GOVERNMENT OF ODISHA

DEPARTMENT OF WATER RESOURCES

UPPER INDRAVATI PROJECT

TENDER DOCUMENT

(Technical BID)

(COVER –I)

E-PROCUREMENT NOTICE No. CCE,UIP-10(05)/ 2026-27
BID IDENTIFICATION No. CCE,UIP-10(05-05)/ 2026-27

FOR THE WORK

Construction of RCC trough lining of Ghumar Sub- Minor, Ampada Sub-Minor, Haldi Sub-Minor & Parla Sub-Minor-II under Left Canal Division-II, Dharamgarh.

Sd /-

CHIEF CONSTRUCTION ENGINEER
UPPER INDRAVATI PROJECT
MUKHIGUDA, KALAHANDI

PARTICULARS OF TENDER

1.	Name of the work	:	**"Construction of RCC trough lining of Ghumar Sub- Minor, Ampada Sub-Minor, Haldi Sub-Minor & Parla Sub-Minor-II under Left Canal Division-II, Dharamgarh."**
2.	Amount put to tender	:	**Rs. 6,02,24,702.89 /- (Excluding GST)**
3.	E.M.D	:	**Rs. 6,02,300 /- (Online)**
4.	Period of completion	:	**18 (Eighteen) Calendar months**
5.	Class of Contractor	:	Registered Construction firm of '**A' CLASS** Registered under Govt. of Odisha & other eligible classes registered elsewhere mentioned in Tender call Notice.
6.	Cost of Tender Documents	:	**Rs.10,000 /-** (Non-refundable) for Technical & Financial Bid Documents
7.	Availability of Tender in web site	:	From **16.10.2026, 10.00 AM** to **02.11.2026, 05.30 PM**
8.	Bidding Period starts from	:	From **16.10.2026, 10.00 AM** to **02.11.2026, 05.30 PM**
9.	Date of opening of Technical Bid	:	At **11.00 A.M.** on **03.11.2026 in** the office of the **Chief Construction Engineer, Upper Indravati Project, Mukhiguda, Dist- Kalahandi, Odisha, Pin-766026.**
10.	Date of opening of Financial Bid		Will be intimated to qualified Bidders by registered Post/speed Post / e-mail / web site etc. after approval of Technical Bid from competent authority.

CONTRACTOR **SUPERINTENDING ENGINEER**

GOVERNMENT OF ODISHA

BID DOCUMENTS

NAME OF WORK: ‘‘Construction of RCC trough lining of Ghumar Sub- Minor, Ampada Sub-Minor, Haldi Sub-Minor & Parla Sub-Minor-II under Left Canal Division-II, Dharamgarh.”

The bid document contains -Technical Bid 191 Pages.

Chief Construction Engineer
Upper Indravati Irrigation,
Mukhiguda, Kalahandi

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SECTION - 1

NOTICE INVITING TENDER

AND

DETAILED TENDER CALL

GOVERNMENT OF ODISHA
OFFICE OF THE CHIEF CONSTRUCTION ENGINEER
UPPER INDRAVATI PROJECT
AT/PO: MUKHIGUDA DIST:KALAHANDI
ODISHA, PIN: 766026

e-mail address: cceuip1987@gmail.com/louiipbbsr@gmail.com

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1. **Type of Work : Canal & structure Work.**
2. **Total No. of Works : 05 nos.**
3. **Approximate value of work : Rs. 459.22 lakhs to Rs 602.25 Lakhs (Excluding GST)**
4. **Tender Paper Cost : Rs. 10,000/-(online)**
5. **Bid Security/E.M.D : Rs.4,59,300/- to Rs.6,02,300/-(Online)**
6. **Period of Completion : 18 (Eighteen Calendar months).**
7. **Class of Contractor : "A" Class & A and Special Class**

Procurement Officer	e-procurement Notice No.	Bid Amount	Availability of online viewing of Tender prior to Bidding		Period for seeking tender clarification	Submission & Availability bid on-line	Date & time of opening of Technical Bid
			From	To			
1	2		3	4	5	6	7
CHIEF CONSTRUCTION ENGINEER, UPPER INDRAVATI PROJECT, AT/PO-MUKHIGUDA, DIST-KALAHANDI, ODISHA, PIN-766026.	CCE, UIP-10(05)/2026-27, Dt. 12.10.2026	Rs4,59,21,980/- To Rs 6,02,24,703/- (Excluding GST)	16.10.2026 (10.00 AM)	02.11.2026 (up to 5.30 PM)	16.10.2026 to 21.10.2026 during office hours.	16.10.2026 (10.00 AM) to 02.11.2026 (up to 5.30PM)	03.11.2026 at 11:00 AM

Date of opening of technical bid - **Dt-03.11.2026 at 11.00 AM** in the O/O the Chief Construction Engineer, UIP, Mukhiguda, Kalahandi, Odisha, PIN-766026

Date of opening of financial bid : - To be decided after finalization of Technical Bid.

Further details can be seen from the Govt. Website - **www.tendersorissa.gov.in**

Chief Construction Engineer
Upper Indravati Project
Mukhiguda

CONTRACTOR **SUPERINTENDING ENGINEER**

GOVERNMENT OF ODISHA
DEPARTMENT OF WATER RESOURCES
OFFICE OF THE CHIEF CONSTRUCTION ENGINEER
UPPER INDRAVATI PROGECT,
AT/PO: MUKHIGUDA, DIST. - KALAHANDI
e-Procurement Notice No.CCE,UIP-10(05)/2026-27, Dt. 12.10.2026.
cceuip1987@gmail.com/louiipbbsr@gmail.com

1. The Chief Construction Engineer, Upper Indravati Project, Mukhiguda on behalf of the Governor of Odisha invites **Percentage Rate** bids in **Double cover system** for the work(s) as detailed in the table below, from eligible contractors registered with the State Government and contractors of equivalent Grade / Class registered with Central Government / M.E.S. / Railways or other Licensing Authorities for execution of Civil works on production of definite proof from the appropriate authority. The bidders may submit online bids for any or all of the following works.

Sl. No.	Bid Identification No.	Name of the works	Value of works (Rs.) excluding GST	Eligible Class of Contra-ctor	Security/ E.M.D. Required (1%) (Rs.)	Cost of Bid Docum -ent (Rs.)	Period of completion	Name & address of the Division where the works will be executed
1	2	3	4	5	6	7	8	9
1	**CCE,UIP-10(01-05)/ 2026-27 Date: 12.10.2026**	Construction of rcc trough wall lining for improvement of the existing canal, including strengthening of canal banks, within RD 0 m to RD 2150 m of pratapur minor, within RD 0 m to RD 1130 m of pratapur sub-minor - I, and within RD 0 m to tail end of pratapur sub-minor - iv under U.I. left canal division no. I, kusumkhunti	**5,87,33,095/-**	**A"Class**	**5,87,400/-**	**10000**	18 (Eighteen Calendar months)	S.E, U. I. Left Canal Division No-I, Kusumkhunti
2	**CCE,UIP-10(02-05)/ 2026-27 Date: 12.10.2026**	Construction of slope protection work in between RD 18.00km to RD 20.60 km of Lift Canal Division,Kusumkhunti	**5,02,24,542/-**	**"A"Class**	**5,02,300/-**	**10000**	18 (Eighteen Calendar months)	E.E, U. I. Lift Canal Division, Kusumkhunti
3	**CCE,UIP-10(03-05)/ 2026-27 Date: 12.10.2026**	Improvement of Vulnerable reaches and damaged portion of Chhenagaon Distributary in between RD 6000 m to RD 7500 m and Patharla minor in	**5,20,47,273/-**	**A"Class**	**5,20,500/-**	**10000**	18 (Eighteen Calendar months)	S.E, U. I. Right Canal Division No-II, Junagarh

CONTRACTOR **SUPERINTENDING ENGINEER**

		between RD 1200 m to RD 2220 m under RCD No. II, Junagarh.						
4	**CCE,UIP-10(04-05)/ 2026-27 Date: 12.10.2026**	Improvement of Vulnerable reaches and damaged portion of Pastipada minor in between RD 00 m to RD 2000 m, Karlapada minor in between RD 00 m to RD 1700 m and missing link of Jharkusumkhunti sub minor from RD 00 m to RD 825 m under RCD No. II, Junagarh.	**4,59,21,980/-**	**A"Class**	**4,59,300/-**	**10000**	18 (Eighteen Calendar months)	S.E, U. I. Right Canal Division No-II, Junagarh
5	**CCE,UIP-10(05-05)/ 2026-27 Date: 12.10.2026**	Construction of RCC trough lining of Ghumar Sub- Minor, Ampada Sub-Minor, Haldi Sub-Minor & Parla Sub-Minor-ll under Left Canal Division-II, Dharamgarh.	**6,02,24,703/-**	**"A" & Special class**	**6,02,300/-**	**10000**	18 (Eighteen Calendar months)	Superintending Engineer, Upper Indravati Left Canal Division No-II Dharmagarh, Kalahandi

(Five nos. of works only)

2. Bidders registered themselves under CDMS portal can only participate in the bidding process after 31.12.2020 as per works department letter No. 9100, Dt. 17.11.2026

3. Bid document consisting of qualification, information and eligibility criteria of bidders, plans, Specification and schedule of quantities of the works are available in web-site www.tendersodisha.gov.in and the set of terms and conditions of contract and other necessary documents can be seen in the web-site till last date of on-line biding for the works.

4. As per Works Department, Government of Odisha, Office Memorandum No 8484 dated 05.04.2022 (As mentioned in above Column No- 7 and 6 respectively) should be submitted online through electronic receipt payment gateway mode of designated banks such as SBI/ICICI Bank/HDFC Bank as per works Department O.M No-17254//W on Dtd-05.12.2017 as mentioned in DTCN.)
5. Only those bidders who successfully remit their cost of tender paper and Earnest Money Deposit on submission of bids would be eligible to participate in the tender/bid process. The bidders with pending or failure payment status shall not be able to submit their bid. Tender inviting authority, state procurement cell, NIC, the designated Bank shall not be held responsible for such pendency or failure.
6. Bidders registered in the e-Procurement Portal www.tendersodisha.gov.in can participate in the online bidding for any or all of the works mentioned in Col. 3 of the above table.

7. Procurement Details:

Procurement officer	**e-procurem-ent Notice No.**	**Availab-ility of Bid On-line**	**Submission of Bid On-line**	**Period of seeking tender clarification**	**Date & time of opening of tender**	
					Technical bid	**Financial bid**
1	2	3	4	5	6	7
Chief Construction Engineer, Upper Indravati Project, Mukhiguda, Dist-Kalahandi	**CCE,UIP-10(05)/ 2026-27 Date: 12.10.2026**	**From 16.10.2026 (10.00AM) to**	**From 16.10.2026 (10.00AM) to**	**16.10.2026 to 21.10.2026**	**03.11.2026 at 11.00 AM**	**To be intimated to qualified**

CONTRACTOR **SUPERINTENDING ENGINEER**

		02.11.2026 (5.30 PM).	**02.11.2026, (5.30 PM).**	**during office hours.**		**bidders after evaluation of the technical bid.**

8. The bidder must possess compatible Digital Signature Certificate (DSC).
9. **The Technical Bid (Cover–I)** consisting of qualification, information and eligibility criteria of bidders, plans, specification are available in web-site **www.tendersorissa.gov.in** and should be submitted in **www.tendersorissa.gov.in** furnishing scan copies of valid registration certificate, GSTIN registration Certificate, PAN card, no relation certificate, EMD and Affidavit about the authenticity of documents along with bid document mandatory otherwise his / her bid shall be declared as non-responsive and thus liable for rejection.
10. **The Financial Bid (Cover – II)** consisting of the schedule of quantities of works are available in web-site **www.tendersorissa.gov.in** and the set of terms and conditions of contract and other necessary documents can be seen in the web-site till **02.11.2026 up to 5.30 PM** i.e.; last date of availability of bid on "on-line" for bidding. Interested bidders may obtain further information, if any required, at the web-site **www.tendersorissa.gov.in.**
11. **Bid validity**: - The bid for the work shall remain open for acceptance for a period of **90 days** from the last date of receipt of bids.
12. No Engineer of Gazetted rank or other Gazetted officer employed in Engineering or Administrative duties in an Engineering department of the State Government is allowed to work as a contractor for a period of two years after his retirement from Government service, without permission of Government.
13. The original documents along with a set of it's Xerox copies against the scanned copy of RC, (valid contractor registration certificate), GSTIN registration Certificate, PAN Card, Adhar Card, Affidavit and other requisite documents submitted through web site should be produced in the office of **Chief Construction Engineer, Upper Indravati Project, Mukhiguda** for verification on demand after opening the Technical Bid. The **Technical Bid** will be opened in the office of the **Chief Construction Engineer, Upper Indravati Project, Mukhiguda** on

    Dt. 03.11.2026 at 11.00AM.
14. Any addendum / corrigendum /cancellation of above tender will be published in the web-site www.tendersorissa.gov.in and in the notice board. The system shall generate a mail to those bidders who have already uploaded their tenders and those bidders if they wish, can modify their tenders.
15. Other details including details of Portal Registration, Submission of bid, Resubmission and withdrawal of bid can be seen in the bidding document which is available in web-site www.tendersorissa.gov.in.
16. Bid must be accompanied with scanned copies of valid Registration Certificate, valid GST Registration Certificate and PAN Card failing which the bid will be rejected. Bidders desirous to avail exemption / relaxation of E.M.D. as per prevailing rules should upload copies of necessary document and affidavit in support of their claim along with their bid. Bidders registered as **"Engineering Contractors"** desirous to avail exemption of E.M.D. for participating in bid shall have to upload an affidavit for not having availed this facility in three works (for Degree Engineering Contractors) and Two Works (For Diploma Engineering Contractor) during the year **2026-27.** In such case, the successful Engineering Contractor has to produce the original Registration Certificate for recording the fact of availing exemption of E.M.D. for award of the work. Bidders registered as **"S.C. & S.T. Contractors"** desiring to avail concession(s)/ price preference as per prevailing rules should apply for the same in writing in shape of **Affidavit.**

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17. **No Exemption is allowed in EMD, Paper Cost, Performance security and any other deposits** to Contractors having **MSME** registered certificates, as per Notification no-MSME-1PE-MISC-0060-2019/566/MSME, Bhubaneswar, Dt-24.01.2024 from Micro, Small & Medium Enterprises Department, Govt. Of Odisha Clause No-4- "MSME policy will, however, not applicable to procurement of services including work contracts (Including EPC contracts)" vide Office Memorandum Ltr No-4281/W dtd-05.03.2025 from Works Department, Govt. of Odisha.
18. If the rate quoted by the SC & ST Category Contractor comes to the rate quoted by the L1 bidder (decimal up to two numbers will be taken for all practical purposes) after availing 10% price preference as per Para-2 of Works Department Resolution No. 27748 dated 11.10.1977, the tender shall be finalized by the tender accepting authority through a transparent lottery system along with other categories of contractor as per Office Memorandum No. 07764600022025-632 BBSR dated 09.01.2026 of Works Dept. Govt. of Odisha.
19. **Additional performance security** shall be taken on an incremental basis from the selected bidder for low prices in project works as under. As per Office Memorandum No. 07764600022025-17941/WE BBSR dated 08.10.2026 of Works Dept. Govt. of Odisha.
    Earlier, the provisions of threshold negative bid caps of 15% introduced in Appendix-IX, Clause 36 of OPWD Code Vol.-II had been abolished, and the system of incremental Additional Performance Security (APS) was adopted vide Works Department O.M. No.173/W., dated 03.01.2026 in the procurement of Works undertaken by Government of Odisha and its agencies to ensure that the procurement process results in a viable and successful manner.

    Subsequently, a clarification vide Works Department O.M. No. 632/W., dated 09.01.2026, and a corrigendum No. 14560/W., dated 11.08.2026, were issued on the subject.

    Considering the continuing trend of quoting of abnormally low bids in procurement of Works, Government, after careful consideration, have been pleased to further review the issue of abnormally low bid prices.

    Now, therefore, in supersession of Works Department O.M. No.173, dated 03.01.2026, O.M. No.632/W., dated 09.01.2026 and Corrigendum No. 14560/W., dated 11.08.2026, it has been decided that the Additional Performance Security (APS) shall be obtained from the selected bidder, on an incremental basis, where the accepted bid price is lower than the Cost Put to Tender, in the following manner:

    i) The Additional Performance Security (APS) shall be calculated as a percentage of the accepted Bid Price of the selected bidder.
    ii) For the purpose of determining the APS, the percentage by which the accepted Bid Price is lower than the Cost Put to Tender shall be calculated and rounded off.
    iii) The rounded-off percentage so determined shall be referred to as the Rounding Off of Percentage Less (ROPL) of accepted Bid Price and shall form the basis for calculation of the APS in accordance with the applicable incremental rate prescribed under this Office Memorandum.
    iv) Rounding Off of Percentage Less (ROPL) of accepted Bid Price, l.e. the percentage by which the accepted Bid Price is less than the Cost Put to Tender, shall be as follows:
        - Where the decimal fraction is less than 0.50, the percentage shall be rounded off to the next lower whole percentage.
        - Where the deomal fraction is 0.50 or above, the percentage shall be rounded off to the next higher whole percentage.
        - For avoidance of doubt, 13.25% less shall be reckoned as 13% less, whereas 13.50% less shall be reckoned as 14% less, for the purpose of determining the applicable APS under this Office Memorandum.
    v) Calculation of Additional Performance Security:
        - Where the accepted bid price is such that the ROPL is up to (-)10%, no additional performance security is required.

- where the accepted bid once is such that the ROPL is below (-)10% but not below (-)20%, the additional performance security percentage shall be incremented by 0.2% for every percentage of ROPL below (-)10%, for avoidance of doubt, if ROPL is (-)13%, then APS shall be @ 0.2% x (13-10) = 0.6% of accepted bid price.
- where the accepted bid price is such that the ROPL is below (-)20% but not below (-)30% the additional performance security percentage shall be incremented by 0.3% for every percentage of ROPL below (-)20% in addition to 2% of the accepted bid price, for avoidance of doubt, if ROPL is (-)24%, then APS shall be @ 0.3% x (24-20) +2% 1.2% + 2% 3.2% of accepted bid price.
- Where the accepted bid price is such that the ROPL is below (-130% or more, the additional performance security percentage shall be incremented by 0.5% for every percentage of ROPL below (-)30% in addition to 5% of the accepted bid price; for avoidance of doubt, if ROPL is (-)37%, then APS shall be @ 0.5% x (37-30)+5% = 3.5% +5% 8.5% of accepted bid price.

vi) The additional performance security shall be treated as part of the performance security

vii) The provision of additional performance security shall be applicable to all forms of tender except Tumkey Tender.

viii) Justification for abnormally low bids shall be scrutinized by the Technical Committee and recommended to the Competent Authority for Acceptance of Tender as per Para 6.3.15 of OPWD Code, Vol-1 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 at the offered price. Procuring Entity may, in such cases, seek written clarifications from the Bidder, including detailed price analysis of its Bid price in relation to scope, schedule, resource mobilization, allocation of risks and responsibilities, and any ather requirements of the bad document. If, after evaluating the price analysis, the procuning 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 advisatile to fix a normative percentage below the estimated cost, which would automatically be considered as an abnormally low bid.

ix) If more than one bid is quoted (decimal up to two numbers will be taken for all practical purposes, in percentage rate tenders) as lowest, either at the estimated cost put lo tender or less than the estimated cost put to tender, the Tender Accepting Authority will finalize the tender through a transparent lottery system, where all the concerned bidders/their authorized representatives, the concerned SE/EE of the concerned Division and DAO will remain present.

x) If the rate quoted by the SC and ST Category Contractors comes to the rate quoted by the lowest bidder (decimal up to two numbers will be taken for all practical purposes, in percentage rate tenders) after availing 10% price preference as per Para 2 of Works Department Resolution No. 16262 dated 30.10.2018, the tender shall be finalized by the Tender Accepting Authority through a transparent lottery system along with other categories of contractors.

xi) 11. Accordingly, the relevant existing codal/contractual provision stands modified with effect from the date of issue of this O.M.

xii) However, as regards the bidding process in which the tender has been floated before the issue of this Office Memorandum, the APS shall be calculated as per Works Department O.M.No. 173 di 03.01.2026 την O.M. No.632/W, dated 09.01.2026 and Corrigendum No. 14560/W., dated 11.08.2026.

xiii) In pursuance to, Works Deptt. OM No.2375/W, dt.03/03/2022, Additional Performance Security(APS) shall be refunded immediately on successful completion of the work within seven(07) days of issuance of Completion Certificate/Provisional Completion Certificate.

xiv) This has been concurred in by the Finance Department vide OSWAS file No.**FIN-WFI-MISC-0102-2025.**

CONTRACTOR **SUPERINTENDING ENGINEER**

20. The bidder has to submit the Additional performance security in shape shape of NSC/Post Office Savings Bank Account/Post Office Time Deposit Account/Kishan Vikash Patra/Bank Guarantee from any nationalized bank pledged in favour of the **Superintending Engineers/ Executive Engineers** as cited in **column no-9 against work respectively** within seven days of issue of Letter of Acceptance (LoA) by the **Divisional Officer** (by e-mail) to the successful bidder, otherwise the bid of the successful bidder shall be cancelled and the Earnest Money Deposit/ Bid Security shall be forfeited. Further, proceeding for blacklisting shall be initiated against bidder. (As per O.M. File No. 14459/W, dated 20.09.2018 of Amendment to Para-3.5.5(v) of the OPWD Code, Volume-I.

21. If the 1st lowest bidder does not turn up for agreement after finalization of tender, then he shall be debarred from participation in bidding for three years & action will be taken to black list the contractor as per codal provision in Annexure-II of Amendment to Para-3.4.14 Note-I of OPWD Code Vol-1.

22. The bidders shall furnish an affidavit on-line at the time of submission of the bid, about the authentication of the tender documents including Registration Certificate, PAN Card, Adhar card, valid GSTIN registration certificate etc. failing which the bid shall be considered as non-responsive and thus liable for rejection. No adjustment of EMD will be entertained at all; Labour license is to be produced by the successful bidder at the time of agreement.

23. For a particular work a bidder can submit only one bid. Submission of more than one bid by a bidder for a particular work will be liable for rejection of all such bids of the concerned bidder.

24. The Technical Bids will be opened on-line on **03.11.2026 at 11.00 A.M onwards**, in the presence of the bidders who wish to attend if the office happens to be closed on the date of opening of the bids as specified, the bids will be opened subsequently on the next working day at the same time and venue.

25. **The bidder should mention his detail address and phone/mobile no./Email ID in the separate sheet for communication regarding the tender.**

26. As per Office Memorandum No.16 dt.01.01.2015 of Work Department Government of Odisha, when in response to a notice calling for tenders, only a single tender is received in the first instance, the tender will be cancelled without opening of the bid and fresh tender will be invited publicly. If single tender is received, even after retendering, then the approval of the next higher authority shall be obtained, if the tender is in order and acceptable.

27. As Goods and Service Tax has come into force with effect from 01.07.2017, GST as applicable will be paid extra after gross bill amount prepared vide Section-15 and Section-142 (11-C) of Odisha Goods and Service Tax Act 2017.

28. The bidder must have to register under CDMS portal **as per O.M No-12934/W dated 23.08.2018 of Works Department, Govt. of Odisha with insertion of provision in Para - 12.4 below Para-12 in Appendix-IX (A) of the OPWD Code, Volume – II otherwise bid shall be rejected.**

29. **Authority reserves the right to reject any or all the tenders without assigning any reasons thereof**.

CONTRACTOR **SUPERINTENDING ENGINEER**

30. If there is more than one valid lowest bidder for any work the tender will be finalized through a **transparent Lottery system,** if required which will be intimated later. The activity will be done with the presence of all bidders/their authorized representatives, the Superintending Engineer and Divisional Accounts Officer. If the office happened to be closed on the above date the same will be drawn on the next working day at the same time and venue.

31. Other details and conditions can be seen in the bidding documents, which is available in the website**www.tenderodisha.gov.in.**

Chief Construction Engineer,
Upper Indravati Project,
Mukhiguda

Memo No. **2883** **Dt :12.10.2026**

Copy submitted to the Engineer-In-Chief, W.R. Odisha, Bhubaneswar for information and necessary action.

Chief Construction Engineer,
Upper Indravati Project,
Mukhiguda

Memo No. **2884** **Dt :12.10.2026**

Copy forwarded to the Director, (M&E), O/o the Engineer-in-chief, WR, Bhubaneswar, Odisha along with hard and soft copy (CD) of Notice Inviting Tender for information and necessary action.

Chief Construction Engineer,
Upper Indravati Project,
Mukhiguda

Memo No. **2885** **Dt :12.10.2026**

Copy forwarded to the Superintending Engineer, U.I. Right Canal Division no. -I, Mukhiguda/Superintending Engineer, U.I. Right Canal Division no. -II, Junagarh/ Superintending Engineer, U.I. Left Canal Division no. -I, Kusumkhunti/ Superintending Engineer, U.I. Left Canal Division no. -II, Dharmagarh/ Executive Engineer, U.I. Lift Canal Division, Kusumkhunti for information and necessary action.

Chief Construction Engineer,
Upper Indravati Project,
Mukhiguda

Memo No. **2886** **Dt :12.10.2026**

Copy to Notice Board /Divisional Accounts Officers / Estimator / Head Clerk / Cashier / Estimating Clerk / Tender file / 1 spare copies for respective tender file.

Chief Construction Engineer,
Upper Indravati Project,
Mukhiguda

CONTRACTOR **SUPERINTENDING ENGINEER**

GOVERNMENT OF ODISHA
DEPARTMENT OF WATER RESOURCES
OFFICE OF THE CHIEF CONSTRUCTION ENGINEER
UPPER INDRAVATI PROGECT,
AT/PO: MUKHIGUDA, DIST. - KALAHANDI
e-Procurement Notice No. CCE,UIP-06(06)/2026-27, Dt. 21.09.2026.
cceuip1987@gmail.com/louiipbbsr@gmail.com

DETAILED TENDER CALL NOTICE

1. **The Chief Construction Engineer, Upper Indravati Project, Mukhiguda** on behalf of Hon'ble Governor of Odisha invites e-tender on percentage rate in the prescribed form to be eventually drawn in P.W.D. form no. "**P1 from in Double cover system"** for the work(s) as detailed in the table below, from **'A' Class** contractors registered with the State Government and contractors of equivalent Grade / Class registered with Central Government / M.E.S. / Railways or other Licensing Authorities for execution of Civil works on production of definite proof from the appropriate authority. All the contractors are to be registered in the State portal and must posses' compatible digital signature certificate of Class-II and III for online bidding. The website for online bidding is http://tendersodisha.gov.in for the work **"Construction of RCC trough lining of Ghumar Sub- Minor, Ampada Sub-Minor, Haldi Sub-Minor & Parla Sub-Minor-II under Left Canal Division-II, Dharamgarh."**

2. The tender documents can be downloaded from the website identified as http://tendersodisha.gov.infrom **10.00 AM on 16.10.2026 up to 05.30 PM on 02.11.2026.** The bidders for participation in online bidding will have to pay **Rs. 10,000/-** (**Rupees ten thousand)** only **(Online)**. The Bid will be received through e-procurement portal from **10.00 AM on 16.10.2026 up to 05.30 PM on 02.11.2026.** Each set of bid document contains Technical Bid (Cover-I) and an intelligent bill of quantity in MS-Excel format (Cover-II). The Technical Bid (cover-I) will be opened on **03.11.2026 at 11.00 hours** in the **office of the Chief Construction Engineer, Upper Indravati Project, Mukhiguda** in presence of the bidder or their authorized agents. The bidders who participate in the online bidding can witness opening of the bid from any system logging on to the portal away from opening place. The bids can only be opened by the pre-designated officials only after the opening time mentioned in the bid. In the event of the specified date of bid opening being declared a holiday, the bid will be opened at the appointed time and location in the next working day. Date, time and place of opening of Cover-II (Financial bid) shall be intimated separately to those bidders who will be found eligible after evaluation of Cover-I (Technical bid). The intimation will be sent through e-procurement portal by their email address.

3. The value of the work tendered for is **Rs. 6,02,24,702.89 /- (Without GST)**

4. The bidders shall prepare the documents and upload the scanned typed document in PDF format and BOQ in excel format (or as specified in the portal) in appropriate place.

5. No bidder will be permitted to furnish their tender in their own manuscript.

6. **Bidders desirous to avail exemption / relaxation of EMD as per prevailing rules should upload copies of necessary documents and affidavit in support of their claim along with their bid. Bidders registered as "S.C. & S.T Contractors" desiring to avail concession(s)/ price preference as per prevailing rules should apply for the same in writing in shape of Affidavit.**

   I. The officers authorized by the Procurement Officer – Publisher (Officer Inviting Tender) shall transmit the above documents carefully to the Procurement Officer – Publisher prior to opening of bid. The Procurement Officer – Publisher shall provide signed receipt with date and time for having received the number of documents.

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II. Contractor exempted from payment of EMD will able to participate in the tender directly by uploading the documentary evidence towards his eligibility for such exemption.(As per below mentioned conditions)

7. a) Providing facilities to the Engineer Contractor :-

i. **Engineering Contractor** desirous to avail the facility of "Exemption of EMD" as per prevailing rules should upload copies of required documents and **affidavit** in support of their claim along with the Bid, in online to the effect that he/she has not yet availed the above facility for more than three works during the current financial year, failing which the tender will be liable for rejection. The name of work for which and the authority to which the tender is being submitted previously, if any, must be mentioned in the affidavit falling which the tender will be rejected. Bidders who are exempted from paying EMD/ISD etc. can avail the privilege by uploading copy of the notification as notified by Government from time to time.

ii. The Engineer contractor shall have to execute the work if awarded to him under his direct supervision and he will not be allowed to execute such work through his Power of Attorney Holder.

b) **EMD – Rs. 6,02,300.00 /-** The bidder has to deposit required EMD through online, Non-submission of the EMD will be liable for rejection.

8. The work is to be completed in all respect within **18 (Eighteen)** Calendar months from the date of issue of work order.

9. The plans specifications and scope for the work can be seen in the office of the **Superintending Engineer, Upper Indravati Left Canal Division No-II Dharmagarh, Kalahandi** during any working days.

10. The bidders shall carefully study the tentative drawings and specifications applicable to the contract and all documents which form part of the agreement to be entered into by the accepted bidder and detailed specifications for Odisha and other relevant specifications and drawings which are available with the tender document or with the **Superintending Engineer, Upper Indravati Left Canal Division No-II Dharmagarh, Kalahandi**. Complaints on the plans and specifications on a future date will not be entertained.

11. The bidder can resubmit his bid through e-procurement on online mode out of which the system shall consider only the last bid submitted to the portal.

12. Every bidder is expected before quoting his rates to inspect the site of the proposed work. He should also inspect the quarries and approach road to quarries and locality of the work and satisfy himself about the quality and availability of materials including the medical aids, labour and foodstuff etc. In every case the materials must comply with the relevant specifications. The contractor would however, be responsible for procurement of materials from authorized sources and voluntarily disclose the source of procurement for the purpose billing. Besides, the bidder would be required to submit the details of quarry for procurement while submitting the bills.

    The bidder will be deemed to have satisfied himself that the rates quoted by him in the tender will be adequate to complete the work according to the specifications and conditions attached to and that he has taken into account all conditions, difficulties that may be encountered during its progress and to have quoted labour rates and materials, entry tax and other duties, leads, lifts, loading and unloading and freight for materials and all other charges necessary for the completion of the work to the entire satisfaction of the Engineer-in-charges of the work and his authorized subordinates. In the course of awarding a work the Department may desire the analysis of the rate so arrived for against any items of work.

13. Each bidder must quote a definite percentage rate for the work which will be included in the contract. Tenders containing indefinite terms such as estimated rates or schedule of rates will not be considered. Rates should be for finished items of work unless otherwise mentioned in the Tender Schedule to be quoted at a certain percentage on the amount put to tender.

14. If any further necessary information is required the bidder can seek clarification on the bids from 06.04.2026 to 10.04.2026 during official hours. The employer response for the queries raised by the bidder will be posted in the portal.

15. The percentage / item rate should be furnished for finished items of work unless otherwise mentioned in the tender schedule.

16. BOQ in MS Excel format shall be made available to the bidder through e-procurement portal. The bidder shall download that particular excel sheet and fill in the rates in figures at the appropriate location. The line item total in words and the total amounting in case of item rate tenders shall be calculated automatically and shall be visible to the bidder. The bidder is not supposed to change or modify the format of the excel sheet in any form.

Bidders are to submit only the original BOQ updated by the publisher after entering the relevant fields without any alteration / deletion / modification. Simple BOQ submission shall lead to cancellation of Bid. If the bidder does not fill rates for any items it will be considered that he has quoted the rates combined in some other items. In case of item rate tender, bidder shall fill in their rates other than zero value in specified cells. In the percentage rate tender, the bidder quoting zero value is valid and will be taken as schedule of rates.

17. The bidder shall submit the documents in the designated locations of technical bid (Cover-I) and Financial bid (Cover-II). Submission of bid documents shall be effected by using DSC of appropriate class and thus shall be in encrypted form. The bidder shall only submit single copy of the document. He is required to check the documents uploaded with the requirement asked for in the bid. Only after satisfying that all the required documents have been uploaded are correct, then he should activate submit button. His bid shall not be considered responsive and action as per relevant clause shall be taken if he does not provide the required documents or provides illegible documents. Clarity of the document may be ensured by taking out a sample printing.

18. Bidders desirous to hire machineries or equipment from outside the State are required to furnish **1% (One percent) of the amount put to tender as bid security**. Tender not accompanied with bid security and security for hired machineries as specified above shall be liable for rejection.

19. The bidder may at his option quote reasonable rate for the work carefully so that, the rate should not be unworkably low.

20. All taxes, fees, royalties, EMF, DMF, Addl. Charges payable under the local rule including, Cess, income taxes & Surcharges as applicable, Octroi tax, Entry tax etc. will be borne by the contractor as admissible. It is implied that the quoted rates are inclusive of such elements except GST.

21. Labour welfare Cess @ 1% will be deducted from the work bill of the contractor as per resolution number 12563 dated 15.12.08 of Labour and Employment Department, Govt. of Odisha.

22. Request for raising and lowering the rates or dealing with any point in connection with the tender will not be considered.

23. Conditional Tender will not be taken in to consideration.

24. The tender containing extraneous conditions not covered by the tender notice are liable for rejection and quotations should be strictly in accordance with the Tender Call Notice. Any change in the wording will not be accepted.

25. It is allowed to modify the bid through the e-procurement portal. The bidder shall have to log in the system and resubmit the documents as asked for by the system including the price bid. In doing so, the bids already submitted by the bidder will be removed automatically from the system and latest bid only will be admitted. But the bidder should avoid modification of the bid at the last moment to avoid system failure or malfunction of the internet or traffic jam. If the bidder fails to submit his modified bids within the designated time of receipt, the bids already in the system shall be taken for evaluation.

26. Withdrawal of bid is also allowed in the e-procurement portal. The bidder has to click on the “withdraw” button and record the necessary justification for the same in the space provided. In addition to this he has to write a letter addressed to officer inviting the bid and upload the scanned document from portal in respective bid. The system shall not allow any withdrawal after expiry of the closure of the bid.

27. The e-procurement portal system shall reject submission of any bid through portal after closure of the receipt time. For all purpose the portal time displayed in the system shall be the time to be followed by the bidder.

28. All tenders received will remain valid for **90 (Ninety) days** from the date of opening of tenders and validity of tenders can also be extended if required without any monetary compensation.

29. **No Relation Certificate**

    The contractor shall have to furnish certificate along with the tender to the effect that he is not related to any officer in the rank of an Assistant Engineer and above in the State PWD or Under Secretary and above in the Water Resources Department. If the fact subsequently proved to be false the contract will be rescinded. The earnest money and the total security will be forfeited & shall be liable to make good to the loss & damage resulting from such cancellation. **Failure to submit in prescribed format (Form-A) as enclosed in bid document is liable for rejection of tender.**

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30. While determining the validity of tenders the following points shall be taken into consideration by the authority empowered to accept tenders and his decision in the matter shall be final.

    (a) Any special condition which does not find place in the tender notice and which are not acceptable.

    (b) Indefinite conditions which will make it difficult for access to the financial implications.

    (c) Tenders being incomplete in some important respects.

    (d) Incomplete schedule of time for completion of the work.

    (e) Failure to furnish the specified bid security.

    (f) Tendered rates being unduly low and unworkable.

    (g) Rates in different items of the tender being irrational.

31. The Department reserves the right of authority to reject any or all tenders received without assigning any reason whatsoever.

32. The tender may not (at the discretion of the competent authority) be considered unless accompanied by attested true copies of Registration of Firms/S.S.I. unit/ EPM rate contract holder certificate, PAN Card, VAT/GST clearance certificate as the case may be and the original certificates are to be produced if required in any subsequent date during processing of tender. Attested true copy of work done certificate is to be furnished along with the tender obtaining from the Executive Engineer concerned.

33. The earnest money will be retained in the case of successful bidder and will be dealt with as per the terms and condition of O.P.W.D. code. The earnest money of the unsuccessful bidder except the three lowest bidders shall be refunded on application. The EMD given by the other two parties shall also be refunded within 15 days of acceptance of tender and drawl of agreement.

34. The EMD will be forfeited in any of the following cases.

    a) If the bidder withdraws the bid after bid opening during the period of bid validity.

    b) If the bidder does not accept the correction of the bid price.

    c) In the case of a successful bidder if the bidder fails within the specified time limit to

        (i) Sign the agreement or

        (ii) Furnish the required performance security.

    d) If any of the statements, documents, certificate uploaded by the bidder through e-procurement portal, is found to be false / fabricated / bogus the bidder will be black listed and his EMD / Bid Security will forfeited.

35. **Additional performance security** shall be taken on an incremental basis from the selected bidder where the accepted bid price is lower than the amount put to tender, As per Office Memorandum No. 07764600022025-17941/W, BBSR dated 08.10.2026 of Works Dept. Govt. of Odisha.

    a. **Where the accepted bid price is such that the ROPL is up to (-)10%,** no additional performance security is required.

    b. **where the accepted bid price is such that the ROPL is below (-)10% but not below (-)20%,** the additional performance security percentage shall be incremented by 0.2% for every percentage of ROPL below (-)10%.

    c. **where the accepted bid price is such that the ROPL is below (-)20% but not below (-)30%,** the additional performance security percentage shall be incremented by 0.3% for every percentage of ROPL below (-)20% in addition to 2% of the accepted bid price.

    d. **Where the accepted bid price is such that the ROPL is below (-)30% or more,** the additional performance security percentage shall be incremented by 0.5% for every percentage of ROPL below (-)30% in addition to 5% of the accepted bid price.

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e. Rounding Off of Percentage Less (ROPL) of accepted Bid Price, i.e. the percentage which the accepted Bid Price is less than the Cost Put to Tender, shall be as follows:

f. Where the decimal fraction is less than 0.50, the percentage shall be rounded off to the next lower whole percentage.

g. Where the decimal fraction is 0.50 or above, the percentage shall be rounded off to the next higher whole percentage.

h. The additional performance security shall be treated as part of the performance security.

i. Justification for abnormally low bids shall be scrutinized by the Departmental 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 at the offered price. Procuring Entity may, in such cases, seek written clarifications from the Bidder, including detailed price analyses of its Bid price in relation to scope, schedule, resource mobilization, allocation of risks and responsibilities, and any other requirements of the bid document., If, after evaluating the price analyses, 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.

36. If the rate quoted by the SC & ST Category Contractor comes to the rate quoted by the L1 bidder (decimal up to two numbers will be taken for all practical purposes) after availing 10% price preference as per Para-2 of Works Department Resolution No. 16262 dated 30.10.2018, the tender shall be finalized by the tender accepting authority through a transparent lottery system along with other categories of contractor as per Office Memorandum No. 07764600022025-17941/W, BBSR dated 08.10.2026 of Works Dept. Govt. of Odisha**.**

37. If more than one bid is quoted (decimal up to two numbers will be taken for all practical purposes, in percentage rate tenders) as lowest, either at the estimated cost put lo tender or less than the estimated cost put to tender, the Tender Accepting Authority will finalize the tender through a transparent lottery system, where all the concerned bidders/their authorized representatives, the concerned SE/EE of the concerned Division and DAO will remain present. The date and time of Lottery will be communicated through online to the respective contractors if required, as per Office Memorandum No. 07764600022025-17941/W, BBSR dated 08.10.2026 of Works Dept. Govt. of Odisha**.**

38. The successful bidder have to furnish Additional Performance Security (APS) as mentioned above in shape of BG pledged in favour of the **Superintending Engineer, Upper Indravati Left Canal Division No-II Dharmagarh, Kalahandi** /Bank Guarantee in favour of the **Superintending Engineer, Upper Indravati Left Canal Division No-II Dharmagarh, Kalahandi** from any Nationalized/Scheduled Bank in India counter guaranteed by its local branch at **Charbahal** within seven days of issue of Letter of Acceptance (LoA) by the Divisional Officer (by e-mail) to the successful bidder otherwise the bid of the successful bidder shall be cancelled and the Earnest Money Deposit shall be forfeited. Further, proceeding for blacklisting shall be initiated against the bidder as per Works Department letter No. 14459/W dt.20.09.2018. This shall take effect from the date of issue of this Office Memorandum.

39. The codal provision exists in Works Department Office Memorandum No. 14459/W dated 20.09.2018 stands modified to the above extent with effect from the date of Issue of this Office Memorandum.

40. The security will be refunded after one year on completion of the work in all respect provided the final bill is passed and will not carry any interest. Any defect noticed during the period of one year after the actual date of completion shall be rectified by the contractor at his own cost. Failure to comply such rectification the cost involved to carry out the defective work shall be met from his dues available with Department. (Ref. works Dept. order No. 17823 /USdt.11.10.2006.

41. The e-procurement portal system shall generate the award of the contract letter and intimate the bidder in his e-mail after acceptance of the agreement.

42. The bidder whose tender is selected for acceptance shall within a period of seven days upon intimation being given to him of acceptance of his tender make an initial security deposit in the form of NSC, postal time deposit, Post Office Saving Bank Account / Kisan Vikas Patra / Insurance surety bond issued by an Insurance Company authorized by the insurance Regulatory and Development Authority of India(IRDAI) /Bank Guarantee from any Nationalized/Scheduled Bank in India counter guaranteed by its local branch at **Charbahal** duly pledged in favour

of the **Superintending Engineer, Upper Indravati Left Canal Division No-II Dharmagarh, Kalahandi** shall be 2% of the value of the accepted tendered amount and sign agreement in the P.W.D. form No. P1 (Schedule XLV No.61) for the fulfillment of the contract in the office of the **Superintending Engineer, Upper Indravati Left Canal Division No-II Dharmagarh, Kalahandi.**

The security deposit together with the earnest money, Initial Security money and the amount withheld according to the provision of the P1agreement shall be retained as Security for the due fulfillment of this contract. Failure to enter into the required agreement and to make the security deposit as above shall entail forfeiture of the earnest money. The written agreement to be entered into between the contractor and the Govt. shall be the foundation of the rights of both the contractor and the Govt. and the contract shall be deemed to be incomplete until the agreement has first been signed by the contractor and then by the proper officer authorized to enter into the contract on behalf of the Govt.

43. Before acceptance of tender, the successful bidder will be required to submit a work programme and mile stone basing on the financial achievement so as to complete the work within the stipulated time and in case of failure on the part of the agency to achieve the mile stone liquidated damaged will be imposed.

44. The contractor shall sign as a token of final acceptance of the plans, sections and agreements for the work prior to take up the work for execution.

45. The date of commencement of work shall be as notified in work order.

46. On signing the agreement the site will be handed over to the contractor for execution and completion of works in all respect.

47. On no account, the contract work should be sublet to any body without prior approval of tender accepting authority of the Department. In such an event the contract may be rescinded.

48. The authority reserves the right to make such increase or decrease in quantity of items of works mentioned in the scheduled attached to the tender notice as may be considered necessary for the satisfactory completion of the contract work. All such increase or decrease shall in no way invalidate/ vitiate the contract rates. The contractor shall not be entitled for any compensation on this account, except grant of extension of time where considered necessary.

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

50. That for the purpose of jurisdiction in the event of any dispute if any, the contract would be deemed to have been entered into within the State of Odisha and it is agreed that neither party to the contract will be competent to bring a suit in regard to the matter by this contract at any place outside the State of Odisha.

51. Under section12 of contract labour (Regulation and Abolition Act 1970) the contractor who undertakes execution of work through labour, should produce valid license from licensing authority of labour department (labour license) to start the work.

52. The contractor shall be liable to fully indemnify the Department of any compensation under workmen compensation Act VII of 1993 on account of the workmen employed by the contractor and full amount of compensation paid will be recovered from the contractor. In the event of any claim sub-judice before any court of law, the claim amount shall be kept withheld till final disposal.

53. Contractor is required to abide by the fair wages clauses as introduced by Govt. of Odisha and will not pay less than the Fair wages fixed by Govt. to the labourers engaged by him for the work**.**

54. In case of any complaint by the labourer about the nonpayment of his wages as per latest minimum wages Act., the Superintending Engineer/Executive Engineer will have the right to investigate and if the contractor is found to be in at fault, Superintending Engineer/Executive Engineer may recover such amount due in any form from the contractor and pay such amount to the labourer directly under intimation to the local labour office of the Govt. The decision of the Superintending Engineer/Executive Engineer is final and binding on the contractor.

