Website

NATIONAL MISSION FOR CLEAN GANGA

(MINISTRY OF WATER RESOURCES,
RIVER DEVELOPMENT & GANGA REJUVENATION)
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Transaction Advisory Support for Mathura-Vrindavan PPP for Sewage Wastewater Treatment and Reuse

BACKGROUND

The Ministry of Water Resources, River Development & Ganga Rejuvenation (MoWR, RD& GR- "Contracting Authority"), Government of India is seeking transaction advisory support towards a Public-Private Partnership (PPP)for the Mathura-Vrindavan Wastewater Treatment and Reuse Project (herein and after referred as "MVWWTRJI).

The MVWWTR- PPP is being proposed as a part of a larger initiative of the MoWR, RD& GR to clean the Ganga and its tributaries like Yamuna. This pilot project is expected to demonstrate the use of PPP in river cleaning, wastewater treatment and reuse in Mathura and Vrindavan, which could then potentially be replicated in other parts of the country.

OBJECTIVE OF THE ASSIGNMENT

The Transaction Advisory Support (TAS) team support for this assignment includes:

- Provision of transaction advisory support, including PPP structuring, financial structuring, and bid process management
- Technical advisory support, including details on engineering/ infrastructure for the project and associated operations and maintenance considerations; cost estimations and benchmarking; and environmental and social safeguards
- Legal advisory and review

PROJECT PROCESS

The MVWWTR-PPP process has been structured as a two-phase process:

Phase I (ongoing) - Preparatory Phase: MoWR, RD & GR is partnering with 2030 Water Resources Group (2030 WRG) for Phase I of the project, bringing on board consultants for conceptualizing the project scope, the project structure, and the broad project term sheet. 2030 WRG have also engaged external technical experts and consultants to assess the technical details of the project, undertake cost-benefit analysis of various centralized/ decentralized options, define the project scope and collect primary data on existing sewerage assets, wastewater flows.

Phase II (focus of current proposal) - Transaction Phase: The current proposal requests for support for Phase II of the project, focused on the transaction phase, including detailed assessment of financial viability of the project, development of a framework for implementation under private

sector participation, Request for Proposals (RFP) preparation, technical, legal support and bid process management to detail the contract structure, design a transparent bid process, prepare bid documents and hand-hold the Ministry in running the bid process.

Building on the ongoing Phase I preparatory work, the advisors for this phase will help with transaction advisory from RFQ release onwards, to advise on the PPP project structuring, financial, technical and legal aspects as per the scope of work outlined in this document. In view of the ongoing technical assessment under Phase I, the technical scope of work for this assignment covers select technical details needed for RFP preparation as per the details outlined in the next section.

ELIGIBILITY CRITERIA

1. The firm should have undertaken at least 10 PPP projects in the last 10 years, each project size of at least Rs 100 crores
2. It should have also undertaken at least 3 projects in the water/sanitation sector for activities related to the following areas
   (i) Project identification/structuring for development under PPP
   (ii) Feasibility Assessment, including financial viability and technical feasibility and
   (iii) Tender document preparation and assistance to government for bidding out projects, evaluation of bids received and recommendation on preferred bidder
3. The Transaction Advisory Support team should submit CVs of the following key team members (i) Team Leader and sector expert, PPP Expert, Financial Expert, Technical Team Leader and Legal Expert.

Draft ToR is available at www.nmcg.nic.in. Interested firms may submit "Expression of Interest' in sealed envelopes clearly superscripted as " **Transaction Advisory Support for Mathura-Vrindavan PPP for Sewage Wastewater Treatment and Reuse** ", in one original and two copies, to the Procurement, NMCG, up to 3:00 PM on 16th Nov 2015.

