



**GOVERNMENT OF ODISHA
DEPARTMENT OF WATER RESOURCES
MINOR IRRIGATION**

**TENDER DOCUMENT FOR P-1 CONTRACT
(BID DOCUMENT)**

Improvement to Gadhuatotha Check Dam in Jhumpura Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"

SUPERINTENDING ENGINEER
MINOR IRRIGATION DIVISION
KEONJHAR

CONTRACTOR

SUPERINTENDING ENGINEER

Improvement to Gadhuatotha Check Dam in Jhumpura Block of Keonjhar
District under “Improvement to Check Dam Scheme for the year 2026-2027”

OFFICE USE ONLY

- | | |
|---|---------------------------|
| 1) Copy of active GSTIN | furnished / not furnished |
| 2) Copy of PAN | furnished / not furnished |
| 3) Affidavit of authenticity | furnished / not furnished |
| 4) No Relation Certificate | furnished / not furnished |
| 5) Affidavit for exemption of EMD (in case of Engg. Contractor) | furnished / not furnished |
| 6) Copy of Contractor's license | furnished / not furnished |

CONTRACTOR

SUPERINTENDING ENGINEER

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CHECK LIST FOR SUBMISSION OF PARTICULARS

1	Structure and Organization	Yes/ No
2	Financial position	Yes/ No
	a) Balance sheet of last five years	Yes/ No
	b) True copies of Income Tax & VAT clearance Certificate for the last five years for domestic contractors.	Yes/ No
3	Additional information	Yes/ No
4	Certificate of registration for execution of contract attached	Yes/ No
5	Certified copy of power of attorney in case of partnership firm, limited or Corporation attached.	Yes/ No
6	Affidavit for authenticity of document, EMD & Tender	Yes/ No
7	Affidavit for GST (outside bidders)	Yes/ No

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**GOVERNMENT OF ODISHA
OFFICE OF THE SUPERINTENDING ENGINEER,
MINOR IRRIGATION DIVISION, KEONJHAR**

NOTICE INVITING TENDER e-Procurement

Bid ID No. 02 SEMID (KJR/ 2026-2027) Dt. 07.08.2026

Superintending Engineer, Minor Irrigation Division, Keonjhar on behalf of Governor of Odisha invites bid through e-procurement in **Single cover** system as per Annexure to this bid Notice. The bid should be submitted online in the website www.tendersorissa.gov.in by **eligible Contractors with CDMS registration**. The bidders should have necessary Portal Enrolment (with his own Digital Signature Certificate). The registered bidders of outside Odisha can also participate in this process after necessary Portal Enrolment, but shall have to subsequently undergo registration with the appropriate authority of the State Government within a month of acceptance of bid.

Procurement Officer	Bid Identification No.	Availability of tender online for bidding		Date and Time of opening of Tender-Office of the Superintending Engineer, M.I. Division, Keonjhar
		From	To	
1	2	3	4	5
Superintending Engineer, Minor Irrigation Division, Keonjhar	Bid ID No.02 SEMID (KJR/ 2026-2027)	14.08.2026	24.08.2026 upto 5.00 PM	25.08.2026 at 11.00 AM

- Bids must be accompanied by a non-refundable fee as indicated at Column-6 of Annexure towards cost of bid documents and the amount specified at Column-4 as bid security of for the works in Annexure to this bid notice payable in favour of Superintending Engineer, M.I Division, Keonjhar.
- Other details can be seen from the Bidding documents which is available in the Website www.tendersorissa.gov.in
- Engineer contractor who wants to avail EMD Exemption shall have to furnish scan copy of affidavit along with tender, declaring there in that he/she has not yet availed EMD Exemption for not more than two nos. of works during this financial year and to show the original CDMS registration certificate to the tender opening authority for verification without which the tender will be rejected. A bidder has to deposit 2% EMD / Bid Security of the amount put to tender rounded off to the nearest one hundred rupees, if he/she proposes to **engage machineries and equipments** as asked for in the tender documents, owned or hired but **deployed from outside the state**.
- Tender shall be uploaded in standard formats prescribed in the bid documents displayed at Govt. of Odisha e-market place web site & submitted duly filled up. The on-line bidders should upload the **scanned clear copy** of the **affidavit** in support of correctness or proof of the information submitted including bid security accompanied with tender by them. They should **digitally sign** on all statements, documents, certificates uploaded by them, owning responsibility for their correctness/ authenticity. If the documents are not digitally signed, an **affidavit** owing genuinity of the documents should be uploaded. **The affidavit of authenticity of documents uploaded by the bidder being a legal document, checking genuinely of signature put on other uploaded documents including affidavit and lease deeds is beyond preview of the officer inviting tender. The bidder himself is liable for the authenticity of the documents if challenged by any other bidder or in the court of law.**
- As per Office Memorandum No. 14299 / Dtd. 03.10.2017 of Works Department, Additional Performance Security shall be obtained from the bidder when the bid amount is less than estimated cost put to tender. In such an event, only the successful bidder who has quoted less bid price / rates than the estimated cost put to tender shall have to furnish the amount of differential cost i.e. estimated cost put to tender minus the quoted amount as Additional Performance Security (APS) in accordance with latest circular of works Department 173 / dt. 03.01.2026 indicated as Sl. No. 6 in shape of NAC / Post office saving Bank Account / Post Office Term Deppisit Account / Kisan Bikas Patra / Bank Guarantee in favour of Divisional Officer from any Nationalized Schedule Bank in India counter guaranteed by its local Branch at Bhubaneswar / e-Bank Guarantee executed on the National e-Governance Service Limited (NeSL) Digital Document Execution Portal receipt pledge in favour of the Divisional Officer (Superintending Engineer) within seven days from the date of lottery, otherwise the bid shall be cancelled and the security deposit shall be forfeited. Further, proceeding for blacklisting shall be initiated against bidder. Following all codal procedure from time to time as laid down.
- As per Officer Memorandum No. 07764600022025 ___173___W, Bhubaneswar Dt. 03.01.2026 Amendment of Codal & Contractual Provisions, The Additional performance security shall be taken on an incremental basis from the selected bidder for low bid prices in the project works as under:

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- i. **Where the bid price is below 0% but not below 10% of the project cost put to bid,** no additional performance guarantee / security percentage is required.
 - ii. **Where the bid price is below 10% but not below 20% of the project cost put to bid,** the additional performance guarantee / security percentage shall be incremented by 0.1% for every percentage of bid price below 10% of the project cost put to bid starting at 11% with the additional bid performance guarantee being 0.1% and this additional performance guarantee percentage shall be applied on the bid price.
 - iii. **Where the bid price is 20% or more below of the project cost put to bid,** the additional performance guarantee percentage shall be increased for every percentage of bid price below 20% of the project cost put to bid in additional to 1% of the bid price and this additional performance guarantee percentage shall be applied on the bid price.
 - iv. The additional performance guarantee percentage shall be rounded off to the next lower percentage based on whether the decimal point of the percentage of the bid price is below 0.5% of next higher percentage based on whether the decimal point of the percentage of bid price is 0.5% or more.
 - v. The additional performance security shall be treated as part of the performance security.
 - vi. Justification for abnormally low bids shall be scrutinized by the Department Technical Committee and recommended to the competent authority of the Administrative Department for the approval of the Additional Performance Security (APS). An abnormally low bid is one in which the Bid price. In combination with other elements of the Bid, appears so low that it raises material concerns as to the capability of the Bidder to perform the contract offered price. Procuring Entity may, in such cases, seek written clarifications from the bidders, including details price analyses of its Bid price in relation to scope, schedule, resources mobilization, allocation of risks and responsibilities, and any other requirements of the bid document. If, after evaluating the price analysis, the procuring entity determines that the Bidder has substantially failed to demonstrate its capability to deliver the contract at the offered price, the Procuring Entity may reject the Bid/Proposal. However, it would not be advisable to fix a normative percentage below the estimated cost, which would automatically be considered as an abnormally low bid.
 - vii. If the APS & ISD submitted in shape of BG (Bank Guaranty). Then validity period of Bank Guaranty must cover the scheduled completion period plus the defect liability (DPL) period (one year) and othe month extra buffer for transaction and administrative processing.
7. **The cost of tender paper (non-refundable) as tabulated in the annexure shall be received online along with the bids as per guideline issued by Works Dept O.M No 6785 dated 09.05.2017 and No 17254 dated 05.12.2017. The procedure of bid submission using electronic payment of tender paper cost and EMD by the bidder is as per the notification of Works Dept O.M No 17254 dated 05.12.2017 which has been added to the DTCN.**
8. Bidders are advised to note the minimum qualification criteria specified in Clause-10 of the instruction to bidders to qualify for the award of the contract. Interested bidders may obtain clarifications regarding the minimum qualification criteria from the office of the Superintending Engineer, M.I. Division, Keonjhar prior to participation in the bid.
 9. Bid documents consisting of qualifying information and eligibility of the bidders, plans, specification, drawings, the schedule of quantities of estimate and abstract of various classes of work is available in the Website www.tendersorissa.gov.in.
 10. Bid for the work shall remain open for acceptance for a period of (90) Ninety days from the last date of receipt of Bids. If any Bidder/ Tenderer withdraw his/her Bid /tender before the said period or makes any modifications in the terms and conditions of the Bid, the said earnest money shall stand forfeited. Conditional Bid in any manner is subject to forfeiture of EMD.
 11. No Engineer of Gazetted Rank or other Gazetted Officer employ in Engineering or Administrative duties in an Engineering Department in State Government is allowed to work as contractor for a period of two years after his retirement from Government Service without Government permission.
 12. Clear scanned copies of **No relation certificate in shape of affidavit, original valid Contractor Data Management System (CDMS) Registration Certificate, valid & active GST Certificate, PAN, Affidavit** regarding correctness / authenticity of document for each work separately, Affidavits for claiming / availing of price preference in case of SC/ ST / Physically Handicapped Contractors should be clearly indicate and mention the e-mail ID & contact no. also should be uploaded along with the Bid documents for any such immediate contact and smooth facilitation in communication facility to the concerned bidder. **Non-visible copies of documents may be liable for rejection of BID.**
 13. The bidder shall have to furnish No relation certificate along with the bid documents to the effect that no officer of the Department to the rank of Junior Engineer or above is related to him.
 14. Further corrigendum if any can be seen from the website: www.tendersorissa.gov.in / office Notice Board.
 15. GST to be imposed as applicable.
 16. The bid is liable to be rejected if the TDRs submitted found fake and criminal action shall be initiated against the bidder.
 17. In case of transparent lottery need to be conducted in accordance with latest circular of work department the lottery will be held on **02.09.2026** after 11.00 AM onwards in EMIC conference Hall as per OM No. 632 /W Dt. 09.01.2026. If any deviation in this due to some unavoidable / unwarrent circumstances, will be intimated as per given contact no./ mail ID / through

office Notice Board for bidder information and the remaining process will be taken care in the next working day or any suitable date as fixed and the same time and venue will be intimated.

18. Successful tenderer will be intimated for executing Agreement timely with due instructions and S.O.P followed by Govt. time completion of the work in all respect at his own cost.
19. Authority reserves the rights to reject any or all the tenders without assigning any reasons thereof.

ANNEXURE TO BID NOTICE

Sl No.	Name of the project and location	Approx. Estd. Cost in Rs. lakhs	Bid Security in Rs.	Class of contractor With CDMS registration	Cost of Bid Documents in INR	Date of Sale & Receipt of Tender	Time for completion
1	2	3	4	5	6	7	8
1	Improvement to Padampur Check Dam in Keonjhar Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"	12.70	12700.00	"D" & 'C' Class	6000/-	14.08.2026 to 24.08.2026	04 (Four) Calendar Months
2	Improvement to Mandua-II Check Dam in Keonjhar Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"	12.69	12690.00	"D" & 'C' Class	6000/-	14.08.2026 to 24.08.2026	04 (Four) Calendar Months
3	Improvement to Bhuldasahi-I Check Dam in Jhumpura Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"	8.01	8010.00	"D" & 'C' Class	4000/-	14.08.2026 to 24.08.2026	04 (Four) Calendar Months
4	Improvement to Bhuldasahi-II Check Dam in Jhumpura Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"	7.76	7760.00	"D" & 'C' Class	4000/-	14.08.2026 to 24.08.2026	04 (Four) Calendar Months
5	Improvement to Gadhuatotha Check Dam in Jhumpura Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"	8.17	8170.00	"D" & 'C' Class	4000/-	14.08.2026 to 24.08.2026	04 (Four) Calendar Months
6	Improvement to Degaghat Check Dam in Jhumpura Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"	8.87	8870.00	"D" & 'C' Class	4000/-	14.08.2026 to 24.08.2026	04 (Four) Calendar Months
7	Improvement to Babajisahi Check Dam in Patna Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"	6.88	6880.00	"D" & 'C' Class	4000/-	14.08.2026 to 24.08.2026	04 (Four) Calendar Months
8	Improvement to Bhaliadala-I Check Dam in Telkoi Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"	8.47	8470.00	"D" & 'C' Class	4000/-	14.08.2026 to 24.08.2026	04 (Four) Calendar Months
9	Improvement to Bhaliadala-II Check Dam in Telkoi Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"	8.36	8360.00	"D" & 'C' Class	4000/-	14.08.2026 to 24.08.2026	04 (Four) Calendar Months

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10	Improvement to Kathiamunda Check Dam in Telkoi Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"	8.48	8480.00	"D" & 'C' Class	4000/-	14.08.2026 to 24.08.2026	04 (Four) Calendar Months
11	Improvement to Kasiabandha-I Check Dam in Joda Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"	7.89	7890.00	"D" & 'C' Class	4000/-	14.08.2026 to 24.08.2026	04 (Four) Calendar Months
12	Improvement to Jhargaon Check Dam in Joda Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"	7.81	7810.00	"D" & 'C' Class	4000/-	14.08.2026 to 24.08.2026	04 (Four) Calendar Months
13	Improvement to Bala-I Check Dam in Champua Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"	7.45	7450.00	"D" & 'C' Class	4000/-	14.08.2026 to 24.08.2026	04 (Four) Calendar Months
14	Improvement to Badanala-II Check Dam in Champua Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"	7.84	7840.00	"D" & 'C' Class	4000/-	14.08.2026 to 24.08.2026	04 (Four) Calendar Months
15	Improvement to Sananala Check Dam in Champua Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"	7.35	7350.00	"D" & 'C' Class	4000/-	14.08.2026 to 24.08.2026	04 (Four) Calendar Months
16	Improvement to Danla Check Dam in Banspal Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"	11.53	11530.00	"D" & 'C' Class	6000/-	14.08.2026 to 24.08.2026	04 (Four) Calendar Months
17	Improvement to Champajhar-II Check Dam in Banspal Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"	7.02	7020.00	"D" & 'C' Class	4000/-	14.08.2026 to 24.08.2026	04 (Four) Calendar Months
18	Improvement to Padhankudar Check Dam in Saharapada Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"	6.99	6990.00	"D" & 'C' Class	4000/-	14.08.2026 to 24.08.2026	04 (Four) Calendar Months
19	Improvement to Masanighat Check Dam in Saharapada Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"	8.81	8810.00	"D" & 'C' Class	4000/-	14.08.2026 to 24.08.2026	04 (Four) Calendar Months
20	Improvement to Bankabeda Check Dam in Saharapada Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"	7.76	7760.00	"D" & 'C' Class	4000/-	14.08.2026 to 24.08.2026	04 (Four) Calendar Months

Sd/-
Superintending Engineer
M.I. Division, Keonjhar

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Memo No. 2528 / Dt. 07.08.2026

Copy Submitted to the Deputy Director (Adv), I & P.R. Department, Odisha, Bhubaneswar with a request to get the notice published in two local Odia daily and a local English daily for wide publication. Complimentary copy of the News Papers containing the tender call notice may be sent to this office for reference and record.

Encl. Tender Notice in C.D Format

Sd/-
Superintending Engineer

Memo No. 2529 / Dt. 07.08.2026

Copy along with soft copy of the notice submitted to the Head State Portal Group, I.T Centre, Department of Information and Technology, Bhubaneswar for exhibiting the advertisement in the Website of Govt.

Encl. Tender Notice in C.D Format

Sd/-
Superintending Engineer

Memo No. 2530 / Dt. 07.08.2026

Copy to Director, Printing Stationary and Publication, Odisha, Madhupatna Cuttack-10 with request to get the notice published in next issue of Odisha Gazettee.

Encl. Tender Notice in C.D Format

Sd/-
Superintending Engineer

Memo No. 2531 / Dt. 07.08.2026

Copy submitted to the Engineer-in-Chief (PD), Secha Sadan, Bhubaneswar/ Chief Engineer, M.I. Odisha, Bhubaneswar / Chief Engineer, M&E O/o E.I.C. (WR) Secha Sadan for favour of kind information.

Sd/-
Superintending Engineer

Memo No. 2532 / Dt. 07.08.2026

Copy submitted to the Collector and District Magistrate, Keonjhar for favour of kind information and necessary action.

Sd/-
Superintending Engineer

Memo No. 2533 / Dt. 07.08.2026

Copy submitted to the Superintendent of Police, Keonjhar / IIC, Town Police Station, Keonjhar for favour of kind information and necessary action.

Sd/-
Superintending Engineer

Memo No. 2534 / Dt. 07.08.2026

Copy submitted to the Additional Chief Engineer, Eastern Minor Irrigation Circle, Keonjhar for information and necessary action.

Sd/-
Superintending Engineer

Memo No. 2535 / Dt. 07.08.2026

Copy forwarded to all Superintending Engineers under M.I. Wing/ Superintending Engineer (R&B) Division, Keonjhar / Superintending Engineer Baitarani Division, Salapada / Superintending Engineer N.H. Divn. Keonjhar / Superintending Engineer, P.H. Divn. Keonjhar/ Superintending Engineer R.W.S.&S Divn. Keonjhar / Superintending Engineer Kanpur, Head works Division, Basudevpur, and canal Divisions /Jhumpura / Remuli / Executive Officer, Keonjhar Municipality with request for information and wide circulation of the tender.

Sd/-
Superintending Engineer

Memo No. 2536 / Dt. 07.08.2026

Copy forwarded to the Contractor Association / Assistant Executive Engineer (Estimator) / Divisional Accounts Officer / Head Clerk / Cashier /Concerned Works File / Notice Board of this Division for reference and circulation.

Sd/-
Superintending Engineer

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PARTICULARS OF TENDER

1.	Name of the work	:	Improvement to Bhuldasahi-I Check Dam in Jhumpura Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026- 2027"
2.	Estimated Cost	:	8.17 Lakh
3.	E.M.D.	:	8170/-
4.	Submission of Bid Security & Cost of Tender Papers.	:	From 14.08.2026 to 24.08.2026 (ONLINE)
5.	Period of Completion.	:	4(Four) Calendar Months.
6.	Class of Contractor	:	'D' & 'C' Class Registered under Govt. of Orissa and other eligible classes registered elsewhere mentioned in Tender Call Notice.
7.	Cost of Technical & Financial tender document	:	Rs.4,000/- over the Cost of Bid Document (Non - refundable)
8.	Availability of Technical & Financial Bid document.	:	From 14.08.2026 at 11.00 AM upto 24.08.2026 at 17.00 Hrs in web site only.
9.	Date of receipt of technical & financial Bid document.	:	Up to 17.00 Hours of 24.08.2026 only through On-Line
10.	Date of opening of Technical bid documents	:	At 11.00 AM of 25.08.2026 in the Office of the Superintending Engineer Minor Irrigation Division, Keonjhar.

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INFORMATION AND INSTRUCTION TO BIDDERS

1. General

Forms for bid and letter of Transmittal are attached herewith. All information required, for the enclosed forms should be furnished. If any particulars query is not relevant it should be stated as 'Not applicable'. However, the tenderers are cautioned that giving incomplete information in the tender or making any change in the prescribed forms may render the tender non-responsive.

Reference information and certificates furnished along with the tender for the respective owner certifying the suitability, technical know how or capability of the tender should be signed by the owner.

The tenderer is to attach any additional information which he thinks are necessary in regard to his capabilities. No further information will be entertained after submission of bid document unless it is called for by the Government of Orissa.

The condition of this bid document shall eventually be a component of Agreement.

2. Project Out Line

The **GADHUATOTHA CHECK DAM** is located in **JHUMPURA BLOCK OF KEONJHAR** District.

3. Scope of work

The work under present tender involves Reconstruction of structures, Lining and Outlets.

4. Site Visit

The Project site may be inspected by the tenderer or his authorized representative at his own cost with prior appointment with the Superintending Engineer, Minor Irrigation Division Keonjhar.

5. General Specification

The work is to be executed in accordance with the Orissa standard specification & Technical specification mentioned in Bid documents. Quality Standards of Bureau of Indian standard specification are to be followed.

6. Language of bid documents

All information as called for in the bid documents shall be furnished in English. All literature and correspondences in connection with bid shall also be in English. In case of amount, it has to be shown in both word and figures in English.

7. Final Decision making authority

The competent authority reserves the right to accept or reject or disqualify any of the tender of technical bid without assigning any reasons and its decision shall be final.

8. Further Clarification

The Superintending Engineer, Minor Irrigation Division, Keonjhar may be contacted during office hours on any working days for any further clarification regarding technical bid criteria.

LETTER OF TRANSMITAL

To

The Superintending Engineer
Minor Irrigation Division, Keonjhar.

Sub: Submission of bid for the work "Improvement to Gadhuatotha Check Dam in Jhumpura Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"

Sir,

Having examined the details given in invitation and technical note for the work **Submission of bid for the work** "Improvement to Gadhuatotha Check Dam in Jhumpura Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"

1. I hereby submit the bid information and relevant documents.
2. I hereby certify that all the statements made as information supplied in the enclosed forms and Annexure are true and correct.
3. I have furnished all information and details necessary as per check list for bid and have no further pertinent information to supply.
4. I submit the requisite certified liquid asset/ credit facility certificate and authorize the Superintending Engineer, Minor Irrigation Division Keonjhar, to approach the Bank issuing the Liquid asset/credit facility certificate to verify the correctness thereof. I also authorize the Superintending Engineer, Minor Irrigation Division Keonjhar, to approach individuals, employers, firms and corporations to verify our competence and general reputation.
5. I submit the following certificates in support of our suitability, technical knowledge, and capability for having successfully completed the following works.
6. I submit requisite affidavit as mentioned in Tender Call Notice.

Name of work.

Client / Owner

- 1.
- 2.
- 3.

Signature of Tenderer

Enclosures:

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SUPERINTENDING ENGINEER

Seal of Tenderer

Date of submission

ANNEXURE – A

FORMAT FOR PERFORMANCE RECORD OF CONTRACTORS

1. Name of the Contractor :
2. Registration No. and Date :
3. Class of Contractor :
4. Licensing Authority :
5. License valid up to :
6. Details of works executed :

Sl. No.	Jobs under execution	Agreement amount	Date of Commencement	Stipulated Date of Completion	Whether work is progressing as per programme	Reasons for delay , if any
1	2	3	4	5	6	7

7. Whether the Contractor has requisite machineries & personnel deployed (details of machinery and personnel deployed)
8. Whether the quality of construction is satisfactory
9. Whether he has capability to make good the loss in time
10. Whether the Contractor has abandoned any work in the past three years, if yes, the details thereof.
11. Whether the Contractor has entered in to any litigation in the past if yes, the details thereof.

Name of the Certifying Officer
With official seal

Signature of Contractor

CONTRACTOR

SUPERINTENDING ENGINEER

ANNEXURE – B

Details of the works on hand and performance for last five years as on the date of submission of bid documents in the following proforma.

(Separate form for each work)

1. Name of work_____
2. Place and State_____
3. Total tendered cost of work _____
4. Brief description of works including principal features and quantities of main items. _____

5. Details of works in hand
 - i. Percentage of physical completion and amount billed for the work completed.
 - ii. Cost of work remaining to be executed.
 - iii. Stipulated date of completion.
 - iv. Anticipated date of completion.
6. Explain for non-completion of work within stipulated time limit if so.
7. Were there any penalties /fines / stop notice / compensation /liquidated damages imposed? Yes or No. If yes , give amount and explain
8. Were there any fines, claims or stop notice filed by the employer? (Yes or No.)/ (If yes, give amount and explain)

Signature of Tenderer

ANNEXURE- E (1)
AFFIDAVIT

I, Sri..... Aged Years, Son/ Daughter/ Wife of
Sri at present residing At..... P.O P.S
..... Dist Pin do here by solemnly affirm as follows.

i) That, I / We posses a valid license for execution of works contract issued by *.....
belongs to Class & is valid up to * *

I am submitting tenders before the Superintending Engineer, Minor irrigation Division,
Keonjhar, for execution of following works in response to Tender Call Notice No.

-
1. * * *
2. etc.

ii) I am the authorized signatory on behalf of contractor for the tender for the work /
works mentioned above.

iii) I am swearing this affidavit that all tender documents and accompanying papers those
being submitted by me before the Superintending Engineer, Minor irrigation Division,
Keonjhar, including E.M.D. in any shape are all authentic and bonafied documents in
the eyes of the law of the land.

That the facts stated in the affidavit are true to the best of my knowledge and belief.

Signature of Contractor /
Authorized Signatory

Note :

- *Mention the license issuing authority.
- * *Mention the date up to which the license is valid
- * * *Mention name of works for which tender is being submitted.

ANNEXURE- E(2)
AFFIDAVIT

I, Sri..... Aged Years,
 Son/ Daughter/ Wife of Sri..... at present residing
 At P.O..... P.S.....
 Dist..... Pin..... do here by declare that , I have not
 registered under the VAT act in the state of Orissa as I have not started any business in the
 state and I have no liability under the act.

In the event of this contract is awarded to me, I will register my self in the VAT Act
 in the State of Orissa and I will produce the VAT clearance certificate in form VAT 612
 before drawl of agreement.

That the facts stated in the affidavit are true to the best of my knowledge and belief.

Signature of Contractor /
 Authorized Signatory

Note:- This certificate is required to be furnished by the outside contractor who has not
 started any business in the state of Orissa.

CONTRACTOR

SUPERINTENDING ENGINEER

ANNEXURE – E (3)

(No Relationship Certificate)

I/We hereby certify that I/We* am/are* **not related** (*) to any officer of Water Resources Department of the rank of Assistant Engineer & above and any officer of the rank of Assistant / Under Secretary and above of the Water Resources Department of I/We* am/are* aware that, if the facts subsequently proved to be false, my/our* contract will be rescinded with forfeiture of E.M.D and security deposit and I/We* shall be liable to make good the loss or damage resulting from such cancellation. I//We also note that, non-submission of this certificate will render my / our tender liable for rejection.

Signature of Bidder

CONTRACTOR

SUPERINTENDING ENGINEER

PART-II

CHAPTER – I

CONTRACT FOR WORKS

ORISSA PUBLIC WORKS DEPARTMENT (FORM P-1)

Percentage Rate Tender and Contract for works

General Rules and Directions for the Guidance of Contractor.

1. All works proposed for execution by contract will be notified in a form of invitation to tender pasted on a board hung up in the office and signed by the Sub-divisional Officer / Superintending Engineer.

This notice will state the work to be carried out, the items and approximate quantities thereof as well as the date for submitting and opening tenders also the amount of earnest money to be deposited and the amount of the security deposit to be deposited by the successful tenderer and the percentage if any, to be deducted from bills. Copies of the specification, designs, and drawings and any other documents required in connection with the submission of tender signed for the purpose of identification by the Sub-divisional Officer / Superintending Engineer shall also be open for inspection by the contractor at the office of the Sub-divisional Officer/ Superintending Engineer during office hours.

2. In the event of the tender being submitted by a firm it must be signed separately by each member thereof, or in the event of the absence of any partner, it must be signed on his behalf by a person holding a power of attorney authorizing him to do so.

3. Receipts for payments made on account of work, when executed by a firm, must also be signed by the several partners, except where the contractors are described in their tender as a firm in which case the receipt must be signed in the name of the firm by one of the partners, or by some other person having authority to give effectual receipts for the firm.

4. The memorandum of work tendered for and the memorandum of materials to be supplied by the Public Works Department and their issue rates shall be filled in and completed in the office of the Sub-divisional Officer/ Superintending Engineer before the tender form is issued if a form is issued to an intending tenderer without having been so filled in a completed he shall request the office to have this done before he completes and delivers his tender.

5. Any person who submits a tender shall fill up the usual printed form stating at what rate he is willing to undertake each item of the work. Incomplete tender and tenders which propose any alternation in the work specified in the said form of invitation to tender, or which contain any other conditions of any sort, or omit to note the time within which the work can be furnished or which are not accompanied by a treasury challan for the required earnest money will be liable to rejection. No single tender shall include more than one work. But contractors who wish to tender for two or more work shall submit a separate tender for each. Tender shall bear the name of the work to which they refer written outside the envelope. Cash deposits for earnest money herein before mentioned shall be made in Govt. treasuries and the challan thereof should be enclosed with the tender.

6. The Engineer or his duly authorized assistant will open the tenders in the presence of any intending contractors who may be present at the time and will enter the amounts of the several tenders in a comparative statement in a suitable form. In the event of a tender being rejected, the challan for the earnest money forwarded therewith shall there upon be returned to the tenderer with a pay order for the amount of the earnest money.

7. The Engineer shall have the right of rejecting all or any of the tenders.

8. In the event of a tender being selected for acceptance the Engineer who opened the tenders will, if he is competent to accept the tender, inform the tenderer of the selected tender who shall there upon sign copies of the specification and other document mentioned in rules 1 and 4 for the purpose of identification and for his acceptance with tender. The tenderer of the selected tender shall also deposit the required amount of the security money within the prescribed time. If the tenderer fails to deposit the required amount of the security money within the prescribed time, the Engineer may reject the tender.

If the Engineer is not competent to accept the tender himself, he will inform the tenderer of the tender which he decides to recommend for acceptance. Such tenderer shall there upon sign forthwith copies of the specification and other documents mentioned in rules 1 to 4 shall deposit the required amount of the security money within the prescribed time, the tender with the

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specification and other documents signed by the tenderer will then be forwarded for acceptance to the Engineer competent to accept the same in case he rejects the tender the security money deposited shall be refunded to tenderer.

9. When a tender is selected for acceptance the tenderer shall deposit the required amount of the security money in cash in the treasury and shall forward the challan to the Superintending Engineer Govt. securities may be endorsed to the Superintending Engineer in lieu of a cash deposit of the required amount of the security money. No tender shall be finally accepted until the required amount of the security money has been deposited.

10. The amount of security money to be deposited by the tenderer whose tender is selected for acceptance shall be **2** percent of the estimated value of the work and towards this amount, the earnest money already deposited by him shall be credited. At least half this security inclusive of the earnest money shall be deposited by the tenderer within such time as may be notified to him in writing by the office opening the tender, failing which tender shall be liable to rejection.

Any balance of the Security money outstanding after completion of the contract with the tenderer may be made up by deductions of 5 percent of the amount of each payment to be made to him under clause 6 of the conditions of contract for the work done under the contract.

11. When tender has been selected for acceptance and the required amount of the security money has been deposited the Engineer shall scrutinize all pages of the form of item, rate, tender and contract for works to see that the form has been properly filled up and signed by the contractor and the signature witnessed. He shall then, if he is competent to accept the tender, sign the acceptance of the tender or if he is not so competent, shall send the form for signature of the acceptance to the officer competent to accept it.

12. (i) A separate and specific bank account may be opened to keep the security deposits deducted from the running bills in any Nationalized Bank only in the name of the concerned Superintending Engineer of the Division/ FA & CAO, but not in personal name.

(ii) The security amount so deposited should be withdrawn from the same account after completion of the defect liability period of the concerned work and after the work is found defect free in all respects.

MEMORANDUM OF TENDER FOR WORKS

I/We hereby tender for the execution for the Governor of Orissa of the work specified in the underwritten memorandum at the specified therein within a period of 4 **(Four) calendar months** from the date of written order to commence and complete in all respect with the specifications, designs, drawings and other documents referred to in rule-1 thereof and subject to the annexed conditions of contract and with such material as are provided for by and in all other respects in accordance with such conditions so far as applicable.

MEMORANDUM

a)	Name of work :	i)	If several sub works are included, they should be detailed in a separate list	Improvement to Gadhuatotha Check Dam in Jhumpura Block of Keonjhar District under "Improvement to Check Dam Scheme for the year 2026-2027"
b)	Name of the Contractor :			
c)	Estimated Cost of the work :	i	Amount put to tender :	8.70 Lakh
		ii.	Agreement Amount :	
d)	Earnest money deposit :	i.	1% of the tender value	Rs. 8700.00
e)	The deposit will be 2% of the estimated cost of the work	i)	Initial Security deposit (including earnest money) to be deposited at the time agreement:	
		ii)	Additional Performance Security :	
f)	This percentage deduction from bills will be credited to the contractor's security deposit	i)	Percentage to be deducted from bills @ Rs. 3% (Rupees three percent) :	
g)	Period for completion of the work	i.	Time required for the work from date of written order to commence :	
		ii.	Date of written order to commence:	
		iii.	Stipulated date of completion :	
		iv.	Total number of items of work tendered For :	

Should this tender be accepted I/We hereby agree to abide by and fulfill all the terms and provisions of the said conditions of contract annexed here to so far as applicable, or in default thereof to forfeit and pay to the Governor of Orissa or his successors in office the sums of money mentioned in the said conditions.

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Dated the day of 2026

Signature of the Contractor

Signature of the Contractor
before submission of tender

Witness:

Signature of one witness to
Tenderer's signature

Address:

Occupation:

The above tender is hereby accepted by me on behalf of the Governor of Orissa.

