

TERMS OF REFERENCE

Selection of Senior Bioengineering Expert for World Bank funded Himachal Pradesh State Roads Transformation Program (HPSRTP)

A. Project Background

The Government of Himachal Pradesh through the Govt. of India has received a loan from the World Bank (USD 82 Million) for implementation of the Himachal Pradesh State Roads Transformation Project (HPSRTP). HPSRTP has envisaged to strengthen transport, logistics and Road Safety institution and also to improve priority Major District Roads/other Districts Roads (State Road Network) to stimulate horticultural and overall economic growth of Himachal Pradesh State.

The Lead Implementing Agency Himachal Pradesh Roads and Infrastructure Development Corporation (HPRIDCL) represented by the Director (Project)-cum-Chief Engineer has already awarded consultancy services for conducting detailed feasibility study of about 2,000 Km of State Core Road Network, mainly Major District Roads. The Consultancy firm shall prepare Detailed Project Report (DPR) for upgradation works of 650 kms of core roads which include detailed engineering design, social, environment and road safety safeguards measures and maintenance of 1,350 km of MDRs through contracting and Project Management Consultant (PMC) to assist in implementation of the Project.

Up-gradation of 650 Km road length will be carried out in 3 Tranches i.e. Tranche-I=90 Km, Tranche-II=270 Km, and Tranche-III=290 Km. The Tranche-I of HPSRTP-II is to be implemented in three components namely Institutional Strengthening/Transformation Agenda, Upgradation of Priority Roads, and Development of "Safe Corridor Initiative."

B. Objective

The project envisages up-gradation and maintenance of state roads, some of which may lead to adverse environmental impacts and risks due to erosion proneness, slope instability, and geo-hazards, etc.

It is the HPRIDCL's initiative to introduce and evolve economical/affordable, environment friendly and ecologically sustainable measures of landslide disaster management, Soil erosion reduction and prevention. Bioengineering will be used as one tool towards attaining sustainable asset management, reducing over-all road maintenance costs, and improving the overall environment. Bioengineering techniques as preventive measures for these interventions will be introduced under the project to achieve these objectives. The key elements will be covered are as follows:

- Guide developing Bio-engineering suitability checklist covering land, slope, soil, hydro-geology parameters for guiding decision making process to stabilize erosion prone slopes;
- Assist in Documenting best practices from the sector to stabilize erosion-prone slopes/landslides, debris disposal sites along the RoW boundaries specially from hilly fragile/Himalayan region;
- Assessment and design of slope failure treatments (for both natural as well as man-induced failures) for such sites;
- Development of guidelines for minimizing man-induced instabilities;
- Assist Bioengineering Solution Consultant in Preparation of Bioengineering Solution Manual;
- Assist Bioengineering Solutions Consultant in Creation of an institutional framework to ensure inter-agency coordination.
- Assist Bioengineering Solutions Consultant in Creation in monitoring framework
- Review quality control and quality assurance measures frequently for ongoing and completed bioengineering works.

In this regard, HPRIDCL needs to hire a Senior Bioengineering Expert in its unit to effectively coordinate/review necessary studies regarding Bioengineering measures as part of project preparation, implementation and monitoring.

C. Scope of Work

In preparation, implementation and monitoring stages Senior Bioengineering Expert will undertake following specific tasks:

- i. Review Hill road construction and maintenance design standards and other applicable manuals/documents available regarding Bioengineering Measures.
- ii. The consultant will familiarize him/herself with the approach to Soil Bioengineering piloted by the HPRIDCL as part of first HPSRP funded by the World Bank and recommend any change in scope of this TOR to produce a robust bioengineering manual that will be mainstreamed in regular business practices of PWD.
- iii. Examine in detail the slopes along the first 650km of road scheduled for detailed design and 1350km roads under Periodic Maintenance of road by Long Term performance Base Maintenance Contract. Liaise with the DPR Consultant's Geo-technical Specialist to put together a series of designs that combine geo-technical and bioengineering measures to the optimum extent.
- iv. To review and provide the comments/observations on ESIA's in terms of Bioengineering aspects as proposed by the Design and ESIA Consultants for the proposed project to ensure robust planning of the Bioengineering measures/solutions. It has to be ensured that Bioengineering studies and implementation plans include (i) site assessment & appropriate species selection procedures, (ii) required quantity/types of material resources (recommended species, water & any other if) & its availability in the region, (iii) methodologies & drawings for different techniques to be used, (iv) practical ways in which planting materials can be obtained and (v) estimated bill of quantities (BoQ) for the proposed measures. Consultant need to provide a comprehensive checklist/guidelines in terms of Bio-engineering aspects to the ESIA/DPR/CSC consultant to be incorporated in the report or to be implemented at site.
- v. Provide all necessary support and facilitation on behalf of HPSRTP to Design and ESIA Consultants on Bioengineering related aspects during site assessments, related stakeholder consultations, field surveys during the planning stages of the Contract. During the process, the consultant needs to ensure the availability of proposed plant resources in advance by consulting owners of locally available nurseries, and those in charge of PWD's nursery. Consultant need to submit an audit/status report after every site visit to the active project construction sites.
- vi. Assist/suggest Bioengineering Solutions Consultant on recommendations on the needs of relevant staff in HPPWD/HPRIDCL and training and other capacity support in planning, implementation and monitoring of bioengineering solutions to stabilize erosion-prone slopes/landslides, debris disposal sites along the RoW boundaries. The consultant based on his/her assessment shall prepare a training calendar detailing out modules and frequency of training and target audiences. Capacity-building activities will also include orientation of the Contractor's designated staff about scopes and proposed methods of the bioengineering solutions in their respective projects.
- vii. To interact with officials of the forest and horticulture department in order to understand fully the ground reality and requirements for bioengineering, existing local practices and techniques including identification of suitable species for bioengineering.
- viii. Engagement of the local community in the form of Social groups, NGOs, women SHGs' (self-help groups) or individuals for the implementation of bioengineering works during construction and maintenance is promoted to improve livelihood, employment opportunity, greater commitment (which facilitates project implementation and long-term maintenance), localized benefits of skill development. The consultant needs to plan visits and conduct consultation to assess available skill set and need for training at community

level, which will input to developing mechanism for aforementioned engagement and agreeing with HPRIDCL.

- ix. Suggest the bioengineering measures/plan to be undertaken on 650km upgradation and 1350Km roads under Periodic Maintenance of road by Long Term performance Base Maintenance Contract to promote ecological sustainability of the region. Detailed designs should be accompanied by specifications, digital photographs and videography and drawings of the proposed works, for all sites along the roads in question. The completed designs as part of Bio-engineering Implementation Measures Report should be submitted for each project and agreed with the HPRIDCL and Bank's Technical Team.
- x. The Consultant shall also assess changes in vegetation coverage and land use in the high geo-hazard risk areas along the road and determine the potential of new landslide risk occurrence and possible remedial Bioengineering measures to sustainably prevent and protect the landslide risks.
- xi. The consultant will prepare lists of species appropriate for each area where Soil Bioengineering is to be undertaken on the roads, and propose practical ways in which the planting materials can be obtained or produced and appropriate to each technique that should be adopted and should be submitted as part of Bio-engineering Implementation Measures Report. Where possible these should use existing HPPWP nurseries; the need for additional nurseries should be specified. The sources of materials for plant production should be specified in detail and closely related to the wide variations in altitude found in the HP road network.
- xii. Coordinate with Bioengineering Solutions Consultant in preparation of Action Plans for time-bound implementation of such activities with field staff and other involved agencies. The discussion will include matters about the use of design, implementation, nursery establishment and management, works calendars and programs; in particular, define the timings of the obligations of the PWD Horticulture Wing in producing materials for site use by the contractors.
- xiii. Regular review of bioengineering related activities on-site during the construction stage to ensure compliance and adequacy of proposed bioengineering measures. It has to be ensured that proposed bioengineering solutions are being regularly supervised and monitored by the Construction Supervision Consultants. This will require regular maintenance of the record and documents, regular travel, and virtual interaction with the assigned staff of different CMUs, CSC, and any other involved agencies.
- xiv. To identify the stances of Contractor's negligence and non-compliance as per the proposals during the project implementation stage and further provide corrective solutions.
- xv. Prepare a first draft report at the beginning of the contract on the findings and recommendations for improving the bioengineering works and discuss/ present this with the HPRIDCL and project related stakeholders. Finalize the First report based on the discussions and additional information provided, if any including the necessary activities of the Consultant for planning, design, and training purposes.
- xvi. At the end of each year, the Consultant shall compile a report based on overall findings, actions taken and improvement in planning, design, implementation and maintenance. It should also include recommended steps for future works.
- xvii. To assist HPRIDCL/Bioengineering Solution Consultant and inhouse Horticulture / Bioengineering Expert in preparation of the Bioengineering Solution Manual so that Bioengineering measures can be mainstreamed in the regular PWD's works.
- xviii. Documentation and reporting to apprise World Bank team during mission visits or as and when required.
- xix. To assist HPRIDCL for procurement of any Bioengineering Solution Consultant/Contractor.
- xx. Review the deliverables of the concern consultant/contractor w.r.t. the Bioengineering measures.

