

Sector	Urban Development
Sub - sector	Urban Infrastructure
Profile No.	UD-12
Project Title	Urban Infrastructure projects in Ahmedabad, Rajkot, Surat and Vadodara

A. Introduction

Gujarat, the second most urbanized State in India, has about 35% urban population. The urbanized areas contribute a major share of the State's GDP. Ahmedabad, Rajkot, Surat and Vadodara are the four major cities in the State, where growth is the highest. Hence, it is imperative to focus on improvement of urban infrastructure in these cities.

The Government of India has proposed substantial assistance in the various urban infrastructure projects through "**The Jawaharlal Nehru National Urban Renewal Mission (JNNURM)**", which aims to encourage reforms and fast track planned development of the identified cities, thereby improving the urban economic activities to achieve higher productivity.

B. Objectives of JNNURM

The major objectives of JNNURM are as follows:

1. To have focused attention to integrated development of infrastructure services in cities covered under the mission.
2. To establish linkages between asset-creation and asset-management through a slew of reforms for long-term project sustainability.
3. To ensure adequate funds to meet the deficiencies in urban infrastructural services.
4. To have planned development of identified cities, which include peri-urban areas, outgrowths and urban corridors leading to dispersed urbanization.
5. To scale-up delivery of civic amenities and provision of utilities with emphasis on universal access to urban poor.
6. To provide special focus on urban renewal program for the old city areas to reduce congestion.
7. Provision of basic services to the urban poor including security of tenure at affordable prices, improved housing, water supply and sanitation, and ensuring delivery of other existing universal services of the government for education, health and social security.

The Urban Local Bodies of Ahmedabad, Rajkot, Surat and Vadodara had identified a few projects to improve the infrastructure in the cities. The detailed project reports were prepared and were submitted to the Central Government. The sanctioned projects under JNNURM are being discussed in the subsequent sections.

These projects would entail substantial investments in the State and would also improve the urban infrastructure in the cities of Gujarat.

C. Sanctioned Projects under JNNURM for the State of Gujarat

1. Urban infrastructure projects in Ahmedabad

Ahmedabad, the 7th largest metropolis of India, is also the largest urban city of Gujarat. The city is an important centre of trade and commerce, with four major GIDC industrial estates in the vicinity and is one of the leading centers for textile sector. The city is home to several national and international institutes like IIM, NID, CEPT, DA-IICT, ISRO, PRL, etc. Ahmedabad contributes to about 60% of the total productivity of the State and about 14% of the total investments in equity markets in India.

The projects sanctioned under JNNURM for Ahmedabad city across various sectors are:

Projects Sanctioned under JNNURM

Sr.	Name of Project	Sector	Cost, INR Million
1	Pipeline from Narmada Main Canal to Kotarpur Water Treatment Plant, including construction of 330 MLD intake well at Kotarpur, construction of water treatment plant at Raska, providing water distribution station and network in uncovered areas and modification of existing network and pumping stations	Water Supply	2,540.00
2	Construction of four lane river bridge – Vasna to Pirana *	Transport	312.50
3	Construction of Railway Overbridge on Ahmedabad - Botad Meter gauge railway line *	Transport	156.80
4	Sewage Treatment plant at Vasna	Sewage	115.70
5	Sewage Treatment plant at Pirana	Sewage	705.60
<i>* Completed projects</i>			

The details about the above projects are discussed in the subsequent sections.

i. Sector – Water supply

Rapid urbanization in the city has led to the development of new areas on the outskirts of the city. Thus, the majority of these areas are dependent upon Kotarpur for water supply.

Dharoi reservoir was commissioned in 1978 in order to supply water to Ahmedabad city. However, the assured quantity of 680 MLD water to Kotarpur was not met due to:

1. Depleting water levels in summer, causing severe shortage.
2. Only 33% of the water released actually reaches the city, due to in-transit infiltration, evaporation losses and illegal tapping. Moreover, 15-20% of the water supplied is lost in transmission and distribution.

The above factors led to increased dependency on private bore wells in many societies located in peripheral locations, which has resulted in depleting ground water levels at the rate of 2 - 3 meters annually. This water has very high TDS and fluorine content and may lead to severe health problems.

