

Toolkit for analysis of Urban Infrastructure Projects for Public-Private-Partnerships under JNNURM

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The toolkit has been prepared by the Mission Directorate of Sub-Mission for Urban Infrastructure and Governance, under JNNURM, with support from the JNNURM Technical Cell and PricewaterhouseCoopers Pvt. Ltd.

The toolkit has been prepared from a ULB's point of view and is designed to help the ULB to determine whether undertaking a particular project under PPP maximises the benefits to the public as well as ensure long-term sustainability of the project. Accordingly, it should not be used as a substitute for consultation with professional and competent advisors.

Toolkit for PPP in urban infrastructure

Preface.....	1
1 Introduction	2
1.1 <i>Scope of PPP projects</i>	2
1.2 <i>PPP in Municipal Services</i>	3
1.3 <i>Approach for the toolkit</i>	4
2 Stage 1 - Initial Assessment	8
2.1 <i>Determine key objectives</i>	8
2.2 <i>Evaluate key parameters</i>	10
3 Assessing commercial viability	11
3.1 <i>Project arrangements</i>	13
4 Preliminary project structuring	15
4.1 <i>Risk management</i>	15
4.2 <i>Financing plan</i>	17
4.3 <i>Subsidy requirements</i>	18
4.4 <i>PPP models</i>	18
Annexure I – Checklist for PPP in JNNURM projects	21
Annexure II – Calculating NPV and IRR for a project	24
Annexure III – Template for Financial Analysis.....	27
Annexure IV - Public-Private-Partnership Models.....	29
Figure 1 – Three stages in PPP assessment toolkit.....	7
Figure 2 – Project lifecycle activities and impact on outcomes	8
Figure 3 – Project arrangement for urban infrastructure projects	13
Figure 4 – Four steps in risk management	15
Table 1 – Examples of project arrangements.....	14
Table 2 – Examples of risk allocation	16

Preface

Public-Private-Partnerships (PPP) is a method of working in which the public and private sectors cooperate and partner with each other to create infrastructure and/ or provide services to users. All PPP projects have multiple stakeholders such as the ULBs, citizens, private sector, and state and central governments.

These stakeholders want to achieve different objectives from the PPP project. While Urban Local Bodies (ULBs) want to improve access to service, improve efficiency and quality of services, citizens are interested in lower costs and improvement in quality of services. The private sector is keen to achieve the most optimal balance between risks taken and profitability achieved from the project.

This toolkit has been prepared from a ULB's point of view. It is designed to help the ULB to determine whether undertaking a particular project under PPP maximises the benefits to the public as well as ensure long-term sustainability of the project. This toolkit is equally applicable to new assets as well as rehabilitation and modernisation of existing assets. The ULB may assign different weights to various parameters such as improving service delivery, commercial viability, operating efficiency, etc. while assessing projects under PPP.

PPPs cover the entire gamut of contracts ranging from simple service contracts to long term concessions. ULBs have experience of using private sector organisation for simple services such as transportation of waste, maintenance of equipment, etc., and where operators do not undertake any capital investment, are compensated through lumpsum payments and seldom bear risks arising from demand shortage, under-recovery of user charges etc. This toolkit is specifically designed to help ULBs undertake large capital investment projects through the PPP route after considering lifecycle costs, revenue generation and appropriate risk allocation and mitigation.

The typical lifecycle of a PPP project consists of seven stages which include project initiation and assessment, feasibility analysis, and project structuring. If the project is prima-facie amenable to PPP and technical parameters and costs are not uncertain, the fourth stage of detail project preparation may not be required and the next stage of preparation of bid process and invitation of bids from prospective private partners may be commenced. The sixth stage is project execution and construction monitoring. The last stage is commencement of regular operations. This toolkit is focused on the first three stages of the lifecycle as PPP options analysis needs to be embedded right from initial stages when a project is being considered. Most ULBs lack the capacity to consider PPP options during planning stage and to undertake the necessary analysis. This toolkit provides detailed steps for ULB staff to consider and analyse PPP options for a project.

1 Introduction

Public Private Partnership (PPP) is a method of working in which the public and private sectors cooperate and partner with each other to create infrastructure and/or provide services to users. There is no universal definition of PPP and the specific nature of partnership depends upon the type of project, scope of services, duration, responsibilities of parties and the allocation of risks between public and private sectors. Service Contract, Management Contract, Build-Operate-Transfer (BOT) Design, Build Operate and Transfer (DBOT), Build-Own-Operate (BOO), etc. are different forms of PPP arrangements.

In the context of this toolkit, public sector refers to the local body or the municipality which has identified a specific urban infrastructure project. The private sector in the context of PPP could include any of the following:

- a) Private sector organisation (which could vary from a local contractor to a large private company)
- b) Resident Welfare Association
- c) Non Government Organisation
- d) Community groups, etc.

1.1 Scope of PPP projects

Government agencies are already undertaking projects wherein they enter into contracts with private parties for preparation of designs, simple service contracts, procurement of material etc. This toolkit is tailored towards assisting local bodies in determining which of the medium to large sized infrastructure projects proposed to be undertaken under the JNNURM are best suited for the PPP route.

Accordingly, the scope of PPP projects includes one or more of the following:

- Preparation of designs
- Construction of infrastructure asset
- Transfer of any proprietary technology
- Maintenance of assets
- Delivery of services to citizens, if applicable
- Collection of user charges

1.2 PPP in Municipal Services

Urban local bodies are responsible for delivering basic services such as water, sewerage, solid waste management, urban transport, etc. Each of these is a separate sector with its own unique operating requirements, mode of service delivery and payment for services. Therefore, each project should be analysed in detail to determine the most suitable mode of PPP.

Access to basic services such as clean water and sanitation are important from the society's point of view and these services may not be commercially viable through user charges alone. However, ULBs have a social responsibility to provide these services. It is possible that certain aspects of the service delivery such as development and maintenance of water treatment plant, transportation of municipal waste, etc. could be done in partnership with private sector. This could improve efficiency of operations and lower the overall cost of serving the public and thereby improve financial sustainability.

The poor constitute a substantial part of the population in urban areas and typically reside in under poor living conditions. Quite often, they do not have access to various municipal services such as water and sewerage. They incur an unusually high cost in coping with the absence of such services. Involvement of community organisations, NGOs and private operators can help expand access to service for the poor at affordable costs.

In the course of PPP projects, the ULBs will need to partner with private sector organisations. This may result in ULBs being confronted with conflicting objectives at times. For instance, higher user charges are necessary to make a project financially sustainable and reduce the subsidy/ support required from the ULB. However, the ULB will have to balance this objective with the need to provide affordable services to the citizens, especially the poor. ULBs need to address these issues through appropriate mechanism for efficiency improvements, tariffs and regulation.

It is also well-recognised that certain infrastructure projects may not be financially viable on the basis of project revenues alone and that the financial viability can be improved through government support. Through various guidelines, including the Viability Gap Funding, the Government of India has promoted the PPP route for developing infrastructure projects. To be eligible for VGF, the project should be awarded by competitive bidding to a private party which should have a minimum of 51% stake in the project entity. In evaluating the cost-benefit of such support, it is important to set-up a base case in which the same service is provided through some other delivery option other than PPP.

1.3 PPP lifecycle

PPP lifecycle refers to the entire set of activities from project identification and initiation to construction and commencement of operations. The entire lifecycle can be divided into seven distinct stages each which are briefly discussed below.