55. The contractor will have to submit the **Superintending Engineer, Upper Indravati Left Canal Division No-II Dharmagarh, Kalahandi** monthly return of labour both skilled and unskilled employed by him on the work.

56. The contractor should keep himself in touch with the Engineer-in-charge for smooth execution of the work and arrange adequate labour depending on the workload and working space available. No claim for detention for

labour on any account will be entertained. The contractor shall make his own arrangement to shift men and machineries at his own cost before during and after natural calamities.

57. No compensation will be paid by the Department for any damage done by rain, flood, cyclone& earthquake, tide or by any other natural calamities during the execution of the work. The contractor shall make his own arrangement to shift men and machineries at his own cost before, during and after natural calamities.

58. It should be understood clearly that no claim whatsoever will be entertained in regard to extra items of work or extra quantity of any item besides estimated amount, unless written order is obtained from the Engineer-in-charge and rates settled before the extra items of work or extra quantity of any item of work is taken up.

59. The bidder shall have to abide by the C.P.W.D. safety code rules introduced by the Govt. of India, Ministry of Works, Housing and Supply in their standing order No.44150 dated 25.1.1957.

60. The bidder shall bear various incidentals, sundries and contingencies necessitated by the work in full within the following or similar category.

(a) Rent, royalties and other charges of materials & all other taxes including ferry, tolls, conveyance charges and other cost on account of land and buildings including temporary building and temporary electric connection to work site as well as construction of coffer dam, construction of service road and its maintenance till completion of work required by the bidder for collection of materials, storage, housing of staff, other purpose of the work. No bidder will however be liable to pay for temporary occupation of land owned by Govt. at the site of the work.

(b) Labour camps or hutments including conservancy and sanitation arrangements up to the satisfaction of the local health authorities should be arranged by the contractor.

(c) Suitable water supply including pipe water supply wherever available for the staff and labour as well as for the work.

(d) Fees and duties levied by the municipality or water supply authorities.

(e) Suitable equipment and wearing apparatus for the labour engaged in risky operations and medical aid to the labourer engaged for the work.

(f) Suitable fencing, barriers, signals including paraffin and electric signals where necessary at work and approaches in order to protect public and employees from accident.

(g) Compensation including cost of any suit for injury to persons or property due to neglect of any major precautions also becomes payable due to operation of the workmen compensation Act.

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

61. In case of delay in acquisition of land handing over possession of work site no compensation will be admissible but extension of time will be allowed if applied in prescribed format within due time to keep the contract in force.

62. The department will have the right to supply at any time in the interest of the work and departmental material to be used in the work and the contractor shall use such materials at the stock issue rate fixed by the Department by adding + 10 percentage in a particular item of work or market rate whichever is higher.

63. If a contractor removes any Govt. material or stores supplied to him from the site of the work in contraception of the provision of this clause with a view to dispose of the same dishonestly, he shall be in addition to any other liability civil or criminal arising out of this contract be liable to pay penalty equivalent to (5) five times of the price of the materials cost. The penalty so imposed shall be recoverable at any time from the sum that may be due then or at any time thereafter become due to the contractor or from his security deposit or from his other available dues with the Department.

64. Over and above these conditions including the Technical specifications the terms, conditions, rules and regulations and specifications laid down in I.S.I/B.I.S. code are also binding on the part of the contractor.

60. Deduction of income tax at source and surcharge on income tax will be made from each running account bill for the work at the rate as per Income Tax Act and as amended from time to time. (Present rate **1% in case of Individual Contractor & 2% in case of company, corporation& firm etc**.) (or any latest circular).

65. (a) The rates quoted by the contractor shall be deemed to be inclusive of CESS on all the materials that he will have to purchase for performance of this contract.

(b) GST on works contract as applicable at the time of payment shall be paid extra over the Gross amount of the running bill amount (vide section 15 and section 142 (11) (C) of Odisha GST Act 2017)

(c) Prevailing rate of GST (Presently TDS-2%) on the gross amount of the bill will be deducted from the contractor's bill as applicable on the date of payment where agreement value exceeds rupees two lakhs fifty thousand. (to be applicable as per Govt. Notification & amended from time to time)

(d) 1% (one percent) of the gross amount of the bill will be deducted from the contractor bill towards labouur cess as per Odisha building and other construction workers (RE & CS) rule 2002 and amendment during 2008 and as amended by Govt. from time to time.

66. The amount on royalties of different materials as utilized by the contractor in the work will be recovered from his bill, basing on the rate fixed by the Govt. or as amended from time to time during the period of execution.

67. Schedule of quantity accompanies the tender notice**:** It shall be definitely under stood that the Government do not accept any responsibility for the correctness and completeness of this schedule and this schedule is liable for alternations or omissions, deductions or additions as set forth in the condition of contract and such omissions, deductions, additions or alternations shall in no way invalidate/ vitiate the contract and no extra monetary compensation will be entertained.

68. Sample of materials such as cement, steel, sand, stone, Moorum etc. to be used, are to be collected and deposited quoting the name of quarry under dated initial of the tenderer and A.E.E in charge in the office of the **Superintending Engineer, Quality Assurance Division, Bhawanipatna,** before procurement for testing and acceptance. The conveyance along with all testing charges will be born by the contractor.

69. Items of works not covered by the tender notice shall be paid at the current schedule of rates of the State and those not covered by the said schedule of rate will be paid on actual analysis approved by the competent authorities prevailing during the period of execution of work.

70. All preliminary works such as temporary constructions, mixing platforms etc are to be done by the contractor at his own cost. No payment will be made for benchmarks, level pillars, profiles, benching and leveling the ground where required. The rates to be quoted should be for finished items of works inclusive of such incidental items of works.

71. After the work is finished all surplus materials and debris's should be removed from100m Clear away from the site of the work. Preliminary work such as vats, mixing platforms etc. should be dismantled and all materials removed from the site and premises shall be made neat and clean and this is inclusive of the rates quoted by him.

72. The contractor is to supply necessary labour and materials for the purpose of alignment lying recording of levels whenever required at his own cost.

73. The contractor should arrange necessary tools and plants such as Pumps, Excavator, Trucks, compressors, Tippers, batching plants, Concrete Mixer, steel shutter plates etc. required for the efficient execution work at his own cost. The running charges of such plant and cost of consumables and conveyance are to be borne by the contractor. Any deviation from this may lead recession of contract.

74. In the event of delay in supply of design reasonable extension of time shall be granted on the application of the contractor. But no claim for monetary compensation will be entertained under any circumstances.

75. Under no circumstances, interest is chargeable for the dues or any additional dues, if any payable for the work.

76. An affidavit shall be furnished by the contractor at the time of submission of tender paper about the authentication of tender documents including bid security. The scanned copy of the affidavit is to be uploaded through the e-procurement portal along with the technical bid.

77. Prediction of flood / monsoon Damage

The contractor shall make his own arrangement at his cost to shift the machineries, equipment's, materials, labourer and departmental machineries if hired by the contractor to a safe place prior to flood. The work shall have to be resumed after the flood come to normal. No extension of time for the completion of the work may be considered by the Department if the discontinuance of the work is beyond the reasonable attempts of the contractor to such eventualities.

78. The debris, sand and other materials, accumulated in the work area during flood shall be removed by the contractor as required for continuing the work at his own cost. By any chance, if any excavated portion that could

not be filled up with concrete by the contractor, gets filled up during the monsoon period with earth such removal will not be paid again. The contractor will have to re-excavate the same at his own cost.

79. It shall be distinctly understood that it is entirely the responsibility of the contractor to make such arrangements may be required from time to time to protect the men, machinery, materials and the work under progress and work for which the measurements were recorded and payment made, against any damages either during working season or during the flood. The department accepts no liability, what so ever for any damage or loss of men, materials, machinery and type of hindrance caused to the progress of work.

80. The contractor should provide at his own cost adequate protection measures to the completed works at the end of working season or work in progress against such eventuality till completion and handing over the entire work to the Department.

81. Dewatering from the foundation of structures when and where necessary during execution will have to be done by the contractor and no extra payment will be made on that account. The term dewatering shall mean the execution or operation of the items due to standing water as well as due to percolation water.

82. The quantity in respect of items for which quoted rates are more than 25% of the estimated rates are not allowed to be varied by more than five percent. In case, if it exceeds the limit approval of the competent authority should be obtained prior to execution.

83. In case of discrepancy revealed between P1 form and Detailed Tender Call Notice, condition in P1form shall prevail over the Detailed Tender Call Notice.

84. No claim for idle labour etc. on any account will be entertained by the Department.

85. The clause of printed form of P1 contract with latest addition/ deletion/ corrections/ substitution etc. will also be binding.

86. All the measurement of earthwork is to be done by level section measurement, which will be accepted by contractor from time to time. Prior written approval of the Executive Engineer will be taken in case of pit measurement with size of pits etc. where level section measurements cannot be made.

87. For section measurement, levels will be taken in presence of the contractor at 15m & 30m interval in cutting & Filling of earthwork respectively and will be recorded in the level book before commencement of the work. The level should be accepted by the contractor and initial section be signed by him in token of acceptance. The final levels will be taken after completion of the work in presence of the contractor on the same position, as in the case of initial level. The measurement of earth work for filling sections will be recorded on finished compact section and payment will be made on level sections only as mentioned in the BOQ.

88. The measurement of fine dressing &turfing will be taken after satisfactory full growth of the turf.

89. Borrowing earth is the entire responsibility of the contractor. No extra cost will be considered for whatsoever reason.

90. The contractor has to complete the work in every respect as per the approved drawings in finished section for the complete reach of the canal before handing over to the department.

91. 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 equipment, appliances or things of whatsoever nature required for the execution, 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 bidders 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 **Superintending Engineer, Upper Indravati Left Canal Division No-II Dharmagarh, Kalahandi** 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 Executive Engineer, in-charge of the work specified or parts of the works under the contract, or such other departmental assistants or sub-ordinates to whom the Executive Engineer, in-charge may have delegated certain duties, acting separately within the scope of particular duties entrusted to them.

g. Government - Means Government of Odisha, 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" are 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.

k. Year – means financial year.

92. Commercial/ GST invoice should be submitted by the contractor at the time of preparation of the work bill for enabling the Division office to make necessary payment.

93. Agreement shall be drawn only after due verification of EMD & APSD of the successful bidder and if any illegitimate instruments are found, criminal proceedings will be initiated against the defaulting bidder and action will be initiated for blacklisting through the license issuing Authority.

94. The incentive for timely completion should be on a graduated scale of 1(One) percent to 5(Five) percent of the contract value. Assessment of incentives may be worked out for earlier completion in all respect in the following scale.

Before 30% of the contract period = 5% Contract value

Before 20 to 30% of the contract period = 4% Contract value

Before 10 to 20% of the contract period = 3% Contract value

Before 5 to 10% of the contract period = 2% Contract value

Before 5% of the contract period = 1% Contract value

95. **EMPTY CEMENT BAGS**

The cost of empty cement bags @ **Rs. 4.00 (Rupees four rupees) per bag** will be recovered from the contractor's bills / Updated rate time to time.

96. Tenders pending for approval due to all bidders quoting rate on schedule of rate shall be cancelled Immediately by the Tender Inviting Authority &fresh tender will be invited as per Letter No. 7787/W dated 31.05.2021 of Works Department, Odisha.

97. The bidder must have to register under CDMS portal **as per O.M No-12934/W dated 23.08.2018 of Works Department, Govt. of Odisha with insertion of provision in Para -12.4 below Para-12 in Appendix-IX (A) of the OPWD Code, Volume – II otherwise bid shall be rejected.**

98. In case the tender for composite work includes in addition to main work / building work all other ancillary works such as sanitary and water supply installations, drainage installation, electrical work, Firefighting installation, horticulture work, roads and paths and gate works in dams and canals etc. , the bidder apart from being a registered civil Contractor of appropriate class must associate himself with agencies of appropriate class those who is eligible to tender for sanitary and water supply drainage, electrical, Firefighting installation and horticulture works in the composite tender. Intending purchasers are not required to produce any documents viz. copy of Registration, GST Registration certificate & GSTIN etc. at the time of purchase of tender documents but will be required for verification purpose at later stage. Furnishing copy of such documents is mandatory along with the tender documents otherwise his/her bid shall be declared as non-responsive and thus liable for rejection. The L1 Bidder is required to attend the officer inviting the bid for **verification of original documents** within **five days** of opening the Price bid.

99. The Bidder must provide his/her **active Mobile No. and e-Mail ID** with the tender documents for any type of future correspondences required, if any. **(This office will not be held responsible for non-intimation to Bidder due to non-submission of his/hers Mobile No. /e-Mail Id or any System Failure)**. The affidavit of authenticity of documents uploaded by the bidders being a legal document checking gaminess of signature put on other uploaded documents including affidavit and lease deeds is beyond purview of the officer inviting tender**.** The bidder himself/herself is liable for the authenticity of the documents if challenged by any other bidder or in the court of law. However, the authority reserves the right to verify the authenticity of documents in case of any doubt of self.

100. No Engineers of Gazetted rank or other Gazetted officer employed in Engineering or Administrative duties in engineering department of State Government is not allowed to work as a contractor for a period of **two** years after his retirement from government service, without permission of Government.

CONTRACTOR **SUPERINTENDING ENGINEER**

SECTION - 3

CHECKLIST

AND

CONTRACT DATA

CHECKLIST TO BE ENSURED BY THE BIDDER

Sl. No	Particulars	Reference to DTCN Clause No.	Whether furnished		Reference to Page no.
			Yes	No	
01.	Cost of tender paper **Rs. 10,000.00 (Online)**	**No.4**			
02.	All the E.M.Ds requirements mentioned in the DTCN shall be **Rs. 6,02,300/- (Online)**	**NIT**			
03	Additional performance security shall be taken on an incremental basis from the selected bidder for low prices in project works as per Office Memorandum No. 07764600022025-17941/W, BBSR dated 08.10.2026 of Works Dept. Govt. of Odisha.	**NIT**			
04.	Copy of valid Contractor Registration Certificate	**NIT**			
05.	Copy of valid GSTIN	**NIT**			
06.	Copy of PAN Card	**NIT**			
07.	No Relationship Certificate in **Schedule – A**	**No.174**			
08.	Information regarding current litigation, debarring / expelling of the tender or abandonment of the work by the tenderer **(Schedule-B)**	**No.175**			
09.	Affidavit **(Schedule-C)**	**No.176**			
10.	Certificate of employment of unemployed graduate Engineer/Diploma holders **(Schedule-D)**	**No.177**			
11.	Undertaking **(Schedule-E)**	**No.178**			
12.	e-mail ID & Adress				
13.	Contact no.				

CONTRACTOR **SUPERINTENDING ENGINEER**

CONTRACT DATA

A. GENERAL INFORMATIONS

Sl No	Item	Details
1	Name of the Work	**Construction of RCC trough lining of Ghumar Sub-Minor, Ampada Sub-Minor, Haldi Sub-Minor & Parla Sub-Minor-II under Left Canal Division-II, Dharamgarh.**
2.	Employer	**Chief Construction Engineer, Upper Indrvati Project, Mukhiguda.**
3.	Employer's Representative	**Superintending Engineer, Upper Indravati Left Canal Division No-II Dharmagarh, Kalahandi**
6	**Estimated Cost (Excluding GST) (In Rs.)** Civil Works **Total**	**Rs. 6,02,24,702.89 /-** **or say** **Rs. 5,87,33,095.00 /-**

B. BID INFORMATION

7	Intended completion period/Time period assigned for Completion		**18 (Eighteen) Calendar Months**
8	Last Date & time of submission of Bid		**Date: 02.11.2026**
			Time 05.30 PM
9	Cost of Bid Document		
	i	Amount as per DTCN	**Rs.10,000/- To be remitted Online**
10	**Bid Security**		
	i	Amount as per DTCN	**Rs. 6,02,24,702.89 /- To be remitted Online**
11	Additional Performance Security		
	i	Amount	Additional Performance Security in case the bid price/rate is less than the estimated cost put to tender as per O.M. 07764600022025-17941/W, BBSR dated 08.10.2026 of Works Dept. Govt. of Odisha.
	ii	In favour of	**Superintending Engineer, Upper Indravati Left Canal Division No-II Dharmagarh, Kalahandi**
	iii	Type of instrument	**As specified in the bid document.**
12	Bid validity period		**90 days**
13	Currency of Contract		Indian Rupee
14	Language of Contract		English

SECTION - 3

INFORMATION AND INSTRUCTION TO BIDDERS

PROCEDURE TO PARTICIPATE IN ONLINE BIDDING E-PROCUREMENT

1. **PARTICIPATING IN THE BID IN THE E-PROCUREMENT PORTAL:** 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 Login ID and attach his/her valid Digital Signature Certificate (DSC) to his/her unique Login ID. The DSC used must be of appropriate class (Class II or Class III) issued from a registered Certifying Authority such as n-Code, Sify, TCS, MTNL etc. He/ She has to submit the relevant information as asked for about the firm/ contractor. The portal registration of the bidder/ firm is to be authenticated by the State Procurement Cell after verification of original valid certificates/ documents such as (i) PAN (II) ADHAR CARD and (III) Registration Certificate (RC)/ GST Registration Certificate and GSTIN (for procurement of goods) of the concerned bidder. The time period of validity in the portal is at par with validity of RC/ GST Registration Certificate and GSTIN. Any change of information by the bidder is to be re-authenticated by the State Procurement Cell. After successful authentication bidder can participated in the online bidding process.

Contractor not regisertered with Government of Odisha, can participate in the e-procurement after necessary enrolement in the portal but have to subsequently register themselves with the appropriate registering authority of the Sate Government before award of the work as per prevalent registration norms of the State.

a. To log on to the portal the Contractor/Bidder is required to type his/her *username* and password. *The* system *will again ask to* select the DSC and confirm it with the password of DSC. 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 CAs stored in system database. The system checks the unique ID, password and DSC combination and authenticates the login process for use of portal.
b. The tender documents uploaded by the Tender Inviting Officer in the website https://tendersodisha.gov.in will appear in the section of "Upcoming Tender" before the due date of tender sale. Once the due date has arrived, the tender will move to "Active Tender" Section of the *homepage*. Only a small notification will be published in the newspaper specifying the work details along with *mention* of the specific website for details. The publication of the tender will be for specific period of time till the last date of submission of bids as mentioned in the 'Invitation for Bid' after which the same will be removed from the list of Active tenders. Any bidder can view or down load the bid documents from the web site.
c. 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.
d. The *software* application has the provision of payment of cost of tender document through payment gateways of *authorized* bankers by directly debiting the account of the bidders.

1.1. Furnishing scanned copy of such documents is mandatory along with the tender documents otherwise his/her bid shall be declared as non-responsive and thus liable for rejection. Bidders participating through Joint Venture shall declare the authorized signatory through Memorandum of Understanding duly registered and enroll 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 authorized signatory is used in the portal.

1.2. In the case of any failure, malfunction, or breakdown of the electronic system used during the e-procurement process, the tender inviting officer shall not accept any responsibility for failures or breakdowns other than in those systems strictly within their own control.

1.3. 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.

1.4. For submission of Bids through the E-Procurement Portal, the bidder shall up load the scanned copy/copies of document in prescribed format wherever warranted in support of eligibility criteria and qualification information. The online bidder shall have to produce the original documents in support of the scanned copies and statements uploaded in the portal before the specified date as per DTCN.

1.5. Each bidder shall submit only one bid for one package. A bid is said to be complete if accompanied by cost of bid document and appropriate bid security. The system shall consider only the last bid submitted

through the E-Procurement portal.

1.6. The bidder may ask question related to tender 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 quarries related to the tender.

1.7. The details of drawings and documents pertaining to the works available with the officer inviting the Bid as well as in the office of the Superintending Engineer as mentioned in the Contract Data will be open for inspection by the bidders. The bidder is required to down load all the documents for preparation of his bid. It is not necessary for the part of the Bidder to up-load other Bid documents (after signing) while up-loading his bid. He is required to up load documents related to his eligibility criteria and qualification information and Bill of Quantities duly filled in. It is assumed that while participating in the bid, the bidder has referred all the drawings and documents. 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. Action will be taken as per Bid Security Declaration in Schedule-K vide F.D O.M No.8943 dtd.18.03.2021

1.8. Any addendum / corrigendum/ cancellation of tender shall be published in the website https://tendersodisha.gov.in , notice board and through paper publication and such notice shall form part of the bidding documents.

1.8.1. The system generates a mail to those bidders who have already uploaded their tenders and those bidders if they wish can modify their tenders. The bidders are required to which the website till last date and time of bid submission for any addendum/ corrigendum/ cancellation thereof. Tender inviting authority is not responsible for communication failure of system generated mail.

All the volumes/documents shall be uploaded / provided in the portal by the Officer inviting the bid. The bidder shall carefully go through the document and prepare the required documents and up load the scanned documents in Portable Document Format to the portal in the designated locations of Technical Bid. He will fill up the rates of items or percentage in the BOQ down loaded for the work in designated Cell and up loads the same in designated locations of Financial Bid. Bidders are to submit only the original BoQ uploaded by publisher after entering the relevant fields without any alteration/deletion/modification. Multiple BoQ submission shall lead to cancellation of bid. In case of item rate tender, bidders shall fill in their rates other than Zero value in the specified cells. In the percentage rate tender, the bidder quoting Zero value is valid and will be taken as Schedule of Rates. Submission of document shall be effected by using DSC of appropriate class.

2. **PAYMENT OF EMD/ BID SECURITY AND COST OF BID DOCUMENTS:** The Bidder shall furnish, as part of his Bid, a Bid security for the amount mentioned under NIT/Contract Data in online mode. 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 cancelled. His name shall also be informed to the registering authority for cancellation of his registration.

2.1 Deleted.

2.2 Deleted.

2.3 The tender accepting authority will verify the originals of all the scanned documents of the successful lowest bidder only within 5 days of opening of the tender (price bid). In the eventuality of failure on the part of the lowest successful bidder to procedure the original documents, he will be debarred in future from participating in tender for 3 years and will be black listed by the competent authority. In such as situation, successful L-2 bidder will be required to produce his original documents for consideration of his tender at the negotiated rate equal to L1 bidder.

2.4 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.

2.5 Government of Odisha has introduced 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 is mentioned in the "***Procedure for Electronic receipt, accounting and reporting of Cost of Tender Paper and Earnest Money Deposit on submission of bids***". .

3. **FORMAT AND SIGNING OF BID:** (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 CAs stored in system database. The system checks the unique Login ID, Password and DSC combination and authenticates the login process for use of portal.

The bidder can download the tender of his choice and save it in his system and undertake the necessary preparatory work off-line and upload the completed tender at his convenience within the final date and time of submission.The bidder shall only submit single copy of the required documents and Price Bid in the portal. In the Financial bid, the bidder can not leave any figure blank. He has to only write the figures, the words will be self generated. The Bidders are advised to up load the completed Bid document well ahead of the last date & time of receipt to avoid any last moment problem of power failures etc.

3.1. The bidder shall log on The Bidder shall go through the Bid carefully and list the documents those are asked for submission. He shall prepare all documents including Declaration form, price bid etc. and store in the system.

3.2. to the portal with his DSC and move to the desired tender for up loading the documents in appropriate place one by one simultaneously checking the documents. Once the Bidder makes sure that all the documents have been up-loaded in appropriate place he clicks the submit button to submit the bid to the portal.

3.2.1. The bids once submitted can not be retrieved or corrected. Tender cannot be pre-opened and cannot be submitted after due date and time. Therefore only after satisfying that all the documents have been uploaded, the Bidder should activate submit button.

3.2.2. In the e-procurement process each processes are time stamped. The system can identify each individual who has entered in to the portal for any bid and the time of entering in to the portal.

3.2.3. The Bidder should ensure clarity of the document up loaded by him to the portal especially the scanned documents by taking out sample printing. Non-submission of legible documents may render the bid non-responsive. However, the Officer inviting the Bid if so desires can ask for legible copies or original copies for verification with in a stipulated period provided such document in no way alters the Bidder's price bid. If the Bidder fails to submit the original documents with in the stipulated date, his bid security shall be forfeited. Action will be taken as per Bid Security Declaration in Schedule-K vide F.D O.M No.8943 dtd.18.03.2021

SUBMISSION OF BIDS:-

3.3. The bidder shall carefully go through the tender and prepare the required documents. The bid shall have a Technical Bid and a Financial Bid. The Technical bid generally consists of GSTIN, PAN, Registration Certificate, Affidavits, Profit Loss statement, Joint venture agreement, List of similar nature of 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.

3.4. Bidders are to submit only the original BOQ (in .xls format) uploaded by Procurement Officer Publisher (Officer Inviting Tender) after entering the relevant fields without any alteration/ deletion/ modification. Multiple BOQ submission by bidder shall lead to cancellation of bid. In case of items rate tender, bidders shall fill in their rates other than zero value in the specified cells without keeping it blank. In the percentage

rate tender the bidder quoting zero percentage is valid and will be taken at par with the estimated rate of the work put to tender.

3.5. The bidder shall upload 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.

3.6. 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 items(s) without any blank cell in the rate column in case of item rate tender and type percentage excess or less up to two decimal place only in case of percentage rate tender.

3.7. The bidder shall log to the portal with his/ her DSC and move to the desired tender for up loading the documents in appropriate place one by one simultaneously checking the documents.

3.8. Bids cannot 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 summery 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.

3.9. Each process in the e-procurement is time stamped and the system can defect the time of log in of each user including the Bidder.

3.10. The Bidder should ensure clarity/ legibility of the document uploaded by him to the portal.

3.11. The system shall require all the mandatory forms and fields filled up by the contractor during the process of submission of the bid/ tender.

3.12. The bidder should check the system generated confirmation statement on the status of the submission.

3.13. The bidder should upload sufficiently ahead of the bid closure time to avoid traffic rush and failure in the network.

3.14. The Tender Inviting Officer is not responsible for any failure, malfunction or breakdown of the electronic system used during the e-procurement process.

3.15. The Bidder is required to upload documents related to his eligibility criteria and qualification information and Bill of Quantity duly filled in. It is not necessary for the part of the bidder to upload the drawing and the other Bid documents (after signing) while uploading his bid. It is assumed that the bidder has referred all the drawings and documents uploaded by the Officer Inviting the Bid.

3.16. 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 and 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.

3.17. 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 his registration in the portal shall be blocked and the bidder is liable to be blacklisted.

4. SECURITY OF BID SUBMISSION:

4.1. All bid data uploaded by the Bidder to the portal will be encrypted by the DSC of the opener(s). The system shall require all the mandatory forms and fields filled up by the contractor during the process of submission of the bid/tender.

4.2. The Bid shall be received in encrypted format by the system which can only be decrypted / opened by the authorized openers only on or after the due date and time.

5. DEADLINE FOR SUBMISSION OF THE BIDS :

5.1. The online bidding will remain active till the last date and time of the bid submission. Once the date and time (Server date and time) is over, the bidder will not be able to submit the bid. 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.

RESUBMISSION AND WITHDRAWAL OF BIDS :

5.2. Resubmission of bid by the Bidders for any number of times before the final date and time of submission is allowed.

5.3. Resubmission of bid shall require uploading of all documents including price bid afresh.

5.4. If the bidder fails to submit his modified bids within the pre-defined time of receipt, the system shall consider only the last bid submitted.

6. LATE BIDS :

6.1. The system shall reject submission of any bid through portal after closure of the receipt time. For all purpose the server time displayed in the e-procurement portal shall be the time to be followed by the bidder and concerned officers.

7. **MODIFICATION AND WITHDRAWAL OF BIDS :**

7.1. In the E-Procurement Portal, it is allowed to modify the bid any number of times before the final date and time of submission. The bidder shall have to log on to the system and resubmit the documents as asked for by the system including the price bid. In doing so, the bids already submitted by the bidder will be removed automatically from the system and the latest bid only will be admitted. But the bidder should avoid modification of bid at the last moment to avoid system failure or malfunction of internet or traffic jam or power failure. If the bidder fails to submit his modified bids with in the designated time of receipt, the bid already in the system shall be taken for evaluation.

7.2. In the E-Procurement Portal, withdrawal of bid is allowed. But in such case he has to write a letter with appropriate reasons for his withdrawal addressed to the Officer inviting the bid and up load the scanned document to portal in the respective bid before the closure date and time of receipt of the bid. The system shall not allow any withdrawal after expiry of the closure time of the bid.

8. OPENING OF THE BID:

8.1. Bid opening date is specified during tender creation or can be extended with corrigendum. This date is available in IFB, tender document as well as the home page of portal. Bid opening can be done by the authorized users which are defined during the tender publication / approval stage. The bids are encrypted using there public keys and can be decrypted only on or after the Bid Opening due date and time. The bid openers private key will be required to open the bids and all the openers have to log on to the portal during that time.

8.1.1. The bidders who participated in the online bidding can witness opening of the bid from any system logging on to the portal with the DSC away from opening place. Contractors are not required to be present during the bid opening at the opening location if they so desire.

8.1.2. Each activity is date and time stamped with user details. For time stamping, server time is taken as the reference.

8.2. In the event of the specified date of bid opening being declared a holiday for the Officer inviting the Bid/Engineer-in-Charge, the bids will be opened at the appointed time on the next working day.

8.3. 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”.

8.4. The Bid openers; who have been pre-defined shall log on to the portal with their respective DSC. Unless all the Officers who have been declared as Opening officers, log on the portal with their DSC the Tender cannot be opened.

8.5. In case of non-responsive tender the officer Inviting tender should complete the e-Procurement process by uploading the official letter for cancellation/ re-tender.

EVALUATION OF BIDS:-

All the opened bids shall be downloaded and printed for taking up evaluation. The officer authorized to open the tender shall sign and number on each page of the documents downloaded and furnish

a certificate that “the documents as available in the portal containing..... nos. of pages”.

8.5.1. After opening of technical bid, the bidder may be asked in writing / online (in their registered e-mail ID) to clarify on the uploaded documents provided in the Technical Bid, if necessary, with respect to any doubts or illegible documents required for Technical Evaluation. 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 bidders price bid. Non submission of legible documents may render the bid non-responsive. The authority inviting bid may reserve the right to accept any additional document.

8.5.2. 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

8.5.3. Immediately, on receipt of these clarifications, the Evaluating Officers; predefined in the system for the bid, will finalize the list of responsive bidders. They will log on to the site with their DSC and record their comments on the Technical evaluation page in the system. The Officer Inviting the Bid if also the accepting authority, shall log on to the system with his digital signature and check the technical evaluation. He can either accept or pass on to the evaluating officers for re-evaluation. Upon acceptance of technical evaluation by the Accepting authority in the system, the system shall automatically generate letter to all the responsive bidders and the system shall forward the letter to all the responsive bidder that their technical bid has been evaluated responsive with respect to the data/information furnished by him and the letter shall also intimate him the date & time of opening of financial bid. The system shall also inform the non-responsive bidders in their e-mail ID that their bid has been found non-responsive.

8.6. The Technical evaluation of all the bids shall be carried out up as per the information furnished by the Bidders. But evaluation of the bid does not exonerate the bidders from checking their original documents and if at a later date the bidder is found to have misled the evaluation through wrong information, action as per relevant clause of DTCN shall be taken against the bidder/contractor.

8.7 The Procurement Officer-Evaluators will evaluate bid and finalized list of responsive bidders.

Opening of price bid and evaluation of lowest bidder is subject to satisfaction of other qualification information.

8.7.1 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.

8.7.2 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.

8.7.3 At the time of opening of “Financial Bid”, the names of the bidders whose technical bids were found responsive will be announced and the bids of only those bidders will be opened. The remaining bids will be rejected.

8.7.4 The responsive bidders’ name, the bid prices, the item wise rates, the total amount of each item in case the item rate tender and percentage above or less in case of percentage rate tenders will be announced. any discounts and withdrawals, and such other details as the officer inviting the tender may consider appropriate, will be announced by him or his authorized representatives at the time of opening.

8.7.5 Rebate/discount offer if any uploaded to the system shall be declared and recorded first.

8.7.6 The Financial bid of the bidders shall be opened one by one by the designated officers. The system shall auto-generate the Comparative statement.

8.7.7 The Bidder can witness the principal activities and view the documents/summary reports for that particular work by logging on to the portal with his DSC from anywhere.

8.7.8 Procurement Officer-Openers shall sign on each page of the download BOQ and the Comparative Statement and furnish a certificate to that respect.

8.7.9 System provides an option to Procurement Officer Publisher for reconsidering the rejected bid

with the approval of concern Chief Engineer/ Head of Department.

9. CLARIFICATION AND NEGOTIATION OF BIDS:

9.1. 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 breakdowns of unit rates.

9.2. On opening of the price bid the system shall arrange the financial bids in order of their value (L1 first, followed by L2, L3 ….) for subsequent evaluation. The evaluation status (Sheet) will be visible to all the participating bidders after opening on their respective logins. Each activity is recorded in the system with date and time stamping.

10. NOTIFICATION OF AWARD AND SIGNING OF AGREEMENT:

10.1. In the E-Procurement Portal, the system shall generate the template of award letter and the Officer Inviting the Bid shall mention the amount of Performance Security and additional security required to be furnished in the letter and intimate the bidders in his e-mail ID.

10.2. 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 execution and completion of the works by the contractor as prescribed by the contract and 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.

10.3. The Contractor after furnishing the required acceptable Performance Security and Additional Performance Security, " Letter of 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 summery and declare the process as complete.

10.4. If the L1 bidder does not turn up for agreement after finalisation of the tender then he shall be debarred from participation in bidding for three years and action will be taken to blacklist the contractor. Besides the consortium/ JV/firm where such an agency/ firm already happens to be or is going to be a partner/ member/ proprietor , he/ they shall neither be allowed for participation in bidding for three years nor his/ their application will be considered for registration and action wll be initiated to blacklist him/ them. In that case, the L2 bidder, if fulfils other required criteria would be called for drawing agreement for execution of work subject to condition that the L2 bidder negotiates at par with the quoted by the L1 bidder, otherwise the tender will be cancelled.

11. BLOCKING OF PORTAL REGISTRATION :

1.1 If the registration Certificate of the contractor is cancelled/ suspended by the registering authority/ blacklisted by the competent authority his portal registration shall be blocked automatically on receipt of information to that effect.

1.2 The portal registration blocked in the ground mentioned in the above Para- 11.1 shall be unblocked automatically in receipt of revocation order of cancellation/ suspension/ blacklisting from the concerned authority.

1.3 The Officer Inviting Tender shall make due inquiry and issue show cause notice to the concerned contractor who in turn shall furnish his reply, if any, within a fortnight from the date of issue of show cause notice. Thereafter the Officer Inviting Tender is required to issue an intimation to the defaulting bidder about his unsatisfactory reply and recommend to the Chief Manager (Tech) for blocking of portal registration within 10 days of intimation to the defaulting bidder regarding his unsatisfactory reply with intimation to the Registering Authority and concerned Chief Engineer/ Heads of Office if any of the following provisions are violated.

1.3.1 Fails to furnish original Technical Documents before the designated officer within the stipulated date and time.

1.3.2 Backs out from the bid on any day after the last date of receipt of tender till expiry of the bid validity period (including till the extended bid validity period)

1.3.3 Fails to execute the agreement within the stipulated date.

1.3.4 If any of the information furnished by the bidder is found to be false/ fabricated/ bogus.

Accordingly the officer Inviting Tender shall recommended to the Chief Manager (Tech) State Procurement Cell, Odisha for blocking of portal registration of bidder and simultaneously action shall also be initiated by OFFICER INVITING TENDER for blacklisting as per Appendix-XXXIV of OPWD code Volume-II.

The minimum period of blocking of Portal Registration shall in no case be less than 180 days.

Procedure for Electronic receipt, accounting and reporting of Cost of Tender Paper and Earnest Money Deposition submission of bids

1. The State Government have formulated rules and procedures for Electronic receipt, accounting and reporting of the receipt- of Cost of Tender Paper and Earnest Money Deposit on submission of bids through the e-procurement portal of Government of Odisha i.e. "https://tendersodisha.gov.in".

2. Electronic receipt of cost of tender paper has been successfully tested through SBI payment gateway. Now it has been decided to introduce electronic receipt of **Cost of Tender Paper and Earnest Money Deposit on submission of bids** through payment gateway of designated banks such as SBI/ICICI Bank/HDFC Bank for all Government Departments, State PSUs. Statutory Corporations, Autonomous Bodies and Local Bodies etc. in phases (ANNEXURE-I). The process outline as well as accounting and reporting structure are indicated below:

   a) It will be carried out through a single banking transaction by the bidder for multiple payments like **Cost of Tender Paper and Earnest Money Deposit on submission of bids.**

   b) Various payment modes like Internet banking/ NEFT/RTGS of Designated Banks and their Aggregator Banks as well can be accessed by the intending bidders.

   c) Reporting and accounting of the e-receipts will be made from a single source.

   d) Credit of receipts into the Government accounts and to the designated Bank account of the participating entities indicated in Para 2 above would be faster.

3. Only those bidders who successfully remit their **Cost of Tender Paper and Earnest Money Deposit on submission of bids would be eligible to** participate in the tender/bid process. The bidders with pending or failure payment status shall not be able to submit their bid. Tender inviting authority, State Procurement Cell, NIC, the designated Banks shall not be held responsible for such pendency or failure.

4. **Banking arrangement:**

   a) Designated Banks (SBI/ICICI Bank/HDFC Bank) payment gateway are being integrated with e-Procurement portal of Government of Odisha (https://tendersodisha.gov.in)

   b) The Designated Banks participating in **Electronic receipt, accounting and reporting of Cost of Tender Paper and Earnest Money Deposit on submission of bids** will nominate a Focal Point Branch called e-FPB, who is authorized to collect and collate all e-Receipts. Each such branch will act as the Receiving branch and Focal Point Branch notwithstanding the fact that the bidder might have debited his account in any of the bank's branches while making payment.

5. Procedures of bid submission using electronic payment of tender paper cost and EMD by bidder:

a) Log on to e-Procurement Portal: The bidders have to log onto **the** Odisha e-Procurement portal (https://tendersodisha.gov.in) using his/her digital signature certificate and then search and then select the required active tender from the "Search Active Tender" option. Now. submit button can be clicked against the selected tender so that it comes to the "My Tenders" section.

b) **Uploading of Prequalification/Technical/Financial bid:** The bidders have to upload the required Prequalification /Technical/Financial bid, as mentioned in the bidding document and in line with Works Department office memorandum no.7885, dt.23.07.2013.

c) **Electronic payment of tender paper cost and EMD:** Then the bidders have to select and submit the bank name as available in the payment options

   i. A bidder shall make electronic payment using his/her internet banking enabled account with designated Banks or their aggregator banks.

   ii. A bidder having account in other Banks can make payment using NEFT/RTGS facility of designated Banks.

- Online NEFT/RTGS payment using internet banking of the bank in which the bidder holds his account, by adding the account number as mentioned in the challan as an interbank beneficiary.

d) **Bid submission:** Only after receipt of intimation at the e-Procurement portal regarding successful transaction by bidder the system will activate the 'Freeze Bid Submission' button to conclude the bid submission process.

e) **System generated acknowledgement receipt for successful bid submission:** System will generate an acknowledgement receipt for successful bid submission. The bidder should make a note of **'Bid** ID' generated in the acknowledgement receipt for tracking their bid status.

6. Settlement of Cost of Tender Paper;

a) **Cost of Tender Paper:** In respect of Government receipts on account of **Cost of Tender Paper,** the e-Procurement portal shall generate a MIS for the State Procurement Cell (SPC). The MIS will contain an abstract of the cost of tender paper collected with reference to **Bid Identification Number.** The State Procurement Cell shall generate Bank-wise-head-wise challans separately for **Cost of Tender Paper** and instruct the designated Banks to remit the money to the State Government account under different heads. In respect of the cost of tender paper received through the e-procurement portal, the remittance to the Cyber Treasury account will be made to the Head of Account 0075-Misc, General Services-800-Other Receipts -0097-Misc. Receipts-02237-Cost of Tender Paper.

b) For the time being, the State Procurement Cell (SPC) will use over the counter payment facility of the Odisha Treasury portal. Thereafter, remittance through NEFT & RTGS will be facilitated through the Odisha Treasury portal.

c) Similarly, in case of State PSUs, Statutory Corporations, Autonomous Bodies and Local Bodies etc., **Cost of Tender Paper,** the e-Procurement portal shall generate a MIS for the State Procurement Cell (SPC). The MIS will contain an abstract of the cost of tender paper collected with reference to **Bid Identification Number.** The State Procurement Cell shall generate Bank-wise list of challans and instruct the designated Banks to remit the money through the Odisha Treasury portal. The cost of tender papers will be credited to the registered Bank account of the concerned State PSUs, Statutory Corporations, Autonomous Bodies and Local Bodies etc.

d) Bank will refund (in case the Tender Inviting Authority (TIA) issues such instructions) the tender fee, EMD to the bidder, in case the tender is cancelled before opening of Bid as per direction received from TIA through e-procurement system.

e) Back-end Transaction Matrix of Electronic receipt of Cost of Tender Paper and Earnest Money Deposit on submission of bids is enclosed in the Annexure.

7. Settlement of Earnest Money Deposit on submission of bids:

a) The Bank will remit the **Earnest Money Deposit on submission/cancellation of bids** to respective bidders accounts as per direction received from TIA through e-procurement system.

8. Forfeiture of EMD :

Forfeiture of **Earnest Money Deposit on submission of bid** of defaulting bidder is occasioned for various reasons.

a) In case the **Earnest Money Deposit on submission of bid** is forfeited, the e-Procurement portal will direct the Bank to transfer the EMD value from the Pooling Account of SPC to the registered account of the tender inviting authority.

b) The Tender inviting authorities of the Government Departments will deposit the forfeited **Earnest Money Deposit on submission of bid,** in the State Government Treasury under the appropriate head (8782-Cash Remittances and Adjustments between the officers rendering accounts to the same Accounts Officer-102-P.W.Remittances-1683-Remittances-91028-Remittances into Treasury) after taking the amount as a revenue receipt in their Cash Book under the head 0075-Misc. General Services-00-101 -Unclaimed Deposits-0097-Misc, Receipts-02080-Misc. Deposits and submit the detail account to DAG (Puri) as a deposit of the Division.

c) By clicking submit button, system will initiate the forfeiture of EMD. System will not allow the evaluator to edit the initiation after clicking the submit button. Forfeiture option can be carried out in phased manner like one bidder at a time.

9. Role of the Banks:

a) Make necessary provision / customizations at their end to enable the provision for online payments / refunds as per this document.

b) Provide necessary real-time message to bidders regarding successful or unsuccessful transactions during online payment processes and redirect them to e-Procurement website with necessary transaction reference details enabling them to submit their bids.

c) The bank shall ensure transfer of funds from the pooling account to the Government Head/current account of PSUs/ULBs within the next bank working day as per the directions generated from e-Procurement portal.

d) Bank should provide timely reports and reference details to NIC enabling them to carry out their role as stated below.

e) e) Refund of amount to bidders as per the XML file provided by e-Procurement system on the next bank working day from the date of generation of the XML file and also provide a confirmation to NIC on the same.

10. Role of State Procurement Cell:

a) Communicate requirements of Government departments/ State PSUs/ Autonomous Bodies/ ULBs online payment requirements to National Informatics Centre / the authorized Banks for mapping/ customization.

b) In every working day, the State Procurement Cell shall generate MIS from the e-Procurement portal to ascertain the tender paper cost received in the e-Tendering process separately bank-wise for the Government Department and the PSUs/ULBs. The SPC shall generate bank-wise separate online challans from the Odisha Treasury portal and make the remittance through over the counter facility or NEFT/RTGS (as and when this functionality is available in Treasury portal) and issue instruction to the bank for remittance of the receipt to the State Government account.

c) The State Procurement Cell shall be responsible for providing challan details and MIS in respect of the remittance towards tender paper cost to the Tender inviting authorities for their record.

d) State Procurement Cell shall monitor the progress of e-Tendering by different Government departments / State PSUs/ Autonomous Bodies / ULBs through an MIS. State Procurement Cell shall monitor and send monthly progress reports to the Government.

e) The e-Procurement system will generate a consolidated refund & settlement XML file as an end of the day activity.

f) e-procurement system will provide a web service for payment gateway (PG) provider to pull the encrypted refund and settlement details in XML file against a day.

g) Similarly, payment gateway (PG) provider will provide a web service to pull the refund and settlement status

against a day

h) e-procurement system will update the status accordingly for reconciliation report.

11. Role of National Informatics Centre :

a) Customize e-Procurement software and web-pages of Government of Odisha (https://tendersodisha.gov.in) to enable the provision for electronic payment.

b) The NIC, Odisha will modify / rectify the errors in electronic data relating to the Chart of Account.

c) NIC will provide an interface to organizations to download the electronic receipt data.

d) Enable automatic generation of daily XML files from e-Procurement system and ensure delivery of the same to the authorised Banks for enabling automatic refund/settlement of funds.

e) NIC shall enable the e-Procurement portal to generate MIS as required for the State Procurement Cell in order to make remittance of the tender paper cost to the State Government account using the Odisha Treasury portal.

12. Role of Cyber Treasury :

a) The cost of the tender paper deposited by the SPC using the Odisha Treasury Portal which will be accounted for by the Cyber Treasury and it shall submit the accounts to A.G (O) as per the established process.

b) The Cyber Treasury will provide MIS as required to the SPC for the purpose of accounting and reconciliation of the electronic remittances made to the State Government account.

