

SERVICE LEVEL IMPROVEMENT PLAN (SEWERAGE)

1 Assess the Service Level Gap

The first step is to assess the existing situation and service levels gaps for Sewerage (AMRUT Guidelines; para 3 & 6). This will also include existing institutional framework for the sector. For this City has to review all policy, plans, scheme documents etc. to identify service level gaps and hold discussions with officials and citizens. AMRUT is focused on improvement in service levels. The zone wise data shall be used in identifying the gaps. These zone-wise gaps will be added to arrive at city level service gaps. While assessing service level gap reply following questions not more than word indicated against each question.

- What kind of baseline information is available for sewerage system of the city? Detail out the data, information, plans, reports etc related to sewerage available with city? Is zone wise information available? Have you correlated your data with census 2011 data? (100 words)

The Corporation has prepared the City Development Plan as per CDP guidelines (April 2013) issued by the Ministry of Urban Development. The Sectorial Action Plans have been finalized which includes sewerage and sanitation. The Corporation under the National Urban Sanitation Policy (NUSP), Government of India has prepared the City Level Sanitation Plan as well.

The documents are:

1. City Sanitation Plan – Panaji, June 2015
2. Revised City Development Plan for Panaji, 2014, May 2015

Yes, Zone wise information is available. Yes, both the above mentioned documents and data there-in are co-related to Census 2011.

The sewage infrastructure of the city of Panaji was started in the year 1967. A STP of 5.76 MLD was commissioned in the year 1969. The city of Panjim is divided into

12 zones having approximately 40 kms of sewer lines with 8 pumping stations and 5 out falls. The area of Patto has a decentralized scheme with approximately 3.0 km of sewer lines and a STP of 0.56 MLD. The STP was designed for a period of 30 yrs and to serve a population of about 40,000. However, at present the sewer lines are handling a population of approximately 1-2 lakhs (as per census 2011). Detail plans of the zones are attached. Zone wise information available is enclosed.

- What are existing service levels for sewerage for coverage of sewerage network services, efficiency of collection of sewerage and efficiency in treatment. Provide information in table 2.1

Table 2.1: Status of sewerage network and Service Levels

Sr. No.	Indicators (as per SLB framework)	Existing Service Level	MOUD Benchmarks
1	Coverage of latrines (individual or community)	96%	100%
2	Coverage of sewerage network services	56%	100%
3	Efficiency of collection of sewerage	90%	100%
4	Efficiency in Treatment: Adequacy of sewerage treatment capacity	95%(Quality of treatment) 108.90% (treatment capacity)	100%

As per the benchmarks prescribed by the MoUD, 100% coverage of sewage connectivity is necessary. In the city of Panaji, approximately 95% of coverage is attained. The balance of 5% remain mainly due to technical reasons viz: low lying areas, no proper ownership documents etc. Besides the city of Panaji, some surrounding areas like Ribandaretc also remain to be covered.

- What is the gap in these service levels with regard to benchmarks prescribed by MoUD? (75 words)

The following table represents the gaps in service levels with regard to the benchmarks

Sewerage	Unit	Value (2011-12)	SLB	GAP
Coverage of Toilets	%	96	100	4
Sewerage network w.r.t. households	%	56 (95% in the city area, but 56% considering Dona Paula, Caranzalem and Ribandar)	100	44
Collection efficiency (sewerage)	%	90	100	10
Treatment capacity	%	108.9	100	-
Quality of treatment	%	95	100	5
Reuse and recycling	%	2	10	8
Complaints redressal	%	100	80	-
Cost recovery	%	80	100	20
Collection Efficiency (sewage charges)	%	80 (Rs. 21 Lacs per month)	90	10
Coverage of toilets in slums	%	50	100	50

The major issues in the present sewerage system are as listed below:

- 1 The existing sewerage network in the city is only limited to the core city area with 56% coverage w.r.t the existing roads in the CCP area. The remaining areas of CCP as well as the outgrowth areas are devoid of sewerage system.
- 2 The existing sewerage network is very old and dilapidated. It needs to be redesigned to ensure optimal collection and treatment of sewerage. This will include provision of new durable pipelines, manholes and pumping stations.
- 3 In the uncovered areas 58% of the households depend upon individual soak pits and 7% of the households opt for public toilets for sanitation facilities. About 6% of the households still donot have any access to sanitation which results in practice of open defecation. Hence the present sewage coverage in the city is highly inadequate.
- 4 There are no measures for recycling and reuse of treated water. As of now the waste water after treatment at the STP is drained in to the river Mandovi. However, a project is required wherein the treated water can be recycled and used for non-potable uses within the CCP area i.e. for gardening, fire fighting purposes etc.
- 5 The major drains which carry the sewage from the STP to the River are prone to direct disposal of sewage from the uncovered areas as well as solid waste. This results in blocking of waste water in the drains leading to unhygienic conditions within the city.

