCGM	<p>MCGM is already implementing C&amp;D(M&amp;H) Rules,2016 in city, which insists on control measures at site, before work commences. The approved Debris Management Plan includes such control measures.</p>
<b>6. Source Group: Domestic fuel burning</b>				
6	i	Shift to LPG from solid fuel & kerosene for domestic applications	Petroleum Ministry, MNGL, MCGM	<ul style="list-style-type: none"> <li>•Pradhan Mantri Ujjwala Yojana was launched in Mumbai, Maharashtra</li> <li>•10 Lakh LPG connections will be released in Mumbai covering all APL/BPL families in the State</li> </ul>

Sr. No.	Sub No.	Action	Responsible agency (ies)	Remarks
<b>7. Source Group: DG Sets</b>				
7	(i)	Monitoring of DG sets and action against violations	MPCB	<ul style="list-style-type: none"> <li>As Mumbai and Mumbai suburban city very rare electricity interruption due to which very rare use of DG set as well as most of the DG set as provided with necessary control equipment and enclosures.</li> </ul>
	(ii)	Reduction in DG set operation/ Un-interrupted power supply	Power Generation and Supply Companies -Reliance, BEST	<ul style="list-style-type: none"> <li>As Mumbai and Mumbai suburban city very rare electricity interruption due to which very rare use of DG set as well as most of the DG set as provided with necessary and enclosures.</li> </ul>
<b>8. Source Group: Bakeries/crematoria</b>				
8	i	Use of LPG in Hotels and "dhabas"	Petroleum Ministry, Ch. E. (M & E)_ MCGM, EHO_ MCGM, MPCB	<ul style="list-style-type: none"> <li>Commonly used fuel is either LPG gas or Electricity for preparation of eatable, which does not create much air pollution</li> </ul>
	ii	Use of LPG in Bakeries	Petroleum Ministry, Ch. E. (M & E)_ MCGM, EHO_ MCGM, MPCB	<ul style="list-style-type: none"> <li>Fuel such as LPG gas, Electricity, diesel is used for preparation of bakery products. There is no air pollution due to use of LPG gas or Electricity.</li> <li>As per the DC Regulation 1991 vide sr. no. 55 named as "Services Industries Zone (I-1 Zone)" vide Table 23 - Manufacture of bakery products the special conditions mentioned are : (i) Fuel used for bakery products shall be electricity, gas or smokeless fuel. (ii) No floor above the furnace portion (iii) Where only electric oven is used, an additional heating load of 24 KVA permitted per establishment.</li> </ul>
	iii	Use of Piped Natural Gas (PNG) for Human cremation.	Chief Engineer (Mechanical & Electrical)_ MCGM	<p>Present Scenario:1) Total Number of Electric furnaces with Air Pollution control Mechanism = 23 Nos.; 2) Number of Electric furnaces proposed for PNG conversion = 8 Nos.;</p> <p>3) New PNG Furnaces Proposed = 12 Nos.;4) Total No. Of Wood Pyres= 196 Nos.;5) Total Pyres with Air Pollution control mechanism installed = 167 Nos. Phase - I = March 2018 (08 Electric Furnaces to be converted in to PNG Furnace and 06 New PNG furnaces to be Installed at three New Locations) Phase - II = March 2019 (05 Electric Furnaces to be converted in to PNG Furnace and 06 New PNG furnaces to be Installed at three New Locations) Phase - III = March 2020 (10 Electric Furnaces to be converted in to PNG</p>
<b>9. Source Group: Other (City Specific)</b>				
9	1	Sampling at many more locations on grid pattern Study and analysis of hourly data to understand contribution of different pollutants	MCGM, MPCB	<ul style="list-style-type: none"> <li>Forming joint committee with concerned stakeholders for combined action plan.</li> <li>Monitoring and review mechanism at every quarter to decide modifications in the monitoring mechanism.</li> <li>All planning to install monitoring stations and data to be forwarded fortnightly to MCGM for consolidation and analysis in joint committee which is expected to meet monthly.</li> <li>At present there are SAFAR stations and MCGM is monitoring at 5 stations. MPCB already provided 11 CAAQMS station and proposal for additional 4 CAAQMS stations.</li> </ul>
	2	Source Identifications per emission inventory the percent emission contribution is around 33% from Industrial sector to the whole of Mumbai.	MCGM, MPCB	<ul style="list-style-type: none"> <li>MPCB awarded work order to IIT(B) and NEERI. Work is in final stage of completion. As per emission inventory the percent emission contribution is around 33% from Industrial sector to the whole of Mumbai.</li> <li>Among the industries Tata power fuel contribution of PM is about 22.84% the Red LSI i.e. refineries, chemical and fertilizer companies are shares 3.53%</li> <li>All MSI &amp; SSI (R, O, G) adds 6.6% of PM to the city</li> </ul>
	3	Action plan to address large industries (e.g. oil refinery and fertilizer)	Petroleum Industry, MPCB	enclosed ANNEXURE-A

