



BAIF Institute for Sustainable Livelihoods and Development
Lachhakadi, PO-Gangpur, Vansda, Navsari– 396580



Tel.: 02630 244005

Tender Notice

Tender notice no: **BISLD/ADPG-II/RCC Jalkund/2019–20/1**

Date: 9th May 2019

Sealed tenders in the prescribed format in two parts (Techno-commercial bid & price bid) are being invited from experienced & reputed civil contractors for the **construction of RCC Jalkund** in the **villages of Dangs & Valsad District**

Tender document price: `500 /- (Rupees Five hundred only).

Tender Issue Date: 09th May 2019, 11.00 am

Tender Submission Last Date: 15th May 2019, 2.30 pm

Website - www.baif.org.in/ www.bisld.org.in



Chapter1: Detailed Tender Notice & Conditions

Tender notice no.: **BISLD/ADPG-II/RCC Jalkund/2019–20/1**

Date: 9th May 2019

Sealed tenders in the prescribed format in two parts (Techno-commercial bid & price bid) are being invited from experienced & reputed civil contractors for the **construction of RCC Jalkund in Dangs & Valsad district.**

Scope of work:

- 1.1 Name of work: **Construction of RCC Jalkund in Dangs& Valsad district**
- 1.2 Construction of Plain Cement Concrete & RCC structure (as per detailed bill of quantity enclosed).
- 1.3 The above work shall be carried out as per the technical specification mentioned in Chapter 2 of this tender document.

2. Availability of tender documents

2.1 The non-transferable tender documents can be obtained from the office of BAIF Institute for Sustainable Livelihoods and Development (BISLD), Lachhakadi, PO Gangapur, Vansda, Navsari, Gujarat – 396580 on payment of `500/- (Rupees Five hundred only) in cash or demand draft drawn from any scheduled bank favoring “BAIF Institute for Sustainable Livelihoods and Development ”and payable at Vansda, Navsari district.

Tender not submitted with the cost of tender documents as prescribed above shall be considered as invalid and rejected.

2.2 All other terms and conditions shall remain the same as stipulated in the tender notice. Further corrigendum/addendum etc if any, will be made available on our website only.

3. Rate to be quoted

The bidders are required to quote their percentage rate and total cost both in figures and words in the “Price Bid” format enclosed in Annexure-II. The quoted rate shall be inclusive of all prevailing taxes and duties. In case of any change in the taxes by the Government during the contract period, the same shall be considered and will be paid extra.

The bidder will be evaluated on the basis of the lowest quoted percentage rate in the price bid. The rate quoted in the price bid should be in line with the total value quoted in the BOQ. If percentage rate quoted is not workable, committee reserves right to reject tender

Tenders containing overwriting, corrections without authentication with signature on the pages of “Price Bid” will be liable for rejection. In case there is any discrepancy between figures and words, then the amount quoted in words will be considered for revaluation.

In case the quoted percentage rate is abnormally lower than the estimate, BISLD reserves the right to call justification from bidder. further, the bidder may have to submit a performance guarantee in the form of bank guarantee towards the differential amount.



4. Earnest Money Deposit (EMD)

4.1 EMD of the prescribed amount must be submitted in the form of demand draft/bankers' cheque /pay order drawn in favor of '**BAIF Institute for Sustainable Livelihoods and Development**' and payable at Vansda, Navsari district along with the bid. Cheques, bonds, guarantee bonds and govt.securities (stock certificates, bearer bonds, promissory notes, and cash certificates) will not be accepted towards the earnest money. No interest will be paid on EMD. EMD of the unsuccessful bidders shall be refunded/returned immediately after the final evaluation of the tender and issue of the work order to the successful bidder.

4.2 The EMD amount shall not bear any interest. In case the awarded bidder denies accepting the work order their EMD shall be forfeited.

4.3 Tender without EMD shall be summarily rejected.

4.4 EMD of the successful bidder will be converted into security deposit to be retained without interest for a period of 12 (twelve) months after the date of issue of completion certificate. In case of submission of bank guarantee towards EMD, the successful bidder will have to extend the validity period of the guarantee till the end of 12 (twelve) months after the date of issue of completion certificate.