13. Redressal of Public grievances:

a) The State Procurement Cell, Odisha, National Informatics Centre, Odisha and the e-FPB will have an effective procedure for dealing with, public complaint for e-Receipt related matters. In case, any mistake is detected by any of the stakeholders in reporting of receipt of tender paper cost and EMD, either suomoto or on being brought to its notice, the State Procurement Cell, Odisha, National Informatics Centre, Odisha unit, Cyber Treasury and the bank will promptly take steps for rectification. The e-Focal Point Branch of the participating Banks, National Informatics Centre, Odisha and the State Procurement Cell, Odisha will notify the contact number and address of the Help Desk for resolution of any dispute regarding e-Receipt.

14. Applicability and modification of existing rules / orders:

The modalities prescribed in this Office Memorandum for downloading of tender paper, submission and rejection of bid, acceptance of Bids as well as refund and forfeiture of earnest deposit will be applicable for electronic submission of bids through e-procurement portal. Existing provisions regulating cost of tender paper, earnest money deposit in OPWD Code and OGFR would stand modified to the extent prescribed.

15. These arrangements would be made effective after signing of MoU between the designated Banks and the State Procurement Cell, firming up of Banking arrangements and technical integration between designated Bank and e-Procurement Portal.

ANNXURE-I

Back-end Transaction Matrix of Electronic receipt and remittance of Cost of Tender Paper and Earnest Money Deposit on submission of bids.

	Cost of Tender Paper on submission of bids	**Earnest Money Deposit on submission of bids**

Government Departments	I. The payment towards the cost of Tender Paper, in case Government Departments shall be collected in separate Pooling accounts opened in Focal Point Branch called e-FPB of respective designated banks [as stated in Para 2] at Bhubaneswar on T+1_day. II. With reference to the Notice Inviting Tender/ Bid Identification Number, the amount so realized is to be remitted to Government Account under the Head Of Account 0075-Misc. General Services-800-Other Receipts-0097-Misc. Receipts-02237-Cost of Tender Paper through Odisha Treasury Portal after opening of the bid.	I. In case of tenders of Government Departments, amount towards Earnest Money Deposit on submission of bids shall be collected in a pooling account opened for this purpose at Focal Point Branch called e-FPB of respective designated banks at Bhubaneswar and the banks will remit the amount to respective bidder's account within two working days on receipt of instruction from TIA through refund and settlement of e-procurement system. II. In case of forfeiture of Earnest Money Deposit on submission of bids, the e-Procurement portal will direct the Bank to transfer the EMD value from the Pooling Account of SPC to the registered account of the tender inviting authority within two working days of receipt of instruction from TIA.

	Cost of Tender Paper on submission of bids	Earnest Money Deposit on submission of bids
State PSUs Statutory Corporations, Autonomous Bodies and Local Bodies.	I. In case of State PSUs, Statutory corporations, Autonomous Bodies and Local Bodies etc. the amount towards **Cost of Tender Paper,** on submission of bids shall be collected in separated pooling accounts opened in Focal Point Branch called e-FPB of respective designated Banks at Bhubaneswar on T+1 days. II. The Paper cost will be transferred to the respective current accounts of concerned State PSUs, Statutory Corporation, Autonomous Bodies and Local Bodies etc. after opening of bid.	I. Amount towards **EMD** on submission of bids shall be collected in a separate pooling account of Focal Point Branch called e-FPB of respective designated banks at Bhubaneswar and the banks will remit the amount to respective bidder's account on receipt of instruction from TIA through refund and settlement of e-procurement system within two working days from receipt of such instruction. II. In case of forfeiture of Earnest Money deposit on submission of bids, the e-Procurement portal will direct the Bank to transfer the EMD value from the Pooling Account of SPC to the registered account of the tender inviting authority within two working days of receipt of instruction from TIA.

INSTRUCTION TO BIDDERS (ITB)
E-PROCUREMENT

1. NOTICE INVITING BID AND OBTAINING BID DOCUMENTS:

1.1. The authority belonging to the major discipline is competent to invite tender of composite bids. He will also nominate the Executive Engineer who will deal with all matters relating to the bids in the invitation of bids.

1.2. For composite tender, estimated cost of each component should be clearly indicated in addition to combined estimated cost put to tender. The eligibility of bidders will correspond to the combined estimated cost of different components put to tender.

1.3. The contractor shall comply with the provisions of the Apprentices Act 1961, and the rules / amendments issued there under from time to time. If he fails to do so, it will be considered a breach of the contract and the Superintending Engineer/Executive Engineer may at his discretion without prejudice to any other right or remedy available under law, cancel the contract. The contractor shall also be liable for any pecuniary liability arising on account of any violation of the provisions of the said Act by him.

1.4. The contractor shall be deemed to have satisfied himself as to the correctness and sufficiency of the Tender and of the rates and prices quoted in the Bill of Quantities, all of which shall, except in so far as it is otherwise provided in the Contract, cover all his obligations under the Contract (including those in respect of the supply of goods, materials, plant & services or of contingencies for which there is a Provisional Sum) and all matters and things necessary for the proper execution and completion of the work and the remedying of any defects therein.

1.5. The successful bidder shall complete the works by the intended completion date specified in the Contract data.

1.6. Throughout these bidding documents, the terms '' bid and tender'' EMD and Bid Security and their derivatives (bidder / tenderer, bidding / tendering, etc.) are synonymous.

1.7. In case the tender for composite work includes in addition to main work / building work all other ancillary works such as sanitary and water supply installations, drainage installation, electrical work, Firefighting installation, horticulture work, roads and paths and gate works in dams and canals etc. , the bidder apart from being a registered civil Contractor of appropriate class must associate himself with agencies of appropriate class those who is eligible to tender for sanitary and water supply drainage, electrical, Firefighting installation and horticulture works in the composite tender. Intending purchasers are not required to produce any documents viz. copy of Registration, GST Registration certificate & GSTIN etc, at the time of purchase of tender documents but will be required for verification purpose at later stage. Furnishing copy of such documents is mandatory along with the tender documents otherwise his/her bid shall be declared as non-responsive and thus liable for rejection. The L1 Bidder is required to attend the officer inviting the bid for **verification of original documents** within **seven days** of opening the Price bid.

1.8. PARTICIPATING IN THE BID IN THE E-PROCUREMENT PORTAL: The Contractor/ Bidder intending to participate in the bid is required to register in the Portal with some information about the firm/Contractor. This is a onetime activity for registering in Portal. During registration, the contractor has to attach a Digital Signature Certificate (DSC) to his / her unique user ID. The DSC used must be of appropriate class (Class II or Class III) issued from a registered Certifying Authority such as n-Code, Sify, TCS, MTNL e-Mudra etc.

1.8.1. To log on to the portal the Contractor/Bidder is required to type his/her *username* and password. *The* system *will again ask to* select the DSC and confirm it with the password of DSC. 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 CAs stored in system database. The system checks the unique ID, password and DSC combination and authenticates the login process for use of portal.

1.8.2. The tender documents uploaded by the Tender Inviting Officer in the website

www.tendersOdisha.gov.in will appear in the section of "Upcoming Tender" before the due date of tender sale. Once the due date has arrived, the tender will move to "Active Tender" Section of the *homepage*. Only a small notification will be published in the newspaper specifying the work details along with mention of the specific website for details. The publication of the tender will be for specific period of time till the last date of submission of bids as mentioned in the 'Invitation for Bid' after which the same will be removed from the list of Active tenders. Any bidder can view or down load the bid documents from the web site.

1.8.3. 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.

1.8.4. If the software application has the provision of payment of cost of tender document through payment gateways of *authorized* bankers by directly debiting the account of the bidders, bidders will be required to avail on-line payment.

1.9. The bidders are to participate in the bid on-line.

1.10. ***DELETED.***

1.11. In the case of any failure, malfunction, or breakdown of the electronic system used during the e-procurement process, the tender inviting officer shall not accept any responsibility for failures or breakdowns other than in those systems strictly within their own control.

1.12. 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.

2. ELIGIBLE BIDDERS:

2.1. This Bid is open to **all** Contractors of the class mentioned in the *Invitation for Bids* registered with the State Governments and Contractors of Equivalent Grade/ Class Registered with Central Government/ MES/ Railways for execution of civil works. The Bidders are required to enclose the proof of registration from the registering authority along with the Bid subject only to the registration in the portal using his/her DSC for on-line bids.

Contractors not registered with Govt. of Odisha can participate in the e-procurement after necessary enrolment in the portal but have to subsequently register themselves with the appropriate registering authority of the state Govt. before award of the work as per prevalent registration norms of the state.

2.2. All bidders *shall* provide a statement that the bidder is neither associated, nor has been associated, directly or indirectly, with the Consultant or any other entity that has prepared the design, specifications, and other documents for the Project or being proposed as Project Manager for the Contract. A firm that has been engaged by the Engineer-in-Charge to provide consulting services for the preparation or supervision of the works, and any of its affiliates shall not be eligible to bid.

2.3. If the bidder has a relative employed as an Officer in the rank of an Assistant Engineer/Under Secretary and above in the Government of Odisha in the concerned Department, he shall inform the same in **Schedule-I** of the bid document mentioning the exact details in a covering letter along with the tender, failing which his bid will not be considered. Also if the fact of relationship subsequently comes to light, his contract will be rescinded. The bid security or the performance security will be forfeited and he shall be liable to make good any loss or damage resulting from such cancellation. In case the bidder has no relationship with any of the officers mentioned above he shall have to furnish with his bid an undertaking to that effect.

2.4. He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any gazetted officer in the concerned Department. Any breach of this condition by the contractor would render him liable for penal action for suppression of facts.

2.5. No Engineer of gazetted rank or other gazetted officer employed in Engineering or Administrative duties in an Engineering Department of the Government of Odisha is allowed to work for contractor for a period of two years after his retirement from Government service, without prior permission of the Government of Odisha in writing. Such a contract is liable to be cancelled if either the contractor

or any of his employees is found any time to be such a person who had not obtained the permission of the Government of Odisha as aforesaid before submission of the tender for engagement in the contractor's service.

3. QUALIFICATION CRITERIA:

3.1. For submission of Bids through the E-Procurement Portal, the bidder shall up-load the scanned copy/copies of documents listed under clause 3.2 in prescribed format wherever warranted in support of eligibility criteria and qualification information. **The L-1 bidder shall have to produce the original documents in support of the scanned copies and statements uploaded in the portal within 5 days of opening of price bid.** The Bids from Joint ventures are not acceptable.

3.2. The bid shall include following information and documents.

(a) Copy of valid contractor's registration certificate, PAN card, Affidavit, GST Registration certificate & GSTIN should accompany the technical bid.

(b) Copies of original documents defining the constitution or legal status, place of registration, and principal place of business; written power of attorney of the signatory..

(c) Details of work under progress as per tender documents.

3.3. ***DELETED***

3.4. *The Bidders are subject to be disqualified if they have:*

a. Made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or

b. Record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc.; and/or

c. Participated in the previous bidding for the same work and had quoted unreasonable prices and could not furnish rational justification to the Engineer-in-Charge.

d. Indulged in unlawful & corrupt means in obtaining bids.

e. Been black listed/their registrations by the competent authority.

4. ONE BID PER BIDDER:

4.1. Each bidder shall submit only one bid for one package. A bid is said to be responsive if accompanied by cost of bid document and appropriate bid security. The system shall consider only the last bid submitted through the E-Procurement portal.

5. COST OF BIDDING:

5.1. The bidder shall bear all costs associated with the preparation and submission of his bid, and the Engineer-in-Charge will in no case be responsible and liable for those costs.

5.2. All the rates and prices in the bid shall cover all taxes, GST Registration certificate & GSTIN, ferry, tollage charges and royalties and any other charges except GST.

5.3. The rate of royalties and taxes prevailing on the date of measurement shall be considered while making deductions in the bills.

5.4. The successful bidder shall make his own arrangement for all materials unless otherwise specified in the conditions of contract.

6. SITE VISIT:

6.1. Bidders are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their tenders as to the nature of the ground and sub-soil (so far as practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bid. A Bidder shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charges consequent on any misunderstanding or otherwise shall be allowed. The Bidder shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity access, facilities for workers and all other services required for executing the work unless otherwise specifically provided

for in the contract documents. Submission of a bid by a bidder implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and rates at which tools and plant, etc. will be issued to him by the Government and local conditions and other factors having a bearing on the execution of work.

6.2. The bidder, in preparing the bid, shall rely on site Investigation Reports referred to in the Contract Data, supplemented by any information available to the bidder.

6.3. The Officer inviting the bid / Engineer-in-Charge will clarify queries on the Contract Data on requisition by the intending Bidder. The bidder may ask question in the e-procurement portal using his DSC; provided the questions are raised before the date mentioned in the home page under critical dates.

B. BIDDING DOCUMENTS

7. GENERAL INSTRUCTIONS:

7.1. The description of the work is as mentioned under Invitation for Bid.

7.2. The bids uploaded by the Tender Inviting Officer may consist of general arrangements drawings or typical sections of the project. Bidder may down load these drawings and take out the print for detail study. Any other drawings and documents pertaining to the works available with the officer inviting the Bid as well as in the office of the Executive Engineer as mentioned in the contract data will be open for inspection during working hours on all working days by the bidders. The bidder is required to down-load all the documents including the drawings for preparation of his bid. It is not necessary on the part of the Bidder to up-load the drawings other Bid documents (after signing) while up-loading his bid. He is required to up load documents related to his qualification information and Bill of Quantities duly filled in. It is assumed that while participating in the bid, the bidder has referred to all the drawings and documents uploaded by the Officer Inviting the Bids. 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 document by the Officer Inviting the Bids will be construed as plea to disrupt the bidding process and in such cases the bid security shall be forfeited.

7.3. The bidder is expected to examine carefully all instructions, conditions of contract, contract data, forms, terms, and technical specifications, bill of quantities, forms, Annexes and drawings in the Bid Document. Failure to comply with the requirements of Bid Documents shall be at the bidder's own risk.

8. CLARIFICATION OF BIDDING DOCUMENTS:

8.1. Bid documents consisting of drawings, plans, specifications, the schedule of quantities of the various items of work to be done and the set of terms & conditions of contract to be complied with by the contractor who intends to bid and other necessary Documents can be seen in the office of the officer inviting the Bid during office hours every day except on Sundays & Public Holidays till last date of sale of tender paper.

8.2. **No paper** copy **of** the **bid shall be sold.**

8.3. The Contract Data to bid shall be filled and completed in the office of Officer inviting bid before issue of bid documents. If the documents are issued to the intending bidder without having been so filled in & completed, he shall request the officer inviting the bid to have this done before he completes and delivers his bid.

8.4. **The bidder can** seek **clarification on the bids** which he received earlier than 15 days prior to the deadline for submission of bids. The Employer's response will be forwarded through the e-mail ID of the enquirer.

8.5. **Tender Clarification : 16.10.2026 to 21.10.2026 during office hours in the Office of the Chief Construction Engineer, Upper Indravati Project, Mukhiguda**

9. AMENDMENT OF BIDDING DOCUMENTS:

9.1. Before **the** deadline for submission of bids, the officer inviting the Bid may modify the bidding documents by issuing addenda.

9.2. Any **addendum** thus issued shall be part of the bidding documents and shall be notified in the website **www.tendersOdisha.gov.in** / notice board and through paper publication.

9.3. To give **prospective** bidders reasonable time in which to take an addendum into account in preparing their bids, the Officer inviting the Bid if also happens to be the Engineer-in-Charge with the permission of the higher authority may, at his discretion, extend as necessary the dead line for submission of bids.

C. PREPARATION OF BIDS

10. LANGUAGE OF THE BID:

10.1. All documents relating to the Bid shall be in the English / Hindi / Oriya language. Bids submitted in any other language shall be summarily rejected.

11. DOCUMENTS COMPRISING THE BID:

11.1. Following documents will be deemed to be part of the bid even if not submitted with the bid.

(i) Invitation for Bids (IFB)

(ii) Instructions to bidders (ITB)

(iii) Conditions of Contract

(iv) Contract Data

(v) Specifications

(vi) Drawings

11.2. All the volumes/documents shall be provided in the portal by the Officer inviting the bid. The bidder shall carefully go through the document and prepare the required documents and up load the scanned documents in Portable Document Format to the portal in the designated locations of Technical Bid. He will fill up the percentage rate in the BOQ down loaded for the work in designated Cell and up-load the same in designated locations of Financial Bid. Submission of document shall be effected by using DSC of appropriate class.

A. **Cost** of **"Bid document"** & **"Bid Security"** shall be remitted online using e-procurement Gateway.

B. **"Technical Bid"** shall comprise.

(i) Declaration under the Official Secret Act, 1923

(ii) Qualification Information and supporting documents,

(iii) Certificates, undertakings, affidavits,

C. **"Financial Bid "**shall comprise.

(i) Priced Bill of Quantities

12. PROPOSAL BY THE BIDDER:

12.1. **In the E-Procurement Portal,** an intelligent Bill of Quantity in Microsoft Excel format shall be made available to the bidder.

12.2. For **Item rate** tenders, the bidder shall fill in rates in figures and should not leave any cell blank. The line item total in words and the total amount shall be calculated by the system and shall be visible to the bidder.

12.3. In case of **percentage rate** tender, the bidder will only fill in the designated cell and activate "less" or "excess" to indicate how much his price offer is excess or less **(Up to two decimal Place)** than the estimated amount.

12.4. The **bidder** shall bid for the whole works as described in the Bill of Quantities.

12.5. Bidders shall submit offers that fully comply with the requirements of the bidding documents, Including the Conditions of Contract basic technical design as indicated in the drawing and

specification. **Conditional offer or alternative offers will not be considered** in the process of bid evaluation.

12.6. All duties, taxes, excluding GST including Building and other Construction Workers Welfare Cess @ 1% payable by the contractor under the contract, or for any other cause shall be included in the rates, prices submitted by the bidder. Taxes on material in respect of this contract shall be payable by the Contractor and Government will not entertain any claim whatsoever in respect of the same except GST payable for works contract.

12.7. In the case of any bid where unit rate of any item/items appear unrealistic, such bid will be considered as unbalanced and in case the bidder is unable to provide satisfactory explanation such a tender is liable to be disqualified and rejected.

12.8. Bidders while quoting their offers shall consider the following as regards price adjustment towards **Cement, Steel** & **Bitumen** and escalation of **all components** of work **as per Sub-Clause 31 of Condition of P-1 Contract.**

12.9. **Deleted.**

12.10. **Deleted.**

12.11. **Deleted.**

12.12. **Deleted**

12.13. The contractor shall be deemed to have satisfied himself as to the correctness and sufficiency of the Tender and of the rates and prices stated in the Bill of Quantities, all of which shall, except in so far as it is otherwise provided in the Contract, cover all his obligations under the Contract (including those in respect of the supply of goods, materials, plant & services or of contingencies for which there is a **Provisional** Sum) and all matters and things necessary for the proper execution and completion of the work and the remedying of any defects therein.

12.14. The **contractor shall** conform in all respects, by giving all notices and paying all fees, with the provisions of:

i) Any national or State Statue, Ordinance, or other Law, or any regulation, or bye-law of any local or other duly constituted authority in relation to the execution and completion of the works and remedying of any defects therein, and

ii) The rules and regulations of all public bodies and companies whose property rights are affected or may be affected in any way by the works.

12.15. *FOR **COMPOSITE** BIDS*: **DELETED.**

13. CURRENCIES OF BID AND PAYMENT:

13.1. The unit rates and the prices shall be quoted by the bidder entirely in Indian Rupees. All payments shall be made in Indian Rupees.

14. VALIDITY:

14.1. Bids shall remain valid for a period not less than **90 days** or the period mentioned in the Contract Data, after the deadline date for submission of bid as specified in the notice inviting the Bids. A Bid valid for a shorter period shall be rejected by the Engineer-in-charge as non-responsive.

14.2. In exceptional circumstances, prior to expiry of the original time limit, the Officer inviting the Bid may request the bidders to extend the period of validity for a specified additional period. The request and the bidders' responses shall be made in writing or by cable or by e-mail.

14.3. **DELETED.**

15. BID SECURITY:

15.1. The Bidder shall remit a bid security for the amount mentioned under Contract Data.

The successful lowest bidder will produce the original of all scanned documents for verification within 5 days of opening of the tender (Price Bid). In the eventuality of failure on the part of the lowest successful bidder to produce the original documents, he will be debarred in future from participating in tender for three years and will be blacklisted by the competent authority. In such a situation, successful L-2 bidder will be required to produce his original documents for consideration of his/her tender at the negotiated rate equal to L-1 bidder.

15.1.1. **DELETED**

15.1.2. **DELETED.**

15.1.3. **DELETED**

15.2. The Bid shall be declared non-responsive and shall be rejected if submitted without an acceptable Bid Security and not secured as indicated in Sub-Clauses 15.1.

15.3. Combined bid security for more than one work is not acceptable.

15.4. In the case of Government Undertakings, Co-operatives Societies, Diploma or Degree holders in Engineering who are registered with the Government of Odisha, the rules framed by government from time to time about Cost of Bid documents, Bid security, performance security will apply.

15.5. The bid Security of unsuccessful bidders will be returned within 28 days of the end of the validity period specified in Sub-Clause 14.1.

15.6. The Bid Security of the successful bidder will be discharged when the bidder has signed the Agreement and furnished the required Performance Security and Additional Performance security if any

15.7. The Bid Security may be forfeited

15.7.1. If the bidder withdraws the bid after opening of the bid but within the period of validity.

15.7.2. If the Bidder seeks any revision of rates or backs out of the bid claiming for not having referred to any or all documents provided in the Bid by the Officer Inviting the Bids.

15.7.3. **DELETED.**

15.7.4. In the case of a successful bidder, if the bidder fails within the specified time limit to

15.7.4.1. Sign the Agreement; or

15.7.4.2. Furnish the required Performance Security including additional performance security if any.

16. FORMAT AND SIGNING OF BID:

16.1. The bidder can download the tender of his choice and save it in his system and undertake the necessary preparatory work off-line and upload the completed tender at his convenience within the final date and time of submission. The bidder shall only submit single copy of the required documents and Price Bid in the portal. In the Financial bid, the bidder cannot leave any figure blank. He has to only write the figures, the words will be self-generated. The Bidders are advised to up-load the completed Bid document well ahead of the last date & time of receipt to avoid any last moment problem of power failures etc.

16.2. 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.

16.3. The bidder shall log on to the portal with his DSC and move to the desired tender for up-loading the documents in appropriate place one by one simultaneously checking the documents. Once the Bidder makes sure that all the documents have been up-loaded in appropriate place, he clicks the submit button to submit the bid to the portal.

16.3.1. Tender cannot be pre-opened and cannot be submitted after due date and time. Therefore, only after satisfying that all the documents have been uploaded, the Bidder should activate submit button.

16.3.2. In the e-procurement process, each process is time stamped. The system can identify each individual who has entered into the portal for any bid and the time of entering into the portal.

16.3.3. The Bidder should ensure clarity of the document up-loaded by him to the portal, especially the scanned documents by taking out sample printing. Non-submission of legible documents may render the bid non-responsive. However, the Officer inviting the Bids if so desires, **can ask for legible copies for clarification within a stipulated period of 7 days**, provided such document in no way alters the Bidder's price bid. **If the Bidder fails to submit Such documents with in the stipulated date, his bid shall be evaluated on it's own merit**.

D. SUBMISSION OF BIDS

17. SECURITY OF BID SUBMISSION:

17.1. All bid data uploaded by the Bidder to the portal will be encrypted by the DSC of the opener(s). The system shall require all the mandatory forms and fields filled up by the contractor during the process of submission of the bid/tender.

17.2. The Bid shall be received in encrypted format by the system which can only be decrypted / opened by the authorized openers only on or after the due date and time.

18. DEADLINE FOR SUBMISSION OF THE BIDS :

18.1. The online bidding will remain active till the last date and time of the bid submission. Once the date and time (Server date and time) is over, the bidder will not be able to submit the bid. The date & time of bid submission shall remain unaltered even if the specified date for the submission of bids declared a holiday for the Officer inviting the Bid.

18.2. The officer inviting the bid may extend the deadline for submission of bids by issuing an amendment in accordance with Sub-Clause 9.3, in which case all rights and obligations of the officer inviting the bid & Engineer-in-Charge and the bidders previously subject to the original deadline will then be subject to the new deadline.

19. LATE BIDS :

19.1. The system shall reject submission of any bid through portal after closure of the receipt time. For all purpose the server time displayed in the e-procurement portal shall be the time to be followed by the bidder and concerned officers.

20. MODIFICATION AND WITHDRAWAL OF BIDS :

20.1. In the E-Procurement Portal, it is allowed to modify the bid any number of times before the final date and time of submission. The bidder shall have to log on to the system and resubmit the documents as asked for by the system including the price bid. In doing so, the bids already submitted by the bidder will be removed automatically from the system and the latest bid only will be admitted. But the bidder should avoid modification of bid at the last moment to avoid system failure or malfunction of internet or traffic jam or power failure. If the bidder fails to submit his modified bids within the designated time of receipt, the bid already in the system shall be taken for evaluation.

20.2. In the E-Procurement Portal, with-drawl of bid is allowed. But in such case he has to write a letter with appropriate reasons for his withdrawal addressed to the Officer inviting the bid and up load the scanned document to portal in the respective bid before the closure of receipt of the bid. The system shall not allow any withdrawal after expiry of the closure time of the bid.

E. OPENING AND EVALUATION

21. OPENING OF THE BID:

21.1. Bid opening dates are specified during tender creation or can be extended vide corrigendum. These dates are available in IFB, tender document as well as the home page of portal. Bid opening can be done by the authorized users which are defined during the tender publication / approval stage. The bids are encrypted using there public keys and can be decrypted only on or after the Bid Opening due date. The bid openers private key will be required to open the bids and all the openers have to log on to the portal during that time.

21.1.1. The bidders who participated in the online bidding can witness opening of the bid from any system logging on to the portal with the DSC away from opening place. Contractors are not required to be present during the bid opening at the opening location if they so desire.

21.1.2. Each activity is date and time stamped with **user** details. For time stamping, server time is taken as the reference.

21.2. In the event of the specified date of bid opening being declared a holiday for the Officer inviting the Bid/Engineer-in-Charge, the bids will be opened at the appointed time on the **next working day.**

21.3. 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”.

21.4. The Bid openers; who have been pre-defined shall log on to the portal with their respective DSC. Unless all the Officers who have been declared as Opening officers, log on the portal with their DSC the Tender cannot be opened.

21.4.1. **After receipt of confirmation of the bid security**, the bidder will be asked in writing to clarify his technical bid, if necessary.

21.4.2. The bidders will respond in **not more than 7 days** of issue of the clarification letter, which will also indicate the date, time and venue of opening of the Financial Bid.

21.4.3. Immediately on receipt of these clarifications, the Evaluating Officers; predefined in the system for the bid, will finalize the list of responsive bidders. They will log on to the site with their DSC and record their comments on the Technical evaluation page in the system. The Officer Inviting the Bid if also the accepting authority, shall log on to the system with his digital signature and check the technical evaluation. He can either accept or pass on to the evaluating officers for re-evaluation. Upon acceptance of technical evaluation by the Accepting authority in the system, the system shall automatically generate letter to all the responsive bidders and the system shall forward the letter to all the responsive bidder that their technical bid has been evaluated responsive with respect to the data/information furnished by him and the letter shall also intimate him the date & time of opening of financial bid. The system shall also inform the non-responsive bidders in their email ID that their bid has been found non-responsive.

21.5. The Technical evaluation of all the bids will be taken up as per the information furnished by the Bidders. **If any of the information/ statements/documents/certificates furnished by the bidder is found to be false/fabricated/bogus, his EMD/Bid Security shall stand forfeited and his registration in the portal shall be blocked and the bidder is liable to be blacklisted.**

21.6. After **technical** evaluation of the bidders and selection of the qualified bidders, the financial bids of the technically qualified bidders shall be opened on the due date of opening. Members of the bid opening committee log on to the system in sequence and open the financial bids for the technically qualified bidders. The opening of financial bid by the opening officer using their DSC shall decrypt the financial bids.

21.6.1. Opening of price bid and evaluation of lowest bidder is subject to satisfaction of other qualification information asked for in the bid pursuant to Clause-3.

21.6.2. The Officer inviting Bid shall ensure that all the Bidders are individually intimated about the date, time & venue of opening of the financial bid along with the responsiveness of the Technical Bid.

21.6.3. The Financial Bid will be opened on the notified date & time in the presence of bidders or their authorized representative who wish to be present.

21.6.4. At the time of opening of “Financial Bid”, the names of the bidders whose bids were found responsive in accordance with Sub-Clause 24.1 will be announced. The bids of only those bidders will be opened. The remaining bids will be rejected.

21.6.5. The responsive bidders’ names, the bid prices, the item wise rates the total amount of each item, any discounts and withdrawals, and such other details as the officer inviting the tender may consider appropriate, will be announced by him or his authorized representatives at the opening.

21.6.6. Special conditions and/or rebate/discount offer if any uploaded to the system shall be declared and recorded first.

21.6.7. The Financial bid of the bidders shall be opened one by one by the designated officers. **The system shall auto-generate the Comparative statement**.

21.6.8. The Bidder can witness the principal activities and view the documents/summary reports for that particular work by logging on to the portal with his DSC from anywhere.

22. PROCESS TO BE CONFIDENTIAL:

22.1. Information relating to the examination, clarification, evaluation, and comparison of bids and recommendations for the award of a contract shall not be disclosed to bidders or any other persons not officially concerned with such process until the award to the successful bidder has

been announced. Any effort by a bidder to influence the officer inviting the bid, processing of bids or award decisions may result in the rejection of his bid.

23. CLARIFICATION OF BIDS:

23.1. To assist in the examination, evaluation, and comparison of bids, the officer inviting the bid may, at his discretion, ask any bidder for clarification of his rates including breakdowns of unit rates. The request for clarification and the response shall be in writing or by cable or by e-mail, but no change in the bid price or substance of the bid shall be sought, offered.

23.2. Subject to sub-clause 23.1, no bidder shall contact the officer inviting the bid on any matter relating to his bid from the time of the opening to the time the contract is awarded. If the bidder wishes to bring additional information to the notice of the officer inviting the bid, it should do so in writing.

24. EXAMINATION OF BIDS AND DETERMINATION OF RESPONSIVENESS:

24.1. During the detailed evaluation of "Technical Bids", the officer inviting the bid will determine whether each bid:-

24.1.1. Whether the Bid security is confirmed by issuing institution/bank.

24.1.2. Has submitted legible documents for evaluation

24.1.3. Meets the eligibility criteria defined in *Clause 3* and;

24.1.4. Is substantially responsive to the requirements of the bidding documents.

24.2. During the detailed evaluation of the "Financial Bid", the responsiveness of the bids will be further determined with respect to the remaining bid conditions, i.e., priced bill of quantities, technical specifications and drawings.

24.3. A substantially responsive "Financial Bids" is one, which conforms to all the terms, conditions, and specifications of the bidding documents, without material deviation or reservation. A material deviation or reservation is one

24.3.1. Which affects in any substantial way the scope, quality, or performance of the works?

24.3.2. Which limits in any substantial way, inconsistent with the bidding documents, the right of the officer inviting the bid or the bidder's obligations under the contract or

24.3.3. Whose rectification would affect unfairly the competitive position of other bidders presenting substantially responsive bids.

24.4. If a "Financial Bid" is not substantially responsive, it will be rejected by the officer inviting the bid, and may not subsequently be made responsive by correction or withdrawal of the non-conforming deviation or reservation.

24.5. On opening of the price bid the system shall arrange the financial bids in order of their value (L1 first, followed by L2, L3 ….) for subsequent evaluation. The evaluation status (Sheet) will be visible to all the participating bidders after opening on their respective logins. Each activity is recorded in the system with date and time stamping.

25. EVALUATION OF BIDS: DELETED

25.1. If the officer **inviting** the Bid in his opinion judges that the price quoted by the lowest qualified bidder is high or a special condition imposed by the bidder is to be withdrawn, the bidder shall be invited for negotiation by the officer inviting the Bid or by an officer authorised by him in writing. **Negotiations** of financial bid with **only the lowest bidder** shall be carried out, if necessary. Negotiation of bid will be carried out by manual way.

25.2. **DELETED.**

25.3. **DELETED**

25.4. **DELETED.**

25.5. **DELETED.**

F. AWARD OF CONTRACT

26. AWARD CRITERIA:

26.1. The officer inviting the bid will award the contract to the bidder whose bid has been determined to be substantially responsive to the bidding documents and who has offered the lowest evaluated price.

26.2. On acceptance of the tender, the Contractor shall name in writing his accredited representative(s) who would be responsible for taking instructions from the Engineer-in-Charge.

26.3. Competent Authority on behalf of Governor of Odisha reserves to himself the right of accepting the whole or any part of the bid and the bidder shall be bound to perform the same at the rate quoted.

26.4. The successful bidder registered under other State Government / MES / Railways / CPWD in equivalent rank has to register under state PWD before signing of the agreement.

27. OPTIONS IF THE BIDDER BACKS OUT FROM BIDDING PROCESS :

27.1. In case the 1st lowest Bidder or even the next lowest Bidder withdraw in series one by one, thereby facilitating a particular Bidder for award, then they shall be penalized with adequate disincentives with forfeiture of EMD/Bid Security unless adequate justification for such back out is furnished. Appropriate action for blacklisting the bidder shall also be taken apart from dis-incentivising the bidder.

27.2. The bidding process shall be deemed to be complete till the date of issue of letter of acceptance. If the bidder fails to sign the agreement within the stipulated period mentioned under clause 29.2, his bid security shall stand forfeited.

28. RIGHT TO ACCEPT OR REJECT ANY OR ALL BIDS :

28.1. The competent authority on behalf of the Governor of Odisha does not bind him to accept the lowest or any other tender and reserves to him the authority to reject any or all the tenders received without assigning any reason.

28.2. All bids in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the bidder shall be summarily rejected.

29. NOTIFICATION OF AWARD AND SIGNING OF AGREEMENT:

29.1. In the E-Procurement Portal, the system shall generate the template of award letter and the Officer Inviting the Bid shall mention the amount of Performance Security and additional security required to be furnished in the letter and intimate the bidders in his e-mail ID. The issue of the letter of acceptance shall be treated as closure of the Bid process and commencement of the contract.

29.2. The bidder shall within 15 days of issue of letter of acceptance, furnish the Performance security & additional Performance security (if any) in the prescribed form & the work programme & shall sign the agreement in prescribed format, failing which the Engineer-in-Charge shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the Bid Security absolutely**.** The agreement will incorporate all agreements between the officer inviting the bid and the successful bidder.

If L1 bidder does not turn up for agreement after finalization of the tender, then he shall be debarred form participation in bidding for three years and action will be taken to blacklist the contractor. In that case, the L2 bidder, if fulfils, other required criteria would be called for drawing agreement for execution of work subject to the condition that L2 bidder negotiates at par with the rate quoted by the L1 bidder otherwise the tender will be cancelled. In case a contractor is black listed, it will be widely published and intimated to all departments of Government and also to Govt. of India agencies working in the state.

(Amendment to Para-3.5.14 Note-I of OPWD Code Vol.-I by inclusion).

29.2.1. Following documents shall form part of the agreement.

29.2.1.1. The notice inviting bid, all the documents including additional conditions, specifications and drawings, if any, forming the bid as issued at the time of invitation of bid and acceptance thereof together with any correspondence &

documents leading thereto & required amount of performance security including additional performance security as per sub clause 29.2 hereof.

29.2.1.2. Standard Bid Document P.W.D. Form **P-1**

29.3. The letter to proceed with the work shall be issued by Engineer-in-charge only after signing of the agreement. The notification of award will constitute the formation of the contract subject only to the furnishing of performance security and additional performance security in accordance with the provisions of the agreement.

29.4. On acceptance of the composite bids by the competent authority the letter of award will be issued by the Engineer-in-Charge of the major component of the work on behalf of the Governor of Odisha.

29.5. Upon signing of the agreement by the successful bidder, the Engineer-in-Charge will promptly notify the other bidders that their bids have been unsuccessful.

30. CORRUPT OR FRAUDULENT PRACTICES:

30.1. The Engineer-in-Charge will reject a proposal for award if he determines that the bidder recommended for award has been engaged in corrupt or fraudulent practices in competing for the contract in question. He will report to the Officer Inviting Bid / next higher authority.

30.2. Canvassing whether directly or indirectly, in connection with tenders is strictly prohibited and the tenders submitted by the contractors who resort to canvassing will be liable for rejection.

GOVERNMENT OF ODISHA

WORKS DEPARTMENT

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OFFICE MEMORANDUM

No. 07764600022025 17-941 /W., Bhubaneswar Dt. 8.10.26

Sub:- Amendment of Codal & Contractual Provisions.

Earlier, the provisions of threshold negative bid caps of 15% introduced in Appendix-IX, Clause 36 of OPWD Code Vol.-II had been abolished, and the system of incremental Additional Performance Security (APS) was adopted vide Works Department O.M. No.173/W., dated 03.01.2026 in the procurement of Works undertaken by Government of Odisha and its agencies to ensure that the procurement process results in a viable and successful manner.

Subsequently, a clarification vide Works Department O.M. No. 632/W., dated 09.01.2026, and a corrigendum No. 14560/W., dated 11.08.2026, were issued on the subject.

Considering the continuing trend of quoting of abnormally low bids in procurement of Works, Government, after careful consideration, have been pleased to further review the issue of abnormally low bid prices.

Now, therefore, in supersession of Works Department O.M. No.173, dated 03.01.2026, O.M. No.632/W., dated 09.01.2026 and Corrigendum No.14560/W., dated 11.08.2026, it has been decided that the Additional Performance Security (APS) shall be obtained from the selected bidder, on an incremental basis, where the accepted bid price is lower than the Cost Put to Tender, in the following manner:

1. The Additional Performance Security (APS) shall be calculated as a percentage of the accepted Bid Price of the selected bidder.
2. For the purpose of determining the APS, the percentage by which the accepted Bid Price is lower than the Cost Put to Tender shall be calculated and rounded off.
3. The rounded-off percentage so determined shall be referred to as the Rounding Off of Percentage Less (ROPL) of accepted Bid Price and shall form the basis for calculation of the APS in accordance with the applicable incremental rate prescribed under this Office Memorandum.
4. Rounding Off of Percentage Less (ROPL) of accepted Bid Price, i.e. the percentage by which the accepted Bid Price is less than the Cost Put to Tender, shall be as follows:

    - Where the decimal fraction is less than 0.50, the percentage shall be rounded off to the next lower whole percentage.

- Where the decimal fraction is 0.50 or above, the percentage shall be rounded off to the next higher whole percentage.
- For avoidance of doubt, 13.25% less shall be reckoned as 13% less, whereas 13.50% less shall be reckoned as 14% less, for the purpose of determining the applicable APS under this Office Memorandum.

5. Calculation of Additional Performance Security:
   - Where the accepted bid price is such that the ROPL is up to (-)10%, no additional performance security is required.
   - where the accepted bid price is such that the ROPL is below (-)10% but not below (-)20%, the additional performance security percentage shall be incremented by 0.2% for every percentage of ROPL below (-)10%; for avoidance of doubt, if ROPL is (-)13%, then APS shall be @ 0.2% x (13-10) = 0.6% of accepted bid price.
   - where the accepted bid price is such that the ROPL is below (-)20% but not below (-)30%, the additional performance security percentage shall be incremented by 0.3% for every percentage of ROPL below (-)20% in addition to 2% of the accepted bid price; for avoidance of doubt, if ROPL is (-)24%, then APS shall be @ 0.3% x (24-20) +2% = 1.2% + 2% = 3.2% of accepted bid price.
   - Where the accepted bid price is such that the ROPL is below (-)30% or more, the additional performance security percentage shall be incremented by 0.5% for every percentage of ROPL below (-)30% in addition to 5% of the accepted bid price; for avoidance of doubt, if ROPL is (-)37%, then APS shall be @ 0.5% x (37-30) + 5% = 3.5% + 5% = 8.5% of accepted bid price.
6. The additional performance security shall be treated as part of the performance security.
7. The provision of additional performance security shall be applicable to all forms of tender except Turnkey Tender.
8. Justification for abnormally low bids shall be scrutinized by the Technical Committee and recommended to the Competent Authority for Acceptance of Tender as per Para 6.3.15 of OPWD Code, Vol-I 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 at the offered price. Procuring Entity may, in such cases, seek written clarifications from the Bidder, including detailed price analysis of its Bid price in relation to scope, schedule, resource 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.

9. If more than one bid is quoted (decimal up to two numbers will be taken for all practical purposes, in percentage rate tenders) as lowest, either at the estimated cost put to tender or less than the estimated cost put to tender, the Tender Accepting Authority will finalize the tender through a transparent lottery system, where all the concerned bidders/their authorized representatives, the concerned SE/EE of the concerned Division and DAO will remain present.
10. If the rate quoted by the SC and ST Category Contractors comes to the rate quoted by the lowest bidder (decimal up to two numbers will be taken for all practical purposes, in percentage rate tenders) after availing 10% price preference as per Para 2 of Works Department Resolution No. 16262 dated 30.10.2018, the tender shall be finalized by the Tender Accepting Authority through a transparent lottery system along with other categories of contractors.
11. Accordingly, the relevant existing codal/contractual provision stands modified with effect from the date of issue of this O.M.
12. However, as regards the bidding process in which the tender has been floated before the issue of this Office Memorandum, the APS shall be calculated as per Works Department O.M.No.173 dt 03.01.2026 r/w O.M. No.632/W., dated 09.01.2026 and Corrigendum No.14560/W., dated 11.08.2026.
13. In pursuance to, Works Deptt. OM No.2375/W, dt.03/03/2022, Additional Performance Security(APS) shall be refunded immediately on successful completion of the work within seven(07) days of issuance of Completion Certificate/ Provisional Completion Certificate.
14. This has been concurred in by the Finance Department vide OSWAS file No.**FIN-WFI-MISC-0102-2025**.

By order of the Governor

Principal Secretary to Government

Memo No. 17942 /W, dated 8.10.26

Copy along with soft copy forwarded to Gazette Cell, Commerce and Transport (Commerce) Department, Bhubaneswar, for information and necessary action.

They are requested to publish the Office Memorandum in the extraordinary issue of the Gazette and supply 20 (twenty) copies to this Department.

8/10/26.

EIC-cum-Special Secretary to Government

CONTRACTOR **SUPERINTENDING ENGINEER**

Memo No. 17943 /W., Dt. 8.10.26

Copy forwarded to the P.S. to the Hon'ble Chief Minister, Odisha for the kind information of the Hon'ble Chief Minister.

EIC-cum-Special Secretary to Government

Memo No. 17944 /W., Dt. 8.10.26

Copy forwarded to the P.S. to the Hon'ble Minister, Law, Works, Excise, Odisha for the kind information of the Hon'ble Minister.

EIC-cum-Special Secretary to Government

Memo No. 17945 /W., Dt. 8.10.26

Copy forwarded to the OSD to the Chief Secretary, Odisha, for the kind information of the Chief Secretary, Odisha.

EIC-cum-Special Secretary to Government

Memo No. 17946 /W., Dt. 8.10.26

Copy forwarded to Sr. P.S. to the DC-cum-ACS, Odisha, for the kind information of the DC-cum-ACS, Odisha.

EIC-cum-Special Secretary to Government

Memo No. 17947 /W., Dt. 8.10.26

Copy forwarded to Principal Accountant General (A&E), Odisha, Bhubaneswar/ Principal Accountant General (E & SR Audit), Odisha, Puri Branch, Puri for kind information and necessary action.

EIC-cum-Special Secretary to Government

Memo No. 17948 /W., Dt. 8.10.26

Copy forwarded to the P.S. to the Additional Chief Secretary, Home Department/ the P.S. to the Additional Chief Secretary, GA&PG Department / P.S. to the Additional Chief Secretary, Parliamentary Affairs Department /P.S. to the Additional Chief Secretary, Industries Department / P.S. to the Additional Chief Secretary, Steel & Mines Department / P.S. to the Additional Chief Secretary, Revenue & Disaster Management Department / P.S. to the Additional Chief Secretary, H & UD Department / P.S. to the Additional Chief Secretary, Energy Department for kind information of ACS, Home Department/ ACS, GA&PG Department /ACS, Parliamentary Affairs Department/ ACS, Industries Department /ACS, Steel & Mines Department/ ACS, Revenue & Disaster Management Department / ACS, H & UD Department/ ACS, Energy Department.

EIC-cum-Special Secretary to Government

Memo No. 17949 /W., Dt. 8.10.26

Copy forwarded to the P.S. to the Principal Secretary to Govt., Finance/Works/ Law/ C&T(T) /Forest, Environment and Climate Change Department / Department of Water Resources for kind information of the Principal Secretary, Finance/ Works/ Law/ C&T(T) / Department of Water Resources, respectively.

EIC-cum-Special Secretary to Government

CONTRACTOR **SUPERINTENDING ENGINEER**

Memo No. 17950 /W., Dt. 8.10.26

Copy forwarded to the DG, (RD&SS), MoRT&H, New Delhi for kind information.

EIC-cum-Special Secretary to Government

Memo No. 17951 /W., Dt. 8.10.26

Copy forwarded to the P.S. to the Commissioner-cum- Secretary to Govt., RD /PR&DW/ Tourism/ Department of Mission Shakti for kind information of the Commissioner-cum-Secretary, RD /PR&DW/ Tourism/ / Department of Mission Shakti, respectively.

EIC-cum-Special Secretary to Government

Memo No. 17952 /W., Dt. 8.10.26

Copy forwarded to all Departments for information and necessary action.

EIC-cum-Special Secretary to Government

Memo No. 17953 /W., Dt. 8.10.26

Copy forwarded to all Collectors & DMs for information and necessary action.

