



Surat Municipal Corporation

**Reuse & Recycle of Treated Wastewater  
Action Plan 2019**

## Contents

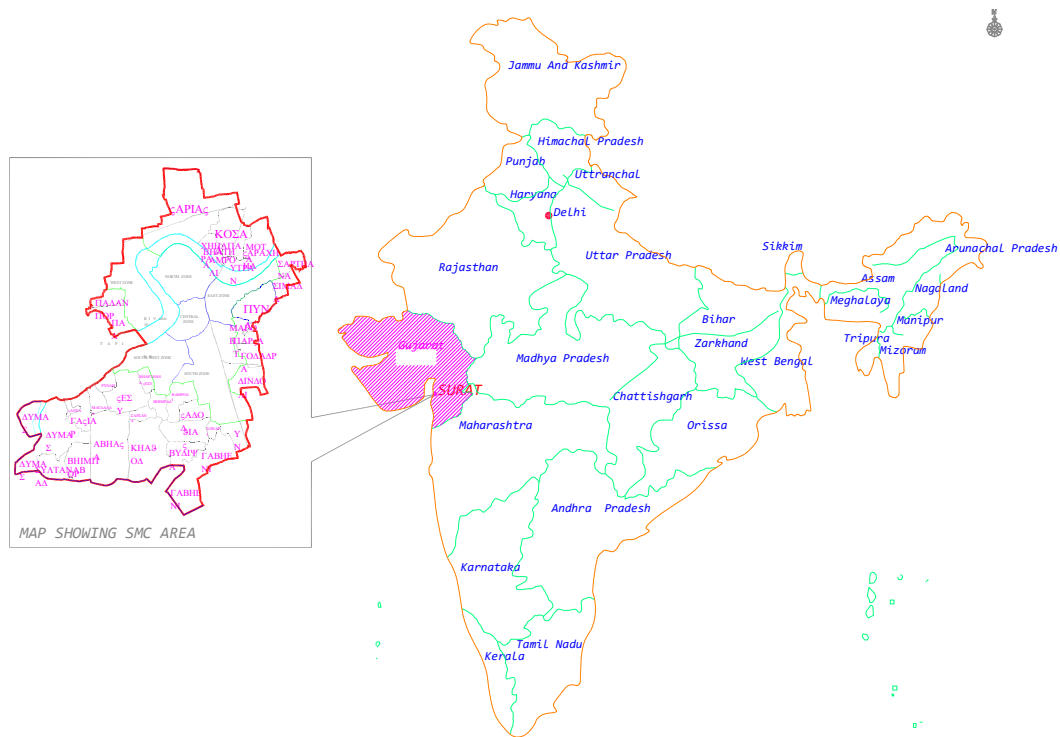
### **Action Plan: Reuse & Recycle of Treated Wastewater<sup>3</sup>**

1. Introduction .....	3
2. Present Sewerage Scenario in Surat City .....	4
3. Government Policy on Recycle and Reuse .....	4
Objectives of Policy .....	5
4. Current Scenario .....	5
5. Future Planning & Strategies .....	8

## Action Plan: Reuse & Recycle of Treated Wastewater

### 1. Introduction

Surat is a city located on the western part of India in the state of Gujarat and have a prime location along the best developed region in the state i.e. along the Ahmedabad - Mumbai corridor, linking the major industrial urban centres like Ahmedabad, Vadodara, Ankleshwar, Surat, Vapi etc. Besides, the finding of the natural oil and gas from Bombay – High at Hajira along this corridor has given the boost in the development of various centres viz. Bharuch, Ankleshwar, Hajira etc, resulting into further concentration of the industrial activities along this corridor. Surat is experiencing a rapid growth of population; because of the increasing industrialization in the peripheral area of Surat. Due to industrialization, migrant population is more in Surat because of the highly increased industrialization.



Surat is one of the cleanest city of India and is also known by several other names like “THE SILK CITY”, “THE DIAMOND CITY”, “THE GREEN CITY”, etc. It has the most vibrant present and an equally varied heritage of the past. The British, Dutch and the Portuguese had established there business centres in Surat, the remnants of which are still preserved in the modern day Surat. In

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past this was a glorious port with ships of more than 84 countries anchored in its harbour at any time.