National Mission for Clean Ganga,
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सत्यमेव जयते
Ministry of Water Resources
Government of India

Terms of Reference
Transaction Advisory Support for
Mathura-Vrindavan PPP for Sewage Wastewater Treatment and Reuse

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I. Background

The Ministry of Water Resources, River Development & Ganga Rejuvenation (MoWR, RD & GR – "Contracting Authority"), Government of India is seeking transaction advisory support towards a Public-Private Partnership (PPP) for the Mathura-Vrindavan Wastewater Treatment and Reuse Project (herein and after referred as "MVWWTR").

The MVWWTR– PPP is being proposed as a part of a larger initiative of the MoWR, RD & GR to clean the Ganga and its tributaries like Yamuna. This pilot project is expected to demonstrate the use of PPP in river cleaning, wastewater treatment and reuse in Mathura and Vrindavan, which could then potentially be replicated in other parts of the country.

The cities of Mathura and Vrindavan have been selected as a demonstration project as the size of these cities presents an ideal opportunity for relatively faster implementation and replication of learning to other cities and towns. These cities are important religious and cultural centers, have a combined population of about 6 lakhs, and have some basic sewage collection and treatment infrastructure, with expansion plans for the near to medium term (further details are included in annexure 1).

The required support for this assignment includes:

- Provision of **transaction advisory support**, including PPP structuring, financial structuring, and bid process management
- **Technical advisory support**, including details on engineering/ infrastructure for the project and associated operations and maintenance considerations; cost estimations and benchmarking; and environmental and social safeguards
- **Legal advisory** and review

II. Project Process

The MVWWTR-PPP process has been structured as a two-phase process:

I. **Phase I (ongoing) – Preparatory Phase**: MoWR, RD & GR is partnering with 2030 Water Resources Group (2030 WRG) for Phase I of the project, bringing on board consultants for conceptualizing the project scope, the project structure, and the broad project term sheet. 2030 WRG have also engaged external technical experts and consultants to assess the technical details of the project, undertake cost-benefit analysis of various centralized/ decentralized options, define the project scope and collect primary data on existing sewerage assets, wastewater

flows and loads (see Annexure 2 on scope of work of existing assignment). This phase will finalize the Request for Qualification (RFQ), planned for release by June 2015.

II. **Phase II (focus of current proposal) – Transaction Phase:** The current proposal requests for support for Phase II of the project, focused on the transaction phase, including detailed assessment of financial viability of the project, development of a framework for implementation under private sector participation, Request for Proposals (RFP) preparation, technical/ legal support and bid process management to detail the contract structure, design a transparent bid process, prepare bid documents and hand-hold the Ministry in running the bid process.

Building on the ongoing Phase I preparatory work, the advisors for this phase will help with transaction advisory from RFQ release onwards, to advise on the PPP project structuring, financial, technical and legal aspects as per the scope of work outlined in this document. In view of the ongoing technical assessment under Phase I, the technical scope of work for this assignment covers select technical details needed for RFP preparation as per the details outlined in the next section.

III. Scope of Work:

This assignment seeks to recruit a transaction advisory firm with demonstrated experience in PPP transactions (and with ability to mobilize relevant technical consultants) to support project development and transaction for MVWWTR-PPP[1].

The Transaction Advisory Support (TAS) team recruited for this assignment will (a) advise on the financial/ commercial, and PPP structuring aspects of the project, (b) provide assistance in preparing the PPP transaction, (c) support the identification of private developer(s) through a competitive and transparent bid process, and (d) draft commercial contracts for wastewater treatment and its offtake. The TAS team is expected to work with the Phase I consultants to ensure effective hand-over of documents/ learning and continuity in the process of engagement from the first phase.

NOTE: TAS teams should submit a single proposal for all components under the scope of work of this ToR. Below inputs will build on technical scope of work carried out under Phase I, which will finalize technical scope of the project, collect actual data on flows and loads, assess condition of assets etc (see Annexure 2 for details on Phase I technical scope), as well as proposed draft project structure. Points below relate to viability assessment and transaction support for identified technical option (finalized under phase I of the project). Preference will be accorded to the firm demonstrating clarity of process to the market and streamlined approach/ continuity of engagement from phase I activities (see section VII on Evaluation Criteria for further details on evaluation process).

