

Republic of India



EXPRESSIONofINTEREST
for

Engineering and Management Consultancy Services for
Central Project Management Unit

Under the
Dam Rehabilitation and Improvement Project(DRIP)
Phase II and Phase III

IBRD Loan No.:

May 22,2020

Central Project Management Unit(CPMU)

DRIP Phase II and Phase III

Central Water Commission

Department of Water Resources, River Development and Ganga Rejuvenation
Government of India

Office of Chief Engineer, DSO & Project Director DRIP Phase-II and Phase-III
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SELECTION OF CONSULTANTS BY THE CENTRAL WATER COMMISSION

REQUEST FOR EXPRESSIONS OF INTEREST

REPUBLIC OF INDIA

**DAM REHABILITATION AND IMPROVEMENT PROJECT PHASE-II AND
PHASE-III**

**ENGINEERING AND MANAGEMENT CONSULTANCY SERVICES FOR
CENTRAL PROJECT MANAGEMENT UNIT**

Expressions of Interest (EoI)

Central Water Commission through Government of India intends to receive financing from World Bank in the form of a loan toward the cost of DAM REHABILITATION AND IMPROVEMENT Project, and intends to apply a portion of the proceeds of this loan to eligible payments for consultancy Services.

The Consulting Services (“the services”) include Engineering and Management Consultancy Services to be provided to the Central Project Management Unit (CPMU) in Central Water Commission (CWC), headed by a Project Director, having overall responsibility for project oversight and implementation.

The duration of Project is ten years, to be implemented in two Phases, each of six years duration with two years overlapping. The Project may be operationalised in October 2020. The Project has rehabilitation provision for approximately 700 dams with an budget outlay of Rs. 10,211 Cr. It will be implemented in 19 States namely Andhra Pradesh, Chhattisgarh, Goa, Gujarat, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Odisha, Punjab, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh, Uttarakhand, West Bengal, along with three Central Agencies viz Bhakra Beas Management Board, Damodar Valley Corporation, and Central Water Commission. The final figure of dams for rehabilitation most likely shall be 400 during period of implementation.

The Project has four components, viz. i) Rehabilitation and Improvement of Dams and Associated Appurtenances; ii) Dam Safety Institutional Strengthening; iii) Incidental Revenue Generation for sustainable operation and maintenance of dams; and iv) Project Management

The CPMU would be strengthened by engaging a engineering and management consulting firm. The main scope of the consulting firm include:

- (i) To assist CPMU in management and implementation of the program, including fiduciary, safeguard, and ESMF aspects;
- (ii) To assist CPMU with certain tasks pertaining to technical as well as managerial nature related to this Project;
- (iii) To provide independent supervision and quality assurance on behalf of CPMU for the rehabilitation and improvement works to be undertaken by the participating agencies; and
- (iv) To assist CPMU and Implementing Agencies in strengthening of the central and state level dam safety institutional setup.

The CPMU now invites eligible consulting firms (“consultants”) to indicate their interest in providing the services. Interested consultants should provide information demonstrating that they have the required qualifications and relevant experience to perform the services (brochures, description of similar assignments, experience in similar conditions, availability of appropriate skills among staff, etc.). Key Experts will not be evaluated at the shortlisting stage.

The detailed shortlisting criteria are mentioned in Section II of the EoI.

Consultants may associate with other firms in the form of a joint venture to enhance their Qualifications. **The EOI submitted by consultants in association should clearly indicate the nature of the association if it is a joint venture. In case of Joint venture, the name of the lead firm should be clearly stated and the JV should not have more than three members including the lead.**

The attention of interested Consultants is drawn to paragraph 3.16, 3.17: “Conflict of Interest” and paragraph 3.32: “Fraud & Corruption” of the World Bank’s *Procurement Regulations for IPF Borrowers* dated July 2016, revised November 2017 and August 2018, setting forth the World Bank’s policy.

Consultants will be selected in accordance with the Quality and cost Based selection (QCBS method set out in the *Procurement Regulations for IPF Borrowers*. The consultant/bidders can download the Expression of Interest (EoI) comprising ‘Short Listing Criteria’ and ‘Terms of Reference’ from the e-procurement platform (<https://eprocure.gov.in/eprocure/app>) from May 22, 2020, 1000 hrs (IST) onwards. The Bidders need to submit the EoI along with all relevant documents online through eprocurement platform (<https://eprocure.gov.in/eprocure/app>). Last date/time for receipt of bid through e-procurement is on July 20, 2020 upto 1500 hrs (IST). Late and offline bids shall not be accepted. The ‘Short Listing Criteria’ and ‘Scope of Work’ are also available in the DRIP website <http://www.damsafety.in>.

Interested consultants may obtain further information at the address below from 0930 hrs to 1730 hrs (Monday to Friday, except Govt. holidays).

The office of the Project Director,
DRIP Phase II and Phase III,
Central Water Commission, 8th Floor, Sewa Bhawan
R K Puram, N Delhi-110066, India
Phone No.: +91-11-26106848,
projectdr.drip-cwc@gov.in

Instruction for submission of Expression of Interest

1. Consultant shall go through the guidelines provided under section 'I' and Section 'II' before preparing EOI proposal.
2. Consultant who meet shortlisting criteria given in section 'II' shall prepare EOI as per the guidelines given in section I. If the Consultant desires to submit certain information not covered in the guidelines would be in his interest, he may submit such information.
3. The Application shall be the basis for drawing up a shortlist of eligible consultants who will be invited to submit proposals for services required.
4. All Applications shall be submitted in English.
5. If the EOI is submitted by a Joint Venture, attach a letter of intent or a copy of an existing agreement.
6. The EOI and all related correspondence and documents should be written in the English language. Supporting documents and printed literature furnished by Applicant with the EOI may be in any other language provided that they are accompanied with translations in the English language. Supporting materials, which are not translated into English, may not be considered. For the purpose of interpretation and evaluation of the EOI, the English language translation shall prevail. The translated documents from any other language to English language shall be notarised.
7. The Applicant shall provide all the information sought under this shortlisting Criteria. Central Water Commission would evaluate only those EOI that are received in the required format and complete in all respects. Incomplete and / or conditional EOI shall not be considered for short listing.
8. Detailed ToR will also be available on website www.damsafety.in
9. No EOI whatsoever will be entertained if submission is not received online by due date and time.
10. The Consultant has to digitally sign and upload the required bid documents one by one as indicated in the tender document.

Section-I

Guidelines for Preparation of Expression of Interest

Following information shall be submitted using given formats and where no formats are specified, free format can be used.

- 1) Complete name of firm, date of establishment and type of organization whether individual, proprietorship, subsidiary, partnership, private limited company, public limited company etc. (Annexure-I).
- 2) Exact and complete corporate/registered/home office address, business address, telephone numbers, fax numbers, E-mail and cable address. For wholly owned subsidiary in India, complete details of the Group Company with all details of its ownership or vice-versa shall be provided. Information is to be furnished by the consultancy firm con or members of JV individually (Annexure-I).
- 3) If present firm is the successor to or outgrowth of one or more predecessor firms, fresh name(s) of former entity (ties) and year(s) of their original establishment with details in aforesaid manner. Information is to be furnished by the consultancy firm or members of JV individually (Annexure-I).
- 4) Indicate financial figures from consultancy business for past five financial years. (Annexure-II)
- 5) Organizational strength of consultant and its constituents in case of a JV shall be given.(Annexure-III)
- 6) Consultant shall have the experience of engineering and management consultancy in the following six categories or combination of two or more categories.
 - A. The first category (A): It includes the works related to hydrological safety assessment of a given dams alongwith various structural and non-structural rehabilitation measures to safely address the safety concerns of dams due to increase in design flood. The structural measures include construction of additional spillway, expansion of existing spillway, raising of height, fuse plug etc. Non-structural measures include preparation/modification of rule curves, emergency action plans, early flood warning system etc.
 - B. The second category (B): It includes the various kind of dam rehabilitation measures to minimize the seepage through the dams including raking and pointing of upstream face, grouting, guniting and shotcreting, treatment of dam contraction joints for damaged seals application of geo-membrane etc.
 - C. The third category (C): It includes the assessment of structural adequacy of existing dams alongwith rehabilitation measures to ensure the structural stability which may include the re-sectioning of earthen dam, concrete backing of downstream face of masonry dam, and retro-fitting of concrete dams, seismic safety review, potential failure modes analysis for risk assessment etc.
 - D. The fourth category (D): It includes the assessment of operational safety through repair, strengthening or replacement of existing spillway/under sluice gates, hoisting system, automation, SCADA and control system, repair

or further strengthening of existing energy dissipation arrangements, as well as repair of the spillway glacisetc.