Still today, Surat continues the same tradition as people from all around the country flock in for business and jobs.

## 2. Present Sewerage Scenario in Surat City

At present, out of total area of 326.51 sq.km of the Surat city, 187.50 sq.km area (about 91 % of habitable area) is having comprehensive sewerage system. The sewerage system covers approximately 97.5 % of the total present population of city. There are 58 nos. of sewage pumping stations and 11 nos. of sewerage treatment plants with more than 1900 kms. of main sewerage network for collection of sewage.



## 3. Government Policy on Recycle and Reuse

Water is a critical resource for social and economic development of any region besides being elixir of life. Water are getting depleted due to adverse changes in climatic conditions, scanty and erratic rainfall, increasing industrialization, population growth, exploitation of ground water, increasing demand for domestic purposes etc. This problem is getting amplified due to uneven natural distribution of water resources in different regions of the state mainly due to diverse topography. Gujarat has a high portion of water stressed area i.e. 58.6% of the total area due to arid, semi-arid and saline conditions.

The Government of Gujarat has launched many schemes titled Swarnim Jayanti Mukhya Mantri Shehri Vikas Yojna (SJMMSVY), Centrally Sponsored Schemes such as Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Swachh Bharat Mission (SBM), Smart City Mission, Shyama Prasad Mukherji Mission. All the schemes are for augmentation of the collecting system and treatment of sewage leading to a healthy environment.

*Action Plan: Reuse & Recycle of Treated Wastewater (2019)*

The government of Gujarat Launched a policy for Treated WasteWater reuse on 28<sup>th</sup> May 2018, which promotes the reuse of Treated sewage for different purposes of Gardening, Industrial Reuse, Tanker Filling, Lake restoration, Flushing, Construction reuse etc. The policy of treated wastewater is prepared by Government of Gujarat with a vision to maximize the collection & treatment of generated sewage and reuse of treated wastewater on a sustainable basis, thereby reducing dependency on freshwater resources. Also, the reuse of treated wastewater can become a source for revenue generation. The policy aims to achieve ultimate goal of reuse of treated wastewater fully by the year 2030.

Objectives of Policy

- To reach minimum 80% coverage and collection of sewage in all municipal towns.
- To reach a level of 100% treatment of collected sewage as per the prescribed standards.
- To reuse at least 25% of total freshwater consumption from TWW within the time limit set under policy by every municipal body.
- To reuse 70% of TWW by 2025.
- To reuse 100% of TWW by 2030.

4. Current Scenario

The Surat Municipal Corporation has 11 nos. of STPs in different area of Surat city having total design capacity of 1072 MLD. Currently, about 930 to 950 MLD of waste water is being treated at these STPs.



**Anjana Sewage Treatment Plant**

List of STPs with its technology

Sr. No.	Location of Treatment plant	Capacity (MLD)	Process
1	Anjana	122	Conventional Activated Sludge + IFAS
2	Bhesan	100	Conventional Activated Sludge
3	Bhatar	162	Conventional Activated Sludge + SBR
4	Karanj	140	Conventional Activated Sludge+ Fixed film Technology
5	Singapore	155	Conventional Activated Sludge + SBR technology
6	Bamroli	100	UASB+ Extended Aeration
7	Asarma	15	Moving Bed Bio Reactor
8	Khajod	25	Moving Bed Bio Reactor
9	Variav-Kosad	134	UASB + Moving Bed Bio Reactor + SBR
10	Dindoli	66	Conventional Activated Sludge
11	Gavier	53	SBR Technology
	<b>Grand Total</b>	<b>1072</b>	

Before the policy of Reuse of Treated Waste Water (TWW) was laid, the Surat Municipal Corporation had already commissioned various projects on Reuse of Treated Waste Water. The Corporation is successfully operating a 40 MLD (Net Output) Sewage Treatment Plant based on Ultra Filtration (UF) & Reverse Osmosis (RO) technology at Bamroli, generating Industrial grade Water and supplying it to Pandesara GIDC since year 2014. No complaint ever received regarding the quality of treated waste water and user industries are satisfied with the quality & quantity of water.