In order to ensure adequate water supply, the projects proposed are:

1. Pipeline from Narmada main canal to Kotarpur Water Treatment Plant
2. 330 MLD capacity intake well at Kotarpur
3. Construction of water treatment plant at Raska

These projects would ensure the following benefits:

- ☞ 100% of the population to get about 180 lpcd of water, thereby supplying continuous and ensured water supply.
- ☞ Improvement in quality of supplied water, which would enhance health security.
- ☞ Reduction of unaccounted losses as the source of water is nearer to water treatment plant.
- ☞ Reduction of operation and maintenance costs as raw water pumping station & treatment plant are in same premises.

ii. Sector – Transport

Construction of Railway Over Bridge on Ahmedabad Botad Meter gauge line

There is an existing meter gauge line connecting Ahmedabad with Botad, which originates from Ahmedabad railway station and crosses Sabarmati river and passes through Western

Ahmedabad. There is 120' ring road that passes from Usmanpura and Kankaria through railway crossing near Shreyan foundation. The crossing lies between Nehrunagar and Manekbaug on the north side and Vasana area on the south side. The entire area is highly developed and the road further intersects Ashram road on the southern side which is connected to national highway 8 on one side and Railway station and ST bus terminus on the other side.

A recent traffic survey shows that the traffic through Shreyas level crossing has increased to 67,000 vehicles per day, which is mainly due to the following reasons:

1. With the construction of Vasna Pirana River Bridge on Sabarmati, the 120' road will provide a straight link to the eastern parts of the city.
2. The 120' road is part of the route selected for the **Bus Rapid Transit System** and hence it is mandatory to provide a ROB at this location.

The proposed project aims at relieving the peak hour traffic congestion and reduction in fuel consumption and pollution.

Construction of four lane River Bridge from Vasna to Pirana

With the development of residential areas in Western Ahmedabad, the number of vehicles has also increased, resulting in increased traffic congestion. To reduce the traffic congestion, it is proposed to construct four lane river bridge from Vasna to Pirana. To estimate the traffic on the proposed bridge, traffic volumes on Sardar and Shastri bridges were studied, where the volume counts were 1,26,643 vehicles per day and 29,042 per day respectively.

Based on the likely diversion of traffic from Sardar and Shastri Bridges, the likely traffic on the proposed bridge is 65,990 per day and 44,683 per day respectively. This is likely to increase with the development of adjacent areas.

The proposed bridge across river Sabarmati connecting Vasna and Pirana on 120' road would have total length of about 828 meters, width of 20.10 meters and would also have width of footpath of 1.5 meters on both sides.

The proposed bridge will act as an important link between Western and South Ahmedabad. The bridge would help in reducing traffic congestion at Sardar bridge and Jamalpur intersection.

iii. Sector – Sewage

The western area of Ahmedabad is growing at a very fast pace. The existing sewerage treatment facilities are inadequate as per the population projections. Hence, additional sewerage treatment facility is necessary for the estimated population growth.

Sewage treatment plant at Vasna and Pirana

At present in the city of Ahmedabad, the population covered under sewerage system is about 90%, while the area covered is about 75% of the total area. However, the sewage treated is about 72% of the total generation. A few regions on the eastern side of the city still lack sewerage facilities, while in the peripheral areas, sewerage systems are yet to be developed.

Out of 500 MLD sewage generated in Ahmedabad, 168 MLD is disposed off in Sabarmati River without any treatment. For improving the necessary infrastructure, Sewage treatment plant at Vasna (35 MLD) and Pirana (old Pirana – 60 MLD, new Pirana – 180 MLD) are proposed.

Project benefits

- ↵ Pollution caused due to disposal of untreated water at Sabarmati will be stopped.
- ↵ An estimated population of 231,481 and 1,904,760 will be benefited by Vasna and Pirana Sewage Treatment Plants respectively by 2021 AD.
- ↵ There will be reduction in environmental degradation.
- ↵ The treated water can be used for irrigation purpose.

2. Urban infrastructure projects in Surat

The city has the advantage of being situated at the core of what is known as “The Golden Corridor” stretched from Ahmedabad to Mumbai. The city, spread over an area of 112.28 sq. kms, has been experiencing a rapid population growth, as per the demographic trends.