5. Submission of tender

5.1 Tenders shall be submitted in sealed envelopes only.

5.2 Envelope 1 (approx.30cmx25cm) should be sealed and superscribed "Techno-Commercial Bid for RCC Jalkund construction in Dangs & Valsad district (notice no. BISLD/ADPG-II/RCC Jalkund/2019–20/1)".Contact details of the bidder should be stated on front side bottom left of the envelope. This envelope should contain

- a. Techno-commercial bid filled as per format with a signature/seal on all pages.
- b. Enclosures/supporting documents as required.
- c. EMD demand draft

5.3 Envelope 2 (approx. 30cm x 25 cm) should be sealed and superscribed "**Price Bid for construction of RCC Jalkund in Dangs & Valsad district** (notice no BISLD/ADPG-II/RCC Jalkund/2019–20/1)". Contact details of the bidder should be stated on front side bottom left of the envelope. This envelope should contain a. Price bid as performs at with signature/seal on all pages.

5.4 Envelope 1 and Envelope 2 should be put inside Envelope3 (approx.40cmx30cm). Envelope 3 should be sealed and superscribed "**Offer for construction of RCC Jalkund in Dangs & Valsad district**". Contact details of the bidder should be stated on front side bottom left of the envelope.

5.5 Envelope 3 should be submitted/sent to the following.

Senior Programme Manager

BAIF Institute for Sustainable Livelihoods and Development Lachhakadi, PO-Gangpur, Vansda, Dist.Navasari–396580

5.6 Last date of submission: 15th May 2019 up to 02.30pm.

5.7 Submission "by hand "is preferred. However, the bidder may choose to send the offer by Speedpost/Courier.

5.8 Tenders received after the deadline will not be accepted. It is the responsibility of the bidder to ensure and confirm that the tender is received in time.



5.9 Queries pertaining to tender, if any, may be clarified by contacting Mr.V.U.Patil TPE during office hours at the number given above.

5.10 Interested bidders are advised to visit the site at own cost and familiarize themselves with the site conditions, concerned areas and to go through the terms and conditions of the tender document before submission.

5.11 Tenders not received in prescribed form will be liable to be summarily rejected.

5.12 Tenders not adhering to the terms and conditions are liable to be rejected.

5.13 BISLD reserves the right to accept or reject any or all tenders without assigning any reason thereof.

5.14 The tender documents have to be signed by the bidder on each page and the terms and conditions must not be altered, failing which the tender will be rejected.

5.15 Tender form containing 'overwritten' or 'erased' rate or rates and amount not showing figures and words in English will be liable to rejection.

5.16 Tender containing clerical or arithmetical mistakes may be rejected.

5.17 Any request from the bidder in respect of additions, alterations, modifications etc.of either terms or conditions or rates of his tender after the opening of the tender may lead to rejection of the tender.

5.18 **Pre-bid meeting:** A pre-bid meeting is scheduled on 13th May 2019 at 11:30 am at BAIF Institute for Sustainable Livelihoods and Development (BISLD), Lachhakadi, PO.Gangpur, Vandsa, Navsari, Gujarat-396580 for any clarifications pertaining to offer, specifications, requirements, site, etc. Interested bidders may attend the same.

6. Tender opening

6.1 Techno-commercial bids shall be opened in the presence of the designated committee of BISLD. Price bids of bidders whose techno-commercial bids are found acceptable will opened at a later date in the presence of the designated committee. Tender opening dates shall be conveyed to the bidders. Interested bidders may be present during the opening.

6.2 BISLD reserves the right not to accept the lowest offer. BISLD also reserves the right to cancel the tender. No claim from any bidder in this regard shall be entertained.

6.3 The validity of the offer shall be 180 days from the date of submission of the tender.

7. Date of commencement of work

7.1 The successful bidder should commence the work within 7 days after issuing the work order.

8. Contract period

8.1 The contract period shall be for 45 days from the date of issuing the work order.

9. Jurisdiction

9.1 The jurisdiction shall be Vandsa.



10. Salient features of the bid

Sr.	Particular	Details
1	Tender notice no.	BISLD/ADPG-II/RCC Jalkund/2019–20/1
2	Dated	9 th May 2019
3	Name of the work	Construction of RCC Jalkunds in Dang & Valsad District: total 248 nos
4	Cost of tender document	`500/- (Rupees five hundred only)
5	Earnest Money Deposit	15000/- (Rupees fifteen thousand only)
6	Availability of tender document	BAIF Institute for Sustainable Livelihoods and Development, Lachhakadi, PO-Gangpur, Vansda, Navsari–396580
7	Date of issue	9 th May 2019, 11:00 am
8	Date of submission	Till 15 th May 2019, 2.30 pm
9	Period of contract	45 days from the issue of work order
10	Validity of offer	5 days from the date of issue of LOI/Work Order

11. Eligibility criteria

11.1 The bidder should be an established contractor/firm with experience in civil construction works. The bidder should have undertaken three works of similar nature (as given in scope in the tender) in the last three years with each work amounting to more than `3 lacs.

