Case Study

on

Pre-qualification and Risk Allocation Process for Procurement

of

PPP Regional Municipal Solid Waste Management (MSWM) Facility

at

Taloja, Maharashtra

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Introduction

It was August 11, 2011. Mr. Shiva Iyer, General Manager (Public Private Partnership (PPP) Cell), Mumbai Metropolitan Development Authority (MMRDA) had just emerged from a high level meeting chaired by the Chairman of MMRDA and municipal commissioners / head of urban local bodies (ULBs) in the Mumbai Municipal Region (MMR). The primary agenda for the meeting was to decide the course of action for the initiative "Regional Municipal Solid Waste Management Facility (RMSWM)" at Taloja. A feasibility study was undertaken by MMRDA to look into the possibility of setting up a regional municipal solid waste management facility under the jurisdiction of various ULBs in MMR. This initiative was to address the torrid issue of indiscriminate dumping of municipal solid waste (MSW) in low lying and far off areas of MMR. The discussions among the ULB representatives had reached a crucial juncture as MMRDA had requested the ULBs to indicate their concurrence to join the project so that MMRDA could initiate the procurement process.

The discussions kicked off with a presentation by Mr. Iyer about the proposed RMSWM facility. Moving forward, there were exchange of views on the issues raised by the representatives of the ULBs about the structure and design of the project. Though the MMR comprises of seventeen ULBs, only six ULBs showed interest in participating in the proposed project. MMRDA considered the RMSWM facility as one of their key projects in the infrastructure development sector. Extensive research and discussions among multiple stakeholders were undertaken since long.

Mr. Iyer initiated procurement management process in order to appoint a private partner for this project. Although, it was certain that majority of the private players would be interested in this much awaited project, the attractiveness of RMSWM hinged on the following factors:

- setting up realistic prequalification criteria for selection of the bidder,
- the design of equitable risk allocation framework and
- improving the bankability of the concession agreement.

Mr. Iyer and his team of officials from MMRDA initiated the bidding process on December 25, 2011 with the call for request for qualification. Prior to the bid, on October 25, 2011, Chairman of MMRDA, Ms. Yogini Mule had called for the risk allocation framework and pre-qualification criteria to be presented before the board members of MMRDA.

Mumbai Metropolitan Regional Development Authority

On January 26, 1975 the Mumbai Metropolitan Development Authority (MMRDA) was formed in line with the Mumbai Metropolitan Development Act, 1974. The primary objective of setting up the Mumbai Metropolitan Region (MMR) was to enhance the city's economic activities through the following responsibilities:

1. preparation of regional development plans,
2. provision of financial assistance for significant regional projects,
3. helping the ULBs in execution of their infrastructure projects,
4. coordinating the implementation of infrastructure programmes and projects in MMR, and
5. ensuring appropriate development of MMR by restricting any undue activity.

The MMR was the metropolitan area consisting of the metropolis of Mumbai and its satellite towns in Maharashtra. The MMR was spread over an area of 4,355 sq.km consisting of 17 urban local bodies. The 17 urban local bodies include

eight municipal corporations viz. Greater Mumbai, Thane, Kalyan-Dombivali, Navi Mumbai, Ulhasnagar, Bhiwandi-Nizamapur, Vasai-Virar and Mira-Bhayandar; and nine municipal councils viz. Ambarnath, Kulgaon-Badlapur, Matheran, Karjat, Panvel, Khopoli, Pen, Uran, and Alibaug. The population of MMR region as per the 2001 census was 19.28 million, with 11.97 million coming from Greater Mumbai alone. The municipal corporations such as Mira–Bhayandar, and Vasai Virar cities were the two municipal corporations that have experienced population growth in double digits, 11.48% and 27.24%, respectively, during the 1991-2001 period. The information about the MMR is provided in Exhibit 1.

The highest policy making body of MMRDA consists of 17 members and the Minister for Urban Development, Government of Maharashtra serves as it's Chairman. The members include: Minister for Housing; Minister of State for Urban Development; Mayor of Mumbai; Chairman, Standing Committee, Municipal Corporation of Brihan Mumbai; three councillors of Municipal Corporation of Brihan Mumbai; two members of the Maharashtra Legislative Assembly; one member of the Maharashtra Legislative Council; Chief Secretary to the Government of Maharashtra; Municipal Commissioner of Municipal Corporation of Brihan Mumbai; Secretary, Urban Development; Secretary, Housing; Managing Director, City and Industrial Development Corporation of Maharashtra Ltd (CIDCO); and Metropolitan Commissioner of MMRDA.

Legislative Framework for Municipal Solid Waste Management

The 74th Constitution Amendment Act (CAA) brings the ULBs at the forefront of urban services delivery. The 74th CAA seeks to introduce fundamental changes in the functioning of ULBs and one of the salient features have been the introduction of Twelfth Schedule that lists the functions of ULBs, which, covers it's planning, regulation and developmental aspects. Development of roads and bridges; water supply for domestic, industrial and commercial purposes; and public health, sanitation conservancy and solid waste management were among the few development efforts that fell under the jurisdiction of the ULBs. Rapid urbanization, solid waste management turned out to be one of the most challenging services of ULBs.

Municipal solid waste management (MSW) refers to the entire process chain of waste segregation and storage at source, primary collection, street sweeping, secondary waste storage, transportation of waste, treatment and recycling options of solid waste, and final disposal.

- The key deficiencies and challenges encountered in MSW management include;
- lack of primary collection of waste at doorstep,
- inappropriate system of secondary storage of waste,
- no treatment of waste, and
- inappropriate disposal of waste at open dumping grounds.

With the objective to meet these challenges, the Ministry of Environment and Forest (MoEF) issued Municipal Solid Waste (Management and Handling) Rules 2000 under the Environment Protection Act 1986. The MSW Rules 2000 directs the ULBs to set up infrastructure with regards to collection, storage, segregation, transport, treatment, and disposal of MSW.

The MSW Rules consisted of four schedules that related to ULB's key guidelines for MSW management services provision. The Schedule II of the MSW Rules (2000) directs the ULBs to implement improved practices and services for waste processing and disposal facilities. The standards for waste processing and disposal facilities to be adhered by

the ULBs were stated in Schedule III and IV. Schedule I includes the timeline by which the facilities were expected to be established. In addition to this, ULBs were urged to adopt suitable technology to utilize wastes and minimize the burden on landfill.

For instance, biodegradable waste should be processed using appropriate biological procedures such as vermicomposting or anaerobic digestion whereas incineration with or without energy recovery could be used for processing combustible wastes. The use of sanitary landfills should be limited to non-biodegradable wastes, inert wastes and other wastes not suitable for recycling or biological treatment. The location of the landfill site should be away from human habitation, forest areas, water bodies, heritage sites, parks, and places of cultural, religious and historical importance. Furthermore, landfill lining should be designed to prevent groundwater contamination and the landfill top cover should have the requisite features to collect the leachate and landfill gas for further treatment.

MSW Management in MMR

The amount of waste generated by the seventeen ULBs in 2008 was estimated at 11021 tonnes per day. This had been estimated to reach 19508 tonnes per day by 2035. The break-up of the waste generated by the municipal corporations and municipal councils are shown in Exhibit 2. Most of the ULBs of the MMR had not set up treatment and processing facilities except ULBs of Mira-Bhyander and Vasai-Virar. All the ULBs were practicing open dumping of solid waste.

The ULB's poor compliance with the Act could be attributed to: (i) lack of technical know-how, and understanding of the technology for treatment and sanitary landfill; (ii) lack of financial resources; and (iii) non-availability of land for setting up the sanitary landfill facilities.

Regional Municipal Solid Waste Management Facility for MMR

The precarious state of MSW processing and disposal in MMR region was in contrast with the efforts of MMRDA to position the region as a global urban conglomerate. MMRDA planned to benchmark the MSW system with larger cities and urban regions at par with international standards. The idea was to improve the current state of MSW management with a forward looking plan. The first step was to initiate a study focusing on evaluation of the present status of the processing and disposal of MSW in MMR and then evaluating potential of RMSWM facility based on the study report. MMRDA had foreseen various advantages offered by regional facility over setting up of individual ULB units, in order to improve processing and disposal of MSW:

1. Evade administrative processes involved in searching and procuring land parcels for establishment of ULB specific landfill facility.
2. Overall redevelopment of ULBs owing to improvement in environmental conditions as the regional facilities are located at outskirts, away from the ULBs.
3. Setting up of processing plans and sanitary landfills for disposing off MSW is uneconomical when compared to the low amount of waste generated by most ULBs. Therefore, introduction of RMSWM facility would relieve the ULBs from high capital costs and operating expenses.
4. RMSWM facility will allow sharing of fixed capital and operational costs, providing financial benefits in the waste processing, treatment and landfill operations.
5. Avoiding duplication and wastage of resources due to optimum utilization of land, costly landfill machinery and supporting infrastructure for handling large quantum of MSW.

6. The large capacity of resources at RMSWM facility created resource opportunities at a large scale with a life span of over 25 to 50 years of planning and handling MSW generated by new urbanized areas in the MMR. This assisted in a holistic economic development of the region.

In 2004, the MMRDA performed a preliminary study jointly with the Government of Maharashtra and Municipal Corporation of Greater Mumbai for identification of suitable sites for RMSWM facility and came up with fifteen suitable sites. However, further progress was not made in terms of putting together a concrete plan for execution. In 2008, the MMRD re-focused on finding a solution to the poor state of processing and disposal of MSW in MMR, by carrying out a pre-feasibility study on establishing RMSWM facility. The responsibility was given to All India Institute of Local Self Government, Mumbai with an objective to assess land availability and suitability while safeguarding the environment. Five sites were identified as part of this study and grouped as Priority 1 and 2 sites. Priority 1 sites were located at Taloja, Bhiwandi and Shil Phata (Kalyan). These sites were most suitable for immediate development and had potential to absorb MSW load of about 10999 tons per day from year 2011, which was expected to increase to 18327 tonne per day by the year 2031. The priority 2 sites were at Ambernath and Panvel – Pune highway near Chiklet village that were allocated for other government projects.

The location and profile of priority 1 sites are shown in Exhibit 3. It was evident from factors like land availability, potential for absorbing MSW for processing, treatment and landfill that Taloja was the first ideal site for development of RMSWM facility. Land acquisition processes are usually time consuming and elaborate. However, since a large tract of the Taloja site was already under Government possession, it was convenient for MMRDA to develop Taloja in the first phase itself.

The MMRDA circulated the pre-feasibility report among the ULBs to seek their comments and participation in the RMSWM facility. ULBs studied the report to review their own efforts on MSW processing and disposal. Out of seventeen ULBs in MMR, ULBs of Thane, Bhiwandi – Niampur, Kalyan – Dombilvi, Ulhanagar, Ambernath and Kulgaon Badlapur confirmed and committed to supply wastes to the RMSWM facility. In 2010, MMRDA decided to undertake a detailed study on "Development of Regional Municipal Solid Waste Management Facility at Taloja" covering financial, economic, social, environmental and technical aspects of the project. The MMRDA decided to perform this study in association with the National Environmental Engineering and Research Institute (NEERI), located at Mumbai and Nagpur. The MMRDA and NEERI decided to involve other expert agencies as well to evaluate this project. It involved Tata Consulting Engineers Ltd for techno-commercial assessment, Indian Institute of Technology, Bombay for transport related analysis, KPMG for financial analysis and Mahabal Enviro for socio economic study to structure the resettlement and rehabilitation plan. The key findings of this detailed study are presented in Exhibit 4.

Public Private Partnership for RMSWM Facility

The most important dimension of the project, was structuring the financing mechanism for execution of the project. Mobilization of financial resources to the tune of INR 700 crore (US$ 1.07 billion @ 1 US$ = INR 66 approx) was a challenging task. Multiple financial options for capital and operating expenses, project design, operation and maintenance of project, project ownership, and revenue streams were explored. Mr. Iyer and his team also held series of discussions with the officials of participating ULBs. The outcomes of the discussions were as follows:

1. The ULBs were monetarily strained and therefore reluctant to contribute financially towards creation, operation and maintenance of the facility. They were nonetheless willing to furnish any other kind of requirements needed to bring the project to reality other than financial support.

2. The participating ULBs were unaware of the current processing and treatment methods of MSW. Hence, to formulate a design for the facility and maintain the same was a big challenge.
3. The ULBs were interested in payment of charges / tipping fee for processing and treatment of municipal solid waste and operation of landfill.

Mr. Iyer's team came to realize that the project was headed towards PPP implementation mode, with private sector playing a major role in all phases of the project except the construction phase. Several models of PPP for infrastructure development and service delivery were analyzed but the decision to choose procurement model for project implementation was made and it was an important milestone in the project (Refer Exhibit 5). Right from the preliminary phase of procurement, transparency and efficiency were firmly maintained. The team followed standard procurement procedures during implementation and were successfully able to investigate policy documents and knowledge resources generated by the Ministry of Finance, Government of India.

The team discovered PPP toolkits (released by the Ministry of Finance, Government of India) that comprised of of PPP family indicator, PPP mode evaluation and PPP suitability filter, which proved beneficial in arriving at a potential PPP model for the project (Refer Exhibit 6). Mr. Iyer's team decided to use the tool with the consent of participating ULBs.

In 2011, Mr. Iyer had formally intimated the ULB officials about potential use of PPP model and also circulated the detailed study performed by the NEERI on RMSWM facility which the ULBs willing approved. MMRDA board members and ULB officials collectively gave consent to proceed to the next stage of procurement process.