Sr. No.	Sub No.	Action	Responsible agency (ies)	Remarks
	4	Source Apportionment (SA) and Emission Inventory (EI) MPCB awarded work order to IIT(B) and NEERI.	MPCB, MCGM	<ul style="list-style-type: none"> <li>• MPCB awarded work order to IIT(B) and NEERI. Work is in final stage of completion.</li> <li>• As per emission inventory other area sources though called area sources, are limited to small regions (viz. Open eat outs, bakeries, crematoria and hotels) and therefore, their impact does not seem to be wide ranging and across the city.</li> <li>• Emission from Metro line development is time bound activity for at least 5 years. For point source, outcome of EI and SA study explained in above pt. 9(2)</li> <li>• For line source i.e. Vehicular pollution, study presented for emission load reduction based on emission factor calculation. Reduction in emission load predicted due to proposed metro rail.</li> </ul>
	5	Public Awareness and Complaint Redressal Mechanism developed by respective stakeholders.	MPCB, MCGM	<ul style="list-style-type: none"> <li>• Concerned stakeholders will be informed to take care of public awareness and to establish Complaint Redressal Mechanism for the complaints under their control.</li> <li>• Complaint Redressal Mechanism for the complaints under control of MCGM is already in operation on MCGM portal (<a href="https://portal.mcg.gov.in">https://portal.mcg.gov.in</a>) under Complaint</li> <li>• Complaint Registration for receiving all types of complaints.</li> <li>• MPCB has conducted awareness program above mitigation of NOx and particulate matter and SO2 at Bandra while installing WAYU (Air purification machine at heavy traffic signals like bandra area).</li> </ul>
	6	Citizen Access to Transportation (CAT), School Zone Traffic Improvement Programme (szTIP), Quite KEM (Q KEM), Monitoring of air pollution by planning authority in their jurisdiction	MCGM	<ul style="list-style-type: none"> <li>• This is the proposed special initiative of MCGM. The one of the reason for the traffic jam is the stopping of the vehicles for dropping and pick up of the passengers outside malls, multiplex schools etc</li> <li>• The School bus should allowed to drops the children inside the school ground if the school ground is located inside the school.</li> <li>• Parking should be on the nearby ground in consultation with local authorities i.e. Ward and Traffic Police. Parking of school buses on roads should not be allowed.</li> </ul>



## 26. MUMBAI CLIMATE ACTION PLAN

Mumbai is the capital of Maharashtra and also financial capital of the country. The various developments taking place in this metropolis have a direct impact not only on the economy of the state but also on the economy of the country. This coastal metropolis is currently facing many problems due to climate change. Unseasonal rain, heavy rainfall, precipitation, heat waves, urban pollution etc. against this backdrop, the 'Mumbai Environment Action Plan' prepared by the Brihanmumbai Municipal Corporation is the first step taken to curb environmental change and its possible side effects. Brihanmumbai Municipal Corporation is the first municipal corporation in the country to prepare such an Environmental Action Plan.

### Concept of Planning

Government of Maharashtra and Mumbai Municipal Corporation started preparation of Environment Action Plan on August 2021. This plan was prepared in collaboration with 'C40 Cities Network' and 'World Resources Institute of India'. At this time, the suggestions of experts, research institutes and common citizens were taken into consideration.

The launch ceremony of the ambitious initiative of the Mumbai Climate Action Plan (MCAP) concluded on 13th March 2022. The MCAP is committed to a net zero emission by 2050. The MCAP will be on all inclusive strategy to dealing with the effects of climate change on Brihanmumbai Corporation area, focus on applications that reduce the severity of problems and adapt to climate change.

### Objective of Planning

The 'Mumbai Environment Action Plan sets short-term and long-term environmental objectives for the city. Accordingly, considering the base year 2019, the target has been set to reduce carbon emissions in Mumbai by 30 percent by 2030 and 44 percent by 2040. Ultimately, carbon emissions are expected to drop to zero by 2050. Coal-based power generation is the largest source of carbon emissions. Therefore, by the year 2030, 50 percent of the total energy generation will be generated from sustainable sources. This ratio will be increased to 90 percent by the year 2050.

In the Mumbai Climate Action Plan, future emissions have been analysed on the basis of the following three scenarios.

1. Emissions will be around 64.8 million tons per year by 2050 if current day-to-day environmental conditions are not improved.
2. Existing and planned scenarios include local, regional or national measures policies and programs to reduce emissions. Accordingly, emissions are expected to be 51.3 million tonnes per year by 2050. It represents an increase of 119.4% over base year (2019) emissions.

3. While implementing the Mumbai Climate Action Plan, targets have been set to reduce emissions by 27% by 2030 and 72% by 2050.