To summarize, improvement of existing pipelines, lack of provision of individual toilets for un- served residential population, lack of provision for additional community toilets, short fall in public toilets for floating population, expansion of sewerage network in uncovered areas, upgradation and capacity augmentation of sewage pumping stations and enhancing reuse prospects for treated effluent from the STPs are some of the gaps in the service level with regards to benchmark.

- Does city has separate drainage system or sewer lines take care of storm water?
(50 words)

The city of Panaji has a separate drainage system to take care of the storm water. These drains are surface drains which lead to the river / sea. The sewerage system of the city of Panaji was not designed to cater to the storm water, however due to the age (more than 20 years), of the sewer system, part of the storm water is taken care of by the infiltration in the sewer lines and the inspection chambers / manholes through the joints of the brick work.

Sewerage network And Collection of Sewerage

- How much of the area of the city is covered by sewerage network? What is the status of household connections in each zone? What are the areas covered under septage? Provide information in Table 2.2.

With the recent execution of laying of sewer network in the uncovered areas of wards 1,2,3,4 and remaining parts of ward 5, CCP has now, achieved sewerage coverage in almost 85% of the city.

Table 2.2: Zone Wise Coverage of Households* (Data covers only households, not institutions)

Zone No	Total No of Households	Households with Sewerage Network	Households with Septic Tank	Households without any outlets for toilets
1	-	212	-	-
2	-	352	-	-
3	-	418	-	-
4	-	48	-	-
5	-	1510	-	-

6	-	150	-	-
7	-	212	-	-
8	-	708	-	--
9	--	808	-	-
10	-	663	-	-
11	-	715	-	-
12	-	172	-	-
Total	10158	5978	3840	340

- Are there any areas where sewer lines have been laid but still households are not connected to sewer lines? Are there any areas where toilets may be connected to sewer lines but kitchen or bathroom waste is not connected to sewerage system?
(75 words)

As on date there are hardly any areas where the sewer lines have not been laid, however some houses are not connected. There are a few isolated cases where the households are not connected but this is due to the dispute in the ownership of the household. There are a few cases where the toilet is connected to the sewer lines but kitchen or bath room waste is not connected to the sewage system. This is due to the restriction of space in and around the houses to construct another inspection chamber / bath room / kitchen and also due to adverse site condition.

- Is there any systematic and organized method to collect and treat waste from septic tanks? What is the duration of cleaning of septic tanks (monthly, quarterly,

semiannually or annually)? Indicate status of overflows of septic tanks, either in the nearby drains /open fields/ sewerage lines etc? (75 words)

As given earlier, 95% of the households are connected to the sewage system in city core area. The cleaning of the septic tanks is taken care of by the individuals of the remaining respective households, the department has not maintained any systematic and organized method to collect and treat waste from septic tanks as it was not found necessary. Usually the septic tanks are cleaned as and when cleaning is required, which is taken care of by the individual, by engaging private agencies who collect the sewage in night soil tankers and discharge in the S.T.P. of the department.

In recent years PWD has approved and prescribed a standard drawing of septic tanks for regulating their construction in CCP and adjoining areas. Presumably this takes into account at least the number of users, and thereby the variations in daily volume of sewage that is expected to be discharged. Malfunctioning of septic tanks is exhibited in the form of solids overflow as well as the need for frequent pumpouts of septage. This situation has enabled growth of private service providers in the entire North and South Goa who use vacuum tankers to empty and haul away septage. On account of large number of septic tanks and the need for frequent pump-outs, handling and safe disposal of septage is an issue in the entire area. While there is no dedicated septage treatment facility, fortunately the existing sewage treatment plant at Tonka is currently able to absorb extra hydraulic load and thus disposal of septage brought by tankers is permitted.