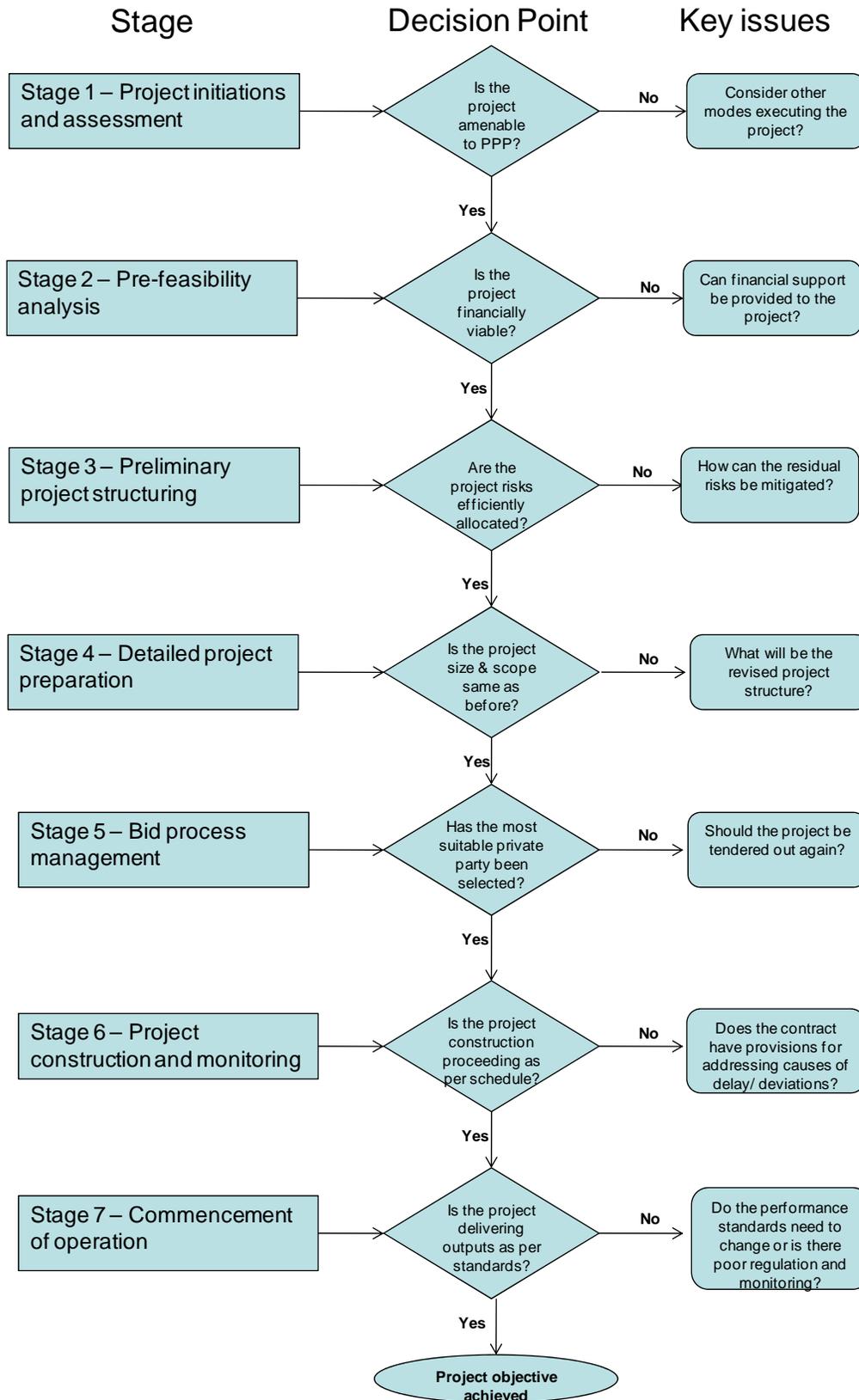
- **Stage 1-Project initiation and assessment:** The suitability of undertaking the project through PPP route should be analysed by considering the objectives to be achieved by implementing the project. This involves evaluating the suitability of PPP route to meet the objectives and generate greater value to the project beneficiaries.
- **Stage 2- Pre-feasibility analysis:** This involves a quick assessment of the commercial feasibility of undertaking the project. It includes estimation of capital expenditure, operating/ recurring expenses, and revenue stream, if any from the project. It will show whether the project is self-sustainable based on the revenues it may generate or require financial support in the form of capital grant or subsidy.
- **Stage 3- Preliminary project structuring:** Allocation of roles and responsibilities in the project to different stakeholders in a manner that the risks are assigned to entities best suited to manage them. It also includes determining the financing plan and the most likely PPP model that would be applicable.
- **Stage 4- Detailed project preparation:** If more information on technical, cost or commercial aspects is necessary, detailed project report may be prepared. This will help in defining the project scope in greater detail and with more clarity. Commercial feasibility can also be assessed with more certainty due to availability of better information.
- **Stage 5- Bid process management:** This include preparation of bid documents such as request for qualification, request for proposal and draft concession agreement. An independent and transparent process should be followed for inviting proposals from private sector partners to select the most suitable private party for implementing the project.
- **Stage 6- Project construction and monitoring:** Once project construction begins, it should be monitored on pre-agreed parameters at regular intervals. Corrective action may be necessary to ensure that the project will be completed within agreed time and cost.
- **Stage 7-Commencement of operation:** This marks the completion of construction phase. The project is now available for delivering the service for which it was intended. It is necessary to monitor whether the quality and quantity of service delivered by the project meets the performance standards as originally agreed.

Each of the seven stages represents a crucial checkpoint for the project. Each stage should be undertaken sequentially as the output of one stage has a bearing on the next stage. The key decisions and outputs of each of the stages are presented in figure 1.

This toolkit specifically addresses the first three stages and culminates with providing guidance to ULB staff on how to undertake the preliminary steps to determine whether a project can be taken-up under PPP and if so then what is likely to be the most suitable project structure. The project scope and size is usually determined in the initial stages and it is quite difficult to change these basic parameters after detailed project preparation or once bid documents have been prepared. Unless the initial stages are done correctly, the subsequent stages may not bring about the desired results and the project in its present form may have to be dropped. In most cases, ULB staff is responsible for carrying out the initial assessment. Therefore, this toolkit focuses on providing simple and yet practical guidance to ULB staff for assessing a project's suitability for PPP.

It is well-recognised that the subsequent stages are equally important. Support of well-reputed and established consultants and transaction advisors may be obtained for completing the later stages of PPP lifecycle. Assistance from consultants empanelled by the Department of Economic Affairs may be obtained. Please refer to the following web-link for the list of empanelled consultants.