- E. The fifth category (E): It includes the consultancy for detailed engineering stage for construction of a large new dam, construction supervision and quality assurance activities etc.
- F. The sixth category (F): It includes the services for procurement of civil works, goods, and services; institutional development and development of training programmes for capacity-building related to various activities of dam rehabilitation aspects.

In case of JV firm, each member has to likewise give above information. Only those works which are done as Lead consultant shall be considered. (Annexure-IV)

- 7) As many references from employers as the consultant(for each member in case of JV) may choose shall be submitted at Annexure-V.
- 8) The EoI needs to be supported by relevant document supporting the same.
- 9) An undertaking for supply of true information shall be given as per Annexure-VI

Section-II
Short Listing Criteria

- (i) During last 15 years, Consultant firm shall have experience of providing engineering and management consultancy for a minimum of one Dam Rehabilitation and Improvement Project, this assignment shall cover a minimum of three activities out of the listed activities under the six categories mentioned in Section I.
- (ii) If consultancy firm is in the form of a JV, each JV partner shall have specific experience of working for minimum one activity, but the lead partner shall have specific experience of working for minimum three activities out of the listed activities under the six categories mentioned in Section I.
- (iii) The average annual turnover of the consultancy firm shall not be less than Rs. 300 Cr or US\$ 43 M for consultancy services during last 5 years. For arriving at updated value, turnover shall be updated to the present year by a factor of 5% per year.
- (iv) In case of JV, each partner shall meet the 40% requirement of criteria given at para.(iii) above, and lead partner shall meet the 60% requirement of criteria given as para(ii). In the JV, maximum three partners are allowed
- (v) In case, a wholly owned subsidiary of a Group Company partners with wholly owned any entity of a Group Company shall be considered as single entity provided each subsidiary participating in the bid shall have average annual turnover for last 5 years not be less than Rs.300 Cr or US\$ 43 M
- (vi) The Consulting firm should be in the consultancy Business for atleast last 10 years. If a JV, each partner should be in consultancy business for atleast last 7 years.
- (vii) The consultant shall submit satisfactory Completion Certificate of the assignment(s) from the concerned employer showing the completion date of assignment with explicit date
- (viii) The Consultant firm shall have team of core engineering experts i.e Dam Design Expert, Construction Supervision and Quality Assurance Expert, Hydrologist, Institutional Expert, Hydro-Mechanical Expert, Procurement Expert who shall be on permanent employment of firm for a minimum of last three years.. The consultant firm shall furnish the explicit details for last three years of their inhouse team of professionals as a proof for permanent nature of employment. In case of JV, each partner shall have a minimum of three experts, but cumulative shall meet all the requirement during last three years

Expression of Interest Form for Consulting Firm or Joint Venture (To be filled up by each of the partner in case of a Joint Venture)

Consultant	Date of Establishment	Country	Type of organization			
			Individual	Partnership	Corporation	Other
Name						

2. Corporate/registered Office / Business Address / Telephone Nos. / Cable Address/ E-mail address of consultant and its branch offices for Consultant (including members in case of JV)
3. Consultant's former name and year of establishment (including that of members in case of JV)
4. Narrative description of Consultant firms with special focus on relevant information to present assignment if any (Use other sheet, if necessary)

Financial Statement of the last five Financial Years

Sr. No .	Particulars		*2019-2020	2018-2019	2017-2018	2016-2017	2015-16
1.	<i>Annual turnover from Consulting business</i>	<i>Lead member</i>					
		<i>other member(1)</i>					
		<i>other member(2)</i>					
2	<i>Net Profit.</i>	<i>Lead member</i>					
		<i>other member(1)</i>					
		<i>other member(2)</i>					

- Provisional would also suffice for year 2019-20

Organizational Strength

1. Current Staff strength of the Organization/s

S No.	Area of Expertise	Total No. of Staff	No. with Doctoral Degree	No. with Post-graduate Degree	No. with Graduate Degree	No. of Permanent Employees	No. of years with the firm

2. Details of Core Experts

Sl. No.	Expert	Name	Qualification	Date of joining	Permanent Employee	List and attach the documents for Proof of Permanent Employee
i.	Dam Design Expert					
ii.	Hydrologist					
iii.	Construction Supervision & Quality Assurance Specialist					
iv.	Institutional Strengthening Specialist					
v.	Hydro-mechanical Expert					
vi.	Procurement Expert					

Details of Experience

S r. N o	Proje cts Nam e / Year	Category of services rendered A, B, C, D...or combinat ion of any of these	Correspond ing Cost	Date of Agreemen t	Date of Completion	Attach Copy of Agreement	Fee (Applicant's share in case of JV/ Consortium)	Completion certificate from client (Reference page no)	Duration in months	Funding Agency	Sole / JV/ Consortium (if JV, state Lead Partner with share)
1	2	3	4	5	6	7	8	9	10	11	12
1											
2											

Note: Only those assignments shall be considered for which consultant has provided services as lead member in case that work is done by a JV/ Consortium. Each assignment shall be supported by following details:

Name of Overall assignment :

Location of Overall assignment :

Owner's Name and Address :

Completion Cost (Actual/Estimated vis-à-vis Stipulated):

Description of assignment:

Description of Services provided by the firm:

Employer's References

Undertaking

I certify that the information in the above Expression of Interest forms is true to the best of my knowledge. I also understand that any misleading or wrong information will disqualify this application straightaway.

*President/Managing
Director or*

Authorized Signatory of Applicant

Terms of Reference

1. Introduction

- 1.1 The DRIP Phase-II and Phase-III has been taken up with World Bank assistance for implementation in 19 States and three Central Agencies including Central Water Commission. The Objective of the Project is to improve the dam safety and operational performance of selected dams of the Country, with emphasis on institutional strengthening with system wide management improvement alongwith sustainable operation and maintenance. . The Project is to be implemented over a period of 10 years, in two phases, with each phase of 6 years duration and an overlap of 2 years over each other.
- 1.2 The Project has four components, viz. i) Rehabilitation and Improvement of Dams and Associated Appurtenances; ii) Dam Safety Institutional Strengthening; iii) Incidental Revenue Generation for sustainable operation and maintenance of dams; and iv) Project Management. The Project has rehabilitation provision for 687 dams at a Cost of Rs. 10,211 Cr. The main implementing agencies for Project will be the owners of dams (i.e. water Resources Departments, State Electricity Boards, Central Agency). The overall implementation as well as supervision of the Project would be coordinated and supervised by the Central Water Commission through a Central Project Management Unit (CPMU). Day-to-day project coordination and management at the State level is to be done by State Project Management Units (SPMUs) . The CPMU will be assisted by an Engineering and Management Consultant. The existing Implementing Agencies are Water Resource/Irrigation Department of Andhra Pradesh, Bihar, Chattisgarh, Goa, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Odisha, Punjab, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh, Uttarakhand, West Bengal, along with three Central Agencies viz Bhakra Beas Management Board, Damodar Valley Corporation and Central Water Commission.
- 1.3 The main implementing agencies for Project will be the owners of dams (i.e. water Resources Departments, State Electricity Boards, Central Agency). The overall implementation as well as supervision of the Project would be coordinated and supervised by the Central Water Commission through a Central Project Management Unit (CPMU). Day-to-day project coordination and management at the State level is to be done by State Project Management Units (SPMUs) . The CPMU will be assisted by an Engineering and Management Consultant. The existing Implementing Agencies are Water Resource/Irrigation Department of Andhra Pradesh, Chattisgarh, Goa, Gujarat, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Odisha, Punjab, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh, West Bengal, State Electricity Boards of Tamil Nadu and Kerala, KPCL and UJVNL, Meghalaya Power Department along with three Central Agencies viz Bhakra Beas Management Board , Damodar Valley Corporation and Central Water Commission.