The projects sanctioned under JNNURM for the city of Surat are:

Projects Sanctioned under JNNURM for Surat

Sr.	Name of Project	Sector	Cost, INR Million
1	Proposed bridge across river Tapi joining Dabholi village to Jahangirpura	Transport	957.0
2	Upgradation of Anjana sewerage system	Sewage	110.0
3	Augmentation of Adajan sewerage	Sewage	120.0
4	Augmentation of Bhesan sewerage treatment plant	Sewage	150.0
5	Secondary sewage treatment plant at Barmoli	Sewage	100.0
6	Water Supply	Water	
	a. Pal area	supply	136.50
	b. Vesu area		258.20
7	Storm water drainage system for Vesu	Drainage	373.1
8	Sewage disposal and STP for Pal-Palanpore	Sewage	473.70
9	Sewage disposal and STP for Vesu	Sewage	473.30

Sector – Water supply

Villages in SUDA area rely on ground water through bore wells or on water supply schemes of Gujarat Water Supply and Sewerage Board (GWSSB). GWSSB has agreed to supply water to SUDA region on approval of Variav Regional Water Supply Project. On this basis, water supply schemes for Vesw and Pal – Palanpore areas have been proposed.

Project Description – Water supply in Vesu and Pal – Palanpore areas

Vesu urban settlement of SUDA area is located in the neighborhood of Surat city. The growth trend and the development of this area are in line with the growth in the city.

The water demand in Vesu area in the year 2004 is estimated at 17.74 MLD, which is likely to increase upto 71 MLD by the year 2034. Due to fast development and urbanization, the rate of water supply adopted for this area is considered at 140 liters / capita / day.

The water demand in Pal – Palanpore area in the year 2004 is estimated at 10.94 MLD, which is likely to increase upto 43.8 MLD by the year 2034. Due to fast development and urbanization, the rate of water supply adopted for this area is considered at 140 liters / capita / day.

The benefits of the proposed projects are:

- ✧ There would be adequate and continuous water supply, which would encourage better consumer satisfaction.
- ✧ There would be reduction in depletion of ground water levels.
- ✧ Health benefits – Absence of TDS and fluorine content would improve health of the people.

Sector – Sewage

There are inadequate sewerage facilities in the developing surrounding areas of Vesu and Pal Palanpore of Surat city. Based on the sustainable sources of water, SUDA has given priority for development of sewerage facilities in the areas of Vesu and Pal Palanpore areas.

The project envisages development of sewage disposal and sewage treatment plant in the areas of Vesu and Pal Palanpore. The total sewage flow is estimated at the rate of 115 lpcd.

In Vesu area, based on the population projections, the sewage generation in the year 2004 and 2034 is estimated at 12.67 MLD and 50.70 MLD. Similarly in Pal Palanpore area, the sewage generation is estimated at 7.81 lpcd in 2004 and at 31.25 lpcd in 2034.

The benefits of the proposed sewerage projects are:

- ✧ It would ensure clean sanitation in the areas
- ✧ The areas would be free from health hazards
- ✧ The area would environmentally free from water pollution, bad odour, etc.

Sector – Drainage

The location of SUDA areas are on the bank of river Tapi and river Madholi, near the estuary of Arabian Sea. The flooding during monsoon causes water logging, resulting into a loss of property and infrastructure. Hence, to overcome these problems, storm water drainage schemes for Vesu of SUDA area have been proposed.

The project aims to achieve following goals:

- There will be protection of mankind and other living organisms from flooding
- There will be protection of major equipments and infrastructure from being getting damaged due to floods.
- To protect loss of man hours, business hours of working people and increase productivity, thereby enhancing economic growth in the area.

Sector – Sewage

Of the total city area of 112.27 square kilometers, about 92% area and 97% of the population have been covered with sewerage systems.

Upgradation of sewage treatment plant at Anjana

The present capacity of existing sewage treatment plant at Anjana is 82.5 MLD, which covers an area of approximately 1200 hectares. 55 MLD of sewage is pumped to Anjana sewage treatment plant for the treatment before its final disposal. Against the ETP capacity of 1400 LPS, sewage flow in peak hours reaches 1750 LPS, which results into release of surplus flow in the creek.