Figure 1 – PPP lifecycle – Stages, decision points and key issues



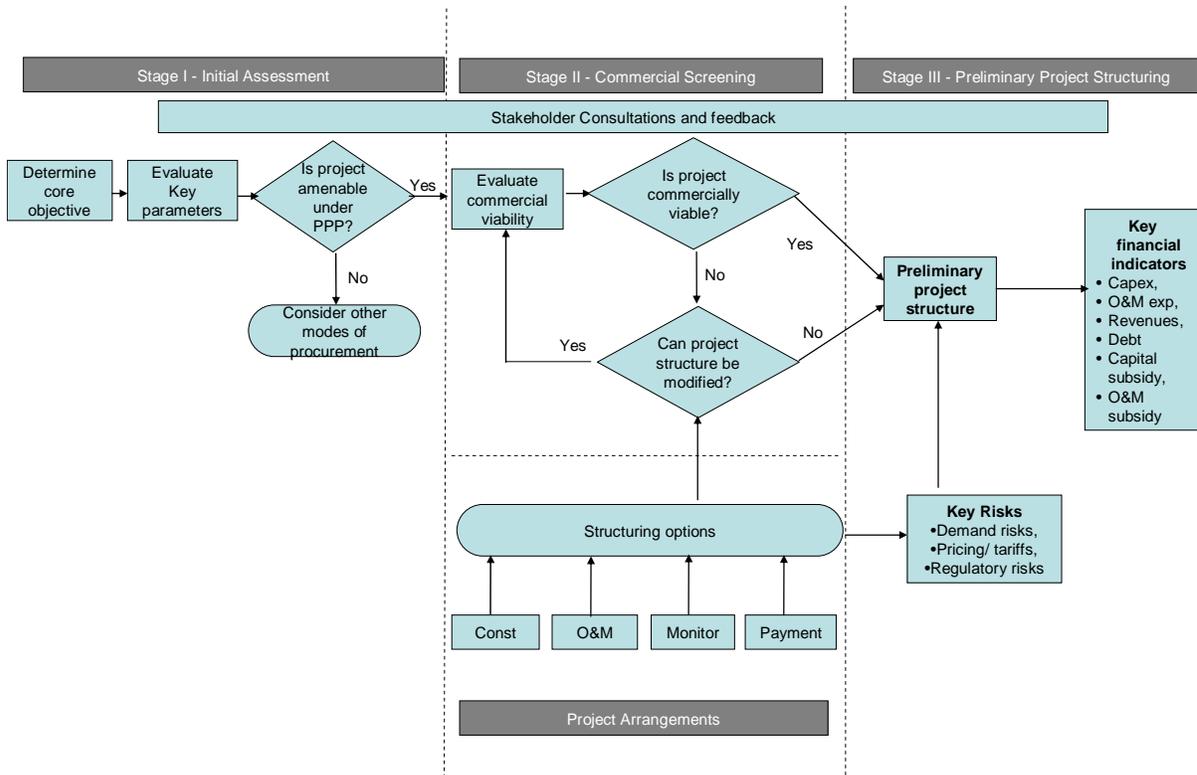
1.4 Approach for the toolkit

Figure 2 summarises the activities and key decision points in the first three stages.

- Stage 1 – Initial project assessment
- Stage 2 – Commercial screening and project arrangements
- Stage 3 - Initial project structuring

During all three stages, the ULB should constantly consult with key stakeholders such as the public/ project users, political representatives, community groups and NGOs, private operators, ULB staff, financial institutions, other government organisations, etc. The result of such consultations should be built into the project preparation process such that the project structure or parameters could be modified to address their concerns and interests.

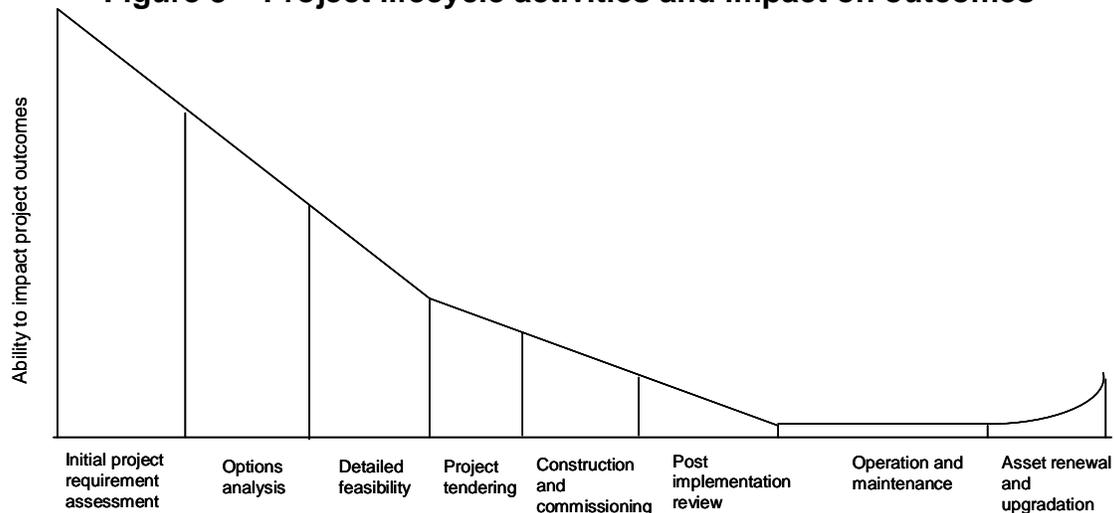
Figure 2 – Three stages in PPP assessment toolkit



2 Stage 1 - Initial Assessment

It is important to quickly assess if a project is suitable to be taken-up under PPP. This exercise should be undertaken in the initial stages of the project conception so that there is still scope for modifying certain dimensions of the project to make it amenable to PPP.

Figure 3 – Project lifecycle activities and impact on outcomes



Source: Adapted from Gateway Initiative, Business case development guidelines, Government of Victoria

Figure 3 shows that ability to affect the project outcome is highest in the initial stages of the project lifecycle. The initial steps determine the broad project specifications and requirements which strongly influence all subsequent activities.

2.1 Determine key objectives

The ULB should begin the exercise with an analysis of the key objectives to be achieved for a particular sector or service. Examples of such objectives are discussed below. The possible role of private sector in each of these is also highlighted:

- Improving service delivery:** This includes expanding the physical area of service delivery, serving new categories of customers, increasing the quality and

Box 1 - 24x7 water supply in Karnataka Towns

A management contract for 24x7 water supply in pilot zones in three towns (Hubli-Dharwad, Gulbarga and Belgaum) was awarded in April 2005. The private operator is responsible for rehabilitation, O&M of the water supply system. The assets and staff continue to remain with the ULB. The private operator will improve the quality of service against a fee based contract. Tariff revision is the responsibility of the ULB and would be taken-up only after demonstration of service improvement. The pilot zones serve close to 20,000 households. The quality of service has improved and two out of the three city corporations have passed resolutions for extending the service to other areas.

Source: Karnataka Urban Infrastructure Development Corporation

quantity of service or a combination of these. The private sector can be used to extend services to locations or customer segments which have not been effectively served in the past. Quite often, the private sector can adopt flexible service delivery mechanism at much lower costs. Many local bodies have used NGOs and the private sector to provide services such as water and solid waste management in slum areas and extension colonies.

- **Lower cost of service:** Cost of delivering a service can be lowered by improving processes and operations. This lowers direct user charges borne by users. Private sector can achieve lower operating costs and better efficiency due to better management practices and operating controls. They also have more leeway to incentivise operating staff to improve the efficiency.
- **Access to better technology:** The private sector can often bring better technology to improve the quality of service delivered to residents. For instance, in case of solid waste management better quality of transportation and cleaning equipment as well as advanced waste treatment technologies could improve the quality of service as well as reduce the health hazard for the staff.
- **Undertake heavy capital investment:** Governments often face resource constraints that prevent them from undertaking projects that also have reasonable potential to generate revenue. PPP is a suitable alternative for such projects as it results in smooth payout over the entire life-cycle of the project rather than

Box 2 - Cost savings through PPP in SWM

Cities such as Surat and Rajkot have used private sector in all aspects of SWM and achieved significant reductions in cost of service. In the initial set of contracts, private parties were engaged for collection and transportation of garbage and were compensated on per ton of waste brought to the landfill site. Competition between service providers resulted in lower cost for the ULB in the subsequent years.

The contract mechanism has continuously evolved to ensure better value for money. The payment terms have moved from per ton to per trip and per collection point to ensure that the private service provider provides effective service.

Source: Fire-D Project Note No.15, Innovative Approaches to Solid Waste Management in India

Box 3 -Development of Bus Terminal in Uttranchal

The Mussoorie-Dehradun Development Authority (MDDA) awarded the development and O&M of an ISBT in Dehradun in 2003 to a private developer. The ISBT will also have commercial area that will generate revenue. The contract is a 20 year concession agreement extendable by another 10 years. After the initial moratorium of 4 years, the developer will pay Rs. 81 lakh every year to the MDDA. The developer is also responsible for maintenance expenditure. At the end of the concession period, both ISBT and commercial area will revert to MDDA. The ISBT became operational in June 2004. The project has enabled the city to get a "state-of-the-art" bus terminal with very little up-front investment

Source: Urban Finance, Vol 8 No.4, Oct-Dec 2005.