EIC-cum-Special Secretary to Government

Memo No. 17954 /W., Dt. 8.10.26

Copy forwarded to the Regional Officer, NHAI, Odisha, Bhubaneswar / Regional Officer, MoRT&H, Odisha, Bhubaneswar for information and necessary action.

EIC-cum-Special Secretary to Government

Memo No. 17955 /W., Dt. 8.10.26

Copy forwarded to the FA-cum-Special Secretary to Government, Works Department for kind information and necessary action.

EIC-cum-Special Secretary to Government

Memo No. 17956 /W., Dt. 8.10.26

Copy forwarded to EIC(Civil-cum-Roads), Odisha /EIC, Water Resources, Odisha/ EIC, Rural Works, Odisha/ EIC (PH), H&UD Department/ EIC (RWSS) PR&DW Department/ EIC, DPQ, Odisha/ EIC, NHs, Odisha/ EIC-cum-Managing Director, OB & CC Ltd., Bhubaneswar, Odisha/ Chief Engineer, Roads-I & II, Odisha / Chief Engineer, Buildings-I & II, Odisha / Chief Engineer, NHs, Odisha/ Chief Engineer, Bridges, Odisha / Chief Engineer, P&IP, Odisha / Chief Engineer, RD &QP, Odisha /Chief Engineer, RW- I & II, Odisha / Chief Engineer, PH (Urban), Odisha / Chief Engineer, Electricity, Odisha / Managing Director, OCC Ltd., Bhubaneswar/ all State PSUs for kind information and necessary action.

EIC-cum-Special Secretary to Government

CONTRACTOR **SUPERINTENDING ENGINEER**

Memo No. 17957 /W., Dt. 8.10.26

Copy forwarded to DDG & State Informatics Officer. National Informatics Centre, Odisha State Centre, Bhubaneswar, Email- sio-ori@nic.in for information and necessary action.

EIC-cum-Special Secretary to Government

Memo No. 17958 /W., Dt. 8.10.26

Copy forwarded to the Chief Executive Officer (Administrative), Odisha Computer Application Centre (OCAC), Bhubaneswar, for information and necessary action.

EIC-cum-Special Secretary to Government

Memo No. 17959 /W., Dt. 8.10.26

Copy forwarded to all EICs/CEs/CCEs/ SEs/ EEs of the Works Department for kind information and necessary action.

EIC-cum-Special Secretary to Government

Memo No. 17960 /W., Dt. 8.10.26

Copy forwarded to Roads Section/ A/C-I Section /A/C-II Section/ Plan Section / Building Section / Budget Section / N.H. Section / FC & AA/FA Section, Works Department / OSWAS Control Room for information and necessary action.

EIC-cum-Special Secretary to Government

CONTRACTOR **SUPERINTENDING ENGINEER**

GOVERNMENT OF ODISHA
WORKS DEPARTMENT
*****

OFFICE MEMORANDUM

File No.07556900012016- 17254 /W, dated, 5.12.17

Sub: **Electronic Receipt, Accounting and Reporting of Cost of Tender Paper and Earnest Money Deposit on submission of bids.**

1. The State Government have been working on formulation of rules and procedures for Electronic receipt, accounting and reporting of the receipt of Cost of Tender Paper and Earnest Money Deposit on submission of bids through the e-procurement portal of Government of Odisha i.e. "https://tendersodisha.gov.in" for some time past.
2. Electronic receipt of cost of tender paper has been successfully tested through SBI payment gateway. Now it has been decided to introduce electronic receipt of **Cost of Tender Paper and Earnest Money Deposit on submission of bids** through payment gateway of designated banks such as SBI/ICICI Bank/HDFC Bank for all Government Departments, State PSUs, Statutory Corporations, Autonomous Bodies and Local Bodies etc. in phases(ANNEXURE-I). The process outline as well as accounting and reporting structure are indicated below:

a) It will be carried out through a single banking transaction by the bidder for multiple payments like **Cost of Tender Paper and Earnest Money Deposit on submission of bids**.
b) Various payment modes like Internet banking/ NEFT/RTGS of Designated Banks and their Aggregator Banks as well can be accessed by the intending bidders.
c) Reporting and accounting of the e-receipts will be made from a single source.
d) Credit of receipts into the Government accounts and to the designated Bank account of the participating entities indicated in Para 2 above would be faster.

3. Only those bidders who successfully remit their **Cost of Tender Paper and Earnest Money Deposit on submission of bids would be eligible to** participate in the tender/bid process. The bidders with pending or failure payment status shall not be able to submit their bid. Tender inviting authority, State Procurement Cell, NIC, the designated Banks shall not be held responsible for such pendency or failure.

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d) **Bid submission:** Only after receipt of intimation at the e-Procurement portal regarding successful transaction by bidder the system will activate the 'Freeze Bid Submission' button to conclude the bid submission process.

e) **System generated acknowledgement receipt for successful bid submission:** System will generate an acknowledgement receipt for successful bid submission. The bidder should make a note of '**Bid ID**' generated in the acknowledgement receipt for tracking their bid status.

6. **Settlement of Cost of Tender Paper:**

a) **Cost of Tender Paper** : In respect of Government receipts on account of **Cost of Tender Paper**, the e-Procurement portal shall generate a MIS for the State Procurement Cell (SPC). The MIS will contain an abstract of the cost of tender paper collected with reference to **Bid Identification Number**. The State Procurement Cell shall generate Bank-wise challans under the head of Account for **Cost of Tender Paper** and instruct the designated Banks to remit the money to the proper head of account of State Government. In respect of the cost of tender paper received through the e-procurement portal, the remittance to the Cyber Treasury account will be made to the Head of Account 0075-Misc. General Services-800-Other Receipts -0097-Misc Receipts-02237-Cost of Tender Paper.

b) For the time being, the State Procurement Cell (SPC) will use over the counter payment facility of the Odisha Treasury portal. Thereafter, remittance through NEFT & RTGS will be facilitated through the Odisha Treasury portal.

c) Similarly, in case of State PSUs, Statutory Corporations, Autonomous Bodies and Local Bodies etc. **Cost of Tender Paper**, the e-Procurement portal shall generate a MIS for the State Procurement Cell (SPC). The MIS will contain an abstract of the cost of tender paper collected with reference to **Bid Identification Number**. The cost of tender papers will be credited to the registered Bank account of the concerned State PSUs, Statutory Corporations, Autonomous Bodies and Local Bodies etc.

d) Bank will refund (in case the Tender Inviting Authority (TIA) issues such instructions) the tender fee and EMD to the bidder, in case the tender is cancelled before opening of Bid as per direction received from TIA through e-procurement system.

e) Back-end Transaction Matrix of Electronic receipt of Cost of Tender Paper and Earnest Money Deposit on submission of bids is enclosed in the **Annexure- I.**

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7. **Settlement of Earnest Money Deposit on submission of bids:**

a) The Bank will remit the **Earnest Money Deposit on submission/cancellation of bids** to respective bidders accounts as per direction received from TIA through e-procurement system.

8. **Forfeiture of EMD :**

Forfeiture of **Earnest Money Deposit on submission of bid** of defaulting bidder is occasioned for various reasons.

a) In case the **Earnest Money Deposit on submission of bid** is forfeited, the e-Procurement portal will direct the Bank to transfer the EMD value from the Pooling Account of SPC to the registered account of the tender inviting authority.

b) The Tender inviting authorities of the Government Departments will deposit the forfeited **Earnest Money Deposit on submission of bid,** in the State Government Treasury under the appropriate head (8782-Cash Remittances and Adjustments between the officers rendering accounts to the same Accounts Officer-102-P.W.Remittances-1683-Remittances-91028-Remittances into Treasury) after taking the amount as a revenue receipt in their Cash Book under the head 0075-Misc. General Services-00-101-Unclaimed Deposits-0097-Misc. Receipts-02080-Misc. Deposits and submit the detail account to D.A.G., Puri as a deposit of the Division.

c) By clicking submit button, system will initiate the forfeiture of EMD. System will not allow the evaluator to edit the initiation after clicking the submit button. Forfeiture option can be carried out in phased manner like one bidder at a time.

9. **Role of the Banks:**

a) Make necessary provision / customizations at their end to enable the provision for online payments / refunds as per this document.

b) Provide necessary real-time message to bidders regarding successful or unsuccessful transactions during online payment processes and redirect them to e-Procurement website with necessary transaction reference details enabling them to submit their bids.

c) The bank shall ensure transfer of funds from the pooling account to the Government Head/current account of PSUs/ULBs within the next bank working day as per the directions generated from e-Procurement portal.

d) Bank should provide timely reports and reference details to NIC enabling them to carry out their role as stated below.

e) Refund of amount to bidders as per the XML file provided by e-Procurement system on the next bank working day from the date of generation of the XML file and also provide a confirmation to NIC on the same.

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10. Role of State Procurement Cell:

a) Communicate requirements of Government departments/ State PSUs/ Autonomous Bodies/ ULBs online payment requirements to National Informatics Centre / the authorised Banks for mapping/ customization.

b) In every working day, the State Procurement Cell shall generate MIS from the e-Procurement portal to ascertain the tender paper cost received in the e-Tendering process separately bank-wise for the Government Department and the PSUs/ULBs. The SPC shall generate bank-wise separate online challans from the Odisha Treasury portal and make the remittance through over the counter facility or NEFT/RTGS (as and when this functionality is available in Treasury portal) and issue instruction to the bank for remittance of the receipt to the State Government account.

c) The State Procurement Cell shall be responsible for providing challan details and MIS in respect of the remittance towards tender paper cost to the Tender inviting authorities for their record.

d) State Procurement Cell shall monitor the progress of e-Tendering by different Government Departments / State PSUs/ Autonomous Bodies / ULBs through MIS. State Procurement Cell shall monitor and send monthly progress reports to the Government.

e) The e-Procurement system will generate a consolidated refund & settlement XML file as an end of the day activity.

f) e-procurement system will provide a web service for Payment Gateway (PG) provider to pull the encrypted refund and settlement details in XML file against a day.

g) Similarly, Payment Gateway (PG) provider will provide a web service to pull the refund and settlement status against a day.

h) e-procurement system will update the status accordingly for reconciliation report.

11. Role of National Informatics Centre :

a) Customize e-Procurement software and web-pages of Government of Odisha (https://tendersodisha.gov.in) to enable the provision for electronic payment.

b) The NIC, Odisha will modify / rectify the errors in electronic data relating to the Chart of Account.

c) NIC will provide an interface to organisations to download the electronic receipt data.

d) Enable automatic generation of daily XML files from e-Procurement system and ensure delivery of the same to the authorised Banks for enabling automatic refund/settlement of funds.

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CONTRACTOR **SUPERINTENDING ENGINEER**

e) NIC shall enable the e-Procurement portal to generate MIS as required for the State Procurement Cell in order to make remittance of the tender paper cost to the State Government account using the Odisha Treasury Portal.

12. Role of Cyber Treasury :

a) The cost of the tender paper deposited by the SPC using the Odisha Treasury Portal which will be accounted for by the Cyber Treasury and it shall submit the accounts to A.G. (O) as per the established process.

b) The Cyber Treasury will provide MIS as required to the SPC for the purpose of accounting and reconciliation of the electronic remittances made to the State Government account.

13. Redressal of Public grievances :

a) The State Procurement Cell, Odisha, National Informatics Centre, Odisha and the e-FPB will have an effective procedure for dealing with, public complaint for e-Receipt related matters. In case, any mistake is detected by any of the stakeholders in reporting of receipt of tender paper cost and EMD, either suomoto or on being brought to its notice, the State Procurement Cell, Odisha, National Informatics Centre, Odisha unit, Cyber Treasury and the bank will promptly take steps for rectification. The e-Focal Point Branch of the participating Banks, National Informatics Centre, Odisha and the State Procurement Cell, Odisha will notify the contact number and address of the Help Desk for resolution of any dispute regarding e-Receipt.

14. Applicability and modification of existing rules / orders:

The modalities prescribed in this Office Memorandum for downloading of tender paper, submission and rejection of bid, acceptance of Bids as well as refund and forfeiture of earnest deposit will be applicable for electronic submission of bids through e-procurement portal. Existing provisions regulating cost of Tender Paper and Earnest Money Deposit in OPWD Code and OGFR would stand modified to the extent prescribed in this Office Memorandum.

15. These arrangements would be made effective after signing of MoU between the designated Banks and the State Procurement Cell, firming up of Banking arrangements and technical integration between designated Bank and e-Procurement Portal.

1. This shall take effect from the date of issue of this Office Memorandum.
2. Accordingly, relevant existing codal / contractual provision exist vide Office Memorandum No.6785/W dt.09.05.2017 of Works Department stands modified to the above extent.
3. This has been concurred in by the Finance Department vide their UOR No.-39-WF-I dt.09.11.2017.

5/11/17

E.I.C-cum-Secretary to Government
(P.T.O.)

CONTRACTOR **SUPERINTENDING ENGINEER**

ANNEXURE-I

Back-end Transaction Matrix of Electronic receipt and remittance of Cost of Tender Paper and Earnest Money Deposit on submission of bids.

	Cost of Tender Paper	Earnest Money Deposit on submission of bids
Government Departments	I. The *payment* towards the **cost of Tender Paper,** in case of Government Departments, shall be collected in separate pooling accounts opened in Focal Point Branch called e-FPB of respective designated banks [as stated in Para 2] at Bhubaneswar on T+1 day.	I. In case of tenders of Government Departments, amount towards **Earnest Money Deposit** on submission of bids shall be collected in a pooling account opened for this purpose at Focal Point Branch called e-FPB of respective designated banks at Bhubaneswar and the banks will remit the amount to respective bidder's account within two working days on receipt of instruction from TIA through refund and settlement of e-procurement system.
	II. With reference to the Notice Inviting Tender/ Bid Identification Number, the amount so realised is to be remitted to Government Account under the Head of Account 0075-Misc. General Services-800-Other Receipts -0097-Misc. Receipts-02237-Cost of Tender Paper through Odisha Treasury Portal after opening of the bid.	II. In case of forfeiture of **Earnest Money Deposit** on submission of bids, the e-Procurement portal will direct the Bank to transfer the EMD value from the Pooling Account of SPC to the registered account of the tender inviting authority within two working days of receipt of instruction from TIA.
State PSUs, Statutory Corporations, Autonomous Bodies and Local Bodies	I. In case of State PSUs, Statutory Corporations, Autonomous Bodies and Local Bodies etc. the amount towards **Cost of Tender Paper** on submission of bids shall be collected in separate pooling accounts opened in Focal Point Branch called	I. Amount towards **EMD** on submission of bids shall be collected in a separate pooling account of Focal Point Branch called e-FPB of respective designated banks at Bhubaneswar and the banks will remit the amount to respective bidder's

CONTRACTOR **SUPERINTENDING ENGINEER**

	e-FPB of respective designated banks at Bhubaneswar on T+1 day.	account on receipt of instruction from TIA through refund and settlement of e-procurement system within two working days from receipt of such instruction.
	II. The **Paper cost** will be transferred to the respective current accounts of concerned State PSUs, Statutory Corporations, Autonomous Bodies and Local Bodies etc. after opening of bid.	II. In case of forfeiture of **Earnest Money Deposit** on submission of bids, the e-Procurement portal will direct the Bank to transfer the EMD value from the Pooling Account of SPC to the registered account of the tender inviting authority within two working days of receipt of instruction from TIA.

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CONTRACTOR **SUPERINTENDING ENGINEER**

Government of Odisha
Works Department
*****

RESOLUTION

File No.07556900142018- 16262 /W, dated, 30-10-2018

Sub:- Grant of Concession (s) to Scheduled Caste and Scheduled Tribe Contractors.

Government have extended certain concessions to the Scheduled Caste and Scheduled Tribe Contractors regarding award of P.W.D. Works vide Resolution No.27748/W dt.11.10.1977. On the basis of the recommendation of Codes Revision Committee, it has now been decided to modify the aforesaid Resolution and allow the following facilities to the individual Scheduled Caste and Scheduled Tribe contractors for execution of P.W.D. Works.

1. The Scheduled Caste and Scheduled Tribe applicants desirous of enrolling themselves as Contractors are required to deposit 50% of the amount specified for various Classes of Contractors under Rule-7 of Appendix-VIII (P.W.D. Contractors' Registration Rules, 1967) of O.P.W.D. Code, Volume-II.

2. The concessions / facilities for 10% Purchase Preference shall be allowed only to the individual registered contractors belonging to Scheduled Caste and Scheduled Tribe having Registration Certificate up to "B" Class.

3. If the Tender of the individual registered contractors belonging to Scheduled Caste and Scheduled Tribe is within 10% of the rate quoted by the lowest tenderer for any work, the work may be considered for award to him/her at the lowest tendered rate in relaxation of Rule-18 of Odisha General Financial Rules (O.G.F.R.), Volume-I and Para-3.5.14 of O.P.W.D. Code, Volume-I.

4. The Security Deposit (Earnest Money, Initial Security and Performance Security) at half the usual rate may be deposited/realized by/from the Scheduled Caste or Scheduled Tribe Contractors coming under the Categories up to "B" Class only as against the prescribed percentage under Rule-13 of Appendix-VIII (P.W.D. Contractors' Registration Rules, 1967) of O.P.W.D. Code, Volume-II.

5. The above concession will take effect from the date of issue of this Resolution.

6. This order shall supersede Works Department Resolution No.27748/W dt.11.10.1977.

7. This has been concurred in by the Finance Department vide their U.O.R.No.92/WF-I dt. 09.10.2018.

EIC - cum- Secretary to Government

Memo No. 16263 /W, dated, 30-10-2018

Copy forwarded to Principal Secretary to Hon'ble Chief Minister, Odisha / P. S. to Hon'ble Minister, Works, Odisha for information and necessary action.

FA - cum- Addl. Secretary to Government

(P.T.O.)

CONTRACTOR **SUPERINTENDING ENGINEER**

Memo No. 16264 /W, dated, 30-10-2018

Copy forwarded to OSD to Chief Secretary, Odisha / Sr P.S. to Development Commissioner-cum-Additional Chief Secretary, Odisha / Sr. P.S. to Additional Chief Secretary, Finance Department for information and necessary action

29.X.18

FA - cum- Addl. Secretary to Government

Memo No. 16265 /W, dated, 30-10-2018

Copy forwarded to the Principal Accountant General (A&E), Odisha, Bhubaneswar / Principal Accountant General (E & S R Audit), Odisha, Puri Branch, Puri for information and necessary action.

29.X.18

FA - cum- Addl. Secretary to Government

Memo No. 16266 /W, dated, 30-10-2018

Copy forwarded to All Departments / Managing Director, OB & CC Ltd., Bhubaneswar / Managing Director, OCC Ltd., Bhubaneswar for information and necessary action.

29.X.18

FA - cum- Addl. Secretary to Government

Memo No. 16267 /W, dated, 30-10-2018

Copy forwarded to EIC (Civil), Odisha / All Chief Engineers, Odisha / All Superintending Engineers / All Executive Engineers (under Works Department) for information & necessary action and wide circulation among subordinate offices.

29.X.18

FA - cum- Addl. Secretary to Government

Memo No. 16268 /W, dated, 30-10-2018

Copy forwarded to OSWAS Control Room with a request to upload it in the web-site of Works Department.

29.X.18

FA - cum- Addl. Secretary to Government

Memo No. 16269 /W, dated, 30-10-2018

Copy forwarded to the Director, Printing, Stationary & Publication, Odisha, Cuttack by e-mail (deputydirectorpp@rediffmail.com) for publication of this Office Memorandum in the next issue of Odisha Gazette and supply 20 (Twenty) copies to this Department for official use.

29.X.18

FA - cum- Addl. Secretary to Government

Memo No. 16270 /W, dated, 30-10-2018

Copy forwarded to A/C-I Section / A/C-II Section / Road Section / Plan Section / Building Section / Budget Section / N.Hs. Section / FC & AA Section / PPP Cell / EAP Cell, Works Department for information and necessary action.

29.X.18

FA - cum- Addl. Secretary to Government

CONTRACTOR **SUPERINTENDING ENGINEER**

SECTION - 4

CONDITIONS OF CONTRACT

ODISHA PUBLIC WORKS DEPARTMENT
(FORM P-1)
PERCENTAGE RATE TENDER AND CONTRACT FOR WORKS
GENERAL RULES & DIRECTIONS FOR THE GUIDANCE OF CONTRACTORS

1. The work proposed for execution by contract will be notified in a form of invitation to tender pasted through the Govt. web-site **www.tendersodisha.gov.in**

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 by the successful tenderer and the percentage if any to be deducted from bills. Copies of the specifications, 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/Executive Engineer shall also be open for inspection by the contractor at the office of the Sub-Divisional Officer/Executive 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 payment made on accounts of works, 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 receipts 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 Departments and their issue rates shall be filled in and completed in the office of the Sub-Divisional Officer/Executive Engineer before the tender from is issued if a from is issued to an intending tender without having been so filled in and completed, he shall requested the office to have this done before he completes and delivers his tender.

5. The amount of earnest money to be deposited will be 1% of the estimated cost.

6. Any person who submits a tender shall fill up the usual printed form stating at what rate he willing to undertake each item of the work. Incomplete tender and tender rate he willing to undertake each item of the work specified in the said form of invitation to tender or which the contain any other conditions of any sort, or omit to note the time within which the work can be finished or which are not accompanied 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. Tender shall bear the name of the work two which they refer written outside the envelope.

7. 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.

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

9. 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 documents with the tender. The tenders to the selected tender shall also deposited 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 recommended for acceptance, such tender shall there upon sign forthwith copies of the specification and other documents mentioned in rules 1 and 4 and shall deposit the required amount of the security money within the prescribed time. The tender with the specification and other documents signed by the tenderer will then be forwarded for acceptance to the Engineer who is competent to accept the same. If the said Engineer rejects the tender the security money deposited shall be refunded to the tenderer.

10. When a tender is selected for acceptance, the tenderer shall deposit the required amount of the security money in cash in any treasury and shall forward the Challan to the Executive Engineer. Government securities may be endorsed to the Executive Engineer in lieu of 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.

11. The amount of security money to be deposited by the tenderer whose tender is selected for acceptance shall be **1** 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 of this security inclusive of the earnest money shall be deposited the tenderer within such time as may be notified to him in writing by the officer 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 deduction of **3%** of the amount of each payment to be made to his under clause 7 of the condition of contract for work done under the contract. Taxes as per provisions of Government shall be deducted from the bills of tenderer.

12. When tender has been selected for acceptance and the required amount of the security money has been deposited the Engineer shall scrutinize a pages of the form of item, Rate Tendered 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 tenders or if he is not so competent to, shall send the form for signature of the acceptance to the officer competent to accept it.

13. All tenderers are required to submit a list of works, which are in hand at the time of submitting their tenders. The list of works are required to be submitted in the proforma by the Executive Engineer under whom he has executed the work in order to judge their past performance (vide Works Department Circular No. 15443dt. 01.08.2005.)

14. Deleted

15. T.D.S (Tax Deducted at Source) towards GST will be deducted at the rate prescribed as per rule.

CONTRACTOR **SUPERINTENDING ENGINEER**

16. 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 concerned Executive Engineer of the Division /FA & CAO, but not in personal name.

The security deposit so deposited should be withdrawn from the same account after completion of the defects liability period of the concerned work and after the work is found defects free in all respect.

CONTRACTOR **SUPERINTENDING ENGINEER**

TENDER FOR WORKS

I / We hereby tender for the execution for the Government of Odisha for the work specified in the underwritten memorandum at the rates specified therein a period of **18 (Eighteen) calendar months** from the date of written order to commence and in accordance in all respects with the specifications designs and other documents referred to in rule. I here of and subject to the annexed conditions of contract and with such materials as are provided for by and in all other respects in accordance with such condition so far as applicable.

MEMORANDUM

(a) If several sub-works are included they should be detailed in a separate list	a.	Name of work	:	**Construction of RCC trough lining of Ghumar Sub-Minor, Ampada Sub-Minor, Haldi Sub-Minor & Parla Sub-Minor-ll under Left Canal Division-II, Dharamgarh.**
	b.	Amount put to tender	:	**Rs. 6,02,24,702.89**
	c.	Agreement Amount	:	
	d.	Earnest Money Deposit	:	**Rs. 6,02,300.00**
(e) This deposit will be 2 % of the Agreement	e.	Initial Security Deposit (including earnest money to be deposited before the commencement of the work)	:	
(f) This percentage deduction from bills be credited to the contractor's security	f.	Percentage to be deducted from bill (As Security Deposit)	:	
	g.	Additional Performance Security Deposit.(APSD)	:	
	h.	Time required for the work from date of written order to commence	:	
	i.	Date of written order to commence work	:	
	j	Actual date of commencement	:	
	k.	Stipulated date of completion	:	
	l.	Number of items of works tendered for	:	
	m.	Income Tax	:	
	n.	GST	:	
	o.	Royalty of construction materials	:	
	p.	Building and other construction Workers Welfare Cess	:	

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

CONTRACTOR **SUPERINTENDING ENGINEER**

to forfeit and pay to the Governor of Odisha or his successors in office the sum of money mentioned in said conditions.

Signature of contractor before submission of tender.

Dated the ..... day of .....20 .....

Signature of Contractor

Signature of the Witness to tender Signature

Address

Signature of officer by whom accepted.

The above tender is hereby accepted by me on behalf of the Government of Odisha.

Dated..... day of .....20 .....

Superintending Engineer
UI Left Canal Division No-II,
Dharmagarh, Kalahandi

Agreement No .....P1/..... Certified that this agreement contains .....pages only.

Superintending Engineer
UI Left Canal Division No-I,
Dharmagarh, Kalahandi

UNDERTAKING

I/we do hereby under take that, I / We will not claim anything in any shape from the Government if the work is curtailed or stopped at any stage for want of funds. This will form a part of the contract.

SPECIAL CONDITIONS

1. Any increase or decrease over or below the Schedule of Quantities appended to the tender during the execution be carefully watched to determine the financial implication in accordance to the codal provisions.
   No extra items, extra quantities beyond the agreement quantities should be allowed without prior permission from competent authority.
2. The contractor is to bear required sales taxes, octroi taxes, all other taxes and royalties, etc. as are in force from time to time, Royalty will be reimbursed on production of valid money receipt by the contractor from the concerned Tahasildar.
3. The contractor has to pay the minimum wages fixed by Government from time to time to the labourers engaged by him in the work.
4. The work should be executed as per approved designs. Necessary soil tests / field tests etc, are to be conducted at site to ensure the structural adequacy.
6. The fortnightly progress of work both physical and financial should be submitted forthwith and any failure of progress of work. in proportionate to work programme as submitted by the contractor should be reported and appropriate action as deemed proper should be taken under the terms and conditions of the agreement.
7. The work should be restricted to the available funds.
8. The Chief Construction Engineer, Superintending Engineer, Executive Engineer, while inspecting the work under execution should invariably record his observations in the Register of Inspections maintained at the site of work for which the tender has been accepted by him or by Government. He shall make final inspection of such works after completion thereof but before the payment of the final bills.
9. At no stage difficulty or obstacle for procurement of materials due to any reasons whatsoever shall not be entertained by the department nor any plea for extension of time or compensation/claim to this effect shall be entertained on account of the above The safe custody of the materials issued by the Deptt. of procured by the contractor will be sole responsibility of the contractor.

CONTRACTOR

CONDITION OF CONTRACT

Clause 1- All compensation or other sum 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 what so ever 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 cash or Government securities 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.

Compensation for delay

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 of the essence of the contract on the part of the contractor) and the contractor shall pay as compensation an amount equal to ½ % on the amount of the estimated cost if the whole work as shown by the tender for every day that the work remains uncommenced, or unfinished after the proper dates (The work should not be considered finished until such date as the Executive Engineer shall certify as the date on which the work is finished after necessary rectification of defects pointed out by the Executive Engineer, or his authorized, agents are fully complied with by contractor to the Executive Engineer's satisfaction). And further to ensure good progress during execution of the work the contractor shall be bound, in all cases in which time allowed for any work exceeds one month, complete one fourth of the whole work before one fourth of the whole time allowed under contract has elapsed one half of the work, before one half of such time has elapsed and three-fourth of the work before three-fourth of such time has elapsed. In the events 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% on estimated cost of the work as shown in the tender.

The work should not be considered finished until such date as the E.E. shall certify as the date on which the work is finished after necessary rectification of defects as pointed out by E.E. or his authorized agents are fully complied with by the contractor to the E.Es satisfaction.

(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 tendered himself liable to pay compensation amounting to the whole of his security deposit in the hands of Govt. (whether paid in one sum or deducted by installments) the Executive Engineer on behalf of the Governor of Odisha, shall have power to adopt any of the following courses as he may deem best suited to the interest of Government.

Action when whole security deposit is forfeited

(i) To rescind the contract (of which rescission notice in writing to the contractor under the hand of the Executive Engineer shall be conclusive evidence) 20% of the value of left over work will be realized from the contractor as penalty.

In the event of any of the above courses being adopted by the Executive 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 advances on account of or 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 thereto for actually performed under this contract, unless and until the Executive 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.

Amendment to clause 2(b) of item rate F2 Agreement vide Works Department order no.10639 dt. 27.05.2005

(ii) Security deposit of contractor for each work will be refunded only **twelve month** after the date of completion of work provided the final bill has been paid and defects if any rectified.

Clause-3 In any case in which any of the powers, conferred upon the Executive Engineer by clause 3 thereof, shall become exercisable and the same shall not be exercised the non-exercise thereof shall not constitute a waiver of the conditions here of and such powers shall not withstanding be exercisable in the event of any clause or clauses thereof he is declared liable to pay compensation amounting to the whole of his security

Contractor remain liable to pay compensation if action not taken under clause-5

deposit, and the liability of the contractor for past and future compensation shall remain unaffected in the event of the Executive Engineer putting in force the powers vested in him under the preceding clause he may if he so desire, take possession of all or any tools, plants, materials & 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 all wing 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 Executive Engineer whose certificate thereof shall be final; otherwise the Executive Engineer may give notice in writing to the contractor or his clerk of the works, foreman or other authorized agent required 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 requisition to the Executive 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 Executive Engineer as to the expense of removal and the amount of proceeds and expense of any such sale shall be final and conclusive against the contractor.

Power to take possession of or require removal of or sell contractor plants

Clause – 4 If the contractor shall desire on extension of time for completion of the work, on the ground of his having been unavoidable hindrances in its execution or any other ground he shall apply in writing to the Executive Engineer within 30 days of the date of the hindrance on account of which he desires such extension as aforesaid and the Executive Engineer shall, if in his opinion (which shall be final) reasonable be shown therefore, authorize such extension of time if any, as may in his opinion, be necessary or proper. The Executive Engineer shall at the same time inform the contractor whether he claims compensation for delay.

Extension of time

Clause – 5 On completion of the work, the contractor shall be furnished with a certificate by the Executive Engineer (here-in-after called the Engineer-in-charge) of such completion, but no such certificate be given, nor shall the work be considered to be complete until the contractor shall have removed from the area of premises (to be distinctly marked by the Executive Engineer in the site plan) on which the work shall be executed, all scaffolding surplus materials and rubbish and cleaned 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,

Final Certificate

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 PWD in accordance with the rules of the department whose measurements shall be binding and conclusive against the contractor the contractor shall fail to comply with the requirements of this clause as removal of scaffolding surplus materials and rubbish and cleaning of dirt on or

before the date fixed for the completion of the work the Engineer-in-charge may at the expenses of the contractor, remove such scaffolding surplus materials and rubbish and dispose of the same as he thinks fit and clean off such dirts as aforesaid and the contractor shall forth with 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 realized by the sale thereof

Sub clause – 5 "If in the opinion of the Engineer-in-charge which shall be final and binding on the contractor occupation or utilization of a portion of the work completed in no way interferers with the progress for rest of the work, the same may be occupied or utilized by or on behalf of the Govt. under the written order of the Engineer-in-charge to get the defects of 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 other concession either in the shape of extensions of stipulated period or any other monetary compensation on account of such occupation or use.

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 of having the same verified and the claim as far as admissible' adjusted if possible before the expiry of ten day 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 countersignature 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.

Payment on intermediate certificate be regarded as advance & bill to be submitted monthly

Provided that, if any balance of the 7% security is outstanding from each such payment shall be deducted so much, not exceeding 5% as may be necessary to make up the balance of the security. All such intermediate payments shall be regarded as payment 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 requiring or re-erected, or be considered as an admission of the due performance of the contract, or any part thereof in any respect, or the actual 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 the final settlement or adjustment of the accounts or otherwise, or in any other way vary or effect the contract.

Clause – 7 The final bill shall be prepared by the offices of the P.W.D. in accordance with the rules of department in the presence of the contractor within one month of the date fixed for completion of the work.

Clause – 8 **Deleted.**

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 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".

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 here to annexed. There may be delay in obtaining materials by the Department and the contractor is therefore required to keep himself in touch with 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

extension of time for the completion of work can be granted on timely application by the contractor vide clause 4.

Clause - 9 The contractor shall execute the whole and every part of the work in the most substantial and workman like manner and both as regards materials and otherwise in every respect in strict accordance with the specification. The contractor shall also confirm exactly fully and faithful to the design, drawings & 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 hours and the contractor shall, if he so require be entitle at his own expense to make or cause to make copies of the specifications and of all such designs, drawings and instructions as aforesaid.

Works to be executed in accordance with specification drawing & orders etc.

Sub clause – 9 The work should be done strictly in accordance with the relevant specifications of the I.S.I. Codes. If the work is not covered by the specification of I.S.I. it should be done in accordance with the provision in the Odisha Detailed Standard Specifications (O.D.S.S). In case, the work is not covered by O.D.S.S. the work should be executed as per the instruction of the Engineer-in-charge.

Clause – 10 The Engineer-in-charge shall have power to make any alterations in or additions to the original specifications, drawing, designs and instruction that may appear to him to be necessary advisable during the progress of the work and the contractor shall be bound to carry out the work in accordance with any instruction which may be given to him in writing signed by the Engineer-in-charge and such alteration shall not invalidate the contract and at 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 respect on which he agreed to do the main work, and at the same time 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 includes bears to the original contract work and the certificate of the Engineer-in-charge shall be conclusive as to such proportions. And if the additional work includes any class of work for which on rate is specified in this contract then such class of work shall be carried out at the on rates specified on this contract than such class of work shall be carried out at the rates entered in the sanctioned schedule by rates of the locality during the period when the work being carried on and if such 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 is it his intention 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 or work and arrange to carry it out in such manner as he may consider advisable.

Alteration in specification and designs

Extension of time in consequence of alterations

Do not invalidate contract

No deviations from the specification stipulated in the contract or additional items of work shall ordinarily be carried out by contractor nor shall any altered. Additional or substituted work to be carried out by him unless the rates on the substituted altered of additional items have been approved and fixed in writing by the Engineer-in-charge.

Rates of works not in estimate of schedule or rate of the district.

The contractor shall be bound to submit his claim for any additional work done during any month on or before the 5th days of the following month accompanied by 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.

CONTRACTOR **SUPERINTENDING ENGINEER**

Provided always that if the contractor shall commence work incur any expenditure in regards thereof before the rates shall have been determined as lastly herein before mentioned, then and in such case he shall only be paid in respect of the work carried out or expenditure incurred by him prior to the determination of the rates as aforesaid according to such rates as shall be fixed by the Engineer-in-charge. In the event of dispute the decision of the Executive Engineer of the circle will be final.

Clause – 11 If at any time after the commencement of the work the Government of Odisha shall for any reason whatsoever not require 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 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 but 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 alternations having been made in the original specification, drawing, designs and instruction which shall involve any curtailment of the work as originally contemplated.

No compensation for alteration in or restriction of work to be carried out.

Clause – 12 If it shall appear to the Engineer-in-charge or his subordinate in charge of the 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 or 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 forth with rectify or remove and reconstruct the work so specified in whole or part, as the case may require or as the case may be remove the materials or articles so specified and provided 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 the days his failure to do 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 other the materials or articles complained of as the case may be at the risk and the expense in all respects of the contractor.

Action and compensations payable in case of inferior / unsound work.
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Clause – 13 All work under or in course of execution or executed in pursuance of the contract shall at all times be open to the inspections 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 intention of Engineer-in-charge his subordinates to visit the works shall have been given to the contractor either himself be presented to receive orders and instructions, or have a responsible agent duly accredited in writing present for that purpose, 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.

Works to be open to inspection

Contractor or responsible agents to be present

Clause – 14 The contractor shall give not less than five day's notice in writing to the 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 placed beyond the reach of measurement any work without the consent in writing of the Engineer-in-charge or his subordinate in charge of work and if any work shall be cover 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 payments

Notice to be given before work is covered up

or allowance shall be made for such work or the materials with which the 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, enclosure or grass land, or cultivated ground continuous to the premises on the premises on which work or any part of it being executed, or if any damage shall happen to the work while in progress from any cause whatever or any imperfection become apparent in it within six 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 good at his own expense, or in default the Engineer-in-charge may cause the same to be made good by other workmen, and deduct the expense(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.

Contractor liable for damage done and for imperfections for 6 months after certificate

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-charge's 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 or 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 he 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 work and counting, weighing and assisting in the measurement of examination at any time and from time to time the work or materials, failing him so doing the same may be provided by the Engineer-in-charge at the expenses of the contractor and the expenses may be deducted from any money due to 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 to every suit, action or other proceeding at law that may be brought by any persons for injury sustained owing to the above precautions, and to pay any damages and cost which may be awarded in any such suit action or proceeding to any such person or which may with the consent of the contractor be paid to compromise any claim by any such person.

Clause – 17 No Female labour shall be employed within the limits of a cantonment. The contractor shall not employ for the purpose of this contract any labour below the age of legal employment as per Government norm, and shall pay to each labour; for the work done by such labour, wages not less than the wage paid for similar work in the neighborhood.

Explanation : Fair wages means wages whether for time or piece work prescribed by State P.W.D. provided that where higher rates have been prescribed under the minimum wages Act 1948 wages at such higher rates would constitute "Fair wages" [W/D No.22059 dated 16.8.77.

The Executive Engineer shall have the right to enquire into and decide any complaints 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.

The officer in charge of the work shall have the right to decide whether labourer employed by the contractor is below the age of legal employment as per Government norm and to refuse to allow any labourer whom he decides to be below that age.

Clause – 17 (a) The contractor shall, if so required by the Engineer-in-charge employ one more Engineering Graduate or Diploma holder as apprentices at his own cost if the cost of work as shown in the tender exceeds Rs.2,50,000/- The apprentices will be selected by

the Chief Engineer. The period of employment will commence within one month after the date of work order and would last till the date when 90% of work is completed. The stipend to be paid to the apprentices, should not be less than Rs.200/- per day in case of graduate Engineers and not less than Rs.150/- per day in case of Diploma holders. The number of apprentices to be employed should be fixed by the Chief Engineer in a manner so that total expenditure does not exceed 1% of the tender cost of the work.

Clause – 17 (b) Special class Contractor shall employ under him one Graduate Engineer and Two Diploma Holders belonging to the State of Odisha. Likewise 'A' class contractor shall employ under him one Graduate Engineer or Two Diploma holders under the contractor shall be full time & continuous and they should not be superannuated, retired, dismissed or removed personnel from any State Govt. or Central Govt. service/public Sector undertakings, private companies and firms or be ineligible for appointment to Government 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 Government of Odisha. The Chief Engineer, Roads Odisha may however, assist the contractor with names of such unemployed Graduate Engineer and Diploma holders if such help is sought for by the contractor. The names of such Engineering personnel appointed by the contractor should be intimated to the tender receiving authority along with the tender.

Employment of Graduate Engineers & Diploma Holders

Each bill of the Special Class or 'A' class contractor shall be accompanied by an employment Roll of the Engineering personnel together with a certificate of the Graduate Engineer or Diploma holder is employed by the contractor to the effect that the work executed as per the bill has been supervised by him.

Each bill of the Special Class or 'A' class contractor shall be accompanied by an employment Roll of the Engineering personnel together with a certificate of the Graduate Engineer or Diploma holder is employed by the contractor to the effect that the work executed as per the bill has been supervised by him.

Clause – 18 The contract shall not be assigned or sublet without the written approval of the Engineer-in-charge and if the contractor shall assign or sublet his contract or attempt so to do, or become insolvent or commence any insolvency proceedings or make any composition with

Work not to be subleted.

his creditor or attempt so to do, or if any bride gratuity, gift loan, perquisite reward or advantage pecuniary otherwise shall either directly or indirectly be given, promised or offered by the contractor or any of his servants to agents to any public officer or person in the employee of Government in any way relating to his office of employment or if any such officer or person shall become in any way directly or indirectly in the contract, the Executive Engineer may thereupon by notice in writing rescind the contract and the security deposit of the contractor shall there upon stand forfeited and be absolutely at disposal of Government and the same consequences shall ensure as if the contract had been rescinded under clause 3 hereof and in addition the contractor, shall not be entitled to recover or be paid for any work therefore actually performed under the contract.

Contractor may be rescinded and security deposit forfeited subletting bribing or if contractor become in solvent

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.

Sum payable by way of compensation to be considered as reasonable compensation without reference to actual loss

CONTRACTOR **SUPERINTENDING ENGINEER**

Clause – 20 In the case of a tender by partners any changes in the constitution of the firm shall be forthwith 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 be noticed in writing rescind the contract and the security deposit of the contractor shall there upon stand forfeited and be absolutely at the deposal of Government and the same consequences shall ensure as if the contract had been rescind under clause 3 hereof and in addition the contractor shall not be entitled to recover or be paid for any works therefore actually performed under the contract.

Changes in constitution of firm

Clause – 21 All works to be executed under the contract shall be executed under the direction and subject to the approval in all respects by Executive 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.

Clause – 22 **DELETED**

Clause – 23 When the estimate on which a tender is made includes lump sums 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 sums payable to him under the provisions of this clause.

Lump sums in estimates

Clause – 24 In the case of any class of work for which there is no such specification as is mentioned in rule, such work shall be carried out in accordance with the circle specification and in the event of there being no circle specification, then in such case the work shall be carried out in all respects in accordance with the instructions and requirements of the Engineer-in-charge.

Action where no specification

Clause – 25 The expression 'work' or 'works' where used in these conditions shall unless there be something either in the subject or context repugnant to such construction be construed & taken to mean the works by or by virtue of contract to be executed whether temporary or permanent, and whether original altered, substituted, or additional.

Definition of works

Clause – 26 Government shall be entitled to recover in full from the contractor any amount that the Government may be liable to pay under workmen compensation Act. VIII of 1923, to any workmen employed in course of execution of any part of the work covered by this contract.

Clause – 27 That for the purpose of jurisdiction in the event of dispute if any, the contract should be deemed to have been entered into within the State of Odisha and it is agreed that neither party to the contract or agreement will be competent to bring a suit in regard to the matters covered by this contract at any place outside the State of Odisha.

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 his 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 Contract price shall be adjusted for increase or decrease in rates and price of Labour , Cement, Steel, Bitumen, Pipes, POL & other material component in accordance with the following principles and procedures as per formula given below:-

31 (a) (i): REIMBRUSEMENT / RECOVERY DUE TO VARIATION IN PRICES OF MATERIALS OTHER THAN (STEEL, CEMENT, BITUMENT, PIPES & P.O.L.).

If during the progress of the work the price of any materials (Excluding the cost of steel cement, bitumen & P.O.L) incorporated in the work (not being materials supplied from the Engineer-in-Charge's store) in accordance with clause there of increases or decreases as a result of increase or decrease in the Average wholesale price Index (all commodities), and the contractor there upon necessarily and properly pays in respect of that materials incorporated in the work such increased or decreased price, 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 of 85% in between the Average Wholesale price Index (all commodities) which the operating for the quarter under consideration and that operated for the quarter in which the bid was received (last date of receipt) as per the formula indicated below provided that the work has been carried out within the stipulated time or extension thereof as are not attributable to him. If penalty is levied for delayed completion of the work, the contractor shall not be eligible to get price escalation on the above materials on the value of works executed during the extended period.

This clause will be applicable to the contracts where original stipulated period of completion is more than 18 months.

In the situation where the period of completion is initially stipulated in the agreement as less than 18 (eighteen) months but subsequently the completion period has been validly extended on the ground that the delay in completion is not attributable to the contractor and in the result the total period including the extended period stands more than 18 (eighteen) months or more, price escalation for other materials is admissible only for the remaining period excluding 18 (eighteen) months there from. (This amendment has been issued vide O.M No. 07550400132012-/2606/W, Dated 24.12.2012 of Works Department, Govt. Of Odisha)

Formula to calculate the increase or decrease in the price of materials: -

Price adjustment for increase or decrease in cost of materials other than cement, steel, bitumen, pipes and POL procured by the contractor shall be paid in accordance with the following formula:

$$\mathbf{V_m = 0.85 \times P_m /100 \times R \times (M_i - M_0)/M_0}$$

V_m= Increase or decrease in the cost of work during the quarter under consideration due to changes in rates of materials other than cement, steel, bitumen, pipes and POL.

R= Value of work done during the quarter under consideration excluding the work executed under extra items if any at prevailing schedule of rate / derived rates.

M_0= The all India wholesale price index (all commodities) prevailed during the quarter of last date of receipt of bids (as published by the Economic Adviser to Govt. of India, Ministry of Industry and Commerce, New Delhi)

M_i= The all India wholesale price index (all commodities) for the quarter under consideration as published by Economic Adviser, Govt. of India, Ministry of Industry and Commerce, New Delhi. In respect of the justified period extended for completion of the work, the index prevailing at the time of stipulated date of completion or the prevailing index of the period under consideration, whichever is less, shall be considered.