Design of Procurement Process for RMSWM Facility

The study undertaken by the NEERI had created a strong justification for the establishment of RMSWM facility at Taloja, as it explored diverse perspectives like technical, social, financial, and environmental aspects. However, there were a series of challeneges faced in the design phase of the procurement process:

1. Quantum of solid waste generation: The quantum of waste that would arrive at the treatment and processing facility from the six participating ULBs was undetermined and the projected increase in the supply of solid waste were based on discrete assumptions.
2. There were diverse technologies available in the market with regards to turning waste to energy, incineration, composting and bio-methanization but the uncertainty was over the suitability of technology in the Indian context.
3. There was a huge disparity in the financial resources required for the adoption of identified technologies that affected the viability of the entire project.

Mr. Iyer initiated discussions with the agencies and experts involved in the detailed study of RMSWM facility at Taloja. They reached upon a common agreement that the two primary drivers for adoption of PPP model were (i)alternate mode of financing (which was different from traditional government funding) and (ii)ingraining design, construction and operational efficiencies of the private sector. However, the focus of PPP model was a contentious issue as some of the experts were vying with the idea of "output" while others were stressing on "outcome" of the selected technology for processing of MSW.

The discussions related to "output" focused on issues like quality of compost, packaging of compost, electricity generation from bio-methanisation plant, quantum of gas output from landfill and so on. The experts focusing on

"output" were of the opinion that there is a large variation in costs associated with the technologies. For example, setting up and operating an incineration plant requires higher quantum of financial resources as compared to setting up of compost plant. Therefore, they opined that a prior selection of suitable technology would provide certainty over cost of the project as well as financing mechanism for the project. MSW was perceived by many ULBs in India as a high value resource because of which payment of processing charges / treatment charges were considered unnecessary.

The experts who were emphasizing on "outcome" of the plant were of the opinion that the procurement objectives for this project was to process and treat the MSW in an environment friendly manner by complying with the environmental norms, and therefore it was not required for the team to get involved in the technical detailing and technology selection procedures or its functions. They stressed that the private concessionaire could be given the liberty to choose a technology for treatment and processing of waste. This, in turn, will lead to structuring the appropriate financing model and they may adopt either tipping fee mechanism (charges for processing and treatment of waste) or royalty mechanism (charges to be paid by the private partner to the ULBs based on MSW processed). These experts were wary of the idea of prescribing any specific technology or financing mechanisms in the bidding documents thanks to India's poor track record of MSW processing and treatment plants in the past.. Hence the team were uncertain about the procurement objectives, that is; whether to themselves prescribe the technology to be used in the project or just ensure compliance of technology proposed by the private partner ensuring it's operations obey the environmental norms.

Based on the study carried out by NEERI, the expected waste quantity to be received from the participating ULBs was currently figured at 1595 tons per day (TPD) but the projected quantity would be much higher than the stated numbers. A few experts decided to resolve the issue by setting a lower and upper limit of waste to be supplied to the processing facility. The environmental clearance and land acquisition were important facets of this regional landfill facility. The MMRDA decided to take all necessary steps to ensure that the project did not get embroiled and adversely affected by these two facets. Therefore, the MMRDA decided to select a site for setting up of the regional landfill facility based on availability of maximum government parcels of land so as to minimize the quantum of land to be acquired by the private sector, if required. Similarly, the MMRDA decided to obtain the environmental clearances from the Maharashtra Pollution Control Board for setting up the regional landfill facility at Taloja.

The team assessed past implementation experience to arrive at appropriate solutions for issues raised by experts in the procurement design phase (Refer Exhibit 7). Issues like technology selection, financing mechanism, land availability and environmental clearance compelled Mr. Iyer and team to identify risks associated with this project, allocate identified risks fairly and devise appropriate risk management strategies for effective implementation of the project.

The next task was to design prequalification criteria for selection of private partners. Standard procurement documents developed by the Government of India for the procurement design of PPP projects were referred for guidance and while at it, they also happened to discover a document published by the Planning Commission, Government of India titled "Guidelines for Public Private Partnership - Pre-qualification of Bidders" (Refer Exhibit 8). The team realized that though their understanding on RMSWM facility was satisfactory, they needed to upgrade themselves on prequalification criteria of technical and financial aspects adopted for past PPP projects in MSW sector. The information compiled is shown in Exhibit 9 and 10, respectively.

Exhibit 1. Information about Mumbai Metropolitan Region

1. Geographical Area					
Greater Mumbai (sq. km)					437.71
Mumbai Metropolitan Region (sq. km)					4354.50
2. Population		**Figures (in lakhs) As per Census 2001**	**Annual Compound Growth Rate (%) 1991-2001**	**Figures (in lakhs) As per Census 2011**	**Annual Compound Growth Rate (%) 2001-2011**
Municipal Corporations					
1	Municipal Corporation of Mumbai	119.78	1.90	124.78	0.41
2	Thane Municipal Corporation	12.63	4.62	18.19	3.72
3	Kalyan-Dombivali Municipal Corporation	11.94	3.82	12.46	0.43
4	Ulhasnagar Municipal Corporation	4.74	2.53	5.07	0.68
5	Mira-Bhayandar Municipal Corporation	5.20	11.48	8.15	4.58
6	Bhiwandi-Nizampur Municipal Corporation	5.99	4.68	7.11	1.74
7	Navi Mumbai Municipal Corporation	7.04	8.26	11.19	5.31
8	Vasai Virar City Municipal Corporation	4.70	27.24	12.21	4.88
Municipal Councils					
1	Ambarnath Municipal Corporation	2.04	4.94	2.54	2.23
2	Kulgaon-Badalapur Municipal Corporation	0.98	6.51	1.76	6.01
3	Alibag Municipal Corporation	0.19	1.81	-	-
4	Pen Municipal Corporation	0.30	3.14	-	-
5	Panvel Municipal Corporation	1.04	5.84	1.80	5.66
6	Uran Municipal Corporation	0.23	2.72	-	-
7	Matheran Municipal Corporation	0.05	0.88	-	-
8	Khopoli Municipal Corporation	0.59	2.68	-	-
9	Karjat Municipal Corporation	0.26	2.52	-	-
Rest of MMR		15.18	4.68	-	-
Total		**192.87**	**2.87**	**-**	**-**

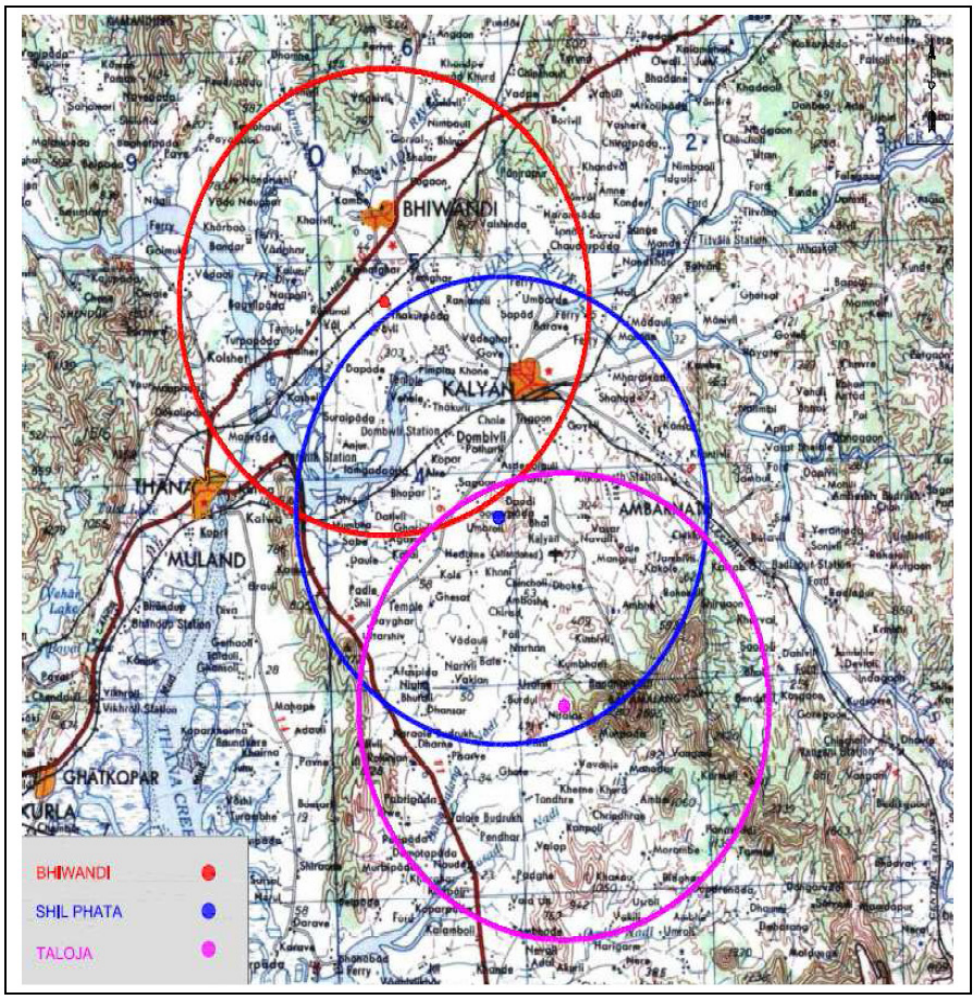
Note: 1 million = 10 lakhs

Exhibit 2. Population and Waste Generation in MMR

ULBs		Population (in lakhs)		Waste Generation (Tonnes per day)	
		2008	2035 (projected)	2008	2035 (projected)
Municipal Corporations					
1	Greater Mumbai	131.7	180.0	7532	10835
2	Thane	15.5	34.5	749	1757
3	Kalyan- Dombivali	13.6	31.1	550	1350
4	Ulhasnagar	5.4	7.9	344	522
5	Mira -Bhayandar	7.3	18.9	395	1088
6	Bhiwandi-Nizampur	7.4	16.4	285	678
7	Navi Mumbai	11.5	27.3	634	1581
8	Vasai Virar	8.5	24.0	266	822
Municipal Councils					
1	Ambarnath	2.5	4.4	98	187
2	Kulgaon-Badalapur	1.9	14.4	47	412
3	Alibag	0.2	0.5	8	19
4	Pen	0.5	1.2	17	47
5	Panvel	1.3	3.0	34	90
6	Uran	0.3	0.5	7	16
7	Matheran	0.1	0.1	6	8
8	Khopoli	0.7	1.6	26	63
9	Karjat	0.4	0.8	14	33
Total		**208.6**	**366.5**	**11021**	**19508**

Note: 1 million = 10 lakhs

Exhibit 3. Details and Location of Regional Sites in MMR



Sites	Development Phases	Area (ha)	Processing and Treatment (MT/D)	Sanitary Landfill (MT/D)
Taloja	Phase I	264	2000	2500
Shil Phata	Phase II	259	1000	1500
Bhiwandi	Phase II	352	500	2500

Exhibit 4. Information on Prefeasibility Study

1. Loca f Taloja Site

The proposed site is accessible from National Highway-4 via Thane city towards Shil Phata circle to Taloja MIDC road. Taloja MIDC road is connected to 7 meter road facing the proposed site. The site is connected to roads leading to the Ambarnath MIDC area and Thane (Mumbai) city. The proposed site is about 3 kms away from Taloja MIDC area, which has 277 units of large, medium and small scale industries. It is located about 15 kms down from Panvel-Pune highway. The site is well connected to Thane, Navi Mumbai, Kalyan- Dombivli, Bhiwandi-Nizampur, Ambernath, Badlapur, Matheran, Karjat and Khopoli regions. Proposed Taloja regional site will be implemented under phase I on priority basis and will cover an area of about 264 hectares.

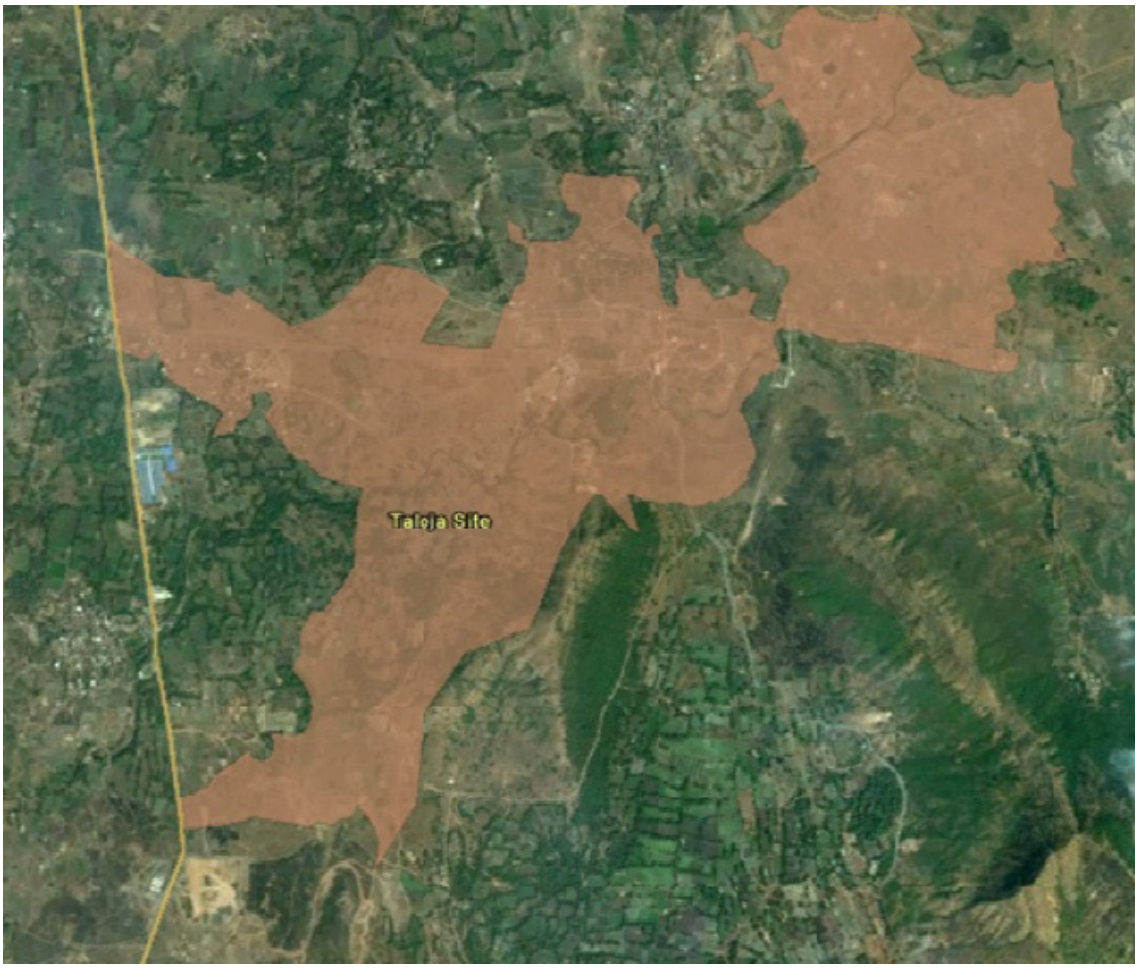


Figure 1. Layout of Taloja Regional Facility

Figure 2. Location of Taloja Regional Facility

2. MSW at Taloja Regional Facility

Taloja Regional Facility (TRF) was being developed to tackle mixed waste generated from Thane, Bhiwandi-Nizampur, Kalyan-Dombivli, Ulhasnagar, Kulgaon-Badlapur and Ambernath ULBs. These ULBs committed to dispensing wastes to Regional Municipal Solid Waste Management Facility, Taloja and the quantity of it (excluding construction and demolition waste) is shown in Table 1.

