



GOVERNMENT OF ODISHA  
DEPARTMENT OF WATER RESOURCES

Request for

**EXPRESSION of INTEREST**

for

**Consultancy Services for “Construction Supervision and  
Quality Assurance of Works and Review of Design &  
Drawing”**

For the Construction of Additional Spillway of Hirakud Dam,  
on Left of Gandhi Hillock, Burla, Odisha, India

Under the  
Dam Rehabilitation and Improvement Project (DRIP)

IBRD Loan No. 7943-IN  
IDA Credit No. 4787-IN

The E O I document can be downloaded from [www.dowrorissa.gov.in](http://www.dowrorissa.gov.in) &  
[www.odisha.gov.in](http://www.odisha.gov.in)

*Chief Engineer & Basin Manager,  
Upper Mahanadi Basin, Burla,  
Distt. Sambalpur, Odisha, India*

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## DETAILED NOTICE



### REQUEST FOR EXPRESSIONS OF INTEREST

**COUNTRY:** INDIA

**NAME OF PROJECT:** “Construction of Additional Spillway” of Hirakud Dam  
IBRD LOAN NO- 7943-IN AND IDA CREDIT NO- 4787-IN

**Assignment Title:** **Consultancy Services for “Construction Supervision and Quality Assurance of Works, and Review of Design & Drawing”** for the Construction of Additional Spillway of Hirakud Dam on Left of Gandhi Hillock, Burla, Odisha – India

**Reference No.** : **EOI No.: ICB-C-2/ODISHA/ASW-HIRA-2/ 2017-18**

The **Govt.of Odisha**, Department of Water Resources (the Owner), has received financing from the World Bank toward the cost of the “Construction of Additional Spillway” of Hirakud Dam, under the Dam Rehabilitation & Improvement Project (DRIP) and intends to apply part of the proceeds for consulting services.

The **Consulting Services** (“the Services”) (i.e. the Engineer) would include but not limited to:

- (i) providing the Construction Supervision, Site Inspections, Testing, and Quality Assurance of the Works, and Project Monitoring & Implementing of the MIS & the documentation, contract management, and other related services.
- (ii) carry out the “Review of Design & Drawings” prepared by the Construction Contractor, and carrying out all related services.
- (iii) the implementation period will be approx. 36 months

The Chief Engineer & Basin Manager, Upper Mahanadi Basin, representing the Owner, now invites eligible consulting firms to indicate their interest in providing the Services. Interested Consultants should provide explicit information demonstrating the requisite qualifications and relevant experience to perform the required services. The shortlisting criteria is as under :

- (i) Construction supervision and quality assurance experience in the case of detailed engineering stage services provided during the construction of large dams preferably covering structures like concrete dam, earthen dam, stilling basin, concrete lined spill channel, crest radial gates, stop log gates; hydraulics hoists, gantry crane, bridges and foot bridges etc., including Environment, Social, Health, Safety aspects.
- (ii) Review of design & drawings for above structures.
- (iii) At least 15 years of adequate engineering experience with inhouse team of professionals / experts in the respective engineering fields.
- (iv) Must have completed similar task for a minimum two such large dam projects from concept to commissioning.
- (v) Having appropriate Financial Turnover with a positive networth of last five years.

The Consulting Firms confirming interest in the project shall be shortlisted by a Committee of officials of the Government of Orisha by

- (i) establishing a longlist of applicants, and
- (ii) preparing the shortlist containing the Consulting Firms most suitable for the project. The Short List of Consultants shall comprise of a minimum of three and a maximum of six firms, and an even distribution of the nationalities of the firms shall be taken into account in the shortlisting in accordance with para 2.6 of the World Bank's Guidelines Selection and Employment of Consultants (the "Guidelines").

The attention of interested Consultants is drawn to paragraph 1.9 "Conflict of Interest" and paragraph 1.23 "Fraud & Corruption" of the Guidelines.

Consultants may associate with other firms in the form of a joint venture or a sub-consultancy to enhance their qualifications.

The E O I documents can be downloaded from [www.dowrorissa.gov.in](http://www.dowrorissa.gov.in) & [www.odisha.gov.in](http://www.odisha.gov.in)

**Information on the E O I can be provided between 11:00 to 16:00 hours on any working day up to 31/10/2017 at**

The office of the Chief Engineer & Basin Manager,  
Upper Mahanadi Basin,  
Department of Water Resources,  
Govt. of Odisha, Burla, Distt-Sambalpur,  
Pin-768017, Odisha, India  
PhoneNo.:91-0663-2430866,  
[cebmumburla@rediffmail.com](mailto:cebmumburla@rediffmail.com)

The application of Expressions of Interest must be submitted in the “drop box” at the office of the **Chief Engineer & Basin Manager, Upper Mahanadi Basin Burla, Odisha,** by 10/11/2017 upto 11:00 Hrs.

The E O I envelope shall also contain five (5) DVDs with copies of the original EOI.

The shortlisted applicants shall be requested for Consulting Services Proposals in accordance with the single stage, two envelope procurement method, based on the “Quality & Cost Based Selection” process set out in the Guidelines.

The undersigned reserves the right to disregard any or all EOIs without providing any reason thereof.

