



CITY SANITATION PLAN FOR PANVEL MUNICIPAL COUNCIL



PREPARED BY

ALL INDIA INSTITUTE OF LOCAL SELF GOVERNMENT, MUMBAI
Regional Center for Urban & Environmental Studies



WITH SUPPORT OF
PANVEL MUNICIPAL COUNCIL



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ABBREVIATIONS

AIILSG:	All India Institute of Local Self Government
BDW	: Bio Degradable Waste
BMW	: Bio Medical Waste
BOD	: Bio-Chemical Oxygen Demand
BOT	: Built Operate Transfer
BPMC:	Bombay Provincial Municipal Corporation Act
BSUP	: Basic Service for Urban Poor
CBO	: Community Based Organization.
CIDCO	: City Industrial Development Corporation
COD	: Chemical Oxygen Demand.
CSP	: City Sanitation Plan
CSTF	: City Sanitation Task Force
ESR	: Elevated Storage Reservoir
GIS	: Geographic Information System.
GOI	: Government of India
GOM	: Government of Maharashtra
GR	: Government Resolution
GSR	: Ground Storage Reservoir.
IA	: Implementing Agency
LPCD	: Litres Per Capita per Day
M & E	: Monitoring and Evaluation
MLD	: Million Litres per Day
MMRDA:	Mumbai Metropolitan Regional Development Authority
MSW	: Municipal Solid Waste
MOUD	: Ministry of Urban Development
MPCB	: Maharashtra Pollution Control Board
NGO	: Non Governmental Organization
NRW	: Non Revenue Water
NUSP	: National Urban Sanitation Policy
ODF	: Open Defecation Free
O & M	: Operation and Maintenance
PMC	: Pandal Municipal Council
SLB	: Service Level Benchmark
STP	: Sewage Treatment Plant
SWD	: Storm Water Drainage
SWM	: Solid Waste Management
TDS	: Total Dissolved Solids
TF	: Task Force

ADDRESS BY COUNCIL PRESIDENT



Being the first citizen of Panvel city, I am always dreaming of clean & green Panvel. In my tenure, I have given the top priority to the cleanliness of the city and in turn health of the citizens. I know that healthy citizens can be more productive in every respect.

Panvel city is about 300 years old developed around the tread routs during the Mughal rule & thereafter the Maratha's, British & Portuguese. Panvel is an important junction as many major Highways pass through the city. Mumbai-Pune Express Way, Sion-Panvel Express way, NH-4B & NH-17 start from here while NH-4 passed through Panvel. Navi Mumbai International Airport; which is to be come up around the panvel-kopra area. I will feel proud if we can present a clean, neat and green city in front of the International Airport and major highways connectivity center places; but to achieve all these things, we need hand some funding without any doubt.

Panvel Municipal Council has already started preparation of City Sanitation Plan under the guidance of All India Institute of Local Self Government,(RCUES) Mumbai . It is a step ahead to achieve these goals. As a President of Panvel Municipal Council; I have constituted Task Force Committee involving all the stakeholders from the city, as required under NUSP guidelines.

I am thankful to MoUD, GoI and Water Supply & Sanitation Department, Government of Maharashtra for giving us the opportunity to prepare CSP. I am also thankful to all task force committee members and Regional Center for Urban & Environment Studies of All India Institute of Local Self Government, Mumbai. All Citizens of Panvel for cooperating in my cleanliness drive. I am very much sure of achieving the target of 100% “Open Defecation Free” Panvel in next 2 years.

MRS.CHARUSHEELA GHARAT
PRESIDENT
PANVEL MUNICIPAL COUNCIL,PANVEL

ADDRESS BY CHIEF OFFICER

Ministry of Urban Development, GoI has introduced National Urban Sanitation Policy in 2008, with a vision and objective to make all Indian cities totally sanitized and more livable and 100% open defecation free.

The objective of NUSP is to provide safe and hygienic access to sanitation for all especially, Urban Poor with proper management and dispose of 100% Municipal Solid Waste.



Panvel is an important junction as many major highways pass through the city. Mumbai-Pune Express Way, Sion-Panvel Express way, NH-4B & NH-17 start from here while NH-4 passed through Panvel. Navi Mumbai International Airport, which is to be come up around the Panvel-Kopra area.

Panvel city is very rapidly progressing in Industrial & Educational field. All these factors have increased demand of basic sanitation infrastructure.

It is a great opportunity to prepare City Sanitation Plan which gives a direction to provide the basic sanitation services in future. Panvel Municipal Council formed a city sanitation task force committee and implementing agency which is a first step towards city sanitation plan. The capacity building for preparation all the components CSP has been carried out by All India Institute of Local Self Government (RCUES), Mumbai. To make CSP more effective and proper for urban poor, Social Mapping tool was also utilized and involvement of slum dwellers was ensured.

This city sanitation plan encourages the use of modern innovative and Eco-friendly technologies for management of sanitation facilities and thereby improving the public health.

I am thankful to President, Mrs.Charusheela Gharat, all committee members and All India Institute of Local Self Government (RCUES), Mumbai for their valuable support.

Mr. Mangesh Chitale

CHIEF OFFICER, PANVEL

Executive Summary

The National Urban Sanitation Policy (NUSP) is announced by the Ministry of Urban Development (MOUD), Government of India, (GOI) in 2008. The overall Goal of the NUSP is to make all Indian cities totally sanitized, healthy and livable for all citizens especially the urban poor. In pursuance of the policy, GOI is supporting cities to develop City Sanitation Plans. The MoUD has also formulated Service Level Benchmark (SLB) in four areas of service delivery viz :-

- A) Water Supply (WS)
- B) Sewerage and Sanitation (SS)
- C) Solid Waste Management (SWM)
- D) Storm Water Drainage (SWD).

The 13th Finance Commission has made it mandatory for all the states to publish in the government gazette prior to each financial year the status of the above service level benchmarks and the targets to be achieved by the urban local bodies for the next financial year for being eligible for the performance grant.

The Water Supply & Sanitation Dept.(WSSD), GOM has also formulated a demand driven and reform oriented water supply & sanitation program “ Sujal Nirmal Abhiyan” 2010-2011 vide GR dated 12th October 2008 and for universal access “water at door step & toilet in house” program vide GR dated 19th June 2010.

As per the 74th Constitutional Amendment the ULBs are responsible for providing water supply & sanitation services to their citizens.

Government of India recognizes that sanitation is a state subject and on-ground implementation and sustenance of public health and environmental outcomes requires strong city level institutions and stakeholders. Although there are some common elements across urban areas of India, there are a number of factors, constraints and opportunities that are peculiar to specific situation of states and cities with respect to sanitation, climate, physiographic factors, economic, social and political parameters, and institutional variables, etc., Therefore each state and city needs to formulate its own sanitation strategy and their respective city sanitation plan respectively in overall conformity to the National Policy.

The state strategy needs to identify agencies that will train its state level, ULB personnel and orientation of elected representatives. These agencies could be specialist agencies of the State Government, and/or NGOs and private sector organizations. This will also need to focus on capacity building, i.e. not just training but also development of systems and capacities of ULBs in sanitation, in line with the Urban Sector Reforms that the state may be implementing. ULBs will need to provide training on sanitation to their own staff – using state level resource agencies. They will need to utilize Govt. of India and State Government Schemes for training and capacity building in order to achieve this

States will need to determine time-frames and deadlines to achieve the goals mentioned in the National Urban Sanitation Policy and will need to spell out a detailed roadmap, including the incremental targets for achievement of goals. For example, to achieve the goal of open defecation free (ODF) by year 2015, a detailed plan for extending access will need to be formulated and implemented in a time-bound manner. All such steps will need to be spelt out

in and operationalized under the CSPs. While some of the activities in the sanitation plan may be possible to complete with little financial resources e.g. better utilization of existing facilities, improved management systems for septage cleaning, awareness generation; etc. whereas others e.g. reconditioning or laying new sewers, may be more resource-intensive.

The CSP will need to be prepared keeping in view what the city can afford and finance. It will be better as far as possible to improve the effectiveness of existing facilities before embarking on expensive new investments. Further, thinking about the whole city, and not just some portions or just some facilities, will be necessary to achieve the goals in a comprehensive and systematic manner.

The purpose of development of City Sanitation Plan framework is to assist Urban Local Bodies, NGOs, community based organizations, citizens and private sector agencies in Govt. of India through a series of steps toward achieving the goal of 100 percent sanitation in their cities. The focus of this framework is on how to go about the process. Since each city will make choices based on demand and need, local context, availability of financial and human resources, and the opportunity for innovations, this note does not answer what options etc. to choose. The exact contents of this framework may be adapted to suit the state's urban sanitation strategy and used for its cities. Though apparently linear, the process needs to be highly iterative and draw in inputs from one series of steps to another.

City Sanitation Plan Outline

The Chapter No.1 outlines the Mission Statement, Vision and the Objectives of the City Sanitation Plan of Panvel Municipal Council which focus on the improved toilet coverage for open defecation free city, effective and efficient management of liquid waste water/municipal solid waste, safe potable drinking water, proper O&M of all sanitary installation and water supply schemes, behavioral change in civilians by various IEC tools.

The city profile of Panvel Municipal Council is briefly described in Chapter 2.

The bottom up and the all inclusive approach and methodology in preparing CSP of PMC are discussed in Chapter 3.

The elements which are considered in the CSP and the reasons for inclusion of the elements are described in the Chapter 4.

The existing situation of all CSP elements is discussed in Chapter 5.

Chapter 6 highlights the present requirements to satisfy the Service Level Benchmarks for all the 28 indicators of the CSP elements.

On the basis of existing situation discussed in chapter 5 & the requirements to satisfy the relevant SLBs for the CSP elements in Chapter-6 ; gaps were identified & discussed in Chapter-7.

Chapter 8 is giving the focus on population projection for next 30 years & requirement relatively for the same.

Chapter 9 gives details about frame work of action which is carried out by detailed calculations of requirement considering the present situation & future need to satisfy the coverage of set SLBs for each element described in CSP.

Chapter 10 shows the financial provision made in the municipal budget for the CSP elements & future provision to achieve the set targets of SLBs.

Chapter 11 focuses on limitations; while achieving the SLBs or delivering the services to civilians at prabhag level in general.

Chapter 12 highlights some judiciary provisions, suggestion to make amendments in Municipal Laws in particular.

Thus a **holistic/comprehensive approach** is adopted while preparing the City Sanitation Plan of Panvel. The following table will give an idea of sector wise demand for Capital Investment of City Sanitation Plan.

Sr.No	Sector	Capital Cost (Rs. In Crores)	Remarks
1	Toilets & Sewerage	58.575	Topmost priority given
2	Water Supply	97.00	Improved efforts taken now.
3	Solid Waste Management	10.07	Second priority attached.
4	Storm Water Drainage	44.30	Phased Solution Adopted.
5	Environment	1.0	Sustained Efforts Needed.
6	IEC & Social Mapping	2.5	Continuous Processing Required.

From above table it can be seen that an amount of Rs.213.445 Crores is required in next 7 years for successful implementation of City Sanitation Plan. As Panvel Municipal Council has not sufficient finances of its own, it is expected that GoM & GoI will assist substantially say 40% each towards this cause.

The combined efforts of three i.e. PMC,GoM and GoI will make this City Sanitation Plan more effective and sustainable.

CHAPTER 1

1.1 Objective & Vision

The Vision for Urban Sanitation in Panvel Municipal Council is:

1. To Make Panvel city totally sanitized, healthy and liveable and ensure and sustain good public health and environmental outcomes for all their citizens with special focus on hygienic and affordable sanitation facilities for the urban poor and women.

2. Key Sanitation Policy Issues –

In order to achieve the above vision of Panvel Municipal Council following key policy issues are to address:

Lack of Awareness: Sanitation has been accorded low priority and there is poor awareness about its inherent linkage with public health.

Social and Occupational Aspects of Sanitation: Despite the appropriate legal framework, progress towards the elimination of manual scavenging has shown limited success, little or no attention has been paid towards the occupational hazard faced by sanitation workers daily.

Fragmented Institutional Roles and Responsibilities: There are considerable gaps and overlaps in institutional roles and responsibilities at the national, state, and city levels.

3. Lack of an Integrated City-wide Approach: Sanitation investments are currently planned in a piece-meal manner and do not take into account the full cycle of safe confinement, treatment and safe disposal.

Limited Technology Choices: Technologies have been focused on limited options that have not been cost-effective, and sustainability of investments has been in question.

Reaching the Unserved and Poor: Urban poor communities as well other residents of informal settlements have been constrained by lack of tenure, space or economic constraints, in obtaining affordable access to safe sanitation. In this context the issues of whether services to the poor should be individualized and whether community services should be provided in non-notified slums should be addressed. However provision of individual toilets should be prioritized. In relation to “Pay and Use” toilets, the issue of subsidies inadvertently reaching the non-poor should be addressed by identifying different categories of urban poor.

Lack of Demand Responsiveness: Sanitation has been provided by public agencies in a supply-driven manner, with little regard for demands and preferences of households as customers of sanitation services.

Policy Goals

The overall goal of this policy is to transform Panvel into **community- driven, totally sanitized, healthy and live able town.**

A Awareness Generation and Behavior Changes:

Awareness Generation and Behavior Changes:

Generating awareness about sanitation and its linkage with public and environmental health amongst communities and institutions.

Promoting mechanism to bring about and sustain behavioral changes aimed at adoption of healthy sanitation practices;

B Open Defecation Free Cities

Achieving Open Defecation Free Cities

All urban dwellers will have access to and use safe and hygienic sanitation facilities and arrangement so that no one defecates in the open. In order to achieve this goal, the following activities shall be undertaken:

- Promoting access to households with safe sanitation and its linkage with public and environmental health amongst communities and institutions.

Promoting mechanism to bring about and sustain behavioral changes aimed at adoption of healthy sanitation facilities and arrangements so that no one defecates in the open. In order to achieve this goal, the following activities shall be undertaken:

- Promoting access to households with safe sanitation facilities (including proper disposal arrangements);
- Promoting community – planned and managed toilets wherever necessary, for groups of households who have constraints of space, tenure or economic constraints in gaining access to individual facilities;
- Adequate availability and 100% upkeep and management of Public Sanitation facilities in all Urban Areas, to rid them of open defecation and environmental hazards;

C Integrated City- Wide Sanitation

1. Reorienting Institutions and Mainstreaming Sanitation

Mainstream thinking, planning and implanting measures related to sanitation in all sectors and departmental domains as a cross-cutting issue, especially in all urban management endeavors;

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- Strengthening national, state, city and local institutions (Public, Private and Community) to accord priority to sanitation provision, including planning, implementation and O & M management;
- Extending access to proper sanitation facilities for poor communities and other unserved settlements;

2. Sanitary and Safe Disposal

100% of human excreta and liquid wastes from all sanitation facilities including toilets must be disposed of safely. In order to achieve this goal, the following activities will be undertaken;

- Promoting proper functioning of network- based sewerage systems and ensuring connections of households to them wherever possible.
- Promoting recycle and reuse of treated waste for non potable applications wherever possible.
- Promoting proper disposal and treatment of sludge from on-site installations (septic tanks, pit latrines etc.);
- Ensuring that all human wastes are collected safely conveyed and disposed of after treatment so as not to cause any hazard to public health or the environment.

3. Proper Operation and Maintenance of all Sanitary Installations;

- Promoting proper usage, regular upkeep and maintenance of household, community and public sanitation facilities;
- Strengthening ULBs to provide or cause to, sustainable sanitation services delivery;

4. Awareness Generation

Country-wide information, Education and Communication (IEC) Strategy will be designed and implemented awareness on the public health and environmental importance of sanitation. The socio-cultural biases against sanitation and sanitary work need to be targeted, and dignity and humane approach promoted in the elevation of priority to sanitation in public affairs. Further, the public-good nature of urban sanitation necessitating collective action needs to be highlighted in the minds of all stakeholders.

5. Institutional Roles

The Govt. of India will support clear assignment of roles and responsibilities, resources and capacities and institutional incentives in relation to setting standards, planning and financing, implementation, knowledge development, capacity-building and training. Monitoring & Evaluation (M & E), and regulatory arrangements. The government will help states and cities in ensuring sanitation as a core responsibility of Urban Local Bodies as envisaged in the

Constitutional (Seventy fourth) Amendment Act, 1993. The special roles of NGOs and Community based organizations (CBOs) will be recognized in mobilizing communities, raising awareness and in working with poor communities to assist them in finding affordable, community-manages solutions to sanitation.