- xxi. Review/ensure quality control and quality assurance measures frequently for ongoing bioengineering works.
- xxii. Review Bioengineering Solution Manual.
- xxiii. Review of plantation type and applications.
- xxiv. The Consultant will assist HPRIDCL in establishing nurseries at suitable location on core road network entrusted to HPRIDCL for propagation avenue plants / shrubs & bushes etc., manpower requirement for nurseries and implementation of Bioengineering techniques and capacity building of the same.
- xxv. The Consultant will work in close coordination with In-charge Horticulture and Bioengineering Expert of HPRIDCL.

D. Duration of Assignment

The duration shall be for a period of 36 (thirty six) months with intermittent input of 12 months (inceptions and training), to be reviewed and renewed based on performance and work requirement. The input of Senior Bioengineering expert shall be on intermittent basis at the HPRIDCL project office in Shimla and must be willing to travel extensively in other Districts of Himachal Pradesh to different project sites.

E. Qualifications and Experience

The Senior Bioengineering Expert should possess a Bachelor in Civil Engineering and a Master's Degree in Environmental Sciences / Bioengineering or Equivalent from a recognized University and must have proven experience (expert level) of 15 years in the civil works and use of bioengineering and or vegetative structures.

Relevant experience

- i. 10 years in planning and practical application of bioengineering solution in road projects. Essentially, preference will be given to candidates having related experience of preparing Bioengineering Management Plans and Supervising & Monitoring the implementation of bioengineering measures/plans in about 2 highway development projects funded by the World Bank or any other external aided agencies in the hilly area.
- ii. Good knowledge of road construction in hill and mountainous areas including knowledge of local language and culture of Himachal Pradesh.
- iii. Experiences of planning, design, implementation, and maintenance of bioengineering / vegetative structural works on slopes and gullies or landslide areas.
- iv. Field experience in identifying and assessing suitable sites for bioengineering, as well as supervising/inspecting/monitoring projects during implementation to mitigate and monitor Bioengineering measures.
- v. The Consultant must have excellent analytical skills and solid experience in researching and drafting reports and translating findings into actionable recommendations. Proficiency in the use of computers to manage database and generation of reports, with overall good presentation, interpersonal and communication skills (in English and Hindi/local language.)
- vi. The candidate's familiarity with the objectives and requirements of the World Bank's new ESF will be an added advantage.
- vii. The applicant must be physically fit for extensive touring.

F. Travel Requirements

The Senior Bioengineering expert will be required to undertake field-visits and tours as per the project requirements.

G. Reporting and Performance Review

The Consultant shall report to the Superintending Engineer/Executive Director HPRIDCL (under the overall command of the Project Director). The quality of service and performance of the Senior

Bioengineering expert will be reviewed by the Project Director, HPRIDCL from time to time for taking appropriate action/way forward.

H. Facilities to be provided by the Client

- HPRIDCL will provide all reports related to soil bioengineering piloted under HPSRTP funded by the World Bank, contract/design and details etc.
- The HPRIDCL will provide office accommodation in the PIU office at Shimla subject to availability.
- Will be given access to all documents, reports, correspondence, contacts available and any other information as deemed necessary for smooth accomplishments of tasks assigned.
- Will not be provided with any clerical assistance.
- The HPRIDCL will provide pooled vehicle subjected to availability for field visits to the Senior Bioengineering Expert outside Shimla only. If, not available the Consultant can hire a taxi which will be reimbursed as per applicable Government rates.