The Chief Engineer & Basin Manager,  
Upper Mahanadi Basin,  
Department of Water Resources,  
Govt. of Odisha, Burla,  
Distt. Sambalpur, Pin-768017,  
Odisha, India  
(for and on behalf of Govt. of Odisha)  
Phone No.91-0663-2430866,  
[cebmumburla@rediffmail.com](mailto:cebmumburla@rediffmail.com)



**Information on  
EXPRESSION OF INTEREST**

**Consultancy Services for “Construction Supervision and Quality Assurance of Works, and Review of Design & Drawing ” for the Construction of Additional Spillway of Hirakud Dam on Left of Gandhi Hillock, Burla, Odisha, India**

Financing Institution	International Bank for Reconstruction and Development (IBRD) and International Development Association (IDA), jointly called the World Bank
The Borrower	GOVERNMENT OF ODISHA, Department of Water Resources, Through Government of India
The Executing Agency	The Chief Engineer & Basin Manager, Upper Mahanadi Basin, Department of Water Resources, Govt. of Odisha, Burla, Distt.-Sambalpur, Pin-768017, Odisha, India
The Project for Civil Construction	Construction of Additional Spillway of Hirakud Dam
The Assignment	Consultancy Services for “ <b>Construction Supervision and Quality Assurance of Works, and Review of Design &amp; Drawing</b> ” for the Construction of Additional Spillway of Hirakud Dam on Left of Gandhi Hillock, Burla, Odisha, India
Period of Consulting Services	36 months
Methodology of E O I for Consultancy	As per World Bank Guidelines
Submission of E O I for Consultancy	<b>Expressions of Interest must be submitted in the “drop box” at office of the Chief Engineer &amp; Basin Manager, Upper Mahanadi Basin Burla, Odisha, by 11:00 Hrs. on 10/11/2017</b> The E O I envelope shall also contain 5 CDs with scanned copies of the original EOI.
Language	English
Start downloading E O I documents from <a href="http://www.dowrodisha.gov.in">www.dowrodisha.gov.in</a>	Date: <b>10/10/2017 Time: 16:00 Hrs</b>
Address for correspondence and requests for information	<b>The Chief Engineer &amp; Basin Manager, Upper Mahanadi Basin, Department of Water Resources, Govt. of Odisha, Burla, Distt-Sambalpur, Pin-768017, Odisha, India PhoneNo.:91-0663-2430866, <a href="mailto:cbmumbburla@rediffmail.com">cbmumbburla@rediffmail.com</a></b>
Last date for seeking information	Date: <b>31/10/2017 Time: upto 16:00 Hrs</b>
Closing of submission of E O I in “drop box” at office of EE, Main Dam Division, Burla	Date <b>10/11/2017 Time: upto 11:00 Hrs</b>

Date and Hour of Opening of “drop box” at Burla	Date: <b>10/11/2017</b> Time: <b>12:00 Hrs</b>
Place of Opening of E O I on 10.11.2017 at 12:00 Hrs at Burla	<b>The Office of the Chief Engineer &amp; Basin Manager, Upper Mahanadi Basin, Department of Water Resources, Govt. of Odisha, Burla, Distt-Sambalpur, Pin-768017, Odisha, India</b>

### **Eligibility:**

The Expression of Interest Process is open to all Consultancy firms from eligible source countries as defined in the World Bank’s Guidelines: Selection and Employment of Consultants, under IBRD Loans and IDA Credits.

Interested Consultants should provide explicit information demonstrating the requisite qualifications and relevant experience to perform the required services. The shortlisting criteria is as under :

- (i) Construction supervision and quality assurance experience in the case of detailed engineering stage services provided during the construction of large dams preferably covering structures like concrete dam, earthen dam, stilling basin, concrete lined spill channel, crest radial gates, stoplog gates; hydraulics hoists, gantry crane, bridges and foot bridges etc., including Environment, Social, Health, Safety aspects.
- (ii) Review of design & drawings for above structures.
- (iii) At least 15 years of adequate engineering experience with inhouse team of professionals / experts in the respective engineering fields.
- (iv) Must have completed similar task for a minimum two such large dam projects from concept to commissioning.
- (v) Having appropriate Financial Turnover with a positive networth of last five years.

The Consulting Firms confirming interest in the project shall be shortlisted by a Committee of officials of the Government of Orisha by

- (i) establishing a long list of applicants, and
- (ii) preparing the short list containing the Consulting Firms most suitable for the project.

The Short List of Consultants shall comprise of a minimum of three and a maximum of six firms, and an even distribution of the nationalities of the firms shall be taken into account in the shortlisting in accordance with para 2.6 of the Guidelines.

The consultants who will be invited to submit their “Request for Proposal ( Technical& Financial Proposals)”. A Consultant (out of the shorted listed consultant firms ) will be selected in accordance with the “Quality & Cost Based Selection” method set out in the Consultant Guidelines.

The attention of interested Consultants is drawn to paragraph 1.9: “Conflict of Interest” and paragraph 1.23: “Fraud & Corruption” of the World Bank’s *Guidelines: Selection and*



*Employment of Consultants [under IBRD Loans and IDA Credits & Grants] by World Bank Borrowers* (“Consultant Guidelines”), setting forth the World Bank’s policy.

Consultants may associate with other firms in the form of a joint venture or a sub-consultancy to enhance their qualifications.

The E O I documents can be downloaded from [www.dowrorissa.gov.in](http://www.dowrorissa.gov.in) & [www.odisha.gov.in](http://www.odisha.gov.in)

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The Chief Engineer & Basin Manager,  
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Pin-768017, Odisha, India  
Phone No.:91-0663-2430866,  
[cebmumburla@rediffmail.com](mailto:cebmumburla@rediffmail.com)

**Submission of EOI in drop box:**

The application of Expressions of Interest must be submitted in the “drop box” at Office of the Chief Engineer & Basin Manager Upper Mahanadi Basin, Burla, Odisha, by

**11:00 Hrs. on 10/11/2017**

The E O I envelope shall also contain five CDs with scanned copies of the original EOI.

The undersigned reserves the right to cancel any or all EOIs without assigning any reason thereof.