Table 1. Expected waste quantity to be received from ULBs

Sr. No.	ULBs	Waste Generated (TPD)
1	Thane	550
2	Bhiwandi-Nizampur	280
3	Kalyan-Dombivli	400
4	Ulhasnagar	280
5	Ambernath	50
6	Kulgaon-Badlapur	35
Total		1595

The physical compositions of Municipal Solid Waste at dumpsite in ULBs joining the TRF are given in Table 2. The composite samples of dumpsite of each ULB were analyzed by NEERI. Table 3 gives the chemical characteristics of MSW at ULBs.

Table 2: Average Physical Compositions (%) for MSW

ULBs	Biodegradable (Values in %)	Combustible (Values in %)	Recyclable (Values in %)	Inert (Values in %)
Ulhasnagar	42.5	36.5	18.0	3.0
Kalyan-Dombivli	60.1	21.1	15.2	3.6
Thane	51.2	20.6	21.5	6.7
Bhiwandi-Nizampur	36.2	37.9	20.4	5.5
Kulgaon-Badlapur	47.5	16.8	14.0	21.7
Ambernath	41.5	23.2	17.8	17.5

Table 3: Chemical Characterization of ULBs

ULBs	Moisture (%)	pH	Volatile Matter (%)	Carbon (%)	Nitrogen (%)	Phosphorus (%)	Potash (%)	C/N Ratio	CV (Kcal/kg)
Ulhasnagar	20.4	5.2-8.3	42.6	24.7	0.9	0.4	0.9	27.4	2594
Kalyan-Dombivli	26.2	6.5-8.6	35.8	23.5	0.9	0.7	0.5	26.1	1421
Thane	23.1	4.8-7.9	57.1	33.1	1.2	0.7	1.5	27.6	1288
Bhiwandi-Nizampur	18.2	6.1-8.2	18.9	11.0	0.5	0.6	0.6	22.0	1523
Badlapur	54.8	6.4-8.1	32.2	18.6	0.8	0.7	0.7	23.3	1273
Ambernath	58.8	5.3-7.8	58.6	33.8	0.7	0.7	0.5	48.3	687

Note: Volatile Matter at 550°C, Phosphorous as P_2O_5, and Potash as K_2O

3. Transport Assessment

For an efficient solid waste transportation plan, detailed analysis of travel costs (travel time, fuel consumption, etc.) from ULB to landfills were to be derived. Based on the geographical consideration, proximity to each ULBs as well as other attributes, designated landfill sites were to be identified. The transportation plan would also include a grid system which would be operative in case of exigencies or be used as a contingency plan. It could, however, be operational at all times for all ULBs in MMR, if required.

Transport Survey: The survey included collection, compilation, dissemination and analysis of data relating to roads and road transport. The various aspects considered under the survey were:

- Road status: Condition of roads and whether roads are paved, unpaved, congested or any other condition were observed.
- Vehicle density on roads: Survey covered aspects like number of vehicles, types of vehicles, and the vehicle diurnal variation. This survey included all sites as well as relevant points which would be critical for transport plan of the project.

A transport assessment is a comprehensive review of all the potential transportation impacts of a proposed development, with an agreed plan to mitigate any adverse consequences. When planning of landfill for regional facility was being considered, it was important to assess the present dumpsites of each ULBs to understand the issues related to current scenario of accessibility, road condition, and road connectivity. The dumpsite coordinates along with the landfill coordinates would help in finding the most optimal route to reach the landfill sites. Table 4 summarizes the transport system and related costs for the Taloja site and respective ULBs.

Table 4. Transport Alternative to ULBs and Cost

ULBs	Routes	Distances (km)	Per km cost (Rs)	Travel Time (min)
Thane	Main route	22	42.34	38
	Alternate route-1	27	43.85	47
	Alternate route-2	29	42.78	50
	Alternate route-3	25	42.70	43
Kulgaon-Badlapur	Main route	24	45.46	41
	Alternate route-1	21	44.83	37
Kalyan	Main route	23	44.83	39
	Alternate route-1	19	43.57	33
Ambernath	Main route	19	46.11	33
	Alternate route-1	15	46.02	26
Ulhasnagar	Main route	31	44.27	59
	Alternate route-1	27	43.19	51
Bhiwandi	Main route	33	44.78	62
	Alternate route-1	29	44.78	55

Note: This cost includes both vehicle capital and O&M costs. (O&M = Operations and Maintenance).

4. Transfer Stations for ULBs

Since the Taloja regional facility was located outside the jurisdiction of the above six ULBs, it was essential to transport the waste in closed vehicles/closed containers by establishing a modernized transfer station at each ULB of required capacity. The ULBs joined hands with TRF and agreed to provide suitable land for setting up transfer station within their limits. Location of transfer stations and area allocated as per the waste quantities are as shown in Table 5. Ambernath and Kulgaon- Badlapur agreed upon holding a common transfer station at Chikoli site (Ambernath) and quantities of both ULBs were around 100 TPD collectively.

ULBs would either deploy compactors or stationary compactors for bulk transportation with a setup of mini transfer station along with appropriate loading arrangements, concrete platforms and other ancillary infrastructure. The ULBs were expected to establish modernized transfer stations with suitable capacity, equipment, vehicles, containers, and hook lifts.

Table 5: Details of Transfer Stations

Sl No	Name of ULBs	Locations	Area (Ha.)	Distance from TRF (km)	
				Main Route	Optional Route
1	Thane	Dhighar, On Shilphata-Kalyan Road	2.00	13.00	25.25
2	Bhiwandi-Nizampur	Near Octri check post, Kalyan-bypass Road	1.50	36.00	23.80
3	Kalyan-Dombivli	Parking Area, Near Khambalpada, Near Tata Power, Dombivli	1.50	16.25	15.70
4	Ulhasnagar	Being finalized in consultation with ULB	-	-	-
5	Ambernath	Survey No. 186, Chikloli	1.00	18.23	26.80
6	Kulgaon-Badlapur				

Operation and maintenance activities for transfer facility would need high standards of transfer stations and transport systems. Provisions of MSW rules or any prescribed standard by the MMRDA were to be strictly adhered to. A conceptual diagram and flow chart of the transfer station consisting of compactor system, compaction unit with containers being able to attach and detach, hook-lift system, and heavy duty vehicles are shown in Figure 3 to 4.