Dated the day of 2026

Superintending Engineer
Minor Irrigation Division Keonjhar,

Signature of the Officer by
whom accepted

CONTRACTOR

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<u>CONDITIONS OF CONTRACT</u>	
Compensation for delay	Clause-1 : All compensation or other sums of money payable by the contractor to Government under the terms of his contract may be deducted from or paid by, the sale of a sufficient part of his security deposit or from the interest arising there from, or from any sums which may be due or may become due to the contractor by Government on any account whatsoever and in the event of his security deposit being reduced by reason of any such deduction or sale as aforesaid, the contractor shall within ten days thereafter make good in shape of NSC/ KVP/ Deposit receipt of schedule Bank Pledged in favour of the Superintending Engineer endorsed as aforesaid any sum or sums which may have been deducted from, or raised by, sale of the security deposit or any part thereof.
The work should not be considered finished until such date as the Superintending Engineer shall certify as the date as on which the work is finished after necessary rectification of defects as pointed out by the Superintending Engineer or his authorised agents are fully complied with by the contractor to the Superintending Engineer's satisfaction :	Clause-2(a): the time allowed for carrying out the work as entered in the tender shall be strictly observed by the contractor and shall be reckoned from the date on which the written order to commence work is given to the contractor. The work shall throughout the stipulated period of the contract, be carried on with all due diligence (time being deemed to be essence of the contract on the part of the contractor) and the contractor shall pay, as compensation, an amount equal to 1/2 percent of the amount of the estimated cost, if the whole work as shown by the tender for every day that the work remains un-commenced, or un-finished after the proper dates (The work should not be considered finished until such date as the Superintending Engineer shall certify as the date on which the work is finished after necessary rectification of defects as pointed out by the Superintending Engineer or his authorised agents, are fully complied with by the contractor to the Superintending Engineer's satisfaction). And further to ensure good progress during the execution of the work, the contractor shall be bound, in all cases in which the time allowed for any work exceeds one month, to complete one-fourth of the whole of the work before one fourth of the whole time allowed under the contract has elapsed, one half of the work, before the half of such time has elapsed, and three fourth of work before three fourths of such time has elapsed. In the event of the contractor failing to comply with the condition he shall be liable to pay as compensation an amount equal to one-third percent on the said estimated cost of the whole work for every day that the due quantity of work remains incomplete. Provided always that the entire amount of compensation to be paid under the provision of this clause shall not exceed 10 percent of the estimated cost of the work as shown in the tender. (b) If there are possibilities of exceeding this compensation amount as mentioned in clause (a) 10% of the estimated cost, or in any case in which under any clause or clauses of this contract, the contractor shall have rendered himself liable to pay compensation amounting to the whole of his security deposit in the hands of Government (whether paid in the sum or deducted by installments) the Superintending Engineer on behalf of the Governor of Orissa, shall have power to adopt any of the following courses, as he may deem best suited to the interest of the Government.

Actions when whole security deposit is forfeited:	i) To rescind the contract (of which recession notice in writing to the contractor under the hand of the Superintending Engineer shall be conclusive evidence) 20% of the value of the left over work will be realised from the contractor as penalty. ii) To employ labour paid by Deptt. of Water Resources and to supply materials to carry out the work, or any part of the work, debiting the contractor with the cost of the labour and the price of the materials (of the amount of which the cost and price certificate of the Superintending Engineer shall be final and conclusive against the contractor) and crediting him with the value of the work done, in all respect in the same manner and at the same rates as if it had been carried out by the contractor under the terms of his contract; the certificate of the Superintending Engineer as to the value of the work done shall be final and conclusive against the contractor. iii) To measure up the work of the contractor and to take such part of the work of the contract, as shall be unexecuted out of his hands and to give it to another contractor to complete, in which case any expenses which may be incurred in excess of the sum which would have been paid to the original contractor if the whole work had been executed by him (of the amount of which excess the certificate in writing of the Superintending Engineer shall be final and conclusive) shall be borne and paid by the original contractor and may be deducted from any money due to him by Government under the contract or otherwise or from his security deposit or the proceeds of sale thereof or a sufficient part thereof. In the event of any of the above courses being adopted by the Superintending Engineer the contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials, or entered into any engagements, or made any advance on account of with a view to the execution of the work or the performance of the contract. And in case the contract shall be rescinded under the provision aforesaid, the contractor shall not be entitled to recover or be paid any sum for any work there to for actually performed under this contract, unless and until the Superintending Engineer shall have certified in writing the performance of such work and the value payable in-respect thereof and he shall only be entitled to be paid the value so Certified. iv) Security deposit of the contractor shall be refunded only one year after the date of completion of the work provided the final bill has been paid and defects, if any rectified. In case, however where refund of security is delayed for non payment of final bill, two percent of the security deposit recovered as earnest money and initial security shall be refunded and the balance of the security deposit shall be refunded after payment of the final bill. However, the security deposit less any amount due, shall be returned to the contractor subject to the Engineer-in- Charge certifying that no liability attaches to the contractor.
Contractor remains liable to pay compensation if action not taken under	Clause-3 : In any case in which any of the powers, conferred upon the Superintending Engineer by clause 3 here of, shall have become exercisable if the same shall not be exercised. The non-exercise thereof shall not constitute a waiver of any of the conditions in the event any further here of and such powers shall not with standing to be exercisable.

clause – 5 Power to take possession of a require removal of or sell contractor's plants	In the event of any future case of default by the contractor of which by any clause or clauses hereof he is declared liable to pay compensation amounting to the whole of his security deposit, and the liability of the contractor for past and future compensation shall remain unaffected. In the event of the Superintending Engineer putting in force the powers vested in him under the preceding clauses, he may if he so desires, take possession of all or any tools, plants, materials and stores, in or upon the works, or the site thereof or belonging to the Contractor, or procured by him and intended to be used for the execution of the work or any part thereof, paying or allowing for the same in the account at the contract rates, or in case of these not being applicable, at current market rates to be certified by the Superintending Engineer whose certificate thereof shall be final, otherwise the Superintending Engineer may notice in writing to the contractor or his clerk of the works, foreman or other authorised agent require him to remove such tools, plants, materials, or stores from the premises (within a time to be specified in such notice) and in the event of the contractor failing to comply with any such requisition, the Superintending Engineer may remove them at the contractor's expense or sell them by auction or private sale on account of the contractor and at his risk in all respects, and the certificate of the Superintending Engineer as to the expense of any such removal and the amount of the proceeds and expense of any such sale shall be final and conclusive against the contractor.
Extension of time	Clause - 4 : If the contractor shall desire an extension of the time for completion of the work, on the ground of his having been unavoidably hindered in its execution or any other ground, he shall apply in writing to the Superintending Engineer within 30 days of the date of the hindrance on account of which he desires such extension as aforesaid and, the Superintending Engineer shall, if in his opinion (which shall be final) reasonable grounds be shown therefore, authorise such extension of time, if any, as may in his opinion be necessary or proper. The Superintending Engineer shall at the same time inform the contractor whether he claims compensation for delay. In case where the sanction of higher authority to grant extension of time is necessary, the Superintending Engineer will send his recommendation to higher authority. If the order of the competent authority is not received within 60 days from the date of receipt of recommendation of the Superintending Engineer, the Superintending Engineer shall grant extension of time under intimation to the concerned authorities so that the contract shall remain in force, but while communicating this extension of time he must inform the contractor that extension is granted without prejudice to Government's right to levy compensation under relevant clause of the Agreement.
Final Certificate	Clause-5 : On completion of the work, the contractor shall be furnished with a certificate by the Superintending Engineer (hereinafter called the Engineer-in-charge) of such completion, but no such certificate be given nor shall the work be considered to be completed until the contractor shall have removed from the area of the premises (to be distinctly marked by the Superintending Engineer

	in the site plan) on which the work shall be executed all scaffolding surplus materials and rubbish, and cleared off the dirt from all wood-work, doors, windows, walls, floors or other parts of any building in upon or about which the work is to be executed, or of which he may have had possession for the purpose of the execution thereof, nor until the work shall have been measured by the Officer of the Department of Water Resources in accordance with the rules of the department whose measurements shall be binding and conclusive against the contractor, if the contractor shall fail to comply with the requirements of this clause as to removal of scaffolding surplus materials and rubbish and cleaning off dirt on or before the date fixed for the completion of the work, the Engineer-in-charge may at the expense of the contractor remove such scaffoldings surplus materials and rubbish and dispose of the same as he thinks fit and clean off such dirt as aforesaid and the contractor shall forthwith pay the amount of all expenses incurred and shall have no claim in respect of any such scaffolding or surplus materials; as aforesaid except for any sum actually realised by the sale thereof. Sub-Clause - 5 : If in the opinion of Engineer-in-Charge, which shall be final and binding on the contractor, occupation or utilisation of a portion of the work completed in no way interferes with progress of the work the same may be occupied or utilised by on behalf of the Govt. under the written order of the Engineer-in-Charge and to get the defects, if any rectified by the contractor at his (Contractor) own cost within six months from the date of completion of the whole work provided that the contractor will not be allowed any concession either in the shape of extension of stipulated period or any other monetary compensation on account of such occupation or use.
Payment on intermediate certificate be regarded as advances and bill to be submitted monthly.	Clause-6 : A bill shall be submitted by the contractor each month on or before the date fixed by the Engineer-in-charge for all works executed in the previous month and the Engineer-in-Charge or his subordinate shall take the requisite measurement for the purpose having the same verified and the claim as far as admissible, adjusted, if possible, before the expiry of ten days from the presentation of the bill. If the contractor does not submit the bill within the time fixed as aforesaid, the Engineer-in-Charge or his subordinate shall measure up the said work in the presence of the contractor whose counter signature to the measurement list will be sufficient warrant, and the Engineer-in-Charge or his subordinate shall prepare a bill from such list which shall be binding on the contractor in all respects. Provided that, if any balance of the 7% security, outstanding from each such payment shall be deducted so as to, not exceeding 5% as may be necessary to make up the balance of the security. All such intermediate payments to the contractor shall be regarded as payments by way of advance against the final payment only and not as payments for work actually done and completed and shall not preclude the requiring of bad, unsound and imperfect or unskillful work to be removed and taken away and reconstructed or erected, or any part thereof in any respect, or the accrual of any claim nor shall it conclude, determine, or effect in any way the powers of the Engineer-in-Charge under these conditions or any of them as to the final

	settlement or adjustment of the accounts or otherwise, or in any other way vary or affect the contract. Clause-7 : The final bill shall be prepared by the officers of the Department of Water Resources in accordance with the rules of the Department in the presence of the contractor within one month of the date fixed for completion of the work.
Stores supplied by Government.	Clause-8 : If the specification or estimate of the work provides for the use of any special description of materials to be supplied from the Engineer-in-Charge's store, or if it is required that the contractor shall use certain stores to be provided by the Engineer-in-Charge under the conditions of this contract (such materials and stores and the prices to be charged therefore as hereinafter mentioned being so far as practicable for the convenience of the contractor, but not so as in any way to control the meaning or effect of this contract or are specified in the schedule or memorandum hereto annexed) the contractor shall be supplied with such materials and stores noted in the annexed schedule as are required from time to time to be used by him for the purposes of the contract only, and the value of the full quantity of materials and stores so supplied at the rates specified in the said schedule may be set off or deducted from any sums then, due or thereafter to become due to the contractor under the contract or otherwise, or against or from the security deposit, or the proceeds of sale thereof if the same is held in Government securities, the same or a sufficient portion thereof being in this case sold for the purpose. All materials supplied to the contractor shall remain the absolute property of Government and shall not on any account be removed from the site of the work and shall at all times be open to inspection by the Engineer-in-Charge. Any such materials unused and in perfectly good condition at the time of the completion or determination of the contract shall be returned to the Engineer-in-Charge's store, at the prevailing market rate or at the issue rate whichever is less if by a notice in writing under his hand he shall so require, but the contractor shall not be entitled to return any such materials unless with such consent, and shall have no claim for compensation on account of any such materials so supplied to him as aforesaid being unused by him, or for any wastage in or damage to any such materials. Clause - 8(a) : "If a contractor removes any materials or stock so supplied to him from the site of the work in contravention of the provision of this clause with a view to dispose of the same dishonestly, he shall, in addition to any other liability, civil or criminal arising out of this contract be liable to pay a penalty equivalent to five times the price of the said materials or stock, according to the stipulated rate. The penalty so imposed shall be recoverable from any sum that be then or at any time thereafter may become due to the contractor, or from his security deposit, or the proceeds of sale thereof". Clause-8(b) : Owing to difficulty in obtaining certain materials in the open market the Government have undertaken to supply materials specified in the schedule hereto annexed. There may be delay in obtaining materials by the Department and the contractor is therefore required to keep himself in touch with the day to day position regarding the supply of materials from the Engineer-in-Charge and to so adjust the progress of the work that their labour may not remain

	idle nor may there be any other claim due to or arising from delay in obtaining the materials. It should be clearly understood that no monetary claim whatsoever shall be entertained by the Government on account of delay in supplying materials. However, extensions of time for completion of work can be granted on timely application by the contractor vide also Clause-4.
Works to be executed in accordance with specification, drawing and orders etc.	Clause - 9 : The contractor shall execute the whole and every part of the work in the most substantial and workmanlike manner, and both as regards materials and otherwise in every respect in strict accordance with the specifications. The contractor shall also confirm exactly, fully and faithfully to the designs, drawings and instructions in writing relating to the work signed by the Engineer-in-Charge and lodged in his office, and to which the contractor shall be entitled to have access at such office, for the purpose of inspection during office hour and the contractor shall, if he so requires, be entitled at his own expenses to make or cause to be made copies of the specification, and of all such designs, drawings and instructions as aforesaid.
Do not invalidate Contract.	Clause-10 : The Engineer-in-Charge shall have power to make any alterations in or additions to the original specifications, drawings, designs and instructions that may appear to him necessary and advisable during the progress of work and the contractor shall be bound to carry out the work in accordance with any instructions which may be given to him in writing signed by the Engineer-in-Charge and such alteration shall not invalidate the contract, and any additional work which the contractor may be directed to do in the manner above specified as part of the work shall be carried out by the contractor on the same conditions in all respects on which he agreed to do the main work, and at the same rates as are specified in the tender for the main work. The time for the completion of the work shall be extended in the proportion that the additional work differs to the original contract work and the certificate of the Engineer-in-Charge shall be conclusive as to, such proportion. And if the additional work includes any class of work, for which no rate is specified in this contract, then such class of work shall be carried out at the rates entered in the sanctioned schedule of rates of the locality during the period when the work is being carried on and if such last mentioned class of work is not entered on the schedule of rates of the district, then the contractor shall within seven days of the date of his receipt of the order to carry out the work inform the Engineer-in-Charge of the rate which it is his intension to charge for such class of work, and if the Engineer-in-Charge does not agree to this rate he shall by notice in writing be at liberty to cancel his order to carry out such class of work and arrange to carry it out in such manner as he may consider advisable.
Extension of time in consequence of alterations.	No deviations from the specification stipulated in the contract or additional items of work shall ordinarily be carried out by the contractor, nor shall any altered, additional or substituted work be carried out by him, unless the rates of the substituted, altered or additional items have been approved and fixed in writing by the Engineer-in-Charge. The contractor shall be bound to submit his claim for any additional work done during any month on or before the 15th day of

Rates of work not in estimate or schedule of rates of the district	the following month accompanied by a copy of the order in writing of the Engineer-in-Charge for the additional work and that the contractor shall not be entitled to any payment in respect of such additional work if he fails to submit his claim within the aforesaid period. Provided always that if the contractor shall commence work or incur any expenditure in regard thereof before the rates shall have been determined as lastly herein before mentioned, in such case he shall only be entitled to be paid in respect of the work carried out or expenditure incurred by him prior to the date of the determination of the rates as aforesaid according to such rates as shall be fixed by the Engineer-in-Charge. In the event of a dispute, the decision of the Superintending Engineer of the Circle will be final
No compensation for alteration in or restriction of work to be carried out.	Clause-11 : If at any time after the commencement of the work the Governor of Orissa shall for any reason whatsoever not required the whole thereof as specified in the tender to be carried out, the Engineer-in-Charge shall give notice in writing of the fact to the contractor who shall have no claim to any payment or compensation whatsoever on account of any profit or advantage, which he might have derived from the execution of the work in full which he did not derive in consequence of the full amount of the work not having been carried out neither shall he have any claim for compensation by reason of any alterations having been made in the original specification drawings, designs and instruction which shall involve any curtailment of the work as originally contemplated.
Action and compensation payable in case of bad work.	Clause -12 : If it shall appear to the Engineer-in-charge or his subordinate-in-charge of the work, that any work, that any work has been executed with unsound, imperfect or unskillful workmanship or with materials of any inferior description, or that any materials or articles provided by him for the execution of the work are unsound or of a quality inferior to that contracted for or otherwise not in accordance with the contract, the contractor, shall on demand in writing from the Engineer-in-Charge specifying the work, materials or articles complained of notwithstanding that the same may have been inadvertently passed certified and paid for, forthwith rectify or remove and reconstruct the work so specified in whole or in part, as the case may require or as the case may be, remove the materials or articles so specified and provide other proper and suitable materials or articles at his own proper charge and cost, and in the event of his failing to do so within a period to be specified by the Engineer-in-charge in his demand aforesaid, then the contractor shall be liable to pay compensation at the rate of one percent on the amount of the estimate for every day not exceeding ten days, while his failure to do so shall continue and in the case of any such failure the Engineer - in -charge may rectify or remove, and re-execute the work or remove and replace with others, the materials or articles complained of as the case may be at the risk and expense in all respects of the contractor.
Work to be open for inspection.	Clause - 13: All work under or in course of execution or executed in pursuance of the contract shall at all times be opened to the inspection and supervision of the Engineer - in-charge and his subordinates and the contractor shall at all times during the usual working hours, and at all other times at which reasonable notice of the intention of the Engineer -in-charge or his subordinate to visit the works shall have

Contractor or responsible Agents to be present.	been given to the contractor either himself be present to receive orders and instruction, or have a responsible agent duly accredited in writing, present for that purposes. Orders given to the contractor's agent shall be considered to have the same force as if they had been given to the contractor himself.
Notice to be given before work is covered up.	Clause -14: The contractor shall give not less than five days notice in writing to Engineer-in-charge or his subordinate -in charge of the work before covering up or otherwise placing beyond the reach of measurement of any work in order that the same may be measured and correct dimensions thereof be taken before the same is so covered up or placed beyond the reach of measurement and shall not cover up or place beyond the reach of measurement, any work without the consent in writing of the Engineer in charge or his subordinate - in charge of the work and if any work shall be covered up or placed beyond the reach of measurement without such notice having been given or consent obtained,, the same shall be uncovered at the contractor's expense, or in default thereof no payment or allowance shall be made for such work of the materials with which same was executed. Clause -15: If the contractor or his work people, or servants shall break, deface injure or destroy any part of a building in which they may be working or any building, road, fence, enclosure, or grass land or cultivated ground continuous to the premises on which the work of any part of it is being executed or if any damages shall happen to the work while in progress, from any cause whatever or any imperfection became apparent in it within three months from the date of final certificate of its completion shall have been given by the Engineer-in-Charge, as aforesaid the contractor shall make the same to be made good by other workmen and deduct the expenses (of which the certificate of the Engineer-in-Charge shall be final) from any sums that may be then, or at any time thereafter may become due to the contractor, or from his security deposit or the proceeds of sale thereof, or of a sufficient portion thereof and the contractor shall be liable to pay any part of the expenses not so recovered by the Engineer-in-charge. Clause -16 : The contractor shall supply at his own cost all materials (except such special materials, if any as may in accordance with the contract be supplied from the Engineer -in -charges stores), Plant, tools, appliances, Implements, ladders, cordage, tackle scaffolding and temporary works requisite or proper for) the proper execution of the work whether original, altered or substituted, and whether included in the specification or other documents forming part of the contract or referred to in these conditions or not to which may be necessary for the purpose of satisfying or complying with the requirement of the Engineer-in Charge as to any matter as to which under this conditions be is entitled to be satisfied which he is entitled to require together with carriage therefore to and from the work. The contractor shall also supply without charge the requisite number of persons with the means and materials necessary for the purpose of setting out works, and counting, weighing and assisting in the measurement of examination at any time and from time to time of the work or the materials. Failing
Contractor is liable for damages done and for imperfection for 3 months after certificate.	
Contractor to supply plant, ladders, scaffolding etc.	

And is liable for damages arising from provision of lights fencing etc.	him so doing the same may be provided by the Engineer-in-Charge at the expense of the contractor under the contract or from his security deposit or the proceeds of sale thereof, or of a sufficient portion thereof. The contractor shall also provide all necessary fencing and lights required to protect the public from accident, and shall be bound to bear the expenses of defense of every suit, action or other proceedings at law that may be brought any person for injury sustained owing to neglect of the above precautions, and to pay damages and cost which may be awarded in any such suit, action or proceedings to any such person or which may with the consent or the contractor be paid to compromise any claim by any such person.
	Clause-17: No female labourer shall be employed within the limits of a cantonment. The contractor shall not employ for the purpose of this contract any person who is below the age of twelve years, and shall pay to each labourer for the work done by such labourer, wages not less than the wages paid for similar work in the neighborhood. The Superintending Engineer shall have the right to enquire into and decide any complaint alleging that the wages paid by the contractor to any labourer for the work done, by such labourer is less than the wages paid for similar work in the neighborhood. Explanation - Fair wages means wages whether for time of piecework prescribed by the State DOWR provided that where higher rates have been prescribed under the minimum wages Act. 1948 wages at such higher rates would constitute Fair Wages. The Superintending Engineer shall have the right to enquire into and decide any complaint alleging that the wages paid by the contractor to any labour for the work done by such labour is less than the wages paid for similar work in the neighbourhood. The officer-in-charge of the work shall have the right to decide whether any labourer employed by the contractor is below the age of twelve years and to refuse to allow any labourer whom he decides to be below the age of twelve years to be employed by the contractor. Clause-17(a) – The contractor shall if so required by the Engineer-in-Charge employ one or more Engineering Graduates or Diploma holders as apprentices at his own cost of the work as shown in the tender exceed Rs.2,50 Cr. The Chief Engineer will select the apprentices. The period of employment will commence within one month after the date of work order and would last until the date when 90% of the work is completed. The stipend to be paid to the apprentices should not be less than Rs. 200/- per month in the case of graduate Engineers and less than Rs.150/- per month in case of Diploma holders. The number of apprentice to be employed shall be fixed by the Chief Engineer in a manner so that the expenditure does not exceed 1 % of the tendered cost of the work. Clause-18: The contractor shall not be assigned or sublet without the written approval of the Superintending Engineer. And if the contractor shall assign or sublet his contract or attempt to do so or become insolvent or commence any insolvency, proceedings or make any composition with his creditor or attempt to do so or if any bribe, gratuity, gift, loan, perquisite reward, or advance, pecuniary or

Work not to be sublet.	otherwise, shall either directly or indirectly be given, promised, or offered by the contractor, or any of his servants or agents to any public officer or persons in the employ of Government in any way relating to his office employment, or if any such officer or person shall become in any way directly or indirectly interested in the contract, the Superintending Engineer may there upon by notice in writing rescind the contract and the security deposit of the contractor shall there upon stand forfeited and be absolutely at the disposal of Government and the same consequences shall ensure if he contract had been rescinded under the clause 2 thereof, and in addition the contractor, shall not be entitled to recover or be paid for any work thereto for actually performed under the contract.
Contract may be rescinded and security deposit forfeited for subletting, bribing or if contractor becomes insolvent.	Clause-19: All sums payable by way of compensation under any of these conditions shall be considered as reasonable compensation to be applied to the use of Government without reference to the actual loss or damage sustained and whether or not any damage shall have been sustained. Clause-20: In the case of a tender by partners, any change in the constitution of the firm shall be forth with notified by the contractor to the Engineer-in-charge for his information. In case of failure to notify the change in the constitution within fifteen days the Engineer-in-charge may by notice in writing rescind the contracts and the security deposit of the contractor shall thereupon stand forfeited and be absolutely at the disposal of Government and the same consequences shall ensure as if the contract had been rescinded under clause-2 hereof, and in addition the contractor shall not be entitled to recover or be paid for any works therefore actually performed under the contract.
Sum payable by way of compensation to be considered as reasonable compensation without reference to actual loss.	Clause-21: All works to be executed under the contract shall be executed under the direction and subject to the approval in all respects of the Superintending Engineer of the Circle for the time being who shall be entitled to direct at what point or points and in what manner they are to be commenced and from time to time carried on.
Changes in constitution of firm.	Clause-22: Deleted. Clause-23: When the estimate on which a tender is made includes lump sums in respect of parts of the work the contractor shall be entitled to payment In respect of the Items of work involved or the part of the work in question at the same rates as are payable under this contract for such items, or if the part of the work in question is not, in the opinion of the Engineer-in-charge capable of measurement, the Engineer-in-charge may by his discretion pay the lump sum amounts entered in the estimate, and the certificate in writing of the Engineer-in-charge shall be final and conclusive against the contractor with regard to any sum or sums payable to him under the provisions of this clause. Clause-24: In the case of any class of work for which there is no such specification as is mentioned in the rule I, such work shall be carried out in accordance with Circle specification and in the event of there being no circle specification, then in such case the work shall be

Lump sums in estimates. Action where no specification. Definition of works.	carried out in all respect in accordance with the instructions and requirements of the Engineer-in-charge. Clause-25 : The expression “work” or “work” where used in these conditions shall, unless there be something either in the subject or context repugnant to such construction, be construed, and taken to mean the works by or by virtue of the contract contracted to be executed, whether temporary or permanent, and whether original, altered, substituted or additional. Clause-26: Government shall be entitled to recover in full from the contractor any amount that the Government may be liable to pay under Workman’s compensation Act-VII of 1923 to any workmen employed in course of execution of any part of the work covered by these contract. Clause-27 : That the purpose of jurisdiction in the event dispute if any, the contract should be deemed to have been entered into within the state of Orissa and it is agreed that neither party to the contract or of agreement will be competent to bring a suit in regard to the matters covered by this contract at any place outside the state of Orissa. Clause-28: The department will have the right to inspect the scaffolding and centering made for the work and can reject partly or fully such structure if found defective in their opinion. Clause-29 : Sanitary arrangements will be made by the contractor at this own cost for his labour camp. Clause-30 : The contractor shall bear all taxes including sales tax, Income tax, royalty, fair-weather charges and tollage, where necessary.
	Clause-31(a) i: If during the progress of the work the price of any materials incorporated in the work (not being materials supplied from the Engineer-in-Charge’s store in accordance of the clause thereof) increases or decreases as a result of increase or decrease in the Average Wholesale Price Index (all commodities)and the contractor thereupon necessarily and properly pays in respect of that materials (incorporated in the work) such increased or decreased price, then he shall entitled to reimbursement or liable to refund quarterly the case may be, such as an amount as shall be equivalent to the plus or minus difference of 75% in between the Average Wholesale Price Index (all commodities) which is operating for the quarter under consideration and that operated for the quarter in which the tender was opened as per the formula indicated below : <u>Formula to calculate the increase or decrease in the price of materials :</u> $VM = \frac{0.75 \times Pm}{100} \times R \times \frac{(i - i_o)}{i_o}$ VM = Increase or decrease in the cost of work during the quarter under consideration due to changes in prices of

	base materials. R = the value of work done in rupees during the quarter under consideration i_o = Average Wholesale Price Index (all commodities) prevailed during the quarter in which the tender was opened. i = Average Wholesale Price Index (all commodities) prevailed for the quarter under consideration. Pm = Percentage of material component as per sub-clause of this clause. (ii) Where original contract period is one year and above, increase/decrease of cost of steel, cement and bitumen are to be paid/ recovered. Payments in case of increase are to be made with prior approval of Govt. when the total claim is more than Rs.50, 000/- and with prior approval of Engineer-in-Chief/ Chief Engineer (as the case may be) when the claim is up to Rs.50, 000/-. The concerned Superintending Engineer shall make recovery in the case of decrease from the contractor immediately. The cost shall be determined as follows. Steel: Rate as fixed by Steel Authority of India Ltd.,(SAIL) Cement: Average factory price of three manufacturers of cement inside the state Bitumen: Rate as fixed by Indian Oil Corporation (IOC) (iii) Where original contract period is more than six months and below one year, increase/ decrease of cost of steel, cement and bitumen are to be paid/ recovered. Payments in case of increase are to be made with prior approval of Govt. when the total claim is more than Rs.50,000/- and with prior approval of Engineer-in-Chief/ Chief Engineer (as the case may be) when the claim is up to Rs.50,000/- subject to the fulfillment of the condition mentioned below. (i) The cost shall be determined as follows. Steel: Rate as fixed by Steel Authority of India Ltd., (SAIL) Cement: Average factory price of three manufacturers of cement inside the state Bitumen: Rate as fixed by Indian Oil Corporation (IOC) (ii) Cost of the Project should be more than Rs.50.00 lakhs. However, the differential cost of such materials may be paid to the contractor after deducting the hike percentage amount in the tender for those materials from the calculated amount of differential cost. (iii) Contractors have to submit the vouchers showing procurement from an authorized dealer for the said work within 28 days before utilization of steel, cement
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	and bitumen. (iv) Differential cost will be allowed only for the original agreement period, but not for the extended period even though it might have been validly extended. (v) Differential cost will be allowed only after successful completion of the work as per approved work programme. (vi) Stipulations contained in the existing clause 31(a),(ii) recovery in case of decrease shall be made by the concerned Superintending Engineer from the contractor immediately.
	Clause-31(b) Similarly, if during the progress of work, the wages of labour increase or decrease as a result of increase or decrease in the Minimum Wages for Industrial Workers prescribed in the Government and the contractor thereupon necessarily and properly pays in respect of labour engaged on execution of the work with such increased or decreased wages, then he shall be entitled to reimbursement or liable to refund quarterly as the case may be such an amount as shall be equivalent to the plus or minus difference in between the Minimum Wages for Industrial Workers which is operating for the quarter under consideration and that operated for the quarter in which the tender was opened as per the formula indicated below : <u>Formula to calculate the increase or decrease in the cost of labour :</u> $VL = \frac{0.75 \times Pl}{100} \times R \times \frac{(i - i_o)}{i_o}$ VL = Increase or decrease in the cost of work during the quarter under consideration due to changes in the rates of labour. R = the total value of work done in rupees during the quarter under consideration. i_o = Average Minimum Wages for labour in the state as prevailed during the quarter in which the tender was opened. i = Average Minimum Wages for labour in the state prevailed during the quarter under consideration. Pl = Percentage of labour component as per sub-clause of this clause. Clause-31(c) : Similarly, if during the progress of work, the prices of Petrol, Oil and lubricants (Diesel oil being the representative item for price adjustment) increases or decreases as a result of the price fixed therefore by the Government of India & the contractor thereupon necessarily and properly pays such increased or decreased price towards Petrol, Oil and Lubricants used on

	execution of the work then he shall be entitled to reimbursement or liable to refund, quarterly as the case may be such an amount as shall be equivalent to the plus or minus difference in between the price of P.O.L which is operating for the quarter under consideration and that operated for the quarter in which the tender was opened as per the formula indicated below : <u>Formula to calculate the increase or decrease in the price of P.O.L:</u> $K1 = \frac{0.75 \times K2}{100} \times R \times \frac{(D_2 - D_1)}{D_1}$ K1 = Increase or decrease in the cost of work during the quarter under consideration due to changes in the price of P.O.L. R = the value of work done in Rupees during the quarter under consideration. D1 = Average price per liter of diesel oil which is fixed by the Government of India for the nearest consumer P.O.L pump during the quarter in which the tender was opened. D2 = Average price per liter of diesel oil which is fixed Government of India for the nearest consumer P.O.L pump during the quarter under consideration. K2 = Percentage of P.O.L. component as per the sub-clause.
	Clause 31 - (d) : The following shall be the percentage of material, labour and P.O.L. component for reimbursement/refund on variation in price of material, labour and P.O.L. as per sub-clause (a), (b) and (c) of this clause.

CONTRACTOR'S SUPPLY						
Category of works	% of Cement	% of Steel	% of Bitumen	% of other materials	% of labour	% of POL
IRRIGATION WORKS						
a) Structural Works	To be calculated	To be calculated	To be calculated	65 – (calculated % of all three previous items)	30	5
b) Earth work, canal embankment work				35	60	5
Clause-31(e) The reimbursement / refund on variation in price of materials, labour and P.O.L (vide Works Department letter No. 21369, dated 25.09.1991) as per sub-clauses (a) (b) and (c) of this clause shall be applicable in the following manner. “In terms of the aforesaid escalation clause where the period for completion of the work as stipulated in the agreement is less than one year, no escalation is admissible at all.						

In case of work where the stipulated period of completion is **one year and more**, the escalation on account of price variation is admissible only for the remaining period after excluding **the one year period** thereof, provided the work has been carried out by the contractor in terms of the relevant provision of the agreement. In the situations, where the period of completion initially stipulated in the agreement was **less than one year** and subsequently the completion period has been validity extended on the ground that the delay in completion of the work is not attributable to the contractor and in the result the total period including the extended period stands at one year or more, escalation is admissible only for the remaining period after **excluding the first one year** period there from."

Clause 31 - (f) The contractor shall for the purpose of sub-clause (a) (b) and (c) of this clause keep such books of account and other documents as necessary to show the amount of increase claimed or reduction available and shall allow inspection of the same by a duly authorized representative of Government and further shall at the request of the Engineer-in-charge furnish verified in such manner as the Engineer-in-charge may required any document kept and such other information as the Engineer-in-charge may require.

Clause 31 - (g) The contractor shall within a reasonable time of his becoming aware of any alteration in the price of such materials/wages of labour and or price of POL give notice there of to the Engineer-in-charge stating that the same is given in pursuant to this condition together with an information relating there to which he may be in a position to supply.

Clause-32 : After the work is finished all surplus materials and debris are to be removed by the contractor and preliminary works such as vats, mixing platforms, etc. are to be dismantled and all materials removed from the site. The ground up to 100'-0" wide from the building should be cleared and dressed.

FAIR WAGE CLAUSE

Clause-33

(a) The contractor shall pay the wages not less than fair wages to labourers engaged by him on the work.

Explanation : " Fair Wage" means wages, whether for time or piece work prescribed by the state Public Works Department, provided that where higher rates have been prescribed under the Minimum Wages Act.1948, wages at such higher rates would constitute "Fair Wages".(WD No.22059 dt:16.8.77)

(b) The contractor shall, notwithstanding the provisions of any contract to contrary, cause to be paid a fair wage to labourer indirectly engaged on the work including any labour engaged by his subcontractors in connection with the said work, as if the labourers had been immediately employed by him.

(c) In respect of all labour directly or indirectly employed in the works for the performance of the contractors part of this agreement, the contractor shall comply with or cause to be complied with all regulations made by the Government in regard to payment of wages, wage period deductions from wages, recovery of wages not paid and unauthorised deductions made, maintenance of wage register, wage cards, publication of scale of wages and other terms of employment, inspection and submission of periodical returns and all other matters of a like nature.