2. *Objective(s) of the Project*

The project development objectives of DRIP are: (i) to improve the safety and performance of selected existing dams and associated appurtenances in a sustainable manner, and (ii) to strengthen the dam safety institutional setup in participating States as well as at Central level. The objectives of DRIP are to be achieved through investments for physical and technological dam improvements, managerial upgrading of dam operations, management and maintenance, with accompanying institutional reforms. DRIP would thus aim at restoring the capacity of project dams for effective utilization of the stored water, and monitoring and managing the long-term performance of the dams.

3. Scope of Services, Tasks (Components) and Expected Deliverables

3.1 Project Components

3.1.1 Rehabilitation & Improvement of Dams and Associated Appurtenances

The four components of DRIP are summarized as under:

Rehabilitation and Improvement of Dams and Associated Appurtenances, focusing on structural and non-structural measures for approximately 400 project dams, many of which are more than 25 years old. The number of dams proposed for inclusion in the project is based on proposals received from the 19 participating States and two central agency. The States have done a review of the status of their dams and have determined those dams that are most in need of rehabilitation and improvement in order to guarantee their future safety and operational capacity. It was agreed that the States have an option to substitute a few of the currently selected dams with other dams, if it is found that these dams have higher needs. The proposed interventions will include, but not be limited to, such works as: treatment for reduction of seepage through masonry and concrete dams and reduction of seepage through earth dams; improving dam drainage; treatment for cracking in the dam, improving the ability to withstand higher floods, including additional flood handling facilities, as required by the hydrological assessments, accompanied by structural strengthening of dams; non-structural measures to cater for higher design floods in case structural measures are physically not feasible; rehabilitation and improvement of spillways, head regulators, draw-off gates and their operating mechanisms, stilling basins, and downstream spillway channels; improving approach roads; improving office and housing accommodation; and improving dam safety instrumentation. The project will also support hydrological assessments and specialized consulting services, e.g. for the design of state-of-the art, but affordable instrumentation. In addition, preparation and implementation of asset management plans, emergency preparedness plans, emergency warning systems, O&M manuals, public awareness campaigns, and floodplain mapping will be included in all States. Operators of dams, state design organizations, and engineering cells in WRDs and SEBs will provide design services and day-to-day construction supervision. Consulting services for the more complicated design, identification of source of dam safety issue

viz. seepage and third-party supervision services and specialized tasks will be recruited to assist WRDs and SEBs, as needed.

In addition to above, the Consultant shall be assisting CPMU in completing the balanced rehabilitation activities of about 20 dams of ongoing Dam Rehabilitation and Improvement project(DRIP) in case extension is given for this Scheme. The likely activities involved will be Project Rehabilitation Reports, official Implementation Completion Result Report for the Scheme etc.

3.1.2 Dam Safety Institutional Strengthening

Dam Safety Institutional Strengthening, focusing on regulatory and technical frameworks for dam safety assurance. The activities to be carried out will include, but not be limited to, targeted training nationally (especially at the National Water Academy in Pune, State regional centres, IITs/NITs campuses etc.) and internationally to Dam Safety Organizations at Central (CDSO) and State (SDSO) level to become effective organizations that can take the lead in ensuring that dams remain safe from a structural and operational point of view; in-country and external training of staff of WRDs and SEBs to assist with the development of appropriate skills and modern tools to adequately operate and maintain dams; attendance at dam safety courses; study tours, and linking with foreign country agencies that have advanced dam safety programs such as the United States, Australia, Canada, Japan, and Switzerland etc.; operation of independent dam safety review panels, comprising experts in relevant disciplines; development of capacity to carry out reservoir sedimentation studies; development of Management Information Systems (MIS) and other programs to capture and analyze data for long-term planning and guiding of dam operations; support to the further improvement and revision development within CWC of the Dam Health and Rehabilitation Monitoring Application (DHARMA) program that will allow a systematic presentation and interpretation of data for effective monitoring of the health of dams; support to the revision of existing guidelines on dam safety and preparation of new guidelines, as needed; training in hazard and vulnerability assessment and dam-break analysis, emergency preparedness plans, O&M manuals; and training to a select number of academic and research institutions for enhancing their capacities in guiding the dam safety activities. The few selected academic and central institutions would also be part of capacity building under this Project.

3.1.3 Incidental Revenue Generation for sustainable operation and maintenance of dams

In order to ensure long term sustainability of operations & maintenance of existing dams, it is proposed to encourage the dam owners to explore the incidental revenue generation through innovative ideas as a pilot project i.e. development of tourism, fisheries, secondary sources of power generation (hydel as well as solar), water recreation activities etc. About 10-15 nos of dams are to be taken as a pilot projects to experiment such arrangement.

3.1.4 Project Management

The overall responsibility for project oversight and coordination will rest with the CDSO of CWC. This Organisation will act as the Central Project Management Unit (CPMU). The CPMU will be assisted by a management and engineering consulting firm. Each State will establish a Project Management Unit (SPMU) attached to the WRD Chief Engineer's (CE) office in charge of the SDSO. This Unit will have direct responsibility for the coordination and management of the project at State level.

4. Institutional & Implementation Arrangement

- i) The State Dam Safety Organizations (SDSO) will have responsibility for the implementation of the project in the respective participating States. SDSO will be assisted by Water Resources Departments, other operators of dams, and state design organizations for design services and day-to-day construction supervision. Consulting services may also be engaged by the States to assist the SDSOs, as needed, in areas which are to be executed by the state implementing agencies and for which specialized skilled staff may not be available within state departments. Such services (to be provided by individual consultants; Dam Safety Review Panels; Expert Teams; IITs, Engineering University, Colleges, other institutions; or consulting firms) will have clearly defined deliverables without any substantial overlap with the scope and services of the works of Engineering and Management Consulting firm engaged by CPMU.
- ii) Central Project Management Unit (CPMU) will be responsible for overall implementation of DRIP. The duties of CPMU will include support to SDSOs and their SPMUs with their role in facilitating and guiding the implementation and monitoring of all project activities, ensuring synergy and coordination among activities and agencies implementing these activities, preparing consolidated reports and facilitating trainings. The CPMU will also support SDSOs and SPMUs in formulation of project proposals, technical examination of works, linking with MIS, and other relevant activities of project implementation. The Central Dam Safety Organisation (CDSO) of CWC is designated as Central Project Management Unit (CPMU) and the Chief Engineer, CDSO is designated as Project Director (PD). The Project Director would head the Central Project Management Unit (CPMU), which will be strengthened by an Engineering and Management consulting firm. In addition to providing sufficient staff at CPMU, the consulting firm will also open sub-units with adequate staff in selected participating States for coordination of work between CPMU and concerned SPMUs. These sub-units will be reporting to CPMU at CWC, New Delhi. The day to day minor issues with SPMUs will be resolved by the State level sub-units; more detailed/complex and complicated issues, if any, will be referred to CPMU. The State level sub-units would also provide the third-party construction supervision and quality control arrangements for the works undertaken in States alongwith follow up for monthly physical and financial progress of concerned States/Agencies.

iii) A National Level Steering Committee (NLSC) headed by Secretary MoWR, alongwith senior level representatives of CWC and participating States, will review the progress as well as policy related issues in Project on regular basis. A separate Technical Committee (TC) chaired by Member (D&R), CWC will be in place to: (a) provide technical input to NLSC, (b) coordinate with implementing agencies of respective State governments, and (c) review progress of the project on quarterly basis. The Technical Committee includes Engineer-in-Chief of Irrigation/ Water Resources / Power Departments of participating States. The Project Director and Chief Engineer, DSO-CWC, is the Member Secretary of TC. The NLSC and TC will provide the strategic supervision and directions for the successful implementation of DRIP. These Committees will also provide a platform for resolution of project implementation related issues, any corrective measures if required to be recommended by this Committee. The World Bank will conduct support and review missions bi-annualy on regular basis. The Principal Secretaries of concerned States/HOD of State Electricity Boards will also conduct their Project review on quarterly basis.