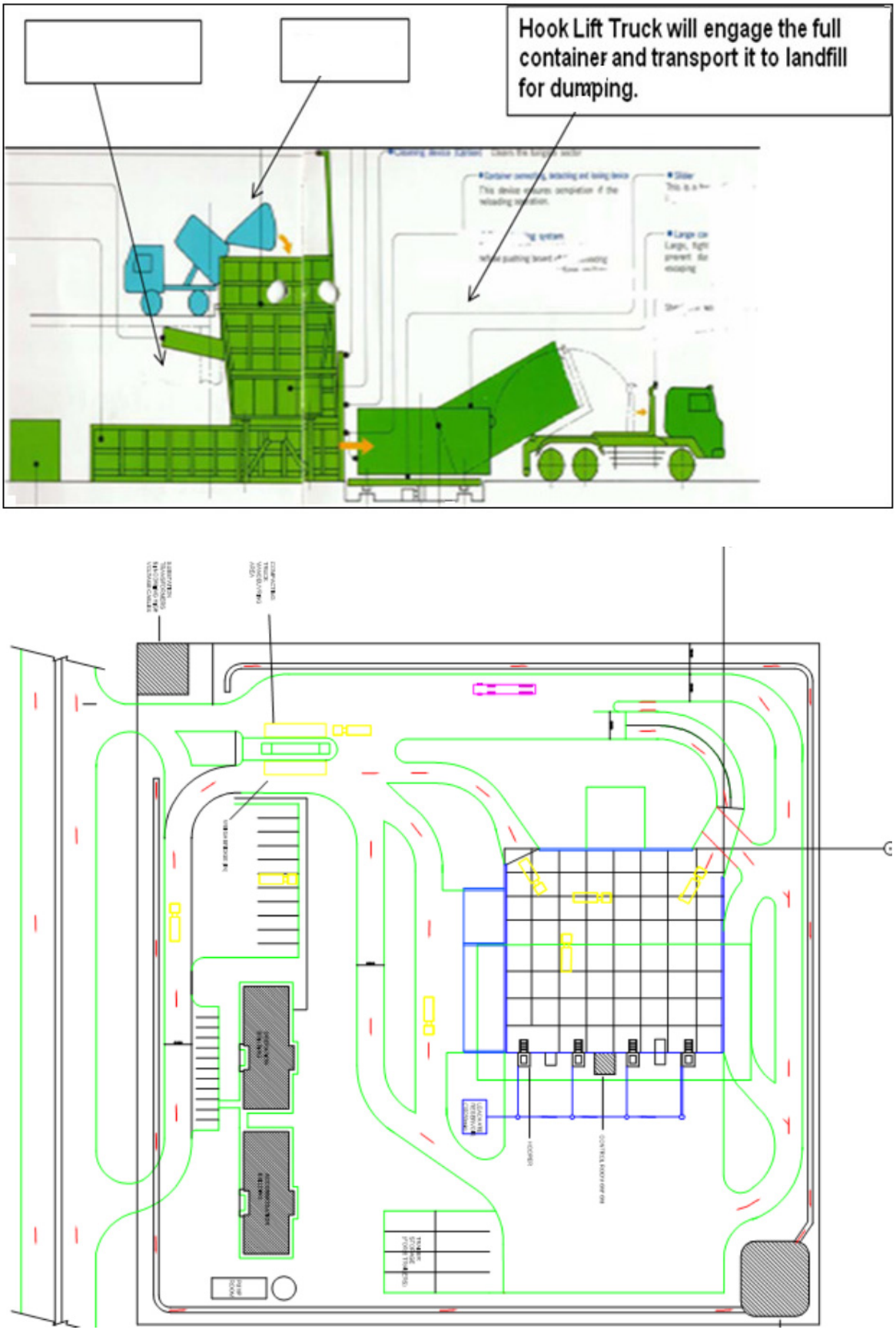


Figure 3: Sectional view of Transfer Station

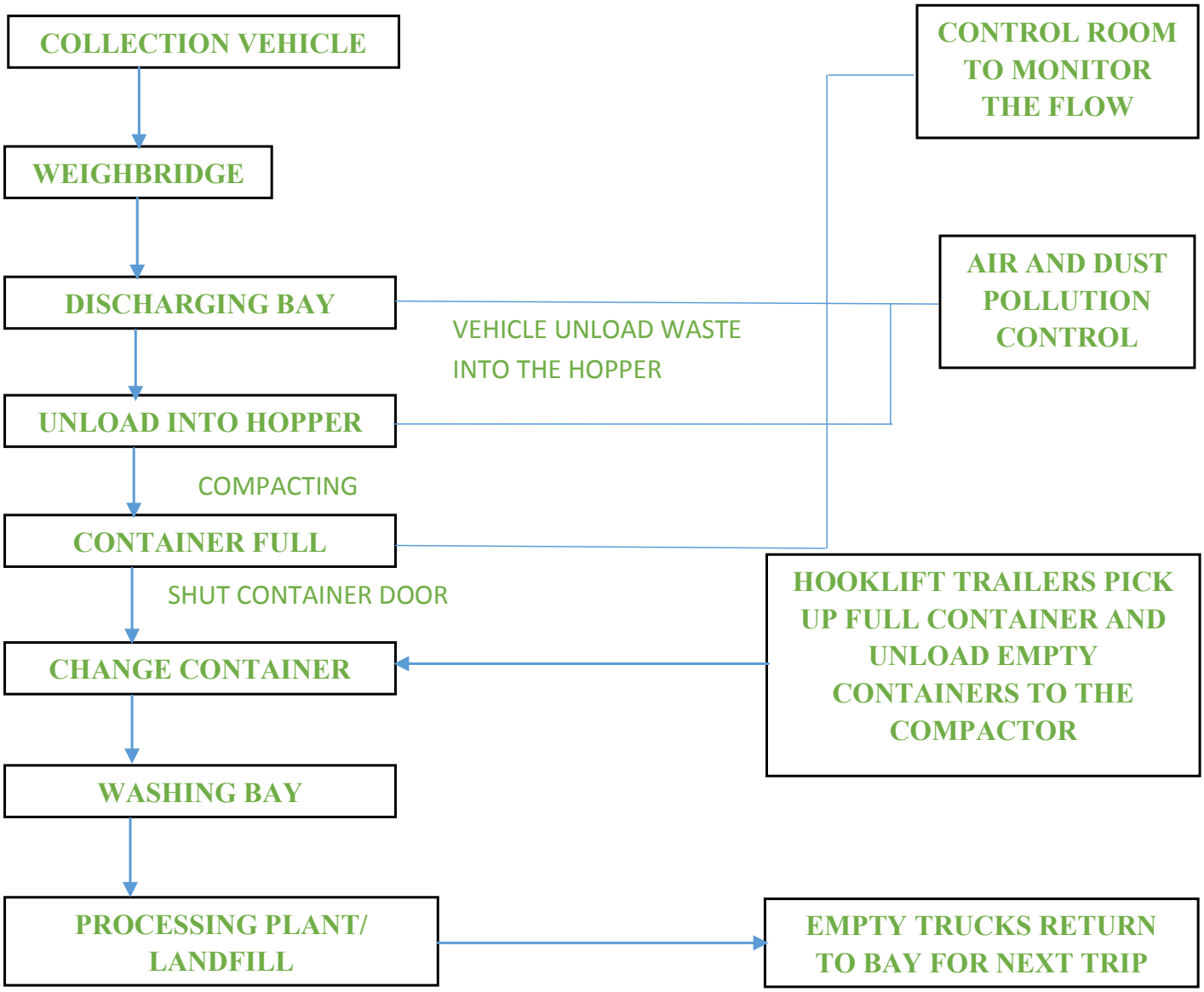


Figure 4: Transfer Station Process Flow Chart

5. Waste Processing Facility

To initiate the evaluation process, lists of MSW treatment technology options were identified as given in Table 6.

Table 6: List of Identified MSW Processing and Treatment Technology

Category	Technology
Biological Treatment Technologies	Composting
	Bio-methanation
	Bioreactor landfill
Thermal Treatment Technologies	Incineration (Mass Burn)
	Gasification
	Pyrolysis
	Plasma arc
Physical Treatment Technology	Refused Derived Fuel (RDF)

5.1 Technology Combination for the Regional Facility

Source segregation is the most important activity to be performed by ULBs so as to reduce waste from disposal. Effective source segregation helps in pre-segregation at the processing stage itself. It has also been understood from past experiences that no technology will run successfully without effective levels of source segregation. Hence the following four technologies were short listed for treatment of MSW in MMR:

- Composting
- Anaerobic Digestion (Biomethanation) for hotel and restaurant, vegetable market waste (source segregated)
- Refused Derived Fuel (RDF) and
- Mass burn/incineration/plasma

The wastes generated in MMR were complex and no single technology would be able to meet the complete processing of the mixed waste. Hence, after a thorough review, three different options were shortlisted and a combination of technologies to be used were suggested. The proposed methods were suitable for local conditions and had regulatory acceptance under MSW Rules 2000:

- Composting+ Recycling + Biomethanation
- Composting +Recycling+ RDF + Biomethanation
- Thermal method +Recycling+ Biomethanation

Post completion, the process remnants would be taken to a scientific landfill. Landfills are the ultimate waste receptors for inerts, process remnants, industrial discards, incineration ashes, and slag.

5.2 Material Recovery Facility

The key issues to be taken into account while designing the material recovery facility, to be engaged in handling and sorting of the mixed waste coming from ULBs, were as follows:

- Design to make sure that it has operating modules that can work in tandem of suitable capacity.
- It should be able to take variable input up to more than 25% of the designed handling capacity of 2000 TPD.
- Internal sorting and segregation system to attain maximum input qualities in biological and thermal processes along with inert materials going to landfill.
- Recyclables would go to separate in-house processing units for further necessary processing or conversion into fuel.
- Facility would be integrated to transfer the materials to respective modular processing units with minimum handling.
- Each parallel unit should have same capacity as per design and additional unit/s shall have the same capacity.

5.3 Biodegradable Waste

For this kind of waste, biological processes such as composting, anaerobic processes, or any other processes which meets the MSW (M&H) Rules, 2000 were to be utilized. For use of this technology it was expected to achieve the following standards:

- The process will be carried out in completely enclosed space.
- The technology that will be adopted shall be proven and suitable for Asian waste conditions.
- Accelerated processes to have minimum processing time.
- The process technology adopted shall be designed in a modular system so that redundancy is reduced to the minimum level.
- At no point of time, should waste be accumulated for more than 3 days in each module.
- The process remnants shall not be stored in any case and disposed off immediately in the landfill.
- A separate emergency storage should be planned, which needs to be fully covered and protected so that there are no environmental hazards.
- The concrete platform/s shall be properly designed with a closed drainage system to take care of any leachate/ wastewater during further treatment process.
- Natural treatment processes for wastewater shall be adopted.
- The process should control odor within 50 m distance at each of the processing unit or module.
- Adequate and properly designed ventilation system shall be provided in the processing plants.
- Outside the processing unit, no trace of odor, mosquitoes, and rodents should be noticeable at any point in time.
- The standards for the compost shall meet high quality.

5.4 Combustible Waste

The key issues that need to be taken into consideration while opting for combustion of wastes are as follows:

- The technology that will be adopted shall be proven and suitable for Asian waste conditions.
- The technology shall not have emissions more than the specified standards for air emission.
- The pollution control system shall be a part of the processing.
- The technology shall be able to generate electricity with high clean-up required for the flue gases.
- The design and standards shall be according to current regulations based on the processes being used that meet the norms and standards as specified.
- Pollution control equipment must be designed for high levels of compliance at 24X7 for all operational period.
- Any waste management operation can give rise to dust and odour and that needs to be controlled. These can be minimized by good building design, performing all operations under controlled conditions indoors, good working practices and effective management undertaken for dust suppression from vehicle movements.
- Plants should be in modular design and scalable to suit the requirements of different waste management operators.

5.5 Recyclables

The key design aspect relating to designing process/system for recyclables are as follows:

- Technologies for recycling should be such that it does not lead to any emission and pollution.
- Quality of end product should be maintained as per standard.
- Process should be in modular scale with decent work environment.

6. Scientific Landfill

MSW landfilling is a method of disposing process remnants on scientifically developed land without creating nuisance or hazards to surrounding environment, public health and safety. The planning and design process of a landfill should involve necessary steps to avoid any substandard landfill creation and operation:

- Design life of landfill shall be 25 years with provision for an additional design period of 25 years.
- Waste volume and landfill capacity computation must include extended period of operation, though the current requirement would be limited to 25 years.
- Phased operation must ensure that the plan period is kept in mind. Creation of landfills in future, if any, should be reviewed every 5 years.
- Leachate quantity and quality should be clearly estimated to design for leachate drainage, collection, treatment and disposal.
- Leachate treatment and reuse management system should be able to use the treated leachate.
- Liner system shall be as per Central Pollution Control Board (CPCB) guidelines. However, the design must consider the possible load requirement of the future height changes to 15 m or more.
- Daily cover use and management plan must consider use of debris. It may need a separate sourcing, transportation and use plan. In case of fresh earth use, source should be well established before activity is started.
- Provisions shall be made for collection, gas venting/ flaring or use for power generation of landfill gas likely to be emitted through landfills. Monitoring system, checking and data maintenance shall be established as well.
- Final cover system design shall follow CPCB guidelines with complete design for drainage, slope management, lighting, green cover, maintenance and hazard management system.
- Site infrastructure to include lighting, approach roads, drainage, water body creation, green belt, site office, security cabins, boundary wall/fencing, internal roads etc. in an integrated manner.
- Environment monitoring system during operation and after closure of the project including monitoring of all environmental parameters as given in environment monitoring program must be regarded.
- Closure and post-closure maintenance plan must be valid for at least 10 years (excluding construction period).

7. Project cost

The total project cost for Taloja regional site shall include the cost relating to MSW treatment, processing and disposal through sanitary landfill with other allied activities such as green belt development, recreational water facilities, including other allied infrastructure. The total project has been estimated to cost upto Rs. 700 crores.

Exhibit 5. Overview of PPP Models

Multiple PPP modes can be compared on a spectrum ranging from low to high levels of private participation and involvement. The four major "families" of PPP modes are:

- Management contracts
- Lease contracts
- Concessions and
- Build-operate-transfer (BOT) and its variants

PPPs have given rise to an array of acronyms for the names that describe the variations in each model family. The main PPP modes for SWM sector and its respective characteristics can be summarized as in Table 1 and Figure 1.

Table 1: Characteristics of typical PPP modes in the SWM sector

Modes / Features	Asset ownership during the contract	PPP duration	Capital investment focus & responsibility	Private partner revenue risk & compensation terms	Private partner role & involvement	Examples
Management Contracts	**Contractual arrangement for the management of a part or whole of a public facility or service by the private sector. Capital investment is typically not the primary focus in such arrangements**					
Management Contract (Waste collection and/or Transportation)	Public- Landfill site and Treatment Plant. Private- Vehicles and equipment for waste collection.	Medium (3-10 years)	Not the focus Public	Medium Take or Pay Arrangement	Full responsibility for collection of waste and transportation to landfill site.	Integrated MSW at Mysore, Collection &Transportation at Ulhasnagar, Greater Noida
Build-Operate-Transfer	**Responsibility for construction (typically greenfield) and operations with the private partner while ownership is retained by the public sector.**					
Build-Operate-Transfer (BOT)/ Design-Build-Finance-Operate-Transfer (DBFOT) (Waste treatment and/or disposal facilities)	Public	Long (25-35 years)	Brownfield/ Greenfield Private	Medium Take or Pay Arrangement	Design, construction, operation and maintenance.	BOT-IMSWM at Nainital Haridwar. DBFOT-Regional MSW facility at Bhubaneshwar and cuttack, IMSWM at Sambalpur, Waste to Energy (WTE) at Kochi City.
Build-Own-Operate-Transfer	**Private partner has the responsibility for construction and operations. Ownership is with the private partner for the duration of the concession.**					
Build-Own-Operate-Transfer / DBOOT (Waste Treatment and/or disposal facilities. Could also include a waste to power facility)	Private	Long (25-35 years)	Brownfield/ Greenfield Private	Medium in case of Take or Pay Arrangement. High in case of User charges	Design, construction, operation and maintenance.	BOOT-Municipal SWM at Taloja MIDC, Municipal SWM Project at Jodhpur DBOOT-IMSWM at Vijayawada.

Figure 1. Generic PPP family decision tree

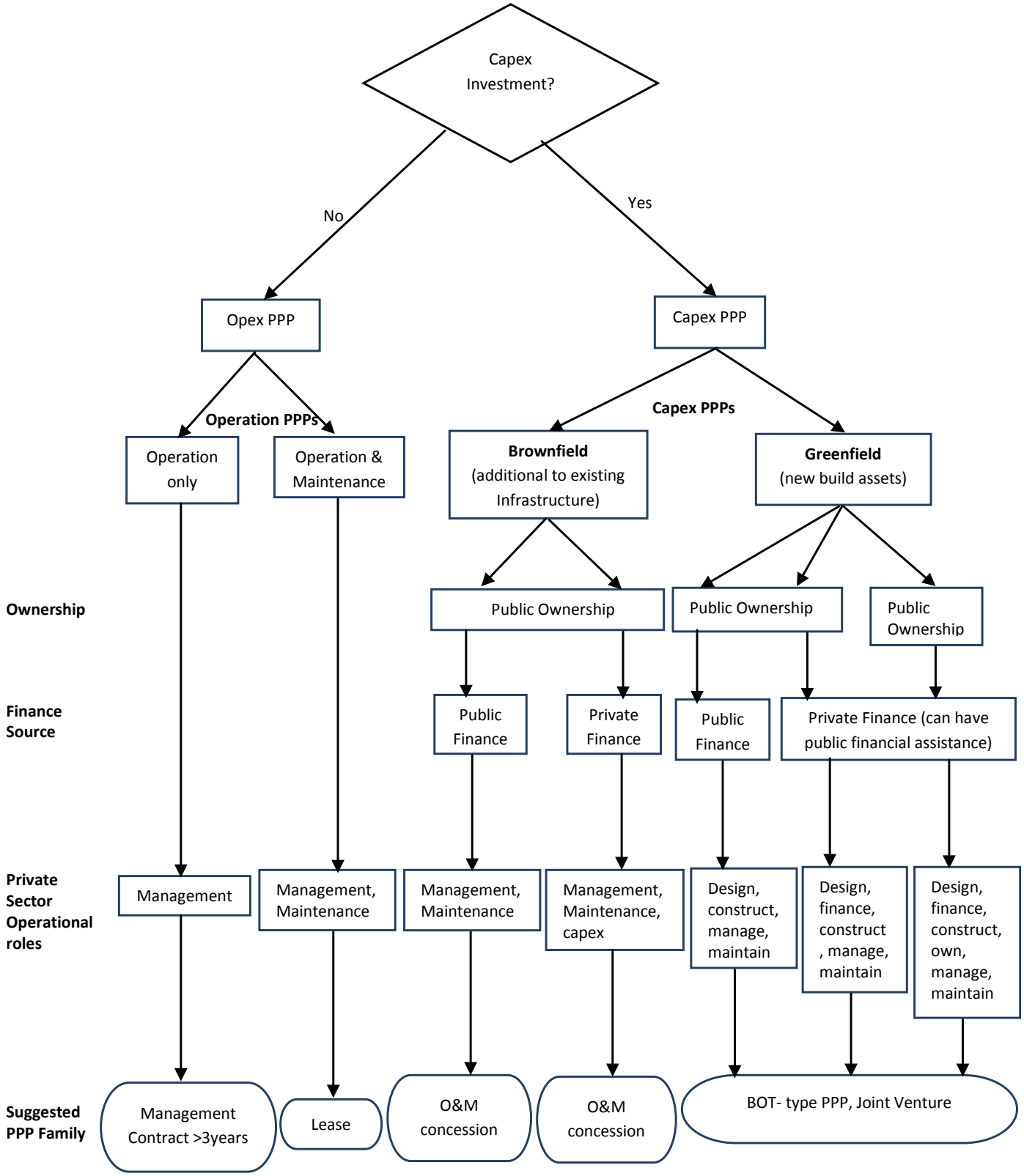


Exhibit 6 : Decision Making Process for PPP Procurement Selection

PPP Family Indicator

According to United Nations Economic and Social Commission for Asia (UNESCAP) 2011, PPP can be categorized into five main models - Management contract; Lease contract; Concessions and; Build-Operate-Transfer (BOTs) and its variants; and Divestiture. Ministry of Finance, Government of India has grouped similar PPP modes into four such PPP families, namely; Management contract; Lease contract; Concessions and; Build-Operate-Transfer (BOTs) and its variants.