(d) The Superintending Engineer or Sub-Divisional Officer concerned shall have the right to deduct, from the money due to the contractor, any sum required or estimated to be required for making good the loss suffered by a worker or workers by reason of non-fulfillment of wages or of deductions made from their wages, which are not justified by their terms of the contract or non-observance of the regulations. Money so deducted should be transferred to the workers concerned.

(e) Vis-à-vis the Government of Orissa, the contractor shall be primarily liable for all payments to be made under and for the observance of the regulations aforesaid

without prejudice to his right to claim indemnity from his sub-contractors.

- (f) The regulations aforesaid shall be deemed to be part of this contract and any breach thereof shall be breach of this contract.
- (g) Under the provision of the Minimum Wages Act 1948 and the minimum wages (Central Rules, 1950) the contractor is bound to allow or cause to be allowed to the labourers directly or indirectly employed in the work one day rest for six days continuous work and pay wages at the same rate as for duty. In the event of default, the Superintending Engineer of Sub-Divisional Officer concerned shall have the right to deduct the sum not paid on account of wages for weekly holiday to any labourers and pay the same to the persons entitled thereto from any money due from the contractor.
- (h) The contractor shall at his own expense provide or arrange for the provision of footwear for any labour doing cement mixing work and black topping work of roads (the contractor has under taken to execute under this contract) to the satisfaction of the Engineer-in-Charge, and on his failure to do so, the Government shall be entitled to provide the same and recover the cost from the contractor.
- (i) The contractor shall submit by the 4th and 19th of every month, to the Engineer-in-Charge a true statement showing in respect of the second half of the preceding month and the first half of the current month respectively:
- i.) The number of labourer employed by him on the work.
 - ii.) Their working hours.
 - iii.) The wages paid to them
 - iv.) The accident if any occurred during the said fortnight showing the circumstances under which they happened and the content of damage and injury caused by them and;
 - v.) The number of female workers who have been maternity benefit according to clause (K) and the amount paid to them, failing which the contractor shall be liable to pay the Government a sum not exceeding Rs.50/- for each default of materially incorrect statement. The decision of the Superintending Engineer shall be final in deducting from any bill due to the contractor, amount levied as fine.
- (j) In respect of all labour directly or indirectly employed in the works for the performance of the contractors part of this agreement, the contractor shall comply with or cause to be complied with all regulations made by the Government from time to time for the protection of health and sanitary arrangement for the workers employed by the Orissa Public Works Department and this will apply to work place having 50 or more workers.
- (k) Maternity benefit rules for female workers employed by the contractor, leave and pay during leave shall be regulated as follows:
- a) **Leave:** In respect of Delivery: Maternity leave not exceeding 8 weeks (4 weeks up to and including the day of delivery of 4th weeks following that day,
in case of miscarriage: Up to 3 weeks from the date of miscarriage.
 - ii.) **Pay:** In case of Delivery: Leave pay during maternity leave will be at the rate of the woman's average daily earnings calculated on the total wages earned on the days when full time work was done during the period of three months immediately proceeding the date of which she gives notice that she expects to be confined or at the rate of Rs.52.50 a day whichever is greater.
In case of miscarriage: Leave pay at the rate of average daily earning calculated on the total wages earned on the days when full time work was done during a period of three months immediately preceding the date of miscarriage.

Condition of the grant of maternity leave: No maternity leave benefit shall be

admissible to a woman unless she has been employed for a total not less than 6 months immediately proceeding the date on which she proceeding on leave.

MODEL RULES
FOR HEALTH & SANITARY ARRANGEMENTS FOR WORKERS EMPLOYED
BY ORISSA P.W.D.CONTRACTORS

1. APPLICATION: These rules shall apply to all construction work in-charge of Orissa Public Works Department, which is expected to continue for a year or more.
2. DEFINITIONS:
 - i. "Work Place" means a place at which an average of fifty or more workers is employed in connection with construction work.
 - ii. "Large Work Place" means a place at which an average of 500 or more workers is employed in connection with a work.
3. FIRST AID:
 - i. At every work place, there shall be maintained in a readily accessible place for first-aid appliances including an adequate supply of sterilizer dressings and sterilized cotton wool. The appliances shall be kept in good order and in large work places, which shall be readily available during working hours.
 - ii. At Large Work Places, where hospital facilities are not available within easy distance of works, first aid posts shall be established and run by a trained Compounder.
 - iii. Where Large Work Places are remote from regular hospitals an indoor ward shall be provided with one bed for every 250 employees.
 - iv. Where Large Work Places are situated in cities, towns or in their suburbs and no beds are considered necessary owing to the proximity of the city, town hospitals, an ambulance shall be provided to facilitate removal of urgent cases to these hospitals. At the work place, some conveyance facilities, such as a car, shall be kept readily available to take injured person or persons suddenly taken ill to the nearest hospital.
4. DRINKING WATER:
 - i. In every work places there shall be provide and maintained at suitable places, easily accessible to labour, a sufficient supply of water fit for drinking.
 - ii. Where drinking water is obtained from an intermittent public water supply, each work place shall be provided with storage where such drinking water shall be stored.
 - iii. Every water supply of storage shall be at distance of not less than 50 feet from any latrine, drain or other sources of pollution. Where water has to be drawn from an existing well, which is within such proximity of latrine, drain or any other source of pollution, the well shall be properly chlorinated before water is drawn from it for drinking. All such wells shall be entirely closed in and be provided with a trap door, which shall be dust and waterproof.
 - iv. A reliable pump shall be fitted to each covered well and trap door shall be kept locked and opened only for cleaning or inspection which shall be done at least once a month.
 - v. The temperature of the drinking water supplied to worker shall not exceed 90° F.
5. WASHING AND BATHING PLACE:
 - i. Adequate washing and bathing places shall be provided separately for men and women.
 - ii. Such places shall be kept clean and well drained condition.

6. SCALE OF ACCOMODATION IN LATRINES NAD URINALS:

There shall be provided within the premises of every work place, latrines and urinals in an accessible places and accommodation, separately for each of them for men and women not less than the following:

i.	Where the number of person employed does not exceed 50	No.of seats 2.
ii.	Where the number of person employed does exceed 50 but not exceed 50	No.of seats 3.
iii.	For every additional 100 employees (in particular cases, the Superintending Engineer shall have the power to vary the scale where necessary)	No.of seats 3 per 100

7. LATRINE AND URINAL FOR WOMEN:

If women are employed, separate latrines and urinals separate from that for men shall also be exhibited at the entrance of latrines for each sex. There shall be adequate supply of water close to the urinals and latrines.

8. CLEANLINESS OF LATRINES AND URINALS:

Except in work places provide with water flushed latrines connected with a water borne sewerage system, all latrines shall be provided with receptacles on dry-earthen system, which shall be cleaned at least four times daily and at least twice during working hours and kept in a strictly sanitary condition. The receptacle shall be tarred inside and outside at least once in a year.

9. CONSTRUCTION OF LATRINES:

The inside wall shall be constructed of masonry or stone materials and shall be cement washed inside and outside at least once a year. The dates of cement washing shall be noted in register maintained for this purpose and kept this available for inspection.

10. DISPOSAL OF EXCRETA:

Unless otherwise arranged for by the local sanitary authorities, arrangements for proper disposal of excreta, by incineration at the work place shall be made by means of a suitable incinerator approved by the Asst. Director of public Health of Municipal, Medical Officer of Health as the case may be in whose jurisdiction the work place is situated. Alternatively, excreta may be disposed off by putting a layer of light soil at the bottom of pucca tank prepared for the purpose and covering it with a layer of waste or refuse and then covering it up with a layer of earth for a fortnight (when it will turn into manure).

11. PROVISIONS OF SHELTERS DURING REST:

At every work place, there shall be provided free of cost, two suitable sheds one for meals and other for rest or use of the labourers. The height of the shelter shall not be less than 11 feet from the floor level to the lowest part of the roof.

12. CRECHE:

- a. At every work place at which more than 50 women workers are employed, there shall be provide only hut for the use of children under the age of 6 years, belonging to such women and shall be used for infant's games and play and their bed room. The huts shall not be constructed on the lower standard than the following:
 - i. Thatched roofs.
 - ii. Mud floors and walls.
 - iii. Plants spread over the mud floor and covered with mat.

- iv. The hut shall be provided with suitable and sufficient opening for light and ventilation. There shall be adequate provision for sweepers to keep the place clean. There shall be two Dhais in attendance. Sanitary utensils shall be provided to the satisfaction of the Health Officer of the area concerned. The use of the hut shall be restricted to children, their attendants and mothers of the children.
- b. Where the number of women is more than 50, the contractor shall provide one hut and one Dhai to look after the children of women workers.
- c. The size of the crèche shall vary according to the number of women workers.
- d. The crèche shall be properly maintained and necessary equipments like toys etc. shall be provided.

13. CANTEEN:

A cooked food canteen on a moderate scale shall be provided for the benefit of workers whenever it is considered expedient.

ORISSA P.W.D CONTRACTOR'S LABOUR REGULATIONS

- 1) **Short title:** These regulations may be called "Orissa Public Works Department Contractor's Regulations".
- 2) **Definitions:** In these regulations, unless otherwise expressed or indicated the following words and expressions shall have the meaning hereby assigned to them respectively, that is to say:
 - i. **"Labour"** means a worker employed by the contractor of Orissa Public Works Department, directly or indirectly through sub-contractor or other person, or by an agent on his behalf.
 - ii. **"Fair Wages"** means wages whether for the time or piece work prescribed by the State Public works Department, provided that where higher rates have been prescribed under the Minimum Wages Act.1948, wages at such rates would constitute fair wages.(WD No.22059 dt: 16.8.77).
 - iii. **"Contractor"** shall have the same meaning as defined the Payment of Wages Act and include time and piece rate wages, if any.
- 3) **Display of notices regarding wages etc:** The contractor shall :
 - i. Before he commences his work on contract, display and correctly maintain and continue to display and correctly maintain, in a clean and legible condition, in conspicuous places on the work, notices on English and in the local Indian Language spoken by the majority of the workers, giving the rate of wage prescribed by the State P.W.D/ Electricity Department for the district which the work is done.
 - ii. Send a copy of the notices to the Engineer-in-charge of the work.
- 4) **Payment of wages:**
 - i. Wages due to every worker shall be paid to him direct.
 - ii. All wages shall have to be paid in cash where no food grain is supplied by the department or partly in cash and partly in grain, if food grain is supplied by the Department to the contractor for issue to labour engaged on the work.
- 5) **Fixation of Wages period:**
 - i. The contractor shall fix the wage period in respect of which the wages be payable.
 - ii. No wage period shall exceed one month.

- iii. Wages of every workmen employed on the contract shall be paid before the expiry of ten days, after the last day of the wage period in respect of which the wages are payable.
- iv. When the employment of any worker is terminated by or on behalf of the contractor, the wages earned by him shall be paid before the expiry of the day succeeding the one on which his employment is terminated.
- v. All payments of wages shall be made on a working day.

6) Wage book and Wages cards etc:

- 6.1 The contractor shall maintain a wage book of each worker in such forms as be convenient, but the same shall include the following particulars-
 - a. Rate of daily or monthly wages.
 - b. Nature of work on which employed.
 - c. Total number of days worked during each wage period.
 - d. Total amount payable for the work during each wage period.
 - e. All deductions made from the wages with an indication in each case of the ground for which the deduction is made.
 - f. Wage actually paid for each wage period.
- 6.2 The contractor shall also maintain a wage card for each worker employed on the work.
- 6.3 The Superintending Engineer may grant an exemption, from the maintenance of wage bond, wages cards to a contractor who, in his opinion may not directly or indirectly employ more than 100 persons on the work.

7) Fines and deduction which may be made from wages:

- 7.1 The wages of a worker shall be paid to him without any deduction of any kind except the following-
 - a. Fines.
 - b. Deductions for absence from duty, i.e., from the place or places where the terms of his employment he is required to work. The amount of deductions shall be in proportion to the period for which he was absent.
 - c. Deduction for damage to or loss of good expressly entrusted to the employed person for custody or for loss of money for which he is required to account where such damage or loss is directly attributable to his neglect or default.
 - d. Any other deductions which the Orissa Government may from time to time allow.
- 7.2 No fines shall be imposed on a worker and no deduction for damage or loss shall be made from his wages until the worker has been given an opportunity of showing cause against such fines or deduction.
- 7.3 The total amount of fines which may be imposed in any one wage period on a work shall not exceed an amount equal to 10% in a rupee of the wages payable to him in respect of that wage period.
- 7.4 No fine imposed on any worker shall be recovered from him by instalments or after the expiry of 60 days from the date on which it was imposed.

8) Register of Fines, etc:

- 8.1 The contractor shall maintain a register of fines and of all deductions for the damage or loss. Such register shall mention the reason for which fine was imposed or deduction for damage or loss was made.

- 8.2 The contractor shall maintain a list in English and in the local Indian language, clearly defining the acts and omissions for which penalty of fine can be imposed. It shall display such list and maintain it in a clean and legible condition in conspicuous places on the work.
- 9) **Preservation of Register:**
The wage register, the wage cards and the register of fines, deductions required to be maintained under these regulations shall be preserved for 12 months after the date of last entry made in them.
- 10) **Powers of Labour Welfare Officer to make investigation or enquiry:**
The labour Welfare Officers or any other persons authorised by the Government of Orissa on their behalf shall have the power to make enquiries with a view to ascertaining and enforcing due and proper observance of the fair wage clauses and the provisions of these regulations. He shall at liberty to investigate into any complain regarding default made by the contractor, sub-contractor in regard to such provisions.
- 11) **Report of Labour Welfare Officers:**
The Labour Welfare Officers or others authorised as aforesaid shall submit a report of the result of his investigation or enquiry to the Superintending Engineer concerned, indicating the extent, if any, to which the default has been committed with a note that necessary deductions from the contractor's bill be made and the wages and other dues be paid to the labourer concerned.
- 12) **Appeal against the decision of Labour Welfare Officer:**
Any person aggrieved by the decision and recommendation of the Labour welfare Officer or other authorised person, may appeal against such decisions to the Labour Commissioner within 30 days from the date of the decision forwarding simultaneously a copy of his appeal to the Superintending Engineer concerned but subject to such appeal, the decision of the Officer shall be final and binding upon the contractor.
- 13) **Inspection of Registers:**
The contractor shall allow inspection of the wage book and wage cards of any of his workers at a convenient time and place after due notice is received or to the Labour Commissioner or any other person authorised by the Government of Orissa on his behalf.
- 14) **Submission of Return:**
The contractor shall submit periodical returns as may be specified from time to time.
- 15) **Amendments:**
The Government of Orissa may from time to time, add to or amend these regulations and on any question as to the application, interpretation of effect of these regulations, the decision of the Labour Commissioner or any other person authorised by the Government of Orissa on that behalf shall be final and binding on that effect.

Clause-34 Additional Performance Security

Additional Performance Security shall be deposited by the successful bidder when the bid amount is seriously unbalanced i.e less than the estimated cost by more than 10%.

In such an event, the successful bidder will deposit the additional performance security to the extent of the differential cost of the bid amount and 90% of the estimated cost in shape of post office saving bank account/ NSC/ KVP/ Post office TDR/ Deposit receipt of scheduled bank before execution of the agreement.

The tender will be liable for rejection in absence of furnishing of the performance security even in case of **fixed deposit holders** and **Engineer Contractors** who were exempted from furnishing EMD while participating in tender.

Clause-35 The terms and conditions of the agreements have been read/ explained to me and I Sri/Smt certify that I clearly understand them and agreed to abide by these rules.

CONTRACTOR

SUPERINTENDING ENGINEER

Date: _____ Witness _____ Contractor _____

ADDENDUM TO CONDITION OF CONTRACT

2. TIME CONTROL.

2.1 Progress of work and re-scheduling programme.

2.1.1. The Superintending Engineer/Engineer in charge shall issue the letter of acceptance to the successful contractor. The issue of the letter of acceptance shall be treated as closure of the Bid process and commencement of the contract.

2.1.2 Within 15 days of issue of the letter of acceptance, the contractor shall submit to the Engineer-in-charge for approval and programme commensurate to clause no 2 showing the general methods, arrangements, and timing for all the activities in the works along with monthly cash flow forecast.

2.1.3. To ensure good progress during the execution of the work the contractors shall be bound in all cases in which the time allowed for any work exceeds one month to complete, 1/4th of the whole of the work before 1/4th of the whole time allowed under the contract has elapsed, 1/2 of the whole of the work before 1/2 of the whole time allowed under the contract has elapsed, 3/4th of the whole of the work before 3/4th of the whole time allowed under the contract has elapsed.

2.1.4 If at any time it should appear to the Engineer-in-charge that the actual progress of the works does not conform to the programme to which consent has been given, the contractor shall produce, at the request of the Engineer-in-charge a revised programme showing the modifications to such programme necessary to ensure completion of the works within the time for completion. If the contractor does not submit an updated programme within this period, the Engineer-in-charge may withhold the amount of 1% of the contract value from the next payment certificate and continue to withhold this amount until the next payment after the date on which the over dues programme has been submitted.

2.1.5 An update of the programme shall be a programme showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work including any changes to the sequence of the activities.

2.1.6 The Engineer-in-charge's approval of the programme shall not alter the contractor's obligations. The contractor may revise the programme submit it to the Engineer-in-charge again at any time. A revised programme is to show the effect of variations and compensation events.

2.2. Extension of the Completion date.

2.2.1 The time allowed for execution of the work as specified in contract data shall be the essence of the contract. The execution of the works shall commence from the 15th day or such time period as mentioned in letter of award after the date on which the Engineer-in-charge issue written orders to commence the work or from the date of handing over of the site whichever is later. If the contractor commits default in commencing the execution of the work as aforesaid, Government shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the earnest money and performance guarantee/security deposit absolutely.

CONTRACTOR

SUPERINTENDING ENGINEER

2.2.2 As soon as possible after the contract is concluded the contractor shall submit a time and progress chart for each milestone and get it approved by the Department. The chart shall be prepared in direct relation to the time stated in the contract documents for completion of items of the works, it shall indicate the forecast of the dates of commencement and completion of various trades of section of the work and may be amended as necessary by agreement between the Engineer-in-charge and the Contractor within the limitation of time imposed in the contract documents, and further to ensure good progress during the execution of the work the contractor shall in all cases in which the time allowed for any work, exceeds one month (save for special jobs for which a separate programme has been agreed upon) complete the work as per milestone given in contract data.

2.2.3 In case of delay occurred due to any of the reasons mentioned below, the contractor shall immediately give notice therefore in writing to the Engineer-in-charge but shall nevertheless use constantly his best endeavors to prevent or make good the delay and shall do all that may be reasonably required to the satisfaction of the Engineer-in-charge to proceed with the works for:

- i. Abnormally bad weather or –
- ii) Serious loss or damage by fire or
- iii) Civil commotion, local commotion of workmen, strike or lockout, officers any of the heads employed on the work or
- iv) Delay on the part of other contractors or tradesmen engaged by Engineer-in-charge, in executing work not forming part of the contract.
- v) In case of variation is issued which makes it impossible for completion to be achieved by the intended completion date without the contractor taking steps to accelerate the remaining work and which would cause the contractor to incur additional cost or
- vi) Any other cause, which, in the absolute discretion of the authority mentioned, in contract date is beyond the contractor's control.

2.2.4 Request for re-schedule and extension of time to be eligible for consideration shall be made by the contractor in writing within fourteen days of the happening of the event causing delay. The contractor may also, if practicable, indicate in such a request the period for which extension is desired.

2.2.5 In any such case a fair and reasonable extension of time for completion of work may be given. Such extension shall be communicated to the contractor by the Engineer-in-charge in writing. Within 3 months of the date of receipt of such request, Non application by the contractor for extension of time shall not be a bar for giving a fair and reasonable extension by the Engineer-in-charge and this shall be binding on the contractor.

2.3 Compensation for delay.

2.3.1 If the contractor fails to maintain the required progress in terms of clause-2 or to complete the work and clear the site on or before the contract or extended date of completion he shall without prejudice to any other right or remedy available under the law to the Government on account of such breach pay as agreed compensation the amount calculated at the rates stipulated below as the Superintending Engineer (whose decision in writing shall be final and binding) may decide on the amount of tendered value of the work for every complied day/ month (as applicable) that the progress remains below that specified in clause-2 or that the work remains incomplete.

This will also apply to items or group of items for which a separate period of completion has been specified.

Provided always that the total amount of compensation for delay to be paid under this condition shall not exceed 10% of the tendered value of work or to the tendered value of the item or group of item of work for which a separate period of completion is originally given.

The amount of compensation may be adjusted or set off against any sum payable to the contractor under this or any other contract with the Government. In case the contractor does not

achieve a particular milestone mentioned in contract date, or the rescheduled milestone(s) in terms of clause 2.5 the amount shown against that milestone shall be withheld, to be adjusted against the compensation levied at the final grant of extension of time. Withholding of this amount on failure to achieve a milestone, shall be automatic without any notice to the contract. However, if the contractor catches up with the progress of work on the subsequent milestone(s) the withheld amount shall be released. In case the contractor fails to make up for the delay in subsequent milestone(s) amount mentioned against such milestone missed subsequently also shall be withheld. However no interest, whatsoever, shall be payable on such withheld amount.

2.4 Bonus for early completion.

2.4.1 In case the contractor completes the work ahead of scheduled completion time, a bonus 1% (one percent) of the tendered value per month computed on per day basis, shall be payable to the contractor subject to a maximum limit of 2% (two percent) of the tendered value. The amount of bonus, if payable, shall be paid along with final bill after completion of work.

The Bonus/ Incentive should be paid in respect of individual project for new construction/ substantial additional improvement works, the minimum value for which the Bonus/ Incentive applicable is given below.

<u>Type of work</u>	<u>Minimum Value</u>
1. Building work / P.H. Work	Rs. 40.00 Lakhs
2. Road Work	Rs. 300.00 Lakhs
3. Irrigation works	Rs. 1,000.00 Lakhs

Incentive will be paid with approval of next higher authority of tender accepting authority on completion of original work before original time schedule.

2.5 Management of Meetings.

2.5.1 Either the Engineer or the contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.

2.5.2 The Engineer shall record the business of management meetings and is to provide copies of his record to those attending the meeting and to the employer. The responsibility of the parties for actions to be taken is to be decided by the Engineer either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

RELEVANT PROVISION IN THIS CONTRACT STANDS MODIFIED ACCORDINGLY.

CHAPTER – II

SPECIAL CONDITIONS OF CONTRACT

SPECIAL CONDITIONS OF CONTRACT

1. DEFINITIONS

In the Contract (as hereinafter defined) the following words and expressions will have the meanings here by assigned to them:

- a) **Approved/Approval** - Means approved in writing.
- b) **Construction Plant** - Means all equipments, appliances or things of whatsoever nature required for the executing, or completion, maintenance of the works or temporary works but do not include materials or other things intended to form or forming part of the permanent work.
- c) **Contract** - Means the instruction and information for tenderers General and Special conditions of the contract, Technical specification, drawings, tender (including the schedule of quantities and tender prices) the formal agreement and all agenda and attachment related to the above.
- d) **Contractor** - Means the particular person, firm or Corporation with whom the contract has been made for executing the work.
- e) **Drawing** - Means the drawings referred to in the specifications, any modifications of such drawings approved in writing by the Engineer-in-charge and such other drawings as may from time to time be furnished or approved in writing by the Engineer-in-charge.
- f) **Engineer-in-charge** - Means the Superintending Engineer, in-charge of the work specified or parts of the works under the contract, or such other departmental assistants or subordinates to whom the Superintending Engineer, in-charge may have delegated certain duties, acting separately within the scope of particular duties entrusted to them.
- g) **Government** - Means Government of Orissa, Department of Water Resources.
- h) **I.S.S/B.I.S** - Means Indian Standard Specifications/ Bureau of Indian Standard.
- i) **Temporary works** - Means all temporary works of every kind required for the performance of the contract.
- j) **Specification** - Whenever the terms " Specification " is used, apart from a specified standard specification, it shall mean the specification or plan prepared for a particular site as instructed to the contractor in executing that item of work.

2. EARNEST MONEY DEPOSIT.

- i) Tenderers including Govt. undertakings are required to deposit Earnest Money @ 1% of the amount put to tender.
- ii) In case the contractor proposes to engage machineries and equipments as asked for in the tender document owned or hired but deployed outside the State, he /she is required to furnish additional 1% EMD as bid security. The entire bid security including the additional bid security shall stand forfeited in case the contractor fails to mobilize the machineries with stipulated time as per the tender document.
- iii) The earnest money to be pledged in favour of the **Superintending Engineer, Minor Irrigation Division, Keonjhar** and may be in the following shape.
 - a) Deposit Call Receipt of any Schedule Bank.
 - b) National Savings Certificate.
 - c) Kisan Vikash Patra
- iv) No Cash/ Cheque payments are accepted.
- v) Earnest money given with one tender previously and submitted with other tender is not to be entertained.

3. TAX CERTIFICATES

The tenderers are also required to furnish Xerox/attested copy of the valid PAN CARD, ITCC (if any), VAT/TIN along with tender documents failing which the tender may not be considered. The original are to be shown at the time of opening. The bidders registered out side the State are required to submit an undertaking in the form of an affidavit that they are not registered under the VAT Act in the state of Orissa as they have not started any business in the state and they have no liability under the act. But Bidder has to produce VAT clearance certificate in form VAT 612 before signing of the agreement.

4. TIME OF COMPLETION

The work is to be completed within with in the period indicated in the detailed tender call notice which includes the period of monsoon commencing from the date of issue of order to proceed with the work.

5. PRE BID INSPECTION BY CONTRACTORS

The tenderers are required to go through each clause of PWD form No.F-2 carefully in addition to clause mentioned herein before tendering. In any case the tenderer shall be deemed to have carefully examined the tender documents, visited the site of work and it's surroundings and satisfied himself as the form and nature of the site, approach roads, haul roads, local conditions, assessed all the facilities including requirement and availability of labour and materials needed from complete execution of the work and made an inventory of such information as to the risks, contingencies and other circumstances which would influence or effect his tender before tendering. He should also satisfy himself about the sufficiency of availability of materials in quarry and borrow area. The Department will not be responsible for any misjudgment of the tender on the account for any future claims.

6. VALIDITY OF TENDER

6.1 On the outer cover the tenderers should write the name of the work and authority who had issued the tender.

6.2 The tenderer must furnish copy of Registration & VAT clearance certificate at the time of delivery of tender document other wise his/her bid shall be declared as non-responsible & shall be liable for rejection.

6.3 The rates quoted shall remain valid for a period of 90 (ninety) days from the last date prescribed for receipt of tenders.

6.4 The tender which is not in the prescribed proforma and is not strictly in accordance with the terms and conditions of the tender call notice is liable for rejection.

6.5 Alternate tenders, conditional tenders and tenders containing indefinite terms will not be entertained. The tenders will be considered given special emphasis on the capability of the tenderer and the implements and earth moving machinery at his disposal for the work.

6.6 Loose letters found in the tender box intimating modification to the tenders already submitted will not be considered.

6.7 Rate quoted should be for finished items of work and for sufficiency as per the description of the schedule of quantity and specification and shall include all taxes including rent. VAT on works contract, royalty, cess and general and incidental charges pertinent to the work, other charges of materials, octroi duty, ferry tolls, conveyance charges and other costs on account of land and building including temporary building required by the tenderer for collection of materials storage, housing of staff or other purpose for the work.

The tender must quote the rate for each item of work to be included in contract and tenders containing indefinite terms such as estimate rate or at percentage basis shall not be considered. All rates must be for finished items of work unless otherwise mentioned in then tender schedule. In case of percentage rate tender, the percentage quoted in the tender without mentioning the "Excess" or "Less" and not supported with corresponding amount will be treated as "Excess". Bills for percentage rate tender shall be prepared at the estimated rates for individual items only and the percentage excess or less shall be added or subtracted from the gross amount of the bill.

6.8 The units and rates in the tender should be written both in words and figures and in case of any discrepancy noted, the units and rates written in words will prevail. The rates should be quoted in Indian Currency.

- i) The tenderer shall bear cost of various incidental sundries and contingencies needed by the work of all within the following or similar category.
- ii) Labour camps and hutments necessary to a suitable scale including contingency and sanitary arrangements medical aids thereon to the satisfaction of the health authorities.
- iii) Water arrangements for laborer as well as for the works. No claim for carriage for water whatsoever will be entertained.
- iv) Fees and dues levied by the Municipal and water supply Authorities.

- v) Suitable equipment and wearing apparatus for the labors engaged in risky operation.
- iv) Suitable fencing, barriers, signals, including parapet and electrical signal where necessary at works and approaches in order to protect the public and employees from accidents.
- vii) No compensation for any damage done by rain or by similarly action during execution of the works shall be paid.
- viii) The tender shall be written legibly and free from erasures, overwriting or correction of the figures. Corrections unavoidable should be made by scoring out the same and initialing dating and rewriting. The tender should show the total of each page and grand total of whole tender.

6.9 The tender is to be decided as per prevailing codal provisions taking into consideration the capacity of the tenderer and equipments available with him for the work. The authority reserves the right to reject any or all tenders without assigning any reason thereto.

6.10 In order to qualify for consideration for award of the contract the tenderer should satisfy the Bid criteria as stipulated in the technical Bid. To substantiate the tenderer is required to submit authentic records duly certified by the Superintending Engineer of the Department in support of such experience.

6.11 Rate to be quoted by the contractor for various items of work should be consistent and rational. Tenders with in consistent rates and/ or speculative rates shall be liable for rejection.

6.12 The payment for RA bill will be made in level section measurement and no string section measurement will be considered.

6.13 All the tenderer are required to submit along with their tenders declaration about the names of their relatives employed in Water Resources Department in the prescribed proforma appended. In case they have no relation in Water Resources Department a certificate to that effect shall have to be furnished.

6.14 An affidavit shall be furnished by the contractor at the time of submission of tender paper about the authentication of tender documents including E.M.D.

6.15 The conditions in this detailed tender call notice will form part of the agreement to be drawn by the contractor.

7. AWARD OF CONTRACT

7.1 The tenderer whose tender is selected for acceptance shall within a period of fifteen days upon written intimation being given to him by Registered post deposit, initial security deposit so that the EMD and initial security deposit will be 2% (two percentage) +additional security 1% in case of machineries to be hired from outside, of the accepted tender amount and sign the agreement in the PWD form F-2 (Schedule SLV. No.61) for fulfillment of the contract in the office of the Engineer-in -charge. This initial security deposit together with the EMD and the amount of 5% deduction from each running bill as per F-2 agreement shall be retained as security deposit for the fulfillment of this contract. This security deposit will carry no interest. Failure to enter into the required agreement and to pay the security deposit as above within the specified period shall entail forfeiture of the earnest money. No tender shall be finally accepted until the required amount of security money is deposited. The written agreement to be entered into between the Contractor and the Govt. shall be the foundation of the rights of both the parties and the contract shall be deemed to be incomplete until the agreement is first signed by the Contractor and then by the Superintending Engineer, the department will accept the initial security deposit in the accepted from prescribed in clauses as above pledged in favor of the Engineer-in -Charge and in no other form. The Security deposit deducted from each running bill will be 5%. If the contractor express his request in writing he will be permitted to convert the security deposit of 5% into interest bearing securities (for an amount not less than Rs. 10.00 lakh in each case which will be pledged in favour of the Superintending Engineer)

Successful bidder registered under other state government/ MES/ Railways/ CPWD has to register under the State PWD before signing of the agreement.

7.2 The work may be splitted up and distributed among several contractors if considered necessary in urgency of circumstances of the work and the contractor will not be entitled to any compensation on this account.

7.3 In case of delay in acquisition of land no compensation will be admissible but extension of time will be granted.

7.4 The earnest money deposited by the unsuccessful tenderers will be refunded as per relevant rules in force.

7.5 Super/ Special Class contractors shall employ under him one Graduate Engineer and two Diploma holders belonging to the State of Orissa. Likewise an 'A' Class contractor shall employ under him one Graduate Engineer or two Diploma holders belonging to state of Orissa. The employment of such graduate Engineer and Diploma holders under the Contractor shall be full time and continuous and they shall not be superannuated, retired, dismissed or removed personnel from any State Government/Central Government Service / Public Sector Undertakings /Private companies and firm or be ineligible for appointment to Govt. service. The contractor shall pay them monthly emoluments, which shall not be less than the emoluments of the personnel of equivalent qualification employed under the State Govt. of Orissa. The Chief Engineer Roads, Orissa may however assist the contractor with names of such unemployed Graduate Engineers and Diploma holders if the contractor seeks for such help.

The name of such Engineering personnel appointed by the contractor who would be supervising the works should be intimated to the tender receiving authority along with each tender. Each bill of the contractor shall be accompanied by an employment roll of engineering personnel together with certificate of the Graduate Engineer or Diploma holder employed by the contractor to the effect that the work executed as per the bill has been supervised by him.

7.6 No part of the contract shall be sublet without written permission of the Engineer-in-charge or any transfer be made by power of attorney authorizing others to receive payment on behalf of the contractor.

7.7 No tenderer is permitted to furnish their tender in his own manuscript paper.

7.7.1 Exemption of EMD.

To avail the exemption of EMD, the intending Engineering Contractor should get the name of work recorded in the original registration certificate, any time before the tender is opened. Also he should have to furnish an affidavit to the effect that he has not availed the benefit during the financial year along with the tender paper for such exemption. If the intending Engineering contractor does not submit the original registration licenses duly recording the name of work for exemption of EMD and the photocopy of the same duly attested by the officer who has recorded the entry in the registration Certificate before opening of the tender, his/her tender will be treated as invalid even if he/she has submitted application for such exemption along with tender paper. It is the sole responsibility of the Engineer Contractor to make necessary entry in the Original Registration Certificate and submit copy of the same any time before the tender is opened. Exemption from EMD not permissible for fixed deposit holders even if entitled by License issuing Authority with valid period of 45 days beyond bid validity period.

8. OBSERVATION OF LAWS AND LOCAL REGULATIONS, ACCIDENTS AND SAFETY MEASURES:

The Contractor shall observe all State and Local rules and regulations so far as they are relevant in controlling the operations involved carrying out the work and indemnify the Govt. and employees of the Govt. against all suite losses, demands, actions, judgments and cost of every kind resulting from the commissions and omissions of the contractor and his employees in violation of the said rules and regulations.