5. Objectives of the Consultancy

- i) The main objective of the Consultancy service is to strengthen the Central Project Management Unit (CPMU) for discharge of its day-to-day responsibilities by providing a team of consultants for managerial, technical, fiduciary, safeguards; Monitoring and Evaluation services as brought out in the Scope of Consultancy.
- ii) The Consultant shall provide at CPMU a team of experts, including technical and non-technical manpower, and all resources necessary for meeting the Consultancy objectives. The Consultant shall also establish sub-units in selected participating States and provide therein adequate technical and non-technical manpower for coordination of work between CPMU and SPMUs.

6. Scope of Consultancy

The scope of the services will include supporting the Project Director, CPMU with the day-to-day responsibilities of project management and implementation, comprising:

- i) Project Management: planning and management of the project, including monitoring physical and financial progress, and preparing annual work plans and regular progress reports;
- ii) Design Flood Review: Supporting CWC in vetting of hydrological analyses; advising on the options to cater for the increased design floods, wherever applicable;
- iii) Design Review: Checking and ensuring that the designs of engineering works proposed by dam owners for important rehabilitation works are technically sound, and if needed for some Implementing Agencies shall improve and finalise the submitted design;

- iv) Third-Party Construction Supervision & Quality Assurance: Providing independent third-party supervision for construction and quality control to ensure works are implemented to internationally acceptable standards;
- v) Dam Safety Institutional Strengthening: Advising on dam safety institutional strengthening measures at central level in CWC, as well as DRIP partner States.
- vi) Preparation of selected Emergency Action Plans: Dam Break Analysis and Inundation mappings for all dams, freely available DEM of highest resolution for inundation mapping to be used Preparation of inundation mapping, in case Tier-II and Tier-III inundation mappings are to be done, it shall be supplied by concerned partner agency; about 120 nos of Final EAPs for selected dams; review and technical assistance to the States for the preparation and publication of balanced EAPs and stakeholders consultations; regular trainings for IAs to be conducted to strengthen their capacity to complete these balanced EAPs
- vii) Preparation of the selected O&M Manuals: Preparation of about 120 nos of O&M manuals for selected dams, and review and technical assistance to the States for the preparation and publication of balanced O&M manuals; regular trainings for IAs to be conducted to strengthen their capacity to complete these balanced O&Ms

Project Management

6.1 The DRIP implementation is required to be carried out in accordance with the project implementation plan, containing, inter alia, specific provisions on detailed arrangements for the carrying out of the Project, including the procurement, financial management and disbursement requirements, the Environmental and Social Management Framework (ESMF) and the Governance and Accountability Action Plan (GAAP). The Consultant, as part of CPMU, shall provide support to SDSOs and their SPMUs and facilitate and guide the implementation and monitoring of project activities, ensuring synergy and coordination among activities and State-level agencies implementing these activities, facilitating training and knowledge sharing, and preparing consolidated progress and other project reports. The Consultant shall also extend to the States technical advice and guidance for the formulation of comprehensive proposals for complicated dams, if required may extend planning and design support for very few selected dams. The Consultant shall provide all required project management services to enable CPMU to implement the project in an effective and timely manner. These services to CPMU shall include, but not be limited to, project planning and programming; procurement management; financial management; project monitoring; document management and dissemination system; work accounting and monitoring mechanism of Consultant team including State Sub-units offices; and

Project Planning and Programming

Implementation Completion Reports etc.

6.1.1 (a) The Consultant shall formulate/improve the project standard template form which will provide the basic parameters of each dam, and detailed information on technical, environmental, social, and all implementation-related aspects. The web-based MIS to be maintained by the Consultant shall capture the salient information of DRIP dams from the templates as well as web-based physical and financial reporting. The Consultant shall customize this software to facilitate periodic reporting to the CPMU/World Bank and consolidation of data of all the implementing agencies. For each dam, the Consultant shall carry out such activities as:

- (i) Examination of project template and review of rehabilitation proposal received from SPMUs;
 - (ii) Preliminary dam site inspection for ensuring completeness of State proposal, and verification of additional investigation and rehabilitation requirements;
 - (iii) Examination of ESMF screening carried out by SPMUs for segregation of dams into low, medium, and high categories in terms of their potential social and environmental impacts;
 - (iv) Project prioritization and scheduling for rehabilitation based on project template, site inspection and ESMF screening;
 - (v) Technical, managerial and trouble-shooting support to the SPMUs and the implementing agencies;
 - (vi) Guiding preparation of asset management plans so that a better justification can be made to government for adequate O&M budget and development of the asset management systems to minimize future risks of dam failures.
- (b) In case of projects that are found to be complicated or where major issues are involved, the Consultant shall be required to carry out detailed site inspection so as to guide the SPMUs in preparation of detailed technical reports and site-specific environmental assessments (EA) and Environmental Management Plans (EMP).
- (c) The Consultant shall be required to describe the project planning and programming process in the inception report

Procurement Management

6.1.2 (a) Procurement for DRIP will be carried out in accordance with the World Bank's Guidelines and latest framework. The Consultant shall have one or more procurement specialists with experience in Bank Procurement for overall coordination with SPMUs and for provision of guidance on procurement matters.

(b) In respect of each SPMU, the Consultant shall carry out such

activities as:

- (i) Examination of the periodically submitted Procurement Plans, and consolidation of these state annual procurement plans to submit to World Bank timely;
 - (ii) Examination of the completeness of rehabilitation proposals in work package of each dam, proper procurement documentation, bid document and processes, bid evaluations, contract award and management of commercial aspects;
 - (i) Quality checking and recommendation on the bid proposals submitted by SPMUs for prior review by World Bank as per Bank's thresholds for prior review;
 - (ii) Quality checking and recommendation on the proposals of SPMUs for post review by World Bank as per Bank's thresholds for prior review;
 - (iii) Prior review of the proposals submitted by SPMUs as per thresholds for the review by CPMU.
 - (iv) The monitoring and appraisal of prior and post review proposals
- (c) Consultant shall facilitate uniformity and consistency in the work specifications, procurement procedures and documents of all implementing agencies.

Financial Management

- 6.1.3. (a) For financial management of DRIP, including fund flow, accounting, and internal control framework of the project, the country systems will be followed. The Consultant shall have one or more financial management specialist to provide a coordinating role in financial management of the project.
- (b) In respect of each SPMU, the Consultant shall carry out such activities as:
- (i) Examination of annual budget plans;
 - (ii) Follow-up, consolidation and submission of quarterly Interim Unaudited Financial Reports (IUFR) for disbursement of the credit/loan funds by the World Bank;
 - (iii) Periodic review of internal control system to verify whether internal controls as laid down in various rules and codes are operating effectively and whether timely corrective measures are being undertaken to address departures or non-compliances;
 - (iv) Follow-up and compilation of the project audit reports of all implementing agencies for submission to the World Bank

within six months from the end of each financial year;

- (v) Follow-up for timely resolution of audit observations.
- (vi) Generation of monthly physical and financial report agency wise as well as dam wise including all components

Project Monitoring 6.1.4 (a) Project monitoring will entail a process for reviewing continuously and systematically the various project implementation activities, which shall be accomplished by Consultant team as well as its sub-units in the participating States. Consultant shall also develop and maintain a web-based MIS for this purpose.

(b) A good baseline, comprising a description of the current conditions, shall be prepared by Consultant for every dam based on available templates for various ongoing and implemented rehabilitation projects, which shall be done during screening of project templates and the preliminary inspections, this base line template shall be used to compare pre and post rehabilitation state of dam to justify the investment, risk reduction and safety improvement, and each template shall be shared with concerned IA, and shall be uploaded in the MIS, after completion of rehabilitation works, this template shall be the part of Project Rehabilitation Report as per agreed format .

