ADB

Government of India
Ministry of Finance
Department of Economic Affairs

Toolkit for Public Private Partnership in Urban Water Supply for Maharashtra

(A CRISIL- Assisted Rapid Assessment Study)

Knowledge Series
Water
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MAINSTREAMING PPPS IN INDIA

The GOI - ADB PPP Initiative

Toolkit for Public Private Partnership in Urban Water Supply for the State of Maharashtra

Local Government Consultations and Sector Assessment for developing possible Public–Private Partnership Models for the state of Maharashtra

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GOI-ADB PPP Initiative

Mainstreaming PPPs in India

November, 2009

The Asian Development Bank (ADB) engaged CRISIL (a leading consultancy firm), at the request of the Government of Maharashtra, under the Mainstreaming PPPs in India Initiative, to develop possible PPP solutions for the urban water supply sector in the State. The DEA, PPP Cell (Maharashtra) and ADB have worked closely in the development of this report. No part of this document may be replicated, quoted or printed without written confirmation from DEA & ADB PPP focal points.

FOREWORD

Sustained growth of the Indian economy is essential for all-round development of the country. Within this requirement, *sustainable infrastructure development* is critical for providing the backbone for economic activities as well as for ensuring that resources are conserved and used most efficiently, given the limited and the fast depleting nature of these resources.

Public private partnerships (PPPs) are seen as a key ingredient in this, for bringing in much needed investments as well as efficiencies in utilization and management of resources - whether water, power, or indeed money. Various estimates indicate that if the economy has to grow at 8% per annum, over $ 500 billion of investment is needed for the infrastructure sectors from 2007 – 2012; around 30% of this requirement is needed to come from private sector.

The Government of India has therefore been following a considered approach to create the enabling environment for catalyzing such private investment and operations in all infrastructure sectors. Supported by the Asian Development Bank, a PPP Initiative has been targeted on capacity building and institutionalization of PPPs across the country

Under the above initiatives, the Asian Development Bank (ADB) is supporting the Public Private Partnership (PPP) Cell, the Urban Development Department and the Water Supply and Sanitation Department of the Government of Maharashtra in Mainstreaming Public Private Partnerships (PPPs) in select sample cities of the state through a Technical Assistance (TA) Project.

The project aims to identify and develop PPP structures which can be implemented in the water supply and sanitation sector for the cities of Maharashtra. As a part of this TA, various possible PPP structures in the water supply and sanitation sector were studied, and the applicability of these structures assessed in the context of the sample cities. The project aimed to develop term sheets for those PPP structures, which are identified as most suitable and feasible for implementation.

The toolkits so developed are expected to assist the relevant public entities in the state of Maharashtra for developing PPP-based projects in the water supply and sanitation sector. The toolkit is also designed to help the decision makers in deciding whether a particular project might be suitable for the PPP route or not. The toolkit can therefore be the basis for approving a project implementation structure as part of the overall project approval methodology.

We are confident that these toolkits will be used by the Municipal Commissioners and the Chief Executive Officers of the urban local bodies, the Managing Directors and the functional directors of the

Water Supply and Sanitation Boards and the state governments and other decision makers while considering PPP-based implementation of urban water supply and sanitation projects.

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ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
BLT	Build Lease & Transfer
BOO	Build Own Operate
BOOT	Build Own Operate Transfer
BOT	Build Operate & Transfer
BPO	Business Process Outsourcing
BROT	Build Rent Operate Transfer
BT	Build & Transfer
BTO	Build Transfer Operate
CAO	Contract Add Operate
COI	Committee on Infrastructure
DBFO	Design Build Finance Operate
DEA	Department of Economic Affairs (India)
DOT	Develop Operate and Transfer
DRB	Dispute Resolution Board
EOI	expression of interest
EPC	Engineering Procurement & Construction
FDI	Foreign Direct Investment
FM	facilities management
GDP	gross domestic product
GDP	Gross Domestic Product
GOI	Government of India
IIFCL	India Infrastructure Financing Company Limited
IIPDF	India Infrastructure Project Development Fund
ITN	invitation to negotiate
ITT	Invitation To Tender
MOF	Ministry of Finance
MOO	Modernize Own Operate
MOT	Modernize Operate Transfer
NGO	nongovernmental organization
O&M	Operation & Maintenance
PFI	private finance initiative
PFI	Private Finance Initiative
PPP	public private partnership

PPPAC	Public Private Partnership Approval Committee
PQ	Pre-Qualification
PQQ	pre-qualification questionnaire
PSP	Private Sector participation
Q & A	Question & Answer
R&M	Refurbishment & Maintenance
RFP	Request For Proposal
RFQ	Request for Qualification
ROO	Refurbish Own Operate
ROO	Rehabilitate Own & Operate
ROT	Refurbish Operate Transfer
ROT	Rehabilitate Operate & Transfer
SC	Supreme Court
SPV	Special Purpose Vehicle
UN	United Nations
UOI	Union of India
US	United States
VFM	value-for-money
VGF	Viability Gap Funding
WTO	World Trade Organisation

ACKNOWLEDGEMENT

Under the ADB support for "Mainstreaming PPPs in India", the PPP team (under the joint guidance of ADB and GOI PPP focal points have developed a number of sector initiatives leading to knowledge building and dissemination. This report is an outcome of this activity and constitutes a part of the PPP knowledge series emanating from the PPP Initiative in India.

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LIST OF ABBREVIATIONS

ADB	Asian Development Bank
BIS	Bureau of Indian Standards
BOT	Build Operate Transfer
CMWSSB	Chennai Metro Water Supply and Sanitation Board
DBOOT	Design Build Own Operate Transfer
GoI	Government of India
GoM	Government of Maharashtra
KL	Kilo Litre
KMDA	Kolkata Metropolitan Development Authority
KUIDFC	Karnataka Urban Infrastructure Development and Finance Corporation
LPCD	Litres Per Capita per Day
MBC	Metering Billing and Collection
MJP	Maharashtra Jeevan Pradhikarna
MLD	Million Litres per Day
NITA	Nabadiganta Industrial Township Authority
NRW	Non Revenue Water
O&M	Operation and Maintenance
STP	Sewage Treatment Plant
UIDSSMT	Urban Infrastructure Development Scheme for Small and Medium Towns
UDD	Urban Development Department
TA	Technical Assistance
VGF	Viability Gap Funding
WSSD	Water Supply and Sanitation Department
WTP	Water Treatment Plant

INTRODUCTION

1.1 Background and Scope of Work

The Asian Development Bank (ADB) is supporting the Public Private Partnership (PPP) Cell of the Urban Development Department and the Water Supply and Sanitation Department of the Government of Maharashtra in mainstreaming Public Private Partnerships (PPPs) in select sample cities of the state through a Technical Assistance (TA) project. The project aims to identify and develop PPP structures which can be implemented in the water supply and sanitation sector for the cities of Maharashtra. As a part of this TA, various possible PPP structures in the water supply and sanitation sector will be studied, and the applicability of these structures will be assessed in the context of the sample cities. The project aims to develop term sheets for those PPP structures which are identified as most suitable and feasible for implementation. The overall TA has been structured into the following phases:

Phase I: Review of PPP structures implemented in India, preliminary assessment of water supply and sanitation services in the sample cities of Maharashtra[1], identification of probable PPP structure for approved projects and preparation of term sheets

Phase II: Detailed financial analysis, feasibility studies and project structuring for select cities

Phase III: Bid process management

This toolkit is an output of Phase I of the TA.

ADB in discussion with the PPP Nodal officer cum Secretary (Urban Development Department) and Principal Secretary (Water Supply and Sanitation Department), Government of Maharashtra has identified a sample of 12 cities for the identification of PPP structures. In order to ensure that a representative category of sample cities is represented in the study, cities with varying population sizes and geographical settings have been selected. While a few cities fall in the category of 30,000 to 1,00,000 population size, a few are in the 1,00,000 to 3,00,000 size and the rest have a population of over 3,00,000. The selected cities are largely covered under the Urban Infrastructure and Development Scheme for Small and Medium Towns (UIDSSMT) of the Government of India (GoI) and/or are undertaking a project under the Maharashtra Sujal Nirmal Abhiyaan scheme. With either of these schemes in place, most of the sample towns already have identified some investments which need to be undertaken for improvement to their water supply and sanitation situation. In some of the sample cities, the water supply is managed by the respective Urban Local Body (ULB) itself, whereas in some other towns, the institution overseeing the water supply scheme is Maharashtra Jeevan Pradhikaran (MJP). The sampled cities include Jalna, Sangli-Miraj-Kupwad, Virar, Navghar-Manikpur, Kulgaon-

[1] Only the city of Kolhapur to be studied for the applicability of PPP in the sanitation sector

Badlapur, Chiplun, Kolhapur, Akot, Saoner, Shirpur, Ambarnath and Navi Mumbai [2].For the purpose of identifying PPP options which are best suited for implementation, Phase I has been structured into the following components:

- Detailed study of PPP structures possible in the entire chain of water supply services
- Comprehensive review of the water supply situation in sample cities and identification of areas for PPP-based intervention
- Preparation of term sheets for the PPP structures which have been identified as most suitable for the sample cities

1.2 Process followed for toolkit

The toolkit was initially conceived by the Asian Development Bank in conjunction with the Government of Maharashtra. The initial approach followed in the formulation of the toolkit included a review of documentation available on PPP in urban water supply. This included case studies on the implementation of PPP in urban water in India like Latur, Chandrapur, Haldia, Chennai Desalination, Salt Lake, KUWASIP etc. Other documents reviewed were reports, articles and presentations on the implementation of PPP in the urban water supply sector. The review of this documentation assisted the team in getting a understanding of the current status of the urban water supply sector in India and gaining an understanding on the different implementations of PPP in the urban water supply sector. The team drew key learning from the case studies it referred to in the Indian context. The key learning's focussed on the different PPP structures which are suitable under varying urban water supply scenarios. Additionally, it laid focus on the main hurdles which private participation would face in the urban water supply sector.

Subsequently using these key learning, the team identified the various project structuring options which could be used for implementing PPP in the urban water supply. These options were drawn up on the basis of the current implementations of PPP in the sector. (For e.g: Option of using Viability Gap Funding for project funding of a water supply scheme). A project structuring options for development of bus depots was also considered. The team also undertook a study of PPP concession agreements for the urban water supply sector. The team studied concession contracts of Latur, Haldia, Salt Lake City, Navi Mumbai and KUWASIP. The team formulated terms sheets for each PPP structure based on the learning's of the documentation review and study of concession contracts. Each terms sheet contains a brief reference guide for understanding the key clauses applicable under the specific PPP structure. The clauses presented in the term sheet would help the water supply service provider in drafting a contract for the PPP structure that has been selected for implementation of the identified projects in the urban water supply sector.

Going forward in the project, a current assessment of the sample cities chosen by ADB was undertaken. A study of the sample cities was undertaken using documents like City Development

[2] Since Navi Mumbai has already undertaken PPP in water supply, learnings are to be drawn from the existing structure.

Plans, Detailed Project Reports. The team also held discussions with urban water supply officials of the sample cities to get an update of the current situation of the urban water supply sector. The agenda of the discussions included the current state of the urban water supply sector, problems besetting the urban water supply department, future plans and scope for PPP in urban water supply in the city. The teams also obtained views and suggestions on the various PPP structures devised. These suggestions were incorporated into the term sheets. The team also met the private developers who are involved in the provision of urban water supply services in various cities.

All the learning obtained from the study of PPP in urban water supply was used in the formulation of a step by step process for implementation of a PPP life cycle. Suggestions were taken from internal PPP and urban water supply experts. The process was also discussed with Mr. Ajay Saxena, PPP Expert, ADB and his suggestions were incorporated in the toolkit. The entire toolkit was subsequently presented to the Government of Maharashtra, ADB and DEA. The comments and suggestions received on the same were then incorporated into the final copy of the report.

1.3 Structure of the toolkit

The entire toolkit comprises of four volumes:

- Volume 1: PPP toolkit for the water supply and sanitation sector
- Volume 2: Details of PPP structures
- Volume 3: Case studies of sample cities in Maharashtra
- Volume 4: Term sheets

Volume 1 is a comprehensive toolkit while the rest of the volumes detail out specific sections of Volume 1. The eight chapters of Volume1 proceed as follows:

- Chapter 1 outlines the background to the toolkit, its structure, the users of the toolkit and guidelines to the toolkit.
- Chapter 2 provides an overview of PPP, the benefits that it shall bring to the water supply situation in the city and the trend of PPP in the water sector.
- Chapter 3 provides an overview of the steps involved in the identification of a suitable PPP structure and the processes involved in its implementation
- Chapter 4 presents the preparatory work to be done by a ULB for the identification of a PPP structure including problem definition, project identification and assessment and prioritisation of the key problem areas.
- Chapter 5 provides details of the method of undertaking a viability assessment of the projects identified on a PPP basis. This includes details on the process of carrying about the financial assessment for determining the feasibility of the project and the scope for Viability Gap Funding to add to the viability of a project.

- Chapter 6 outlines how a ULB should decide whether it should opt for public funding or PPP. It presents how a ULB should scope the work for PPP, assess if the project is financially viable and decide whether to implement it through PPP or otherwise.
- Chapter 7 presents the identification and allocation of risks amongst the public entity and the private operator/developer and selection of a suitable contract structure.
- Chapter 8 presents the procurement process to be followed if the ULB decides to implement the project on a PPP basis.

1.4 Context of the toolkit

The purpose of the toolkit is to assist the relevant public entities in the state of Maharashtra for developing PPP-based projects in the water supply and sanitation sector. The project development process in the urban water supply and sanitation sector involves multiple stages to arrive at the implementation stage. These multiple stages are tabled below.

Table 1: Stages in development of urban water supply and sanitation projects

SI. NO.	STAGE	DESCRIPTION	LEVEL
1.	**Detailed assessment study**	A detailed assessment of the existing service delivery is the process of reviewing the existing status of water supply and sanitation services in the city vis-à-vis the current demand based on standardized delivery norms. Such studies shall include water audit, leak detection study, energy audit, consumer survey, etc. The assessment is to be carried out across the entire value chain of water supply services. The output of this study is identification of all the areas of service delivery which need improvement in terms of augmentation of services, rehabilitation, repairs, etc.	City level
2.	**Alternative Analysis**	Alternative analysis is the process of identifying the possible alternatives for resolving the problems identified in each component of the value chain, evaluating the identified alternatives and selecting the optimum alternatives based on multiple parameters. The output of the alternative analysis process is a set of defined projects for each component in the value chain.	Value Chain Component level
3.	**Techno-economic feasibility for project**	Techno-economic feasibility is the process of assessing whether the identified project is technically and financially implementable.	Project level

SI. NO.	STAGE	DESCRIPTION	LEVEL
	approval		
4.	**Detailed project report**	Detailed Project Report (DPR) is a specific project blueprint on the basis of which the project will be implemented. It includes detailed technical designs of the project and detailed costing. The DPR for urban water supply projects in India needs to be prepared as per the Manual on Water Supply and Treatment, published by CPHEEO, Ministry of Urban Development. In the case of sanitation projects too, the manual prepared by CPHEEO for sanitation services needs to be consulted.	Project level

The toolkit detailed out in Volume I of the report discusses in parts the assessment of water supply services and details out the formulation of project structure for implementation, if the PPP route is to be adopted. The toolkit would provide information on how to develop a project if a PPP-based option is found necessary and possible for implementation.

It is to be noted here that under Phase I of the TA, a broad analysis has been undertaken for the sample cities of Maharashtra in order to assess, and determine the possibility and suitability of PPP-based intervention for water supply and sanitation sector projects for these cities. The detailed analysis, which however ought to be undertaken for finalising the PPP option, would have to be undertaken as a component of Phase II of the TA.

1.5 Users of the toolkit

As explained above, this toolkit covers a part of the project development process. Therefore, the toolkit may be used by any entity which is developing urban water supply or sanitation projects and wishes to explore the possibility of implementing the project through the PPP route. In India, organisations likely to be involved in the project development process are:

1. Urban Local Bodies (ULB)

2. Water Supply and Sewerage Boards

3. Public Health and Engineering Departments

Thus, individuals most likely to use the toolkit would be the departmental staff of the above entities with project development responsibilities.

Additionally, the toolkit will help in deciding whether a particular project might be suitable for the PPP route or not. The toolkit can therefore be the basis of approving a project implementation structure as part of the overall project approval methodology. Usually, the responsibility for approval of projects is vested in the top decision-making authority of the entity, which has the primary responsibility for implementing and/or financing the project. Thus it can be useful for the Municipal Commissioner and the Standing Committee (being the top decision-making authorities in an ULB) in urban local bodies, the Managing Director and the functional directors of the Water Supply and Sanitation Board and the state government (in case of the Public Health and Engineering Department).

The toolkit would be utilised for:

1. Approval of project implementation structure for PPP-specific urban water supply and sanitation projects

2. Overall project approval

3. Consideration of viability gap funding for individual projects

1.6 Guidelines to the toolkit

The broad guidelines which need to be kept in mind while using this toolkit have been presented below:

- In order to understand the concept, purpose, need and rationale for developing the projects on a PPP basis, the user should refer to Chapter 2 of this toolkit. The chapter introduces the concept of PPP in water supply and sanitation services and also provides insights into the overall trend of PPP in the water supply and sanitation sector in the country.

- Having understood the concept of PPP in the water supply and sanitation sector, the next chapter viz. chapter 3 in the toolkit would guide the user with information on the overall process that is involved in developing a project on a PPP basis and the steps to be taken to implement the same.

- For information on the first important set of steps to be undertaken in an effort to develop a project on a PPP basis, the user or reader of the toolkit would need to refer to chapter 4. Here, the reader would be familiarised with the methods of identification of the areas in the water supply and sanitation services where there are service delivery and infrastructure gaps and which require intervention for improvement. If the user needs to gain insights into the various methods of service delivery assessment, and the performance standards which need to be met with, this chapter would provide all the key inputs.

- If the user has already identified some projects required for improvements in the water supply and sanitation sector, and would want to assess if a PPP route can be tried for developing and implementing the project, the first activity that would be required is to undertake a financial assessment. For details about the process of financial assessment and the key components that form a part of the assessment process, the user of the manual would need to study the contents of Chapter 5. On the basis of the assessment, the process by which a choice between

the public-funded mode of project development and a PPP route for project development can be made is explained in this chapter. Chapter 6 would build on the financial viability assessment carried out so far, and would provide insights into additional points of assessment which are qualitative in nature.

- For users who need to know some of the pre-requisites that are necessary to develop a project on a PPP basis, information on the same has been listed in Chapter 6.

- If the assessments carried out so far have strongly established the case for developing a proposed project on a PPP basis, then the user can refer to Chapter 7 to determine what type of PPP structure is best suited for implementing the project. The user would be familiarised with the various key factors such as risks involved, their allocation, etc, to determine and help him/her choose from the various PPP structures, the best suited option.

- For users who desire information on the procurement process and procedures which need to be followed once the PPP structure for a project has been finalised, the details of the bidding process, the key factors which need to be considered, the method of inviting bids, etc. have all been detailed out and presented in this chapter viz. chapter 8.

PPP IN THE WATER SECTOR

This section of the report gives a brief on the concept and rationale for PPP-based project development in the water supply and sanitation sector. It additionally familiarises users with PPP projects developed in the water supply and sanitation sector in India. A brief on the key PPP projects that have been implemented in India is also captured as part of this section, in Volume I.

1.7 General definition and overview of PPP

Provision of public services and infrastructure has traditionally been the exclusive domain of the government. However, with increasing population pressures, urbanisation and other developmental trends, the government's ability to adequately address public needs through the traditional means has been severally constrained. This has led governments across the world to increasingly look at the private sector to provide supplement infrastructure investments and provide public services through Public Private Partnerships (PPP).

A PPP transaction has been clearly defined by the Department of Economic Affairs (Infrastructure section), Ministry of Finance in its guideline document for 'Scheme for Support to Public Private Partnerships in Infrastructure.' This definition emphasizes that PPP is a contractual arrangement, made by a government or statutory entity and a private sector company, to provide an infrastructure service.

Thus a Public Private Partnership (PPP) project means a project based on a contract or concession agreement, between a government or statutory entity on the one side and a private sector company on the other side, for delivering an infrastructure service on payment of user charges.

1.8 Rationale for PPPs

PPP offers a win-win solution for all stakeholders, as is explained in the following section.

For the Public Sector

PPPs allow the public sector to derive benefits from the efficiency and effectiveness of the private sector. This is possible because of the following impacts;

Innovation: PPP allows the government to tap the private sector's capacity to innovate. Instead, the government will spell out the services it needs, and the desired outcomes/outputs. The private sector can then introduce innovative solutions to meet the government's objectives.

Sharing of responsibilities: In a PPP project, the government and the private sector share the responsibilities of delivering a service depending on each party's expertise.

Finance: In a PPP project, access to private capital frees government capital to be used in projects with higher public policy objectives

For the Private Sector

Business opportunities: Through PPP the private sector can have access to business opportunities which were traditionally accessible only to the public sector.

Designing and delivering innovative solutions: PPP also allows the private sector to move from just constructing assets according to clearly specified designs, to designing and delivering innovative solutions. The private sector has more room to innovate and offer efficient solutions for public services.

For the General Public

Combining expertise of public and private entities: When structured appropriately, PPPs will deliver public services that can better meet the needs of the public without compromising public policy goals and needs.

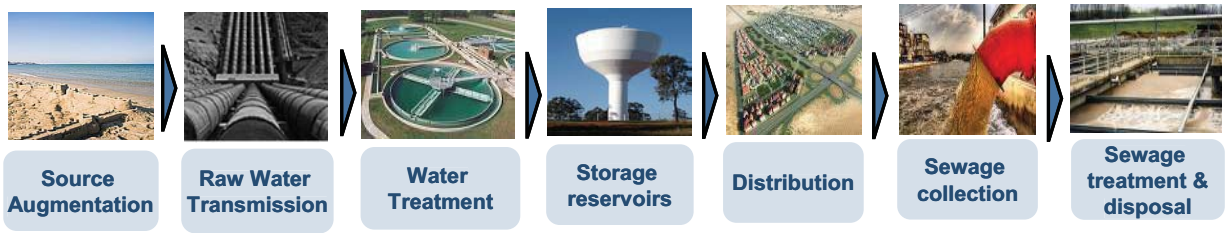
Protection of public interest: The government will also ensure that public interest is protected in all PPP projects and that service delivery will meet public needs at the best value for money when the private sector is brought in to provide government services.

While service delivery through a PPP changes the means of delivering services, it does not change the government's accountability for ensuring that the services are delivered. The department's focus shifts from providing the service to managing the service provider.

1.9 Water supply and sanitation sector in India

In India, urban water supply and sanitation service is a state subject. The water supply and sanitation service is managed by either one of the following institutions, i.e., state-level Public Health and Engineering Departments (PHEDs), Urban Local Bodies (ULBs), or the city level Water Supply and Sanitation Boards. The entire water system from source to the consumer end is managed by one of these agencies. Water and sanitation services can be unbundled into several components, including raw water production and treatment, bulk water supply, retail distribution, and sanitation collection, treatment, and disposal as indicated in Figure 1 below.

Figure 1: Value chain of the water supply and sanitation sector



The entire process represented above is referred to as the value chain for water supply and sanitation services. The unbundling of water supply services is being increasingly experimented with such as:

- Separating wastewater responsibilities from water supply

- Separating bulk water production and treatment from water distribution, or wastewater treatment and discharge from collection
- Separating water transmission from distribution

1.9.1 Institutional set-up for water supply and sanitation service

As discussed earlier, water supply and sanitation services in the country are largely managed at the level of the state government and local governments. The role played by the Central government in the urban water supply and sanitation services is limited to defining norms for the sector[3], and providing guidelines and technical assistance to the states. The Central government also intervenes through some centrally funded special programmes of the Ministry of Urban Development. Similarly, the Planning Commission plays a role in evaluating financial requirements for its quinquennial plans and plays an advisory role in policymaking. However, the states are responsible for urban water supply and sanitation services while the ULBs operate and maintain the water supply and sanitation services. The role of ULBs in operation and maintenance has now been reinforced with the 74th Constitutional Amendment.

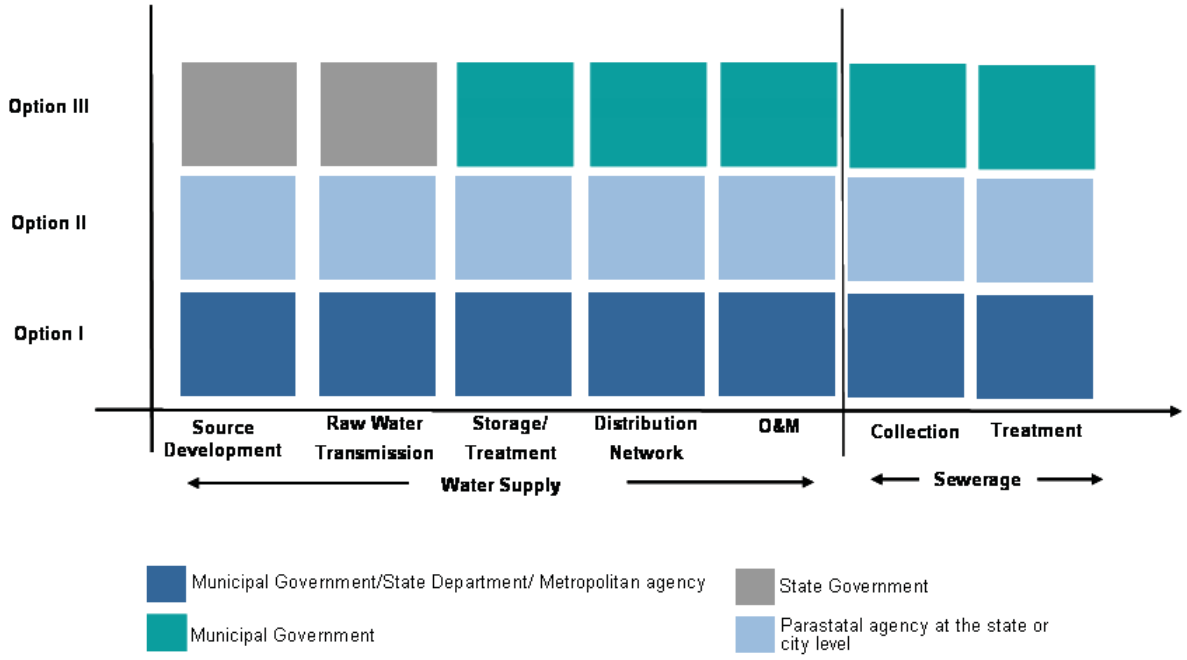
Capital investment for development for these water supply projects has been typically either funded through internal funds of the ULBs/Boards or by way of the regional government's budgetary support and donor support from multilateral agencies.

The three primary institutional set-ups, engaged in the provision and delivery of water supply and sanitation services in the country, are represented in

Figure 2.

Figure 2: Institutional set-up for the water supply and sanitation sector

[3] Through the Central Public Health and Engineering Organisation (CPHEEO), Ministry of Urban Development, Government of India



In the first set-up as can be seen from the figure above, the entire value chain of services of the water supply and sanitation sector is undertaken fully by one of the agencies -- viz., the municipal government or a parastatal agency or by the state government. In the case of large urban cities and municipal corporations, such an institutional set-up is commonly found in India. For examples, in the cities of Mumbai, Pune, and Ahmedabad, the respective municipal corporations manage all the activities in the sector including capital investment and are also largely involved in the designing and planning of source development. In the case of large metropolises parastatal agencies at the state level or at the city level oversee the entire value chain of water supply and sewage services, as can be seen in option 2. For instance in cities of Delhi, Chennai, Hyderabad, and Bangalore water supply and sanitation boards have been set up to develop and manage water supply and sanitation services. The third form of institutional arrangement is as represented in option three. As per this arrangement, the activities of source development and capital investment for network development are managed by the state department (in most cases, the Public Health Engineering Department), while the management of distribution network, operation and maintenance and revenue collection are overseen by the municipal government.

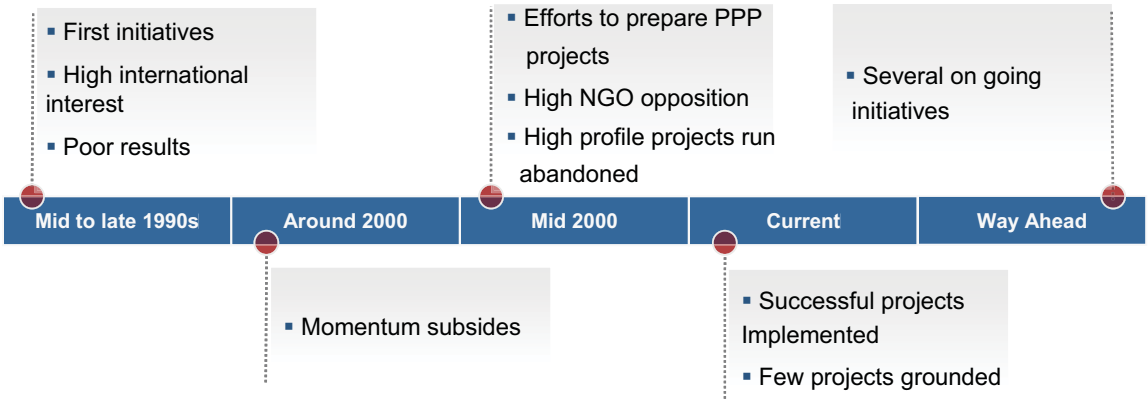
1.10 Trend of PPP in the water supply and sanitation sector in India

As has been discussed in the earlier sections, water supply and sanitation services in the country are managed by the state or local governments. However, the overall service delivery levels in the country for these sectors have been assessed to be largely inadequate. There are large infrastructural gaps and the operations of water supply and sanitation are plagued with high levels of inefficiencies. The per capita availability of water in most urban centers of the country is significantly lesser than what is

needed. Only 50% (140 million) of the urban population is directly connected to the distribution networks.[4] The existing infrastructure suffers from high degree of operational inefficiencies. For instance, approximately 40-50% of the water pumped into the system is not available for consumption since it is lost in transmission, theft etc. On an average, only 24% of all connections in the country are metered.[5] In addition, poor collection practices by the utilities have resulted in low cost recovery rates at 20-30% of operation and maintenance (O& M) cost. The cost of production of these services has been assessed to be very high, against the low level of recoveries, resulting in limited fund availability with the service providers for routine maintenance. This eventually causes poor infrastructure coverage, poor access and low quality of services. Additionally, the service providers have been incurring huge losses on their services.

Improvement in the service delivery levels have implied huge investments for augmentation, improvements in physical infrastructure, and significant scaling up of operational efficiencies in the system. In order to meet both these requirements, various ULBs and parastatal agencies in the country have explored the option of PPP for both the development of infrastructure and operation and maintenance of the same. PPP efforts made in the country have met with different degrees of success. While some of the PPP initiatives completely failed, there have been recent instances of successful implementation of the same. In the sections below, the evolution of PPP in water sector, India has been traced and the same has been discussed.

Figure 3: PPP timelines in the water supply and sanitation sector in India



As can be seen from the preceding schematic, PPP projects in the country have evolved over the years and increasing instances of successful implementation are being observed.

Mid to late 1990s: PPP initiatives were attempted in the cities/states of Goa, Pune, Hyderabad, and Bangalore. The initiatives however met with failure on account of multiple reasons. For instance, in Goa, a PPP initiative was attempted for the development of a bulk water supply system; PPP was sought for investment, design, construction and operation and maintenance. However, though the

[4] India Water Supply and Sanitation, Bridging the Gap between Infrastructure and Service, World Bank 2006.

[5] ADB, 2007 Benchmarking and Data Book of Water Utilities in India.

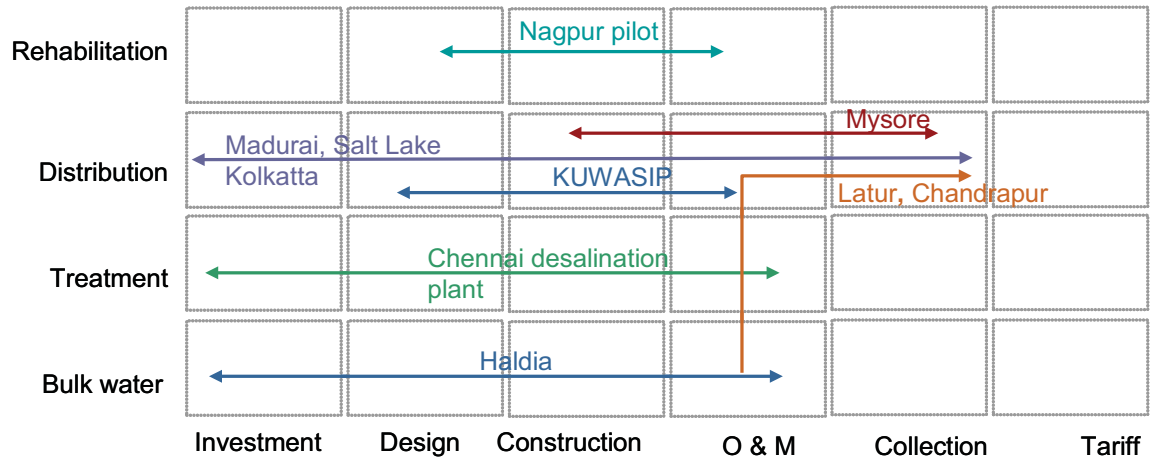
project was bid out, it was abandoned due to issues of high bulk tariff proposed by the private party, and also low political will. A similar project in bulk supply value chain was proposed in Bangalore, where again on account of unaffordable tariff levels and other controversies, the project was abandoned. This phase of PPP initiatives in the country was thereby largely unsuccessful due to issues of tariff setting and lack of political support.

Around 2000: Fewer projects were attempted on a PPP mode around this time, noteworthy being the development of a Water Treatment Plant(WTP) in Sonia Vihar, Delhi, and two other projects in Sangli-Miraj city of Maharashtra and in Bangalore. The Sonia Vihar project sought PPP for design, construction and operation and maintenance of a WTP. The project has been implemented successfully largely due to balanced allocation of risks between the Water Supply Board (Delhi Jal Board) and the private developer. In Sangli though, the PPP was called for the Operation and Maintenance (O&M) of bulk water supply and treatment and distribution operations only; but lack of political support led to the project being abandoned. Similar was the case with the Bangalore initiative. This phase therefore saw few initiatives being proposed.

Mid 2000: This period was also marked by the abandonment of several large-scale PPP initiatives such as a pilot project proposed by Delhi Jal Board (DJB) in Delhi, and projects proposed by the Water Supply Board in Bangalore. These projects met with strong political and public opposition.

Current (late 2000): In the current phase of the decade, the country has seen several PPP initiatives being implemented successfully. These include PPP-based projects in the cities of Latur, Chandrapur, Chennai, Kolkatta, Mysore, Madurai, Haldia, and Nagpur. The type of PPP options and the value chains in which these have been implemented differ as represented below.

Figure 4: PPP projects implemented in India



Going forward, it is understood that several PPP initiatives are being planned and proposed in the water supply and sanitation sector following the successful implementation of ongoing and projects in the recent past. This trend is also observed in the several urban sector development programmes of the Centre and the state governments which are encouraging and promoting development of water supply and sanitation projects on a PPP mode. The overall policy framework for PPP projects in the country has seen significant measures, aimed at facilitating increased PPP in project development and operation and maintenance. For example, specific urban infrastructure funds such as the Viability Gap Fund (VGF) scheme has been developed by the Central Government to provide financial support to

infrastructure projects that are to be undertaken through the PPP mode. A Special Purpose Vehicle (SPV) India Infrastructure Finance Company Limited (IIFCL) has been constituted by the Government of India as a dedicated institution, purported to assume an apex role in the financing and development of infrastructure projects in the country. Again, the urban developmental scheme of the GoI, the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) initiated in 2005, also encouraged urban infrastructure projects to be developed on a PPP basis.

A summary of few of the PPP projects implemented in the country is presented in the following sections.

1.11 PPP projects in water and sanitation sector in India

A brief on the PPP structures implemented in the cities of Latur, Chandrapur, Salt Lake City, Chennai, and clusters in Karnataka and Haldia is presented here.

1.11.1 Distribution-cum-revenue collection contract at Latur and Chandrapur

The distribution-cum-revenue collection contract implemented in Latur and Chandrapur has been classified as a performance management contract. These cities faced severe issues of acute shortage of water and required augmentation of the source. Additionally, the water supply operations, as being managed by the ULBs, suffered from a high extent of operational inefficiencies resulting in poor recoveries. In order to improve water supply to these cities, MJP undertook a source augmentation project. However, the ULBs recognised their inability to efficiently manage the water supply services and sought private sector intervention in operations and management of the water supply system.

In Latur, the capital investment for augmentation of the bulk water supply system has been borne by MJP. Post-augmentation, the entire water supply system from source to the distribution end, has been handed over to the private developer for operation and maintenance. In the case of Latur, the contract is being executed by the SPV, Latur Water Management Company Limited" formed by a consortium of Subhash Projects & Marketing Ltd., UPL-EEL and Hydro Comp Enterprises. The contract was awarded for a period of five years. For Chandrapur, the contract was handed over to M/s Gurukripa Associates for a period of ten years.

The primary purpose of the contract has been to bring in operational efficiencies in the entire water management system, and thereby, reduction in the associated operation and maintenance cost. Besides, the private developer is required to increase coverage of the water supply services, increase the number of direct connections, reduce illegal connections, install meters, generate bills and undertake collection activities. As per the contract, specific performance targets for each activity have been defined for the private developer. The private developer has been given the right to levy the tariff set by Maharashtra Jeevan Pradhikarna (MJP) to collect revenues from the consumers and retain the same. In return, the private developer is required to pay a fixed bi-monthly/bi-yearly or annual payment to MJP as license fee. The financial bid criteria for this was the highest licensee fee payment quoted.

1.11.2 Water supply and sanitation concession agreement for a service area, Salt Lake City

A water supply and sanitation concession agreement has been implemented in Sector V of the Salt Lake City, Kolkata. This agreement has been categorized as a form of Build Operate Transfer (BOT) type of PPP structure. The contract implemented by the Kolkata Metropolitain Development Authority (KMDA) requires private sector participation for the development of an underground network for water supply and sewage services for the township of Sector V, managed by Nabadiganta Industrial Township Authority (NITA). The key bidding criterion was the lowest water-cum-sewage charge which the private developer would levy. The tenure of the contract is thirty years.

The contract was handed over to Jamshedpur Utilities and Services Company (JUSCO) and Voltas who formed a joint venture for undertaking the contract. As per the contract, the private developer has been required to undertake construction of infrastructure for water supply and sanitation services, and to operate and manage both the systems for the concession period. The private developer would levy a water-cum-sanitation charge for the services managed. At the end of the concession period, the assets are to be transferred to NITA. Approximately 35% of the capital costs for the project would be passed on as a subsidy from the GoI through JNNURM to the private developer.

All the operational expenses for managing the water supply/sanitation services from source to the end consumer would have to be borne by the private developer during the concession period. In addition to the water-cum-sewage charge which the private developer can levy, the developer has also been the given the right to levy and collect a one-time connection charge from the consumers. The tariff to be charged and the extent and timeline for its escalation would also be decided by the private developer, subject to approval from KMDA/NITA.

The SPV formed by the JUSCO-VOLTAS Consortium has already started water supply related work on ground, after the working schemes have been approved by KMDA/NITA. About 25% progress in the work on ground has been achieved against the sanctioned water supply component of the Project.

1.11.3 Bulk supply cum Operation and Maintenance contract, Chennai

The bulk supply plus O&M contract is a PPP agreement that has been implemented for the development of a 100 MLD sea water desalination plant in Chennai. The PPP structure has been categorized as a Design Build Own Operate and Transfer (DBOOT) model. The project has been awarded to Chennai Water Desalination Ltd (CWDL), a SPV floated by IVRCL Infrastructures & Projects Ltd. The contract was awarded to the Chennai Metro Water Supply and Sanitation Board (CMWSSB) for a tenure period of 25 years.

As per the contract, the private developer is required to design, engineer, finance and procure the entire infrastructure for off-take of water, transmission, treatment and supply of treated water to the storage reservoir. In addition, the private developer is also required to operate and manage the facility for the concession period. The private developer is therefore required to supply treated bulk water to the CMWSSB. For the treated water produced, the private developer is paid a water charge by CMWSSB.

The unique feature of this contract is that for all the activities required to be undertaken by the private entity, it is assured of a minimum fixed payment by the utility. This arrangement is also referred to as a "take or pay" system. The key bidding criteria has been the per unit charge for treated water, which the private developer would collect from CMWSSB.

1.11.4 Augmentation-cum-O&M contract for distribution system for a cluster of ULBs, Karnataka

The augmentation-cum-O&M contract for the distribution system is a performance-based fee model, implemented under the Karnataka Urban Water Sector Improvement Project (KUWASIP) for the towns of Belgaum, Hubli-Dharwad, and Gulbarga. This performance contract is a PPP model with a 100% capital subsidy from the government agency -- Karnataka Urban Infrastructure Development and Finance Corporation (KUIDFC).

These select cities of Karnataka faced issues with their distribution network. There was no accurate estimation of the loss of water incurred in transmission and distribution; the supply hours were reported to be irregular; and no clear information was available with the ULBs on the status of water supply infrastructure assets. Given these issues, private developer assistance was sought to improve the water supply services.

Under the PPP structure, the private developer has been required to undertake rehabilitation works of the distribution network of a cluster of towns and oversee the operations and maintenance of the distribution network. The private developer is therefore first required to undertake construction works for the distribution network. The private developer will be fully reimbursed by the state agency for the rehabilitation activity it undertakes. The private developer is therefore responsible only for water supply activities at the distribution end, including supplying treated water to all the connections, installing meters, generating bills, collecting revenues, and undertaking repair works.

The contract was awarded to an international bidder, Compagnie Generale des Eaux, Paris, France. As per the contract, the operator will have the responsibility for operation and management of the distribution network in the cities for two years following eighteen months of distribution network rehabilitation.

The private developer gets fixed operator fees from the respective ULBs for executing O&M activities; this fee which is to be paid by the ULBs to the private developer is the critical bid parameter.

1.11.5 Augmentation of water treatment system-cum-Operation and Maintenance contract of the water supply system, Haldia

For the augmentation of the WTP and for operation and management of the water supply system at the Haldia Industrial region, a PPP arrangement has been designed. A concession based PPP agreement has been implemented in Haldia for the development of the WTP system and for the O&M works of the water supply system. The agreement has been implemented by the Haldia Development Authority (HDA) to meet the long-term demand of industrial consumers of the region. Developed as a Greenfield Water Supply Project, it envisages the development of a 227 MLD WTP along with O&M of the water supply system.

The water supply system for the region was earlier managed by the West Bengal Public Health and Engineering Department (PHED) on behalf of HDA. The water supply system was plagued with several problems including high production and distribution losses, poor service quality, poor operation and maintenance of the WTP, and very high operation cost. Private sector participation was therefore sought for the development of the WTP and for O&M of the distribution system.

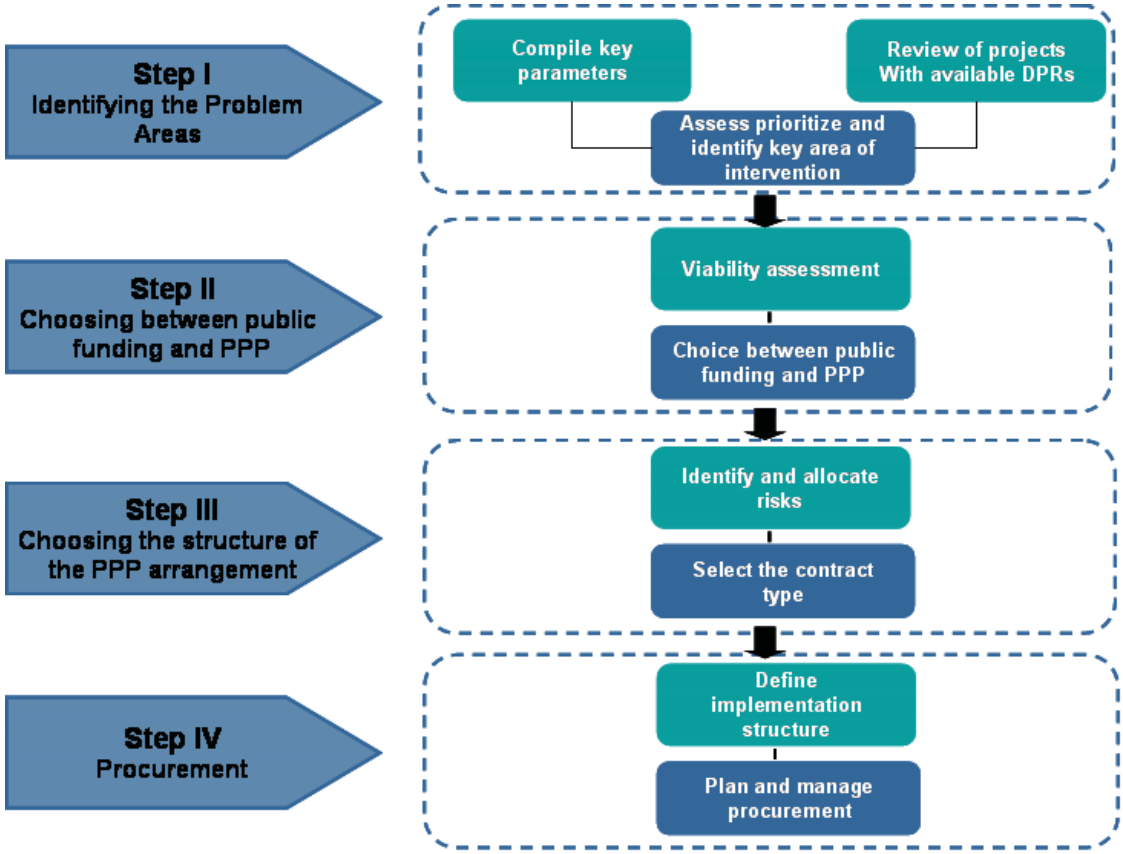
The contract has been handed over to consortium consisting of Jamshedpur Utilities & Services Company Ltd. (JUSCO), Ranhill Utilities Berhard (Malaysia) and Infrastructure Development Finance Company Limited (IDFC). The total tenure of the project is 25 years. The project for raw water off-take, transmission and treatment plant has been developed on a BOT basis.

As per the concession agreement, the private developer is required to undertake the construction of the raw water off-take system and raw water transmission lines; augmentation to the existing treatment plant; and operation and management of the water supply system from source to the end-consumer. Any expansion and rehabilitation work for the distribution network would be managed by HDA before inviting the private developer to operate and manage the water supply system. The private developer is required to make a fixed monthly payment as license fee to HDA for the right to operate the existing water supply assets and the entire system. This highest fixed monthly payment was set as the critical financial bid parameter

IMPLEMENTING PPP: AN OVERVIEW

In this section, an overview of all the steps which are to be followed for determining a suitable PPP structure for an identified project in the water supply and sanitation sector are indicated along with a snapshot of the remaining activities which need to be undertaken to facilitate the implementation of the selected PPP structure. A step-by-step indication of the stages involved in the determination of the PPP structure and its implementation are represented in the schematic below.

Figure 5: Overview of stages in determining suitable PPP structures



The steps indicated in the schematic above have been briefly explained in the following sections.

1.12 Step 1: Identifying the problem areas

The determination of the set of projects required for improvement to the existing level of water supply and sanitation services is based on identification of all the areas of service delivery where some form of project based intervention is required. In this context, the very first step to be taken is to list down all the issues in the current system based on a detailed assessment. This detailed assessment is to be carried out by the ULB/state agency for the water supply and sanitation services across its entire value chain

by undertaking studies such as consumer surveys, water audit, leak detection study and energy audit s. The results of these assessments should be compared with the key performance indicators/standards applicable for each level of operations. The existing Detailed Project Reports (DPRs) should be reviewed to check if the proposed project components would adequately address the issues identified, and if not, whether the same would need to be rectified. It is important to ensure that even the DPRs which have been sanctioned are assessed to ensure that if any further modifications based on the assessment undertaken is required, then the same be pursued. Going a step further, the ULBs may explore the possibility of modifying the DPR to ensure that the relevant areas of service delivery are adequately addressed. If on account of change in scope, the costs of the project increase, the ULB can consider approaching the state/central government for additional funding or may explore the PPP option for the same. The output of the assessment would indicate the accurate status of the services, the issues being faced in the current system and the interventions required.

1.13 Step 2: Choosing between public funding and PPP

Having identified the areas where intervention in the form of specific projects is required, the next stage is to determine whether the proposed projects should be taken up through the ULB/state agency wholly or should be developed on the basis of a PPP route. This choice between the two options is largely guided by a detailed project viability assessment. This assessment would then have to be followed up with a qualitative assessment that tries to determine which of the two parties, the private developer or the public agency, is realistically best suited to undertake the project.

1.14 Step 3: Choice of PPP structure

If the analysis undertaken in the previous stage indicates that the PPP option is to be pursued for developing the proposed project, the next logical activity in the sequence of steps is to determine an appropriate PPP structure. As has been indicated in the previous chapter, a host of PPP structures can be developed and implemented; however, the choice of a particular structure from among the various options is made based on the project characteristics and the uniqueness of the context. One of the key parameters determining the choice is the extent and type of risks which are associated with the project and the allocation of these risks between the private developer and the ULB/state agency. Therefore, an exhaustive list of risks associated with the project needs to be prepared, deliberated upon and its allocation duly considered to determine the suitability of the various PPP structure options. From the activities undertaken in stage two and three, the best suitable PPP structure would be identified.