- What is the situation of O&M of the existing sewerage system? Does the city has routine maintenance system or breakdown maintenance system? What is the duration of cleaning of sewer lines (monthly, quarterly, semiannually or annually)? Indicate infrastructure available for O&M of the sewerage system i.e sewer jetting machines etc? (100 words)

The CCP and the PHE have very limited specialised equipment/ machines and vehicles for this purpose. The single tanker with CCP is used mainly for public

establishments and its own public/ community toilets; while those of the PHE are used for cleaning of sewers rather than servicing septic tanks of private houses.

However, the role of CCP and PHE is also noteworthy because in the interest of the entire region they have allowed disposal of septage from the Out-growth colonies and the Census Towns at their STP at Tonca, thereby safeguarding environment and public health of larger population. This is done via PSP's (~ 40 nos. with 5000-8000 lts tankers having vacuum and pumping-out arrangements). There are no details available on sewer cleaning schedule

The O&M of the sewerage system for the city of Panaji is carried out by a sub division attached to the public works department. Routine maintenance is carried out by attending day to day blockages and overflows. The clearing of the manholes is normally carried out annually and as and when required. At present, the department has a roding machine and a bucket cleaning machine besides the normal sufficient quantity of S.S.

Sewage Treatment System

- Does city has Sewage Treatment Plant (STP)? Which areas are covered under each of the STPs? Provide details in Table 2.3.

As mentioned earlier, the Patto area of Panaji has a separate sewage system and an independent STP which has a capacity of 0.56 MLD. This STP caters only to the Patto area which houses around 85% of offices and commercial establishments and around 15% of households including the main bus stand which belong to the city of Panaji.

SEWERAGE ZONES IN THE PANAJI CCP AREA

Zone no.	Coverage area	Sewage station	pumping	Remarks
SEWERSHED-A				
I	Ward# 27: Neugi Nagar, Portaise, Nine Infantil.	SPS-1 in Neugi Nagar;		Sewage pumped to OFS at Panaji Residency.
		operational issues – Old machinery and improper working conditions. Requires refurbishing and capacity augmentation.		
II	Ward# 27: Mala, Mala Hillock, Bhandari Hospital.	SPS-2 near Bhandari Hospital.		Sewage pumped to OFS at Panaji Residency.
		Requires refurbishing and capacity augmentation.		
III	Ward# 19, 20, 23: Mary Immaculate School, Anita te house, People's high school, upper part of Mala.	SPS-3;	working satisfactorily.	Sewage pumped to OFS at Panaji Residency.
IV	Ward# 26 and 28: Bharat lodge, post office, old bus stand.	SPS-4 near Avanti.		Sewage discharged to the outfall to Zone III
		Requires refurbishing and capacity augmentation.		
V	Ward# 11, 12, 13, 14, 24 and 25: Panaji core city area.	SPS-5 near Thakur Patrol Pump (Kamat Nagar). Old machinery and improper working conditions of the staff. Requires refurbishing and capacity augmentation.		Receives flow from the preceding OFS starting from Panaji Residency. Discharges to the outfall sewer near St. Inez. Church.
VI	Ward# 6: Campal, Dr. Jack Siquira house.	No SPS.		Gravity flow to Zone V
VII	Ward# 7, 8, 11: St Inez, Caulo colony, Govt Quarters.	No SPS		To STP by gravity
VIII	Ward# 15, 21, 22, 23: Part of Altihno, military camp, Mental Hospital.	No SPS.		Gravity flow; in 4 places - Near Panjim Church - Near Vivanta - Bhatlem - Mala

Zone no.	Coverage area	Sewage pumping station	Remarks
IX	Ward# 9: Adarshana colony, Miramar to Solmar Hotel.	No SPS SPS 9 Near Dhempe College Requires refurbishing	Discharge to the outfall to Zone IX Near Dhempe College Discharge to the outfall near Hotel Goa International.
X	Ward# 17 and 18: Batulem and some parts of Altihno Govt. Quarters.	SPS-10 requires refurbishing in Batulem.	Discharged to the outfall sewer near TB hospital.
XI	Ward# 10: La Campala and lake view colony.	SPS-11. None of the original pumps is operational. Temporary arrangements made. Requires refurbishing and capacity augmentation.	Sewage pumped directly to the STP at Tonca.
XII	Ward# 16: Municipal quarters, Tonca.	SPS-8. Requires refurbishing.	Two submersible pumps. Sewage pumped directly to the STP at Tonca.
SEWERSHED-B			
EDC Patto	Ward# 28: Patto, area across the Ourem Creek.	SPS-10 near Shram Shakti Bhawan would need capacity augmentation in future with coverage of additional area.	Sewage pumped directly to the small STP at Patto.