6. Reaching the Unserved and Poor Households

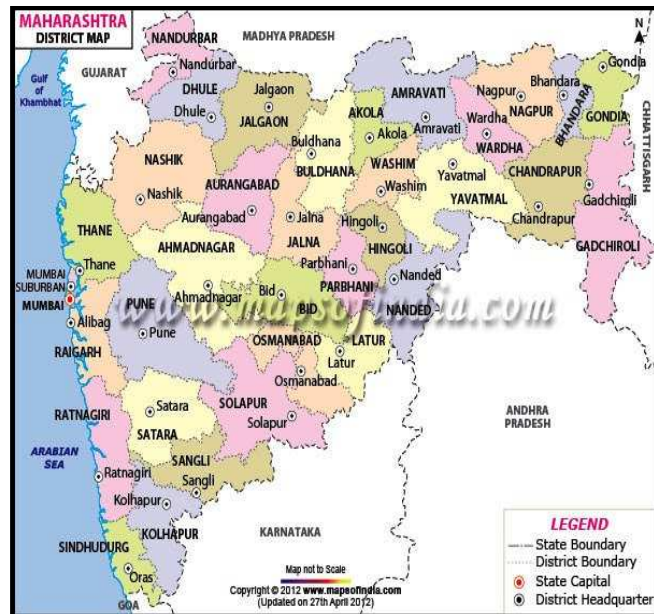
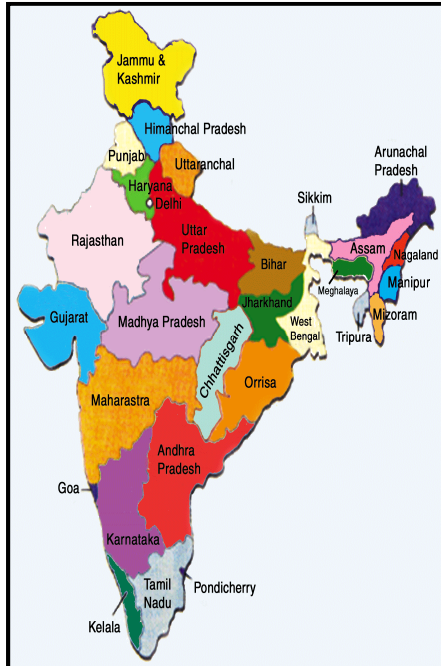
The national policy will help urban areas adopt a city-wide, demand-based participatory approach to individual (resolving tenure, space and affordability constraints), and community sanitation where individual sanitation facilities are not feasible. Towards this, special slum and community sanitation plans will be formulated as a part of the City Sanitation Plan. Provision of public sanitation facilities will also be supported.

CHAPTER-2

General (City Profile)

2.1 About Panvel Town

Panvel is the most populated city in Raigad district in Maharashtra, India. Panvel is also known as the gateway of Konkan region. It is located in Navi Mumbai, Raigad district and is just across the Thane district border. Panvel is the starting point of the Mumbai-Pune Expressway.



Profile of Panvel Town

Demographics:

The city is the headquarters of the Panvel sub-division of Raigad district, which is the largest in the district as per number of villages (564) including Panvel taluka which has 177 villages under it. The development authority of Panvel is the Panvel Municipal Council (PMC) and that of New Panvel is City and Industrial Development Corporation (CIDCO). The villages of Panvel come under the purview of Raigad Zilla Parishad. Panvel is the main city of Pavel taluka covering 89 grampachayatias. Panvel Municipal Council area is 12.17 sq.km. As per census 2011, the population of Panvel is 1,80,464 and total number of households as per Panvel Municipal Council are 43,231.



The population density of India is 365/km² and India ranks as the 31st most densely populated country in the world. The population density of Panvel is $180464/12.17=14829$ sq/km; very high density compared to India & Maharashtra's (364/sq.km) population density.

Panvel is about 300 years old, developed around trade routes (both land and sea), during the Mughal rule and thereafter by the Marathas, British and the Portuguese. Once upon a time Panvel was famous for its rice market. Panvel Municipal Council (PMC) was established in the year 1852, and is the oldest municipal council of Maharashtra. Panvel Municipal Council elections were started in the year 1910. The first mayor of the PMC was Mr. Yousuf Noor Mohammed Master for the year 1910 - 1916. The sesquicentennial anniversary (150th anniversary) of the PMC was celebrated in the year 2002. The city prospered and grew due to the influence of large scale trade by land and sea. This was characterized by the large palace-like homes that came up during the Peshwai period. It is also said that old name of this city was Paneli (Panelim in Konkani). There were historic cannons (during the time of Chhatrapati Shivaji Maharaj) situated on Panvel port.

Panvel is surrounded by some Maharashtra Industrial Development Corporation (MIDC) managed major regions like Patalganga, Taloja, Nagothane, Roha and Khopoli. Some of the Indian industry majors like Larsen & Toubro Limited, Reliance, Hindustan Organics Chemicals Ltd., ONGC, IPCL are based around Panvel providing mass employment. The JNPT port is also located near Panvel. New SEZ declared by government is coming near Panvel. This has its direct and indirect, both effects on infrastructure and services of Panvel Municipal Council during last few years.

The recent developments of Panvel are in New Panvel. New Panvel is developed, administered, and maintained by CIDCO. Though residents of New Panvel elect a representative in the Panvel Municipal Council, the Municipal Council does not control or manage any administrative or development activity in New Panvel.

The development of New Panvel was initiated in 1970 to meet the housing requirements of employees working in the nearby industrial MIDC areas such as Taloja, Rasayani, Patalganga and Pen.

Out of total 10 numbers of municipal councilors, 3 nos. of councilors are from CIDCO region of Panvel City.

The population of New Panvel is 94020 as per census 2011

New Panvel is strategically located on the eastern side of the Mumbai-Bangalore National Highway (NH-4) and the Mumbai-Pune Expressway. It is well connected to rest of India by road and railway.

New Panvel is divided in two parts – New Panvel East and New Panvel West (commonly known as Khanda Colony). They have 19 and 23 sectors respectively.

Location:

Panvel is located in Raigad district of Maharashtra State. It is a gateway of Konkan Region. It is nearby Navi Mumbai & on the boarder of Thane district. Distance of Panvel to Mumbai is 45 km and it is situated on Mumbai-Pune National Highway. The villages of Panvel come under Panvel Municipal Council for administrative purpose. Panvel is situated on the bank of Gadhi River which meets to an arm of the Arabian Sea.

Industries:

Panvel is surrounded by Maharashtra Industrial Development Corporation (MIDC) managed major regions like Patalganga, Taloja, Nagothane, Roha, Khopoli. Some of the Indian industry majors like Larsen & Toubro Limited, Reliance, Hindustan Organics Chemicals Ltd., ONGC, IPCL are based around Panvel providing mass employment. The JNPT port is also located near Panvel. New SEZ declared by government are coming around Panvel. This has reflected in number of floating population very high which is about 40,000 daily.

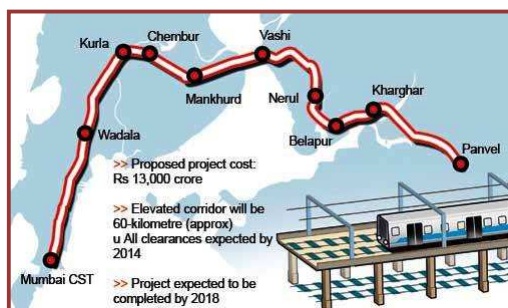
Connectivity:

Panvel is an important junction point as many major highways meet and pass through the city. The Mumbai-Pune Expressway, Sion-Panvel Expressway, NH 4B and NH 17 start from here while NH 4 passes through Panvel. Roads of New Panvel are maintained by CIDCO while those in old Panvel by PMC. New Panvel, being developed by CIDCO, has well planned and wide lane major roads and even the arterial roads are of two lanes. Old Panvel has relatively less maintained roads which are very congested due to lack of planning on part of the PMC and half hazard growth of town.

Proposed Navi Mumbai International Airport

The Navi Mumbai International Airport, which is to come up around the Panvel-Kopra area, would be built through public-private partnership (PPP) — with private sector partner getting 74% equity while Airport Authority of India (AAI) and Maharashtra government through CIDCO holding 13% each. The International Civil Aviation Organisation (ICAO) has already given techno-feasibility clearance to the Navi Mumbai airport and central cabinet has cleared it. The project is at global tendering stage.

Railway



Panvel railway station is one of the most important junctions on the Konkan Railway. Harbour line from Mumbai CST, central line from Diva / Karjat, western freight corridor from JNPT and the Konkan Railway line from Mangalore meet at Panvel. Panvel railway station comes under Mumbai division of central railway. Panvel is the terminating station of Mumbai railway's harbour line. Also, Konkan railway connecting Mumbai to south India passes through Panvel. Platforms 1,2,3 &

4 are for suburban trains while platforms 5,6 & 7 are for main line trains. 9 pairs of daily express trains, 13 pairs of non-daily express trains and 12 daily commuter (passenger) trains stop here. Also, the Ernakulam-Nizamuddin Duronto has a technical halt at Panvel for crew change, refuelling and catering. In addition, Panvel handles 116 suburban trains which go to destinations Mumbai CST, Wadala Road, Andheri and Thane. The station also handles a sizeable amount of freight trains. Panvel is a very major station and is considered equivalent to Mumbai for trains which skip Mumbai. The trains run on diesel traction and alternating current (the tracks to Konkan are not electrified south of Panvel), and Panvel is a refueling point for their locomotives. In addition to refueling, Panvel has a huge number of parcel bookings, and most trains stop for periods varying from 5 minutes to 20 minutes for technical purposes. Panvel also handles crew and locomotive change for long distance passenger / freight trains.

Bus

There are two main bus stands in Panvel - ST stand on the national highway & NMMT stand near railway station. The ST buses are available from Panvel to Thane, Kalyan, Dombivli, Badlapur, Dadar, Uran as well as beyond city. NMMT buses are available from Panvel to Thane and Vashi.

Tourist Places around Panvel

Between Pen and Panvel lies the Karnala fort. At the bottom of the fort there is a bird sanctuary. Karnala is 65 km away from Mumbai, 120 km away from Pune and 13 km away from Panvel. The sanctuary is around 25 m above mean sea level, while the fort itself is 370



m above mean sea level. Maharashtra government declared this 4.5 km region as the bird sanctuary in 1968-69. Rich with natural habitats for various kinds of birds, in the sanctuary one can find around 150 species of birds. One can watch for red vented Bulbul, Indian grey Hornbill, Owl, Paradise Fly Catcher. One can

also visit the Gadeshwar dam during the monsoon when the dam overflows. One can reach there by entering New Panvel and via the Sukhapur -Nere road. The villages and farms with the Matheran hills on the background are a treat to watch. People who love trekking can reach Matheran from the Nere route. Panvel is also famous for watermelon.

Bet El Synagogue: The one of the only synagogues in the Panvel is one of the most well known religious places where both Jews and Non Jews do visit, is today's well known tourist place and is the part of the Indian heritage and tourist place.

Two of the eight Ashtavinayak temples of the Ganesha are close to Panvel, Ballaleshwar at (Pali) and Varadvinayak at Mahad near Khopoli. There is a NMMT bus no. 58 from Vashi to Khopoli which halts at Mahad.

Climate & Rainfall :



The climate of Panvel is semi arid and sub humid type having tropical monsoon atmosphere. Overall climate is average considering very rainy days and very hot days. Most dry days are in winter and most dry days in the month of July. May is the average hottest month.(Max.34.17° C ,Min 27.05°C)

Possibility of heavy rain falls in the month of July. Annual Rainy season starts from June and ends in September month; however monsoon showers also occur in later part of October for last few years. Average rain fall is 2400mm; of which major rain falls in the month of July i.e. 800 mm. The humidity is 57% to 81% in the month of July. Panvel is located at 6.7m above sea level i.e. 21.97 feet having area of 12.17 sq.km. The density of Panvel is 14,792/km².

Land Used:

Area of Panvel Municipal Council is about 12.17 sq.km.Panvel is divided in to 10 wards in which Old Panvel comes under Panvel Municipal Council area while New Panvel is in CIDCO area. Development in SEZ is ongoing. 78 Industries are situated in Old Panvel area.

1. **Residential Area:** Since last few years Panvel is known as very developed area. Due to rapid urbanization and proper facility of transportation between Mumbai to Panvel; hug population is selected Panvel as their residential hub. Due to this rapid urbanization; many huge propey developers has invested & developed their property project in this town. Similarly many more slums have developed due to migration & urbanization. Total numbers of residential household are 43231while numbers of commercial households are 6978.
2. **Commercial/Industrial Area :** Many well known organization & Institutions has opened their offices or centers in the areas developed by CIDCO in New Panvel.
3. **Land used in Public & Semi Public Area:** In this type of areas Educational institutes like Primary & Secondary Schools, Religious places like Mandir, Church, Masjid etc., Government & Semi Government Offices. Nearby 70-75% area is covered under this.
4. **Open Spaces:** There are some natural resource of Water in Panvel which includes lakes and Gandhi River. Panvel Municipal Council has developed lakes at Lendale,Istrayale, Krushnale, Vadale and Devale. These lakes are mainted by municipal council on regular basis In this area ; open grounds and gardens are also well maintained by the Municipal Council.

City Development:

Panvel is developing very rapidly. The new industrial & citywide development gives more opportunities in jobs & earnings. Many people are farmers, shopkeepers, farm workers, carpenters, labourers and fisherman. Now a day the farmers are less occupied in farming.

Education & Literacy:

Panvel Municipal Council had started free education at Primary level since 1979. In year 1927, primary education was conducted by Kulaba District Prashala Mandal. In Present situation; apart from Zilla Parishad Schools , there are many education institutes like ; one girls Marathi school, Urdhu School, Nutan Gujarati School, Government basis primary training center, Konkan Shikshan Societies Vithoba Khandappa Vidhyalaya, Keshvaji Kanya Vidhyalaya . Municipal Council is giving grants of at least Rs.10000/- per year to public library and reading rooms. The average literacy rate of Panvel is 93% of which male literacy is around 96% while female literacy is 92%.

% of Literacy at Panvel Council

Sr. No.	Details	Total Population	Male	Female
1	Literacy Number	153138	80790	72348
2	Literacy %	93.28	96.27	91.54
3	Illiteracy %	6.72	3.73	8.46

Health & Medical Facilities:

Panvel Municipal Council is giving the medical facilities as and when required to the civilians for the communicable diseases like dengue, malaria, plagues, cholera, small pox, polio etc.,

Municipal Council has its own health clinic in the council premises. The council has both private and public Primary Health Centers; which conduct the immunization programme every month. The health department of Panvel Municipal Council provides the necessary medical facilities to them. The diseases like Gastro, Cholera, Yellow Fever, Polio, Typhoid etc., are treated. 24 hours facility of ambulance and mobile clinic is available for civilians.



The work of multi specialty rural hospitable of having capacity of 100 beds is in progress. In every week on Tuesday and Saturday, Immunization programme for different communicable disease is carried out by the medical hospital along with the continuous treatment like T.B. is also taken care of by this medical hospital.

Sr.No.	Details	Total Number
1	Private Hospitals	42
2	Maternity Hospitals	8
3	Government Veterinary Dispensary	1

4	Pathology Labs	15
5	Dispensaries	350
6	Ambulance Service	8

Annual Expenditure incurred on Health Services alone, is about Rs 0.455 Crores which is 0.48% of annual budget.

Gardens and Open Spaces:

Panvel Municipal Council has established nurseries in which different types of plants are grown. These plants are distributed in the public as per their need and requirements at free of cost. Major plantation of basil (Tusli) has carried out and distributed to the pupils in different programme to encourage them for plantation. Various type of Plantation has been carried out at road sides, in open space and in various gardens administrated by the Panvel Municipal Council.

Details of Gardens and Open Space in Panvel Municipal Council

Sr. No.	Place	Name
1	Open Space	Chatrapati Sambhaji Maharaj Maidan
		Bans Vidhyalaya Maidan
2	Gardens	Lions Garden
		Mahatma Gandhi Garden
		Ashok Bag
		Hutatma Smarak
		Chatrapati Shivaji Maharaj Garden
		Ganpati Mandir
		Rohidas Wada
		Rajiv Gandhi Garden

The tree plantation programme is a big event in Panvel. In which plantation of different types of trees are considered for plantation. As per recent survey of plants, nearby 15000 trees are there in Panvel council area.