The detailed scope of work is outlined below:

I. **Actual measurements** of flows / discharge in the drains / nallahs for dry weather conditions using advance methods and spatial distribution of flows;

[1] Preliminary transaction structure – BOT/ BOOT etc – will be advised by phase I consultants, to be validated during phase II.

II. **Solid Waste Generation and Ghats Infrastructure**: (a) Assessment of solid waste generation at nala tapping works and proposal for their safe disposal, and (b) layout and implementation plan for sanitation of identified ghats, including construction, operation and maintenance of public/ community toilet blocks.

III. **Improvements to Wastewater Collection and Treatment Systems**: Establish applicable effluent quality standards (Class A/B/C/D/E) for proposed wastewater treatment options. Design and layout plans for rehabilitation and development of wastewater collection and treatment systems to consistently achieve water quality objectives at the point of discharge of treated wastewater. Scope of work includes but is not limited to, lift stations, lateral, trunk and outfall sewers, sewage treatment plants, disposal sites, etc., including assessment of hydraulic design, consistent with the techno-economic criteria, of (a) wastewater collection and interconnection to other parts of the collection network, (b) assessment of the existing sewerage network; and (c) recycled water distribution system.

For the avoidance of doubt, indicative design mean indicative sizes, capacities, layout plans and sectional elevations that would provide an indication of general arrangement, land requirement and the preparation of cost estimates. This does not include any structural design and detailed specifications.

IV. **Demand Assessment for Treated Wastewater and Willingness to Pay Survey**: Assessment of existing and projected demand for offtake of recycled water, including:

i. Map demand for reuse to establish total reuse market potential, willingness of identified offtakers to purchase treated wastewater, quality and quantum of water that offtakers would be willing to purchase and tariff (to be formalized through written consent letters).
ii. Assessment of alternate sources of water and installed captive treatment capacities that may be available to identified potential offtakers; cost implications for potential buyers (between current cost of raw water and procurement costs versus treated wastewater).
iii. Duration of commitment from potential buyers to buy treated water on a long-term basis.
iv. Assess feasibility of building in wastewater rights into the Mathura-Vrindavan PPP, and subject to feasibility, implement a process of market price discovery mechanisms, and bidding out wastewater rights as a determinant to revenue generation and revenue-/ risk-sharing among the concessionaire, ULB and central government. If this approach is deemed unfeasible, alternative models including annuity may be considered.

V. **Wastewater Reuse Design**: For proposed alternative(s), indicative designs and layout plans for distribution of recycled water to identified bulk consumers (presently proposed to be Indian Oil Refinery, Mathura);

VI. **Cost Assessment:** Conduct detailed capital and operating cost assessment of project technical scope with details on the variable and fixed expenses; including specifics on salary, electricity, chemicals, sludge treatment/disposal, and maintenance (including equipment repair/ replacement if needed) costs. Benchmark current and historical operational costs (such as for labor, power, chemicals, sludge disposal, routine maintenance, capital improvements, etc.).

VII. **Environmental and Social Impact Assessments**: Study of the project area through necessary primary and secondary surveys for potential environmental impacts of the project;

and preparation of an Environmental and Social Impact assessment with suitable environmental and social management plan. This should include:

i. Public/ stakeholder consultation;
ii. Collection and dissemination of project-specific and quantitative information on potential environmental impacts (both positive and negative) and proposed mitigation measures;
iii. Preparation of environmental impact assessment consistent with good international industry practice;
iv. Analysis of social impacts of the project, including but not limited to land acquisition and involuntary resettlement, community health and safety, etc., through stakeholder consultations and field visits of project locations, and recommendations on appropriate social safeguards, and outline of plan for land acquisition, where appropriate.