(c) In respect of each SPMU, the Consultant shall carry out such activities as:

- (i) Collection and compilation of physical and financial progresses;
- (ii) Monitoring and Evaluation (M&E) so as to: (i) measure input, output, and outcome indicators, (ii) provide information regularly on progress towards achieving desired results and to facilitate reporting to the State and Central governments, (iii) alert managers, both in CPMU and SPMUs, to actual or potential problems in implementation so that timely adjustments can be made, and (iv) provide a process whereby the CPMU and SPMUs can reflect and improve on performance;
- (iii) Monitoring of ‘Environment & Social Management Framework (ESMF)’ compliances so as to show in a clear and transparent way whether there are any social and environmental issues related to the rehabilitation of the dams and the mitigation actions;
- d) Consultant shall compile monthly, quarterly and annual

reports for the overall activities of Project including all agencies. These reports shall cover the progress of the rehabilitation works, the institutional activities, trainings, and special studies, as well as updates of the performance indicators, the procurement plans, CS&QA, O&M manuals, EAPs, critical issues alongwith corrective measures etc. Quarterly Interim Unaudited Financial Reports (IUFRs) shall also be prepared. A section of the progress reports shall be devoted to issues identified during project implementation and strategies and actions to be taken to resolve such issues so that they do not affect the progress. The fourth report of each calendar year shall be an Annual Report incorporating progress in fourth quarter, providing information of the progress during the past year and an approved annual work plan and budget for the next year. A monthly DRIP Bulletin shall also be prepared and published giving brief summary of activities related to project covering all Implementing agencies, CPMU as well as other stakeholders. The last Bulletin shall be Annual one covering all annual details of the Project activities.

- e) The Consultant shall be required to monitor the progress of Project Outcome Indicators as given in the Project Appraisal Document of the World Bank and shall make all efforts to achieve the defined targets for CPMU and shall assist the Implementing Agencies to achieve their respective targets for these Project Outcome Indicators.
- f) The Consultant shall disseminate project activities in all social media platform through professional expert to bring awareness about various important activities of Project on regular basis
- g) Consultant has to operationalise a web based intranet project management and monitoring system to manage the engaged team of experts and staff, creation of all deliverables and targets system of project, review and monitoring daily progress and work system delivery of any individual, financial management of CPMU consultancy and Project, various level of access to individual expert and staff, DTL, TL, Project Director and Project Office team etc. so that project management and resource optimisation can be ensured alongwith identifying resource needs, finding the right talent, and developing them accordingly to project-success. Consultant can operationalise any ready made commercial web based tool but it shall be customised to client and project requirement

Document Management and Dissemination System

- 6.1.5 (a) To manage both proactive and on-demand responses to requests for information, DRIP will manage a document management and dissemination system which will ensure that quality standards for accuracy and presentation are met on each

document. This shall be ensured by the Consultant in order to keep a track of all activities of Project, disposal, pendency, as well as pendency level etc. shall be the part of MIS

- (b) The Consultant shall also ensure that all queries and responses are classified according to task and/or project components and appended to a Frequently Asked Questions (FAQ) file which shall be readily available to project functionaries and online for all States.
- (c) Documentation of queries and responses by SPMUs will help different States' units in promptly replying to queries in future. Such a mechanism will also educate all the project functionaries about the apprehension and queries, which the general public may have about the project. The Consultant, with the help of appropriate team expert, shall provide necessary guidance and support to the SPMUs for managing the disclosure system.
- (d) On completion of rehabilitation and improvement work of each dam, the Consultant shall compile a "Project Rehabilitation Report" of that dam which will include project template; site inspection reports; design flood review report; detailed computations of design review; rehabilitation design, scope of work packages and details of awarded contracts; trouble shooting (if any) and records of discussion thereof; site-specific environmental assessment and environmental management plan (if any); relevant pre and post photographs; litigation matters(if any),compliances to DSRP/PST/CSVs and project completion certificates/reports.

Design Flood Review

- 6.2. Under DRIP, before any rehabilitation and improvement works are undertaken on a dam, the design flood for the reservoir will have to be calculated in accordance with IS-11223 (as revised) and any other relevant guidelines that may come into force at that time, using the most appropriate available data. This calculation will require the approval of CWC. If the revised design flood of DRIP dams exceeds the current spillway capacity, either structural (e.g. enlargement of spillways) or non-structural measures are to be implemented. The Consultant shall provide all the required services to review the design flood studies of DRIP dams submitted by SPMUs for its approval by Hydrological Studies Organization (HSO) of CWC in an effective and timely manner. The Consultant shall also provide all the required services to review and guide the rehabilitation works or operational procedures (non-structural methods of coping with design floods) so as to ensure the safety of the dam and reservoir with this design flood.

- Vetting of Design* 6.2.1 (a) The design flood reviews of about 250 dams under phase-II

Flood Analysis

and Phase-III of DRIP implementation are expected to be completed in-house by HSO, CWC before lining up of the Consultant. The Consultant shall provide all the required services for the design flood reviews of balance DRIP dams. Also, the flood routing studies using state of arts softwares and other tools on need basis to be done by Consultant in case client ask so on the need basis

- (b) The Consultant shall go through the design flood review study reports submitted by project authorities to check their accuracy regarding physiographic parameters of the project, adequacy of design rainfall depths along with its hourly distribution, losses and UH parameters adopted. The same after necessary correction/modification shall be submitted to HSO, CWC for vetting. Consultant shall also guide the project authorities for adoption of technologically sound and modern practices for design flood reviews.
- (c) The Consultant in discussion with HSO, CWC shall evolve the improved techniques for design flood analysis. The Consultant shall apply such improved techniques on design flood review studies of some of the important DRIP dams.

Review of options to cater for the increased design floods

- 6.2.2. (a) The dam rehabilitation measures will include improving its ability to withstand higher floods, as required by the hydrological assessments, including enlargement of spillways, head regulators, and draw-off gates. For each of the DRIP dams, Consultant shall carry out review of free board and spillway capacity with the existing as well as additional spillway (if required) for the revised design flood approved by HSO, CWC. Consultant shall also review the revised energy dissipation arrangement, and recommend model studies where ever required.
- (b) In cases where topographical and/or structural constraints make it difficult to increase the spillway capacity of DRIP dam to suit the revised design flood, the Consultant shall carry out routing trials for the identification of lower reservoir levels during the flood season. If this arrangement of creating flood cushion is found to be costly and unviable in terms of loss of power and irrigation benefits, the Consultant shall advice other options that can be considered for the safe operation of the reservoir. These options shall include, but not be limited to, (i) pre-release of water at maximum rate on 24-hour warning of a flood; (ii) lowering the spillway crest level and using fuse gates or other spillway control systems; (iii) building flood control retention basins upstream; (iv) developing an emergency action plan; and

- (v) controlled overtopping of the dam, (vi) provision of improved inflow flood forecasting procedures.
- (c) For each dam under DRIP, the Consultant shall recommend the best option for safe release of floods for further needful implementation by concerned state project authorities. Such dams will also need new or updated Reservoir Operational Manual that reflects the developed solutions, and these will be prepared by the State project authorities and submitted to CPMU. The Consultant shall provide all the required services to review the Reservoir Operational Manuals/ Plans submitted by the SPMUs.
- (d) In some of the important DRIP dams, provision of real-time data automation systems (RTDAS) for efficient reservoir operation will also be considered. The Consultant shall provide all the required services to CPMU to support and guide the process of RTDAS implementation by the project authorities.
- (e) In the event of the revised design flood exceeding the spillway capacity (with normal freeboard) by more than 50 percent, a dam break analysis, inundation map, and emergency action plan will have to be prepared by the State project authorities and submitted to CPMU. The Consultant shall provide all the required services to review the dam break analysis, inundation map, and emergency action plan submitted by the SPMUs.