Slum Population:

As Panvel is being developed as suburban of Mumbai a inward migration seems to be noticeable due to the large industrial activities in the MIDC estates at Belapur, Taloja and in Rasayani Complex(H.O.C.), the labourers are also attracted and they found their homes in this town. Due to their poor economic level, they formed slums along the national highway near S.T.Bus Stand. All the disadvantages are existing in these slums like those available in other slums colonies elsewhere. However other town areas are still free from such slums.

The Municipal Council has conducted survey of Slum Settlements in year 2000 and year 2008 and according to this survey the number of slums settlements & number of people

living in these slums are as follows. All slums settlements located in Municipal Council areas are illegal and non notified.

Sr. No	Name of the Slum Settlement	Place	Owner of the land & purpose	Slums before 1995	Slums as per the survey carried out in the year 2000	Slums as per the survey carried out in the year 2008
1	Lakshminagar Vasahat	Near. N.H. No.4	Nation Highway Municipal Council Service Road	195	287	389
2	Indiranagar	Near N.H.	Nation Highway Municipal Council Service Road	90	219	277
3	Shivajinagar-1	No.L.N.307	Municipal Council Road, Service Road and No.L.N.307 & 307 A	198	295	352
4	Azadnagar and Navnathnagar	No.L.N.405 CIDCO	Private CIDCO Land	75	157	412
5	Marketyard	Near Govt. Storehouse	Municipal Council Road & Govt. Store Room	16	26	19
6	Kachhi Mohalla	No.L.N.508 & 520	Reserved Land of Municipal Council	79	102	178
7	Patel Mohalla	No.L.N.508 & 520	Reserved Land of Municipal Council	83	92	249

8	Bavan Bangalo Khajanagar	No.L.N.34/7 part 30 road	Private Property	47	79	80
9	Vishrali Talav	No.L.N.210	Private Property	30	39	26
10	Panchasheelnagar	Opp. Abhyudaya Bank	CIDCO	149	448	447
11	Railway Maldhakka	Near Railway Station	CIDCO	79	128	192
12	Old Thananaka Road	No.L.N.28	Panvel Municipal Council	24	36	14
13	Valmikinagar	No.L.N.50	Panvel Municipal Council	120	171	216
14	Ashokbaug	Near Vadale Lake	Reserved for Road Development by Panvel Municipal Council	68	110	178
15	Katakarwadi	No.L.N.538	Reserved Land of municipal Council	12	19	26
				1265	2208	3055

It is thus observed that there is 94% increase in slums settlements due to rapid growth of Panvel and industrialization surrounding Panvel town. It's obvious that due to this coupled with inadequate sanitary facilities there is rampant open defecation taking place in these areas.

CHAPTER 3

Resolution Task Force Committee sanction for CSP

With reference to the Government of India resolution dated 12th April, 2012 about preparation of City Sanitation Plan in 15-A class Municipal Council of State of Maharashtra under no.CSPEst-2011/letter number 108-WS-21 and letter received from All India Institute of Local Self Government, Mumbai.

Panvel Municipal Council has formed the Task Force Committee on 16-04-2013 and resolution has been passed in General Body meeting held on 16-04-2013 . The copy of the same is appended to this document.

The constituent members of TFC are chosen as per the guidelines in NUSP book. Hon. Chairman of Panvel Municipal Council is heading this committee.

Copies of National Urban Sanitation Policy (NUSP) booklet and copies of “ Responsibilities and duties” of President, Chief Officers, Members of TFC and all stakeholders were also distributed during various trainings and capacity building workshops to ensure ideal CSP

पनवेल नगर परिषद

परिषद संप्रसाधारण सभा

दिनांक १६/४/२०१३

आयत्या वेळ्या
विषय क्र. १

शहर स्वच्छता आराखडा तयार करणेकामी शहरकार्यबल गट व अंमलबजावणी गटांची स्थापना करणेबाबतचा रिपोर्ट कार्यालयीन अहवालासह वाचला.

ठराव क्रमांक १९६ (२)

कार्यालयीन अहवालात नमूद केलेप्रमाणे केंद्रशासनाचे शहरी विकास मंत्रालय यांनी पनवेल शहराची निवड शहर स्वच्छता आराखडा तयार करणेसाठी केलेली आहे. शहराचा सर्वांगीन विचार करून शहर स्वच्छता आराखडा तयार करावयाचा आहे. शहर स्वच्छता आराखड्यासंबंधी वार्डाची पायाभूत माहिती संकलन करण्यासाठी नगरपरिषदेने प्रगणक व प्रोत्साहक यांची नेमणूक यापूर्वी केलेली आहे. शासनाने शहर स्वच्छता आराखडा तयार करणेकामी नगरपरिषदांचे क्षमता बांधणीसाठी अखिल भारतीय स्थानिक स्वराज्य संस्था, मुंबई यांची नियुक्ती केलेली आहे. शहर स्वच्छता आराखडा तयार करणेकामी शहरकार्यबल गट व अंमलबजावणी गटाची स्थापना करणे गरजेचे असलेने खालीलप्रमाणे शहरकार्यबल गट व अंमलबजावणी गट स्थापन करणेस सभा मंजूरी देत आहे.

शहरकार्यबल गट

१. न.प.अध्यक्ष	-	अध्यक्ष.
२. न.प.मुख्याधिकारी	-	सदस्य सचिव
३. सर्व न.प.सदस्य	-	सदस्य
४. शहरातील विविध विषयातील तज्ञ	-	सदस्य
५. तहसिलदार	-	सदस्य
६. वरीष्ठ पोलीस निरीक्षक	-	सदस्य
७. कार्यकारी अभियंता (सिडको)	-	सदस्य
८. वैद्यकीय अधिकारी (ग्रामीण रुग्णालय)	-	सदस्य
९. प्रशासन अधिकारी, शिक्षण मंडळ	-	सदस्य
१०. न.प.चे सर्व विभाग प्रमुख	-	सदस्य
११. न.प. कर्मचारी युनियन अध्यक्ष	-	सदस्य

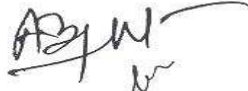
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अंमलबजावणी गट

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| १. न.प.मुख्याधिकारी | - | अध्यक्ष |
| २. नगर अभियंता (नि.श्रे.) | - | सदस्य सचिव |
| ३. सर्व खातेप्रमुख | - | सदस्य |
| ४. सर्व कनिष्ठ अभियंता | - | सदस्य |

सूचक



अनुमोदक



अध्यक्ष,
पनवेल नगर परिषद

CHAPTER 4

Resolution Municipal General Bodies/Mahasabha Meeting Sanction at Plan

CSP is submitted to General body of Council for approval. Copy of resolution will be submitted as early as possible.

CHAPTER 5

APPROACH & METHODOLOGY

5.1 Approach

Ministry of Urban Development, GoI has sanctioned the resolution of making City Sanitation Plan for 15-A Class Municipal Councils in the state of Maharashtra on 19th April, 2012.

Water Supply and Sanitation Department, Government of Maharashtra has selected All India Institute of Local Self Government, Mumbai (AIILSG) as the Nodal Agency for preparing the City Sanitation Plan for 15- A Class Municipal Councils. The WSSD has sent a letter to AIILSG, Mumbai on 18th March, 2012 about selection as a nodal agency for the 15-A class Municipal Councils for making of CSP.

RCUES, AIILSG, Mumbai then invited Panvel Municipal Council to attend a meeting convened on City Sanitation Plan at Bandra Office on 21st April, 2012 along with all 15-A Class Municipal Councils selected for CSP.

Each aspects of the City Sanitation Plan have a time bound schedule and should be carried out as per schedule given by the Government for the same. Panvel Municipal Council has formed the Task Force on date 16/04/2013 in which the Hon. Mayor is the Chairman of the Task Force Committee and Hon. Chief Officer as the Committee Organizer.

Task Force Committee

Sr.No.	Details	Designation in TSC
1	Municipal Council President	President
2	Municipal Council's Chief Officer	Member of President
3	All Municipal Council Members	Member
4	Specialist of various subjects from the city	Member
5	Collectorate	Member
6	Senior Police Superintendent	Member
7	Chief Engineer (CIDCO)	Member
8	Health Officer (Rural Hospital)	Member
9	Administrative Officer, Education Board	Member
10	All HoD's from Municipal Council	Member
11	Union Leader of Employee Union	Member

Implementing Agency

Sr.No.	Details	Designation in TSC
1	Chief Officer	President
2	City Engineer	Member
3	Department Heads	Member
4	All Junior Engineers	Member

5.2 Methodology

The following is the course of events taken place during CSP preparation.

1. Joint meeting of Chief Officer, Health Officer, Sanitary Inspectors, City Engineers with RCUES/AIILSG consultant at Bandra, Mumbai office on 3rd May, 2012.
2. Meeting held on 16th May, 2012 at Panvel Municipal Council for Capacity Building, guiding on City Sanitation Task Force Committee Formation, Importance of Implementing Agency, Various IEC tools by AIILSG, Mumbai with all concern officers and stakeholders.
3. Letter has been sent on 11th June, 2012 from AIILSG, Mumbai to Chief Officer, Panvel for publishing the notice in newspapers & asking for people's participation in preparation of City Sanitation Plan.
4. Letter has been sent on 3rd July, 2012 to Chief Officer asking for starting "Baseline data collection for CSP. Motivators, Trainers, Councilors and NGOs are expected to take part in this data collection exercise.
5. Meeting held at Panvel on 18th July, 2012 to review the status of collected Baseline data and to guide further to the PMC staff.
6. Training was carried out to Motivators & Trainers by RCUES, AIILSG, Mumbai on 28th August, 2012 at Panvel Municipal Council.
7. Letter has been sent on 30th August, 2012 to Chief Officer asking for the gaps in baseline data, pre-preparation of seven plans of city showing various details of existing situation of all the CSP elements.
8. Review meeting was held on 18th October, 2012 with PMC officials at Bandra office by AIILSG staff. In this further guidelines have been given to them related to CSP elements.
9. Review-Reminder meeting held on 21st November, 2012 at Panvel with all officials.

10. Follow-up meeting were held on 31st December, 2012 & 10th January, 2013 at Panvel by AILSG, Mumbai officials.
11. Letter has been sent to PMC on 21st February, 2013 related to appointing “Associate Writer” for draft CSP based on Baseline data inputs, information given by council officials timely & other secondary data provided by the council.
12. Meeting was held on 5th April, 2013 for estimate preparation with engineers at PMC.
13. Workshop/Training for use of Social Mapping as a tool while preparation of CSP was held on 15th April, 2013. In this workshop Dr. Sneha Palnitkar, Director, RCUES, AILSG, Mumbai has given the guidance in making CSP.
14. Distress meeting for speeding up the CSP work has been carried out at Panvel on 9th May, 2013 in which review of delay in formation of Task Force and Implementing Agency along with review of Social Mapping Work was taken.
15. Letter received from PMC on 16th April,2013 related to resolution has passed for formation of “ City Sanitation Task Force Committee” in General Body meeting held on 16th April 2013 vide resolution number 196(2).On the same date i.e. 16th April,2013 resolution was passed for formation of Implementing Agency in General Body meeting.

Conclusively it is seen that ward wise baseline data of all CSP elements was collected, scrutinized and further integrated into zonal/prabhag level and city level. This data gave the picture of current status of all basic amenities provided by Panvel Municipal Council .This information was utilized in finding out ‘gaps’ in each service of PMC. Thus, the action plan prepared to fill up these ‘Gaps’ resulted into City Sanitation Plan of City.

CHAPTER 6 **CITY SANITATION PLAN ELEMENTS**

INTRODUCTION

In this chapter an effort has been made to impress upon the necessity of inclusion of each of the components viz., Toilets, Sewerage, Municipal Solid Waste, Storm Water Drain, Water Supply, I.E.C, Environment and Social Mapping into City Sanitation Plan. By doing this way, CSP has become a complete, holistic and citywide approach document.

A. TOILET



All urban dwellers will have access to and use safe and hygienic sanitation facilities and arrangement so that no one defecates in the open. The facilities for safe disposal of solid and liquid waste are also inadequate. Inadequate sanitation facilities not only pollute the environment, but have deleterious impacts on health. It is a well documented fact that it is the urban poor especially the women and children living in the slums who suffer the most due to the lack of sanitation facilities. Research findings suggest a loss of 2% in GDP due to lack of sanitation related facilities. Promoting access to households with safe sanitation and its linkage with public and environmental health amongst communities and institutions. Adequate availability and 100% upkeep and management of Public

Sanitation facilities in all Urban Areas, to rid them of open defecation and environmental hazards which is the main issue in the City sanitation plan.. Ensuring that all human wastes are collected safely conveyed and disposed of after treatment so as not to cause any hazard to public health or the environment. GoI has attached 9 SLBs for this sector to achieve 100% ODF cities. Hence, this is included in CSP report on top most priority.

B. SEWERAGE

The scope of sewage management has evolved throughout history with changes in socioeconomic conditions, city structures, and the environment. Effective sewage management is essential for nutrient recycling and for maintaining ecosystem integrity. It is also important for:

- Improving the environment through proper drainage and disposal of wastewater;
- Preventing floods through removal of rainwater;
- Preserving receiving water quality.



The sewage treatment process facilitates the achievement of water quality objectives. In addition to nutrient recycling, advanced treatment of wastewater often includes associated unit processes which support the optimization of resource use. Some of these unit processes include the conversion of sludge into various beneficial by-products, and the process of extracting thermal energy from sewage and wastewater. In addition, the sewage collection system can be used as a conduit for optical fiber cables and other communications infrastructure. GoI has attached 9 SLBs for this sector considering its importance in CSP.

C. STORM WATER



Storm water drain is one of the most important aspects of all the city sanitation plan elements. Improper and unplanned storm water drainage network will lead to water stagnation in monsoons creating health related issues. Panvel Municipal Council needs to develop proper and planned storm water drainage network. There are 19 identified flooding spots in Panvel. The Coverage of SWD network is 25% and needs improvement. Hence this is included in CSP report.

D. SOLID WASTE

With rapid urbanization, industrialization, population growth and increasing economy syndrome, municipal solid wastes which had been a problem in the past, has become a serious threat in recent years, if appropriate measures are not taken immediately. Solid waste is element which affects all the elements of the City Sanitation Plan. GoI has given 8 SLB for this sector and is thus included in the CSP report.

Disposal of solid waste is most commonly conducted in landfills, but incineration, recycling; composting and conversion to bio fuel are also avenues. The importance of daily cover lies in the reduction of vector contact and spreading of pathogens. Daily cover also minimizes odor emissions and reduces windblown litter.



For incineration options, the release of air pollutants, including certain toxic components is an attendant adverse outcome. Recycling and bio-fuel conversion are the sustainable options that generally have superior life cycle costs, particularly when total ecological consequences are considered. Composting value will ultimately be limited by the market demand for compost product. In addition to these prerequisites, an effective system of solid waste management must be both environmentally and economically sustainable. The effective use of 3 Rs (**Reduce, Recycle, Reuse**) will achieve 8 SLBs of GoI for Solid Waste Management.

E. WATER SUPPLY

The water supply is the basic need for the urbanization and development of the cities. In ancient times the settlements or the villages grew on the bank of the rivers. Next to air (oxygen), water is the most essential element to human life; the body usually cannot survive longer than several days without water (a maximum of 1 week). Water is essential for the efficient elimination of waste products through the kidneys. Water Source is a key component of industrial and agricultural development. If sufficient water is available, then energy can be produced which attracts the industries for investment and related growth of city or state increases. Water is required for effective functioning of sewerage system and good quality of water will curb spread of water born diseases and enhance overall wellness of citizens. GoI has given 9 SLBs for this sector so included in CSP report.



F. ENVIRONMENT

We desperately need to save the Environment, Every second the Earth is getting polluted by poisonous gases and fumes made by cars and factories. If we carry on to pollute this much what will happen to next generation? How will they survive/alive?



The Environment is the most important resource for life. We get water, power and Oxygen from the Environment. It helps to clear pollution and is a large habitat for animals. We get lots of resources from there but if we use too much and it doesn't come from sustainable forests we may run out of resources. Which are not good?

Despite all of the damage we have caused the environment most of it is reversible. We can restore habitats and return species to them, clean rivers, renovate buildings, replenish the topsoil, replant forests. However, these activities do not slow the worst affects of the damage made. We still have to fix the source of these problems. Curbing Air, Water and Noise pollution will make urban life better and livable. Hence included in CSP.