VIII. **Financial Analysis**:

i. Assessment of capital and O&M costs of developing the project (in conjunction with technical advisory firm), and estimation of revenue generation potential from reuse of wastewater to different water quality standards; comparisons of cost estimates for implementation of treatment and reuse alternatives against current and projected revenues of respective ULBs;
ii. Development of a financial plan, including but not limited to, possible sources of finance such as private, government, market finance, and multi-lateral development banks;
iii. Development of a financial model on the basis of the above to assess the financial viability of the project, including required support from government, and sensitivity analysis and related outputs – projected project financial statements – Balance Sheet, Cash Flow, Income Statement, Key Ratio Analysis, Financial Internal Rate of Return (FIRR), Debt Service Coverage Ratio (DSCR) and key ratio analysis.

IX. **Risk Assessment**: Assessment of risks associated with the project (technical, contractual, operational, political, social etc) and recommendation of suitable mitigation measures for communication to project-related counterparts.

X. **Consultation with Bidders**: Assistance to MoWR to interact with key private sector Bidders to discuss their expectations and concerns related to project development such as risk sharing, key concession agreement terms, bid process time lines, evaluation criteria, etc.

XI. **Legal/ Regulatory Due Diligence**: Legal advice on regulatory / legal issues relevant to the project structure, including applicability of relevant laws keeping in mind various signatories to the Concession Agreement and laws applicable for sewerage, water, environment and municipal matters, including issues that may impact a private sector party's ability to implement or operate the project as needed.

XII. **Approvals and Clearances**: Legal advice relating to identification of required approvals/ clearances for the project, including:

i. Approvals, licenses and authorizations for environmental issues and preparation of legal documents for obtaining such approvals to proceed with bidding for the project
ii. Title claims for the proposed site(s)
iii. Review of central government funding schemes such as VGF for financial closure impacting PPP design
iv. Institutional structures such as regulatory and monitoring mechanisms proposed.

XIII. **Technical Schedules**: Preparation of technical and system-related Schedules of the Concession Agreement, including (a) manual of applicable water quality standards and indicative specifications of wastewater treatment systems and associated infrastructure , and (b) key performance indicators (KPI) to evaluate performance of concessionaire, process for monitoring, reporting and verification.

XIV. **RFP and Concession Agreement Preparation**: Preparation of Request for Proposal (RFP) outlining the bid proposal formats, bid evaluation criteria and methodology, timeline for award of contract etc. The RFP document would also include the draft Concession Agreement. The Agreement should clearly spell out the roles & responsibilities of the stakeholders, financing framework of the project (including capital and O&M costs and revenue generation potential from sale of treated wastewater where applicable), optimal PPP project structure and institutional framework, mechanism for resolution of disputes etc.

XV. **PPP-AC Approval**: Assistance to MoWR in preparation of the documentation necessary for PPP-AC Approval.

XVI. **Preparation of Commercial Contracts**: Drafting (concession) commercial contracts for wastewater treatment and offtake arrangements.

XVII. **Pre-Bid Conference and Response to Queries**: Assistance to MoWR in organizing and managing the pre-bid conference, and preparation of draft responses to the queries submitted by Bidders.

XVIII. **RFP Evaluation**: Assistance to MoWR in evaluation of the bids submitted in response to the RFP and preparation of the Bid Evaluation Report.

XIX. **Signing of Concession Agreement**: Assistance to MoWR in issue of Letter of Acceptance (LoA) to the preferred bidder, assistance for negotiations with the preferred bidder (if applicable) and signing of the Concession Agreement.

Deliverables:

Below deliverables should ensure continuity of effort from Phase I activities and should avoid duplication of effort. Assistance from TA covers bid process management till execution of the Concession Agreement, with key deliverables outlined below (dates refer to number of months from date of initiation of the assignment).

Contracting Authority will provide comments/ approval on the Draft Technical Report and Draft Project Structure within two weeks, post which Final Technical Report and Final Project Structure should be submitted.