1.15 Step 4: Procurement

The final step in the entire process discussed so far is the procurement stage. Having identified the PPP structure to be adopted for developing, operating and maintaining the proposed project, and finalising the same, the next stage is to plan the procurement process. The contractual structure identified needs to be translated to a workable action plan with clear and precise definitions of the responsibilities of the two contracting parties – the ULB/state agency and the private developer to be identified. The financial model prepared for the project would then be further refined as per the requirements of the transaction structure. Based on the transaction structure, the contract for the PPP

arrangement would need to be drawn up. Finally, the procurement plan will be finalised and put into operation.

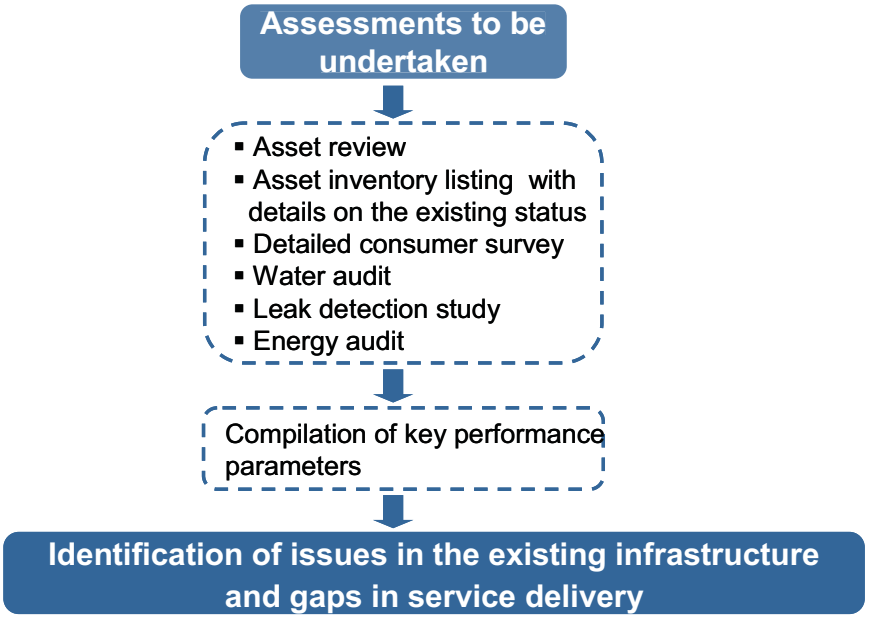
All the four steps discussed above have been detailed out in the following sections of this report.

STEP1: IDENTIFYING THE PROBLEM AREAS

1.16 Assessment of current water supply and sanitation system

The basis for identification of the area of improvement is a detailed assessment of the existing status of the infrastructure and service delivery across the value chain of the water supply and sanitation system. The output of the assessment would indicate the accurate status of the services and the issues being faced in the current system. It is to be noted here that for successful implementation of any form of PPP in this sector, there needs to be a well-maintained accurate database of the existing level of services. Figure 6 provides an overall review of the broad stages in the assessment to arrive at the issues in the existing water supply and sanitation system.

Figure 6: Overview of stages in assessment of water supply and sanitation services



As can be seen from the schematic above, a combination of physical assessments and service level review needs to be carried out to ascertain the issues and gaps in the existing water supply and sanitation services. It is important that both these assessments are undertaken simultaneously and are equally critical for issue identification. The comprehensive list of assessments which needs to be undertaken is as presented in the following section.

1.16.1 Asset review

One of the important assessments which need to be undertaken is that of review of the existing water supply and sanitation assets of the ULB. Asset review forms an integral component of the physical infrastructure assessment to be undertaken by the ULB. The assessment of existing physical infrastructure needs to be carried out by the ULB/state agency to determine the existing condition of water supply and sanitation assets in the service area. The importance of the infrastructure survey lies in identifying assets in the entire system which need to be replaced or rehabilitated on account of their poor condition or inadequacy.

Additionally technical issues of operation associated with the assets can also be identified as part of the physical assessment.

The assessment is expected to identify:

1. The status of availability and adequacy of physical infrastructure such as , toilets, sanitation, septic tanks, VGS,(water) distribution network in slums, etc

2. The operational condition of the infrastructure in the water supply and sanitation system

3. The infrastructure components which require augmentation and or replacement

The ULB/state agency may have to undertake the asset review on its own or obtain technical assistance for the asset review. It may be noted here that the status of the current infrastructure directly determines the level of services provided by the ULB/state agency. For instance, if the raw/pure water transmission lines are corroded, it would result in a high extent of water loss during the process of conveyance resulting in reduced availability of potable water at the consumer end. Similarly, if the sewage treatment plant is not operating as per the required standards, or has outdated technology, it would result in improper treatment of the sewage and finally result in of natural water bodies.

ULBs/ state agencies in several instances do not have a detailed updated record of the water supply and sanitation infrastructure. On account of poor or un-reliable information on the status of the assets, a correct picture of the existing status of the infrastructure would not emerge and therefore the interventions required cannot be identified. Additionally, if a PPP-based project is identified, then the performance standards to measure the effectiveness of the private developer in operating and maintaining the system cannot be correctly framed due to ambiguous information about current infrastructure.

A representative per forma on the asset inventory list that the service provider should maintain is presented below.

Table 2: Representative sample of asset inventory list

ASSET	SPECIFICATION OF THE ASSET	AGE	VALUE	CONDITION	REMARKS

The asset inventory listing may also be undertaken specific to each value chain. The above table is only a basic per forma indicating the minimum components of the inventory list. Suitable changes may be made to the same for a comprehensive compilation and presentation of information.

Parallel to the infrastructure assessment undertaken by the ULB/state agency, a review of the service delivery levels is also critical to determine the current status of the entire system. As a part of the service delivery assessment, it is important that the following three surveys or studies are undertaken:

- Detailed consumer survey
- Water audit and leak detection study
- Energy efficiency audit
- Water quality audit

1.16.2 Detailed consumer survey:

The ULB/state agency in most cases has been found to have inadequate or un-reliable information on the extent of coverage of its services, the number and type of water supply connections, the exact consumption levels, etc. In the absence of such information, it becomes difficult to correctly plan an improvement or intervention. More so, it is difficult to hand over the system to a private developer for development and/or operation and management of the system with inaccurate information about the system. It would invariably result in imbalanced allocation of responsibilities and risks between the stakeholders. One of the basic premise on which a PPP option is built is the provision of good, reliable information about the existing system by the ULB/state agency to the private developer. Therefore, it is extremely critical that the ULB/state agency exploring the PPP option for development and improvement of water supply and sanitation services undertake a detailed consumer survey on the existing status of services provided by it.

Depending on the population and area being serviced by the service provider, the time required for carrying about a consumer survey would vary. While undertaking a consumer survey, it is important that a good representative sample in terms of the size of population or the zones is considered to give accurate information. The detailed consumer survey would address the following information gaps:

- What is the type of connection
- What is the frequency of water supply

- How reliable are the water supply services
- Is the tariff level affordable?
- How often are the sceptic tanks cleaned ?

The detailed consumer survey would provide a correct picture of the status of water supply and sanitation services would directly help in identifying the areas of intervention required.

1.16.3 Water audit and leak detection study

An important study which needs to be conducted by the service provider, i.e., the ULB/state agency is water audit and leak detection. A water audit is a thorough examination of the accuracy of water agency records and system control equipment. Leak detection is the systematic method of surveying the entire system to identify leaks, and exactly identify the points of leak in the water supply system. The primary objective of this survey is to assess the entire water supply system for detection of the extent of technical and commercial losses. The audit would facilitate the service provider in determining the efficiency of the distribution system. A water audit would help the service provider to select and implement programmes which would reduce water and revenue losses.

Water losses, whether due to leakages, theft, under-billing of customers, or faulty system controls, represent monetary losses to the water agency. This is water that the agency has already paid to obtain, treat, and pressurize. However, since the water is lost, the water produces no revenue. A water audit would provide answers to the following questions:

- Where are losses occurring within the system?
- How much water is lost in each problem area identified?
- What corrective measures are needed to reduce the water loss?
- What will be the cost of reducing the water loss?
- What savings and benefit-cost ratios will result from reducing the water loss?
- When can the corrective measures be implemented?

It is important that the ULB/state agency has the latest updated version of the water and leak detection study to share with the private developer.

1.16.4 Energy audit study

Along with the water audit, the ULB/state agency is also required to undertake an energy audit of the entire water supply and sanitation operations. Energy audits are undertaken to determine the current level of energy consumption at various stages of the value chain and to compare the same with the standard benchmarks. The audits measure the energy consumption at various points of pumping of water and review the efficiency of the equipment being used. The energy audit undertaken generally covers the following range of assessments:

- Study of existing system and past records
- Setting of existing energy consumption benchmark

- Study of system energy efficiency from source to consumer
- Checking of equipment efficiency including pumps
- Checking the process losses for energy efficiency

The information provided from the energy audit would help in accurately identifying the cost reduction efficiency benchmark that can be set.

1.16.5 Water quality audit study

One of the critical areas which needs to be reviewed while undertaking the water quality audit is that of assessing the water quality levels. Water quality audits would ascertain whether the water being supplied in the ULB is fit for potable consumption or not. As per the process, the required samples of water would be collected and tested at laboratories to ascertain the water quality standards.

The four studies discussed above are critical to determine the service levels and standards of operational efficiency prevalent in the existing water supply and sanitation system.

1.16.6 Assessment of future demand

It is to be noted that the assessment undertaken would highlight the issues in terms of infrastructure gaps in the existing scenario. Going a step further, the ULB/state agency would also have to measure the adequacy of the current services to meet the demands of the future population. For instance, the per capita water availability in the existing scenario may meet the demands of the current population; however, for the expected rise in population, the current levels of supply may not be adequate. Therefore, it becomes important that when the detailed assessment is undertaken, both the needs of the current population and that of a horizon plan period are considered.

1.16.7 Compiling Key Parameters

Some key performance indicators are to be used for assessing the level of services and for determining the infrastructure gaps. The parameters most commonly used are discussed in the following section. For each component of the value chain, parameters have been identified for evaluating the performance levels. These parameters include technical indicators and quality indicators. The performance standards for each of the indicators are as per the guidelines mentioned in the CPHEEO manual. Some of the key indicators with respect to the water supply sector which need to be assessed along with their formula and rationale have been provided in Table 3.

Table 3: Key parameters for assessing the performance of the water supply services

INDICATOR	UNIT	NORM	FORMULA	DEFINITION	RATIONALE	REMARKS
Service level performance parameters						
Per capita quantum of water supplied (for cities without a developed underground system)	litres per capita per day (lpcd)	70 lpcd	= [Quantum of water supplied to the distribution system/ Population served]	Total water supplied into the distribution system (ex-treatment plant and including purchased water, if any) expressed by population served per day	Indicates the adequacy of the water supplied for consumption at the distribution end	▪ For cities without an underground sanitation system, a per capita water availability should ideally be 70 lpcd ▪ Only treated water input into the distribution system should be measured ▪ Only population served by the ULB to be considered
Per capita quantum of water supplied(with a developed underground system)	litres per capita per day (lpcd)	135 lpcd				▪ For cities with a fully developed sanitation system, the CPHEEO norm of 135 lpcd is to be adhered to
Quality of water supplied	-	As per BIS norms	= [(Number of samples that meet the specified potable water standards in a month/ Total number of water samples in a month)*100]	Percentage of water samples that meet or exceed the specified potable water standards, as defined by CPHEEO. Sampling regimen should be as per standards and norms laid down for the same	Poor water quality can pose serious public health hazards. Its highly critical to monitor the quality of the water supplied	▪ . Samples should be drawn at both points - outlet of treatment plant and at consumer end. ▪ All parameters of the quality standards should be met.
Frequency of water supply	Hours per day	24 hours	= [average number of hours of pressurised	The number of hours in a day during which	Intermittent supply results in the need for	▪ The number of hours of supply in each of the

INDICATOR	UNIT	NORM	FORMULA	DEFINITION	RATIONALE	REMARKS
Service level performance parameters						
			water supply per day]	pressurised water is available	individual households to create additional storage requirements and other in conveniences	operational zones should be measured, continuously for a period of 7 days ▪ The zone-wise figures should be averaged out to get city-wise data
Water Treatment Plant Capacity	%	100%	= [(Quantum of bulk water supply/ Installed capacity of the WTP)*100%]	Installed capacity of the water treatment plant in MLD terms to treat the bulk water supplied for treatment	Indicates if the installed capacity is adequate to treat the bulk water supplied	▪ If the installed capacity is less than the bulk supply, a check on the water quality standards is essential to determine any
Storage levels	%	33%	=[((installed capacity/(1- quantity of water discharged from WTP))]	The storage capacity available in the form of Elevated Storage Reservoirs or Ground Water Storage Reservoirs	Indicates the extent of storage capacity available to store treated water at any point in time before actual supply to the distribution system is undertaken	
Coverage of distribution system	%	100%	= [(Total number of households with direct water supply connection/ Total number of households in the service area)*100]	Total number of households in the service area that are connected to the water supply network with a direct service connection, as percentage of total number of households in that service area.	Indicates the extent of households in the service area which have a direct access to drinking water supply and therefore the extent that are not covered and where services need to be provided	▪ Only the number of households (not properties) in the service area should be considered ▪ Would include households which receive supply at one common point, from where it is stored and distributed Common public stand posts not to be considered
Raw water	%	Less	= [((1- quantity of	Total raw water lost in	Indicates the efficiency	▪ In case of conveyance

INDICATOR	UNIT	NORM	FORMULA	DEFINITION	RATIONALE	REMARKS
Service level performance parameters						
transmission loss level		than 2%	water received at WTP)/ quantity of water pumped at intake works)*100]	conveyance from the source/MBR to the treatment plant expressed as a percentage of total bulk water off take at source	of the conveyance system to ensure that only technical loss levels due to friction are permissible.	through open channels, the loss level would be higher due to evaporation ▪ Loss level exceeding permissible standards indicate either corroded pipelines or theft of raw water.
Water Treatment Loss	%	2%-3%	= [((1- quantity of water discharged from WTP)/ quantity of water received at WTP))*100]	The quantum of water which is lost at the time of treatment on account of technical issues	Indicates if the technology and the equipments used for treatment procedure are operating efficiently and result in only acceptable levels of loss	▪ Loss levels beyond acceptable limits indicate either obsolete equipments being used or operational inefficiency
Pure Water Transmission loss	%	Less than 2%	= [((1- quantity of water discharged from ESR)/ quantity of water discharged from WTP)*100]	The quantum of water lost during conveyance from the WTP to the Storage reservoirs	Indicates if the pure water transmission pipeline is corroded, or has points where there are leaks	▪ Loss levels beyond acceptable limits indicate either corroded pipelines, theft of pure water
Extent of metered service connections	%	100%	=[(Number of metered direct service connections+ Number of metered public stand posts)/ Total number of direct service connections+ Total number of public stand posts)*100]	Total number of functional metered water connections expressed as a percentage of total number of water supply connections. Public stand post connections should also be included.	Facilitates in measuring the exact quantum of water consumed and thereby that which can be billed as per consumption levels	▪ Of the meters installed, it is important to check the extent which are fully functional and operational ▪ All the installed meters need to be 100% functional

INDICATOR	UNIT	NORM	FORMULA	DEFINITION	RATIONALE	REMARKS
Service level performance parameters						
Non Revenues Water (NRW)	%	20%	=[((Total water produced and put into the transmission and distribution system- Total water sold)/ (Total water produced and put into the transmission and distribution system))*100%]	Extent of water produced which does not earn the ULB/State agency any revenue.	Reduction in NRW levels is vital for the financial sustainability of the ULB/State agency	▪ Only treated water input into the distribution system to be included. ▪ Water sold implies actual volume of water supplied to customers ▪ In the absence of a functionally effective metering alternate methods of measurement needed
Cost recovery in water supply services	%	100%	=[(Total annual operating revenues/ Total annual operating expenses)*100]	Total operating revenues expressed as percentage of total operating expenses incurred in the corresponding time period	▪ Financial sustainability is critical ▪ Provide a basis for tariff fixation, enables setting targets for revenue mobilisation and cost control in delivery of water supply services	▪ Operating expense includes charges on electricity, chemicals, staff, bulk water purchase costs etc ▪ Revenues may be in the form of taxes / cess / surcharges, user charges, connection charges, sale of bulk water, etc
Collection efficiency	%	100%	= [(Current revenues collected in the given year/ Total operating revenues billed during the given year)*100]	Efficiency in collection is the current year revenues collected, expressed as a percentage of the total operating revenues, for the corresponding time period.	Indicates the extent of operational efficiency present in the system and makes note of the extent of arrears	▪ Collection of arrears to be excluded

It is to be noted here that the indicators discussed in the preceding table are the most critical parameters for assessing the status of water supply services in a city/town. In addition to these indicators, it is important that the ULB/state agency also considers other important factors in the value chain such as the age of the installed equipment, efficiency of operations etc. Also, the efficiency of consumer grievance redressal needs to be monitored and the adequacy of staff to manage the existing connections assessed.

Similar to the assessment undertaken for the water supply services, the sanitation services of the ULB/state agency also require to be assessed. A snapshot of the key parameters which needs to be assessed is represented in Table 4 below.

Table 4: Key parameters for assessing the performance of the sanitation services

INDICATOR	UNIT	NORM	FORMULA	DEFINITION	RATIONALE	REMARKS
Service level performance parameters						
Coverage of sanitation network	%	100%	= [(Total number of properties with direct connection to the sanitation network/ Total number of properties in the service area)*100]	Denotes the extent to which the underground sanitation (or Sanitation collection) network has reached out to individual properties across the service area.	Last mile access to Sanitation networks is key to improvement in service levels of sanitation management	▪ The total number of properties (as against households) as recorded in the municipal records should be assessed ▪ Only properties with access connection to underground sanitation network should be included. Those that connect their sanitation outlet to storm water drains or open drainage systems should not be considered
Adequacy of sanitation treatment capacity	%	100%	=[(Treatment plant capacity/ Total water consumed+ Estimated water use from other sources)*0.8]	Adequacy is expressed as secondary treatment (i.e. removing oxygen demand as well as solids, normally biological) capacity available as a percentage of normative wastewater	It will highlight the adequacy of available and operational sanitation treatment capacity	▪ To include water supplied to the distribution system (ex-treatment plant and including purchased water, if any and water supplied through any decentralised system.

INDICATOR	UNIT	NORM	FORMULA	DEFINITION	RATIONALE	REMARKS
Service level performance parameters						
				generation, for the same time period		
Collection efficiency of sanitation network	%	100%	=[(Wastewater collected/((Total water produced+ Estimated water use from other sources)*0.8)]	The quantum of wastewater collected as a percentage of normative sanitation generation in the ULB	Signifies the effectiveness of the network in capturing waste water and conveying it to the treatment plants	▪ To include water supplied to the distribution system (ex-treatment plant and including purchased water, if any and water supplied through any decentralised system.
Extent of reuse and recycling of sanitation	%	Minimum of 20%	=[(Wastewater recycled or reused after appropriate treatment/ Wastewater received at the treatment plants)*100]	Percentage of wastewater received at the treatment plant that is recycled or reused after appropriate treatment for various purposes.	For sustainable water management, it is desirable that Sanitation is recycled or reused after appropriate treatment. To maximise the same, it is important that this indicator is measured and monitored	▪ Indicator should be reported at the city / ULB level as a whole. ▪ This should only consider water that is directly conveyed for recycling or reuse, such as use in gardens and parks, use for irrigation, etc.
Quality of sanitation treatment	%	100%	= [(Number of samples that pass the specified secondary treatment standards/ Total number of wastewater samples tested in a month)*100]	Extent of wastewater samples that pass the specified secondary treatment standards	It is important that the treated water that is discharged back into water bodies, or used for other purposes such as irrigation, meets the laid down environmental standards	▪ Sampling should be taken as per good industry practices and laid down norms by environmental agencies, such as Pollution Control Boards of respective State.
Extent of cost recovery in sanitation management	%	100%	=[(Total annual operating revenues/ Total annual operating	Extent of cost recovery is expressed as - Wastewater revenues as a percentage of wastewater expenses,	For ensuring financial sustainability it is necessary to ensure that costs incurred are	▪ All operating expenses and revenues of the revenue account only to be included and incomes and expenses of capital account to be

INDICATOR	UNIT	NORM	FORMULA	DEFINITION	RATIONALE	REMARKS
Service level performance parameters						
			expenses)*100]	for the corresponding time period.	fully recovered	excluded
Efficiency in collection of sanitation charges	%	100%	=[(Current revenues collected in the given year/ Total operating revenues billed during the given year)*100]	Efficiency in collection is defined as - Current year revenues collected, expressed as a percent of age of the Total operating revenues billed.	Efficient collection of revenues due in the current year is critical for overall financial health of the utility	▪ Collection of arrears to be excluded

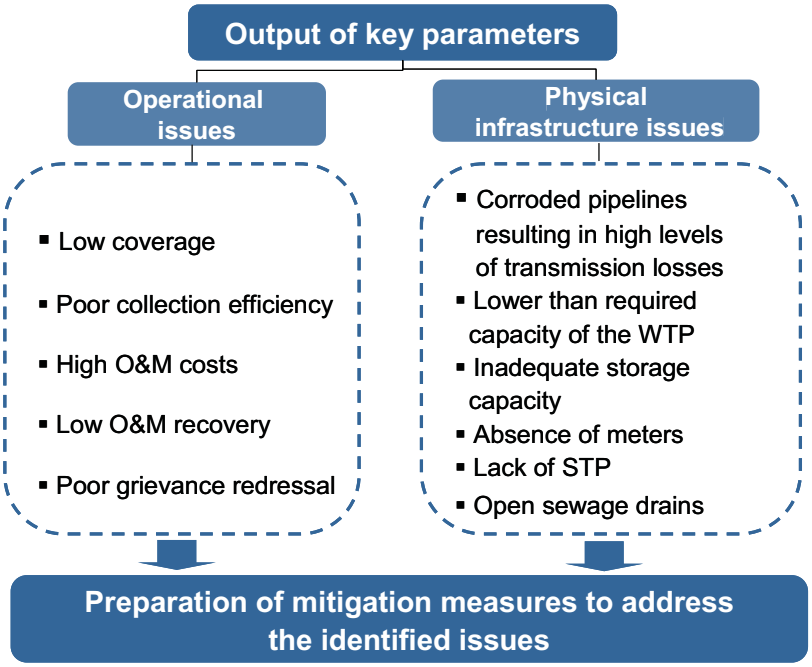
It is to be noted here that the indicators discussed in the preceding table are the most critical parameters assessing the status of sanitation service in a city. In addition to these indicators, it is important that the ULB/state agency also considers other important factors in the value chain such as the age of the installed equipment, operational efficiency etc. Also, the efficiency of consumer grievance redressal process needs to be monitored. Indicators which can also effectively capture the impact on health of the consumers in the service area such as incidence of water borne disease may also be included. These indicators would provide an insight on how with improved sanitation services, there is an improvement in the health of the consumers in the service area.

The above mentioned indicators would facilitate in assessing the service level status of the asset. In addition to these, the quality and status of the water supply and sanitation assets would be reflected in the water audit, leak detection audit, and energy audit which are also to be carried out as part of the technical assessment.

1.16.8 Identification of key issues

The detailed assessment undertaken would facilitate in identifying the major issues which are being currently faced in the water supply and sanitation services in the system. The issues identified may be categorized as those related to the operational handling of the system and the those relating to the physical infrastructure, as indicated below

Figure 7: Indicative list of issues in the water supply and sanitation services



On the basis of the assessment, key inferences in terms of issues can be identified and categorized as indicated above. For each of the issues identified, the ULB/state agency would need to prepare a set of mitigation measures or remedial actions to address the issues. It is important that the ULB should first focus on addressing the operational issues which require minimal levels of capital investments and should then pursue addressing the physical infrastructure which typically require much higher levels of capital investments. These measures may take the form of infrastructure development projects for the areas where a gap has been identified, or may be steps for revision of tariff to facilitate higher cost recovery level.

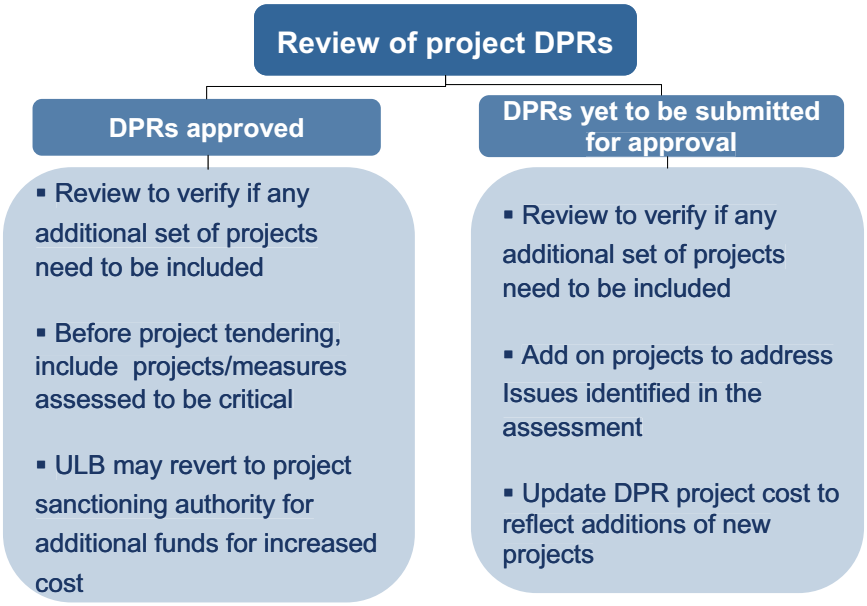
1.17 Review of projects with approved DPRs

Typically, the output of the assessment process would be the key input for any project the ULB/state agency proposes to develop for improvement of the water supply and sanitation services. As a next step towards addressing the issues in the water supply and sanitation services, the ULB needs to develop short, medium and long-term projects which would effectively address the current issues in the water supply and sanitation system. The ULB/state agency may develop Detailed Project Reports

(DPRs) which would list all the specific components which need to be addressed in terms of augmentation, replacement, and rehabilitation with the corresponding investment requirement.

Herein, the ULB needs to adopt different approaches depending on whether the ULB has an approved Detailed Project Report (DPR) for its water supply and sanitation sector or whether such a DPR has been prepared, but is yet to be approved and sanctioned by the concerned authority.

Figure 8: Assessment of project DPRs



In case of those projects with approved DPRs, a further assessment of the system should be undertaken so as to identify any other improvements that are needed in addition to those listed in the approved DPR. Thus, the existing DPR may be modified to incorporate initiatives which the ULB might consider as important to ensure that all the issues identified in the assessment are included. All such modifications to the DPR should be undertaken only before the period of project tendering. Also, it is to be reviewed if the requirement for additional capital investment for the new works identified can be met within the existing approved project cost or needs further government assistance. If additional government assistance is necessary to pursue newly identified initiatives, the ULB may revert to the project sanctioning authority at the GoI or GoM level for further investment support.

In instances where the DPR (under an existing scheme like JNNURM/ UIDSSMT/ State scheme) has been prepared and awaits approval, it is important that a thorough review of the components of the DPR is undertaken. The review must assess and establish the need for the various proposals made in the DPR, and should critically evaluate the costs considered for the various activities. The ULBs would need to include any additional project which is felt necessary after the assessment undertaken. The costs of the DPR would need to be updated to correspond with the new projects included.

A detailed list of the activities which need to be considered while undertaking a due diligence of the cost components has been elaborated upon in Chapter 5. In addition to the costs which are to be incurred,

the projected revenue from the proposed project must also be elaborated. The detailed components of the revenues which would likely accrue to the project have also been explained in Chapter 5.

If there are infrastructure and other issues which are not directly addressed in the DPR, then those need to be added and the corresponding investment requirement needs to be revisited.

1.18 Prioritisation of key areas of investment

Having identified the projects which need to be taken up -- the associated project costs and the expected revenues -- it is important to list the projects which need to be undertaken on a priority basis. The ULB/state agency would need to look at a host of criteria to determine the projects which have to be pursued on a priority basis. Typically, the ULB/state agency would not necessarily have the capacity to undertake the identified investments across the various projects at one go. Even the technical skills and expertise may not be readily available. A set of issues might require immediate attention, while others may be undertaken at a later stage. Given the range of factors which may face the ULB/state agency, it becomes important to clearly define the projects which would have to be accorded the highest priority.

1.18.1 Rationale for prioritisation

The rationale for prioritisation of projects would depend broadly on two important considerations of investment requirement, and the criticality of the project in the current scenario. For both the parameters, the ULB/state agency would need to undertake a detailed analysis to determine project components across the various value chains which require intervention.

Ideally, the ULB should first take measures to address all the issues of operational inefficiency in the entire value chain of water supply and sanitation services, which have been identified as part of the assessment study. Having taken specific steps to address the issues relating to operating inefficiencies, the ULB should then proceed to addressing issues of infrastructure gaps by way of augmentation works. For instance, if as per the assessment of the entire chain of water supply services, it is identified that the distribution network faces several issues such as high extent of distribution loss, poor pressure levels, etc and that the bulk water supply to the city requires augmentation, then, the ULB should ideally first address the issues in the distribution network and then take up projects for augmenting the bulk supply to the city. The rationale behind this is that, if the ULB/state agency takes up the bulk supply augmentation project and keeps the distribution network improvement project as second in line of priority; the result would be the ULB/state agency pumping in additional water into a poorly performing distribution system. The additional water supplied also would be lost if the distribution network has corroded pipelines resulting in water loss. Therefore, the ULB/state agency should have a strong rationale behind pursuing specific project over other projects identified.

A choice of the projects which need to be pursued would therefore be to some extent guided by the output of analysis undertaken above. Additionally, the priority requirements would need to be supported with financial considerations. Against the projects and their costs identified, the ULB would need to review the possible alternative sources of funding for the required investment, viz., from internal revenues of the ULB/state agency or from external sources comprising grants and commercial

borrowings, etc. The investment ability of the ULB to undertake and sustain the required investment would have to be assessed.

The project criticality analysis, together with a review of the investment sustenance ability of the ULB/state agency, would facilitate project prioritisation.

It is important that ULBs/state agencies, which have already developed DPRs or are in the process of doing so, undertake this type of analysis and phase out the capital investments required to improve the overall service delivery in the water supply and sanitation sector.

FINANCIAL FEASIBILITY

The assessment undertaken so far would help in identifying projects which are required for improvement to the water supply and sanitation services. For the projects so identified, the next important activity to be undertaken is that of assessing their financial viability with respect to the costs involved and the alternative sources of funding for the identified project cost. In this section of the report, the entire process of undertaking a financial feasibility of the project has been elaborated upon. The various factors which need to be considered to arrive at a decision regarding the select projects viability have been discussed.

1.19 Determination and Due diligence of Project Cost

One of the most critical activities which need to be taken up to determine the possibility of developing a project on a PPP mode and to further pursue the same is a detailed financial analysis. The financial analysis so undertaken would determine the viability of the project given the costs involved and the expected revenues from the same. The next step in the entire scheme of activities is therefore to undertake a detailed financial analysis.

The key input for the financial feasibility analysis is the project cost. Three broad categories of costs need to be considered -- capital costs for project development, operation costs and maintenance costs which arise during the operation and maintenance of the created infrastructure or asset. The following sections define these costs and guide the identification of these costs by the ULB.

1.19.1 Determination of Project Cost

As indicated above, there are two broad categories of costs to be incurred for the projects.

1.19.1.1 Capital Costs

Capital costs for the development of the water supply and sanitation projects would include basic capital costs on buildings required for the project, including any fit-out costs required to convert an existing property to the required use. Land acquisition cost would include specific costs on assets across the value chain, which needs to be created. Cost estimates should reflect the full resource costs of the project.

For instance, the components of a bulk supply project would include expenditure on intake well, ESRs,jack well, pump house, raw water pumping machinery, raw water pumping main ,approach bridge, etc. Similarly, the capital cost to develop a Water Treatment Plant (WTP) would include expenditure on the development of a pump house, WTP, sumps, bulk meters, etc. At the distribution end, the capital cost largely would be that associated with the laying of pure water pipelines, bulk meters, etc. Therefore, all the costs which are relevant to each component of the value chain and a part of the project are to be considered during the estimation of the capital cost.

It is to be noted here that the estimation of capital costs should also include the opportunity cost of assets already owned by the institution and which are to be used in the project. If the asset could be sold or used for another purpose, then the use of that asset in the project has an opportunity cost.

The capital costs would be identified from the detailed project report. Table 5 indicates the main heads of capital costs for a typical project.

Table 5: Broad components of the capital costs

SI. NO.	PARTICULARS	CAPITAL COST (Rs. in crores)
1.	Land acquisition cost	
	Water supply services	
2.	Construction cost on: ▪ Bulk water supply system ▪ Raw water transmission pipelines ▪ Water Treatment Plant ▪ Distribution network ▪ Storage Reservoirs ▪ Electric sub stations ▪ Pump houses	
3	Installation and additional costs on: ▪ Bulk Meters/Consumer end meters ▪ IT infrastructure ▪ Energy saving measures	
	Sanitation Services	
	Construction cost on: ▪ Sanitation pipeline ▪ Sanitation Treatment Plant ▪ Electric sub stations ▪ Pump houses	
4.	Contingency reserve	
5.	Preliminary and pre-operative expenses	
6.	Interest during construction	
7.	Operations and maintenance to be capitalised	
	Total	

1.19.1.2 Operating Costs

As indicated, in addition to consideration of the capital costs to be incurred for the creation of an asset, the project cost estimation should also include the costs on operation of the assets created. In the case of water supply and sanitation projects, these costs would include the following:

1. Raw bulk water purchase charges
2. Power consumption charges
3. Input costs such as chemicals for water treatment, sewage treatment

4. Cost of employees directly involved in service delivery includes wages and salaries, employee entitlements, superannuation, training and development, etc.

5. Administration expenses

6. Insurance costs

The operating costs would be identified on the basis of the demand projections presented in the detailed project report and the rates of operating costs identified on the basis of current market rates or rates paid in recent similar projects.

Table 6: Broad components of the operation costs

SI. NO.	PARTICULARS	COST (Rs. In crores)
1.	Administrative expenses	
	Water supply services	
2.	Operation and maintenance cost on: ▪ Raw bulk water purchase ▪ Power consumption ▪ Chemicals utilised ▪ Meters ▪ Connection costs	
	Sanitation Services	
	Operation and maintenance cost on: ▪ Energy costs ▪ Chemicals ▪ Sludge handling ▪ Connection costs	
3.	Salaries and other establishment expenditure	
4.	Insurance costs	
5.	Any other miscellaneous expenditure	
	Total	

1.19.1.3 Maintenance Costs

In addition to considering the operational costs of the assets, it is equally important for the ULB to take into account the expenses relating to the maintenance of the assets created. These costs therefore largely relate to the regular civil works which need to be undertaken for maintaining the life of the asset. These civil works therefore include repair works and minor replacements. These maintenance costs are recurring in nature and will be linked to maintaining the capacity and quality of the asset rather than upgrading or improving assets. Maintenance cost typically includes raw materials (spares), tools and equipment and employee costs associated with maintenance work

Therefore, a combination of the capital costs and the operation and maintenance expenses on the proposed project would indicate the total investment costs on the project.

1.19.2 Due diligence of Project Cost

This activity involves reviewing the definition of project costs, both capital and operational, to ensure that they conform to some minimum tests of reliability, credibility and consistency. This stage is important to ensure that the estimate of costs and revenues are prima facie acceptable to the prospective bidders. A description of some of the important parameters for the review of project costs follows[6].

1.19.2.1 Inflation

The costs of individual items considered for arriving at the final cost should reflect current market prices. If the costs are based on standard historical prices, then they should be adjusted to the extent they reflect the inflation. Additionally, the assumed rate of inflation should be documented. The implications of unrealistic assumptions on inflation/omission of inflation are that the cost estimates would be lower and would not reflect the current level of prices. Thus, there will be substantial differences in the costs planned for and the costs actually incurred.

1.19.2.2 Opportunity Cost

In case the sponsor is deploying its own resources – men, machinery or funds -- in the project, then the opportunity cost (the return foregone by the sponsor by not deploying these resources profitably elsewhere, including its own operations) will need to be considered as the cost of the resource.

The implications of omitting opportunity costs in the cost estimates are that the cost estimates would be underreported, inflating the feasibility of the project. However, the project will then not be comparable with the private sector reference.

1.19.2.3 Basis for estimation of costs

The basis or assumptions for the estimation of the costs needs to be verified. The costs of individual items considered for arriving at the final cost should be based on either:

- Standard costs,
- Costing for similar projects in the recent past,
- Actual market prices, or
- Standard industry norms.

All of these above mentioned factors need to be adjusted for inflation. The implications of unrealistic bases for the estimation of costs are that the cost estimates would not reflect the current level of prices. The estimates would be inconsistent and incomparable, thus distorting the feasibility analysis.

[6] Please note that this is an indicative list of the minimum required parameters of review.

1.20 Identification of project revenues

The next important estimation which needs to be undertaken as a part of the financial feasibility analysis is the project revenues. Project revenues represent the income that is generated from the provision of water supply and sanitation charges to the consumer. It should be noted that inflows of a revenue nature will be considered as project revenues. Any inflow of a capital nature would be added to the project funding or reduced from the gross cost of the project, depending on its accounting nature.

The revenues may be bifurcated into two broad categories- Direct revenues and indirect revenues. The revenues generated from the water supply services are discussed in the following section.

1.20.1 Direct sources of revenues from water supply service

1.20.1.1 Water Supply Charges

The single, largest and the most important component of revenue generated from the provisioning of water supply services is that obtained from a levy of water supply charges. Water supply charges may be levied in the form of flat rate tariffs, or volumetric tariffs or telescopic tariffs. The three types of tariff structures are discussed below.

Flat rate tariff: Flat rate tariff refers to a pricing structure wherein the customers are charged a fixed amount of tariff based on the size of pipe connections at certain intervals, irrespective of the quantity of water consumed. It is therefore a linear rate, which may not vary with the usage of the service or with the time of availing of the service. In the case of water supply services, this implies that a fixed per monthly charge is levied for different categories of consumers, viz., residential, commercial and industrial. Usually, within these categories again, a differential rate is levied depending upon the type of individual unit holding. For instance, in the residential user category, different units such as residential houses, slum dwellings, educational institutions, and government establishments are charged varying rates based on the size of pipe connections.

Therefore, a residential unit may be charged Rs. 120 per month for water supply services whereas a slum unit may be charged Rs. 40 per month, and an institution may be charged Rs. 200 per month. The rates for the commercial establishments and the industrial units are generally much higher than the domestic rates. It is to be noted here that irrespective of the quantity of water used by a consumer, s/he would be charged only a fixed rate. Typically, such a pricing structure is found in the case of cities where no meters have been installed at the consumer end.

Volumetric tariff: Volumetric tariff refers to a pricing structure wherein the tariff rate varies as per the quantum of water used by the consumer. It is therefore a variable rate, where for different consumption levels, different tariff rates are applicable. Such a tariff structure is applicable in cities/towns where meters have been installed at the consumer end; there are separate consumption slabs with corresponding per unit charges. The broad consumption category remains the same as that under the flat rate tariff structure, viz., residential, commercial and industrial. Within these categories, slabs for different consumption levels exist. For example, under the residential category, there may be the following slabs with the corresponding rates, as shown below.

Table 7: Representative volumetric tariff structure

RESIDENTIAL	Rs. per kilo litre
Below 15 KL	6.00
15 KL- 30 KL	8.00
31 KL- 50 KL	15.00
51KL-100 KL	20.00

Water meter readings are recorded and depending on the volume of water consumed, tariff is levied.

Telescopic/Increasing block tariff: As per this tariff structure, there exist two or more prices for water used, where each price applies to a customer's use within a defined block. Prices rise with each successive block. Generally, under such a pricing structure, the first block price is deliberately set below cost. A water user in a particular use category (e.g., residential) is charged a unit price for the first units abstracted up to a specified amount (this defines the end of the initial or first block). Above this amount, the user faces a higher price for additional units until a second specified amount is reached (the end of the second block), and so on until the highest (top) block in the increasing block structure is reached. The user can typically abstract as much water as desired in this top (highest priced) block, but for each additional unit of water, the bill increases by an amount equal to the highest price in the rate structure.

Table 8: Representative telescopic tariff structure

RESIDENTIAL	Rs per litres
Below 15 kl	2.50
15 kl- 30 kl	6.00
31 kl- 50 kl	12.00
51-100 kl	20.00

1.20.1.2 Water Connection Charges

Another component of the revenue from the provision of water supply services is the water connection charge. A water connection is a one-time payment to be made by a consumer to the service provider for accessing water supply services. These connection charges are generally based upon the size of the connection; user category (e.g., domestic, industry); location of the property (i.e., within/outside city limits); and distance of the property to the nearest water main. Connection charges usually include a basic connection fee plus various add-on charges for physical facilities, labour, administrative fees, and other costs.

Therefore, as a part of the total projected revenues, it is important that the future demand for the water supply services is estimated. Based on the anticipated increase in the number of connections which need to be provided, the applicable water connection charges need to be applied and the revenue from this source to be estimated.

1.20.1.3 Penalties

A small contributor to the total revenues earned is the penalty imposed on consumers who are illegally connected to the water supply system, and those customers who have not paid up the water bills. On the basis of the trend in the arrears in the total collections to be made, the revenue to be earned as penalty may be estimated.

1.20.1.4 Charge for establishment of meter

The cost incurred by the ULB in purchasing and installing meters at the consumer end is generally recovered as part of the total water bill generated. The revenue from this source is to be largely treated as an inflow, meant to recover the costs already incurred by the ULB. The costs are generally recovered as instalments from the consumers, and the same should also be accounted for in the total revenues.

1.20.2 Indirect sources of revenue

In addition to the direct sources of revenue, the ULB should also explore the indirect revenue sources for the water supply sector. Few such revenue sources which have been identified are as under:

1.20.2.1 Development charges

The ULB should also consider possibility of developing a special corpus fund meant to make payments to the private developer for developing the water supply system. A Municipal Fund may be created with revenue contributions from the development charges which are currently levied under MRTP Act 1966. Approximately 50% or a pre decided share of the development charges so levied may be consolidated to form the fund.

1.20.2.2 Real estate revenues

The ULB may also explore the possibility of un-locking the real estate value of the municipal land within its possession. As part of the payment or compensation agreement between the ULB and the private developer, the ULB may consider the option of providing the developer with a Transfer of Development Right (TDR). TDRs may be given by the ULB to the private developer as form of compensation

The sum total of the above revenue streams would have to be projected as a part of the financial analysis for the water supply services.

1.20.3 Direct revenues for sanitation service

The revenues from provision of sewage services are as indicated as below:

1.20.3.1 Sanitation charge

Sanitation charges form a significant component of the total revenues accruing from the provision of sanitation services. Sanitation charges generally are levied as a percentage of water charges and are collected from all the premises which have sanitation connections. Therefore, as part of the total projected revenues, the income from the sanitation charges should also be estimated and included in the total revenue stream.

1.20.3.2 Sanitation connection charge

Sanitation connection charge is the fee that the ULB/state agency would levy as a one-time charge on consumers for provision of a connection. The fee would consist of a charge for providing connections and a tapping charge. The total revenue from connection fees each year would depend on the number of connections provided in that year. Therefore, the total revenue for sanitation charges should also account for the income from the connection.

1.20.3.3 Penalties

A small component of the revenue from sanitation services is from imposition of penalties. Generally, penalties are imposed on those consumers who have not taken a legal connection to the sanitation system and are dumping their sewage in the open drain. On the basis of the trend of income from penalties in the previous years, this income component would have to be computed.

1.20.4 Indirect revenues for sanitation service

In case of sanitation services, the revenues from sale of treated sewage would need to be treated as an indirect source of revenue by the ULB. Treated sewage may generally be purchased by manufacturing or industrial units which have a high use of water for their industrial activities. If the option exists, the ULB may identify such units and can guarantee a pre determined quantity of treated sewage water to such units in exchange for a certain price.

1.21 Preparation of the financial model

Once the project costs and revenues are identified, the next stage in the financial analysis is to build the financial model of the project. This task involves the following activities:

1) Identifying all the inputs for the financial model:
   a) Project cost
   b) Project revenues
   c) Operation and maintenance costs
   d) Assumptions for the financial model
2) Preparing the financial model including the following components:
   a) Calculation of project cash flows
   b) Calculation of Project IRR

1.21.1 Inputs to the financial model

Some basic assumptions and inputs need to be considered when a financial model is prepared. The inputs and assumptions are listed below.

- Project cost as derived from the detailed project report capital costs, pre-operative expenses (to be capitalised), fees of the transaction advisor (if any), cost of legal approvals, etc. In addition, the phasing of the capital expenditure also needs to be defined.
- Project revenues including the revenues which have been identified from all the sources as indicated in the preceding sections.
- Operations and maintenance costs as derived from the DPR as per the demand projections and the estimated operating expenses.
- Certain assumptions for projecting the cash flows in the future, for instance, long-term inflation rates, long-term interest rates, income tax rates in the future, etc.

All these assumptions will need to be documented as part of the financial feasibility process.

1.21.2 Preparation of the financial model

The financial viability of any capital-intensive project is largely defined by the returns on investment the project is expected to earn the investors. Therefore, one of the key objectives behind the preparation of a financial model is to estimate the returns that the project can generate in the future. These returns are calculated on the basis of project cash flows, which are available for investors who have invested in the project, both debt and equity investors.

Therefore, for the calculation of the project cash flows, the following key statements would have to be prepared:

- Projected Profit and Loss A/C
- Projected Balance Sheet
- Projected Cash Flow statement (showing calculations of the project cash flows)
- A statement of the assumptions used across the financial statements
- Total capital expenditure and its phasing

These five financial statements together will constitute the basic financial model of the project. Generally, the financial statements listed above are projected to cover the economic life of the created asset so as to consider the costs of the complete project life cycle. In case the economic life of the project is longer than 30 years, the ULB can at this stage of preliminary financial feasibility limit the duration of the projects to 20-30 years.

1.22 Assessing the viability of the private investment

The spectrum of PPP contract structures can be broadly classified into two categories:

1. Contracts in which the private sector invests capital, either the whole project cost or a part
2. Contracts in which the private sector does not invest capital

The following discussion is specifically applicable to PPP contracts in which the private sector invests capital. Such PPP contracts can take the nature of concessions (BOT), BOO, BOOT, DBFO, etc. The private sector invests capital in these contracts as a business investment. This means that there is an expectation of attractive returns from the investment that the private investor has made. The key question therefore to assess the commercial viability of the project under consideration is to determine whether the returns available from the project are attractive enough for a private investor. The following sections discuss the calculation and assessment of the project returns to check their attractiveness.

1.22.1 Principles and Risk Return relationship

On the basis of the projected cash flows which have been estimated in the preceding step, the next activity to be undertaken is to compute the Internal Rate of Return (IRR) of the project. The IRR so estimated would then have to be compared against a benchmark to assess whether the project is commercially viable. The possible benchmarks could be returns that are generated through similar projects or returns that are assumed to be reasonable by a private developer player in the water supply and sanitation sector. It is to be noted here that projects of large-scale investments would differ from case to case. For instance, an only bulk supply augmentation project would differ from one which requires development, operation and maintenance of both bulk water supply and a distribution system. The ULB/state agency therefore, cannot assume an arbitrary rate of return. A suitable rate of return would have to be clearly identified.

In order to identify whether a project is commercially viable or not, the following formula can be used:

Project Internal Rate of Return ≥ Weighted Average Cost of Capital

Weighted average cost of capital (WACC) is a ***minimum return that a project must earn on its asset base to satisfy its creditors, owners, and other providers of capital.*** WACC is calculated as:

$WACC= (1-t)\ (E/K)*C_e + (D/K)*C_d$

Where,

t = amount of tax applicable

E = Value of equity in the project

D = Value of debt in the project

K = D+E

C_e = Cost of Equity/ Minimum return expected by equity investors

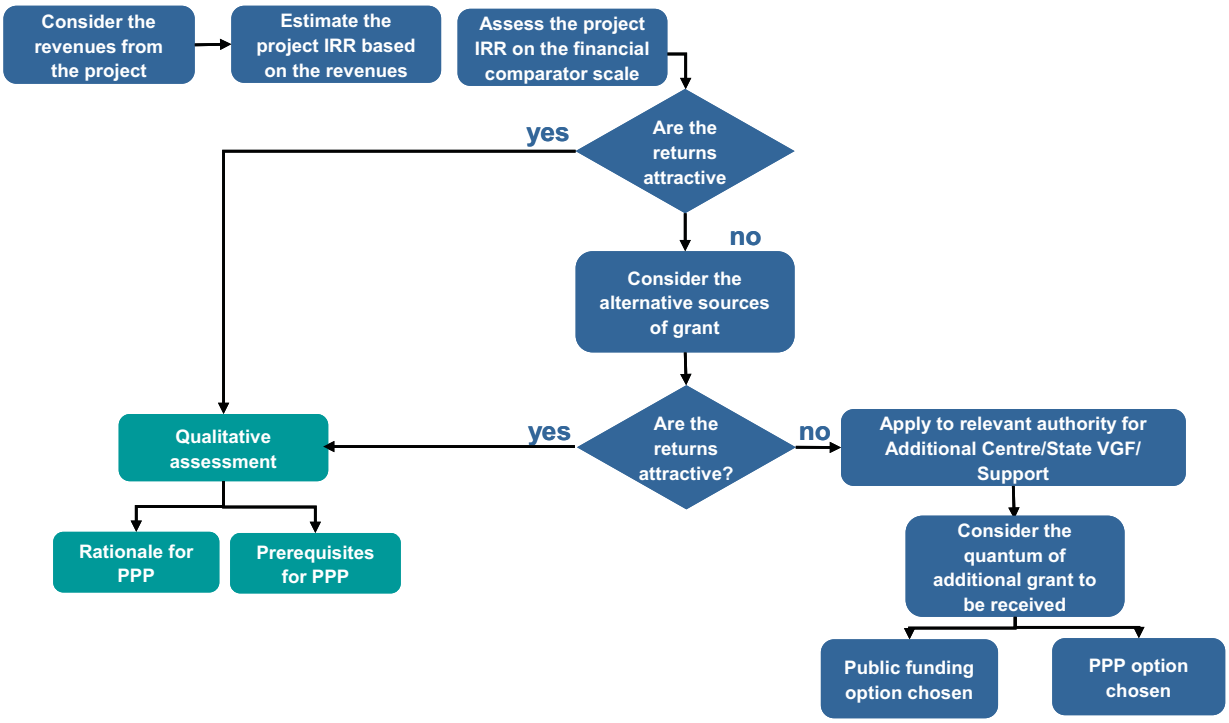
C_d = Cost of Debt/ Minimum return expected by debt investors

The project IRR must at least be equal to the WACC of capital for the project to be called commercially viable. The value of WACC would be directly related to the risk perceived in the project by the investors.