8.1 Department for payment of the compensation under workmen's compensation act VI of 1923 on account of the workmen being employed by him and the full amount of compensation of awarded by any competent court of law to the workmen will be recovered from the contractor and will be paid to the workmen as per direction of the court.

8.2 The contractor shall have to abide by the Labour Laws and Rules in vogue and shall provide at his own cost housing, watering supply, sanitation, medical aid and other facilities to the labours engaged in the work as required under Labour Laws and Regulations. The Contractor shall not employ labour of minor age group.

8.3 The contractor shall have to abide by the safety code introduced by the Govt. of India, Ministry of works. Housing and supply in their standing order No.44 to 50 dated 25.11.57.

8.4 Blasting where required shall be taken up only when proper precaution have been taken for the protection of lives and property in accordance with I.S. 4081 – 1967 safety code for blasting and related drilling operations. Only persons licensed for and thoroughly conversant with the working methods and precaution to be observed in using explosives shall carry out blasting. To avoid the danger of injury from flaying debris, all personnel in a blasting area shall retreat to an adequate cover. While carrying out excavations, adequate precautions in accordance with I.S. 3764 – 1966. Safety code for excavation works shall be taken for the safety of workers. The contractor shall have to abide by the blasting rules & regulations.

8.5 In case of any damage to Govt. or public property or to the property owned to any persons of firms or bodies due to negligence or any such action of the contractor resulting in damage or stoppage or work thereby, the contractor shall be liable to be penalized to the extent of the assessed value of the damage or the out turn lost.

9. CHANGE OF ADDRESS OF CONTRACTOR:

The Contractor shall inform the Engineer and the Department any change of his postal address from time to time from the one given in the tender paper and authorize any person with due intimation to the Engineer-in-charge and the Department to receive instruction or communication from the Department on his behalf, failing which the said undelivered instructions and communications published in the notice board of the Engineer-in-charge shall be treated to be intimation to the Contractor and the same shall be binding on him.

All the correspondence should be made in English.

10. ARCHAEOLOGICAL FINDINGS

The contractor shall deliver to the Engineer-in-charge all articles of archaeological importance as and when those are found in course of execution.

11. CONTEMPORARY CONTRACTORS

The contractor shall take into consideration the needs and requirements of the other contractors if any, working in the vicinity during the tenure of his contract and shall neither take nor cause to be taken any steps or actions that may cause disruption disturbance to their work, labour or arrangements etc. Any action by the contractor that the Engineer-in-charge in his unquestioned direction may consider as infringement of the above would be considered as a breach of contract and he may take such action against the contractor as deemed fit.

12. TAXES:

- a. The rates quoted by the Contractor shall be deemed to include VAT and other taxes including royalties of all materials that the contractor will have to purchase for performances of this contract.
- b. During the course of contract period deductions of VAT on works contract turn over at the source, shall be made from each bill at such rate and conditions as may be required under the provision of Orissa VAT Act and Rules.
- c. **SALES TAX / VAT:**
Amount equal to four percent (4%) of each RA bill of the contractor will be deducted towards VAT on works as amended by Orissa Value Added Tax (Amendment) ordinance 2005. In case any amendment to the existing provisions is made during the tenure of the contracts, the same will be applicable to this contract.
- d. **INCOME TAX:**
Two percent (2% + 12% Surcharge) of the gross amount of each on going account will be recovered from the contractor towards Income Tax (Provisional or as advised by Income Tax Department)

13. INTEREST:

Under no circumstances interest is payable for dues of the Contractor if any lying unpaid or payable for the work.

14. PLANS AND DRAWINGS:

The work has to be carried out in accordance with the Orissa detailed standard specification and relevant I.S. specification pertaining to the tendered items of work and specifications and special conditions appended here to Drawings will be supplied to the contractor to execute the work in general conformity therewith. These drawings will be supplemented by such additional, general and details drawings or directions as may be considered necessary or desirable as the work progress. No claim will be entertained due to change of drawing.

Where details shown on those drawings differ from the requirement of the specifications, the requirement of the specifications shall govern and the contractor shall not work without proper drawings, direction and instructions. He shall check all drawings carefully and bring to the notice of the Engineer-in-charge any error and omissions and discovered, where upon the Engineer-in-charge shall prepare revised additional drawings and specifications as may be required. All such additional general and detailed drawings will be binding on the Contractor under the same terms and conditions as provided in clauses of F2 agreement. The decision of the Engineer-in-charge with regards to specification is final, for which no compensation or claim will be entertained.

15. CONSTRUCTION PROGRAMME:

i) The contractor shall have to submit the construction programme i.e. the plan and programme of execution for completion of the work at the time of agreement to the Engineer-in-charge. the construction programme should be such that, road work will commence after completion of 75% of lining work, or otherwise after completion of the canal work including structure in full shape. The Engineer-in charge shall have to approve the said construction programme by fixing a pragmatic mile stone with reference to the provisions laid down under clause 2(a) of the condition of the contract, for timely completion of the work and accordingly the work is required to be executed.

ii) If the revised construction programme is required on account of non-completion of work for which Extension of Time is required or for disruption of the execution in the stipulated period, the contractor shall have to submit the same to the Engineer-in-charge along with the Extension of Time application, if extension of time is prayed for or immediately after disruption of the execution mentioning the clear reasons as the case may be, for revision of work programme. The decision of the Engineer-in-charge is final and binding on the contractor. The contractor shall arrange for additional shifts whenever necessary to suit the revised construction programme. No extra payment on this account is admissible.

iii) The contractor has to make adequate lighting arrangements for night works wherever necessary in fulfillment of the construction programme at his own cost and no extra payment on this account is admissible.

16. AVAILABILITY OF LABOUR:

Labour required for the work may not be available to the full extent in the locality. The contractor may have to import labour from outside.

He shall arrange and regulate the labour strength according to necessity. The Department shall not entertain the claim for any idle labour whether or not at the fault of the contractor or due to any other reasons whatsoever. The contractor's item rate in the tendered are deemed to have adequate coverage on account of import and employment of required labours and providing facilities and amenities to them.

17. SUSPENSION OF WORK:

The Engineer-in-charge may from time to time by written orders without in any way deviating the contract, direct the contractor to suspend the work or any part thereof at such time and the contractor shall not after receiving such written order proceed with the work or items thereof ordered to be suspended until he shall have received a written notice from the Engineer-in-charge to proceed with the work again.

Should the work be ordered to be suspended directly in the interest of safety of the work due to acts of God or major war or indirectly as a result of the contractor not complying with any of the provisions of the contract in respect of the quality of the materials, workmanship programmed of execution he shall not be entitled to claim any compensation for any loss he may be put to directly or indirectly for such suspension of work.

During the period of suspension of the work the contractor shall properly protect and secure the works as necessary in the opinion of the Engineer-in-charge.

18. ITEMS NOT COVERED IN THE SCHEDULE:

The items of work not covered in the agreement shall be paid in the current schedule of rate of the State and those not covered by the said schedule of rates will be paid on actual analysis approved by competent authority.

19. FORCE MAJUORE:

The contractor shall take all precautions to protect the work from damages due to rains, flood, cyclones, fire or by any other natural calamity, public agitation or riots etc and also make good such damage if any at his own cost during the period of execution and till the work is taken over by the Department. No compensation will be paid to the contractor on account of idle laborers due to above reason.

20. TOOLS AND PLANT:

The contractor should arrange necessary tools, plant and machineries for the efficient execution of work at his own cost and the rates quoted should be inclusive of such charges. The department may lend on hire some machinery for use in the work subject to their availability on terms and condition as shall be specified by the Department from time to time and after execution of necessary agreement. But on the plea of non supply of machineries by the Department, the works should not be delayed nor any compensation on such account is tenable nor will the contractor be eligible for any time extension on that score.

21. HAUL ROADS:

All haul roads to Borrow areas and quarries will be constructed and maintained by the contractor at his own cost. The roads so constructed shall be allowed to be used free of cost by agencies working in other reaches of the canal including Govt. Department unless other wise restricted by the Engineer-in-charge.

22. DEPARTMENTAL STOCK MATERIALS:

The contractor may be issued stock materials as per terms and conditions specified under Clause - 8 of F-2 contract for bonafied use in the work. It shall be his responsibility to make all arrangements for proper transport, safe storage, watch and ward of materials and all other charges incidental there on. No payment shall be made on this account to the contractor separately.

He shall be responsible for any loss or damage of departmental materials and machinery during transit and execution of work. The stock materials to be issued by the Department and details there of is annexed separately Annexure-IV.

23. CONSTRUCTION SHEDS:

Temporary structures may be erected by the contractor at his expenses for storage sheds, office, residence, labour hutments etc. on the land available with the Department with the permission of the Engineer-in-charge. On completion of the work these structures should be dismantled and the site cleared and handed over to the Department.

23.1. In the event of delay in supply of departmental materials or supply of detailed structural designs for unavoidable reasons, reasonable extension of time will be granted on the application of the contractor. But no claim for monetary compensation will be entertained under any circumstances.

23.2. Any slip debris and other foreign materials deposited on the working region on account of rains, flood or any other cause prior to and during the course of execution and till the work is completely taken over the department have to be cleared by the contractor at his cost. The rates quoted by the contractor shall be inclusive of all such contingencies.

- 23.3. The contractor shall not interfere with the execution of water supply or electrical arrangements or any other works entrusted to any other agency by the Department at any time during progress of work.
- 23.4. It shall be the responsibility of the contractor to make such arrangements as may be required from time to time to protect men, machinery and the works against damage due to flood and the department accepts no liability whatsoever for damage or loss on this context.

24. SITE CLEARANCE:

Such portion of the site of work as may be considered necessary for the purpose of alignment and demarcation shall be cleared of jungle, if any by the contractor at his own cost.

The limits of the structure within which work will be carried out within the scope of the contractor shall be suitably demarcated by the Department.

The contractor has to supply necessary labour at his own cost fixing benchmark pillars/alignment pillars / alignment and pegs and also for layout, leveling and profiling and maintaining the same till completion of the work. The contractor at his own cost will supply cement concrete pillars required for layout. The generally layout and Bench mark pillars already laid out by the Department is to indicate generally this alignment of Canal in the field. The contractor while taking up excavation works will preserve original pillars.

- 24.1. The contractor should kept himself in touch with the Engineer-in-charge for smooth execution of work and arrange adequate labour depending upon the work load and working space available. No claim whatsoever for detention / idle of labour will be entertained.

25. OTHER CONTRACTORS:

Contractor's operations shall be so planned as to prevent water from his work flowing or finding way in to the neighboring reaches. In the event of water from his reach flowing or finding way into the neighboring or subsequent reaches, the respective contractor shall be liable to pay compensation towards any expenditure incurred and loss or damage sustained by the concerned contractor(s) on account of the said reasons unless they otherwise mutually settle the issue amongst themselves. Provided that if there, by any dispute among the contractors on the account of such compensation arises, the decision of the Engineer-in-charge shall be final and conclusive and binding on concerned contractor.

26. ORDER BOOK:

An order book with pages serially numbered will be issued by the Superintending Engineer shall be maintained by the Sectional Officer systematically till completion of the work and there after surrender it, to the Engineer-in-charge for record. The order book shall be available at the site during work hours for recording instructions relating to the work. Order regarding the work as and when necessary shall be entered in this book by the Superintending Engineer or his superiors in office with their dated signature in exercise of statutory power vested on them which shall be duly noted by the contractor or his authorized agent with his dated signature. The Executive Sub-ordinate, the in charge of work shall also record his observation of defective work and such orders / observation entered in this book, and noted by the contractor agent shall be considered to have been duly given to the contractor, similarly orders entered by the Superintending Engineer and Chief Engineer shall be deemed to have been duly issued by the Engineer - in - charge for the contract.

27. CLAIM BOOK:

A claim book of pages serially numbered shall be issued by the Superintending Engineer to the contractor who shall maintain it systematically and securely, and shall record in it such items as are not covered by his contract and or claimable as extra claim shall be entered in this book under the dated signature of the contractor or his duly authorized agent at the end of each month.

A certificate should be furnished by him along with those claims to the effect that beyond the claims entered in the book, the contractor has no other claims up-to-date. If in any month there are no claims, a recorded a certificate to that effect should be furnished by the contractor in the claim book. Each claim must be definite and should give also as far as possible the quantities as well as the total amount claimed. The claim book must be submitted regularly by the contractor

to the Engineer-in-charge by the 10th day of each month for his orders. Claims not made in this manner are liable to be summarily rejected. The claim book shall be finally surrendered by the contractor to the Engineer-in-charge for record.

28. RULE TO VERBAL ORDER:

It shall be the contractors responsibility to get any verbal orders, instructions or directions confirmed in writing without which no cognizance will be taken of such verbal orders, instructions or directions for settlement of any claim arising thereof.

29. STATUTORY OBLIGATIONS OF CONTRACTOR:

The contractor shall have to arrange water required for the work at his own cost.

- 29.1. The contractor shall have to construct and maintain coffer dam as required for the work during execution at his own cost.
- 29.2. Bailing out water from foundation, construction of cross bund dewatering wherever necessary during execution of the work shall have to be done by the contractor at his own cost.
- 29.3. Gangway, scaffolding or any such arrangements required for the work are to be provided by the contractor at his own cost as per direction of the Engineer-in-charge. The Department will have the right to inspect such arrangement made for the work and reject partly or fully such structures found defective in opinion of the Engineer-In-Charge.
- 29.4. Department shall not pay compensation to the contractor for the damage occurred to the materials and work entrusted to his due to natural calamities.

30. DEPARTMENTAL RIGHT FOR DEVIATION IN QUANTITIES:

Right is reserved to make such increase or decrease in quantity or item of work mentioned in the schedule attached to the tender notice as may be considered necessary for satisfactory completion of the work and such increase or decrease shall in no way invalidate the contractor.

31. EMERGENCY MEASURE:

The work may be split up and distributed among several contractors if considered necessary on the emergency of the circumstances of the work and the contractor will not be entitled to any compensation to this account.

32. SAFETY OF MACHINERIES:

Unusual flood may occur during the working season. In the event of overtopping or breach in the cofferdam/embankment due to such flood in the working season resulting in flooding of the working area or outside the working area, the contractor shall make his own arrangement to shift the machineries and equipments, materials etc. to a safe place at his own cost. The work shall be resumed after the floods. Necessary reconstruction of the cofferdam / embankment clearing the working area of debris and silt shall have to be done by the contractor at his own cost. Suitable extension of time may however be granted in such eventualities at the request of the contractor, but no compensation whatsoever shall be paid in this regard.

33. CONTRACTOR DYING, BECOMING INSOLVENT, INSTANCE OR IMPRISONED:

(a) In the event of the death, insanity, insolvency and imprisonment of the contractor or the contractor being a partnership or firm becomes dissolved or being a corporation goes into the liquidation, the contract may be terminated by notice in writing posted at the site of work and advertised in one issue of the local newspaper and all acceptable works shall be paid for after recovering all the contractors due to Govt. there from at appropriate rates to the person or persons entitled to receive and given dishonor-age for the payment.

(b) If the contractor becomes bankrupt or has a receiving order made against him or compound with his creditor or being a Corporation commence to be wound up not being a voluntary winding up for the purpose only an amalgamation or reconstruction or carry on its business under a receiver for the benefit of the creditors of any of them, the Department shall be at liberty.

- i) To give such liquidator receiver, or other person the option of carrying out the contract subject to his providing a guarantee for the due, faithful performance of the contract up to an amount to be determined by the Department.

- ii) To terminate the contract forthwith by notice in writing to the contractor or to the liquidator or receiver or to any person in whom the contract may become vested and to act in the manner as per prevalent clauses of F-2 contract.

34. MEASUREMENT OF EACH WORK SHALL BE TAKEN AS FOLLOWS:

Before commencement of work initial levels and to determine the final measurement of the work, final levels of the embankment or canal or ground or structural work as the case may be, shall be taken in presence of the contractor. The contractor will satisfy himself about the correctness of the initial and final levels entered in the level book issued by the Engineer-in-charge and in token of the acceptance of the said levels the contractor shall have to sign in each page of level book in which the said levels are recorded. Basing on these levels, the gross quantity of work executed by the contractor shall be arrived at. After completion of the work the contractor shall be given a written notice to attend the final measurement. On receipt of the notice, the contractor must have to attend the final measurement failing which the measurement ex-parte shall be taken by the Engineer-in-charge which shall be binding on the contractor. In case of the abandonment of work, if it is decided by the Engineer-in charge that final measurements of executed work shall be taken, the same procedure shall be followed as in case of final measurement on completion of work. It is the responsibility of the contractor to make the site free from all problems to take measurement by the Superintending Engineer or his authorized officer. If, in the opinion of the Engineer-in-Charge, the site is not free from problem for measurement and the contractor does not take any corrective measures to get rid of same, the Engineer-in-Charge shall make the site free from problem to take the measurement at the cost of the contractor and to determine cost involved there of, certificate by the Engineer-in-Charge for the purpose, shall be conclusive and binding.

- 34.1. The Engineer-in-charge shall decide the contractual matters in accordance with codes, rules and acts in vogue which shall be binding on both parties.

35. REMOVAL OF CONTRACTOR'S MEN:

The contractor shall on the written direction of the Superintending Engineer immediately removed from the works any person employed thereon, who may, in the opinion of the Engineer-in-charge, be incompetent or has misconduct himself. Such person shall not be employed again on the works without the written permission of the Engineer-in-charge.

36. DETAILS CALL NOTICE BEING PART OF CONTRACT:

The detail Tender Call Notice and all the Annexure there to will form the part of the agreement when the work will be awarded to the contractor. All the correspondences made with the contractor and all his correspondences with the department after the tender is received will also be attached with the agreement.

37. FAIR WAGES CLAUSE:

The contractor should abide the fair wage clause introduced by the Govt. and shall not pay less than the fair wages fixed by the Govt. to the laborer engaged by him in the work.

38. LABOUR LICENSE AND REGISTRATION:

The contractor is to furnish labour license as per the relevant labour Act and rules in force before signing the agreement, failing which execution of agreement will not be entertained.

39. PRICE PREFERENCE:

- a) Schedule Caste and Schedule Tribe tenderers will be given concession where their tenders are within 10% of the rate quoted by the lowest tenderer for any work. The work may be considered for award to him / them at the lowest tendered rate in relation of rule 18 of O.G.F.R. Vol. 1 Para 2.5.14 of O.P.W.D. Code vide Govt. of Orissa Works Deptt. Circular No.27748 dated 11.10.97.
- b) Preference in price will also be given to M/s Orissa Construction Corporation Ltd. as per relevant Govt. Circular.

40. QUALITY CONTROL AND TESTING:

The quality control organization of department will conduct necessary tests to ensure specifications and quality of execution of work as per standard procedures in vogue. The testing charges of Reinforcing Bar will be borne by the contractor.

41. TESTING OF THE STRUCTURES:

During execution of work, the contractor shall arrange the requisite equipments for testing of the work if found necessary at his own cost.

42. DEFECTS LIABILITY:

The contractor shall be responsible to make good of the defects at his own expense, which may develop or may be noticed before the expiry of one year from the certified date of completion and which is attributable to the contractor. All notices of such defect shall be given to the contractor promptly. In case, the contractor fails to make good of the defects, the Engineer-in-charge employ other persons/ agencies to make good of such defect, and all expenses consequent thereof and incidental thereto, shall be borne by the contractor.

In the event Government takes over portions of works, as they are completed, the liability of the contractor under this clause for those portions shall extend to a period of one year from the actual date on which portions of the works are taken over to the possession of the Department.

43. ENGINEER-IN-CHARGE'S DECISION:

It shall be accepted as an inseparable part of the contract that in matters regarding materials, workmanship, removal of improper work, interpretation of the contract drawing and contract specification, mode of procedure and the carrying out of the work, the decision of the Engineer-in-charge, which shall be given in writing, shall be final and binding on the contractor. The Engineer-in-Charge's final authority applies to technical consideration and does not include decisions regarding sums due to or from the contractor for extension of time.

44. PAYMENT OF PRICE ESCALATION IN THE CONTRACT CONTAINING THE PRICE ADJUSTMENT CLAUSE:

With regard to payment of price escalation during the extended period when the reasons for delay are not attributable to the contractor, it is clarified that where the extension of time is allowed by the Govt. / Higher authorities with the benefit of price escalation in respect of the balance work left for execution, pragmatic revised milestones should be fixed for completion of the balance work. The escalation calculation should be based on the milestones which could have been achieved by the contractor during the agreement period and extended period and should be limited to the quantities stipulated therein. Payment of price escalation during extended period will be paid subject to approval of the same by the Government of Orissa, Department of Water Resources.

45. SETTLEMENT OF DISPUTE:

If the contractor considers any work demanded of him to be outside the requirements of the contract or considers any drawing record or ruling of the Engineer-in-charge, on any matter in connection with or arising out of the contract or carrying out of work to be unacceptable, he shall promptly ask the Engineer-in-charge in writing for written instruction or decision. There upon the Engineer-in-charge shall give his written instructions or decision within a period of thirty days of such request. Upon receipt of the written instruction or decision, the Contractor shall promptly proceed without delays to comply with such instruction or decision. If the Engineer-in-charge fails to give his instructions or decision in writing within a period of thirty days after being requested or if the contractor is dissatisfied with the instruction or decision of the Engineer-in-charge, the contractor may within thirty days after receiving instructions or decision of the Engineer-in-charge will approach to the higher authority who shall afford an opportunity to the contractor to be heard and to offer evidence in support of his appeal. The Authority shall give his decision within a period of thirty days after the contractor has given the said evidence in support of his appeal, which shall be binding upon the contractor.

46. RESOLUTION OF DISPUTES:

- a) All claims are to be settled by a Civil Court of Competent jurisdiction by way of Civil Suit.

- b) The contractor shall not be entitled to invoke Civil Suit until and unless he has completed the work or until the Govt. has made alternative arrangements for completion of work in question as the case may be.
- c) The pendency of Civil Suit proceedings shall not dis-entitle the Government for completion of the work.

47. JURISDICTION OF COURT:

For the purpose of jurisdiction in the event of dispute, if any contractor should be deemed to have entered into within the State of Orissa and it is agreed that neither part to the contractor nor the agreement will be competent to bring a suit in regard to matters covered by this contract any place outside the state of Orissa.

- 47.1. If any further necessary information is required, the Engineer-in-charge will furnish such information on written request, but it must be clearly understood that tender must be received in order and according to instruction / specifications appended herewith.

48. CLAUSE FOR ADDITIONAL SECURITY FOR UNBALANCED ITEMS:

Additional performance security shall be deposited by the successful bidder when the bid amount is seriously unbalanced i.e. less than the estimated cost by more than 10%. In such an event the successful bidder will deposit the additional performance security to the extent of the differential cost of the bid amount and 90% of the estimated cost in shape of National Savings Certificates/ Kisan Vikash Patra/ Deposit receipt of schedule Bank.

49. CEMENT:

The Cement manufactured inside the State of Orissa is to be used as mentioned in Technical Specification. (Refer clause 31 of condition of contract).

50. STEEL:

Reinforcement bar manufactured by Steel Authority of India Ltd. (SAIL) is to be used. (Refer clause 31 of condition of contract).

51. BITUMEN:

Bitumen manufactured by Indian Oil Corporation Ltd. (IOCL) is to be used. (Refer clause 31 of condition of contract).

TECHNICAL SPECIFICATION

Technical Specification
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CHAPTER - 1
GENERAL SPECIFICATION

The terms the India Standard Specification herein after referred to as BIS as used therein means the relevant Bureau of Indian Standard codes with all amendments published up to the date of Submission of tenders. A statement of relevant BIS is applicable to this contest is enclosed.

LIST OF INDIAN STANDARDS

Sl. No.	Short Title	B.I.S Number
I. CEMENT		
1.	Specification to ordinary Portland cement 33 grade (4 th Rev)	269-1989
2.	Specification for Portland Pozzolana Cement	1489-1976
3.	Portland Slag Cement (Fourth revision)	455-1989
4.	Method for physical tests for hydraulic cement (Reaffirmed 1980)	4031-1968
5.	Method of Chemical analysis for hydraulic cement (First revision)	4032-1985
6.	Rapid hardening Portland cement	8041-1978
7.	Hydrophobic Portland cement	8043-1978
8.	High Strength ordinary Portland cement	8112-1976
II. AGGREGATES		
1.	Specification for coarse and fine Aggregates from natural source for concrete (Second Revision)	383-1970
2.	Specification for sand for masonry mortars	2116-1965
3.	Method of Tests for aggregates for concrete	2385-1969 (Part- I to Part- IV)
4.	Standard sand for testing of cement (First revision) with amendment 1 and 2 Reaffirmed 1980	650-1966
5.	Methods for sampling of aggregates for concrete	2430 -1969
6.	Method of test for determining aggregates impact value of soft coarse aggregates	5640-1970
III. STEEL		
1.	Code of practice for bending and fixing of bars	2502-1963
2.	Specification for cold worked steel deformed bars for concrete reinforcement	1786-1979
3.	Code of practice for welding of MS Bars used for reinforced concrete construction.	2751-1966
4.	Code for practice for use of Metal arc welding for general construction of mild steel	818-1989
5.	Deformed bars for concrete reinforcement hot rolled mild steel and medium tensile steel (Revised)	1139-1966
6.	Recommendations for detailing of reinforcement in reinforced concreted works	5525-1969
7.	Specification for Mild Steel and medium tensile steel Bars for Concrete reinforcement.	432-1966(Part I)
8.	Code for practice for safety and health requirement in Electric and Gas welding and cutting operations	818-1968
9.	Code for practice for fire precautions in welding and cutting operation.	3016-1965
10.	Measurement of building and Civil Engineering works, method part VIII steel work and iron work	1200-1974 (Part VIII)
11.	Code of procedure for manual or metal ARC and welding of Mild steel	823-1964
12.	Specification for filler rods and wires for gas welding	1278-1972

13.	Recommendations for welding cold worked steel bars for reinforced concrete construction	9417-1979
Sl. No.	Short Title	B.I.S Number
14.	Hard drawn steel wire fabrics for concrete reinforcement	1566-1982
IV.	CONCRETE	
1.	Method of Measurement of building and Civil Engineer work Part-II cement concrete works.	1200-1968 (Part-II)
2.	Code of practice for plain and reinforced concrete	456-2000
3.	Specification for pre cast concrete coping blocks.	5751-1969
4.	Methods of tests for strength of concrete	516-1959
5.	Code of practice for laying in situ cement concrete lining on canals	3873-1993
6.	Specification for Admixtures for concrete	9103-1979
7.	Method of Test for Autoclaved cellular concrete products.	6441-1972-73 (Part-I to IX)
8.	Method of Sampling and Analysis of concrete	1199-1959
9.	Specification of Batch type concrete mixtures (Second Revision)	1791-1968
10.	General requirements for Concrete Vibrators immersion type	2505-1980
11.	Specification for concrete vibrating tables	2514-1963
12.	Method of test for permeability of cement mortar & concrete	3085-1965
13.	Specification for fly ash for use as pozzolana as admixture for Concrete	3812-1981 (Part-II)
14.	Specification for Portable swing weigh batch for concrete (single and double bucket type)	2722-1964
15.	Code of practice for installation of joints in concrete pavements	6509-1972
16.	Code of practice for general construction of plain and reinforced concrete for dams and other massive structures	457-1957
17.	General requirement for concrete vibrator screed board type (First revision)	2506-1985
18.	Code of practice for concrete structures for shortage of liquids	3370 (Part-1 to 4)
19.	Code of practice for use of immersion vibrator for consolidating concrete (First revision)	3558-1983
20.	Method for testing performance of batch type concrete mixer	4634-1968
21.	Form vibrators for concrete	4656-1968
22.	Concrete batching and mixing plant	4925-1968
23.	Ready mixed concrete (Second revision)	4926-1976
24.	Code of practice for sealing joints in concrete lining on canals	5256-1992
25.	Vibrating plate compactor	5889-1970
26.	Concrete transit mixer and agitator	5892-1970
27.	Concrete pavers	7245-1974
28.	Concrete slump test apparatus	7320-1974
29.	Method of making curing and determining compressive strength of accelerated cured concrete test specimens.	9013-1978
30.	Specification for 43 Grade Ordinary Portland Cement (First Revision)	8112-1989
31.	Specification for 53 Grade Ordinary Portland Cement (First Revision)	12269-1987
32.	Specification for admixtures for concrete (First Revision)	9103-1999
V.	EARTH WORK	
1.	Method of Measurement of building and Civil Engineering Works Part I, Earthwork.	1200-1969 (Part-I)
2.	Safety code for piling and other deep foundations	5121-1969

Sl. No.	Short Title	B.I.S Number
3.	Code of practice for Design installation, observation and Maintenance of uplift pressure pipes for Hydraulic structures on permeable foundation.	6532-1972
4.	Safety code for excavation works	3764-1966
5.	Code of practice for protection of slope for Reservoir embankment	8237-1985
6.	Code of practice for earth work on canals	4701-1982
7.	Guidelines for lining of canals in expansive soils	9451-19
8.	Method of test for soils Part-II Determination of water concrete	2720-1973 (Part-II)
9.	Method of test for soils Determination of water content dry density relation using light compaction.	2720-1974 (Part-VII)
10.	Method of test for soils determination of dry density of soils in place by the sand replacement method	2720-1974 (Part-XXVIII)
11.	Method of test for soils determination of dry density of soils in place by the core cutter method	2720-1975 (Part-XXIX)
12.	Classification and identification of soils for general	1498-1970
13.	Safety code for blasting and related drilling operation with Amendment No. I (Reaffirmed 1978)	4081-1967
14.	Portable Pneumatic drilling machine (First revision)	5441-1986
15.	General requirement for black hold drilling rigs	7209-1974
16.	Safety code for working with construction machinery	7293-1974
17.	Code of practice for stability analysis of earth dams	7894-1975
18.	Guidelines for design of under seepage control measures for earth and rock fill dams	8414-1977
19.	Filtration media sand and gravel	8419-1977(Part-I)
20.	Guidelines for design of large earth and rock fill dams	8826-1978
21.	Under drainage arrangements of lined canals.	4558-1995
22.	Pre-cast cement concrete stables for canal lining	3868-1966
23.	Methods of tests of soils	2720 (Part-1 to X)
24.	Ammonium nitrate for explosive	4668-1967
25.	Method of test for commercial blasting explosives and accessories.	6609 (Part-1 to V)
26.	Detonators	7632-1975
27.	Method of load test on soils (Second revision)	1888-1982
28.	Method for standard penetration test for soil (first revision)	2131-1981
29.	Glossing of terms and symbolic relating to soil engineering.	2809-1972
30.	Method of sampling and preparation of stabilized soils for testing	4332 (Part-I of 1967)
31.	Test in over burden	5529 (Part-1 of 1969)
VI. OTHER SUBJECTS		
1.	Safety code for scaffolds and ladders part I scaffolds	3696-1966
2.	Safety code for scaffolds and ladders Part 2 ladders.	3696-1966 (Part-II)
3.	Recommendation s on stacking and storage of construction materials at site.	4082-1977
4.	Plywood for general purposes (Second revision amendment 1to 3)	303-1975
5.	Test Sieves	460-1985
6.	Code practice for under drainage of lined canals (2nd revision)	4558-1995

Sl. No.	Short Title	B.I.S Number
7.	Code of for practice for in situ permeability test	5529 (Part-1 & 2)
8.	Structural steel (Standard quality) (with amendment No.1 to 3)	IS: 226-1975
9.	Hard drawn steel wires (Third revision)	IS: 432-1982 (Part-II)
10.	Concrete pipes (with and without reinforcement) (2 nd revision)	IS: 458-1971
11.	Code of practice for laying of concrete pipes	IS: 783-1959
12.	Specification for mild steel tubes, tubular and other wrought Steel fittings Part-I mild steel tubes (fourth revision) (With Amendments No. 1 to 5)	IS:1239-1979
13.	Hard drawn steel wire fabric for concrete reinforcement (Second revision)	IS: 1566-1982
14.	Asbestos cement pressure pipe (Second revision)	IS: 1592-1980
15.	Preformed filler for expansion test in concrete payment and structures (non extruding and resilient type)	IS: 1838-1961
16.	Cast iron detachable joints for use with asbestos cement pressure pipes.	IS:8794-1978
17.	Structural steel (Fusion welding quality) (Second revision)	IS: 2062-1980
18.	Code of practice for laying of cast iron pipe (With amendment No. I)	IS: 3114-1965
19.	Methods of testing for concrete pipes	IS 3597-1966
20.	Rubber sealing rings for gas mains water mains and sewers	IS: 5382-1969
21.	Centrifugally cast (spun) iron low pressure pipes for water gas and sewage (First revision)	IS: 6163-1978
22.	Code of practice for laying of asbestos cement pressure pipes	IS: 6530-1972
23.	Cast iron detachable joints for use with asbestos cement pressure pipes	IS: 8794-1978
24.	Other Publications: Ministry of shipping and transport Specification for Road and Bridge works	No. 7900
VII. STONE PITCHING AND LAUNCHING APRON		
1.	Methods of test for determination of strength properties of natural building stone	IS: 1121-1975(Part-1 to 4)
2.	Method of test determination of true specific gravity of natural building stone (First revision)	IS: 1122-1974
3.	Method of identification of natural building stone (1st Revision)	IS: 1123-1975
4.	Method of test for determination of water absorption apparent specific gravity and porosity of natural building stone (1st revision)	IS: 1124-1974
5.	Method of test for determination of weathering of natural building stones (First revision)	IS: 1125-1974
6.	Method of test for determination of durability of natural building stone (First revision)	IS: 1126-1974
7.	Recommendations for dimensions and workmanship of natural building stones for masonry work (First revision)	IS: 1127-1970
8.	Recommendation of dressing of natural building stone (1st. revision)	IS: 1129-1972
9.	Sand for plaster (First revision)	IS: 1542-1977
10.	Code of practice for construction of stone masonry	IS: 1597-1967
11.	Rubble stone masonry	IS: 1597-1967(Part I to II)
12.	Method for determination of resistance to wear by abrasion of natural building stones (First revision)	IS: 1706-1972

Sl. No.	Short Title	B.I.S Number
13.	Sand for masonry mortars (First revision)	IS: 2116-1980
14.	Code of practice for preparation and use of masonry mortars (First revision)	IS: 2250-1981
15.	Stone facing	IS: 4101-1967(Part-I)
16.	Method of test for determination of water transmission rate by capillary action through natural building stones	IS: 4121-1967
17.	Method of test for surface softening of natural building stones by exposure to acidic atmospheres	IS: 4120-1967
18.	Methods of test for determination of permeability of natural building stones (First revision)	IS: 4348-1973
19.	Method of test for toughness of natural building stones	IS: 5218-1969
20.	Gujarat State, Section - 2, Engineering properties of building stones	IS: 7779-1975 (Part1/Sec.2)
21.	Recommendation practice for quarrying stones for construction purpose.	IS: 8881-1977
VIII. ROAD WORK		
1.	Paving bitumen (revised) (with Amendment No.1)	IS: 73-1961
2.	Cut back bitumen (Revised)	IS: 217-1982
3.	Glossary of terms relating to bitumen and tar(2 nd revision)	IS:454-1961
4.	Digboi type cut back bitumen (revised)	IS: 454-1961
5.	Distributors for hot tar and bitumen (first revision)	IS: 2093-1974
6.	Heaters for tar and bitumen (first revision)	IS: 2094-1974
7.	Hot asphalt mixing plants (with amendment No.1)	IS: 3066-1965
8.	Bitumen emulsion for roads (anionic type)	IS: 3117-1965
9.	Asphalt pavers' finisher (first revision with amendment No.1)	IS: 3251-1965
10.	Bitumen drums	IS: 3575-1977
11.	Recommendations on stacking and storage of construction materials at site (first revision)	IS: 4082-1977
12.	Bitumen mastic for bridge decking and roads	IS: 5317-1969
13.	Method of test for determining aggregates impact value of soft coarse aggregates.	IS: 5640-1970
14.	Safety code for construction involving use of hot bituminous materials.	IS: 5916-1970
15.	Method of test for determination of stripping value of road aggregates.	IS: 6241-1971
16.	Coarse aggregates for water bound macadam (first revision)	IS: 6579-1981
17.	Adhesive, bitumen emulsion	IS: 7393-1974
18.	Code of practice for road gullies	IS: 774-1975
19.	Bitumen emulsion for roads (Cationic type)	IS: 8887-1976
20.	Methods for testing tar and bituminous materials	IS: 9381-1976
21.	Method for testing tar and bituminous materials Determination of effect of heat and air by thin film over test.	IS: 9382-1979

In addition to the relevant BIS code, the specifications prescribed and guidelines issued by Central water Commission Standard Specifications shall also be followed where BIS specifications are not available.