11.2 The bidder should have an annual turnover of not less than `3 lacs for the preceding three years (2016-17, 2017-18, 2018-19).

11.3 Documents in support of above clauses 11.1 and 11.2 should be attached with the techno-commercial bid. Submission of any incorrect/forged/false documents will attract legal action including rejection of tender and cancellation of the contract at the risk and cost of the bidder.

11.4 The bidder should have paid the tender document cost of `500/- and the offer should be accompanied by the EMD of the specified amount.

12. Evaluation of the bids

12.1 Two bid evaluation system shall be followed.

13. Area of works

13.1 The area of works is located in Dang and Valsad district. The bidders are advised to visit the site at own cost to acquaint themselves with the working conditions, soil quality, etc. before submitting the tender. BISLD will provide the exact location of the construction site.

14. Award of the contract

14.1 After evaluation of the received offers through two bid process, the contract may be awarded to the L1 bidder.

14.2 Notwithstanding the above, BISLD reserves the right not to award the contract to the L1 bidder and may cancel or reject any part or whole of the tender without assigning any reasons what



so ever. The bidders shall not be entitled to any claims on account of the incidental expenses incurred.

14.3 Acceptance of the bid shall be intimated through a letter of intent/work order. In turn, the bidder has to countersign and return the same as a token of acceptance.

14.4 An agreement may be entered between BISLD and the selected contractor for execution of work.

15. Work schedule, maintenance of record and measurement

15.1 The successful bidder will draw the work schedule of each activity along with the time schedule of completion of work. The work schedule is to be drawn in consultation with the team of BISLD. However, the quantities set out in the schedule of items are only the estimated quantities of the works and are subject to alterations /modifications as per the instructions of the BISLD.

15.2 The engineer of BISLD may suggest variations after getting the written permission from TPE and SPM of BISLD in the quantity of the works to be performed for what so ever reason in the interest of BISLD and community as per the following.

- a. Increase or decrease the quantity of any work included in the contract
- b. Omit any such work
- c. Change the levels, lines, positions, and dimension to any part of the works
- d. Execute additional work of any kind necessary for the completion of the works and no such variation shall in any way vitiate or invalidate the contract but the value (if any) of all such variations shall be taken into account in ascertaining the amount of the contract price.

15.3 The monitoring of the work carried out will be recorded in a Measurement Book which shall be maintained by the concerned engineer. The engineer shall ascertain and determine the value of work done by measurement. For the purpose, he/she may give notice to the contractor for measurement of any portion of the work. The contractor shall forthwith attend or send a qualified agent to assist the engineer or the engineer's representative in seeking such measurement and shall furnish all particulars required by either of them. If the contractor ignores or neglect or omits to attend such agent, then the measurement made by the engineer or approved by him shall be taken to be the correct measurement of the works. The engineer will have the right to inspect the scaffolding, centering and shuttering made for the work and reject partly or fully such structures if found defective.

16. Payment terms

16.1 Payment of running account bills shall be released to the contractor through RTGS/NEFT subject to the submission of details of a bank account.

16.2 85% of the RA bill shall be released depending upon the progress of work and subject to inspection and verification made by BISLD. After verification and certification by Thematic programme Executive-BISLD shall forward the same to the Accounts Department for consideration of payment.

16.3 Necessary pre-inspection of the materials will be made by the engineer in order to ascertain the quality and conformity with standards.

16.4 10% of the payment will be made on completion of the job in all respect, issue of work completion certificate and fulfillment of the liabilities by the contractor.



16.5 Balance 5% of payment will be released on completion of defect liability period of 12 months after the issue of completion certificate.

16.6 No payment will be made for benchmarks, level pillars, profile, benching, ground leveling or any temporary works which are required for successful completion of work.

16.7 For construction and repair of dams, user group contribution is assigned to the beneficiary under unskilled labor work. The contractor has to ensure the involvement of the user community to this extent in unskilled labor work.

17. Penalties

17.1 Liquidated damages: If the contractor fails to successfully complete the work as per the specification within the stipulated time period mentioned in the work order the necessary liquidated damage will be deducted from the final bill. For the purpose of liquidated damage deduction, the total value of actual work done against the work order will be considered. The rate of liquidated damage will be 0.5% (half percent) per week subject to a maximum of 5% of the total value of work done. No liquidated damage is applicable if the completion period of the work gets extended beyond the stipulated period of the contract due to no fault of the contractor Decision of BISLD shall be binding and final in this regard.

17.2 Forfeiture: In case the successful bidder fails to take up the work after issuance of work order BISLD may at its discretion impose upon any or all of the following penalties.