During the year 2005, GPCB norms regarding effluent disposal have become stringent as compared to 1995. The existing STP is designed on the effluent treatment criteria of BOD of 30mg/l and suspended solids of 100 mg/l, which do not fulfill the norms laid by GPCB.

The proposed project of upgradation of sewage treatment plant will satisfy the sewage treatment needs for the year 2021. The proposed project would thus yield the following benefits:

- It would improve the hygienic condition and would help in preserving the environment.
- The treated water would comply to the GPCB norms.
- The aquatic lives in the areas of Koyali creek would be preserved, as a result of disposal of treated water.

Augmentation of sewage treatment plant at Bhesan

The existing capacity of the treatment facility at Bhesan is 60 MLD. The sewage from the three SPS – Rander, Adajan and Pal goes to the Bhesan. With the addition of two SPS – Jahangirabad and Jahangirpura; the expected flow by the year 2011 is estimated at 95 MLD. Also, the plant needs augmentation considering the stringent norms of GPCB.

The proposed project would have the following benefits:

- About 1900 hectare would be covered under the sewage treatment plant. Thus, the disposal of untreated sewage in to Tapi River would be stopped and thus preventing further pollution.
- It will satisfy the sewage treatment need for the year 2011.
- It would improve the hygienic conditions and would help in preserving the environment.
- It would ensure the treatment as per GPCB norms.

Augmentation of Adajan sewerage system

The Adajan SPS was designed to transmit 15 MLD flow, whereas the present flow reaches to about 20 MLD. The untreated sewage overflows to the storm water drain, which ultimately is dumped in the river Tapi. By the year 2021, the sewage in Adajan SPS is estimated at 36 MLD. In order to meet this flow rate, it is imperative to augment the sewerage system of Adajan.

The proposed project would have the following benefits:

- About 530 hectares of land would be covered by this system.
- It would remove the drawbacks in the existing system.
- It would ensure sewerage facilities to the uncovered areas of Adajan.
- The pollution in Tapi river would be reduced.

Secondary Sewage treatment plant at Bamroli

The capacity of existing sewage treatment plant at Bamroli is 100 MLD. At present, 25 MLD of sewage is being treated by the UASB process. This process removes 60% BOD and 70% of suspended solids, lacking post aeration treatment. The characteristics of the effluent do not match with the criteria as per GPCB norms. This creates the need for secondary sewage treatment plant at Bamroli.

The proposed project would cover about 1,900 hectare area and would satisfy the need for sewage treatment up to the year 2011. The proposed project would also help in preserving the aquatic life in the near by Khajod creek.

Sector - Transport

The city of Surat has been experiencing rapid growth in population as per its demographic trends. With the increase in population, the numbers of registered vehicles have also increased by 9.53%. At present, for transportation from South Zone to West Zone, there are following bridges in the city:

- Nehru bridge – 2 lane bridge
- Sardar bridge – 4 lane bridge
- Amroli bridge – 2 lane bridge
- Weir cum causeway – 2 lane bridge
- Swami Vivekanand Bridge – 4 lane bridge

In order to further decrease the transport problems, a bridge is proposed across the River Tapi, joining Dabholi village to Jahangirpura (near intake well) for Surat city.

Bridge across river Tapi joining Dabholi village to Jahangirpura (near intake well)

The traffic across 4 lane Sardar bridge and Nehru bridge is about 79,844 PCU / day. The traffic is likely to be grow at 10% per annum. The traffic is thus estimated at 275,643 PCU / day by the year 2013. Thus, it is necessary to construct an additional bridge to provide a shift to the traffic volume.

The benefits of the proposed project are:

- Reduction in distance of about 4.5 per PCU by using the proposed bridge instead of Nehru or Sardar bridge.
- Saving in travel time of about 8 to 10 minutes.
- PCU that travel on Nehru and Sardar bridge would save about 1 to 2 minutes of delay due to possible reduction in traffic, due to diversion to the proposed bridge.

3. Urban infrastructure projects in Rajkot

Rajkot is one of the fastest developing cities in Gujarat. Rajkot city which is spread over an area of 104.86 square kilometer had a population of about one million (as per 2001 census). The city is an important industrial hub with the presence of two important estates. Machine tools, foundry, automobile components, etc. are some of the developed industries in the area.