Design Review

6.3 The State project authorities will arrange detailed designs for the identified rehabilitation works of each dam. In complicated cases (e.g. when changes to the design flood or structural changes to dams are proposed), the SPMUs of States will submit these designs to the CPMU for examination and advice. The Consultant shall ensure the compliance of the designs of the rehabilitation works with relevant Indian standards and with best international practices where such Indian standards are not available. The Consultant shall provide all the required services to review such designs in an effective and timely manner. These services shall include, but not be limited to, Seismic design review; Structural safety review; Hydro-mechanical equipment review; Dam instrumentation, surveillance, SCADA and control system review; Overall dam rehabilitation design review; and De-siltation design review etc.

Seismic design review

6.3.1 Before any rehabilitation and improvement works are undertaken on a dam in a seismic active zone, the stability of the dam will be checked using the latest seismic parameters applicable to the location of the dam. The works proposed under DRIP will have to ensure that the dam and reservoir will be safe under the specified seismic conditions. For the proposal

submitted to the CPMU, the Consultant shall carry out review of the design earth quake parameters, and review of the structural designs for seismic safety. Consultant shall also carry out dynamic analysis, where ever required.

Structural safety review

- 6.3.2 (i) In order to accommodate the revised design flood magnitudes, there may be cases where maximum water level in the reservoir will be temporarily increased during peak floods. In few cases, the dam section may have to be raised if freeboard is not sufficient to allow temporary encroachment. In these cases, structural stability analysis will have to be made to ensure the stability of the dam against the increased water load. For such design proposals submitted to the CPMU, the Consultant shall carry out review of structural designs, and where ever required, the remodeling of dams to safe and stable cross-sections.
- (ii) As part of structural safety review, the Consultant shall also review the strength and porosity of existing materials of the dam; effectiveness of foundation treatment; seepage through the dam & foundation; condition of galleries and other drains; filter and rip-rap in earth dam; and general health of the dam. The remedial/ strengthening/ rehabilitation measures that have been carried out in the past shall also be kept in mind during above design reviews.

Hydro-mechanical equipment review

- 6.3.3 Some of the DRIP dams may involve enlargement of spillways, head regulators, and draw-off gates, and improving operating mechanisms of their gates. All such cases where maximum water level in the reservoir will be temporarily increased during peak floods may also require revisions in the designs of gates and hoisting equipments. For such design proposals submitted to the CPMU, the Consultant shall carry out review of structural safety with existing as well as additional loads; condition of water seals and trunion; hoist capacity; gantry; and general condition of the various hydro- mechanical parts. Design of training courses for dam staffs as well as officials to enhance their skill for efficient operation of system.

Dam Instrumentation, Surveillance and SCADA System Review

- 6.3.4 Some of the old dams under DRIP may not have adequate dam monitoring instrumentations, and in some cases malfunctioning of instruments due to aging as well as lack of maintenance is expected. Rehabilitation of dams under DRIP will involve improving dam safety instrumentation to monitor and record structural behavior, displacements, seepage and related hydro-meteorological and seismic factors to forewarn dam operators of possible risks, as well as provision of software for analyzing and evaluating data generated by the dam instruments. For such instrumentation improvement proposals submitted to CPMU, the Consultant shall carry out review of the number and type of

instruments installed and their condition; review of additional instruments suggested, required and feasible; review of data logging arrangements; review of data analyzing methodology; state command and control centre with all provisions of data receiving and further transmission, data transmission related infrastructure; operation and maintenance provisions, surveillance and SCADA systems for selected dams, advance and sound technical specifications as well as technology for a robust and bankable system and related software etc.

Overall dam rehabilitation design review

6.3.5 (a) In addition to structural, hydrological, hydro-mechanical and instrumentation related safety issues of dams, other typical safety issues that may need remedial works include: (a) seepage boils and leakage downstream of earth dams; (b) deformity and erosion of upstream and downstream slopes, including slope sloughing/slips, and erosion of abutments and settlement and cracks along dam crests; (iii) excessive seepage through masonry and concrete dams; and (c) cracks and pitting in concrete and masonry spillways and outlet gate structures and erosion of energy dissipation systems and spill channels, (d) all kind of investigations necessary for rehabilitation along with need based physical modelling. For rehabilitation design proposals on such issues submitted to the CPMU, the Consultant shall carry out review of the diagnosis of problem; review of the rehabilitation design; and review of internal and external dam drainage arrangements and seepage measuring devices.

- (b) Consultant shall review the analytical and experimental measures used for rehabilitation design. Consultant shall guide the project authorities for adoption of technologically advanced and modern methods of structural/ hydraulic safety assessment and rehabilitation planning. Consultant shall guide the project authorities on use of new materials and state-of-the-art construction techniques for dam rehabilitation measures.
- (c) In few cases, enhancement in tourism potential and environmentally friendly interventions such as fish ladders may also be taken up. The Consultant shall provide all the required services to review and guide the planning/ design/ implementation of such measures.

De-siltation of reservoirs

6.3.6 Sedimentation in some reservoirs has impacted on the storage capacity, thus limiting economic benefits of these investments. However, de-silting of reservoirs is expensive and the deposit of silt can have environmental impacts. Also, considering the annual flood events there are limited opportunities to encroach on silted areas within the reservoir. De-silting of reservoir areas will not be a major activity under DRIP, and will be carried out

on need basis cases when the regained reservoir volume would have a high economic impact. There are only requests for possible de-silting of a few States/Central Agencies, and these are in remote areas where there is no encroachment. For the reservoir de-siltation proposals submitted to CPMU, the Consultant shall carry out detailed review of the de-siltation designs/ planning and also guide the project authorities in environmentally sound implementations, ensuring ESMF compliances. The advanced technology available globally for various de-silting techniques to be promoted keeping in view various official guidelines/manuals nationally as well as internationally etc. For bathymetry survey, requisite technical specifications for this activity alongwith bill of quantities etc. to be part of this activity

Third Party Construction Supervision

- 6.4 For rehabilitation and improvement works undertaken by the participating States, the day-to-day construction supervision will be conducted by the field units of concerned State implementing agency, and direct quality assurance of the works will be ensured through quality control unit of the implementing agency. The CPMU, through Consultant, will be required to provide the third-party supervision of the construction and quality control. The Consultant shall provide all required services for the third-party supervision of the construction and quality control to ensure works are implemented to internationally acceptable standards. These services to CPMU shall include, but not be limited to, periodical site inspections; assessing the supervision system; assessing the quality control system; and assessing the ESMF compliances, sample material testing, The recommendations and transmittal for corrective actions and their follow up.

Periodical Site Inspection

- 6.4.1 For each of such projects where active rehabilitation and improvement works are in progress, the Consultant shall undertake at least one project site visit per quarter; and these visits shall be carried out more often for dams with complicated designs and construction works.

Assessing supervision system

- 6.4.2 Consultant shall periodically assess the supervisory mechanism and system of the state implementing agencies and suggest possible improvements.

Assessing quality control system

- 6.4.3 Consultant shall prepare a CS&QA manual within six months of effectiveness of Contract Agreement, with details for all kind of protocols i.e. site inspection, frequency of material sampling and testing, various design and acceptable limits, design mix protocols for high end activities, various quality assurance protocols for geo-membrane work, various kind of grouting, upstream raking and pointing, construction of various additional

structures etc. Consultant shall periodically assess the quality control mechanism and system of the state implementing agencies/Central agencies and suggest possible improvements. Consultant shall also conduct a limited sample material testing of ongoing rehabilitation works (not less than 20% of the tests required as per the prevailing protocols for a particular material) of the works of the inspection reports given by quality control departments of the State governments for authenticity and accuracy.