Chief Engineer & Basin Manager,  
Upper Mahanadi Basin,  
Department of Water Resources,  
Govt.of Odisha, Burla, Distt-Sambalpur,  
Pin-768017, Odisha, India  
PhoneNo.:91-0663-2430866,  
[cebmumburla@rediffmail.com](mailto:cebmumburla@rediffmail.com)

**INFORMATION ON  
“EXPRESSION OF INTEREST FOR CONSULTANCY”**

**The Project:** Construction of Additional Spillway of Hirakud Dam

**THE ASSIGNMENT : The consultancy services for  
“Construction Supervision and Quality Assurance of Works, and Review of  
Design & Drawing”**

for the Construction of Additional Spillway of Hirakud Dam, on Left of Gandhi Hillock,  
Burla, Odisha –India

**1. Introduction**

The Hirakud Dam Project is built across river Mahanadi about 15 km upstream of Sambalpur town in the state of Odisha and inaugurated in January 1957. The dam is located about 6 km from NH-6 and it is 8 km from Hirakud railway station. The project provides 159106 Ha of Rabi irrigation in the districts of Sambalpur, Baragarh, Bolangir and Subarnapur. The water released through the powerhouse irrigates an additional 251000 Ha of CCA in Mahanadi Delta. Power generation after upgrading is 347.86 MW The project provides flood protection to 9500 so km of delta area in undivided districts of Cuttack and Puri.

Hirakud Dam is a composite dam of earth, concrete, and masonry. There are two spillways in the main dam on the left and right sides located on the two channels of the main river. The main dam toe Power House is on the right flank of the main dam. The dam is flanked by two earthen dykes on left and right sides with a combined length of 21 km to close the saddles.

As per the project records the existing spillway capacity of the dam at FRL is 42450 cumecs (15 lakh cusec). The FRL is at RL 192.024 m (630 ft) and the Dam top level is at RL 195.68m (642ft). The above design flood can be passed through the existing under sluices and spillway crest radial gates. Discharge through 64 nos under sluices is 26885 cumecs. Discharge through 34 nos spillway radial gates is 15565 cumec. Thus total discharging capacity is 42450 cumecs.

Subsequently, the design flood has been revised and a PMF with a peak value of 69632 cumecs was accepted by CWC in 1997. The present exercise is to find a solution to pass the additional discharge of around 27000 cumecs while ensuring the safety of the Dam. Therefore, an additional spillway is required to be constructed to pass the excess flood discharge. This project has been included under DRIP assisted by World Bank to be implemented over a period of six years starting from 18<sup>th</sup> April 2012 and likely to be extended by two more years.

On account of a review of hydrological data of the project, the design flood of the project has been revised to a 69,632cumecs against the original flood of 42,450 cumecs. As such additional spillway one on the left bank, Phase-1 (present proposal) and another on the right bank, Phase-2 (later on) are proposed for passing the additional flood. Additional spillway on the left bank, which was earlier proposed on the saddle next to the Gandhi Hillock has now been shifted upstream along the same Spill channel alignment by

about 700m to found the spillway control structure on good granite gneiss and is planned to be taken up in phase-1. The spillway will have 5 radial gates of 15m x 15m, stilling basin, downstream spill channel, left and right earthen dykes to connect the new spillway control structure with the existing left bank dyke. Removal of the part of the existing dykes upstream of the new spillway for its connection with the main reservoir will also be part of the phase-1 construction.

The project is intended to be constructed under on-going DRIP project of Govt. of India with financing assistance from the World Bank.

## 2. Project Objectives

The contractor (here it means the Agency in charge of the execution of the additional spillway) will provide the designs and construction drawing for construction of the above project with a state of the art technology of high quality, reliability and most economical solution consistent with the latest established practices across the world. Within one month of the signing of the contract, schedule of preparation of detailed designs/drawings will be jointly agreed by the Contractor and Client (OWRD) / Consultant.

The contractor will provide the following:

### **Civil Construction drawings:**

It includes drawings for Additional Spillway from the upstream approach channel to the end of downstream spill channel up to the confluence of Mahanadi river including connections with the existing dyke on the upstream and with the flood embankments on the downstream. It will include all layout drawings, foundation treatment details, outline and structural details of various project components, slope protection details, reinforcement details, Earthen dyke details, bridges, foot bridges, instrumentation details etc.

### **Hydro-Mechanical drawings:**

It includes drawings for Radial Gates & Hydraulic Hoists, Stop log & Lifting beam including their embedded parts, Gantry Crane etc.

### **Electrical and Automation Construction drawings:**

It includes drawings for all Electrical Works and Dam Control System.

The objective of this consultancy assignment will be as under:

- 2.1 Review of Civil & Hydro-Mechanical Design and drawings –**  
Timely reviewing of design and drawings of Civil works including instrumentation works and Hydro - Mechanical works submitted by the Contractor and assisting CWC for approval of construction drawings
- 2.2 Electrical & Automation Consultancy –** Review of designs and drawings of Electrical & automation works submitted by the Contractor.
- 2.3 Construction Management. Work Supervision & Quality Assurance:**  
Construction Management, Work supervision with proper quality control assurance is the second part of the Consulting Services. Monitoring the progress of work with the help of modern project

management tools is to be carried out.

#### 2.4 Spoil Management & Landscaping:

During the execution of Civil Contract, huge quantity of earth excavation will be generated and there is the provision of landscaping at identified locations. The excavated soil being dumped judiciously in the locations identified for landscaping shall be supervised.

2.5 The above-mentioned works including the construction will be completed within the 30 months from award of the works to the Contractor.