Public Service Delivery- Urban Infrastructure. Presentation by ICICI Venture, Oct 2007

high initial capital investment from the government. For example private sector can invest in expensive medical equipment and could be compensated through recovery of full user charges from regular patients while providing subsidised access to the poor.

There could be other objectives that the ULB may seek to achieve through PPP. The ULB should determine a relative prioritisation among the objectives.

2.2 Evaluate key parameters

It is possible to apply certain guiding principles to assess the suitability of a project under a PPP framework. A PPP project should ideally have the following:

- **Clarity in objectives** – The objective of seeking private partnership should be clear right at the outset. It could be only for development or construction of the project, maintenance and service delivery, technology transfer or for a combination of these. The specific objective would determine which mode of PPP would be most suitable.
- **Improvement in service delivery**– It covers increasing the coverage of the service to hitherto uncovered areas as well as improving the quality of services currently delivered. If the performance benchmarks are clearly identified it is possible to link payments to actual services and make the system transparent for the ULB and the private party. Ability of define performance standards is a crucial element of successful PPP design. Services that involve greater degree of human interaction pose greater challenges to definition of performance standards.
- **Commercial viability/ revenue model** – Any activity which involves providing a direct service to users and has a provision for directly charging the users is more amenable to PPP as the revenue stream could be directly used to meet the project expenses. The risks emanating from collection of user charges may or may not be borne by the private party.
- **Availability of competitive suppliers** - The project to be implemented should be one where there are number of competing firms available in the market place. This will ensure best rates to the local body and lower user charges for the public. This could be significant challenge in some cases as there may be no existing market for municipal services and hence very few

Box 4 -Energy efficiency in Street lighting Bangalore

Bangalore Development Authority (BDA) executed a PPP project through an Energy Service Company (ESCO) which was responsible for developing, installing and maintaining an energy efficient street lighting system in 2005-06. It involved developing a system that adjusted the illumination levels on the road according to time of day and traffic load. The energy savings was almost 50% compared to the earlier scenario. The savings is also sufficient to recover the initial investment in a few years.

Similar savings were achieved by Vadodra and Nashik through the use of energy efficient technology for street lighting

*Source: Urban Finance, Vol 10 No.1, Jan-Mar 2007
Documentation of Best Practices, NIUA, June 2007*

competing firms. In some cases, reputed contractors are not keen to take-up projects with ULBs as they may be less lucrative due to the smaller size. Therefore, it is necessary to build capacities of smaller contractors who typically work at a city level to increase the availability of contractors for PPP projects.

- **Improvement in operating efficiency** - There should be scope for the private party to demonstrate its efficiency over and above the existing levels in delivering the concerned service. This may be achieved by using a better technology, a different method of service delivery or both.
- **Organisational capacity** - PPP projects vary in their complexity and ULBs also have varying degrees of management capacity. The complexity of the project should be such that the ULB has capacity to manage the project. However, the capacity can be strengthened in the short-term through use of external advisors.
- **Regulatory impact** - It is important to assess whether the current legal framework allows to ULB to undertake PPP projects without substantial legal or procedural delays. In some cases, the governing legislation for ULBs has specific provisions that enable the ULB to provide services through PPP. In other cases, a precedence of similar projects undertaken by the ULB may also be sufficient to consider PPP.

Annex I provides a template which ULBs should complete to assess suitability of a project under PPP. The ULB should determine inter-se priority for the parameters discussed above. Based on this a prima-facie decision should be made whether to go ahead with the project on a PPP basis. The cost of providing the service using other methods should be analysed before taking a go no-go decision.

3 Assessing commercial viability

Assessing commercial viability is a crucial step in the PPP process as it will highlight important financial parameters relating to the project, which would help the ULB to change the project configuration if required or to consider the most suitable financing option for the project.

- **Estimate capital costs:** Capital costs are one-time expenses incurred for creating a new asset or for substantial modernisation or renovation of an existing asset. It should include cost of civil works, machinery, equipment, installation and commissioning expenses. Any substantial expenditure that needs to be incurred during the life of the project to maintain the useful life of the asset is also taken as a capital expenditure.
- **Estimate recurring costs:** Recurring costs are periodic costs which are incurred periodically for operating the asset. These include cost of labour,

energy/ fuel costs, periodic maintenance and other operating expenses such as cost of tools, consumable, etc.

- **Estimate recurring revenues:** This include any user charges or fees that will be collected from users, revenue from other non-tax resources such as advertising arising out of the project, any special tax or levy that could be charged from the project users or general public, etc.
- **Quantum of debt:** Typically most infrastructure projects are financed with 70-80% of the cost met through debt sources such as loans from financial institutions, bonds, pooled finance, etc. This would help the ULB to undertake more infrastructure projects by leveraging its own resources to the maximum extent. The remaining amount is financed through equity contributions¹.

The next step is to evaluate key financial indicators that could provide inputs to structuring of the project:

- **Operating ratio:** This is a measure of the extent to which recurring revenues from the project are sufficient to meet recurring expenses. Operating surplus, defined as excess of operating revenues over operating expenses shows whether the project is self-sufficient.
- **Interest payments:** The quantum of debt determines the interest expenses. If the operating surplus is more than the annual interest payment, it shows that the project can bear the cost of interest payments and this improves the financial viability of the project.
- **Project returns:** This is a measure of the overall financial viability of the project. It also measures the extent to which the project can bear the capital expenditure on the project. The project returns should be measured over a period of time that matches the life of the asset or the expected duration of the contract. Financial viability can be determined through various methods such as NPV, IRR, etc. These are discussed separately in annex II.
- **Debt repayment:** The Debt Service Coverage Ratio (DSCR) gives an indication of the capacity to repay the debt incurred for the project from operating surpluses. This ratio should be above one, although lenders may insist on much higher DSCR for additional comfort. Cash reserves and other separate provisions may have to be made to ensure that the DSCR does not fall below the minimum.

A template for broad financial analysis is presented in annex III. It is important to assess income and expenses during the entire life of the project. Estimates during subsequent years could be very different from those of the initial year. The

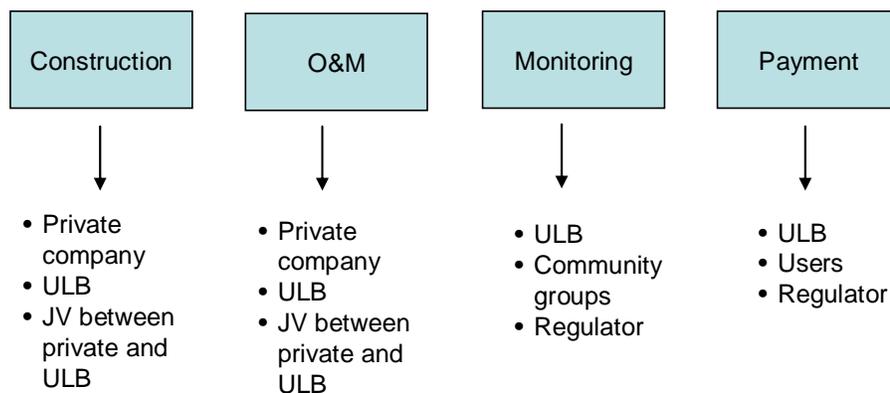
¹ In India, urban infrastructure projects are financed through much lower quantum of debt. The ULB should assume a realistic amount of debt while undertaking this analysis.

financial viability is affected by scope and structure of the project. Suitable modifications in the project structure could enhance the project viability.