G. I.E.C. & SOCIAL MAPPING

I.E.C:

Awareness on the public health and environmental importance of sanitation is very important to carry out city sanitation plan successfully. Making human approach towards the safe health and elevating the priority to the sanitation by using media tools, news paper, hoardings etc. And social mapping is also a key factor for the preparation of the city sanitation plan. The Socio-cultural biases against sanitation and sanitary work need to be targeted, and dignity and human approach promoted in the elevation of priority to sanitation in public affairs by making different tools like social mapping, group discussion, prabhat pheri, media support, celebrities participation etc., In our country where the level of civic sense and social responsibility is very low, I.E.C. becomes a continuous process and need of day for each city. Hence it is included in CSP.

SOCIAL MAPPING

Social Mapping: Social mapping is a visual method of showing the relative location of households and the distribution of different types of people (such as male, female, adult, child, landed, landless, literate, and illiterate) together with the social structure and institutions of an area. It also maps the existing status of facilities including Water Supply, Solid Waste Management, Gutters, Drains, Toilets, Health etc.,

What can it be used for?

- showing data on community layout, infrastructure, demography, ethno-linguistic groups, health pattern, wealth, and so on
- identifying different social groups using locally defined criteria and assessing the distribution of assets across social groups

- learning about the social institutions and the different views local people might have regarding those institutions

What does it tell us?

An overview of community structure and the socioeconomic situation

- Household differences by social factors
- Who lives where in a community?

Complementary tools

Community resource mapping, wealth ranking, transect walk

This is included in City Sanitation Plan to get grass root level situation correctly reflected and proper remedies to overcome same are taken care for. City Sanitation Plan has to be demand based document for which Social Mapping is included.

CHAPTER 7

EXISTING SITUATION (ALL ELEMENTS)

7.1 TOILETS:

Panvel Municipal Council has run the project named Sant Gadage Baba Nagari Swachhata Abhiyan on regular basis. As per the report of year 2011-12, the concept of residence with toilet facility is covered around 95% of the residential area. There are some households which do not have the individual toilet facility so they are using community and public toilets. The financial provision has been made for the construction of public toilets in the annual budget of the Municipal Council. MMRDA is providing funds for construction of Public Toilets under Nirmal MMR Scheme under which 100 seats toilets were got sanctioned.

Panvel Municipal Council has constructed Public Toilets and O&M of these toilets was taken by the contractor appointed by the municipal council. There are 168 toilet seats having all the necessary facility like water supply, electricity, sullage management and safe construction.

The slum settlement doesn't have any facility of individual toilet. The Community toilets available for these slum settlements are 16 (78 seats) of which 64 toilet seats are having all the above mentioned necessary facility. The budgetary provision has been made for construction of toilet seats in slum areas in the yearly municipal council budget.

ZONAL DATA

Particulars	1	2	3	4	5	6	7	8	9	10	Total
Private Properties having Individual toilet seats	9750	7962	3384	4059	1789	3221	3069	2817	3650	1276	40977
Toilet seats provided by Municipal Council	0	0	0	31	14	0	60	60	45	64	274
Toilet seats built on Pay & Use basis	0	9	0	8	0	0	0	42	28	0	87
Toilet for Handicapped	0	0	0	1	0	0	0	0	0	0	1
No. of households not having facility of individual toilets	0	16	0	102	199	1050	53	240	1195	1455	4310
Open Defecation Spots	4	3	0	4	1	14	4	3	6	2	41
No. of personnel using open defecation spots on daily basis (Approximate)	287	192	0	148	40	450	160	270	250	300	2097

How many public toilets need repairs?	0	0	0	3	0	0	5	0	2	2	12
No.of urinals	0	0	0	0	3	0	1	9	50	0	63

Thus out of total 45005 nos of households only 40932 households having individual toilets which is 89%

7.2 Sewerage

Good riddance: Panvel has faced severe sewage-related problems for several years now. A new sewage treatment plant, with a capacity of 14 million liters per day, will cater to the needs of the population of old Panvel, which is approximately 82,000. The new plant is completed & commissioned on March 2013.

Panvel: This year, the Panvel Municipal Council may find it less difficult to cope with the notorious sewage problems that arise in the area during the monsoon season every year.

A new sewage treatment plant, with a capacity of 14 million liters per day, is operational & at present 3.5MLD sewage is being collected in plant . It will cater to the needs of the population of old Panvel.

Previously, sewage from the municipal area was collected and then discharged into the creek, causing heavy water pollution, an issue for which the civic body was pulled up by the Maharashtra Pollution Control Board(MPCB).

The new sewage treatment plant, which was built at a cost of Rs 15.41 crore, combats this problem. The plant is built about 500 meters away from the old collection point, and once it is connected to that, waste will no longer pollute the creek.

Currently, the population of old and new Panvel is 1.8 lakh. Since the plant is not meant to cater to the needs of the population of new Panvel, it has sufficient capacity to dispose of the waste generated by the population of old Panvel, pegged at 82,000. Moreover, the plant will also be able to dispose of sewage generated by the projected population of 1.70 lakh in 2039, as the plant's capacity can also be increased.

The Panvel Municipal Council also said that while a drainage network of approximately 10 km has been connected to the new plant, it will take time for the entire municipal area to be connected it. The area under the municipality has an underground drainage facility that is fully available in several wards.

Currently, in these wards, sewage is collected and treated partially in a septic tank by owners of property. Such septic tanks are located in the premises of buildings or in the vicinity of the buildings. As Panvel has heavy rainfall, there are many problems related to the draining of rainwater and septic tank effluent. This leads to water logging, odour problems and problems with insects such as mosquitoes and flies.

A report stated that the aforementioned problems may pose serious health risks: 'It is necessary to have a separate sewage system carry the sewage to the treatment facility, where it will be treated in such a manner that the treated effluent would be suitable for disposal in surface water. This will definitely provide better environmental conditions to the residents.

7.2.1 Sewerage Treatment Plant (STP)

Panvel Municipal Council has sewerage treatment facility for the waste water generated by Residential & Private properties.

Waste water is originated from Residential Properties, Commercial Properties and in small quantity by Industrial Properties on which treatment is proposed to get collected through sewerage lines & reaches treatment plant of Panvel Municipal Council. The treatment of sewerage is carried out on the basis of norms and guidelines of the local and state level rules and regulations.

Currently there are 2600(approximately) septic tanks in city.As sewerage network and STP is operational house connections to network is in process & will take 1 year to complete the work.

The treatment process carried out at Panvel Municipal Council's sewerage treatment plant is "Activated Sludge Process". In this process; sludge is processed by micro bacterial with the help of oxygen. The capacity of this treatment plant is 14 MLD. Ultimate stage for year 2039 this plant need increase in capacity to 22 MLD.

7.2.2 Drainage Facility:

The provision of proper drainage system is as equally important and necessary as a water supply scheme. Presently the sullage water from houses is collected and carried in open drains along the roads and is ultimately discharged in a Nalla. The rain water is also carried by the storm water drains provided along the road and all the sullage and storm water is



drained ultimately through the nalla in the nearby river. The night soil is collected from the septic tanks and is carried either by periodically through a mobile unit and dumped. All the night soil depots are away from the town and are at a distance of 2 km from the town. Judging from the modern standards of civic life it is absolutely necessary that the town should have an underground drainage system. New drainage scheme is completed with STP.

After house connection to drainage network, sullage water to open drain will be reduced and gradually will become nil and hence only storm water will flow in roadside drains.

Present Situation:

Under this scheme; length of the distribution network is 29.559 KM & 1008 manholes are constructed. There are three prabhag's i.e. 1,2,& 3 which comes under CIDCO area having 100% coverage of underground drainage & in prabhags 4,5,6,7,8 & 9 100% laying is completed however work of connections at house drainage is not completed yet. PMC has received Rs.46.28 crore grants for this work under UIDSSMT. The house connection to network is pending & this will end till 31st March,2016.

7.3 Storm Water Drainage

Panvel Council has open drains of 124.5 kms. Total area of Panvel Municipal Council is 12.27 sq.km having road length is around 128.5 sq.km. Currently, only 25% of total coverage of Storm water Drainage is exists in PMC. There are 14 nalls and major 8 nalls carry the waste water mixed with the storm water drainage. There are 19 water logging spots in Panvel council area of which 7 are major.

- i. Opp. Taluka Police Station
- ii. Opp.Raigad Bank
- iii. Tapal Naka (Ramnil Mill)
- iv. Nr.Telephone Exchange
- v. Maharashtra Bank
- vi. Middle Class Housing Society
- vii. Uran Road Circle

Details of existing storm water drainage system

The survey is carried out for existing storm water drainage system by taking bed (invert) levels,cross section,type of construction of existing drains,etc.

Details of existing storm water drainage system are given below.

- a) Total length of existing storm water drain is – 24.462 km
- b) Total length of drain on one side of road is - 15.41 km
- c) Total length of drain on both side of road is – 8.58 km
- d) Type of construction wise length of drains is mentioned below-
 - i) Stone Masonry - 17.09 km
 - ii) RCC - 6.91 km
- e) Lengths having no proper section drain - 14.00 km

f) Length of cross country drain – 40.00 km

The maximum and minimum depth of existing drain is 3.30m & 0.30m respectively.

The maximum & minimum width of existing drain is 8.0m & 0.20m respectively.

For details of existing storm water network please refer Drawing no.SWD/PANVEL/04.

Proposed Storm Water Drainage System

Formation of Zones

The storm water of Panvel Town is released in river Gadhi and Panvel creek. Topography of Panvel town is generally plain. Considering the reduced levels and slope of Panvel town total 8 zones are planned. The zone wise details are given below. The planned zones are showing on [Drawing SWDZ/PANVEL/02](#).

Zone-I

The zone boundary is limited to, on west side Pune-Mumbai National highway 4 (NH-4), on east side by Panvel Municipal Boundary, Godrej and Gangaram theatre on North side ST depot, Yashodhan society and Navnath Mandir, on south side river Gadhi. There is one main drain starting from ST depot and releases into river Gadhi near Rajasthan Smashan Bhoomi. There are total 14 sub drains joins to main drain. For maintaining the slope one drop is proposed. The maximum RL and minimum RL in this zone are 11.755m and 2.146m respectively. The proposed bed width is ranging from 0.3m to 6.75m.

Zone-II

The zone boundary is limited to on west side river Gadhi, on east side Mominpada trust, telephone exchange Panvel and part of NH-4, on north side Dhavale tank, Powar Laundry and Hanuman Mandir, on south side hotel Panchratna and Vasantkunj. There is one primary drain flowing from d/s side of hotel Panchratna and releases into Panvel creek back side of court. There are total 19 main drains joins to primary drain and 75 sub drains joins to main drain. The maximum RL and minimum RL in this zone are 10.43m and 3.130m respectively. The proposed bed width is ranging from 0.3m to 11.2m.

Zone-III

The zone boundary is limited to on west side telephone exchange, Mominpada trust, hotel Panchratna and Vasant Kunj on east side Pune Mumbai NH-4, on north side Panvel middle class co-operative housing society and Gandhi hospital, on south side hotel Bharathi, market yard and river Gadhi. There is one main drain flowing from Gandhi hospital and releases into river gadhi u/s of Uran road bridge. There are total 28 sub drains joins to main drain. The maximum RL and minimum RL in this zone are 7.796m and 5.213m respectively. The proposed bed width is ranging from 0.3m to 7.75m.

Zone-IV

The zone boundary is limited to on west side market yard, on east side Pune Mumbai NH-4 and hotel Bharathi, on north side Market Yard, on south side river Gadhi. There is one main drain flowing from market yard area and releases into river Gadhi d/s of Pune-Mumbai (NH4) road bridge. There are total 13 sub drains joins to main drain. The maximum and minimum RL in this zone are 7.788m and 6.38m respectively. The proposed bed width is ranging from 0.3m to 4.80m.

Zone-V

The zone boundary is limited to on west side river Gadhi, on east side and north side Masjid tank, on south side rice mill. There is one main drain flowing from rice mill and releases into river Gadhi near MPL water supply scheme. There are total 2 sub drains joins to main drain. The maximum and minimum RL in this zone are 5.389m and 4.040m respectively. The proposed bed width is ranging from 0.40m to 3.10m.

Zone-VI

The zone boundary is limited to on west side Wadala tank, on east and north side Pune-Mumbai (NH4), on south side Ballareshwar temple and Panvel Marathi girls High school. There is one main drain flowing from Panvel Marathi girls High school and releases into Khadi channel near Karnala Sports Club. There are total 16 sub drains joins to main drain. The maximum and minimum RL in this zone are 10.010m and 5.506m respectively. The proposed bed width is ranging from 0.30m to 4.0m

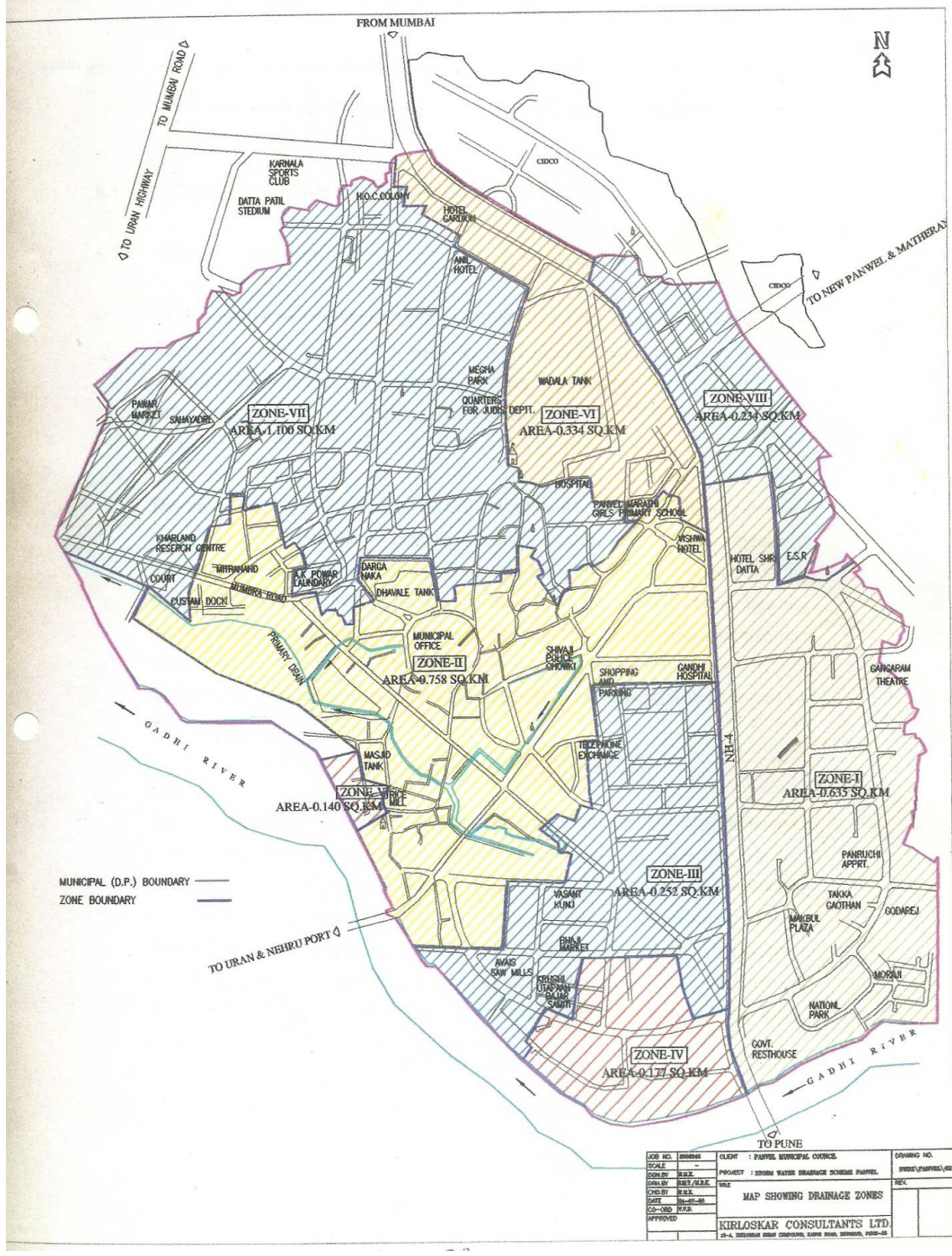
Zone-VII

The zone boundary is limited to on west side Pawar market, Lotus Srikal and Datta Patil stadium, on east side Wadala tank and Pune-Mumbai (NH4) and north side Pune-Mumbai (NH4), on southside court, Power Laundry, Dhavale tank, Hanuman Mandir and Panvel Marathi girls High school. There are two main drain one is flowing from Z.P High School and releases into creek D/s of court and another is flowing from Ideal park and releases into creek D/s of court. There are total 91 sub drains joins to main drain. The maximum and minimum RL in this zone are 9.200m and 2.154m respectively. The proposed bed width is ranging from 0.25m to 9.2m.