The PPP family indicator enables the practitioner to quickly check the main PPP family option available for a particular sector of infrastructure such as highways, water and sanitation (W&S), ports, solid waste management (SWM), urban transport etc. The PPP Family Indicator have four sets of questions for solid waste management projects to be answered. The questions are answered with a top to bottom approach after which the indicator gives a preliminary indication of the best suited PPP family for the project. Figure 1 shows the flowchart of the process involved in identification of the applicable family indicator.

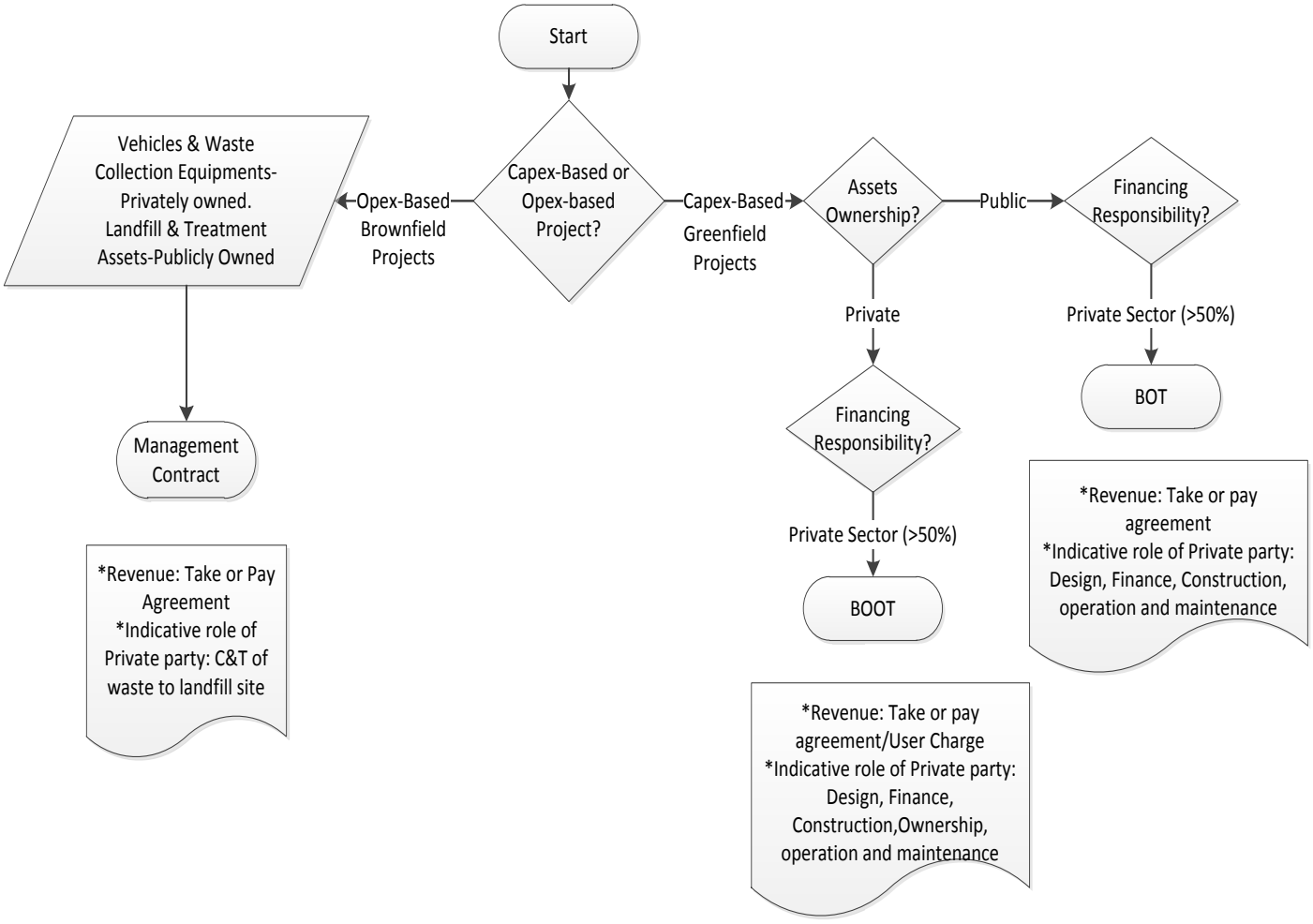


Figure 1: Flowchart of PPP Family Indicator

The preliminary PPP family is identified based on the project type: Capex-based project such as disposals, treatment and waste to energy project which requires substantial amount of capital investment or Opex-based project such as collection and transportation of solid waste to landfill site which requires little or no investment. The decision of which party will own the assets and finance the project also determines the PPP family. The PPP family indicator indicates not only the PPP family but also the revenue structure and the indicative role of private party in the project.

PPP Mode Validation

The purpose of PPP mode validation tool is to further test the preliminary choice of the best PPP family for the project by taking the risk allocation as the deciding factor. The risks can be allocated to public or private sector and some risks may be shared by both the parties. There are five major risk categories for PPP solid waste management projects: Pre-operative phase risks, construction phase risks, operation phase risks, handover risks event and other risks such as change in law, force majeure etc.

At any stage, risk allocation can be changed by the user from that of the typical allocation and the deviation of the score can be observed. In case of typical allocation of risks, score is maximum for a particular PPP family on account of perfectly matching allocation of risks. But due to changes in allocation of risks by the user, there will be deviation of score and the user may adopt the PPP family having maximum score after allocation of risks as preferred by him/ her. Figure 2 shows the process involved in validation of the appropriate PPP model while Table 1 shows the typical risk allocation of various PPP models.

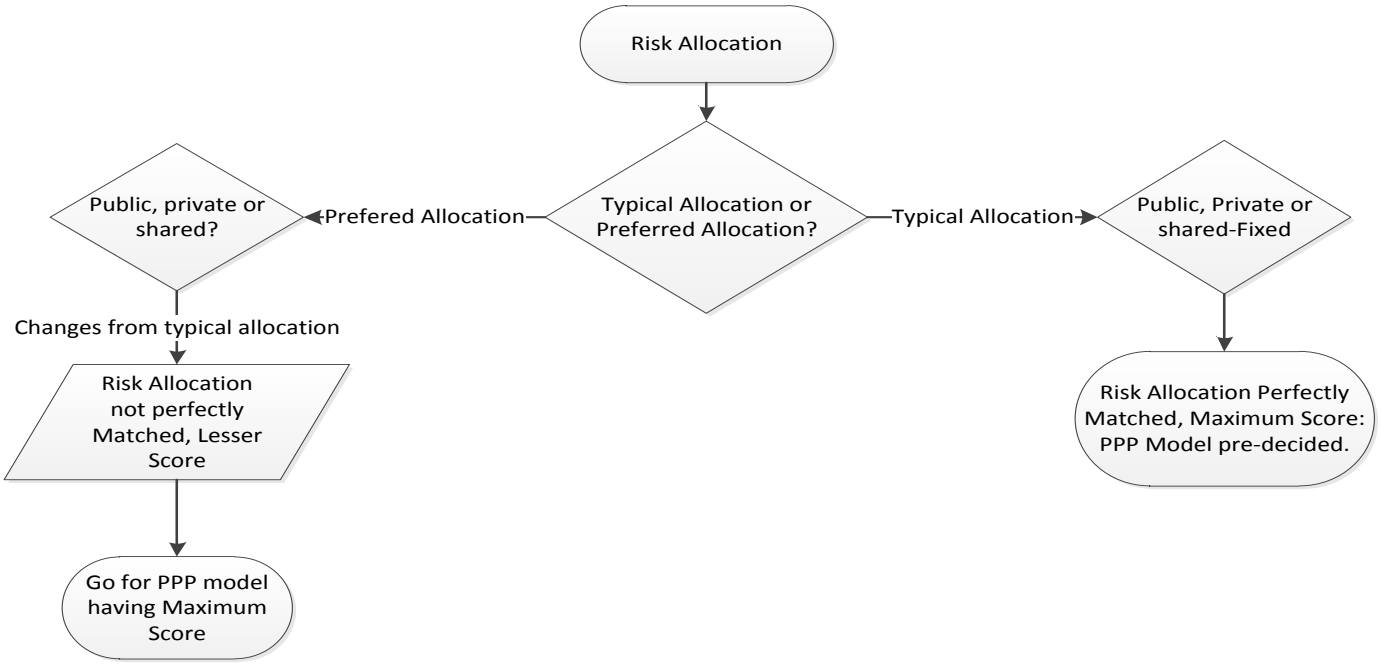


Figure 2: Flowchart of PPP mode Validation

Table 1: Typical Risk Allocation for PPP Family

Risk Type	Sensitivity Of the Risk	Typical Risk Allocation Under BOT and BOOT	Typical Risk Allocation Under Management Contract
A. PRE-OPERATIVE PHASE RISKS			
A.1 Delays in land acquisition	High	Public Sector	Not relevant
A.2 External Linkages	High	Public Sector	Not relevant
A.3 Financing Risks	Medium	Private Sector	Not relevant
A.4 Planning	Medium	Private Sector	Not relevant
A5. Approvals (Other than for construction)	Medium	Private Sector	Not relevant

B. CONSTRUCTION PHASE RISKS			
B.1 Design risk	Medium	Private Sector	Not relevant
B.2 Construction risk	Medium	Private Sector	Not relevant
B.3 Approvals	Medium	Private Sector	Not relevant
C. OPERATION PHASE RISKS			
C.1 Operation and Maintenance risk	Medium	Private Sector	Private Sector
C.2 Volume risk	Medium	Public Sector	Public Sector
C.3 Payment risk	Medium	Public Sector	Public Sector
C.4 Financial risk	High	Private Sector	Private Sector
C.5 Revenue risk in associated operations (e.g. waste to power)	Medium	Not relevant	Not relevant
C.6 Environmental, health and safety risk	Medium	Private Sector	Shared
D. HANDOVER RISK EVENTS			
D.1 Handover risk or terminal value risk	Medium	Private Sector	Private Sector
E. OTHER RISKS			
E.1 Change in law	Low	Public Sector	Public Sector
E.2 Force Majeure	Low	Shared	Shared
E.3 Concessionaire risks	Medium	Public Sector	Public Sector
E.4 Sponsor risks	Medium	Private Sector	Private Sector
E.5 Concessionaire's event of default	Medium	Private Sector	Private Sector
E.6 Sponsor's event of default	Low	Public Sector	Public Sector

RISK DEFINITION: Various risks associated with Solid waste management projects

A. PRE OPERATIVE PHASE RISKS

Delays in land acquisition risk : The risk that the project site will be unavailable or unable to be used within the required time, or in the manner or the cost anticipated or the site will generate unanticipated liabilities due to existing encumbrances and native claims being made on the site. This risk is most relevant to greenfield projects involving treatment and disposal facilities.

External Linkages risk : The risk that adequate and timely connectivity to the project site is not available, which may impact the commencement of construction and overall pace of development of the project. An example of connectivity could be roads to landfill sites.

Financing Risks : The risk that sufficient finance will not be available for the project at reasonable cost (eg, because of changes in market conditions or credit availability) resulting in delays in the financial closure for a project.

Planning risks : The risk that the pre-development studies (technical, legal, financial, environmental and social impact assessments and mitigation planning, and others) conducted are inadequate or not robust enough resulting in possible deviations from the outcomes that were planned or expected in the PPP project development.

Approvals risks (other than for construction) : The risk is that the needed approvals will either be delayed or will not be granted, resulting in additional cost or threat to the project. Such approvals may include transport permits, relevant environmental permits, waste disposal consents, etc.

B. CONSTRUCTION PHASE RISKS

Design risk : The risk that the proposed design will be unable to meet the performance and service requirements in the output specification. It can result in additional costs for modification and redesign.

Construction risk : The risk that the construction of the assets required for the project will not be completed on time, on budget or to specification. It may lead to additional raw materials and labor costs, additional financing costs, increase in the cost of maintaining existing infrastructure or providing a temporary alternative solution due to a delay in the provision of the service.

Approvals risks : The risk that delays in approvals to be obtained during the construction phase will result in a delay in the construction of the assets as per the construction schedule. Such delays in obtaining approvals may lead to cost overruns.