Projects sanctioned under JNNURM for Rajkot

Sr.	Name of Project	Sector	Cost, INR Million
1	Water supply	Water supply	
2	Solid waste management	Environment	89.40
3	Drainage	Environment	239.50

Sector – Water supply

The city is in the water deficit region, with no perennial source of water. More than 10% of the population in the city does not have access to water within 500 yards.

The project component is as follows:

1. Development of new sub head works - It includes construction of 6 new Elevated Service Reservoir / Ground Service Reservoir with pumping station and allied work.
2. Augmentation of sub head works - It consists of construction of 6 new Ground Service Reservoir with necessary augmentation of pipes and pumps.

3. Development of new head works – It consists of water treatment plant, raw water transmission mains, pumping stations, elevated & ground service reservoir, staff quarters, etc.
4. Transmission system – It consists of replacement of existing transmission mains, laying of express feeder lines, etc.
5. Distribution network - Pipe, valves, etc.

Project Description

The domestic demand of water for the Rajkot city is estimated at 135 liters per capita per day. The water is being drawn from various sources, viz., Bhadar, Aji - 1, Nyari - 1, Nyari - 2, Lalpari, Randarda Lake and from Narmada pipeline.

The domestic water requirements have been calculated for RMC for the years 2001, 2005, 2010, 2015 and 2020 as follows:

Future requirements of water			
Year	Total water requirement, MLD	Maximum permissible water drawn from all reservoirs in MLD	Daily drawn shortfall in MLD
2001	136	94	42*
2005	155	170 (75 from Narmada)	0
2010	235	254 (160 from Narmada)	-
2015	275	254 (160 from Narmada)	21
2020	315	254 (160 from Narmada)	61

* In 2001, Narmada water was not available

The projects are identified for the fulfillment of water demand in areas situated in the outskirts, which are likely to develop within a period of three to four years.

Project benefits

- ☞ Achievement of 95% coverage in 2010 and 100% coverage in 2015
- ☞ Water service utility fully accountable to citizens
- ☞ Involvement of private societies to develop a water supply network from RMC

Project components and cost

1. Development of new sub head works: It includes construction of 6 new ESR/GSR with pumping station and allied work
2. Augmentation of sub head works: It consists of construction of 6 new GSR with necessary augmentation of pipes and pumps.
3. Development of new head works: Consists of water treatment plant, raw water transmission mains, pumping stations, ESR and GSR, staff quarters, etc.
4. Transmission system: Consists of replacement of existing transmission mains, laying of express feeder lines, special etc.
5. Distribution network: Pipe, valves and special etc.

Sector – Drainage

In the inner parts of the city, as well as the old city area, the sewerage system task is on the verge of completion.

The city is developing at a robust pace. The population is expected to reach 1.5 million by 2011. The generation of sewage in 2011 is estimated to be 210 MLD, which is in contrast to the existing STP of a capacity of 44.50 MLD only. Thus, it has become necessary to emphasize on augmentation of STP or development of new STP.

Drainage work – Phase-II and Phase-III

Project Description

With financial assistance of World Bank, an underground sewerage project was commissioned in 1994.

RMC has also taken up work to connect the left out area with underground drainage system, and on completion of Phase-II, 90% of old city area will be covered through underground sewerage system, with the balance being covered during the year 2008-10.

The capacity of the STP is 44.5 MLD, which is inadequate to cater to the present quantity of sewage about 64 MLD.

Also, in 1998, the city limit of Rajkot was increased which merged three urban bodies namely Nana Mava Raiya and Mavdi. At the time of merger, all three areas lacked basic infrastructure facilities. All these areas are presently covered under surface drainage.

For this Phase-III there is no sewage treatment plant, and hence it is planned to construct 51 MLD sewage treatment plant in said area.

Project benefits

- ✦ Achievement of 95% coverage by 2011 through augmentation of existing sewage treatment plant, and construction of new sewage treatment plant.