1.22.2 Process flow of viability assessment

The steps which to be followed for undertaking the viability assessment are summarized in the following schematic.

Figure 9: Process flow for viability assessment



Project IRR is defined as the discount rate that makes the net present value of all cash flows from a particular project equal to zero. Generally speaking, the higher a project's internal rate of return, the more desirable is the project.

The project IRR is calculated using the inputs of project cash flows over the economic life of the project. In case the economic life of a project exceeds the tenure for which the cash flows have been projected, then for the last year of the projected cash flows assume the terminal value of the project as the cash flow.

1.22.3 Assessment of Project IRR: Financial comparator scale

To assess the commercial viability of the project, the project IRR would have to be compared with a series of benchmark returns. These benchmark returns would include comparisons with:

1. **Risk-free rate of return:** The risk-free rate of return represents the lowest possible return for the project, as it represents a risk-free investment. Generally, a project being developed as an investment avenue would have a substantially higher degree of risks in addition to the sovereign risk (corresponding to the risk-free rate of return). Therefore, the project IRR should be greater than the risk-free rate of return in the market. For practical purposes, the 10-year yield on government securities is a reasonable indicator of the risk-free rate of return.

2. **Comparison with AAA-rated bond yield:** The AAA-rated bond yield (over the risk-free rate of return) represents the return on an investment which is rated by rating agencies as carrying the lowest risk for the investor among the bonds available in the market. The risk of the project

under development will realistically be equal to or higher than that of the AAA-rated bond. This means the interest on debt to the project will be more than the AAA-rated bond yield. If the return available for equity shareholders is less than the AAA-rated bond yield, an investor will like to invest in the AAA-rated bond, rather than in the project. Therefore, in such a case, the public sector should fund the project completely as the returns are not attractive for a private investor.

3. **Comparison with interest rate at which debt is available to the ULB/state agency:** The project IRR may also be compared with the long-term interest rate at which the ULB/state agency can borrow funds from the market for the project. If the project IRR is equal to or less than the interest rate at which debt is available to the ULB, then the return available for the equity investors would be the same as the cost of debt. However, since the equity in the project would have higher risk than the project debt, the return required by the equity investors would be correspondingly higher. Therefore, the return available for the equity investors is not adequate.

4. **Comparison with the market rate of return:** As a representation of all business opportunities available to the investor, the rate of return of the equity market over a long term on the Bombay Stock Exchange (BSE) sensex or National Stock Exchange (NSE) Nifty Nifty can be used to compare whether the Project IRR is attractive or not. In case the returns available for the equity investors are equal or more than the market rate of return, the project can be declared as commercially viable for execution through private investment.

In case the project returns are found attractive for private investment, the focus would shift to an assessment of the project on a specified set of qualitative parameters for choosing between public funding and PPP.

In case the project returns are not found to be attractive with the projected revenues considered, the possibility of obtaining a capital grant to fund the costs of the project may be explored. Typically, if the returns on a project are found to be unattractive, the viability of the project may be enhanced by considering the option of a Viability Gap Fund (VGF) scheme of the Government of India. Under this scheme, for a PPP project developed, financed, constructed, maintained and operated by a private sector by a private developer where the commercial viability is low, the VGF option can be explored to enhance the viability[7]. The viability gap funding is typically provided in the form of a capital grant, in which case the gross cost of the project decreases by the amount of the capital grant. In certain cases, viability gap funding can also be provided in the form of deferred grant or revenue grant, in which case it becomes an additional source of revenue for the project.

The result of the above comparisons, in terms of the range of benchmarks, where the actual project IRR lies will support the following decisions to be taken by the ULB/State agency:

[7] Kindly refer to 'The Scheme for Support to Public Private Partnerships in Infrastructure', Department of Economic Affairs, Ministry of Finance.

- Whether the project returns are attractive enough for a private investor to pursue it;
- Whether the project would require VGF support to make the project commercially viable

1.23 Viability Gap Funding

As indicated above, in case of the project returns not being attractive with the internal revenues considered, the option of viability gap funding may be explored. The VGF scheme by GoI has been initiated with the purpose of lending financial support to those infrastructure projects which are being developed on a PPP basis. However, to be able to attract VGF grant there are a few basic guidelines which need to be adhered to:

- The scheme provides VGF grants to PPP projects in specific sectors, sponsored by any level of administration -- Central Government, State Government and Local Government.
- The VGF support is issued only after the other options of enhancing viability are exhausted or are not possible in the case of a specific project. Therefore, if the ULB/State agency has explored all the available options for funding a proposed water supply and sanitation project and would need additional investment support to make it commercially viable enough to attract private sector for the project.
- The VGF support is capped at 20% of the project cost. An additional VGF grant, capped at 20%, can be given by the government agency sponsoring the project.
- The VGF scheme provides a one-time grant or deferred grants with the exclusive reason of making the project viable. It is generally in the form of a capital grant at the stage of project construction.
- To be eligible, the project should involve provision of a service against the payment of user charge.
- The approved amount of VGF grant for a project is released in its entirety to the Lead Financial Institution (lead member of the consortium financing the project). The Lead Financial Entity releases the grant after the equity of the private partner is exhausted. The release of the grant to the project is in the ratio of release of the debt.

The extent of VGF support that would be required to make the project attractive for private investment would therefore have to be assessed.

1.24 Assessment of water PPPs not requiring private investment

As per financial principles, a service should be outsourced when the market price of the service is lower than the variable costs of providing the service in-house. Variable costs are direct operating costs, which are directly proportional to the level of operations. These costs increase in the same percentage as the level of operations increase. For the water supply and sanitation sector, the variable costs would

be the raw water charges, the electricity costs, chemical costs, etc. The following steps would facilitate in decision-making with respect to the choice between outsourced service and in- house service. This way, the ULB/State agency can choose between a private-operated service and a government-operated service.

Step 1: Based on the service component (or components) being considered for outsourcing through a PPP arrangement, the ULB/state agency will need to list all the costs for the service. The list of the service costs should be segregated into fixed and variable costs.

Step 2: Separate the costs, both fixed and variable, into costs which will be retained by the ULB/state agency and costs which will be transferred to the private party (based on risk allocation).

Step 3: Price the service which is being considered for outsourcing, taking the costs that will be shifted to the private operator. Price the service on the basis of the service being done in-house. The ULB/service authority will have to assume a level of operations to price the variable costs, while the fixed costs can be taken as they are.

Step 4: Estimate the price for the offerings of the private sector. If the estimated price for the private sector offering is lower than the cost calculated for the government service, the PPP arrangement can be considered for further action.

CHOOSING BETWEEN PUBLIC FUNDING AND PPP

The financial viability assessment undertaken would determine whether the proposed water supply and sanitation project offers enough investment returns such that it is attractive enough for the private sector. The returns expected on the project would be the key indicator to the ULB/state agency regarding the commercial viability of the project. Once, it has been clearly established that the proposed project offers returns that are adequate to attract a private developer to the project; the ULB/state agency would have to decide whether the project is to be taken up through the route of PPP or through complete public funding. The following section of this report would discuss the key parameters which the ULB/state agency needs to consider before a final decision on the involvement of the private sector for the project is made.

A ULB/state agency's choice of adopting a PPP option would have to be supported by the following parameters:

1.24.1 Innovation

The ULB/state agency needs to review whether the private developer would be able to provide the same set of services efficiently. Generally, the private developer would be able to bring in innovative practices which would help in improving the efficiency of operations of the service. Since earnings made by the private developer are largely linked to how best the services are provided, the developer has an incentive to try and reduce costs and improve the revenues on the project.

1.24.2 Responsibility and risk sharing

It is important that each risk in a project be allocated to that party which is best able to manage the risk at least possible cost. Therefore, it needs to be assessed as to whether a particular risk can be managed better by the private developer at a lesser cost or not. If the case is that the private developer would be able to handle the identified risk better, it is recommended that the same be handed over to it. Additionally, it also needs to be assessed if the private developer can also take up some of the responsibilities of the ULB/state agency and handle the same efficiently. Doing so, would make available some of the resources of the ULB/state agency to undertake some other higher priority projects and or works.

1.24.3 Sharing in funding

One of the important and major benefits of private sector participation is that the private developer would to partake in some of the capital investment for the identified project. Therefore, the ULB/state agency is in a position to access some of the private sector funds for developing the projects in the water supply and sanitation sector.

1.25 Rationale for PPP

The choice of opting for a PPP-based route for execution of the identified project would be dependant on a set of key parameters. These parameters justify the use of PPPs in creation of an asset in the water supply and sanitation sector. These parameters may be termed as the rationale for PPP. To establish the rationale for PPP, the ULB/state agency would need to assess the project on the basis of the following indicators.

1.25.1 Resource constraint in the way of public sector providing the service

The ULB/state agency will need to assess whether there are any constraints being currently faced which hinder in efficient service provisioning. These constraints can be in the areas of capabilities of the existing work force, cost recovery, inaccessibility of better technology, limited resources, etc. The ULB/state agency will need to assess whether these constraints can be removed internally by it.

If these constraints cannot be removed by the ULB/state agency internally, then the argument supporting the involvement of the private sector through PPP can be initiated. It is to be then determined whether private sector support would be essential in facilitating efficient service delivery.

If it is clearly established that private sector assistance would be necessary, then the PPP option can be further explored by the ULB/state agency. In this context, the following set of critical questions would need to be answered.

1.	What are the resources that are required for creation of the asset/ providing the service	List all the areas of operation, the costs involved, the recoveries made against the costs, the efficiency levels, etc.
2.	Are there any constraints for the ULB/State agency in arranging all the resources itself?	Define the constraint if any in the provision of any or all the above resources
3.	What is the nature of the constraint?	Is the constraint a statutory constraint? Or is it a budget constraint? Or Management capability constraint? Or constraint of available skills?
4.	Can the constraint be removed?	Whether there is a possibility of removing the constraint? Does removal of the constraint require legislative changes?

1.25.2 Ability of the private developer to create the asset and provide the service

An assessment needs to be undertaken to find out whether the private sector has the capability to innovate and provide an efficient service. Only if the private sector, whether domestic or international,

has the technical skill and management capacity to perform the service that the ULB/State agency intends to carry out through PPP, should PPP contracts be explored. Otherwise, the ULB/state agency would have to procure the requisite skills and upgrade its internal capacity to provide the service. In this context the following set of questions may be deliberated upon by the ULB/state agency:

1.	Does the ULB recognize that external expertise is essential for competent and efficient management of services?	Has it been clearly established that the private sector would be able to manage and provide the water supply and sanitation services better?
2.	What are the capabilities within the ULB for O&M, procurement or financial management?	List the internal skills available with the ULB/state agency in the area of everyday operations and management of an infrastructure, financial management, accounting skills, procurement handling etc. Based on the list identify the existing gaps
3.	What are the private sectors strengths which the ULB is proposing to explore?	Will the private developer be able to operate the system better by use of better technology, or system understanding

1.25.3 Efficiency in managing the overall costs

One of the critical parameters which need to be assessed is regarding the efficiency in managing the overall costs which are involved in the development and operation and maintenance of the water supply and sanitation services. The ULB/state agency would need to undertake an analysis of whether there is scope for savings in costs incurred in developing and provisioning of the service if the private sector is involved in the same. For doing so, the ULB/state agency would need to first assess the total costs which are involved. This can be derived from the financial analysis which has already been carried out to determine the financial viability of the project. The cost to be considered here is the total operation and maintenance cost that is required to be incurred for provisioning of water supply and sanitation services.

The total O&M cost so obtained needs to be compared with the cost which the private developer would incur for operating and managing the same set of water supply and sanitation services. This comparison would be made once the financial model prepared in the preceding task is refined according to the suitable PPP model. That exercise would generate the service costs for the PPP arrangement for comparison with the public sector costs calculated earlier. Depending upon the output of the analysis it can be decided as to whether the cost savings under the private developer are substantial or not. Some of the key points or questions which need to be considered there in are as indicated in the following table:

1.	Are the costs for public service known?	Has the ULB/state agency calculated the cost to enable its comparison with the cost of the private sector? Does the ULB have the accounting information to determine whether private sector participation would offer service delivery at equivalent or lower costs?
2.	Is there scope for the private developer to innovate and improve the efficiencies of operation?	Will the private developer be allowed to bring in innovations in service provisioning?
3.	Would the innovations identified be able to bring down the current O&M costs substantially or the saving going to be marginal in nature?	Has there been sufficient strategic planning and have feasibility studies been conducted to benchmark whether the price or technology offered by the private sector would result in savings?

1.25.4 Overall level of competition in the market

It is desirable from the perspective of the ULB/state agency that there are substantial number of private developers in the market who have the skills and the financial wherewithal to provide the water supply and sanitation services efficiently. The existence of multiple players in the market puts the ULB/state agency in a better position in terms of asking for the best of technical and operational expertise from the private sector to provide the services identified. In this context, the ULB/state agency would hence have to also undertake an assessment of the market to determine the extent, number and type of private sector players who are currently engaged in the creation of the water supply and sanitation services and are also in a position to operate and manage the services. Having adequate competition in the market would also help in obtaining competitive quotes for the contract. In this context some of the key questions which need to be looked into are indicated below:

1.	What is the potential capacity and strength of the market?	List the number of private players who have the experience in providing the identified set of services.
2.	Is the private sector adequately developed so as to ensure competition among private firms?	Assess the experience of the private players who are currently engaged in the provision of water supply and sanitation services. Also undertake a review of the quality of

		work being provided at various locations.

1.26 Pre-requisites for PPP

1.26.1 Extent of public and political support

The ULB/state agency would be able to take a final decision on whether private sector participation is required for the provisioning of water supply and sanitation services based on the general views of the public and the support extended by the political representatives. Given the fact that the provision of the water supply and sanitation services has traditionally been the domain of the public sector, the inclusion of private sector in the same is a sensitive matter. The ULB/state agency would therefore have to necessarily consult the various stakeholders who are directly or indirectly related to the provisioning of water supply and sanitation services provided. A detailed process of consultation would be necessary with the end consumers and the members of the Municipal Councils or Corporation to create awareness regarding the proposed change in hand in provision of the service, and in the interactions so held, the concerns of the stakeholders would need to be gauged well.

For the PPP option to be implemented successfully, it is important that there is consensus among the general public and the political representatives regarding contracting out of the creation and provision of service to the private developer.

1.26.2 Legal capacity of ULB/state agency to contract out

In addition to consideration of the factors of efficiency in operation, savings in costs etc, it is important to assess and ensure whether the ULB/state agency has the right to appoint a private party through a PPP contract including concessions for providing a service for which it has the legal mandate. The ULB/state agency needs to be clear about the legal context in which private sector participation is possible. Additionally, it needs to assess if there are some approvals required from some higher authorities to be able to involve a private party in provision of water supply and sanitation services. The ULB will also assess whether there is a need for an enabling provision in the authority's bye-laws or other legislations to provide an environment suitable for PPP arrangements.

1.	Does the ULB have the right to award concessions or enter into contractual license agreements with the private sector to essentially deliver municipal services?	Is the ULB clear on its right to outsource provisioning of water supply and sanitation services to a private developer?
2.	What are the statutory permissions it needs to do so?	Does the ULB/state agency know of all the permissions, approvals, and relating procedures which may be needed to facilitate inclusion of private developer in provision of water supply and sanitation services?
3.	What are the enabling provisions or amendments in the existing legal framework that would be necessary to make such arrangements	If the existing legal framework does not permit inclusion of private developer in provision of water supply and sanitation

	enforceable?	services are amendments possible to facilitate private sector participation?

1.27 Making the Choice

The final decision to undertake the execution of the project through the public-funded route or through PPP arrangements would have to be taken after considering the following points.

- Assess whether the projected returns from the proposed investment are attractive enough for a private entity to enter into a contractual relationship. If the project returns are attractive, then the project would be suitable for consideration of execution through PPP.
- Assess whether the policy and administrative environment is suitable for PPP or not, whether the private sector is capable of providing the service that is intended and whether involving the private sector will generate savings in the service cost.
- Assess the degree of acceptance among all the key stakeholders regarding the likely decision. Stakeholders shall include prospective users, employees of the ULB/state agency currently managing the service (if any), and public representatives. Concerns of these stakeholders should be addressed before taking the final decision.

After having undertaken the above steps, the ULB/state agency would need to finalise the choice of the execution methodology -- public funding or PPP. The final decision will be influenced, in addition to the above parameters, by the public policy mandate of the ULB/state agency. The final decision should be documented along with its rationale for the subsequent procedure.

CHOOSING THE PPP STRUCTURE

Having decided that the ULB/state agency would develop the project on a PPP basis, the next step would be to identify the appropriate PPP structure. This shall involve the following activities:

- Identification of all the risks associated with the project
- Allocation of risks between the private developer and the ULB/state agency
- Identification of a set of appropriate PPP contract options
- Identification of the PPP contract structure best suitable

The above mentioned activities have been discussed in greater detail in the following sections.

1.28 Identification of Risks

A component critical to any PPP structure is the risks involved in the development of the project. Successful implementation of a PPP contract is therefore dependant on how the risks associated with the project are allocated. Before the risks are allocated, it is important that these risks be identified. Hence, as a step towards making a choice about the PPP option to be implemented; all the risks associated with the project are to be listed down. An illustrative list of risks associated with a project and its consequences is presented in Table 9.

Table 9: Generic risk categories

RISK CATEGORY	DESCRIPTION OF RISK	DIRECT CONSEQUENCE
Commissioning risk	The risk that the infrastructure will not receive all approvals to satisfy an output specification, such as expected changes in legislation which allow for a specific output specification not materialising	Additional ramp-up costs, cost of maintaining existing infrastructure or providing a temporary alternative solution where this leads to a delay in the provision of the service
Construction risk	The risk that the construction of the assets required for the project will not be completed on time, within the budget or to specification	Additional raw materials and labour costs, cost of maintaining existing infrastructure or providing a temporary alternative solution where this leads to a delay in the provision of the service
Demand (usage) risk	The risk that the actual demand for a service is lower than planned	Reduced revenue
Design risk	The risk that the proposed design will be unable to meet the performance and service requirements in the output specifications	Cost of modification, redesign costs
Environmental	The risks that the project could have	Additional costs incurred to rectify an

RISK CATEGORY	DESCRIPTION OF RISK	DIRECT CONSEQUENCE
risk	an adverse environmental impact which affects project costs not foreseen in the environmental impact assessment	adverse environmental impact on the project, incurred from the construction or operation of the project or pre-existing environmental contamination
Financial risk	The risk that the private sector over-stresses a project through inappropriate financial structuring	Additional funding costs for increased margins or unexpected refinancing costs
Force majeure risk	An act occasioned by an unanticipated, unnatural or natural disaster such as war, earthquake or flood of such magnitude that it delays or destroys the project and cannot be mitigated	Additional costs to rectify
Industrial relations risk	The risk that industrial relations issues will adversely affect construction costs, timetable and service delivery	Increased employee costs, lost revenue or additional expenditure during delay in construction or service provision (post-construction)
Latent defect risk	The risk that an inherent defect exists in the structure being built or equipment used, which is not identified upfront and which will inhibit provision of the required service	Cost of new equipment or modification to existing infrastructure
Operating risk (service under-performance)	The risks associated with the daily operation of the project, including an unexpected change in operating costs over budget	Increased operating costs or reduced revenue over the project term
Performance risk	The risk that the operator will not perform to the specified service level, such as the Water Resources Department permitting off-take of less than required demand	Cost of failing to comply with performance standards
Change in law risk	The risk that the current regulatory regime will change materially over the project or produce unexpected results	Cost of complying with new regulations
Residual value risk	The risk relating to differences from the expected realisable value of the underlying assets at the end of the project	Lower realisable value for underlying assets at the end of the project term
Technology obsolescence risk	The risk that the technology used will be unexpectedly superseded during the term of the project and will not be able to satisfy the requirements in the output specification	Cost of replacement technology
Upgrade risk	The risks associated with the need for upgrading the assets over the term of the project to meet performance	Additional capital costs required to maintain specified service

RISK CATEGORY	DESCRIPTION OF RISK	DIRECT CONSEQUENCE
	requirements	

The list of risks presented above is generic and indicative in nature. As mentioned earlier, the detailed project-specific risks would have to be identified and detailed out in addition to the ones listed above by the ULB/state agency. It is important that the list be made as exhaustive as possible.

1.29 Allocation of Risks

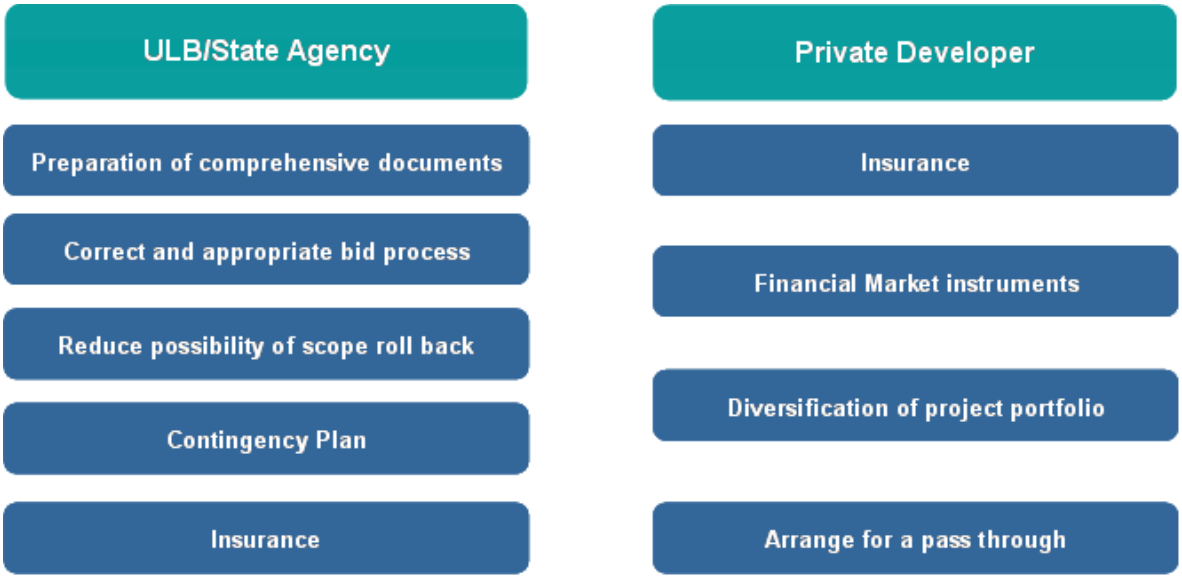
Balanced allocation of all the risks identified plays a critical role in the successful implementation of any PPP structure. In this context, the general principle governing risk transfer is that each risk should be allocated to whoever is best able to manage it at least cost, taking into account public interest considerations. Therefore, an optimal rather than a maximum transfer of risk needs to be undertaken.

The important factors to be considered during risk allocation include:

1. The nature of the project
2. The respective strengths and ability of each party to manage a risk (this may change over time as each party's risk mitigation skills improve)
3. Flexibility of the output specification (whether any constraints exist which influence the method for managing risk)
4. Previous levels of risk transfer (this indicates the historical success of each party in managing particular risks and the potential ability to manage risks in the future)
5. Prevailing market attitudes towards risk
6. Public interest factors
7. Other policy considerations
8. External Environment, economic scenario, risk appetite of foreign institutions

Once the risks have been identified, and allocated appropriately, the next activity to be undertaken is developing the probable risk mitigation strategies. Risk mitigation strategies are developed with the intention of reducing each party's exposure to the risk. Simultaneously, it inherently increases the likelihood of achieving (or bettering) the project's base case scenario. An indicative list of risk mitigation strategies or measures for both the ULB/state agency and the private developer has been presented in the following figure:

Figure 10: Risk mitigation measures for the ULB/State agency and the private developer



It is recommended here that in addition to identification of risks, its allocation and development of mitigation measures, the ULB/state agency also develop a dispute resolution mechanism. Once the project implementation begins with the private developer, it is necessary to ensure that a regulatory body be formed which would formally look into the disputes that might arise during the concession period.

1.30 Selection of possible PPP structures

The activities and the steps taken so far have created the context for implementation of a PPP-based model for the development of the proposed project. The next stage in this process is to determine which of the PPP structures is best suitable to address the needs of the proposed project. Five such possible PPP structures have been discussed in the sections below. It is to be noted here that these structures have been prepared based on the successful PPP structures implemented in the country.

1.30.1 Performance-Based Management Contract

The performance-based management contract is one where the private developer is required to undertake the activity of operation and maintenance of the entire water supply system from source to the consumer end including metering, billing and collection of revenues. If sanitation services are to be also included as part of the PPP contract, then the operation and management of the sanitation services would also have to be managed by the private operator. As per this contract, all the major capital costs which are required for improving the service, be they for service level augmentation, expansion etc would have to be borne by the ULB/state agency. Under this PPP structure, the private developer is given the rights to levy the user charges set by the ULB, collect the charges. As per the financial feasibility, the private developer may be given the right to retain the revenues against payment of a fixed license fee to the ULB/state agency. In other cases, the private developer may be required to handover the revenues collected to the ULB/state agency and in return for activities undertaken will be paid an operator's fee by the ULB/state agency. If the ULB/state agency intends to implement a performance based management contract for its water supply and sanitation services, it is important that it should have undertaken a water and energy audit. Since the performance criteria for the private developer would be defined on the basis of the existing scenario of the water supply and sanitation services, it is important that the water and energy audit be undertaken on a priority basis. The output from the audit so undertaken would help the ULB identify the areas of operational improvement which would be required. The private developer would also on the basis of the results of the audit gauge the actual level of the services on ground. The ULB/state agency should then define required performance targets for the private developer.

1.30.2 Concession agreement for water supply and sanitation services

A concession agreement for water supply and sanitation services is a PPP contract wherein the private developer would be required to undertake investments for creation of assets in the water supply and sanitation value chain and would also be required to undertake the operation and maintenance of the entire system for the period of the concession. As per this concession agreement, the private developer would be required to design, finance, construct, operate and manage the water supply and sanitation services for the concession period. The capital investment required for undertaking the augmentation works would be met wholly or partly by the private developer. Additionally, all operational expenses for managing the water supply/sanitation services such as electricity charges, bulk water charges, establishment expenses, and repair and maintenance, would have to be borne by the private developer. The private developer would recover the investments made by way of collection and retain user charges levied on consumers. Any change to the tariff, the rate of escalations, etc. would be

determined by the ULB. Typically, the tenure of such a contract ranges from fifteen to thirty years and is dependant on the financial feasibility of the proposed project.

1.30.3 Concession agreement for construction, operation and maintenance of bulk water supply system

The concession agreement for the construction, operation and maintenance of the bulk water supply system is a typical PPP structure under the Design Build Own Operate and Transfer (DBOOT) model. As per this structure, the private developer is required to construct the bulk supply infrastructure so as to provide treated water up to the point of the storage reservoir. From the point of the storage reservoir to the distribution network up till the consumer end, the water supply responsibility rests with the ULB. The capital investment required for the augmentation works needs to be borne by the private developer. The operation and management of these assets during the concession period rests with the private developer. Therefore, all the associated operating expenses including the purchase of bulk water, payment of electricity charges, chemicals for water treatment, and establishment expenses including labour charges are the responsibility of the private developer.

For the treated water produced, the private developer is paid a water charge by the ULB. The typical tenure of this contract is twenty to thirty years.

1.30.4 Concession agreement for construction, operation and management of the distribution system

As per this form of concession agreement, the design and finance of the identified augmentation works would be undertaken through a 100% capital grant from the government. As per the contract, the private developer is required to first undertake the construction/rehabilitation works for the identified section of the water system, and further to the construction activity, undertake the operation and maintenance of the entire water supply system. The private developer would get full capital reimbursement from the ULB or any other government agency for the rehabilitation works undertaken. Once the construction activity is complete, the private developer alone is responsible for the operation and maintenance of the entire water supply system, including the supply of treated water to all the connections, installation of meters, generation of bills, and collection of revenues. Any major expansion activity which may be required to the existing infrastructure would have to be borne by the ULB.

A set of performance targets would be set by the state nodal agency or by the ULBs in the cluster for the operation and maintenance activity. For the O&M activity undertaken by the private developer, an operator fee is paid by the ULBs or the state nodal agency for the period of the contract based on the achievement of performance standards. The tenure of such contracts can range between five to ten years.

1.31 Concession agreement for development of the bulk water supply system and operation and maintenance of the entire system

The concession agreement for the development of the bulk water supply system including the operation and maintenance of the entire water supply system is a PPP structure developed on a BOT basis. As

per the concession agreement, the private developer is required to undertake the construction of the bulk water supply system including the raw water off-take system, raw water transmission lines and water treatment plant. The private developer will also be responsible for the operation and management of the water supply system from source to the end consumer. The private developer is given the right to levy and collect revenues from the consumers for the activities undertaken, and retain the same. The private developer is required to make a fixed monthly payment as license fee to the ULB for the right to operate the existing water supply assets and the entire system. The typical concession period would range from twenty to thirty years.

1.32 Service management contract: Metering, Billing and Collection

Under the service management contract for metering, billing and collection, the private developer would be required to undertake investments for installation of meters at the consumer end, oversee their operation and maintenance, maintain a computerized data recording system, generate bills and collect user charges from the consumers. The private developer would not be required to undertake any other activity in the entire chain of water supply services. The type of meter to be installed and the number of connections where the meter is to be installed would be specified by the ULB/state agency. The tariff to be levied would also be determined by the ULB/state agency. The performance standards laid out by the ULB/state agency would specify the revenue collections target to be achieved, the extent of meter functional levels which need to be maintained, etc. The cost of purchase of the meter and the installation of the same would be generally recovered by the private developer from the consumers as part of the water supply service bills. This recovery is generally in the form of instalments.

For the operation and maintenance activity undertaken by the private developer, a fixed annuity payment is made by the ULB/state agency. This annuity amount would generally be the bidding parameter.

1.33 Preparatory documents and activities required to be undertaken

Before any PPP contract is implemented, it is necessary that ULB/state agency on its part undertakes some important set of activities and makes available some critical documents to the private developer. A list of the same has been indicated below:

Table 10: List of documents and activities to be arranged by the ULB/State agency

Sl. No	DOCUMENTS	ACTIVITIES
1	Contract/Agreement document	▪ Raw bulk water purchase contract with Water resource department for water source supply from --- river ▪ Power purchase agreement with the --- Electricity Board for supplying power to the water supply system and the proposed tariff details

Sl. No	DOCUMENTS	ACTIVITIES
2.	Site and asset information	▪ Contour Maps, Network maps and Network survey on a GIS platform ▪ Asset Inventory with technical specification ▪ Site details in terms of land area, assets there in etc ▪ Number and type of water supply connections ▪ Number and type of bulk meters
3.	Reports	▪ Water Audit ▪ Leak Detection ▪ Energy Audit ▪ Water quality standards ▪ Consumer study ▪ Water demand projection ▪ Capital investment plan
4.	User Charges	▪ Tariff levels, escalation rate and schedule ▪ Connection Charges ▪ Electricity charges escalation rate and schedule ▪ Penalties
5.	Manuals	▪ Construction guidelines, debris disposal guidelines ▪ Waste disposal guidelines ▪ Environmental regulations ▪ Quality control guidelines

1.34 Matching of PPP structures with the value chain and prioritised projects

Some of the possible PPP options have been discussed in the sections above. In addition to these, there may be other PPP structures which may be developed to suit the specific project requirements of the ULB/state agency. The ULB/state agency having identified the projects which are to be implemented and the value chain for which they are best suited, would next need to the review the PPP alternatives with the project requirements in order to determine the best suited PPP option. The ULB/state agency would need to clearly understand the project requirements across the value chain of water supply and sanitation services, and review these in the context of the possible PPP options. The ULB/state agency then needs to identify that PPP option from among the suitable structures which would fully address the project requirements. An indicative PPP structure matrix along with different status of the existing value chain of services has been represented in the following table.

Table 11: PPP matrix in context of the value chain

Parameters	Concession agreement for Integrated water supply system	Performance management agreement for O&M of entire water supply services	Service agreement for only Metering Billing and Collection	Concession agreement for bulk supply system	Concession agreement for distribution system
▪ Low bulk water supply ▪ High raw water transmission loss ▪ Inadequate capacity of WTP ▪ Obsolete WTP ▪ High WTP operational losses ▪ Low distribution network coverage ▪ Low metering ▪ Low O&M recoveries ▪ High investment need	✓				
▪ Low bulk water supply ▪ High raw water transmission loss ▪ Inadequate capacity of WTP ▪ Obsolete WTP ▪ High WTP operational losses ▪ High investment need for bulk supply and WTP ▪ Satisfactory distribution network operation				✓	
▪ Adequate bulk water supply ▪ Moderate raw water transmission losses ▪ Adequate WTP capacity; low losses ▪ Low distribution network coverage ▪ High distribution losses ▪ Low metering ▪ High investment need for improvisation of distribution network					✓

Parameters	Concession agreement for Integrated water supply system	Performance management agreement for O&M of entire water supply services	Service agreement for only Metering Billing and Collection	Concession agreement for bulk supply system	Concession agreement for distribution system
▪ Adequate bulk water supply; ▪ Moderate raw water transmission loss ▪ Adequate WTP capacity; low losses ▪ High distribution network losses ▪ Untimely repairs and maintenance of distribution network ▪ Minimum coverage of meters / No meters ▪ Low O&M recoveries ▪ No investment need		✓			
▪ Adequate bulk water supply ▪ Low transmission losses ▪ Adequate WTP capacity; low losses ▪ High distribution network coverage ▪ Minimum coverage of meters / No meters ▪ Low collection efficiency			✓		

Based on the assessment the best suited PPP arrangement would have to be finalised by the ULB/state agency.

PROCUREMENT

The final stage in the entire activity of developing and implementing a project in the water supply and sanitation sector on a PPP basis is the phase of procurement. A detailed implementation plan for the contractual structure needs to be prepared, which includes clear and precise definitions of the scope of work and the roles and responsibilities of the two contracting parties-- ULB/state agency and the private developer. This is termed as the transaction structure. The financial model prepared for the project would then be refined as per the requirements of the financial structure. Based on the transaction structure, the contract for the PPP arrangement would need to be drawn up. Finally, the procurement plan will be finalised and put into operation.

1.35 Transaction Structure

The stage of drafting of a PPP contract would be preceded by one where a detailed transaction structure is prepared by the ULB/state agency. The implementation structure would define the context of dealings, and the relationship between the private developer and the ULB/state agency. When such a structure is prepared, it is necessary to ensure that it is defined, keeping in mind the following considerations:

- The transaction structure should be within the definition of the legal and public mandate of the ULB/state agency. In other words, the implementation structure should not dilute the legal responsibility of the ULB/state agency.
- The transaction structure should be responsive to the interests of the private sector and should promote competition within the private sector.
- The transaction structure should allocate the risks and responsibilities to ensure that the party which is capable of managing particular risks and responsibilities is entrusted with those.

The transaction structure would be legally formalised in the form of the PPP contract. Under the transaction structure, the following information would have to be provided

- The parties involved in the contract
- The contractual relationship between the parties
- The nature of the agreement
- The key risks and their allocation
- Tariff
- Government commitment
- Duration of contract
- Performance indicators

- Payment terms
- Award criteria
- Contract management strategy

The above mentioned key points of the transaction structure have been further elaborated upon in the following sections.

1.35.1 Defining the parties involved in the contract

The transaction structure would clearly identify and define the parties who are involved in the proposed contractual agreement. For instance, in the water supply and sanitation services, typically a contractual agreement would involve a competent authority, ULB (Municipal Corporation/Council), customer, developer/private developer, sub-contractor, etc. The list of parties is only indicative and would vary across the various contracts.

1.35.1.1 Stating the contractual relationship between the parties involved

The transaction structure would have to necessarily state the contractual relationship between the parties involved. The contractual relationship would be largely defined on the following two grounds:

1. Services/activities to be undertaken by both the parties
2. Payments which would be made for the services

It should clearly state as to which of the parties is undertaking what activity in the water supply and sanitation service value chain. For instance, in a performance management contract for operation and maintenance of the water supply services, it should be clearly stated as to whether the ULB/state agency is responsible for the purchase of raw bulk water from the Water Resources Department and provide it at no cost to the private developer for treatment and distribution, or if the private developer would also have to bear the expenses on the purchase of the bulk water. Similarly, each of the activities in the value chain needs to be mapped and responsibilities among the parties clearly mentioned in the transaction structure.

The contractual relationship would also have to be defined in terms of the payment arrangements between the two parties. For instance, as per the structure, it needs to be stated, if the ULB/state agency is required to make any payment to the private developer for the activities entrusted upon the latter or if the private developer is required to make a fixed license fee payment to the ULB/ state agency or if there is a revenue-sharing arrangement between the parties, etc.

1.35.2 State the nature or type of the contractual agreement

The transaction structure would need to state the type of agreement being developed, viz., if it's a concession agreement or a performance-based management agreement or if it is a service contract, etc. From the analysis and activities undertaken in the previous stages, it would be clear as to what

type of PPP contract is being proposed. The same should be stated with a broad explanation of the contract, and a brief on the activities involved.

1.35.3 State the key commercial risk and its allocation

With reference to water supply and sanitation services, the possible set of key risks has already been discussed. However, the commercial risks facing the project may be explicitly stated as part of the transaction structure. For instance, in a concession agreement for development of water supply services and operation and management agreement, the commercial risk may be the collection of revenue risk that the private developer would have to bear. It is possible that some of the customers may refuse to pay the private developer for the water supplied by the latter. Such a scenario would result in lesser revenue realisations than that estimated by the private developer and would give rise to problems in the smooth operation of services. Another type of revenue risk is associated with the projected demand for water supply services in a green field project. If the actual demand for the water supply services is significantly lesser than that estimated, this would again pose a huge risk in the operations of the services. Hence, the commercial risks on the project should be stated in the transaction structure.

1.35.4 Set the tariff to be levied

Various approaches for tariff setting exist. Tariffs are perhaps the most politically sensitive aspect of a PPP contract, particularly for water supply services. It is important to ensure that the tariff be set by ULB is determined after a complete understanding of costs which are incurred to provide that service have been assessed. The structure of the tariff should be made transparent such that the cross subsidies provided to users are clearly known. The ULB/state agency should account for the following considerations before defining the tariff:

State of competition: Where market competition for the service is strong, the private sector is usually given considerable scope to set their own tariffs, although they may be subject to utility rate regulations. Where some degree of monopoly power exists, tariffs tend to be regulated and where the government sets them, mechanisms for changes must be clearly arranged.

Public acceptance of PPP: Where PPPs have been in existence for a substantial period of time and the users accept it and are comfortable with it, it is easier to delegate the right of defining fares to the private sector. It will be difficult to do that in a scenario where the public authority is in a transition phase of moving towards PPP from traditional public procurement.

Social objectives: Where the ULB/state agency wants to protect the weaker sections of the society from completely market-based tariffs, it is desirable that it retains the right to define fares. It is to be noted here that the consumers are in most instances willing to pay for improved level of water supply services. Any tariff charged should be in line with the quality of the service delivered. An increase in tariff levels without a corresponding improvement in the water supply services would not be acceptable by the consumers.

1.35.5 Government Commitment

The transaction structure should state the government's commitment to the process of PPP-led project development. Support from government for the implementation of PPP projects is crucial in the implementation and running of the project. The potential private developers are always concerned about the extent of political will and support to the development of a project on a PPP basis, and this area is considered to be highly sensitive.

1.35.6 Performance Indicators/ Parameters

The transaction structure would have to state in clear terms the various standards of performance which would be applicable to the private developer. These would largely relate to the construction standards which the private developer would have to adhere to and the operation and maintenance standards for the water supply and sanitation services during the life of the contractual agreement. In addition, the standard of the assets at the time of their transfer back to the ULB/state agency should also be mentioned.

1.35.7 Payment terms

Payments in PPP contracts can happen either from the private developer to the ULB or vice versa. For instance, in a contractual agreement, the private developer would pay the ULB/state agency on a bi-monthly basis a fixed license fee for the right given to the former for operation and maintenance of the water supply and sanitation services. Similarly, in a service agreement, the ULB would make payments to the private developer to undertake the required activities. As per the PPP contract applicable to all the payments, the terms of payments and the mode of payments should be clearly specified in the transaction structure.

1.35.8 Duration of the contract

The time period for which the contract is applicable would have to be specified in the transaction document. The time period of the contract generally varies depending upon the type of PPP contract. In PPP structures where the private developer is required to invest and also operate and manage the services, the time span of the contract would be generally longer. Here, it is largely guided by the time it would take the private developer to recover the investments made by him/her on the project. For instance, a PPP project which requires the private developer to undertake investments in the development of a WTP, bulk water pipelines and also take care of the operation and management of the entire system from source to distribution end would generally have tenure of 25-30 years. Similarly, a PPP contract which is in the nature of a management contract or a service agreement would typically be of a shorter duration.

1.35.9 Award Criteria

The award criteria would need to be specified in advance of the bidding, along with their relative weight, since this helps potential bidders understand the selection mechanism and reduces the risk of allegations about corrupt government practices. The criteria largely determine the allocation of benefits between governments and consumers. For instance, one of the key award criteria in a PPP agreement

for a performance-based management contract would be the highest license fee sum agreed to be paid by the private developer to the ULB/state agency for the right to operate and maintain the water supply and sanitation services. In cases where a VGF-based grant is being explored so as to make the proposed project commercially viable, the award criteria would be the lowest VGF grant quote requested by the private developer.

1.36 Drafting the PPP contract

The PPP contract puts the implementation structure into a legal document that can be enforced. The contract agreement is the most important document in the transaction as it regulates the transaction during its complete tenure. It defines the rights and obligations of the contracting parties and the terms and conditions under which the obligations would be discharged. It also regulates the enforcement of the terms and conditions and specifies the consequences when a contracting party defaults.

The PPP contract would need to be drafted by the ULB/state agency before it initiates the procurement process as during the procurement process, the prospective bidders would need to be made aware of the contract conditions subject to which they would be required to bid. A typical contract would have the following components:

1. Recitals
2. Definitions and interpretations
3. Rights of the parties
4. Consideration of the contract
5. Commencement of operations
6. Obligations of the parties to the contract
7. Payment mechanism
8. Performance management
9. Defaults and consequences of defaults
10. Step-in and substitution rights
11. Dispute resolution
12. Termination of the contract

1.37 Selection of the Procurement Strategy

It is critical that a transparent strategy which is suitable for the type of contract selected for the PPP arrangement. In this context, there are largely two procurement strategies which are broadly followed, viz a Competitive Procurement strategy or a Suo moto/unsolicited strategy. A brief on the two strategies is discussed below:

- **Competitive Procurement strategy:** Competitive procurement strategies are the most efficient strategy in case the contract size is large and it is expected that the number of prospective bidders would be large. Competitive strategies are seen as the preferred procurement strategy when the contracting party is initiating the procurement process to identify the private partner for a PPP arrangement. The generic competitive strategies include methods such as International Competitive Bidding, National Competitive Bidding, Limited Competitive Bidding, and Shopping (international or domestic markets).

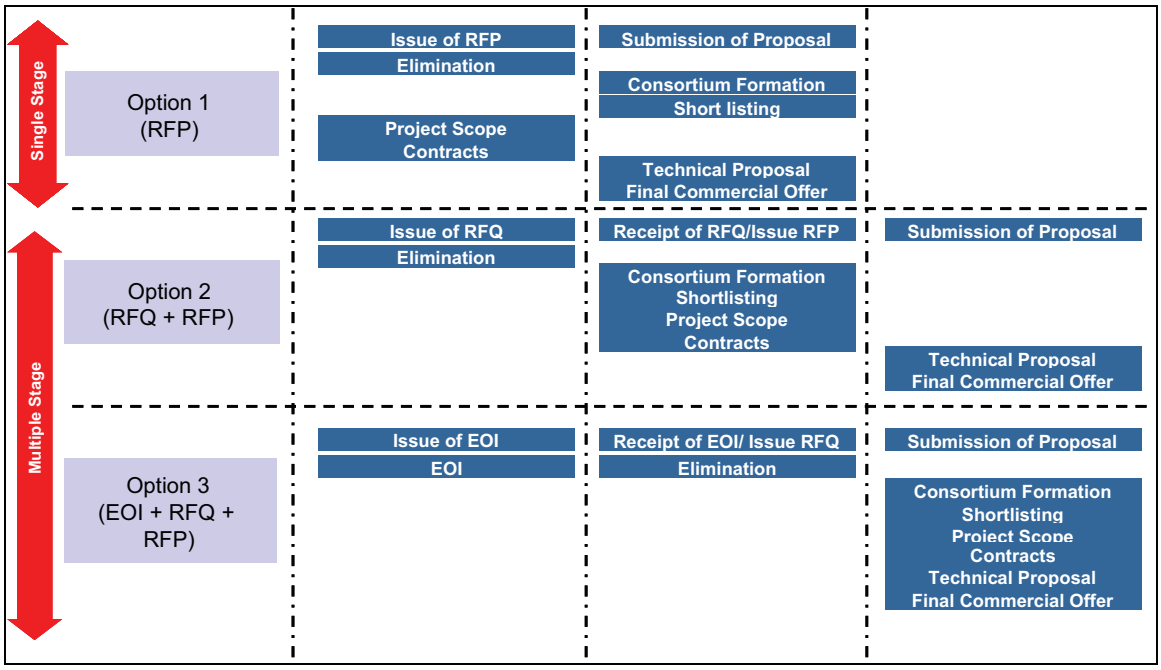
- **Suo Moto / Unsolicited strategy:** In exceptional cases, the contracting party might not follow the competitive bidding route for procurement of the private party. The alternate procurement strategies are not strictly competitive; they may be completely suo moto as in direct contracting or they might have induced competition. The different forms of this strategy include Direct Contracting, Swiss Challenge and Margin Preference procurement strategies.

The ULB depending on the specific need and on site situation select either of the procurement strategies discussed above. The procurement strategy selected would have to be approved by the relevant authority before it could be implemented further

1.38 Design of the procurement process

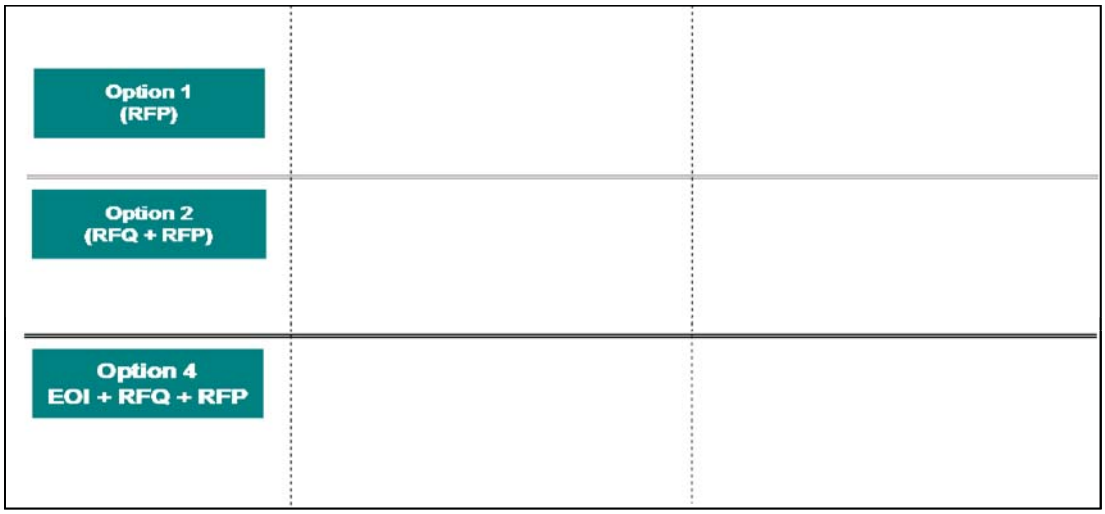
Several alternative procurement processes can be implemented. The following schematic represents this range.

Figure 11: Alternative procurement process strategies



The selection would be based on the matrix of criteria represented by the following schematic.

Figure 12: Alternative procurement process strategies



1.39 Managing the Procurement Process

Various alternative procurement processes may be pursued. Depending upon the requirements and characteristics of the project, the best suitable procurement process can be selected. In the following section, the process discussed is based on a two-stage (RFQ- RFP) approach. The section provides an overview of the procurement process and provides information on the basic requirements for each stage.

1.39.1 Undertake Pre Bid Activities

1.39.1.1 Review and update project information

One of the basic requirements here is that the ULB/state agency should organise and put together all the project-specific information which has been collected and detailed out in the earlier phases. In doing so, the following should be reviewed and analysed:

- **Project definition, objective and scope:** As an introduction to the procurement document, it is suggested that the overall project definition, objective and the scope are stated in clear and precise terms of business outcomes and expected outputs.

- **Procurement Plan:** Updated project timelines, processes and deliverables based on the latest available information should be stated.

- **Nature of project and structuring:** The ULB/state agency's views on project structuring and funding should be stated here. However, it should also provide the potential bidders with an option to provide innovative solutions.