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| Assessing ESMF compliances | 6.4.4 The Consultant shall periodically (monthly basis during screening and preparation stage and on quarterly basis during construction stage) assess the quality of ESMF compliances of the Implementing Agencies from screening of dam activities to preparation of Environmental Management Plan (EMP), wherever needed, to implementations and monitoring stage so as to ensure that actions agreed to minimize environmental impact are being implemented. For projects that come under high category in terms of their potential social and environmental impacts, the Consultant shall also conduct environmental audits at regular intervals. (A brief note on ESMF is given as Appendix A) |
| Dam Safety Institutional Strengthening | 6.5 One of the objectives of DRIP is to support and strengthen the Dam Safety Organizations of the participating States, and at national level the Dam Safety Organization of Central Water Commission, any other central agencies. The Consultant shall provide all the required services to enable the State Dam Safety Organizations (SDSOs) of DRIP States and the Dam Safety Organizations of CWC (DSO-CWC) to carry out State level and Central level dam safety institutional strengthening in an effective and timely manner. These services shall include, but not be limited to, capacity building of participating units for DRIP implementation; revision of CWC's existing guidelines on dam safety; formulation of new guidelines on dam safety related issues; development of dam design review manual; further improvement of developed Dam Health And Rehabilitation Monitoring Application (DHARMA) and its implementation; identification of analysis and design software requirements; assisting CWC in facilitating ISO 9001 certification for HSO-CWC and its regular audits of all ISO 9001 certified CWC organisations; facilitating dam safety trainings, study tours and conferences; improvement and management of a national web site for dam safety information; and development of dam safety expertise in select number of academic and research institutions, . |
| Capacity building for | (a) Capacity building of participating agencies and CWC for the implementation of DRIP will have to be ensured through |

DRIP implementation

periodical training programs and workshops. In addition, the project seeks to build the capacity of the implementing agencies in long-term planning and guiding of dam operations. The Consultant shall work for the capacity building objectives through one or more training specialists for providing training, support and knowledge sharing to the officials of all participating units.

- (b) These trainings shall include, but not be limited to such areas as:
 - (i) Design of various training programs for various kind of important rehabilitation activities vis-a-vis various levels i.e. dam staff, middle and senior levels officials, administrative level officials
 - (ii) Procurement of works and goods, and selection of consultants under IBRD loans;
 - (ii) Financial management (including record keeping, internal controls, reporting, and audit compliance matters) for DRIP;
 - (iii) Environmental Management of dam projects, legal requirements and related environmental aspects, Project's ESMF and its compliances, including on-the-job training to project staff to ensure that there is full awareness about environmental and social issues;
 - (iv) Modern practices for design flood reviews;
 - (v) Modern practices for dam design reviews, including seismic design review;
 - (vi) Dam rehabilitation design, including both structural and non-structural interventions;
 - (vii) Advanced numerical modelling for comprehensive safety reviews of dams based on PFMA approach
 - (viii) Training regarding first level/rapid risk assessment of dams
 - (ix) Emergency action plans including dam break analysis, inundation mapping and stakeholders consultation;
 - (x) Dam portfolio management;
 - (xi) O&M of dams
 - (xii) Modern construction methodologies;
 - (xiii) DHARMA trainings
 - (xiv) Public outreach training programs for dissemination of

DRIP related activities for all stakeholders

- (xv) Modern practices for supervision and quality control;
- (xi) State-of-the-art practices for dam operation and risk-based maintenance;
- (xii) International dam safety codes of practice, safety monitoring and inspection;
- (c) The trainings shall be planned on regular intervals as per the need and progress of DRIP activities in order to assist the various partner agencies to successfully implement various important Project activities, to ensure consistency in performance and to achieve the intended Project Outcome Indicators. The Consultant shall be required to develop and present an annual comprehensive training calendar in advance with objectives. Course details, venue, duration of course and shall publish it at official website in the beginning of the year. This training calendar shall be part of the inception report.

**Revision of
CWC's Existing
Guidelines**

6.5.2 Consultant shall undertake revision of such guidelines as:

- (i) Guidelines for Developing Emergency Action Plans for Dams
- (ii) Guidelines for Preparing Operation and Maintenance Manual for dams
- (iii) Hazard Classification of Large dams;
- (iv) Guidelines for Managing Assessing Risks Associated with Dams
- (v) Guidelines for Safety Inspections of Dams
- (vi) Handbook for Assessing and Managing Reservoir Sedimentation
- (vii) Guidelines for Instrumentation, SCADA, Surveillance and Control System for Dams

**Formulation of
New Guidelines**

6.5.3 Consultant shall undertake formulation of following new guidelines as:

- (i) Construction Supervision & Quality Assurance Manual for Dam Construction and Rehabilitation
- (ii) Inspection, Operation and Maintenance of Spillway Gates, Sluice Gates, Hoisting System, Automation and Control System;
- (iii) Advanced Construction and Rehabilitation Materials for Dams and Construction Technology
- (iv) Latest Investigations and Bathymetry Technology for Dams

Improvement and implementation of DHARMA

(v) Investigations, and Rehabilitation Techniques for Seepage Control in Dams

(vi) Guidelines for Initial Filling of Dams

6.5.5 (a) Consultant shall undertake the improvement of ‘Dam Health And Rehabilitation Monitoring Application (DHARMA)’ Ver2.0, and help in its implementation in DRIP Agencies. DHARMA program, presently developed under DRIP Phase-I, will enable collection and compilation of basic as well as engineering information for all dams and allow the systematic presentation and interpretation of data for effective monitoring of the health of dams (A separate brief on DHARMA is given as Appendix B). Consultant shall also assist import and export of pertinent DHARMA data with other CWC tool i.e. ‘Water Resources Information System (WRIS)’ as well as any such important tool developed by any dam owner in India.

(b) The Consultant shall be required to carry out System Requirement Studies (SRS) before the improvement of DHARMA Ver2.0. The schedule for the draft and final SRS shall be indicated by the Consultant in the inception report. The Consultant shall also be required to identify the training requirements for DHARMA implementation and describe the training programs/ schedules in the inception report.

Dam Analysis and Design software requirements

6.5.6 Consultant shall facilitate identification of any important software requirements of CWC for its effective organizational role in national level dam safety. Accordingly, Consultant shall identify the most suitable modern software for hydrological, hydraulic, and structural analysis of dams under different operational regimes and for dam break analysis. Consultant shall also guide the implementation of such software tools in CWC. (The procurements of analysis and design software will be made by CWC directly). The Consultant shall facilitate few trainings for existing design softwares in CWC which have been procured under DRIP Phase-I i.e. GeoSlope, Roc Science, Plaxis 3D, FLAC 3D Ver 6.0 and FLAC 2D Ver 8.0 ,STAAD Pro etc

ISO 9001 Certification of HSO-CWC and audit activities

6.5.7 Consultant shall facilitate all activities related to ISO 9001 certification of HSO-CWC for Quality Management System and its continual (planned) improvement, and its one time renewal after initial three years (The payments for registration, certification and mandatory auditing would be paid by CWC directly). Also, Consultant shall assist to CWC in carrying out internal ISO audit for HSO as well as DSO on regular basis.

Dam safety trainings, study

6.5.8 (a) The activities will include targeted trainings nationally and internationally. Consultant shall facilitate in identification of

tours and conferences

training requirements for development of appropriate skills in CWC and participating agencies for the application of modern tools/ practices in operation, maintenance and rehabilitation of dams. The training areas shall include, but not be limited to, Potential Failure Mode Assessment (PFMA) developed by the US Federal Energy Regulatory Commission; Portfolio Risk Assessment techniques using tools such as the United States Bureau of Reclamation Risk Based Profile System; Failure Mode Effect and Criticality Analysis for electro-mechanical and hydraulic control systems; hazard/vulnerability assessment and hazard ratings; dam-break analysis; reservoir sedimentation studies; and site-specific seismic parameter studies. The experts of Consultant from respective areas shall be available for national level trainings. (All expenses related to international trainings would be paid by CWC/ participating agencies directly). Consultant will come out identification of leading global institutions having specific domain expertise to deliver the specific training programmes in various areas of dam safety as well as for various levels.

(b) Consultant shall facilitate CWC and agencies officials' study tours and linking with other country agencies that have advanced dam safety programs, such as Canada, United States, Japan, Australia and Switzerland etc. (All expenses for study tours would be paid by CWC/ participating agencies directly).

(c) Consultant shall assist DSO-CWC in organizing international level dam safety conferences/workshops proposed to be held in different participating each year, during the period of Consultancy. (The expenses for dam safety conferences would be borne by CWC/ Agencies)

Improvement of National web site for dam safety , DHARMA

6.5.9 Consultant shall improve existing websites i.e. national dam safety, *DHARMA* information for general public, along with provision for password linked membership of professionals for dam safety trouble-shooting and discussions. These websites are being hosted by CWC presently. The participating states would have easy access to the data pertaining to the very State and its interoperability.