C. OPERATIONS PHASE RISKS

Operation and maintenance risk : The risk associated with the need for increased maintenance of assets or machinery over the term of the project in order to meet performance requirements.

Volume risk : The risk that demand for a service will vary from the initial forecast, such that the total revenue derived from the project over the project life will vary from initial expectations. In SWM contracts with take-or-pay terms (often the case in BOT and management contracts) the public sector bears the volume risk.

Payment risk : The risk that fees for services are not collected in full or are not set at a level that allows recovery of costs. Who bears the payment risk depends on whether the fees for services are paid directly by users, or are paid by the municipality. Often in the SWM sector the fees are paid by the municipality (via taxes), and the public sector bears this risk.

Financial risk : The risk that the concessionaire introduces too much financial stress on a project by using an inappropriate financial structure for the privately financed components of the project. It can result in additional funding costs for increased margins or unexpected refinancing costs.

Revenue risk in associated operations (e.g. waste to power) : This risk refers to the revenue risk related to waste-to-power, or other similar waste conversion business operations that are associated with the project. This risk is only relevant to BOOT PPPs, in which associated developments are often an important revenue source for the project.

Environmental, health and safety risk : The risk of environmental damage in excess of what is planned for in the environmental impact mitigation plan and the risk to employee health and safety from SWM operations. For example, ground water pollution from a landfill site in excess of maximum allowed levels, accidents involving employees and heavy equipment, or employees contracting illness.

D. HANDOVER RISK EVENTS

Handover risk or terminal value risk : The risk that the concessionaire will default in the handover of the asset at the end of the project life, or that it will fail to meet the minimum quality standard or value of the asset that needs to be handed back to the public entity.

E. OTHER RISKS

Change in law risk : The risk that the current legal / regulatory regime will change, having a material adverse impact on the project.

Force Majeure risk : The risk that events beyond the control of either entity may occur, resulting in a material adverse impact on either party's ability to perform its obligations under the PPP contract. These events are sometimes also called "Acts of God", to indicate that they are beyond the control of either contracted party.

Concessionaire risk : The risk that the private entity will not fulfil its contractual obligations or that the private entity will prove to be inappropriate or unsuitable for delivery of the project. The government would then face the risk that it will not be able to either enforce those obligations against the private entity or recover some form of compensation or remedy for any loss resulting from the breach.

Sponsor risk : The risk that the sponsor will prove to be an unsuitable partner for the project, for example due to poor project management or a failure to fully recognize the agreed terms of the concession agreement.

Concessionaire's event of default risk : The risk that the concessionaire will not fulfil its contractual obligations and that the government will be unable to either enforce those obligations against the concessionaire, or recover some form of compensation or remedy from the concessionaire for any loss sustained by it as a result of the breach.

Sponsor's event of default risk : The risk that the public sponsor will not fulfil its contractual obligations and that the concessionaire will be unable to either enforce those obligations against the sponsor, or recover some form of compensation or remedy from the sponsor for any loss sustained by it as a result of the breach.

PPP Suitability Filter

The purpose of suitability filter tool is to check whether the project can deliver value for money and can be developed as a PPP project. If not, the project is discarded in the early stage itself so that resources are not wasted and can instead focus on the most promising project. The suitability filter has a series of questions grouped under five major issues that impact the suitability of the project to develop as PPP. These major issues are:

(i) How supportive is the public sector environment?

(ii) How supportive is the private sector environment?

(iii) How significant are the potential barriers to a PPP?

(iv) How well suited are the project characteristics to a PPP?

(v) How do other factors impact on PPP suitability?

Each question has been assigned weightage based on their importance. There is also a provision for changing the weightage of the questions. The final result is presented on a scale of ease or difficulty of developing the project as a PPP project. The result ranges from "very difficult" to "very attractive" indicating the suitability of the project as PPP. Figure 3 shows the process used to assess the suitability of PPP, while Table 2 shows the various questions under each of the above five categories, answering these questions will help in arriving at suitability of the project for PPP mode of procurement.

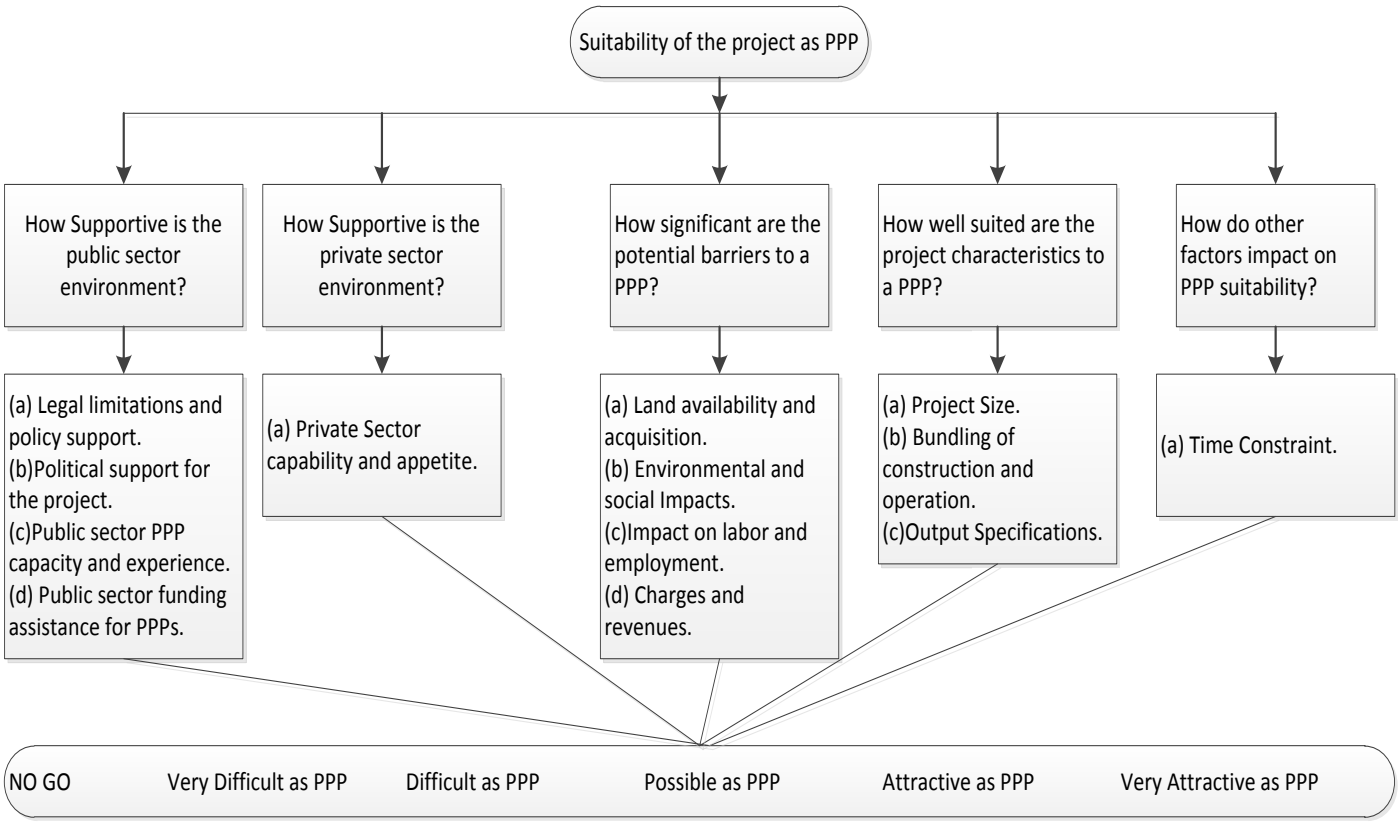


Figure 3: Flowchart of PPP Suitability Filter

Table 2: Detailed PPP Suitability Filter Questions

Question	Answer	Suitability
A. How supportive is the public sector environment?		
Legal limitations, Policy support		
1. Are there laws or other legal restrictions that limits PPP	PPP specifically enabled in primary legislation.	Very Attractive as PPP
	No known legal restrictions.	Possible as PPP
	There are legal restrictions on some aspects of PPP.	Difficult as PPP
	PPP disallowed by existing laws or legal restriction.	NO GO

Question	Answer	Suitability
2. Does a policy for private participation in the sector exist?	Policy issued in last two years by current Government	Very Attractive as PPP
	Current Government has issued a policy or has officially adopted a policy issued by previous Government.	Attractive as PPP
	Policy issued by previous Government.	Possible as PPP
Political support for the project		
3. Is there high level Political "Champion" for the PPP?	A strong high level political "Champion" exists for the project.	Very Attractive as PPP
	A high level political "Champion" exists for the project.	Attractive as PPP
	Some lower level committed political support for the project	Possible as PPP
	No political "Champion" or committed political support for the project	Difficult as PPP
4. Is there support for the PPP in the affected communities?	Local community leaders are well informed and supportive of the PPP.	Very Attractive as PPP
	Local community leaders are not informed or engaged but previously supportive of the PPPs.	Attractive as PPP
	Local community not informed or engaged over the project as PPPs.	Possible as PPP
	Local community actively opposed to the PPP concept.	Difficult as PPP
Public sector PPP capacity and experience		
5. Is there a PPP focal point?	PPP focal point exists with decision-making powers.	Very Attractive as PPP
	PPP focal point exists with advisory powers.	Attractive as PPP
	PPP focal point has not been established	Difficult as PPP
6. Does the sponsoring agency have the capability to procure PPP?	Full set of capabilities	Very Attractive as PPP
	Some capabilities	Possible as PPP
	No or very little capability	Difficult as PPP
7. Does the sponsoring agency have the capability to manage and monitor a PPP contract?	Full set of capabilities	Very Attractive as PPP
	Some capabilities	Possible as PPP
	No or very little capability	Difficult as PPP

Question	Answer	Suitability
8. Does the sponsoring agency have previous experience with PPP?	Extensive experience (4+ projects), including similar projects	Very Attractive as PPP
	Limited experience (1-3 projects), including similar projects	Attractive as PPP
	Some experience with dissimilar PPPs or no previous PPP experience	Possible as PPP
9. Would the physical infrastructure pass through multiple jurisdiction?	Project fully contained within one jurisdiction.	Very Attractive as PPP
	Project in two jurisdictions	Attractive as PPP
	Project in multiple jurisdictions with previous experience of shared PPPs	Possible as PPP
	Project in multiple jurisdictions with limited experience of shared PPPs	Difficult as PPP
Public sector funding assistance for PPPs		
10. Is funding assistance available for project development?	Budget has been set aside (Sanctioned Project)	Very Attractive as PPP
	PDA funds are available (following applications)	Attractive as PPP
	Uncertainty as to availability	Possible as PPP
	No PD budget is available	Difficult as PPP
11. Is the project likely to be eligible for viability gap funding?	Project is likely to be eligible for viability gap funding	Very Attractive as PPP
	Project is unlikely to be eligible for viability gap funding	Possible as PPP
12. Is the project likely to be eligible for funding from other grant schemes?	Project is likely to be eligible for funding from other grant schemes	Very Attractive as PPP
	Project is unlikely to be eligible for funding from other grant schemes	Possible as PPP
13. Is the project eligible for funding/guarantees from multi-lateral agencies?	Project is likely to be eligible for funding/guarantees from multi-lateral agencies	Very Attractive as PPP
	Project is unlikely to be eligible for funding/guarantees from multi-lateral agencies	Possible as PPP
B. How supportive is the private sector environment?		
Private sector capability and appetite		

Question	Answer	Suitability
14. Are multiple firms active in the PPP market?	5+ qualified firms have competed for similar opportunities	Very Attractive as PPP
	5+ qualified firms are expected to be interested	Attractive as PPP
	Extent of interest among qualified firms is not yet known	Possible as PPP
15. Have other similar PPP projects been successfully financed?	Similar PPP projects successfully financed in the last 2 years.	Very Attractive as PPP
	Dissimilar PPP projects successfully financed in the last 2 years.	Attractive as PPP
	No similar PPP projects recently financed	Possible as PPP
	No recently financed project but positive bankability consultation	Possible as PPP
	No PPP project recently financed	Difficult as PPP
C. How significant are the potential barriers to a PPP?		
Land availability and acquisition		
16. Will the PPP require land acquisition	(a) No land acquisition	Very Attractive as PPP
	(b) Minor land acquisition required	16(b) + 17(a): Very attractive as PPP
	(c) Major land acquisition required	
17. If land acquisition is required will the Concessioning authority do it?	(a) Concessioning authority will acquire land before project tendered	16(b) + 17(b): Attractive as PPP
	(b) Concessioning authority will acquire land before construction starts	16(b) + 17(c): Possible as PPP
	(c) Concessioning authority will acquire land after construction starts	16(b) +17(d): Difficult as PPP
	(d) Concessioning authority will not acquire land	16(c) + 17(a): Attractive as PPP
		16(c) + 17(b): Possible as PPP
		16 (c) +17 (c): Difficult as PPP
		16 (c) +17 (d): Very Difficult as PPP
Environmental and Social Impacts		
18. Will the PPP have significant environmental impacts?	No or very little environmental impact	Very Attractive as PPP
	Some environmental impacts	Attractive as PPP
	Significant environmental impacts	Possible as PPP
	Major environmental impacts	Difficult as PPP
19. Will the PPP have significant social impacts?	No or very little social impact	Very Attractive as PPP
	Some social impacts	Attractive as PPP
	Significant social impacts	Possible as PPP
	Major social impacts	Difficult as PPP
Impacts on labor and employment		