- **Third party contracts:** The procurement plan should provide details on the timing and signing of the third party contracts. Draft Contracts providing the critical information needs to be prepared.

- **Payment mechanism:** Details of the payment mechanism as identified and defined by the ULB/state agency would have to be clearly stated.

- **Risk matrix:** The risks identified in the analysis stage should be frequently reviewed and the latest updated version would need to be provided as part of the procurement documentation. It is important that risks are clearly stated so that the bidders can consider the same while preparing bid proposals.

1.39.1.2 Key considerations of the procurement process

Some of the critical areas which need to be adequately deliberated upon by the ULB/state agency during the procurement stage are indicated below:

- **Bidding timeframes:** It is necessary that appropriate time is provided to the bidders for submission of their bids. Generally, the time period required for bidders to prepare and submit bids is directly linked to the size of the project being bid and directly affects the quality of the bid. Suitable time frames can be determined by way of gauging the perceptions and opinions of the bidders at or during the RFQ stage.

- **Information related to institutional assets:** All the information regarding the assets to be used by the private developer as part of the project would have to be provided, viz., information on all the equipment used, such as pipelines, jack wells, valves, WTP, and meters.

- **Labour issues:** In case the PPP project requires modifications to existing labour or staff, the bidders should be provided with sufficient information to account for such project costs and risks.

- **Competition and regulatory issues:** All the requisite approvals for compliance need to be explicitly stated. Also, the competition laws should also be examined and appropriate procedural/approval requirements should be dovetailed into the PPP process.

- **Bid costs:** The costs of due diligences by private parties may be significant. Where possible, and where bidders agree, survey costs may be shared between pre-qualified bidders. It may be noted here that the Department /ULB costs to provide survey information to bidder could be capitalised into the project cost at a later stage.

1.39.2 Prepare RFQ and pre-qualify bidders

During the RFQ stage, the intention is that only those bidders who are technically and financially qualified and those possessing requisite skill sets for implementation of the project submit bids for the project and continue into the remaining stages of the PPP procurement process.

While pre-qualification should not be undertaken solely to limit the number of bidders to a pre-specified or targeted number, it is advisable to have at least three pre-qualified bidders to ensure competitive bidding and achieve value for money through the bidding process.

- **Preparation of the RFQ document:** The RFQ document would need to clearly communicate to the private bidders, the requisite delivery specifications on the project. All the necessary information regarding the project should be provided to the bidders. The document should also clearly lay down the RFQ evaluation criteria and any specific requirements of the institution.

- **Advertise and distribute the RFQ document:** Once the RFQ document has been finalised, the same would have to be distributed. The ULB/state agency would be required to advertise the RFQ in the form of a public advertisement in at least one newspaper of national circulation and at least one newspaper of regional circulation. Additionally, any other medium of communication such as an official portal of the ULB/state agency could be used for advertising.

- **Receive queries and give clarifications:** Generally, the bidders would have some clarifications and other pre-bid queries on the information provided. Once these queries are received by the ULB/state agency, it is mandatory that they respond to the clarifications sought. Typically, the ULB/state agency is required to respond to all clarifications sought two weeks prior to the date of the final bid. If required, the institution could also consider organising a pre-bid conference wherein the issues raised by the bidders could be collated and addressed. However, this activity should be in addition to written communication to the bidders as mentioned above.

- **Evaluation of responses:** The responses received to the RFQ document should be evaluated based on the evaluation criteria specified in the RFQ document. The evaluation criteria should consider the technical and financial capability of the private party, their understanding of the project and their skill sets to deliver the committed outputs within the required timeframes.

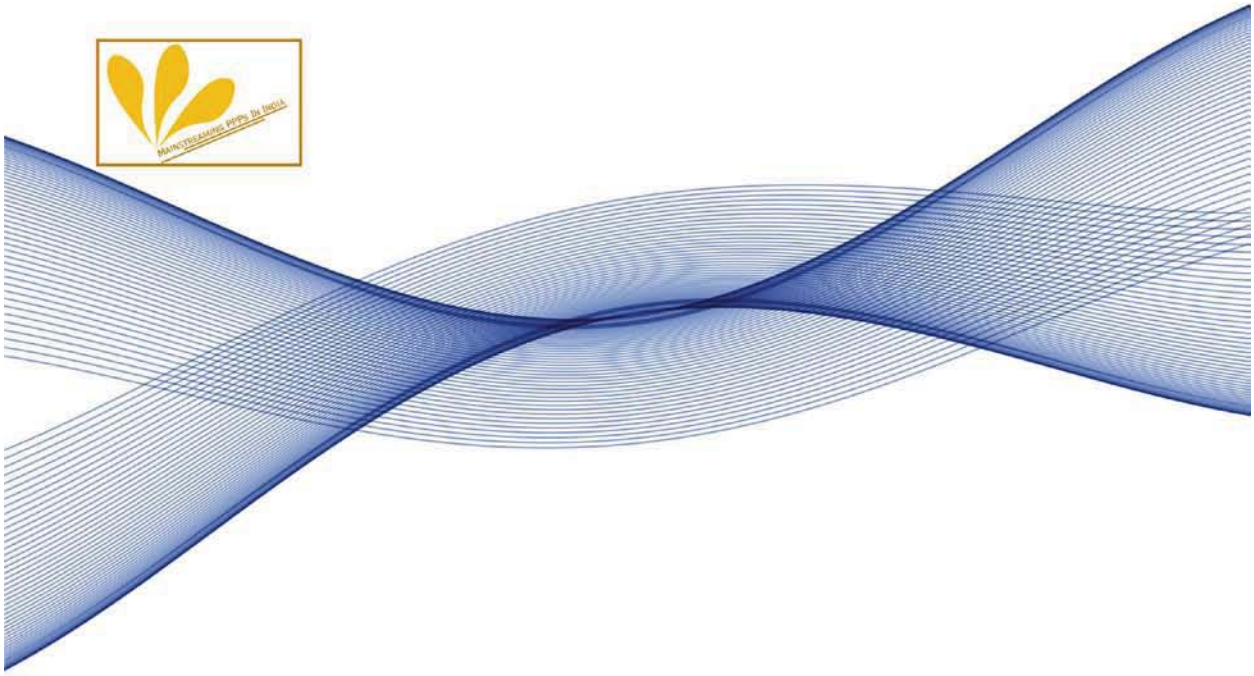
- **Publish list of pre-qualified bidders:** Firms meeting the pre-qualification criteria and approval by the appropriate tender board shall be so notified by the institution and invited to tender. The notification shall indicate the terms and conditions under which tender documents shall be obtained as well as the date, hour and place for latest delivery of tenders by the tenderer, and of the tender opening.

Applicants who are not successful in the pre-qualification shall be accordingly informed by the institution within one week after receipt of all the required approvals to the pre-qualification. Only bidders that have been pre-qualified are entitled to participate further in the procurement proceedings.

1.39.3 Preparation of RFP

In the RFP stage, a preferred bidder is selected based on an objective, comprehensive and transparent selection process. The RFP document (including the draft PPP Agreement) is the formal bid document issued by the institution. Its issue to short-listed parties signals a commitment to deliver the project, subject to the defined hurdles being cleared. The RFP document should also be structured in such a manner that it clearly lays down the informational requirements of the bidders. The form and manner of submission of information should be clear and concise to assist the Evaluation Committee in selecting the appropriate bidder. The following aspects should be necessarily present in the RFP document:

- Disclaimer
- Outline of the contents of the RFP
- Purpose of issuing the RFP
- Terms and conditions of issuance of RFP and bid formalities
- General Information to Bidders
- Minimum Essential Requirements
- Service requirements
- Standard specification
- Payment mechanism and penalties
- Legal requirement and draft PPP agreement
- Commitments required from bidders
- Evaluation process



Water Supply

Volume 2: Details of PPP structures

November 2009

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LIST OF ABBREVIATIONS

BOT	: Build Operate Transfer
CMWSSB	: Chennai Metro Water Supply and Sewerage Board
DBOOT	: Design Build Own Operate Transfer
GoI	: Government of India
GoM	: Government of Maharashtra
KL	: Kilo Litre
KMDA	: Kolkata Metropolitan Development Authority
KUIDFC	: Karnataka Urban Infrastructure Development and Finance Corporation
LPCD	: Litres Per Capita per Day
MBC	: Metering Billing and Collection
MJP	: Maharashtra Jeevan Pradhikarna
MLD	: Million Litres per Day
NITA	: Nabadiganta Industrial Township Authority
NRW	: Non Revenue Water
O&M	: Operation and Maintenance
PPP	: Public Private Partnership
STP	: Sewage Treatment Plant
WTP	: Water Treatment Plant

BACKGROUND

This section of the report provides key information relating to the five PPP structures that have been studied and reviewed in great detail. The overall structure of each PPP, the obligations of the involved parties, the nature and type of risk allocations[8] between the public and private entity and other key features have been presented. The five PPP structures are:

- Performance management contract for operation and maintenance of water supply services
- Concession agreement for water supply and sewerage services
- Concession agreement for construction, operation and maintenance of bulk water supply system
- Concession agreement for construction, operation and maintenance of the distribution system
- Concession agreement for development of the bulk water supply system and operation and maintenance of the entire system

[8] The risk allocation as mentioned in this volume is to provide a perspective to the user of the toolkit. The details of the risk allocation are in Volume 4 of the toolkit.

PERFORMANCE MANAGEMENT CONTRACT FOR OPERATION AND MAINTENANCE OF WATER SUPPLY SYSTEM

Under this arrangement, the private developer is required to undertake the operation and maintenance of the entire water supply system from source to the consumer end including metering, billing and collection of revenues. The primary purpose of the contract is to bring in operational efficiencies in the entire water management system, and thereby reduction in associated operation and maintenance cost.

1.40 About the PPP structure

As per this contract, the private developer would be required to take over the operations and management of the existing assets of the water supply scheme, comprising off take wells, with all pumping stations, electrical installations, water treatment plants (WTPs), water storage reservoirs, transmission pipelines and distribution system till consumer end. The operation and management of the water supply services would match with the performance standards specified by the Urban Local Body (ULB) in the agreement with the private developer. The performance standards has primarily two components i.e. coverage and quality. Coverage standards will include the number of households connected to direct connections. Quality standards will include availability of service, pressure, water quality, effluent treatment and customer service. The standards would include specifications on the number of meters to be installed within a specific time period, the operational efficiency levels to be maintained, etc.

Under this PPP structure, the private developer is given the rights to levy the user charges set by the ULB, collect the charges and retain the revenue for the period of the contract.The responsibility of the private developer also includes the purchase of bulk water from the Water Irrigations or Resource Department, transmission to the WTP and the supply of treated water to the end consumers. In addition to provision of water to the existing consumers, the private developer would also be required to provide these services to all new connections, install bulk meters at all source and consumer points, generate bills and collect user charges from the consumers. The periodic repair and related maintenance of these assets would have to be undertaken by the private developer.

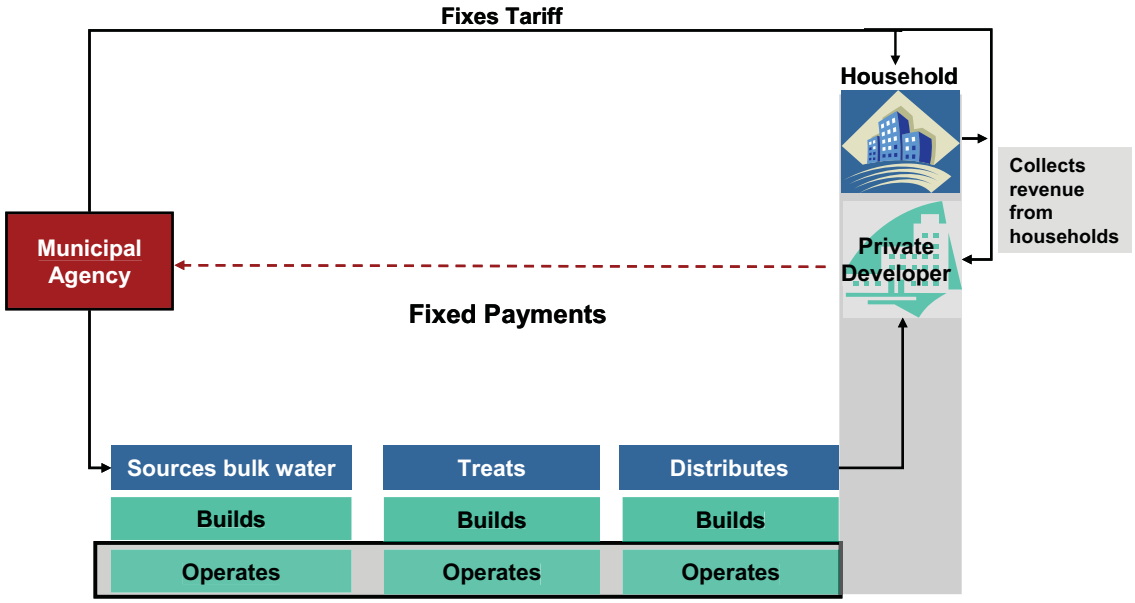
All the operational expenses would have to be borne by the private developer including payment to the Water Resources or Irrigation Department for purchase of raw bulk water, payment to the State Electricity Board (SEB) for units consumed, etc. Since the private developer is given the right to take over the entire water supply services and operate and manage the same for a fixed time period, in return, a license fee is required to be paid by the private developer to the ULB. This fee may be paid up at mutually agreed intervals (monthly, bi-monthly, annual etc.). The composition of revenue accruing to the private developer includes water charges collected from users, fees from new connections, penalty

charges, and if the case may be, then from the sale of surplus water. The highest fixed fee quoted by the private developer to be paid to the ULB would be the key financial bid criteria.

The performance standards generally

Typically the tenure of such a contract ranges between three to five years and is dependant on the financial feasibility of the proposed project. Figure 13 presents a holistic view of the entire transaction under a performance management contract for operation and maintenance.

Figure 13 : Performance management contract for operation and maintenance of water supply services



The key role and responsibility of the stakeholders is given in the table below.

Table 12: Key roles and responsibilities of the private developer and the ULB

PARTICULARS	PRIVATE DEVELOPER	URBAN LOCAL BODY
Primary Task	Operate and manage the water supply system from source to consumer end	Set performance standards
	Provide new water service connections	Handover of water assets to the private developer to operate and manage
	Install bulk and consumer meters, generate bills, collect revenues	Coordinate and oversee works of the private developer
Tariff	Levy tariff, generate bills as per tariff, collect and retain revenue	Sets the tariff, determines the revision rate and period
Operating Expense	Install meters	Oversee the O&M expenses
	Bear expense on repairs to assets	
	Pay for raw water purchase and electricity consumption	
	Labour charges, chemical charges	

PARTICULARS	PRIVATE DEVELOPER	URBAN LOCAL BODY
	Any other O&M expense	
Capital Expense	No capital expense borne	All capital augmentation works to be undertaken – source, WTP, network augmentation, etc
Asset Ownership	Transfers assets and operational rights to the ULB at the end of the contract	Retains ownership to all water assets including the meters installed

A detailed list of the obligations and responsibilities of the stakeholders is presented in Volume IV of this report.

Before such a contract comes into effect, both the private developer and the ULB need to undertake certain preparatory activities. In order to set reasonable performance targets for the private developer, the ULB would need to:

- Carry out consumer surveys, water and energy audits to accurately ascertain the existing status of the water assets and supply services.
- Facilitate the takeover of assets by the private developer for the period of the contract by entering into necessary agreements/negotiations of water purchase with the Irrigation Department and electricity purchase with the State Electricity Board.
- Provide the rights and permits to the private developer to be able to take over the assets and discharge the tasks as required.
- Provide land lease rights to the private developer for operating the water supply systems, etc.
- All details on the current connections, network maps, the applicable acts, and bye-laws, water demand projections, water quality levels, etc. need to be made available by the ULB to the private developer.

The key risks which need to be borne by the private developer and the ULB are as stated below.

Table 13: Key risks and roles and responsibilities of the private developer and the ULB

Sl. No	RISKS	PRIVATE DEVELOPER	ULB	COMMENT
1	Commencement Risk		✓	The ULB will be responsible to transfer the existing assets to the private developer.
2	Operations Risk	✓		The operations and maintenance of the entire water supply system shall be done by the private entity. All costs for the same shall be incurred by such private entity.
3	Financial Risk	✓		All costs for the operation and maintenance of the entire water supply system and meeting the performance benchmarks shall be met by the private entity. The

Sl. No	RISKS	PRIVATE DEVELOPER	ULB	COMMENT
				finances for such operations shall have to be arranged by the private entity.
4	Payment Risk	✓		The risk of collecting revenues from the citizens may also reside with the private entity. This shall be project specific and decided by the ULB.
5	Performance Risk	✓		The risk that the water supply system performs such that the performance criteria are met shall reside with the private entity.
6	Change in law Risk	✓	✓	Any additional cost incurred by any party due to change in law shall have to be borne by the respective party.
7	Force Majeure Risk	✓	✓	Any additional cost incurred by any party due to force majeure shall have to be borne by the respective party.

1.41 Applicability of the PPP structure

The PPP structure discussed here is applicable under the scenarios/conditions where:

1. The current operational efficiencies of the water supply system are poor, viz., the system has Non-Revenue Water (NRW) losses (above 25-30%) due to a high number of illegal connections, has poor collection efficiencies, low per unit cost recoveries, lack of metering etc.

2. The ULB has undertaken major capital improvement works before handing over the system to the private developer for improvisation of operational efficiencies and no significant capital expense needs to be made by the private developer.

CONCESSION AGREEMENT FOR WATER SUPPLY AND SEWERAGE SERVICES

A concession agreement for water supply and or sewerage servicing is a type of Built Operate Transfer (BOT) of PPP structure

1.42 About the PPP structure

As per this concession agreement, the private developer would be required to design, finance, construct, operate and manage the water supply and sewerage services for the concession period.[9] Under this PPP structure, the private developer would undertake the construction of infrastructure for water supply and sewage services, and operate and manage both the systems during the concession period. The capital investment required for undertaking the augmentation works would be met wholly or partly by the private developer. The private developer would be required to undertake construction/augmentation works for all or few of the following works for the water supply and sewerage sector and undertake O&M of the same:

- Water supply transmission pipelines (raw & /pure water)
- Water Treatment Plant
- Underground/ Elevated Storage Reservoirs
- Laying of distribution network pipelines
- Sewerage Treatment Plant
- Drainage pipelines

Post construction of the systems, the operation and maintenance of both the water supply and sewerage system would have to be managed by the private developer, including the generation of bills and collection of user charges from the consumers. Additionally, all operational expenses for managing the water supply/sewerage services such as electricity charges, bulk water charges, establishment expenses, and repair and maintenance, would have to be borne by the private developer.

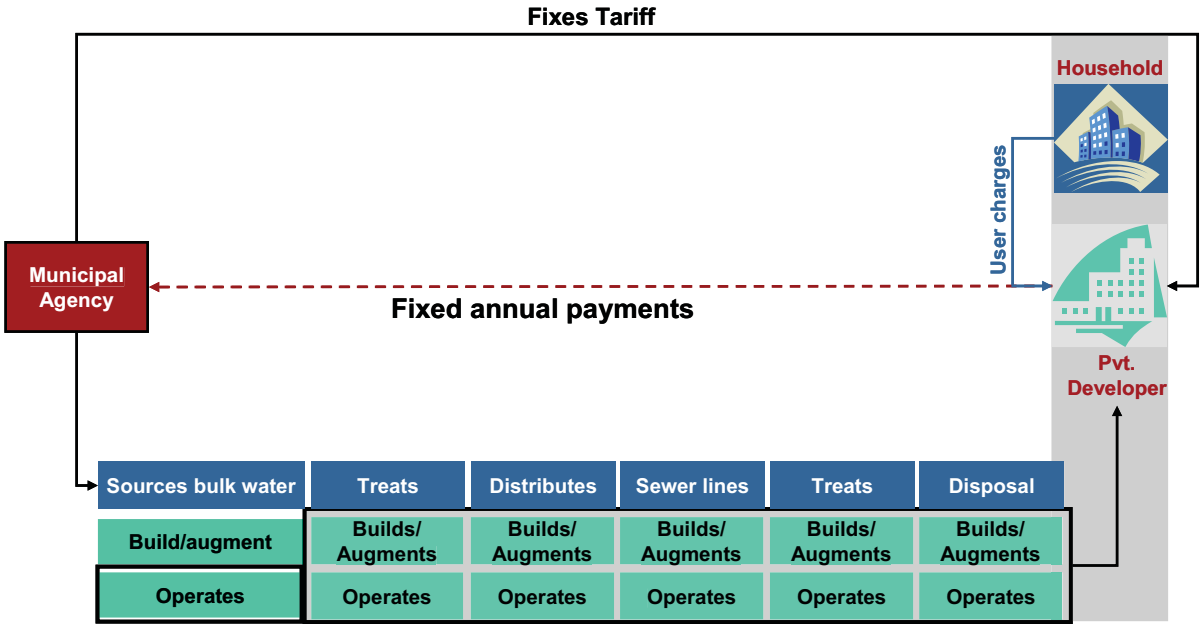
As per the concession agreement, the ULB would specify the augmentation works and design specifications for the construction activity to be undertaken, the time schedule for completion of works, and would provide information relating to the existing level of water supply and or sewage operations.

[9] This may also include the takeover, operation and maintainance of the existing water assets. However, this shall be project specific and a decision of the ULB.

The private developer would be required to purchase bulk water, treat the raw water and supply treated water to all the specified connections. In addition, if the sewerage infrastructure is also to be managed by the private developer, the sewage from all connections would have to be carried to the STP and treated waste water disposed off. The private developer would recover the investments made by way of collection and retaining of user charges from the consumers. Any change to the tariff, the rate of escalations etc would be determined by the ULB. Typically the tenure of such a contract ranges between fifteen to thirty years and is dependant on the financial feasibility of the proposed project.

Figure 14 presents a holistic view of the entire transaction under a concession agreement for water supply.

Figure 14 : Structure of concession agreement for water supply and sewerage services



The key roles and responsibilities of the stakeholders are given in the following table:

Table 14: Key roles and responsibilities of the private developer and the ULB

PARTICULARS	PRIVATE DEVELOPER	URBAN LOCAL BODY
Primary Task	Design, plan, construct water distribution and sewage infrastructure	Provide permits, rights of operation
	Operate and manage the water supply and sewage infrastructure	Facilitate negotiations for bulk water and electricity purchase
	Levy user charge, generate bills, collect and retain revenues	Oversee construction, and operation and maintenance activity
Tariff	Levy tariff set by the ULB	Determine the tariff level, schedule for changes, escalation factor etc
Operating Expense	Pay for raw water purchase and electricity consumption	Oversee the O&M expenses
	Bear expense on repairs to assets	

PARTICULARS	PRIVATE DEVELOPER	URBAN LOCAL BODY
	Install meters	
	Labour charges, chemical charges	
	Any other O&M expense	
Capital Expense	Bear capital expenditure for works identified, escalation in costs of raw material inputs	
Asset Ownership	Retains ownership during concession period and handover at the end of contract term	Take over assets at the end of the concession period

A detailed list of obligations, responsibilities of the stakeholders is presented in Volume IV of this report.

For such an agreement to come into effect, the private developer and the ULB need to undertake preparatory activities. In order to set reasonable performance targets for the private developer, the ULB would need to:

- Carry out consumer surveys, water and energy audits to accurately ascertain the existing status of the water assets and sewage assets and services supply services.
- Provide the design specifications for the assets to be augmented/constructed, procurement process, raw material utilisation etc
- Provide land lease rights to the private developer to undertake construction activity. The terms of lease would have to be clearly stated as a part of the concession agreement.
- Facilitate the take over of assets by the private developer for the period of the contract by entering into necessary agreements/negotiations of water purchase with the Irrigation department and electricity purchase with the State Electricity Board.
- Provide the rights and permits to the private developer to be able to take over the assets and discharge the tasks as required
- All details on the current connections, network maps, the applicable Acts and Bye laws, water demand projections, water quality levels etc need to be made available by the ULB to the private developer

The composition of revenue accruing to the private developer includes water charges collected from users, fees from new connections, penalty charges, and if case may be then from sale of surplus water.

The key risks which need to be borne by the private developer and the ULB are as stated in the following table:

Table 15: Key risks and roles and responsibilities of the private developer and the ULB

Sl. No	RISKS	PRIVATE DEVELOPER	ULB	COMMENT
1	Commencement risk		✓	The ULB will be responsible to transfer the existing assets to the private developer.
2	Construction risk	✓		The construction and operations and maintenance of the water supply and sewerage assets shall be done by the

Sl. No	RISKS	PRIVATE DEVELOPER	ULB	COMMENT
				private entity. All costs for the same shall be incurred by such private entity.
3	Design risk	✓	✓	The design risk shall be shared by the ULB and the private entity. The specifications of the assets shall be mentioned by the ULB in the RFP document. The design shall be proposed by the Developer in line with such specifications.
4	Operations Risk	✓		The operations and maintenance of the entire water supply and sewerage system shall be done by the private entity. All costs for the same shall be incurred by such private entity.
5	Financial Risk	✓		All costs for the operation and maintenance of the entire water supply system and meeting the performance benchmarks shall be met by the private entity. The finances for such operations shall have to be arranged by the private entity.
6	Payment Risk	✓		The risk of collecting revenues from the citizens may also reside with the private entity. This shall be project specific and decided by the ULB. In addition to this, all payments to contractors, suppliers, etc. shall have to be borne by the private entity.
7	Performance Risk	✓		The risk that the water supply system performs such that the performance criteria are met shall reside with the private entity.
8	Change in law Risk	✓	✓	Any additional cost incurred by any party due to change in law shall have to be borne by the respective party.
9	Force Majeure Risk	✓	✓	Any additional cost incurred by any party due to force majeure shall have to be borne by the respective party.

1.43 Applicability of the PPP structure

The PPP structure discussed here is applicable under the following scenarios/conditions.

1. The PPP structure is suitable for green field projects requiring large capital investments for infrastructure creation. This is ideal in a scenario where no infrastructure facility is available and where a large number of rehabilitation and replacement of the existing infrastructure services would have to be carried out.

2. The ULB does not have the financial capacity to undertake the required capital investments and has poor operational efficiencies.

3. The per unit operation cost of the utility would be higher without PPP and the costs could be reduced.

CONCESSION AGREEMENT FOR CONSTRUCTION, OPERATION AND MAINTENANCE OF BULK WATER SUPPLY SYSTEM

The concession agreement for the construction, operation and maintenance of the bulk water supply system is a typical PPP structure under the Design Build Own Operate and Transfer (DBOOT) model.

1.44 About the PPP structure

According to this concession agreement, the private developer is required to undertake the design, construction, finance, operation and management of water supply services from raw water source to the distribution point. The augmentation activity includes construction of the raw water off-take machinery; installation of electrical sub-stations and raw water transmission lines; and the construction of WTPs, pure water transmission lines up to the point of the storage reservoir, and storage tanks. The capital investment required for the augmentation works needs to be borne by the private developer. The private developer is therefore required to construct the bulk supply infrastructure so as to provide treated water up to the point of the storage reservoir. From the point of the storage reservoir to the distribution network up till the consumer end, the water supply responsibility rests with the ULB.

The operation and management of these assets during the concession period rests with the private developer. Therefore, all the associated operating expenses including the purchase of bulk water, payment of electricity charges, chemicals for raw water treatment, and establishment expenses including labour charges are the responsibility of the private developer.

The ULB on its part would specify the quantity of treated water which would have to be made available by the private developer at all times. For the treated water produced, the private developer is paid a water charge by the ULB. The unique feature of this contract is that for all the activities required to be undertaken by the private entity, it is assured of a minimum fixed payment by the utility. This arrangement is also referred to as a “take or pay” system.

15 presents a holistic view of the entire transaction under a bulk supply-cum- O&M contract.

15 : Concession agreement for construction, operation and maintenance of bulk water supply system

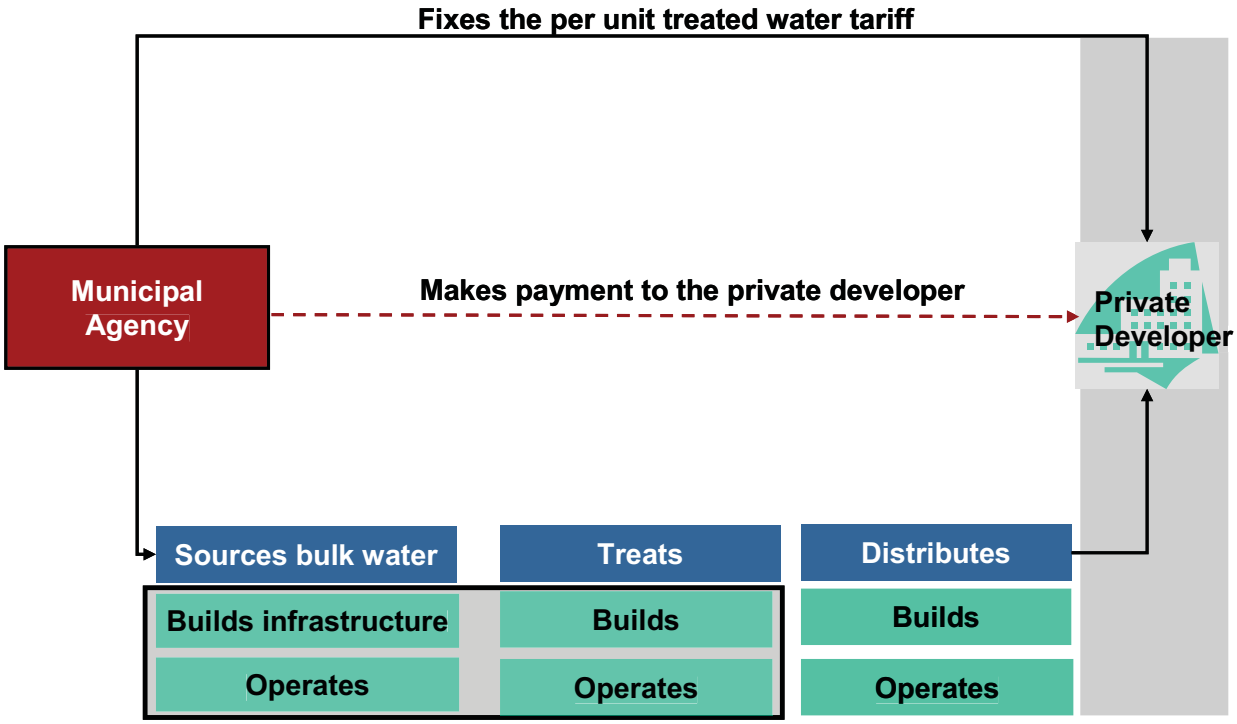


Table 16:

Key roles and responsibilities of the private developer and the ULB

PARTICULARS	PRIVATE DEVELOPER	URBAN LOCAL BODY
Primary Task	Provide treated water supply	Set treated water level requirements, specify water quality levels
	Design, plan, construct raw water off take infrastructure, raw water transmission pipelines, WTP	Define the technical specifications for the infrastructure to be created
	Operate and manage the water supply infrastructure including WTP	Provide permits, rights of operation
		Oversee construction, and operation and maintenance activity
Tariff		Sets the tariff for treated water supplied
Operating Expense	Pay for raw water purchase and electricity consumption	Oversee the O&M expenses
	Bear expense on repairs to assets	Facilitate negotiations for bulk water and electricity purchase
	Labour charges, chemical charges	
	Any other O&M expense	
Capital Expense	Bear capital expenditure for works identified, escalation in costs of raw material inputs	

PARTICULARS	PRIVATE DEVELOPER	URBAN LOCAL BODY
Asset Ownership	Retains ownership during concession period and handover at the end of contract term	Take over assets at the end of the concession period

A detailed list of obligations and responsibilities of the stakeholders is presented in Volume IV of this report.

The preparatory activities which the ULB and the private developer need to undertake largely pertain to the estimation of the quantum of treated bulk water which needs to be made available. Therefore, accurate water demand projections need to be made. The private developer would need to conduct the necessary tests to ascertain the raw water quality standards and determine the appropriate water treatment technology. The ULB in such an agreement would need to:

- Provide land lease rights to the private developer to undertake construction activity. The terms of lease would have to be clearly stated as a part of the concession agreement.
- Detail out design specifications, procurement process, raw material utilisation, etc.
- Facilitate the takeover of assets by the private developer for the period of the contract by entering into necessary agreements/negotiations of water purchase with the Irrigation Department and electricity purchase with the State Electricity Board. Also, all the rights and permits given to the private developer need to be stated clearly.

The key risks which need to be borne by the private developer and the ULB are as stated below.

Table 17: Key risks and roles and responsibilities of the private developer and the ULB

Sl. No	RISKS	PRIVATE DEVELOPER	ULB	COMMENT
1	Commencement risk		✓	The ULB will be responsible to transfer the existing assets to the private developer.
2	Construction risk	✓		The construction and operations and maintenance of the water supply and sewerage assets shall be done by the private entity. All costs for the same shall be incurred by such private entity.
3	Design risk	✓	✓	The design risk shall be shared by the ULB and the private entity. The specifications of the assets shall be mentioned by the ULB in the RFP document. The design shall be proposed by the Developer in line with such specifications.
4	Operations Risk	✓	✓	The operations and maintenance of the entire water supply system shall be done by the private entity. All costs for the same shall be incurred by such private entity.

Sl. No	RISKS	PRIVATE DEVELOPER	ULB	COMMENT
5	Financial Risk	✓		All costs for the construction, operation and maintenance of the bulk water supply system shall be met by the private entity. The finances for such construction and operations shall have to be arranged by the private entity.
6	Payment Risk	✓		The risk of collecting revenues from the citizens may also reside with the private entity. This shall be project specific and decided by the ULB. In addition to this, all payments to contractors, suppliers, etc. shall have to be borne by the private entity.
7	Performance Risk	✓		The risk that the water supply system performs such that the performance criteria are met shall reside with the private entity. Any additional cost incurred by any party due to change in law shall have to be borne by the respective party.
8	Change in law Risk	✓	✓	Any additional cost incurred by any party due to change in law shall have to be borne by the respective party.
9	Force Majeure Risk	✓	✓	Any additional cost incurred by any party due to force majeure shall have to be borne by the respective party.

1.45 Applicability of the PPP structure

The PPP structure discussed here is applicable under the following scenarios/conditions.

1. The existing bulk supply system is inadequate and needs augmentation and rehabilitation.
2. The extent of raw water transmission and treatment losses are high requiring infrastructure replacement and improved operations and management.
3. The ULB does not have the financial capacity to undertake the required capital investments.

CONCESSION AGREEMENT FOR CONSTRUCTION, OPERATION AND MANAGEMENT OF THE DISTRIBUTION SYSTEM

The concession agreement for the construction, operation and management of the water s is a PPP structure along the lines of a Built Operate Transfer (BOT) module.

1.46 About the PPP structure

As per this form of concession agreement, the design and finance of the identified augmentation works would be undertaken through a 100% capital grant from the government. As per the contract, the private developer is required to first undertake the construction/rehabilitation works for the identified section of the water system, and further to the construction activity, undertake the operation and maintenance of the entire water supply system. The private developer would get full capital reimbursement from the ULB or any other government agency for the rehabilitation works undertaken.

Once the construction activity is complete, the private developer alone is responsible for the operation and maintenance of the entire water supply system, including the supply of treated water to all the connections, installation of meters, generation of bills, and collection of revenues. The private developer is therefore responsible for:

- Creation of identified assets in the water supply system and operate and maintain the entire system
- Monitoring of pressurised and continuous supply of water
- Leakage reduction
- 100% metering for consumer connections
- Management of water quality at various distribution points
- Development of a system for billing and monitoring of the same

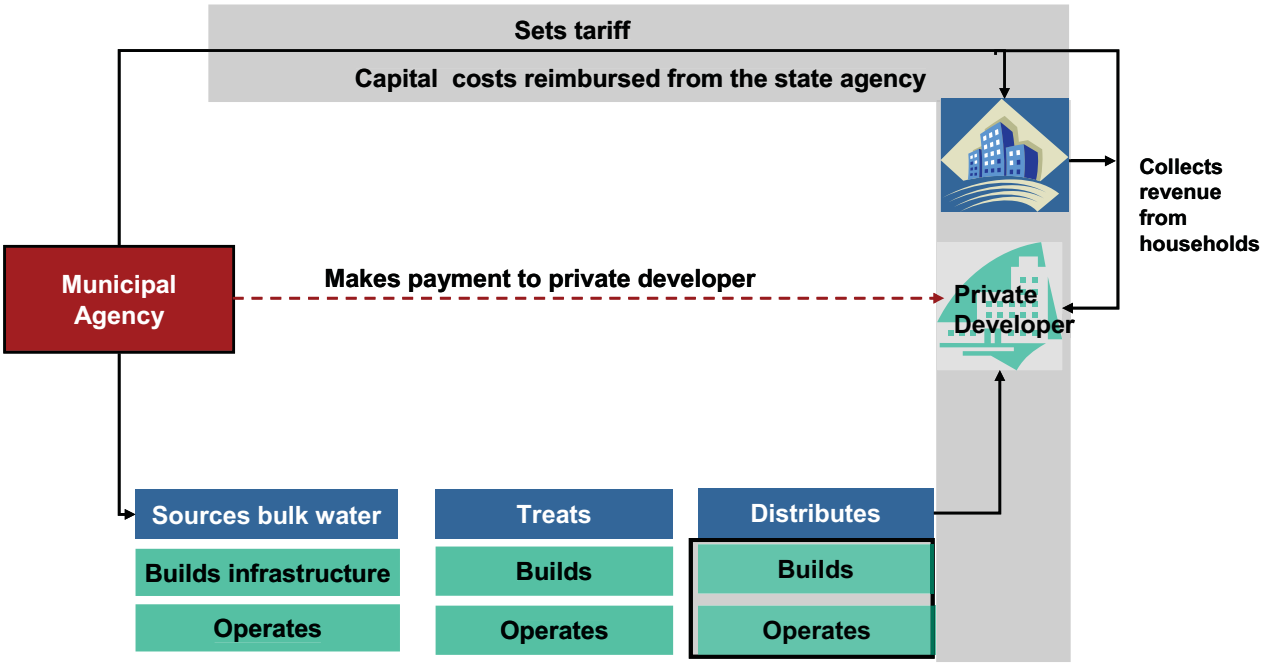
In such a contract therefore, depending upon the financial feasibility of the project, the responsibility of the purchase of raw water and its supply to the WTP would rest upon either the private developer or the ULB. However, any major expansion activity which may be required to the existing infrastructure would have to be borne by the ULB.

The purpose of involving a private developer at the distribution end is to bring in operational efficiencies which the existing system lacks. Such a contract can be implemented for a single ULB or for a cluster of ULBs, which may have a common raw water source and face similar issues of operational inefficiencies at the distribution end. Since it's a cluster, a nodal agency would be involved in overseeing the water supply services to the cluster.

A set of performance targets would be set by the state nodal agency or by the ULBs in the cluster for the operation and maintenance activity. For the O&M activity undertaken by the private developer, an operator fee is paid by the ULBs or the state nodal agency for the period of the contract based on the achievement of performance standards.

Figure 16 presents a holistic view of the entire transaction under the augmentation-cum-distribution network expansion contract.

Figure 16 : Concession agreement for construction, operation and maintenance of the distribution system



The key roles and responsibilities are listed below.

Table 18: Roles and responsibilities of the different institutions

PARTICULARS	PRIVATE DEVELOPER	STATE/NODAL AGENCY	URBAN LOCAL BODY
Primary Task	Design, plan, construct distribution pipelines	Set performance standards	Supply of treated bulk water for distribution
	Operate and maintain the distribution network		Operate and manage the water supply system till the distribution point
	Provide new water supply connections		Define the technical specifications for the distribution network rehabilitation works
	Install meters, generate bills, collect revenues		Oversee the O&M works of the distribution network
			Handover of distribution system for

PARTICULARS	PRIVATE DEVELOPER	STATE/NODAL AGENCY	URBAN LOCAL BODY
Tariff	Collect revenues as per tariff set, handover the collections to ULB		Set tariff to be set, escalation factor
Operating Expense	Pay for electricity consumption for distribution of treated water		Operating expenses till distribution point including bulk water purchase, operation of WTP, transmission etc
	Bear expenses on installation of meters, operation and maintenance of meters		
	Bear escalations on input costs for rehabilitation works beyond permissible levels		
	Bear expense on repairs to assets		Oversee the O&M expenses
	Labour charges, chemical charges		Facilitate negotiations for bulk water and electricity purchase
	Any other O&M expense		
Capital Expense	Undertake initial capital expense for rehabilitation works and be reimbursed	Capital expenditure reimbursement to private developer	
Asset Ownership	Only given right to operate and maintain the assets. Returns asset at the end of the contract period.		Take over assets at the end of the concession period

Under such a PPP agreement, the state agency and the ULB need to determine if the private developer's services need to be extended to the entire city or to be focussed initially on a few demonstration zones, and then extended to the remaining zones based on performance results. A performance-based timeline can be set to analyse the outcome of the contract for the demonstration zones.

Before the contract is implemented, the ULB/ or the cluster of ULBs (as the case may be) needs to undertake the following steps:

- Undertake an assessment to ascertain the extent of rehabilitation works which need to be constructed by the private developer.
- Detail the design specifications, procurement process, raw material utilisation, etc.; however, all the procurement activity will have to be managed by the private developer.
- Undertake a water audit study to ascertain the extent of losses at the distribution end.

- Determine the tariff to be charged and prepare an action plan for the transition period from flat rate to volumetric tariff.
- Provide the private developer with accurate information on the points of bulk water supply, the status on existing connections and properties, number of and type of connections to be served, the number and type of meters to be installed, etc.
- Provide land lease rights to the private developer to undertake construction activity.
- Additionally, the ULB needs to facilitate the takeover of assets by the private developer for the period of the contract by entering into the necessary agreements/negotiations of electricity purchase with the State Electricity Board. The ULB will have to provide its own employees for a limited period of time to assist the private developer.

The key risks which need to be borne by the private developer and the ULB/state agency are tabled below.

Table 19: Key risk-sharing

Sl. No	RISKS	PRIVATE DEVELOPER	ULB/CLUSTER	COMMENT
1	Commissioning Risk		✓	The ULB will be responsible to transfer the existing distribution assets to the private developer, if any.
2	Construction Risk	✓		The construction and operations and maintenance of the water supply distribution assets shall be done by the private entity. All costs for the same shall be incurred by such private entity.
2	Design Risk		✓	The design risk shall be shared by the ULB and the private entity. The specifications of the assets shall be mentioned by the ULB in the RFP document. The design shall be proposed by the Developer in line with such specifications.
3	Operations Risk	✓	✓	The operations and maintenance of the distribution network shall be done by the private entity. All costs for the same shall be incurred by such private entity.
4	Financial Risk	✓		All costs for the construction and operation and maintenance of the entire distribution network shall be met by the private entity. The finances for such operations shall have to be arranged by the private entity.
5	Payment Risk	✓		All payments to contractors, suppliers, etc. shall have to be borne

Sl. No	RISKS	PRIVATE DEVELOPER	ULB/CLUSTER	COMMENT
				by the private entity.
6	Performance Risk	✓		The risk that the distribution system performs such that the performance criteria are met shall reside with the private entity.
7	Change in law Risk	✓	✓	Any additional cost incurred by any party due to change in law shall have to be borne by the respective party.
8	Force Majeure Risk	✓	✓	Any additional cost incurred by any party due to force majeure shall have to be borne by the respective party.

1.47 Applicability of the PPP structure

The PPP structure discussed here is applicable under the following scenarios/conditions.

1. A city or a cluster of cities face similar water supply-related issues of operational inefficiencies at the distribution end.
2. No augmentation or capital works need to be undertaken for raw water bulk supply and treatment by the private developer.
3. The capital costs for the rehabilitation activity are to be fully funded as a grant from the state nodal agency/ULB.

CONCESSION AGREEMENT FOR DEVELOPMENT OF THE BULK WATER SUPPLY SYSTEM AND OPERATION AND MAINTENANCE FOR ENTIRE SYSTEM

The concession agreement for the development of the bulk water supply system including the operation and maintenance of the entire water supply system is a PPP structure developed on a BOT basis.

1.47.1 About the PPP structure

As per the concession agreement, the private developer is required to undertake construction of the bulk water supply system including the raw water off-take system, and raw water transmission lines. The private developer will also be responsible for the augmentation/creation of a treatment plant, as well as operation and management of the water supply system from source to the end consumer. Therefore, as per this structure, augmentation works are to be carried out by the private developer only for the bulk supply system, whereas any expansion to the distribution system is the sole responsibility of the ULB. Therefore, any expansion or rehabilitation work for the distribution network is to be managed by the ULB before inviting the private developer to operate and manage the water supply system.

For the construction works identified, the private developer would also be required to undertake the necessary capital investments. The private developer would be required to off-take raw water, supply to the treatment plant and transmit the treated water through the existing distribution network to all the consumers. All the operating expenses including procurement of raw materials, deployment of labour, payment for electricity charges, and repair and maintenance need to be managed by the private developer. The private developer would also have to follow all safety norms for disposal of the waste generated from all the WTPs, and would not be entitled to charge extra fees for the same. All the new assets created by the ULB would also have to be managed by the private developer.

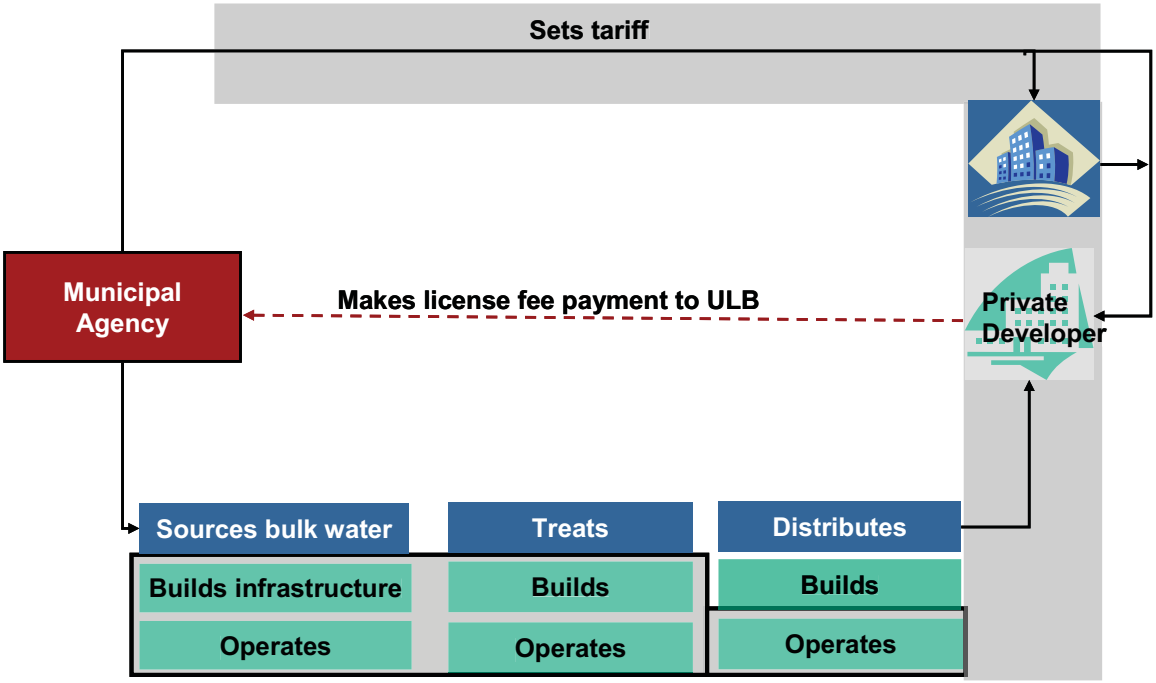
The private developer is given the right to levy and collect revenues from the consumers for the activities undertaken, and retain the same. The private developer is required to make a fixed monthly payment as license fee to the ULB for the right to operate the existing water supply assets and the entire system. The highest monthly payment quoted would be the key financial bid parameter.

Under such PPP agreements, the private developer may also be given the right to sell surplus water to consumers other than those identified by the ULB. However, only limited such surplus sale can be undertaken and a revenue share in the earnings from the surplus water is to be provided to the ULB. The typical concession period would range from ten to fifteen years.

Details of the contract structure are given in the term sheet presented in Volume 4 of this report.

Figure 17 presents a holistic view of the entire transaction under the augmentation-cum-distribution network expansion contract.

Figure 17 : Concession agreement for development of the bulk water supply system and operation and maintenance of the entire system



The key roles and responsibilities under such a PPP arrangement are listed in the table below.

Table 20: Roles and responsibilities of the different institutions

PARTICULARS	PRIVATE DEVELOPER	URBAN LOCAL BODY
Primary Task	Design, plan and construct raw water off take system, augment raw water transmission lines, and WTP system	Undertake rehabilitation, expansion works to the distribution network if any
	Operate and manage the entire water supply system from source to end consumer	Oversee the O&M works underway
	Levy, collect user charges	
Tariff	Levy and collect user charges as per set tariff	Set the tariff levels, structure, escalation factor
Operating Expense	Bear electricity consumption charges	Oversee the O&M activity undertake
	Civil works , repairs to the assets	
	Labour charges and any other O&M	
Capital Expense	To bear all the construction work capital cost	
Asset Ownership	Retains the right to operate the assets for the concession period and handover at the end of the contract period	Takes over assets at the end of the contract period.