- Inception Report (2 weeks)
- Draft Technical Report (2 months)
- Final Technical Report (3 months)
- Draft Project Structure (4 months), including Environmental Impact Assessment and Social Impact Assessment
- Final Project Structure (5 months)
- Bid Documents (6 months)
    - RFP preparation, preparation of commercial contracts/ concession for wastewater treatment and offtake arrangements, preparation of letter of acceptance for preferred bidder, and preparation of concession agreement

- Bid Evaluation Report (9 months)
- Signing of Concession Agreement (10 months)

NOTE: All background documents used for the purpose of developing the above documents should be shared by the TAS team (including financial model, risk assessment report etc)

IV. Team Experience/ Qualification Criteria

This assignment invites applications from relevant firms as per the qualification criteria below.

The contract will be signed with the transaction advisory firm meeting the requirements below, and which is able to in turn tie-up with relevant technical consultants. Under this assignment, the Contracting Authority will sign a **single contract** with the relevant transaction advisory firm for all components of this assignment.

Transaction Advisory Firm Experience

The firm should have undertaken at least 10 PPP projects in the last 10 years where a Concession Agreement was executed between the identified private partner and the Concessioning Authority in any infrastructure sector (with each project size of at least Rs 100 crores).

It should have also undertaken at least 3 projects in the water/ sanitation sector for activities related to the following areas:

1. Project identification/ structuring for development under PPP
2. Feasibility Assessment, including financial viability and technical feasibility
3. Tender document preparation and assistance to government for bidding out projects, evaluation of bids received and recommendation on preferred bidder

The projects should have been undertaken for Water Utilities, State Government Departments/ Agencies, and/or Central Government Departments/ Agencies.

V. CVs of Key Team Members

The Transaction Advisory Support team should submit CVs of the following key team members mentioned in the table below.

The team leader and key team members listed below shall not delegate their responsibilities except with the prior written approval of the Contracting Authority. The Contracting Authority will not normally consider any request of the Selected Applicant for substitution of the key team members as the ranking of the Applicant is based on the evaluation of the team members. Substitution will, however, be permitted in exceptional circumstances, subject to equally or better qualified and experienced personnel being provided to the satisfaction of the Contracting Authority.

Position	Educational Qualifications	Experience Requirement
Team Leader and Sector	Post-Graduation in Management / Relevant Field	• At least 15 years of professional experience. • He/ She should have undertaken at least 1 engagement related to policy for the water and sanitation sector and should have undertaken at least 5 projects/engagements

Position	Educational Qualifications	Experience Requirement
Expert		related to Water/ Sanitation sector, with preference for PPP project development and feasibility assessment.
PPP Expert	Post-Graduation in Management, CA, Economics/ Planning or equivalent Post Graduation	• At least 10 years of professional experience. • He/ She should have advised for transaction advisory/bid advisory services for at least 5 projects, including at least 2 in the water and sanitation sector.
Financial Expert	Post-Graduation in Management, CA or equivalent Post Graduation	• At least 10 years of professional experience. He/ She should have a proven track record in financial analysis of PPP projects.
Technical Team Leader	Graduate in Engineering with Post Graduation in Environment Engineering/ Public Health Engineering (or equivalence degree)	• At least 15 years of professional experience. Must have specific international experience in the design, construction, commissioning, operation and maintenance of sewerage networks, wastewater treatment plants; demonstrated experience at least 2 similar engagements
Legal Expert	Graduate in Law	• Minimum of 8 years' demonstrated experience in drafting contractual agreements and other related documents/agreements • Successful preparation of documents for 3 PPP projects with Concession Agreement executed

VI. Timeline

The assignment is expected to span 10 months, starting in **December 2015**.

VII. Evaluation Criteria

Evaluation of bids will be conducted on the basis of Quality cum Cost-Based Selection (QCBS).

Technical evaluation:
At first, the Technical Proposal will be evaluated on the basis of Applicant's experience, its understanding of TOR, proposed approach and methodology and Work Plan (particularly demonstrating clarity of approach for the market, and continuity/ logical flow of activities from the Phase I engagement), and the experience of proposed key personnel for the engagement.