Broad Schedule for Construction Stage Designs & Drawing works are as follows:

Sl No	Item of works	Time in months
1.	Finalization of layout drawings including review of stability analysis for NOF & OF sections, hydraulic designs, hydraulic model study reports and temporary works	0-4
2.	Finalization of excavation drawings for spillway, NOF blocks and Spill Channel up to RD 582 m	1-4
3.	Finalization of excavation drawings for Spill Channel beyond RD 582 m up to RD 1117m including slope protection for hill cutting.	1-8
4.	Finalization of structural reinforcement details & construction drawings of the dam, spill channel including foundation treatment.	5-22
5.	Finalization of earthen dyke Construction drawings including a review of stability analysis, cut-off trench details, foundation treatment, connection details etc.	2-23
6.	Finalization of detailed fabrication drawings for Stop-logs & Radial gates including embedded parts, gate hoists & gantries	8-24
7.	Finalization of O&M manuals	20-30
8.	Submission of As-built drawings & completion report	20-33

The objective of procuring Independent Consultancy is to help the Client in checking and reviewing the designs and drawings provided by the Contractor at various stages as per the work schedule and suggest modifications to the contractor before approval of the Civil and Hydro-Mechanical drawings by the Competent authority. The consultant will review and any suggestion or modification, if necessary, will be intimated to the Contractor and the modified construction drawings and designs will be resubmitted to the Consultant. On the basis of approval of drawings (Civil & Hydro-Mechanical) by the competent authority, the consultant will release the drawings for construction on behalf of Govt. of Odisha, WRD.

The Consultant will also be responsible for review & approval of

concrete mix designs, testing of construction materials, Thermal/Cooling Studies for concrete and Electrical and Automation drawings before they are issued for construction/implementation.

**2.6 The system of approval of Construction Drawings:**

- i) Comments by the Consulting Firm- within 3 weeks in each case after receipt from the Contractor.
- ii) If no comments are given within above stipulated period then it is deemed to have been approved by the Consulting agency.
- iii) Incorporation of the reviewing agency’s comments by the Contractor within one week of issue of comments.
- iv) Final approval of design & drawing by the competent authority within two weeks after receipt of incorporation of comments.
- v) The Consultant shall ensure that Construction Drawings provided by the Contractor for each component of works are issued minimum three months in advance before taking up of the construction works of that component.

**3. Project Components**

The five components of Consulting services are summarized as under:

Review of Design & drawings of Civil works of additional spillway, spill channel & allied works	3.1	It includes Review of Design and Drawings for Civil works of Additional Spillway from the upstream approach channel to the end of downstream spill channel up to the confluence of Mahanadi River including cofferdams and connections with the existing dyke on the upstream and with the flood embankments on the downstream. It will include all layout drawings, foundation treatment details, slope protection details, reinforcement details, earthen dyke details, bridges, foot bridges, instrumentation details etc. The tentative list of probable drawings, but not limited to those specified in the list, is enclosed as Annex.1.
Review of Design & drawings of Hydro-mechanical works of additional spillway	3.2	It includes a review of Design and Drawings for Radial Gates & Hydraulic Hoists, Stop log & lifting beam including embedded parts, Gantry Crane etc. The tentative list of probable Hydro-Mechanical drawings, but not limited to those specified in the list, is enclosed at Annex.2.
Review of Design & drawings of Electrical and Automation works of additional spillway	3.3	It includes a review of design and drawings for Electrical and Automation works. The tentative list of probable drawings, but not limited to those specified in the list, is enclosed at Annex.3.
Construction Management, Work supervision & Quality Assurance	3.4	Construction management. Work supervision with quality assurance is the second part of the Consulting Services. Monitoring the progress of work with the help of modern project management tools is to be carried out. The Consultant will also suggest improvements, modifications in the quality of works, execution methodology and

approve contingency plans of the Contractor to stick to the original construction schedule.

Spoil management and Landscaping activities

3.5 During the execution of Civil Contract, huge quantity of earth excavation will be generated and there is the provision of landscaping in identified locations. The excavated soil will be dumped judiciously in the locations identified for landscaping as per instruction of the Engineer in consultation with the Client (OWRD). The Consultant has to review necessary plans for this purpose.

#### 4 Objectives of the Consultancy

4.1 The main objective of the Consultancy service is to help the Project Authority for reviewing all Designs & Drawings submitted by the Contractor, supervision of construction works, quality assurance, day to day progress of construction activities etc.

4.2 The Consultant shall provide to Project Authority a team of expert consultants, including technical and non-technical manpower, and all resources necessary for meeting the Consultancy objectives. The Consultant shall also establish coordination of work between Civil Contractor and Project Authority.

#### 5 Scope of Consultancy

The scope of the services will include;

- **Review of Civil & Hydro-Mechanical Design and drawings** – Timely reviewing of design and drawings of Civil works including instrumentation works and Hydro - Mechanical works submitted by the Contractor and assisting the competent authority for approval of construction drawings
- **Electrical & Automation Consultancy** – Review of designs and drawings of Electrical & automation works submitted by the Contractor.
- **Work Supervision** – Providing independent work supervision for construction and quality control to ensure that works are implemented as per National and International standards;
- **Spoil Management & Landscaping** – Advising Civil Contractor on effective spoil management and guide Project Authority on landscaping.
- The Consultant shall report and will be answerable to the Chief Engineer & Basin Manager, Upper Mahanadi Basin.
- The Consultant shall provide for deployment of an optimum number of experts for review of design and construction drawings, work supervision, quality assurance etc.

#### 6 Organization of the Consultant's Team

6.1 Based on a preliminary assessment of proposed additional spillway and other ancillary works, a tentative projection of Consultant's team requirement is indicated at Annexure-A. However, the actual manpower requirement of Consultancy in terms of expertise needed, team composition, and staffing schedule is required to be assessed by the Consultant and presented in the Consultant's bid proposal.

6.2 The actual number of professional staff desired under Consultancy need not be equal to the number of type-of-expertise indicated in Annexure-A because of the possibility of an individual professional possessing more than one expertise. Similarly, activities involving large quantum of works may warrant requirement of more than one professional staff with the same type of expertise.