Zone-VIII

The zone boundary is limited to on west side Pune-Mumbai (NH4), on east side Panvel Railway station, on north side Shivshankar Mandir, on south side ST depot, Yashodhan society and Navnath Mandir. There is one main drain flowing from ST depot and releases into big drain constructed by CIDCO. There are total 18 sub drain joins to main drain. The maximum and minimum RL in this zone are 12.915m and 5.957m respectively. The proposed bed width is ranging from 0.25m to 9.2m.

The proposed zone wise storm water drain network is shown on Drawing no.SWD/PANVEL/01.



7.4 Solid Waste Management

Presently Panvel Municipal Council is collecting the waste through Gantagadi's at each Prabhag. The total waste collected from Panvel city is 54 MT. There are total 22 Gantagadi's in all 10 prabhags collecting the total waste. There are 44470 household getting benefit of the service of waste collection through Gantagadi's. In Many areas the dustbin facility has been provided by the CIDCO & PMC. The total number of community dustbins is 210. There are different vehicles for collection, transportation of solid waste which are provided by Municipal Council/CIDCO and by contractor appointed for the Solid Waste Management by council. The number of vehicles provided by CIDCO contractor are 8 and 14 by PMC contractor for waste collection, transportation etc.,

There is a need to increase one vehicle in prabhag 4 and one in prabhag 9. The waste generated from various sources like vegetable market, buildings of private and government offices, Bazar is approximately 11 MT.

Existing Waste Generation & Infrastructure

Sr.No.	Available Infrastructure	Generated Waste In MT (Per Day)
1	Residential	64.30
2	Commercial	
3	Industrial	-
4	Medical	1.5
5	Institutional	0.2
6	Other	2
	TOTAL	68 MT/day

CIDCO has adopted and is implementing the Solid Waste Management rule 2000 in New Panvel, Kalamboli. Kharghar, Drongiri areas get covered. The management has two parts:

1. Collection & Transportation of Solid Waste
2. Processing & Waste Management of Solid Waste

7.4.1 Collection & Transportation of Solid Waste:

Presently Solid Waste Collected is around 68 MT/day which contains Solid Waste from the area of Panvel Municipal Council. The procedure of Collection & Transportation is as under :

1. House to house collection of Solid Waste
2. Solid Waste Collected from Community Bins
3. Transportation of Solid Waste from Source to Site point
4. Collection & Transportation of other waste
5. Collection & Transportation of green waste collected from road site areas.
6. Management of animal clattering
7. Collection of waste from road sweeping.

8. Availability of Vehicles for collection and transportation of SWM
 - Refuse Compactors
 - Rickshaw having facility of tripping arrangement
 - Skip Loaders
 - Grab & Ken
 - Handcarts having different dustbin facilities
- Dustbins at proper places
9. IEC activities carried out for degradation of collected waste at source as dry & wet waste.



7.4.2 Processing & disposal of Solid Waste

CIDCO has developed processing & disposal facility at Chawl gaon, Talaja M.I.D.C. The collection of solid waste had started since Nov,2007.The project of composting has started. The site area is around 16 hectre. The site has got approval & sanction from Pollution Control Board and Government Authorities. At this processing site, the solid waste processing and disposal of its in a scientific manner.

7.4.3 Medical Waste Management

As per the rule of Solid Waste Management & Disposal,2000, the management of biodegradable waste is a major element to take care off. Approximately 300 kg waste gets generated per day within PMC limit and sent to Talaja MIDC site through Mumbai Waste Company's collection vehicles for collection of Biodegradable waste.

7.4.4 Processing on Solid Waste

At processing center, weight of solid waste is done. Then its segregation of waste is done as dry & wet waste. The dry waste is again divided as recyclable & non recyclable waste. The material which can be used as recyclable is plastic, glass, metal etc., The degradable waste has cut down in required diameter & sent to compost platform. To control the bad odour, herbal sanitizers are used. To make compost processing more properly, micro organisms were used. To control flies, 'flex' is used.

Five landfill sites are developed. They were developed scientifically as per the norms and requirements of MPCB and MSW(2000) Rules.



7.5 Water Supply

7.5.1 Source of Water

Main source of water supply is Dehrang Dam. Currently the dam is operated and maintained by PMC. The water is conveyed from intake structure to WTP by 500 mm dia. PSC line. The intake well is of 2.5m diameter and 15m height receives the water from Dam through three nos. of 350 mm dia. Connecting pipe placed at different levels. Water storage capacity of the dam in earlier period was 3.570 MCum. But over the period time storage capacity is subsequently reduced because of heavy silt deposition.

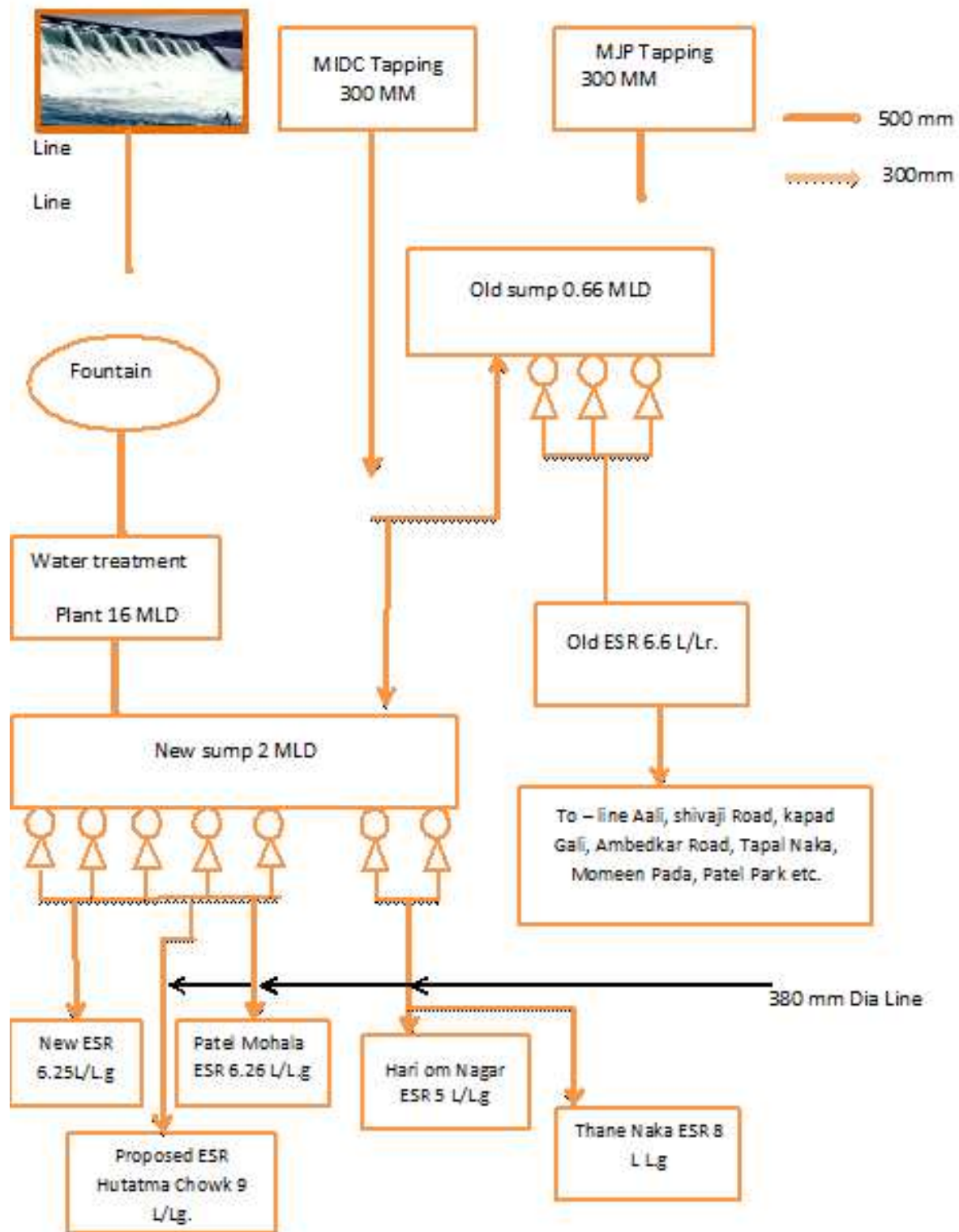
To cater the decreased water demand, PMC identified additional water supply sources and decided to take additional treated water from agencies like MJP, MIDC and CIDCO. There are currently 07 nos. of tapping points at different locations and of various sizes. Flow meters are installed at each tapping point. Water supplied by the agencies is charged based on the mutual agreed rates with PMC.

The raw water from the Dehrang dam is conveyed through 500 mm dia. Pre stressed Concrete (PSC) gravity main to the existing Water Treatment Plant (WTP) having capacity of 16

MLD. The WTP is located behind the state transport bus stand in the city area. The water from this WTP is mainly supplied to the old Panvel area through various ESR's namely Patel Mohalla ESR, Hari Om Nagar ESR, Thana Naka ESR and two ESR at ST stand and Bhaji Market ESR.

Sr. No	Source Name	Source Location	Source Distance from City in Km	Transmission/Tapping point/	Avg. Daily water lifted, MLD	Water Supplied to PMC area through ESR, Distribution networks or by directly.
1.	Dehrang Dam	Dehrang	16	500mm	10	Old panvel
2.	MJP Tapping	Vichumbi River	1	300mm	5.2	Old panvel
3.	MJP Tapping	Fire Station	0.5	300mm	2	Old panvel
4.	MJP Tapping	Vadghar	0.15	150mm	2	Uran Road
5.	MIDC Tapping	Dhakta Khanda	0.1	100mm	0.5	Dhakta Khanda
6.	MIDC Tapping	Motha Khanda	0.2	100mm	0.5	Motha Khanda.
7.	MIDC Tapping	Datta Hotel	0.1	300mm	5.50	Old panvel
8.	CIDCO Tapping	Podi	0.003	80mm	0.3	Podi
Avg. Total Quantity of Water Supplied					26	

Schematic Arrangement of Water Supply



- New Sump – New Sump – 40 Hp Pump x 2-1 Working and 1 standby
- New sump – Patel Mohala – 40 HP Pump x 3 – 1 Working and 2 Standby
- New Sump – Hariom Nagar – 35 Hp pump x 2-1 Working and 1 Standby
- Old Sump – Hari Om Nagar – 40 Hp Pump x 2 and 15 HP x 1-1 Working and 1 standby

7.5.2 Water treatment Plant

The existing water treatment plant was constructed in year 2001 of phase III (A) work of water supply scheme o 16 MLD capacity. The water treatment plant having units as Aeration fountain, mixing channel, clarifier, rapid sand filter and chlorination system. The aeration fountain is of cascade type of 4.5m diameter. The mixing channel has a detention period of 30 sec and length of the channel is 9m. The clarifier has a detention period of 1.5 hrs and total diameter of 28.6m. Rate of filtration of Rapid Sand Filter is 5000 lit/sqm/hr. Treated water is stored in Pure Water Sump having capacity 2000000 litres near WTP. For backwash, RCC elevated wash water tank capacity 25000 ltrs is constructed in above Admin cum Laboratory room of treatment plant.

7.5.3 Service Reservoirs & Transmission Mains

Presently water is supplied to consumers from 5 ESR's which are located in different water supply zones and single sump which are located in WTP premises. The water from this sump is pumped in to ESR's through rising mains. The details of service reservoirs and transmission mains are tabulated as under.

Details of Service Reservoirs.

Location and Type	Capacity in lit	Water Supplied to Zone	Description
Hair Om Nagar – ESR	500000	Zone – 1 (a)	RCC With 21m Staging
Kanak Sarovar- ESR	800000	Zone – 1 (b)	RCC With 21m Staging
ST Stand – New ESR	625000	Zone – 2	RCC With 21m Staging
ST Stand – Old ESR	625000	Zone – 3(B)	RCC With 11m Staging
Patel Mohalla – ESR	650000	Zone – 3 (A)	RCC With 21m Staging
Pumping Station New sump	2000000		RCC Underground Storage
Vegetable market ESR	9,50,000	Zone – 3 (B)	RCC with 21 m Staging.
Total Storage Capacity	6150000	Lts	

Details of Transmission mains

Sr. Nos.	Type	From – To	Pipeline Description
1	RW Gravity Main	Dehrang Dam Intake Well to WTP	PSC, 500mm dia, 16Km length.
2	PW Rising Main – 1	PW Sump to Hari Om Nagar ESR & Thane Naka ESR	DI, 350mm dia, 1 Km length

3	PW Rising Main – 2	PW Sump to New ESR@WTP	DI, 350mm dia, 30 M length
4	PW Rising Main – 3(B)	PW Sump to Old ESR @ WTP	DI, 350mm dia, 30 M length
5	PW Rising Main – 3(A)	PW Sump to Patel Mohalla ESR @ WTP	DI, 350mm dia, 3 M length

Details of DMA Zone

Sr.No	DMA Zone	Wards covered	Supply from
1	Zone 1 (a)	Payonair Society and part of Sainagar, kakan samaj hall, dhutpapeswar karkhana , post office, pardeshi ali	Hair om ESR
2	Zone 1 (b)	Part of Sainagar, Kakan Samaj & Panvel court	Thana Naka ESR
3	Zone 2	Lokmanya nagar, CIDCO fire brigade, Middle class society, takka agon, godrej colony, railway station	New ST ESR
4	Zone 3 (a)	Patel mohala, kacchi mohalla & part of rohidas wada, panvel court	Patel Mohalla ESR
5	Zone 3 (b)	Vadale talao, lain ali, gao devi mandir, panvel municipality & part of dhutpapeswar karkhana, post office, pardeshi ali, rohidas wada	Old ST ESR
6	Zone 4	Koliwada & part of rohidas wada	MJP Tapping (wadghar connection)
7	Zone 5	Motha Khanda	MIDC Tapping
8	Zone 6	Dhakta Khanda	MIDC Tapping
9	Zone 7	Poddi	CIDCO Tapping

7.6 Environment

Panvel Municipal Council is regularly taking samples of Air from different location to check the pollutant in the Air. The places where sample of Air has taken are as follows:

SR.NO.	SAMPLING LOCATION
1	Near PMC Office
2	Patel Mohalla
3	Near Bus Stand
4	Near Panchamukhi Hanuman Temple
5	Uran Naka Fish market
6	Rotary Circle
7	Kapad Bazar
8	Khanda Colony
9	New Panvel Bridge
10	Nr. HOC Colony

The Air Samples taken at different location during May 2014.

`	SAMPLING SITES	SAMPLING PERIOD (hrs)	CONCENTRATIONS		
			RSPM (100 µg/cum)*	Sox (80 µg/cum)*	NOx (80 µg/cum)*
1	Near Municipal Council Office	8	71	19	25
2	Patel Mohalla	8	46	14	23
3	Near Bus Stand	8	88	28	32
4	Near Panchamukhi Hanuman Temple	8	76	33	69
5	Uran Naka Fish market	8	76	22	40
6	Shivaji Chowk	8	63	25	43
7	Rotary Circle	8	73	24	30
8	Kapad Bazar	8	77	21	38
9	Khanda Colony	8	81	31	34
10	New Panvel Bridge	8	80	16	24

- National Ambient Air Quality Standards, Part-III-Section-V

Panvel Municipal Council has its own water source which is on the bank of Gadhi River. The water gets distributed through water distribution network. Municipal Council is regularly doing checking of water samples from various sources. The details given below is collected water samples from 14 different location like one from river, six lakes, three from potable water sources & five from nallas.