P_m= percentage of material component (other than cement, steel, bitumen, pipes and POL) of the work, as indicated in clause – 31 (d) below.

31 (a) (ii) REIMBRUSEMENT / RECOVER OF DIFFERENTIAL COST DUE TO VARIATION IN PRICES OF PRINCIPAL MATERIALS (STEEL, CEMENT, BITUMENT, PIPES NOT ISSUED BY DEPARTMENT) AFTER SUBMISSION OF TENDER**.**

If after submission of the tender, the prices of Steel, Cement, Bitumen and Pipes (not being supplied by the Department) increases / decreases beyond the price (s) prevailing at the time of the last date for submission of tenders including extension for the work, the contractor shall be eligible to get differential cost due to such hike on the value of works executed during the stipulated period and during the extended period when the reason of delay in completion of the work is not attributable to the Contractor. If penalty is levied for delay completion of the work, the contractor shall not be eligible to get price variation on the above materials on the value of works executed during the extended period.

Reimbursement in case of differential cost due to increase in prices of cement, steel, bitumen and pipes are to be made by the Executive Engineer with prior approval of tender accepting authority subject to following conditions: -

1) Contractors have to submit the vouchers showing procurement of difference materials from authorized dealers for the said work.

2) Differential cost will be allowed only for the works which are progressed as per the approved work programme / revised work programme duly approved by the Engineer in Charge.

Recovery in case of decrease in prices of cement, steel, bitumen & pipes shall be made by concerned Executive Engineer from the Contractor immediately.

The increase/decrease in prices of cement, steel, bitumen and pipes for reimbursement/recovery shall be determined as follow: -

a) Adjustment towards differential cost of cement.

V_c = $(C_i – C_0) / C_0$ x Actual quantity of cement utilized in the work during the quarter under consideration x base price of cement as prevailing on the last stipulated date of receipt of tender including extension, if any.

V_c = Differential cost of cement i.e amount of increase or decrease in rupees to be paid or recovered.

C_i = All India Wholesale price index for cement for the quarter under consideration as published by Economic Adviser, Govt. of India, Ministry of Industry and commerce, New Delhi.

C_0 = All India Wholesale price index (as published by Economic Adviser, Govt. of India, Ministry of Industry and commerce, New Delhi) for cement as prevailing on the last stipulated date of receipt of tender.

b) Adjustment towards differential cost of steel.

V_s = $(S_i – S_0)$ x Actual quantity of steel utilized in the work during the quarter under consideration.

V_s = Differential cost of Steel i.e. amount of increase or decrease in rupees to be paid or recovered.

S_i = Cost of the Steel as prevailed during the period under consideration as fixed by Steel Authority of India.

S_0 = Base price of Steel prevailing as on the last date of submission of tender including extension, if any.

c) Adjustment towards differential cost of Bitumen.

V_b = (B_i – B_0) x Actual quantity of bitumen utilized in the work during the quarter under consideration.

V_b = Differential cost of Bitumen i.e amount of increase or decrease in rupees to be paid or recovered.

B_i = Average cost of Bitumen prevailed during the period under consideration as fixed by IOCL/BPCL/HPCL.

B_0 = Base price of Bitumen as prevailing on the last stipulated date of receipt of tender including extension, if any.

d) Adjustment towards differential cost of Pipes.

V = $0.85 \times P_p / 100 \times R (P_i - P_0) / P_0$.

V_p = Differential cost of pipe i.e. amount of increase or decrease in rupees to be paid or recovered during the quarter under consideration.

P_p = Percentage of pipe component of the work as indicated in the clause 31 (d).

R = Value of work done during the quarter under consideration excluding the value of work executed under extra items, if any, at prevailing schedule of rates or derived rate.

Pi = All India Whole sale price index for the period under consideration as published by Economic Advisor, Govt. of India, Ministry of Industry and Commerce, New Delhi, for the type of pipe under consideration.

P_0 = All India Wholesale price index (as published by Economic Advisor, Govt. of India, Ministry of Industry and Commerce, New Delhi) as on the last stipulated date of receipt of tender including extension, if any, for the type of pipe under consideration.

31 (b) REIMBRUSEMENT / REFUND DUE TO STATUTORY RISE IN COST OF MINIMUM WAGES BY GOVERNMENT.

If after submission of the tender, the wages of labour increases or decreases as a direct result of the coming into force of any fresh law, or statutory rule or order beyond the wages prevailing at the time of the last date of submission of tenders including extensions, the contractor shall be eligible to get escalation due to such hike on the value of works executed during the stipulated period and during the validity extended period when the delay in completion is not attributable to the Contractor. If penalty is levied for delayed completion of the work, the contractor shall not be eligible to get escalation on labour on the value of works executed during the extended period.

The Contractor shall, within a reasonable time of his becoming aware of any alteration in the price of any such wages of labour, give notice thereof to the Engineer-in-Charge stating that the same is given pursuant to this condition together with all information relating thereto which he may be in a position to supply. Engineer-in-Charge may call books of account and other relevant documents from the contractor to satisfy himself about reasonability of increase in prices of wages and actual payment thereof for this purpose, the labour component of the work executed during period under consideration shall be the percentage (as

specified in table below) of the value of work done during that period and the increase/decrease in labour shall be considered on the cost of minimum daily wages of any unskilled Labourer, fixed by the Government of Odisha under Minimum wages act.

The compensation for escalation of labour shall be worked out as per the formula given below: -

V_i = 0.85 x P_i /100 x R x (L_i – L_0)/L_0

V_i = increase or decrease in the cost of work during the quarter under consideration due to changes in rates of minimum wages.

R = Value of work done during the quarter under consideration excluding the work executed under extra items if any at prevailing schedule of rate / derived rates.

L_0 = the minimum wages for labour as notified by State Government, as prevailing on the last stipulated date of receipt of tender including extension, if any.

L_i= the minimum wages for labour as notified by State Government & as prevailed on the last date of the quarter previous to the one under consideration. In respect of the justified period extended, the minimum wage prevailing on the last date of quarter previous to the quarter pertaining to stipulated date of Completion or the minimum wage prevailing on the last date of the quarter previous to the one under consideration, whichever is less, shall be considered.)

Pi= Percentage of labour component of the work, as indicated in the clause 31 (d)

31 (c) REIMBRUSEMENT / REFUND DUE TO VARIATION IN PRICES OF P.O.L.

Similarly, if during the progress of work, the prices of Diesel, Petrol, ,Oil and Lubricants increase or decreases as a result of the price fixed there of by the Government of India and the Contractor thereupon necessarily and properly pays such increased or decreased price towards Diesel, Petrol, Oil and Lubricants used in the 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 of 85% in between the price of P.O.L, which is operating for the quarter under consideration and that operated for the quarter of last date of receipt of bids as per the formula indicated below provided that the work has been carried out within the stipulated time or extension thereof as are not attributable to him. If penalty is levied for delayed completion of the work, the contractor shall not be eligible to get price escalation on POL on the value of works executed during the extended period.

Formula to calculate the increase or decrease in the price of P.O.L.: -

V_f = 0.85 x P_f /100 x R x (F_i – F_0)/F_0

V_f = increase or decrease in the cost of work during the quarter under consideration due to changes in rates for P.O.L.

P_f= Percentage of P.O.L. component of the work, as indicated in clause-31 (d) below.

R = Value of work done during the quarter under consideration excluding the work executed under extra items if any at prevailing schedule of rate / derived rates.

F_i = All India Wholesale price index for Fuel, Oil & Lubricant (High Speed Diesel) for the quarter under consideration as published by Economic Adviser, Govt. of India Ministry of Industry And Commerce, New Delhi. In respect of the justified period extended, the rates prevailing at the time of stipulated date of completion or the

prevailing rates of the period under consideration, whichever is less, shall be considered.

F_0= All India Whole dale price index for Fuel, oil & lubricant (High Speed Diesel) as prevailing on the last stipulated date of receipt of tender including extension, if any.

31 (d):- The following percentages will govern the price adjustment for the entire contract for different types of works as applicable given in the following table.

Percentage Table

Sl.No	Category of works		% Component (cost wise)		
			Labour (P_1)	POL(P_1)	Steel (P_1)+ Cement (Pc) + Bitumen (P_0)+ Pipes (P_p)+ Plant & Machinery, spare & Component(P_0) + Other Materials)
1	R&B works (% of compone	Road works	5	5	90
		Bridge works	5	5	90
		Building works	5	5	90
2	Irrigation works (% of component)	Structural work	5	5	90
		Earth, canal & embankment works	5	5	90
	P.H. works (% of component)	Structural work	5	5	90
		Pipeline work	5	5	Pipe-70% *Machinery + Other materials-20%
		Sewer line	5	5	Pipe-70% *Machinery + Other materials-20%

Note: Further break up may be worked out considering the consumption of cement, steel, bitumen, pipe and Plant & Machinery, spare component in the concerned works and shall be provided in the bid document in shape of "Schedule of Adjustment Data" as an "Appendix to bid" (enclosed here with).

*Note: - Further break up may be worked out considering the consumption of Cement, Steel, Bitumen and pipe in the concerned works for the period under consideration. **Appendix to Bid**

Schedule of Adjustment Data

(For all works, adjustment factor for Labour and POL shall be considered @ 5% each Steel, cement, pipes, other Materials and Machinery shall contribute to 90% of Price Adjustment and shall be calculated for each work separately during preparation of estimate shall be approved by the authority during technical sanction as a "Schedule of Adjustment Data" and shall from part of the Bid Document)

Cl.No.31 of F2/P1 contracts Sl.No	Index description	Source of index	Base value	Base Date	Weightage of item
31(a)(i)	Other materials	All India Wholesale price index (all commodities) as published by the Economic Advisor to the Govt. of India, Ministry of Commerce and Industry)			
31(a)(ii)	Cement	Wholesale price index for cement (Ordinary Portland cement) as published by the office of the Economic Advisor to the Govt. of India, Ministry of Commerce and Industry)			

31(a)(iii)	Steel	Wholesale price index for Steel (Mild Steel-long products) as published by the office of the Economic Advisor to the Govt. of India, Ministry of Commerce and Industry)			Initimated later
31(a)(iv)	***Bitumen (VG-30)***	Official retail price of bulk bitumen at the nearest IOC/HPCL depot			
31(a)(v)	Pipes	Wholesale price index for the type of pipe under consideration as published by the office of the Economic Advisor to the Govt. of India, Ministry of Commerce and Industry)			
31(b)	Labour	Minimum Wage notified by the Labour and Employee's State Insurance Department of government of Odisha, India			5%
31(c)	P.O.L.	Official retail price of HSD at the nearest IOCL/HPCL/BPCL Consumer pump depot			5%
31(d)	Plant & Machinery	Wholesale price index for manufacture of Machinery for Mining, Quarrying and Construction as published by the office of the Economic Advisor to the Govt. of India, Ministry of Commerce and Industry)			
			Total		100%

*Value to be filled up at the time of drawl of contract

*Values to be filled up in the bid document.

31 (e): - APPLICATION OF ESCALATION CLAUSE:

(i) The contractor shall for the purpose of availing reimbursement/refund of differential cost of steel, bitumen, cement, pipe, POL and wages, keep such books of account and other documents as are necessary to show that 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 documents to be verified in such a manner as the Engineer-in-Charge may require any document and information kept. The contractor shall within a reasonable time of 15 days of his becoming aware of any alteration in the price of such material, wages of labour and / or price of P.O.L. give notice thereof to the Engineer-in-Charge stating that the same is given pursuant to this condition along with information relating there to which he may be in a position to supply.

(ii) The compensation for escalation shall be worked out at quarterly intervals and shall be with respect to the cost of work done as per bills paid during the three calendar months of the said quarter. The first such payment shall be made at the end of three months after the month (excluding the month in which tender was accepted) and thereafter at three months interval. At the time of completion of the work, the last period for payment might become less than 3 months, depending on the actual date of completion.

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 or canal structure should be cleared and dressed.

FAIR WAGE CLAUSE

Clause – 33 (a) The contractor shall pay not less than fair wage to labourers engaged by him on the work.

Explanation: "Fair wages" means wages, whether for time or price 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" (W.D. 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 labourers indirectly engaged on the work including any labour engaged by his sub contractors in connection with the said work, as if the labours had been immediately employed by him.

(c) In respect of all labour directly or indirectly employed in the works for the performance of the contractor's part of this agreement, the contractor shall comply with or cause to be complied with all regulation made by Government in regard to payment of wages, wage period deductions from wages, recovery of wages not paid and deductions unauthorized made, maintenance of wages 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/ Executive Engineer or Sub-Divisional Officer concerned shall have the right to deduct, from the money due to 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 the conditions of the contract for the benefit of workers nonpayment of wages or of deductions made from his or 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 Odisha, 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 contractor.

(f) The regulations aforesaid shall be deemed to be part of this contract and any breach there of shall be breach of this contract.

(g) Under the provision of the Minimum Wages Act, 1948 & minimum wages (Central Rules, 1950) the contractor is bound to allow or cause, to allow to the labourers directly or indirectly employed in the works 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/ Executive Engineer or Sub-Divisional Officer concerned shall have the right to deduct the sum not paid on account of wages for weekly holiday to labourers and pay the same to the persons entitled there to from any money due to the contractor.

(h) The contractor shall at his own expense provide or arrange for the provision of foot wear for any labour doing cement mixing work and black topping of roads (The contractor has undertaken to execute under this contract) to the satisfaction of the Engineer-in-charge and on his failure to do so Government shall be entitled to provide the same and recover the cost from the contractor.

(i) The contractor shall submit by the 4^{th}& 10^{th} 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 to the current month respectively (1) the number of labours employed by him on the work (2) their working hours (3) the wages paid to them (4) the accident that occurred during the said fortnight showing the circumstances under which they happened and the contend of damage and injure caused by them and (5) the number of female workers who have been allowed maternity benefit according the clause [K] and the amount paid to the Government a sum not exceeding for each default of materially incorrect statement. The amount levied as fine decision of the Superintending/ Executive Engineer shall be final in deducting from any bill due to contractor.

(j) In respect of all labour directly employed in the works for the performance of the contractor's part of this agreement, the contractor shall comply with a cause to be

complied with all the rules framed by Government from time to time for the protection of health and sanitary arrangement for workers employed by the Odisha Public Works Department and its contractor. This will apply to work places having 50 or more workers.

(k) Maternity benefit rules for female worker employed by contractor, Leave and pay during leave shall be regulated as follows.

1- Leave : (i) **In case of Delivery :-** Maternity leave not exceeding 8 weeks, 4 weeks up to including the day of delivery or 4th weeks following that day.

(ii) **In case of Miscarriage: -** Up to 3 weeks from the date of miscarriage.

2. Pay (i) **In case of Delivery :** Leave pay during maternity leave will be at the rate of women's average daily earnings 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 which she gives notice that she expects to be confined or at the rate of **Rs. 472.00** a day whichever is greater.

(ii) **In case of Miscarriage :** Leave pay at the rate of average daily earnings calculated on the total wages earned on the days when full time work was done during a period 3 months immediately preceding the date of such miscarriage,

Conditions of grant of Maternity Leave: No maternity leave benefit shall be admissible to a woman unless she has been employed for a total period not less than 6 months immediately preceding the date on which she proceeds on leave.

MODEL RULES FOR HEALTH & SANITARY ARRANGEMENTS FOR WORKERS EMPLOYED BY ODISHA P.W.D. OR IT'S CONTRACTORS

1. **Application:** These rules shall apply to all construction work in charge of Odisha 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 are employed in connection with construction work

(ii) Large work place means a place at which averages of 500 or more workers are employed in connection with construction work.

3. **First Aid:**

(a) At every work place there shall be maintained in a readily accessible place first aid appliances including an adequate supply or sterilizer dressing and sterilized cotton wool. The appliances shall be kept in good order and in large work places they shall be readily available during working hours.

(b) At large work places where hospital facilities are not available within easy distance of the workers, first aid posts shall be established and run by a trained compounder.

(c) Where large work places are remote from regular hospitals an indoor ward shall be provided with one bed for every 250 employees.

(d) Where large work places are situated in cities towns or in their suburbs and no beds are considered necessary owing to the proximity of city, town hospitals, and 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 persons or person to the nearest hospitals.

4. **Drinking Water:**

(a) In every work place, there shall be provided and maintained at suitable places, easily accessible to labour, a sufficient supply of water fit for drinking.

(b) 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.

(c) Every water supply of storage shall be at a distance of not less than 50 feet from any latrine, drain or other sources of pollution where water to be drawn from an existing well

which is within such proximity of latrine drain or any other sources 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 tray door which shall be dust and water proof.

(d) A reliable pump shall be fitted to each covered well the tray door shall be kept locked and opened only for cleaning or inspection which shall be done at least once a month.

(e) The temperature of drinking water supplied to workers shall not exceed 90^0 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 in clean and drained condition

6. **Scale of Accommodation in Latrines and Urinals: -** There shall be provided within the premises of every work place latrine and urinal in an accessible place; and the accommodation, separately for each of them shall not be less than the following.

(a)	Where the number of persons employed does not exceed 50.	No. of seats 1
(b)	Where the number of persons employed exceeds 50 but does not exceed 100	No. of Seats 3
(c)	For every additional 100 (in particulars cases the Executive Engineer shall have the power to vary the scale where necessary)	No. of seats 3 per 100

7. **Latrine and Urinals for Women:** If women are employees, separate latrines and urinals separate from that for women and marked in the vernacular in conspicuous letter “for women only” shall be provided on the scale laid in rule.

Those for men shall be similarly marked “for men only” A poster showing the figure of a men and women and 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. Latrines and Urinals : Except in work places provided with water flushed latrines connected with a water borne sewerage system, all latrines shall be provided with receipt able 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 receptables shall be tarred inside and outside at least once 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 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 as, Director of Public Health of Municipal Medical Officer or Health at the case may be, whose jurisdiction the work place is situated. Alternatively excreta may be disposed off by putting a laver of night soil at the bottom of pucca tank prepared for the purpose and covering it with 6’ layer of waste or refuse and then covering it up with a layer of earth for a fortnight (when it will turn in to manure).

11. **Provision of shelters during rest:** At every work place, there shall be provided free of cost two suitable sheds one for females and the other for rest for the use of labourers. The height of the shelter shall be less than 11 feet from the floor level the lowest part of the roof.

12. **Crèches:**At every work place at which more than 50 women workers are employed, there shall be provided only one hut for the use of children under the age of 6 year, 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 a lower standard than the following.

i. Thatched huts
ii. Mud floors and walls.

iii. Planks spared over the mud floor and covered with matting.

iv. The hut shall be provided with suitable and sufficient openings for light and ventilation. There shall be adequate provision for sweepers to keep the place clean. There shall be two dhai in attendance. Sanitary utensil 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 workers is more than 50 the contractor shall provide one hut and Dhai to look after the Children of women workers.

c) The size of creche 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.

CONTRACTOR'S LABOUR REGULATIONS

1. **Short title**: -These regulations may be called "The Odisha Public Works Department / Electricity Department Contractor's Regulations".

2. **Definition:** In these Regulations, unless otherwise expressed or indicated the following words and expressing shall have the meaning hereby assigned to them respectively,

that is say:

(a) "Labour" mean workers employed by a contractor for work directly or indirectly through a sub-contractor or other person, by an agent on his behalf.

(b) Fair wages mean wages whether for time or piece work prescribed by the **Superintending Engineer, Upper Indravati Left Canal Division No-II Dharmagarh, Kalahandi** provided that where high rates have been prescribed under the minimum wages Act 1948 wages at such higher rates would constitute fair wages (W.D. No.22059 dt,16.8.77)

(c) "Contractor" shall include every person whether a sub-contractor or headman or agent employing labour on the work taken on contract.

(d) "Wages" shall have the same meaning as defined in the payment of wages Act. And include time and piece rate wages if any.

3. **Display of notices regarding ways, etc.:-**

The contractor shall:-

(a) 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 a conspicuous places on the work, notice in English and in the local Indian language spoken by the majority of the workers giving the rate of wage prescribed by State Public Works Department **Superintending Engineer, Upper Indravati Left Canal Division No-II Dharmagarh, Kalahandi,** the district in which the work is done.

(b) Send a copy of such notices to Engineer-in-charge of the work.

4. Payment of Wages :-

(a) Wages due to every worker shall be paid to him direct.

(b) All wages shall have to be paid in cash in current coin or currency or in both.

5. Fixation of wages periods :-

(a) The contractor shall fix the wage period in respect of which the wages be payable.

(b) No wage period shall exceed one month.

(c) Wage of every workman 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.

(d) 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.

(e) All payment of wages shall be made on a working days.

6. Wage book and wage cards etc.

1) The contractor shall maintain a wage book of each worker in such forms as may 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 of the ground for which the deduction is made.

f) Wage actually paid for each wage period.

2) The contractor shall also maintain a wage card for each worker employed on the work.

3) The Executive 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.

1) The wages of a worker shall be paid to him without any deductions of any kind except the following.

a) Fines.

b) Deduction for absence from duty, i.e. from the place or places where by 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 goods expressly entrusted to the employed person for custody' or for loss on money for which he is required to encount where such damage or loss is directly attributable to his neglect or default.

d) Any other deduction which the Odisha Government may from time to time allow.

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 abuse against such fines or deduction.

3) The total amount of fines which may be imposed in any one wage period on a works shall not exceed an amount equal to Five paise in a rupee of the wages payable to him in respect of that wage period.

4) No fine imposed on any worker shall be recovered from him by installments after the expiry of 60 days from the date on which it was imposed.

8. Register of fines, etc.

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

2) The contractor shall maintain a list in English and in the local Indian language clearly defining 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 place on the work.

9. **Preservation of register:**

The wage register, the wage cards and the register of fines, deduction required to be maintained under these regulations shall be preserved for 12 months after date of the last entry made in them.

10 **Powers of Labour Welfare Officers to make investigation or enquiry**

The labour Welfare Officers or any other persons authorized by the Government of Odisha on their behalf shall have power to make enquiries with a view to ascertaining and enforcing due and proper observance of the fair wage clauses and the provision of these regulations. He shall investigate into any complaint 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 authorized as aforesaid shall submit a report of the results of his investigation of enquiry to the Executive 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 labourers concerned.

12. Appeal against the decision of Labour Welfare Officers.

Any persons aggrieved by the decision and recommendation of the Labour Welfare Officer or other person so authorized may appeal against such decision to the Labour Commissioner within 30 days from the date of decision forwarding simultaneously a copy of this appeal to the Executive 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 wage book, card to any of his worker or his agent at a convenient time and place after due notice is received, or to the Labour Commissioner or any other person authorized by the Government of Odisha on his behalf.

14. Submission of return:

The contractor shall submit periodical returns as may be specified from time to time.

15. Amendment

The Government of Odisha may from, time to time add to or amend these regulations and on any question as to the application interpretation of effect of the regulations the decision of the Labour Commissioner or any other persons authorized by the Government of Odisha in that behalf shall be final.

Clause 34 The incentive for timely completion should be on a graduated scale of 01 (One) percent to 5 (Five) percent of the contract value. Assessment of incentives may be worked out for earlier completion in all respect in the following scale.

Before 30% of the contract period = 5% Contract value

Before 20 to 30% of the contract period = 4% Contract value

Before 10 to 20% of the contract period = 3% Contract value

Before 5 to 10% of the contract period = 2% Contract value

Before 5% of the contract period = 1% Contract value

Clause – 35 The royalty of materials will be recovered from the work bill in case failure of production of proper receipt from quarry holder or Revenue Department after proper verification from concerned Tahasildar

Clause - 36 - - Deleted.

Clause - 37 The terms and conditions of the agreements have been read/ explained to me and certify that I/We clearly understand them.

1. ADDENDUM TO CONDITION OF CONTRACT:

1.1. The bidder / Tender whose bid has been accepted will be notified of the award by the Engineer-in-Charge prior to expiration of the validity period by cable, telex or facsimile confirmed by registered letter. This letter (hereinafter and in the conditions of contract called the ("Letter of Acceptance") will state the sum that the Engineer-in-Charge will pay the contractor in consideration of the execution, completion and maintenance of the works by the contractor as prescribed by the contract (hereinafter and in the contract called the "Contract Price").

1.2 The notification of award will constitute the formation of the contract, subject only to the furnishing of a performance security (ISD) and additional performance security in accordance with the provisions of the agreement.

1.3 The agreement will incorporate all agreements between the officer inviting the bid/Engineer-in-Charge and the successful bidder. **Within 15** days following the notification of award along with the letter of acceptance, the successful bidder will sign the agreement and deliver it to the Engineer-in-Charge. Following documents shall form part of the agreement.

a) The notice inviting bid, all the documents including additional conditions specifications and drawing, if any, forming the bid as issued at the time of invitation of bid and acceptance thereof together with any correspondence leading thereto & required amount of performance security including additional performance security.

b) Standard P.W.D. Form P_1.

2. TIME CONTROL

2.1 Progress of work and Re-scheduling programme

2.1.1. The Executive 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. Before acceptance of tender successful bidder shall submit to the Engineer-in-Charge for approval and programme commensurate to clause no 3 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, ½ of the whole of the work before ½ 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 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 overdue 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 after the contractor's obligations. The contractor may revise the programme and 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 the 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 issues 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.

2.2.2. As soon as possible after the contract is concluded the contractor shall submit a Time & 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 sections of the work and may be amended as necessary by agreement between the Engineer-in-Charge and the Contractor within the limitations 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 Clause – 2.1.3 above.

2.2.3. In case of delay occurred due to any of the reasons mentioned below, the contractor shall immediately give notice thereof 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, bx officers any of the heads employed on the work, or
iv. Delay on the part of other contractors or tradesmen engaged by Engineer-in-Chief, 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 Data without the Contractor taking steps to accelerates 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 data 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 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/ Executive Engineer (whose decision in writing shall be final and binding) may decide on the amount of tendered value of the work for every completed 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 completion has been specified Compensation @ 1.5% per month or for delay of work, delay to be computed on per day basis.

The existing relevant provision in the original documents shall stand modified accordingly. 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 items of work for which 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 Cl 2 (a) of P1 contract. 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 the contract. However, if the Contractor catches up with the progress of work on the subsequent milestone(s), thew withheld amount shall be released.

In case the contractor files to make up for the delay in subsequent milestone(s) amount mentioned against each milestone missed subsequently also shall be withheld. However, no interest whatsoever, shall be payable on such withheld amount.

2.4 Management Meetings

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

2.4.2. The Engineer shall record the business of management meetings and 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 the management meeting or after the management meeting and stated in waiting to all who attended the meeting.

Percentage rate Contract

(i) In percentage rate contract the schedule of quantities shall mention estimated rate of such item and amount thereof. The contractor has to mention the percentage excess or less over the estimated cost (in figures as well as words) in the prescribed format appended to the tender document.

(**ii)** The percentage rate contract may be named as **P-1**. In this form **time is the essence**.

(iii) The contractor is required to maintain a certain rate of progress specified in the contract. The contract can also be terminated with penalty when the progress of work is not as per the condition of contract. The quantity mentioned can be increased or reduced to the extent of 10% for individual items, subject to a maximum of 5% over the estimated cost. If it exceeds the limit stated above prior approval of competent authority is mandatory before making any payment. The period of completion is fixed and cannot be altered except in case of exceptional circumstances with due approval of next higher authority.

(iv) In this form of tender, only percentage quoted by the contractor shall be considered. Percentage quoted by the contractor shall be accurately filled in figures and words, so that there is no discrepancy. If any discrepancy is found in the percentage quoted in words and figures, then the percentage quoted by the contractor in words shall be taken as correct. If any discrepancy is found in the percentage quoted in percentage excess/less and total rate quoted by the contractor, then percentage will be taken as correct. The percentage quoted in the tender without mentioning excess or less and not supported with the corresponding amount will be treated as excess. The contractor will write **percentage excess/ less up to two decimal point only**. If he writes percentage excess/less up to two or more decimal points, the first decimal point shall only be considered without rounding off. Where the contractor has omitted to quote the rates either in figures and words, the officer opening the tender should record the omission.

(**v)** Bills for the percentage rate tenders 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.

RELEVANT PROVISION IN THIS CONRACT STANDS MODIFIED ACCORDINGLY.

GENERAL CONDITION

1. RATE

The percentage rates quoted should be for finished items or work unless otherwise mentioned in the tender schedule and shall remain valid for a period of ninety days from the date of receipt of tender. The percentage rates quoted in the tender should be written both in words and figures. In case of any discrepancy, the percentages rates written in words shall prevail.

The percentage rates quoted will cover (i) cost of all materials, supplies, labour (ii) carriage of all materials from source of quarries to proper work site (stacking where necessary), Worksite to mixing platform and then to proper work, with all leads, lifts and delifts (II) rehandling (iv) Royalty and all taxes (v) Curing water required for construction and curing (vi) plants, tools, machineries, implements, loaders, gangway scaffolding (vii) Labour and materials required for setting out works, construction and maintenance of reference pillars, haul road and maintenance haul road (vII) construction of storage sheds, labour sheds, providing labour amenities watch and ward of materials (ix) fencing and light for protection (x) protection work (xi) Providing block outs and all other contingencies (xii) over head charges, sundries and all other contingent and incidental charges. The tenderer shall also be deemed to have quoted the rates after having carefully examined the detailed tender call notice, tender documents, special conditions, and/or Additional conditions. P1, Agreement, detailed drawings, specifications, visited the site of work and its surroundings, visited the quarries, approach roads required for the work and satisfied himself as to the form and nature of the site, approach roads and quarries, assessed all the requirements, needed for execution of the works, made an inventory of such information's as to risks, contingencies, arrangements and other circumstances which would influence or affect his rate and tender for satisfactory completion of work. The tenderer shall be entitled/responsible for the efficiency of percentage rates, quoted or negotiated rates offered due to negotiation thereafter should be noted that the above operations are not exhausted: and omissions of any such items required for delivering finished items of work and completion of work shall not be plea by the contractor that some items are not covered by the rates quoted or negotiated thereafter by him. It should also be noted that the contractor is not entitled to any claim/any compensation or losses for making any such aforesaid arrangements to execute the work due to stoppage of work or close of work decrease of quantity in any item in the work for whatever reason.

Letter up loaded for the tender intimating modification to the tender already submitted will not be considered.

2. CAPABILITY OF TENDERER

Details of plants & Machinery proposed to be used in the work with period details of technical and supervising personal proposed to be engaged in the work past, full information in the capacity, financial resources and experience are to be furnished clearly by the tenderer.

3. TAXES, ROYALTY, CLEARANCE CERTIFICATE & LICENCE ETC.

It is hereby expressly provided that the contractor shall bear all taxes, royalties, income tax, sales tax, fair weather charges, tollage fees, all local taxes including enhancements thereafter during execution.

The tender will not be considered unless the tenderer encloses upto date certify copy of the Income tax, Sales tax clearance certificate, PAN card, GSTIN Clearance Certificate, Labour license and contractor's license along with the tender and shall have to produce the originals as and when so required.

4. DEVIATION OF QUANTITY, EXTRA ITEMS & MODIFICATIONS.

Right is reserved by the Engineer-in-charge to make such increase or decrease in the quantity or items of work mentioned in the schedule as may be considered necessary for satisfactory completion of the work and such Increase or decrease to be made in writing by the Executive Engineer to the contract or his agent shall neither in any way invalidate the contractor, nor rates nor the contractor shall be entitled to get any compensation on this account. But extension of time shall be considered, if necessary, on the application of the contractor.

It should be clearly understood that no claim whatsoever will be entertained as regards extra item of work or extra quantities of any item besides those provided in the agreement if executed without written order of the Engineer-in-Charge. The contractor shall at his own cost watch the day-to-day upto date quantity of work executed and intimate in writing additional work necessary well in advance and take up such additional works or extra items of work only after receipt of written approval of the Executive Engineer.

The written authority given by the Executive Engineer for any modification or alterations or addition to the work are to be measured and valued and added to or deducted from the amount of the contract as the case may be, at rates from the contractor, rates, in force at the time when the particulars item of work was commenced. In those cases, in which rates do not exist the Executive Engineer will fix the rates, which

is final and binding on the contractor.

5. ALLOTMENT OF WORK TO OTHER AGENCY & SUB-LETTING.

The contractor shall not sublet the work or a portion of the work without the written approval of the Executive Engineer.

6. NO RELATIONSHIP CERTIFICATE

The contractor shall have to furnish a certificate along with the tender to the effect that he is not related to any officer of the rank of Asst. Engineer and above connected with estimate, tender and execution of the work and any officer of the rank of Asst. Secretary or above of Water Resources Department, Government of Odisha.

7. DAMAGES TO PROPERTY

In case of any damage to Government property or public property or any private property due to negligence or any such action of the contractor, or contractors employee resulting in damage of thereby, the contractor shall be liable to be penalized to the extent of the assessed value of the damage or the out turn lost.

8. Rules & Regulations

The contractor shall abide by all rules and regulations of the State & Central Govt. / Local Bodies in controlling the operations involved to carry out the work and indemnify the Government and employees of the Govt. against all suits, losses, demands, actions, Judgments and cost of every kind resulting from the conduct of the contractor and his employees in violations of the said rules and regulations.

9. OBLIGATION TOWARDS CONTEMPORARTY CONTRACTORS

The Contractor shall take into consideration the needs and requirements of the other contractors working in the Project or nearby during the tenure of his contract and shall neither take nor cause to be taken any steps or action that may cause disturbances to their works, labour or arrangements etc.

Any action by the contractor which the Engineer-In-Charge in his unquestioned discretion may consider as infringement, the above shall be considered as a breach of the contract and the Engineer-in-charge may take such caution against the contractor as he may deem fit.

10. ARCHEOLOGICAL FINDINGS

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

11. SUSPENSION OF WORK

The Engineer-in-charge may from time to time by written orders without in any way violating the contract direct the contractor to suspend the work or any part thereof at any time and the contractor after receiving such written order shall not proceed with the works or item thereof ordered to be suspended until he receives a written notice or authority from the Engineer-in-Charge to proceed with the said work again.

Should the works be ordered to be suspended directly in the interest of safety of the work due to act of God, force major, war or indirectly as a result of the contract in respect of the locality of materials, workmanship, programme of execution the order of execution etc., the contractor shall not be entitled to claim any compensation or any loss to him directly or indirectly.

During the period of suspension of the work the contractor shall properly protect and secure the work materials and machinery in all respect at his own cost and risk.

12. PROGRAMME & PROGRESS

The contractor shall carry out the work in conformity to Clause 2 of P1 contract.

13. PRECAUTONS AND SAFETY MEASURES

(Natural calamities and other cases)

The contractor at his own cost and risk shall take precautions to protect the work from damages due to rains, flood, cyclone, fire or by any other natural calamity public agitation or riots and etc, and also make good such damages, if any at his own cost during the period of execution and till the work, is taken over by the Department. The contractor shall not be paid any compensation for the expenditure towards losses due to idle labour or due to idle machinery on account of the above reasons.

Accumulation of slit or any foreign materials are to be cleared by the contractor at his own cost during the course of execution and till the work is completely taken over by the Department. The rates quoted by the contractor should be inclusive of all such contingencies.

The contractor is responsible for and is to make good all injuries, damages and repair occasioned or rendered necessary to the same by fire or accident of other causes and he is to hold the Government of

ODISHA or his employees free from any claims for injuries to persons or for structural damages to property due to neglect or default or want of proper care or misconduct on part of the contractor or any his employee during the execution of work. The contractor shall provide necessary precautions and safety measures prescribed by ISI, Central Government, State Government, Local administration with its day-to-day amendments, if any.

The contractor shall be responsible for all accidents which may arise from whatsoever causes it may arise and the contractor is required to meet all expenses, claims, damages and compensation due to such accident (s) at his own cost.

The contractor shall without prejudice to any other liability pay prescribed fine per day to Government for each day of default for his failure, to comply with the provisions of the safety manual (N.O.C.W.& P.C.86)

14. PRICE PREFERENCE

Concession and price preference to M/s ODISHA Construction Corporation and other firms registered under Government of ODISHA / Government of ODISHA Undertaking shall be considered as per rule in vogue.

15. ADDITIONAL SHIFT

The contractor shall arrange adequate lighting for night shifts at his own cost whenever necessary to suit the construction programme.

16. TOOLS, PLANTS & MACHINERIES

Ordinarily no tools or plants and machinery or equipments will be hired to the contractor. The contractor will at his own cost arrange necessary tools; plants and machineries required for the efficient execution of work and the rates quoted should be inclusive of such charges. The Department may lend on hire some machineries for use in the work with recovery of hire charges subject to their availability on terms and conditions as per rules in vogue which can be seen in the office of the Superintending Engineer. The Superintending Engineer has full right to withdraw the departmental machinery at any time from the contractor for any other work or for any other reasons and the contractor shall not be paid any other compensation or losses due to withdrawal of the machine. It is hereby expressly provided those on the pleas of non-supply of machineries the work should not be delayed. Any compensation on such account is not tenable.

DELETED

17. STOCK MATERIALS :

Empty Cement gunny / polythene bag shall be returned in good condition at the departmental store failing which the cost of the same @ Rs.3.13 per bag shall be recovered from the contractor.

Every tar / paint drums shall be returned in good condition at the departmental store failing which the cost @ Rs…… per drum shall be recovered from the contractor. Surplus materials not required for the work shall be returned by the contractor at the departmental store at his own cost and risk, failing which the cost shall be recovered from the contractor at five times of stock issue rate of the department or at market price of materials whichever is higher. The contractor shall be credited with the issue rate original, issued minus depreciation due to deteriorated or damages as shall be fixed by the Engineer-in-charge. In case of dispute the decision of the Executive Engineer shall be final.

18. LABOUR AMENITIES / REGISTRATION

The contractor shall provide at his own cost housing accommodation labour amenities drinking water supply sanitation, medical aid, foot-wear in cement concrete work and/or black topping works and other facilities to the laborers engaged on the work as required under labour laws and regulations. He shall abide by THE FAIR WAGE CLAUSE, ODISHA P.W.D. / ELECTRICITY DEPARTMENT CONDTRACTORS LABOUR REGULATIONS" and amendment if any during the contract period. The contractor shall be liable to fully indemnify for payment of compensation under Workmen's Compensation Act and the department reserves the right to recover the compensation, if any those not paid.

The contractor shall have to be got registered with the labour department for engagement of labourers as per rules in vogue.

The contractor will have to submit the Engineer-in-charge monthly return both skilled and unskilled labourers employed by him for the work.

The contractor shall obtain Medical Fitness of labourers engaged in the work from a RMP from nearest Government Hospital / PHC and the same should be updated monthly. No labour without medical fitness certificate should be engaged in the work. The Engineer-in-Charge may verify such fitness from time to time.

CONTRACTOR **SUPERINTENDING ENGINEER**

19. LABOUR

The contractor is preferably required to employ local labour. He may also import necessary skilled and unskilled labourers from outside as and when it is so required and the contractor' item rates in tender shall be deemed to have adequate converge on account of import and employment of required labourers and providing facilities and amenities to them.

20. CONTRACTOR'S REPRESENTATIVE & POWER OF ATORNEY HOLDER

The contractor underwritten intimation to the Engineer-in-charge shall employ and authorize at least one representative sufficiently technically qualified or otherwise competent experienced and well versed in all aspects of the work in order to carry out and supervise the work at the site for and on behalf of the contractor. The said representative shall have full power to enter in to negotiation at site in regard to the implementation of the contract.

It is the sole responsibility of the contractor on the act(s) of power of attorney holder/of his agent. The contractor is also responsible to see that intimation in writings is received by all departmental officers and staff in charge of works and when the power of attorney is revoked or the representative is withdrawn.

The Executive Engineer may require the contractor to dismiss or discharge or remove any person employed by the contractor in the work due to the misconduct or incompetence or otherwise whose presence at work site is considered to be harmful and the contractor is to comply forthwith such requirements.

21 (a) TECHNICAL HANDS AND APPRENTICES

The contractor shall employ requisite number of Engineering Graduate. Diploma Holders and Apprentices, technical and non-technical staff for quality testing of materials at his own cost for proper supervision and quality control and the number of such personnel shall not be less than the numbers prescribed.

21 (b) NEW CLAUSE

Special class contractor shall employ under him one Graduate Engineer and two Diploma Holders belonging to the State of ODISHA Likewise 'A' class contractor shall employ under him on graduate Engineer or two Diploma Holders belonging to State of Odisha.

The contractor shall pay to the Engineering personnel and quality control staff engaged for the test monthly emoluments, which shall not be less that the emoluments of the personnel of equivalent qualification employed under State Government of Odisha. The Chief Engineer, Roads, Odisha, however assist the contractor with names of such unemployed Graduate Engineers and Diploma Holders, if such help is sought for by contractor.

Each bill of the Special class or Super class contractor shall be accompanied by an Employment Roll of the Engineering personnel together with a certificate of Graduate Engineer or Diploma Holder so employed by the contractor to the effect that the work executed as per the bill has been supervised by him.

22. SPECIFICATIONS & DRAWINGS

The work has to be carried out in accordance with detailed specification of work and / or Odisha detailed standard specifications and / or Indian Standards Specification and / of instructions and specifications supplied in writing during execution of work by the Engineer-in-charge. The decision of the Engineer-in-charge in this regard is final.

Signed drawing shall not be an order of work unless it is entered in the agreement or schedule of drawings under proper attestation of the contractor and the Engineer-in-charge or unless it has been sent to the contractor by the Engineer-in-charge with a covering letter confirming that the drawing is an authority for work in the contract.

23. Blasting procedure

Blasting where required shall be taken up on when proper precautions have been taken for the protection of persons and property in accordance with IS 4081-1967 Safety code for Blasting and related drilling operations. Blasting shall be carried out only by licensed person thoroughly cover sent with the working methods and precautions to be observed in using and handling explosives. To avoid the danger of injury from flying debris all personnel in a blasting area shall retreat to an adequate cover while carrying out execution. Adequate precautions in accordance with IS 3764-1966 (Safety code of Excavation work) shall be taken for the safety of workers.

24. QUARRY, APPROACH ROAD & ETC.

The tenderer should get fully acquainted with the site of work, the quarries, approach roads and other local conditions, before tendering and should make himself fully satisfied with regard to the quantity and quality of the materials available. The contractors rate shall be inclusive of cost of materials, al taxes, royalty, cost and erection of plants, conveyance including loading, unloading, re-handling, cost of operating personnel, running maintenance and depreciation of transport vehicles and plant and leads, lifts and de-lifts, re-handling and etc. The contractor shall have to arrange quarries of forest and/or Revenue Department at his own cost.

If at any stage of construction quarries become un approachable or unsuitable for the work then the contractor is to obtain materials from other suitable quarries duly approved by the Engineer-in-charge for which no extra payment will be made.

25. CONTRACTOR DIENG, BECOMING INSOLVEMENT, INSANE OR IMPRISONED.

In the event of the death or Insanity of the contractor, the contract may be terminated notice in writing pasted at the site and advertised in one issue of the local newspapers. All acceptable works shall thereafter be paid at appropriate rates after recovering al the contractor's dues to Government to the persons entitled to receive and give a discharge for such payment.

If the Contractor is imposed, becomes insolvent, compound with his creditors has a receiving order made against him or carries on business under a receiver for the benefit of the creditor or any of them, or being a partnership firm becomes dissolved, or being a corporation goes into liquidation or commence to be wind up not being a voluntary winding up for the purpose. Only for amalgamation, the Department shall be at liberty:-

a) to give such liquidator, receiver, or other person in whom the contract may become vested the option of carrying out the contract, or a portion thereof to be determined by the Department, subject to his providing an appropriate guarantee for the performance of such contract.

b) to terminate the contract forthwith by notice in writing to the contractor, the liquidator the receiver or person in whom the contract may become vested and take further action as provided in the clause "Default by Contractor" treating as if this termination is ordered under that clause.

26. (a) FORECLOSURE OF WORKS BY GOVERNMENT

If any time after award of the contract the Govt. for any reason whatsoever does not require the whole or any part of the works to be carried out, the Engineer-in-charge shall give notice in writing to that effect to the Contractor. The contractor shall not have claim to any compensation whatsoever, on account of any profit or advantage which he might have derived from the execution of such works.

Thereupon the contractor shall be paid at contract rates for works executed and in reasonable amount as certified by the Engineer-in-charge for the items hereunder mentioned which could not be fully utilized on the work because of the foreclosure.

(a) Preliminary, site work such as temporary access roads, temporary labour huts, staff quarters and the site offices, storage accommodation and water storage, tanks.

(b) Contractors material either brought to site or for which the contractor is legally bound to accept delivery from the suppliers provided, however that the quantities of such materials are not in exceeds of reasonable requirements of works. The decision of the Engineer-in-charge in respect of reasonable quantity required for works will be final and conclusive. If the contractor wishes to take away sum of materials the Engineer-in-charge may permit him to do so.

(c) Materials supplied by Government except for normal wastage shall be returned at rates at which these were originally issued less allowance for and deterioration or damage, which may have been caused while those materials were in the custody of the contractor. The contractor shall also be paid the cost of transporting such materials from Government stores to site and from the site to Government stores, as the case may be.

(d) Transporting of contractor's tools and plants from the contractor's permanent stores to site from the site of the contractor's permanent stores.

(e) Mobilization and repartition of contractor's site staff and imported labour.

The contractor shall if required by the Engineer-in-charge, furnish him books of account and other relevant documents as may be necessary to enable him to certify the reasonable amount payable under this condition.