3.1 Project arrangements

We can broadly divide the value chain or sequence of any project into the four activities as identified in the Figure 4. There are various options for each of these activities and each arrangement has a different impact on risk allocation and mitigation.

Figure 4 – Project arrangement for urban infrastructure projects



Construction: This could include design and construction of the project or only construction based on pre-specified designs. Further, the construction contracts may be structured as simple rate contracts for items or as an output based contract wherein the constructed asset should deliver a pre-determined standard of service

Operation and maintenance: while considering the responsibilities for operating the asset and delivering services to the public, it is important to lay down clear performance parameter which should be met. Parameters which could be out of the control of the private party should also be suitably identified.

Monitoring and regulation: The local body could directly monitor the performance of the private agency/ NGO. In cases where the performance of the private party is spread across, the RWA or the community groups could monitor.

Payment for services: In some case direct payment can be made by the beneficiaries/ users to the private party. In some cases, the ULB will pay based on pre-agreed norms or services. There could be other combination as well. The key issue is who bears the risk for non-payment or under-recovery especially when user charges are to be paid by the consumers.

Toolkit for PPP in urban infrastructure

Table 1 gives some examples of different project arrangements in water, solid waste management and urban transportation.

Table 1 – Examples of project arrangements

	Construction/ investment	Service delivery	Monitoring and regulations	Payment for services
Solid Waste Management				
Primary collection	private	Directly by the private party	Best monitored locally by RWA	Directly by the users
Secondary collection	Private	private	ULB. Community groups could monitor timely waste collection	By the ULB based on actual volume of waste
Treatment and disposal	Private	private	ULB	Directly by the ULB backed by user charges
Water Supply				
Development of water treatment plant	Private	private	ULB	ULB.
O&M of water supply	Some investments by private and some by ULB	Private	Through regulator/ state govt	Direct users (with some risks shared between ULB and private party)
Urban transportation				
Corridor development for urban bus transport	Private	Private	ULB/ State govt	payment by ULB based on annuity
O&M of urban bus service	Private	Private	ULB/ independent regulator	Directly by users. (Operating subsidy if required)
Construction of bus terminals	Private	Private	ULB	Share of ticket revenues, use of real estate
Sanitation				
Construction of public toilets	Private/ Public grants	Private	ULB	Directly by users. (Advertising revenue if necessary)

Each of the above combinations refers to various models of PPP which entails different degree of investment by the private party, risk sharing, time duration, etc. These models range from simple service contracts to long-term concession agreements as well as Build-Own-Operate arrangement.

4 Preliminary project structuring

Project structuring involves allocation of roles and risks for various modules and activities under the project to different stakeholders. The preliminary project viability and analysis of project arrangement options form an important input into determining the project structure. Determining the project structure is not a one off activity but it evolves during the initial stages of project preparation.

If initial assessment highlights that the project cannot bear the capital cost of certain components, the scope and structure of the project could be modified to lower the capital costs that will be taken up under PPP format, keeping some capital costs for public funding.

The project may entail different risk return trade-off for various stakeholders and this could be serious impediment to progress on the project. Project structuring is essential to balance the costs and benefits from the projects among various stakeholders.

Stages 2 and 3 should be undertaken iteratively as inputs from the commercial viability assessment will highlight certain changes in project structure that could make it financially viable. This will entail a different risk sharing arrangement than initially envisaged and will require further stakeholder consultations.

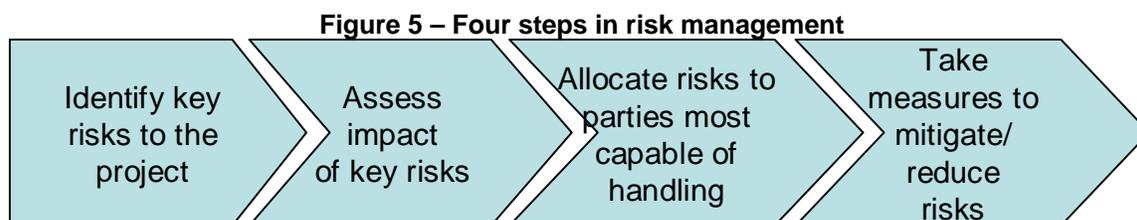
Box 5 - Desalination Plant in Chennai

Chennai Metrowater (the water utility in Chennai) has awarded a contract for a 100 MLD desalination plant under Design, Build, Own, Operate and Transfer basis to a consortium of Indian and Spanish Firms. The project would be undertaken by an SPV owned by the consortium. There are separate contracts for EPC, O&M, land lease and provision of stores and consumables which clearly delineate the roles and responsibilities of various stakeholders. Chennai Metrowater is the bulk consumer of water and the SPV has a bulk water purchase agreement with the water utility. The responsibility for un-interrupted power supply is with the GoTN. To ensure sufficient security of payments to the contractor, there are three security mechanisms viz., escrowing of identified customer receivables, state support agreement and a three-month revolving letter of credit.

Source: Chennai Water Desalination Limited

4.1 Risk management

All projects involve certain degree of risk which needs to be borne by the different stakeholders. The four steps in risk management are presented in Figure 5.



Each project has its own unique set of risks. However, they could be broadly classified into construction risks, financing risks, demand risks, political risks and regulatory risks. The impact of a risk is a function of the likelihood of its occurrence and its severity. The most important step is to allocate the different risks across the stakeholders on the basis of who is best suited to handle and mitigate the risk. If the private party is asked to bear a high degree of risk due to procedural delays, absence of legal framework, lack of clarity for tariff revisions, demand uncertainty, etc., the return expected by the private party would also be higher. Optimal allocation risks across stakeholders will reduce the overall cost of bearing the risk and thereby lower the project cost.

Box 6 - Alandur Sewerage Project

A comprehensive project for developing underground sewerage system was prepared in 1996. Tamil Nadu Urban Infrastructure Financial Services Limited (TNUIFSL) was given the task of project preparation. It identified risks relating to construction, O&M, demand, payment as well as time and cost overruns. The local body undertook continuous consultation with the public to assess the demand and desire to take connections. Almost 25% of the project cost was to be financed through citizen contributions. To address demand risks - up-front contributions were raised from the citizens and first utilised in the project. To minimise the construction risks and coordination problems, all three components – underground sewerage network, pumping stations, and treatment plant were awarded to a single BOT operator. Payments were structured in a manner that encouraged simultaneous completion of all components. The project was commissioned in July 1999 and once cost details were available, the ULB imposed a monthly charge of Rs. 180 per month to cover O&M and debt servicing charges

Source: Ministry of Urban Development

Table 2 gives an example of which party is best capable of handling each type of risk.

Table 2 – Examples of risk allocation

Type of threats which may lead to Financial and/or Operational Risks	Preferred Risk Allocation
Political opposition	Public Sector
Site non-availability	
Government instability	
Level of public support	
Project approval and permit by regulatory authorities	Public/Private, depending on the circumstances
Contract variation	
Lack of experiences in PPP arrangement	
Lack of commitment from public/private partner	
Force majeure	
Authority distribution between partnerships	
Late design changes	
Tariff revisions	
Inflation	Mainly private sector
Demand uncertainty	
Private agency's staff strike	
High financing cost	

Type of threats which may lead to Financial and/or Operational Risks	Preferred Risk Allocation
Unforeseen rise in Interest rate	Mainly private sector
Organisation and coordination risk	
Environment	
Insolvency of subcontractors/suppliers	
Operation cost overrun	
Higher maintenance cost	
Construction time delay	

The actual allocation of risk on each project would depend on specific circumstances. For example, if the project involves development and O&M of a water treatment plant and the ULB has a bulk purchase agreement with the private party, then the demand risk may be shared between the ULB and the private sector.