Only those Applicants whose Technical Proposals score at least 70 points or more out of 100 shall be ranked as per score achieved by them, from highest to the lowest technical score. As a part of the Technical Proposal, Applicants will be requested to make a presentation to the Contracting Authority.

The technical scoring criteria is given in the table below:

Sl.	Particulars	Score
1	Applicant's Experience • Three points will be awarded for each additional project undertaken (over and above those highlighted under Section IV above)	15
2	Proposed Approach and Methodology and Comments on ToR[2] (including presentation) • Detailed Activity Plan and Methodology • Work Schedule • Approach to ensure Continuity of Engagement from Phase I • Staffing	25
3	CVs of Key Team Members (as per Section V above)	60
Total		100

Financial evaluation:
The Financial Proposal should include separate costing for:

(a) Staff Costs (covering Expatriate and Resident, in the field, office etc), including:
- Name and role of team member
- Number of man-days
- Man-day rate

(b) Reimbursables, including:
- Travel costs
- Accommodation
- Equipment
- Printing of documents etc

Financial Proposal shall take into account all expenses and tax liabilities. For the avoidance of doubt, it is clarified that all taxes shall be deemed to be included in the costs shown under different items of the Financial Proposal.

Final evaluation:
Final evaluation will follow an 80:20 QCBS method. Proposals will finally be ranked according to their combined technical (Tb) and financial (Cb) scores as follows:

$Bb = (0.8) * Tb + (0.2) \times (Cmin / Cb * 100)$

Where,

Bb = overall combined score of Applicant under consideration (calculated up to two decimal points)

Tb = Technical score of the Applicant under consideration

Cb = Financial bid value of the Applicant under consideration

[2] Any comments on the Terms of Reference, including scope of work, timeline etc may be provided an addendum to the Applicant's Technical Proposal.

Cmin = Lowest financial bid value among the financial proposals under consideration

VIII. Payment Schedule

S. No.	Description of Deliverable	Payment
1	Submission of Inception Report	10%
2	Submission of Draft Technical Report	15%
3	Submission of Final Project Structure	15%
4	Submission of RFP and Concession Agreement	30%
5	Bid Evaluation Report	20%
6	Completion of Services upon Execution of the Concession Agreement	10%
Total		**100%**

Annexure I: EXISTING SITUATION AND PRELIMINARY PROJECT SCOPE

Relevant State Agencies

There are two state agencies involved in water supply, sewerage and distribution in Mathura & Vrindavan:

- **Uttar Pradesh Jal Nigam** (UPJN) which is responsible for construction of infrastructure and procurement of water, and
- **Municipal Council** (Nagar Palika Parishad - NPP) which is responsible for distribution, and for operation and maintenance of the schemes handed over to it by the UPJN.

Mathura has four sewerage zones:

(i) Masani zone
(ii) Masoon Nagar zone
(iii) Koyla Ali Pur zone
(iv) Trans-Yamuna zone

Existing Sewage Treatment Plants and Network

Approximately 25 to 30 per cent of the city's area is sewered. The city of Mathura has 19 nallahs, out of which two nallahs are the larger ones, Masani nallah and Ambakhar nallah. The Masani nallah carries around 46 per cent, whereas Dhruvghat Nallah and Ambakhar Nallah together carry 41 percent of the city's total discharge. All these nallahs including Ambakhar nallah also carries wastewater from Saree textile processing (dyeing) and other small factories which are located within the city premises.

Under Yamuna Action Plan in 2002, all nallahs were intercepted and the wastewater flow was diverted to the IPS (Intermediate Pumping Station) and MPS (Main Pumping Station). There are 6 IPS and 3 MPS, which are situated along the banks of Yamuna. The wastewater from the 19 nallahs flow into the IPS / MPS and thereon to the 3 STPs. However, these IPSs/MPSs are now deficient with respect to flows and therefore excess wastewater is outfalling directly into river Yamuna.