- a. Cancellation of the work order. In case of cancellation, the recovery of extra cost incurred by BISLD for getting the work done through other sources/agencies which may be without any notice to the contractor will be recovered from the contractor.
- b. Forfeiture of earnest money/security deposit/bank guarantee wholly or partly without notice to the contractor.
- c. Blacklisting of the contractor.
- d. Recovery from any of the other present/future pending bills of the contractor.

18. Price escalation

18.1 No price escalation during the period of validity of the offer shall be accepted by BISLD.

19. Signing of agreement

The successful bidder shall be required to sign an agreement with BISLD within 5 days of the issue of work order/LOI or within such extended period as may be specified In case the contractor fails to sign the agreement within the stipulated time, BISLD will have right to terminate the contract and forfeit the EMD of the bidder and the bidder stands debarred from future participation in any tender of BISLD.

20. Obligation of the contractor

20.1 The contractor will commence and complete the work as stipulated in the tender document.

20.2 The contractor will have to make own arrangements for traveling, boarding, lodging, etc.

20.3 The job cannot be sublet in part or in whole without the written consent of the Senior programme Manager, BISLD, Lachhkadi

20.4 The contractor will comply with the directions of BISLD from time to time.



20.5 All security arrangement for the materials to be utilized in the project shall be done by the contractor until completion and handover.

20.6 The contract assumes a proper degree of skill on the part of the contractor and all his workmen employed. The contractor shall consult with engineer whenever in his judgment variation in the work of construction or in the quality of the materials specified would be beneficial or necessary to fulfill the guarantees called for in the contract Such variations shall be carried out by the contractor only when authorized by the engineer in writing The request for such changes shall be made before the contract agreement is executed otherwise guarantees will be understood to hold good for work. As specified in the contract and any variation necessary to fulfill such guarantee shall be carried out by the contractor at is own cost.

20.7 The guarantee period for all the civil works and equipment/accessories etc. should not be less than 01(one) year from the date completion of the work. All the documents related to a guarantee to be submitted to BISLD.

20.8 The contractor shall report the occurrence of any accidents at the work site including particulars of his employees involved to the concerned authorities and effect payment of compensation as per the Workmen's Compensation Act as amended from time to time within the prescribed time limit.

20.9 The contractor shall at his own cost observe, perform and comply with the provisions of the Contract Labor (Abolition and Regulation) Act, 1971 and the rules made thereunder as amended from time to time. The contractor shall have to observe, perform and discharge his/their obligations under the said act and BISLD shall be entitled to recover from the contractor any cost of expenses that it may have to incur or suffer on account of contractor's failure.

20.10 The material to be supplied by the contractor shall be as per IS specification. All the materials needed for the work must be approved by the engineer and brought to the site in bulk.

20.11 If any work either in temporary or permanent nature or necessary to complete the work in all respect but not mentioned in the tender shall have to bed one without extra cost.

20.12 The contractor has to arrange the adequate lighting arrangement for the work wherever necessary at his own cost.

20.13 After the work is finished, all surplus materials and temporary structures should be removed from the site of work such as brickbats, aggregate, mixing platform, etc. The site and the premises left to be neat and clean.

20.14 The contractor shall give or provide all necessary supervision during the execution of the work. The contractor or his authorized representative is to be constantly on the work and shall give his whole time for the supervision of the same. Such authorized representative shall receive direction and instruction from the engineer on behalf of the contractor. Site meeting will be called at regular interval and the contractor or his authorized representative will be required to be present in such meetings to discuss the progress of the work and other matters including any deviation from drawing or specification.

20.15 The contractor shall comply with all prevailing safety and environmental laws.

21. Supplementary items

21.1 The item so the work not covered in the specific schedule of items or BOQ will be considered as supplementary items. The rate of the supplementary items of work will be determined in order of precedence as given below.



- a. The rate will be derived where ever possible from the rate of allied items of work quoted by the contractor in the specific schedule of probable items of work plus the contractual percentage.
- b. The rate of the items which cannot be derived by any of the above processes shall be determined from the market rate of the materials and labor plus profit and overhead charges. However, the profit and overhead charges were taken together shall constitute 10% of the cost of materials and labor.

22. Completion certificate

The work shall be said to be completed on the basis of certification of the user department and subject to completion of all sorts of laboratory tests as instructed by the engineer and on receiving written undertaking from the contractor to finish any outstanding work during the period of maintenance/defect liability period, the concerned engineer shall issue a Certificate of Completion in respect to of the work. The period of maintenance of the works shall commence from the date of such certificate.