27. SETTLEMENT OF DISPUTES

If the contractors consider any work demanded of him to be outside the requirement of contract or conceder's any drawings, record or ruling of the Executive Engineer any matter in connection with or arising out of contract or the carrying out of work to be unacceptable he shall promptly ask the Executive Engineer in writing for instructions or decisions. These upon the Executive Engineer may afford an opportunity to the contractor to be heard and to offer evidence within a fortnight and give his written instructions or decision within a period of thirty days from the date of hearing. Upon receipt of the written instructions or decision the contractor shall promptly proceed without delay to comply with such instructions of decision. If the Executive Engineer does not give his instructions decision in writing within a period of forty five days of receipt or if the contractor is dis-satisfied may within a week after receiving instructions or decision appeal to the Chief engineer failing which the decision or Executive Engineer is final and conclusive. The Chief Engineer shall afford any opportunity within a fortnight to the contractor to be heard and to offer evidence in support of his appeal. The Chief Engineer shall give decision within a period of thirty days after the contractor has given the said evidence in support of his appeal. If the Chief Engineer does not give the decision within a period of 45 days of if the contractor is dissatisfied with the decision of the Chief Engineer, the contractor within a period of a week from receipt of the decision or after 45 days shall refer the dispute to Government in Water Resources Department failing which the said decision shall final and conclusive. The decision of Government in Water Resources Department is final and binding.

28. COURT OF JURISDICTION (As per clause-27 of Form-P1)

That the purpose of jurisdiction in the dispute, if any, the contractor should be deemed to have been entered into within the state of ODISHA and it is agreed that neither party to the contractor agreement will be competent to bring a suit in regard to the matters covered this contract at any place outside the State of ODISHA.

29. ENTERING TO CONTRACT

The tenderer whose tender is accepted shall within ten days upon the written intimation being given to him make an initial security deposit and the sign the agreement n PWD Form No.P1, Schedule XLV, Form No.61 along with production and supply of necessary documents for the due fulfillment of the contract in the office of the Executive Engineer. The security deposit together with the earnest money should be taken as the security deposit for the fulfillment of the contract. Failure to enter into the required agreement or to deposit the security money within the stipulated period shall entail forfeiture of the earnest money and rejection of tender in case of fixed deposit holder the amount of earnest money will be recovered from the fixed deposit.

30. ESCALATION

Escalation cost will be applicable as per orders of Govt. of Odisha Works Department Memorandum issued vide their No. FAILLM33/86 10273 Dated 7.4.86 read with Works Department Order No.5606/WE dt.3.4.07 which has been amended vide OM No.07550400132012/2606 dt.24.12.2012 of Works Department Government, of Odisha in vogue and same can be seen in the division office. Percentage of materials component excluding cost of departmental materials denoted by Pm and percentage of labour component denoted by Pi and percentage of POL by Pf as shown against the schedule item shall be adopted for calculation of cost.

31. LAYOUT

The contractor is to supply at his own cost necessary labour and materials for mixing platforms, vat and labour for reference i.e. bench mark pillar, level pillars, alignment pillars, pegs, string labour for benching and leveling etc. necessary for the purpose of alignment laying profiling and checking the work from time to time and maintain the same in the perfect condition at his cost and risk till final measurements and final check measurements. Pillars required for layout will be supplied by the contractor. It shall be noted that checking shall not absolve contractor of his own responsibility of maintaining the accuracy of work.

The contractor shall be responsible for the true and proper setting out of work for the correctness of levels, dimensions block outs alignment of all parts of the work and for the provision of all necessary application in connection here with done by him or by his men from these reference points. The contractor shall ask for omission or mistake if any, in writing, failing which consequent mistakes, omission shall be made good at the cost and risk of the contractor.

32. SITE ORDER BOOK

The site order book numbered and rectified with pages serial number shall be issued by the Executive Engineer. The Section Officer shall maintain it systematically and carefully as the measurement

book for the work till completion of the work and thereafter surrender it to the Division office for record.

The order book shall be available with the Section Officer at the site during working hours.

Order regarding the work as and when necessary, entered in this Book by the Executive Engineer or his superiors in office and instructions defective work etc. If any entered by the Sub-Ordinate Officer not below the rank of Sectional Officer in charge of work with their dated signature in exercising of statutory powers vested on them either noted by the Contactor or his agent shall be deemed to have been duly issued by the Engineer for the purpose of the contract copy of extract of these orders or instructions are to be supplied up to next immediate superior officer who has recorded.

33. CLAIM BOOK

The claim book numbered and certified with pages serially numbered shall be issued by the Executive Engineer to the contractor or receipt of written requisition from the contract or who shall maintain it systematically and securely and shall record in it such item as would enable him to record item of the work which are not covered in the contract and or clearable as extra claims shall be entered regularly in this book under the dated signature of the contractor or his authorised agent and an extract copy should be submitted in the same days to the Engineer-in-charge. A certificate should also be furnished along with these claims to the effect that beyond the claims entered in the book the contractor has no other claims to record a certificate to that effect should be furnished by the Contractor in the claim book. Each claim must be definite and should give a brief note of the quantities, rate and the total amounting claims. The contractor is responsible to submit the claim book regularly to the Executive Engineer by the 15thdays of each month, for his orders and it should be clearly understood that claims not preferred in the aforesaid manner are liable to be summarily rejected. The claim book shall be finally surrendered by the Contractor to the Executive Engineer for record.

34. HANDING OVER SITE

The site shall be handed over the land acquired, in case of delay in availability of land for the work of working spaces or stocking yard or spoil yard or borrow area no compensation whatsoever shall be admissible but extension of time will be considered on its merits.

35. MAINTENANCE OF WORK

The contractor shall maintain the work and all works connected with the work in good and perfect condition up to twelve months from the date of completion of the work. The contractor shall maintain the top surface of all embankments fairly level with addition of earth towards settlement. Should any damage be caused to the work or any other ancillary works by rains strips or similar other causes till twelvemonths from the date of completion, the contractor shall make good the damages at this own expenses as and when such damages occurred failing any defects shrink settlement or other faults which may appear within twelve months from the completion of work shall be made good at the cost of the contractor.

36. COMPLETION OF THE WORK AND CLEARING SITE OF WORK

The contractor shall inform in writing to the Executive Engineer immediately after he completed the work and the said intimation should reach the Executive Engineer within a week time from the date of completion. However, the work shall not be considered complete until such date as the Executive Engineer shall certify as the date on which the work is completed after necessary rectification of defects as pointed out by the Executive Engineer or his authorized agents are fully complied with by the contractor to the Executive Engineer's satisfaction. The contractor shall be responsible to make good at his own expenses defects which may develop or may be notified before or after twelve months from the certified date of completion by the Engineer-in-charge shall rectify the defects and the expenses thereof is to be recovered from the Contractor on the failure of Contractor to make good the defects. After the work is finished, al surplus materials should be removed from the site of work preliminary works such as vats mixing platforms etc. should be dismantled and all materials removed from the site and as per the direction of the Engineer-in-charge. The said areas should be left neat and clean dressed by the contractor at his own cost.

37. ADDRESS OF CONTRACTOR

The contractor shall give his full name a postal address. Any undelivered notice or instruction or communication to the contractor or to his authorized agent due to his/their absence or due to change of address or for refusal to accept notified in the notice board of the concerned office shall be deemed to have the same force as if they have been served on the contractor. The contractor is responsible to forthwith notify and intimate in writing to departmental officer any change in address and otherwise the contract shall be deemed to have made necessary arrangements to remain in close watch to all such publication in the notice board of the departmental officers.

38. AMENDED SALES TAX CLAUSE

The rates quoted by the contractor shall be deemed to be inclusive of sales tax on all the materials that he will have to purchase for performance of the contract.

The rates quoted by the contractor in the tender for works shall include sales tax that may be levied on turnover of works contract according to the law and regulations as prevalent on date of opening of tenders. Subsequent rise or fall in the rate of Sales tax during the currency of the contract shall be paid by or credited to the Government.

Sales tax as applicable with dues if any is to be deducted from each running account bill for the work in accordance with provisions under clause 4 of the ODISHA Sales Tax ordinance 1986 or as amended from time to time.

ii) Cess @ 1 % shall be deducted from the bill in accordance with the provision U/s 3(I) of the Building and Other Construction Workers Welfare Cess Act -1996 vide Resolution No. LL-1-II-125/07- 12653 dt.15.12.08 of Govt. of ODISHA, Labour and Employment Department.

39. CORRECTION TO BONAFIDE MISTAKES OR OMMISSIONS:

If there are any Bonafide mistakes or omissions in the contract detected later, the Engineer-in-charge can rectify such mistakes or omissions after due approval by the competent authority. Such rectification can be made after drawing supplementary agreement with the contractor, if necessary, in order to remove the ambiguities or indefiniteness in the contract.

40. BONOUS PAYMENT: Deleted

41. CODAL PROVISIONS

The tenderer should be aware of the relevant provisions of OPWD code.

CERTIFICATE BY CONTRACTOR

The terms and conditions of the detailed notice and additional / specified P1-Agreement have been read, explained and * I/We Certify that* I/We clearly understand them.

Signature of Contractor
(Full Name In Block Letters)
With Postal & Telegraphic Address

Permanent Address:

Present Address:

SECTION -5

SPECIAL CONDITIONS

SPECIAL CONDITION 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 does 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 Executive Engineer, in-charge of the work specified or parts of the works under the contract, or such other departmental assistants or sub-ordinates to whom the Executive Engineer, in-charge may have delegated certain duties, acting separately within the scope of the particular duties entrusted to them.

g) **Government -** Means Government of Odisha, 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.: Online payment **Rs.6,02,300 /-**

3. TAX CERTIFICATES:

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

4. TIME OF COMPLETION : The work is to be completed within **18 (Eighteen)** calendar months including 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 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 in general and particularly about the availability of the construction materials, electricity supply, water supply, storage and handling of materials, road communication etc. 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 The tenderer must furnish copy of Registration Certificate, GST Regd. Certificate, PAN Card / Affidavit, Bid Security Declaration in the prescribed format, the TIA as specified in NIT, otherwise his/her bid shall be declared as non-responsible & shall be liable for rejection.

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

6.3 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.

6.4 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.

6.5 The percentage 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, but excluding GST on works contract, but including 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 tenderer must quote the percentage rate for the contract and tenders containing indefinite terms such as estimate rate, schedule of rate shall not be considered. The rates must be for finished items of work unless otherwise mentioned in the tender schedule.

6.6 The rates should be quoted in percentage less or excess up to two decimal.

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.

6.7 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.

6.8 In order to qualify f or 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 Executive Engineer of the Department in support of such experience.

6.9 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.

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

6.11 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.

6.12 An affidavit shall be furnished by the contractor at the time of submission of tender paper about the authentication of tender documents.

6.13 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 sign the agreement in the PWD Form for fulfillment of the contract in the office of the Engineer-in-charge. The amount of **5%** deduction from each running bill as per the 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 Executive 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 Executive 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. In case of delay in acquisition of land no compensation will be admissible but extension of time will be granted.

7.3. Deleted

7.4 Deleted

7.5. 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.

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

8. OBSERVATIONS 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.

CONTRACTOR **SUPERINTENDING ENGINEER**

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 flying debris, all personnel in a blasting area shall retreat to an adequate cover. While carrying out excavation 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 contact 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 GST 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 GST 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 Odisha GST Act and Rules.

c. Sales Tax / GST:

GST on works contract will be deducted from each RA bill of the contractor @ as amended from time to time and will be credited to the Govt. account. 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:

1% or 2% as applicable under Govt. Rules of each ongoing account will be recovered from the contractor towards Income Tax (Provisional or as advised by Income Tax Department)

e. 1% of the gross amount of each R/A bills of the contractor will be deducted towards cess on works as amended from time to time.

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 Odisha 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 detail 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 P1 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 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. 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 / Percentage 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:

17.1 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.

17.2 Design forum, Bhubaneswar Consultancy supervise the work at stages during construction and Completion.

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 MAJOR:

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 including Govt. Department unless otherwise restricted by the Engineer-in-charge.

22. a. DEPARTMENTAL STOCK MATERIALS: - DELETED-

22. b. MATERIALS SUPPLIED BY THE DEPARTMENT:

No material can be supplied to the contractor as a principle as per the current policy of Govt. of Odisha vide G.O. No. 48443 / F dt. 11.12.95 effective from 01.04.96. The contractor shall be responsible for procurement of all materials at his own cost and got it tested and approved as per the relevant clauses of the contract before use.

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 keep 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 of 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 Executive 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 Executive 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 Executive Engineer and Chief Construction 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 Executive 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. 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.

32. CONTRACTOR DYING, BECOMING INSOLVENT, INSANE 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 would 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 P1 contract.

33. MEASUREMENT OF EACH WORK SHALL TAKE AS FOLLOWS:

Before commencement of work initial levels and to determine the final measurement of the work, final levels of the ground / river bed and bank 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 Executive 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 thereof, certificate by the Engineer-in-Charge for the purpose, shall be conclusive and binding.

33.1. 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.

34. REMOVAL OF CONTRACTOR'S MEN:

The contractor shall on the written direction of the Executive 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.

35. 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.

36. 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.

37. 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.

Preference in price will be given to M/s Odisha Construction Corporation Ltd. as per relevant DOWR Govt. Odisha Circular No. 20754 dated 05.06.2002.

38. QUALITY CONTROL AND TESTING:

The quality control organization (**O/o the Superintending Engineer, Quality Assurance Division, Bhawanipatna, Kalahandi**) 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.

39. 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.

40. 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.

41. 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.

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

Payment is as per Ltr No.15847 dtd.19.11.2019 of Works Department, Govt. of Odisha as appended.

CONTRACTOR **SUPERINTENDING ENGINEER**

43. 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.

44. 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.

45. 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 Odisha and it is agreed that neither party to the contract has the right to bring a suit in regards to the matter covered by the agreement or contract at any place outside the state Odisha.

45.1. 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.

46. CEMENT:

The Cement manufactured inside the State of Odisha is to be used as mentioned in Technical Specification.

47. STEEL:

Reinforcement bar manufactured by Steel Authority of India Ltd. (SAIL) / RINL is to be used.

48. ROYALTY OF CONSTRUCTION MATERIALS:

Royalty of construction materials at the rate specified by the Government of Odisha will be recovered from the bills of contractor.

Signature of witness **signature of contract**

CONTRACTOR **SUPERINTENDING ENGINEER**

SECTION -6

TECHNICAL SPECIFICATION

SECTION - 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 (4th 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- VIV)
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 are 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
Sl. No.	**Short Title**	**B.I.S Number**
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
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
Sl. No.	**Short Title**	**B.I.S Number**
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
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
Sl. No.	**Short Title**	**B.I.S Number**
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 1 to 3)	303-1975
5.	Test Sieves	460-1985
6.	Code practice for under drainage of lined canals (2nd revision)	4558-1995
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)
Sl. No.	**Short Title**	**B.I.S Number**
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 (Ist 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
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(2nd 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
Sl. No.	**Short Title**	**B.I.S Number**
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.

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SECTION – 2
SITE OF WORK

2.1 DISCHARGE 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 Odisha) 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.

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 30 m intervals. Profiles of the canal in filling and in moderate cutting shall be marked at 50 m intervals in straight reaches and at 25 m intervals 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. Pilling 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 0.5 cubic meters will be made, and the rate quoted for excavation will be considered to include this item. However, payment will made for the removal of surface boulders of sizes greater than 0.5 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.

No direct payment will be made for construing 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. The Assistant Engineers and Executive 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.

If the work is awarded to any agency, 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.

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CONTRACTOR **SUPERINTENDING ENGINEER**

SECTION- 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 there-with 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 Executive 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 Executive 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 Executive 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. EXCAVATION FOR CANAL

a) The excavation may be carried out manually or mechanically and as per specification drawing and direction of Engineer-in-charge.
b) The excavation for canal in all kinds of soil and D.I. Rock shall be done according to the dimensions and grades shown on the drawing. Proud equivalent to thickness of the lining on sides and in bed on the underside of the lining shall be left unexcavated temporarily and the removal of this proud shall be done just before trimming and placing concrete for lining.
c) Blasting shall be done in such a manner as not to cause over break, which in the opinion of the Engineer-in-charge is excessive. Special care shall be taken to prevent over break or loosening of material on bottom and side slopes against which concrete lining is to be placed. The method of drilling and blasting to be resorted to for rock excavation, shall be got approved from the Engineer-in-charge.
d) Except for the area of rock, all areas to be excavated for canal sections shall be pre-wetted so that at the time of excavation moisture content shall be at about optimum. However, in case the excavated material from canal is not to be used for embankment, such pre-wetting is not necessary.
e) The excavation shall be allowed to progress from the valley ends of the reach towards the ridge in conformity with the layout given. All useful earth from excavation shall be used in for filling the banking section, with varying leads and with all lifts either manually or mechanically. Excavated materials which is not useful for banking or which is in excess after meeting the banking requirement of the reach shall be disposed as specified at Para 8.1 and 8.2 of I.S. Code 4701-1982 either by head lead or by mechanical means or by both in spoil bank or at any specified place with all lifts and with varying leads.
f) The re-gradation for tail channel and approach channel for structures and diversion of drains, nallah shall be done according to the dimension and grade as shown on the drawings or as instructed by the Engineer-in-charge.
g) The contractor shall not be entitled to any additional rate above the rates quoted in the schedule on account of the requirement for allowing additional time for drying, stock piling and re-handling the excavated materials which

have been deposited temporarily and stock piled.

h) When cutting on cross sloping ground, the contractor shall cut a catch water drain on the higher side to prevent water from flowing down the cutting slope.

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 300 mm maximum diameter in one direction. 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 3.0 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 3.0 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 Executive 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 Executive 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/ nalla by cutting an open channel within the canal section to be excavated. When the drain/ nalla bed is higher than the subsoil water level met with, pumping shall be resorted to for dewatering below the drain/ nalla 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 of 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 of by any other method.

3.1.2.5 MEASUREMRENT AND PAYM ENT

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 of 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.

3.2.3.1 MEASUREMRENT 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.

3.2.3.2 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

3.2.4.1 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.

3.2.4.2 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.

3.2.4.3 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.

3.2.4.4 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.

3.2.4.5 MEASUREMRENT 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 fill 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 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.

CONTRACTOR **SUPERINTENDING ENGINEER**

3.4 EMBANKMENTS

3.4.1 PREPARATION OF SURFACES UNDER EMBANKMENTS

The preparation of surfaces under embankment shall be in accordance with clause 6.1 & 6.5 of IS 4701-1982.

Before commencing the work, the toe of the slope on each side of the Banks shall be lock spitted (dog belled) and marked by pegs firmly driven into the ground at intervals of about 15 meters. Profiles made by bamboos, earth, or other convenient materials and strings shall be set up for the guidance of the workmen about 15 meters apart over straight reaches and about 7.5 meters apart at curves & payment therefore will be made at the unit prices.

Except in areas of rock, the areas under canal embankments shall be pre-wetted by sprinkling water before cleaning, grubbing or excavation operations or construction of embankment begin. The moisture content shall be optimum to a depth of one meter below the original ground surface or to impervious material whichever less as directed by the Engineer-in-charge. Whenever possible, all water shall be added uniformly in one application. Areas, on the sides of the canal banks upon which the Engineer-in-charge may direct spoil banks to be constructed will not require application of water.

The contractor is cautioned to control carefully the application of water and to check on the depth and amount of water penetration during application so as to avoid over watering, accumulation of water in depressions or excessive run-off.

If at any location on embankment foundations, before and during embankment construction, there is excessive moisture as determined by the Engineer-in-charge; steps shall be taken to reduce the moisture by excavating drains, by allowing adequate drain time or by any other approved means.

The contractor shall not be entitled for any additional allowance above the unit prices bid in the schedule, on account of the requirement for allowing additional time for drying, delays or increased costs due to poor traffic ability on the embankment, foundations or on the haul roads, reduced efficiency of the equipment the contractor elects to use or on account of any other operational difficulties caused by over wetting of embankment, foundation or haul roads.

Where the ground surface under any embankment is not suitable as determined by the Engineer-in-charge for a foundation for the embankment, the contractor shall strip the area under the embankment of such unsuitable material to such depth as may be directed. The material so removed shall be disposed off as provided in paragraph 3.2.3. Measurement for payment of stripping unsuitable materials under embankments shall be made only to the lines and to such depth as may be directed and payment there off will be made at the unit prices per cubic meter bid in the bill of quantities for excavation for canal/construction of embankment.

Before beginning the construction of embankments, the surface area of ground to be occupied shall be cleared of all roots and vegetable matter of any kind stripped to a suitable depth. The stumps shall be pulled or otherwise removed, and the roots grubbed. The stumps and roots removed shall be suitably disposed-off.

The depth to which top soil is removed shall be adequate to remove all perishable material and any soil which may become unstable on saturation or may interfere with development of proper bond between foundation and embankment. It is not necessary to remove all the soil containing fine hairlike roots but only heavy mat. The underline table may offer as a guideline for finding depth of stripping.

Type of vegetable cover in the soil	Depth of stripping.
1. Soil containing light grass cover	5.0 to 7.5 cm.
2. Agricultural Lands	To bottom of ploughed zone 15.0 to 20.0 cm.

The ground surface under all canal embankments excepting rock surface, where it is below the full supply level in the canal shall be scarified making open furrows not less than 20 (twenty) centimetres deep below natural ground surface at intervals of not more than 1.0 (One) meter. However, where the ground surface is below the bed level of the canal, the entire surface of the foundation of embankments shall be stripped to a depth of not less than 20 (twenty) centimetres.

Immediately after preparation of the embankment foundation, the contractor shall excavate cut-off trenches. Following this operation, as soon as feasible and as approved by the Engineer-in-charge the contractor shall place and compact embankment in the cut-off trenches and place one metre of embankment over the entire embankment foundation and compact where required. This procedure will seal the foundation against loss of moisture and provide some consolidation of the foundation. Foundation surfaces under the canal embankments and other embankments shall be scarified before laying earth.

Water applied for pre-wetting areas under the canal embankments and under other embankments will not be measured for payment and shall be included in the unit price bid per cubic metre in the bill of quantities for excavation for canal and other embankments.

In case of existing canals and dams, where the slopes in canals and embankment portions are to be modified, benching of slopes shall be done or old bunds shall be sloped as directed by the Engineer-in-charge duly clearing the surface area under slopes from all roots and vegetable matter and stumps shall be pulled or otherwise removed and roots grubbed. The stumps and roots removed shall be suitably disposed off.

The measurement of benching operation if done shall be done separately and the payment shall be made at unit price per cubic metre bid in the bill of quantities for that item.

3.4.2 CONSTRUCTION OF EMBANKMENTS

3.4.2.1 GENERAL

Canal and dam embankments shall be constructed to top widths and side slopes as shown on the drawings duly providing for compacted allowance of two centimetres per meter height of bank for settlement. The embankment shall be built to heights as directed above those shown on the drawings. The top of all the embankments shall be graded to be suitable for a road way in accordance with subparagraph 3.4.2.2 and the top of other embankments shall be graded or scarified as directed.

Before commencing over haul of material from the burrow area, levels of the banks to be formed in the sections where the over hauled material is proposed for construction of embankments shall be taken. After completing the construction of embankment final cross section levels shall be taken and the volume shall be arrived at and payment shall be made to that quantity only.

All materials shall be deposited in embankments so that cobbles, gravel and boulders are well distributed through other materials and not nested in any position within or under the embankment as enunciated in clause 6.4 of IS 4701 – 1982.

In area where required excavation does not furnish suitable or adequate material for constructing embankment, material shall be obtained from area where material in excess of that required to construct the adjacent embankment is available.

Where the original ground surface is below the grade of the canal and where construction of a fill below the bottom of the canal is prescribed, such fill shall be placed as a compacted embankment. Where the original ground surface is below the base of a structure, the fill required to form a suitable foundation for the structure shall be placed as compacted embankment.

3.4.2.2 ROADS AND RAMPS

In conjunction with construction of canal embankments, the contractor shall construct operate and maintain earth ramps adjacent to the canal and structures where shown on the drawings and where directed at his own expense. Suitable materials obtained from excavation shall be placed on embankment for the roads and ramps. If sufficient material is not available from required excavation the Engineer-in-charge may direct Excavation from burrow areas.

3.4.2.3 EMBANKMENTS NOT TO BE COMPACTED

Embankment not be compacted shall be formed conforming to clause 6.6.1 of I.S. 4701-1982. The material for these embankments shall have optimum moisture content before earth moving equipment is routed over the embankment. The embankments shall be built in layers not exceeding 30 (thirty) cm in thickness. Embankments shall be built in approximately horizontal layers carried across the entire width of the embankments to the required slopes. Embankments shall not be widened with loose materials dumped from the top. Embankments may be built by excavation and hauling equipment or by excavating and hauling equipment shall be made in horizontal layers and shall be kept as close to level as practicable. The travel over the embankments during construction shall be routed so as to distribute the compacting effect of the equipment to the best practicable advantage.

3.4.2.4 DEPOSITING

Spoil from the pits shall be deposited on bank to each section as are shown on the relevant plans specified or ordered by the Engineer-in-charge. Ramming, breaking clods and smooth surface sectioning shall not be necessary, but a spoil bank with a neat straight toe, even slopes and even top surface shall be formed as the depositing proceeds.

Embankment built by excavating machinery depositing the materials directly from the excavation shall be made in horizontal layers having a thickness of 30 (thirty) cm. Finer portions of the materials excavated shall be placed in that part of the embankment nearest to the water and coarser materials shall be placed in the outer part of the embankment.

3.4.2.5 EMBANKMENT TO BE COMPACTED

The requirements for compacted embankments shall be as specified in section 3.5. All materials shall be placed, moisture and compacted as provided in Section 3.5. The materials used for compacted embankments shall be suitable materials as determined by the Engineer-in-charge and shall be obtained from required excavation. The materials shall conform to clause 6.4 of IS 4701-1982.

Before the materials for the 1st layer of embankment is placed, the foundation of the embankment shall be prepared as provided in paragraph 3.4.1 and shall be moistured and compacted in the manner herein after specified for each layer of compacted embankment to be placed thereon. The embankments shall be compacted to the elevation and to the top widths and side slopes shown on the drawings or prescribed by the Engineer-in-charge.

The layers shall be placed in rows approximately parallel to the axis of the bank. The base of embankment at every height is to be made to its full width of each zone as shown in the drawing plus offsets of not less than 0.45 meters beyond the finished profile on either side for compaction. No payment will be made for the off sets or for the subsequent removal, and unit price quoted for the banking is deemed to include this. No additions will be allowed to slope for the full design section of the bank after the bank is raised. The embankment shall be compacted to at least 95% proctors density

using pneumatic tampers, frog rammers or vibratory plate compactor or power roller.

Where the original ground surface is below the bottom of the canal (designed bed level) and where a compacted fill below the bottom of the canal is prescribed, such fill shall be placed as compacted embankment. Where the original ground surface is below the base of structures or where sloping concrete walls or slabs extend above the original ground surface and it is practicable as determined by the Engineer-in-charge to construct the walls or slabs directly on earth foundation, without intervening forms, compacted embankments shall be constructed to lines and grades as directed to form suitable foundation for the structure of for the sloping or slabs.

3.4.3 BURROW AREA

3.4.3.1 GENERAL.

All materials required for the construction of embankment and backfill for cut-off trench and around the structures which are not available from excavation, excavation for structure or from excavation of other ancillary works shall be obtained from the designated burrow area after stripping as shown on drawing or as designated by the Engineer-in-charge in consultation with field laboratory. The depth of cut in all burrow areas shall be designated by the Engineer-in-charge and the cuts shall be made up to such designated depths only. Haphazard exploitation of burrow pits shall not be permitted. The type of equipment used and the operations in the excavation of materials in burrow area shall be such as to produce the required uniformity of the mixture of materials for the embankment. The contractor has to arrange burrow earth at his own cost and responsibility. No compensation whatsoever for change in limits and locations of the burrow areas and depth of cut for getting suitable earth shall be paid to the contractor within a distance of 5 Km of dumping place of embankments in most practical route. The burrow area shall not be designated within a distance of **five times** the height of embankment from the toe.

Burrow pits shall be operated so as not to impair the usefulness or mar the appearance of any part of the work or any other property. The surfaces of wasted materials shall be left in a reasonably level and even condition.

3.4.3.2 PREPARATION OF BURROW AREAS

All areas required for burrowing earth for embankment shall be cleared of all tree stumps, roots, bushes, rubbish and other objectionable materials. Adequate lighting arrangement should be provided by the contractor.

Particular care shall be taken to exclude all organic matter from the materials to be placed in the embankment. All cleared organic materials shall be burnt to ashes or disposed-off as directed. The cleared areas shall be maintained free of vegetable growth during the progress of the work. No payment shall be admissible for preparation of the burrow areas indicated above as this is deemed to have been included in unit bid price of earth work in the bill of quantities.

3.4.3.3 STRIPPING OF BURROW AREAS

Burrow area shall be stripped 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.

3.4.3.4 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 ponding of water.

3.4.3.5 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.

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3.4.4 EARTH FILL MATREIALS

3.4.4.1 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.

3.4.5 PLACING EARTHFILL

3.4.5.1 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 15 cm in thickness after being rolled as herein specified.

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 30 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 0.45 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.

The inside proud section shall not be removed, if the lining work is not included under the same contract. Such proud section made out of burrow earth from outside only shall be paid as per bid price of the item in the bill of quantities. No payment shall be made for compaction for such proud section left.

3.4.5.2 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.

3.4.5.3 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 cm. in thickness or such thickness as directed by Engineer. 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.

3.4.5.4 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.

3.4.5.5 CARE IN LAYING FILATERS

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.

3.4.6 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.

3.4.7 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 burrow area before excavation. If additional moisture is required it shall be added preferably at the burrow 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.

3.4.8 MEASUREMENT AND PAYMENT

3.4.8.1 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 M^3.

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.

3.4.8.2 RATE FOR PAYMENT:

The rate for embankment fills 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 MATEIALS

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.

The following guide lines are prescribed for compaction of different height of earth fill in canals.

3.5.1.1 EARTH FILL UP TO 5 M. HEIGHT:

When a finished reach of canal having an earth fill height up to 5 m is subjected to natural compaction by rain and own weight for two seasons or more before it carries irrigation water, no compaction is required to be done.

When it is expected to carry water just after one season, compaction by dozer track chain is to be done. However, this is not necessary, if the earth fill could be subjected to profuse watering during laying of each layer.

If the canal will be used immediately for carrying irrigation water, compaction by sheep foot roller or by any approved method shall be done.

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

3.5.1.2 EARTH FILL HEIGHT MORE THAN 5 M.

Canal reaches having earth fill height more than 5 m shall always be compacted by any approved method of compaction.

3.5.1.3 MOISTURE CONTROL.

The water content of the earth fill material prior to and during compaction shall be distributed uniformly throughout each layer of materials and it shall be between ± 2% of the optimum moisture content. As far as possible and practicable, the moisture content of the materials should be brought to required level by watering of burrow area before excavation. If additional moisture is required, the same should be sprinkled while laying the earth fill in layers. If the moisture content is greater than required, the material shall be allowed to dry and if necessary, ploughing, blending with other materials may have to be resorted to obtain uniform moisture distribution. In order to have proper control of moisture in earth fill, no embankment shall be constructed during rainy days.

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 have 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) 1973Indian 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 6.6.3.1of 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 posses 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 95% 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.

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 rol ler.
	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, power 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	Frog rammer, power rammer

		plasticity.)	
	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 confirm 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 Procter 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 95% of proctor density predetermined by Laboratory tests. For strengthening of channels, compaction should be done to 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, settlement allowance of 2% should be provided. **In case of earth fill of canal which has not been mechanically compacted, settlement allowance at 10% should be provided & settlement allowance shall be calculated after embankments are subjected to natural compaction of one full monsoon rains. For short duration works, settlement allowance at 16% should be provided & necessary adjustments are to be made to take care of natural settlement due to rains.** Extra height should be provided taking the settlement into account. Settlement allowance at 2% should be provided after embankments are subjected to natural compaction for two or more full monsoon rains. 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.

3.6 SLOPE PROTECTION (Rip-Rap)

3.6.1 MATER1AL

The stone required for rip-rap shall be in accordance with clause 4.1. of I.S: 8237-1967 Indian Code of practice for protection of slopes for Reservoir embankments The stones for rip-rap shall be hard and durable and shall not crumble on long exposure to water and air. The gravel protection shall be reasonably well graded and shall conform to clauses 5.1, 5.1.1, 5.1.2, 5.1.3. and 5.2 of I.S: 8237-1976. The thickness of the stone to be used in the rip-rap shall be in accordance with clauses 6.3, 6.4 and 6.4.1 of I.S: 8237-1976 Indian code of practice for protection of slopes for reservoir embankments.

The contractor shall, unless otherwise specifically stated in the contract be responsible for payment wherever payable, of all import duties, tolls, octroi duties, seignorages, quarry fees etc. on all materials and articles that he may use.

3.6.2 PLACING

The placing and laying of rip-rap with coarse gravel protection shall be, in accordance with clause 6.1, 6.2, 6.2.1 and 6.2.2 of I.S: 8237-1985 in case the rip-rap is hand placed rip-rap, and in accordance with clause 7.1, 7.2 of I.S: 8237-1976 in case the rip-rap is dumped rip-rap.

MINIMUM THICKNESS OF HAND PLACED RIP-RAP

Expected Wave Height in m	Minimum Thickness cm.
0 to 1.5	30
1.5 to 3.0	45
Larger than 3.0	60

RECOMMENDED RIP-RAP THICKNESS AND GRADATION

Range of Wave height in m	Minimum/ Average Rock size in cm	Minimum Rip-Rap thickness in cm
0 to 1.5	30	60
1.5 to 3.0	40	75
Above 3.0	70	100

3.6.3 MEASUREMENT AND PAYMENT

Measurement for payment of rip-rap or of coarse gravel protection shall be made to the outlines of nominal thickness prescribed. Payment for rip-rap and coarse gravel protection shall be made at the applicable unit price per cubic meter bid there for in the bill of quantities for rip-rap and coarse gravel protection which unit price shall include the cost of procuring or furnishing, hauling and placing the rock for rip-rap or gravel for coarse gravel protection including the rock-spalls and gravel to fill the voids in the revetment.

3.7 FORMING DRY RUBBLE ROCK-TOE

The dry rubble rock-toe along with filter shall be formed to the lines and grades as shown in the drawing. The forming of dry rubble rock-toe filters consists of:

a. Excavation of foundation trench 45 cm deep for laying filters and forming rock toe.
b. Laying of filters
c. Laying of graded metal filters and
d. Forming of dry rubble rock-toe.

3.7.1 MATERIALS

The filter materials should be composed of layers of fine sand, coarse sand and hard rock aggregate of thickness specified in the plan and in schedule.

The fine and coarse sand used shall be composed of clean sand, well graded, hard siliceous material, free from injurious amounts of dust, lumps of clay, soft or flaky particles, shale, alkali, loam, mica or other deleterious substance. If the same brought to the site is dirty, it must be washed thoroughly and cleaned with water so as to get rid of all soluble impurities. The sand shall be screened and the fine and coarse sand is stacked separately which materials shall conform to the gradation specified as under.

The aggregate of 10 mm. to 75 mm. size rock fragments shall consist of broken stone which are hard, dense and durable. The rock fragments shall be free of disintegrated and decomposed stone, soft, flaky, salt, alkali, vegetable matter and other deleterious substance like clay lumps etc. They should be washed clean and stacked separately as per the gradation defined hereafter.

Almost all the quantities of rock chips and spalls required breaking for the aggregate and which are obtained from the spoil of canal; rock blasting will be available at site. It shall be incumbent upon the contractor to first utilise this materials to the full and the recovery cost for the material used from such spoil from canal excavation shall be fixed by the Engineer-in-charge, **which is binding on the contractor**.

The gradation of each filter layer shall meet the following requirement with respect to the materials in the adjacent filter layer. Each successive layer of material shall be composed of particles such that the particle size of 15% of base materials (15% smaller than and 85% larger than the diameter) is more than 5 times that of 15% size of the layer above.

The requirement for grading of the filters shall be established by the field laboratory on the basis of mechanical analysis of the adjacent fill material. Mechanical analysis shall be performed on samples which have been compacted. The test has to be conducted by the contractor at his cost in the presence of Departmental Engineers to be nominated by the Engineer-in-charge.

The following gradation is however tentatively and roughly indicated for the Contractor's information:

Fine Sand: At least 15% particles should be less than 0.3mm to 0.5mm in diameter.
Coarse Sand: At least 15% particles should be less than 2.5mm to 3mm in diameter.

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Aggregate: 10mm to 75mm with at least 15% particles are less than 20mm in diameter.

3.7.2 ROCK-TOE

The rock fill at the down stream toe of the bank shall be constructed to the finished lines and grades shown in the drawing. The stones used shall consist of sound, dense and durable rocks and shall be reasonably well graded.

The rock fill shall be placed in layers not exceeding 0.30 meter thickness at a time. The large rock fragments shall be placed in the outer faces of rock toe and shall be closely and firmly set with hand with their broadest side downwards and face normal to the finished slope. At least 25% of these stones of the outer faces, should be 300 mm in depth in normal to the slope and to be well embedded in the mass and should be laid with breaking joints as far as possible, so as to secure a firm and stable rock mass. For the sloping surface away from the embankment, interstices between the adjacent stone on the slope shall be well filled with stones of the proper size and tightly wedged by wooden mallets or crowbars to ensure firm packing to result in a neat and well packed surface true to the finished slope. For earth side slope, the surface stones need not be that wedged with small stones so as to allow free drainage of the embankment. Profile of strings and pegs should be used to ensure that rock-toe is done true straight and conform neatly to the designed slopes throughout.

3.7.3 SLOPE AND BED FILTER TO ROCK-TOE

Slope and bed filter should be laid for the rock toe consisting of filter materials of specified thickness and types shown in the drawings. The specification of the materials mentioned shall be the same as given in paragraph 3.7.1 above. The thickness of the various types of filter materials shall be specified in the plans.

3.7.4 MEASUREMENT AND PAYMENT

Measurement and payment for filters shall be in the units of cubic meter. The payment shall be made on the relevant unit price bid in bill of quantities and the unit price shall include cost of furnishing, hauling of all materials and labour involved in all the operations specified for formation of filters.

3.7.5 ROUGH STONE DRY PACKING FOR APRONS AND REVETMENTS

3.7.5.1 The bed or slopes to receive the packing shall first be prepared as specified and passed by the Engineer-in-charge. In case where the work of preparation of bed and slopes such as cutting out high bund, filling in hollows, etc., or the digging of the well foundations is rather extensive, separate items should usually be provided for such subsidiary kinds of work in the schedule of the agreement. But if the work involved in such subsidiary item is very little, no separate provision need to be made and in the absence of such provision, the contractor shall understand that his tender rate is inclusive of all such work without extra charge. If the backing is to be laid on made up ground which is objectionable, it shall, so far as possible, not to be laid till the ground has completely settled. If a backing of gravel, quarry rubbish or other material is to be given, it shall be specified in a separate schedule item.

3.7.5.2 The size of the stone to be used for dry stone revetment should be of 225 mm. to 300 mm. thick or as specified.

3.7.5.3 The stone shall be perfectly sound, as regular in shape as possible, free from cracks and decay and with their length equal to the thickness of the required apron or revetments and each stone shall not be less in size than **0.03** cubic meters unless other wise specified or order by the Engineer-in-charge. Having regard to the nature of the stone along quarried, the smaller size stones required for filling in interstices and wedging shall only be supplied to the actual requirements for the work as defined in hereunder and shall not be used in two or three layers as a substitute for the full thickness stone specified in following clauses. The stone shall be obtained from the approved quarry.

3.7.5.4 The stones shall be laid closely in position on the prepared bed and firmly set with their broadest end downwards, so that they may meet all round their bases and with the top of the stone, level with the finished surface of packing. The stone shall be laid breaking joints so far as possible in the direction of the flow of water. The stones are to be placed perpendicular to the finished surface ie perpendicular to the slope for revetments.

3.7.5.5 Interstices between adjacent stones shall be filled in with stones of the proper size, well driven in with crowbars to ensure tight packing and complete filling of all interstices. Such filing shall be carried simultaneously with the placing in position of large stones and shall in no case be permitted to fall behind. The final wedging shall be done only after obtaining the orders of the Engineer-in-charge. The final wedging shall be done with the largest sized chip practicable, each chip being well driven home with a hammer so that no chip is possible of being picked up or removed by hand.

3.7.5.6 Profiles of strings and pegs are to be put up to ensure that the pitching is done true straight and to proper slope throughout and revetment are in all cases to be built up from the foot of the bund. Care is necessary that, a strong toe wall or other protection is always given to the revetment, of which protective measures shall be shown on the plans.

3.7.5.7 On the completion, the surfaces presented by the aprons or revetments shall be even throughout, free from irregularities to the required length, breadth and slope as specified in the plans.

3.7.5.8 MEASUREMENT AND PAYMENT

Measurement and payment for rough stone dry packing for aprons and revetments will be in the units of cubic meter. The payment shall be made on the relevant unit price bid in bill of quantities and the unit price shall include cost of furnishing, hauling of all materials and labour involved in all the operations specified for rough stone dry packing.

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SECTION – 4
CONCRETE WORKS

4.0 CONCRETE STRUCUTRES

Concrete in structures shall conform to the requirements of paragraphs 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 by weight or by concrete mixers by volume 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 PROPROTIONS:

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 volume. Water shall be either measured 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

a. The contractor shall be responsible for providing quality concrete to ensure compliance of the contract requirements.
b. Making and cutting concrete test specimens in the field will conform to IS 516-1959
c. Capping cylindrical concrete specimens will conform to IS 516-1959
d. 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 SO_4) :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 form 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	90-100	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

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 coordinating 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 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 mining 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 15^0 C to 30^0 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 of 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 of 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 form*work* 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 6.2.21.

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 and 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 TOLERANCE FOR CANAL EXCAVATIONS

1. Departure from Established alignment **:** ± 20 mm to on straight sections.
   ± 50 mm on tangent sections.
   ± 100 mm on curves.
2. Departure from Established Grade **:** ± 20 mm

4.2.13.4 TOLERANCE FOR CANAL LINING

1. Departure from Established alignment **:** ± 20 mm to on straight sections.
   ± 50 mm on partial curves and tangents

4.2.13.5 TOLERANCE FOR CANAL STRUCTURES

1. Deviations from specified dimensions of cross section of columns, beams, piers and slabs **:** (-) 6 mm to (+) 12mm
2. Deviations from dimensions of footing :
   a. Dimensions in plan **:** (-) 12mm to (+) 50 mm
   b. Eccentricity **:** ± 0.02 times width of footing in the direction of deviation but not more than 50mm
   c. Thickness **:** ± 0.05 times the specified thickness

CONTRACTOR **SUPERINTENDING ENGINEER**

Note: Tolerance applies to concrete dimensions only but not for positioning of vertical reinforcing bars or dowels.

4.2.13.6 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 SURACE 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.

4.2.13.7 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.

4.2.13.8 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.

4.2.14.2.1REINFORCEMENT DRAWINGS

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

4.2.14.2.2MEASUREMENT 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 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 (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 than 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 litanies 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 grater 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 a 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 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.

SECTION -5

CEMENT CONCRETE LINING

5.1 SCOPE OF WORK

5.1.1 GENERAL

Canal lining shall be done with concrete paving and finishing machines, which will place, compact and finish the concrete lining in bed and slopes. Plain cement concrete of M-15 grade, with the maximum size of aggregate of 20mm shall be laid on the bed and slopes of the canal sections as shown on relevant drawings. The thickness of lining shall be as indicated in paragraph 5.3.4.5. for both in bed and slopes of the canal. If during construction it is found necessary to alter the canal section and side slopes without altering the thickness of lining, the contractor shall be informed in writing of such changes.

Each concrete paving machine and associated support equipment utilized under this contract shall place canal lining at an average sustained rate of advancement of not less than 3.5 meters per hour. This minimum rate shall be obtained for paving operation on the side slopes and on the bottom of the canal while also meeting the requirements for lapsed time following trimming, consolidation of concrete, finishes, joints and other requirements specified therein.

The equipment and operation for concrete lining includes foundation trimming, sub-grade preparation, concrete production and delivery from point of production, placement of concrete, curing and other associated activities. Supporting the placement of the canal lining shall be matched with the lining equipments capability, so as not to impede the specified placement rate of lining operation. The overall equipment deployment shall be such as to ensure the completion of canal lining within the scheduled period specified in the contract.

The contractor can alternatively deploy longitudinally operating self aligning slip form Paver with built-in vibrator attached to the mould/ forms, so as to effectively compact and finish the concrete (alternative to concrete Paver finisher outlined above).

During the preparation of sub-grade for canal lining, the proud earth work shall be excavated and trimmed by machine for better progress and to achieve the designed profile of the sub-grade. This excavation for trimming for base preparation of lining shall be carried out immediately prior to laying of the lining, but in no case the time interval should exceed 3 days in normal whether and 2 days in adverse weather conditions.

The scope of work also includes the following:

i. Dewatering the canal section for preparing the base for lining and laying concrete lining.
ii. Providing steel safety ladders at required intervals or as directed.
iii. Providing necessary under drainage arrangements consisting of filter blanket of graded sand and pressure relief valves as per drawings.
iv. Providing filter materials of approved quality as per design.
v. Providing and fixing P.V.C. contraction joints forming water stops.

5.2. CLEARANCE OF SITE

Area proposed for lining of the canal as a whole shall have to be cleared of all objectionable materials, stumps, roots, bushes, and rubbish. Such materials, from clearing operation shall be disposed-off from the working area clear of work site as per direction of the Engineer-in-charge.