6.3 Details of the Consultant's team composition should be presented in the Consultant's proposal. However, the team should include, but not be limited to, the following professional staff:

**i) Team Leader cum Project Coordinator:** He/ She should have a good academic background with a degree in Civil Engineering and preferably a Master degree in Civil Engineering.

He/ She should have at least 25 years of experience in the field of design of large dams including detailed engineering and designs, Construction Supervision and implementation of works etc. He/ She should have design and construction experience of completing a minimum of three major dam projects.

**ii) Design Expert (Civil):** He / She should have a degree in Civil Engineering with post-graduation in either Civil/Structural / Water Resources/ Hydraulic Engineering. He / She should have minimum 15 years experience in designs of Concrete dams, Embankment dams, Spillways and its appurtenant works.

**iii) Hydro-Mechanical Expert:** He / She should have a degree in Civil / Mechanical Engineering with post- graduation in either Civil/ Mechanical /Structural Engineering. He / She should have minimum 15 years experience in designs & erection of Hydro-Mechanical works and their appurtenances.

**iv) Construction Expert:** He/She should have a degree in Civil Engineering preferably post-graduation in Water Resources engineering and about 20 years experience in construction, supervision of works and Quality Control aspects of dam projects. He/ She should have successfully completed at least three Dam Projects.

**v) Quality Control Expert:**

He/ She should have a degree in Civil Engineering, preferably post-graduation in Civil / Water Resources Engineering with a minimum of 15 years experience of quality control, material testing etc. He/ She should have worked in at least three dam projects (Concrete & Embankment dams).

**vi) Electrical and Automation Engineer:**

He/ She should have a degree in Electrical Engineering, preferably post-graduation in Electrical Engineering with a minimum of 15 years experience in handling electrical installations/ works. He/ She should have worked in at least three dam projects including automation of gates.

**vii) Engineering Geologist:**

He/ She should have a degree in Geology, preferably post-graduation in Engineering Geology with minimum working

experience of at least 15 years in at least three dam projects.

**viii) Environment Expert:**

He/ She should have post graduate degree in Environmental Sciences /Environmental Planning / Environmental engineering with at least 15 years of work experience.

**ix) Architect**

He/She shall have a degree in Architecture with minimum working experience of atleast 15 years in landscaping works, recreational/amusement parts, fancy lighting etc.

**x) MIS & Doc. Management Executive**

He/She should have a degree in Computer Science with minimum 10 years of work experience

- 6.4 The activities of Consultancy services would be spread over a period of about thirty-six months. The Consultancy will start 3 months before the start of actual construction contract and will continue upto 36 months after completion of project works (project construction period is estimated as 30 months). Management support to Project Authority 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. The activities concerning work supervision and quality control of additional spillway and other ancillary works would be required throughout thirty months of work execution.
- 6.5 Adequate office space and electricity/water will be provided by Project Authority for the Consultant's office establishment at or near Project site. However, all types of furnishing, maintenance and housekeeping requirements of this space shall be met by the Consultant.

**7 Deliverables**

- 7.1 The general deliverables to be provided by the Consultant are:
- (i) Draft inception report within 45 days of the signing of the contract and final inception report within 60 days of the signing of the contract.
  - (ii) Construction stage design & drawings, Technical / Design Memorandum etc.
  - (iii) Construction Supervision Manual, Quality Assurance Manual, Maintenance Manual etc.
  - (iv) Regular brief monthly progress reports of all aspects of Consultancy, drawing attention to problematic issues.
  - (v) Quarterly and annual progress reports of the overall project.
  - (vi) Quarterly and annual financial management reports of the overall project.
  - (vii) Assessment reports of Consultancy reviews of the project at an interval of maximum six months.
  - (viii) As built drawings and O&M Manual for spillway gates.
  - (ix) Draft Consultancy completion report before 60 days of the end of Consultancy, and final completion report after receipt of



Employer's comments.

- 7.2 For the purpose of assessment of the quality of key deliverables and for their acceptance or rejection, in part or full, appropriate Review Committee (one or more in numbers) will be constituted under the chairmanship of Chief Engineer & Basin Manager, Upper Mahanadi Basin, Burla. The Review Committee(s) will consist of Director level officers of Project and SDSO dealing with pertinent areas of deliverables as Members of the Committee(s) and will include concerned Executive Engineer as Member Secretary. The Review Committee(s) will also recommend liquidated damages or penalty,(subject to a maximum of 10 % of the contract value) if the assignment is not carried out as per the contract and if the quality of service is found to be inferior or deficient.
- 7.3 In the case of deliverable is a document such as Construction stage designs and Drawings, Technical/Design Memorandum, Construction Supervision Manual, Quality Assurance Manual, O&M Manual for spillway gates, as built drawings etc., the Consultant would be required to provide multiple copies (10 hard copies and a pdf copy) of the final approved material along with its soft copy in CDs.
- 7.4 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 Project Authority and these deliverables shall remain the exclusive property of Project Authority who shall retain the right to use and modify this Software, Guidelines, and Manuals in any manner.
- 7.5 During development and implementation of software, if any add-on software is required to be procured as an off-the-shelf item, the licenses for full or any part of such software shall be in the name of Project Authority.

## **8 Monitoring of Consultancy Services**

The Consultant's work will be monitored by the Review Committee (referred at Para 7.2) under the chairmanship of Chief Engineer & Basin Manager, Upper Mahanadi Basin, Burla. The Committee will review the progress reports submitted by the Consultant as required under Para 7.1. The recommendations of the Review Committee(s) regarding liquidated damages/penalties referred under Para 7.2 will also be discussed for approval by the Competent Authority of the Odisha State Govt. The Review Committee will broadly supervise the overall functioning of the Consultancy so as to ensure that the Consultancy assignment is carried out as per agreed terms of reference and contractual conditions.