### **The Mumbai Climate Action Plan aims to focus on six key actions.**

1. **Power and Buildings:** To build energy and power generation climate-friendly infrastructure with minimal carbon emissions.
2. **Sustainable Transport:** Increasing the use of public transport and promoting zero carbon sustainable transport.
3. **Sustainable Waste Management:** Minimizing use of landfills Emphasis on decentralized waste management solutions schemes. Also to manage the land in a scientific manner.
4. **Urban Greening and Biodiversity:** Increasing urban green cover and permeable land cover to reduce urban atmospheric heat. Making green spaces available to all. To restore and conserve biodiversity.
5. **Air Quality:** Controlling on increase pollution. Enhancement of Air Monitoring System and Emphasis on Data Collection. Decentralization of planning as well as increasing public awareness on health.
6. **Floods and Water Resource Management:** Build mechanisms and infrastructure to cope with floods, increase water storage capacity, reduce pollution and restore aquatic ecosystems. Supply clean drinking water at affordable rates. Increasing availability of clean and safe sanitation and managing emergency risk.

### **Special Cell to Combat Climate Change:**

Dealing with the issue of climate change requires coordination between different departments. Strict implementation of the plan The need to have a designated authority for identification of carbon emission sources and their assessment etc. has been expressed in Mumbai's Climate Action Plan. In this background, it is aimed to expand the scope of work of the BriahnMumbai Municipal Corporation's Environment Department and transform it into the 'Environment and Climate Change' Department. Additional Municipal Commissioner (City) will be entrusted with the role of coordinating officer of this department. Objectives of the newly established Department of Environment and Climate Change are;

1. Coordinating tools and using state-of-the-art technology across all departments to achieve climate goals.
2. Develop guidelines for new infrastructure and building projects.

3. Focusing on strict implementation of Mumbai Environment Action Plan.

**The Department of 'Environment and Climate Change' will be divided into the following three sub-divisions.**

1. **Monitoring, Assessment, Report Sub Division:** Coordinating with all Departments and Circle Offices of Brihanmumbai Municipal Corporation and implementation of Action Plan and Information on Greenhouse gas Emission Sources.
2. **Remedial Planning Sub Section:** Remedial Planning on Climate Change Issues.
3. **Building and Transport Sub-Division:** Efforts to reduce carbon emissions from buildings and transport sectors.

The Mumbai Climate Action Plan will submit a report every six months to the 'Maharashtra Council for Climate Change' to periodically ensure that the plan is being strictly implemented.

'Mumbai Climate Action Plan' is available in detail at <http://masap.masigm.goa.in>.



## SALIENT FEATURES OF MUMBAI'S ENVIRONMENT

1. Due to the inverse ratio of the total area and population of Brihanmumbai, there is a stress on the facilities in the city of Mumbai and it is seen that it has a serious impact on the Environment.
2. In the year 2021-22, about 40,000 trees were planted on the open space available in the city area through the Brihanmumbai Municipal Corporation. Also, in the year 2022-23, the target of planting 25,000 trees has been set.
3. According to Brihanmumbai Municipal Corporation Tree Census, the total number of trees in 24 Wards is 29,75,283. 'N' Ward has maximum number of trees as 2,92,965 and 'C' Ward has less number of trees as 5,756.
4. A Ward-wise percentage review of contaminated water samples shows a reduction in the percentage of contaminated water samples in 2021-22 as compared to the previous 2 years.
5. As per Brihanmumbai Municipal Development Plan- 2034, from dt.08.05.2018. the "Rain water Harvesting" condition is binding to all developments having plot area 500 Sq. Mts.& more.
6. Under the National Clean Air Programme, Brihanmumbai Municipal Corporation for creating public awareness among the citizens towards segregation of wet waste and dry waste, composting from waste within the housing complex premises, not burning waste elsewhere, avoiding the use of plastic. Such messages are disseminated through radio jingles, hoardings at bus stops and newspapers.
7. About 4,500 MT municipal solid waste are received daily at the Kanjur Landfill site, processed by bio-reactor technology in a scientific manner .
8. BEST is committed to reducing air and noise pollution in BrihanMumbai and accordingly electrification of the entire BEST bus fleet by 2025-26 .
9. Brihanmumbai Municipal Corporation's English medium school 'Mumbai Public School' provides quality education facilities for students from KG to class 10th.
10. The ambitious project 'SAFAR-MUMBAI' is a joint venture of Brihanmumbai Municipal Corporation (BMC), Indian Institute of Tropical Meteorology - Pune (IITM - Pune) Indian Meteorological Department - Mumbai (IMD - Mumbai). Through this initiative, location-wise Air Quality Index(AQI) in Brihanmumbai Municipal Corporation, current weather conditions, one to three days forecast, UV intensity and health advice available to Mumbaikars through SAFAR -Air mobile app.





**Swarajyabhumi, Girgaon Choupaty**



**Mahim Beach**





**Flyover over R. M, Bhatted Road, Borivali West**