Question	Answer	Suitability
20. Will a significant transfer of employees take place under the PPP?	(a) Insignificant number (< 2%) transferred	Very attractive as PPP
	(b) Significant number (2-10%) transferred	20(b) + 21(a): Attractive as PPP 20(b) + 21(b): Possible as PPP 20 (b) + 21(c) : Difficult as PPP
	(c) Large number (10-20%) transferred	
	(d) Very large number (>20%) transferred	
21. Have there been successful transfers under previous PPP?	(a) Successful past transfer	
	(b) No previous transfer	
	(c) Past transfer have been unsuccessful	20(c) + 21(a) : Possible as PPP 20(c) + 21(b): Difficult as PPP 20 (c) + 21(c) : Very Difficult as PPP
		20(d) + 21(a) : Difficult as PPP 20(d) + 21(b): Very Difficult as PPP 20 (d) + 21(c) : Very Difficult as PPP
22. Is the project likely to result in job losses?	The project is expected to create new jobs	Very attractive as PPP
	No job losses are expected	Attractive as PPP
	Some job losses likely (<10% of existing workforce)	Possible as PPP
	Significant job losses likely (>10% of existing workforce)	Difficult as PPP
Charges and Revenue		
23. What is the main revenue source for the project?	(a) User Charges	23(a)+24(a)+25(a): Very attractive as PPP 23(a)+24(a)+25(b): Very attractive as PPP 23(a)+24(a)+25(c): Attractive as PPP 23(a)+24(a)+25(d): Possible as PPP 23(a)+24(a)+25(e): Possible as PPP 23(a)+24(a)+25(f): Difficult as PPP
	(b) User charges with take or pay (or similar) arrangement	
	(c) Annuity payment or operating or performance fee	
24. If the main revenue source is user charges, how much demand risk is involved?	(a) Demand risk is low (e.g., due to very stable and predictable usage)	
	(b) Demand risk is medium (e.g., project includes take or pay agreement))	
	(a) Demand risk is high (e.g., unpredictable usage)	

Question	Answer	Suitability
25. How are user charges set?	(a) Set by the operator (e.g., competitive market price)	23(a)+24(b)+25(a): Very attractive as PPP 23(a)+24(b)+25(b): Attractive as PPP 23(a)+24(b)+25(c): Possible as PPP 23(a)+24(b)+25(d): Difficult as PPP 23(a)+24(b)+25(e): Difficult as PPP 23(a)+24(b)+25(f): Very Difficult as PPP
	(b) Predetermined in the contract	
	(c) Set by independent regulator using formula in the contract	
	(d) Set by independent regulator but not predetermined of the contract	
	(e) Set by Government sponsors using formula in the contract	
	(f) Set by Government sponsors using discretion	23(a)+24(c)+25(a): Very attractive as PPP 23(a)+24(c)+25(b): Possible as PPP 23(a)+24(c)+25(c): Difficult as PPP 23(a)+24(c)+25(d): Very Difficult as PPP 23(a)+24(c)+25(e): Very Difficult as PPP 23(a)+24(c)+25(f): Very Difficult as PPP
		23(b)+24(a)+25(a): Very attractive as PPP 23(b)+24(a)+25(b): Very attractive as PPP 23(b)+24(a)+25(c): Attractive as PPP 23(ab+24(a)+25(d): Possible as PPP 23(b)+24(a)+25(e): Possible as PPP 23(b)+24(a)+25(f): Difficult as PPP
		23(b)+24(b)+25(a): Very attractive as PPP 23(b)+24(b)+25(b): Attractive as PPP 23(b)+24(b)+25(c): Possible as PPP 23(b)+24(b)+25(d): Difficult as PPP 23(b)+24(b)+25(e): Difficult as PPP 23(b)+24(b)+25(f): Very Difficult as PPP
		23(b)+24(c)+25(a): Very attractive as PPP 23(b)+24(c)+25(b): Possible as PPP 23(b)+24(c)+25(c): Difficult as PPP 23(b)+24(c)+25(d): Very Difficult as PPP 23(b)+24(c)+25(e): Very Difficult as PPP 23(b)+24(c)+25(f): Very Difficult as PPP
		23 (c) : Very Attractive as PPP

Question	Answer	Suitability
26. What is the likelihood that the PPP operator will be paid?	Good likelihood: Public sponsors have a track record of paying, and/or mechanism of payment are in place	Very attractive as PPP
	Uncertain likelihood: Public sponsors have an unreliable track record of paying, and/or mechanism of payment are not in place	Difficult as PPP
D. How well suited are the project characteristics to a PPP?		
Project Size		
27. What is the project value?	>200 Crore	Very attractive as PPP
	100-200 crore	Attractive as PPP
	20-100 crore	Possible as PPP
	<20 crore	Difficult as PPP
Bundling of construction and operation		
28. Do life-cycle costs exceed construction cost?	Operation phase costs are substantial and are affected by construction.	Very attractive as PPP
	Operation phase costs are substantial but are not affected by construction.	Possible as PPP
	Operation phase costs are low	Possible as PPP
Output specifications		
29. Are outputs easily definable, measurable and verifiable?	Few outputs - each easily definable, measurable and verifiable	Very attractive as PPP
	Multiple outputs - each easily definable, measurable and verifiable	Possible as PPP
	Few outputs – difficult to define and/or measure and/or verify	Difficult as PPP
	Multiple outputs – difficult to define and/or measure and/or verify	Very Difficult as PPP
How do other factors impact on PPP suitability		
Time constraints		
30. How much preparation of the PPP procurement documents have been done already?	(a) Preparation of PPP procurement documents have not yet started or the documents are at an early stage of development	
	(b) PPP procurement documents have been prepared or are at an early stage of preparation	Very attractive as PPP

Question	Answer	Suitability
31. If the project is at an early stage of development, are standard documents available to allow it to be tendered?	(a) Similar project previously tendered using standard documents	30(a)+31(a): Attractive as PPP
	(b) Similar project previously tendered	30(a)+31(b): Possible as PPP
	(c) No previous similar project but standard documents prepared	30(a)+31(c): Difficult as PPP
	(d) No previous experience or no standard documents.	30(a)+31(d): Very Difficult as PPP

Exhibit 7 – Key lessons from some MSW projects

Project	Project scope and key lessons
Bangalore Mahanagar Palike : Waste processing and sanitary landfill	Project scope and private operator obligations: Segregation of MSW transportation by ULB to the processing facility Construction, operation and maintenance of MSW compost facility Construction, operation and maintenance of sanitary landfill Post closure maintenance of sanitary landfill for 15 years after the term of concession
	Key lessons Technology selection: Private operator was constrained to follow the technology prescribed in the detailed project report. This has restrained the private sector from selecting the most innovative technologies that could have resulted in higher commercial benefit. Therefore, the need to provide flexibility to private sector in technology selection was felt and the selection should focus on outcome based indicators. Procurement process should be aimed at designing the process to focus on outcome specification relating to project performance rather than input specifications. Proposals from private sector should not be invited on the basis of a specific technology but rather should be chosen from the available proven waste processing technology to compete as per the output specifications. This will allow flexibility and promote innovation and competition that can trigger greater efficiency and better service delivery.
Jaipur Municipal Corporation: Waste processing	Project scope and private operator obligations: MSW segregation at the processing facility Construction and operation of MSW processing facility by private operator
	Key lessons: ULB has failed in providing the minimum assured waste quantity to the processing facility. ULB failed to maintain MSW quality. Mixed un-segregated waste after extraction of organic/recyclable waste by rag pickers significantly affected the desired calorific value of the waste. ULBs should take the risk relating to waste quantity and quality as the baseline information on waste quantity and quality tend to be very sketchy. ULB should either assure the committed minimum quantity or design a two part tipping fee with a variable portion and fixed portion (paid irrespective of quantity of waste handled). The fixed portion will insulate the operator from waste quantity and quality risk.

Exhibit 8. Guidelines for Public Private Partnership – Prequalification of bidders

1. Overview of the framework

For ensuring competitive, efficient and economic delivery of services, selection of bidders for undertaking infrastructure projects through (PPP) should be undertaken in a manner that is fair, transparent and inexpensive.

In line with this objective, guidelines have been framed for prequalification of bidders for PPP projects. The guidelines are broad and generic in nature and are aimed at providing predictability to the entire process, allowing decisions to be made objectively and expeditiously. They address the critical minimum requirements that must be observed in conducting the selection process. It is expected that the administrative ministries/autonomous bodies intending to procure PPP projects would observe these guidelines for short listing of bidders at the Request for Proposal (RFP) stage involving submission of financial bids.

The salient features of the guidelines are as follows.

1.1 Two stage process

The bidding process for PPP projects is typically divided into two stages. In the first stage, eligible and prospective bidders are shortlisted. This stage is generally referred to as Request for Qualification (RFQ) or Expression of Interest (EoI). The objective is to short-list eligible bidders for stage two of the process. In the second and final stage, which is generally referred to as the Request for Proposal (RFP) or invitation of financial bids, the bidders engage in a comprehensive scrutiny of the project before submitting their financial offers.

1.2 Request for Qualification (RFQ)

The RFQ process should aim at short-listing and prequalifying applicants who will be asked to submit financial bids in the RFP stage. The objective is to identify credible bidders who have the requisite technical and financial capacity for undertaking the project. In order to encourage greater participation from credible domestic and international investors, the RFQ document should not require respondents to incur significant expense in preparing a response. The information sought for the purposes of pre-qualification should generally be restricted to technical and financial capabilities that are relevant to the project. Such information should be precise and quantified so that the process of short-listing is fair and transparent, and does not expose the government to disputes or controversies.

1.3 Number of bidders to be pre-qualified

The number of bidders to be pre-qualified and short-listed for the final stage of bidding i.e. the RFP stage needs careful consideration. On one hand, the number of pre-qualified bidders should be adequate for ensuring real competition in bidding and on the other, a large number of short-listed bidders are viewed as a factor that dampens participation by serious bidders, thus diluting competition, because credible investors are normally less inclined to spend the time and money necessary for making a competitive PPP bid if the zone of consideration is unduly large.

Unlike a bid for procurement of goods and services, bids for PPP projects involve greater risks, significantly larger investments and long-term participation. Since PPP projects in infrastructure provide a critical service to the users at large, the quality and reliability of service assumes greater importance. Moreover, restricting the list to the best available bidders improves the chances of a successful PPP operation. It is also an international best practice to short-list about three to four bidders for the final stage of bidding. Considering all these factors, short-listing of about six to seven pre-qualified bidders has been specified in the RFQ with a view to securing high quality and competitive financial bids. Towards the end, a fair and transparent system of evaluation at the RFQ stage would be necessary.

1.4 Specifying stringent pre-qualification criteria

While stringent eligibility criteria would ensure prequalification of bidders well suited for the RFP stage, yet the same would effectively reduce the number of qualified bidders. A balance, therefore, needs to be drawn for serving the objective of pre-qualifying a reasonable number of bidders for the RFP stage. The principles for determining the eligibility criteria such as technical and financial capacity should be formulated keeping these considerations in view.

1.5 Project-specific flexibility

The model RFQ provides sufficient flexibility to adapt its provisions for meeting sector-specific and project-specific needs. Provisions encased in square parenthesis can be modified by the project authorities to suit their respective requirements. Further flexibility has been provided through options specified in the footnotes. In addition, project authorities can add project-specific conditions in their respective RFQ documents.

1.6 Evaluation criteria

The criteria for short-listing of bidders should be divided into technical and financial parameters as stated below:

Technical capacity

The applicant should have acquired sufficient experience and capacity in building infrastructure projects. This can be measured either from the construction work undertaken/ commissioned by him, or from revenues of BOT/BOLT/BOO projects, or from both, during the five years preceding the application date. Eligibility conditions, as necessary, may also be stipulated in respect of O&M experience.

The technical capacity of a bidder can be assessed on the following parameters:

(a) Project experience on BOT projects in the specified sector.

(b) Project experience on BOT projects in the core sector.

(c) Construction experience in the specified sector.

(d) Construction experience in the core sector.

(e) O&M experience: The consortium may include a member with at least ten per cent equity participation and having relevant experience in O&M. Alternatively, the successful bidder may be required to enter into an O&M agreement with an entity having equivalent experience. While suggesting this arrangement, it is proposed to provide sufficient flexibility for modifying these requirements to suit the needs of individual sectors/projects.

For an applicant to be pre-qualified, it must have undertaken projects having a weighted capital cost/ revenues equal to twice the estimated project cost.

Financial capacity

Applicants should have a minimum net worth equivalent to 25 per cent of the estimated capital cost of the project for which bids are to be invited. This would ensure that prequalified applicants have sufficient financial strength to undertake the project.

1.7 Stake of consortium members

The consortium members on whose strength an applicant has been short-listed should have a substantial stake in the project. Each member should, therefore, hold at least 26 % of the equity in the project special purpose vehicle (SPV) and should also hold equity equal to at least 5 per cent of the total project cost for a period of two years after commissioning of the project. This would ensure that members with small equity holdings are not included with the sole purpose of achieving pre-qualification. In other words, only the experience and networth of consortium members who shall have a substantial stake in implementation of the project is to be counted.

1.8 Technical evaluation to be part of pre-qualification stage

Demanding a technical evaluation at the RFP stage would normally lead to an elaborate and costly evaluation of complex proposals which are, by their very nature, difficult to compare since technical proposals of different bidders would vary significantly. Apart from the difficulties in evaluating diverse proposals on a common set of parameters, such evaluation also implies that instead of the government determining the assets and services to be provided by the selected bidder, it is the technical bid that would tend to guide the outcome. Logically, the government should set the technical parameters and ask for financial bids only, leaving sufficient flexibility for bidders to design and engineer the project in a manner that conforms to pre-determined standards and specifications, including service outputs.

In case of exceptionally complex projects where the project authority determines that the bidders must submit their technical proposals/plans, the requirements thereof should be specified in detail and such proposals/plans should be invited at the qualification stage, either along with the initial application or at an intermediate stage preceding the bid stage. Only prequalified applicants should be invited to participate in the bid stage, which should consist of an invitation to submit only financial offers.

