

## Terms of Reference

### Consultancy Services for Road Asset Management System support to the UPPWD under Uttar Pradesh Core Road Network Development Program (UPCRNDP) (Individual)

#### 1. Background

Uttar Pradesh (UP) has a road network under the UP Public Works Department (UPPWD) of 2,54,970 km, which comprises 11,487 km of National Highways (NHs), 8,322 km of State Highways (SHs), 5,550 km of Major Districts Roads (MDRs), 49,476 km of Other Districts Roads (ODRs) and 1,80,135 km. of Village Roads (VRs).

Under a previous Bank-financed state roads project<sup>1</sup>, the UPPWD had commissioned the development of a Road Maintenance Management System (RMMS) with GIS-based database of road network to facilitate road investment decision-making and monitoring. The objective was to prioritize projects for annual maintenance and upgradation using various civil engineering parameters such as road condition, traffic, population served etc. The current in-house developed web-portal (Shristi) has a Management Information System (MIS) with considerable data inventory, conditions, traffic and other civil engineering parameters of roads, bridges and culverts, RoB/RuB etc. that has been collected since 2011. This MIS is capable of generating customized reports and a Multi-Criteria Analysis (MCA) module that supports the prioritization of roads for annual maintenance. The Geographic Information System (GIS) module of Shristi2 maps all roads of Uttar Pradesh (NH, SH, MDR, ODR and VR), for which data of NH, SH, MDR and approximately 50% of ODR network has been entered.<sup>2</sup> A Road Asset Management System (RAMS) Division in the UPPWD, headed by Superintending Engineer (RAMS & Road Safety) and comprising of 1 Executive Engineer (EE), 1 Assistant Engineer (AE), 2 Junior Engineers (JEs) supported by a GIS expert, 2 programmers and 4 computer operators, is responsible for day-to-day maintenance and database updates of Shristi2. NIC provides the required technical support.

Component 2 of the ongoing Bank-financed Uttar Pradesh Core Road Network Development Project (UPCRNDP) includes operational support to the UPPWD RAMS Division in expanding the scope of the data, completing the road network assets inventory, improving information on road condition, improving information on traffic volumes and axle loading, Bridge Management System, road safety, climate vulnerability and extending the analytical capability of the RAMS. Through technical assistance and advisory support, the project will strengthen the processes in UPPWD related to network data collection, prioritization of investments, multi-year planning and use of RAMS in preparation of annual maintenance plans. The UPCRNDP budget provides for the necessary fund allocation for upgradation/ operationalization of Shristi2, field data collection, and training and capacity building of UPPWD engineers in RAMS. As a first step, a preliminary assessment of the extant UP RAMS features and UPPWD capacity against best practices of RAMS design and implementation was undertaken and presented to the UPPWD for consideration in February 2021.

In light of the above, the UPPWD now seeks to enhance its RAMS capacity and capability to systematically and scientifically assess and identify, select, prioritize and implement road work improvements across its entire road network, and monitor the network performance.

#### 2. Objective

The objective of these individual consultancy services is to provide technical advisory support to the UPPWD's RAMS Division to augment its evolving internal capacity and parallelly, to undertake a deep dive diagnostic of the existing platform/systems/tools and procedures.

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<sup>1</sup> Uttar Pradesh State Roads Project II that closed in December 2010

<sup>2</sup> Remote Sensing Application Center (RSAC) is collaborating for capturing GIS information for the remaining ODR network and Village Roads.

### 3. Scope of work

The consultant will be primarily responsible for consultancy support to the UPPWD's RAMS Division to manage, execute and implement its road asset management functions and activities. In execution of all related tasks, the consultant shall effectively liaise with other units of the UPPWD and their related consultants<sup>3</sup>, if any, to synchronize and synergize implementation of all RAMS activities. In addition, the Transport Department and Traffic Directorate will also implement few Road Safety components under the UPCRNDP project. These agencies will also engage project management consultants for their respective components. The consultant is expected to liaise with these agencies and consultants as well to establish synergies between the project activities.

The Consultant will also assess existing asset management systems/ procedures/processes and practices in terms of its broader strategy and goals, integration with existing PWD MIS/systems/databases and linkages to new systems (such as the upcoming Integrated Road Accident Database or IRAD), reporting requirements, human and budgetary resources and implementation capacity, standard operating procedures for data collection and software platform/updates etc.

The consultant shall plan and implement his work schedule such that each activity is completed within the agreed timeline, budgeted cost and in compliance with the WB guidelines and applicable Employer's acts, rules and regulations. The Consultant is expected to guide and support the UPPWD to perform the following specific tasks and deliver related outputs as follows:

#### **3.1 Task 1: Capacity assessment of the existing RAMS operations**

- 3.1.1 Review existing business processes and procedures, road improvement and maintenance needs analysis and preparation of annual works programmes
- 3.1.2 Review current procedures for RAMS data collection, network evaluation, system input and update, and day-to-day operations and comment on the same
- 3.1.3 Identify systemic constraints in UPPWD for mainstreaming RAMS into all its road improvement/construction works.
- 3.1.4 Assess structure, functions and resources needed for the RAMS unit to become fully self-sufficient to comprehensively handle all related functions.
- 3.1.5 Based on the above, prepare a report on existing capacity and capabilities for road asset management and provide recommendations for plugging the identified gaps.