Before the contract comes into existence, the ULB would have to undertake the following activities:

- Assess the bulk supply system to accurately ascertain the extent of rehabilitation works which need to be carried out by the private developer.
- Detail out the design and technical specifications on the infrastructure asset to be developed.
- Ascertain the water demand projections and provide the private developer with the schedule for the same. Post enforcement of the contract, any change to the volume of water required to be drawn from the source, would be subject to approvals from the ULB
- Undertake financial and commercial viability assessment for the project to determine whether the private developer would need to bear the expense of the bulk water purchase or the same may be paid up for by the ULB itself.
- Determine the tariff to be charged and prepare an action plan for transition from flat rate to volumetric (if applicable) rates and share the same with the private developer.
- Develop and maintain accurate information on the points of bulk water supply, the status of existing connections and properties, the number and type of connections to be served, the number and type of meters to be installed, etc.

The risks to be borne by the ULB and the private developer are represented below.

Table 21: Key risk-sharing

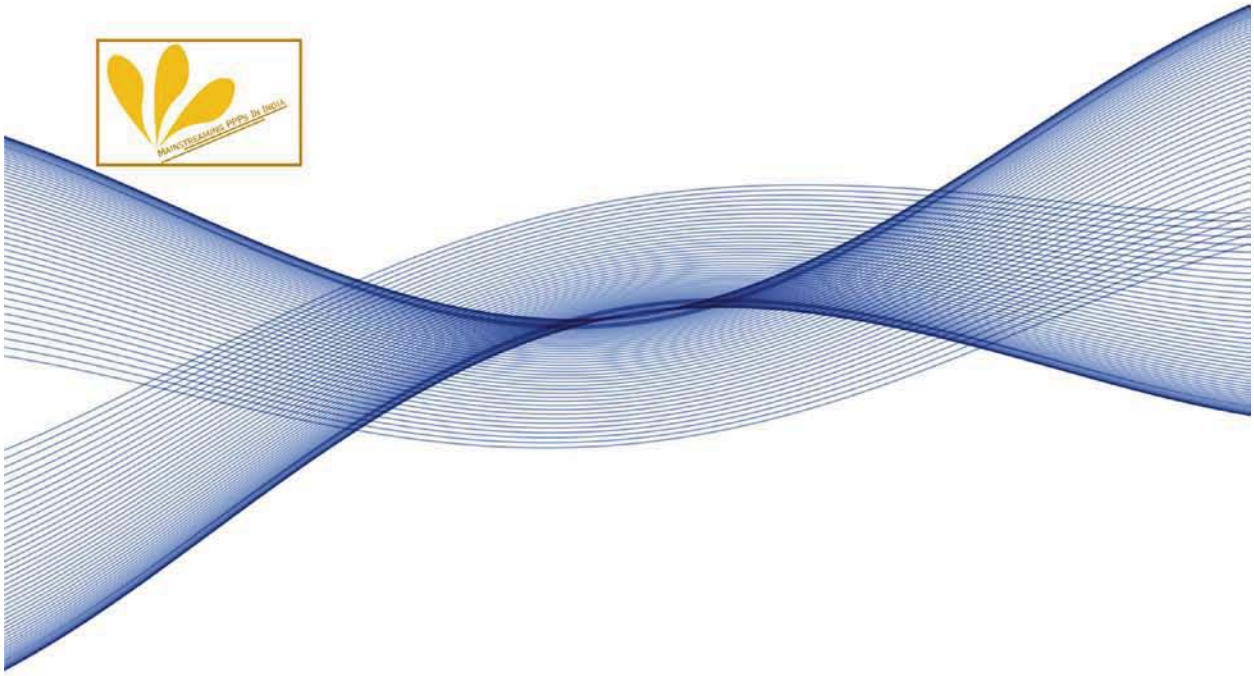
Sl. No	RISKS	PRIVATE DEVELOPER	ULB	COMMENT
1	Commissioning Risk		✓	The ULB will be responsible to transfer the existing assets to the private developer, if any.
2	Construction Risk	✓		The construction of the bulk water supply system and the operations and maintenance of the water supply system shall be done by the private entity. All costs for the same shall be incurred by such private entity.
3	Design Risk	✓		The design risk shall be shared by the ULB and the private entity. The specifications of the assets shall be mentioned by the ULB in the RFP document. The design shall be proposed by the Developer in line with such specifications.
4	Operations Risk	✓	✓	The operations and maintenance of the entire water supply system as per the pre-specified performance benchmarks shall be done by the private entity. All costs for the same shall be incurred by such private entity.
5	Financial Risk	✓		All costs for the construction of bulk

Sl. No	RISKS	PRIVATE DEVELOPER	ULB	COMMENT
				water supply system and the operation and maintenance of the entire water supply system and meeting the performance benchmarks shall be met by the private entity. The finances for such operations shall have to be arranged by the private entity.
6	Payment Risk	✓		The risk of collecting revenues from the citizens may also reside with the private entity. This shall be project specific and decided by the ULB. In addition to this, all payments to contractors, suppliers, etc. shall have to be borne by the private entity.
7	Performance Risk	✓		The risk that the water supply system performs such that the performance criteria are met shall reside with the private entity.
8	Change in law Risk	✓	✓	Any additional cost incurred by any party due to change in law shall have to be borne by the respective party.
9	Force Majeure Risk	✓	✓	Any additional cost incurred by any party due to force majeure shall have to be borne by the respective party.

1.48 Applicability of the PPP structure

The PPP structure discussed here is applicable under the two following scenarios/conditions:

1. Only augmentation and improvements to the distribution network is required
2. Existing distribution network coverage is low, distribution losses are high, O&M recoveries are low



Water Supply

Volume 3: Case Studies of PPP in Maharashtra

November 2009

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LIST OF ABBREVIATIONS

ADB	: Asian Development Bank
AMC	: Akot Municipal Council
BOT	: Build Operate Transfer
CDP	: City Development Plan
CMC	: Chiplun Municipal Council
CMWSSB	: Chennai Metro Water Supply and Sewerage Board
DBOOT	: Design Build Own Operate Transfer
DCB	: Demand Collection and Balance
DPR	: Detailed Project Report
GOI	: Government of India
GOM	: Government of Maharashtra
JMC	: Jalna Municipal Council
JNNURM	: Jawaharlal Nehru National Urban Renewal Mission
KBMC	: Kulgaon-Badlapur Municipal Council
KL	: Kilo Litre
KMC	: Kolhapur Municipal Corporation
KMDA	: Kolkata Metropolitan Development Authority
KUIDFC	: Karnataka Urban Infrastructure Development and Finance Corporation
LPCD	: Litres Per Capita per Day
MBC	: Metering Billing and Collection
MJP	: Maharashtra Jeevan Pradhikarna
MLD	: Million Litres per Day
MMRDA	: Mumbai- Metropolitan Regional Development Authority
NITA	: Nabadiganta Industrial Township Authority

NMMC	: Navi Mumbai Municipal Corporation
NRW	: Non Revenue Water
O&M	: Operation and Maintenance
PPP	: Public Private Partnership
SKMMC	: Sangli-Miraj-Kupwad Municipal Corporation
STP	: Sewage Treatment Plant
SWMC	: Shirpur Warvde Municipal Council
TA	: Technical Assistance
UDD	: Urban Development Department
UIDSSMT	: Urban Infrastructure Development Scheme for Small and Medium Towns
VGF	: Viability Gap Funding
WSSD	: Water Supply and Sanitation Department
WTP	: Water Treatment Plant

INTRODUCTION

The overall process of identification of the Public Private Partnership (PPP) structure and the process of implementation of the same had been described in the toolkit presented in Volume I of this report. A preliminary assessment of the sample cities was undertaken on the basis of this toolkit.

As per the steps described therein, for determining the PPP structure suitable for the water supply system and sewerage services in the city, the ***first step*** undertaken has been that of ***identification of the problem areas*** in the existing system of water supply services of the city. A set of performance assessment parameters have been compiled and the same used for determining the status of the services. The output from this process has been compared with the water supply improvement projects which have already been identified by the city and for which Detailed Project Reports (DPRs) had also been available to verify if the current issues in the system have been adequately addressed in the proposed project.

As a ***second step*** to the entire process, ***a choice between public mode of funding and PPP*** based mode of project development has been assessed for the projects already identified in the city for the water supply services. A preliminary viability assessment based on financials for the projects identified has also been carried out. Based on the output of the preliminary assessment an appropriate choice of option between public and private mode of developing the project has been made.

As per ***step three*** of the entire process of PPP determination and its implementation, ***a choice of the suitable PPP structure*** for the water supply and sewerage services has been recommended. For the structure so identified, the risks have been listed and allocated between the parties.

As a ***final step*** to the entire process of identification and ***implementation of the PPP structure***, the key bidding parameter with reference to the specific PPP option has also been indicated.

In the following section, the broad assessment of the water supply services for the select sample cities followed by the preliminary financial analysis and the recommendation for the suitable PPP option has been presented. The assessment and the analysis has been presented in a such a manner that the user of this tool kit gets a broad idea of the process and the steps which are to be followed in identification and finalisation of a suitable PPP structure for the development of projects in the water supply and sewerage services.

SUMMARY OF CITY ANALYSIS

In this Volume of the report, viz. Volume III, the preliminary analysis of the selected sample of 12 cities of Maharshtra viz. Jalna, Sangli-Miraj-Kupwad, Kolhapur, Virar, Navghar Manikpur, Chiplun, Akot, Saoner, Shirpur , Kulgaon-Badlapur , and Ambernath has been presented. For these sample cities, as had been indicated earlier, a broad assessment of the water supply and sewerage services has been carried out. The broad assessment provides insights on the status of the water supply and sewerage services in the sample cities. Based on the assessment, a preliminary financial analysis has been undertaken to assess the viability of the projects identified in the city to improve the water supply and sewerage services for development on a PPP basis. The objective of the preliminary analysis has been to assess scope for a PPP based intervention in the provision of water supply and sewerage services in the select sample cities.

In the following sections of this report the assessment which has been undertaken to determine the status of the water supply and sewerage services has been presented, along with the preliminary financial analysis undertaken for each city. A summary of the output from the preliminary financial analysis undertaken in terms of the PPP structure recommended has been presented in the following table:

Table 22: Summary of PPP structures for sample cities

CITIES/ TOWNS	CAPITAL COST	INVESTMENT REQUIRED	TYPE OF PPP STRUCTURE	COMMENTS
Jalna	Rs. 331 crores	Rs 196 crores	▪ Performance management contract for operation and maintenance of the entire water supply services from source to consumer end	▪ A PPP option for design, finance and construction of the proposed water supply project is not feasible since it requires total VGF support of approximately 85% of the project cost. With such high funding assistance required from the government, the project cannot be packaged under a PPP module. ▪ The state government would need to assist in meeting the capital requirement of Rs. 196 crores to augment the proposed works, and then to hand over the system to a private developer for O&M activity.
Sangli-Miraj-Kupwad	Rs. 254 crores	Rs 137 crores	▪ Integrated water supply contract only for design and construction of the proposed projects	▪ If the option of an integrated concession agreement for design, finance, construction and operation and maintenance of water supply networks is handed over as a single contract to the

CITIES/ TOWNS	CAPITAL COST	INVESTMENT REQUIRED	TYPE OF PPP STRUCTURE	COMMENTS
			▪ Performance-based management contract for the entire water supply system	private developer, the total government support including grants and VGF funding assistance would be more than 65% of total project cost. Given the high grant assistance, the project would not be viable as a single PPP module. ▪ PPP for the proposed project may be bifurcated into two separate contracts: – Private developer is required to undertake design, finance, and construct in the case of the proposed project; the developer will retain revenues from users for the concession period to recover investments. – A separate performance management contract for only the operations and maintenance of the water supply system woud be made in return for annual payments by SKMC.
Kolhapur	Rs. 280.80 crores	Rs 198.9 crores	▪ Integrated concession agreement for design, finance, construction and operation and maintenance of the water supply and sewerage system	▪ The private developer would be able to design, finance, construct the required projects and earn Rs. 65 crores (NPV @ 14%) against a requirement of Rs. 134 crores by KMC due to significant operational efficiencies brought in by the private developer.
Virar	Rs. 5.2 crores	Rs. 5.2 crores	▪ Service management contract for metering, billing and collection	▪ Current water supply operations are assessed to be satisfactory ▪ No major investment required ▪ High scope of PPP in metering, billing collection activity since private operator to bring in high efficiency resulting in additional water revenue.

CITIES/ TOWNS	CAPITAL COST	INVESTMENT REQUIRED	TYPE OF PPP STRUCTURE	COMMENTS
				▪ Given the limited financial capability of the ULB, it need not undertake lump sum investment in meters but, pay an annuity to the private operator.
Navghar-Manikpur	Rs. 6 crores	Rs. 6 crores	▪ PPP not applicable	▪ Current water supply operations are assessed to be satisfactory ▪ No major investment required ▪ Limited scope for PPP in metering, billing collection activity since ULB is highly efficient in it's billing and collection activity. ▪ Limited investment needed for metering can be obtained through government grants.
Chiplun	Rs. 15 crores	Rs. 7 crores	▪ Performance management contract for O&M of water supply services	▪ The capital requirements for the ongoing project are being arranged by the council itself, and thus do not demand any PPP intervention for the proposed project. ▪ The existing tariff would require to be revised and post revision, a private operator can be brought in to only operate and manage the water supply services on an annuity basis.
Akot	Rs. 53 crores	Rs. 36 crores	▪ Performance management contract for O&M of water supply services	▪ If the option of an integrated concession agreement for developing and operating and managing the water supply services is considered, the VGF requirement is estimated to be approximately 76% of the capital cost after considering the UIDSSMT funding. This defeats the purpose of undertaking the project on a PPP basis. ▪ The ULB with support from the State Government should invest in the proposal physical infrastructure.

CITIES/ TOWNS	CAPITAL COST	INVESTMENT REQUIRED	TYPE OF PPP STRUCTURE	COMMENTS
				▪ A PPP option for operating and managing the water supply services on an annuity basis can be explored by AMC.
Saoner	Rs 7.39 crores	Rs. 73 lakhs[10]	▪ PPP not applicable	▪ Existing investment needs of SMC are being arranged internally and the project construction has commenced. In such a scenario, there is no scope for a private developer to undertake the proposed project. ▪ PPP in operations and maintenance of the water supply system has limited scope since the town size is small and the existing collection efficiency is high. Thereby, there is limited value addition which the private operator can provide to the ULB.
Shirpur	Rs. 5.2 crores	Rs. 5.2 crores	▪ PPP not applicable	▪ Current water supply operations are assessed to be satisfactory ▪ No major investment required ▪ Limited scope for PPP in metering, billing collection activity since ULB is highly efficient in it's billing and collection activity. ▪ SWMC has the financial capacity to install and maintain meters.
Kulgaon-Badlapur	Rs. 26.85 crores	Rs 2.68 crores	▪ PPP not applicable	▪ The scheme is currently managed by MJP. ▪ No need for huge capital investment currently. ▪ The existing level of services has been largely assessed to be satisfactory and the current issues are being addressed in the project proposed. ▪ KBMC has the financial ability to

[10] SMC has arranged for this investment from internal funds and debt.

CITIES/ TOWNS	CAPITAL COST	INVESTMENT REQUIRED	TYPE OF PPP STRUCTURE	COMMENTS
				undertake the proposed capital investment and would not require private participation for undertaking capital investment. ▪ Given the existing level of services, there is no scope for a PPP intervention.
Ambernath	Rs. 4.8 crores	Rs. 1.2 crores		▪ The scheme is currently managed by MJP. ▪ No need for huge capital investment currently. ▪ The existing level of services has been largely assessed to be satisfactory and the current issues are being addressed in the project proposed. ▪ Given the existing level of services, there is no scope for a PPP intervention.

As indicated earlier, the assessments and financial analysis undertaken for each of the above listed cities is represented in the following chapters.

JALNA

1.49 Brief introduction to Jalna

Jalna, the headquarters of the Jalna district, encompasses an area of 70.87 sq. km. and has a current population of 3 lakhs (2.35 lakhs as per the 2001 Census). The total number of households in the city stands at 48,000. The city is managed by the Jalna Municipal Council (JMC) with a revenue budget of Rs. 29.13 crores (2007-08) and a revenue surplus of Rs. 1.15 crores.

The city's water supply system is managed by JMC itself. JMC incurs a deficit of Rs. 3.15 crores on its water supply operations. Besides, JMC has liabilities of approximately Rs. 153 crores towards its water supply operations. Thus the city has no investment capacity to undertake new projects.

1.50 Water supply system at Jalna

Jalna draws a total water supply of 19 MLD. The city has two water sources, i.e., Ghanewadi lake (seven km from city) and Shahgad in Godavari river (60 km from city). The majority of the water (13 MLD) is sourced from the Shahgad head work scheme which has been jointly developed and operated for Jalna and Ambad by Maharashtra Jeevan Pradhikaran (MJP).

Raw water from Shahgad headworks is supplied to the Water Treatment Plant (WTP) at Ambad and thereon, treated water is transmitted through pure water transmission mains of 26 km to Jalna.

Jalna receives treated water supply of approximately 38 litres per capita per day (lpcd) at the consumption point. Water is available for one hour on alternate days and is supplied through individual connections and public stand posts. A basic profile of the water supply system of JMC has been presented in the table below.

Table 23: Basic profile of water supply services in Jalna

JALNA UTILITY PROFILE			
Key infrastructure components	Bulk supply		19 MLD
		Shahgad Head works	13 MLD
		Ghandewadi Lake	6 MLD
	Water Treatment Capacity		15 MLD
	Treated water available for consumption		38 lpcd
	Storage Capacity	9 Elevated Storage Reservoirs	10.1 MLD [Equivalent to 0.6 days of consumption]
	Distribution network		22 km
	Direct Connections		16,814 (35% of total households)

JALNA UTILITY PROFILE			
Water Supply Financials (FY-2007-08)	Water Account Revenue		Rs 1.09 crores
	Annual O&M costs		Rs 4.24 crores
Tariff	Flat Tariff	1/2 inch	Rs 806 per annum
		20 mm	Rs 1555 per annum
		1 inch	Rs 3662 per annum

Source: Jalna Municipal Council

1.51 Step 1: Identification of the problem area

As a first step to assessing the status of the water supply services in the city of Jalna, the problem areas in the existing services in the existing system needs to be carried out. Doing this would highlight the interventions required in improvement to the level of services. As the first activity which needs to be undertaken in this regard, the service assessment has been undertaken on the basis of a few key performance criteria. On the basis of the assessment, the key issues in the current system would need to be identified and the existing projects reviewed. It is to be noted here that the assessment presented here for Jalna is based only on few key parameters. For a detailed review, as has been discussed in Volume I of the toolkit, the ULB would be required to carry out consumer survey, water audit, leak detection and energy audit for the entire value chain of water supply services. The key performance parameters used have been presented below:

1.51.1 Compiling key parameters

Based on the preliminary analysis of the water supply service data[11] and discussions with JMC officials, CRISIL assessed the current water supply system in Jalna. Table 24 presents the key indicators for assessing the water supply system at Jalna and the inferences therein.

Table 24: Water supply indicators and inferences (Jalna)

PERFORMANCE AREA	NORM	JALNA	KEY INFERENCE
Bulk Water			
Supply (Per capita treated water available for consumption)	135 lpcd	38 lpcd	Jalna needs to have minimum 135 lpcd of water supply available for consumption as per the CPHEEO norms; the water available at consumption point in Jalna is 38 lpcd (14.2 MLD)[12]. If the existing

[11] In the absence of a water or energy audit report, the data provided by the Municipal representatives has been considered for all the assessments. The actual technical losses may be more or less than that stated and can be verified only if water audit is undertaken along with consumer survey.

[12] It may be noted here that per capita water consumption calculations are rough estimates based on analysis of data made available by JMC officials. In the absence of water audit report, or estimates on the number of households being supplied with direct service connections, these are at best approximate estimates.

PERFORMANCE AREA	NORM	JALNA	KEY INFERENCE
			transmission and distribution losses are reduced from the current level of 45% to an average of 20%, the water available shall increase by 3.5 MLD and raise per capita availability for consumption to 50 lpcd. Thus, improvement in operational efficiency shall help in increasing the supply to a limited extent. However, in order to solve the issue in the long term, the city needs to augment its water supply.
Raw water transmission loss	2%	10%	Extremely high raw water transmission loss. The transmission losses are extremely high owing to corroded pipelines and theft.
Treatment			
Capacity utilization of WTP	100%	100%	Within the norms
Treatment Quality		Good	No improvement needed
Treatment Loss	Less than 3%	2%	As per norms
Transmission and Distribution			
Losses	Less than 15%	35%	Approximately 15%[13] is lost in pure water transmission. In addition, 20% loss occurs during distribution.
Consumer			
Coverage (Connections/ Total Households)	100%	70%	Assuming that one connection caters to two households, the city should have ideally 24,000 connections.
Metering	100%	0%	In the absence of metering, JMC cannot realistically estimate the losses in the system and the consumption pattern. Also, in order to ensure that the tariff paid by the consumer is in line with the consumption, JMC needs to introduce a volumetric tariff system. Hence, all the water connections need to be metered.
Duration of water supply	24 hours	1 hour on alternate days	The current supply hours and frequency is not adequate.
O&M cost recovery	100%	26%	The cost recovery levels are highly inadequate. JMC needs to improve not only its operational and collection efficiency, but also revise its tariff such that at least the

[13] The estimate on losses is as per information provided by JMC officials

PERFORMANCE AREA	NORM	JALNA	KEY INFERENCE
			operations costs are covered.
Unit production cost Unit income		Rs. 6.12/ KL Rs. 1.58 /KL	The revenue demand raised by JMC covers just 26% of its water production cost.
Collection efficiency	100%	56%[14]	Poor level of collection efficiency.

Source: CRIS analysis on the basis of the data provided by JMC

1.51.2 Identification of the key issues

As indicated earlier, the next stage following the assessment of the water supply services in Jalna is that of listing of the key issues which is being faced in the city. After the assessment of the services, the ULB should necessarily clearly list down all the service and infrastructure related issues being faced by the current water supply system in the city. Based on the status of the water supply system, key indicators and the resultant inferences, the following areas appear to need investment on a priority basis:

- Augmentation of bulk water source to meet the current and future demand of water
- Rehabilitation and/or replacement of existing transmission and distribution infrastructure to reduce technical losses to minimum acceptable standards
- Installation of meters at all points of bulk distribution and consumption and adoption of a volumetric-based tariff system
- Improvement in the financial status of water account of JMC by revision of tariff rate and structure, increase of coverage, and improvement in collection efficiencies

1.51.3 Review of the water supply projects with approved DPRs

Having identified the key issues in the existing status of provisioning of water supply services in the city, the next activity to be undertaken is that of undertaking a brief review of the projects that have already been identified for Jalna under various schemes for improvement of the water supply services. JMC has identified the following projects for the water supply sector.[15]

Table 25: Proposed water supply projects (Jalna)

POTENTIAL AREA OF INVESTMENT	SCHEME PROPOSED	DETAILS

[14] Figure refers to current revenue collections against current demand raised

[15] It is to be noted here that for the purpose of this assessment, a due diligence on the project components and costs has not been undertaken.

POTENTIAL AREA OF INVESTMENT	SCHEME PROPOSED	DETAILS
Augmentation of water drawn from Jaikwadi dam	Proposed under UIDSSMT scheme It includes a source augmentation of 65 MLD, raw water rising main of 46 km and WTP of capacity 24 MLD.	Capex Required(DPR) – Rs. 200 cr Capex required (Escalated cost) – Rs. 260 cr Grant – Rs. 111 cr [16] JMC's contribution- Rs. 12 cr contribution plus an escalation of Rs. 136 cr.
Rehabilitation and expansion of the distribution network	MJP Scheme approved by GoM It includes rehabilitation and expansion of 170 km of distribution pipeline.	Capex Required(DPR) – Rs. 57 cr Escalated cost – Rs. 71 cr Grant – Rs. – 23 cr JMC's contribution- Rs. 34 cr contribution plus an escalation of Rs. 14 cr.

Source: Project information as provided by JMC

1.52 Step 2: Choice between public funding and PPP option

Having undertaken the assessment of the existing status of the water supply services in the city, identification of key issues there on and a brief review of the projects identified by the city, the next stage in the entire process as indicated in Volume I of the toolkit is the choice that is to be made between the public mode of funding and implementation of the proposed project and the private or the PPP based mode of developing and implementation of the project. For doing so the first step that is required to be undertaken is that of undertaking a viability assessment as indicated below:

1.52.1 Viability assessment

As mentioned earlier a preliminary financial analysis has been undertaken to assess the viability of the projects identified. This assessment has been for the purposed of assessing the commercial viability of the project if it is to be developed on a PPP mode. The viability assessment undertaken in the following sections have largely focused on determining whether the public sector. viz. JMC or the private sector has the financial wherewithal to undertake the project. The investment need under both the scenarios has been looked at. Additionally, for assessing the viability of the project from the private sector perspective the option of a Viability Gap Fund (VGF) has also been considered.

For undertaking the financial analysis a set of key assumptions have been used which have been indicated in the table below. From the DPR review presented, it can be observed that Jalna plans to undertake projects worth Rs. 331 crores by 2011-12. For the same, Jalna needs to arrange for a capital investment of Rs. 196 crores. The key assumptions of the analysis have been outlined in Table 26.

[16] The grant is 80% of an approved cost of Rs. 123 crores

Table 26: Key assumptions

PARTICULARS	ASSUMPTIONS
Phasing of capital expenditure	Over a period of 4 years
Raw water transmission losses	2%
Treatment Losses	2%
Distribution Losses	20% - in case of JMC 15% - in case of private operator
Tariff[17]	A volumetric tariff of Rs. 6.42 per KL with a revision of 3% every year. The tariff is fixed such that it covers the minimum production cost.
Collection Efficiency	Phasing from 56% to 70% - in case of JMC
	Phasing from 70% to 95% - in case of private developer
Cost Reduction Efficiency	0% - in case of JMC
	20% - in case of private party up to 2012

Based on the assumptions stated in the preceding table, the preliminary financial assessment has been undertaken to review the viability of undertaking the project under two scenarios. The first scenario is Option 1 wherein the investments identified for the proposed projects is made by JMC. The second scenario, under Option 2 is where the investments identified for the proposed projects is to be fully funded by the private developer.

Option 1: Public funding- investments by JMC

JMC shall have to invest Rs. 196 crores of capital investment (excluding grant amount) and in addition, incur the operations cost of an average of Rs. 23 crores per annum. This results in a net cash outflow of Rs. 194 crores considering the water supply charges which shall accrue to JMC and the operational efficiencies of JMC. However, JMC generates a revenue surplus of only Rs. 1.15 crores and already has a huge liability of Rs. 153 crores. In such a scenario, JMC shall not be able to undertake the project in an integrated manner on its own.

Option 2: Private funding - investments by private operator

If the entire investment gap of Rs. 196 crores and the operations cost of an average of Rs. 16 crores per annum [18] up to 2030 is incurred by the private operator, then in spite of the private operator retaining the water supply revenues, the operator shall need a viability gap fund (VGF) of Rs. 141 crores. This is in spite of the improved operational and managerial efficiencies of the private operator. The total grant of Rs. 134 crores, coupled with a VGF of Rs. 141 crores, shall result in 83% of the total cost being funded by the Government. This shall defeat the essence of implementing the project on a PPP basis. Hence, it is not financially feasible to implement and operate the water supply system on an integrated basis through PPP.

[17] It is the weighted volumetric tariff calculated on the basis of the current tariff structure.

[18] The operations cost incurred by private operator is lower as compared to JMC since he brings in cost efficiency of 20%.

Table 27 presents the investment requirements under each option.

Table 27: Investment requirement with a PPP

PARTICULARS	CAPITAL EXPENDITURE (RS. CRORES)	IN CASE OF INVESTMENT BY JMC	IN CASE OF INVESTMENT BY PRIVATE OPERATOR
DPR Cost	257		
Escalated Cost	331		
Grant	134		
Investment Gap	196		
Total investment required by JMC / Viability Gap to private sector	[NPV@14%]	199	148

Source: Preliminary financial analysis

The details on the financial workings for the above mentioned assessment can be found in the Annexure that has been attached with this report.

From the above analysis it is understood that the option of developing the project on a fully government funded mode is not viable given the huge investment need and the limited fund availability with JMC. Also, the option of private sector investment is assessed to be not viable in its present form of PPP structure. It is therefore prudent to assess whether the PPP option can be still pursued under a modified form of PPP arrangement. The alternative PPP structuring options have been explored in the sections below:

1.53 Step 3: Choosing the structure of the PPP arrangement

Having assessed the viability of developing the proposed project through a public funded or PPP mode of the next step decision which needs to be made is regarding the choice of PPP structure which is best suited to address the overall needs of the proposed project.

Since the integrated project including operations cannot be undertaken on a PPP basis, Option 2 which relates to the PPP scenario has been further reviewed using alternative PPP structuring options. viz. Option 2(a) and 2 (b) as indicated below:

Option 2(a) Capital investment by private developer and revenue to be retained by the private developer

The water supply project shall be designed, financed and constructed on a PPP basis by the private developer. In return, the private developer would get the revenues earned from the consumers as user charges for a fixed number of years. However, preliminary analysis shows that this will not be financially

feasible and the developer will need an additional viability gap funding (in addition to the grant) of Rs. 76 crores.[19]

Option 2(b): Operations and maintenance of project under PPP on an annuity basis

For the operation and management of the water supply system, JMC contracts another private party who would be given an annual fixed payment to operate the water supply system of the town. The private operator would undertake all the operation and management activity at a predetermined cost bill and collect the revenues and transfer the revenues to JMC.

From an analysis of options 2(a) and 2(b), it can be concluded that PPP for the design, finance and construction of the proposed water supply projects is not feasible. Thus, the state government shall have to provide additional financial support of Rs. 196 crores to JMC and put in place the physical infrastructure for the project. Then a private developer can be appointed as per option 2(b) to operate and maintain the project for a fixed payment. However, if JMC is insistent on ensuring capital investment from the private operator, then it shall have to increase the tariff or JMC shall need to re-visit the project cost of the proposed water supply system and undertake projects which need immediate attention only.

Therefore, as per the assessment undertaken above, the choice of PPP option for overseeing the operations and management of the water supply services for JMC is that of a performance based management contract.

The performance-based management contract is one where the private developer is required to undertake the activity of operation and maintenance of the entire water supply system from source to the consumer end including metering, billing and collection of revenues. Herein, all the capital investments needed for improvement to the water supply and sewerage services would have to be borne by the public sector. The operating standards are as prescribed by the ULB. The private developer is given the rights to levy the user charges set by the ULB, collect the charges and hand over the same to the ULB. For the activities carried out, the ULB would make a performance based payment to the private developer.

The details of the obligations, risks and payment arrangements under the performance-based management contract, as mentioned in Option 2(b), have been provided in Volume II of this report. Additionally, the term sheet for this contract structure has been attached in Volume IV of this report.

1.54 Step 4: Procurement

Having identified the PPP structure to be adopted for operating and maintaining the proposed project, and finalising the same, the next stage is to plan the procurement process. For initiating the procurement process, JMC would need to develop a transaction structure which would cover the aspects relating to details on the parties involved in the contract, the contractual relationship between

[19] This is assuming that the tariff shall be a volumetric tariff covering the production cost.

the parties, the nature of the arrangement, the risk allocation, the tariff to be levied, duration of the contract, the performance indicators, payment terms, award criteria and contract management strategy.

The same has been detailed in Volume IV of the report.

SANGLI-MIRAJ-KUPWAD

1.55 Brief introduction to Sangli- Miraj- Kupwad

In 1998, the towns of Sangli, Miraj and Kupwad (SMK) were merged to form a single entity called the Sangli-Miraj-Kupwad Municipal Corporation (SMKC). It encompasses an area of 118.18 sq.km and has an estimated number of 106,000 households. SMKC has a total revenue budget of Rs. 93 crores and generates a revenue surplus of Rs. 5 crores. The water supply works are managed by SMKC itself and there exists a deficit of Rs. 1 crore in it's water account. Thus, the city has very limited investment capacity to undertake new projects.

1.56 Water supply system at Sangli-Miraj-Kupwad

SMK draws a total water supply of 66 MLD, of which, 2 MLD is purchased from the Maharashtra Industrial Development Corporation (MIDC) for the Kupwad region. The present source of water supply to the city is the Krishna River.

There are three water treatment plants (WTP) in the city based at Hirabaug, Malbungalow and Miraj. The water available at the three WTPs is 71.4 MLD. The city receives treated water of about 106 lpcd at the consumption point.

The supply hours vary from an average of three to fours hours a day in Sangli and Miraj to an hour a day in Kupwad. The total number of direct connections in the city is 48,000, of which 85% are metered. A basic profile of the water supply system of SMK has been presented in the table below.

Table 28: Basic profile of water supply services in Sangli, Miraj and Kupwad

SANGLI-MIRAJ-KUPWAD UTILITY PROFILE			
Key infrastructure components	Bulk supply		66 MLD
		Sangli	48 MLD
		Miraj	16 MLD
		Kupwad	2 MLD
	Water Treatment Capacity	Malbungalow	36 MLD
		Hirabaug	16.2 MLD
		Miraj	19.2 MLD
		Total	71.42 MLD
	Treated water available for consumption		106 lpcd
	Storage Capacity	15 Elevated Storage Reservoirs	18.5 MLD

SANGLI-MIRAJ-KUPWAD UTILITY PROFILE			
	Distribution network		240 km
	Connections		48,000 [45 % of Total Households]
Water Supply Financials (FY-2007-08)	Water Account Revenue		Rs 15 crores
	Annual O&M costs		Rs 16 crores
Tariff	Flat tariff		Rs 320 per month
	Volumetric tariff	Domestic Non-Domestic Special Categories	Rs. 8/ Kl Rs. 30/KL Rs.12/KL

Source: Sangli Miraj Kupwad Municipal Corporation

1.57 Step 1: Identification of the problem area

As a first step to assessing the status of the water supply services in the city of Sangli-Miraj-Kupwad, the problem areas in the existing services in the existing system needs to be carried out. Doing this would highlight the interventions required in improvement to the level of services. As the first activity which needs to be undertaken in this regard, the service assessment has been undertaken on the basis of a few key performance criteria. On the basis of the assessment, the key issues in the current system would need to be identified and the existing projects reviewed. It is to be noted here that the assessment presented here for Jalna is based only on few key parameters. For a detailed review, as has been discussed in Volume I of the toolkit, the ULB would be required to carry out consumer survey, water audit, leak detection and energy audit for the entire value chain of water supply services. The key performance parameters used have been presented below:

1.57.1 Compiling key parameters

Based on the preliminary analysis of the water supply service data[20] and discussions with SMKC officials, CRISIL assessed the current water supply system in Sangli-Miraj-Kupwad. Table 29 presents the key indicators for assessing the water supply system at Sangli-Miraj-Kupwad and the inferences made from therein.

Table 29: Water supply indicators and Inferences for Sangli

PERFORMANCE AREA	TYPICAL NORM	SANGLI-MIRAJ-KUPWAD	KEY INFERENCE
Bulk Water			
Supply [Per capita treated water available for	135 lpcd	106 lpcd	As per CPHEEO norms, the total water supplied to consumers after treatment should be 135 lpcd. SMKC, as of date,

[20] In the absence of a water or energy audit report, the data provided by the Municipal representatives has been considered for all the assessments. The actual technical losses may be more or less than that stated and can be verified only if water audit is undertaken along with consumer survey.

PERFORMANCE AREA	TYPICAL NORM	SANGLI-MIRAJ-KUPWAD	KEY INFERENCE
consumption]			supplies 106 lpcd (i.e., 47 MLD). If the transmission losses are reduced from the existing level of 30% to an average of 20%, the water supply available for consumption shall increase by 5.1 MLD, and raise the per capita availability of water to 118 lpcd level at the consumers' end. This indicates that the city has an immediate need of augmentation of its bulk water supply.
Quality		Potentially need for improvement in quality	The banks at the upstream of the Krishna river house several sugar cane industries, which release a huge amount of untreated industrial waste into the river. Thus, the water from the Krishna River, especially during the summers, is highly polluted due to high algae content. This results in poor quality of water to the city and overloading of the water treatment plant. Hence, there is a need to change the water source.
Treatment			
Installed capacity of the WTP	100%	100%	The installed capacity available is sufficient for treatment of the current bulk supply. Also, the existing treatment plant is utilized to the extent of 92% indicating that there is no immediate need for augmentation of the WTP.
Treatment Loss	Less than 3%		As per norms
Transmission and Distribution			
Losses	Less than 15%	30%	Very High Transmission Losses due to leakages from the old corroded pipes
Consumer			
Coverage (Connections / Total Households)	100%	91%	Assuming that one connection caters to two households, the city should have ideally 53,000 connections. Additional direct connections need to be provided and the public stand posts should be removed.
Metering / Total Connections	100%	85 %	Only 60% of the meters are functional. Thus, meters need to be replaced.
Duration of water supply	24 hours	Ranges from 1 hour to 4 hours a day	Not sufficient. Needs to be improved, losses need to be reduced and operations

PERFORMANCE AREA	TYPICAL NORM	SANGLI-MIRAJ-KUPWAD	KEY INFERENCE
			made more efficient.
Non revenue water	Less than 20%	43%	Against a revenue potential of Rs. 25 crores[21], SMKC raises a water demand of only Rs. 14 crores. Thus, a reduction in the technical and commercial losses can generate additional revenue of Rs. 11 crores.
O&M cost recovery	100%	93%	The tariff in SMK is already high as compared to other cities. There is a need to increase operational efficiency and reduce energy costs in order to improve cost recovery.
Unit production cost Unit income		6.48 Rs./KL 6.02 Rs./KL	There is a need to increase operational efficiency and reduce energy costs in order to improve cost recovery.
Collection efficiency	100%	82%	Indicates a scope for improvement in collection efficiency.

Source: CRIS analysis on the basis of data provided by SMKC

1.57.2 Identification of the key issues

As indicated earlier, the next stage following the assessment of the water supply services in Sangli-Miraj-Kupwad is that of listing of the key issues which is being faced in the city. After the assessment of the services, the ULB should necessarily clearly list down all the service and infrastructure related issues being faced by the current water supply system in the city. Based on the status of the water supply system, key indicators and the resultant inferences, the following areas appear to need investment on a priority basis:

- Shifting of raw water source from Krishna river to Warna to improve the water quality
- Rehabilitation/replacement of existing transmission and distribution infrastructure to reduce technical losses to minimum acceptable standards
- Installation of meters

[21] The revenue potential has been estimated by factoring in quantum of water supplied for distribution vis-a vis the cost involved in per unit production of water supply

1.57.3 Review of the water supply projects with approved DPRs

Having identified the key issues in the existing status of provisioning of water supply services in the city, the next activity to be undertaken is that of undertaking a brief review of the projects that have already been identified for Sangli-Miraj-Kupwad under various schemes for improvement of the water supply services. SMKC has identified the following projects for the water supply sector.[22]

Table 30: Proposed water supply projects (Sangli-Miraj-Kupwad)

POTENTIAL AREA OF INVESTMENT	SCHEME PROPOSED	DETAILS
Shifting of raw water source from Krishna river to Warna to improve the water quality	Proposed under UIDSSMT scheme Project 1: For Sangli and Kupwad comprising source augmentation of 58 MLD, distribution network of 100 km, up-gradation of WTP, etc. Project 2: For Miraj comprising of pumping station, elevated storage reservoir, distribution network, headworks at Krishna river and water treatment plant.	Capex Required (DPR) – Rs. 145 Cr. Capex Required (Escalated) – Rs. 182 Cr. JNNURM Grant – Rs. 100 crores SMKC contribution –Rs. 11 crores plus escalation of Rs. 71 crores
Rehabilitation/ replacement of existing transmission and distribution infrastructure to reduce technical losses to minimum acceptable standards.	Under Sujal Nirmal Abhiyan Scheme. It includes a distribution network for the Kupwad region, construction of ESRs at Sangli and Miraj, up-gradation of WTP and construction of pumping stations.	Capex Required (DPR) – 28 Cr. Capex required (Escalated)- Rs. 32 cr Grant – Rs. 16.8 crores SMK contribution –Rs. 15.2 crores
SMKC would need to invest an additional Rs. 40 crores for rehabilitation of the distribution network at Sangli.	No Proposed Scheme	

[22] It is to be noted here that for the purpose of this assessment, a detailed review of the projects proposed has not been undertaken.

Source: Project information as provided by SMKC

1.58 Step 2: Choice between public funding and PPP option

Having undertaken the assessment of the existing status of the water supply services in the city, identification of key issues there on and a brief review of the projects identified by the city, the next stage in the entire process as indicated in Volume I of the toolkit is the choice that is to be made between the public mode of funding and implementation of the proposed project and the private or the PPP based mode of developing and implementation of the project. For doing so the first step that is required to be undertaken is that of undertaking a viability assessment as indicated below:

1.58.1 Viability assessment

As mentioned earlier a preliminary financial analysis has been undertaken to assess the viability of the projects identified. This assessment has been for the purposed of assessing the commercial viability of the project if it is to be developed on a PPP mode. The viability assessment undertaken in the following sections have largely focused on determining whether the public sector. viz. SMKC or the private sector has the financial wherewithal to undertake the project. The investment need under both the scenarios has been looked at. Additionally, for assessing the viability of the project from the private sector perspective the option of a Viability Gap Fund (VGF) has also been considered.

For undertaking the financial analysis a set of key assumptions have been used which have been indicated in the table below. From the DPR review presented, it can be observed that Sangli plans to undertake projects worth Rs. 254 crores up to 2011-12. For the same, Sangli needs to arrange for a capital investment of Rs. 137 crores.

CRISIL undertook a preliminary financial analysis to understand the applicability of PPP for the above-mentioned projects. The key assumptions of the analysis have been outlined in Table 31.

Table 31: Assumptions of preliminary financial analysis

PARTICULARS	ASSUMPTIONS
Phasing of capital expenditure	Over a period of 4 years
Raw water transmission losses	2%
Treatment Losses	2%
Distribution Losses	20% - in case of SMKC 15% - in case of private operator
Tariff[23]	A current weighted average tariff of Rs. 12.04 per KL with 3% revision every year

[23] It is the weighted volumetric tariff calculated on the basis of the current tariff structure.

PARTICULARS	ASSUMPTIONS
Collection Efficiency	82% - in case of SMKC 90% - in case of private operator
Cost Reduction Efficiency	0% - in case of SMKC 20% - in case of private operator

Based on the assumptions stated in the preceding table, the preliminary financial assessment has been undertaken to review the viability of undertaking the project under two scenarios. The first scenario is Option 1 wherein the investments identified for the proposed projects is made by SMKC. The second scenario, under Option 2 is where the investments identified for the proposed projects are to be fully funded by the private developer.

Option 1: Investments by SMKC

SMKC shall have to invest a total of Rs. 137 crores (excluding grant amount) and in addition incur the operations cost of an average of Rs. 37 crores per annum[24]. This results in a net cash flow of Rs.123 crores (NPV) considering that the revenue from the water supply shall accrue to SMKC and the operational efficiencies shall be at a moderate rate as mentioned in Table 31. However, SMKC generates a revenue surplus of Rs. 5 crores every year. Thus, it is not in a position to undertake the investment on its own.

Option 2: Investment by private operator

If the entire capital gap of Rs. 137 crores (including SMKC's contribution) and the operations cost of Rs. 28 crores per annum up to 2030 is incurred by the private operator, then the private operator shall need a viability gap funding of Rs. 50 crores. This is in spite of improved operational and managerial efficiencies brought in by the developer as mentioned in Table 31 and the revenue being retained by the developer. The total grant of Rs. 116 crores along with the viability gap requirement of Rs. 50 crores shall result in 65% of the total capital cost being funded by the government. This will defeat the purpose of undertaking the project on a PPP basis. Hence, it is not financially feasible for a private operator to invest and operate an integrated water supply project.

Table 32 presents the investment requirements under each option.

Table 32: Investment requirement with a PPP

PARTICULARS	CAPITAL EXPENDITURE (RS. CRORES)	IN CASE OF INVESTMENT AND OPERATIONS BY SKMC	IN CASE OF INVESTMENT AND OPERATIONS BY PRIVATE OPERATOR
DPR Cost	173		

[24] The operations cost incurred by SMKC is higher as private operator as it has not cost efficiency

Escalated Cost	254		
Grant	117		
SMKC share (expected) but envisaged to be sourced from Private Operator [A]	18		
Viability Gap from Private Sector [B]	119	[NPV@14%]	[NPV@14%]
Total investment required (A+B)	137	123.22	50.08

Source: Preliminary financial analysis

The details on the financial workings for the above mentioned assessment can be found in the Annexure that has been attached with this report.

As outlined above, SMKC cannot implement the project on its own as it does not have the investment capacity of Rs. 123 crores. On the other hand, the integrated water supply project and operations cannot be done on a PPP basis, since it results in 60% of funding from the government. This option of PPP structure has been assessed to be not viable. It is therefore prudent to assess whether the PPP option can be still pursued under a modified form of PPP arrangement. The alternative PPP structuring options have been explored in the sections below

1.59 Step 3: Choosing the structure of the PPP arrangement

Having assessed the viability of developing the proposed project through a public funded or PPP mode of the next step decision which needs to be made is regarding the choice of PPP structure which is best suited to address the overall needs of the proposed project.

Since the integrated project including operations cannot be undertaken on a PPP basis, Option 2 which relates to the PPP scenario has been further reviewed using alternative PPP structuring options. viz. Option 2(a) and 2 (b) as indicated below:

Option 2(a): Capital Investment by private developer and revenue to be retained by private developer

The water supply project shall be designed, financed and constructed on a PPP basis by a private developer. The private developer shall undertake a net investment to the tune of Rs. 137 crores. This is inclusive of the JNNURM grant to be made available to such a private operator. Preliminary analysis shows that over a period of 20 years, the private operator shall earn Rs. 95 crores in such a scenario. Thus, the bidding parameter shall be the annuity payment which the private developer shall make to SMKC.

Option 2(b): Operations and maintenance of project under PPP on an annuity basis

SMKC shall appoint a private operator under a performance management contract for the operations and maintenance of the entire water supply system. The private operator shall be paid a fixed amount on an annual basis.

In this way, the SMKC shall have two PPP contracts, i.e., ***an integrated water supply contract without operations and maintenance contract*** wherein the developer shall invest in the system and the water supply revenues shall accrue to the private operator, and a ***performance-based management contract for the entire water supply system*** wherein the private developer shall operate the entire water supply system, establish meters and undertake billing and collection activities. The private developer shall be paid on an annuity basis by SMKC.

Under the integrated water supply contract, the private developer would make investments in the projects identified by the ULB. However, the private developer would not be required to undertake the operations and management for the water supply operations. In return for the investment made by the private developer, the revenues which accrue to the ULB from the consumers as per the tariff levied would accrue to the private developer during the tenure of the contract. The responsibility of setting tariff, levying tariff, collection of the user charges would remain with the ULB.

The performance-based management contract is one where the private developer is required to undertake the activity of operation and maintenance of the entire water supply system from source to the consumer end including metering, billing and collection of revenues. Herein, all the capital investments needed for improvement to the water supply and sewerage services would have to be borne by the public sector. The operating standards are as prescribed by the ULB. The private developer is given the rights to levy the user charges set by the ULB, collect the charges and hand over the same to the ULB. For the activities carried out, the ULB would make a performance based payment to the private developer.

The details of the obligations, risks and payment arrangements under the performance-based management contract, as mentioned in Option 2(b), have been provided in Volume II of this report. Additionally, the term sheet for this contract structure has been attached in Volume IV of this report.

1.60 Step 4: Procurement

Having identified the PPP structure to be adopted for operating and maintaining the proposed project, and finalising the same, the next stage is to plan the procurement process. For initiating the procurement process, SMKC would need to develop a transaction structure which would cover the aspects relating to details on the parties involved in the contract, the contractual relationship between the parties, the nature of the arrangement, the risk allocation, the tariff to be levied, duration of the contract, the performance indicators, payment terms, award criteria and contract management strategy.

The details of the same can be found in the term sheet attached in Volume IV of this report.

KOLHAPUR

1.61 Brief introduction to Kolhapur

Kolhapur city, more popularly known as "the Door of Konkan," is the district headquarters of the Kolhapur district in the state of Maharashtra and covers an area of 66.82 sq. km with a current population of 5.64 lakhs (4.85 lakhs as per the 2001 Census). The total number of households in the city is 120,000. The city is managed by the Kolhapur Municipal Corporation (KMC) having a total revenue budget of Rs. 105 crores in 2007-08 and generating an overall revenue surplus of Rs. 7 crores. The total liabilities of KMC are estimated to be Rs. 100 crores.

The water supply works for the city is managed by KMC itself. From its water supply services, KMC generates a revenue surplus of Rs 1.53 crores. KMC has unpaid liabilities to the tune of approximately Rs. 50 crores for its water supply operations.

1.62 Water supply system at Kolhapur

Kolhapur sources 152 MLD of water from the rivers of Panchaganga and Bhogoti, and Kalmba lake. These sources are at a distance of less than 10 km from the city. Water from these sources is supplied to the four Water Treatment plants located at Pulkhadi, Bauda, Balinga and Kalmba, and pure water is transmitted to the different zones of the city.

Kolhapur receives treated water supply of approximately 103 lpcd levels at the consumption point. Of the 127 MLD of water which is available for distribution, only 58.5 MLD is available for consumption since the rest is lost due to technical and commercial leakages in the distribution system.

Water supply hours vary between the inner core of the city and the peripheral areas. While the main parts of the city receive water supply for 15 hours on an average, the peripheral areas receive water for only 2 hours. This supply is received through individual connections and through public stand posts. A basic profile of the water supply system of KMC has been presented in the table below.