Sampling sites / locations

Sr. No.	Sample type	Locations
1	River and Lakes	Gadhi River (Under Bridge Wadhghar)
		Gadhi River (Under Bridge Highway)
		Well bear VirupakshMandir
		Well near Lokhandepada
		Well near Urdu School
		Lendale Lake in Patel Mohalla
		Israyale Lake
		Vadale Lake near BallaleshwarMandir
		Krishnale Lake near Bhaji Market
		Devale Lake near corporation office
2	Drinking	Maharashtra jeevanpradhikaran (MJP)
		MIDC
		Gadeshwar Dam Inlet sample
		Treated Gadeshwar Dam Water sample
		Hair Om Water Tank
		Patel Mohalla
		Koli Wada
		KachiMohalla

The Water Samples taken from different location during the period of September,2012 to October,2012

Average Analysis results of River & Lake Water Samples in May 2014

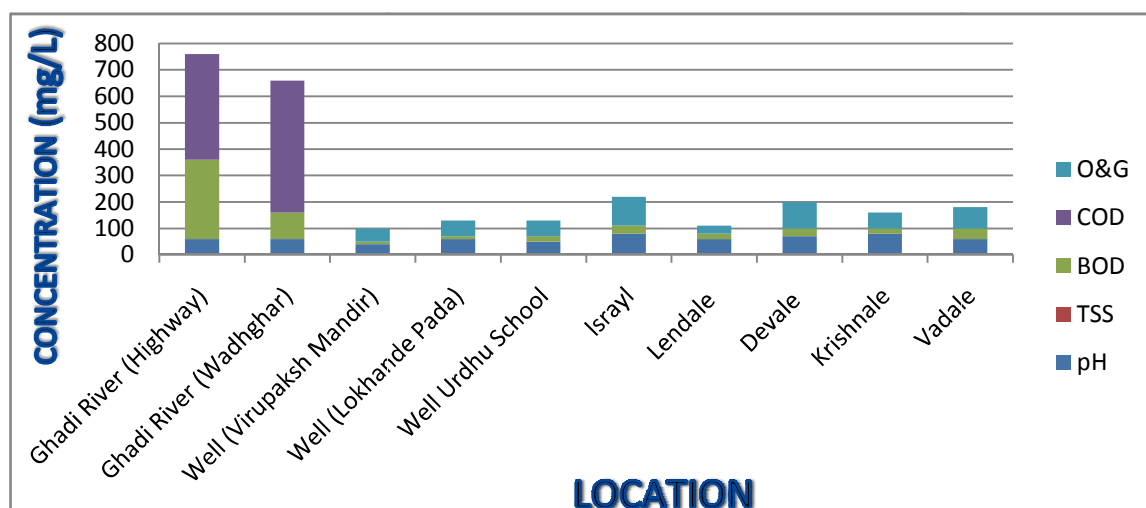
SR No	PARAMETER	UNIT	LIMIT	River		Well		
				Nr. Wadhgher	Nr. Highway	Well (VirupakshMandir)	Well (Lokhandepada)	Well (Urdu School)
1	pH	-	5.5-9.0	7.1	7.3	7.3	7.2	7.1
2	TSS	Mg/L	<100	55.0	50.0	35.0	60.0	45.0
3	BOD	Mg/L	<30	139	113	11	15	16
4	COD	Mg/L	<250	556	486	48	60	64
5	O&G	Mg/L	<5	-	-	-	-	-



Sr. No	PARAMETER	UNITS	LIMITS	Lake				
				Istrayale	Lendale	Devale	Krushnale	Vadale
1	pH		5.5-9.0	7.8	7.4	7.1	7.3	6.8
2	TSS	Mg/L	<100	60.0	65.0	55.0	75.0	70.0
3	BOD	Mg/L	<30	32	11	26	17	25
4	COD	Mg/L	<250	116	56	108	68	96
5	O&G	Mg/L	<5	-	-	-	-	-

Parameter Analyzed :-

- **pH** : It is the indicator of acidity or alkalinity of the water. Its value is between 0-14 . The water with pH value of 7 is said to be neutral and its Tolerance range for Aquatic water is 5.5-9.0.
- **TSS (Total Suspended Solid)** : It is the concentration of free suspended solids present in the water. It is measured in mg/l. Its Tolerance range for Aquatic water is 100mg/l
- **COD (Chemical Oxygen Demand)**: It is the indirect measure of organic matter present in the water. It is measured in me/l. Its Tolerance range for Aquatic water is 250mg/l.
- **Oxygen BOD (Biochemical Demand)**: It is the indirect measure of bio degradable organic matter present in the water. It is measured in mg/l. Its Tolerance range for Aquatic water is 30 mg/l
- **O&G (Oil & Grease)** : It is the amount of oil & grease present in the water. It is measured in mg/l. Its Tolerance range for Aquatic water is 5 mg/l.



Panvel Municipal Council is taking necessary action to control the noise pollution under which they are calculating the noise decibels at different location to avoid noise pollution.

Places where sound decibels recoded with the help of sound mapping technique:

SR.NO.	SAMPLING LOCATION
1	Near PMC Office
2	Patel Mohalla
3	Near Bus Stand
4	Near Panchamukhi Hanuman Temple
5	Uran Naka Fish market
6	Rotary Circle
7	Kapad Bazar
8	Khanda Colony
9	New Panvel Bridge
10	Nr. HOC Colony

Average Noise Levels Measured during day, Afternoon & Night time in May 2014

Sr.No.	LOCATIONS	DAY TIME NOISE LEVEL (dB)	NIGHT TIME NOISE LEVEL (dB)	DAY TIME NOISE LEVEL LIMIT(dB)	NIGHT TIME NOISE LEVEL LIMIT (dB)
1	Near PMC Office	71.2	47.4	65	55
2	Patel Mohalla	60.2	45.6	55	45
3	Near Bus Stand	61.7	55.9	65	55
4	Near Panchamukhi Hanuman Temple	67.8	55.1	65	55
5	Uran Naka Fish	66.2	50.6	65	55

	market				
6	Rotary Circle	62.2	58.9	65	55
7	Kapad Bazar	63.9	45.2	65	55
8	Khanda Colony	61.8	51.1	65	55
9	New Panvel Bridge	67.1	55.4	65	55
10	Nr. HOC Colony	65.3	44.8	55	45

Standard Norms of Noise Levels

Code	Area	Day time (dB)	Night time (dB)
A	Industrial area	75	70
B	Commercial area	65	55
C	Residential area	55	45
D	Silence Zone	50	40

Temperature:

Since last 100 years is (1901 to 2007) average increase in temperature of Panvel is 1.62° C . This temperature increase is related to urbanization, rapid growth and population increase. More increase in temperature make the atmosphere very humid due to which increase the moister in atmosphere which correlates increase in diseases due to air pollution. May is the hottest month in Panvel while January is the coldest month. The monsoon get started in the month of July.

Plant Survey:

Panvel Municipal Council is taking regular survey of plats in the public and private premises. On the basis of this survey, council can take decision about various plants in the areas surrounded by the premises. The main information carried out thorough this survey is as follows.

- Name of the plants based on scientific name of the same & its spices
- Height of plants/trees
- Age of the plant/tree
- Health of the plant/tree
- Age limit of the plant/tree

The survey results helps in preparation of Environmental Reports, Local level decisions for maintenance of these trees or helps in preventing the trees/plants which are really helpful to mankind.

Panvel Municipal Council has open area of about 3.63 sq.km of which 80-90% area surrounded by various plants. Plantation survey is carried out at both the places in Residential as well as Commercial areas.

Panvel Municipal Council is also taking care of soil pollution by taking different samples of soil at different places and taking proper action to avoid soil pollution. The reason of

soil pollution is mainly due to mismanagement in Solid Waste Management, use of pesticides and improper use of soil.

Environment Status Report is prepared on regular basis by PMC with the help of consultant.

7.7. IEC & Social Mapping:

7.7.1 IEC :

Municipal Council is conducting various activities under IEC component to make awareness about water, sanitation health education etc., in their council area. Many of these are under.

- Distribution of leaflets contains various messages related to water born disease and how to protect ourselves from these by taking precautionary measures like boil the water, cover it properly, do not eat things which are kept open area, wash the hands before making lunch/dinner, keep surrounding area of house clean etc.,
- Distribution of chlorine tablets on demand in rainy season
- Arranging health camps as and when required.
- These messages are given on local TV channel, Newspaper and putting hoardings at various locations.
- Awareness programmes has carried out for reuse of waste water in gardening, vehicle cleaning etc.,

7.7.2 Social Mapping

On 15th April,2013 Training Programme on Social Mapping was organized for Municipal Officials, Corporators , Resident Community Volunteers , Project Officials(SJSRY).71 participants attended the training programme.

The training programme was inaugurated at the hands of Dr.(Prof.) Sneha Palnitkar, Director, RCUES, AILSG, Mumbai wherein in her inaugural ; she highlighted the elements of City Sanitation Plans, role and responsibilities of various stake holders while making the plan. She explained in brief Service Level Benchmarking, 28 indicators on Water Supply, SWM, Sewerage and Sanitation and Storm Water Drainage. She also explained various SJSRY and Urban Poverty Alleviation Schemes in brief.

She highlighted the role of RCVs and their involvement in plan preparation and community empowerment. She discussed some of the best practices with the RCVs and elected representatives. Mr.S.G.Patankar, Chief Officer Panvel Municipal Council addressed the RCVs and elected representatives by appealing them to participate actively in the preparation of City Sanitation Plan. He explained the various components of CSP and explained various

government policies and schemes to the participants. Mr.Jitendra Sali, Field Officer, AILSG, Mumbai explained the participatory Research Techniques to be utilized at community level and discussed aspects of city sanitation plans. He also emphasized the significance of creating awareness, disseminating information and use of appropriate channels of communication. Mrs. Sunita Ganage, Senior Social Worker, CSSC, Mumbai discussed methodology and guiding principals of Focus Group discussion (FGDs), Time- Line Interview, Personal Interview and underline the importance of people's perspective in collecting the correct and accurate information about sanitation facilities, problems and access to basic services in slum settlements. Ms.Madhura Palnitkar, Programme Development Officer, CSSC, Mumbai discussed the technique and importance of Vasti Pheri and Resource Mapping in acquiring the information about the access to basic services at community level. She explained in detail the slum questionnaire for acquiring accurate and authentic data at slum level to the participants.

SR.NO	SERVICE LEVEL BENCHMARK	BENCHMARK	SLB ACHIEVED BY COUNCIL TILL DATE	TARGET SET FOR MARCH 2015
1	2	3	4	5
1	Coverage of water supply connections	100 %	100 %	100 %
2	per capita supply of water	135	173	160
3	Extent of metering of water connections	100 %	5%	30 %
4	Extent of non -revenue water (NRW)	20 %	20 %	19 %
5	Continuity of water supply	24 × 7	1½ × 7	1½ × 7
6	Quality of water supplied	100	99	100
7	Efficiency in redressal of customer complaints	80 %	93%	95 %

8	Cost recovery in waiver supply services	100 %	39 %	50 %
9	Efficiency in collection of water supply related charges	90 %	62.00 %	70 %
10	Coverage of Toilet	100 %	95 %	96 %
11	Coverage of sewage network services	100 %	4 %	70 %
12	Collection efficiency of the sewage network	100 %	0%	70 %
13	Adequacy of sewage treatment capacity	100%	0%	90 %
14	Quality of sewage treatment	100 %	0 %	90 %

15	Extent of reuse and recycling of sewage	20 %	0 %	10 %
16	Efficiency in redressal of customer complaints	80 %	92 %	93 %
17	Extent of cost recovery in sewage treatment	100 %	45%	50 %
18	Efficiency in collection of sewage charges	90 %	77 %	85 %
19	Household level coverage of solid waste management services	100%	100%	99%
20	Efficiency of collection of municipal solid waste	100%	100%	99%
21	Extent of segregation of municipal solid waste	100%	13%	32%

22	Extent of municipal solid waste recovered	80%	605	60%
23	Extent of scientific disposal of municipal solid waste	100%	42%	40%
24	Efficiency in redresal of customer complaints	80%	100%	100%
25	Extent of cost recovery in SWM services	100%	0	0
26	Efficiency in collection of SWM charges	90	0	0
27	Coverage of storm water drainage network	100	21	25
28	Incidence of water logging/flooding	0	20	16

CHAPTER 8

Requirements to satisfy SLBs

8.1 Introduction:

Every sector has a few key performance indicators that are understood by most stakeholders in that sector. Similarly, in the urban sector too, there have been a number of performance indicators related to urban management and service delivery that have been defined, measured and reported. However, most initiatives in performance management so far have been observed to have some key limitations:

- Different sets of performance indicators have been defined under different initiatives;
- The definition or the assessment method may vary for the same performance indicator, thus
- inhibiting inter-city or intra-city comparisons;
- Most measurement exercises have been externally driven (by agencies external to the agency responsible for delivery against those performance parameters), leading to the key issue of ownership of performance reports;
- Most performance measurement initiatives have not been institutionalized, limiting the benefits of monitoring trends in performance over time; and
- The process of performance measurement has not been taken forward into performance management (Figure 1).
- These limitations mean that systems for measuring performance and taking further action on them have not been institutionalized in urban agencies.
- It is therefore important that the basic minimum standard set of performance parameters are commonly understood and used by all stakeholders. Depending on the specific need, additional performance parameters can be defined and used.

Measuring service levels of civic agencies implies measuring outcomes, and indirectly also reflects on institutional capacity, financial performance and other parameters. Service level parameters can be measured either from a utility manager's/planner's perspective or from a citizen's or consumer's perspective. In addition, to facilitate comparison between cities/service delivery jurisdictions, and changes in performance over time, it is important that the performance levels are benchmarked, and monitored against those benchmarks.

It is in this context, that the Ministry of Urban Development (MoUD) has initiated an exercise to define Service Level Benchmarks (SLBs). The MoUD constituted a 'Core Group for Service Level Benchmarking,' comprising experts from various institutions to arrive at the SLBs. Drawing on the experiences of various initiatives in measuring service level performance, the Core Group narrowed down the exercise to four basic urban services to begin with, and arrived at sets of indicators in each. After much deliberation, the indicators

their definitions, means of measurement, frequency and jurisdiction of measurement and reporting, etc., were finalized.

The Handbook of Service Level Benchmarking is a ready reckoner to enable Urban Local Bodies (ULBs) and other city level parastatal agencies implement systems for measuring, reporting and monitoring the SLBs.

8.2 PERFORMANCE PARAMETERS FOR BASIC URBAN SERVICES

Service level performance parameters have been identified for four basic urban services:

- Water Supply;
- Sewage;
- Solid Waste Management (SWM); and
- Storm Water Drainage

These parameters have been defined primarily from a utility manager's/planner's perspective. In other words, the parameters highlight the performance as would be monitored by the leadership/management of ULBs or other civic agencies. These performance measurements will need to be carried out by the service delivery agencies themselves, reported to higher levels of management and also disseminated widely.

Clear definitions and methodologies are expected to eliminate bias in measurement and reporting.

The succeeding table give current status of all 28 SLB of PMC (as on 31/03/13)

A. Toilets

Sr. No.	Indicator	Benchmark	SLB achieved by council till date	Target set for March,2015
1	Coverage of Toilets	100%	91%	92%
2	Coverage of wastewater network services	100%	4%	10%
3	Collection efficiency of waste water network	100%	0%	NA
4	Adequacy of wastewater treatment capacity	100%	0%	NA
5	Quality of waste water treatment	100%	0%	25%
6	Extent of reuse and recycling of treated waste water	20%	0%	0%
7	Efficiency in redressal of customer complaints	80%	95%	96%
8	Extent of cost recovery in wastewater treatment	100%	45%	50%
9	Efficiency in collection of sewerage charges	90%	77%	78%

Coverage of Toilets

According to census 2011, total population of PMC is 180020.

Out of present population slum households are 3055 having population 12580.

Floating population is 40000

The total numbers of households are 45005. The household size is 4.

Sr.No.	Zone/Ward	Population	Total No. of individual toilets	Total No. of individuals having access to these toilets
1		39843	9985	39943
2		32422	8180	32722
3		10346	2506	10346
4		14293	2623	10492
5		10668	2417	9658
6		13786	2971	11834
7		14389	3047	12188
8		14884	3246	12984
9		14538	2534	10136
10		14851	3423	13692
	TOTAL	180020	40932	163995

The group toilet concept is not exist in PMC.

There are total 45005 properties in the city of which 40932 propertise having toilet facility.

There are total 4000 households depending upon community toilets/public toilets.

having 492 seats. The community toilet/public toilets were built by the PMC/MMRDA under Nirmal Bharat Abhiyan and the O&M is taken care by PMC.