Source: PHE (PWD) & primary survey

Table 2.3: Status of Existing STPs

S. No	Details of Sewage Treatment Plant	Location	Installed capacity	Waste Water treated	Utilized capacity
			MLD	MLD	%
1	STP 1	Tonca	12.5	8.0	64
2	STP 2	EDC Patto	0.57	1	175
3	Proposed STP 3	EDC Patto	2.0	-	-

Source: DPR for water supply Network Project, Panaji

- Does decentralized waste treatment system exist or planned in the city? If yes, provide details (75 words)

A STP was commissioned in 2005 at Tonca. It was constructed with design capacity of 12.5 MLD with peak factor of 2.25. The existing treatment plant is not equipped with sludge digesters to take care of the sludge generated out of the plant. PHED has out sourced the maintenance of the sewage treatment plant (STP) to a private agency.

In addition this, a small decentralized STP with a treatment capacity of 0.57 MLD has also been implemented for Patto Plaza area (EDC area) mainly for catering institutions. It receives 0.10 MLD sewage daily. This STP network has about 3 km length of sewer line with 300 sewer connections. The PHED department is at present implementing a 2.0 MLD STP at Patto which is funded under the state government.

It is noted that PHE (PWD) has already constructed another STP of 15 mld capacity at Tonca based on the same SBR technology and will be able to commission the facility in few months, as soon as the new sewerage network starts delivering additional sewage flows.

- How much of sewerage is generated in the city? How much of this sewerage generated reaches the STPs? What is the Biological Oxygen Demand (BOD) of incoming and outgoing sewage of each STP? (100 words)

The city receives about 12 MLD of water supply. Considering 80% is generated as sewage, approximately 8-10 MLD of sewage is generated and treated except during the rainy season where the quantity of the sewage treated is approximately 15 MLD. This is due to the infiltration of rain water in to the sewer lines and to manholes. A new STP commissioned in 2005 with a capacity of 12.5 MLD serves the city. In this STP, the BOD of the treated sewerage is well within the stipulated parameters as given below:

The total sewage generated is about 12 MLD

In the small sewershed-B of Patto area, it is reported that the quantity of sewage reaching the treatment plant is around 1 mld. On the other hand, in the sewershed-A of Tonca STP the quantity of sewage reaching the plant is reported to be between 8-10 mld

	Incoming qty MLD	BOD incoming	BOD outgoing
Sewershed-A Tonca	8-10	200 mg/l & 500 mg/l	Effluent BOD < 5%
Sewershed-B Patto	1	200 mg/l & SS of 500 mg/l	Effluent BOD & < 50%

- Is treated sewage being reused or recycled? Is treated water being used for irrigation or industrial purpose? Does the option of power generation being explored? (75 words)

A small part of the treated effluent from this plant is being used by CCP and Forest Department for irrigation in and around the town. However, agriculture farmers - the potential bulk consumers, have not come forward to use this and therefore a major part of the treated effluent is being discharged into St. Inez Creek which eventually drains into Mandovi Estuary.

Power generation option not explored.

Treated sewage at present is only being partially reused by forest department etc. for gardening purpose. No recycling is being carried out. The department is in the process of using the treated water for construction purpose and especially for gardens and open play grounds within the city of Panaji and close proximity of the S.T.P.

Institutional Framework

- Define role and responsibilities in terms of O&M, policy planning, funding, service provision in table 2.4.