4.2 Financing plan

The financing plan for the project should be determined based on the revenue potential, attractiveness of PPP option, resources available from central and state governments as well as from other sources. The important sources of funds are discussed below. The actual contribution from each source will be project specific and needs to be worked out on a case by case basis.

- **Equity:** This constitutes the risk capital for the project. Depending upon the project structure, equity could be contributed by the ULB, private party or both
- **Debt :** Debt has to be repaid from project revenues or other sources and also carries an interest payment obligation. There are various options for raising debt for a project. These include long-term loans from banks and financial institutions, bonds from the capital market - either on stand-alone basis or pooled basis with other ULBs, loans from state governments, etc. Each of these options may not be available for all ULBs. The important point to note is that there will be outflow of periodic interest and repayment of debt after an initial moratorium. Lender may typically require escrowing of revenues from income sources to ensure periodic payment.
- **Grants from higher levels of government:** Grants from central and state governments (including JNNURM) are also important sources of funds, especially for projects that may not generate any revenue. It is important for the ULB to leverage these grants to maximise investment from private sector and also raise debt , especially for revenue generating projects
- **Public contributions:** Contributions from the public may also be raised as a source of financing part of the initial capital cost. There will be need for strong demonstration of commitment by the ULB and continuous

stakeholder consultations to raise capital contributions for projects from the public.

4.3 Subsidy requirements

Based on the preliminary project structure, key financial indicators for the project should be calculated. The project may require subsidy to become financially viable. These could be:

- **Operating subsidy:** This is necessary to bridge the gap between operating expenses and operating income
- **Interest subsidy:** This subsidy is necessary to meet the debt servicing (interest) costs
- **Capital subsidy:** Capital subsidy is necessary when the project returns are insufficient to re-coup the capital cost of the project.

It is recognised that infrastructure projects have a long gestation period and may not all be fully financially viable on their own. The Government of India has set up a special facility through the Viability Gap Funding to provide such support to PPP projects.

This assistance can be upto 20% of project costs and may be given as a one time grant. In case the sponsoring Ministry/ State Government/ statutory entity propose to provide any assistance over and above the said VGF from the Centre, it shall be restricted to a further 20% of the total project cost. Thus a maximum of 40% of the total project cost may be funded through the VGF route.

For availing the VGF it is necessary that the following conditions should be met:

- Contract for development of the project is awarded to a company in which a private entity control 51% or more of the paid-up equity
- The project is awarded through open competitive bidding
- the private sector company is responsible for financing, development, operation and maintenance of the project
- The project provides a service against a pre-determined tariff or user charge

4.4 PPP models

Depending upon the project scope, project cost or estimated investments, allocation of roles and responsibilities, project duration and risk allocation framework, a range of PPP models could be applied. These vary from simple service contract which could be renewed every year to long-term concession contracts which could extend upto 25-30 years.

The choice of suitable PPP model would be determined by the specific circumstances and details of a project. However, the following principles should be used as a guide for determining the most suitable PPP model for a project.

- **Match the PPP model to objectives:** This should be the building-block for determining the most suitable PPP model. If private sector financing of infrastructure investments is a priority then concessions, BOT and its variants are most suitable. On the other hand, if the objective is to realise efficiency gains from stand alone activities such as meter-reading, pipe-laying, street sweeping, drain cleaning, etc. and/or to bring down costs in these activities then service contracts would be the ideal option. Management contracts and lease would be more suitable for bringing about efficiency improvements in inter-related parts of the activity chain through superior private sector management skills.
- **Quantum of preparatory work required:** Service contracts can be implemented with very little preparatory work whereas higher order PPP models such as management contracts, concessions and BOT require more preparatory work. Such preparatory work may include details project preparation, establishment of baseline date and tools for monitoring private sectors' performance, a conducive regulatory and legal framework that would insulate the private party from change in political regime. For example, a concession for a water supply project will require a clear multi-year framework for tariff revision.
- **Institutional disruption and adaptability:** Models such as concession and lease deal with improving efficiency of present operations and would involve the ULBs and state government institutions to undergo a sizeable shift in the scope of their activities. The staff in these institutions may need to acquire new skills. If the institutional landscape is not amenable to such changes then models such as service contracts and simple forms of management contracts may be more suitable. Notable exceptions to this principle are projects which involve a specific activity or set of activities that are not being undertaken by the ULB or can be ring-fenced from the ULB's present operations. Typical examples include new water treatment plants, waste processing plants and landfill sites.
- **Benefits commensurate with private sector responsibility:** As the scope and responsibilities of private sector is increased, there is greater scope for achieving efficiency gains and expanding the benefits from the project. However, higher benefits go hand-in-hand with need for more preparatory work, wider political will for reform, and ability of ULBs to adapt to change.
- **Need for complementary sector reforms:** If there is need for fundamental reforms in the sector, then certain forms of PPP may even contribute to

precipitate a crisis. For example, a BOT project for water treatment plant and supply of bulk water to ULB may lead to higher revenue deficit if the cost of water is higher than the user tariffs. A contract for primary collection and transportation municipal solid waste will increase pressure on the landfill site unless parallel effort is taken to encourage source segregation, waste minimization, recycling and suitable processing and disposal of waste. In such situations, the impact of PPP on the sector and the ability of ULB to take-up complementary reforms should be an important determinant while choosing the PPP model.

Annexure 5 presents a generic overview of responsibility for various elements of a project under different models. The choice of appropriate PPP model should emerge out of analysis conducted in the earlier stages.

Stages 4 to 7 of the PPP lifecycle depicted in figure 1 have not been dealt-with in detail in this toolkit. It is well-recognised that these stages are equally important. Support of well-reputed and established consultants and transaction advisors may be obtained for completing the later stages of PPP lifecycle. Assistance from consultants empanelled by the Department of Economic Affairs may be obtained. Please refer to the following web-link for the list of empanelled consultants.

http://www.pppinindia.com/pdf/Panel_Transaction_Advisers.pdf

ULBs should preferably follow a two-stage bidding process consisting of initially qualifying a limited number of prospective bidders through a Request for Qualification (RfQ). Detailed technical and financial bids should be obtained only from the short-listed bidders. However, if the project is relatively simple, the ULB may directly call for technical and financial bids without going through RfQ stage. In either case, sufficient weightage should be given to the quality of technical proposal rather than only choosing the lowest bidder. This is especially the case if the project has sufficient scope for the bidder to use technical expertise in designing and delivering the project.

Annexure I – Checklist for PPP in JNNURM projects

The Checklist given below provides guidance on rating PPP projects across seven parameters. Some of these parameters such as regulatory impact may need to be determined on a yes/no basis to proceed with the project. For other parameters, the ULB should assign different weightages depending upon the importance of the parameter to the concerned project and come-up with a weighted average score. This weighted score could be used for inter-se prioritisation of PPP projects.