There are total 64 public toilets in PMC having 334 number of seats. They all are at proper and well maintained by PMC

Summary of toilet usages

Sr.No.	Details	Numbers
1	Total Population	180020
2	Population using Individual toilets	163995
3	Population using public toilets	6975
4	Population using Community toilets	4740
5	Population not using any toilet facility	4310

- Underground sewerage network is likely to be commissioned by March-15 for both Zone-I & Zone-II with the recent addition funds available (12.63 cores) SLB will be achieved.
- There is any proposal for reuse & recycle of treated waste water as on today. The proposal of reuse effluent of STP is under active consideration.
- PMC is charging the sewerage charges for those properties having septic tanks at present. After completion of underground drainage project; suitable sewerage be hovel ant tax will be levied for all properties in lieu of existing charges.

B. Storm Water Drainage

Sr. No.	Indicator	Benchmark	SLB achieved by council till date	Target set for March,2015
1	Coverage of Storm Water Drainage Network	100%	25%	35%
2	Incidence of Water Logging/flooding	0	16	10

There are 19 identified flooding spots out of which 7 are chronic spots. These spots will be given top priority for the marks of open storm water drain on both sides and closure of open drains if existing. Similarly, work of systematic cleaning and dissimulation existing Storm Water Drainage will be taken.

C. Solid Waste Management

Sr. No.	Indicator	Benchmark	SLB achieved by council till date	Target set for March,2015
1	Household level coverage of solid waste management service	100%	97%	98%
2	Efficiency of collection of municipal solid waste	100%	100%	100%
3	Extent of segregation of municipal solid waste	100%	3%	4%
4	Extent of municipal solid waste recovered	80%	46%	47%
5	Extent of scientific disposal of municipal solid waste	100%	100%	100%
6	Efficiency in redressal of customer complaints	80%	100%	100%
7	Extent of cost recovery in SWM	100%	0%	0%
8	Efficiency in collection of SWM charges	90%	0%	0%

- The SLB of household level collection of SWM is quite good. The SLBs for extent of segregation of municipal solid waste is low. This can be achieved by introducing various innovative IEC methods in public. PMC can distribute two types of bins to collect dry and wet waste for some of the societies/properties on pilot basis and encourage them for composting or biogas project.
- Need to educate the civilians for reuse and recycle the waste as and when possible by introducing zero garbage methodology.

D. Water Supply

Sr. No.	Indicator	Benchmark	SLB achieved by council till date	Target set for March,2015	Remarks
1	Coverage of water supply connections	100%	100%	100%	
2	Per Capita available water at consumer end	135 LPCD	171 LPCD	172 LPCD	Unequal distribution
3	Extent of metering of water connection	100%	9%	10%	
4	Extent of Non Revenue Water	20%	22%	20%	
5	Continuity of water supply	24 hours	1.5 hours	1.5 hours	
6	Efficiency in redressal of customer complaints	100%	80%	85%	
7	Quality of water supplied	80%	80%	80%	
8	Cost recovery in water supply services	100%	63%	80%	
9	Efficiency in collection of water supply related charges	90%	68%	80%	

- Panvel Municipal Council has made provision of Rs.2 crores in the Annual Budget 2014-15 for metering of water supply services.
- To increase the SLB for cost recovery in water supply services, PMC should allow all the household connection with metering & billing the 100% of metering. Various IEC methods should be adopted to convince the population in slum settlements for individual tap connection & reduce the use of public tap to control the NRW .
- The wastage of water, leakages of water is happens in most of the public places. Some major actions to be taken to reduce the NRW & increase the cost of water supply services.

E. Environment:

Panvel Municipal Council has prepared an Environment Report for the area covered under municipal council. In this report; some suggestions and recommendation have been given which can be followed by the municipal council to improve the environment status. The main aim to provide these recommendations is to improve the environmental conditions on continuous basis by adopting different methods in and around the area of municipal council.

Sr.No.	Points	Suggestions/Recommendations
1	Use of Land	<ul style="list-style-type: none">• Need timely survey of land to know its use & can take various action accordingly• Proper planning of land at the places like vegetable markets & crowd places to avoid traffic jams.• Road side plantation & proper maintenance of it.• Control on establishment of slum settlements in the open spaces.• Council should monitor illegal construction & dangerous buildings & solve the problem on priority basis.• To make provision for not cutting the trees for any reason.
2	Water Supply	<ul style="list-style-type: none">• To maintain the level of ground water; water demand should be satisfied by finding new resource of water.• To stop drinking water use at construction site.• To monitor the water treatment plant on regular basis & check whether it satisfies the norms of potable water or not.• IEC for Water Conservation
3	Waste Water Management	<ul style="list-style-type: none">• Regular cleaning of the available drainage line• To encourage the reuse of recycled water in the huge housing societies• To study the effect of waste water on Environment conditions & natural water resources.• To provide drainage facilities wherever not available in present situation.• Need to carry survey for drainage system to know its present conditions; so that necessary actions can be taken to make proper facility.

4	Level of Air	<ul style="list-style-type: none"> To avoid air pollution due to traffic jam; facility of vehicle parking in all the areas to be made available. Construction of flyover will be a good solution to avoid traffic jam. Plantation at both sides of the road. Widening of the roads to avoid traffic jam. To encourage use of CNG instead of petrol & diesel. To avoid Air Pollution at main areas; regular checking of Air is required.
5	Solid Waste Management	<ul style="list-style-type: none"> Regular checking of the dumping sites Try to make Biogas from the decomposable waste & use that gas for street lights. Use the wet decomposable waste for composting/vermi composting process. Waste transportation facility should make more advance to avoid the littering of waste on roads while transporting, avoid bad smell of the waste etc.,
6	IEC	<ul style="list-style-type: none"> To make awareness programme based on Problems of pollution, Health related problems & activities to be followed for good life by conducting IEC activities in different schools, colleges & NGOs.



CHAPTER 9

GAPS IN EXISTING SITUATION & REQUIRED ACTION

9.1 TOILETS

There are 41 locations of open defecation in municipal area and a population is around 4310. To reduce this area from open defecation needs 150 seats of toilet. There is difficulty in providing toilets to these location due to non availability of land.

9.2 SEWERAGE

- To overcome the problem of effluent from septic tank, council needs to construct a sewage network including sewage treatment plant & disposal. As the work is ongoing and will be commissioning fully in the month of March-2015. Till that time; PMC needs to purchase more vacuum suction pumps for the sewage management of the septic tanks.
- PMC needs to think of; collection of total generated sewage, its treatment & disposal in a scientific manner to the natural water courses to suit the MPCB norms for receiving water body standards.
- Prepare a proposal for reuse of the treated sewage from treatment plant units. This should also include propagating gray water reuse, reclamation of black water. The proposal of reuse for flushing & gardening or road cleaning should be seriously considered and got implemented.
- Propose to adopt ECO-san Philosophy on pilot basis in few residential areas.

9.3 STORM WATER DRAINAGE

- The council has prepared DPR for SWD.
- Aspects of runoff calculations based on the catchment areas are considered.
- In prepared DPR ; identification of quantum of work for roadside drains and training of nallas are considered.
- To overcome water logging problem, the aspects of levels of the plot developments as well as shifting of utility from road at safe levels are planned.

9.4 SOLID WASTE MANAGEMENT

- Panvel Municipal Council is near to achieve the 100% collection of waste at household level & trying to get waste in segregated manner. PMC needs to adopt proper methodology to achieve the segregation of waste at source like viz; on pilot basis PMC can distribute the two types of containers (dry & wet) to the properties for segregation at source. This practice will emphasis the importance of segregation at source in public & will help to achieve the SLBs for the same.
- Need to make effective IEC which gives message of importance of segregation, how to make money/earning from waste by doing reuse & recycling of the waste collection at Municipal Solid Waste Sites.

- Panvel needs to take concrete steps in respect of composting and biogas generation as required at source.

9.5 WATER SUPPLY

- Presently, Panvel Municipal Council is providing sufficient water supply to the civilians which averages nearby 171 LPCD for 1.5 hours in a day.
- 100% metering at early stage is required to reduced NRW and 100% billing of the metered water connection.
- There is a gap between water produced and water billed which generates resulting less amount of revenue generated through water supply services.
- There are 15 slum settlements in PMC. They should be encourage to adopt individual tap connection/group water tap meter connection with nominal charges for water supply services; which results in decrease the wastage/leakages in water supply results in reduced NRW.

9.6 ENVIRONMENT

Even though there are no gaps that can be pointed out; following steps should be considered.

- To avoid contamination and comply with receiving water body standards as per the MPCB as well as WHO norms.
- To make the most pollutant/areas; clean and hygiene; council needs to carry out more plantation, keep open spaces for playground, gardens, public park as per norms.
- To control Noise pollution; traffic diversion, residential area plantation and barricading should be carried out.
- In the area of PMC; there are many big companies in MIDC areas. PMC can tie-up with these companies under their CSR activity and use their support for plantation or publication of IEC material which gives messages like “Save Water, Save Earth”, Reuse of Waste Water, Green Earth etc., or any other environment related activities.

9.7 SCHOOL SANITATION

Ministry of Urban Development has emphasized the schools issue while designing the City Sanitation Plan for the Municipal Council. Considering the importance of this issue; Panvel Municipal Council has collected data for school sanitation in the same format developed by the MoUD,GoI.

The coverage of toilets in schools are very important; to inculcate the habit of using the toilet as well as following the hygienic practices from the childhood like wash hand after use of toilet, before lunch etc.,. The children are known as change agent in the community for positive behavior change. Hence major focus & importance has given to the School Sanitation in the making of CSP.

Sr.No.	Schools	Total Number of Schools	No. of students	No.of toilet seats available	No.of urinals available
1	Asharmashala's/ Balwadi & Anganwadi's	12	265	14	12
2	Primary Schools	14	6051	125	93
3	Secondary/Higher Secondary Schools	14	34279	484	289
4	Collages/University	6	14819	81	158

There are 28 primary/secondary schools & 12 Anganwadi/Balwadis in Panvel Municipal Council area.

Total number of boys is 28376 while girls are 26773. In all there are 362 toilet seats for boys & 342 toilet seats for girls.

The additional requirements for toilets seats are 40 for both boys & girls.i.e. 20 seats for boys & 20 for girls.

The PMC has to take appropriate action to provide this requirement in their schools with proper budgetary provision. While for the private schools; school authority should be prevailed upon and make compulsion to provide these requirements through proper & appropriate enforcement authority.

CHAPTER-10

POPULATION PROJECTION UP TO 2041 & ELEMENTWISE FUTURE REQUIREMENTS

11.1 INTRODUCTION

The Panvel Municipal Council limit is 12.17 sq.km. As per census 2011, population is 1, 47,331. The town developed up to the end of the limit area of council. Municipal Council is providing basic facilities to the people staying in these areas like Roads, Water, Drainage, Electricity, Sanitation, etc., Many of the areas comes under the authority of CIDCO so they gets all the basic facilities from CIDCO itself & some charges are also collected by CIDCO.

To make the town planning for next 30 years of Panvel, population projection exercise to be carried out. This approach is needed to analyze the needs of present population & future population especially for Water Supply, Sewerage and Solid Waste.

As per the census 2011; population of Panvel Municipal Council is 1,80,020 which having requirements of Rs. 207.72 Crores for achieving the required Service Level Benchmarks. However when the population increase after 30 years, it is necessary to think about future requirements in considering the basic needs like Water Supply, Sanitation, Sewerage, SWM, Strom Water Management etc., & make the costing for those requirements. i.e, costing up to 2041 for all elements need to be worked out here.

The design population is estimated with due regards to all factors governing the future growth and development of the project area in the industrial, commercial, educational, social and administrative spheres. Special factors causing sudden emigration or influx of population should also be foreseen to the extent possible.

The population forecast for next 30 years i.e. 2041 for Panvel is derived by using all the methods of population projection for 2,58,331

A) Arithmetical Progression Method

Year	Population	Increase (X)
1981	37037	
1991	38994	1957
2001	65815	26821
2011	147331	81516
	Total	110294
	Average Increases	36764.66
2021	184096	
2031	220861	
2041	257626	

$$\begin{aligned}\text{Population in 2021} &= \text{Population in 2011} + \text{Increase for 1 decades} * \text{average increase} \\ &= 147331 + 1 * 36765 \\ &= 184096\end{aligned}$$

B) Incremental Increase Method

$$\begin{aligned} \text{Population in 2011} &= \text{Population in 2011} + 1 * \text{increase average} + 1 * (1+1)/2 * \text{Incremental Increase Y} \\ &= 147331 + 1(36765) + 1 * (41280) \\ &= 225396 \end{aligned}$$

Year	Population	Increase (X)	Incremental Increase (Y)
1981	37037		
1991	38994	1957	
2001	65815	26821	27864
2011	147331	81516	54695
	Total	110294	82559
	Average Increases	36764.6	41279.5
2021	225396		
2031	303441		
2041	381486		

C) Geometrical Increase Method

Rate of growth per decade between

1991 and 1981	0.0528
2001 and 1991	0.687
2011 and 2001	1.238

Where growth rate can be defined as $[(V \text{ present} - V \text{ Past}) / V \text{ past}]$
 $= \{(38994 - 37037) / 37037\} = 0.0528$

$$\begin{aligned} \text{Geometric mean } rg &= (0.0528 * 0.687 * 1.238)^{1/3} \\ &= (0.0449)^{1/3} \\ &= 0.355 \end{aligned}$$

$$\begin{aligned} \text{Population in 2021} &= \text{Population in 2011} * (1 + rg)^1 \\ &= 147331 * (1 + 0.355)^1 \\ &= 199696 \end{aligned}$$

Year	Population
1981	37037
1991	38994
2001	65815
2011	147331
2021	199696
2031	270588
2041	366647

D) State Urban Average Method

$$\begin{aligned} & \text{Average Percentage Increase per decade (Uavg)} \\ & = (5.28+68.78+123.85)/3 \\ & = 65.97 \end{aligned}$$

$$\begin{aligned} \text{Population in 2021} & = \text{Population in 2011} + (\text{Population in 2011} * \text{Uavg} * 1) / 100 \\ & = 147331 + (147331 * 65.97) / 100 \\ & = 244525 \end{aligned}$$

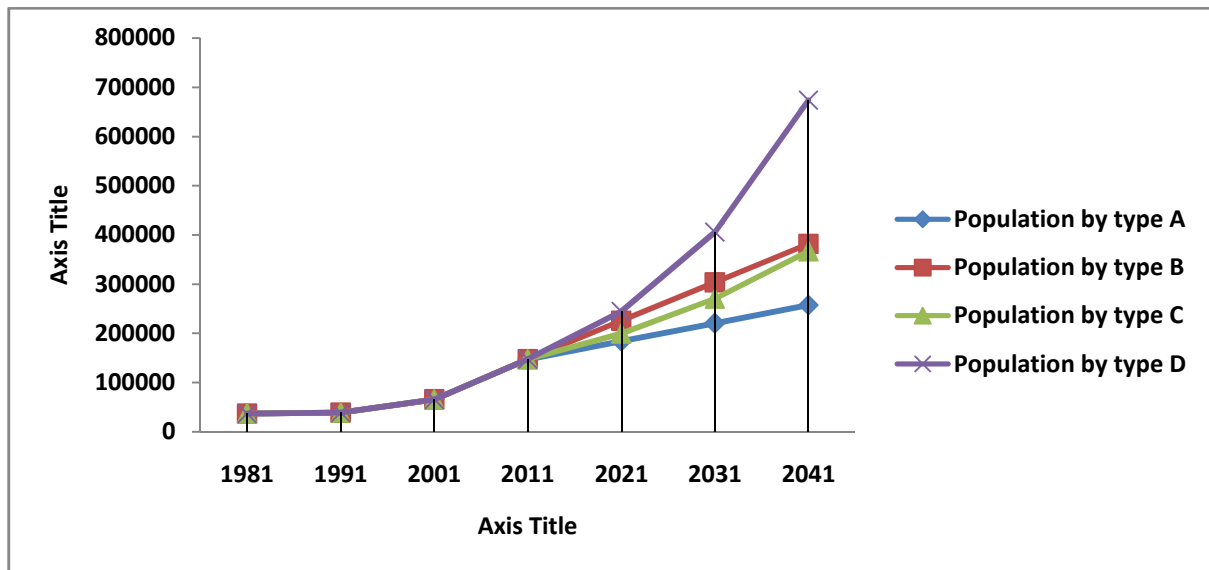
Year	Population
1981	37037
1991	38994
2001	65815
2011	147331
2021	244525
2031	405838
2041	673569

E) Graphical Method

The population is arrived by plotting the figures by above methods; we can see the pattern of population is nearby lays in the incremental increase method & geometrical increase method. If we take the average of both; gives nearest figure for small and medium towns. Hence it is contemplated that the population of Panvel will be 374067 by 2041.