Outcome of the project is as per the design requirement. Environmental outcome of the project is in favour of green environment due to recycle and reuse of sewage water after tertiary treatment. The Project is sustainable in terms of saving of conventional water, which is being utilised where it should be, and this project is for creation of new source which is sustainable.



**Bamroli Tertiary Treatment Plant**

After the implementation of this project, Parliamentary Consultative Committee Headed by Hon'ble Minister Shri Hardeep Singh Puri (MoUHA), New Delhi, Many others water supply & sewerage boards of the Country, State dept., Urban development Dept, Urban local bodies, foreign delegates & many others have visited this plant & appreciated the innovation which is first of its kind & inspire from this initiative to go ahead for such project in their region.

Currently, More than 30 % wastewater is being reused after treatment at city level by Surat Municipal Corporation as mentioned below in Table : A and also planned to increase it up to 35 % of treated waste water.

**Table : A**

Sr. No.	Name of STP/TTP	Reused/ Recycled (MLD)	Type of Use
1	Bamroli STP	110.12	Industrial & Gardening use
2	Bhatar STP		
3	Khajod STP	5.25	MSW disposal site for processing and closure site.
4	Bhesan STP	30.95	Agriculture use
5	Variav STP	113.69	Industrial use
6	Karanj STP	2.25	Gardening, Road washing, Sewer jetting machine
7	Singanpore STP	1.35	
8	Asarma STP	0.71	
9	Anjana STP	1.35	
10	Gavier STP	1.25	
11	Dindoli STP	33.85	Industrial & Gardening use
6	Kavi Kalapi Garden TTP	0.30	Gardening
7	Suman Sangini, ParvatPatia	0.38	Grey water for flushing
<b>Total : A</b>		<b>301.45</b>	<b>&gt;30% of total 933 MLD treated wastewater</b>



## 5. Future Planning & Strategies

Looking to the development and population growth in city area, the sewage flow inflow at these STPs in the coming year going to surpass the existing capacity of STPs and the plant will be overloaded and will not be able to treat all the incoming sewage. Hence, considering design period of 15 years, the capacity of these STPs are being / to be augmented in coming year. The capacity of STPs after augmentation is as under.

**Table : B**  
**List of STPs with its technology**

Sr. No.	Location of Treatment plant	Capacity (MLD) Available in year 2021	Process
1	Anjana	122	Conventional Activated Sludge Process + Fixed Film Activated Sludge Process (IFAS)
2	Bhesan	200	Conventional Activated Sludge Process + Fixed Film Activated Sludge Process (IFAS)+ Oxidation Ditch
3	Bhatar	277	Conventional Activated Sludge Process + SBR technology
4	Karanj	140	Conventional Activated Sludge Process + Fixed film Technology
5	Singapore	255	Conventional Activated Sludge Process + Fixed Film Activated Sludge Process (IFAS) + SBR technology
6	Bamroli	215	UASB + Extended Aeration + SBR technology
7	Asarma	37.5	Fixed Film Activated Sludge Process (IFAS) + SBR Technology
8	Khajod	55	Fixed Film Activated Sludge Process (IFAS) + SBR Technology
9	Variav-Kosad	134	UASB + Moving Bed Bio Reactor + SBR technology
10	Dindoli	167	Conventional Activated Sludge Process + Fixed Film Activated Sludge Process (IFAS) + SBR Technology
11	Gavier	53	SBR Technology
	<b>Grand Total</b>	<b>1655.50</b>	



*Action Plan: Reuse & Recycle of Treated Wastewater (2019)*

Water is an important source for sustainability and one of the parameters that helped create, nourish and sustain life on earth. The recent trends in population rise and industrialization has led to the increase in the demand of fresh water. With the increase in the demand of water, there is depletion in the availability of water sources. The gap between the water supply-demand is increasing daily. Moreover, the natural water sources are in the verge of getting exhausted. Water has become a critical strategic issue. Envisaging the future needs for fresh water, the need of the hour is to search for novel sources of water so that the increasing water demands can be dealt with.