## HIRAKUD DAM

### Additional Spillway Complex ( CIVIL CONSTRUCTION DRAWINGS )

This list is a tentative requirement for undertaking construction of the additional spillway complex, but not limited to the following:

Sl. No.	Description	Nos. of drawings
<b>(A)</b>	<b>Main Dam Excavation Drawings up to end of transition i.e. beginning of spill channel, including slope protection details.</b>	
1.	Excavation plan	4 drawings
2.	Excavation details - X sections u/s of dam axis	6 drawings
3.	Excavation details – X sections at dam axis	1 drawings
4.	Excavation details – X sections d/s of dam axis up to end of stilling basin	5 drawings
5.	Excavation details – X sections d/s of stilling basin up to end of transition i.e. beginning of spill channel	3 drawings
6.	Excavation details – X sections normal to dam axis for the full length from beginning of approach channel to the end of transition d/s of stilling basin	10 drawings
	<b>Sub-Total</b>	<b>29 drawings</b>
<b>(B)</b>	<b>Layout Drawings</b>	
1.	Concrete Dam – u/s & d/s elevations	2 drawings
2.	Concrete Dam - Plan	1 drawing
3.	Overflow sections	4 Drawing
4.	NOF sections	2 Drawing
5.	Zoning of materials - OF section	2 Drawings
6.	Zoning of materials - NOF section	1 Drawing
7.	Water stop details	2 Drawings
8.	Galleries & Adits layout – Plan, Sections etc.	2 Drawings
9.	Elevator shaft – layout details	2 Drawings
10.	Power Pack Control Room – Plan & Section	1 Drawing
11.	Gates control room – layout details	1 Drawing
12.	DG set room - layout details	1 Drawing
13.	Abutment galleries – Plan & Section	2 Drawings
14.	Abutment galleries – Rock Support & Lining details	2 Drawing
15.	Details of concrete lifts	3 Drawings
16.	Stop Log Storage Pits – layout plan & section (2 locations)	4 Drawings
17.	Spillway bridge layout details (Plan, sections etc.)	4 Drawings
18.	Spillway pier details	6 Drawings
	<b>Sub-Total</b>	<b>42 Drawings</b>
<b>(C)</b>	<b>Foundation Treatment</b>	
1.	Dam foundation treatment - consolidation grouting plan ( OF & NOF)	2 Drawing
2.	Dam foundation treatment consolidation grouting - sections	3 Drawings
3.	Drainage and curtain grout holes – Plan (including abutment galleries)	2 Drawing

<b>Sl. No.</b>	<b>Description</b>	<b>Nos. of drawings</b>
4.	Drainage and curtain grouting details L-sections (OF & NOF portions)	3 Drawing
5.	Shear zone / fault zone treatment details	5 Drawings
6.	Typical dental treatment details	2 Drawings
	<b>Sub- Total</b>	<b>17 Drawings</b>
<b>(D)</b>	<b>Stilling Basin &amp; Training walls upto the end of transition</b>	
1.	Stilling basin – Left training wall - Outline Plan	1 Drawing
2.	Stilling basin – Left training wall (including reinforcement details) - Sections, Zoning details etc.	3 Drawings
3.	Stilling basin – Right training wall – Outline Plan	1 Drawing
4.	Stilling basin – Right training wall (including reinforcement details) - Sections, Zoning details	3 Drawing
5.	Stilling basin floor anchorage details - Plan	1 Drawing
6.	Stilling basin floor anchorage details - Sections	1 Drawing
7.	Stilling basin – Sub-surface drainage system details -Plan	1 Drawing
8.	Stilling basin – Sub-surface drainage system details - Sections	3 Drawings
9.	Stilling basin – Concrete outline details - Zoning etc.	1 Drawing
10.	Stilling basin reinforcement details - Plan	1 Drawing
11.	Stilling basin reinforcement details - Sections	1 Drawing
12.	Transition from end of stilling basin to start of spill channel – Left training wall - Plan	1 Drawing
13.	Transition from end of stilling basin to start of spill channel – Left training wall – sections showing reinforcement, drainage & zoning details	2 Drawings
14.	Transition from end of stilling basin to start of spill channel – Right training walls - Plan	1 Drawing
15.	Transition from end of stilling basin to start of spill channel – Right training walls - Sections showing reinforcement, drainage & zoning details	2 Drawings
16.	Transition from end of stilling basin to start of spill channel – Floor protection details – Plan & Sections	1 Drawing
	<b>Sub-Total</b>	<b>24 Drawings</b>
<b>(E)</b>	<b>Reinforcement Details (other than stilling basin, training walls)</b>	
1.	Gallery & Adits reinforcement details	2 Drawings
2.	Spillway crest reinforcement details (including glacis reinforcements, anchors in the d/s leg portion)	4 Drawings
3.	Spillway intermediate & end piers reinforcement details including anchorages (horizontal & vertical) in the spillway crest/glacis	5 Drawings
4.	Spillway left & right training walls reinforcement details upto end of spillway glacis	2 Drawings
5.	Elevator shaft & Machine room – reinforcement details	3 Drawings
6.	Reinforcement details for gate control room	1 Drawing
7.	Reinforcement details for DG set room	1 Drawing
8.	Reinforcement details for power pack room	2 Drawings
9.	Reinforcement details for stop log storage pit (one on each side)	4 Drawings
10.	Spillway metal works to cover the stop log storage pits	2 Drawings
11.	Spillway bridge - reinforcement details (including fixing details of rails for Gantry crane and drainage)	6 Drawings
12.	Spillway bridge parapet - reinforcement details -	1 Drawing