In line with the NUSP, the groundwork of the city sanitation project started with the establishment of a City Sanitation Task force (CSTF) by CCP, comprising of 15-20 stakeholders representing various sections of the society in Panaji, thus, facilitating a multi-stakeholder institutional platform and enabling wider community participation. CSTF, headed by the Hon'ble Mayor and Municipal Commissioner, is responsible for launching the 100% sanitation campaign, coordinating the activities for awareness generation, revising and approving the CSP hence, facilitating CCP in implementing the plan. The need to elevate the consciousness of municipal agencies, government agencies and people of the city regarding holistic sanitation is the main objective of CSTF.

Table 2.4: Functions, roles, and responsibilities

	Planning Design	and	Construction/ Implementation	O&M
On-site sanitation(maintenance of public & community toilets)	CCP and Dept. of Tourism		CCP and Dept. of Tourism	CCP and Dept. of Tourism

The responsibility of delivery of basic Municipal /WatSan services across PUA and CCP is distributed among several agencies as categorized in Table below.

RESPONSIBILITY FOR WATSAN SERVICES

S. No.	Service Area	CCP	CT/OG
1	Water Supply & Wastewater Management	PHE (PWD)	PHE (PWD)
2	On-site sanitation(maintenance of public & community toilets)	CCP and Dept. of Tourism	Nagar and village panchayats
3	Drainage	CCP and WRD	
4	SWM	CCP	
5	Street Sweeping & septage management	CCP	

FUNDING

CCP has following options for raising resources towards its capital investment program:

Own revenues and grants from state/central government:

- Taxes: CCP already has a robust income from property taxes. Periodic revision of such sources would help in improving CCP's finances. In this respect, to further improve efficiency, CCP should consider using GIS for property mapping Panaji so that there is no leakage of property tax by untaxed properties.
- User Charges: CCP collects a sanitation tax from its residents for providing service. However, it is noted that collection efficiency needs to be further improved.
- Grants from the State Government: As in the past, CCP can expect to get its share of grants released by the State Government which can be used to fund its new projects.
- Grants from the Central Government: For the past few years, CCP has not received any grant from the Government of India, possibly due to lack of projects supported by the GOI. However, if some of the future projects could be positioned under any centrally assisted scheme e.g. VIDSSMT, RAY, ILCS etc., then CCP would be eligible to finance such projects with GOI grant.

Other sources:

- Term loan from Institutions: Public financial institutions like Housing and Urban Development Corporation Limited (HUDCO), Life Insurance Corporation (LIC) provide term loans to ULBs towards capital investments. CCP could consider borrowing from these institutions; however, repayment of loan along with interest would need to be guaranteed by the State Government.
- Municipal Bonds: Similar to the cities like Ahmedabad, Hyderabad, Chennai, Nagpur, Indore, Madurai, Ludhiana and Visakhapatnam, CCP can also issue municipal bonds in the capital market by assigning its revenues to an escrow account which would be used to service interest and principal repayment liabilities. The municipal bond issue also has to be rated by a credit rating agency so that

investors are aware of the credit worthiness of the issuer. However, this can be done only when CCP can demonstrate robust revenue streams.

- Please also detail that how city is planning to execute projects. Shall the implementation of project be done by Municipal Corporation or any parastatal body? (75 words)

IMPLEMENTATION, MONITORING AND EVALUATION

CSTF will propel the implementation plan for the CSP in accordance with the proposed interventions detailed as per timelines and accordingly, defined phase wise as immediate, short, medium and long term. CSTF jointly with CCP and local bodies / village panchayats of OG & CTs, shall have the primary responsibility of monitoring project execution and shall prepare quarterly project status reports covering all aspects of implementation in the recommended format. It will act as partner to ULB/ village panchayats for its successful implementation for a 30-year period. If required, an agency/ independent consultants can be recruited for monitoring the program under various interventions on availability of finance.

2 Bridging the Gap

Once the gap between the existing Service Levels is computed, based on initiatives undertaken in different ongoing programs and projects, objectives will be developed to bridge the gaps to achieve universal coverage. (AMRUT Guidelines; para 6.2 & 6.3, Annexure-2; Table 2.1). Each of the identified objectives will be evolved from the outcome of assessment and meeting the opportunity to bridge the gap.

- List out initiatives undertaken in different ongoing programs and projects to address these gaps. For this provide details of ongoing projects being carried out for sewerage system under different schemes with status and when the existing projects are scheduled to be completed? Provide information in Table 2.4

On-going projects

Presently PHE (PWD) is implementing a sewerage expansion project which covers part of CCP area and almost the entire TaleigaoPanchayat (population over 24,000) which is an out-growth on the south of Panaji. This project will help expand the coverage in the adjoining habitation as well as enable treatment of larger volumes of sewage.