23. Tax deducted at source

Income tax and other taxes as applicable shall be deducted at source, at the rate prescribed in the Income Tax Act and or other Acts, from the gross value of each bill.

24. Legal and miscellaneous

The contractor shall be fully responsible to comply with all his statutory obligations as employer towards Employees Provident Fund Act-1952, Employees State Insurance Act-1952, Employees Deposit Linked Benefit Act-1961, Minimum Wages Act-1948, Bonus Act-1965, Gratuity Act-1972 etc. and all other such obligations/ liabilities as per applicable statutory provisions/law and Government notifications; in respect of their labour engaged by them for the job undertaken under the contract, and will take full liability on this account. BISLD will not take any financial liability on this account. In the event of failure of the contractor to comply with the above, BISLD shall be entitled to recover the amount by deduction from any amount payable to the contractor under the contract, including security deposit.

25. Deviation

Deviations sought by the bidder whether they are commercial or technical must only be given within the schedule, prescribed for them. Any willful attempt by the bides to camouflage the deviation by giving them in the covering letter or in any other documents than the prescribed schedules may render the bids to be non-responsive. Any incomplete tender or conditional tender received shall be liable for rejection.

26. Modification of contract

BISLD reserves the right to modify the contract from the point of view of smooth execution. The same shall be conveyed to the contractor.

27. Force majeure



27.1 The contractor shall have no claim what so ever against BISLD for any loss/damage caused to the contractor by reason of war, riot, disturbance pestilence/epidemic sickness, strike lock-out, earthquake, fire, storm, flood, explosion, any change in the nature of deposits, breakdown at plant or machinery for whatever reason, failure/restriction of electrical or other power, act of God, etc.

27.2 Either party affected by the force majeure will provide notice of happenings of any such eventuality to the other party within 7 days from the date of occurrence or failure will not give any benefit.

27.3 The contractor shall resume the work as soon as practicable after such eventuality has ceased to exist.

27.4 If the performance in whole or part of any term/obligation under the contract is prevented or delayed by any such eventuality for a period exceeding 7 days of escalation of above events the contract may be terminated at the discretion of BISLD.

28. Arbitration

Any dispute or difference under or arising out of or in respect of the agreement/accepted contract may be settled mutually. If not settled mutually, it shall be referred to the sole Arbitrator, a person appointed by BISLD and his decision in the matter will be final and binding on both the parties. The arbitration shall be carried out as per Arbitration Act, 1996 and Rules made thereunder as amended from time to time.



Chapter2: Technical Specifications

Section1: General

1. For all items of work described in the bill of quantities, the work shall be carried out strictly in accordance with description in general specifications, particular specifications and drawings. The description, drawings and specifications shall be taken complementary to each other and shall form part of this contract.

2. The percentage rates quoted shall be deemed to include all necessary hardware, tools, plants, props, material, labor, duties, taxes, insurance etc.all needed for successful work completion as per scope.

3. Scope of work

3.1 Construction of Plain Cement Concrete & RCC structure for up-stream & down-stream protection to the structure (as per detailed drawing and bill of quantity enclosed).

3.2 Although all the details of construction have been by and large covered in these documents, any item or detail of construction not specifically covered but obviously implied and essential to consider civil works and all internal services complete and functional shall be deemed to have been covered in the item rate quoted. The bidder may, however, consider a minimum level of specifications conforming to IS Code to cover these missing details.

4. Curing

4.1 Exposed surfaces of all cement work viz.cement concrete, brickwork, flooring, plastering, pointing and the like shall be cured by keeping surface adequately and continuously wet as directed by the engineer for at least seven days. Cost for this shall be deemed to be included in the percentage quoted against the respective schedule.

5. Barchart

5.1 The contractor shall submit a bar chart to engineer, BISLD for the work in the contract. The above bar chart shall be submitted by contractor within one week of acceptance of the contract. Barchart, as submitted, shall be scrutinized by the engineer. Mutually agreed bar chart shall be finalized within three days of submission by the contractor. The contractor shall carry out the changes as suggested by the engineer. The mutually agreed bar chart shall be signed by the contractor and engineer. This shall be binding on the contractor for progressing the work for completion by the due date.

Section2: Excavation and earthwork

1.Scope: This section covers the specification of the work of earthwork in an excavation in all kinds of soils including murrum, hard murrum, soft rock (without blasting,hard rock (without blasting), rock (with blasting), filling excavated earth in plinths, sand filling in the plinth, rubble soiling and brick on edge soiling. Engineer will furnish the necessary drawing showing the areas to be excavated, filled, sequence of priorities etc. Contractor shall strictly follow such drawings.