All works of the contract shall be executed as per the specific and relevant clause/ clauses of relevant I.S. code unless otherwise specified. Materials used should confirm to the desired standards prescribed in the relevant codes. Wherever a Para of IS Code is cited in specification, it goes without saying that the latest revision of the specification subsequently, shall apply. For the purpose of relevancy or otherwise of any provision of the I.S. Code referred to, the decision of the Engineer-in-charge shall be final and binding.

CHAPTER – 2

SITE OF WORK

2.1 DISCHARGE OF RECORDS

The Hydrological data, pertaining to the canal and the streams crossing the canal furnished in the relevant report and drawings, are for information of bidders and contractors. It should be noted that the data used in preparing these particulars were recorded at locations different from the work site. The Government (i.e. Govt. of Orissa) does not guarantee the reliability or accuracy of any of the data, shall assume no responsibilities for any conclusions or interpretations that may be made from them. The contractor shall undertake at his expense such studies as are necessary to assess the reliabilities and accuracy of the information presented in the Data.

2.2. SETTING OUT OF WORK

2.2.1 Permanent bench marks shall be fixed at suitable location connecting permanent bench marks fixed by Survey of India. Temporary Bench Marks shall be set up by the Department at every 0.5 Km intervals at convenient locations along the canal to serve as reference levels. The contractor shall establish additional reference Bench Marks as may be needed at his own cost for facilitating the setting out and taking levels for measurement of work, with the approval of the Engineer-in-charge. The bench mark shall be marked on a concrete pillar 30 cm. (L) x 30 cm (B) x 75 cm (H) which shall be embedded 55 cm into firm ground and projecting 20 cm above the ground. The Bench Mark pillar shall be constructed in plain cement concrete of M-10. The pillar shall be protected from being disturbed. The RL of bench marks shall be conspicuously carved and painted on the pillar. (Conforming to the relevant I.S.Code)

2.2.2 Before starting any work and during execution (if required), the contractor shall erect reference bench marks, reference lines and check profiles at convenient locations as per the direction of the Engineer-in-charge. The centreline of the canal and the reference line for all alignments for demarcation purpose shall be laid by dug-belling on the ground. The reference line shall comprise the base line properly dug-belled on the ground with the numbered concrete/ masonry RD pillar suitably spaced.

2.2.3 Centre line of the canal shall be marked by fixing pillar/ stone at suitable intervals. Profiles of the canal in filling and in moderate cutting shall be marked at suitable intervals in straight reaches and in curves. A reference line shall also be marked on ground away from the outer edges of cutting and filling with pillars at suitable intervals for future reference.

To ensure correctness of execution, the edges of cutting and the outer toe lines of canal in filling should be marked by fixing pillars or pegs at suitable intervals or by dug- belling.

2.2.4 The check profiles shall be located 15 m apart or longer as directed by the Engineer-in-charge to serve as a guide for execution of all slopes and steps to the elevations and profile(s) indicated in the approved drawings. All important levels and all reference points with respect to bench marks and reference shall be fixed and co-related by the contractor as per directions of the Engineer-in-charge.

2.2.5 The zones of full cutting section, full filling section, partial cutting and filling section shall be separated by conspicuous demarcation in the field.

The curves stipulated in construction drawings shall be carefully laid in the field by adopting approved method of curve layout. The curves shall be marked on the ground by fixing pegs at very closer intervals and joining the peg points by dug-belling to a suitable depth.

The locations of different structures indicated in construction drawing shall also be clearly marked on the ground along the alignment of the canal. The control structure locations

of off-taking canals shall also be clearly demarcated, so that unnecessary excavation or filling at these locations can be avoided.

The spoils dumping zones shall clearly be demarcated in the field. These zones should be at least 2 m beyond the location of catch water drains.

2.2.6 To ensure accuracy in execution of cutting, the canal embankment, spoil banks and the structures, their layout shall be given in an appropriate manner with pegs and pillars suitably placed in relation to outer dimensions of these elements.

2.2.7 All materials and labour for setting out works including construction of reference bench marks, reference lines, check profiles and surveys as may be required at the various stages of construction, shall be made by the contractor at his own cost. The cost of such works shall be deemed to have been included in the cost of items in schedule.

2.3 CLEARING AND GRUBBING

2.3.1 CLEARING AND LEVELING SITE.

The portion of the right-of-way where required for constructing the work under these specifications shall be cleared of all trees, bushes, rubbish and other objectionable materials. Trees designated by the Engineer-in-charge shall not be cut and shall be protected from injury. Such cleared materials shall be disposed-off as provided in the sub-paragraph 3.2.3 below or removed from the site of work before the date of completion of the contract as approved by the Engineer-in-charge. The clearing operation shall be in accordance with clauses 4.1., 4.1.1., 4.2 and 4.3 of IS: 4701-1982 Indian code of Practice for earth work in canals. Surface boulders, either loose or partly embedded in the ground will have to be removed and stacked as directed.

2.3.2 GRUBBING.

The area described or shown on the relevant site plan shall be cleared of all obstructions, loose stones, non required materials and rubbish of all kinds. All brushwood shall be cleared and the roots grubbed up. Trees to be preserved will be designated by the Engineer-in-charge. No trees shall be cut down and removed without the instructions of the Engineer-in-charge. Those which are cut down shall be grubbed up. The same remarks apply to jungle clearance.

The products of the clearing shall be stacked in such place and manner as may be ordered by the Engineer-in-charge and the ground shall be left in a perfectly clean condition. All products of the clearing shall be the property of Govt. and shall be disposed- off as per the direction of the Engineer-in-charge.

All holes or hollows, whether originally existing or produced by digging up roots shall be carefully filled up with earth, well rammed to the design density and levelled off as directed.

2.3.3 PREPARATION OF BED

Ant-hills shall be completely dug out before earth work is started. Loose stones and digging of ant-hills involved in the preparation of bed. The contract rate for the earth work shall be deemed to include all the work to be done in accordance with this clause. In cases where the work of preparation of bed is rather extensive, the Engineer-in-charge will usually provide a separate schedule item of such preparation, but in the absence of such schedule provision, the contractor shall understand that his tender rate is inclusive of all such work without extra charge.

The contractor shall therefore examine the site before tendering and provide for all items to be done under this earth work tender rate. Old bunds will be benched or sloped as directed by Engineer-in-charge before addition of earth. The benches shall be 450 mm x 450 mm unless other sizes are specified (Refer page-35/Chapter-2 of Technical Manual, OCTDMS). The benches or slope shall be inspected by the Engineer-in-charge or engineer designated for the purpose and approved before new earth work is keyed into them.

2.3.4 DISPOSAL OF CLEARED AND GRUBBED MATERIAL

The disposal of cleared and grubbed materials shall be in accordance with clause 4.1.1 of IS 4701-1982 code of practice for earth work on canals. All waste materials to be burnt shall be piled neatly and when in suitable condition shall be burnt completely to ashes. Piling of waste material for burning shall be done at such a location and in such a manner as would not cause any fire risk in cleared area. Suitable materials and equipments for prevention and suppression of the fire shall be kept available at all times.

The materials to be disposed off shall be buried.

2.3.5 PAYMENT

For the clearance of light jungles, heavy jungle with or without up-rooting etc., payment will be made as provided for in the bill of quantities. Separate payment will not be made for clearing of site and grubbing including disposal of the cleared and grubbed materials required under the above paragraphs as specified in the contract document. The contractor shall include the cost thereof in the price bid in the bill of quantities of the contract for the relevant finished item of work for which clearing and grubbing as mentioned in the above Para are required. No payment towards removal of small stones and boulders of size less than 0.03 cubic meters will be made, and the rate quoted for excavation will be considered to include this item. However, payment will be made for the removal of surface boulders of sizes greater than 0.03 cubic meter, either loose or partly embedded in the ground, at the rate quoted in bill of quantities for the actual quantity so removed based on stack measurement applicable for the relevant strata classification after deducting 40% towards voids.

Benching will be paid as separate item, per cubic meter of excavation of bench at the rate provided for in the tender documents.

2.4 USE OF WATER

2.4.1 WATER FOR DUST ABATEMENT

The contractor shall procure and apply water for dust abatement.

Water applied for dust abatement will not be eligible for payment. The cost of procuring and applying water including all expenses for all means of conveying water to the point of use, their collection, usage, and all other incidental expenses will not be paid separately including creation of source of water and the cost shall be deemed to have been included in the concerned unit price bid in the bill of quantities of the contract for the relevant finished item of work for which water for dust abatement is required.

So also the cost of procuring and applying water required for the works shall be included in the price bid in the bills of quantities for the items of work for which the water is used.

2.4.2 PREWETTING OF CANAL PRISM AND ADJACENT AREAS

The contractor shall furnish all labour, materials and equipment and shall procure and apply water required for pre-wetting the areas under canal and embankment.

Water applied for pre-wetting areas as detailed above will not be eligible for payment. The cost of procuring and applying water including all expenses for all means of conveying the water to the point of use, their collection, usage and all incidental charges shall be included by the contractor in the concerned unit price bid in the bill of quantities for that item of work where the water shall be used and no separate payment for the same will be made.

2.5 SITE DRAINAGE

2.5.1 CROSS DRAINAGE

The contractor shall handle all flows from natural drainage channel intercepted by the work under these specifications, perform any additional excavation and grading for drainage as directed and provide and maintain any temporary construction required to by-pass or otherwise cause the flows to be harmless to the work and property. When the temporary construction is no longer needed and prior to acceptance of the work the contractor shall

remove the temporary construction and restore the site to its original condition as approved by the Engineer-in-charge.

In addition to cross drains, longitudinal drains may be considered necessary for proper drainage. The drainage system consisting of network of cross and longitudinal drainage system will be led into out-fall drains to prevent stagnation of water at the place of construction. The drains shall be constructed to the section designed and shall be either open or filled up with material to ensure free flow of water without clogging of the filled materials.

The cost of all works and materials required by this paragraph shall be included by the contractor in the unit prices quoted in the bill of quantities and no separate payment will be made for the same.

2.5.2 DRAINS

In connection with excavation for the canal and structures, the contractor shall perform excavation for the construction of drains, beam drains and chutes and any other drains as directed by the Engineer-in-charge.

The location, grades and sections of the drains shall be as shown on the drawings and or as directed. Measurement of excavation for the above drains will be made to the lines shown in the drawings or as directed. Payment for excavation for the above drains, channels and embankment will be made at the unit price bid in the bill of quantities for execution of canal, which unit price shall include the cost of placing the materials in embankment or otherwise disposing of the excavated materials and all work necessary to maintain the work in good order during construction.

2.5.3 BERM DRAINAGE AND DOWEL BANKS

Berm drainage, including drainage along the berm and banks of the canal and longitudinal berm drains shall be constructed where shown to dimensions and grades on the drawings or as directed.

The surface of the berm shall be sloped transversely and dowel banks shall be made along with sides of the banks and berm where shown on the drawings and elsewhere where directed. The dowel banks may be made by balding of material in place, following completion of a canal reach. The size and section of the dowel banks will be decided by the Engineer-in-charge according to the suitability.

No direct payment will be made for constructing Dowel banks and sloping berms and cost thereof shall be included in the unit price per cubic meter bid in the bill of quantities for construction for canal embankment including reconstructing and remodelling.

2.6 MONSOON DAMAGES

Damages due to rain or flood either in cutting or in banks shall have to be made good by the Contractor till the work is handed over to the department. The responsibility for de-silting and making good the damages due to rain or flood rests with the contractor. No extra cost is payable for such operations and the contractor shall therefore, had to take all necessary precautions to protect the work done during the construction period.

2.7 REMOVAL OF SILT AND WATER

Accumulated silt and water in the canal and structures for the works partly done by the contractor in current or previous seasons should be removed and no extra payment will be made, for such removal of silt and water. This unit rate of excavation is deemed to include cost of removal of such silt and water.

2.8 PROCEDURES FOR MEASUREMENT

Before commencement of work, initial levels to indicate existing ground levels, shall be taken at 30 m intervals longitudinally along the alignment of the canal. The level points transversely along the cross sections shall be at the maximum of 5 m intervals in flat ground and 3 m in undulating terrain. The cross sections shall be extended beyond the limit of work to a

suitable distance and minimum 5 m beyond the toe lines of slopes on both the sides. The interval stipulated shall be made closer depending on the topography or any stipulation made by the Engineer-in-charge.

All initial levels shall be recorded in ink in authenticated level books issued by the Engineer-in-charge and shall be signed by the Junior Engineer/ Assistant Engineer when he records the levels with due acceptance of the same by the contractor. The Assistant Engineers and Superintending Engineers shall exercise checks strictly in accordance with the codal provisions.

Actual construction works shall not be allowed to start unless the above formalities are fulfilled.

The level shall be recorded in the presence of the contractor or his authorized agent. The contractor or his authorized agent shall sign each page of the level book/ field book in token of acceptance. These cross sections shall form the basis of all future measurements and payments. Each dimension shall be measured to the nearest 0.01m, areas shall be computed to nearest 0.01sqm. Volume shall be computed to nearest 0.01 cubic m.

CHAPTER- 3 **EARTH WORK**

3.0 EARTH WORK - GENERAL

To the extent that they exist, plans and estimates for the Government's studies of Earth Work for construction of the canal will be available for inspection by the Bidders in the office of the concerned Engineer-in-charge. Such information is made available solely for the convenience of Bidders. The Government does not guarantee that the information is accurate or complete. Bidders are cautioned that this information is subject to revision and that the Govt. disclaims responsibility for any interpretation, deduction or conclusions, which may be made there from. It is not intended that this information will limit or prescribe the excavation and handling procedures of the contractor, and the Govt. reserves the right to utilize and distribute earth work materials during the progress of work as it serves the interest of the Govt.

Drawing showing the typical section of the canal annexed to these specifications provides such details as would enable the contractor to execute the work in general conformity therewith under these specifications which have been prepared as definitely and in as much detail as possible with regard to design data presently available. These drawings will be supplemented by such additional, general and details drawings or directions as may be considered necessary or desirable as the work progresses. For all changes in approved drawing/ design the recommendation of Superintending Engineer and approval of Chief Engineer will be essential. Where details shown on these drawings differ from the requirements of these specifications, the requirement of specifications shall govern. The contractor shall do no work without proper drawings. He shall check all drawings and specifications carefully and advise the Engineer-in-charge if any errors and omissions are discovered where upon the Superintending Engineer will prepare and lodge such revised additional drawings and specifications as may be required to suit the stage of the work. All such additional general and detailed drawings whether original or revised lodged in the office of the Engineer-in-charge and signed by him for the purpose of identification shall be open for inspection by the contractor under the same terms and conditions as provided in agreement.

3.1 EXCAVATION OF CANAL AND FOR STRUCTURES

3.1.1. CLASSIFICATION OF EXCAVATION

Payment shall be made on actual classification of soil met with during excavation. Materials excavated shall be measured in excavation to the lines shown on the drawings or as provided in these specifications, and all materials required to be excavated will be paid for at

the applicable rates in the schedule for excavation. No additional allowance above the rates in the schedule will be made on account of any of the material being wet. Bidders and the contractors must assume all responsibility for deducing and concluding as to the nature of the materials to be excavated and the difficulties of making and maintaining the required excavations. The classification of excavation shall be decided by the Engineer-in-charge and binding on the contractor. In case of dispute, the decision of Superintending Engineer shall be final. Merely the use of explosive in excavation will not be considered in areas on the higher classification unless blasting is clearly necessary in the opinion of the Engineer-in-charge.

3.1.2.1 EXCAVATION OF SOIL AND DISINTEGRATED (D.I) ROCK

Excavation of soil shall comprise of all kinds of soil such as vegetable or organic soil, turf, sand, silt, loam, clay, mud, peat, black cotton soil, loose or compact moorum, soft, stiff/ heavy/ hard shale, stony earth mixed with gravel having boulders up to 0.03 cum. Excavation of D.I. rock. shall comprise of soling of roads/ paths, hard core, macadam surface, lean concrete, stone masonry, brick work, soft conglomerate, lime stone, sand stone, laterite, hard conglomerate and types of D. I. rock, which does not require blasting and can be quarried or split with pick axe and crow bars. If however, the contractor resorts to blasting in such strata and D.I. rocks for his convenience, no extra payment shall be made and the materials shall not be classified in higher grade.

Excavation for canal shall confirm to provisions of relevant I.S.Codes. Side slopes are to be provided as per the approved drawings, specification and provision of I.S.Code.

3.1.2.2 EXCAVATION OF MEDIUM/ HARD ROCK

This shall include all solid rock in place, of such hardness and textures that it can not be removed by pick axe and crowbars or any other method until loosened by drilling, appropriate blasting and wedging. All boulders or detached pieces of solid rocks having volume greater than 0.5 cum can be classified as Medium/ Hard Rock. Blasting shall only be resorted to only after it has been certified by the Engineer-in-charge that blasting is necessary.

The excavated rock and debris so obtained shall be carried and dumped/ stacked separately with varying lead at the places indicated by the Engineer-in-charge. The volume shall be calculated after deduction of suitable void percentage and compared & co-related with the pre-measured volume.

The excavated materials shall be the property of the Department. The same shall be issued to the contractor for the works such as pitching, filter, rock toe, masonry works etc under this work if required, at the issue rate fixed by the department from time to time which is applicable and binding on the contractor.

Payment for Medium/ Hard Rock by means of appropriate blasting shall be made as per level section (pre & finished) at such closer intervals considered necessary for levelling as per opinion of the Engineer-in-charge. Isolated boulders having volume more than 0.5 cum and can't be covered under section measurement, shall be pre-measured. However, the excavated rock as measured by the above method and as calculated by stack measurement (deducting voids) shall be co-related and variation worked out. The volume from stack measurement of rock shall not ordinarily be less than 70%, which shall be ascertained by the Engineer-in-charge and certified in the measurement book. If a higher variation is found after verification, a report in this effect shall be forwarded to the Chief Engineer for approval.

3.1.2.3 OVER EXCAVATION

The canal shall be excavated to exact designed section in all kinds of soil and D.I. rock. No over excavation will be allowed in such reaches. However in canal sections, taken in Medium/ Hard Rock formation over excavation to the extent of 10 cm. depth on an average will be allowed and paid for in the respective item. In case of over excavation beyond 10 cm depth due to poor geological formation certified by the Superintending Engineer and approved by the Chief Engineer payments would be made for removal of such quantity only.

In canal sections where expansive type of soil such as CH type of soil is encountered and

over which concrete lining can not be directly laid, the canal prism shall be over excavated to the extent as directed by the Engineer-in-charge and such over excavated section shall be filled with cohesive-non-swelling (CNS) type of soil to be placed in uniformly compacted layers as directed by the Engineer-in-charge. The over excavation made in such strata, filling by suitable soil, watering & compacting will be paid under respective items at the quoted rate.

3.1.2.4 DEWATERING TRENCHES AND WET EXCAVATION

Subsoil water met within canal excavation shall be diverted to nearby drain/ nallah by cutting an open channel within the canal section to be excavated. When the drain/ nallah bed is higher than the subsoil water level met with, pumping shall be resorted to for dewatering below the drain/ nallah bed level. In case where topography of the area is such that surface water is not possible to be drained off by excavating the channel, pumping shall be resorted to till completion of the work. No distinction shall be made as to whether the materials being excavated is dry, moist or wet, care should be taken to discharge the drained water not to cause damage to works, crops or any other property. No separate payment shall be made for dewatering by pumping or by any other method.

3.1.2.5 MEASUREMENT AND PAYMENT

The payment shall be made on volumetric basis for the quantities excavated to the required extent. The cross sections shall be taken initially before commencement of work as stipulated in earlier Para. On completion of excavation, final cross sections shall be taken at the same points longitudinally and transversely. These cross sections shall be marked on the initial cross sections and the quantities between initial and final cross section shall be worked out and paid.

3.2 EXCAVATION FOR STRUCTURES

Excavation for the foundation of structures shall be to the level shown on the drawings or as directed by the Engineer-in-charge. In so far as practicable the useful materials removed in excavation for structures shall be used for back fill and embankment.

3.2.1 FOUNDATIONS FOR STRUCTURES

All trenches in soil other than rock or hard compact soil more than 1.5 m depth and soft or fissured rock exceeding 2.0 m depth in which men enter shall be securely shored and shuttered and timbered. All loose stones, projecting clumps of earth, pockets of materials which might come down on the workers in the trenches or any condition which is hazardous, shall be either removed or the excavated, sides adequately braced and the trench suitably guarded. On stiff slopes, workmen shall not be permitted to work one above the other.

The contractor shall prepare the foundations of structure sites by method which will provide firm foundation for the structures. The bottom and the side slopes of common excavation upon or against which the structure is to be placed shall be finished to the prescribed dimensions and the surfaces so prepared shall be moistened and tamped with suitable tools to form a firm foundation upon or against which the structures is to be placed. The contractor shall prepare the foundation of the structures as shown on the respective drawings. The horizontal foundation materials beneath the required excavation shall be moistened if required and compacted in place.

If the Engineer-in-charge considers it necessary to consolidate the foundation strata by grouting cement slurry, then drilling and grouting or any other foundation treatment shall be done by the contractor as directed by the Engineer-in-charge and the payment will be as per the general contract document in respect of extra items. Densities of the compacted foundation materials and the testing there of shall be in accordance with relevant IS specification.

When unsuitable materials are encountered in the foundation for structure, the Engineer-in-charge will direct additional excavation to remove the unsuitable materials. The additional excavation shall be refilled as follows. The excavation in soils, the over-excavation shall be filled in by selected bedding materials and compacted. In excavation of rock it shall be filled by cement concrete M-7.5. No Payment will be made for the over-excavation and the

resulting backfill. Should remains of old building be met with, the materials shall be removed with wedges and levers. Blasting shall not be allowed, with out the permission in writing of the Engineer-in-charge. If bad ground of loose soil is met with, the contractor shall be responsible for reporting the fact to the Engineer-in-charge, who shall issue such orders as may be necessary. For extra excavation, concrete and masonry arising from bad ground, the contractors shall be paid for treating this as additional quantity as per the contract rate of contract documents. All excavated earth which is unfit or surplus to the requirements for filling in canal embankments etc. shall be spared, as instructed by the Engineer-in-charge at the contractor's expenses.

3.2.2 OVER EXCAVATION

If at any point in common excavation the foundation material is excavated beyond the lines required to receive the structure, or if at any point in common excavation the natural foundation material is disturbed or loosened during the excavation process, it shall be compacted in place or where directed, it shall be removed or replaced as follows. In excavation in soils and in rock, it shall be filled by cement concrete M-7.5. ***Any and all excess excavation or over excavation performed by the contractor for any purpose or reason except for additional excavation as may be prescribed by the Engineer-in-charge and whether or not due to the fault of the contractor shall be at the expense of the contractor.*** Filling for such excess excavation or over excavation shall be at the expense of the contractor.

3.2.3 DISPOSAL OF MATERIALS

All suitable material removed in excavation or as much thereof as may be needed as directed by the Engineer-in-charge shall be used in the construction of canal embankments, roadway embankments and for selected bedding materials or for backfill and around structures. If there is an excess of material in the excavation, it shall be used to strengthen the embankment on either side of the canal, deposited in low areas uphill of the canal to eliminate trapped drainage or otherwise wasted as directed by the Engineer-in-charge. The disposal of the excavated material shall be in accordance with clauses 8.1 and 8.2 of BIS 4701-1982.

3.2.3 MEASUREMENT FOR PAYMENT

Foundation for structures will be measured for payment, as per drawing with due consideration for shuttering. The payment shall be made on volumetric basis for the quantities excavated to the required extent.

3.2.3 PAYMENT

Payment for excavation for structures shall be made at the unit price per cubic metre. The rate of excavation for structures shall include the cost of all labour and materials and other temporary constructions, cost of all pumping and dewatering, cost of all other work necessary to maintain the excavation in good order during construction, cost of removing such temporary construction where required and shall also include the cost of disposal of the excavated material.

3.2.4 BACK FILL

3.2.4 BACK FILL AROUND STRUCTURES

The item of the schedule for back fill around structures including pipe portions of structures includes all back fill required to place under these specifications.

3.2.4 MATERIALS

The type of material used for backfill, the amount thereof and the manner of depositing the material shall be subject to approval of Engineer-in-charge. In so far as practicable backfill material shall be obtained from material removed from excavation for structures. But when sufficient suitable material is not available from this source or from adjacent canal excavation,

additional material shall be obtained from approved burrow areas. The burrow pit excavation shall be in accordance with clauses 9.1 to 9.3 of B.I.S. 4701 - 1982.

Where sand filling is specified, the sand shall be clean, free from admixture of foreign material and approved by the Engineer-in-charge before filling is commenced. Should there be a necessity to fill in a basement with sea sand, prior written approval of the Engineer-in-charge shall be obtained. Sand filling should be saturated with water before the construction is allowed to proceed.

Filling around structures shall have well consolidated in layers of 15 cm. by ramming with iron rammers and cut ends of crowbars. When filling reaches the finished level the surface shall be saturated with water for at least 24 hours, allowed to dry and then rammed and consolidated.

Except as otherwise provided below, backfill material to be compacted shall contain no stones larger than 80 millimetres in diameter and if not be compacted shall contain no stones larger than 130 millimetres in diameter. If the excavation for the foundations of the structure is in swelling soils, a layer of cohesive non-swelling (CNS) soil conforming to B.I.S. 9451-1985 should be interposed between the swelling soil and the structure.

3.2.4 PLACING BACKFILL

Backfill shall be placed to the lines and grades shown on the drawings as prescribed in this paragraph or as directed by the Engineer-in-charge.

The surface to receive the filling shall be first prepared free from all roots, vegetation or spoil and wetted. All backfill shall be placed carefully and spread in uniform layers so that all spaces around rocks and clods will be filled. Backfill shall be brought up as uniformly as practicable on both sides of walls and all sides of structure to prevent unequal loading. Backfill shall be placed to about the same elevation on both sides of the pipe positions of the structures to prevent unequal loading and displacement of the pipe. The contractor shall provide at least 60 (Sixty) cm thick earth cover over the top of pipe to prevent damage from construction equipment loads. If a haul road is built over a pipe, all backfill about and over the pipe shall be placed to get a uniform surface and no humps or depressions will be permitted at the pipe crossing.

3.2.4 STRUCTURES ON FILL

Where the original ground surface is below the base of a structure or below the bottom of pipe, all fill required for the structure foundation and all fill up to the bottom of the pipe shall be placed as compacted embankment. The embankment over the natural ground up to pipe bottom and over the pipe shall be laid in accordance with clauses 9.2.4, 9.2.5 and 9.2.6 of B.I.S. 783 code of practice for laying of concrete pipe.

3.2.4 MEASUREMENT AND PAYMENT

Payment for backfill about structure will be made as provided in the unit price bid in the bill of quantities which shall include cost of backfill about the structure up to ground level. The cost of backfill shall be included in the applicable price bid in the bill of quantities of contract for excavation of foundation of the structure for which backfill is required.

3.3 DRILLING AND BLASTING

Blasting where required shall be permitted only when proper precaution have been taken for the protection of persons and property in accordance with I.S. 4081 - 1967 (Indian Standard Specification for safety Code for blasting and related drilling operations). While carrying out excavation, adequate precautions in accordance with I.S. 3761-1966 (Indian Standard Specifications for safety Code for excavation work) and in accordance with the Indian Explosives Act-1982 shall be taken. All blasting operations shall be carried out by licensed blasters after obtaining prior permission from the Engineer-in-charge.

All contractors who execute blasting operations in connection with works for purpose of quarrying stones, road construction, excavating foundations, well sinking or for any other

purpose shall observe the rules and precautions as per standard norms and any further additional instructions which may be given by the Engineer-in-charge.

Blasting operation, when considered necessary shall be resorted to only with the written permission of the Engineer-in-charge. Prior inspection shall be carried out for the safety and stability of the public and property. Blasting operations in the proximity of overhead power lines, communication lines, utility lines or other structures shall not be carried on until the operator or the owner or both of such lines have been notified and precautionary measures deemed necessary have been taken.

Any damage to the neighbouring buildings, properties, standing crops, and life due to blasting shall be made good by the contractor at his cost.

3.4 STRIPPING OF BURROW AREAS

Burrow area shall be stripped-off of top soil, sod and any other objectionable materials to the required depths as directed by Engineer-in-charge. The work may be done manually or with suitable machine. Stripping operations shall be limited only to the designated burrow areas. Materials from stripping shall be disposed off in exhausted burrow areas or in the approved adjacent areas as directed. No extra payment shall be admissible for stripping the burrow areas as this is deemed to have been included in the unit bid price for earth work in the bill of quantities.

3.4.1 BURROW AREA WATERING/ DEWATERING

Burrow area watering shall be done by the contractor at his own cost wherever necessary preferably 48 hours in advance, so that materials may be carried with adequate moisture and in the manner specified by the Engineer-in-charge.

The initial moisture content of the materials in the burrow areas shall be estimated with the help of field laboratory tests. The optimum moisture content required for the materials in any particular burrow areas shall be obtained from the field laboratory. The additional moisture requirements as determined by the laboratory test shall be introduced into the burrow areas by watering well in advance of the excavation to ensure uniformity of moisture content. All care shall be taken to reduce excessive moisture in any of the locations of a burrow area before or during excavation to secure the materials with moisture content close to the optimum. To avoid formation of pools in the burrow areas during excavation operation, drainage ditches from burrow areas to suitable outlets shall be excavated, wherever necessary. Upon exhausting of all materials or abandoning the burrow areas, the pits shall be fully drained to ensure to impounding of water.

3.4.2 HAUL ROADS AND APPROACH ROADS

Construction and maintenance of approach roads, and haulage roads to quarry area and burrow area will be the responsibility of the contractor. The department will have full right of way to those roads for inspection purposes. Proper roads sign as directed have to be provided for safety. For haulage of earth, the contractor shall construct ramps and haul roads of sufficient width along the shortest but most practicable route and shall maintain and illuminate them in a satisfactory manner. Watering of the haul road shall be done by the contractor as often as necessary to prevent rising of dust, formation of cuts and consequent deterioration of the surface. When ever service roads meant for public thorough fare run through or close to the burrow area, the contractor shall direct the excavation and haulage operation in such a manner as to ensure uninterrupted use of the service road and safety to the public. At the haul road and service road crossing, the contractor shall install necessary cheek gates and road signs.

No extra payment is admissible as this is deemed to have been included in the unit bid price for earth work in the bill of quantities being contingent to the main work.

3.4.3 EARTH FILL MATREIALS

3.4.3.1 HOMOGENEOUS EARTHFILL

Dams and canal embankments shall be constructed to the top width and side slopes as shown on the drawings. Suitable excavated materials available from the canal cutting, proud cutting, removal of ramps and excavation for structures shall be used for construction of banks.

If suitable and adequate materials for constructing embankment are not available from excavations, the desired materials shall be obtained from burrow area designated for the purpose as per the instruction of the Engineer-in-charge.

The planning for execution should be such that all the useful excavated materials are utilized in embankment prior to utilization of burrow earth from outside. The embankment earth shall be burrowed only after getting written instruction of the Engineer-in-charge. Only suitable materials as per specification shall be excavated, loaded and conveyed to the point of placement in the embankment. Unsuitable materials if conveyed shall be removed and disposed clear of the work site as directed by the Engineer-in-charge at the cost of the contractor.

3.4.4 PLACING EARTHFILL

3.4.4.1 LAYER THICKNESS

Construction of embankment shall begin at the toe of the fill and in no case shall embankment be widened by materials dumped from the top. The materials shall be placed in the earth fill in the continuous horizontal layers not more than 22.5 cm in thickness (15 cm after attaining required degree of compaction).