Among others, the project includes laying of sewer lines, one intermediate pumping station, one main sewage pumping station and a 15 MLD sewage treatment plant at Tonca as mentioned in an earlier section. Within CCP area this project covers Dona Paula & Caranzalem area consisting of ward# 1, 2, 3 & 4 and some other left out areas of ward# 16 & 17. On the whole about 15-20% of the area to be covered under the project falls in CCP while the balance falls in the TaleigaoPanchayat. Nevertheless, it is noted that all of the sewage that will be collected in the Taleigao area (estimated volume of 4 mld in 2014) will be brought to the STP at Tonca and to that effect STP capacity expansion is part of the project. The project is funded by the Govt. of Goa which involves Rs.150 crore of capital investment. It is understood that about 50 % of the work has been completed while the STP is already at the stage of commissioning, awaiting sewage flows from the new areas.

Table 2.4: Status of Ongoing/ Sanctioned

S.No.	Name of Project	Scheme Name	Cost in Rs Crore	Month of Completion	Status (as on dd Month 2015)
1	Pumping station, one main sewage pumping station and a 15 MLD sewage treatment plant at Tonca		150		

- How much the existing system will be able to address the existing gap in sewerage system? Will completion of above will improve the coverage of network and collection efficiency? If yes, how much. (100 words)

The existing sewerage system is more than 40 years old and as such needs to be replaced. Once the new system is complete the efficiency of sewage collection will definitely increase as there will be less infiltration through the joints of the pipes and through the joints of brickwork of the new manholes. Also the new sewerage system will cover the low lying areas by using the latest technology of vacuum suction. This technology will also be utilized in various areas where the natural slope is not available. At present, there is an efficiency of around 80% – 90% due to rigorous maintenance system. However, with the new sewerage system in place the efficiency should go up to between 90% - 100%.

- Does the city require additional infrastructure to improve the services? What kind of services will be required to fulfill the gap?

Renovation of existing network is urgent. Basic infrastructure of having new pumps, new electrical panel boards etc., in pump houses will help in improving the services of the sewerage system. Also in the wet wells, mechanical gates and screens are required to be installed. This will definitely help in improving the present services and services for years to come.

- How does the city visualise to take the challenge to rejuvenate the projects by changing their orientation, away from expensive asset replacement programs, to focusing on optimum use of existing assets?

As per the detail provided earlier, this sewage system has outlived the time frame for providing satisfactory service. The present system was conceived way back in the year 1969 and is over 40 years old. Presently, the department is focusing on using the present sewage system in Panaji city in an optimum way by rehabilitating it and providing new network and a S.T.P. at Ribandar area which is a part of the Corporation of the City of Panaji.

Provide information in Table 3.5.

Based on assessment of existing infrastructure and ongoing / sanctioned projects, calculate existing gaps and estimated demand by 2021 for sewerage network, number of household to be provided with connections, and required enhancement in capacity of

STP (MLD), area to be covered under septage management. Based on the demand and gap assessment, evolve objectives to achieve bridging these gap.

Demand Gap Assessment

Component	Existing	Ongoing projects	Existing + Ongoing	2021 (Short term)	
				Demand	Gap
Sewerage network (km)	43	11	54	72	18
No of Households covered under sewerage system	5968	900	6868	10158	3290
Sewerage Treatment Plant (MLD)	12.5 + 0.57	2 MLD at Patto (Proposed + Sanctioned)	15	19	4

3 Examine Alternatives and Estimate Cost

The objective will lead to explore and examine viable alternatives options available to address these gaps. These will include out of box approaches. (AMRUT Guidelines; Para 6.4 & 6.8 & 6.9). This will also include review of smart solutions. The cost estimate with broad source of funding will be explored for each alternative. While identifying the possible activities, also examine the ongoing scheme and its solutions including status of completion, coverage and improvement in O&M. Please reply following questions in not more than 200 words.

Objectives

- Renovate and implement sewerage network
- Remove direct connections with the River
- What are the possible activities and source of funding for meeting out the objectives?