2. General

2.1 Contractor shall provide all tools plants, instruments, qualified supervisory personnel, labor, materials and temporary works, consumable sand everything necessary whether or not such items are specifically stated herein for completion of the work.

2.2 Contractor shall set properly all line sand establish levels for various works such as earthwork in an excavation in the foundation of toilet etc. The area to be excavated/filled shall be cleared of fences, trees, plants, logs, slumps, bush, vegetations, rubbish, slush, etc. and other objectionable matter. If any roots or stumps of trees are found during excavation, they shall also be removed. The materials removed shall be burnt or disposed off as directed by the engineer. Where earth fills intended, the area shall be stripped of all loose/soft patches, topsoil containing deleterious matter/materials before fill commences. Final cleaning shall be done with removal of all rubbish up to the distance of 30 m all around outside the periphery of the structure.

3. Mode of measurement

3.1 Backfilling,plinthfillingetc.with borrowed earth will be paid for under specified items. The quoted rate shall include all operations such as clearing, excavation, lead and transport, fill, compaction, etc. as specified. The actual quantity of consolidated filling shall be measured and paid for in cubic meters irrespective of lead and lift.

4. Disposal of surplus soil

4.1 Surplus soil/earth if any shall be disposed off within the site up to the quantity as directed by the engineer and the same shall be spread out evenly for which no extra payment shall be made. The balance of surplus quantity shall be removed away from the site. The cost of this removal shall be deemed to be included in the quoted rates/percentages.

Section3: Cement concrete work

1. Applicable codes

1.1 The following codes and standards are made apart of the specifications. All standards, codes of practices referred to herein shall be the latest edition including all applicable official amendment sand revisions. In case of a discrepancy between this specification and those referred to herein, this specification all prevail.

Materials:

IS 269: Specification for ordinary, rapid hardening and low heat Portland cement

IS455: Specification for Portland blast furnace slag

IS1489: Specification for Portland Pozzolana Cement Equipment:

IS1791: Specification for batch type concrete mixers

IS2505: Specification for concrete vibrators immersion type



Codes of Practice:

IS456: Code of practice for plain and reinforced concrete

IS3385: Code of practice for measurement of civil engineering works

Above mode of measurements shall be applicable only if it is not given specifically in the tender document.

2. Quality

2.1 The quality of materials, method, and control of manufacture and transportation of all concrete work irrespective of the mix, whether reinforced or otherwise shall conform to the applicable portions of this specification. Engineer shall have the right to inspect the source/soft materials/the layout and operation of procurement and storage of materials, the concrete batching and mixing equipment and the quality control system. Such inspection shall be arranged and engineer's approval obtained, prior to starting of concrete work.

3. Materials

3.1 Cement: Unless otherwise specified the cement shall be ordinary Portland cement in 50 kg bags of 53 grade/PPC as applicable. The use of bulk cement will be permitted only with the approval of Engineer-in-Charge. For this, the contractor will be required to construct a proper storage facility. Only PPC or 53 grade cement of major IS marked plant should be used by the contractor.

3.2 Aggregates: Unless otherwise, the aggregates shall conform to the requirements as per IS 383:1970. Aggregate in general design at both fine and coarse in materials used in the manufacture of concrete. Fine aggregate is aggregate all of which passes through 4.75 mm sieve. Coarse aggregate is aggregate most of which is retained on 4.75 mm sieve.

All fine and coarse aggregates proposed for use in the work shall be subject to Engineer-in-Charge approval and after specific materials have been accepted the source of supply of such materials should not be changed without prior approval of Engineer-in-Charge.

All coarse and fine aggregates shall be stacked in stock separately in stockpiles in the material yard near the work site in bins properly constructed to avoid intermixing of different aggregates. Contamination with foreign materials and earth during storage and heaping the materials shall be avoided. The aggregate must be of a specified quality not only at the time of receiving at the site but more so at the time of loading into the mixer. Rackers shall be used for lifting the coarse aggregates from bins or stockpiles. Coarse aggregate shall be piled in layers not exceeding 1.20 m in height to prevent coning or segregation. Each layer shall cover then tire area of the stockpile before succeeding layers are started. Aggregates that have become segregated shall be rejected.

Coarse aggregate for concrete, except as noted above and for other than lightweight concrete shall conform IS383. This shall consist of natural or crushed stone and gravel and shall be clean and free from elongated, flaky or laminated pieces, adhering coatings, clay lumps, coal residue, clinkers slag, alkali mica, organic matter or other deleterious matter.



Coarse aggregate shall be graded in both cases, the grading shall be within the following limits.