Project Title		
What are the broad project components?	List out the project components that can be undertaken as separate activities/projects	
Check List for PPP	Rating	Description of the rating
Clarity in project objectives	On a scale of 1 to 5	<p>A rating of 1 if there is no clarity on which components of the project are to be taken up on PPP. Higher ratings can be assigned if specific objectives for PPP have been identified</p> <ul style="list-style-type: none"> • Financing • Design, technology and construction • O&M and services • Customer interface • Combination of those above <p>A high rating of 4 or 5 can be assigned if the scope, roles and responsibilities for the private sector on the above parameters have been worked out.</p>
Improvement in service delivery ((improving quality, quantity and physical coverage of services)	On a scale of 1 to 5	<p>The rating on this parameter depends upon whether the service to be provided by the private party can be identified, measured, and monitored. Ability to link payments to service provider to improvements in quality of service is also important. The guidance for ratings is given below: 1 - If the benefits cannot be measured or quantified and it is not possible to link payments to services. 2&3 – Benefits can be measured, quantified and monitored. External impacts which are not part of the project may also affect the benefits making it difficult to link payments to services. Lumpsum payments with some modifications for quality of service 4&5 - Benefits can be measured, quantified and monitored. External impacts which are not part of the project may also affect the benefits making it difficult to link payments to services. Payments directly linked to service delivery indicators.</p> <p>It is important that whether service indicators have been identified, measured, monitored and linked to payments in the past should not be a consideration. The ratings under this parameter should not be dependent on ability of the ULB to develop and manage these projects.</p>
Commercial viability/ Revenue model for the	On a scale of 1 to 5	Any project that involves delivering a service to the users against a tariff or user charges is important for commercial

Toolkit for PPP in urban infrastructure

<p>project (Is there a clearly identifiable revenue generation model for this project?)</p>		<p>viability of the project. The guidance for ratings is given below: 1 – The project has no scope for generating revenues. For example improvement of internal city roads, drainage system, etc. 2 – The project can generate revenues but it is too low even to meet the O&M expenses 3 – Project Revenues can meet entire O&M expenses 4 – Project revenues can meet O&M and part of debt servicing expenses. 5 – Project can meet O&M, debt servicing and part of principal repayment of debt</p> <p>The ratings here should take into consideration the existing user charges, ability to generate revenue from other non-tax sources such as use of land, advertising, etc. The extent to which user charges can be increased should take into account the ability and willingness to pay as well as improvements in service quality</p>
<p>Competition (Are there sufficient competing firms in the market providing a similar service?)</p>	<p>On a scale of 1 to 5</p>	<p>Availability of competitive suppliers for a particular project will help lower the cost of service for the ULB. The guidance for ratings is given below: 1 – There are no competitive firms providing/ capable of providing this service in the market 2 & 3 – There are a few domestic firms or international firms present in the Indian market who have the capability to execute the project 4&5 – There are a reasonable number of domestic and international players, who have executed such projects in India.</p>
<p>Efficiency of operations (Can the private sector improve efficiency of service to consumers through innovative use of technology or other systems)</p>	<p>On a scale of 1 to 5</p>	<p>The rating on this parameter would depend upon the scope that the project offers to improve efficiency of operations. The guidance for ratings is given below: 1 – The ULB has been providing this service in the past and there is little scope for the private sector to improve the efficiency 2&3 – The same service is also provided by the private sector in some cases with much better service levels at same or slightly higher costs. There is some scope for technology improvements as well. 4&5 – Private party can provide the same or better service at lower costs through elimination of wastages, better technology etc.</p>
<p>Organisational capacity (Does the ULB have the institutional capacity to manage PPP - this includes, past projects, procurement procedures and systems, management capacity etc.)</p>	<p>On a scale of 1 to 5</p>	<p>The guidance for ratings is given below: 1 - The ULB has only undertaken material procurement or simple labour contracts using the private sector 2 – The ULB has undertaken some out-sourcing of services to private sector 3 – The ULB regularly undertakes out-sourcing of services and also has experience with performance based contracts. It may or may not have used external consultants in the past 4 – The ULB has undertaken at least 1 PPP project involving some investment by the private sector. The project has been a successful. ULB has well laid-down procurement procedures, management capacity. Computerised systems for dealing with contracts.</p>

Toolkit for PPP in urban infrastructure

		5 – The ULB has undertaken a reasonable sized PPP project in which the private sector is responsible for development and O&M of a service, The project has been a successful. It has well laid-down procurement procedures, management capacity. Computerized systems for dealing with contracts.
Regulatory impact (Does the current legal and regulatory environment easily allow the ULB to undertake this project under PPP)	On a scale of 1 to 5	The guidance for ratings is given below: 1 – Any rules, provisions in the Municipal Act or policies from the state government expressly prohibit PPP in the concerned service/ activity 2 – The Municipal Act does not prohibit PPP in the concerned services but there are no policy guidelines from the state government 3 – The Municipal Acts and other policy guidelines allow PPP but there is no specific mechanism for state support 4 & 5– Supportive legal framework. The state also has an over-arching framework for PPP. The support mechanism from the state govt is also well laid out
Overall		Weighted Average Score Whether the project seems amenable under PPP?
Has the ULB articulated PPP options for this project	Briefly discuss the following: <ul style="list-style-type: none"> • PPP models considered for this project • Results of preliminary discussions with private parties on this project • Any other steps taken so far 	

Annexure II – Calculating NPV and IRR for a project

Net Present Value

Any large infrastructure project involves the following characteristics:

1. Initial capital investments: Capital investment may also be incurred in large chunks more than once during the life of the project
2. Recurring incomes streams: The project may have recurring income in the form of revenue from the project users, advertising fees and from other sources. The actual income every year may vary
3. Recurring expenses: These include O&M expenses such as salary, consumables, maintenance expenses, etc.

These cash inflows and outflows occur during different time-periods. It is well-known that a rupee today is worth more than a rupee tomorrow due to the time-value of money.

The Net Present Value (NPV) is a well-accepted method for comparing multi-year cashflows. These cashflows are discounted to the present value using an appropriate rate of discount. This rate of discount in most cases reflects the cost of funds that will be used for the project. It should reflect the opportunity cost of the funds i.e., if the next best investment option for the funds is investment in an alternative project with similar risk profile is 12%, then this should be the rate of discount.

Example

A and B are two values denoting cash inflow and cash outflow respectively.

A - Cash inflow, through user fees, grants and other sources

B – Cash outflow through operation costs etc.

If

- A_1 – Total Cash inflow in year 1; A_2 – Total Cashflow in year 2 ; A_n – Total Cashflow in year n
- B_1 – Total Cash outflow in year 1; B_2 – Total Cash outflow in year 1; B_n - Total Cash outflow in year n
- n- Year of expiry of contract period
- r- Discount rate

Then NPV is calculated in the following way:

$$NPV = - (\text{Capital Cost}) + \frac{(A_1-B_1)}{(1+r/100)^1} + \frac{(A_2-B_2)}{(1+r/100)^2} + \dots + \frac{(A_n-B_n)}{(1+r/100)^n}$$

Example:

- Capital Cost (initial investment): Rs.45,00,000
- n= 7 yrs
- r= 10%

The net cashflows are calculated in the following table

Year	Cash inflow	Cash outflow	Net cash flow	Discounted value (An-Bn) (1+r/100) ⁿ
1	A ₁ = 25,00,000	B ₁ = 15,00,000	A ₁ -B ₁ =10,00,000	909,091
2	A ₂ = 27,00,000	B ₂ = 17,00,000	A ₂ -B ₂ =10,00,000	826,446
3	A ₃ = 30,00,000	B ₃ = 19,00,000	A ₃ -B ₃ =11,00,000	826,446
4	A ₄ = 32,00,000	B ₄ = 21,00,000	A ₄ -B ₄ =11,00,000	751,315
5	A ₅ = 35,00,000	B ₅ = 22,00,000	A ₅ -B ₅ =12,00,000	745,106
6	A ₆ = 37,00,000	B ₆ = 24,00,000	A ₆ -B ₆ =13,00,000	733,816
7	A ₇ = 41,00,000	B ₇ = 26,00,000	A ₇ -B ₇ =15,00,000	769,737

$$\begin{aligned}
 NPV &= -45,00,000 + \frac{10,00,000}{(1+10/100)^1} + \frac{10,00,000}{(1+10/100)^2} + \frac{11,00,000}{(1+10/100)^3} + \frac{11,00,000}{(1+10/100)^4} \\
 &\quad + \frac{12,00,000}{(1+10/100)^5} + \frac{13,00,000}{(1+10/100)^6} + \frac{15,00,000}{(1+10/100)^7} \\
 &= \text{Rs. } 10,61,957
 \end{aligned}$$

Since NPV is positive, the project provides an attractive return on investment. If we had a higher initial investment say Rs.60,00,000, the NPV would have been -438,043, i.e., negative. In that case the project would have been considered unattractive for return on investment.