Renovation of sewerage network in Mala is proposed to be taken up under AMRUT.

- How can the activities be converged with other programmes like JICA/ ADB funded projects in the city etc?

Convergence is not possible for the proposed renovation project of sewerage network in Mala Area, which is not covered in any other programme, it is expected that all the activities proposed in this project will be funded under AMRUT.

- What are the options of completing the ongoing activities?

Through allocated funds

- How to address the bottlenecks in the existing project and lessons learnt during implementation of these projects?

Stakeholder involvement and inter department co-ordination is vital.

- Has projects includes O&M of sewerage system?

Maintenance will be for the entire network.

- What measures may be adopted to recover the O&M costs? Can the option of sale of treated wastewater be applicable to recover the O&M cost.

Already being covered.

- What are innovative alternative solutions explored in achieving objectives?

- Are different options of PPP such as Design-build-Operate-Transfer (DBOT), Design Built Finance Operate and Transfer (DBFOT) are considered?
- How the recycle and reuse of water will be done? How much quantity of treated water may be reused?
- Have you analysed best practices and innovative solutions in sewerage sector? Is any of the practice be replicated in the city?

New sewer lines are being laid with new technology. Previously open trenching was used, however, it is now out dated. Therefore, it is proposed to adopt trenchless method i.e. static pipe bursting for pipe replacement. The manholes will be of brick masonry (1st class) and composite type and will be executed through open excavation.

It is also proposed to use HDPE pipes of 6Kg/cm² for lines and the manholes/chambers will be brick composite as per depth (1st class bricks – 100 Kg/cm²) with DI / FRP frame & covers.

It is also proposed to renovate the existing pumping stations with new civil & electric work and replace all pump sets with submersible type of adequate capacity.

- Have you identified the areas for decentralized waste treatment system? Explore the approaches for septage management i.e People Public Private Partnership (PPPP) model or replacing septic tanks by bio-digesters, bioremediation etc.

For each identified activity and alternative indicate the cost estimate with broad source of funding will be explored for each alternative in Table 3.6

S.No	Activity	Basis	Amount in Rs.Cr
1	Renovation of sewerage network in Mala/Altinho	AMRUT	1.15 CR
2	Vaccum sewers SYSTEM IN Panaji city	AMRUT	6.23 CR

4 Citizen Engagement

Each alternative will be discussed with citizens and activities to be taken up will be prioritized to meet the service level gaps. ULB will prioritize these activities and their scaling up based on the available resources. (AMRUT Guidelines; Para 6.6, 6.7 & 7.2). Please reply following questions in not more than 200 words.

- Has all stakeholders involved in the consultation?
Yes, all the stakeholders are involved in the consultation.
 - Has ward/ zone level consultations held in the city?
Yes, city level consultations were held covering all zones.
- Has alternatives explored are crowd sourced?

Yes. The most probable and high priority projects have been proposed.

What is feedback on the suggested alternatives and innovations?

Positive feedback received from all stakeholders.

Has alternative taken up for discussions are prioritized on the basis of consultations?

Yes. The alternatives considered and prioritized the projects accordingly.

- What methodology adopted for prioritizing the alternatives?
The alternatives considered were prioritized as per stakeholder consultations, demand and financial viability.

5 Prioritize Projects

Based on the citizen engagement, ULB will prioritize these activities and their scaling up based on the available resources to meet the respective objectives. While prioritizing projects, please reply following questions in not more than 200 words.

- What are sources of funds?
The project funded is expected from AMRUT
- Has projects been converged with other program and schemes?
No.
- Has projects been prioritized based on “more with less” approach?
Yes. The proposed project is prioritized based on more with less approach.
- Has the universal coverage approach indicated in AMRUT guidelines followed for prioritization of activities?
Yes. The universal coverage approach indicated in AMRUT guidelines has been followed for prioritization of activities.

6 Conditionalities

Describe the Conditionalities of each project in terms of availability of land, environmental obligation and clearances, required NOC, financial commitment, approval and permission needed to implement the project. Please reply following questions in not more than 100 words.

Land is available for the proposed project and there are no pending obligations. All permissions and clearances from concerned departments have been considered and are in alignment. There are no environmental obligations and the project is

environmental friendly and in public interest. The finance for the project is expected from AMRUT and the ULB is committed to their share of finances.