On successful operation of first Tertiary Treatment Plant at Bamroli since last 5 years, the user industries have come forward to get more treated water from Surat Municipal Corporation & Surat Municipal Corporation has started to setup additional 40 MLD (Net Output) capacity Tertiary Treated Waste Water Treatment Plant based on Ultra Filtration (UF) & Reverse Osmosis (RO) technology at Dindoli, in addition to existing 40 MLD TTP, which will make Pandesara Industries to get 80 MLD of TREATED WASTE WATER.

The industrial setup adjacent to the city has also come forward to get 35 MLD TREATED WASTE WATER from SMC by inspiring from the successful implementation of Tertiary Treatment Plant for Pandesara Industries. For that Surat Municipal Corporation has setup 35 MLD (Net Output) capacity Tertiary Treated Waste Water Treatment Plant based on Ultra Filtration (UF) & Reverse Osmosis (RO) technology at Bamroli. Both of these projects are on the verge of completion.

The table below shows the plants with quantity of waste water to be recycled up to year March 2020.

Table : C

Sr. No.	Year	Name of STP / TTP	Reused/ Recycled (MLD)	Type of Use
1	March 2020	Dindoli Tertiary Treatment Plant	56	Industrial use
2		Shyama Prasad Mukharji lake Garden TTP, kasanagar	1.41	Gardening, Road washing, Sewer jetting machine
3	Dec 2020	Bamroli sewage Treatment Plant	7	Commercial use (Dream city)
<b>Total : C</b>			<b>64.41 MLD</b>	
<b>Quantity of waste water to be recycled at end of year 2020. Total (A + C)</b>			<b>365.86 MLD</b>	

*Action Plan: Reuse & Recycle of Treated Wastewater (2019)*

Considering the amount of sewage that is being currently treated and based on the recent **Policy of Government of Gujarat on 'Reuse of Wastewater'**, The Surat Municipal Corporation has proposed to analyze the availability of treated sewage and identify the industries / industrial areas that are water intensive. The plan is to reuse the treated wastewater for the industrial use for non-potable water. Based on the location of industries in and around Surat City and location of various sewage treatment plants in the city, the complete area has been zoned into mainly three clusters viz. Bhesan Cluster, Dindoli Cluster and Bamroli Cluster. Details regarding the demand of various industries have been collected from the industries and accordingly, Detailed Project Report & Proposal has been submitted to Government of Gujarat for approval.

The table below shows the project under planning plants with quantity of waste water to be recycled at end of year 2021.

**Table : D**

Sr. No.	Year	Name of STP/TTP	Reused/ Recycled (MLD)	Type of Use
1	2021	Bhesan - Asarma - Variav Kosad STP	313	Hazira industries (Bhesan Cluster)
			17	Utran Gas Based Power Plant, GSECL.
2		Bamroli - Bhatar STP	50	Industries in Palsana
3		Sheth Navinchandra Mafatlal Garden, Udhana Zone	1.0	Gardening
4		Sidhdharaj Jaysingh Garden, South west Zone	1.0	Gardening
		<b>Total : D</b>	<b>382 MLD</b>	
		<b>Grand Total : A + C + D</b>	<b>747.86 MLD</b>	<b>&gt; 40% of 1655.50 MLD (Total Installed capacity of STPs @ year 2021)</b>

So at the end of year 2021, it is planned to reuse about 747 MLD of Waste Water collected at various Sewage Treatment Plants of Surat City.

The reuse of sewage water will:

- Contribution towards reducing the dependency on conventional resources of water.

*Action Plan: Reuse & Recycle of Treated Wastewater (2019)*

- Facilitates recycling of wastewater - an environmentally sound and progressive advance practice.
- Enable SMC to free up potable water earlier supplied to Industrial area, which can be use to supply the drinking water to the citizens of the city.
- Reduce dependence of Industrial Units on bore-wells and private tanker operators.
- Reduce pressure on ground water resources in the city for the benefit of environment.
- Conserve valuable ground water resources for future generation.
- Assured resource of water for industrial units during scarcity.
- Guaranteed revenue generation for Surat Municipal Corporation.
- Assure more stability in level of water supply by supplementing the source of water.

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