The thickness of the layer shall be adjusted by the Engineer-in-charge; if the contractor satisfies the Department that the particular type of compactors used by him shall give the required density by carrying out trial compaction and requisite tests. The thickness of horizontal layers after compaction shall not be more than 10 cm if compaction is performed by mechanical tampers, not more than 15 cm if by sheep foot roller and not more than 22.5 cm, if compaction is performed by vibratory or pneumatic rollers or similar equipment. Initially the earth in the embankment fill shall be laid in a greater width than the designed section. Adequate extra width of about 0.30 m on either side of the embankment shall be provided, so that the earth fill, up to lines of the finished slopes shall have the required compaction as per the drawing and specification. Such extra width shall be trimmed & removed and utilized in the upper layers of embankment along with slope dressing, for which no additional payment shall be made as it is deemed to have been included in bid price of earth work in embankment in the bill of quantities.

3.4.4.2 LAYING OF FILL

No fresh layer shall be laid until the previous layer is properly watered and compacted as per the requirement. If in the opinion for the Engineer-in-charge, the surface of the prepared foundation or the rolled surface of any layer of earth fill is too dry or smooth to bond properly with the layer of materials to be placed thereon, it shall be moistened or worked with harrow, scarifier or other suitable equipment in an approved manner to a sufficient depth to provide a satisfactory bonding surface before the next succeeding layer of earth fill materials is placed. If the rolled surface of any earth fill is found to be too wet for proper compaction of the layer of earth fill materials to be placed thereon, it shall be raked up and allowed to dry or be worked with harrow, scarifier or any other suitable equipment to reduce the moisture content to the required amount and then it shall be compacted before the next succeeding layer of earth fill materials is placed.

3.4.4.3 COMPACTION OF LAYERS

The materials shall be deposited in rows parallel to the axis and spread in the uniform layers and clods shall be broken to a maximum up to 5 to 7cm size and in such thickness as directed by Engineer-in-charge. The work of spreading and compaction shall be so adjusted as to not to interfere with each other and in such a way that neither of the operations is held up because of non completion of rolling and watering. The excavation and placing operation shall be such that, the materials when compacted shall be blended sufficiently to secure the best practicable degree of compaction, impermeability and stability. If the work is held up due to failure of machinery, no claim whatsoever shall be entertained even in case the machinery is supplied by Department. The surface of banking shall at all time of construction be maintained true to the required cross section.

During construction, a small transverse slope from centre towards edges should be given to avoid pools of water forming due to rains.

3.4.4.4 COMPACTION NEAR STRUCTURES

When compacting, the soil against the rock abutment or walls of masonry or concrete structures, the construction surface of the embankment shall be sloped away from the rock or masonry or concrete structure leaving a minimum distance of 0.6 m and at an inclination of 3:1. If the foundation surface is too irregular to allow the use of large roller directly against the structure or rock out crop, the roller shall be used to compact the soil, as close to the structure or the out crop as possible and the portion of the embankment directly against the rock or the structure shall be compacted with pneumatic hand tampers in thin layers. The moisture content of the earth fill placed against the rock or the structure shall be slightly above the optimum to allow it to be compacted into all irregularities of the rock and this shall be determined by the field laboratory. In placing the earth fill under rock foundation, the foundation shall first be prepared as detailed earlier.

3.4.4.5 CARE IN LAYING FILTERS

Care shall be taken in placing the first layer of the fill above the filter layer so that no damage is caused to the filter layer by the hauling machinery. Sheep foot rollers shall not be employed for compaction over the filter, till the thickness of the layer compacted by other means is greater by 30 cm. than the teeth of the roller drum. The soil for the first layer shall be at moisture content sufficient to enable satisfactory bonding of the fill with the filter surface.

3.4.5 WEATHER CONDITIONS

Embankment materials shall be placed only when the weather conditions are satisfactory to permit accurate control of the moisture content in the embankment materials. Before closing work on embankment, in any continuous reach prior to setting of monsoon, the top surface shall be graded and rolled with a smooth wheeled roller to facilitate run-off. Prior to resuming work, the top surface shall be scarified and moistened or allowed to dry as necessary and approved by the Engineer-in-charge for resumption.

The contractor shall provide suitable protection works to protect the slope from corrosion due to rain water. No payment whatsoever shall be made for providing such protection work and rectifying the monsoon damages.

3.4.6 MOISTURE CONTROL

The water content of the earth fill materials prior to and during compaction shall be distributed uniformly throughout each layer of materials and it shall be between -2% to +2% of the optimum moisture content. Moisture determination of soil as well as needle moisture determination of soil shall be carried out as per I.S. 2720-1983.

Laboratory investigations may impose some restriction on the lower limits of the practicable moisture contents on the basis of studies on consolidation characteristics of soil in embankment. Here in after the term, range of optimum practicable moisture content shall refer to the value as described above. As far as practicable, the materials shall be brought to proper moisture content in the borrow area before excavation. If additional moisture is required it shall be added preferably at the borrow area and only in limited cases/ extent if required, on the embankment by sprinkling water before rolling of a layer. If more moisture is present than required, the material shall be spread and allowed to dry before starting compaction. Moisture control shall be strictly adhered to. The moisture content shall be relatively uniform throughout the layer of material. If necessary, ploughing, disc harrowing or blending with other materials may have to be resorted to obtain uniform moisture distribution. If the moisture content is more or less than the range of optimum practicable moisture content or if it is not uniformly distributed throughout the layer, rolling and adding of further layer shall be stopped. Further work shall be started again only when the above conditions are satisfied.

In order to have proper control of moisture content in the earth fill, no earth work shall

be done during rainy days. No compensation shall be made to the contractor due to held up of work for rain or fog.

3.4.7 MEASUREMENT AND PAYMENT

3.4.7.1 MEASUREMENT

All works shall be measured by levels. For payments, the level books, field books, the cross section sheets and calculation sheets shall be treated as adjuncts to the measurement books. All linear measurement shall be in metres, correct to 0.01m, and volume worked out in cubic meter correct up to 0.01 M³.

The quantities between the levels taken after stripping and cross sectional levels taken after construction of consolidated embankments under OMC conditions with the available useful excavation soils within the pay lines shall be worked out excluding rip-rap, rock toe and filters. It shall be clearly understood that construction of embankments to extra widths as specified in paragraph 3.4.5.1 and extra height formed for shrinkage allowance as specified in paragraph 3.5.8 will not include for payment.

The measurement for construction of consolidated embankment with the materials obtained from the burrow areas shall be the difference between the net quantities of the final compacted embankment section under OMC and net quantities of the compacted embankment constructed with the suitable materials from all excavations as specified above and in earlier paragraphs.

The final measurements and levels shall be taken at the cross sections specified in paragraph 2.8 of the completed, compacted design section after the slopes dressed to ensure that the work is completed as shown on the drawings plus the settlement allowances. The measurement for computation of quantities shall not include the extra section provided as per paragraph 3.4.5.1 and 3.5.8. The quantity of compacted earth work utilising the materials from all excavations and compacted materials utilising from the burrow area shall be worked out on the basis of cross sectional areas of the pay lines and the difference between the cross sections.

3.4.7.2 RATE FOR PAYMENT:

The rate for embankment fill under item specified in schedule of quantities shall include the entire cost for labour, materials, tools and plants, machinery, taxes, excavation, transportation and incidental operation required for carrying out and completing the item of work in accordance with the specification, drawing and as directed by Engineer-in-charge including

- (i) site clearance
- (ii) setting out works
- (iii) cost component of construction and maintenance of cofferdam with diversion arrangements for allowing to flow the excess water in coffer dam and removal of the same after completion of the work
- (iv) clearing trees, stumps and bushes, grubbing and stripping of the burrow area up to required depth and scarifying etc.
- (v) marking out, providing and forming model section, look spitting, string and stacks as may be considered necessary by the Engineer-in-charge to guide the contractor in embankment construction
- (vi) maintaining burrowing area free from vegetation growth, drainage arrangement and moisture control including watering
- (vii) loading, conveyance from designated burrow area, unloading and spreading of suitable fill materials including re-handling
- (viii) construction and maintenance of approach roads and haul roads
- (ix) cutting and trimming the extra fill as specified in **paragraph 3.4.5 and dressing of the slope in paragraph 3.5.9**
- (x) restricted working near site of structures
- (xi) settlement allowance as per paragraph
- (xii) spreading in thinner layers at required places

- (xiii) removal of unsuitable materials like bushes, roots, sods, other perishable materials and pebbles etc. from the fill materials
- (xiv) providing labour for testing of samples (cost of testing shall be borne by the department)
- (xv) the department might review the design, if necessary, on examination of density test results and the contractor shall have no claim arising out of such a review and consequent change, if any, in the design
- (xvi) all safety measures.

3.5 COMPACTING EARTH MATERIALS

3.5.1 GENERAL

Where compaction of earth materials is required, the materials shall be deposited in horizontal layers and compacted as specified in this paragraph. The excavation, placing moistening and compacting operations shall be such that, the materials will be uniformly compacted to the required density throughout the required section, and will be homogeneous, free from lenses, pockets, streaks, voids, laminations or other imperfections.

Having decided on the filling materials to be used, standard compaction test will be conducted on the materials proposed for embankment to indicate best type of equipment to be used and the moisture content at which compaction should be done, thickness of layer and number of passes etc.

3.5.2 COMPACTING CLAY AND SILTY MATERIALS.

Where compaction of earth materials containing appreciable amount of clay or silt is required, the compaction shall be carried out in accordance with the clause 6.6.2 of IS 4701-1982. The materials shall be deposited in horizontal layers. The thickness of each horizontal layer before compaction shall not be more than 25 cm. (Loose layer) and the layer shall be to full width of the embankment. The excavating and placing operation shall be such that the materials when compacted will be blended sufficiently to secure the highest practicable density and best impermeability and stability. If the surface of any compacted layer of earth fill is too dry or too smooth to bond properly with the layer of materials to be placed thereon, it shall be moistened and or scarified in an approved manner to provide a satisfactory bonding surface before the next succeeding layer is placed. The entire roller used on any one layer of fill shall be of the same type and same weight.

Prior to and during compaction operations, the embankment materials shall possess optimum moisture contents as required in clause 6.6.4 of IS 4701-1982. The embankment materials shall have optimum moisture content required for the purpose of compaction and this moisture content shall be fairly uniform throughout the layer. In so far as practicable the moistening of the material shall be performed at the site of excavation but such moistening shall be supplemented as required by sprinkling water at the site of compaction if necessary. If the moisture content is greater than the optimum for compaction, the compaction operations shall be delayed until such time as the materials has dried to the optimum moisture content or to the level directed by Engineer-in-charge. The moisture content of soils shall be determined in accordance with I.S 2720(Part-III) 1982.

If the moisture content is not within the limit described above, the compaction operation shall not be proceeded except with the specific approval of the Engineer-in-charge., until the materials has been wetted or allowed to dry out, as may be required to obtain optimum moisture content, and no adjustment in price will be made on account of any operations of any such operation of the contractor in wetting or drying the materials or on account of any delays occasioned thereby.

When the materials has been conditioned as herein before specified, it shall be compacted by rollers or by hand or power tampers. Where hand or power tampers are used to compact soils in confined areas such as under pipes and at the joints of bank connections with the structures, they shall be equipped with suitably shaped heads to obtain the required density.

The dry bulk density of the soil portion in compacted embankment materials shall be not less than 95% of the maximum dry bulk density at optimum moisture content obtained in accordance with I.S. 2720 (Part-VI) 1980 Indian Code of Practice for determination of moisture

content, dry density relation using light compaction.

The dry density of soil in field shall be determined in accordance with I.S. 2720 (Part – XXVIII) 1974, Indian Code of Practice for determination of soil in place by sand replacement or by I.S. 2720 (Part – XXIX) 1975 Indian Code of Practice for determination of dry density of soils in place by the core cutter method.

Moisture content of soil shall be determined in accordance with I.S. 2720(Part-II) 1973 Indian Code of Practice for determination of moisture content.

The optimum moisture content is the moisture content that corresponds to the laboratory maximum dry density determined in accordance with I.S: 2720 (Part – VII) 1974.

The above compaction tests will be conducted by contractor in the presence of departmental officers at his cost and the contractor shall ensure compaction, till the Engineer-in-charge or his authorized representative is satisfied that the maximum dry density at optimum moisture content is obtained and permits the laying of next layer.

3.5.3 COMPACTING COHESIONLESS MATERIALS

Where compaction of cohesion less, free draining materials, such as sands and gravels is required, the materials shall be deposited in horizontal layers and compacted to the relative density specified below. The excavating and placing operation shall be such that the materials when compacted will be blended sufficiently to secure the best practicable degree of compaction and stability. Water shall be added to the materials as may be required to obtain the specified density by method of compaction being used.

As envisaged in clause 6.6.2.1 of IS 4701-1982 the thickness of the embankment layer shall not exceed 25 cm. (loose layer) before compaction and it should be spread over the full width of the embankment and compaction shall be done by tampers or crawler tractors or vibrating rollers. If the compaction is performed by Treads of crawler type tractor, surface vibrators or similar equipment, the thickness of the layer before compaction shall not be more than 40 cm. If compaction is performed by internal vibrators, the thickness of the layer shall not be more than the penetrating depth of the vibrator.

As envisaged in clause 6.6.3.1 of I.S. 4701-1982, the relative density of the compacted materials shall not be less than 70%, when tested in accordance with I.S.2720(Part-XIV) 1983 Indian code of practice for determination of density Index (relative density) of cohesion less soils.

3.5.4 COMPACTION OF COHESIONLESS MATERIALS CONTAINING SOME CLAY AND SILT

This sub-paragraph applies only to cohesion less materials and not to cohesive materials. Cohesion-less materials containing clay and silt may not be free draining. When compaction of cohesion-less materials containing clay and silt is required, the materials shall be compacted to a dry density in accordance with either sub-paragraph below, using whichever test that result in higher dry density of the compacted materials in the placement.

Prior to and during compaction operation the materials shall possess optimum moisture content as determined in accordance with clause 6.6.4.1 of I.S. 4701-1982 and the moisture content shall be uniform throughout each layer. Provided that the moisture content is ensured as required in clause 6.6.4 of I.S. 4701-1982, the dry density of soil portion in the compacted materials shall not be less than 98% of the laboratory maximum soil dry density compacted. The field dry density shall be determined in accordance with I.S. 2720(Part-XXVIII) 1974 or IS 2720 (Part XXIX) 1975.

The relative density of the compacted materials obtained shall be not less than 70% determined in accordance with clause 6.6.3.1 of I.S. 4701-1982. The moisture content shall be maintained as per clause 6.6.4 of I.S. 4701-1982.

3.5.5 ROLLERS AND OTHER COMPACTING EQUIPMENT

As shown in Appendix C or IS 4701 – 1982 the following compacting equipment may be used for compacting the soils shown against them as detailed below.

CONTRACTOR

SUPERINTENDING ENGINEER

Major Division	Sub-group		Suitable type of compacting equipments.
1. Coarse Grained Soils	1.	Well Grained Gravel, gravel and mixtures of little or no fines.	Smooth wheel roller, Diesel road rollers of 8 to 10 tones capacity, pneumatic tyred roller and vibrating smooth wheel roller.
	2.	Well graded gravel sand mixtures with excellent clay binder	Smooth wheel roller, Diesel road rollers of 8 to 10 tones capacity, pneumatic tyred roller and vibrating smooth wheel roller.
	3.	Uniform gravel with little or no fines.	-do-
	4.	Poorly graded gravel and gravel sand mixtures little or no fines.	-do-
	5.	Gravel with fines, silty gravel, clayey gravel poorly graded gravel sand clay mixtures.	-do-
2. Coarse Grained soils, Sand & sandy clays.	1.	Well graded sand and Gravely sands, little or no fines.	Heavy vibrating plate Frog rammer, pneumatic rammer and power roller.
	2.	Well graded sand with excellent clay binder.	-do-
	3.	Uniform sand with little or no fines.	-do-
	4.	Sands with fines silty sands, clayey sands, poorly graded sand clay mixtures.	-do-
3. Fine Grained Soils, Soil having low compressibility	1.	Silts (in organic) and very fine sands rock flour, silty or clayey fine sands with slight plasticity.	Smooth wheel roller, diesel Road Rollers of 8 to 10 tones capacity, power rollers, and pneumatic tyred roller.
	2.	Clayey silts (inorganic)	-do-
4. Soils having medium compressibility	1.	Organic silts of low plasticity	Sheep Foot Roller
	2.	Silty and sandy clays (Inorganic of medium plasticity.)	Frog rammer, pneumatic rammer, padded vibratory roller.
	3.	Clays (inorganic of medium plasticity)	-do-
	4.	Organic clays of medium plasticity.	-do-
5. Soils having higher compressibility	1.	Micaceous or diatomaceous fine sandy and silty soils, elastic silts.	Smooth wheel roller, diesel Road Rollers of 8 to 10 tones capacity and pneumatic tyred roller.
	2.	Clay (Inorganic)	-do-
	3.	Organic clays of high plasticity.	-do-

The compacting equipment shall conform to relevant India specification below.

1. Smooth wheeled roller should conform to IS 5502-1969
2. Sheep Foot roller should conform to IS 4661-1968
3. Pneumatic tyred roller should conform to IS 5501-1969
4. Vibratory plate compactor should conform to IS 5889-1970
5. Vibratory roller should conform to IS 500-1970

The methods of compaction shall conform to clause 7.2.1, 7.2.2.7, 2.3 of IS 4701-1982

Unless otherwise specified compaction shall be done by mechanical compactors like standard sheep foot roller hauled by dozer or tractor. While specifications below provide that equipment of particular type and size is to be used, the use of improved compaction shall be encouraged. Tamping rollers used for compaction of earth fill shall conform to the following requirement.

A. ROLLER DRUMS:

Double drum sheep rollers shall be used for compaction. Each drum of a roller shall have an outside diameter not less than 142.25 cm. And shall not be less than 122 cm. in length. The space between two adjacent drums when on level surface shall not be less than 30 cm and not more than 38 cm. Each drum shall be free to pivot about an axis parallel to the direction of travel.

B. ROLLER WEIGHT.

The weight of the roller when fully loaded shall not be less than 7091 Kg. and the ground pressure when fully loaded shall not be less than 40 Kg/sq cm. Appropriate equipment for hauling the rollers should be used which can pull the rollers satisfactorily at a speed of 4 Km. per hour when drums are fully loaded. The space between the tamping feet shall be kept clear of material striking the drum as the same can reduce the effectiveness of the tamping roller.

C. ROLLING.

When each layer of material has been prepared to have the proper moisture content uniformly distributed throughout the materials, it shall be compacted by passing the tampering roller. The exact number of passes for each layer to obtain specific density shall be designated by Field Laboratory tests and tests conducted on the burrowed material. The layers shall be compacted in strips overlapping not less than 0.6 m. Rolling shall commence at edges and progress towards centre longitudinally. The rollers of loaded vehicles shall travel in a direction parallel to the axis of the canal. Turns should be made carefully to ensure uniform compaction. Rollers shall always be pulled.

3.5.6 TAMPING

Roller will not be permitted to operate within one meter of concrete and masonry structures in the following locations where compaction of the earth fill materials by means of roller is impracticable or undesirable. The earth fill shall be specially compacted as specified further below:

- i. Portions of the earth fill in embankment adjacent to masonry structures and embankment foundation designated on the drawing as specially compacted earth fill.
- ii. Earth fills in embankment adjacent to steep abutments.
- iii. Earth fills at specially designated location.

Earth fill shall be spread in layers of not more than 10 (ten) cm in thickness when loose and shall be moistened to have the required moisture content as specified. When each layer of materials has been conditioned to have the required moisture content, it shall be compacted to the specified density by special rollers, pneumatic/ hand tampers or by other approved methods. The moisture control and compaction shall be equivalent to that obtained in the earth fill actually placed in the embankment in accordance with specifications.

3.5.7 TESTING

Density tests shall be carried out after rolling to ascertain the state of compaction which should be measured in terms of dry density. Standard proctor density tests shall be carried out at regular intervals to account for variations in the burrow area material. Not less than three tests shall be conducted to indicate variation in the standard Proctor density attained in the laboratory.

In case of determination of maximum Dry/ Bulk Density viz: proctor density and optimum moisture content (OMC) are sometimes not easily feasible, particularly on the jobs of strengthening of canal sections, then these values may be assumed as have been outlined in table 2 of IS: 12169-1987 for calculating the compaction efficiency of the compacted earth fill layers in terms of the percentage of Proctor Density.

Density tests shall be conducted from time to time at site to ascertain whether compaction is attained as specified. For every **1500 cum** of compacted earth fill, at least one field density test shall be conducted. However, minimum **four density tests** shall be made per day irrespective of quantity of earth work. In case, the tests show that the specified densities are not attained, suitable action shall be taken either by moisture correction or by additional rolling, so as to obtain the specified density which shall be checked again by taking fresh tests at the same locations. The test locations should be so chosen as to represent the whole layer under test. Each layer should be tested for proper compaction before a fresh layer is allowed over it.

The density to be attained after compaction should be at least 98% of proctor density predetermined by Laboratory tests. For strengthening of channels, compaction should be done to at least 95% of the proctor density. In case of non-cohesive soils the layers should be compacted to at least 65% relative density.

3.5.8 SETTLEMENT ALLOWANCE

In the mechanically compacted earth fill in tank bund, settlement allowance of **2%** should be provided. In case of earth fill of canal settlement allowance is **5%**. Extra height should be provided taking the settlement into account. The base width of the embankment shall not be increased to maintain the design slopes indicated in the drawings for additional height as settlement allowance, but the following procedure shall be adopted.

Settlement allowance shall be calculated at various levels and the elevation including settlement allowance shall be derived keeping the embankment width at the designated levels unchanged. The edges of the embankment at the increased elevations (including settlement) when joined with the point where the slope has changed earlier below, shall give the slope to be adopted for construction.

3.5.9 SLOPE DRESSING

The slopes of a particular reach of the canal which has been completed in the manner described earlier shall be dressed neatly to the designated line and grade. Extra earth works done at sides are to be dressed and reused in the embankment.

3.5.10 MEASUREMENT AND PAYMENT

The costs of the compacting earth materials as described in this paragraph shall be paid separately in the price bid in the bill of quantities for watering and compacting earth work in dam/ canal embankment under these specifications. The unit rate of this item shall be for unit volume of earth fill watered and compacted. No extra payment shall be allowed for labourers engaged for collecting of samples for testing and rectification during compaction as may be required.

CHAPTER - 4 CONCRETE WORKS

4.0 CONCRETE STRUCTURES

Concrete in structures shall conform to the requirements of paragraphs at 4.1.1.

4.1 CONSTRUCTION OF STRUCTURES

The item of the schedule for concrete in the structures includes all cast-in-place concrete in the structure. Concrete to be Cast-in-place for all the structures shall conform to the requirement of section 4.2 below. Pipe and fitting of miscellaneous metalwork, mechanical and electrical equipment and other items forming a part of the structures are provided for elsewhere in these specifications.

The structures shall be built to the lines, grades, and dimensions shown on the drawings. The dimensions of each structure as shown on the drawings will be subject to such modifications as may be found necessary by the Engineer-in-charge to adapt the structure to the conditions disclosed by the excavation or to meet other condition. Where the thickness of any portion of a concrete structure is variable, it shall vary uniformly between the dimensions shown.

Where necessary, the contractor shall be furnished with additional detail drawings of the structures to be constructed as determined by the Engineer-in-charge. The contractor will not be entitled to any additional allowances above the price bid in the bill of quantities by reason of the dimensions fixed by the Engineer-in-charge or by reasons of any modifications or extension of a minor character to adopt a structure at site.

The cost of furnishing of all materials and performing all work for installing timber, metal and other accessories for which specific price are not provided in the schedule, shall be included in the applicable prices bid in the schedule for the work to which such items are appurtenant.

4.2 GENERAL CONCRETE REQUIREMENTS

4.2.1 COMPOSITION

Concrete shall be composed of cement, sand, coarse aggregate, water, admixtures (if any) as specified and all will be mixed in batching plant/ concrete mixers by weight and brought to the proper consistency. Batching plant shall conform to IS: Code 4925-1968.

For works in which water tightness is required the specification in IS: 3370-1965 Para 1 to 10 shall be adopted.

4.2.1.1 MIXING:

Concrete shall be mixed in a mechanical mixer and shall be as dense as possible, plastic enough to consolidate, well and stiff enough to stay in place on the slopes.

Mixing shall be continued until there is a uniform mixing of the materials and the concrete is uniform in colour and consistency. The time of mixing shall be as shown in table-1 of IS 457-1957 reproduced below.

Capacity of Mixer	Minimum time for Mixing	
	Natural Aggregates	Manufactured Aggregates.
All mixers	2 minutes	2-1/2 minutes.

4.2.1.2 NOMINAL MAXIMUM SIZE OF AGGREGATES:

Sizes of aggregates shall conform to IS: 383-1970. The coarse aggregates to be used in concrete shall be as large as practicable, consistent with required strength, spacing of reinforcement and embedded items and placement thickness. The size of the coarse aggregates to be used will be determined by the Engineer-in-charge and may vary incrementally according to the conditions encountered in each concrete placement. Nominal maximum size of aggregates

for concrete in structures and canal lining shall be as indicated in the relevant drawings appended to the contract documents. When proper placement of concrete is impracticable with the size of the aggregate specified in the drawings, smaller coarse aggregates than specified shall be used as per the opinion of the Engineer-in-charge.

4.2.1.3 MIX PROPORTIONS:

The proportions of various ingredients to be used in the concrete for different items of the work are given in the bill of quantities. In proportioning concrete, the quantity of both cement and aggregate should be determined by weight, specified in the design mix. Water shall be measured in either by volume in calibrated tanks or weighed. Batching plant shall conform to IS: 4925-1968 (Indian Standard Specification for batching and mixing plant). All measuring equipments shall be maintained in a clean serviceable condition and their accuracy periodically checked. Adjustment shall be made as directed to obtain concrete having suitable workability, impermeability, density, strength and durability without the use of excessive cement. The acceptance or rejection of concrete shall be as per the acceptance criteria laid down in clause-16 of IS: 456-2000.

The water cement ratio exclusive of water absorbed by the aggregate shall be sufficiently low to provide adequate durability in concrete. The water cement ratio of various grades of concrete shall be as determined and ordered by the Engineer-in-charge. Admixture of Pozzolana, if ordered, shall conform to the requirements specified in IS: 9103-1979 (Indian Standard Specification for Admixtures for concrete).

4.2.1.4 CONSISTENCIES:

The slump of concrete at the placement shall be as follows:

Sl. No.	Place condition	Degree of workability	Value of workability.
1.	Concreting of light reinforced sections without vibration or heavily reinforced section with vibrations.	Medium	25mm to 75mm slump for 20 mm aggregate.
2.	Plain concrete work	-do-	-do-
3.	Lining with slip form machine for concrete paver finish	-do-	60 to 70 mm slump

If the specified slump is exceeded at the placement, the concrete is unacceptable. The Engineer-in-charge reserves the right to require lesser slump whenever concrete of such lesser slump can be consolidated readily into place by means of vibration specified by the Engineer-in-charge. The use of equipment, which will not readily handle and place concrete of the specified slump will not be permitted.

To maintain concrete at proper consistency, the amount of water and sand batched for concrete shall be adjusted to compensate for any variation in the moisture content or grading of the aggregates as they enter the mixer. Addition of water to compensate for stiffening of the concrete after mixing and before placing will not be permitted. Uniformity in concrete consistency from batch to batch will be required.

4.2.2 CONCRETE QUALITY CONTROL MEASURES AND QUALITY ASSURANCE TESTS

4.2.2.1 CONCRETE QUALITY CONTROL MEASURES

- The contractor shall be responsible for providing quality concrete to ensure compliance of the contract requirements.
- Making and cutting concrete test specimens in the field will conform to IS 516-1959
- Capping cylindrical concrete specimens will conform to IS 516-1959
- Compressive strength of concrete specimens will conform to IS 516-1959.

4.2.2.2 SAMPLING PROCEDURE AND FREQUENCY

- a. A random sampling procedure shall be adopted to ensure that each concrete batch has a reasonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and should cover all mixing units.
- b. FREQUENCY : The frequency of sampling of concrete of each grade shall be in accordance with the following-

Quantity of concrete in cum	Number of samples.
1 to 5	1
6 to 15	2
16 to 30	3
31 to 50	4
51 and above.	4 plus one additional sample for every 50 cum or part thereof.

Note: At least one sample shall be taken during each shift.

4.2.2.3 TEST FACILITIES

The contractor should supply in free of cost, the samples of all the ingredients of concrete used in the work for the test to be conducted by the Engineer-in-charge or any officer nominated by him.

4.2.2.4 CONTRACTOR TO FURNISH DRAWINGS AND DATA

Not less than 30 days prior to start of installation of the contractor's plant and equipment for processing, handling, transporting, storing and proportioning concrete, the contractor shall submit its drawings and data to the Engineer-in-charge for approval, showing the arrangement of plant etc. The drawing and data shall provide a description in sufficient details for an adequate review of the facilities and equipment the contractor proposes to provide at site of work.

4.2.3 CEMENT

4.2.3.1 GENERAL

Cement shall conform to clause 5.1 to 5.1.3 of IS 456-2000 for the purpose of specifications. Cement used shall be any of the following with the prior approval of the Engineer-in-charge.

- a. 33 grade Ordinary or low heat Portland cement conforming to IS: 269-1989
- b. Rapid hardening Portland cement conforming to IS: 8041-1990
- c. Portland slag cement conforming to IS: 455-1989
- d. Portland Pozzolana cement conforming to IS: 1489-1991
- e. 43 grade ordinary Portland cement conforming to IS: 8112-1989
- f. Hydrophobic cement conforming to IS: 8043-1991
- g. 53 grade Ordinary Portland cement conforming to IS: 12269-1987

The provisions of this paragraph apply to cement for use in cast in place concrete required under these specifications. Portland cement required for items such as concrete pipes, pre-cast concrete structural members and other pre-cast concrete products for grout and mortar and for other items provided for, under appropriate paragraph of these specifications covering items for which such Portland cement is required.

The contractor shall make his own arrangements for the procurement of cement to required specifications required for the work. Transportation from the place of supply to the batching plant shall be in weather-tight rail cars, trucks, conveyors and other means, which will protect the cement completely from exposure to moisture. Immediately upon receipt at the jobsite, bulk cement shall be stored in dry, weather tight, properly ventilated bins until the

cement is batched. The bins shall be emptied and cleaned by the contractor when so directed by the Engineer-in-charge. However, the intervals between required cleaning will normally be not less than 6 months. Each shipment of bagged cement shall be stored separately so that it may readily be distinguished from other shipment and shall be stored in a dry enclosed area protected from moisture. Storage of materials shall be as described in IS: 4082-1996 (IS recommendation on staking and storage of construction materials at site). To prevent under-aging of bagged cement after delivery, the contractor shall use bags of cement in the chronological order in which they were delivered to the job site. All storage facilities shall be subject to approval of the Engineer-in-charge.

4.2.3.2 ACCEPTANCE OF CEMENT.

Cement shall be supplied by the contractor according to clause 10.1 of IS: 269-1989.

4.2.3.3 ACCEPTANCE OF POZZOLANA:

Pozzolana added to the concrete as an admixture shall be sampled and tested as per IS: 9103-1999.

4.2.3.4 RECOVERY OF COST OF CEMENT IN WASTED CONCRETE ETC:

The cost of cement used in wasted concrete in replacement of damaged or defective concrete and extra concrete required because of over excavation and in concrete placed by the contractor in excavations intentionally performed to facilitate the contractor's operation shall be borne by the contractor himself. No extra payment shall be made to the contractor for such additional quantity.

4.2.4 ADMIXTURES

The contractor shall use air-entraining admixtures as directed by the Engineer-in-charge. Admixtures shall be of uniform consistency and quality and shall be maintained at the job site at uniform strength of solution. Admixtures shall be batched separately in liquid form in containers capable of measuring at one time the full quantity of each admixture required for each batch. Chemical admixtures, which harm the quality and strength of concrete, shall not be used in the concrete.

4.2.5 WATER

The water used in making and curing of concrete mortar and grout shall be free from objectionable quantities of silt, organic matter, injurious amounts of oils, acids, salts and other impurities etc. as per IS specification 456-2000.

The Engineer-in-charge will determine whether such quantities of impurities are objectionable. Such determination will unusually be made by comparison of compressive strength, water requirement, time of set and other properties of concrete made with distilled or very clean water and concrete made with the water proposed for use. Permissible limits for solids when tested in accordance with IS: 3025-1964 shall be as tabulated below:

4.2.5.1 PERMISSIBLE LIMITS FOR SOLIDS IN WATER

1. Organic solids : Maximum permissible limit 200 mg/l.
2. Inorganic solids : 300 mg/l.
3. Sulphate (as SO₄) : 500 mg/l.
4. Chlorides (as Cl) : 2000 mg/l for plain concrete work and 1000 mg/l for RCC work.
5. Suspended matter : 2000 mg/l.

The pH value of water shall generally be not less than 6 (six).

If any water to be used in concrete mortar or grout is suspected by the Engineer-in-charge of exceeding the permissible limits for solids, samples of water shall be obtained and tested by the Engineer-in-charge in accordance with IS: 3025-1964.

4.2.6 SAND (FINE AGGREGATE)

4.2.6.1 GENERAL

The term sand is used to designate aggregate most of which passes 4.75 mm IS Sieve and contains only so much coarser material as permitted in clause 4.3 of IS: 383-1970. Sand shall be predominantly natural which may be supplemented with crushed sand to make up deficiencies in the natural sand grading.

All sand shall be procured by the contractor from approved sources. Sand as delivered to the batching plant shall have uniform and stable moisture content. Determination of moisture content shall be made as frequently as possible; the frequency for a given job being determined by the Engineer-in-charge according to weather conditions following IS: 456-2000.

4.2.6.2 QUALITY:

The sand shall be clean, dense, durable, uncoated rock fragments as per IS: 383-1979. Sand may be rejected if it fails to meet any of the following quality requirements:

FINENESS: The fineness modulus of sand shall be between 2.20 to 3.20.

ORGANIC IMPURITIES IN SAND:

Colour, no darker than the specified standard in clause 6.2.2. of IS: 2386 Part II 1963 (Indian Standard method of test for aggregates of concrete Part II estimation of deleterious materials and organic impurities)

Sand shall be screened before use. If sand brought to site is not clean, it must be washed clean in water. Fine draft sand or sea sand or sand containing saline impurities shall on no account to be used.