7 Resilience

Required approvals will be sought from competent authority and organisations. The resilience factor would be built in to ensure environmentally sustainable sewerage scheme. Please reply following questions in not more than 100 words.

All installations will be provided with proper security and safety. Necessary steps will be taken during preparation of DPR duly following IS codes and other specifications as per norms.

8 Financial Plan

Once the activities are finalized and prioritized after consultations, investments both in terms of capital cost and O&M cost has to be estimated. (AMRUT Guidelines; para 6.5) Based on the investment requirements, different sources of finance have to be identified. Financial Plan for the complete life cycle of the prioritized development will be prepared. (AMRUT Guidelines; para 4, 6.6, 6.12, 6.13 & 6.14). The financial plan will include percentage share of different stakeholders (Centre, State and City) including financial convergence with various ongoing projects. While preparing finance plan please reply following questions in not more than 200 words

- does financial plan for the complete life cycle of the prioritized development?
Yes. Financial Plan includes execution but doesnot include O&M cost.
- does financial plan include percentage share of different stakeholders (Centre, State, ULBs and)
Yes. Financial plan includes the following percentage share into account:
GOI : 50%
State Govt: 50%
- does it include financial convergence with various ongoing projects.
There is no financial convergence for this project.

- Does it provide year-wise milestones and outcomes ?
Yes. As per details provided in subsequent tables.

Details in financial plan shall be provided as per Table 1.7,1.8,1.9,1.10 and 1.11. These tables are based on AMRUT guidelines tables 2.1, 2.2, 2.3.1, 2.3.2, and 2.5.

Table 8.1 Master Plan of Sewerage Projects for Mission period

(As per Table 2.1 of AMRUT guidelines)

(Amount in Rs.Cr)

S. No	Project Name	Priority number	Year in which to be Implemented	Year in which to be completed	Estimate Cost in Crores
1	Renovation of sewerage network in Mala/Altinho	1	2015-16	2016-17	1.15 CR
2	Vaccum sewers system for low lying areas	1	2015-16	2016-17	6.23 CR
3	Rehabilitation of sewerage network and Pumping stations in Panaji City	2	2016-17	2018-19	180 CR
4	New sewerage network in Ribandar	3	2016-17	2018-19	35 CR
Total					222.38

DETAILS OF PRIORITIZED PROJECTS PREPARED UNDER AMRUT DURING CURRENTLY

(As per Table 2.2 of AMRUT guidelines)

(Amount in Rs.Cr)

Sr.No	Project Name	Physical Components	Change in Service Levels			Estimated Cost
			Indicator	Existing (As-Is)	After (To-be)	
1	Renovation of sewerage network in Mala/Altinho	Collection System network	Improved services delivery in the area	Poor	100% in project area	1.15 CR
		Restoration of road in ULB				
2	Vaccum sewer system for low lying areas	Collection chambers and vacuum valve parts	Improved services delivery and collection efficiency in the area	Poor	100%	6.23 CR
		sewers				
		central vacuum station				
		monitoring and control				
Grand Total						7.38 CR

TABLE- 8.3: ANNUAL FUND SHARING PATTERN FOR SEWERAGE PROJECTS

(As per Table 2.3.1 of AMRUT guidelines)

(Amount in Rs.Cr)

Sr .N o	Name of project	Total Project Cost (Rs.in Cr)	Share				
			GOI	State	ULB	Beneficiari y Contributi on	Total
1	Renovation of sewerage network in Mala/Altinho	1.15	0.57	0.57	-	-	1.15
2	Vaccum sewer system for low lying areas	6.23	3.115	3.115	-	-	6.23
Grand Total		7.38	3.685	3.685			7.38

TABLE- 8.4: ANNUAL FUND SHARING BREAK-UP FOR SEWERAGE PROJECTS**(As per Table 2.3.2 of AMRUT guidelines)**

Sr. No	Project	GOI	State			ULB			Convergence	Beneficiary contribution	Total
			14 th FC	Others	Total	14 th FC	Others	Total			
1	Renovation of sewerage network in Mala/Altinho	0.57		0.57	0.57						1.15
2	Vaccum sewer system for low lying areas	3.115		3.115	3.115						6.23
Grand Total		3.685		3.685	3.685						7.38