Table 33: Basic profile of water supply services in Kolhapur

KOLHAPUR UTILITY PROFILE			
Key infrastructure components	Bulk supply		152 MLD
	Water Treatment Capacity		153 MLD
	Treated water available for consumption		100 lpcd
	Storage Capacity	18 Elevated Storage Reservoirs	30 MLD (Equivalent to 30% of treated supply)
		5 Ground Storage Reservoirs	15.1 MLD
	Distribution network		400 km

KOLHAPUR UTILITY PROFILE			
	Connections		83,000 (69% of total households)
Water Supply Financials (FY-2007-08)	Water Account Revenue		Rs 21.11 crores
	Annual O&M costs		Rs 19.58 crores
Tariff	Volumetric tariff	Upto 20,000 litres consumption	Rs.140 bi-monthly
		20,000-40,000 litres consumption	Rs 8 per KL
		> 40,000 litres consumption	Rs 9 per KL

Source: Kolhapur Municipal Corporation

1.63 Sewerage system at Kolhapur

The sewerage system in Kolhapur is managed by KMC. The city generates 80 MLD of sewage, which is carried through open channels/nallahs of Dudhali and Jayanti and pumped to the Sewerage Treatment Plant (STP) at Kasaba Bawada, and further disposed off into the Panchganga river.

The existing sewerage network measures 50 km and primarily caters to the needs of the core city areas. The peripheral areas of the city are largely dependant on septic tanks from which sewage is carried to the nallahs. A brief profile of the sewerage system in the town is presented below and the key inferences discussed further.

Table 34: Basic profile of sewerage infrastructure in Kolhapur

KOLHAPUR UTILITY PROFILE – Sewerage System			
Key infrastructure components	Sewage generated		80 MLD
	Sewerage Treatment Capacity	Kasaba Bawada	45 MLD
	Sewerage network		50 km
	Current disposal practice		Treated and untreated waste is dumped into the river Panchganga
Financials (FY-2007-08)	Sewerage Revenues		No revenues from sewerage
	Sewerage annual O&M costs (FY 2007-08)		Rs 10 lakhs per annum
Sewerage Charges	Tariff		No sewerage charge levied

Source: Kolhapur Municipal Corporation

1.64 Step 1: Identification of the problem area

As a first step to assessing the status of the water supply services in the city of Kolhapur, the problem areas in the existing services in the existing system needs to be carried out. Doing this would highlight the interventions required in improvement to the level of services. As the first activity which needs to be

undertaken in this regard, the service assessment has been undertaken on the basis of a few key performance criteria. On the basis of the assessment, the key issues in the current system would need to be identified and the existing projects reviewed. It is to be noted here that the assessment presented here for Jalna is based only on few key parameters. For a detailed review, as has been discussed in Volume I of the toolkit, the ULB would be required to carry out consumer survey, water audit, leak detection and energy audit for the entire value chain of water supply services. The key performance parameters used have been presented below:

1.64.1 Water Supply

1.64.1.1 Compiling key parameters

Based on the preliminary analysis of the water supply service data[25] and discussions with KMC officials, CRISIL assessed the current water supply system in Kolhapur. Table 35 presents the key indicators for assessing the water supply system at Kolhapur and the inferences therein.

Table 35: Water supply indicators for Kolhapur

PERFORMANCE AREA	NORM	KOLHAPUR	KEY INFERENCE
Bulk Water			
Supply (Per capita treated water available for consumption)	135 lpcd	103 lpcd	Although Kolhapur sources water of 152 MLD (269 lpcd), the water available for consumption to the consumer is just 103 lpcd as a result of high transmission and distribution losses. If the existing transmission and distribution losses are reduced from the current level of 71% to an average of 22%, the water available shall increase by 64 MLD and raise per capita availability for consumption to 217 lpcd. Thus, in order to increase the water supply, the city does not need to augment the source but focus on reduction of the existing transmission, treatment and distribution losses in the system.
Quality		Poor Quality of Water	About half of the population of Kolhapur gets polluted water since the present source is located downstream of the sewage discharge. This is primarily due to the fact that major polluted nallahs like Jayanthi and Dhudhali carry waste water and sewage from the un-sewered parts of

[25] In the absence of a water or energy audit report, the data provided by the Municipal representatives has been considered for all the assessments. The actual technical losses may be more or less than that stated and can be verified only if water audit is undertaken along with consumer survey.

PERFORMANCE AREA	NORM	KOLHAPUR	KEY INFERENCE
			the city, and dump it into the Panchganga River. This has been causing pollution of the river downstream.
Raw water transmission	Less than 2%	11%	Extremely high raw water transmission losses. The transmission losses are extremely high owing to corroded pipelines and theft.
Treatment			
WTP capacity	100%	99%	The existing installed capacity of the WTPs is sufficient and caters to the entire water supply. However, the WTP at Bawada is not functioning properly being obsolete, and requires up-gradation.
Treatment loss	Less than 3%	6%	The treatment loss is high on account of an obsolete treatment plant, resulting in more than acceptable levels of losses.
Transmission and Distribution			
Losses	Less than 15%	54%[26]	The transmission losses are extremely high due to corroded water transmission pipelines and illegal connections approximating to 10% of the total connections. The losses are at alarming levels and require immediate intervention in terms of replacement, rehabilitation of pipelines, improved operational efficiencies and reduction of illegal connections.
Consumer			
Coverage	95-100%	100%[27]	Assuming that one connection caters to two households, the city should have ideally 60,000 connections. The city has 23,000 connections higher than the ideal number of connections in addition to the 3000 public stand posts.
Metering	100%	100%	All the connections are metered; however only 80% are functional, indicating commercial loss due to incorrect readings

[26] The loss levels here take into account transmission loss, treatment loss and distribution loss. Treatment and raw water transmission loss has been estimated to be at minimal acceptable levels as understood from KMC officials.

[27] In the absence of accurate information on the number of households served by each connection, it has been assumed that one connection serves 2 households.

PERFORMANCE AREA	NORM	KOLHAPUR	KEY INFERENCE
			and approximations from the faulty meters.
Duration of water supply	24 hours	2 -15 hours each day[28]	The supply hours vary across the city. Efforts need to be made to increase the current supply hours across the city.
O&M cost recovery	100%	100%[29]	The water account of KMC showed a surplus of Rs 1.53 crores in 2007-08. A full cost recovery indicates the implementation of rational tariff levels.
Unit production cost Unit income		Rs 3.53 per KL Rs 3.80 per KL	The current per unit (KL) revenue realisation are at satisfactory levels.
Collection efficiency	100%	67%[30]	Collection efficiencies are low. KMC has arrears amounting to Rs. 6 crores. The overall efficiency levels therefore need to be improved substantially.

Source: CRIS analysis and data provided by KMC

1.64.1.2 Identification of the key issues

As indicated earlier, the next stage following the assessment of the water supply services in Kolhapur is that of listing of the key issues which is being faced in the city. After the assessment of the services, the ULB should necessarily clearly list down all the service and infrastructure related issues being faced by the current water supply system in the city. Based on the status of the water supply system, key indicators and the resultant inferences, the following areas appear to need investment on a priority basis:

- Rehabilitation and/or replacement of existing transmission and distribution infrastructure to reduce technical losses to minimum acceptable standards
- Augmentation or improvements to the existing treatment plant to reduce the treatment losses
- Improvement in the water quality of the city by establishing an adequate sewerage system and improving its efficiencies

[28] In some zones of Kolhapur water is supplied for only 2 hours in a day while few other zones in the city receive supply for 15 hours in a day.

[29] Though a 100% O&M cost recovery is indicative of efficient management of water supply system, in the case of KMC, this does not depict a correct picture owing to the high T&D losses, commercial losses and the high NRW loss levels.

[30] Figure refers to current revenue collections against current demand raised

- Improved management of the distribution network including installation and maintenance of the installed meters

Since the pollution of the raw water source in the city is directly linked to the existing status of sewerage infrastructure, it has been judged prudent to address the issues of the sewage sector of the city. A review of the sewerage infrastructure has been carried out. A brief on the sewerage sector and its assessment is presented in the following sub-sections.

1.64.2 Sewerage sector

1.64.2.1 Compiling key parameters

Based on the preliminary analysis of sewerage service data[31] and discussions with KMC officials, CRISIL assessed the current sewerage system in Kolhapur. Table 36 presents the key indicators for assessing the sewerage system at Kolhapur.

Table 36: Key sewerage indicators for Kolhapur

PERFORMANCE AREA	NORM	KOLHAPUR	KEY INFERENCE
Sewerage Infrastructure			
Coverage	95-100%	35%	The current sewerage pipelines cover only 35% of the total extent of the city. Geographically, the pipelines are present only in the core parts of the city, leaving the peripheral and newly developed areas un-sewered. Also, the existing pipelines are approximately 40 years old and corroded, requiring rehabilitation/ replacement.
Treatment capacity	100%	38%	The existing STP has an installed treatment capacity of 45 MLD. However, the STP is obsolete as a result of which it treats a very small quantity of sewage. There is an immediate need to upgrade and augment the treatment capacity of the STP to ensure 100% treatment.
Disposal		Untreated sewage disposed in the river	This results in contamination of the river, leading to health problems and violation of environmental norms.
Consumer			
O&M cost recovery	100%	0 %	Since KMC does not charge sewerage charges, the operations costs are met

[31] In the absence of a water or energy audit report, the data provided by the Municipal representatives has been considered for all the assessments. The actual technical losses may be more or less than that stated and can be verified only if water audit is undertaken along with consumer survey.

PERFORMANCE AREA	NORM	KOLHAPUR	KEY INFERENCE
			from the general budget of KMC.

Source: CRIS analysis on the basis of data provided by KMC

1.64.2.2 Identification of the key issues

Based on the status of the sewerage system, key indicators and the inferences, the following areas have been earmarked for investment on a priority basis:

- Augmentation of the STP
- Expansion of the sewerage network in the city
- Rehabilitation/ replacement of existing rising mains and pipelines

1.64.3 Review of the water supply projects with approved DPRs

Having identified the key issues in the existing status of provisioning of water supply and sewerage services in the city, the next activity to be undertaken is that of undertaking a brief review of the projects that have already been identified for Kolhapur under various schemes for improvement of the water supply services. KMC has identified the following projects for the water supply sector.[32]

Table 37: Proposed water supply and sewerage projects at Kolhapur

Proposed Area Of Investment	Scheme Proposed	Details
Augmentation of capacity of water treatment plant and rehabilitation of transmission lines	Proposed under UIDSSMT scheme It includes the augmentation of the WTP by 36 MLD, 60 km of distribution network, 10 km of raw water rising main and pumping machinery.	Capex Required(DPR) : Rs. 59 crores Capex required (Escalated cost) – Rs. 70 crores UIDSSMT grant -- Rs. 53.1 crores KMC's contribution – Rs. 5.9 Cr and escalation cost of Rs. 12 crores
STP augmentation and expansion of the sewerage network	UIDSSMT: 80 MLD STP, pumping stations and distribution network	Capex Required (DPR) : Rs 175 Cr Capex required (Escalated cost) – Rs. 210 cr

[32] It is to be noted here that for the purpose of this assessment, a due diligence on the project components and costs has not been undertaken.

Proposed Area Of Investment	Scheme Proposed	Details
		UIDSSMT grant- Rs 28.8 Cr[33] KMC's contribution – Rs. 3.2 Cr Plus escalation and unapproved cost of Rs 178 Cr

Source: Kolhapur Municipal Corporation

1.65 Step 2: Choice between public funding and PPP option

Having undertaken the assessment of the existing status of the water supply services in the city, identification of key issues there on and a brief review of the projects identified by the city, the next stage in the entire process as indicated in Volume I of the toolkit is the choice that is to be made between the public mode of funding and implementation of the proposed project and the private or the PPP based mode of developing and implementation of the project. For doing so the first step that is required to be undertaken is that of undertaking a viability assessment as indicated below:

1.65.1 Viability assessment

As mentioned earlier a preliminary financial analysis has been undertaken to assess the viability of the projects identified. This assessment has been for the purposed of assessing the commercial viability of the project if it is to be developed on a PPP mode. The viability assessment undertaken in the following sections have largely focused on determining whether the public sector. viz. KMC or the private sector has the financial wherewithal to undertake the project. The investment need under both the scenarios has been looked at. Additionally, for assessing the viability of the project from the private sector perspective the option of a Viability Gap Fund (VGF) has also been considered

From the above analysis, it can be observed that Kolhapur plans to undertake projects worth Rs. 280 crores by 2011-12. Kolhapur needs to arrange for a capital investment of Rs. 198 crores to execute these projects.

A preliminary financial analysis has been undertaken in the context of exploring a PPP-based alternative to fund the project requirement at Kolhapur. The key assumptions which have been considered are presented below.

Table 38: Key assumptions

PARTICULARS	ASSUMPTIONS
Phasing of capital expenditure	Over a period of 4 years

[33] The approved cost is Rs. 32 crores only.

PARTICULARS	ASSUMPTIONS
Raw water transmission losses	2%
Treatment Losses	2%
Distribution Losses	30%- in case managed by KMC 15% - in case managed by private developer
Tariff[34]	Rs 7.95[35] per KL with 3% revision every year
Collection Efficiency	Phased from 67% to 80% - in case managed by KMC
	Phased from 80% to 90% - in case managed by private developer
	0% - in case managed by KMC
Cost Reduction Efficiency	20% - in case managed by private party upto 2011

Based on the assumptions stated in the preceding table, the preliminary financial assessment has been undertaken to review the viability of undertaking the project under two scenarios. The first scenario is Option 1 wherein the investments identified for the proposed projects is made by KMC. The second scenario, under Option 2 is where the investments identified for the proposed projects is to be fully funded by the private developer.

Option 1: Public funding- Investment and operations by KMC

KMC shall have to invest a total of Rs. 198.90 crores (excluding grant amount) and in addition incur the operations cost of an average of Rs. 46 crores per annum[36]. This results in a net cash outflow of Rs.134 crores (NPV) considering that the revenue from the water supply and sewerage shall accrue to KMC and the operational efficiencies at a moderate rate as mentioned in Table 38Table 59. Although, KMC generates a revenue surplus of Rs. 7 crores, it has liabilities of more than Rs. 100 crores. In such a scenario, KMC is not in a position to invest in this project.

Option 2: Private funding - Investment and operations by private operator

If the entire capital gap of Rs. 198.9 crores (including KMC's contribution) and the operations cost of Rs. 28 crores per annum up to 2030 is incurred by the private operator, then the private operator shall earn Rs. 30 crores (net present value). This is primarily due to the improved operational and managerial efficiencies brought in by the Developer as mentioned in Table 38 and the revenue being retained by the Developer. Thereby, the project can be undertaken on a PPP basis.

Table 39 presents the investment requirements under each option.

Table 39: Investment requirement with a PPP

[35] The tariff assumed is the weighted volumetric tariff calculated on the basis of the current tariff structure.

[36] The operations cost incurred by KMC is higher than private operator as it does not bring cost efficiency

PARTICULARS	CAPITAL EXPENDITURE (Rs crores)	IN CASE OF INVESTMENTS AND OPERATIONS BY KMC	IN CASE OF INVESTMENTS AND OPERATIONS BY PRIVATE OPERATOR
DPR Cost	234		
Escalated Cost	281		
Grant	82		
KMC share (expected) but envisaged to be sourced from Private Operator [A]	9.1		
Gap from Private Sector [B]	189.8	[NPV@14%]	[NPV@14%]
Total investment required Party A+B	198.9	134	-30.15

Source: Preliminary financial analysis

The details on the financial workings for the above mentioned assessment can be found in the Annexure that has been attached with this report.

From the above analysis it is understood that the option of developing the project on a fully government funded mode is not viable given the huge investment need and the limited fund availability with KMC. However, the second option of investments being made by the private developer and also the operations and management of the services being managed by the private developer is assessed to be viable option. This is because of the high operational efficiencies which the private developer would bring in to the operations of water supply and sewerage services, which would make the project viable for the private developer.

1.66 Step 3: Choosing the structure of the PPP arrangement

Having assessed the viability of developing the proposed project through a public funded or PPP mode of funding, the next step decision which needs to be made is regarding the choice of PPP structure which is best suited to address the overall needs of the proposed project.

Since the above mentioned structure wherein the private developer would make the investments in the development of the water supply and sewerage services, and would also oversee the operations and management of the sewerage services, the feasible PPP structure for Kolhapur is that of an ***Integrated concession agreement for water supply and sewerage services including operations and management of the system.***

An integrated concession agreement for water supply and sewerage services is a PPP contract wherein the private developer would be required to undertake investments for creation of assets in the water supply and sewerage value chain and would also be required to undertake the operation and maintenance of the entire system for the period of the concession. As per this concession agreement, the private developer would be required to design, finance, construct, operate and manage the water supply and sewerage services for the concession period. The capital investment required for undertaking the augmentation works would be met wholly or partly by the private developer. The private

developer would recover the investments made by way of collection and retain user charges levied on consumers. Any change to the tariff, the rate of escalations, etc. would be determined by the ULB.

The details of the obligations, risks and payment arrangements under the performance-based management contract, as mentioned above have been provided in Volume II of this report. Additionally, the term sheet for this contract structure has been attached in Volume IV of this report.

1.67 Step 4: Procurement

Having identified the PPP structure to be adopted for operating and maintaining the proposed project, and finalising the same, the next stage is to plan the procurement process. For initiating the procurement process, KMC would need to develop a transaction structure which would cover the aspects relating to details on the parties involved in the contract, the contractual relationship between the parties, the nature of the arrangement, the risk allocation, the tariff to be levied, duration of the contract, the performance indicators, payment terms, award criteria and contract management strategy.

The details of the same can be found in the term sheet attached in Volume IV of this report.

VIRAR

1.68 Brief introduction to Virar

Virar is a suburban city to the north of Mumbai. It is located in the Thane district of Maharashtra and covers an area of 19.6 sq. km. The current population of the city is 2.46 lakhs (1.19 lakhs as per 2001 Census) with a total number of 99,740 households. The city is governed by the Virar Municipal Council (VMC). VMC has a total revenue budget of Rs 70 crores (2007-08) with a revenue surplus of Rs 39 lakhs. Besides, VMC has liabilities of approximately Rs 17 crores.

Water supply works (i.e. from source augmentation to treatment) for Virar is managed as part of a joint scheme with three other cities viz., Vasai, Navghar-Manikpur, and Nalasopara. The scheme is managed by a joint committee formed by the four ULBs and a joint account is maintained for the same.

1.69 Water supply system at Virar

Virar with a total water supply of 27 MLD draws water from two sources i.e. Surya headworks (17 kms) and the Uzgaon headworks (60 kms). From the Surya headworks(100 MLD) i.e. the joint scheme for four cities, Virar is supplied 20 MLD and from the Uzgaon headworks 7 MLD. The total quota available to Virar is 36 MLD.

The total treated water supply available for consumption is 21 MLD (85 lpcd). Water is available for three hours every day and is supplied through individual connections and public stand posts. The total number of direct connections is 9200 of which none are metered. A basic profile of the water supply system of VMC has been presented in the table below:

Table 40: Basic profile of water supply services in Virar

VIRAR UTILITY PROFILE			
Key infrastructure components	Bulk supply		27 MLD
	Water availability for consumption		85 lpcd
	Water Treatment Capacity	Surya headworks (joint scheme)	100 MLD
		Uzgaon	20 MLD
	Storage Capacity	5 Elevated Storage Reservoirs	4.9 MLD
		2 Ground Storage Reservoirs	2.75 MLD
	Distribution network		70 km
	Connections		9200
Water Supply Financials (FY-2007-08)	Water Account Revenue		Rs 8.26 crores
	Annual O&M costs		Rs 8.80 crores

VIRAR UTILITY PROFILE		
Tariff	Flat tariff structure	Rate differs depending upon type of property and type of connection i.e. Rs. 40 p.m. for slums, Rs. 120 p.m. for flats, etc.

Source: Virar Municipal Council

1.70 Step 1: Identification of the problem area

As a first step to assessing the status of the water supply services in the city of Virar, the problem areas in the existing services in the existing system needs to be carried out. Doing this would highlight the interventions required in improvement to the level of services. As the first activity which needs to be undertaken in this regard, the service assessment has been undertaken on the basis of a few key performance criteria. On the basis of the assessment, the key issues in the current system would need to be identified and the existing projects reviewed. It is to be noted here that the assessment presented here for Jalna is based only on few key parameters. For a detailed review, as has been discussed in Volume I of the toolkit, the ULB would be required to carry out consumer survey, water audit, leak detection and energy audit for the entire value chain of water supply services. The key performance parameters used have been presented below:

1.70.1 Compiling key parameters

Based on the preliminary analysis of water supply service data[37] and discussions with VMC officials, CRISIL assessed the current water supply system in Virar. Table 41 presents the key indicators for assessing the water supply system at Virar.

Table 41: Key water supply indicators for Virar

PERFORMANCE AREA	NORM	VIRAR	KEY INFERENCE
Bulk Water			
Supply (Per capita consumption)	135 lpcd	85 lpcd	Reduction of losses from 20% to 15% and utilisation of the entire quota of 36 MLD increases water availability to 120 lpcd. Hence, there is no urgent need to augment water supply to Virar.
Treatment			
WTP capacity	100%	100%	There may be a need to increase the capacity of the WTP if the water supply is increased. However, there is no urgent need for the same.
Treatment loss	Less than 3%	2%	Loss levels are as per acceptable

[37] In the absence of a water or energy audit report, the data provided by the ULB representatives has been considered for all the assessments. The actual technical losses may be more or less than that stated and can be verified only through water audit.

PERFORMANCE AREA	NORM	VIRAR	KEY INFERENCE
			standards
Transmission and Distribution			
Losses	Less than 15%	22%[38]	Moderate level of losses. Primarily distribution losses due to leaking pipelines. The loss level can be brought down by improved operational efficiency including better leakage management.
Consumer			
Coverage	95% to100%	100%[39]	This is inclusive of only direct service connections.
Metering	100%	0%	No meters have been meters installed at the consumer end; a flat tariff structure is prevalent.
Duration of water supply	24 hours	3 hours each day	Inadequate supply hours. The supply hours need to be increased.
O&M cost recovery	100%	94 %	There exists a deficit of Rs 50 lakhs largely on account of high energy bills. Need to implement energy saving measures and ensure improved operational efficiencies. Illegal connections need to be identified and reduced.
Unit production cost Unit income		Rs 8.93/ KL Rs 8.38 /KL	Per unit revenue realisation is at moderate levels. However, it can be further improved to ensure full cost recovery.
Collection efficiency	100%	78%[40]	Collection efficiencies need to be improved substantially.

Source: CRIS analysis and discussions with VMC officials

[38] The loss levels include transmission loss, and distribution loss. Treatment and raw water transmission loss have been estimated to be at minimal acceptable levels as understood from VMC officials. In the absence of meters, the leakages in the distribution network cannot be accurately established.

[39] As per VMC officials, one connection serves 12 households.

[40] Figure refers to current revenue collections against current demand raised

1.70.2 Identification of the key issues

As indicated earlier, the next stage following the assessment of the water supply services in Virar is that of listing of the key issues which is being faced in the city. After the assessment of the services, the ULB should necessarily clearly list down all the service and infrastructure related issues being faced by the current water supply system in the city. Based on the status of the water supply system, key indicators and the resultant inferences, the following areas appear to need investment on a priority basis:

- Repair and rehabilitation of the identified stretch of distribution network to reduce losses due to pipeline leakages
- Increased operational efficiencies especially at the distribution end
- Installation of meters at all points of bulk distribution and consumption and adoption of a volumetric based tariff system

1.70.3 Review of the water supply projects

Having identified the key issues in the existing status of provisioning of water supply services in the city, the next activity to be undertaken is that of undertaking a brief review of the projects that have already been identified for Virar under various schemes for improvement of the water supply services. VMC has identified the following projects for the water supply sector.[41]

Table 42: Proposed water supply projects

SL NO.	PROPOSED AREA OF INVESTMENT	SCHEME PROPOSED	DETAILS
1	Augmentation of water supply under the current joint scheme (Surya headworks) for the four cities	Project for source augmentation of 125 MLD for supply to all the municipal councils. To be executed by MMRDA	DPR Cost: Rs 672.90 Cr
2	Augmentation of water supply for Vasai-Virar Municipal Councils	Project for source augmentation of 300 MLD. To be executed by MMRDA	Capital Cost: Rs 1100 Cr (approximate). DPR currently under preparation
3	Installation of Meters	No Proposed Scheme	

[41] It is to be noted here that for the purpose of this assessment, a due diligence on the project components and costs has not been undertaken.

Source: Virar Municipal Council and MJP

The source augmentation projects mentioned in the above table are currently under preparation and no approvals for either of the projects have been received. Since the current proposal is at best an estimate and no decision has been taken on the same, these projects have not been considered while exploring the PPP alternatives for water supply operations at Virar.

1.71 Step 2: Choice between public funding and PPP option

Having undertaken the assessment of the existing status of the water supply services in the city, identification of key issues there on and a brief review of the projects identified by the city, the next stage in the entire process as indicated in Volume I of the toolkit is the choice that is to be made between the public mode of funding and implementation of the proposed project and the private or the PPP based mode of developing and implementation of the project.

However, as per the project assessment, currently no major capital investment work is envisaged to be undertaken by the Council. Discussion with VMC officials indicate that for reduction in distribution losses, the rehabilitation of 26 km of pipeline would be undertaken as a part of regular on going civil works of VMC, and no separate project needs to be developed for the same. This indicates that the current operations and management of the water supply by VMC is satisfactory.

In such a scenario, the only area of improvement is installation of meters and improved efficiency in billing and collection. A preliminary financial analysis has been undertaken in the context of exploring PPP for undertaking the metering, billing and collection activity.

1.71.1 Viability assessment

As indicated above, the only area of improvement in the overall water supply services in Virar is that of introduction of metering in the system. This may be done under a PPP structure where in the activity of metering, billing and collection of water supply charges is outsourced to a private operator. The viability assessment have been carried out in the context of assessing whether VMC should undertake the investments required for installation of meters, their operation and management and also generate bills and collect the same, or whether the same activity can be managed better by a private developer.

For undertaking the financial analysis a set of key assumptions have been used which have been indicated in the table below.

Table 43: Key Assumptions

PARTICULARS	ASSUMPTIONS
Cost of a meter (including installation charges)	Rs. 4000 per meter
Cost of computer software	Rs. 1,00,000 (one- time cost)
Maintenance cost of meters	8% of capex.
Computer software maintenance cost	15% of capex.
Meter connection charges	Rs. 1000 per meter
Increase in water tariff	3% per annum
Population growth rate (CAGR)	9.5% per annum

PARTICULARS	ASSUMPTIONS
Tariff	Volumetric tariff of Rs. 8 per KL[42]
Collection Efficiency	78% - in case of VMC
	95% - in case of PPP
Period of contract / evaluation	Period of 5 years upto 2013
Cost Reduction efficiency (O&M costs)	0% - in case of VMC
	20% - in case of PPP

Based on the assumptions stated in the preceding table, the preliminary financial assessment has been undertaken to review the viability of undertaking the project under two scenarios. The first scenario is Option 1 wherein the investments identified for the proposed metering, billing and collection activity is made by VMC. The second scenario, under Option 2 is where the investments identified for the proposed metering, billing and collection activity is to be fully funded by the private developer.

Option 1: Public funding- Metering, billing and collection by VMC

VMC shall have to invest a total capital expenditure of Rs. 5 crores (in the first year) and also incur an operations cost of Rs. 1.3 crores per annum. With metering and a volumetric tariff, VMC shall earn water supply charges of Rs. 39 crores by 2013. VMC with a revenue surplus of just Rs. 0.39 crores does not have the potential of incurring such kind of expenditure. Thereby, it is not in a position to incur this investment on it's own.

Option 2: Private funding - Metering, billing and collection by a private operator

If a private operator undertakes the metering, billing and collection activity, then the private operator shall incur a total capital expenditure of Rs. 5 crores(in the first year) in addition to an operation cost of Rs. 1 crore per annum. The water supply charges generated shall be Rs. 45 crores by 2013. VMC shall have to pay a minimum annuity payment to the private operator.

The details on the financial workings for the above mentioned assessment can be found in the Annexure that has been attached with this report.

Thus, VMC can undertake the metering, billing and collection activity through PPP wherein VMC need not incur an expenditure of Rs. 5 crores upfront and also earns additional revenue of around Rs. 10 crores up to 2013 as a result of the operational and revenue collection efficiency of the private entity.

1.72 Step 3: Choosing the structure of the PPP arrangement

Having assessed the viability of developing the proposed project through a public funded or PPP mode of the next step decision which needs to be made is regarding the choice of PPP structure which is best suited to address the overall needs of the proposed project.

[42] Virar Municipal Council has an existing tariff schedule of Rs. 8 per KL volumetric tariff in case of metered connections.

Since the above mentioned structure wherein the private developer would make the investments for the installation of the meters and would also be responsible for overseeing their operations and generate bills and collect the same, the PPP structure suitable here is that of a PPP agreement for ***Metering, Billing and Collection.***

Under the service management contract for metering, billing and collection, the private developer would be required to undertake investments for installation of meters at the consumer end, oversee their operation and maintenance, maintain a computerized data recording system, generate bills and collect user charges from the consumers. The private developer would not be required to undertake any other activity in the entire chain of water supply services. The type of meter to be installed and the number of connections where the meter is to be installed would be specified by the ULB. The tariff to be levied would also be determined by the ULB. The performance standards laid out by the ULB would specify the revenue collections target to be achieved, the extent of meter functional levels which need to be maintained, etc. The cost of purchase of the meter and the installation of the same would be generally recovered by the private developer from the consumers as part of the water supply service bills.

For the operation and maintenance activity undertaken by the private developer, a fixed annuity payment is made by the ULB. This annuity amount would generally be the bidding parameter.

1.73 Step 4: Procurement

Having identified the PPP structure to be adopted for operating and maintaining the proposed project, and finalising the same, the next stage is to plan the procurement process. For initiating the procurement process, VMC would need to develop a transaction structure which would cover the aspects relating to details on the parties involved in the contract, the contractual relationship between the parties, the nature of the arrangement, the risk allocation, the tariff to be levied, duration of the contract, the performance indicators, payment terms, award criteria and contract management strategy. The details can be found in the term sheet attached in Volume IV of this report.

NAVGHAR MANIKPUR

1.74 Brief introduction to Navghar Manikpur

The city of Navghar Manikpur forms a part of the Thane district of Maharashtra. Located in close proximity to the suburban city of Virar, the city has an area of 16.5 sq. km covering a current population of 2.16 lakh residents (1.16 lakhs as per 2001 Census). The city is managed by the Navghar Manikpur Municipal Council and has an estimated 54,000 households. The Council has a total revenue budget of Rs. 60 crores (2007-08) with a revenue surplus of Rs. 62 lakhs.

Water supply works for Navghar Manikpur is managed as part of a joint scheme of 120 MLD with three other cities, viz., Vasai, Virar and Nallasopara. Together, these four cities have a joint committee which manages the bulk water supply, treatment and supply of treated water to the four cities. Navghar Manikpur Municipal Council generates marginal revenues to the tune of Rs. 7 lakhs from its water supply operations.

1.75 Existing water supply system

Navghar Manikpur draws a total water supply of 24 MLD. However, its total quota available under both the schemes is 32 MLD. The total treated water available for consumption to the citizens is 18.4 MLD (85 lpcd). Water is available for three hours every day and is supplied through individual connections. The total number of direct connections in the city is 5,541 and these are all un-metered. A basic profile of the water supply system of the Council has been presented in Table 44.

Table 44: Basic profile of water supply services in Navghar Manikpur

NAVGHAR MANIKPUR UTILITY PROFILE			
Key infrastructure components	Bulk supply		24 MLD
	Treated Water available for consumption		100 lpcd
	Water Treatment Capacity	Surya headworks (joint scheme)	100 MLD
		Uzgaon	20 MLD
	Storage Capacity	6 Elevated Storage Reservoirs	2.6 MLD
		5 Ground Storage Reservoirs	1.85 MLD
	Distribution network		108 km
	Connections		5541
Water Supply Financials (FY-2007-08)	Water Account Revenue		Rs 7.75 crores
	Annual O&M costs		Rs 7.68 crores
Tariff	Flat tariff structure		Rs 120 p.m. for residential connections

NAVGHAR MANIKPUR UTILITY PROFILE		
		Rs. 1500 p.m. for industrial connections

Source: Navghar Manikpur Municipal Council

1.76 Step 1: Identification of the problem area

As a first step to assessing the status of the water supply services in the city of Navghar Manikpur, the problem areas in the existing services in the existing system needs to be carried out. Doing this would highlight the interventions required in improvement to the level of services. As the first activity which needs to be undertaken in this regard, the service assessment has been undertaken on the basis of a few key performance criteria. On the basis of the assessment, the key issues in the current system would need to be identified and the existing projects reviewed. It is to be noted here that the assessment presented here for Navghar Manikpur is based only on few key parameters. For a detailed review, as has been discussed in Volume I of the toolkit, the ULB would be required to carry out consumer survey, water audit, leak detection and energy audit for the entire value chain of water supply services. The key performance parameters used have been presented below:

1.76.1 Compiling key parameters

Based on the preliminary analysis of the water supply service data[43] of the Navghar Manikpur Municipal Council and discussions with it's officials, CRISIL assessed it's current water supply system. Table 45 presents the key indicators for assessing the system.

Table 45: Key water supply indicators for Navghar Manikpur

PERFORMANCE AREA	NORM	NAVGHAR MANIKPUR	KEY INFERENCE
Bulk Water			
Supply (Per capita consumption)	135 lpcd	85 lpcd	Reduction of distribution losses from 20% to 15% and utilisation of the entire water supply quota of 32 MLD increases the water availability to 120 lpcd. Hence, there is no urgent need to augment water supply to Navghar Manikpur.
Treatment			
WTP capacity	100%	100%	No urgent need for increasing the capacity of the WTP.
Treatment loss	Less than 3%	2%	Loss levels are as per acceptable standards.

[43] In the absence of a water or energy audit report, the data provided by the Municipal representatives has been considered for all the assessments. The actual technical losses may be more or less than that stated and can be verified only if water audit is undertaken along with consumer survey.

PERFORMANCE AREA	NORM	NAVGHAR MANIKPUR	KEY INFERENCE
Transmission and Distribution			
Losses	Less than 15%	22%[44]	Moderate level of losses. Primarily frictional losses and can be brought down by improved operational efficiency including better leak management.
Consumer			
Coverage	95-100%	100%[45]	This is inclusive of only direct service connections.
Metering	100%	0%	No meters have been installed at the consumer end; a flat tariff structure is prevalent.
Duration of water supply	24 hours	3 hours each day	Inadequate supply hours. The supply hours need to be increased.
O&M cost recovery	100%	100 %	Full cost recovery indicates the implementation of rational tariff levels and an overall efficiency in management of water supply activity.
Unit production cost Unit income		8.77 Rs/KL 8.85 Rs/KL	The current per unit (KL) revenue realisation are at satisfactory levels.
Collection efficiency	100%	95%[46]	Collection efficiencies are at satisfactory levels.

Source: CRIS analysis and data from Navghar Manikpur Municipal Council

1.76.2 Identification of the key issues

As indicated earlier, the next stage following the assessment of the water supply services in Navghar Manikpur is that of listing of the key issues which is being faced in the city. After the assessment of the services, the ULB should necessarily clearly list down all the service and infrastructure related issues being faced by the current water supply system in the city. Based on the status of the water supply system, key indicators and the resultant inferences, the following areas appear to need investment on a priority basis:

[44] The loss levels here take into account raw water transmission loss, and pure water distribution loss. Treatment and raw water transmission loss has been estimated to be at minimal acceptable levels as understood from the officials. In the absence of meters, the leakages in the distribution network cannot be accurately established.

[45] As per Navghar Manikpur Municipal Council officials, one connection serves 2 households.

[46] Figure refers to current revenue collections against current demand raised

- Needs to undertake a leakage study to capture the losses in the distribution system and
- Install meters to understand the pattern of consumption and levy an un-biased tariff.

1.76.3 Review of the water supply projects

Having identified the key issues in the existing status of provisioning of water supply services in the city, the next activity to be undertaken is that of undertaking a brief review of the projects that have already been identified for Navghar Manikpur under various schemes for improvement of the water supply services. From discussions with the officials at Navghar Manikpur, it is understood that projects in the areas mentioned below are being planned.

Table 46: Key water supply projects planned/proposed

SL NO.	PROPOSED AREA OF INVESTMENT	SCHEME PROPOSED	DETAILS
1	Augmentation of water supply under the current joint scheme	Proposed project for source augmentation of 125 MLD for supply to all the municipal councils. To be executed by MMRDA.	Capex required (DPR): Rs 672.90 Cr
2	Installation of meters	No proposed scheme	

Source: Navghar Manikpur Municipal Council and MJP

The source augmentation project mentioned in the above table is currently under preparation and no approval has been received. Since the current proposal is at best an estimate and no decision has been taken on the same, this project has not been considered while exploring the PPP alternatives for water supply operations at Navghar Manikpur.

1.77 Step 2: Choice between public funding and PPP option

Having undertaken the assessment of the existing status of the water supply services in the city, identification of key issues there on and a brief review of the projects identified by the city, the next stage in the entire process as indicated in Volume I of the toolkit is the choice that is to be made between the public mode of funding and implementation of the proposed project and the private or the PPP based mode of developing and implementation of the project.

As per the assessment, there is no major capital investment needed and the operation of the water supply system is at a satisfactory level. In such a scenario, the only area of improvement is ensuring that all connections are metered and the consumers are charged on the basis of their consumption. This will also reduce the wastage of water.

In such a scenario, the only area of improvement is installation of meters and improved efficiency in billing and collection. A preliminary financial analysis has been undertaken in the context of exploring PPP for undertaking the metering, billing and collection activity.

1.77.1 Viability assessment

As indicated above, the only area of improvement in the overall water supply services in Virar is that of introduction of metering in the system. This may be done under a PPP structure where in the activity of metering, billing and collection of water supply charges is outsourced to a private operator. The viability assessment have been carried out in the context of assessing whether Navghar Manikpur Municipal Council should undertake the investments required for installation of meters, their operation and management and also generate bills and collect the same, or whether the same activity can be managed better by a private developer.

For undertaking the preliminary financial analysis a set of key assumptions have been used which have been indicated in the table below.

Table 47: Key Assumptions

PARTICULARS	ASSUMPTIONS
Cost of a meter (including installation charges)	Rs. 4000 per meter
Cost of computer software	Rs. 1,00,000 (one- time cost)
Maintenance cost of meters	8% of capex.
Computer software maintenance cost	15% of capex.
Meter connection charges	Rs. 1000 per meter
Increase in water tariff	3% per annum
Population growth rate (CAGR)	8.1% per annum
Tariff	Volumetric tariff of Rs. 8 per KL[47]
Collection Efficiency	95% - in case of both ULB and PPP
Period of contract / evaluation	Period of 5 years upto 2013
Cost Reduction efficiency (O&M costs)	0% - in case of ULB
	20% - in case of PPP

Based on the assumptions stated in the preceding table, the preliminary financial assessment has been undertaken to review the viability of undertaking the project under two scenarios. The first scenario is Option 1 wherein the investments identified for the proposed metering, billing and collection activity is made by Navghar Manikpur Municipal Council. The second scenario, under Option 2 is where the investments identified for the proposed metering, billing and collection activity is to be fully funded by the private developer.

Option 1: Metering, billing and collection by Navghar Manikpur Municipal Council

The municipal council shall have to invest a total capital expenditure of Rs. 4 crores (in the first year) and also incur an operations cost of Rs. 1 crore per annum. With metering and a volumetric tariff, the municipal council shall earn water supply charges of Rs. 48 crores by 2013.

[47] In the absence of any GB Resolution, the volumetric tariff of a town of similar nature has been considered.

Option 2: Metering, billing and collection by a private operator

Since the Navghar Manikpur is highly efficient in the management of it's operations and has a high revenue collection efficiency, there is limited scope for the private operator to bring in further efficiency. Thereby, the private operator too will incur the same amount of capital expenditure and generate almost equivalent water charges as mentioned in Option 1.

The details on the financial workings for the above mentioned assessment can be found in the Annexure that has been attached with this report.

Hence, PPP in metering, billing and collection shall not be highly beneficial to Navghar Manikpur Municipal Council. It can implement the metering activity by obtaining grant from government schemes including Maharashtra Sujal Nirmal Abhiyan.

1.78 Step 3: Choosing the structure of the PPP arrangement

Having assessed the viability of developing the proposed project through a public funded or PPP mode of the next step decision which needs to be made is regarding the choice of PPP structure which is best suited to address the overall needs of the proposed project.

Since the above mentioned structure wherein the private developer would make the investments for the installation of the meters and would also be responsible for overseeing their operations and generate bills and collect the same, the PPP structure suitable here is that of a PPP agreement for ***Metering, Billing and Collection.***

Under the service management contract for metering, billing and collection, the private developer would be required to undertake investments for installation of meters at the consumer end, oversee their operation and maintenance, maintain a computerized data recording system, generate bills and collect user charges from the consumers. The private developer would not be required to undertake any other activity in the entire chain of water supply services. The type of meter to be installed and the number of connections where the meter is to be installed would be specified by the ULB. The tariff to be levied would also be determined by the ULB. The performance standards laid out by the ULB would specify the revenue collections target to be achieved, the extent of meter functional levels which need to be maintained, etc. The cost of purchase of the meter and the installation of the same would be generally recovered by the private developer from the consumers as part of the water supply service bills.

For the operation and maintenance activity undertaken by the private developer, a fixed annuity payment is made by the ULB. This annuity amount would generally be the bidding parameter.

1.79 Step 4: Procurement

Having identified the PPP structure to be adopted for operating and maintaining the proposed project, and finalising the same, the next stage is to plan the procurement process. For initiating the procurement process, Navghar Manikpur Municipal Council would need to develop a transaction

structure which would cover the aspects relating to details on the parties involved in the contract, the contractual relationship between the parties, the nature of the arrangement, the risk allocation, the tariff to be levied, duration of the contract, the performance indicators, payment terms, award criteria and contract management strategy. The details can be found in the term sheet attached in Volume IV of this report.

SHIRPUR

1.80 Brief introduction to Shirpur

Shirpur is a city located in the Dhule district of Maharashtra. With a current population of 75,000 (61,294 as per 2001 Census), the city in recent years has seen an increase in its industrial activity. The city is spread over an area of 9 sq. km and has an estimated 12,000 households. The city is managed by the Shirpur Warvade Municipal Council (SWMC). SWMC has a total revenue budget of Rs. 9.69 crores with a surplus in its revenue account to the tune of Rs. 3.76 crores (2007-08).

The water supply works in the city is managed by SWMC and it incurs a deficit to the tune of Rs. 9 lakhs from its water supply operations. The city, however, has no unpaid liabilities on its water account.

1.81 Existing water supply system at Shirpur

Shirpur has a total water supply of 9 MLD. The city has 2 main water source i.e. Tapi River (at a distance of 8.5 km) and the Karvand Dam (at a distance of 8 km). The treated water available for consumption is 97 lpcd. Water is supplied daily for one and a half hour. The total number of direct connections to the city is 9,249, all of which are not metered. A basic profile of the water supply system of SWMC has been presented in the table below.

Table 48: Basic profile of water supply services in Shirpur

SHIRPUR UTILITY PROFILE			
Key infrastructure components	Bulk supply		9 MLD
		Tapi River	4 MLD
		Karvand Dam	5 MLD
	Water availability after treatment		97 lpcd
	Water Treatment Capacity	Ganesh Colony + Wazari Road	12 MLD
	Storage Capacity	4 Elevated Storage Reservoirs	6.6 MLD
		2 Ground Storage Reservoirs	2.3 MLD
	Distribution network		34 km
	Connections		9,249
Water Supply Financials (FY-2007-08)	Water Account Revenue		Rs 0.97 crores
	Annual O&M costs		Rs 1.06 crores
Tariff	Flat Tariff (	Domestic (p.a)	Rs 1,000
		Non- Domestic (p.a)	Rs 4,600

SHIRPUR UTILITY PROFILE			
		Special categories (p.a.)	Rs 2,000

Source: Shirpur Municipal Council

1.82 Step 1: Identification of the problem area

As a first step to assessing the status of the water supply services in the city of Jalna, the problem areas in the existing services in the existing system needs to be carried out. Doing this would highlight the interventions required in improvement to the level of services. As the first activity which needs to be undertaken in this regard, the service assessment has been undertaken on the basis of a few key performance criteria. On the basis of the assessment, the key issues in the current system would need to be identified and the existing projects reviewed. It is to be noted here that the assessment presented here for Shirpur is based only on few key parameters. For a detailed review, as has been discussed in Volume I of the toolkit, the ULB would be required to carry out consumer survey, water audit, leak detection and energy audit for the entire value chain of water supply services. The key performance parameters used have been presented below:

1.82.1 Compiling key parameters

Based on the preliminary analysis of water supply service data[48] and discussions with SWMC officials, CRISIL assessed the current water supply system in Shirpur. Table 49 presents the key indicators for assessing the water supply system at Shirpur.

Table 49: Key water supply indicators for Shirpur

PERFORMANCE AREA	NORM	SHIRPUR	KEY INFERENCE
Bulk Water			
Supply (Per capita treated water available for consumption)	70 lpcd	97 lpcd	The treated water available for consumption is 97 lpcd (7.3 MLD) which is higher than the CPHEEO norm of 70 lpcd for towns with piped water supply without sewerage systems. The city therefore does need to augment its bulk water supply.
Treatment			
WTP capacity	100%	100%	The current installed WTP capacity is sufficient and has been operating as per the required standards.

[48] In the absence of a water or energy audit report, the data provided by the Municipal representatives has been considered for all the assessments. The actual technical losses may be more or less than that stated and can be verified only if water audit is undertaken along with consumer survey.

PERFORMANCE AREA	NORM	SHIRPUR	KEY INFERENCE
Treatment loss	Less than 3%	3%	The treatment loss levels are considered to be as per norm.
Transmission and Distribution			
Losses	Less than 15%	15 %[49]	Minimal transmission losses. The current levels do not therefore require replacement or rehabilitation of pipelines.
Consumer			
Coverage (Connections / Total Households)	100%	100%[50]	On an average, in SWMC, each connection serves five households. Therefore, the existing connections indicate full coverage. The city has no public stand posts.
Metering / Total Connections	100%	0%	No meters are installed at the consumer end. A flat tariff system based on the pipe diameter is prevalent.
Duration of water supply	24 hours	1.25 hours each day	The number of supply hours need to be increased.
O&M cost recovery	100%	91%	The current cost recovery levels require to be improved. It would be important to review the flat rates and adopt a volumetric tariff structure to reflect more accurate revenue demand levels.
Unit production cost Unit income		Rs.3.24/KL Rs.2.95/KL	There is a need to increase operational efficiency and reduce energy costs in order to improve cost recovery.
Collection efficiency	100%	93%[51]	Collection efficiency level is satisfactory.

Source: CRIS analysis and discussion with SWMC officials

[49] As per SWMC officials, there is no loss at the distribution end. In the absence of bulk meters and consumer end meters, there is no accurate method to ascertain the loss level. It is assumed that minimum of 15% losses are inevitable due to friction and leakages. For analysis purpose, therefore the minimal loss levels have been considered.

[50] SWMC officials indicate that one connection serves 5 households. However, it would be prudent for SWMC to undertake water supply audits and also maintain detailed consumer database to ensure full coverage levels.

[51] Collection efficiency has been measured against current demand raised vis-à-vis the current collections

1.82.2 Identification of the key issues

As indicated earlier, the next stage following the assessment of the water supply services in Shirpur is that of listing of the key issues which is being faced in the city. After the assessment of the services, the ULB should necessarily clearly list down all the service and infrastructure related issues being faced by the current water supply system in the city. Based on the status of the water supply system, key indicators and the resultant inferences, the following areas appear to need investment on a priority basis:

- Installation of meters and adoption of a volumetric-based tariff system
- Undertaking water supply and energy audits to ascertain loss levels

1.82.3 Review of the water supply projects

As per discussions with SWMC officials, it is understood that currently no projects have been proposed in the water supply sector for Shirpur.

1.83 Step 2: Choice between public funding and PPP option

Having undertaken the assessment of the existing status of the water supply services in the city, identification of key issues there on and a brief review of the projects identified by the city, the next stage in the entire process as indicated in Volume I of the toolkit is the choice that is to be made between the public mode of funding and implementation of the proposed project and the private or the PPP based mode of developing and implementation of the project.

As per the assessment, there is no major capital investment needed and the operation of the water supply system is at a satisfactory level. In such a scenario, the only area of improvement is ensuring that all connections are metered and the consumers are charged on the basis of their consumption. This will also reduce the wastage of water.

In such a scenario, the only area of improvement is installation of meters and improved efficiency in billing and collection. A preliminary financial analysis has been undertaken in the context of exploring PPP for undertaking the metering, billing and collection activity.

1.83.1 Viability assessment

As indicated above, the only area of improvement in the overall water supply services in Virar is that of introduction of metering in the system. This may be done under a PPP structure where in the activity of metering, billing and collection of water supply charges is outsourced to a private operator. The viability assessment have been carried out in the context of assessing whether SWMC should undertake the investments required for installation of meters, their operation and management and also generate bills and collect the same, or whether the same activity can be managed better by a private developer.

For undertaking the preliminary financial analysis a set of key assumptions have been used which have been indicated in the table below.

Table 50: Key Assumptions

PARTICULARS	ASSUMPTIONS
Cost of a meter (including installation charges)	Rs. 4000 per meter
Cost of computer software	Rs. 1,00,000 (one- time cost)
Maintenance cost of meters	8% of capex.
Computer software maintenance cost	15% of capex.
Meter connection charges	Rs. 1000 per meter
Increase in water tariff	3% per annum
Population growth rate (CAGR)	2.55% per annum
Tariff	Volumetric tariff of Rs. 8 per KL[52]
Collection Efficiency	93% - in case of both SWMC and PPP
Period of contract / evaluation	Period of 5 years upto 2013
Cost Reduction efficiency (O&M costs)	0% - in case of SWMC
	20% - in case of PPP

Based on the assumptions stated in the preceding table, the preliminary financial assessment has been undertaken to review the viability of undertaking the project under two scenarios. The first scenario is Option 1 wherein the investments identified for the proposed metering, billing and collection activity is made by SWMC. The second scenario, under Option 2 is where the investments identified for the proposed metering, billing and collection activity is to be fully funded by the private developer.