SODIUM SULPHATE TESTS FOR SOUNDNESS:

The sand to be used shall pass Sodium or Magnesium Sulphate accelerated test as specified in IS: 2386(Part-V) 1963 for limiting loss on weight.

SPECIFIC GRAVITY:

The sand to be used shall have minimum specific gravity of 2.4

DELETERIOUS SUBSTANCE:

The amount of deleterious substances in sand shall not exceed maximum permissible limits prescribed in table-1, clause 3.2.1 of IS: 383-1970 (Indian Standard Specification for coarse and fine aggregates from natural source for concrete) when tested in accordance with IS: 2386-1963.

4.2.6.3 GRADING

The sand as batched shall be well graded and when tested by means of standard sieves, shall conform to the limits given in table-4 of IS: 383-1970 and shall be described as fine aggregates, Grading zones, I, II, III and IV. Sand complying with the requirements of any of the four grading zones is suitable for concrete. However, sand conforming to the requirements of grading zone IV shall not be used for **reinforced cement concrete** work.

Sieve analysis of natural sand shall conform to the following limits of gradation.

I.S. Sieve size	Percentage of passing on Sieve		
	Grading Zone-I	Grading Zone-II	Grading Zone-III
4.75 mm	90-	90-100	90-100
2.36 mm	60-95	75-100	85-100
1.18 mm	30-70	55-90	75-100
600 micron	15-34	35-59	60-79
300 micron	5-20	8-30	12-40

150 micron	0-10	0-10	0-10
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*It is recommended that the sand conforming to grading **zone-I to III** is suitable for use.*

4.2.7 COARSE AGGREGATES:

4.2.7.1 GENERAL

For the purposes of these specifications, the term "Coarse Aggregate" designate clean well graded aggregates, most of which is retained on 4.75 mm. I.S: Sieve and containing only so much finer materials as permitted for various types described under clause 2.2. of IS: 383-1970. Coarse Aggregate for concrete shall consist of uncrushed stone, or crushed stone and partially uncrushed and crushed stone.

Coarse Aggregates for concrete shall be procured by the Contractor from the approved quarries. The contractor shall, unless otherwise specified in the tender notice and subsequently on this basis in the contract, be responsible for payment of seignorages, quarry fees etc. on all materials.

Coarse aggregates as delivered to the batching plant shall generally have uniform and stable moisture content. In case of variations, clause 9.2.3 of IS 456-2000 shall govern during batching.

4.2.7.2 QUALITY

The coarse aggregate shall consist of naturally occurring (crushed or uncrushed) stones, and shall be hard, strong, durable, clear and free from veins and adherent coating, and free from injurious amounts of disintegrated pieces, alkali, vegetable matter and other deleterious materials. Coarse aggregate not conforming to any of the following requirements, shall be rejected.

LOS ANGLES ABRASION TEST

The abrasion value of aggregates when tested in accordance with the method specified in IS: 2386 (Part IV)-1963 using Los Angles machine, shall not exceed 30% for aggregates to be used in concrete for wearing surface and 50% for aggregates to be used in other concrete.

AGGREGATE CRUSHING STRENGTH TEST

Aggregates crushing value, when determined in accordance with IS: 2386 (Part IV)-1963 shall not exceed 45% for aggregates used for concrete other than wearing surface and 30% for wearing surfaces. As an alternative to the crushing strength test of aggregates, impact value shall be found out with the method specified in IS: 2386 (Part IV)-1963. The aggregates impact value shall not exceed 45% by weight for aggregates used for concrete for other than wearing surfaces and 30% by weight for concrete for wearing surface such as runways roads and pavements.

SOUNDNESS TEST

The coarse aggregates to be used for all concrete works shall pass a Sodium or Magnesium Sulphate accelerated soundness test specified in IS: 2386 (Part V)-1963 and the average loss of weight after 5-cycles shall not exceed the limits specified in clause 3.6 of IS: 383-1970.

SPECIFIC GRAVITY

The coarse aggregates shall have specific gravity of 2.60 minimum.

DELETORIOUS MATERIALS

The maximum quantity of deleterious materials in coarse aggregates shall not exceed the limits specified in Table of I.S: 383-1970 when tested in accordance with IS: 2386-1963.

4.2.7.3 SEPARATION

The coarse aggregates shall be separated into nominal sizes during production of the aggregates. Just prior to batching, the coarse aggregates shall be re-washed by pressure spray and finish screened on multi-desk vibrating screen capable of simultaneously removing undersized and over sized aggregate from each of the nominal aggregate. Aggregates entering the batches occur during intermittent batching then a dewatering screen will be required after the finish screens to remove the excess free moisture. Finish screens shall be mounted over the batching plant or on the ground adjacent to the batching plant. Finish screens shall be so mounted that, the vibration of the screen will not be transmitted to the batching bins or scales and will not affect the accuracy of the weighing equipment in any other manner.

The method and rate of feed for finish screening shall be such that, the screens are not over-loaded and result in a finished product, which meets the grading requirements of these specifications. Coarse aggregate shall be fed to the finish screens in a combination of alternations of nominal sizes, which will not cause noticeable accumulation of poorly graded coarse aggregates in any bin. The finish-screened aggregates shall pass directly to the individual batching bin in such a manner as to minimize breakage. Below 2.36 mm. materials passing through the finish screens shall be wasted unless it is routed back through a sand classifier in a manner, which causes uniform blending with the natural sand being processed. Water from finish screening shall be drained in such a manner as to prevent aggregate wash water from entering the batching bins and weighing hoppers washing and finish screening requirements shall be subject to approval by the Engineer-in-charge.

Coarse aggregates for concrete shall be separated into various nominal maximum sizes specified in the relevant paragraph. Separation of the coarse aggregate into the specified sizes after finish screening shall conform to the grading requirements specified in Table-2 of IS 383-1970 when tested in accordance with IS: 2386 (Part II)-1963 (Method of test for aggregates for concrete part I) particles size and shape.

Coarse aggregate for mass concrete may be separated as previously herein specified. Separation of the coarse aggregates into the various sizes shall be such that when tested in accordance with IS 2386 (Part I) 1963 shall conform to the requirements specified in Table 3 of IS 383 – 1970.

Sieves used in grading tests shall be standard mesh sieves conforming to IS 460 (Part I) 1978 (specification for test sieves part I wire cloth test sieves)

4.2.8 PRODUCTION OF SAND AND COARSE AGGREGATE

4.2.8.1 GENERAL

Sand and coarse aggregate for concrete and sand for mortar and grout shall be obtained by the contractor from the approved sources. The approval of deposits by the Engineer-in-charge shall not be construed as consisting of the approval of all or any specified materials taken from the deposits and the contractor will be responsible for the specified quality for all such materials used in the work.

Tests performed on samples of sand and coarse aggregate obtained from the approved sources mentioned in the contract documents indicates that they are generally suitable. Well in advance of their usage on the works, the contractor shall have his own testing of materials and satisfy himself that they conform to the specification mentioned here in for use in the works.

No separate payment will be made for such tests. If sand and coarse aggregate are to be obtained from a deposit not previously tested and approved by the Engineer-in-charge, the contractor shall submit representative samples for pre-construction test and approval not less than 60 days before the sand and coarse aggregates are required for use. Each sample shall approximately consist of 100 Kg. of material. In addition to pre-construction tests for the approval of deposits, the Engineer-in-charge may test the aggregates for their suitability during their processing. The contractor shall provide such facilities as may be necessary for procuring representative samples free of cost at the aggregate processing plant and at the batch plant or mixing platform.

However, use and development of any such deposit shall be subject to the approval by the Engineer-in-charge. Any royalties (seignorages or other charges) required for the materials

taken from deposits either owned by the State Government or controlled by the Department of Mines and Geology, Govt. of India or owned by any other person shall be paid by the contractor.

4.2.8.2 DEVELOPING AGGREGATE DEPOSITS

If the deposit is owned by the State Govt. and controlled by the department of Mines and Geology, the portion of the deposit used shall be located and operated so as not to detract the usefulness of the deposit or any other property of the Government and so as to preserve, in so far as practicable, the future usefulness or value of the deposit. The contractor shall carefully clear the area of deposit from which the aggregates are to be produced, free from trees, roots, bushes, sods, solid unsuitable sand, gravel and other objectionable matter. Materials including stripping, removed from deposits owned by the Government, controlled by the Director of Mines and Geology, Government of India, and not used in the work covered by these specifications shall be disposed-off as directed.

Due to the overall construction programme, it is quite likely that more than one contractor may elect to use of the sources named in the contract document. The contractor shall be responsible for co-ordinating his work such that it does not interfere with the operations of other contractors who are also using any given source.

4.2.8.3 PROCESSING RAW MATERIALS

Processing of the raw materials shall include screening and washing as necessary to produce sand and coarse aggregate conforming to the requirements of paragraph 4.2.6 and paragraph 4.2.7. Processing of aggregate produced from any source owned by the State Government and controlled by the Department of Mines and Geology shall be done at an approved site. Water used for washing aggregate shall be free from objectionable quantities of salts, organic matter and other impurities. Oversize metal may be crushed to correct aggregate particle size and excess material in individual coarse aggregate size fractions may be crushed to give the largest practical yield of usable concrete aggregate.

Suitable types of crushers shall be used with the prior approval of the Engineer-in-charge for producing coarse aggregates. Crusher fines produced in the manufacture of coarse aggregates may be used in sand. Crushed stone, sand, crushed gravels and crusher fines if used shall be predominantly cubical in shape and shall be blended uniformly with natural sand by routing them together through sand classifier. Crusher coarse aggregate shall be blended uniformly with natural coarse aggregate by routing both together through the classifying screens.

In the process of developing and producing aggregates from approved sources for work under these specifications, **the provisions of environmental quality protection shall apply.**

4.2.8.4 COST

This shall be included in the applicable price bid in the schedule for concrete, filter and other works in which the aggregates are used of which prices shall include the cost for stripping, producing and transporting & storing the materials. The contractor shall not be entitled to any additional compensation for materials wasted from a deposit including crushed fines and materials, which have been discarded by the reasons of being above the maximum size specified for use or for any other reasons.

4.2.9 BATCHING

The contractor shall notify the Engineer-in-charge 24 hours before batching of concrete. Unless inspection is waived in each case, batching shall be performed only in the presence of an Engineer authorized by Engineer-in-charge.

The contractor shall provide, maintain, and operate the equipment as required to accurately determine and control the prescribed amounts of the various materials entering the concrete mixtures. The quantities of cement, sand and each size of coarse aggregate entering each batch of concrete shall be determined by individual volume measurement or by weight as the case may be. Cement has to be weighed/ measured in volume separately from the

aggregates. Sand and coarse aggregates may be weighed with separate scale and hoppers.

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 being stacked in separate stock piles, the materials shall be stock piled a day before use. The grading of coarse and fine aggregates will be checked as frequently as directed by the Engineer-in-charge. Water shall be added by weight or measured by volume in calibrated tanks. The amount of added water shall be adjusted to compensate for any observed variations in the moisture contents. Determinations of moisture content in the aggregate shall be in accordance with IS: 2386 (Part-III) 1963 (Indian Standard Method of test for aggregate of concrete Part III). The amount of surface water carried by aggregates will be determined in accordance with Table-5 of IS: 456-2000.

Cement and aggregates are hauled from a central batching plant to the mixer. Each batch shall be protected during transit to prevent loss and to limit the pre-hydration of cement. Separate compartments with suitable covers shall be provided to protect the cements or they shall be completely enfolded in and covered by the aggregates to prevent wind loss. If cement are enfolded in moist aggregates or otherwise exposed to moisture and delay occurs between batching and the mixing, then extra cement shall be added to each batch. The extent of such extra cement will be to attain the required quality. **No separate payment** for this addition of extra cement shall be made.

4.2.10 MIXING

4.2.10.1 GENERAL

The concrete ingredients shall be thoroughly mixed in mechanical mixers designed to positively ensure uniform distribution of all the component materials throughout the concrete at the end of the mixing period. Mixing shall be done as per clause-9 of IS: 456-2000. The mixer should comply with IS: 1971-1985 (IS Specifications for batch type concrete mixers)

The concrete as discharged from the mixer shall be uniform in composition and consistency from batch to batch. Workability shall be checked at frequent intervals as per IS: 1199-1959. Mixer shall be examined regularly by the Engineer-in-charge or his authorized Engineer for changes in conditions due to accumulation of hardened concrete or mortar or to wear of blades. The mixing shall be continued until there is a uniform in colour and consistency and to the satisfaction of the Engineer-in-charge. If there is, aggregation after unloading, the concrete should then be remixed.

Any mixer that at any time produces unsatisfactory mix shall not be used until repaired. If repair attempts are unsuccessful, a defective mixer shall be replaced. Batch capacity shall be at least 10% of but not in excess of the rate capacity of the mixer unless otherwise authorized by the Engineer-in-charge.

4.2.10.2 CENTRAL MIXERS

Water shall be admitted prior to and during charging of the mixer with all other concrete ingredients. After all materials are in the mixer, each batch shall be mixed for not less than the time specified by the Engineer-in-charge. The minimum mixing time shall be 2 minutes. The minimum mixing time specified is based on average mixer performance. The Engineer-in-charge will adjust the minimum mixing time as required by the observations of the mix delivered from mixer. Excessive over mixing which require addition of water to maintain the required concrete consistency shall not be permitted.

In addition to IS: 1791-1985, the mixing equipment shall conform to the following further requirements.

1. Plant configuration shall be such that the mixing of each mixer can be observed from the safe location, which can be easily reached from the control station. Provisions shall be made so that the operator can observe the concrete in the receiving hopper or bucket as it is being dumped from the mixers.
2. Each mixer shall be controlled with timing device, which will indicate the mixing period and assure compliance of required period of mixing.

3. The batch plant shall be equipped with an interlocking mechanism, which will prevent concrete batches from entering mixers, which are not empty.

4.2.10.3 TRUCK MIXERS

Each truck mixer shall be equipped with accurate water meter located between the supply tank and mixers with a dial or digital indicator and a reliable revolution counter, located near the water meter, which can be readily reset to Zero for indicating the total number of revolutions of the drum for each batch. Each mixer shall have affixed there to a metal plate on which the drum operations in terms of volume for both mixing and agitating and the maximum and minimum speeds of rotation of the drum are mainly marked.

Mixing shall be continued for the minimum period specified and may be increased and number of revolutions, speed of the drum may be such that the mixture as delivered from the mixer has uniform colour and consistency to the satisfaction of Engineer-in-charge. In no case shall the design water content be exceeded.

Concrete shall be discharged within half an hour after the introduction of the water and cement into the mixer. Each batch of concrete when delivered at the job site from commercial ready mix plants shall be accompanied by a written certificate of batch weights and time of batching.

4.2.11 TEMPERATURE OF CONCRETE

Fresh structural concrete and fresh canal lining concrete shall be placed at temperature of 15°C to 30°C. During hot or cold weather the concreting should be done as per the procedure set in IS: 7861 (Part I) 1975 or IS: 7861 (Part II).

The temperature will be determined by placing a thermometer in the concrete immediately after sampling at the site of placement. The temperature of concrete at the batch plant shall be adjusted to assure that the specified concrete temperature is attained at the placement.

In case of concrete in hot weather condition, the contractor shall employ effective means such as pre-cooling of aggregates and mixing water and placing at nights as necessary to maintain the temperature of the concrete as it is placed at the specified limit. The methods of pre-cooling shall be subject to approval by the Engineer-in-charge.

Then contractor shall not be entitled for any additional compensation due to the foregoing requirements.

4.2.12 FORMS

4.2.12.1 GENERAL

Form shall be used wherever necessary to confine the concrete and shaping it to the required lines. If a type of form does not consistently perform in an acceptable manner as determined by the Engineer-in-charge, the type of form shall be changed and method of erection shall be modified by the contractor subject to approval of the Engineer-in-charge.

Plumb and string lines shall be installed before and maintained during concrete placement. Such lines shall be used by the contractor's personnel and by the Engineer-in-charge and shall be in sufficient number and properly installed as determined by the Engineer-in-charge. During concrete placement, the contractor shall continuously monitor plumb and string lines, form positions and immediately correct the deficiencies.

Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete and shall be maintained rigidly in position. Where form vibrators are to be used, forms shall be sufficiently rigid to effectively transmit energy from the form vibrators to the concrete while not damaging or altering the positions of forms. Forms shall be sufficiently tight to prevent loss of mortar from the concrete. Chamfer strips shall be placed to produce bevelled edges on permanently exposed concrete surfaces. Interior angle intersecting concrete surfaces and edges of construction joints shall not be bevelled except where indicated on the drawings.

Suitable struts, stiffeners, or ties shall be used for the formwork wherever necessary. All

supports shall be braced and cross-braced into two directions. All splices and braces shall be secured by bolting unless specially intended otherwise. All struts shall be firmly supported against settlement and slipping, by suitable means as directed. All supports shall be cut square at both ends and firmly supported against settlement and slipping. When the formwork is supported on soil, sleepers etc. shall be used to properly disperse the loads. In case the supports rest on already completed beam or slab suitable props shall be provided under the latter.

The formwork shall be of well-seasoned timber or steel. When timber forms are used, they shall be lined with MS sheet or other suitable smooth faced non-absorbent materials as specified. Supports may be of timber or steel. Suitable wedges in pairs to facilitate adjustment and subsequent releasing of forms shall be provided preferably at the upper end of the supports. The details of the proposed formwork and supports shall be submitted to the Engineer-in-charge and shall be approved before erection.

In case of columns, retaining walls or deep vertical component, the height of the column shall facilitate the placement and compaction of concrete and suitable arrangement may be made for securing the forms to the already poured concrete for placing the subsequent lifts. No steel tie or wires used for securing this formwork shall be left exposed-off the face of the finished work.

Suitable inserts for block-outs for electrical and other service fixtures where necessary shall be provided in the required locations as specified. At the time the concrete is placed in forms, the surfaces of the forms shall be free from encrustations of mortar grout or other foreign material. Before concrete is placed, the surface of the forms shall be oiled with commercial forms of oil.

4.2.12.2 REMOVAL OF FORMS

The stripping of formwork shall conform to clause-11.3 of IS: 456-2000. The contractor shall be liable for damage and injury caused by removing forms before the concrete has gained sufficient strength. Forms on sloping faces of concrete, such as forms on the watersides of wrapped transitions shall be removed as soon as the concrete has attained sufficient stiffness to prevent sagging. Any needed repairs or treatment required on such slopping surfaces shall be performed at once and be followed immediately by permitted curing.

To avoid incessant appearance in concrete that might result from swelling of forms, wood forms for wall openings, shall be loosened as soon as the loosening can be accomplished without damages to the concrete. Forms for the opening shall be constructed as to facilitate such loosening. Forms shall be removed with care so as to avoid injury to concrete and any concrete so damaged shall be repaired in accordance with paragraph 4.2.20.

4.2.12.3 COST

The cost of furnishing all materials and performing all works for constructing forms including any necessary treatment or coating of forms is included in the price bid of item of form work provided in the bill of quantities.

4.2.13 TOLERANCES FOR CONCRETE CONSTRUCTION

4.2.13.1 GENERAL

Tolerances are defined as allowable variations from specified lines, grades, and dimensions and as the allowable magnitude of the surface irregularities. Allowable variations from specified lines, grades and dimensions are listed as given under sub-paragraph 4.2.13.2 below.

The intent of this paragraph is to establish tolerances that are consistent with modern construction practice that is governed by the effect that, permissible variations may have upon a structure. The Govt. reserves the right to diminish the tolerances set forth therein if such tolerances impair the structural action, operational function or architectural appearance of a structure or position thereof.

Concrete shall be within all stated tolerances even though more than one tolerance may be specified for a particular concrete structure, provided that the specified variation for one

element of the structure shall not apply, when it will permit another element of the structure to exceed its alterable variation. Where tolerance is not specified for particular structure, tolerances shall be those specified for a similar work. As an exception to clause-2 of the general provisions, specific tolerance shown here in connection with any dimension shall govern. The contractor shall be responsible for finishing the concrete forms within the limit necessary to ensure that the completed work will be within the tolerance limit specified. The defective work where the tolerance limit is exceeded shall be remedied in accordance with the sub-paragraph 4.2.13.2 & 4.2.13.3 as below.

4.2.13.2 VARIATION FROM SPECIFIED LINES, GRADES AND DIMENSIONS

Hardened concrete structure shall be checked by the contractor and will be subject to such inspection and measurement as needed to determine that the structures are within the tolerance as specified below.

Variation is defined as the distance between the actual position of the structure or any element of the structure and the specified position in plan for the structure or the particular element. Plus or minus variations shown as indicated or permitted from actual position up or down and in or out from the specified position in plan. Variations not designated as plus or minus indicate the minimum deviation permitted between designated successive points on the completed element of construction.

Specified position in plan is defined as the lines, grade and dimensions described in those specifications or shown on the drawings or as otherwise prescribed by the Engineer-in-charge.

4.2.13.3 CONCRETE SURFACE IRREGULARITIES

GENERAL

Bulges, depressions and offsets are defined as concrete surface irregularities. Concrete surface irregularities are classified as "abrupt" or "gradual" and are measured relative to the actual concrete surface.

ABRUPT SURFACE IRREGULARITIES

Abrupt surface irregularities are defined herein as offsets such as those caused by misplaced or loose forms, loose knots in form of Lumber, or other similar forming faults. Abrupt surface irregularities are measured using a straight edge held firmly against the concrete surface over the irregularity and the magnitude of the offset is determined by direct measurement.

GRADUAL SURFACE IRREGULARITIES

Gradual surface irregularities are defined herein as bulges and depressions resulting in gradual changes on the concrete surface. Gradual surface irregularities are measured using a suitable template conforming to the design profile of the concrete surface being examined. The magnitude of the gradual surface irregularities is defined herein as measures of the rate of change in slopes of the concrete surface.

The surface irregularities shall not exceed 6 mm for bottom slab and 12 mm for side slopes when tested with a straight edge of 1.5 meter in length.

The magnitude of gradual surface irregularities on concrete shall be checked by the contractor to ensure that the surfaces are within the specified tolerance. The Engineer-in-charge will also make such checks of hardened concrete surfaces as determined and ensure necessary compliance with such specifications.

4.2.13.4 HARDENED CONCRETE NOT WITHIN SPECIFIED TOLERANCES

Hardened concrete which is not within specified tolerances shall be repaired to bring it within those tolerances. Such repair shall be in accordance with paragraph 4.2.20 and shall be accomplished in a manner approved by the Engineer-in-charge. Such repair shall be done only after consultation with a representative of Engineer-in-charge regarding the method of repair.

The Engineer-in-charge shall notify as to the time when repair will be performed.

Concrete shall be finished in a manner, which will result in concrete surface with a uniform appearance. The fins and any rough projections can then be rubbed down and the whole surface brought to an even finish by rubbing with a wooden float using a mortar of one part of cement by two parts of coarse sand as an abrasive. The mortar at the same time filling the voids, a neat cement works shall then be applied to give a smooth surface. If the concrete has set hard, the fins and rough projections, if any shall be removed by using carborandum brick or a paved grinding machine by chipping, before finishing-off with the smoothing wash. If the work of chipping is not done with care or if the surface exposed after removal of the forms cannot be satisfactorily dealt with in this manner due to bad work or for other reasons, a coat of cement plaster of 1:2 mix of the thickness as ordered by Engineer-in-charge shall be applied. No extra payment will be given for finishing concrete surface as instructed above in this clause.

4.2.13.5 PREVENTION OF REPEATED FAILURE TO MEET TOLERANCES

When concrete placements result in hardened concrete that does not meet the specified tolerance, the contractor shall submit to the Engineer-in-charge an outline of all preventive actions such as modification to the form system, modified procedure for setting screeds and different finishing techniques to be implemented by the contractor to avoid repeated failure.

The Engineer-in-charge **reserves the right to delay concrete placement** until the contractor implements such preventive actions, which are approved by the Engineer-in-charge.

4.2.14 REINFORCING BARS

Reinforcing bars shall be placed in the concrete as shown in the drawings or as directed. For anchoring the concrete to the hard rock, provision of anchor bar is made in the drawing and contractor shall place these anchor bars to the spacing and depth shown in the drawings.

The contractor shall make his own arrangement for procurement of steel of required specification of reputed factory for the work. Transportation from the place of supply to work site and all incidental charges will be borne by the contractor.

4.2.14.1 MATERIALS

Unless shown otherwise on the drawings the reinforcement to be used shall be High Yield strength deformed bars of grade Fe-415 conforming to IS: 1786-1985 specification for high yield strength deformed steel bars and wire for reinforced cement concrete.

4.2.14.2 PLACING THE GRILLS

Reinforcement shall be bent and fixed in accordance with the procedure specified in IS: 2502-1963 (code of practice for bending and fixing of bars for concrete reinforcement). All reinforcement shall be placed and maintained in the position shown in the drawings. Splices shall be located where shown in the drawing, provided that the location of the splice may be altered subject to written approval of the Engineer-in-charge.

Subject to the written approval the Engineer-in-charge, the contractor may for his convenience, alter splice bars at additional locations other than those shown on the drawings. All additional splices allowed shall be **at the expense of the contractor**. In order to meet design and space limitation on splicing, some bent bars may exceed usual clearance, cutting and bending of such bars from stock lengths may be required at the site.

Unless otherwise prescribed, placement dimensions shall be to the centre line of the bars. Reinforcement will be inspected for compliance with requirement as to size, shape, length, spacing and splicing etc.

Before reinforcement is embedded in concrete, the surface of the bars shall be cleaned of heavy flaky rust, loose scale, dirt, grease or other foreign substances, which in the opinion of the Engineer-in-charge are objectionable. Heavy flaky rust that can be removed by firm rubbing with burlap or equivalent treatment is considered objectionable.

As specified in clause 12.3.1 of IS: 456-2000, unless otherwise specified by the Engineer-in-charge, reinforcement shall be placed with the following tolerances.

- a. For effective depth 200 mm or less ± 10 mm
- b. For effective depth more than 200 mm ± 15 mm

The cover in no case be reduced by more than one third of specified cover or 5 mm whichever is less. Reinforcement shall be securely held in position so that it will not be displaced during the placing of the concrete and special care shall be exercised to prevent any disturbances of the reinforcement in concrete that has already been placed. Welding of bars shall be done as directed by the Engineer-in-charge and in conformity with the requirements of clause 12.4 of IS: 456-2000. Concrete cover shall be maintained as shown on the drawings.

4.2.14.3 REINFORCEMENT DRAWINGS

The Engineer-in-charge will supply drawings of reinforcement details and bar bending schedules for adoption.

4.2.14.4 MEASUREMENT AND PAYMENT

Measurement for payment of reinforcement bars will be based on the weight of the bars placed in the concrete in accordance with the drawings supplied by the Engineer-in-charge when conformance with these specifications drawings has been determined at the time of embedment. Except as otherwise provided below, payment for furnishing and placing reinforcing bars will be made at the unit price bid in the bill of quantities for furnishing and placing reinforcement bars which unit price shall include the cost of reinforcing bars, attaching wire, cutting, bending, cleaning, tying the grills, securing and maintaining in position of the reinforcing bars as shown in the drawings.

The total weight of bars placed as reinforcement in concrete shall be arrived at by adding the products of lengths of each size and mass per meter (vide Table-1 and Para 6.2.1 of IS: 1786-1985) of that size of rod.

4.2.15 PREPARATION FOR PLACING

4.2.15.1 GENERAL

No concrete shall be placed until formwork installation of items to be embedded and preparation of surface involved in the placement have been approved.

The contractor shall supply concrete placement checkout cards/ OK card (Placement Register) satisfactory to the Engineer-in-Charge and shall provide a watertight container for such cards at the convenient location near each individual concrete placement site. The cards shall list all the various work items for example "cleanup" and "embedded items" required prior to placement of concrete. After each work item for an individual placement has been completed that item on the cards shall be signed by contractor or his representative signifying completion of the required work. Engineers authorized by the Engineer-in-Charge will inspect the work during and after completion of each phase of the preparation and if the work is satisfactory will sign the checkout card (placement register). Approval of preparation of placement will not be complete until the contractor or his representative and above authorized Engineer have approved by signature to all applicable items for the placement.

All surfaces of forms and embedded materials shall be free from curing compound, dried mortar of previous placements and foreign substance before the adjacent or surrounding concrete placement is begun.

Prior to beginning concrete placement, the contractor shall make ready a sufficient number of properly operating vibrators and operators, and shall have readily available additional vibrators to replace defective one during the progress of the placement. The Engineer's representative at the placement may delay the start of the concrete placement until the number of working vibrators available is acceptable.

4.2.15.2 FOUNDATION SURFACES

All surfaces upon or against which concrete is to be placed shall be free from frost, ice, water, mud and debris. Rock surface shall be free from oil, objectionable coatings, and loose semi-detached and unsound fragments. Immediately prior to placement of concrete, surfaces of

rock shall be washed with an air water jet and shall be brought to uniform surface dry condition.

Earth foundation surfaces shall be wet to a depth of 15 cm or to impermeable material whichever less before placement.

4.2.15.3 CONSTRUCTION JOINTS

Construction joints are defined as concrete surfaces upon or against which concrete is to be placed and to which new concrete is to adhere, but which have become so rigged that the new concrete can not be incorporated integral with that previously placed. The provision of construction joints shall conform to clauses 12.4.1 and of IS: 456-978.

When the work has to be resumed on a surface, which has hardened, such surface shall be roughed. It shall then be swept clean thoroughly and wetted. For vertical joints, neat cement slurry shall be applied on the surface before it is dry. For horizontal joints the surface shall be covered with a layer of mortar about 10 to 15 mm thick, composed of cement and sand in the same ratio as the cement and sand in concrete mix. This layer of cement slurry or mortar shall be freshly mixed, applied immediately before placing of the concrete.

Where the concrete has not fully hardened, all laitances shall be removed by scrubbing the wet surface with wire or bristle, brushes, care being taken to avoid dislodgment of particles or aggregate. The surfaces shall be thoroughly wetted and all free water removed. The surface shall then be coated with neat cement slurry. On this surface, a layer of concrete not exceeding 15 mm. in thickness shall first be placed and shall be well recommend against old work, particular attention being paid to corners and close spots, and work thereafter shall proceed in the normal way.

4.2.15.4 CONTRACTION JOINTS

Contraction joints serve to provide for volumetric shrinkage of monolithic concrete and or movement between monolithic units at established joints, thus preventing formation of objectionable shrinkage cracks elsewhere in concrete. Prior to application for wax based curing compound to contraction joints, the surfaces of all joints shall be cleaned thoroughly of accretion of concrete or other foreign material by scraping, chipping or other means approved by the Engineer-in-Charge. Water stops, reinforcing bars and other embedded items shall be free of curing compound when adjoining concrete is placed.

4.2.16 PLACING OF CONCRETE

4.2.16.1 GENERAL

The contractor shall notify the Engineer-in-Charge before batching 'begins for placement of concrete. Placing shall be performed only on the presence of an authorised Engineer's representative. Placement shall not begin until after preparations are complete and the concrete placement check out card has been signed by the contractor or his representative and the authorized representative of the Engineer-in-Charge substantiating completion of all preparation for that placement.

All surface upon or against which concrete is to be placed shall be prepared in accordance with paragraph 4.2.15.

Re-tampering of concrete will not be permitted for any concrete, which has become so stiff that proper placing cannot be assured.

Concrete shall not be placed in standing water except with written permission of the Engineer-in-Charge and the method of placing shall be subject to approval. Concrete shall not be placed, in running water and shall not be subjected to running water until after the concrete has hardened. Concrete shall be deposited as nearly as practical in its final position and shall not be allowed flow in such a manner that the lateral movement will cause of the coarse aggregate separated from the concrete mass. Methods and equipment employed in depositing concrete in forms minimize clusters of coarse aggregates. Clusters that occur shall be scattered before the concrete is vibrated. Forms shall be constantly monitored and their position adjusted as necessary during concrete placement in accordance with paragraph 4.2.12 and 4.2.13.

All concrete except canal lining shall be placed in approximately horizontal layers. The

depth of layers shall not exceed 15 cm. The Engineer-in-Charge reserves the right to require lesser depth of layers where concrete cannot otherwise be placed and consolidated in accordance with the requirements of these specifications. All construction joints which intersect exposed concrete surface shall be made straight and level to plumb except as shown otherwise on the drawings. The placing of concrete shall be in accordance with clause 12.2 of IS: 456-1978.

If concrete is placed monolithically around openings having vertical dimensions greater than 60 cm or if concrete in decks, floor slabs or other similar part of structures is placed monolithically with supporting concrete, the following requirements shall be strictly observed:

- (1) Concrete shall be placed up to the top of the formed opening at which point further placement will accommodate settlement of fresh concrete. If concrete levels are specified beneath nearly horizontal structural members such as decks floor slabs, beams and girders or the levels being between the nearly horizontal members and the vertical supporting concrete below, concrete shall be placed to the bottom of the bevels before delay of placement.
- (2) The last 60 cm or more of concrete placed below horizontal members or bevels shall be placed with a slump of 50 mm or less and shall be thoroughly consolidated.

In placing concrete on uniform slopes so steep as to make internal vibration of the concrete impractical without footing, the concrete shall be placed in non-vibrating slip forms with screed extending approximately 0.75 meters back from its leading edge. Concrete ahead of the slip form screed shall be consolidated by internal vibrations so as to ensure complete filling under the slip form.

A cold joint is an unplanned joint resulting when a concrete surface hardens before the next batch is placed against it. Cold joints would be allowed only in the event of equipment break down or other unavoidable prolonged interruption of continuous placing. If such unavoidable delay in placing occurs, which make it that, unconsolidated concrete may harden to the extent that later vibration will not fully consolidate it, the contractor shall immediately consolidate such concrete to a stable and uniform slope. If the delay of placement is short enough to permit penetration of the underlying concrete, placement shall resume with particular care being taken to thoroughly penetrate and re-vibrate the concrete surface placed before the delay. If concrete cannot be penetrated with vibrator, the cold joint shall be then treated as a construction joint. Care shall be taken to prevent cold joints when placing concrete in any part of the work. The concrete placing rate shall ensure concrete is placed while previously placed adjacent concrete is plastic, so that the concrete can be made monolithic by normal use of vibrators/ tamping.