<b>Sl. No.</b>	<b>Description</b>	<b>Nos. of drawings</b>
13.	Spillway bridge - Bearing details	2 Drawings
14.	Details of steel ladder/rungs on the piers	1 Drawing
	<b>Sub-Total</b>	<b>36 Drawings</b>
<b>(F)</b>	<b>Instrumentation Details for main dam</b>	
1,	Instrumentation Details	2 Drawings
2.	Cable Layout Details	2 Drawings
	<b>Sub-Total</b>	<b>4 Drawings</b>
<b>(G)</b>	<b>Spill Channel (Concrete Lined)</b>	
1.	Layout plan & sections	4 Drawings
2.	Excavation details – Plan & Sections	6 Drawings
3.	Details of concrete lining and training wall in different reaches on left side including drainage, rock anchors, reinforcement etc.	6 Drawings
4.	Details of concrete lining and training wall in different reaches on right side including drainage, rock anchors, reinforcement etc.	6 Drawings
5.	Details of concrete lining in Spill channel bed, including drainage, reinforcement, anchors etc.	10 drawings
6.	Slope protection works in hill cutting	4 Drawings
7.	Concrete zoning details for training walls	2 Drawings
8.	Weep hole and filter details behind the training walls	2 Drawings
	<b>Sub-Total</b>	<b>40 Drawings</b>
<b>(H)</b>	<b>Earthen Dykes</b>	
1.	Overall Plan	1 Drawing
2.	Detailed Plan and L-Sections	4 Drawings
3.	Excavation Details Including Junctions with Abutments	4 Drawings
4.	Cut-off Trench Details – Plan and L-Section Including Grouting Details	10 Drawings
5.	Cross-Section of Dyke-	
	a) Near Abutment /connection with existing dyke @ 30 m c/c	6 Drawings
	b) In the Central portion @ 50 m c/c	20 Drawings
6.	Internal Drainage and Grouting Details (Including Chimney Filter, Horizontal Filter, Rock Toe and Toe Drain)	6 Drawings
7.	D/S Slope Surface Drainage Details	2 Drawings
8.	Channelization of seepage water beyond Toe drain	2 Drawings
9.	Dam top details including Parapet walls, Road, Drains etc.	2 Drawings
	<b>Sub-Total</b>	<b>57 Drawings</b>
<b>(I)</b>	<b>Instrumentation Details for Earthen Dyke</b>	
1.	Instrumentation Details	3 Drawings
2.	Cable Layout Details	4 Drawings
	<b>Sub-Total</b>	<b>7 Drawings</b>
	<b>G. Total</b>	<b>256 Drawings</b>

**HIRAKUD DAM**  
**Additional Spillway Complex**  
**( Hydro-Mechanical Drawings )**

This list is a tentative requirement for undertaking construction of the additional spillway complex but not limited to the following:

Sl. No.	Item	No. of Drawings
<b>(A) Radial Gates &amp; Hydraulic Hoists</b>		
1.	Embedded Parts Details	2
2.	Embedded Parts- Installation Details	2
3.	Gate Leaf Assembly	2
4.	General layout and arrangement drawings	4
5.	Gate leaf Details, Bottom horizontal girders, Arms, limb plates, bracings, Trunnion assembly with bracket & Thrust Pads.	10
6.	Seal Assembly & Details	1
7.	Guide Rollers - Details	1
8.	Lifting Lug Attachment - Details	1
9.	Anchor Girder Assembly / Anchor Rod/Flat - Details	10
10.	Yoke Girder Assembly - Details	2
11.	Dogging Attachment Assembly - Details	1
12.	Cylinder Assembly, clevis-Piston Eye & parts & Cylinder Heads Details	4
13.	General Layout With Position Indicators	1
14.	Electrical Circuit Diagram for the power pack	1
15.	Schematic layout Including Remote Control	1
16.	Hoist Trunnion Support Structure With Anchorages	3
17.	Hydraulic Oil Circuit Diagram	1
18.	Walkways, Hand railings, ladders / Rungs for approach to d/s parts of gate, Arms etc.	3
19.	Walkways / Platforms at trunnion level, Platform for hydraulic piping & Mobile power Pack.	3
20.	General arrangements drawing of Power Packs, hydraulic piping layout & details, control room etc.	2
<b>Sub-Total</b>		<b>54</b>
<b>(B) Stop log: &amp; Lifting Beam:</b>		
1.	Embedded parts Installation & storage grooves details.	2
2.	Embedded parts details	2
3.	Stop log-General Installation	1
4.	Stop log Assembly –top unit, bottom unit & intermediate units	3

Sl. No.	Item	No. of Drawings
5.	Stop log details	1
6.	Seal Assembly and details	1
7.	Lifting beam, Links & hooks details,	2
8.	General arrangement drawings	2
	<b>Sub-Total</b>	<b>14</b>
<b>(C) Gantry Crane</b>		
1.	Gantry Crane General layout & other details( Frame, Machinery housing etc)	4
2.	Gantry Crane supporting structure details (Columns /Portal, Tie Beams, operator cabin etc.)	4
3.	Electrical circuit diagram, control circuit diagrams	2
4.	Rails & Embedment details	2
5.	Cable reeling drum	2
6.	Column & tie beam details	1
7.	Detail of gantry travel arrangement.	1
8.	Detail of wheel bogies	1
9.	Detail of gantry travel wheel assembly.	1
10.	Detail of hoist assembly	2
11.	Detail of hoist frame. Chequered plate walkway & hand railings	1
12.	Crane wheel assembly & L.T Drive	1
13.	Hook & Pulley Block - Details Gear Box Covers etc.- Details	1
14.	Counter Weight & its Enclosure	1
15.	Detail of slack and overload limiting device & Sheaves & pulleys with wire rope reeling arrangement	1
16.	Lifting beam assembly details	1
17.	Detail of control cabin	1
18.	Detail of parking brake	1
19.	Ladder details.	1
20.	Arrangement of rotary limit switch	1
	<b>Sub-Total</b>	<b>30</b>
	<b>Grand Total</b>	<b>98 Drawings</b>
	Catalogs and manufacturers literature for all bought out items / equipment shall be submitted as supporting documents.	