The pieces shall be angular in shape and shall have granular or crystalline surfaces. Mica and shale, if present, shall be only in such quantities that will not, in the opinion of engineer affected adversely the strength and/or durability of concrete. The maximum size of coarse aggregate shall be in no case greater than $\frac{1}{4}$ of the minimum thickness of the member, provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and fill the corners of the form. Plums above 150 mm and up to any reasonable size can be used in plain mass concrete work of large dimensions up to a maximum limit of 20% of the volume of concrete when specifically approved by Engineer-in-Charge. For heavily reinforced concrete members the nominal maximum size of the aggregate shall be 5 mm less than the minimum clear distance between the reinforcing main bars or 5 mm less than the minimum cover to the reinforcement whichever is smaller. The number of fine particles occurring in the free state or as loose adherent shall not exceed 1% when determined by laboratory sedimentation tests as per IS 2386. After 24 hours immersion in water, a previously dried sample shall not have gained more than 10% of its self weight in the air, as determined by IS2386.

3.3 Sand

Sand shall be clean and free from dust or organic foreign matter and its grading shall be within the limits. Sand from the Tapi/Par river should be used for construction work.

3.4 Water

Unless otherwise stated the water quality and requirements for concrete will be in conformity with IS 456:1978. Water used for both mixing and curing shall be free from injurious amounts of deleterious materials. Potable water is generally satisfactory for mixing and curing concrete. Water-cement ratio should be 1:0.5.

3.5 Reinforcement steel

All MS reinforcing bars shall conform strictly to IS432:1982 and high strength deformed steel (Torq steel) bars should conform to IS 1786:1985. All reinforcement shall be clean and free from loose mill scales, cost, loose rust, coats of paints, oil or other coatings which may destroy or reduce bond.

All reinforcing bars shall conform to drawings and dimensions shown on the drawing or where required to carry out the according to the intent of drawings or specifications. Reinforcement shall not be bent or straight needing manner injurious to the materials. Bars containing cracks or splits shall be rejected. They shall be bent cold, except bars of over 25 mm in diameter which may be bent hot if specifically approved by the Engineer-in-Charge. Bars which depend for their strength on cold working shall not be bent hot. Bars bent hot shall not be heated beyond cherry red colour (not exceeding 845 Degree Celcius) and after bending the same shall be allowed to cool slowly without quenching. No reinforcement shall be bent when in position in the work without approval, whether or not it is partially embedded in hardened concrete. Bars with kinks or bends not shown on drawings shall not be used.

Reinforcing bars supplied bent or in coils, shall be straightened before they are cut to size.



Straightening of bars shall be done in cold and without damaging the bars. This is considered as apart of reinforcement bending fabrication work.

3 Mixing of cement concrete

The quantities of cement shall be determined by weight. Ordinary Portland cement shall be taken to weigh 1442 kg/m³. The quantities of fine and coarse aggregates shall be determined either by volume for ordinary concrete and by weight for controlled done. The proportions of volume or weights specified are based on dry aggregates, due allowances to beamed for bulking or variation in weight of aggregates according to IS 2386(Part-III):1963.

All concrete shall be mixed in a mechanical mixer until there is a uniform distribution of the materials and the mass is uniform in colour and consistency but in no case shall the mixing be done for less than two minutes. Hand mixing shall not be allowed for any concreting work on the job.

4 Mix design

All concrete in the works shall be of design mix as defined in IS456 unless it is nominal mix concrete such as 1:2:4, 1:3:6, 1:4:8 or 1:5:10. It shall be very clearly understood that whenever the class of concrete such as M20 is specified it shall be the contractor's responsibility to ensure that minimum crushing strength stipulated for the respective class of concrete is obtained at works. The maximum total quantity of aggregate by weight per 50kg of cement shall not exceed 450 kg except when otherwise specifically permitted by Engineer-in-Charge.

5 Proportioning, consistency, batching and mixing of concrete

5.2 Aggregate: The proportions which shall be decided by conducting a preliminary test shall be by volume. These proportions of cement, fine and coarse aggregates shall be maintained during subsequent concrete mixing. The supply of properly graded aggregate of uniform quality shall be maintained over the period of work, the grading of aggregates shall be controlled by obtaining the coarse aggregate in different sizes and blending them in the right proportions. The different sizes shall be stocked in separate stockpiles. The grading of coarse and fine aggregate shall be to let frequently as possible as determined by the engineer, to ensure maintaining of grading in accordance with the samples used in the preliminary mix design. The material shall be stockpiled well in advance of use.