#### **3.2 Task 2: Formulate an approach/ strategy paper on operationalizing of the RAMS**

- 3.2.1 Define clear vision statement and scope of RAMS in UPPWD
  - 3.2.1.1 Define RAMS objectives such as toward improving road network efficiency and service delivery
  - 3.2.1.2 Define network efficiency indicators and targets that address road connectivity, traffic capacity, road safety, ride quality and overall network condition in UP
  - 3.2.1.3 Define structure and contents of an annual report to be produced by the RAMS unit presenting for example the condition and traffic of the network, the network efficiency indicators, the program of road works, and the expected performance of the network
- 3.2.2 Foster use of RAMS in lifecycle planning and costing
  - 3.2.2.1 Establish procedure for defining "homogeneous road section" based on road inventory, road condition and traffic data collected
  - 3.2.2.2 Formulate procedures to evaluate the road network data and report on network monitoring indicators,
  - 3.2.2.3 Formulate procedures to generate a rolling program of road works under budget constraints, perform a multi-criteria (MCA) analysis, and perform a cost benefit (CB) analysis
  - 3.2.2.4 Formulate procedures to produce maps for road network monitoring and present the results of the road network evaluation

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<sup>3</sup> Such as the Road Safety Project Management Consultants

- 3.2.2.5 Explore integration of all sources of funding (plan and non-plan) for upgradation, maintenance and new construction toward preparation of medium to long-term budget plans
- 3.2.2.6 Determine annual maintenance needs for roads and bridges and help prepare annual work programs and multiyear rolling work programs and annual maintenance plans, with identified needs based on plan and non-plan budgets for network improvement
- 3.2.2.7 Provide needed specific recommendations for updating any circulars, codes, guides/manuals for mainstreaming road asset management.
- 3.2.3 Explore integration of RAMS with other existing data systems
  - 3.2.3.1 Assess integration of system with Bridge Management System
  - 3.2.3.2 Assess extent of road safety data and furniture that is captured and capability of system to capture the same;
  - 3.2.3.3 Assess extent of climate vulnerability data that is captured and capability of system to capture the same
  - 3.2.3.4 Ensure that all RAMS network data can be exported to Excel per homogenous road section and/or per km;
- 3.2.4 Assess institutional requirements for sustainability of RAMS over medium to long-term
  - 3.2.4.1 Formulate/revise organizational structure and functions for asset management in UPPWD
  - 3.2.4.2 Determine human resource requirements for recommended structure along with clear responsibilities, reporting obligations and terms of reference for key staff
  - 3.2.4.3 Determine equipment requirements and use of high-end machines and software (such as ROMDAS for periodic data collection and other devices for automated traffic counting at select locations)
  - 3.2.4.4 Determine IT and communication requirements (computer software and hardware, servers, hosting, Internet, Intranet etc.)
  - 3.2.4.5 Determine annual financial requirements
  - 3.2.4.6 Determine annual training requirements
  - 3.2.4.7 Prepare roadmap for RAMS implementation, including institutional setup, phasing of implementation (i.e., what percent of road prioritization through RAMS should be targeted over what period).
- 3.2.5 Based on the above, formulate a strategy paper with short to medium term actions for mainstreaming use of the Shristi2 system in UPPWD to enable it to develop annual and multiyear rolling road work programs, and annual road maintenance plans, for prioritizing its road investments.

**3.3 Task 3: Identify requirements for upgrading the RAMS software/system, including linkages to existing systems/databases and formulate a Terms of Reference for a consultancy firm to accomplish related tasks**

- 3.3.1 Based on 3.2.3 above, provide recommendations for upgrading RAMS software platform with recommended architecture.
- 3.3.2 Formulate a Terms of Reference for a system integrator/database consultancy firm to supply, configure, host, operate and maintain a modular, web-enabled and GIS-based state of the art RAMS, that would produce customized reports and data for informed decision making at the UPPWD headquarters, and facilitate data entry and analysis at the field offices. The upgraded system should also enable seamless connectivity/interfaces with the upcoming IRAD, climate vulnerability/disaster management systems and any other relevant online/offline systems (as advised by UPPWD).
- 3.3.3 Assist UPPWD in procurement of consultancy services to upgrade the existing system
- 3.3.4 Support UPPWD in monitoring the activities of the selected firm
- 3.3.5 Support UPPWD's transition of the existing system to the designated new system

**3.4 Task 4: Build capacity of the RAMS unit in day-to-day operations**

The consultant shall initiate activities to build capacity of the RAMS unit in road asset management through training etc. for effective transfer of knowledge, on-the-job mentoring and training of participating staff. Specifically, the consultant shall:

3.4.1 Specify periodic staff training requirements:

3.4.1.1 Conduct a quick training needs analysis (TNA) to identify short- and medium-term comprehensive training needs

3.4.1.2 Prepare periodic training plan for UPPWD operational staff (Head Quarters and divisions) in road asset management. The plan should, at a minimum, include: modules on need for asset management, life cycle costing approach, preparation of annual work programs and maintenance plans, maps and reports, MCA and CB analysis. The plan should identify both domestic and international training opportunities in these areas.