Project components and cost:

The works to be carried out under Phase-II (part-I) are:

1. The work of collective system with house connection in remaining area Phase-II part-I.
 2. Installation of pumping machinery for additional load.
 3. Extension of existing sewerage treatment plant by 44.5 MLD.
 4. Power connection.
 5. Compound wall and area development at STP.
- ✦ Design, construction, procurement, manufacture, supply, storage at site, erection, testing and commissioning of all mechanical and electric equipments, instrumentation and all pipings etc complete for sewage treatment plant of 44.5 MLD capacity to be constructed near existing STP at Madhapar

Work under Phase-III (Part-I)

1. Collective system and house connection
2. Construction of STP of capacity 51 MLD disposal work
3. Pumping station with pumping machinery and pumping main
4. Purchase of equipment and miscellaneous work

Project components and cost:

- ✦ Design, construction, procurement, manufacture, supply, storage at site, erection, testing and commissioning of all mechanical and electric equipments, instrumentation and all pipings etc complete for sewage treatment plant of 51 MLD capacity to be constructed near existing STP at Madhapar

Sector – Solid Waste Management

1. Modernization of primary solid waste management – which includes purchase of debris containers, closed container, wheel borrows, littering bins, mechanical sweeper, etc.
2. Modernization of secondary SWM – which includes purchase of various vehicles like dumper placer of 14 cumts for transfer station, dumper placer of 8 cumt, dumper placer of 4.5 cumt, vehicles for lifting of debris container, dead animal pick up van, etc.
3. Modernization of tertiary SWM which includes development of land fill site purchase of equipments like bull dozers, compactor, tractor, etc. or
4. Computerization of SWM department, and MIS generation.

Project description:

At present, RMC emphasizes on improving the SWM practices prevailing in the city in order to raise standards of health, sanitation and urban environment.

The per capita waste generated is about 300 grams per day, which is estimated to be about 325 grams per capita by the end of the year 2011.

Issues:

- ↯ No system of door to door collection of waste
- ↯ No segregation of waste at source
- ↯ Inadequate community bin facilities
- ↯ Burning of waste on roads/ bins
- ↯ People throwing waste on streets, open space, drains, nalas etc.
- ↯ No separate system for collecting of disposal of construction waste and /or Industrial waste
- ↯ Problem of hotel & restaurant waste
- ↯ No system of collection of garden waste
- ↯ Issue of plastic begs / plastic with less than 20 microns
- ↯ Crude dumping of waste
- ↯ Need of Capacity building of RMC employees
- ↯ Use of Plastic begs / plastic thinner than 20 micron
- ↯ Lack of public awareness
- ↯ High level of subsidy and low level of recovery for SW service

4. Urban infrastructure projects in Vadodara

Vadodara is the third largest city in Gujarat. The city became a metropolis in 1991, when its population crossed 1 million. Much of the industrial growth in Central Gujarat region is concentrated at Vadodara. The city's population is estimated at 14.69 lakhs in 2005, projected to reach 17.54 lakhs in 2011, due to large scale urbanization in the city.

The city boasts the presence of large scale industries like Indian Petrochemicals Corporation Limited (IPCL), Gujarat State Fertilizers Limited (GSFC), Gujarat Alkalies and Chemicals Limited (GACL), Apollo Tyres, etc.

The basic need of citizens as well as industrial estates is contingent on the services offered by Vadodara Municipal Corporation (VMC). The services offered by VMC include water supply, sewerage and sanitation, storm water drains, etc. The present water demand of the city is estimated at about 270 MLD, where as the supply is in the range of 240 - 270 MLD.

The project sanctioned under JNNURM for the city of Vadodara is in the water supply sector.

Projects sanctioned under JNNURM for Vadodara

Sr.	Name of Project	Sector	Cost, INR Million
1	Water supply	Water supply	410

Water supply project

The water supply project proposal for the period 2006 – 2008 comprises of the three main components:

1. Development / Augmentation of water supply source
2. Construction of water treatment plant at Nimeta
3. Provision of transmission main from:
 - a. Ajwa reservoir to Nimeta water treatment plant
 - b. Nimeta water treatment plant to Sardar Estate crossing
 - c. Sardar Estate crossing to Dabhoi road
 - d. Laying feeder main from Dabhoi road to Lalbaug service reservoir
4. Construction of balancing reservoir at Sardar Estate crossing

Contact Agencies

Gujarat Urban Development Company Limited
Industrial Extension Bureau
Mott MacDonald India
Ahmedabad Municipal Corporation
Rajkot Municipal Corporation
Surat Municipal Corporation
Vadodara Municipal Corporation