Option 1: Metering, billing and collection by Shirpur Warvade Municipal Council

SWMC shall have to invest a total capital expenditure of Rs. 5 crores (in the first year) and also incur an operations cost of Rs. 1 crore per annum. With metering and a volumetric tariff, SWMC shall earn water supply charges of Rs. 5 crores by 2013. SWMC with a revenue surplus of Rs. 3.76 crores has the capacity to install and maintain meters.

Option 2: Metering, billing and collection by a private operator

Since Shirpur is highly efficient in the management of it's operations and has a high revenue collection efficiency, there is limited scope for the private operator to bring in further efficiency. Thereby, the private operator too will incur the same amount of capital expenditure and generate almost equivalent water charges as mentioned in Option 1.

Hence, PPP in metering, billing and collection shall not be highly beneficial to Shirpur Warvade Municipal Council. It can implement the metering activity through funding from internal funds or by obtaining a grant from government schemes including Maharashtra Sujal Nirmal Abhiyan.

[52] In the absence of any GB Resolution, the volumetric tariff of a town of similar nature has been considered.

AKOT

1.84 Brief introduction to Akot

The city of Akot is a B class municipal council in the Akola district of Maharashtra. The city is governed by the Akot Municipal Council (AMC) and encompasses an area of 14.34 sq. km. With a current population of 1 lakh (81,000 as per the 2001 Census) the city has an estimated 18,600 households. AMC has a total revenue budget of Rs. 7.21 crores (2007-08) and generates a revenue surplus of Rs 0.04 crores.

The water supply works including the billing and collection activity is currently operated and managed by Maharashtra Jeevan Pradhikarna (MJP). All the revenue income and expenditure activity for the water supply works are thereby fully overseen by MJP.

1.85 Existing water supply system

Akot with a total water supply of 3.4 MLD draws water primarily from the Wan Dam. It receives water from a joint scheme (including Akot and 84 villages in the surrounding areas) operated by MJP. The total treated water available for the citizens is 2.8 MLD (27.4 lpcd). Water is available for three hours each day and is supplied through individual connections and public stand posts. A basic profile of the water supply system of AMC has been presented in the table below.

Table 51: Basic profile of water supply services in Akot

AKOT UTILITY PROFILE			
Key infrastructure components	Bulk supply		3.4 MLD
		Wan Dam	1.9 MLD
		Bore well	1.5 MLD
	Water availability for consumption		27.4 lpcd
	Water Treatment Capacity (for the joint scheme)		16 MLD
	Storage Capacity	Elevated Storage Reservoirs	1.81 MLD
	Distribution network		38 km
	Connections		6,913
Water Supply Financials(FY-2007-08)	Water account revenue		Rs 0.46 crores
	Annual O&M costs		Rs 1.44 crores
Tariff	Flat Tariff	Domestic (p.a)	15mm: Rs 300 20mm: Rs 460 25mm: Rs 890
		Commercial (p.a)	15mm: Rs 100

AKOT UTILITY PROFILE			
	Volumetric Tariff	Domestic	20mm: Rs 205 25mm: Rs 385
			Rs. 10.20 per KL
		Commercial	Rs. 46.20 per KL

Source: MJP and Akot Municipal Council

1.86 Step 1: Identification of the problem area

As a first step to assessing the status of the water supply services in the city of Akot, the problem areas in the existing services in the existing system needs to be carried out. Doing this would highlight the interventions required in improvement to the level of services. As the first activity which needs to be undertaken in this regard, the service assessment has been undertaken on the basis of a few key performance criteria. On the basis of the assessment, the key issues in the current system would need to be identified and the existing projects reviewed. It is to be noted here that the assessment presented here for Jalna is based only on few key parameters. For a detailed review, as has been discussed in Volume I of the toolkit, the ULB would be required to carry out consumer survey, water audit, leak detection and energy audit for the entire value chain of water supply services. The key performance parameters used have been presented below:

1.86.1 Compiling key parameters

Based on the preliminary analysis of water supply service data[53] and discussions with AMC officials, CRISIL assessed the current water supply system in Akot. Table 52 presents the key indicators for assessing the water supply system at Akot and the resultant inferences.

Table 52: Key water supply indicators for Akot

PERFORMANCE AREA	TYPICAL NORM	AKOT	KEY INFERENCE
Bulk Water			
Supply [Per capita treated water available for consumption]	70 lpcd	29 lpcd	The level of water supply to the city is highly inadequate. The city needs to augment its bulk water supply immediately. The carrying capacity of the raw water transmission lines is inadequate to source additional raw water from the source. The size of the transmission lines need to be augmented.
Treatment			

[53] In the absence of a water or energy audit report, the data provided by the Municipal representatives has been considered for all the assessments. The actual technical losses may be more or less than that stated and can be verified only if water audit is undertaken along with consumer survey.

PERFORMANCE AREA	TYPICAL NORM	AKOT	KEY INFERENCE
WTP capacity	100%	100%	The installed capacity of WTP is part of the combined scheme for Akot and 84 surrounding villages. 22% of the installed capacity of WTP is utilized for Akot. If the bulk water supply to the city is augmented significantly, there may arise, a need for augmentation of the WTP.
Treatment loss	Less than 3%	3%	Current loss levels are as per minimal acceptable standards.
Transmission and Distribution			
Losses	Less than 15%	15%[54]	The current loss levels are as per minimal acceptable levels.
Consumer			
Coverage	95% to 100%	74%	Assuming that each connection serves two households, the city should have at least 9300 connections. The coverage needs to be improved.
Metering	100%	10 %	All the connections should be metered.
Duration of water supply	24 hours	3 hours	Inadequate supply hours.
O&M cost recovery	100%	32 %	The high production cost coupled with poor collection efficiency results in poor level of recovery.
Unit production cost Unit income		11.24 Rs./KL 3.60 Rs./KL	Per unit realization is extremely low.
Collection efficiency	100%	18%	The level of collection efficiency is extremely poor and needs to be improved drastically.

Source: CRIS analysis based on data given by MJP and Akot Municipal Council

1.86.2 Identification of the key issues

As indicated earlier, the next stage following the assessment of the water supply services in Jalna is that of listing of the key issues which is being faced in the city. After the assessment of the services, the ULB should necessarily clearly list down all the service and infrastructure related issues being faced by the current water supply system in the city. Based on the status of the water supply system, key

[54] In the absence of 100% metering, it is not possible to accurately estimate the actual levels of distribution loss. The loss level assumed here as per MJP officials.

indicators and the resultant inferences, the following areas appear to need investment on a priority basis

- Augmentation of bulk water supply to the city
- 100% metering
- Improvement in the overall operational efficiencies of the system

1.86.3 Review of the water supply projects with approved DPRs

Having identified the key issues in the existing status of provisioning of water supply services in the city, the next activity to be undertaken is that of undertaking a brief review of the projects that have already been identified for Jalna under various schemes for improvement of the water supply services. AMC and MJP have under the UIDSSMT scheme identified the following projects for the water supply sector.[55]

Table 53: Proposed water supply projects (Akot)

POTENTIAL AREA OF INVESTMENT	SCHEME PROPOSED	DETAILS
Augmentation of bulk water supply to Akot city from the existing Wan Dam source and expansion of the distribution network in the city.	Proposed under UIDSSMT scheme It includes augmentation of water supply by 21 MLD, construction of raw water rising mains, augmentation of the WTP capacity to 21 MLD, and expansion of the distribution network by 80 km	DPR cost: Rs. 45 Cr, of which 20 cr is approved Total capital cost(incl. escalation) : Rs 54 Cr UIDSSMT grant- Rs 18 Cr AMC's contribution- Rs 36 Cr

Source: MJP and Akot Municipal Council

1.87 Step 2: Choice between public funding and PPP option

Having undertaken the assessment of the existing status of the water supply services in the city, identification of key issues there on and a brief review of the projects identified by the city, the next stage in the entire process as indicated in Volume I of the toolkit is the choice that is to be made between the public mode of funding and implementation of the proposed project and the private or the

[55] It is to be noted here that for the purpose of this assessment, a due diligence on the project components and costs has not been undertaken.

PPP based mode of developing and implementation of the project. For doing so the first step that is required to be undertaken is that of undertaking a viability assessment as indicated below:

1.87.1 Viability assessment

As mentioned earlier a preliminary financial analysis has been undertaken to assess the viability of the projects identified. This assessment has been for the purposed of assessing the commercial viability of the project if it is to be developed on a PPP mode. The viability assessment undertaken in the following sections have largely focused on determining whether the public sector. viz. AMC or the private sector has the financial wherewithal to undertake the project. The investment need under both the scenarios has been looked at. Additionally, for assessing the viability of the project from the private sector perspective the option of a Viability Gap Fund (VGF) has also been considered.

For undertaking the financial analysis a set of key assumptions have been used which have been indicated in the table below. From the DPR review presented, it can be observed that Akot plans to undertake projects worth Rs. 54 crores by 2011-12. CRISIL undertook a preliminary financial analysis to understand the applicability of PPP to the above-mentioned project. The key assumptions of the analysis have been outlined in Table 54.

Table 54: Assumptions of preliminary financial analysis

PARTICULARS	ASSUMPTIONS
Phasing of capital expenditure	Over a period of 4 years
Raw water transmission losses	2%
Treatment Losses	2%
Distribution Losses	20% - in case managed by AMC
	15 % - in case managed by AMC
Tariff[56]	Rs 4.20 [57]per KL with 3% revision every year
Collection Efficiency	Phased from 18% to 70% - in case of AMC
	Phased from 30% to 90% - in case of private developer
Cost Reduction Efficiency (On operations)	0% - in case managed by AMC
	20% - in case managed by private party (only upto 2015)

[56] It is the weighted volumetric tariff calculated on the basis of the current tariff structure.

[57] As per MJP officials, Rs4.20 has been currently decided to be the new tariff rate post implementation of the scheme. The current tariff of Rs. 10.20 per KL shall be applicable only up to 2011-2012.

Based on the assumptions stated in the preceding table, the preliminary financial assessment has been undertaken to review the viability of undertaking the project under two scenarios. The first scenario is Option 1 wherein the investments identified for the proposed projects is made by AMC. The second scenario, under Option 2 is where the investments identified for the proposed projects is to be fully funded by the private developer.

Option1: Public funding- investments by AMC

AMC would have to invest a total of Rs. 36 crores (excluding grant amount) and in addition incur the operations cost of an average of Rs.3.5 crores per annum[58]. This results in a net cash flow (NPV) of Rs. 37 crores. However, AMC has a revenue surplus of Rs. 0.04 crores only. Thus, it is not in a position to undertake such investment.

Option 2: Private funding - investments by private developer

If the investment gap of Rs. 36 crores and the year-on-year operation cost of Rs. 1.35 crores (considered up till 2030) is to be incurred by the private developer, then the private developer would require a viability gap funding od Rs. 23 crores. This is inspite of improved operational and managerial efficiencies brought in by the developer and revenue retained by the developer. The existing UIDSSMT grant of Rs. 17.6 crores and the VGF requirement of Rs. 23 crores indicate 76% of the total project cost being funded by the government. This high extent of grant requirement would therefore defeat the purpose of taking up the project on a PPP basis. Hence, it is not advisable to undertake the project on a PPP basis. Table 55 presents the investment requirement under each of the options.

Table 55: Investment requirement with a PPP

PARTICULARS	CAPITAL EXPENDITURE (RS. CRORES)	IN CASE OF INVESTMENT AND OPERATIONS BY AMC	IN CASE OF INVESTMENT AND OPERATIONS BY PRIVATE OPERATOR
DPR Cost	45.6		
Escalated Cost	53.5		
Grant	17.6		
AMC share (expected) but envisaged to be sourced from Private Operator [A]	1.95		
Viability Gap from Private Sector [B]		[NPV@14%]	[NPV@14%]
Total investment required (A+B)	35.9	37	23

[58] The operations cost incurred by AMC is higher than the private operator since it does not have cost efficiency

The details on the financial workings for the above mentioned assessment can be found in the Annexure that has been attached with this report.

As discussed above, AMC may find it difficult to implement the project on its own and it does not have the financial capability to meet the investment gap. Similarly, even if a private developer were to undertake the investments, the overall account would continue to be in a deficit and it shall not be profitable for the private developer either. With 76% funding from the government, it is not feasible to have a concession for this project on a PPP basis.

1.88 Step 3: Choosing the structure of the PPP arrangement

Having assessed the viability of developing the proposed project through a public funded or PPP mode of the next step decision which needs to be made is regarding the choice of PPP structure which is best suited to address the overall needs of the proposed project.

From the viability assessment undertaken, it is observed that the investment requirements for the project are large and AMC on its own would not be able to develop and operate and manage the project. Also, assessment of the private sector viability for undertaking the project also indicates that the project is not commercially feasible for a private developer given the current investment requirements and the operation costs involved.

In such a scenario the State Government shall have to provide additional financial support to put in place the physical infrastructure for the project. However, for operations and management of the water supply system, a private developer can be appointed under a performance based management agreement.

The performance-based management contract is one where the private developer is required to undertake the activity of operation and maintenance of the entire water supply system from source to the consumer end including metering, billing and collection of revenues. Herein, all the capital investments needed for improvement to the water supply and sewerage services would have to be borne by the public sector. The operating standards are as prescribed by the ULB. The private developer is given the rights to levy the user charges set by the ULB, collect the charges and hand over the same to the ULB. For the activities carried out, the ULB would make a performance based payment to the private developer.

The details of the obligations, risks and payment arrangements under the performance-based management contract, as mentioned above have been provided in Volume II of this report. Additionally, the term sheet for this contract structure has been attached in Volume IV of this report

1.89 Step 4: Procurement

Having identified the PPP structure to be adopted for operating and maintaining the proposed project, and finalising the same, the next stage is to plan the procurement process. For initiating the procurement process, AMC would need to develop a transaction structure which would cover the aspects relating to details on the parties involved in the contract, the contractual relationship between

the parties, the nature of the arrangement, the risk allocation, the tariff to be levied, duration of the contract, the performance indicators, payment terms, award criteria and contract management strategy. The details can be found in the term sheet attached in Volume IV of this report.

SAONER

1.90 Brief introduction to Saoner

Saoner is a town and a tehsil headquarters of the north part of Nagpur district in the state of Maharashtra. The town has an area of 3.8 sq. km and a current population of 30,000 (28,712 as per 2001 Census). The town is managed by the Saoner Municipal Council (SMC) and has an estimated 8,000 households.

The water supply works are managed by SMC itself. SMC incurred a deficit to the tune of Rs. 39 lakhs on its water supply operations in 2007-2008. The council however has no unpaid liabilities on its water account.

1.91 Existing water supply system

Saoner has a total water supply of 1.86 MLD, of which, 1 MLD is from the Kanan river (12 km from city) and 0.86 MLD from the Kolar river (2 kms from city). There are two Water Treatment Plants (WTP) in the town located at the Kolar headworks site, and the other at Khapar road.

Saoner receives treated water supply of approximately 47 litres per capita day (lpcd) at the consumption point. Water supply is provided on an average for an hour each day and is supplied through individual connections and public stand posts. The town has 3,694 direct service connections. A basic profile of the water supply system of SMC has been presented in the table below.

Table 56: Basic profile of water supply services in Saoner

SAONER UTILITY PROFILE			
	Bulk supply		1.86 MLD
		Kanan river	1 MLD
		Kolar river	0.86 MLD
	Water Treatment Capacity	Kolar river	1.89 MLD
		Khapar road	5 MLD
	Water availability after treatment		46 lpcd
	Storage Capacity	2 Elevated Storage Reservoirs	11.5 MLD
	Distribution network		32 km
	Connections		3,694
Water Supply Financials (FY-2007-08)	Water Account Revenue		Rs 0.31 crores
	Annual O&M costs		Rs 0.52 crores
Tariff	Flat Tariff	Domestic (p.a)	½ inch: Rs 926 ¾ inch: Rs 1,795

SAONER UTILITY PROFILE			
			1 inch: Rs 4,022
		Non-Domestic (p.a)	½ inch: Rs 4,060 ¾ inch: Rs 7,738 1 inch: Rs 16,872

Source: Saoner Municipal Council

1.92 Step 1: Identification of the problem area

As a first step to assessing the status of the water supply services in the city of Jalna, the problem areas in the existing services in the existing system needs to be carried out. Doing this would highlight the interventions required in improvement to the level of services. As the first activity which needs to be undertaken in this regard, the service assessment has been undertaken on the basis of a few key performance criteria. On the basis of the assessment, the key issues in the current system would need to be identified and the existing projects reviewed. It is to be noted here that the assessment presented here for Saoner is based only on few key parameters. For a detailed review, as has been discussed in Volume I of the toolkit, the ULB would be required to carry out consumer survey, water audit, leak detection and energy audit for the entire value chain of water supply services. The key performance parameters used have been presented below:

1.92.1 Compiling key parameters

Based on the preliminary analysis of water supply service data[59] of the SMC and discussions with the representatives of SMC, a few key indicators of the efficiency and adequacy of water supply services have been developed. These indicators highlight the key issues faced by SMC in the water supply sector.

Table 57: Key water supply indicators for Saoner

PERFORMANCE AREA	TYPICAL NORM	SAONER	KEY INFERENCE
Bulk Water			
Supply (Per capita treated water available for consumption)	70 lpcd[60]	47 lpcd	The water available for consumption is very low. The sand content at the source is extremely high. As a result, the jackwell gets blocked and SMC is unable to draw sufficient water. There is no need for augmentation of the source. The necessary machinery for sorting of sand

[59] In the absence of a water or energy audit report, the data provided by the Municipal representatives has been considered for all the assessments. The actual technical losses may be more or less than that stated and can be verified only if water audit is undertaken along with consumer survey.

[60] As per CPHEEO norms, the total water supplied to consumers after treatment should be 70 lpcd for towns with piped water supply and no sewerage system.

PERFORMANCE AREA	TYPICAL NORM	SAONER	KEY INFERENCE
			needs to be set.
Treatment			
WTP capacity	100%	100%	The capacity of the existing treatment plant exceeds the requirement. Since the current bulk supply is much lower than the installed capacity, the utilization of the WTP is limited to 27%. Currently, there is no need for augmenting the WTP capacity.
Loss	Less than 3%	2%	As per norms
Transmission and Distribution			
Losses	Less than 15%	25%	Moderate level of transmission losses. However, raw water transmission loss levels are high due to corroded pipelines and would need to be repaired/ replaced to contain the losses to minimum acceptable standards. In the absence of consumer meters, accurate estimates of the distribution loss cannot be ascertained.
Consumer			
Coverage (Connections / Total Households)		46%[61]	Poor coverage levels. The low coverage has been accounted to inadequate distribution network. The current distribution network is a part of a 40-year-old scheme and requires expansion. Additional direct connections need to be provided.
Metering / Total Connections	100%	0 %	All water connections need to be provided with meters.
Duration of water supply	24 hours	1 hour supply on an average	Current levels are not adequate and need to be increased.
O&M cost recovery	100%	25%	Poor cost recovery levels. The current tariff levels would require revision. Additionally, SMC would need to pursue cost reduction efficiency measures to contain the expenditure incurred.
Unit production cost Unit income		Rs.7.66/KL Rs.1.91/KL	There is a need to increase operational efficiency and reduce energy costs in order to improve cost recovery.
Collection efficiency	100%	87 %	Indicates scope for improvement in collection efficiency.

Source: CRIS analysis and data provided by SMC

[61] As per SMC officials, one connection serves one household unit.

1.92.2 Identification of the key issues

As indicated earlier, the next stage following the assessment of the water supply services in Jalna is that of listing of the key issues which is being faced in the city. After the assessment of the services, the ULB should necessarily clearly list down all the service and infrastructure related issues being faced by the current water supply system in the city. Based on the status of the water supply system, key indicators and the resultant inferences, the following areas appear to need investment on a priority basis:

- Bulk water supply augmentation
- Increasing the water supply by setting up a sand sifting machinery near the source
- Rehabilitation and or replacement of existing raw water transmission lines and expansion of distribution network
- Establishment of meters for all water connections

1.92.3 Review of the water supply projects with approved DPRs

Having identified the key issues in the existing status of provisioning of water supply services in the city, the next activity to be undertaken is that of undertaking a brief review of the projects that have already been identified for Jalna under various schemes for improvement of the water supply services. In the context of the issues faced at Saoner, SMC has proposed a water supply project. The DPR for the proposed project is at present in its final stages of completion and the project is yet to be submitted for approval. The details of the proposed water supply projects are tabled below. Since the proposal is currently being prepared, there are no escalation costs to be considered.

Table 58: Proposed water supply projects

POTENTIAL AREA OF INVESTMENT	SCHEME PROPOSED	DETAILS
Water supply augmentation, raw water transmission and expansion of the distribution network	Proposed under the Sujal Nirmal Abhiyaan scheme -- 7.5 MLD source augmentation scheme including raw water rising main, pure water pumping main, 42 km of distribution network	Capex Required (DPR) – Rs. 7.39 Cr. GoM Grant – Rs. 6.7 crores SMC contribution –Rs. 73 lakhs

Source: Data provided by SMC

1.93 Step 2: Choice between public funding and PPP option

Having undertaken the assessment of the existing status of the water supply services in the city, identification of key issues there on and a brief review of the projects identified by the city, the next

stage in the entire process as indicated in Volume I of the toolkit is the choice that is to be made between the public mode of funding and implementation of the proposed project and the private or the PPP based mode of developing and implementation of the project. For doing so the first step that is required to be undertaken is that of undertaking a viability assessment as indicated below:

1.93.1 Viability assessment

As mentioned earlier a preliminary financial analysis has been undertaken to assess the viability of the projects identified. This assessment has been for the purposed of assessing the commercial viability of the project if it is to be developed on a PPP mode. The viability assessment undertaken in the following sections have largely focused on determining whether the public sector. viz. SMC or the private sector has the financial wherewithal to undertake the project. The investment need under both the scenarios has been looked at. Additionally, for assessing the viability of the project from the private sector perspective the option of a Viability Gap Fund (VGF) has also been considered.

From the project details, it can be observed that Saoner plans to undertake projects worth Rs. 7.39 crores up to 2011-12. For the same, SMC needs to arrange for a capital investment of Rs. 73 lakhs. It is understood in discussion with SMC officials that the project is already underway and the investment gap would be met by SMC.

Since SMC has already arranged the funding for the proposed projects and investment has already been undertaken, the project cannot be undertaken on a PPP basis. However, the operations and management of the water supply system on the completion of this project on a PPP basis can be explored.

CRISIL undertook a preliminary financial analysis to understand the applicability of PPP for the operations and management of the water supply system. The key assumptions of the analysis have been outlined in Table 59.

Table 59: Assumptions of preliminary financial analysis

PARTICULARS	ASSUMPTION
Raw water transmission losses	2%
Treatment Losses	2%
Distribution Losses	20% - in case of SMC 15% - in case of private operator
Tariff[62]	Rs 3.01[63] with 3% revision every year
Collection Efficiency	92 % - in case of SMC 95 % - in case of private operator
Cost Reduction Efficiency	0% - in case of SMC 20% - in case of private operator

[62] It is the weighted volumetric tariff calculated on the basis of the current tariff structure.

[63] As per SMC officials post implementation of the proposed scheme, a tariff rate of Rs 3.01 per KL has been estimated to be implemented. From the year of implementation of the scheme an O&M of Rs 36 lakhs has been estimated by SMC. This estimate has been taken up as the base year O&M and escalated for the subsequent years.

Source: Preliminary financial analysis

Given the fact that the investment needs of SMC are currently being met with, we have undertaken an analysis to review the possibility of a PPP in operations and management of the water supply system alone. Two options have been considered for the same. Option 1- O&M activity is undertaken by SMC itself. Option 2- O&M activity is handed over to a private developer.

Option 1: Operation and Management of water supply services by SMC

If the water supply operations were to be undertaken by SMC for the period upto 2030, the council shall generate a net revenue (net present value) of Rs. 1.14 crores.

Option 2: Operation and Management of water supply services by private developer

If the water supply operations were to be undertaken by private operator for the period upto 2030, the council shall generate a net revenue (net present value) of Rs. 2.23 crores.

The details on the financial workings for the above mentioned assessment can be found in the Annexure that has been attached with this report.

Thereby, we can observe that undertaking the operations of the water supply system on a PPP basis provides a benefit to SMC of Rs. 1.10 crores only. If SMC increases it's collection efficiency from 87% to 95% and undertakes measures to reduce the expenditure on energy and manpower, then it can bridge this gap of Rs. 1.10 crores. Thereby, there is limited scope for PPP for investment and/or operations of the water supply system in Saoner.

CHIPLUN

1.94 Brief introduction to Chiplun

The city of Chiplun forms a part of the Ratnagiri district in Maharashtra. The city has a total area of 14.69 sq. km and a current population of 55,000 (46,000 as per Census 2001). It is managed by the Chiplun Municipal Council (CMC) having a revenue budget (2007-08) of Rs. 18.46 crores with a revenue deficit of Rs. 2.07 crores. The city has 4,935 households. With respect to its water account, the city has a deficit to the tune of Rs. 1.38 crores. There are no unpaid liabilities in the water account of CMC.

1.95 Existing water supply system

Chiplun draws 9 MLD of raw water from the Vashisti river located at a distance of ½ km from the city. Of the 9 MLD, approximately 7 MLD of water is supplied from the Kherdi headworks and 2 MLD from the Govalkot headworks. Raw water is treated at the WTPs, located at the site of the two headworks and is transmitted to the city. The treated water is supplied to end consumers through a 30 km long distribution network.

The total treated water available for consumption to the citizens is 6.9 MLD (126 lpcd). Water is available for two hours every day. The city has 5,668 individual connections. A basic profile of the water supply system of Chiplun has been presented in the table below.

Table 60: Basic profile of water supply services in Chiplun

CHIPLUN UTILITY PROFILE			
Key infrastructure components	Bulk supply		9 MLD
	Treated water available for consumption		125 lpcd
	Water Treatment Capacity	Kherdi headworks	7 MLD
		Govalkot head works	2 MLD
	Storage Capacity	2 Elevated Storage Reservoirs	0.67 MLD
		2 Ground Storage Reservoirs	4.90 MLD
	Distribution network		30 km
	Connections		5668
Water Supply Financials (FY-2007-08)	Water Account Revenue		Rs 0.68 crores
	Annual O&M costs		Rs 2.06 crores
Tariff	Flat tariff structure	Residential 15 mm	Rs 806 p.a

CHIPLUN UTILITY PROFILE			
		20 mm Commercial 15mm 20 mm	Rs 1550 p.a Rs 3500 p.a Rs 4000 p.a

Source: Chiplun Municipal Council

1.96 Step 1: Identification of the problem area

As a first step to assessing the status of the water supply services in the city of Jalna, the problem areas in the existing services in the existing system needs to be carried out. Doing this would highlight the interventions required in improvement to the level of services. As the first activity which needs to be undertaken in this regard, the service assessment has been undertaken on the basis of a few key performance criteria. On the basis of the assessment, the key issues in the current system would need to be identified and the existing projects reviewed. It is to be noted here that the assessment presented here for Jalna is based only on few key parameters. For a detailed review, as has been discussed in Volume I of the toolkit, the ULB would be required to carry out consumer survey, water audit, leak detection and energy audit for the entire value chain of water supply services. The key performance parameters used have been presented below:

1.96.1 Compiling key parameters

Based on the preliminary analysis of water supply service data[64] and discussions with CMC officials, CRISIL assessed the current water supply system in Chiplun. Table 61 presents the key indicators for assessing the water supply system at Chiplun.

Table 61: Key water supply indicators for Chiplun

PERFORMANCE AREA	NORM	CHIPLUN	KEY INFERENCE
Bulk Water			
Supply (Per capita consumption)	70 lpcd	126 lpcd	The supply of water to the citizens is very high as compared to the norms for a town with piped water supply and no sewerage system as per the CPHEEO norms. This indicates that the city has ample of water supply and there is no need for source augmentation.
Treatment			
WTP capacity	100%	100%	Existing installed capacity of the treatment plants is sufficient. However, the WTP at

[64] In the absence of a water or energy audit report, the data provided by the Municipal representatives has been considered for all the assessments. The actual technical losses may be more or less than that stated and can be verified only if water audit is undertaken along with consumer survey.

PERFORMANCE AREA	NORM	CHIPLUN	KEY INFERENCE
			Bawada is not functioning properly, being obsolete and requires up-gradation.
Treatment loss	Less than 3%	2%	Treatment loss is within the norms
Transmission and Distribution			
Losses	Less than 15%	22%	Moderate level of losses. The existing lines are approximately 30 years old and corroded and need replacement. The accurate estimate on distribution loss can be provided only once the meters are installed.
Consumer			
Coverage	95-100%	100%[65]	This is inclusive of only direct service connections.
Metering	100%	0%	No meters have been installed at the consumer end; flat tariff system is prevalent.
Duration of water supply	24 hours	2 hours each day	The supply hours and frequency is not adequate. CMC officials of the opinion that lack of staff is an issue resulting in poor service delivery in spite of abundance of water supply.
O&M cost recovery	100%	33%	High O&M costs primarily due to high energy costs. CMC needs to undertake an energy audit and implement cost reduction measures.
Unit production cost Unit income		Rs 6.27 / KL Rs 2.07/ KL	Per unit revenue realisation is very low primarily due to high operations cost.
Collection efficiency	100%	95%[66]	High level of collection efficiency.

Source: CRIS analysis and data provided by CMC

[65] It has been assumed that one water supply connection serves 2 households. It is important for CMC to maintain a detailed consumer database with details of each connection. In the absence of accurate database, the water supply coverage levels would be only estimates.

[66] Figure refers to current revenue collections against current demand raised

1.96.2 Identification of the key issues

As indicated earlier, the next stage following the assessment of the water supply services in Chiplun is that of listing of the key issues which is being faced in the city. After the assessment of the services, the ULB should necessarily clearly list down all the service and infrastructure related issues being faced by the current water supply system in the city. Based on the status of the water supply system, key indicators and the resultant inferences, the following areas appear to need investment on a priority basis:

- Undertaking rehabilitation and repair works for the distribution network pipelines
- Increasing the staff and service quality
- Undertaking leak detection study to ascertain the extent of technical and commercial losses
- Installation of meters and adoption of volumetric tariff

1.96.3 Review of the water supply projects with approved DPRs

Having identified the key issues in the existing status of provisioning of water supply services in the city, the next activity to be undertaken is that of undertaking a brief review of the projects that have already been identified for Chiplun under various schemes for improvement of the water supply services. CMC has identified the following projects for the water supply sector.[67]

Inspite of abundance of water supply, Chiplun has proposed a project for water source augmentation. This is with the objective of utilising the opportunity of the UIDSSMT funding and catering to it's future needs. This includes the construction of a new jackwell at the current offtake point for reducing the energy costs.

Table 62: Key water supply projects planned/proposed

SL NO.	PROPOSED AREA OF INVESTMENT	SCHEME PROPOSED	DETAILS
1	Augmentation of water supply, WTP system, rehabilitation of distribution system	**UIDSSMT:** 7.5 MLD source augmentation including Jackwell, intake well & pump house, pure water rising main works, distribution network rehabilitation	Capex Required (DPR)- Rs 9.56 Cr Capex Required (Escalated)- Rs 15 Cr UIDSSMT Grant: Rs 8.6 Cr CMC contribution: Rs 0.95 Cr Plus escalation: Rs 6.4 Cr

[67] It is to be noted here that for the purpose of this assessment, a due diligence on the project components and costs has not been undertaken.

Source: Chiplun Municipal Council

The project is currently underway and is expected to be completed by January 2010. CMC is currently in the process of arranging it's contribution to the project. Alternative arrangements – chiefly external borrowings -- are underway to meet the remaining investment requirement.

1.97 Step 2: Choice between public funding and PPP option

Having undertaken the assessment of the existing status of the water supply services in the city, identification of key issues there on and a brief review of the projects identified by the city, the next stage in the entire process as indicated in Volume I of the toolkit is the choice that is to be made between the public mode of funding and implementation of the proposed project and the private or the PPP based mode of developing and implementation of the project. For doing so the first step that is required to be undertaken is that of undertaking a viability assessment as indicated below:

From the project analysis, it can be observed that Chiplun is currently in the process of implementing projects to the tune of Rs. 15 crores, due to be completed by 2010. For the same, CMC needs to arrange for a capital investment of Rs. 7 crores. It is understood in discussion with CMC officials that the project is already underway and the investment gap would be met by CMC.

Since CMC has already arranged the funding for the proposed projects and investment has already been undertaken, the project cannot be undertaken on a PPP basis. However, the operations and management of the water supply system on the completion of this project on a PPP basis can be explored.

CRISIL undertook a preliminary financial analysis to understand the applicability of PPP for the operations and management of the water supply system. The key assumptions of the analysis have been outlined in Table 63.

Table 63: Assumptions of preliminary financial analysis

PARTICULARS	ASSUMPTIONS
Raw water transmission losses	2%
Treatment Losses	2%
Distribution Losses	20% - in case of CMC 15% - in case of private developer
Tariff[68]	Rs 3.5[69] per KL with 3% revision every year
Collection Efficiency	98%- in case managed by CMC
	98% - in case managed by private developer

[69] The current tariff structure is a flat rate basis. The volumetric tariff has been arrived at after computing the per KL cost of production. The tariff assumed here is an average of production cost of three consecutive years for the initial 3 years.

PARTICULARS	ASSUMPTIONS
	10%[70] - in case managed by CMC
Cost Reduction Efficiency	20% - in case managed by private party

Given the fact that the investment needs of CMC are currently being met with, CRISIL has undertaken an analysis to review the possibility of a PPP in operations and management of the water supply system alone. The first scenario is Option 1 wherein the investments identified for the proposed projects is made by CMC. The second scenario, under Option 2 is where the investments identified for the proposed projects are to be fully funded by the private developer.

Option 1: Operation and Management of water supply services by CMC

If the water supply operations were to be undertaken by CMC for the period upto 2030, the council shall have to bear a net loss (net present value) of Rs. 4.31 crores.

Option 2: Operation and Management of water supply services by private developer

If the water supply operations were to be undertaken by private operator for the period upto 2030, the council shall generate a net revenue (net present value) of Rs. 1.68 crores. This is primarily due to the reduction of distribution losses and operations cost as a result of operational efficiencies by the private developer.

Thereby, we can observe that undertaking the operations of the water supply system on a PPP basis provides a benefit to CMC of Rs. 6 crores. Thereby, CMC can undertake the operations and management of the water supply system on a PPP basis.

1.98 Step 3: Choosing the structure of the PPP arrangement

Having assessed the viability of developing the proposed project through a public funded or PPP mode of the next step decision which needs to be made is regarding the choice of PPP structure which is best suited to address the overall needs of the proposed project.

From the preliminary financial analysis it has been observed that for the improvement to the water supply and sewerage projects in the Chiplun, the suitable form of PPP contract is that of of a performance based management contract.

The performance-based management contract is one where the private developer is required to undertake the activity of operation and maintenance of the entire water supply system from source to the consumer end including metering, billing and collection of revenues. Herein, all the capital investments needed for improvement to the water supply and sewerage services would have to be borne by the public sector. The operating standards are as prescribed by the ULB. The private developer is given the rights to levy the user charges set by the ULB, collect the charges and hand over

[70] With the replacement of the jack well, the energy costs shall be reduced.

the same to the ULB. For the activities carried out, the ULB would make a performance based payment to the private developer.

The details of the obligations, risks and payment arrangements under the performance-based management contract, as mentioned in Option 2(b), have been provided in Volume II of this report. Additionally, the term sheet for this contract structure has been attached in Volume IV of this report.

1.99 Step 4: Procurement

Having identified the PPP structure to be adopted for operating and maintaining the proposed project, and finalising the same, the next stage is to plan the procurement process. For initiating the procurement process, CMC would need to develop a transaction structure which would cover the aspects relating to details on the parties involved in the contract, the contractual relationship between the parties, the nature of the arrangement, the risk allocation, the tariff to be levied, duration of the contract, the performance indicators, payment terms, award criteria and contract management strategy. The details can be found in the term sheet attached in Volume IV of this report.

KULGAON BADLAPUR

1.100 Brief introduction to Kulgaon Badlapur

The city of Kulgaon Badlapur is a part of the Thane district of Maharashtra. The city is managed by the Kulgaon Badlapur Municipal Council (KBMC) and encompasses an area of 35.69 sq. km. It has a current population of 1.91 lakhs (97,948 as per 2001 Census). The revenue budget of KBMC (2007-08) is Rs. 24.6 crores, with a revenue surplus of Rs 11.76 crores.

The water supply works are managed by the Maharashtra Jeevan Pradhikarna (MJP) as a combined scheme for the towns of Kulgaon-Badlapur and Ambernath. The water account for Kulgaon Badlapur faces a deficit of Rs. 16 lakhs(2007-08).

1.101 Water supply system at Kulgaon Badlapur

Kulgaon Badlapur draws 28 MLD of raw water from the Ulhas River (3 km from city). The total quota available to the city is 35 MLD. The scheme from source to the consumer end is operated and managed by MJP. Therefore, the onus of the entire scheme including the operations and maintenance costs, rests purely with MJP.

As a part of the joint scheme, the city has one treatment plant. The citizens receive treated water of 93 lpcd for consumption. Four wards in the city receive water supply for 24 hours. The supply hours in the remaining wards vary from 3 hours to 8 hours. The total number of direct connections in the city is 12,523, all of which are metered. A basic profile of the water supply system of KBMC has been presented in the table below.

Table 64: Basic profile of water supply services in Kulgaon Badlapur

KULGAON BADLAPUR UTILITY PROFILE			
Key infrastructure components	Bulk supply		28 MLD
	Water Treatment Capacity		52 MLD
	Treated water available for consumption		93 lpcd
	Storage Capacity	1Elevated Storage Reservoirs	10.1 MLD
		4 Ground Storage Reservoirs	4.55 MLD
	Distribution network		114 km
	Connections		12,523
Water Supply Financials (FY-2007-08)	Water Account Revenue		Rs 5.92 crores
	Annual O&M costs		Rs 5.31 crores
Tariff	Flat Tariff	Domestic	Rs 7.6 per KL

KULGAON BADLAPUR UTILITY PROFILE			
		Non Domestic	Rs 34.65 per KL

Source: Kulgaon Badlapur Municipal Council

1.102 Step 1: Identification of the problem area

As a first step to assessing the status of the water supply services in the city of Jalna, the problem areas in the existing services in the existing system needs to be carried out. Doing this would highlight the interventions required in improvement to the level of services. As the first activity which needs to be undertaken in this regard, the service assessment has been undertaken on the basis of a few key performance criteria. On the basis of the assessment, the key issues in the current system would need to be identified and the existing projects reviewed. It is to be noted here that the assessment presented here for Jalna is based only on few key parameters. For a detailed review, as has been discussed in Volume I of the toolkit, the ULB would be required to carry out consumer survey, water audit, leak detection and energy audit for the entire value chain of water supply services. The key performance parameters used have been presented below:

1.102.1 Compiling key parameters

Based on the preliminary analysis of water supply service data[71] and discussions with KBMC officials, CRISIL assessed the current water supply system in Kulgaon Badlapur. Table 65 presents the key indicators for assessing the water supply system at Kulgaon Badlapur.

Table 65: Key water supply indicators for Kulgaon Badlapur

PERFORMANCE AREA	TYPICAL NORM	KULGAON BADLAPUR	KEY INFERENCE
Bulk Water			
Supply (Per capita treated water available for consumption)	135 lpcd	93 lpcd	As per CPHEEO norms, the total water supplied to consumers after treatment should be 135 lpcd. The bulk supply currently has an average of 93 lpcd. If the transmission losses are reduced from the existing level of 33% to an average of 20%, the water supply available for consumption shall increase by 4 MLD, and raise the per capita availability of water to 110 lpcd level at the consumers' end. This indicates that the city does have an immediate need of augmentation of its

[71] In the absence of a water or energy audit report, the data provided by the Municipal representatives has been considered for all the assessments. The actual technical losses may be more or less than that stated and can be verified only if water audit is undertaken along with consumer survey.

PERFORMANCE AREA	TYPICAL NORM	KULGAON BADLAPUR	KEY INFERENCE
			bulk water supply.
Treatment			
WTP capacity	100%	100%	The current installed WTP capacity is sufficient and has been operating as per required standards
Treatment loss	Less than 3%	2%	The treatment losses are within the norms.
Transmission and Distribution			
Losses	Less than 15%	33%	High transmission losses due to leakages from the old corroded pipes. Current pipelines are 35 years old and have high extent of leakages.
Consumer			
Coverage (Connections / Total Households)	100%	100%[72]	On an average, in KBMC, each connection serves five households. Therefore, the existing connections indicate full coverage. The city has no public stand posts.
Metering / Total Connections	100%	100 %	All the existing connections are metered and a volumetric tariff system is operational.
Duration of water supply	24 hours	5 hours each day	Not sufficient. Needs to be improved. This calls for reduction in the losses and efficient operations of the system.
O&M cost recovery	100%	100%	The cost recovery levels are satisfactory.
Unit production cost Unit income		5.20 Rs./KL 5.80 Rs./KL	The revenue realizations against per unit production costs are high.
Collection efficiency	100%	97%[73]	The collection efficiency level is satisfactory.

Source: CRIS analysis and data provided by KBMC and MJP

[72] KBMC officials indicate that one connection serves 5 households. However, it would be prudent for MJP and KBMC to maintain a detailed consumer database to ensure

[73] Collection efficiency has been measured against current demand raised vis-à-vis the current collections

1.102.2 Identification of the key issues

As indicated earlier, the next stage following the assessment of the water supply services in Jalna is that of listing of the key issues which is being faced in the city. After the assessment of the services, the ULB should necessarily clearly list down all the service and infrastructure related issues being faced by the current water supply system in the city. However, the assessment undertaken above indicates a largely satisfactory level of operations and management of the water supply services in the city. The only issue which requires attention is with reference to the area of distribution losses. These are currently higher than the acceptable standards.

1.102.3 Review of the water supply projects

Having identified the key issues in the existing status of provisioning of water supply services in the city, the next activity to be undertaken is that of undertaking a brief review of the projects that have already been identified for Kulgaon Badlapur under various schemes for improvement of the water supply services. In the context of the issues faced at Kulgaon Badlapur, KBMC has proposed a project for rehabilitation of the distribution network. The project has been proposed under UIDSSMT.

Table 66: Proposed water supply projects

POTENTIAL AREA OF INVESTMENT	SCHEME PROPOSED	DETAILS
Rehabilitation/ replacement of existing transmission and distribution infrastructure to reduce technical losses to minimum acceptable standards	Proposed under UIDSSMT scheme It includes rehabilitation of distribution network pipelines, repairs to MBR, 24 MLD WTP, and consumer survey.	Capex Required (DPR) – Rs. 26.85 Cr. Project is currently under review phase for approval, and at present no approvals have been received. No project escalation costs have been estimated. If approved, KBMC's share of the project is expected to be Rs. 2.68 crores.

Source: Kulgaon Badlapur Municipal Council

1.103 Step 2: Choice between public funding and PPP option

Having undertaken the assessment of the existing status of the water supply services in the city, identification of key issues there on and a brief review of the projects identified by the city, the next stage in the entire process as indicated in Volume I of the toolkit is the choice that is to be made between the public mode of funding and implementation of the proposed project and the private or the PPP based mode of developing and implementation of the project

The city has limited scope for PPP since no major capital investment is required and the operational efficiencies are satisfactory. Also, if any investments are needed for source augmentation in the future,

KBMC with a revenue surplus of Rs. 11.76 crores has the financial capability to undertake such investment.

Thereby, there is no scope for PPP based intervention in supply of water supply services in Kulgaon Badlapur.

AMBERNATH

1.104 Brief introduction to Ambernath

The city of Ambernath is a part of the Thane district in Maharashtra. Managed by the Ambernath Municipal Council, the city encompasses an area of 38 sq. km and has a current population of 2.5 lakhs (as per the 2001 Census 2.03 lakhs). The council has a a revenue account budget(2007-08) of Rs. 58 crores, with a revenue surplus of Rs 2.27 crores.

The water supply works are managed by the Maharashtra Jeevan Pradhikarna (MJP) as a combined scheme for the towns of Kulgaon-Badlapur and Ambernath. With respect to expenses incurred on Ambernath by MJP, the water account generates a surplus of Rs. 6 crores.

1.105 Existing water supply system

Ambernath draws a total water supply of 39 MLD from three water sources -- the Chikhaloli Dam, the Ulhas River and the Barvi River. Of the above, 28 MLD is supplied by MJP, 5 MLD from MIDC and the balance 6 MLD is supplied by Ambernath Municipal Council itself.

The city receives treated water supply of 106 litres per capita day (lpcd) for consumption. Water is available for four hours each day and is supplied through individual connections. A basic profile of the water supply system of Ambernath has been presented in the table below.

Table 67: Basic profile of water supply services in Ambernath

AMBERNATH UTILITY PROFILE			
Key infrastructure components	Bulk supply		39 MLD
		Chikhaloli Dam	6 MLD
		Ulhas River	32 MLD
		Barvi River	5 MLD
	Water Treatment Capacity	Chikhaloli, Belavali	6 MLD
	Water availability after treatment		150 lpcd
	Storage Capacity	2 Elevated Storage Reservoirs	3.5 MLD
		2 Ground Storage Reservoirs	4.42 MLD
	Distribution network		64 km
	Connections		6000
Water Supply Financials (FY-2007-08)	Water Account Revenue		Rs 11.33 crores
	Annual O&M costs		Rs 4.71 crores

AMBERNATH UTILITY PROFILE			
Tariff	Flat Tariff	Domestic (p.a)	Rs 7.6 per KL
		Non- Domestic (p.a)	Rs 35.4 per KL

Source: Ambernath Municipal Council

1.106 Step 1: Identification of the problem area

As a first step to assessing the status of the water supply services in the city of Jalna, the problem areas in the existing services in the existing system needs to be carried out. Doing this would highlight the interventions required in improvement to the level of services. As the first activity which needs to be undertaken in this regard, the service assessment has been undertaken on the basis of a few key performance criteria. On the basis of the assessment, the key issues in the current system would need to be identified and the existing projects reviewed. It is to be noted here that the assessment presented here for Ambernath is based only on few key parameters. For a detailed review, as has been discussed in Volume I of the toolkit, the ULB would be required to carry out consumer survey, water audit, leak detection and energy audit for the entire value chain of water supply services. The key performance parameters used have been presented below

1.106.1 Compiling key parameters

Based on the preliminary analysis of water supply service data[74] and discussions with Ambernath and MJP officials, CRISIL assessed the current water supply system of the city. Table 68 presents the key indicators for assessing the water supply system at Ambernath and the resultant inferences.

Table 68: Water supply indicators and Inferences

PERFORMANCE AREA	TYPICAL NORM	AMBERNATH	KEY INFERENCE
Bulk Water			
Supply [Per capita treated water available for consumption]	135 lpcd	106 lpcd	As per CPHEEO norms, the total water supplied to consumers after treatment should be 135 lpcd. Ambernath as of date supplies 106 lpcd (i.e. 30 MLD). If the transmission losses are reduced from the existing level of 22% to an average of 20%, the water supply available for consumption shall increase by 1.8 MLD, and raise the per capita availability of water to 112 lpcd level at the consumers end. Though the supply levels do not meet the requisite norm, the availability can be considered adequate, and as not requiring

[74] In the absence of a water or energy audit report, the data provided by the Municipal representatives has been considered for all the assessments. The actual technical losses may be more or less than that stated and can be verified only if water audit is undertaken along with consumer survey.

PERFORMANCE AREA	TYPICAL NORM	AMBERNATH	KEY INFERENCE
			any immediate source augmentation.
Treatment			
WTP capacity	100%	100%	The bulk of the treated water is supplied from the treatment plant at Kulgaon Badlapur. Though the utilization of the WTP is more than the installed capacity, there is no adverse effect on the quality of treated water supply.
Loss	Less than 3%	2%	Meets the norm
Transmission and Distribution			
Losses	Less than 15%	22%	Moderate extent of transmission losses
Consumer			
Coverage (Connections / Total Households)	100%	88%	Assuming that one connection caters to two households, existing coverage levels need to be improved.
Metering / Total Connections	100%	78%	The connections provided by MJP are fully metered. However, those provided by the Ambernath Council are metered only to the extent of 5%. The remaining connections need to be metered.
Duration of water supply	24 hours	4 hours	Not sufficient. Needs to be improved. Calls for reduction in losses and more efficient operations.
O&M cost recovery	100%	100 %	The high recovery levels indicate satisfactory levels of operational efficiency.
Unit production cost Unit income		7.70 Rs./KL 9.70 Rs./KL	High revenue realization per unit against cost of production, indicating satisfactory levels of operational efficiency
Collection efficiency	100%	93%[75]	The current collections are high; however, further improvements can be made.

Source: CRIS analysis on the basis of data provided by MJP and Amberanth Council

[75] This includes efficiency of current collections only. Arrears of water account are Rs. 25 crores. This is on inclusion of a number of villages to the jurisdiction. These arrears are spread over several years.

1.106.2 Identification of the key issues

As indicated earlier, the next stage following the assessment of the water supply services in Ambernath is that of listing of the key issues which is being faced in the city. After the assessment of the services, the ULB should necessarily clearly list down all the service and infrastructure related issues being faced by the current water supply system in the city.

However, based on the status of the water supply operations, the key water supply indicators and key inferences, it can be assessed that the overall water supply operations in the city are at satisfactory levels. However, there is scope for further improvement such as ensuring 100% coverage of the water supply services, higher frequency of supply and 100% metering to all the connections.