5.3 Cement: The cement shall be measured by volume in normal cases. However, in case of central weight batching plants, cement may be weighed for each batch if so desired by Engineer-in-Charge.

5.4 Water: Only such quantity of water shall be added to the cement and aggregates in the concrete mix as to ensure dense concrete, specified surface finish, satisfactory workability, consistent with the strength stipulated for each class of concrete. The water added to the mix shall be such as not to cause segregation of material or the collection of excessive free water on the surface of the concrete. The water-cement (W/C) ratio is defined as the volume of water in the mix (including the surface moisture of the aggregates) divided by the volume of cement in the mix. The actual water-cement ratio to be adopted shall be determined in each instance by the contractor and approved by the Engineer-in-Charge.



The W/C ratio specified for use by engineer shall be maintained. The contractor shall determine the water content of the aggregates as frequently as directed by the engineer as the work progress and as specified in IS2386(Part-III) and the amount to water added at the mixer shall be adjusted as directed by an engineer so as to maintain the specified W/C ratio. To allow for the variation in the volume of aggregates due to variation in their moisture content suitable adjustments in the volume of aggregates shall also be made.

6 Curing, protecting, repairing and finishing

6.2 Curing

All concrete shall be cured by keeping it continuously damp for the period of time required for complete hydration and hardening to take place. Preference shall be given to the use of continuous sprays or ponded water continuously saturated covering of sacks, canvas, hessian or other absorbent materials, or approved effective curing compounds applied with spraying equipment capable of producing a smooth, even textured coat. Extra precautions shall be exercised in curing concrete during cold and hot water as outlined hereinafter. The quality of curing water shall be the same as that used for mixing concrete.

Certain types of finish or preparation for overlaying concrete must be done at certain stages of the curing process and special treatment may be required for specific concrete surface finish. Curing of concrete made of high alumina cement and super-sulfated cement shall be carried out as directed by the engineer.

Fresh concrete shall be kept continuously wet for a minimum period of 10 days from the date of placing of concrete following a lapse of 12 to 14 hours after laying of concrete. The curing of horizontal surfaces exposed to the drying winds shall, however, begin immediately after the concrete has hardened.

Water shall be applied uniformly to concrete surfaces within 1 hour after the concrete has set. Water shall be applied to formed surfaces immediately upon removal of forms. Quantity of water applied shall be controlled so as to prevent erosion of freshly placed concrete.

Whenever, by the judgment of engineer, it may be necessary to omit the continuous spray method, covering of clean sand or other approved means such as wet gunny bags which will prevent loss of moisture from the concrete, may be used. No type of covering will be approved which would stain or damage the concrete during or after the curing period. Covering shall be kept continuously wet during the curing period.

Surface coating type compounds shall be used only by special permission of engineer. Curing compounds shall be liquid type white pigmented. Other curing compounds shall be used on surfaces where future blending with concrete, water or acid-proof membrane or painting is specified.

All equipment and materials required for curing shall be on hand and ready for use before concrete is placed.

6.3 Protecting fresh concrete

Fresh concrete shall be protected from defacements and damage due to construction operation by



leaving forms in place for an ample period as specified later in this specification. Newly placed concrete shall be protected by approved means such as tarpaulins from rain, sun, and winds. Steps, as approved by an engineer, shall also be taken to protect immature concrete from damage by debris, excessive loading, vibration, abrasion or contact with other materials etc.that may impair the strength and/or durability of the concrete. Workmen shall be warned against and prevented from disturbing green concrete during its setting period. If it is necessary that workmen enter the area of freshly placed concrete, the engineer may require that bridges placed over the area.

6.4 Repair and replacement

Immediately after the shuttering is removed, the surface of the concrete shall be very carefully inspected and all defective areas called to the attention of engineer who may permit patching of the defective areas or also reject the concrete unit either partially or entirely. Rejected concrete shall be removed and replaced by the contractor at no additional expense. It shall be filled up and made good with mortar composed of one part of cement to one and a half parts of sand passing 2.36 mm sieve after removing any loose stones adhering to the concrete and shall be finished as described under the particular items of work.

Superficial honeycombed surfaces and rough patches shall be similarly made good immediately after removal of shuttering in the presence of engineer and superficial water and air holes shall be filled in. The mortar shall be well worked into the surface with a wooden float. Excess water shall be avoided. Unless instructed otherwise by engineer, the surface of the exposed concrete placed against shuttering shall be rubbed down immediately on removal of shuttering to remove fine or other irregularities and necessary care being taken to avoid damage to the surface. Surface irregularities shall be removed by grinding.

For BAIF Institute for Sustainable Livelihoods and Development