Calculating Internal Rate of Return

The IRR for an investment is the rate of return that would make the present value of future cash flows of the investment equal the current market price of the investment. For calculation purposes it is the interest rate that produces a zero NPV.

$$0 = - (\text{Initial investment}) + \frac{(A_1-B_1)}{(1+IRR/100)^1} + \frac{(A_2-B_2)}{(1+IRR/100)^2} + \dots + \frac{(A_n-B_n)}{(1+IRR/100)^n}$$

Thus IRR answers a question that complements the NPV analysis – what is the highest cost of capital that this project can bear?

Example

Capital Cost (initial investment): Rs.45, 00,000
 n= 7 yrs

Calculating the net cash flow:

Year	Cash inflow	Cash outflow	Net cash flow
1	A ₁ = 25,00,000	B ₁ = 15,00,000	A ₁ -B ₁ =10,00,000
2	A ₂ = 27,00,000	B ₂ = 17,00,000	A ₂ -B ₂ =10,00,000
3	A ₃ = 30,00,000	B ₃ = 19,00,000	A ₃ -B ₃ =11,00,000
4	A ₄ = 32,00,000	B ₄ = 21,00,000	A ₄ -B ₄ =11,00,000
5	A ₅ = 35,00,000	B ₅ = 22,00,000	A ₅ -B ₅ =12,00,000
6	A ₆ = 37,00,000	B ₆ = 24,00,000	A ₆ -B ₆ =13,00,000
7	A ₇ = 41,00,000	B ₇ = 26,00,000	A ₇ -B ₇ =15,00,000

$$0 = -45,00,000 + \frac{10,00,000}{(1+IRR/100)^1} + \frac{10,00,000}{(1+IRR/100)^2} + \frac{11,00,000}{(1+IRR/100)^3} + \frac{11,00,000}{(1+IRR/100)^4} + \frac{12,00,000}{(1+IRR/100)^5} + \frac{13,00,000}{(1+IRR/100)^6} + \frac{15,00,000}{(1+IRR/100)^7}$$

Solving the above equation the **IRR is equal to 16.373%**. This is the highest cost of capital that the project can bear. If there is an alternative investment opportunity with a similar risk profile which has gives a higher IRR, then investing in this project is not the best option from the financial point of view.

Caveat

This annexure only presents a brief introduction to the concepts of NPV and IRR. There are a number of issues that should be taken into account during actual calculations for a project. It should be noted that NPV and IRR can be calculated from the perspective of an equity or debt investor as well. Infrastructure projects generate substantial public benefits or externalities which are important for the society’s point of view. A social cost benefit analysis should be done along with a financial analysis to capture the true economic and social value of a project.

Annexure III – Template for Financial Analysis

A. Calculating Capital Cost of a project

	Items	Amount (Rs. Lakh)
1	Cost of Civil works	
2	Cost of machinery and equipment	
3	Financing charges during construction period	
4	Installation and commissioning expenses	
5	Any other cost that can be categorised as capital	
6	Total capital cost per annum (1+2+3+4+5)	

Capital costs may be incurred over the first few years of the project. The year-wise expenditure schedule should be established. Any substantial one-time cost that is incurred in the subsequent years and is necessary for maintaining or enhancing the useful life of the asset should also be treated as a part of capital cost.

B. Calculate recurring expenses

	Items	Amount (Rs. Lakh)
1	Salary or staff cost	
2	Cost of consumables (raw material, machines, tools and spare parts)	
3	Fuel and energy expenses	
4	Periodic maintenance	
5	Cost of periodic maintenance estimated annually	
	Total cost of operations per annum (1+2+3+4+5)	

C. Recurring revenue estimates

	Items	Amount (Rs. Lakh)
1	User charges / fees (assume realistic level of realisation)	
2	Revenue from advertising rights (if any)	
3	Any other source of income	
	Total cash inflow expected per annum (1+2+3)	

Both income and expenses estimates should be calculated for the entire duration of the projects as these may vary over the years.

D. Quantum of Debt

Typically most infrastructure projects are financed with 70-80% of the cost met through debt sources such as loans from financial institutions, bonds, pooled finance, etc. In India, urban infrastructure projects are financed through much

lower quantum of debt. The ULB should assume a realistic amount of debt while undertaking this analysis.

E. Key Indicators

Evaluate the following key financial indicators for all years of the project.

	Items	Amount (Rs. Lakh)
1	Recurring revenue income	
2	Less : Recurring expenses	
3	Operating Surplus/ Deficit (1-2)	
4	Less: Interest payments	
5	Net Cash surplus (3 – 4). Calculate this indicator only in case of an operating surplus.	

If there is an operating deficit then the project will require recurring subsidy to meet recurring expenses. Similarly, if operating surplus is less than interest payment, then additional subsidy will be required for meeting interest costs.

If there is a net cash surplus then proceed towards calculating financial viability – NPV or IRR for the project. This should be done after taking into account taxes, interest payment, depreciation, etc.

The financial viability analysis will present additional set of key indicators such as:

- Debt Service Coverage Ratio
- Capital subsidy
- Operating subsidy

Annexure IV - Public-Private-Partnership Models

	Service Contract	Management Contract	Lease	BOT	Concession	Divestiture
Objective	Access to specific skills & efficiency improvement in specific activity(ies)	Access to management skills & efficiency improvement across a function	Access to management skills & efficiency improvement	Access to private finance & technical skills	Efficiency improvement & access to private finance	Efficiency improvement & access to private finance
Ownership of Assets	Government utility / ULB					Private Sector
Capital Financing	Government utility / ULB			Private Sector		
Financing Working Capital	Government utility/ ULB		Private Sector			
Commercial Risk	Government utility/ ULB		Private Sector			
Management Authority	Mainly Government utility / ULB	Private Sector				
Operations & Maintenance	Private Sector					
Duration	Less than 5 years	3 – 5 years	5 – 15 years	10 – 20 years	15 – 30 years	Indefinite or limited under license
Key issues	<ul style="list-style-type: none"> - Execution of project is relatively simple - Easy to revert to in-house management - Limited opportunity to set performance standards - Limited scope to harness managerial skills - Risk that contractor will bid on cost leading to low cost and low skills 	<ul style="list-style-type: none"> - Gains in efficiency - Possible to bring in management expertise - Potential for setting performance standards - Draws little on private sector incentive to reduce costs and improve quality - Need for monitoring and regulatory framework 	<ul style="list-style-type: none"> - Transfer of commercial risk & management responsibility to private sector - Incentive for increased efficiency, improved collection - Difficulty in co-ordination due to conferring responsibility of O&M and financing to separate entities - Need for monitoring and regulatory framework 	<ul style="list-style-type: none"> - Provides transfer of technology & training benefits - Need for a robust regulatory mechanism - Significant cost and effort in project preparation 	<ul style="list-style-type: none"> - Private sector is focused on long-term sustainability of project - Mobilising private sector incentives for efficiency across all areas - Requires significant govt. commitment & credible regulatory framework - Significant cost and effort in project preparation 	<ul style="list-style-type: none"> - Full responsibility of investment & operations with private sector - Potentially large improvement in efficiency - May lead to monopolistic pricing or poor pricing