Concrete shall not be placed in rain sufficiently heavy or prolonged to wash mortar from concrete. A cold joint may necessarily result from prolonged heavy rainfall.

There shall not be any additional payment, over the unit price bid in the schedule for concrete by reason for any limitation in the placing of concrete, required under the provisions of this paragraph.

4.2.16.2 TRANSPORTATION

The transportation of concrete shall conform to clause 12.1 of I.S: 456-1978.

The methods and equipment used for transporting concrete from the batch plant to its final position in the placement and the time that elapses during transportation shall not cause measurable segregation of coarse aggregate or slump loss during transportation exceeding 5 centimetres.

Concrete shall be deposited as practical to its final position. The use of Aluminium pipe or Aluminium chutes for delivery of concrete will not be permitted. Concrete buckets shall be capable of promptly discharging concrete of the specified mix design and the dumping mechanism shall be capable of discharging at one location, small portions of concrete from a full bucket.

If used to transport concrete, the truck mixers shall meet the applicable requirements of paragraph 4.2.10. The transporting equipment for placing concrete shall readily handle the

place concrete of the specified slump. The Contractor shall when directed, replace in-adequate transporting equipment with acceptable equipment.

4.2.16.3 COMPACTION

The compaction of concrete shall conform to clause 12.3 of I. S 456-1978.

Concrete shall be consolidated by vibrators/ tampers. The vibrations shall be sufficient to remove all undesirable air voids from the concrete, including the air voids trapped against the forms. After consolidation, the concrete shall be free of rock pockets and honey comb areas and shall be closed snugly against all surfaces of forms and embedded materials. All concrete shall be properly consolidated before it hardens.

Except as herein after provided, consolidation of all concrete shall be by immersion type vibrators. Immersion type vibrators shall be operated in nearly vertical position and the vibrating head shall penetrate and re-vibrate the concrete in the upper portion of the underlying layer. Care shall be exercised to avoid contact of the vibrating head with embedded items and with formed surfaces, which will later be exposed to view. Concrete shall not be placed upon either plastic concrete until the previously placed concrete has been thoroughly consolidated.

Form vibrators shall be used in conjunction with slip form lining machines to consolidate concrete in canal linings. Such vibrators shall be arranged for effective, uniform consolidation for the concrete. The Engineer-in-Charge or his representative may remove samples of the hardened concrete for testing and examination, and the Contractor shall repair, at no cost to the Government, the concrete from which such samples are removed.

Immersion type vibrators shall be operated at speeds of at least 7000 revolutions per minute when immersed in concrete. Form vibrators shall operate at speeds of at least 8000 revolutions per minute when being used to consolidate concrete. The Contractor shall immediately replace improperly operating vibrators with acceptable vibrators.

4.2.17 FINISHES AND FINISHING

The requirements for finishing of concrete surface shall be as specified in this paragraph, paragraph 4.2.12 and 4.2.13 or as otherwise indicated on the drawings. The Contractor shall notify the Engineer-in-Charge before finishing concrete. Unless inspection is waived, in each specific case, finishing of concrete shall be performed only when an Engineer's representative is present. Concrete will be tested by the Engineer-in-Charge in accordance with paragraph 4.2.13 where necessary to determine whether the concrete surface is within the specified tolerances.

Finished concrete which is not within the specified tolerances shall be repaired in accordance, with paragraph 4.2.20. Interior surfaces shall be sloped for drainage where shown on the drawings or as directed. Surfaces which will be exposed to the weather and which would normally be level shall be sloped for drainage.

Floating may be performed by use of hand or power driven equipment. Floating shall be started as soon as the screed surface has stiffened sufficiently and shall be the minimum necessary to produce a surface that is free from screed marks and is uniform in texture. Joints and edges shall be tooled where shown on the drawing or as directed.

After the surface of roadway slabs of concrete bridges have been wood floated, the surfaces shall be given a broom finish. The finish shall be applied when the water sheet has practically disappeared. The broom shall be drawn transversely across the pavement with adjacent strokes slightly overlapping. The brooming shall be completed before the concrete is in such a condition that the surface will be torn or unduly roughened by the operation. The finished surfaces shall have a uniform appearance and shall be free of corrugations exceeding 1.5 millimetres in depth. Broom shall be of a quality, size and construction and be operated as to produce a surface finish of satisfaction to the Engineer-in-Charge.

The finishing in lining shall be in accordance with Clause 5.7 of IS: 3873-1993. The finished surface shall be equivalent in evenness, smoothness and free from rock pockets and surface voids to that obtainable by effective use of a long handled steel trowel. Where the

surface produced by lining machine meets the specified requirements, no further finishing operations will be required.

4.2.18 PROTECTION

The contractor shall protect all concrete against damage until its final acceptance by the Engineer-in-Charge. The contractor shall provide protection to prevent erosion to fresh concrete whenever precipitation either periodic or sustaining is imminent or occurring.

When precipitation appears imminent, the contractor shall immediately make ready at the placement site all materials, which may be required for protection of fresh concrete. The Engineer-in-Charge may delay placement of concrete until adequate provisions for protection against weather are made.

All fresh concrete surfaces shall be protected from contamination and from foot traffic until concrete has hardened. Hardened concrete surfaces, which have to receive finish, shall be protected against damage from foot traffic and the construction activity by covering with protective mats, plywood, or by other effective means. Method of protection shall be subject to approval by the Engineer-in-Charge.

4.2.19 CURING

4.2.19.1 GENERAL.

The contractor shall furnish all materials and perform all work required for curing concrete. All concrete including bed and sides of canal lining shall be cured by water curing.

The pre-cast slab for canal lining shall be cured by keeping them immersed in water for seven days and by sprinkling water for another 21 days with straw canvass, Hessian or similar materials cover over slab.

The uniformed top surfaces of bridges decks shall be cured for 28 days with a damp sand cover or curing mat cover. The sand or curing mats shall not be kept so wet as to allow water to drain from them, which may stain other concrete. The sand or curing mats shall be removed after expiry of the curing period.

All concrete surfaces shall be treated as specified to prevent loss of moisture from the concrete until the required curing period elapsed or until immediately prior to placement of other concrete or back fill against those surfaces. Only sufficient time to prepare construction joint surfaces and to bring them to a surface dry condition shall be allowed between discontinuance of curing and placement of adjacent concrete.

Forms shall be removed within 24 hours after the concrete has hardened sufficiently conforming to IS: 456-2000 to prevent structural collapse or other damage by careful form removal. Where required, repair of all minor surface imperfection shall be made immediately after form removal. Prior to curing, minor surface repair shall be completed within 2 hours after form removal and shall be immediately followed by the initiation of curing by the applicable method specified herein. Concrete surfaces shall be kept continuously moist after form removal until initiation of curing.

4.2.19.2 MATERIALS

Concrete cured with water shall be kept wet at least for 28 days from the time the concrete has attained sufficient set to prevent detrimental efforts to the concrete surfaces. The concrete surfaces to be cured shall be kept wet covering them with water saturated materials by using a system of perforated pipes, mechanical sprinklers or porous hose or by other methods which will keep all surface continuously wet. All curing methods are subject to approval of the Engineer-in-charge.

4.2.19.3 COST

The cost of furnishing of all materials and performing all work for curing concrete shall be included in the price bid in the bill of quantities for the concrete on the particular curing methods are required.

4.2.20 REPAIR OF CONCRETE

Concrete shall be repaired in accordance with the clauses 5.7 of IS 3873-1978. Imperfections and irregularities on concrete surface shall be corrected in accordance with the paragraph 4.3.13 and clause 5.7 of IS: 3873-1978.

Repair to concrete surfaces and addition where required shall be made by cutting regular opening into the concrete and placing fresh concrete to the required lines. The chipped openings shall be sharp and shall not be less than 70mm in depth. The fresh concrete shall be reinforced and chipped and trowel to the surface of the openings. The mortar shall be placed in layers not more than 20mm in thickness. After being completed, each layer shall be compacted thoroughly. All exposed concrete surface shall be cleaned of impurities, lumps of mortar or grout and unsightly stains.

The cost of furnishing all materials and performing all work required in the repair of concrete shall be borne by the contractor.

4.2.21 MEASUREMENT OF CONCRETE

Measurement for payment of concrete required to be placed directly upon or against surfaces of excavation will be made to the lines for which payment for excavation is made.

The unit of measurement will be in cubic metre. In measuring concrete for payment, the volume of all opening, fixtures embedded pipes and metalwork each of which is larger than 0.1 square meters in cross section will be deducted.

4.2.22 PAYMENT FOR CONCRETE

Payment for concrete shall be made at the applicable unit price in therefor in the bill of quantities, which unit price shall include the cost of furnishing all materials and performing all works required for the concrete construction except that payment for furnishing and placing reinforcement bars and form work which shall be made at the respective unit price's bid thereof in the schedule.

4.2.23 DETAIL SPECIFICATION OF EXPANSION JOINTS/ CONSTRUCTION JOINTER (EJ/CJ) FOR CANAL STRUCTURE

Description of Items

The joint should be left in concrete/masonry in required places as per drawing and design. Embedded parts if any will have to be provided prior to casting of concrete/construction of masonry. Old surface of the concrete/masonry joints should be made clean free of dirt, grease, protrusions or any objectionable materials as per the direction of the Engineer-in-charge. The face of the joints should be made straight. The surface of joints should be painted with bitumen/ coal tar and fitted with the approved sealing materials like bituminous filler boards, etc. The adjacent concreting masonry then only can be constructed.

In the case of P.V.C. water stop, the pieces should be jointed together at the site by vulcanising thoroughly to make it water tight having sufficient strength to withstand the designed water pressure exerted on it.

In case of copper seal, the thickness of the copper sheet should be of 16 gauge (1.63 mm) and minimum of 0.6m wide with 'V', 'U' or 'Z' groove of size 2.5 cm. at its longitudinal axis. The groove should be perfectly straight and uniform. Adjacent copper sheet should be perfectly braced together on both sides for the whole width by butting the two sheets against each other. If lapping between adjacent sheet are given, the maximum lapping should be 5 cm. and should be held together tight. Brazing should be done on both sides for the whole width. The joints should be braced, watertight and should be capable of withstanding the hydraulic pressure exerted on it. M.S. anchor rods of 6 mm to 8mm dia and 30cm long with hook on outer side and should be braced with the copper sheet @ 50 cm centre to centre approximately on both sides of copper sheet preferably staggered. The minimum length of the rod to be brazed is minimum 5 cm. and brazing should be done on both side of the rod.

The edges of the copper sheet should also be given a link at about 0.5 M. interval to have

a better grip with concrete. The brazing should be done as per relevant IS specification.

The P.V.C water stop shall be dense, homogeneous and free from holes and other imperfections. The cross section of the water stop shall be uniform along its lengths and thickness shall be symmetrical.

Location and embedment of the P.V.C./Copper water stops shall be as shown on the drawings, with approximately one-half of the width. Water stops shall be embedded in the concrete on each side of the joints. In order to eliminate faulty installation that may result leakage, care shall be taken that the water stops shall be installed to form continuous watertight diaphragm in the joints. Unless otherwise shown, adequate provision shall be made to protect the water stops during the progress of the work.

Additional vibrations over and above that used for adjacent concrete placement shall be carried out to assure complete embedment of the water stops in the concrete. Larger pieces of aggregate near the water stops shall be removed by hand during embedment to assure complete contact between the water stop and surrounding concrete.

Government of Orissa

Works Department

Office Memorandum

File No. FA-R- 3/09

1027

W, Dated.

24-1-09

Sub: - Guidelines/Procedure to be followed in introduction of e-Procurement in Government of Orissa.

1. This office memorandum consists of the procedural requirement of e-procurement and shall be made part of the Detailed Tender Call Notice or Instruction to Bidder for all "works" tenders hosted in the portal.
2. The e-Procurement portal of the Government of Orissa is "<https://tendersorissa.gov.in>".
3. Use of valid Digital Signature Certificate of appropriate class(Class II or Class III) issued from a registered Certifying Authority(CA) as stipulated by Controller of Certifying Authorities (CCA), Government of India such as n-Code, Sify, TCS, MTNL, e-Mudhra etc is mandatory for all users.
4. The DSC issued to the Department users is valid for the period of two years only. All the Department users are responsible to revalidate their DSC prior to expiry.
5. For all purpose, the server time displayed in the e-procurement portal shall be the time to be followed by all the users.
6. Government after careful consideration has decided to host all tenders costing 20 lakhs or above in the e-procurement portal. This will be applicable across all Engineering Departments such as Works Department, Department of Water Resources, Rural Development and Housing & urban Development Department. Government of Orissa also welcomes hosting of tenders by any other departments, authority, corporations, local bodies etc of the State with prior approval from Information Technology Department.
7. The e-procurement shall be operated compliant to relevant provisions of OGFR/ OPWD code/ Accounts code/ Government statutes including any amendments brought from time to time to suit to the requirement of the best national practice.
8. Registration in the e-procurement portal is without levy of any charges but Government reserves the right to levy any charges for such value added services in future.

9. Contractors not registered with Government of Orissa, can participate in the e-procurement after necessary enrollment in the portal but have to subsequently register themselves with the appropriate registering authority of the State Government before award of the work as per prevalent registration norms of the State.
10. For the role management "Department:" is the Administrative Department, Organisation or wing is the Chief Engineer or highest tender accepting authority or equivalent officer under the Administrative Department, Circle is the Superintending Engineer or equivalent officer, Division is the Executive Engineer or equivalent Officer and Subdivision is the Assistant Engineer or equivalent officer.
11. The e-procurement software assigns role for operation of the module for specific function. The terminologies used in the Portal and their respective functions in the software are as follows.
 - a. Application Administrator: (NIC and State Procurement Cell)
 - i. Master Management
 - ii. Nodal officer Creation
 - iii. Report Generation
 - iv. Transfer and blocking of Officers
 - b. Nodal Officer (At organization Level not below the Superintending Engineer or equivalent rank)
 - i. Creation of Users
 - ii. Role Assignment
 - iii. Transfers and blocking of Officers
 - c. Procurement Officer- Publisher (Officer having Tender inviting power at any level)
 - i. Publishing of Tender
 - ii. Publishing of Corrigendum / addendum/cancellation of Tender
 - iii. Bid Clarification
 - iv. Uploading of Pre-Bid Minutes
 - v. Report generation
 - d. Procurement Officer- Administrator: (generally Sub-ordinate officer to Officer Inviting the Tender)
 - i. Creation of Tender
 - ii. Creation of corrigendum/addendum/cancellation of Tender
 - iii. Report generation

Active Tenders". The Bidders/ Guest Users can download the Bid documents only after the due date & time of sale. The publication of the tender will be for specific period of time till the last date of submission of bids as mentioned in the 'Notice Inviting Bid' after which the same will be removed from the list of Latest Active tenders.

13. ISSUE OF ADDENDA/CORRIGENDA/CANCELLATION NOTICE

- a. The Procurement Officer Publisher (Officer inviting tender) shall publish any addendum/corrigendum/cancellation of tender in the website "<https://tendersorissa.gov.in>", notice board and through paper publication and such notice shall form part of the bidding documents.
- b. The System shall generate a mail to those bidders who have already uploaded their tenders and those bidders if they wish, can modify their tender.

14. PARTICIPATION IN BID

- a. **PORTAL REGISTRATION:** The Contractor/Bidder intending to participate in the bid is required to register in the Portal using his/her active personal/official e-mail ID as his/her Login ID and attach his/her valid Digital signature certificate (DSC) to his/her unique Login ID. He/She will enter relevant information as asked for about the firm/Contractor. This is a onetime activity for registering in Portal.
 - i. Bidders participating through Joint Venture shall declare the authorised signatory through Memorandum of Understanding duly registered and enrol in the portal in the name and style of the Joint venture Company. It is mandatory that the DSC issued in the name of the authorised signatory is used in the portal.
 - ii. Any third party/company/person under a service contract for operation of e-procurement system in the State or his/their subsidiaries or their parent companies shall be ineligible to participate in the procurement processes that are undertaken through the e-procurement system irrespective of who operates the system.
- b. **LOGGING TO THE PORTAL:** The Contractor/Bidder is required to type his/her Login ID and password. The system will again ask to select the DSC and confirm it with the password of DSC as a second stage authentication. For each login, a user's DSC will be validated against its date of validity and also against the Certificate Revocation List (CRL) of respective CA stored in system database. The system checks the unique

Login ID, password & DSC combination and authenticates the login process for use of portal.

c. **DOWNLOADING OF BID:** The bidder can download the tender of his choice and save it in his system to undertake necessary preparatory work off-line and upload the completed tender at his convenience before the closing date and time of submission.

d. **CLARIFICATION ON BID:** The bidder may ask question online in the e-procurement portal using his/her DSC; provided the questions are raised within the period of seeking clarification as mentioned in tender call notice/Bid. The Officer inviting the bid / Procurement Officer-Publisher will clarify queries related to the tender.

e. **PREPARATION OF BID:**

i. The bids may consist of general arrangements drawings or typical or any other drawings relevant to the work for which bid has been invited. Bidder may download these drawings and take out the print for detail study and preparation of his bid. Any other drawings and documents pertaining to the works available with the Officer Inviting the Bid will be open for inspection by the bidders.

ii. The Bidder shall go through the Bid carefully and list the documents those are asked for submission. He shall prepare all documents including cost of Bid Document, Bid Security, Declaration form, price bid etc and store in the system.

f. **PAYMENT OF EMD/BID SECURITY AND COST OF BID DOCUMENTS:**

i. The Bidder shall furnish, as part of his Bid, a Bid security for the amount mentioned under NIT/Contract Data. The bidder shall scan all the written /printed pages of the bid security and upload the same in portable document format (PDF) to the system in designated place of the technical BID. Furnishing scanned copy of such documents is mandatory otherwise his/her bid shall be declared as non-responsive and liable for rejection.

ii. The EMD or Bid Security payable along with the bid is 1% of the estimated contract value (ECV) or as mentioned in the bid document. The validity period of the EMD or Bid Security shall be as mentioned in the bid document. Any bid not accompanied by an acceptable Bid Security and not secured as indicated in the bid document shall be rejected as non-responsive. The bid security shall be retained till such time the successful bidder furnishes Initial Security Deposit (ISD) or Performance security acceptable to the Officer inviting the Bid. Failure of the successful Bidder to comply with the requirements shall constitute sufficient

- e. Procurement Officer- Opener (generally Sub-ordinate officer to Officer Inviting the Tender)
 - i. Opening of Bid
- f. Procurement Officer- Evaluator (generally Sub-ordinate officer to Officer Inviting the Tender)
 - i. Evaluating Bid
- g. Procurement Officer- Auditor (Procurement Officer- Publisher and/or Accounts Officer/ Finance Officer)
 - i. To take up auditing

12. NOTICE INVITING BIDS (NIB) OR INVITATION FOR BID(IFB):

- a. The Notice Inviting Bids (NIB) and Bid documents etc., shall be in the Standard formats as applicable to conventional Bids and will be finalized / approved by the officers competent as in the case of conventional Bids.
- b. The officers competent to publish NIB in case of conventional Bids will host the NIB in the portal. Simultaneously, a notification should also be published in the newspapers, as per existing rules preferably, in the following format, to effect economy:-

Government of Orissa "e" procurement Notice Bid Identification No.: _____	
1. Name of the work:	_____
2. Estimated cost: Rs	_____
3. Period of completion:	_____
4. Date & Time of availability of bid document in the portal:	_____
5. Last date / Time for receipt of bids in the portal:	_____
6. Name and address of the Officer Inviting Bid:	_____
Further details can be seen from the e-procurement portal " https://tendersorissa.gov.in "	

- c. All the volumes/documents shall be uploaded in the portal by the Procurement Officer Administrator and published by Procurement Officer Publisher (Officer Inviting tender) using their DSCs in appropriate format so that the document is not tampered with.
- d. The tender documents published by the Tender Inviting Officer (Procurement Officer Publisher) in the website "<https://tendersorissa.gov.in>" will appear in the "Latest

grounds for cancellation of the award and forfeiture of the Bid Security. The Bid security in the form of FD / BG shall be from a Nationalized Bank valid for a period of 45 days beyond the validity of the bid. Bid security in other form is acceptable if the bid documents provides for it.

- iii. The Fixed Deposit / Bank Guarantee or any other form as mentioned in detailed tender call notice in respect of Earnest Money Deposit / Bid Security and the Bank Draft in respect of cost of Bid are to be scanned and up loaded in portable document format (PDF) along with the bid.
- iv. The bidder shall provide the cost of bid and the Bid security in a sealed cover superscripting the name of the work for which the instruments are intended and the Officer Inviting the Bid. He/she is not required to write his/her name on the cover. The original FD/BG/BD shall be physically produced before the Officer Inviting the Bid or the concerned Division/ Circle/ Chief Engineer before the specified period mentioned in the bid; which in no case shall be less than three days excluding the last date of submission and opening of bids (Technical cover opening in case of Double Cover System). The bidder is also allowed to submit the original FD/BG/BD by Registered post/ Speed post or any other delivery system before the last date & time of opening of tender.
- v. The Officers authorized by the Procurement Officer-Publisher (Officer Inviting Tender) shall transmit the sealed envelopes carefully to the Procurement Officer-Publisher prior to opening of the Bid. The Procurement Officer-Publisher shall provide signed receipt with date and time for having received the number of sealed envelopes.
- vi. The Procurement Officer-Publisher (Officer inviting the Tender) or other concerned officers authorized to receive the original Bid security and Bid cost on behalf of the Procurement Officer-Publisher shall not be responsible for any postal delay and/or non-receipt of the original copy of the bid security on or before specified date and time. Non-submission of bid security within the designated period shall debar the bidder from participating in the on-line bidding system and his portal registration shall be blocked. His name shall also be informed to the registering authority for cancellation of his registration as Contractor.
- vii. Contractor exempted from payment of EMD will be able to participate in the tender directly by uploading documentary evidences towards his eligibility for

such exemption.

- viii. Government of Orissa has been actively considering integrating e-payment gateway in to the portal for payment of Cost of Bid and Bid Security/ Earnest Money Deposit. The process of using e-payment gateway shall be issued separately after it is established.

15. SUBMISSION OF BID:

- a. The bidder shall carefully go through the tender and prepare the required documents. The Bid shall have a Technical Bid & a Financial Bid. The Technical Bid generally consist of cost of Bid documents, EMD / Bid Security, VAT, PAN/TIN, Registration Certificate, Affidavits, Profit Loss statement, Joint venture agreement, List of similar nature works, work in hand, list of machineries, and any other information required by OIT. The Financial Bid shall consist of the Bill of Quantities (BOQ) and any other price related information/undertaking including rebates.
- b. The Protected Bill of Quantities (BOQ) uploaded by the Procurement Officer-Publisher for the Bid is the authentic BOQ. Any alteration or deletion or manipulation in BOQ shall lead to cancellation of Bid.
- c. The Bidder shall up load the scanned copy/copies of document in support of eligibility criteria and qualification information in prescribed format in Portable Document Format (PDF) to the portal in the designated locations of Technical Bid.
- d. The bidder shall write his name in the space provided in the specified location in the Protected Bill of Quantities (BOQ) published by the Officer Inviting Tender. The bidder shall type rates in figure only in the rate column of respective item(s) with out leaving any blank cell in the rate column in case of item rate tender and type percentage excess or less up to one decimal place only in case of percentage rate tender.
- e. The bidder shall log on to the portal with his/her DSC and move to the desired tender for uploading the documents in appropriate place one by one simultaneously checking the documents.
 - i. Bids can not be submitted after due date and time. The bids once submitted can not be viewed, retrieved or corrected. The Bidder should ensure correctness of the bid prior to uploading and take print out of the system generated summary of submission to confirm successful uploading of bid. The bids can not be opened even by the OIT or the Procurement Officer-Publisher/opener before the due date and time of opening.

- ii. Each process in the e-procurement is time stamped and the system can detect the time of log in of each user including the Bidder.
- iii. The Bidder should ensure clarity/legibility of the document uploaded by him to the portal.
- iv. The system shall require all the mandatory forms and fields filled up by the contractor during the process of submission of the bid/tender.
- v. The bidder should check the system generated confirmation statement on the status of the submission.
- vi. The Bidder should upload sufficiently ahead of the bid closure time to avoid traffic rush and failure in the network.
- vii. The Tender inviting Officer is not responsible for any failure, malfunction, or breakdown of the electronic system used during the e-procurement process.
- viii. The Bidder is required to up load documents related to his eligibility criteria and qualification information and Bill of Quantities duly filled in. It is not necessary for the part of the Bidder to up-load the drawings and other Bid documents (after signing) while up-loading his bid. It is assumed that the bidder has referred all the drawings and documents uploaded by the Officer Inviting the Bid.
- ix. Seeking any revision of rates or backing out of the bid claiming for not having referred to any or all documents provided in the Bid by the Officer Inviting the Bid will be construed as plea to disrupt the bidding process and in such cases the bid security shall be forfeited.
- x. The bidder will not be able to submit his bid after expiry of the date and time of submission of Bid(server time). The date & time of bid submission shall remain unaltered even if the specified date for the submission of bids declared as a holiday for the Officer inviting the Bid.

f. **SIGNING OF BID:** The 'online bidder' shall digitally sign on all statements, documents, certificates, uploaded by him, owning responsibility for their correctness / authenticity as per IT ACT 2000. If any of the information furnished by the bidder is found to be false / fabricated / bogus, his EMD / Bid security shall stand forfeited and the bidder is liable to be blacklisted.

16. SECURITY OF BID SUBMISSION:

- a. All bid uploaded by the Bidder to the portal will be encrypted.
- b. The encrypted Bid can only be decrypted/opened by the authorized openers on or after

the due date and time.

17. RESUBMISSION AND WITHDRAWAL OF BIDS :

- a. Resubmission of bid by the bidders for any number of times before the final date and time of submission is allowed.
- b. Resubmission of bid shall require uploading of all documents including price bid afresh.
- c. If the bidder fails to submit his modified bid(s) within the pre-defined time of receipt, the system shall consider only the last bid submitted.
- d. The bidder should avoid submission of bid at the last moment to avoid system failure or malfunction of internet or traffic jam or power failure etc.
- e. The Bidder can withdraw his bid before the closure date and time of receipt of the bid by uploading scanned copy of a letter addressing to the Procurement Officer-Publisher (Officer Inviting Tender) citing reasons for withdrawal. The system shall not allow any withdrawal after expiry of the closure time of the bid.

18. OPENING OF THE BID:

- a. Bid opening date and time is specified during tender creation or can be extended through corrigendum. Bids cannot be opened before the specified date & time.
- b. All bid openers have to log on to the portal to decrypt the bid submitted by the bidders.
- c. The bidders & guest users can view the summary of opening of bids from any system. Contractors are not required to be present during the bid opening at the opening location if they so desire.
- d. In the event of the specified date of bid opening being declared a holiday for the Officer inviting the Bid, the bids will be opened at the appointed time on the next working day.
- e. In case bids are invited for more than one package, the order for opening of the "Bid" shall be that in which they appear in the "Invitation for Bid".
- f. During bid opening, the covers containing original financial instruments towards Cost of bid and Bid Security in the form specified in the DTCN/ITB valid for the period stated in the Bid, received after last date of receipt of bid and before opening of the bids shall be opened and declared. The Procurement Officer-Opener shall continue opening of other documents if he is satisfied about the appropriateness of the cost of Bid and the Bid security.
- g. Combined bid security for more than one work is not acceptable.
- h. The electronically submitted bids may be permitted to be opened by the predefined Bid

opening officer from their new location if they are transferred after the issue of Notice Inviting Bid and before bid opening. Further action on bid documents shall be taken by the new incumbent of the post.

19. EVALUATION OF BIDS:

- a. All the opened bids shall be down loaded and printed for taking up evaluation. The Procurement Officer-Openers shall sign on each page of the documents downloaded and furnish a certificate that the documents as available in the portal for the tender have been down loaded.
- b. The Procurement Officer-Evaluators shall take up evaluation of bids with respect to the qualification information and other information furnished subject to confirmation of the bid security by the issuing institutions.
- c. After receipt of confirmation of the bid security, the bidder may be asked in writing to clarify on the documents provided in the Technical Bid, if necessary, with respect to any doubts or illegible documents. The Officer Inviting Tender may ask for any other document of historical nature during Technical evaluation of the tender. Provided in all such cases, furnishing of any document in no way alters the Bidder's price bid. Non-submission of legible documents may render the bid non-responsive.
- d. The bidders will respond in not more than 7 days of issue of the clarification letter, failing which the bid of the bidder will be evaluated on its own merit.
- e. Technical evaluation of all bids shall be carried out as per information furnished by Bidders. But evaluation of bids does not exonerate bidders from checking their original documents at later date. If the bidder is found to have misled the evaluation through wrong information, action as per relevant clause of DTCN/ITB shall be taken against the bidder/contractor.
- f. The procurement Officer- Evaluators; will evaluate bids and finalize list of responsive bidders.
- g. The financial bids of the technically responsive bidders shall be opened on the due date of opening. The Procurement Officer- Openers shall log on to the system in sequence and open the financial bids.
 - i. The Financial Bid will be opened on the notified date & time in the presence of bidders or their authorised representative who wish to be present.
 - ii. At the time of opening of "Financial Bid", bidders whose technical bids were found responsive will be opened.
 - iii. The responsive bidders' name, bid prices, item wise rates, total amount of each

item in case of Item rate tender and percentage above or less in case of percentage rate tenders will be announced.

- iv. Procurement Officer-Openers shall sign on each page of the downloaded BOQ and the Comparative Statement and furnish a certificate to that respect.
- v. Bidder can witness principal activities and view the documents/summary reports for that particular work by logging on to the portal with his DSC from any where.

20. NEGOTIATION OF BIDS:

- a. For examination, evaluation, and comparison of bids, the officer inviting the bid may, at his discretion, ask the lowest bidder for clarification of his rates including reduction of rate on negotiation and breakdown of unit rates.

21. NOTIFICATION OF AWARD AND SIGNING OF AGREEMENT:

- a. The Employer/Engineer-in-Charge shall notify acceptance of the work prior to expiry of the validity period by cable, telex or facsimile or e-mail confirmed by registered letter. This Letter of Acceptance will state the sum that the Engineer-in-Charge will pay the contractor in consideration of the execution & completion of the Works by the contractor as prescribed by the contract & the amount of Performance Security and additional Performance security required to be furnished. The issue of the letter of acceptance shall be treated as closure of the Bid process and commencement of the contract.
- b. The Contractor after furnishing the required acceptable performance security & additional performance security, "Letter to Proceed" or "Work Order" shall be issued by the Engineer-in-Charge with copy thereof to the Procurement Officer-Publisher. The Procurement Officer-Publisher shall up load the summary and declare the process as complete.

Memo No.

10 28

W, Dated.

EIC - cum - Secretary to Government

24-1-09

Copy forwarded to P.S. to Hon'ble Minister, Finance, Orissa/ P.S. to Hon'ble Minister, Works, Housing, Orissa for information and necessary action.

Memo No.

10 29

W, Dated.

FA- cum - Addl. Secy. to Govt.

24-1-09

Copy forwarded to OSD to Chief Secretary, Orissa/ P.S. to Development Commissioner-cum-Additional Chief Secretary, Orissa/ P.S. to Principal Secretary to Chief Minister, Orissa for information and necessary action.

Memo No. **1030** FA-cum-Addl. Secy. to Govt.
IW, Dated. **24-1-09**

Copy forwarded to Finance Department/ Department of Water Resources/ Housing & Urban Development Department/ Rural Development Department/ Panchayati Raj Department/ Department of Information Technology/ Law Department/ all other Departments/ Managing Director, OB & CC Ltd./ Managing Director, O CC Ltd for information and necessary action.

Memo No. **1031** FA-cum-Addl. Secy. to Govt.
IW, Dated. **24-1-09**

Copy with soft copy forwarded to the Head, State Portal Group, IT Centre, Ground Floor, North Annexe of Secretariat for information and necessary action.

He is requested to display this office memorandum in the web-site of State Government.

Memo No. **1032** FA-cum-Addl. Secy. to Govt.
IW, Dated. **24-1-09**

Copy forwarded to the Chief Procurement Officer, State Procurement Cell, Nirmana Soudha, Bhubaneswar/ Team Leader, E-procurement Mission, Nirmana Soudha Bhubaneswar for information and necessary action.

Memo No. **1033** FA-cum-Addl. Secy. to Govt.
IW, Dated. **24-1-09**

Copy forwarded to EIC (Civil), Orissa /EIC, Water resources, Orissa/ FA-cum-Addl. Secy. to Govt., R.D. Deptt./ Chief Engineer, DPI & Roads, Orissa/ Chief Engineer, Buildings, Orissa/ Chief Engineer, N. Hs., Orissa/ Chief Engineer, R.D. & Q.P., Orissa/ Chief Engineer, World Bank Project, Orissa/ Chief Architect, Orissa/ Chief Engineer, Water Resources, Orissa/ Chief Engineer, R.W-I, Orissa/ Chief Engineer, R.W-II, Orissa/ Chief Engineer, P.H.(Urban), Orissa/ Chief Engineer, Electricity, Orissa/ FA-cum-Joint Secy. to Govt., Water Resources

Deptt./ FA-cum-Joint Secy. to Govt., H.&U.D. Deptt./ FA-cum-Joint Secy. to Govt., Energy
 Deptt./ Special Officer-cum-Joint Secy. to Govt., Fin. Deptt for information and necessary action.

Memo No.

1034

/W, Dated.

24-1-09

FA- cum-Addl. Secy. to Govt.

Copy forwarded to the Accountant General (A&E), Orissa, Bhubaneswar/ Senior D.A.G.
 (Works Audit & Projects), Orissa, Puri for information and necessary action.

Memo No.

1035

/W, Dated.

24-1-09

FA- cum-Addl. Secy. to Govt.

Copy forwarded to the Director, Printing, Stationary & Publication, Orissa, Cutack for
 information and necessary action.

He is requested to publish this amendment in the next issue of Orissa Gazette.

Memo No.

1036

/W, Dated.

24-1-09

FA- cum-Addl. Secy. to Govt.

Copy forwarded to all Officers/ Superintending Engineers/ Executive Engineers/
 Sections/ P.S. to EIC-cum-Secretary to Govt., Works Department/ 20 (twenty) spare copies to
 Guard file for information and necessary action.

FA- cum-Addl. Secy. to Govt.