5.3. **PREPARATION OF SUB-GRADE FOR CONCRETE LINING.**

5.3.1 GENERAL

a. Provision of this paragraph shall apply to the preparation of sub-grade on which concrete lining is to be placed.

b. The work of trimming the canal section up to the bottom of concrete lining/ bottom of filter materials to be provided as the case may be and preparing sub-grade for concrete lining includes removal of proud from the slope and bed of the canal. The trimming operations is to be carried out manually or by machines (Trimmer) of adequate capacity immediately prior to laying of the lining but in no case the time interval between trimming and laying should exceed 3 days in normal weather and 2 days in adverse weather conditions. Wherever rock is over excavated the item of trimming and preparation of sub-grade includes filling the over excavated portion with suitable semi pervious materials, watering and compaction and trimming up to bottom level of the concrete lining. All along the canal alignment the rain cuts on inner slope of the banks shall be filed up with approved excavated materials and shall be compacted adequately to required line and grade and level. The material required for filling the over excavation in rock and rain cuts, if not available during excavation in soils to be done under this item, shall be hauled from stock piles or burrow area to be arranged by the contractor and placed in position.

c. If at any point, materials have been excavated beyond the pay line required to receive the concrete lining the excess excavation shall be refilled on horizontal layer with selected materials moistened if required and compacted using rollers and slope compactors. Where, placing and compacting bedding material is on a sloping foundation, the layers may be placed parallel to the surface of the foundation. If at any point the foundation materials disturbed or loosened during the excavation process or otherwise, it shall be moistened if required and thoroughly compacted by tamping, rolling or by other approved methods to form firm foundations for placing the concrete lining.

d. If at any place, placement of bedding material below the concrete lining is required due care shall be taken by the contractor to wet the surfaces of excavation and embankment to a depth of 15 cm. or to a depth up to impermeable layer below whichever is less as per direction of the Engineer-in-charge.

e. In the canal section requiring bedding material below the concrete lining due care shall be taken by the contractor to place the bedding materials on scientifically approved surface adequately wet as described above in layers not exceeding 15 cm. in depth in a single operation and compacted till the bedding material attains a height where it can be trimmed to form a true and even surface upon which the concrete for lining is to be placed. Each layer of bedding material shall be moistened and thoroughly compacted.

f. All loose materials likely to be present at the end panel of existing lining adjacent of which lining is to be placed under these specifications shall be removed and all voids beneath the existing lining shall be refilled and compacted thoroughly. No **extra payment shall be made** to the contractor on this account.

g. Suitable materials trimmed from the canal shall be judiciously utilized in canal embankment, road embankments or in back filling of the structures or used as a bed material as per direction of the Engineer-in-charge. The trimmed materials which can not be utilized in proper place during one continuous operation shall be piled along the out of way where designated by the Engineer-in-charge.

h. In all, the preparation of sub grade for concrete lining shall confirm to clauses 4.1. 4.2., 4.3., 4.4 and 4.5. of IS 3873-1993 (Indian code of Practice for laying in situ cement concrete lining on canal)

5.3.2 TOLEARANCE IN PREPARATION OF SUB-GRADE

Excavated profile provides the final base for lining and tolerance departure from lines shown on the drawings shall be as indicated here below:

± 20 mm on straight section.
± 50 mm on tangents.
± 100 mm on curves.

Departure from levels shown on the drawings. ± 20 mm

The above tolerance shall be negotiated gradually through smooth transition in a length of 50 m. No over-run in concrete quantity shall be paid to the contractor.

5.3.3 MEASUREMENT AND PAYMENT

Measurement and payment for trimming and preparation of sub-grade shall be made on area basis of number of square meters of the canal prism trimmed over which the concrete lining is to be placed. Payment shall be made at the unit bid price in the bill of quantities. The rate shall include cost of labour, equipments, watering, compaction of bed

and sides and all incidental works as necessary to complete the work as per the specifications and also dewatering of the canal sections where required.

5.3.4 SELECTED BEDDING MATERIALS

The selected bedding material in the case of bed and sides of canal profile in normal soils shall be graded filter material compatible with sub grade materials and thoroughly compacted. In case of expansive soils, cohesive non swelling (CNS) soil will be used for bedding. The thickness of CNS layer shall be designed according to swelling pressure of soil or as directed by the Engineer-in-charge. The bedding materials shall generally be provided conforming to following gradation and index properties.

5.3.4.1 LINING IN NON-BLACK COTTON SOILS

- Selective protective lining *to be provide immediately up stream and downstream of every structure for 2.5m upstream & 3.75m downstream of the structure where fluming of channel is involved, and for 2.5m reach both u/s & d/s of structure where fluming of channel is not made. Toe walls must be provided at upstream and downstream ends of lining.*

- *Lining be provided in high banking reaches and in all such reaches as are considered* "vulnerable" *viz; associated with seepage, slippage of slopes and breaches etc.*

- Model Sections/ Profile Walls of Concrete *of size 30cm x 30cm should be provided in the balance portion of the unlined canal at intervals of 50m and at a closer spacing in curves.*

5.3.4.2 LINING IN SWELLING-BLACK COTTON SOILS:

- Lining to be provided th`roughout the canal reaches passing through swelling B.C. soils. In such case provision for CNS (Cohesive non-swelling) treatment of the sub-grade should be made prior to placement of lining as per **IS : 9451-1994**. The CNS layers shall be in accordance as under:

Table 5A : Thickness of CNS layer in canal carrying Discharge less than 2.0 Cumecs

Discharge in Canal up to 2.0 Cumecs.		Min^m Thickness of CNS layer in cm for Swelling pressure of BC Soil	
Cumecs	Cusecs	0.50 – 1.50 kg/cm^2	More than 1.50 kg/cm^2
1.4 – 2.0	50 -70	60 cm	75 cm
0.7 – 1.4	25 – 50	50 cm	60 cm
0.3 – 0.7	10 – 25	40 cm	50 cm
0.03 – 0.3	1 – 10	30 cm	40 cm

Table 5B : Thickness of CNS layer in canal carrying

Discharge 2.0 Cumecs and above.

Swelling pressure of BC Soil in kg/cm^2	Min^m Thickness of CNS layer in cm
0.50 – 1.50	75 cm
1.50 – 3.00	85 cm
3.00 – 5.00	100 cm

5.3.4.3 GRADATION & INDEX PROPERTIES

The CNS soils to be used should be non-swelling with a maximum allowable swelling pressure of 0.1 kg/cm^2 (10 KN/ m^2) when tested in accordance with Indian standard, IS: 2720 (Part- 41) – 1977. CNS soils are to be broadly conforming to the following range:

GRADATION:

Clay	15 – 20 %
Silt	30 – 40 %
Sand	30 – 40 %
Gravel	0 – 10 %

INDEX PROPERTIES

Liquid Limit :	More than 30% but less than 50%
Plasticity Limit :	More than 15% but less than 30%

CONTRACTOR **SUPERINTENDING ENGINEER**

Note: *Provision for mechanized compaction of CNS soil layers to at least 95% proctor density should be made.*

5.3.4.4 METHOD OF COMPACTION:

In small sectioned channels, provision for "fill & cut method" should be made in order to achieve effective compaction. The channel section should be over excavated (to the extent governed by the CNS thickness) say, in 300m long reach; CNS soil be placed in layers in the full section, watered (as required), and each layer is to be compacted to at-least 95% proctor density through deployment of, preferably, small width powered drum rollers or standard power rollers or fuel operated plate compactors. This process of compaction should be continued right up to the top of designed section. There-after, the compacted section should be scooped out to the proposed design section and the CNS so scooped shall be re-used in the next 300m reach. Provision in the cost estimate should accordingly be made for re-handling of the scooped out CNS and also some percentage of wastage during re-handling is provided.

Note: *This procedure should also be followed for the re-sectioning and strengthening of channels (involving compaction of earth fill other than CNS fill) not passing through B.C. soils.*

5.3.4.5 PARAMETERS OF CAST-IN-SITU CEMENT CONCRETE LINING:

THICKNESS OF C.C.LINING: Thickness of un-reinforced viz: plain C. C. lining may conform to either the Indian Standard IS: 3873 – 1993 or US Bureau of Reclamation Practice as tabulated below:

Table 5C: THICKNESS OF C.C.LINING as per IS : 3873 – 1993

Discharge Capacity in Cumecs (Cusecs)	Depth of Flow in m	Thickness of C.C.lining in mm
0 – 5 (0 – 175)	0 – 1.0 m	50 – 60 mm
5 – 50 (175 -1750)	1.0 – 2.5 m	60 – 75 mm
50 – 200 (1750 – 7000)	2.5 – 4.5 m	75 – 100 mm

Table 5D: THICKNESS OF C.C. LINING as per USBR Practice

Discharge Capacity in Cusecs	Thickness of C.C. lining in inches
0 – 500	2.50
500 – 1500	3.00
1500 - 3500	3.50
3500 – 7500	4.00

Note: *Taking in to consideration the various factors including economy and ease/ practicability of placement, it may be appropriate to adopt a lining thickness of 65 mm for channels of discharging capacity up to 175 cusecs; 70 mm for the channels of discharging capacity up to 500 cusecs and 75 mm for channels of discharge beyond 500 cusecs up to 1750 cusecs.*

5.3.4.6 CEMENT:

For area other than coastal, 43 Grade or 53 Grade Ordinary Portland cement is to be used. In the coastal zones, Portland slag cement may be used.

5.3.4.7 CEMENT CONTENT AND WATER-CEMENT RATIO:

The concrete lining being exposed to alternate wetting and drying during its functioning or working life, comes in the category of " severe exposure condition" as per Indian standard IS: 456 – 2000. Accordingly, provision of cement content of minimum 250kg/m^3 of concrete mix is made in the cost estimate of C. C. lining from "durability consideration". Water Cement ratio is to be restricted to the range from 0.50 – 0.60.

5.3.4.8 MAXIMUM SIZE OF COARSE AGGREGATE:

Graded coarse aggregate with the maximum nominal size (MSA) of 20 mm down to IS grading should be used in the concrete mix of lining.

5.3.4.9 AIR ENTRAINING AGENT (AEA):

Provision for using AEA in the concrete mix for C. C. lining is made in the cost estimate. Concrete mix with AEA affords more" durability" as well as "better workability (viz: fluidity)" and better "finish" to the surface.

Graded fine and coarse aggregates are to be used in the concrete mix and any slight deviation in the requisite grading is compensated by air-entrainment in the mix by the addition of AEA.

5.3.4.10 CONTRACTION JOINTS:

As an acceptable thumb rule, the spacing of contraction joints should not exceed 36 times the thickness of lining in order to avoid cracking of the lining surface in between the joints.

Table 5E: SPACING OF CONTRACTION JOINTS

Lining thickness in mm (t)	Spacing of Joints (36 x t)
65 mm	2340 mm, say 2.30 m
70 mm	2520 mm, say 2.50 m
75 mm	2700 mm, say 2.70 m

Note: *If the perimeter of canal section is equal to or less than 6.0 m, no longitudinal contraction joints need to be provided. However, the transverse contraction joints across the canal section are to be provided irrespective of the extent of the perimeter.*

5.3.4.11 CONSOLIDATION OF CONCRETE LININGS:

Proper consolidation of concrete mix for the C. C. linings, as being placed on bed and sides is of paramount importance.

Use of conventional needle vibrators may puncture the sub grade surface. One of the most effective methods of consolidation comprises of deployment of “vibratory plate device” operated by a fuel operated tiny motor.

5.3.4.12 CUTTING GROOVES FOR CONTRACTION JOINTS:

Grooves should be cut when the concrete is still green/ plastic, to be later filled with the sealing compound. The groove is normally 27mm deep, for the C. C. lining thickness of 65 mm – 75 mm range, 11 mm wide at bottom and 14 mm wide at the top. It should be filled with hot/ poured sealing compound conforming to IS: 5256 – 1992. After the C. C. lining is fully set (viz: after a period of 28 days), only then the grooves have to be filled with the sealing compound after cleaning of dirt and mortar from the grooves.

5.3.4.13 CURING OF C. C. LINING:

Adequate and fool-proof curing is the most vital requirement for C. C. Lining.

The bed lining should be effectively cured by constructing small earth bunds of say, 30 cm high at convenient intervals and ponding water on the bed between the successive bunds. The sloped lining surfaces should be cured either by fully covering the concrete surface with Hessian cloth rolls/ gunny bags and keeping these wet with water throughout 28 days period.

5.3.4.14 UNDER-DRAINAGE:

A convenient method of the under-drainage is the provision of “porous concrete plugs” of 75 mm dia and 250 mm to 300 mm length in bed and side slopes underlain by graded filter of size 300 mm x 300 mm or 350 mm x 350 mm. One plug can be provided in the bed and one plug in each side slope at a distance of d/3 (one third of FSD) from the bed in alternate panels (viz: at a spacing of 4.5 m to 5.0 m). The porous plugs should be composed of one part of cement and four parts of coarse aggregate of size not more than 20 mm. No sand is to be used. Only so much water is used as is required to produce a paste to coat the aggregate without filling the voids. The porous plugs, after requisite curing, are becoming porous and free draining.

The porous concrete after curing shall be pervious and free draining type. As soon as the concrete hardens (i.e. it attains final setting) it should be sprinkled with water and kept moist for at least 14 days. The compressive strength of the porous concrete at 7 days as determined by tests on 15cm dia x 30 cm height cylinders should not be less than 70 kg/ cm2 and the porosity shall be such that, water shall pass through a slab of concrete 30 cm thick at a minimum rate of 500 lt/min/ sq.m of the plug with a constant 10 cm depth of water on the slab.

5.3.4.15 TOLERANCE IN C. C. LINING THICKNESS:

The permissible tolerance for the thickness of lining is ± 10%, provided the average thickness is not less than the designed thickness.

5.3.5 PARAMETERS OF PRE-CAST CONCRETE SLABS FOR LINING:

In case pre-cast slabs are to be used for the lining, the concrete mix for casting the slabs should be of M15 grade. The slabs, 30 cm x 30 cm (or any other convenient size) should be of 50 mm thickness. The sub grade is to be given a plaster layer (1:6) of 12 mm thickness, duly cured with water for at least 24 hours and, there after, placed on this base layer with 6 mm thick mortar of 1:3 mix. The joints between the slabs are to be filled/ pointed with mortar mix of 1:3 and cured.

Note: *Whether cast-in-situ or pre-cast concrete lining is to be placed, the sub grade MUST be hard, well compacted enough and smoothened prior to placement of lining. The “vibratory plate device” mentioned in Paragraph 5.3.4.11 above can be very effectively deployed for compaction of the sub grade.*

The surface irregularities (to be checked with a wooden template/ straight edge) should not exceed the following limits:

i) 6.25 mm for sub grade bed; and

ii) 12.00 mm for sub grade side slopes.

The loading, handling, transportation and placing of the selected bedding material shall be subjected to approval and shall be such as will result in a uniform mixture of the material being placed without separation or segregation. Selected bedding shall be obtained from required excavation in area where materials in excess of that required to construct the adjacent embankments is available or available from burrow pits approved by the Engineer-in-charge.

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5.4. MATERIALS

All materials including cement, fine aggregate and coarse aggregate, water admixture and steel shall be as specified in Section 4.2 for concrete.

5.5. CAST IN SITU CONCRETE LINING

5.5.1. GENERAL

The work shall generally conform to IS 3873-1993. All concrete for lining shall be governed by IS 456-2000. The concrete shall be of controlled grade with suitable admixtures of approved air entraining agents using well graded aggregates with maximum size of aggregates of 20 mm. Ordinary

Portland cement or Portland Pozzolana Cement to be used shall be 321 Kg. per cubic meter of concrete. However due to change in design mix, if it becomes obligatory to use lean/ richer mix, the contractor shall comply with the same. In case of leaner mix the department shall deduct the cost of cement from the bill of the contractor at the issue price of cement for short consumption of cement and no other compensation on this account shall be allowed. In case of richer mix the contractor shall be paid for the extra cement used at the issue price of cement.

5.5.1.1 PRODUCTION OF CONCRETE MIXES:

The concrete should be produced in a mechanical concrete mixer of any standard size or in a stationary weigh batching & mixing plant. Mobile concrete mixers of various drum capacities (0.5 cum or more) are also available in the market for production of concrete.

Hand mixing of concrete shall not be allowed except in rare exceptional circumstances and isolated cases when the quantity of concrete to be placed is very small.

For price adjustments, the amount so recoverable/ payable shall be deducted/ added to the value of the work done. Design mix and actual cement required shall be communicated from time to time to the contractor in writing by the Engineer-in-charge.

5.5.2. TRANSPORTATION OF CONCRETE

a. Transportation shall be handled from the place of mixing to the place of final deposition as rapidly as practicable by use of equipments such as transit mixers which shall prevent initial setting, segregation and loss of any of the ingredients. It shall be transported and compacted in its final position within 30 minutes of its discharge from the mixer unless carried in properly designed agitators operating continuously where this time shall be within 2 hours of the addition of cement to the mix and within 30 minutes of its discharge from the agitator.

b. If segregation occurs during transport, the concrete shall be remixed before being placed after observing the time requirements as above.

5.5.3. PLACING AND COMPACTION

a. Concrete shall be placed only in the presence of a duly authorized representative of the Engineer-in-charge. Concrete shall be placed and compacted before initial setting time and shall not be subsequently disturbed.

b. Placing of concrete shall not be started until all form work installation of parts to be embedded if any and preparation of surface upon which concrete is to be laid have been completely inspected by the Engineer-in-charge. All absorptive surfaces against which concrete is to be laid shall be moistened adequately so that moisture shall not be withdrawn from freshly placed concrete. The surfaces, however, shall be free from standing water and mud.

c. Concrete shall be deposited in all cases as neatly as practicable directly from mechanized pavers in its final position and shall not be caused to flow in a manner to permit segregation. Excessive separation of the coarse aggregate caused by allowing the concrete to fall freely from too great a height or at too great an angle from the vertical shall not be permitted and where such separation would otherwise occur. The contractor shall provide suitable means to convey the concrete without allowing such separation.

5.5.4. MECHANICAL PLACING

a. For efficient placing and finishing of the concrete lining on slopes and in bed concrete laying machines such as slip form pavers or concrete paver finisher of approved quality and design shall be used. Each lining machine and associated support equipment utilized under this contract shall place canal lining at an average sustained rate of advancement of not less than 10 meters per hour. This minimum rate shall be obtained for paving operation on the side slopes and on the bottom of the canal, while also meeting the requirements for lapse time following trimming consolidation concrete thickness tolerances, finishes, joints and other requirements specified herein.

b. The equipment of operations for foundation trimming, sub-grade preparation, concrete production, concrete delivery, joints production, curing compound placement and other associated activities supporting the placement of the canal lining shall be matched with the lining equipment capability so as not to impede the specified placement rate of each lining operation. The overall equipment development shall be such as to ensure in the completion of canal lining within scheduled period specified in the contract.

c. Concrete lining shall be done in the canal prism as shown in the drawing. Mixing of concrete is to be done in a stationery or mobile weigh-batching plant of capacity of one cubic meter to 3.5 cubic meter installed at suitable places and concrete is to be conveyed to work spot in transit mixers to be moved on canal banks and unloaded at site in the hopper of the Paver. The concrete in bed and side is to be placed with mechanized Paver finisher ISI 456 CP 650 or any other Paver of similar capacity. The concrete from transit mixer is to be unloaded into hopper and

conveyed to other bank, through side discharge conveyor. Then placed with Paver in bed and side and vibrated, with plate joints which will be done with Groove cutter attached to the Paver. Panels shall be as per drawing or as directed by the Engineer-in-charge. The above mechanized procedure is to be followed for side lining where slant length is 2.70 M. and above. In case where canal bed width is less than 2.00 M and where bed lining is not possible to be tackled with the above mechanized Paver, concrete shall be laid by conventional method i.e. mixing by concrete mixtures and laying the concrete manually in alternative panels of 3 m. width and 3 m length as per drawing or as directed by Engineer-in-charge duly using steel form work to the required thickness of concrete and vibrated with mechanical pan vibrators. The concrete for side lining where the slant length is less than 2.70m shall be laid by using appropriate equipment with steel guided form work and vibrated by mechanical vibrator fitted to gantry. If the concrete is laid manually on slopes, compaction by suitable method as approved by Engineer-in-charge shall be adopted. Concrete shall be mixed in stationery or mobile batching plant and conveyed through transit mixers included for manual placement. Whenever necessary for the purpose of obtaining economy, workability density, impermeability, durability, strength, mode of vibration and gradation of aggregates or other materials, the Engineer-in-charge of quality control shall after testing, make necessary changes in the proportion of the mix.

d. Concrete when deposited shall unless otherwise specified have placement temperature of not less than 4.5° C and not more than 32 ° C.
e. Concrete shall be so laid as to facilitate placing, vibrating, finishing and curing operations. The side-lining concrete shall be screed up on the slope while the concrete is being vibrated ahead of the screed. Concrete required for key as shown on the drawings shall be laid integrally along with the side slope lining.
   Alternatively, the contractor can select to use longitudinally operating self alignment, slip form machine with built-in vibrators attached to the slip forms, so as to effectively compact and finish the slope and bed concrete lining.

5.5.5. **FINISHING**.

a. All exposed concrete surfaces shall be cleared of impurities, lumps of mortar or grout and unsightly strains. The finished surface shall be even, smooth and free from pockets and equivalent to that obtainable by effective use of long handle steel trowel. Where the surface produced by lining machine meet the specified requirements, no further finishing operation shall be required. Surface irregularities, when tested with a straight edge of 1.5 meter length shall not exceed 6 mm in canal bed for bottom slab and 12mm on side slopes.
b. The surface of concrete finished against form shall be smooth and be free from projections, honey combing and other objectionable effects. Immediately on removal of forms, all ridges or lips shall be removed and undesirable local bulging on exposed surfaces shall be remedied by tooling and rubbing.
c. Repairs to concrete surface and additions where required shall be made by cutting regular openings into the concrete and placing fresh concrete to the required lines. Chopped openings shall be sharp and shall not be less than 75 mm in depth.

5.5.6. **CURING.**

5.5.6.1 GENERAL.

The concrete lining on slopes including curvatures portion, at junction of slope and bed lining shall be cured with specifications given in paragraph 4.2.19. The concrete lining in canal bed shall be cured with water in accordance with the specifications given in Paragraph 4.2.19. If water curing of lining in the canal bed is not carried out to the satisfaction of the Engineer-in-charge as per specifications the contractor shall be directed to switch over to liquid membrane forming curing compound for curing. Water curing of concrete is to follow strictly to spraying procedures and specifications as per clause 5.8 of IS: 3873 of 1993.

All equipment material etc. needed for curing and protection of concrete shall be at site and ready for installing before actual concreting begins. Detailed plans methods and procedures of curing and protection of concrete lining shall be got approved in writing from the Engineer-in-charge sufficiently in advance of the actual concreting in order to avoid interruption or damage to the work of other agencies.

5.5.6.2 MEMBRANE CURING.

a. These specifications cover curing of concrete using membrane forming compound to retard the loss of water during the early hardening period and to reduce the temperature rise in concrete exposed to radiation from the sun. This compound shall be suitable for use as curing media for fresh concrete and for further curing of concrete after removal of forms or after initial moist curing.
b. Concrete of canal lining on slopes including key at the top and curved portion at the bottom of the slope of canal shall be cured with liquid membrane forming white pigmented curing compound which shall form water retaining surface to achieve the desired effect of water curing at 28 days. The curing compound shall be white pigmented of approved qualify conforming to ASTM-C-309-81 Type-2.
c. White pigmented compound (Type-2) shall consist of finely divided white pigments and particle solids, ready mixed for immediate use without alteration. The compound shall present a uniform white appearance when applied uniformly to a fresh concrete surface at a specified rate of application. It shall be of such consistency that it can be readily applied by spraying to provide uniform coating at temperatures above 4 degree Centigrade. If two coats are to be applied then it shall be applied at an interval of approximately one hour. They shall adhere to freshly placed concrete that has stiffened or sufficient to resist marking during the application and to damp hardened concrete and shall form a continuous film when applied at the specified rate of application. When dry the covering shall be

continuous flexible and without visible breaks or pin holes and shall remain as unbroken film for at least 28 days after application. It shall not react and should not have deleterious effect on concrete.

d. The compound shall meet with the requirement of water retention test as per ASTM designation C-150-80 .The loss of water in this test shall be restricted to not more than 0.55 Kg/ M^2 of exposed solution of exposed surface in 72 hours.
e. The white pigmented compound (Type–2) when tested as specified in accordance with method E-97 of ASTM shall exhibit a day light reflectance of not less than 60% of that of magnesium oxide.
f. It shall fulfil the requirement of drying time when tested in accordance with ASTM C-309-81. The compound applied shall be dry to touch in not more than 4 hours. After 12 hours, it shall not be tacky or track-off (peel off) concrete when walked upon nor shall it impart a slippery surface.

5.5.6.3 TESTING.

a. The liquid membrane forming curing compound to be brought in the manufacture's original clear containers. Such container shall be legibly marked with the name of the manufactures the trade name of the compound the type of compound and class of vehicle/solids the nominal percentage of volatile material and batch or lot number. The lot number will be assigned to the quantity of compound mixed sampled and tested as single product. The manufacturer shall exercise the care in filling the container so that all are equally representative of the compound produced.
b. Curing compound to be used on site shall be got tested at least 14 days in advance so that the result of water retention tests reflectance test, drying etc. are available before it can be permitted for use. All of the filled containers represented by the approved sample shall then be sealed to prevent leakage substitution or dilution. The Engineer-in-charge or authorized representative should mark each container represented by the samples with a suitable identification mark for later identification and correlation and shall be kept in store with double lock arrangements. One key shall be kept with the contractor and the other with Engineer-in-charge. Random samples shall be collected from every batch of the compound. Frequency of random sampling shall be done as directed by the Engineer-in-charge. The contractor shall provide samples and labour for collecting samples free of cost. Testing shall be carried out by the department.

5.5.6.4 METOD OF APPLICATION.

The compound shall be sprayed using mechanical sprayer of approved design to ensure uniform and continuous membrane on the concrete surface. The coverage shall be at the rate specified by the manufacture or at the rate of 4 to 5 m. per litres. Field trials shall be conducted to decide effective coverage rate which depends upon surface finish. With a view to ensure through and complete coverage approximately on half of the compound for a given area should be applied by moving the spray gun back and forth in one direction and the remaining half at right angles to this direction. In case the application is still not found uniform the contractor shall have to apply the second coat as and were directed by the Engineer-in-charge. If a second coat is to be applied it should be applied approximately after an interval of one hour. The curing compound shall be applied as soon as the bleeding water or shine disappears, leaving dull appearance. Equipment for spraying curing compound shall be of pressure tank type (5 to 7 kg/cm2) with provision of continuous agitation. A curing jumbo with multiple travelling spray guns shall be provided for effective spray. Spraying on concrete lining shall be done in such a way that the green concrete is not disturbed or damaged or any foot impressions left. Necessary schemes on spraying by mechanized means shall be got approved from the Engineer-in-charge. However, in emergency for very small areas (Patches) it can be applied with wire or bristle brush. Such compounds shall be used on the work only after production of test results and approval of the schematic plan on spray curing compounds. Adequate care shall be taken to prevent any movements on cured surface up to 28 days after application of curing compound. Under unavoidable circumstances created by non availability or short supply of specified curing compound, the contractor shall be allowed to resort to water curing of concrete lining on slopes after obtaining prior approval of the Engineer-in-charge in writing. Such water curing shall be carried out in accordance with the following specification.

5.5.6.5 WATER CURING.

The surface of invert of the canal shall be kept continuously moist by covering it completely with wet burlap as soon as the concrete has hardened sufficiently. The burlap shall be kept continuously wet by spraying water for at least 12 hours. Thereafter curing by ponding shall be resorted to. The concrete to be cured with water shall be kept wet by ponding for at least 14 days. Water lost by evaporation shall be replenished periodically to keep the surfaces continuously submerged under water. The period of 14 days specified above shall be increased to 21 days when Pozzolana has been used in the concrete as part of replacement of cement.

When the curing of concrete in the canal bed is not found satisfactory the Engineer-in-charge may ask the contractor to resort to membrane curing.

5.6. TESTING OF CONCRETE AND ACCEPTANCE OF WORK:

5.6.1 GENERAL.

Testing of concrete shall be carried out at the cost of the department by the Quality Control Division on representative samples taken at the site of laying the concrete in accordance with relevant clauses of IS: 119-1959.The samples to be provided by the contractor at his cost.

5.6.2 SAMPLING PROCEDURE AND FREQUENCY:

a. Sampling Procedure: 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 minimum 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 to above.	4 plus one additional sample for every 50 cum of part thereof.

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

5.6.3 TEST SPECIMEN:

Three test specimens shall be made from each sample for testing at 28 days. Additional cubes may be required for various purposes such as to determine the strength of concrete at 7 days or at the time of striking form work or to determine the duration of curing or to check the testing cubes cured by accelerated methods as described in IS 901-1978. The specimen shall be tested as described in IS: 516-1956.

5.6.4 TEST STRENGTH OF SAMPLES:

a. The test strength of the sample shall be the average of three specimens. Individual variation shall not be more than 15% percent of the average.
b. Contractor shall provide necessary unskilled labour and facilities for collection of samples cores etc. and shall remain present at the time when the samples, cores etc. are taken. Testing shall be carried out at the testing laboratories set up at the site or at any other laboratory that the Engineer-in-charge may decide upon and the results given thereby shall be considered as correct and authentic and acceptable to the contractor. All testing charges will be borne by the department.

5.6.5 ACCEPTANCE CRITERIA.

a. The average strength of the group of cubes cast for each day shall not be less than the specified cube strength for the work. About 20 percent of the cubes cast for each day may have values less than the specified strength provided the lowest value is not less than 85% of the specified strength.
b. In case the concrete does not confirm to the accepted criteria for strength as specified above, the Engineer-in-charge reserves the right to reject the work or accept the same at a reduced rate derived from the tendered rate and as approved by him. Whenever necessary, for the purpose of obtaining economy, workability, density, impermeability, durability and strength or on account of variation in the quality and gradation of aggregates or other materials, the Engineer-in-charge in consultation with Quality Control Division shall after testing, make necessary changes in the proportion of mix. Contractor shall have to effect these changes immediately.

5.7. INSERTION OF PVC CRACK-INDUCING JOINTS.

5.7.1 GENERAL

a. The transverse and longitudinal PVC (Polyvinyl Chloride) strips shall be provided with the shapes confirming to dimensions shown on the drawing. The finished PVC crack inducing joints shall be extruded from virgin Pigmented, Plasticized Polyvinyl chloride (PVC). The PVC crack inducing joints shall be dense homogeneous free from holes and other imperfections. The cross section of the PVC crack inducing joints shall be uniform along its length and thickness shall be symmetrical transversely. Tolerance for dimensions in overall length and width shall be 5% and thickness 10%. The finished PVC crack inducing joints shall meet the following requirements:

Sl.No	Characteristics	Unit	Values
1.	Tensile strength	Kg/Cm2	116 Minimum
2.	Tear Resistance	Kg/Cm2	49 Minimum
3.	Stiffness in Flexure	Kg/Cm2	24.6 Minimum
4.	Accelerated extraction		
	a) Tensile Strength	Kg/Cm2	105 Minimum
	b) Ultimate elongation	Kg/Cm2	250 Minimum
5.	Effect of alkali (7 days)		
	a) Weight measure	%	0.25 Maximum
	b) Weight decreased	%	0.10 Maximum
	c) Hardness change	Point	1.50

6.	Effective of alkali (28 days)		
	a) Weight increase	%	0.4 Maximum
	b) Weight decrease	%	0.3 Maximum
	c) Dimension change	%	1.1

b. Weight of the PVC strip shall be a minimum of 460gm/meter for the longitudinal strip and a minimum of 420 gm/meter for the transverse strip.
c. The above determination shall be made in accordance with the specification of C.W.C. in vogue. The surface finish of PVC strips shall be mat finish and of white colour.
d. Contractor shall arrange for getting the finished PVC crack inducing joint tested in recognized Test Laboratories by the Government. The manufacturers shall furnish test sample of PVC crack inducting joints in 30 cm. length reel, free of cost. Each sample shall be marked with the number of the reel from which sample is obtained and with certificate that the samples are from the reels to be furnished.
e. It is mandatory for the manufacturer of the PVC strips from whom the contractors shall procure PVC strips to have a full-fledged testing laboratory in the factory to enable pre-despatch testing of the products. Test reports from Government test laboratory shall also be binding on the manufacturer based on samples drawn by the Engineer-in-charge from consignments received at site. The contractor shall get the sample of PVC strip approved by the Engineer-in-charge. He shall furnish the name of manufacturer the details of the in-house testing arrangements with the manufacturer and shall also furnish a test report from the in-house testing facilities along with the sample.

5.7.2 PLACING

a. The PVC crack inducing joints shall be inserted in the concrete lining when concrete is plastic. The longitudinal PVC crack inducing joints shall be inserted before the transverse PVC cracks inducing joints is inserted. The PVC crack inducing joints at edges shall be plastered in position fixed with longitudinal channels by clips or such other arrangement prior to lying of concrete. The PVC crack inducing joints shall be inserted in position in concrete lining as shown in drawings. The insertion of the longitudinal and or transverse PVC crack inducing joints at the predetermined locations of joints requires special attention to ensure proper location (depth is especially important) plumb installation and consolidated concrete around the PVC crack inducing joints. The longitudinal PVC crack inducing joint includes a cellular upper fin. The inspection fin shown on the drawings shall be comparatively thin and shall remain above the top surface of lining. It is important that top of the upper fin be at or near the concrete surface. The manner of installation shall include mechanical vibration that produces through consolidation of the concrete around the crack inducing joint and provides a continuous contact between the concrete and all surfaces of the crack inducing joints. The longitudinal crack inducing joint shall be fed into the fresh concrete from reels mounted in front of the pavers through guides and tension rollers so placed as to ensure proper depth and orientation of the crack inducing joints. Installation of transverse crack inducing joint shall be made by suitable joint inserted contrivance capable to insert into freshly placed concrete lining.
b. At intersection of longitudinal and transverse joints containing PVC crack inducing joints the top vertical members of the longitudinal crack inducing joints shall be removed for 10 to 15 cm. in width without pulling the crack inducing joint from the concrete lining and transverse crack inducing joint shall be placed within the notch so formed. Depression of the longitudinal cracks inducing joint below the specified positions in the concrete shall be permitted at intersection only to the extent necessary to place the transverse crack inducing joint to the specified depth. However, tolerances and concrete consolidation requirements of the preceding paragraph shall apply at intersections.
c. The manner of making the intersections shall produce transverse and longitudinal crack inducing joints and provide a nearly continuous weakened plan normal to the lining surface in both directions through the intersection.

5.7.3 JOINTS.

In RCC lining construction, joints shall be provided to accommodate expansion and contraction of the concrete or to provide continuity between the breaks in construction work. Joints shall be provided as shown on the drawings or as directed by Engineer-in-charge. The depth of joints to be cut in the bed of the canal as well as on slope shall be as specified in the drawings. The joints are not to be filled with sealants but only to be cut at specified intervals. The sealants shall be filled in joints later but before functioning of canal. The tools to be used by the contractor for providing joints shall be got approved from Engineer-in-charge.

5.8. TOLERANCES IN EXECUTION OF LINING.

a. The interest of this paragraph is to establish tolerances that are consistent with modern construction practice and yet be governed by the effect that permissible deviations shall have upon the structural action or operational function of the structure. Deviations from the established lines, grades and dimensions shall be permitted to the extent set forth herein provided that the department reserves the right to diminish the tolerance set forth herein if such tolerance imparts the structural action or operational function of the lining.
b. Tolerance for lining shall be permitted within the following limits.
   i) Departure from established alignment: ± 20 mm on straight reaches.
      ± 50 mm on tangents.
      ± 100 mm on curves.
   ii) Departure from established grade: ± 20 mm on straight reaches.

iii) Variation in concrete lining thickness: ± 10 mm of lining thickness provided average thickness is not less than specified.

Any departure from alignment or grade shall be uniform and no corrections in assignment be made in less than 50m. No over run in concrete quantity shall be paid to the contractor.

5.9. DEWATERING.

In canal reaches where subsoil water is met with above the canal bed level, dewatering shall be resorted to and continued during preparation of sub-grades, providing under drainage arrangement and placing of concrete for lining till such period the concrete attains necessary strength. No separate payment shall be made for dewatering operations as the same is deemed to have been included in rate of related item in Schedule of quantities.

5.10. MEASUREMENT AND PAYMENT:

5.10.1 PLAIN CEMENT CONCRETE LINING:

a. Measurement shall be on the basis of square meter/cum of plain concrete lining and payment shall be at the unit rate bid in bill of quantities for concreting works. Payment for lining shall be made for the thickness shown on the drawings and on square meter/cum basis of the area/volume including key on both sides. The thickness of lining as shown in the drawing shall be maintained by setting of paver machine in relation to final sub-grade on which lining is to be laid. The thickness shall be cross checked by (i) volume of concrete placed and area covered (ii) use of probe when concrete is being placed and (iii) coring if required. Any overrun in quantity of concrete in lining shall not be paid to the contractor.
b. The unit rate for lining shall include cutting of grooves for crack inducing joints to specified depth in panels as directed by the Engineer-in-charge including cost, carriage, royalty and taxes of all materials with all leads, lifts, mixing, form work, conveying, placing, compacting, finishing, curing and also dewatering during placing of concrete lining as required.
c. The unit rate of lining shall also include the cost of producing samples and cost of all incidental work needed to make the cracks inducing joints cost of all operation equipment labour tools, etc. required for carrying out this work.

5.10.2 RCC LINING:

The quantity of reinforced cement concrete lining shall be measured on square meter/cum basis on the same lines as of plain concrete lining. Payment of RCC lining shall be made at the unit rate as provided in the bill of quantities. Reinforcement shall be paid separately as per item rate in bill of quantities. The rate for RCC lining is inclusive of costs of all other material, transport with all leads, lifts, cutting of grooves, mixing, conveying, placing, vibrating, compacting, smooth finishing curing etc. and also dewatering during the placing of reinforcement and concrete for lining as required.

5.11. SAFETY LADDERS:

5.11.1 GENERAL

Safety ladders should be constructed in canal lining as directed by the Engineer-In-Charge. Safety ladders consisting of ladder rungs should be constructed in canal lining about 30 m upstream of the point where the canal enters some underground structure. In other reaches safety ladders may be provided at a spacing of about 300 m, the ladders being provided alternatively on either side.

Ladder rungs should be smooth, round mild steel bars, galvanized or coated with coal tar after installation.

Typical details of safety ladders are illustrated in the approved drawing.

5.11.2 MEASUREMENT AND PAYMENT:

Safety ladders shall be measured by weight of M.S. bar. Payment therefore shall be made at the unit rate in schedule of quantities. The rate shall include the cost, carriage, taxes for providing and fixing the ladders as indicated on the drawings.

5.12. CANAL LINING USING CEMENT CONCRETE SLABS

5.12.1 GENERAL

Lining of canals with pre-cast cement concrete slabs shall be adopted for rehabilitation of the damaged pre-cast slab lining in canals or new lining in the old or new canals or in places as shown in the drawings or as directed by the Engineer-in-Charge.

5.12.2 PREPARING FOUNDATION

The provisions detailed in the paragraph 5.3 shall apply.

5.12.3 MODEL (PROFILE) SECTIONS OR TEMPLATES

Model sections or templates of cement concrete M-15 shall be constructed in the bed and sides of the canal to the required sections with the top of model section level to the finished surface of the lined section of the canal portion. The spacing of the model sections shall be 15 meters in straight reaches and 7.5 meters in curved reaches. The exposed

face of the model sections constructed with cement concrete M-15 or shall be plastered with cement mortar as shown in the drawing or as directed by the Engineer-in-Charge. The dimensions of the model sections will be the given in the drawings or as directed by the Engineer-in-Charge.

Suitable super elevation in curved reaches shall be given after the approval of the Engineer-in- Charge.

Since the model sections are to be used as reference for excavation and trimming of sub grade for the lining and for laying accordingly, finishing the lining of the required grade and profile, it should be constructed with in a tolerance limit of 30 mm in a length of 3 meters. Model sections beyond the permissible tolerance will be removed and redone by the Contractor at his own expense.

5.12.4 MATERIALS

All materials cement, sand, aggregate and water shall conform to specifications given in section 4.2.

5.12.5 PRECAST SLABS

Mix for the slab shall be of cement concrete M-15 using 20mm hard machine broken stone aggregates. The face of the slab shall be square or rectangular. The dimensions of the slab shall be 45 cm x 30 cm x 5 cm or 22.5 cm x 30 cm x 5 cm. Toe wall blocks shall be 15 cm x 20 cm x 30 cm or as directed by the Engineer-in-charge. The permissible tolerance on length and width shall be $\pm$ 5 mm. The difference in length of two diagonals of slab shall be not more than 4.5 mm. The thickness shall not be less than the specified value. The permissible tolerance on thickness shall be ±2.0 mm. The slabs shall be either with all its sides right angles to the faces or with two of its sides bevelled at a particular angle to the faces or as directed by the Engineer-in-Charge. The bevelled slabs shall be provided with tongues and grooves as per paragraph 6.1.2.1 of I.S. 3860- 1966.

The slabs shall have minimum flexure strength as specified in I.S. 4060-1968.

5.12.6 CASTING OF SLAB

5.12.6.1 EQUIPMENT

Manufacturing of slabs required for lining shall be done in the casting yard using concrete mixers for mixing, steel moulds and table vibrators. They shall be cured in curing ponds. The casting yard with the required infrastructure shall be constructed by the Contractor at his cost.

The measuring boxes for the ingredients shall be accurate and maintained in serviceable conditions. The concrete mixer shall conform to I.S. 1971-1968.

The table vibrators to be used shall conform to I.S. 2514-1963. For all sizes of vibrating table, the height of the table top from the ground level shall be sufficient to allow for easy placing and removal of the moulds and shall not exceed 0.75 meter. The capacity of vibrating table shall be indicated for the effective vibration by the maximum weight in tones of the mould plus the concrete in the mould.

The frequency of vibration for the table operating at its maximum load capacity shall be between 3000 to 6000 cycle per minute. The vibration acceleration of the table operating at its maximum load capacity shall not be less than four times the acceleration due to gravity. The minimum frequency of the table under loaded state for determining the acceleration shall not be less than 3000 cycles per minute.

The reduction in amplitude of the table while operating from 'zero load' to full load condition shall not exceed 25%.

A source for giving copious water, required for mixing, casting and curing concrete shall be provided at the Contractor's cost. Sufficient numbers of steel moulds of required size with necessary base plates shall be procured by the Contractor.

The payment shall be for finished work and the payment includes all materials, equipment, machinery, casting yard and all other inputs including water supply etc. complete.

5.12.6.2 CASTING AND CURING

Prior to the batching operation, steel moulds and base plates shall be cleared of all dirt and well oiled on all surfaces and kept ready for placement of concrete. The table vibrator and concrete mixer should be checked to ensure that they are in working condition. Cement, sand and aggregate shall be fed in to the mixer after measuring each volumetrically in required proportion. Required water shall be added while the ingredients are fed into the drum from the hopper. The mixing time shall not be less than two minutes and unloading of the mixed concrete to the platform shall be done only after the steel mould and the table vibrator are ready to receive concrete. The concrete shall be laid in the oiled steel moulds and vibrated using vibrating table with a frequency of not less than 3000 cycles per minute and the

vibrating time shall not generally be less than 20 minutes for 10 sqm of slab of size of 5 cm thick and 30 minutes for 10 sqm in the case of 7.5 cm thick slab.

After the specified vibration period is completed, the slab shall after finishing the top surface be allowed to cure under polythene sheet of wet sack for 24 hours. After the lapse of 24 hours the slabs shall be cured in curing ponds for 7 days. Before placing the slab in the curing ponds care shall be taken to finish the top surface smooth and after 7 days of immersed curing under water, the slabs shall be cured with sprinkling water for next 21 days covering the slab with straw, gunny etc., for keeping the surface always moist.

(iii) LAYING OF SLABS

The slabs shall be removed to the canal site for lying only after they are cured for the prescribed period. While loading, transporting and unloading at the site, care shall be taken to prevent any damage to the slab. Slabs which are with rough damaged surfaces or with broken corners or cracks or with irregular edges shall not be allowed to be used in lining.

The laying slab shall be commenced after completing the preliminary works namely preparing the bed construction of model sections or templates, trimming the surface to the bottom line of lining as specified in paragraph 7.12.2 and 7.12.3.

The slabs shall be laid on finished surface true to line and grade using model sections as a guide starting from the bottom layer, the joints shall be filled in with cement mortar of mix 1:3 to the full depth of joint, the width of the joint shall not exceed 12 mm. The joint should be flush pointed in cement mortar 1 :3. Curing shall be done for a period not less than 14 days. Any portion of the work not in line or grade, joints not packed with mortar and not cured for the prescribed period shall be removed and redone at the Contractor's cost.

(D) MEASUREMENT AND PAYMENT

The measurement for the toe wall will be in cubic meter in the case of toe wall built cement concrete blocks. The lining work slabs be measured in square meter.

The unit price bid in the bill of quantities shall include cost of all materials including water, labour and charges for manufacture conveyance, laying furnishing, and casting. Payment shall be made at unit price in the bill of quantities including manufacture and laying of slabs etc. complete.

*****

CHAPTER - 6

FINE DRESSING AND TURFING

6.1 DESCRIPTION

This work shall consist of supplying and laying live sods on the slope and other locations as ordered by the Engineer in accordance with the following specifications.