2. Instruction to applicants

2.1 Eligibility of applicants

To be eligible for pre-qualification and short-listing, an applicant shall fulfil the following conditions of eligibility:

(A) Technical capacity: For demonstrating technical capacity and experience (the "**Technical Capacity**"), the applicant shall, over the past 5 (five) financial years preceding the application due date, have:

(i) paid for, or received payments for, construction of eligible project(s); and/or

(ii) paid for development of eligible project(s) in Category 1 and/or Category 2

(iii) collected and appropriated revenues from eligible project(s) in Category 1 and/or Category 2

such that the sum total of the above is more than [Rs. 1,000 crore (Rupees one thousand crore)] (the "**Threshold Technical Capacity**").

[Provided that at least one fourth of the threshold technical capacity shall be from the eligible projects in Category 1 and/ or Category 3.]

(B) Financial capacity: The applicant shall have a minimum net worth (the "Financial Capacity") of [Rs. 125 crore (Rupees one hundred and twenty five crore)] at the close of the preceding financial year.

In case of a consortium, the combined technical capacity and net worth of those members, who have and shall continue to have an equity share of at least 26% (twenty six per cent) each in the SPV, should satisfy the above conditions of eligibility; provided that each such member shall, for a period of 2 (two) years from the date of commercial operation of the project, hold equity share capital not less than: (i) 26% (twenty six per cent) of the subscribed and paid up equity of the SPV; and (ii) 5% (five per cent) of the total project cost specified in the concession agreement.

2.2 O&M experience

The applicant shall, [in the case of a consortium, include a member who shall subscribe and continue to hold at least 10% (ten per cent) of the subscribed and paid up equity of the SPV for a period of 5 (five) years from the date of commercial operation of the project, and has either by itself or through its associate, experience of 5 (five) years or more in operation and maintenance (O&M) of category 1 projects, which have an aggregate capital cost equal to the estimated project cost. In case the applicant is not a consortium, it shall be eligible only if it has equivalent experience of its own or through its associates. In the event that the applicant does not have such experience, it should furnish an undertaking that if selected to undertake the project, it shall for a period of at least 5 (five) years from the date of commercial operation of the project, enter into an agreement for entrusting its operation & maintenance (O&M) obligations to an entity having the aforesaid experience, failing which the concession agreement shall be liable to termination].

3. Criteria for evaluation

3.1 Evaluation parameters

The applicant's competence and capability is proposed to be established by the following parameters:

(a) Technical capacity; and

(b) Financial capacity

3.2 Technical capacity for purposes of evaluation

The following categories of experience would qualify as technical capacity and eligible experience (the "Eligible Experience") in relation to eligible projects:

Category 1: Project experience on Eligible Projects in [highways] sector

Category 2: Project experience on Eligible Projects in core sector

Category 3: Construction experience on Eligible Projects in [highways] sector

Category 4: Construction experience on Eligible Projects in core sector

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[1]This amount should be equivalent to twice the estimated project cost of the project for which bids are being invited. Where deemed necessary, the authority may increase/decrease this amount by one half of the estimated project cost.

[2]Net worth has been adopted as the criterion for assessing financial capacity since it is a comprehensive indication of the financial strength of the applicant. In exceptional cases, however, the authority may also prescribe a minimum annual turnover and/ or net cash accruals as an indication of the applicant's cash flows and financial health.

For the purpose of this RFQ:

(i) [highways sector would be deemed to include highways, expressways, bridges, tunnels and airfields;] and

(ii) core sector would be deemed to include power, telecom, ports, airports, railways, metro rail, industrial parks/ estates, logistic parks, pipelines, irrigation, water supply, sewerage and real estate development.

Eligible experience in respect of each category shall be measured only for eligible projects.

3.3 For a project to qualify as an eligible project under Categories 1 and 2:

1. It should have been undertaken as a PPP project on BOT, BOLT, BOO, BOOT or other similar basis for providing its output or services to a public sector entity or for providing non-discriminatory access to users in pursuance of its charter, concession or contract, as the case may be. For the avoidance of doubt, a project which constitutes a natural monopoly such as an airport or port should normally be included in this category even if it is not based on a long-term agreement with a public entity;
2. the entity claiming experience should have held, in the company owing the eligible project, a minimum of 26% (twenty six per cent) equity during the entire year for which eligible experience is being claimed;
3. the capital cost of the project should be more than [Rs. 100 crore (Rupees one hundred crore)]; and
4. the entity claiming experience shall, during the last 5 (five) financial years preceding the application due date, have (i) paid for development of the project (excluding the cost of land), and/ or (ii) collected and appropriated the revenues from users availing of non-discriminatory access to or use of fixed project assets, such as revenues from highways, airports, ports and railway infrastructure, but shall not include revenues from sale or provision of goods or services such as electricity, gas, petroleum products, telecommunications or fare/freight revenues and other incomes of the company owning the project.

3.4 For a project to qualify as an eligible project under categories 3 and 4, the applicant should have paid for execution of its construction works or received payments from its client(s) for construction works executed, fully or partially, during the 5 (five) financial years immediately preceding the application due date, and only the payments (gross) actually made or received, as the case may be, during such 5 (five) financial years.

Exhibit 9 : Technical Qualification Limits of some PPP MSW projects

Sl. No.	Project	Project Size (TPD)	Experience as a percentage of MSW to be handled in the current project				
			Collection	Transportation	Transfer Station	Sanitary landfill	Processing
1	ISWM, Ranchi	400	12.5%	37.5%	NA	37.5%	25%
2	ISWM, Dhanbad	568	9%	26.4%	NA	26.4%	17.6%
3	ISWM, Jamshedpur	296	16.9%	50.7%	NA	50.67%	16.9%
4	ISWM, Sambalpur	100	50%	50%	NA	1 Project	1 project

Sl. No.	Project	Project Size (TPD)	Experience as a percentage of MSW to be handled in the current project				
			Collection	Transportation	Transfer Station	Sanitary landfill	Processing
5	IMSWMP, Agra	628	Technical capacity qualification measured in terms of construction experience in other sectors.				
6	ISWM processing facility, Kodungaiyar, Chennai	1800	NA	NA	NA	NA	11.50%
7	Regional municipal solid waste management facility, Bhubaneswar and Cuttack	450	NA	NA	NA	4.4%	22%
8	Municipal solid waste to energy & disposal facility at Greater Mumbai	1000	NA	NA	NA	NA	98.64%
9	Municipal solid waste to energy project for Kochi city	300	NA	NA	NA	NA	66.67%
10	Processing/treatment of mixed municipal solid waste 1000 tons per day at Ahmedabad	1000	NA	NA	NA	NA	25%
11	Door-to-door collection and transportation of MSW to landfill site in Agra	600	17%	17%	NA	NA	NA
12	Development of IMSWM system (processing and disposal) in Vijayawada city on DBOOT mechanism	500	NA	NA	NA	NA	55%
13	Solid waste management system in Lucknow	250	Experience in similar projects and other infrastructure projects in terms of cost of the projects				

Sl. No.	Project	Project Size (TPD)	Experience as a percentage of MSW to be handled in the current project				
			Collection	Transportation	Transfer Station	Sanitary landfill	Processing
14	Door-to-door collection along with lifting, transportation and unloading of waste to the identified MSW processing & treatment site, Faridabad city	NA	*100000 tones till 31/12/2013 *2 years' experience in mechanized MSW collection and transportation, road sweeping and de-silting of drains		NA	NA	NA
15	Municipal solid waste collection and transportation system, waste to energy plant, scientific closure of existing dump site and development of new sanitary land fill site, Bhopal	8 MW	Measured in terms of other PPP projects in Power sector and other infrastructure sector.				
16	Door to door collection & transportation of municipal solid waste within the residential area of various CIDCO nodes, Navi Mumbai.	NA	*300TPD *3 years' experience in collection and transportation of MSW.		300TPD	NA	NA
17	Door to door collection, storage, transportation and procurement on behalf of KDMC, supply delivery along with operation, maintenance of SWM C & T project for 10 years	550	55%	55%	NA	NA	NA
18	PPP project for three WTE plant in NDMC area	70 each plant	Atleast 1 similar project which is operational.				

Sl. No.	Project	Project Size (TPD)	Experience as a percentage of MSW to be handled in the current project				
			Collection	Transportation	Transfer Station	Sanitary landfill	Processing
19	C and T of MSW on a long-term (DPBOMT) from select zone/ group under NDMC	1. 750 2. 500 3.400	80% of the particular group.		NA	NA	NA
20	PPP project for the collection and transportation of municipal solid waste in entire NDMC area.	300	73%	73%	NA	NA	NA
21	Door to door collection and transportation of municipal solid waste to landfill site in Patna	1. 650 2. 200 3. 170	* Min. 50000 households for one project.	*100 TPD for one packages *2/3 times the cumulative MSW for two or three project package.	NA	NA	NA
22	Solid waste management project in the city of Berhampur	138	Experience in at least one integrated SWM project of 100TPD (72.46%)				
23	ISWM, Nainital and Haridwar	Composting plant: 80 TPD RDF: 25 TPD Inert processing plant: 40 TPD Sanitary landfill: 40TPD	Three years of experience in operating and managing integrated solid waste management or individual activities of solid waste management system such as collection, transportation, treatment, land filling etc.				
24	IMSWMP for Bodhgaya city through PPP on BOT basis	20	O & M experience in Only transfer station: 100% Only processing facility: 50% Only sanitary landfill: 75% Atleast two of above (a-b):50% All three (a – c): 30%		2. Construction experience in Only transfer station: 50% Only processing facility:50% Only sanitary landfill: 50% Atleast two of above (a-b):30% All three (a – c): 25%		

Sl. No.	Project	Project Size (TPD)	Experience as a percentage of MSW to be handled in the current project				
			Collection	Transportation	Transfer Station	Sanitary landfill	Processing
25	ISWMP On PPP mode For GMADA MSW cluster, Punjab	350	Experience of 5 years in MSW sector and other infrastructure projects in terms of cost of the projects.				
26	Integrated Municipal Solid Waste Management Project, for Bathinda MSW cluster, Punjab	350	Experience of 5 years in MSW sector and other infrastructure projects in terms of cost of the projects.				
27	500 TPD MSW treatment facility in Surat	500	NA	NA	NA	NA	40%

Exhibit 10: Financial capacity limits of some PPP MSW projects

Sl. No.	Project Title	Project Cost (Rs.)	Financial capacity as a percentage of estimated project cost		
			Min. Annual Turnover	Min. Net Worth	Min. Net Cash Accruals
1	ISWM, Ranchi	51.39 Cr.	30%	116%	NA
2	ISWM, Dhanbad	55 Cr.	27.37%	136%	NA
3	ISWM, Jamshedpur	32.23 Cr.	93%	186%	NA
4	ISWM, Sambalpur	18.17 Cr.	110%	55%	NA
5	IMSWMP, Agra	120 Cr.	33%	20%	10%
6	ISWM, processing facility, Kodungaiyar, Chennai	31.25 Cr.	320%	160%	NA
7	Regional municipal solid waste management facility, Bhubaneswar and Cuttack	58.47 Cr.	NA	25.65%	NA
8	Municipal solid waste to energy & disposal facility at Greater Mumbai	250 Cr.	NA	25%	NA
9	Municipal solid waste to energy project for Kochi city and adjoining areas	70.00 Cr.	NA	50%	NA
10	Processing/treatment of mixed municipal solid waste 1000 tons per day at Ahmedabad	NA	Rs. 150 Cr	Rs. 10 cr	Rs.5 cr
11	Door-to-door collection and transportation of MSW to landfill site in Agra	NA	15 cr.	NA	NA
12	Development of IMSWM system (processing and disposal) in Vijayawada city on DBOOT mechanism	NA	NA	NA	NA
13	Solid waste management system in Lucknow	42.92 Cr.	116%	70%	35%

14	Door-to-door collection along with lifting, transportation and unloading of waste to the identified MSW processing & treatment site, Faridabad city	NA	Rs. 2 Crores	NA	NA
15	Municipal solid waste collection and transportation system, waste to energy plant, scientific closure of existing dump site and development of new sanitary land fill site, Bhopal	350 Cr.	NA	24.30%	NA
16	Door to door collection and transportation of municipal solid waste within the residential area of various CIDCO nodes, Navi Mumbai.	5 cr.per annum	10 Cr.	NA	NA
17	Door to door collection, storage, transportation and procurement on behalf of KDMC, supply delivery along with operation, maintenance of SWM C & T project for 10 years	Cost to be estimated by private parties	10 Cr.	NA	NA
18	PPP project for three WTE plant in NDMC area	NA	10 Cr.	NA	NA
19	C and T of MSW on a long-term (DPBOMT) from select zone/group under NDMC	NA	30 Cr.	10 Cr.	NA
20	PPP project for the collection and transportation of municipal solid waste in entire NDMC area	NA	NA	15 Cr.	5 Cr.
21	Door to door collection and transportation of municipal solid waste to landfill site in Patna	60 Cr. for three packages.	NA	25%	NA
22	Solid waste management project in the city of Berhampur	Cost to be estimated by private parties	NA	15 Cr.	NA
23	ISWM, Nainital and Haridwar	NA	10 Cr.	6 Cr.	NA
24	IMSWMP for Bodhgaya city through PPP on BOT basis	1.65 Cr.	NA	25%	NA
25	ISWMP On PPP mode For GMADA MSW cluster, Punjab	80 Cr.	NA	36%	NA
26	ISWMP for Bathinda MSW cluster, Punjab	66.46 Cr.	NA	30%	NA
27	500 TPD MSW treatment facility in Surat	NA	NA	NA	NA

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