Population forecast for project area by various methods

	Population by type			
	A	B	C	D
1981	37037	37037	37037	37037
1991	38994	38994	38994	38994
2001	65815	65815	65815	65815
2011	147331	147331	147331	147331
2021	184096	225396	199696	244525
2031	220861	303441	270588	405838
2041	257626	381486	366647	673569



Conclusion : The first 3 methods give a fairly acceptable population projection. Hence the average of there(3) viz (A)(B)(C)

Here is considered for Panvel City's population in the year 2041 that works out to 335253.

Note : State urban Average Method (E) and Graphical Method (F) are not considered in final evaluation of projected population of PMC.

CHAPTER 11

FRAMEWORK OF ACTION

Introduction: The cost estimates are developed on the basis of collected information and chapter wise information for all the wards/prabhags for each and every element of City Sanitation Plan. Each CSP element detailing is done by considering relevant sub element along with the present status of the available services, gaps in services, immediate requirements to fulfill the gaps and considering the designed period.

The following needs to be considered while implementing works mentioned in the cost estimates.

- ▶ The requirements of toilets mainly for men, women, children and handicapped are to be identified.
- ▶ Consideration for existing and proposed sewerage system, treatment and disposal, black/gray water management, possibility of technological options, possibility of reuse/ recirculation and even implementing ECOsan philosophy.
- ▶ Quantifying number of water courses, open road side drains, and existing and proposed mitigation steps to take care of water logging.
- ▶ Quantification of total solid waste, segregation at source, collection from each household , collection and transport up to collection centers and dumping grounds and availability of land for scientific disposal and treatment.
- ▶ Water demand, present and future requirements, existing and proposed distribution system, availability and continuity of water, qualitative aspects, leak detection, NRW, requirement in the urban poor areas and study of 24*7 situation.
- ▶ Environment in general and pollutants in respect of Water, Air and Noise, in particular mitigation, environmental management plan and effect of contamination and diseases.
- ▶ Exercise to correlate the existing situation and gaps in 28 indicators of Service Level Benchmark's and proposed programme to implement the works identified in CSP.
- ▶ Importance has to be given to identify the probable O&M cost and viability gap funding to implement the CSP prepared by them within with short/mid/long range programmes.
- ▶ Costing for each element of CSP is carried out considering the basis of DSR i.e District Schedule Rate for the year 2013-2014.

CHAPTER 12
FINANCIAL ASPECT WITH BUDGETORY PROVISION & VIABILITY GAP

Considering the population of Panvel town & the need of providing basic services to in coming future; the following projects have been proposed for city.

Sr. No.	Name of the proposed project	Budgetary Provision (2013) (in Cores)
1	Construction of community toilets	0.30
2	Water Supply System	22.92
3	Construction of underground drainage system	2.50
4	School Sanitation/ School Education	1.28
5	Solid Waste Management	11.60
6	Road side drains & construction of Nallas for water logging problem of rainy season	0.25
7	Environment & Biogas	0.05
9	Slum Settlement	0.02
10	Construction of Roads(D.P.Roads)	8.10
11	Dispensary	-
	TOTAL	47.02 cores

For the city sanitation plan project, total budgetary provision of Rs.207.72 crores will be required.

Sr.No	Sector	Capital Cost (Rs. In Crores)	Remarks
1	Toilets & Sewerage	58.575	Topmost priority given
2	Water Supply	97	Improved efforts taken now.
3	Solid Waste Management	10.07	Second priority attached.
4	Storm Water Drainage	44.3	Phased Solution Adopted.
5	Environment	1	Sustained Efforts Needed.
6	IEC & Social Mapping	2.5	Continuous Processing Required.

The Municipal Council financial budget is of Rs.47.02 crores yearly (2014-15) under which provision of Rs.47.02 crores is available for development works. This is a being meager provision to provide services to the rapid growing population in the municipal council area.

From above table it can be seen that an amount of Rs.27272 Lakhs or Rs.272.72 Crores is required in next 7 years for successful implementation of City Sanitation Plan. As Panvel Municipal Council has not sufficient finances of its own, it is expected that GoM & GoI will assist substantially say 40% each towards this cause.

The following table shows the budgetary provision in each element for basic services in the Municipal Council yearly budget.

Sr. No.	Name of the proposed project	Revenue Collected	Capital Budget 2013-14	O&M Budget 2013-14	Proposed CSP Budget
1	Toilets	0.30	0.50	0.050	9.075
2	Sewerage Management	0.50	7.00	0.09	49.50
3	Strom Water Drains	0.25	0.00	0.00	44.30
4	Water Supply	4.80	4.30	8.91	97.00
5	Solid Waste Management	0.00	1.00	0.00	10.07
6	Environment	0.00	0.00	0.02	1.00
7	IEC	0.00	0.00	0.00	0.50
8	School Sanitation	0.00	0.00	0.00	2.00
	TOTAL	5.85	12.80	9.07	213.445

Table for calculation of Viability Gap Funding to Implement CSP

Sr. No.	Name of the proposed project	Cost estimate in CSP	Capital Budget 2013-14	O & M Budget 2013-14	Funds to PMC by Gol	Funds from other sources to AMC	PMC likely to make budgetary provision in coming 4-5 years for CSP	Viability Gap Funding
1	Toilets	9.075	0.50	0.050	0.0	0.0	0.50	8.025
2	Sewerage Management	49.50	7.00	0.09	3.00	0.0	0.50	38.91
3	Strom Water Drains	44.30	0.00	0.00	0.0	0.0	1.00	43.3
4	Water Supply	97.00	4.30	8.91	2.00	1.625	5.00	75.165
5	Solid Waste Management	10.07	1.00	0.00	2.00	0.0	4.00	3.07
6	Environment	1.00	0.00	0.02	0.0	0.0	0.25	0.73
7	IEC	0.50	0.00	0.00	0.0	0.0	0.20	0.3
8	School Sanitation	2.00	0.00	0.00	0.0	0.0	0.40	1.6
	TOTAL	213.445	12.8	9.07	7.00	1.625	11.85	171.10

CHAPTER 13

LIMITATIONS (PRABHAGWISE)

- Political pressure on slum population for non use of pays & use toilets. Mentality of getting each basic service at free of cost.
- Encroachment of municipal land by slum population resulted in non availability of Garden's, Playground etc., to other civilians.
- Many times development of city affect due to opposition of local public and counselors
- Land un-availability for processing MSW.
- Land un-availability for taking up decentralized waste water treatment systems.
- Non Availability of funds.
- Deep rooted habits of citizens in relation to sanitation and health Hygiene.
- Provisions of a nominal fine to the civilian when they are defecating in open or throwing garbage on road etc.,
- Provisions in existing law for taking action against open defecating people are limited and municipal employees are having limited rights.
- Municipal Council is unable to provide 100% facility of Toilet, Gutter, and Roads for the civilians as there is no such budgetary provision in the municipal council's budget.
- Political interference is a major issue while implementation of various services provided by the municipal council in the different wards/zones; due to which quality of service gets affected & civilians did not received any good/quality services from the council.
- Less manpower is a major issue in the council; due to which allotment and distribution of work to the contractor is a common practice. Contractor is not much bother about the quality of services so at the end of the day; civilians suffer from getting good and better services from the council.

CHAPTER 14

CONCLUSIONS, SUGGESTIONS & RECOMMENDATIONS

1. Provision of reforms for CSP implementation in Legal and Administrative.

Modification in bylaws and internal rules and regulations of PMC for maintaining good Sanitation practices:

Additional Police Officers or Judiciary powers have to be given to the Senior Sanitary Inspectors, Encroachment Demolition Team of PMC for supervision and taking action against defaulters. “ Clean up Marshals” to be deployed in addition to existing staff.

Make relevant changes in Maharashtra Municipal Council Act/Nagarparishad/ Nagarpanchayat and Industrial Township Act 1965 i.e Chapter number 16 sections 229 to 236 IPC and CRPC and Mumbai Police Act changes that Judiciary Power should be given to Nagarpalika /Nagarpanchayats.

2. Tariff increase and other options giving due regards to willingness to pay to match with O&M:

O&M tariffs will be finalized duly involving the stake holders, CBOs, NGOs (at relevant cases) and with the approval of the general body/standing committee. The charges will be collected from the beneficiaries. Tariff increase annually should be made a practice by PMC.

3. Security of municipal Official while taking actions against encroachment, bad sanitation practices, dumping waste on roadsides, doing water wastage etc.,

Panvel Municipal Council official faces problem while doing the above actions against the civilians as they don't have any police protection. The people who are indulged in anti social practices in behavior have support from political leaders which turn into their rudeness behavior. In such cases, officials are unable to do their duties; resulting into non satisfactory management of basic services.

Conclusions/Suggestions

- Proper documentation and data reports shall be prepared and results shall be considered for monitoring and evolution for various parameters
- To adopt use of eco friendly technology options, available promotion of energy efficient buildings and infrastructure is recommended.

- Every provision shall be assessed for cost benefit ratio, life cycle cost affordability in view of legal obligation and budget of council.
- Strengthening the solid waste collection and transport system.
- Setting up centralized and decentralized treatment plants for biodegradable waste.
- Establishment of community sorting centers.
- Rehabilitation of existing dump sites and setting scientific land facility.

INSTITUTIONAL ARRANGEMENTS

Institutional arrangements are the policies, systems, and processes that organizations use to legislate, plan and manage their activities efficiently and to effectively coordinate with others in order to fulfill their mandate

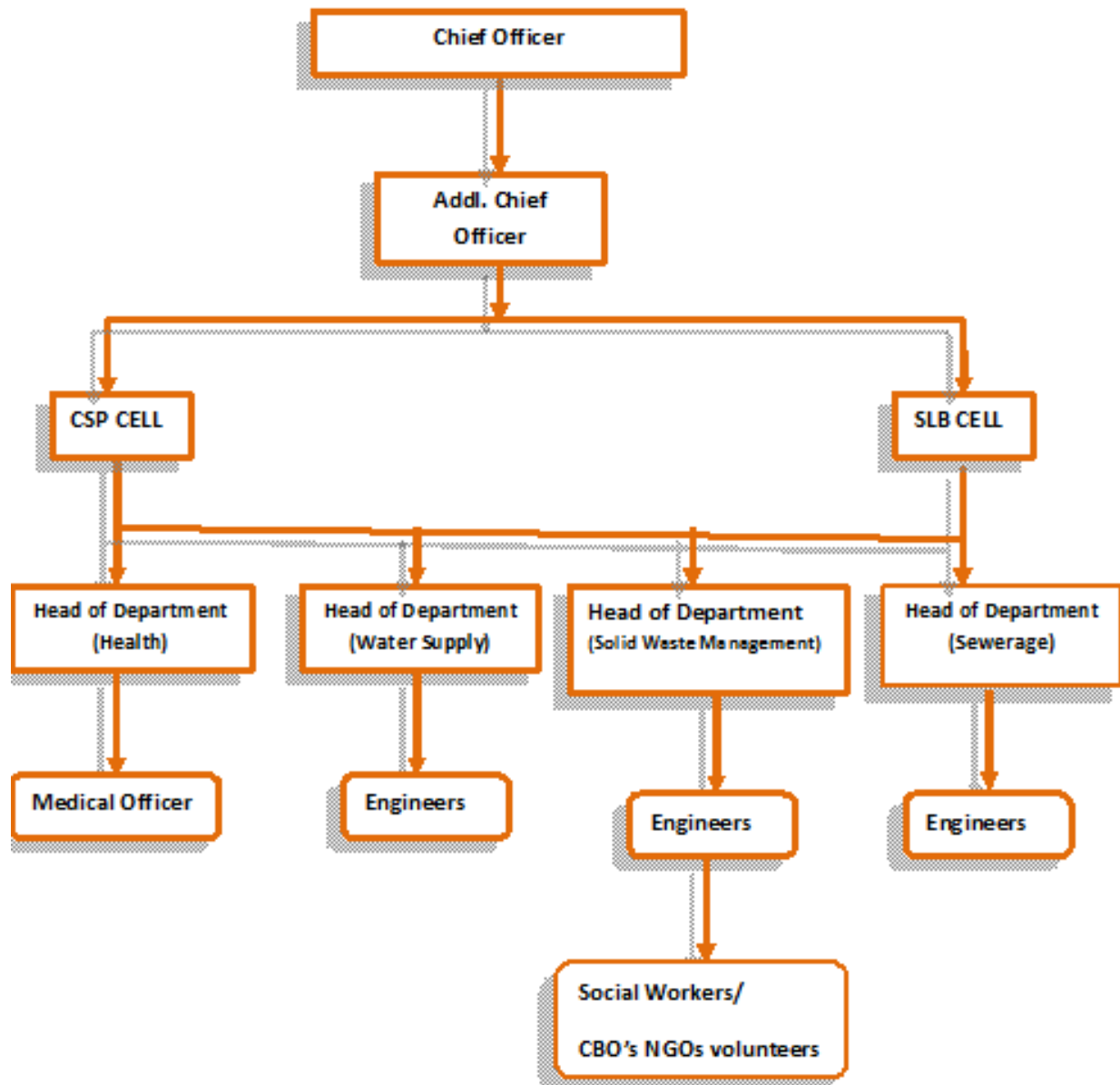
The institutional arrangements refer to the delegation, distribution, or sharing of power related to growth management decision-making and implementation authority. On the Government-Governance scale to the left Government power represents planning as the exclusive domain of a state or regional public agency; Governance reflects relative degrees of delegated or shared power with smaller units of government and/or non profit and private entities.

This has been a crucial issue in sanitation which has hampered the growth in terms of sanitation and also has pushed the cities to look unhygienic by redundant services. Therefore, having a sound institutional arrangement would enable the infrastructure to be used in a proposed manner to its fullest capacity.

Many a times the institutional arrangements cannot be confined with one agency in an urban local body as the activities come under multiple agencies which would make it more cumbersome. This issue of multiple agencies handling the same issues can be resolved only with a good number of convergent meetings and responsibilities to deliver are to be guided by the state government. Each agency handling its own thing is also important but in turn they should also have co-ordination to make sure that the duties do not limit themselves to their circles but the duties should enable the city to look more hygienic in terms of living conditions.

Panvel Municipal Council proposed to establish separate cell for CSP implementation with different expertise at various level to monitor the overall process & progress of CSP. The proposed arrangement will be as under.

PROPOSED FLOW CHART OF CSP MONITORING CELL



BUDGET REQUIREMENT AND INVESTMENT PLAN FOR CSP

Considering all CSP elements towards the protection of environment and for achieving ODF city, Panvel Municipal Council has worked out budget with current rates. The same is worked out sector-wise and total amount required for meeting the SLBs target is calculated. At the end of this chapter PMC has provided the actual amount required for the year 2013-14. PMC has worked out city level CSP budget as well as tentative zonal CSP budget too. It also mentions the part funding which is possible to be borne by PMC and required funds from State Government or Central Government. Without the financial support from GoI and GoM, PMC will not be able to implement the CSP as stated.

PROVISION OF SANITATION INFRASTRUCTURE- TOILETS AND URINALS WITHIN THE CITY

Sr.No.	Status of sanitation (toilets)	Existing situation of City Level	Proposed Action	Quantity	Unit Rate In lakh	Budget In cr.
1A	No. of places of open defecation	41 open defecation spot identified. Approximate 4310 individuals are defecating in open.4000 HHs do not have individual toilet facility	Construction of Individual toilets for unserved population	150	1.25	1.87
1B	Sanitation facilities for floating population	About 4000 floating population is identified within the city in all wards.	Construction of toilets for floating population	400	1.25	500
			Construction of Urinals for floating population	100	0.20	0.20
1C	Reconstruction of old/dilapidated community toilets	12 toilets are non functional.				
1D	School Sanitation-provision and improvement	Requirement of 40 toilet seats for both boys & girls.	Construction of toilet seats for students	160	1.25	2.00
TOTAL BUDGET FOR SANITATION INFRASTRUCTURE						