3.4.1.3 Recommend exposure visit(s) preferably to an advanced Indian state and/or country which has demonstrated good progress in addressing similar asset management challenges and has successfully implemented/evolved a system to tackle it. The costs associated with any travel and program fees for the participating officials shall be borne by the project.

3.4.2 Help conduct knowledge exchange activities such as workshops/seminars/webinars, conferences, etc. as identified by the UPPWD/RAMS Unit.

**4. Time-Schedule of Deliverables:**

The Consultant shall submit deliverables as per the following table:

S.No.	Deliverables	By when (Months)
1.	Date of signing of Contract	T
2.	Submission of inception report	T + 1
<b>Task 1 – Capacity assessment of existing RAMS operations</b>		
3.	Report on completion of Task 1	T + 3
<b>Task 2 – Approach/ strategy paper on operationalizing of the RAMS</b>		
4.	Report on Tasks 3.2.1 and 3.2.2 – Vision and objectives	T + 3
5.	Report on Tasks 3.2.2 – operational procedures	T + 5
6.	Report on Task 3.2.3 – linkages with other systems	T + 5
7.	Report in Task 3.2.4 – institutional requirements	T + 5
8.	Task 3.2.5 – Full Strategy Report	T + 6
<b>Task 3 – Requirements for system upgrade and TOR for firm</b>		
9.	Recommendations on needed upgrades and architecture	T + 6
10.	Task 3.3.2: Terms of Reference for system integrator/ database consultancy firm	T + 6
11.	Bid document preparation for procurement of system integrator/ database consultancy firm	T + 8
<b>Task 4 – Build asset management capacity</b>		
12.	Report on Tasks 3.4.1 (TNA) and 4.3.3 (training opportunities)	T + 5
<b>General Support</b>		
13.	Rolling work program and maintenance plans	As needed
14.	Support for procurement of system integrator/ database consultancy firm	As needed
15.	Support to UPPWD on monitoring activities of selected system integrator/ database consultancy firm	As needed
16.	Support to UPPWD in transitioning to upgraded RAMS platform	As needed
17.	Support to UPPWD on conduct of periodic training programs and/or exposure visits	As needed
18.	Support to UPPWD on knowledge transfer/exchange activities	As needed
19.	Progress report on support provided and tasks accomplished	Every 6 months
20.	Draft final report on all tasks incorporating all reports above	T+34
21.	Final report after incorporation of UPPWD comments	T+36
<i>Note: All reports are required to be submitted in both hard copy and soft copy formats.</i>		

i. The Consultant shall report to the CE, EAP alongwith SE/ EE, RAMS Division of the UPPWD.

- ii. The Inception Report will detail the timeline for implementation of the various activities as per the scope of work.

**5. Duration and Location of Services**

- 5.1 The duration of the consultancy services will be thirty-six (36) months from the date of signing the contract.
- 5.2 The services shall be delivered mainly in Lucknow, Uttar Pradesh. However, in order to perform services as per scope of work, the consultant may have to visit other locations in UP as directed by the RAMS unit/UPPWD.
- 5.3 On their part, UPPWD and its RAMS unit will attend to the following Client responsibilities:
- 5.3.1 Provision of office space within/in close proximity to the RAMS unit.
  - 5.3.2 Provision of counterpart personnel to assist the consultant as required
  - 5.3.3 Facilitating access to relevant documents/records/files to carry out the services
  - 5.3.4 Assistance to the consultant in establishing essential contacts in concerned GOUP areas and in gaining the cooperation of other GOUP departments and agencies, as required for this assignment.
  - 5.3.5 Vetting of the consultants’ main outputs and deliverables
  - 5.3.6 Conduct of review meetings as and when required within Lucknow.

**6. Professional qualifications, skills and experience required:**

<i>Sr. No.</i>	<i>Position</i>	<i>Minimum qualifications</i>	<i>Specific Required Expertise</i>
1	Road Asset Management Systems Specialist	Graduation in Civil/ Engineering with Post graduate qualification in Transportation/ Highway Engineering. Specialist high-level qualifications relevant to Road asset management functions is preferable.  Minimum overall professional experience: 10 years	Graduate Civil Engineer with masters in Highway / Transportation engineer / Transportation planner with overall experience of at least 10 years, with working experience on at least one comparable Road Management System (RMS) development / implementation assignments. Must have worked on large road networks and should have managed development and delivery of at least one such projects. Must have extensive domestic experience in planning, designing, managing, advocating for and in facilitation of related training, capacity-building and institutional initiatives including on WB/ADB or similar donor projects in asset management. Must have worked on preparation of Annual / Multi Year Work Program and should have used HDM-4 extensively. Must have skills in strategic and technical advising to high-level public executives, and in coordinating complex multi-agency action in a public sector environment.