Development of dam safety expertise of select academic and research institutions

6.5.10. Institutional strengthening for building up expertise in the field of dam safety/ rehabilitation would be developed in selected relevant educational institutes like IITs, Engineering colleges / Universities, etc.. Necessary funds for the development of their in-house dam safety expertise will be provided by CWC. Consultant shall identify the thrust areas of desired expertise and the related requirements of lab facilities, hardware, software, trainings, study tours etc. The four centre of excellences have been proposed to be established on regional

basis. The Consultant shall provide a comprehensive blue prints for these proposed four Centre of Excellences which is supposed to be at par with existing such Centres in few leading Countries of world

7. Organization of the Consultant's Team

Based on realistic assessment of DRIP related works in CWC and participating States, Consultant's team shall have a combination of International as well as national experts alongwith supporting staff in order to provide required services. The international experts include Team Leader, Dam Safety Expert, Dam Design Expert, Hydrologist, Dam Instrumentation and Monitoring Expert, Construction Management and Quality Assurance, Dam Break Analysis and Emergency Planing Expert, Hydro-mechanical expert, Institutional expert, Dam Operation andManintenance Expert, and other experts under miscellaneous category i.e. seismic, de-siltation, architectural and planning expert etc. The national expert will include Deputy Team Leader, Dam Safety Expert, Dam Design Expert, Hydrologist, Construction Management and Quality Assurance Expert, Dam Break Analysis and Emergency Planing Expert, Hydro-mechanical expert, Dam Operation andManintenance Expert, procurement specialist, Financial Management expert, software development/MIS expert etc.

In addition to above experts, Consultant shall have a team of local staff which include design engineer, Software Developer, GIS expert, Autocad expert, Office Manager, Account officer, Site Construction Engineer etc. The exact details of about the qualification and experience of these experts and staff would be available in *Request For Proposal* document which would be issued at the RFP Stage.

Main Activities of Consultancy services would be spread over a period of about 10 years. Management support to CPMU would continue for the full period of Consultancy involving guidance to SPMUs, preparation of MIS reports, project completion report, and report for development of future strategy etc. Major implementation support activities for the hydrological analysis and design reviews of identified dams are expected to be over in the first three years of the project. The activities concerning third party supervision and quality control of rehabilitation and improvement works on behalf of CWC would be required throughout project duration. The support of Consultancy services for the dam safety institutional strengthening would continue throughout the ten year period; and during last year, implementation of change management strategy with reference to withdrawal program along project Implementation Completion Report would become the key activity.

The members of Consultant's team will form the CPMU under Project Director. All work flows will take place from CPMU to the respective SPMU of the DRIP States. For the work item "Design Flood Review",

which will require mandatory vetting by CWC, the work flow will be routed to the Hydrology Directorate of the HSO unit of CWC. For work item of “Third party supervision”, the work flow will be channelled directly to the SPMU of the State concerned so that corrective measures can be implemented without loss of time. The work flow for the item “Capacity Building for DRIP Implementation”, will be directed to the SPMU and IAs of the State concerned. All such directorates of CWC that are functionally aligned with different DRIP activities will be associated with respective works of Consulting firm for assimilation of experience and transfer of technology.

Adequate office space and electricity/water will be provided by CWC for the Consultant’s office establishment at CPMU. However all types of furnishing, maintenance and housekeeping requirements of this space shall be met by the Consultant. Efforts will be made for seeking adequate office space for the state-level sub-units from the concerned states. All establishment requirements (excluding space) for works related to State level sub-units shall be arranged by the Consultant on his own. The Space for these offices shall be provided by concerned partner agencies

The trainings to be conducted by the Consultant will be held at CWC (Delhi), National Water Academy (Pune) or the project locations as per scope of different trainings. The requirements of premises and the boarding/ lodging arrangements of trainees will be met by the Central or State IAs as the case may be.

In addition to above defined activities, coordination as well as implementation of other activities like organisation of meetings of relevant Groups and Committees i.e. National Level Steering Committee, Technical Committee, World Bank Implementation and Support Mission, Quarterly and Monthly Review Committee at CPMU level as well as State levels etc., organising annual Dam Safety Conferences, public outreach programs, domestic training programs etc. to be done by Consultant

8. Deliverables

8.1. The general deliverables to be provided by the Consultant are:

- (i) Inaddition to Scope of Consultancy given at Para.6, following deliverables to be part of assignment
- (ii) Draft inception report within 45 days of contract signature, and final inception report (incorporating CWC’s comments) within 60 days of contract signature.
- (iii) Regular monthly, Quarterly and Annual progress reports of Project Implementation, drawing attention to problematic issues.
- (iv) Quarterly and annual progress report on ESMF implementation and environmental compliance.

- (v) Quarterly and annual financial management reports of the overall project.
- (vi) Assessment reports of Consultancy at mid-term reviews of project (at end of PY3 and PY8).
- (vii) Summary Project Implementation Report covering all four components with facts based analysis and assessment before 6 months of Project closure .
- (viii) Draft Implementation Completion and results Report (ICRR) before 6 months before end of Consultancy, and final ICRR within one month after receipt of CWC's and World Bank's comments.
- (ix) Monthly , Quarterly and Annual DRIP Bulletins

8.2. In addition to the general deliverables listed at Para 8.1, Consultant shall also provide activity specific deliverables as per Scope of Consultancy. Such activity specific deliverables to be given by Consultant during period of Consultancy shall include, but not be limited to, the following:

- (i) Standard Project Template Form as per time schedule indicated in final inception report.
- (ii) Web based Management Information System (MIS) as per time schedule indicated in final inception report.
- (iii) Quarterly Interim Unaudited Financial reports (IUFР) for disbursement of credit/loan funds by World Bank.
- (iv) Compilation of project audit reports of all IAs within six months from the end of each financial year.
- (v) Customization of financial reporting software for its use in DRIP as per time schedule indicated in final inception report.
- (vi) Document Management and Dissemination System as per time schedule indicated in final inception report.
- (vii) 'Project Rehabilitation Report' of each project dam within 90 days of its work completion.
- (viii) Training calendar for the capacity building programs for DRIP implementation as per time schedule indicated in final inception report.
- (ix) Revised guidelines on dam safety as per list of guidelines and time schedule indicated in final inception report.
- (x) New guidelines on dam safety as per list of guidelines and time schedule indicated in final inception report.
- (xi) Dam Design Review Manual as per time schedule indicated in final inception report.
- (xii) System Requirement Studies (SRS) report for development of DHARMA as per schedule for the draft and final SRS indicated in final inception report.
- (xiii) Fully developed DHARMA software as per time schedule indicated in final inception report.
- (xiv) Training Calendar for DHARMA implementation and its implementation schedule as per time frame indicated

- in final inception report.
- (xv) Training material on application of modern tools/practices in operation, maintenance and rehabilitation of dams for the national level trainings on dam safety as per time schedule indicated in final inception report.
 - (xvi) National web site for dam safety information as per time schedule indicated in final inception report.

- 8.3 In case of deliverable being a document such as Guidelines, Manuals etc., the Consultant would be required to provide multiple copies (about 100) of hard bound volumes of the final approved material along with its soft copy in CDs (about 100).
- 8.4 All intellectual and commercial rights on the deliverables such as Software, Guidelines and Manuals developed/ prepared by the Consultant during period of Consultancy shall be vested with CWC and these deliverables shall remain the exclusive property of CWC. CWC shall retain the right to use and modify these Software, Guidelines and Manuals in any manner.
- 8.5 During development and implementation of software, if any add-on software is required to be procured as off-the-shelf-item, the licenses for full or any part of such software shall be in the name of CWC.

9. Approach and Methodology

Consultant's approach and methodology will be periodically reviewed by CWC with a view of improving the project outcomes. As and when felt necessary by CWC, the consultant will be required to suitably change the approach and methodology of the assignment in an appropriate manner and without affecting the overall cost of the Consultancy assignment.