Mathura has two existing STPs based on waste stabilization ponds technology with a combined capacity of 28.5 MLD:

- **13.59-MLD plant** is located in Masani, discharge from which goes to the forested areas in the north;
- **14.5 MLD STP** in Kulu ka Nagla is located trans-Yamuna. The discharge from the Kulu ka Nagla goes to the nearby agricultural lands which the ULB has leased out to farmers.

One new STP (partially commissioned) with capacity of 16 MLD has been recently constructed with UASB (Upflow Anaerobic Sludge Blanket) technology next to existing Kulu ka Nagla STP. Of the 16 MLD capacity, the STP processes only 6 MLD wastewater (which flows into the STP) at present.
O&M of the existing 2 STPs, 3 MPS and 6 IPS has been outsourced to a private contractor. The ULB is also responsible for the dredging of sludge of the 2 wastewater stabilization pond in the 2 existing STPs once in 2-3 years. The maintenance of nallahs and the sewerage networks is being done by the ULB through a contracted workforce.

Vrindavan has 2 STPs and 8 IPSs/MPSs. The 4 MLD WSP STP commissioned in 2002 warrants refurbishment or conversion of technology whereas the new 8 MLD UASB is yet to be commissioned. It is envisaged by the ULB that after commissioning the 8 MLD STP, wastewater flowing is nallahs in Vrindavan would be completely stopped. Out of 18 nallahs/drains, two nallahs are major ones; CFC and Maat drain.

Preliminary Project Scope

At present, 28.5 MLD of wastewater is being treated in the two existing STPs. With growing population and tourists, significant increase in the wastewater treatment capacity and reuse solutions are required.

This project is expected to demonstrate the use of PPP in river cleaning, wastewater treatment and reuse which could then potentially be replicated in other parts of the rivers. The proposed PPP project will comprise of a comprehensive and integrated wastewater treatment and reuse solution consisting of:

(i) Rehabilitation, construction and O&M of approximately 100 MLD sewerage treatment along PPP approach;
(ii) Reuse of 20 MLD or more treated wastewater by industry;
(iii) In-situ/decentralized solutions for sewage flowing in streams and nallahs at particular location(s); and
(iv) Integrated waste management provisions for ghats,

thereby eliminating all open drain sewerage pollution into the Yamuna river in Mathura and Vrindavan.

Preliminary consultations have indicated the possibility of Indian Oil Mathura Refinery procuring potentially 20 MLD treated water from the project. The interest emerges from the increased requirement of water by the plant on account of planned refinery capacity expansion as well as its commitment to the national cause of Ganga/Yamuna rejuvenation. This project will enable the plant to reduce its dependency on direct withdrawals from the Yamuna. Present water sources of Mathura refinery are Keetham lake and Koyla River Bed (Yamuna Water). According to the refinery, the water quality from these two sources do not conform to their desired limits. Under the PPP model, appropriate tariff setting for treated water for refinery will be an important factor in the overall project feasibility.

The total project size is estimated at around Rs. 150 crores (subject to completion of technical survey).

Besides hard-core sewerage infrastructure, the project will also cover some basic cleanliness aspects of the ghats. At present, there are three toilet blocks along the ghats of Yamuna which is unable to meet the present demand. Given the increase in tourist inflows in recent years, more toilet blocks are needed to meet the increased demand.

Preliminary project scope is outlined below:

S.No	Indicative Components (To be finalized after Phase-I study)	Indicative Responsibility of the concessionaire (to be finalized)
1	**Mathura Central + South + Trans-Yamuna (66 MLD):**	
i.	2 existing STPs in Kulu ka Nagla (Trans-Yamuna (T-Y), 14+16 MLD)	Mainly O&M
ii.	2 new STP (South, 23+16 MLD) – West of Bengali Ghat and South West of Gokul Barrage (1 DPR in preparation, another DPR planned)	Construction of 2 STPs and O&M
iii.	3 pumping stations + bulk pipe to T-Y	Significant upgrading / augmentation of the pumping stations
iv.	1 new tertiary treatment plant (36-52 MLD) - subject consent refinery	Construction of TTPs and O&M
v.	New Bulk pipe from T-Y to new STP (16 MLD) and onwards to refinery (20 MLD)	Construction pipe and O&M