**HIRAKUD DAM**  
**Additional Spillway complex (Phase I)**  
**(ELECTRICAL AND AUTOMATION CONSTRUCTION DRAWINGS)**

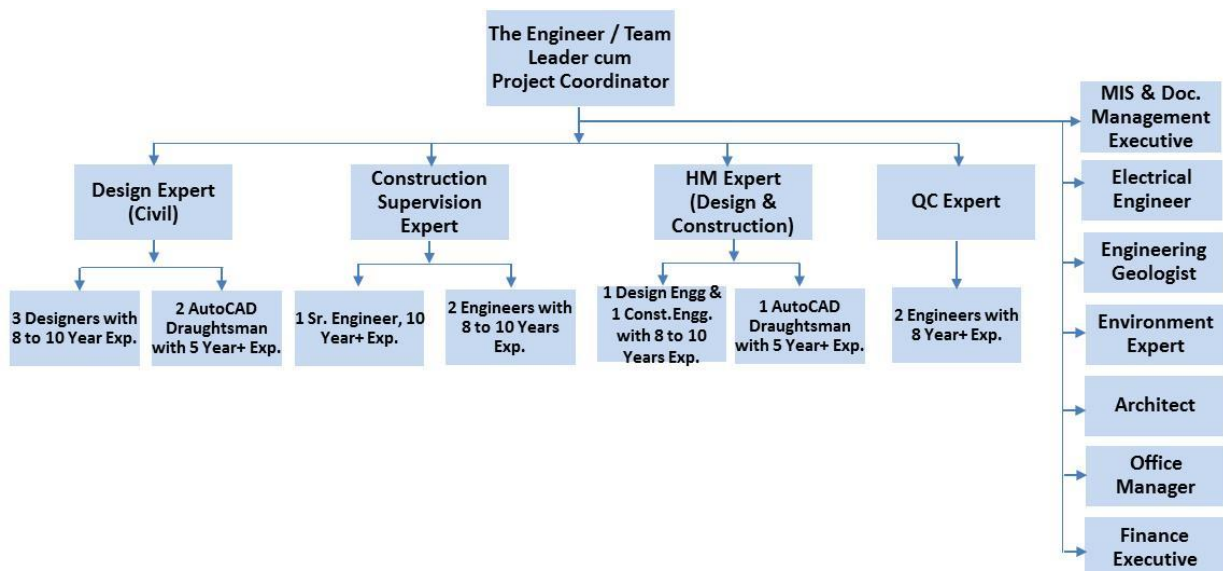
This list is a tentative requirement for undertaking construction of the additional spillway complex but not limited to the following:

Sl. No.	Description	Nos. of drawings
<b>(A)</b>	<b>Electrical works</b>	
1.	The balance of power of the whole infrastructure. Definition of electrical consumers, sizing of all the cables.	1 technical note, 30 pages
2.	Medium Voltage Connection (11KV)	3 Drawings
3.	Low voltage transformer	3 Drawings
4.	Diesel generator set (250 KVA, 415V, 50Hz)	3 drawings
5.	Portable diesel generator	2 drawing
6.	General architectural electrical drawings	3 drawings
7.	Electrical diagram of the control panel at transformer yard	5 drawings
8.	Electrical diagram of the main distribution panel	5 drawings
9.	Electrical diagram of the sub-distribution panels	5 drawings for each sub-distribution panel
10.	General arrangement of the cables racks	20 drawings
11.	Detailed electrical diagrams of primary electrical network	5 drawings
12.	Detailed electrical diagrams of secondary electrical networks	20 drawings
13.	Electrical cables installation and connection drawings	20 drawings
14.	Dam lighting system drawings	10 drawings
15.	Earthing system drawings	10 drawings
	Sub-Total	115 drawings
<b>(B)</b>	<b>Instrumentation and Dam Control system</b>	
19.	Process and Instrumentation Diagrams (P&ID)	4 drawings
20.	Process analysis note with PLCs (Programmable Logic Controllers) specification including Input / Output definitions.	1 note, 20 pages
21.	Operational philosophy notice with definition of the Supervisory Control And Data Acquisition system (SCADA), including the type of servers and software responsible for communicating with the field equipment (Remote Terminal Units, PLCs, Sensors etc.), and then to the Human Machine Interface (HMI) software running on workstations in the control room.	1 note, 30 pages
22.	General arrangement of the control room	2 Drawing
23.	Control/command cables installation and connection drawings	8 Drawings
	Sub-Total	16 documents & drawings

## Hirakud - Additional Spillway

### Manpower requirement for review of construction stage design / drawings & construction supervision.

The Consultancy Agency will have manpower for undertaking the work of review of the construction stage designs/ drawings prepared by the construction agency and construction supervision to be deployed at / near the project to work on behalf of the Odisha State Govt. The period of Consultancy will span for 36 months. For the work of review of construction stage designs/drawings & construction supervision, requirement of manpower has been worked out as under.



**Note: 1) The Consultant will use existing laboratories / facilities of Hirakud Dam authorities / Civil Contractor for all testing purposes regarding quality control / quality assurance.**

**2) The experience of consultants team shall be as per Clause 6.3 of information on EOI**

**3) The above manpower requirement is indicative. The consulting firm has to assess the requirement for complete execution of the project.**