1.106.3 Review of the water supply projects with approved DPRs

Having identified the key issues in the existing status of provisioning of water supply services in the city, the next activity to be undertaken is that of undertaking a brief review of the projects that have already been identified for Ambernath under various schemes for improvement of the water supply services. MJP has identified the following projects for the water supply sector.[76]

Table 69: Proposed water supply projects

POTENTIAL AREA OF INVESTMENT	SCHEME PROPOSED	DETAILS
Augmentation of water supply, improvements to the existing water supply system including metering, repairs, etc.	Proposed under the Sujal Nirmal Abhiyaan scheme Phase 1:Includes installation of bulk meters, re-assessment of properties to reduce illegal connections, implementation of spot billing, replacement of distribution lines, replacement of faulty consumer meters, and replacement of old transmission pipelines Phase 2: Water supply augmentation scheme	Capex Required (DPR) – Rs. 4 Cr. Capex Required (Escalated) – Rs. 4.8 Cr. Sujal Nirmal Grant – Rs. 3.60 crores Ambernath contribution –Rs. 40 lakhs plus escalation of Rs. 80 lakhs Capex Required (DPR) – Rs. 15.56 crores.[77]

Source: MJP and Amberanth Council

Phase 1 of the proposed project is currently ongoing and expenses towards the same are being met by the Ambernath Council. For phase 2 of the project, the DPR has been prepared. However, no approvals have been received on the same.

[76] It is to be noted here that for the purpose of this assessment, a due diligence on the project components and costs has not been undertaken.

[77] Phase II of the project has not been considered as the DPR and the project cost is not approved as yet.

1.107 Step 2: Choice between public funding and PPP option

Having undertaken the assessment of the existing status of the water supply services in the city, identification of key issues there on and a brief review of the projects identified by the city, the next stage in the entire process as indicated in Volume I of the toolkit is the choice that is to be made between the public mode of funding and implementation of the proposed project and the private or the PPP based mode of developing and implementation of the project

The city has limited scope for PPP since the current issues in water supply are adequately captured in the on-going project of Maharashtra Sujal Nirmal Abhiyaan. The proposed water source augmentation project is not an immediate need of the city and is currently under preparation. The DPR and project cost of the proposed project is yet to be finalised. Given that there is no immediate need for undertaking any capital project, and also accounting for the current satisfactory levels of operations, it can be concluded that there is limited scope or need for PPP-based intervention to improve the water supply service delivery in the town.

Thereby, there is scope for PPP based intervention in supply of water supply services in Ambernath.

NAVI MUMBAI

The city of Navi Mumbai, previously known as New Bombay, is a part of the Mumbai Conurbation. The city with a total area of 344 sq.km was developed as a twin city of Mumbai, and is considered to be one of the largest planned cities in the world. Of the total city limits, approximately an area of 108.63 sq.km is managed by the Navi Mumbai Municipal Corporation (NMMC). The part of the city managed by NMMC has a current population of approximately 12 lakhs. As per the budget of 2008-09, NMMC has a revenue account budget of Rs. 480 crores, with a revenue surplus of Rs. 130 crores.

1.108 Existing water supply system

Navi Mumbai has a total water supply of 317 MLD. Water is supplied from three sources, viz., from Morbe Dam, CIDCO Hetvane and from MIDC Barvi. NMMC purchases 32 MLD of potable water from CIDCO; the water supply of 67 MLD from MIDC Barvi is a back-up arrangement in case of a temporary shutdown of the Morbe Dam.

The city has one WTP within the municipal limits of 450 MLD capacity and there are two WTPs, one each at the CIDCO Hetvane and MIDC Barvi site of 50 MLD and 160 MLD installed capacity respectively. The city receives a treated water supply of 200 lpcd on an average. The supply hours vary between a minimum daily supply of four hours to a maximum of twenty-four hours in a few wards. Water is supplied through direct house service connections, numbering 1,15,264, of which 75% are currently metered. A basic profile of the water supply system of Navi Mumbai has been presented in the table below.

Table 70: Basic profile of water supply services in Navi Mumbai

NAVI MUMBAI UTILITY PROFILE			
Key infrastructure components	Bulk supply		317 MLD
		Morbe Dam	218 MLD
		CIDCO Hetvane	32 MLD
		MIDC Barvi	67 MLD
	Water Treatment Capacity	Navi Mumbai	450 MLD
		CIDCO Hetvane	50 MLD
		MIDC Barvi	160 MLD
	Water availability after treatment		200 lpcd
	Storage Capacity	Elevated Storage Reservoirs	74.95 MLD
		Ground Storage Reservoirs	124.50 MLD
	Distribution network		721 km
	Connections		1,15,264

NAVI MUMBAI UTILITY PROFILE			
Water Supply Financials (FY-2007-08)	Water Account Revenue		Rs 54.89 crores
	Annual O&M costs		Rs 14.34 crores
Tariff	Volumetric Tariff	Residential	Rs 4.75 per m^3
		Commercial	Rs 30 per m^3
		Institutional	Rs 11 per m^3

Source: Navi Mumbai Municipal Corporation

1.109 Assessment of the water supply system

Based on the preliminary analysis of water supply service data[78] and discussions with NMMC officials, CRISIL assessed the current water supply system of the city. Table 71 presents the key indicators for assessing the water supply system at Navi Mumbai and the resultant inferences.

Table 71: Water supply indicators and Inferences

PERFORMANCE AREA	TYPICAL NORM	NAVI MUMBAI	KEY INFERENCE
Bulk Water			
Supply [Per capita treated water available for consumption]	135 lpcd	200 lpcd	The treated water supply at Navi Mumbai is high at 200 lpcd levels, much higher than the 135 lpcd norms set by CPHEEO. The current levels of losses in the system are at minimal levels and offer limited scope for reduction. The current water supply levels are assessed to be adequate and therefore there is no immediate need for bulk water supply augmentation.
Treatment			
WTP capacity	100%	100%	The installed WTP capacity is 450 MLD of which only 250 MLD is currently being utilized. The current WTP availability is sufficient and hence does not require any augmentation
Loss	Less than 3%	2%	Meets the norm
Transmission and Distribution			
Losses	15%	17%	Minimal acceptable levels of transmission losses. Of these losses, approximately 4% losses are attributed to theft. NMMC can take measures to check these

[78] In the absence of a water or energy audit report, the data provided by the Municipal representatives has been considered for all the assessments. The actual technical losses may be more or less than that stated and can be verified only if water audit is undertaken along with consumer survey.

PERFORMANCE AREA	TYPICAL NORM	NAVI MUMBAI	KEY INFERENCE
			instances of theft and further bring down the loss levels.
Consumer			
Coverage (Connections / Total Households)	100%	100%	Individual connections are provided to all units within the municipal area.
Metering / Total Connections	100%	78%	Though the current extent of metering is less than the required norm, NMMC is currently undertaking measures such that 100% metering is achieved within the following six months. It is also to be noted that with effective operations of the metering system and rational tariff levels, per head water consumption has been reported to have reduced.
Duration of water supply	24 hours	4 hours to 24 hours	Most wards receive 24 hours of uninterrupted water supply. Only a few wards receive water for four hours. However, in these wards, the supply frequency is twice a day.
O&M cost recovery	100%	100 %	The high recovery levels indicate satisfactory levels of operational efficiency.
Unit production cost Unit income		1.27 Rs./KL 9.70 Rs./KL	High revenue realization per unit against cost of production indicate satisfactory levels of operational efficiency.
Collection efficiency	100%	97%	The current collections are high; however, further improvements can be made. The total collections include an arrear component of Rs. 24 crores. However, this is a one-time accumulated arrear from areas which were previously not included in NMMC municipal limits and have been recently included.

Source: CRIS analysis on the basis of data provided by NMMC

The water supply service of Navi Mumbai has been assessed as performing at fairly good levels. On all the key indicators of water supply services, NMMC has delivered as per the required norms and standards. In the instances where there has been a shortfall such as metering levels, efforts are currently ongoing to achieve the required standards.

NMMC has been able to sustain good service delivery standards on account of a combination of reform measures and stringent measures which have focused on improving the standards of operational

efficiency. One such measure is the use of GIS-based software for tracking cases of illegal connections.

1.110 Proposed water supply project

For further improvements to its water supply services, NMMC has proposed a project under JNNURM. A brief on the same is tabled below.

Table 72: Proposed water supply projects

POTENTIAL AREA OF INVESTMENT	SCHEME PROPOSED	DETAILS
Improvements to the existing water supply services by increasing coverage, better metering system, rehabilitation of the distribution network, etc.	▪ Development of SCADA system ▪ Remote reading system of meters ▪ Additional 42,000 meters in the slums ▪ Rehabilitation to 150 km of distribution network ▪ 150 MLD WTP	Capex Required (DPR) – Rs. 230 Cr.

Source: NMMC

To manage its water supply services, NMMC has engaged a private developer for operation and maintenance of the entire water supply system. The type of PPP contract implemented by NMMC is a Performance-based service contract for the operation and maintenance of water supply services. For a clear understanding on how the current contract oversees and ensures efficient management of water supply services in the city, the same has been studied and details of the PPP structure are presented in the section below.

1.111 About the PPP structure

NMMC has entered into a performance-based operation and management contract with a private operator for the operation and management of the water supply services at Navi Mumbai. As per this contract, the private operator is required to operate and manage the water supply services from the point of the Elevated/Ground Storage Reservoir (ESRs/GSRs) to the consumer end. The operator would be supplied with treated water from the treatment plant through the pure water transmission lines and there from, all the activities would have to be managed by the operator.

Therefore as per the contract, the activities of bulk water supply sourcing, raw water transmission, and treatment at the WTP are the responsibilities of NMMC. The focus of this contract is to ensure improved services at the distribution end, inclusive of metering, billing and collection. The private operator is therefore not required to make any capital-based improvements to the water supply system such as augmentation, and replacement/rehabilitation. The following activities have to be performed under this agreement by the private operator:

- Operations and management of ESR/GSRs, pumps and the distribution network
- Maintenance of water supply pressures and chlorination of water at the distribution end
- Operation and maintenance of the distribution network including leak detection and management
- Provision of new water connections as per ULB's directions

- Installation of bulk and consumer end metering, billing and collection
- Civil works including repairs and maintenance of the water assets from the ESR point to distribution end including meters, bore wells, and public stand posts
- Consumer redressal

NMMC will set the user charges to be levied and collected, and the private operator will be required to generate the bills as per the set tariff structure, collect the revenues and hand over the same to NMMC. The private operator would be paid on an annuity basis a fixed contract price for these activities. In addition, the contract also offers incentives for performance levels over the set standards. With reference to the expenditure incurred on operation and maintenance of the water supply services, as per the agreement, NMMC would be required to bear the expenses for purchase of bulk water, energy charges, chemicals/chlorine and any major capital investment work to the existing water assets. The expenses on labour engaged for operation and maintenance activity and civil works has to be borne by the private operator.

1.112 Key roles and responsibilities of NMMC and Private Operator

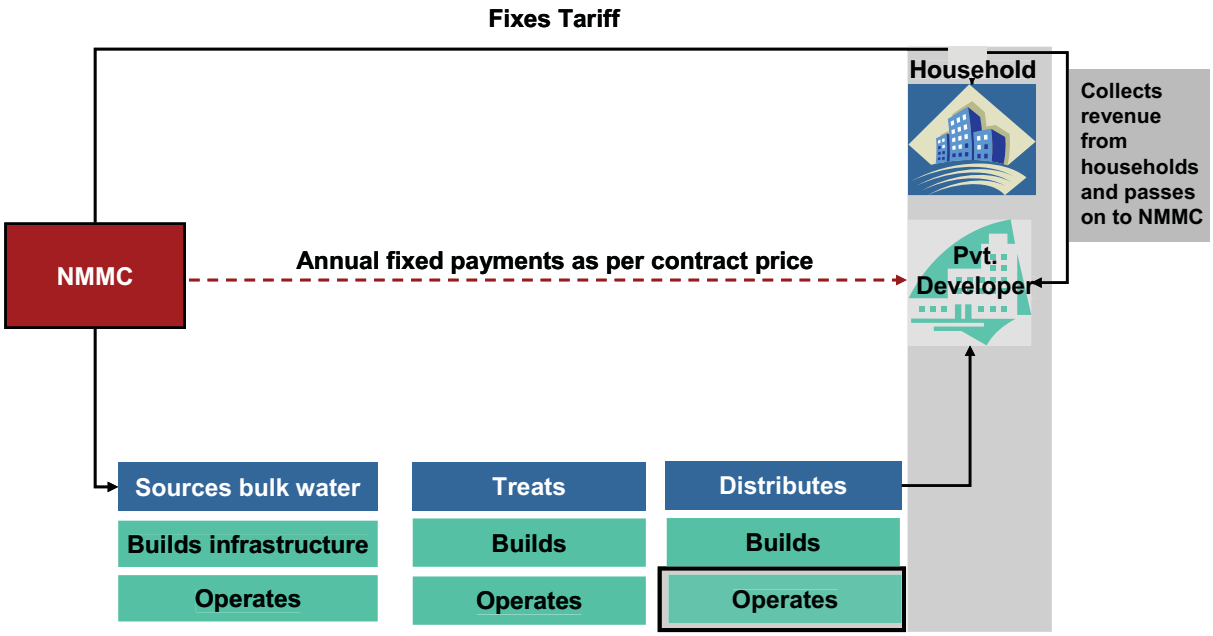
The key roles and responsibilities of the stakeholders are given in the following table.

Table 73: Key roles and responsibilities of the private developer and the ULB

PARTICULARS	PRIVATE OPERATOR	NAVI MUMBAI MUNICIPAL CORPORATION
Primary Task	Operate and maintain the distribution network inclusive of operation of pumps, ESR/GSRs, chlorination, civil works, metering, billing and collection	Operate and manage the water supply system till the point of ESR/GSR
		Undertake major capital investment works for the entire water supply system
		Provide permits, rights of operation to private developer
	Provide all necessary equipments required for the O&M activity	Oversee operation and maintenance activity of distribution network
Tariff	Generate bills as per set tariff	Determine user charges, tariff structure
Operating Expense	Pay all expenses related to labour employed	Pay for raw water purchase, water testing charges and electricity consumption
	Bear expense on repairs to assets	Bear expenses on chlorination of water
	Install meters, incur operation and maintenance expense on the meters	
	Bear any other O&M expense related to distribution network	
Capital Expense		Bear all capital expenditure works including augmentation of the existing system, replacement and or complete rehabilitation of the distribution network
Asset Ownership	Only gets rights of operation of the assets, and is required to hand over the assets at the end of the tenure of the contract	Take over assets at the end of the contract period

Figure 18 presents a holistic view of the entire transaction under a distribution cum revenue collection contract.

Figure 18 : Structure of Water supply performance management contract for O&M



Though NMMC would facilitate obtaining necessary clearances and permits required for operations, the final responsibility of obtaining all the applicable permits would rest with the private developer. In addition, during the period of the contract, if there are any disruptions in supply of bulk water, electricity, etc, the private developer is obligated to make the requisite interim arrangements.

As per the contract, the private developer in addition to carrying out the operation and maintenance activity, is required to undertake overall system and energy audits on a regular basis. The contract specifies the potential increase in the scope of work which may be asked of the private developer. NMMC may need to increase the length of the existing distribution pipelines, connections, and the number of critical pressure points. The contract specifies the maximum range by which these could increase, beyond which the contract price/annual payment would be revised for the private developer.

1.113 Key features of NMMC's Performance Management Contract

Some of the unique features and risk mitigation measures which form a part of the existing contract are listed below.

- The contract clearly lists down the performance criteria which are to be met by the private developer for operations and management of the system. For instance, along with the regular tasks, the operator is required to undertake the energy and system audit. These audits are meant to facilitate leak detection, fix incorrect connections, reduce power consumption, etc. Against these measures, the private developer is provided with a clear incentive/penalty system. For example, for every per KL reduction in water loss level beyond the benchmark, a per unit revenue incentive of Rs. 2 is mentioned. Similarly, for detection of each case of illegal connection, an incentive value has been fixed. Such revenue-linked incentives for encouraging the private developer to operate the system better have been built in.

- Similar to the incentives, stringent penalties have been built into the contract. For instance, the penalty value has been fixed in case more than the specified occurrences of private developer not providing water supply at specified pressure levels are reported. Such penalties are applicable for any deviation in water quality levels, loss levels, increased power consumption, inadequate system maintenance, delay in meter readings, unauthorised sale of water or provision of new connection, non-attendance to customer complaints within the prescribed time-lines, etc. If the total amount charged as penalty exceeds 10% of the contract price for the concerned operating year, NMMC would review whether the contract needs to be continued with the operator or terminated.

- To be able to ensure effective implementation of the incentives and penalties, NMMC has also detailed in the contract the system of regulation and monitoring. NMMC would compare the water bill amount generated at each zone to the water supplied as per records and in case of any difference in the expected and actual bill amount, seek a detailed explanation from the private operator on the same.

- In its effort to ensure implementing consumer responsibility, NMMC has authorized the private operator to impose stringent penalties. For example, if a water tank is found to be overflowing, a penalty of 100% of average amount of 4 months would be imposed.

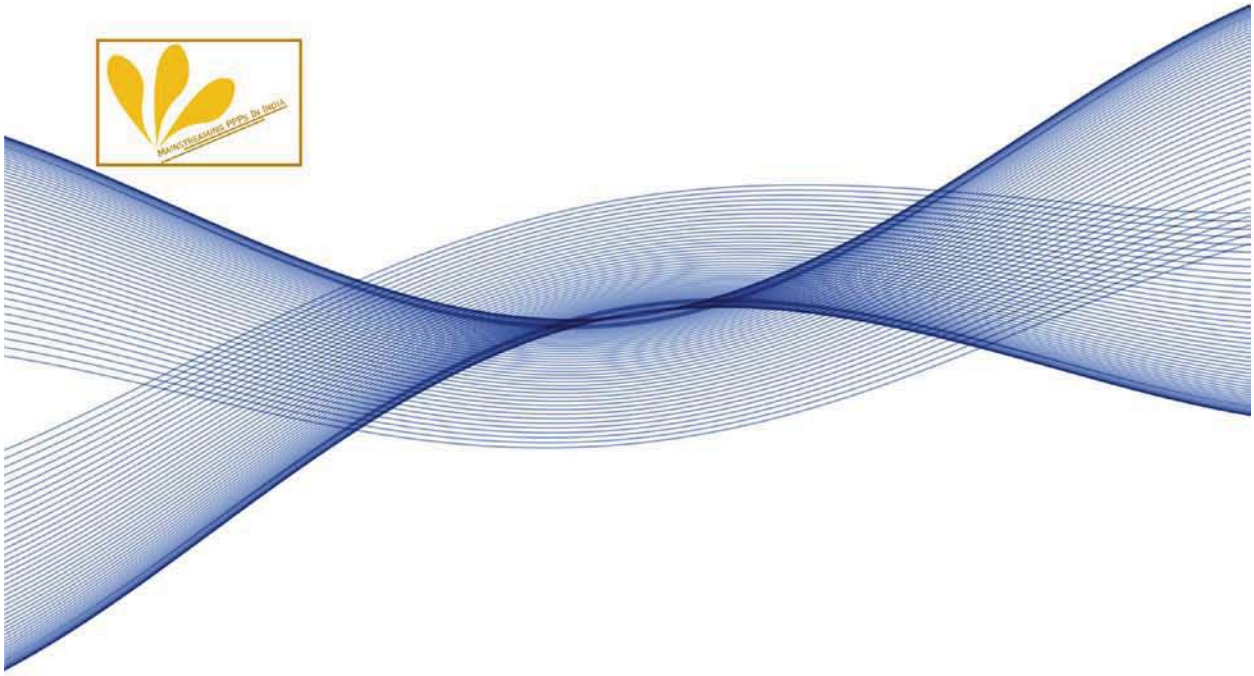
- Failure of the operator to dispense any of the required duties would result in NMMC undertaking the same service at the operator's cost.

1.114 Risk sharing between NMMC and the private developer

The key risks which need to be borne by the private developer and the ULB are stated below.

Table 74: Key risk-sharing

Sl. No	RISKS	PRIVATE OPERATOR	NMMC
1	Commissioning Risk		✓
2	Design Risk		✓
3	Operations Risk	✓	
4	Financial Risk	✓	
5	Payment Risk		✓
6	Performance Risk	✓	
7	Change in law Risk	✓	✓
8	Force Majeure Risk		✓



Water Supply

Volume 4: Term Sheets

November 2009

CONTENTS

2 INTRODUCTION

The Volume IV, of this report presents the detailed term sheets prepared for the PPP options identified for the cities analysed in Volume III. In Volume III of the report, the sample set of cities of Maharashtra, viz. Jalna, Sangli-Miraj-Kupwad, Kolhapur, Virar, Navghar Manikpur, Chiplun, Akot, Saoner, Shirpur, Kulgaon-Badlapur , and Ambernath were studied for assessing the status of water supply and sewerage services in the respective cities and for identification of an appropriate PPP structure for the projects identified and needed to improve the water supply and sewerage services. The PPP structure recommended have been based on the study of a sample of PPP projects which have been implemented in India. These PPP structures can be modified as per the unique requirements of a project and further refined to address the needs of the ULB/state agency and the project. The term sheets so prepared have been presented in this Volume of the report. The objective and contents of the term sheets along with the detailed term sheets are presented in the following sections of this report.

2.1 Objective of the term sheet

The term sheet is a reference guide for understanding the key clauses applicable under a specific PPP structure. The clauses presented in the term sheet would help the ULB/state agency in drafting a contract for the PPP structure that has been selected for implementation of the identified projects in the water supply and sewerage sector. The term sheets presented here have been developed for those PPP structures which have been found to be best suited for the cities studied as part of Volume III.

The ULB/state agency can refer to the detailed set of clauses which have been listed in order to develop an all comprehensive PPP contract. It is to be noted here that, the clauses which have been mentioned here are generic in nature and would vary as per the unique characteristics of the PPP structure finalised for a specific city. Depending upon the output from the detailed analysis which the ULB/state agency would carry out, the roles, responsibilities, risk mitigation measures are subject to change.

2.2 Contents of the term sheet

As indicated above, the term sheet is expected to offer the user with broad guidelines for preparation of a comprehensive contract for the PPP structure so identified. In this context, the term sheet broadly covers the following areas:

- List of preparatory work to be undertaken by the ULB/state agency before the commencement of the PPP contract
- List of information to be provided by the ULB to the private developer

- Tenure of the PPP contract
- Roles and responsibilities of the developer
- ULB's obligations
- Project monitoring mechanism
- Performance standards
- Payment terms
- Risk Mitigation strategies
- Consequences of default
- RFQ criteria
- Bidding parameter

The details of the above mentioned contents are as presented in the term sheets in the following sections of this report.

3 TERM SHEETS

3.1 Performance management contract for entire water supply system

3.1.1 Problem Definition

The ULB has low levels of overall operational efficiencies. The current supply of water, the existing infrastructure though at satisfactory levels, the ULB is unable to fully recover the cost incurred on operation and maintenance activity. The low cost recoveries may be attributed partly to low tariff levels, but is also affected by inefficient management of the water supply services such as in adequate monitoring, high extent of theft, poor leak detection and management, low levels of collection efficiency, etc. Additionally the entire water supply system may not have adequate extent of metering. As a result, the ULB would require to ensure better management of the entire water supply system with a single focus on improvisation of operational efficiencies and full cost recovery.

3.1.2 Need for PPP

The ULB needs PPP to largely improve the service delivery mechanism. The ULB has historically seen poor to moderate operational standards and or have seen minimal year on year operational improvement to the water supply system. The ULB therefore needs an improvement in current operational levels including reduction of energy costs, reduction of transmission and distribution losses, improvement in collection efficiency, etc. Thereby, the ULB needs a private operator for bringing about operational efficiencies in the overall management and provisioning of water supply services.

3.1.3 PPP structure

The PPP structure designed for the above mentioned problem definition is a Performance Management Contract for operation and maintenance of the entire water supply system. Under such a structure, the private developer would be required to carry out all the water supply operations starting from sourcing of bulk water from the existing source to transmission to treatment plant, treatment, storage and supply through the existing distribution network. Additionally in the absence of bulk meters and meters at consumer end, the private developer would also be required to install the same, operate and maintain the meters, read and record data, generate bills and engage in

collection activity. For the activities undertaken, the private developer would be paid on an annuity basis. This annuity sum is to be treated as the important financial bid parameter.

3.1.4 Objective of the PPP structure

This PPP structure aims to improve the operational efficiencies of the water supply system by ensuring improved operational recoveries, reduced losses, and improved collection efficiency.

SL. NO	ITEM	DESCRIPTION
1	**Preparatory work by ULB**	1. Undertake a consumer survey to gauge the number of direct connections, unauthorized connections, etc. 2. Undertake a technical survey (Water audit study, leak detection study, energy audit study) to gauge the current status of the water supply system including the technical losses in the system. 3. Analyze the efficiency of the treatment plant and collect detailed information on the number of pumps and staff 4. Decide on the quality and type of meters to be installed in the city 5. Undertake a survey of the raw water transmission, pure water transmission and distribution network on a GIS platform 6. Undertake a Valve operation study 7. Undertake a customer regularization plan
2	**Information to be provided to the private operator by the ULB**	1. Contract of ULB with Water resource department for drawing of water source 2. Contract of ULB with the Electricity Board for supplying power to the water supply system and the tariff details 3. Design of the water supply system including jackwell, elevated storage reservoirs, main balance reservoirs, water treatment plant, raw water transmission lines, distribution network, etc. 4. Details of the existing connections- number and type 5. Details of quality of bulk meters and customer meters 6. Details of quality of leak detection equipment

SL. NO	ITEM	DESCRIPTION
		7. Tariff structure of water connection charges, water supply charges, penalties for illegal connection/ non-payment of water supply charges and escalations to both if applicable 8. Contour Maps and Network maps 9. Quality standards of water to be maintained 10. Disposal standards for the inerts generated at water treatment plant 11. Operation and Maintenance standards of reservoirs 12. Specifications and standards of handover of assets at end of the contract period
3	**Tenure of the PPP contract**	Generally 5 to 10 years. Depends on the financial feasibility of the project, the life of the water assets and political will.
4	**Roles and Responsibilities of the Developer**	1. Take over of all the water supply systems from source till the distribution point including jack wells, pipelines, WTP, electrical substations, storage reservoirs, pumping stations, meters, valves etc 2. Operate pumping stations, jack wells for drawing of bulk water from the source 3. Operate and maintain the pumping stations 4. Operate and maintain the Main Balancing Reservoir(MBR) 5. Operate valves for raw water transmission from the source to WTP 6. Repair and maintain the raw water transmission pipelines 7. Operate and maintain the WTP as per the procedure and quality standards specified by the ULB 8. Operation and maintenance of the storage reservoirs; Operate outlet valves of ESRs /HSRs to supply water as per operating schedules 9. Operate and maintain the existing connections 10. Operate valves in the distribution network for efficient and equitable water distribution 11. Minor repairs to the water supply assets for a period of – years 12. Daily checks to water pressure levels 13. Establish bulk meters at the water treatment plant, storage reservoirs and measure

SL. NO	ITEM	DESCRIPTION
		the input and output volumes 14. Maintaining overall cleanliness and hygiene standards for the entire water supply assets being maintained; avoiding conditions of water logging and mosquito breeding in ESR/GSR /HRS complexes 15. Dispose the waste generated and other inerts from the water treatment plant as per applicable environmental norms 16. Check quality of treated water and operating chlorinators to add chlorine dosage as required; collect the water samples for various locations including and submit it to the Laboratory for testing on daily basis; 17. Recording & reporting of the reading of bulk flow meters at various inlet and outlet on daily basis 18. Establish meters for all the consumer connections, operate and maintain the meters(100% metering) 19. Record on a monthly basis, water meter readings of Customer and register the same in an appropriate computer database, printing of water bills, distribution of water Bills and notices to consumer as per instruction of Engineer-in-charge; 20. Provide new connections to households and maintain the connections 21. Providing security for Facilities and/or System at all times 22. Daily data recoding regarding working hours of each pump, power factor, power consumption to be collected, recorded and submitted to the Executive Engineer in charge of the ULB (Water Supply) 23. Undertake an overall system audit and connection audit including leak detection, recording and rectification of incorrect customer connection, detection of faulty meters, illegal use of water, reduce energy consumption by regulation of meters once every ___ years 24. Undertake replacement of damaged or leaking pipelines upto ___ meters 25. Undertake maintenance of public wells and bore wells including de silting, disinfection, and any repair 26. Develop and maintain a public awareness system to inform about system

SL. NO	ITEM	DESCRIPTION
		breakdown, shutdown, supply shortage 27. Arrange the water tankers to public in the time of water crises / power failure. 28. Pay the Water Resource Department for the off take of water from the water resource in accordance with the contract between the water resource department and the ULB 29. Pay for the electricity consumption for the operation and maintenance of the water supply system and bear power tariff escalations if any. 30. Bear all expenses for chemicals required for operating water treatment plants. 31. Arrange for the man-power for the operation and maintenance of the water assets as per the contract and for undertaking the scope of work as defined in the contract. Bear all the establishment expenses for operating and maintaining the water assets including the salaries and wages of the staff deployed by the Developer, uniforms, safety equipments, undertake medical tests at pre described intervals etc 32. Ensure that the raw water transmission losses are within the range as specified in the performance standards 33. Submit records on water quality maintained at different points in the value chain to the ULB 34. Ensure that the operation and maintenance standards are as per specified levels 35. Submit a plan to the ULB outlining the details of the operations and maintenance activities timelines and the phasing of metering, reducing unauthorized connections, etc. 36. Charge penalty to consumers if the water supply charges/ water connection fees are not paid within the specified time limit. 37. Operate and maintain the existing connections 38. Maintain a record of all assets purchased by Developer 39. Assess the gross yearly demand of raw water and submit it to ULB for approval and facilitate the further submission to the water resource department. 40. Abide by all applicable bye laws, notifications, amendments to labour laws etc 41. Provide a supriendent as an authorized representative of the private developer and

SL. NO	ITEM	DESCRIPTION
		would be the key point of contact for the ULB. 42. Undertake extensive campaigning and awareness programs for metering of connections 43. Supervise Procurement / Supply chain management 44. Define & implement customer service policy applicable to the Developer's employees
5	**ULB's obligations**	1. Responsible to sign the contract with the Water Resource Department for off-taking water from the water source 2. Responsible to sign contract with the Electricity department for supply of electricity for the water supply operations 3. Replacement of pumping stations, if need be 4. ULB to ensure that the pipes for raw water transmission are closed in order to avoid raw water transmission losses due to evaporation and theft 5. Replacement of the raw water transmission pipelines, distribution network pipes, WTP augmentation, major repairs, and reconstruction works etc if need be. 6. Fix the tariff for water supply consumer wise and the escalations 7. Facilitate approvals needed 8. Monitor the operations of the Developer 9. Maintaining administrative control over the personnel, Facilities and/or System; 10. Alter water supply timings, quantities, pressures and zoning 11. Provide tentative list of staff and labour required 12. Implement capital expenditure as per the Capital Investment Plan 13. Enable access to the water assets, free from encumbrances 14. Permit peaceful use of the water assets 15. Provide support to the Developer for regularizing illegal connections 16. Disconnect the water connection if the consumer does not pay the water supply charge and the penalty within the specified time limit
6	**Monitoring mechanism**	1. Developer shall undertake periodic inspection of water assets and submit reports to

SL. NO	ITEM	DESCRIPTION
		an Independent Engineer. The Independent Engineer shall review the maintenance reports and inspect the water assets at least once in three months and submit an O&M inspection report to ULB. 2. The private developer would have to undertake quality assurance tests for the construction activity underway or already completed, at the behest of the ULB. 3. Developer would oversee the performance standards being met, and maintain records of the same and provide access to the development authority or ULB as and when required.
7	**Performance Standards**	Performance standards shall be set up on the basis of the existing baseline figures. 1. Water treatment plant to function at a minimum capacity of ___% 2. Coverage – Cover a minimum of __% of total households in the range of the main trunk line 3. Water supply should be minimum ___ lpcd. It shall be measured as – [(Quantity measured at ESR)*(1- Distribution loss(%)] 4. Raw water transmission loss should be in the range of --- % to ---%. It shall be measured as [((1- quantity of water received at WTP)/ quantity of water pumped at intake works)*100] 5. Water treatment loss should be in the range of --- % to ---%. It shall be measured as [((1- quantity of water discharged from WTP)/ quantity of water received at WTP)*100] 6. Pure water transmission loss should be in the range of --- % to ---%. It shall be measured as [((1- quantity of water discharged from ESR)/ quantity of water discharged from WTP)*100] 7. Distribution loss should be in the range of --- % to ---%. It shall be measured as [((1- quantity of water billed in a zone)/ quantity of water discharged from ESRs)*100] 8. Supply water for minimum ___ hours per day 9. Frequency of supply should be minimum ___ days a week 10. The pressure of water supply should be maintained at ___ such that it fills --- litres

SL. NO	ITEM	DESCRIPTION
		bucket in less than – seconds. 11. Consumer complaints not to exceed ___ per month 12. Consumer complaints to be redressed within 24 hours from the time of lodge of complaint 13. Water quality to be maintained as per the CPHEEO norms 14. Frequency of billing should be 2 months 15. Collection efficiency to increase to __ within __ years 16. Quality of meters as per __- standards
8	**Payments**	1. As per the financial feasibility, the private developer would be required to make a fixed license fee payment to the ULB every ____ months; 2. The private developer shall have to submit a Performance Security in the form of a Bank Guarantee, which the ULB has the right to encash in case of non-adherence to performance standards and event of default. 3. All the operational of the water assets would have to be borne by the private developer.
9	**Risk Mitigation Strategies**	1. The second ranked bidder shall be issued the letter of award, if the Developer does not sign the agreement within the ____ days of acceptance of letter of award. 2. If the developer does not pay the fixed payment, then ULB shall encash the equivalent amount due from the payment security. Developer to replenish the payment security within – days from such encashment. If Developer fails to replenish the security, then it shall be an Event of Default. 3. The developer shall have to submit a plan to the ULB outlining details of the operations and maintenance plan. The developer shall be allowed to commence operations only once the ULB approves the plan. 4. The liabilities of the bulk water supply contract between the water resource department and the ULB shall rest with the developer (except changes in the tariff paid to the water resource department, as the case may be). If the supply of water falls short and is not available, then the developer shall have to arrange for water

SL. NO	ITEM	DESCRIPTION
		supply through private tankers for the citizens. 5. In case the developer does not pay the water resource department/ state electricity department, then ULB shall en cash the equivalent amount due from the performance security. 6. In the event of the developer not confirming to and meeting the performance standards, the ULB is liable to declaring the same as an event of default and use the performance guarantee sum against the same. 7. If Developer ceases to operate all/or any substantial part of the water supply and distribution assets for a period of – consecutive hours without prior consent of the ULB, then ULB can immediately enter any/all of the water supply assets and operate the system. 8. Any delay in payment to ULB shall attract a penal interest of -- % per annum quarterly compounded. 9. The ULB is liable to impose an Event of Default notice in the case of the developer selling treated water to any party other than the ULB. 10. If the private developer under reports the revenue from sale of surplus water and or does not share the prescribed amount as per agreement from this sale to the ULB, then it would be considered as an Event of Default.
10	**Consequences of default**	
	a) Developer Event of Default	1. ULB has the right to make good any shortfall from the performance security 2. ULB reserves the right to claim from the Developer any costs, expenses or loss it may have incurred by reason of breach or failure on part of the Developer. 3. Developer shall deliver to ULB all papers including forms used, receipt books, promotional materials and other documents. 4. Hand-over all assets to ULB
	b) ULB Event of Default	ULB shall pay the developer an amount equal to Rs. --- lakhs, book value of developer's assets and payments for payments outstanding from the ULB.
11	**Qualification Criteria (RFQ/ RFP)**	<u>Technical criteria:</u>

SL. NO	ITEM	DESCRIPTION
		▪ Developer should have undertaken a similar project for a population size of ___ . ▪ Developer should have operated and managed __ water supply project from bulk supply to distribution end for a a city with water supply of __ MLD ▪ Developer should have operated and managed one project requiring installation or operation and management of ___ number of meters Financial criteria: ▪ Developer should have a minimum net worth equivalent to 25% of the estimated project cost for which bids have been invited ▪ Developer should have an average net cash accruals over the past 3 years of Rs. ___ crores Holding Companies with a direct holding of more than 50% equity n the Lead Consortium Member can be considered for the evaluation of financial criteria.
12	**Bidding Parameter**	1. If the private developer is given the right to collect and retain the user charges, the bidding parameter would be the highest bi monthly or annual fixed payment to be paid as royalty/license fee to the ULB 2. If the private developer is not given the right to retain the user charges, the bidding parameter would be the lowest price at which the private developer would undertake the operation and maintenance activity.

3.2 Integrated Concession and Management of Entire Water Supply and Sewerage system

3.2.1 Problem Definition

The ULB faces a dual problem of poor water supply coupled with absence of a sewerage system. There exists shortage of the current water source, highly corroded raw water and pure water transmission mains, high treatment losses, old distribution network with leakages and high number of illegal connections. The ULB is unable to recover its operational costs from the current water revenue due to inadequate tariffs, less number of direct connections and poor collection efficiency. As a result, the ULB needs to invest in the augmentation and up gradation of the entire water supply system as well improvement in operational efficiencies.

In addition to poor water supply, the city also lacks as adequate sewerage system. A miniscule percentage of the total area and population is covered through an underground sewerage network. Sewage flow through open drains is quite common. .In major parts of the city, the ULB has set septic tanks which are cleaned periodically. The city does not have a sewage treatment plant and the entire sewage that is generated disposed into the river/sea (fresh water). This results in contamination of water and at times also affects the quality of water supplied to the citizens.

3.2.2 Need for PPP

The ULB needs PPP to enhance the public resources as well to improve the service delivery for water supply as well as the sewerage system. The ULB needs to undertake huge amount of investment in the augmentation of the bulk water source, rehabilitation of water pipelines, setting up of a sewerage network and establishing sewage pumping stations and sewage treatment plants. The ULB does not have the required investment capacity to arrange for funds for the planned capital investment (in spite of Government grants). Also, the ULB needs an improvement in current operational levels including reduction of energy costs, reduction of transmission and distribution losses, improvement in collection efficiency, etc. Thereby, the ULB needs a private operator from bringing in investments for undertaking the outlined projects as well as to bring in efficiencies in the system.

3.2.3 PPP structure

The PPP structure designed for the above mentioned problem definition, is an Integrated Concession and Management contract for the entire water supply as well as sewerage system of the city. In such a structure, the private operator will invest capital in the augmentation and upgradation of the entire water supply system and establishment of the sewerage system as outlined in the Detailed Project Report, establish meters, and manage the entire system. The PPP operator shall also undertake the billing and collection activity for water supply as well as sewerage system and retain the revenue collected. If the project is financially viable then, the bidder shall make an annual payment to the ULB. On the other hand, if the project is not financially viable and needs Viability Gap Funding (VGF), then the private operator shall quote the VGF amount. It is possible that the VGF needed for the project shall exceed the cap of 40%. In such a scenario, the ULB/State Govt. shall need to pay a shadow tariff to the private operator.

3.2.4 Objective of the PPP structure

This PPP structure aims to augment the current capacity of the water supply system, reduce the technical and commercial losses in the entire water supply system, establish a complete network of sewerage system and treated disposal of the sewage generated in the city.

3.2.5 Detailed Term Sheet

The following term sheet outlines the detailed working of an Integrated Concession and Management contract for the entire water supply and sewerage system including the preparatory work to be undertaken by the ULB, the key obligations of the Developer and the ULB, the monitoring mechanism, the payment structure, the performance standards to be adhered to by the private operator and key clauses for risk mitigation related to the PPP structure.

SR. NO	ITEM	DESCRIPTION
1	**Preparatory work by ULB**	1. Undertake a technical survey to gauge the current status of the water supply system including the technical losses in the system 2. Undertake a technical survey to gauge the characteristics of the sewage generated, the design of the sewerage network and the technology to be adapted for the Sewerage Treatment Plant(STP) 3. Design in detail the sewerage network considering the contours and physical features of the city 4. Undertake a consumer survey to gauge the number of direct connections, unauthorized connections, etc. 5. Analyze the efficiency of the water treatment plant and collect detailed information on the number of pumps and staff 6. Decide on the quality and type of meters to be installed in the city 7. Undertake a survey of the raw water transmission, pure water transmission and distribution network on a GIS platform 8. Undertake a Valve operation study 9. Undertake a customer regularization plan 10. Prepare a comprehensive metering policy 11. Prepare the performance criteria as per the current levels of performance
2	**Information to be provided to the private**	**For water supply system**

SR. NO	ITEM	DESCRIPTION
	operator by the ULB	1. Contract of ULB with Water resource department for tapping of water source 2. Contract of ULB with the Electricity Board for supplying power to the water supply system and the tariff details 3. Design of the water supply system including jackwell, elevated storage reservoirs, main balance reservoirs, water treatment plant, raw water transmission lines, distribution network, etc. 4. Condition of the water assets for quantifying the cost required for rehabilitation/ renovation of assets 5. Details of quality of bulk meters and customer meters 6. Details of quality of leak detection equipment 7. Tariff structure of water connection charges, water supply charges, penalties for illegal connection/ non-payment of water supply charges and escalations if applicable 8. Detailed Project Report (DPR) of the projects to be undertaken 9. Contour Maps and Network maps 10. Quality standards of water to be maintained 11. Disposal standards for the inerts generated at water treatment plant 12. Operation and Maintenance standards for all the water supply assets in the value chain 13. Specifications and standards of handover of assets at end of the contract period 14. History of payments of end users, if available. **For sewerage system** 1. Design of the sewerage system including sewerage network, pumping stations, sewage treatment plant, rising main, etc. 2. Technology specifications of the sewerage treatment plant

SR. NO	ITEM	DESCRIPTION
		3. Condition of the sewerage assets for quantifying the cost required for rehabilitation/ renovation of assets 4. Tariff structure of sewerage connection charges, sewerage charges, penalties for illegal connection/ non-payment of sewerage charges and escalations if applicable 5. Detailed Project Report (DPR) of the projects to be undertaken 6. Disposal standards for the inerts generated at sewage treatment plant 7. Operation and Maintenance standards 8. Specifications and standards of handover of assets at end of the contract period
3.	**Tenure of the PPP contract**	The tenure of the PPP contract is generally defined in terms of the years of operation and ranges between 25-30 years.
4.	**Roles and Responsibilities of the Developer**	1. Development, design, engineering, finance, procurement, construction, completion, commissioning, implementation, management, administration, operation and maintenance of the water supply source, water treatment plant, water supply network, sewerage network including pumping stations, sewage treatment plant and meters. 2. Taking over the existing assets of the Water Supply scheme, including the jackwell, pumping stations, electrical installations, water treatment plants (WTPs), water storage reservoirs, connecting pipelines and distribution system, from source to tap for the operation, maintenance and repairs. 3. Construction of raw water intake pumps, jackwells, suction mains, transmission pipelines, WTP and other works as per the DPR specifications. 4. Extraction of raw water from the source and supply the required levels to the city 5. Operation and maintenance of the newly constructed WTP and the old WTP 6. Undertake extensive campaigning and awareness programs for metering of connections

SR. NO	ITEM	DESCRIPTION
		7. Increasing the piped water supply by providing new connections. 8. Treat the water and ensure that there are no impurities in water at the point of sale 9. Maintenance of a minimum average water supply level of – liters per capita per day (lpcd) with due pressure and required quality. 10. Construction and maintenance of sewerage rising mains, transmission pipelines, pumping stations, STP and other works as per DPR specifications 5. Dispose off the sewage treated effluents at a water body as specified by the ULB and as per technical specifications 11. Construct, operate and maintain the STP in accordance with applicable laws related to pollution control, environmental standards as applicable. 12. Prepare detailed designs with all requisite specifications for the construction works and obtain approval for the same. 13. Procure all the necessary raw materials for the construction works, hire labour or sub contract the construction activity 14. Undertake rehabilitation works for operating and maintaining the assets for a period of – years 15. Managing regularization of illegal connections and impose penalties in case of illegal connections 16. Establishing meters, reading meters and recording the water consumption 17. Deployment of operations and maintenance staff 18. Developing and maintaining a consumer redressal system 19. Collecting water supply system and sewerage system related data and performance reporting to the ULB 20. Obtain the necessary approvals

SR. NO	ITEM	DESCRIPTION
		21. Ensure financial closure of the project 22. Pay for the electricity consumption for the operation and maintenance of the project and bear power tariff escalations if any. Arrange for power supply back up in case of power failure. 23. Provide access to the officials of the ULB to carry out inspection activity of the construction activity and operations and management works. 24. Shall be solely and exclusively responsible for the recruitment, transportation, accommodation, payment of salaries, wages, taxes as applicable 25. Define and implement procurement policy for the employees of the Developer 26. Select suppliers and sub-contractors for the project as per the terms and conditions of the concession agreement 27. Manage sub-contracts as per the terms and conditions of the concession agreement
5.	**ULB's obligations**	1. Responsible to sign the contract with the Water Resource Department for off-taking water from the water source; ensure supply of water to the developer at a pre-decided tariff as the case may be. 2. Facilitate or assist in obtaining necessary or applicable permits 3. Provide land to the developer on lease basis or on terms agreed upon for the period of concession for undertaking construction activity, operation and management of the water and sewerage assets. 4. Provide necessary permissions for possession and access of the site to the private developer 5. Ensure that all necessary authority required by the private developer for drawing of raw water, in quantum as required by the developer is provided. 6. Undertake independent supervision of the construction activity underway and monitor the operations. 7. Provide all necessary accounts, invoices, statements, demands, notices, insurance demands and other correspondence which are applicable to assets under private developer's possession during concession

SR. NO	ITEM	DESCRIPTION
		period 8. Grant right of way to the site to the Developer 9. Undertake independent checks at frequent intervals to assess the water quality standards of the treated water supplied from the treatment plant and the disposal standards of the treated sewage 10. Authorize the Developer to collect, retain, appropriate, recover and enforce water supply and sewerage charges from the consumers 11. Grant the right to charge penalty to consumers in case of non-payment of water supply and sewerage charges 12. Provide a capital grant to the Developer on the completion of specified milestones (applicable only if JNNURM funding/ Viability Gap Funding is being provided to the project) 13. Obtain permission from the concerned authority for discharge of sewage in a water body adjacent to the STP. 14. Issue a notification banning the use of ground water after the Developer is in a position to offer water connections to all consumers and cancel all existing permissions given for extraction of ground water 15. Assist the bidder in obtaining uninterrupted electric power supply from the State Electricity Board for the implementation of the Project. In case of any interruption in the power supply beyond – hours continuously or – hours per month, the cost incurred by the Developer for the generators shall be borne by the ULB.
6.	**Monitoring mechanism**	1. The construction activity would be overseen by an independent consultant appointed by the ULB, and quarterly progress reports of the same would be generated. 2. Developer shall undertake periodic inspection of water assets and submit reports to an Independent Engineer. The Independent Engineer shall review the maintenance reports and inspect the water and sewerage assets at least once in three months and submit an O&M inspection report to ULB.

SR. NO	ITEM	DESCRIPTION
		3. The private developer would have to undertake quality assurance tests for the construction activity underway or already completed, at the behest of the ULB. 4. Developer would oversee the performance standards being met, and maintain records of the same and provide access to the development authority or ULB as and when required. 5. ULB shall at all times have access to the project site to inspect and examine the works, materials, equipment and workmanship.
7.	**Performance Standards**	Performance standards shall be set up on the basis of the existing baseline figures. 1. Construction of the required assets to be completed as per the phasing of the DPR 2. Raw water transmission loss should be in the range of --- % to ---%. It shall be measured as [((1- quantity of water received at WTP)/ quantity of water pumped at intake works)*100] 3. Water treatment plant to function at a minimum capacity of ___% 4. Water treatment loss should be in the range of --- % to ---%. It shall be measured as [((1- quantity of water discharged from WTP)/ quantity of water received at WTP)*100] 5. Pure water transmission loss should be in the range of --- % to ---%. It shall be measured as [((1- quantity of water discharged from ESR)/ quantity of water discharged from WTP)*100] 6. Water quality to be maintained as per the CPHEEO norms 7. Quality of meters as per __ standards 8. Coverage (water supply and sewerage) should be a minimum of __% of total households in the range of the main trunk line 9. Distribution loss should be in the range of --- % to ---%. It shall be measured as [((1- quantity of water billed in a zone)/ quantity of water discharged from ESRs)*100] 10. Water should be supplied for minimum ___ hours per day and minimum ___ days a week

SR. NO	ITEM	DESCRIPTION
		11. The pressure of water supply should be maintained at ___ such that it fills --- litres bucket in less than – seconds. 12. Treated sewage disposed should be as per specified CPHEEO norms 13. Frequency of billing should be 2 months 14. Revenue collection efficiency at __% of the total bills generated 15. Consumer complaints not to exceed ___ per month 16. Consumer complaints to be redressed within 24 hours from the time of lodge of complaint 17. All performance standards to be achieved within the set time frame by the ULB
8.	**Payments**	1. If the project is financially feasible: The private developer shall pay the ULB a fixed royalty of Rs. -- per month. In this case, the private developer shall also have to submit a payment security in the form of _____ equivalent to 3 months of fixed payment payable to ULB. 2. If the project needs Viability Gap Funding: The ULB shall pay the private developer the amount of VGF in installments on the completion of specified milestones. The private operator shall retain the water revenue and make no payment to the ULB. 3. In all cases, the private developer shall have to submit a Performance Security in the form of a Bank Guarantee, which the ULB has the right to encash in case of non-adherence to performance standards and event of default. 4. All the operational and capital expenditures for design, construction, operation of the water assets would have to be borne by the private developer.
9.	**Risk Mitigation Strategies**	1. The second ranked bidder shall be issued the letter of award, if the Developer does not sign the agreement within the ____ days of acceptance of letter of award. 2. If the developer does not pay the fixed payment, then ULB shall encash the equivalent amount due from