S.No	Indicative Components (To be finalized after Phase-I study)	Indicative Responsibility of the concessionaire (to be finalized)
vi.	4-8 new toilet blocks at Ghats	Construction and O&M
2	**Mathura North/ Masani (18-22 MLD):**	
i.	1 existing STP + pumping station (14 MLD)	Mainly O&M, augmentation & upgradation to 18 MLD capacity
ii.	1 new decentralized/in-situ solution for common Raal & Masani drains for diluted pollution	Construction and O&M
3	**Vrindavan (12 MLD)**	
i.	2 existing STPs (4+8 MLD)	Mainly O&M, some augmentation and upgradation
ii.	Pumping stations	Mainly O&M, some upgrade

All the technical details of above components to define the actual scope under PPP shall be finalized after technical assessment from Phase-I study

Pictures showing present condition of some major nallahs and sewerage infrastructure:

Ambakhar Nallah

Masani Nallah

Dairy Ghat MPS (Commissioned in 2002)

14 MLD WSP STP Kulu Ka Nagla

	
Kulu Ka Nagla MPS (newly constructed)	**16 MLD UASB STP (yet to be fully commissioned)**
	
Masani MPS	**Masani STP – Stabalisation Pond**
	
Toilet blocks near the Ghat	

The map of Mathura presenting all nallahs and STPs are presented in the diagram below.

Source: Anon 2011, *71-City Water-Excreta Survey, 2005-06*, Centre for Science and Environment, New Delhi

ANNEXURE 2: TECHNICAL SCOPE OF WORK UNDER PHASE I

This section outlines the scope of work being undertaken under phase I of the project. Details from this scope of work will be available to the TAS team chosen for this assignment.

i. **Investigation of wastewater generation** (present & future) on the basis of population forecasting methods for the years 2025 and 2040; cross check with water supply data from municipality (vet reasonableness of flows that may then be attributable to extraction from wells and other surface water sources);

ii. **Collection and analysis of wastewater samples** at different points/drains & CETP inlet for water quality data (physical, chemical and biological including presence of heavy metals) as well as at outlet point for existing STPs/ CETP;

iii. **Cost-benefit analysis of centralized and decentralized approaches**/scenarios for sewage treatment and its practical feasibility including identification of land availability;

iv. **Definition of project scope** by undertaking cost-benefit analysis of few options for sewage treatment in Mathura-Vrindavan and providing a recommendation for the optimal option. The options could be as follows:
   a. **Decentralized solution** as per UP Jal Nigam proposal for Mathura-Vrindavan
   b. **3 STPs for the project**: (i) STP located at Masani WSP location for wastewater collected in Masani+Vrindavan areas, (ii) STP located at Trans-Yamuna (16 MLD-UASB) for wastewater collected in T-Y area, (iii) STP located at Masoom Nagar area for wastewater collected in Central Mathura + South Mathura
   c. **1 centralized STP located in Trans-Yamuna** for wastewater collected across Mathura and Vrindavan
   d. **1 centralized STP located in Masoom Nagar** for wastewater collected across Mathura and Vrindavan
   e. **Any other option deemed technically and financially feasible**

   The assessment of each of the above options includes the following:
   - Routing of pipelines under each option – wastewater transportation map of sewerage from nallah to IPS / MPS to STPs to discharge – in terms of length of network, diameter / material of pipes
   - Estimation of capital costs and phasing of capex under each option
   - Estimation of operating costs including pumping/ energy costs under each option (after considering gradient, suitable STP technology)
   - Disposal mechanism for sludge and/or RO reject
   - Detailed representation of existing assets and assets to be constructed (IPS/MPS, STPs, pipelines etc.) under each option in a Mathura-Vrindavan map