6.2 MATERIALS

The sods shall consist of a dense well rooted growth of permanent and desirable grasses. Indigenous to the general locality where it is to be used, and shall be practically free from weeds or undesirable grasses. At the time the sods is out. The grass on the sod shall have a length of approximately 2 inches (if longer, the grass shall be cut to approximately this length and the sod shall have been raked from debris.

The sod shall be cut in uniform strips cot larger than it is convenient for handling and transport. The thickness of the sod shall be as uniform as possible approximately ¾ inch or more depending on the nature of the sod, so that practically all of the dense root system of the grasses will be retained but exposed in the sod strip and so that the sod can be handled without undue tearing or breading.

In the event the sod which is to be cut is in a dry condition, so as to cause crumbling or breaking during cutting operations, the contractor at his own expense, shall at least 12 hours before cutting the sod, apply water to the same in sufficient quantity to provide a well moistened condition of the sod to the depth to which it is to be cut.

Top soil of the area to be turfed shall consist of soil adapted to the sustenance’s of plant life.

6.3 CONSTRUCTION METHOD

6.3.1 PREPARATION OF THE EARTH BED

All areas desired to be covered with sod shall be fine dressed to required contour, to an extent such that the finished work after laying sod with necessary top soil incorporated in the bed will be in accordance with required lines, grades, slopes and cross section.

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The area to sodden shall be free from stones, roots or other undesirable foreign materials. The soil of the area to be sodden shall be loosened to a depth of approximately not less than and top soil shall be spread evenly over the prepared bed to a depth of 2 inches and the clods and lumps shall be broken down to provide a uniform texture to the soil.

6.3.2 PLACING THE SOD

The earth bed upon which the sod to be placed shall be moistened to the depth, manipulated, if naturally not sufficiently moist, and the sod after the same has been cut and shall be properly protected and sprinkled with water until placed be laid in horizontal strips beginning at the bottom of the slopes and working onwards, when placing sods the length to the strips shall be laid at right angles to the direction of flow of water. Sods shall be laid so that the joints caused by abutting ends of sods strips were not continuous, each sod strip shall be so laid to about against the strip previously laid.

As the sod is being laid shall be firmly and lightly tamped with suitable wooden or metal tampers to press the sod into the underlying soil. After tamping, the sod shall present a smooth even surface free from bumps or depressions, at such point. Where water will start flowing over a sodden area the upper edge of the sod strip shall be turned into the soil and layer of earth placed over this, which earth shall be thoroughly compacted to conduct the surface water over the upper edge of the sod. No sods shall be laid during the dry months of March to July.

6.3.3 WATERING

The sod shall be thoroughly watered immediately after placing and shall be kept thoroughly wet for a period of at least seven days after laying and shall be maintained in a satisfactory condition.

6.4 METHOD OF MEASUREMENT AND PAYMENT

Measurement of turfing shall be made after full and satisfactory growth of the turfing. The unit and price shall contain all the specification as mentioned in the tender schedule.

Sod shall be measured by units of 100 square meters and will be paid for at the contract unit price of 100 square meter/ square meter of sod in place which shall include all operation for preparing the earth bed, for furnishing, placing, top dressing and watering the sod and for all labour, equipment, tools and incidentals necessary to complete the work in accordance with contract.

CHAPTER -7
OTHER ITEMS

7. 1. WEEP HOLES

Providing weep holes and placing in position 10 cm dia Asbestos Cement pipes with non-corroding jalli as per design and drawings.

7.2. GENERAL

a) Weep holes of the size as shown on the drawings shall be provided and they shall extend through the full width of the masonry with a slope of about 1 vertical to 20 horizontal towards the draining face to drain moisture from the backfilling, the spacing of holes shall be as per the drawings in either direction staggered. The sides and bottom of weep holes in the interior shall be made up in the stones/ concrete having fairly plain surface as a channel so formed slabbed over with stones/ concrete lintels not less than 150 mm and each side including centring and shuttering. In stone masonry, generally the height of weep holes shall be the same as the height of the course in which they are formed. Filters behind weep holes with jally shall be provided to the dimensions and grades as shown on the drawings with inverted backing of approved quality filter materials in back filling side.

b) In case the length of the pipe falls short of the standard length of the pipe, it shall be joined with necessary collars in cement mortar 1:3 of as per the instruction of the Engineer to form continuous hole in the body of wall. Defective pipes or defective work shall not be measured and paid. These shall be removed and replaced by the contractor. The interior of all pipes shall be free from sand, mortar or dirt and other foreign matter. Care shall be taken to prevent entrance of any foreign matter into the pipes during progress of work.

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SECTION - 7

FORMS

Tenderer(s) is/are required to submit the information in the following Schedules

SCHEDULE - A

CERTIFICATE OF NO RELATIONSHIP

I/We hereby certify that I/We* am/are* **related / not related**(*) to any officer of P.W.D/Water Resourse Department of the rank of Assistant Engineer & above and any officer of the rank of Assistant / Under Secretary and above of the Works Department, Govt. of Odisha 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.

(*) - Strike out which is not applicable

Signature of the Tenderer
Date:-

CONTRACTOR **SUPERINTENDING ENGINEER**

SCHEDULE – B

INFORMATION REGARDING CURRENT LITIGATION, DEBARRING EXPELLING OF TENDERER OR ABANDONMENT OF WORK BY THE TENDERER

1.	a)	Is the tenderer currently involved in any litigation relating to the works.	Yes / No
	b)	If yes: give details:	
2.		Has the tenderer or any of its constituent partners been debarred/ expelled by any agency in India during the last 5 years.	Yes / No
3.	a)	Has the tenderer or any of its constituent partners failed to perform on any contract work in India during the last 5 years.	Yes / No
	b)	If yes, give details:	

Note:

If any information in this schedule is found to be incorrect or concealed, qualification application will summarily be rejected.

Signature of Tenderer

CONTRACTOR **SUPERINTENDING ENGINEER**

SCHEDULE – C

AFFIDAVIT

1. The undersigned do hereby certify that all the statements made in the required attachments are true and correct.
2. The undersigned also hereby certifies that neither my / our firm / company / individuals _____ nor any of its constituent partners have abandoned any road/ bridge/Irrigation /Buildings or other project work in India nor any contract awarded to us for such works have been rescinded during the last five years prior to the date of this bid.
3. The undersigned hereby authorize (s) and request(s) any bank, person, firm or Corporation to furnish pertinent information as deemed necessary and as requested by the Department to verify this statement or regarding my (our) competency and general reputation.
4. The undersigned understands and agrees that further qualifying information may be requested and agree to furnish any such information at the request of the Department.

(Signature of Tenderer)
Title of Officer
Name of Firm
Date:

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SCHEDULE - D

CERTIFICATE OF EMPLOYMENT OF UNEMPLOYED GRADUATE ENGINEER / DIPLOMA HOLDERS
(For Super Class / Special Class / 'A' Class Contractors only)

I / We hereby certify that at present, the following Engineering personnel are working with me / in our firm / company and their bio-data are furnished below.

Sl. No.	Name of Engineering personnel appointed for supervising contractor's work with address	Qualification	Date of Appointment	Monthly emolument	Whether full time engagement and continuous	If they are superannuated / retired / dismissed or removed personnel from state Govt./ Central Govt. / Public Sector Undertaking / private Companies and s or any one ineligible for Government service
1	2	3	4	5	6	7

Signature of the Tenderer.
Date:-

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SCHEDULE - E

SAMPLE FORMATS

UNDER TAKING

This is to certify that

1. My firm has neither been associated, directly or indirectly, with the Consultant or with any other entity that has prepared the design, specifications, and other documents for the Project nor has any person associated with been proposed as Project Manager for the Contract.

2. My firm has not engaged any agency and any of its affiliates engaged by the Engineer-in-Charge to provide consulting services for the preparation or supervision of this work.

3. My firm has not engaged any Engineer of gazetted rank employed in Engineering or Administrative duties in an Engineering Department of the Government of Odisha or other gazetted officer retired from Government service during last two years without prior permission of the Government of Odisha in writing on or before submission of this tender. I am aware that my contract is liable to be cancelled if either I or any of my employees is found any time to be such a person who had not obtained the permission of the Government of Odisha as aforesaid.

Signature of the Tenderer.
Date:-

Note: i. Strike out whichever is not applicable
ii. In case any person is under his employment with due permission from Government, the same may be cited in a separate letter.

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SECTION - 8

QUALITY ASSURANCE

QUALITY ASSURANCE, CONTROL AND QUALITY MONITORING

It shall be the responsibility of the Contractor to ensure the quality of the materials to be used, quality of works to be executed as well as the quality of finished product as per technical specification in accordance with Indian Standards.

Contractor shall establish and maintain field laboratory suitably placed inside the Project area (including suitable building, furniture and equipment) at his own cost and conduct different quality control test on construction material, process control test on construction & quality control monitoring test on finished products. He shall appoint qualified & experienced technical staff as per requirement to conduct tests. Equipment as necessary to conduct the tests shall be procured by the contractor. A list indicating some of the main equipment are given below for reference of the Contractors. The Contractor shall also procure other equipment, if necessary, to conduct tests specified for different items of work to the satisfaction of the Project Manager.

Sl. No.	*Name of Equipment*	*Quantity for each Road*
i.	Post Hole Auger with extension	One Set
ii.	Digging tools like pick axe, shovel, hammer, chisel, etc	One Set
iii.	) IS Sieves with lid and pan (90 mm, 80mm, 63mm, 53mm, 45mm, 37.5mm, 26.5mm, 19mm, 13.2 mm, 11.2mm, 9.5mm, 4.75mm, 2.8mm, 5.6mm, 3.35mm, 2.36mm, 600 micron, 425 micron, 300 micron, 150 micron, 180 micron, 90 micron and 75 micron)	One Set
iv.	Standard Proctor Density Test Apparatus with rammer	One Set
v.	Sand Pouring Cylinder with tray complete for field density test	One Set
vi.	Core Cutter (100 mm dia) 100mm/150mm height complete with dolly and hammer	One Set
vii.	Speedy moisture meter complete with chemicals	One Set
viii.	Straight Edges	Two Nos
ix.	Digital Thermometers	Three Nos
x.	Liquid Limit and plastic limit testing apparatus complete with Water bottle and glass wares	One Set
xi.	Gas burner, sand bath	One Set
xii.	Chamber Board	
xiii.	Electronic / digital balance 1 kg with the least count of 0.01 gm.	One No.
xiv.	Electronic / digital balance 20 kg	One No.
xv.	Pan balance with weight Box, 5 kg	One No.
xvi.	Oven (ambient to 200^0C)	One No.
xvii.	Water bath (ambient to 100^0C)	One No.
xviii.	Bitumen extraction apparatus	One No.
xix.	Penetration apparatus (Bitumen)	One No.

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xx.	Enameled tray	Six Nos
xxi.	Measuring tape, spatula, glassware, porcelain dish, pestle mortar.	One Set
xxii.	Trays for measurement of tack coat quantity	Three Nos
xxiii.	Slump cone	Two Nos
xxiv.	Cube mould (150mmx150 mm x 150 mm)	Twelve Nos

The key equipment's for field laboratory shall be:

9.1 QUALITY ASSURANCE PLAN

The Contractor shall, within fourteen (14) days from the Commencement Date, submit a Quality Assurance Plan.
shall include methodology & sequence of operation, list of materials sources, Quality Assurance & Quality control procedure to be followed prior to commencement of work and during execution, testing schedule showing test to be conducted and their frequencies & testing of end product, with respect to procedure laid down in different Indian Standards for each item of work &internal organization ensuring good quality of constructions works, procedures for supplying of suitable materials, procedures for verification of drawings and other items as required by the Project Manager. The Contractor shall implement the quality control procedures in compliance with the approved Quality Assurance Plan.

9.2 SUPERVISION

Supervision of construction work will be done by Superintending Engineer, Quality Assurance Division, Bhawanipatna.

9.3 MATERIALS AND SAMPLES

The Contractor shall submit to the Project Manager a list of all suppliers of manufactured items from whom he proposes to purchase, and the locations of quarries, material sources from which he proposes to extract material aggregates, stones, fill materials etc. If the contractor is purchasing the aggregates from the vendor he should obtain the material from the licensed quarry where the Orissa Pollution Control Board has given Consent for Establishment and Operation for the crusher. In addition the Contractor should enclose a copy of the Consent for establishment and operation as part of the Vendor approval. All materials and articles shall, whether specified or otherwise, be suitable for the use intended and shall be approved by the Project Manager. Samples of all materials or articles to be incorporated in the Works as may be called for by the Project Manager or his Representative shall be submitted as and when required for retention by the Project Manager's Representative. Manufacturer's test certificates shall be supplied in respect of cement, steel, pipes, etc.

The Contractor shall maintain a detailed record of all materials delivered to his stores or working areas, and shall make these records available to the Project Manager's representative. All goods and materials used in the Permanent Works shall be new, unused, of the most recent or current models, and incorporate all recent improvements in design and materials unless provided otherwise in the Contract.

All materials and works rejected by the Project Manager's representative shall be promptly removed from the site.

9.4 INSPECTION AND TESTS

All materials and goods furnished and works performed under these specifications shall be subject to the inspection of the Project Manager or his authorized representative to determine that they meet the requirements of these specifications. The Contractor shall notify the Project Manager, not less than 15 days in advance of the date and place that the materials will be available for inspection. Acceptance of materials or the waiving of inspection, thereof, shall not relieve the Contractor of the responsibility for furnishing materials and goods or performing works in accordance

with the requirements of the Contract Documents.

The Contractor shall conduct different approval test in Government approved Testing Laboratories prior to utilization in the work.

The Contractor shall be responsible for delivering all samples to the laboratory and for collecting the results. The original test certificates shall be presented to the Project Manager for his review and approval.

The Contractor shall conduct quality control test on construction material, process control test on construction & quality control monitoring test on finished products in Q.C Field Laboratory with respect to procedure & frequencies laid down in different Indian Standards for each item of work.

The Contractor shall maintain quality control test registers made out of approved test formats of all tests & abstract submitted to Project Manager regularly.

Contractor shall maintain guard file & document all test results of approval test of construction materials conducted in government approved Q.C. Testing laboratory, & abstract submitted to Project Manager regularly.

The Contractor shall facilitate inspection & verification of testing, documentation of test result to the Project Manager or his authorized representative (Asst. engineer, Junior Engineer & supporting testing staff) to ascertain, the work has been executed as per approved Technical Specification.

The Contractor shall facilitate State Quality Monitors (appointed by D.O.W.R) & higher authorities of Project to inspect & conduct verification testing as and when required to ascertain the materials used in the work & the end products are of prescribed standards.

The Contractor shall submit all the original quality control Test registers & guard file containing approval test results of materials to the Project Manager for record after completion of the work.

9.5 PROFORMA FOR OK REGISTER FOR QC

QUALITY CONTROL ARRANGEMENT -

a)	Person in-charge of QC.				
	Name				
	Designation				
	Base Lab				
	Name / Location of Base Lab				
b)	QC register /OK Card Produced		Yes		No
	Maintained properly		Yes		No
c)	Field Laboratory				
	Set Up		Yes		No
	Maintained by				

8.5.1 **Borrow Area :**

Location		Km. from site		
Approved		Yes		No
Soil tested		Yes		No
Test Laboratory				
(Name / Location)				
Results pasted in QC Register		Yes		No

8.5.2 **Drawing and Specifications:**

Approved/ Working				
Drawing available at site		Yes		No
Specification available at site		Yes		No

8.5.3 **During Inspection:**

a) Earthwork was done in my presence from RD_____to _____

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	Yes		No

b) I am satisfied/ not satisfied (state details if not satisfied) that proper procedure has been followed in the above work.

Earth from approved borrow area has been stacked suitably and there is no excess earth.

8.5.4 Field moisture content of stacked earth %

OMC %

Type of spreading equipment				
Earth was properly spread to _____ mm		Yes		No
Type of watering equipment				
Type of compacting equipment				
No. of passes				
Field Dry Density				
Percentage of compaction				
Extra passes				
Final Dry Density				
Final percentage of compaction				
Entered in QC register and OK Card.				

. **CHECKLIST FOR CONCRETE**

Drawing & Specification:

Drawing and Specifications:

	Approved/ Working				
	Approved by				
	Specification available at site		Yes		No

Reinforcement grade of steel :	
Fine aggregate Quality :	
Water Quality :	
Coarse aggregate Quality :	
Cement grade :	
Minimum cement in Kg/cum. :	
Maximum cement in Kg./cum. :	
Admixture quality :	

8.5.5 Arrangement :

Safety of centering and shuttering		Yes		No
Stand by equipments :		Yes		No
Lightning arrangement :		Yes		No
Stand by vehicle for emergency		Yes		No
Compressor/ Green cut arrangement		Yes		No
Curing Arrangement		Yes		No

8.5.6 Tests conducted :

Cement		Yes		No
Reinforcement		Yes		No
Course Aggregate		Yes		No
Fine Aggregate		Yes		No
Water		Yes		No
Design Mix done		Yes		No
Laboratory where mix design done				
Cube tests and their results		OK		Not

8.5.7 Field test conducted during inspection/ observation :

Grading of coarse aggregate		Yes		No
Grading of fine aggregate		Yes		No

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Silt content of sand		Yes		No
Bulkage of sand		Yes		No
Type of Cement				
Date of manufacture of cement		Yes		No
Observed slump				
Sample of concrete		Taken		No
Sample No. of cubes				
Weight of cement used per Batch		Kg.		
Weight of Coarse aggregate		Kg.		
Weight of Fine aggregate		Kg.		
Quality of water		Kg.		
Grade of steel used				
Spacing as per drawing		Yes		No
Cover OK		Yes		No
Laps OK		Yes		No
Walk way provided		Yes		No
Status of old concrete OK		Yes		No
Status of cube test results OK		Yes		No
Non destructive test required		Yes		No
Recording in QC register		Yes		No

8.6 CHECKLIST FOR ROAD WORKS

8.6.1 Pre-construction Tests:

Soil Tested		Yes		No
Type of soil				
Liquid Limit				
CBR value Tested		Yes		No
Borrow area specified		Yes		No
Availability of test report		Yes		No
Recorded in QC register		Yes		No
Density of soil				

Test Laboratory (Name/ Location)	
OMC	
MDD	
Suitability	Yes / No

8.6.2 Test during Inspection:

Thickness of layer OK		Yes		No
Moisture content		Yes		No
MDD		Yes		No
Percentage of compaction		OK		No
Profile of Road OK		Yes		No
Recording in QC register		Yes		No

8.7 Granular Sub-base:

8.7.1 Pre-construction Tests:

Test of moorum& soil admixture		Yes		No
Proportion of admixture				
Liquid limit				
CBR value Tested		Yes		No
P.I.				
OMC				
MDD				
Grading		OK		Not
Tested at Lab.		Govt.		Private
Test results available at site		Yes		No.

8.7.2 Test during Inspection :

Thickness of layer OK		Yes		No
Grading		OK		Not
OMC				

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	MDD				
	Percentage of compaction		OK		Not
	Profile of Road OK		Yes		No
	Recording in QC register		Yes		No
8.8	W.B.M. items :				
8.8.1	Tests in Base Lab :				
	Physical properties of coarse aggregate		Yes		No
	Grading of coarse aggregates		Yes		No
	Screening material		Yes		No
	Liquid Limit of Screening materials				
	P.I. of screening materials				
	% finer to 75 micron sieve for screening materials				
	Tested at Lab		Govt.		Private
	Test results available at site		Yes		No
8.8.2	Test during inspection :				
	Thickness of layer OK		Yes		No
	Grading of coarse aggregate		OK		Not
	Grading of screening OK		Yes		No
	Profile of Road OK		Yes		No
	Surface irregularly OK		Yes		No
	% finer to 75 micron sieve				
	Recorded in QC register		Yes		No
3.9	**Bituminous items :**				
8.9.1	Test in Base Lab :				
	Physical properties of coarse aggregate		Yes		No
	Grading of coarse aggregate		Yes		No
	Properties of bitumen/Emulsion		Yes		No
	Test results available at site		Yes		No
	Test conducted at laboratory		Govt.		Private
8.9.2	Test during inspection :				
	Bitumen/Emulsion content in Prime coat/ tack coat/ seal coat/ PMC				
	Mixing temperature				
	Laying temperature				
	Thickness of layer				
	Profile of Road OK		Yes		No
	Surface irregularity OK		Yes		No
	Grading of coarse aggregate		Yes		No
	Record in QC register		Yes		No
8.10	Quality supervision				
	Arrangement during execution OK.		Yes		No
8.11	Quality monitoring arrangement OK		Yes		No
8.12	Rectification and compliance to defects		Yes		No
8.13	Suggestion for improvement to be recorded in QC register		Yes		No

CONTRACTOR **SUPERINTENDING ENGINEER**

SECTION - 9

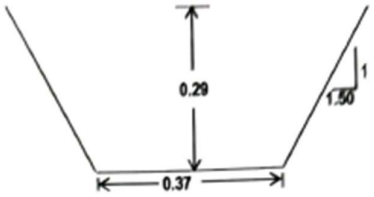
DRAWING

DESIGN DETAILS OF PROPOSED RCC TROUGH WALL FOR GHUMAR SUB-MINOR (FROM RD 00 M TO RD 720 M)

(Drawings are not to scale)

HYDRAULIC PARTICULARS ; (AS PER UNLINED EXISTING SECTION)

Discharge, Q	(Cumecs)	0.1500
Bed width, B	(mtr)	0.374
F.S.D, D	(mtr)	0.294
Velocity	(m/ sec.)	0.530
Water Surface Slope, S		0.000986
Rugosity Coefficient, n		0.0225
Side slopes; (H:V)		
Cutting		1.5:1
Filling		1.5:1
Free board	(mtr)	0.30
Coping	(mtr)	0.15
LB/RB Width	(mtr)	1.50/1.50



(C.S of unlined canal)

DESIGN:

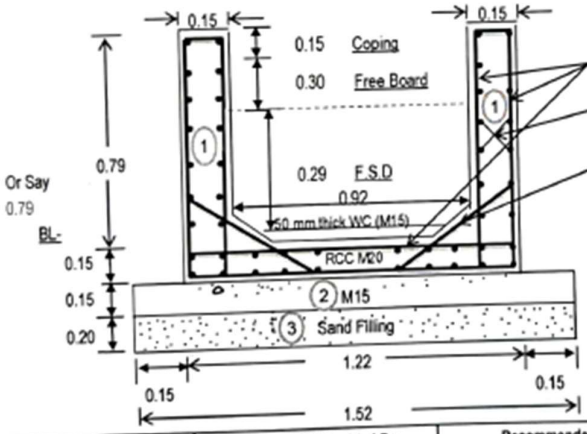
Determination of discharge in the revised lined canal:- (As per Revised Design Statement)

providing a lined channel.

The FSD of canal shall remain unchanged.

Rugosity Coefficient ,n =		0.018 (For concrete surface finished smooth)
Let us provide Bed Width of canal , B=		**0.92** M
F.S.D ,	D=	0.294 M
Area of canal,	A=B *D	0.270 M2
Wetted Perimeter,	P=B+2*D	1.508 M
Hydraulic Mean Depth ,	R= A/P	0.179 M
Velocity	,V = 1/n *R^(2/3)*S^(1/2)	0.555 M/Sec.
Discharge,	Q = A*V	**0.150**

ALL DIMENSIONS ARE IN MTS.



Specifications:-

(1) RCC M-20 using 20mm & down graded H.G.metal.

(2) C.C.M-15 using 20mm & down graded H.G.Metal.

(3) Sand Filling

(4) Clear cover for reinf. should not be less than 40 mm

(5) Detailed drawings are attached herewith separately

Prepared By	Checked & Submitted By	Recommended By	Approved By
25-9-26	01/10/26	01/10/26	03/10/26
Asst. Executive Engineer	Estimator	Superintending Engineer.	Chief Construction Engineer
U.I.L.C Sub-Division No.I	U.I.L.C Division No.II	U.I.L.C Division No.II	Upper Indravati Project
Dharmagada	Dharmagada	Dharmagada	Mukhiguda

		DRG. No.	
		Year	

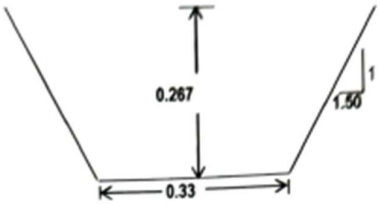
CONTRACTOR **SUPERINTENDING ENGINEER**

DESIGN DETAILS OF PROPOSED RCC TROUGH WALL FOR GHUMAR SUB-MINOR (FROM RD 720 M TO RD 1380 M)

(Drawings are not to scale)

HYDRAULIC PARTICULARS ; (AS PER UNLINED EXISTING SECTION)

Discharge, Q	(Cumecs)	0.110
Bed width, B	(mtr)	0.330
F.S.D, D	(mtr)	0.267
Velocity	(m/ sec.)	0.477
Water Surface Slope, S		0.000909
Rugosity Coefficient, n		0.0225
Side slopes; (H:V)		
Cutting		1.5:1
Filling		1.5:1
Free board	(mtr)	0.30
Coping	(mtr)	0.15
LB/RB Width	(mtr)	1.50/1.50



(C.S of unlined canal)

DESIGN:

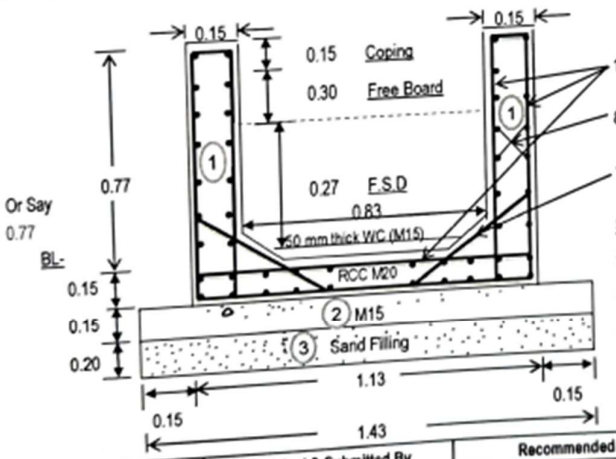
Determination of discharge in the revised lined canal:- (As per Revised Design Statement)

providing a lined channel.

The FSD of canal shall remain unchanged.

Rugosity Coefficient ,n =		0.018 (For concrete surface finished smooth)
Let us provide Bed Width of canal , B=		**0.83** M
F.S.D ,	D=	0.267 M
Area of canal,	A=B *D	0.222 M2
Wetted Perimeter,	P=B+2*D	1.364 M
Hydraulic Mean Depth ,	R= A/P	0.162 M
Velocity	,V = 1/n *R^(2/3)*S^(1/2)	0.499 M/Sec.
Discharge,	Q = A*V	**0.111**

ALL DIMENSIONS ARE IN MTS.



Specifications:-

(1) RCC M-20 using 20mm & down graded H.G.metal.

(2) C.C.M-15 using 20mm & down graded H.G.Metal.

(3) Sand Filling

(4) Clear cover for reinf. should not be less than 40 mm

(5) Detailed drawings are attached herewith separately

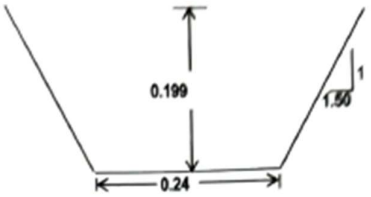
Prepared By	Checked & Submitted By	Recommended By	Approved By
25-9-26	01/10/26	01/10/26	03/10/26
Asst. Executive Engineer	Estimator	Superintending Engineer.	Chief Construction Engineer
U.I.L.C Sub-Division No.I	U.I.L.C Division No.II	U.I.L.C Division No.II	Upper Indravati Project
Dharmagada	Dharmagada	Dharmagada	Mukhiguda
			DRG. No.
			Year

DESIGN DETAILS OF PROPOSED RCC TROUGH WALL GHUMAR SUB-MINOR (FROM RD 1380 M TO RD 1900 M)

(Drawings are not to scale)

HYDRAULIC PARTICULARS : (AS PER UNLINED EXISTING SECTION)

Discharge, Q	(Cumecs)	0.060
Bed width, B	(mtr)	0.236
F.S.D, D	(mtr)	0.199
Velocity	(m/ sec.)	0.475
Water Surface Slope, S		0.00137
Rugosity Coefficient, n		0.0225
Side slopes; (H:V)		
Cutting		1.5:1
Filling		1.5:1
Free board	(mtr)	0.30
Coping	(mtr)	0.15
LB/RB Width	(mtr)	1.50/1.50



(C.S of unlined canal)

DESIGN:

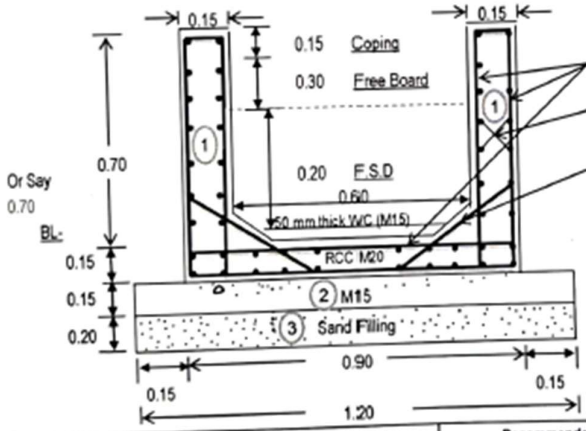
Determination of discharge in the revised lined canal:- (As per Revised Design Statement)

providing a lined channel.

The FSD of canal shall remain unchanged.

Rugosity Coefficient ,n =		0.018 (For concrete surface finished smooth)
Let us provide Bed Width of canal , B=		0.60 M
F.S.D ,	D=	0.199 M
Area of canal,	A=B *D	0.119 M2
Wetted Perimeter,	P=B+2*D	0.998 M
Hydraulic Mean Depth ,	R= A/P	0.120 M
Velocity	,V = 1/n *R^(2/3)*S^(1/2)	0.499 M/Sec.
Discharge,	Q = A*V	0.060

ALL DIMENSIONS ARE IN MTS.



10 mm Dia Main Bar @ 150mm C/C

8 mm Dia Distr. Bar @ 200mm C/C

10 mm Dia Hunch Bar @ 150mm C/C

Specifications:-

(1) RCC M-20 using 20mm & down graded H.G.metal.

(2) C.C.M-15 using 20mm & down graded H.G.Metal.

(3) Sand Filling

(4) Clear cover for reinf. should not be less than 40 mm

(5) Detailed drawings are attached herewith separately

Prepared By	Checked & Submitted By	Recommended By	Approved By
25.9.26	01/10/26	01/10/26	03/10/26
Asst. Executive Engineer	Estimator	Superintending Engineer.	Chief Construction Engineer
U.I.L.C Sub-Division No.I	U.I.L.C Division No.II	U.I.L.C Division No.II	Upper Indravati Project
Dharmagada	Dharmagada	Dharmagada	Mukhiguda
			DRG. No.
			Year

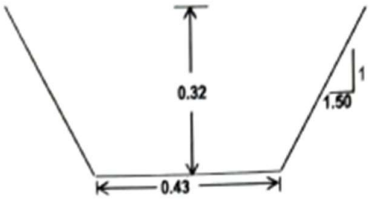
CONTRACTOR **SUPERINTENDING ENGINEER**

DESIGN DETAILS OF PROPOSED RCC TROUGH WALL FOR AMPARA SUB-MINOR (FROM RD 00 M TO RD 420 M)

(Drawings are not to scale)

HYDRAULIC PARTICULARS ; (AS PER UNLINED EXISTING SECTION)

Discharge, Q	(Cumecs)	0.210
Bed width, B	(mtr)	0.425
F.S.D, D	(mtr)	0.319
Velocity	(m/ sec.)	0.620
Water Surface Slope, S		0.0012
Rugosity Coefficient, n		0.0225
Side slopes; (H:V)		
Cutting		1.5:1
Filling		1.5:1
Free board	(mtr)	0.30
Coping	(mtr)	0.15
LB/RB Width	(mtr)	1.50/1.50



(C.S of unlined canal)

DESIGN:

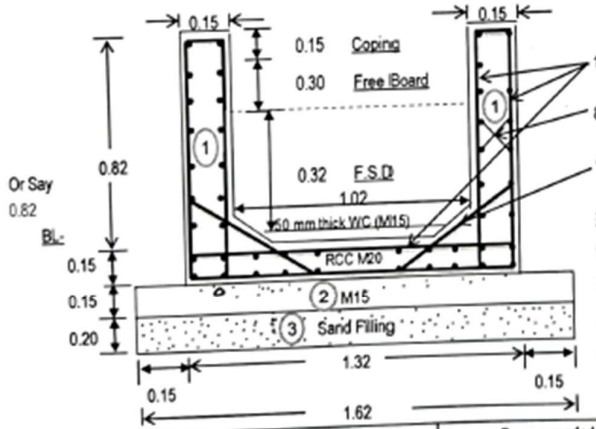
Determination of discharge in the revised lined canal:- (As per Revised Design Statement)

providing a lined channel.

The FSD of canal shall remain unchanged.

Rugosity Coefficient ,n =		0.018 (For concrete surface finished smooth)
Let us provide Bed Width of canal , B=		1.02 M
F.S.D ,	D=	0.319 M
Area of canal,	A=B *D	0.325 M2
Wetted Perimeter,	P=B+2*D	1.658 M
Hydraulic Mean Depth ,	R= A/P	0.196 M
Velocity	,V = 1/n *R^(2/3)*S^(1/2)	0.650 M/Sec.
Discharge,	Q = A*V	0.211

ALL DIMENSIONS ARE IN MTS.



10 mm Dia Main Bar @ 150mm C/C

8 mm Dia Distr. Bar @ 200mm C/C

10 mm Dia Hunch Bar @ 150mm C/C

Specifications:-

(1) RCC M-20 using 20mm & down graded H.G.metal.

(2) C.C.M-15 using 20mm & down graded H.G.Metal.

(3) Sand Filling

(4) Clear cover for reinf. should not be less than 40 mm

(5) Detailed drawings are attached herewith separately

Prepared By	Checked & Submitted By	Recommended By	Approved By
25-9-26	01/10/26	01/10/26	03/10/26
Asst. Executive Engineer	Estimator	Superintending Engineer.	Chief Construction Engineer
U.I.L.C Sub-Division No.I	U.I.L.C Division No.II	U.I.L.C Division No.II	Upper Indravati Project
Dharmagada	Dharmagada	Dharmagada	Mukhiguda

		DRG. No.	
		Year	

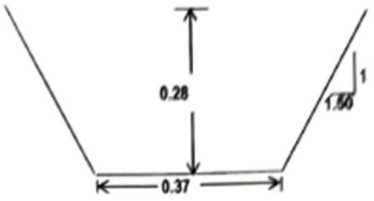
CONTRACTOR **SUPERINTENDING ENGINEER**

DESIGN DETAILS OF PROPOSED RCC TROUGH WALL FOR AMPARA SUB-MINOR (FROM RD 420 M TO RD 1080 M)

(Drawings are not to scale)

HYDRAULIC PARTICULARS : (AS PER UNLINED EXISTING SECTION)

Discharge, Q	(Cumecs)	0.180
Bed width, B	(mtr)	0.365
F.S.D, D	(mtr)	0.280
Velocity	(m/ sec.)	0.695
Water Surface Slope, S		0.0015
Rugosity Coefficient, n		0.0225
Side slopes; (H:V)		
Cutting		1.5:1
Filling		1.5:1
Free board	(mtr)	0.30
Coping	(mtr)	0.15
LB/RB Width	(mtr)	1.50/1.50



(C.S of unlined canal)

DESIGN:

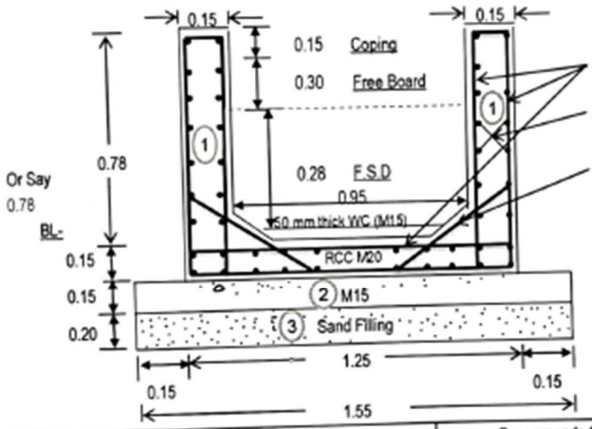
Determination of discharge in the revised lined canal:- (As per Revised Design Statement)

providing a lined channel.

The FSD of canal shall remain unchanged.

Rugosity Coefficient ,n =		0.018 (For concrete surface finished smooth)
Let us provide Bed Width of canal , B=		0.95 M
F.S.D ,	D=	0.280 M
Area of canal,	A=B *D	0.266 M2
Wetted Perimeter,	P=B+2*D	1.510 M
Hydraulic Mean Depth ,	R= A/P	0.176 M
Velocity	,V = 1/n *R^(2/3)*S^(1/2)	0.676 M/Sec.
Discharge,	Q = A*V	0.180

ALL DIMENSIONS ARE IN MTS.



Specifications:-

(1) RCC M-20 using 20mm & down graded H.G.metal.

(2) C.C.M-15 using 20mm & down graded H.G.Metal.

(3) Sand Filling

(4) Clear cover for reinf. should not be less than 40 mm

(5) Detailed drawings are attached herewith separately

Prepared By	Checked & Submitted By	Recommended By	Approved By
25-7-23	01/10/26	01/10/26	03/10/26
Asst. Executive Engineer	Estimator	Superintending Engineer.	Chief Construction Engineer
U.I.L.C Sub-Division No.I	U.I.L.C Division No.II	U.I.L.C Division No.II	Upper Indravati Project
Dharmagada	Dharmagada	Dharmagada	Mukhiguda
			DRG. No.
			Year

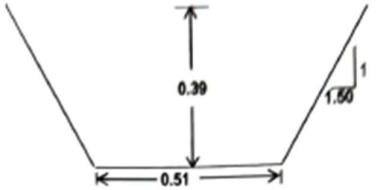
CONTRACTOR **SUPERINTENDING ENGINEER**

DESIGN DETAILS OF PROPOSED RCC TROUGH WALL FOR HALDI SUB-MINOR (FROM RD 00 M TO RD 710 M)

(Drawings are not to scale)

HYDRAULIC PARTICULARS ; (AS PER UNLINED EXISTING SECTION)

Discharge, Q	(Cumecs)	0.180
Bed width, B	(mtr)	0.510
F.S.D, D	(mtr)	0.392
Velocity	(m/ sec.)	0.418
Water Surface Slope, S		0.000415
Rugosity Coefficient, n		0.0225
Side slopes; (H:V)		
Cutting		1.5:1
Filling		1.5:1
Free board	(mtr)	0.30
Coping	(mtr)	0.15
LB/RB Width	(mtr)	1.50/1.50



(C.S of unlined canal)

DESIGN:

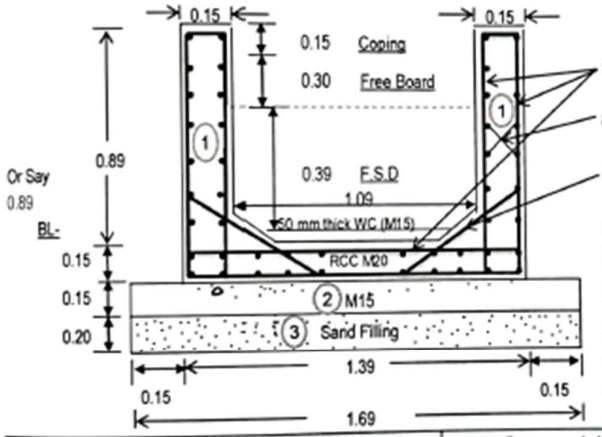
Determination of discharge in the revised lined canal:- (As per Revised Design Statement)

providing a lined channel.

The FSD of canal shall remain unchanged.

Rugosity Coefficient ,n =		0.018 (For concrete surface finished smooth)
Let us provide Bed Width of canal , B=		1.09 M
F.S.D ,	D=	0.392 M
Area of canal, A=B *D		0.427 M2
Wetted Perimeter, P=B+2*D		1.874 M
Hydraulic Mean Depth , R= A/P		0.228 M
Velocity ,V = 1/n *R^(2/3)*S^(1/2)		0.422 M/Sec.
Discharge, Q = A*V		0.180

ALL DIMENSIONS ARE IN MTS.



Specifications:-

(1) RCC M-20 using 20mm & down graded H.G.metal.

(2) C.C.M-15 using 20mm & down graded H.G.Metal.

(3) Sand Filling

(4) Clear cover for reinf. should not be less than 40 mm

(5) Detailed drawings are attached herewith separately

Prepared By	Checked & Submitted By	Recommended By	Approved By
25-9-26	01/10/26	01/10/26	05/10/26
Asst. Executive Engineer	Estimator	Superintending Engineer.	Chief Construction Engineer
U.I.L.C Sub-Division No.I	U.I.L.C Division No.II	U.I.L.C Division No.II	Upper Indravati Project
Dharmagada	Dharmagada	Dharmagada	Mukhiguda
			DRG. No.
			Year

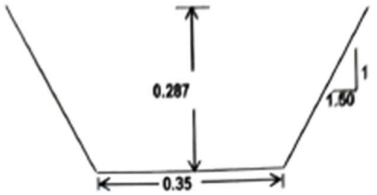
CONTRACTOR **SUPERINTENDING ENGINEER**

DESIGN DETAILS OF PROPOSED RCC TROUGH WALL FOR HALDI SUB-MINOR (FROM RD 710 M TO RD 990 M)

(Drawings are not to scale)

HYDRAULIC PARTICULARS ; (AS PER UNLINED EXISTING SECTION)

Discharge, Q	(Cumecs)	0.080
Bed width, B	(mtr)	0.346
F.S.D, D	(mtr)	0.287
Velocity	(m/ sec.)	0.359
Water Surface Slope, S		0.000473
Rugosity Coefficient, n		0.0225
Side slopes; (H:V)		
Cutting		1.5:1
Filling		1.5:1
Free board	(mtr)	0.30
Coping	(mtr)	0.15
LB/RB Width	(mtr)	1.50/1.50



(C.S of unlined canal)

DESIGN:

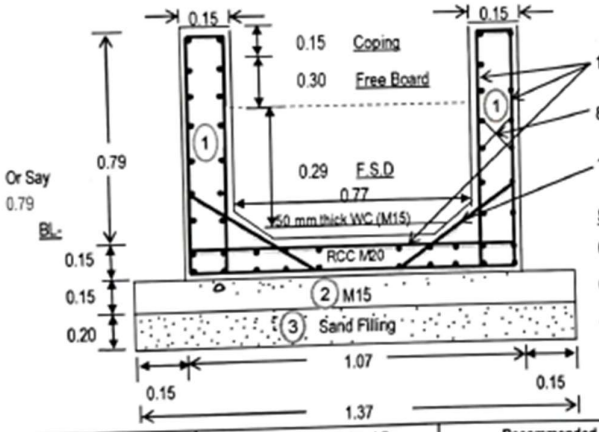
Determination of discharge in the revised lined canal:- (As per Revised Design Statement)

providing a lined channel.

The FSD of canal shall remain unchanged.

Rugosity Coefficient ,n =		0.018 (For concrete surface finished smooth)
Let us provide Bed Width of canal , B=		0.77 M
F.S.D ,	D=	0.287 M
Area of canal,	A=B *D	0.221 M2
Wetted Perimeter,	P=B+2*D	1.344 M
Hydraulic Mean Depth ,	R= A/P	0.164 M
Velocity	,V = 1/n *R^(2/3)*S^(1/2)	0.363 M/Sec.
Discharge,	Q = A*V	0.080

ALL DIMENSIONS ARE IN MTS.



Specifications:-

(1) RCC M-20 using 20mm & down graded H.G.metal.

(2) C.C.M-15 using 20mm & down graded H.G.Metal.

(3) Sand Filling

(4) Clear cover for reinf. should not be less than 40 mm

(5) Detailed drawings are attached herewith separately

Prepared By	Checked & Submitted By	Recommended By	Approved By
25-9-26	01/10/26	01/10/26	03/10/26
Asst. Executive Engineer	Estimator	Superintending Engineer.	Chief Construction Engineer
U.I.L.C Sub-Division No.I	U.I.L.C Division No.II	U.I.L.C Division No.II	Upper Indravati Project
Dharmagada	Dharmagada	Dharmagada	Mukhiguda
			DRG. No.
			Year

CONTRACTOR **SUPERINTENDING ENGINEER**

COVER - II

BILL OF QUANTITY WITH RATES

CONTRACTOR SUPERINTENDING ENGINEER

BILL OF QUANTITY

Name of work :- " **Construction of RCC trough lining of Ghumar Sub- Minor, Ampada Sub-Minor, Haldi Sub-Minor & Parla Sub-Minor-ll under Left Canal Division-II, Dharamgarh."**
Name of the Bidder :
Percentage : **Excess/Less**

Sl No.	Description of Items	Unit	Quantity	Rate	Amount
1	2	3	4	5	6
1	**Clearing grass** and removal of rubbish up to a distance of 50m out side the periphery of the area etc. complete as per the direction of the Engineer-in-charge.	Sqm	15880	2.9	46052.00
2	Earth work **excavation of foundation** in hard soil or gravelly within 50m initial lead and 1.5m initial lift including dressing and levelling the bed with shoring, shuttering and dewatering if required etc completeand as per the direction of the Engineer-in-charge.	Cum	3838.92	282.9	1086030.47
3	**Filling the foundation & plinth** with sand and well watered including cost, conveyance royalty of all materials etc. complete as directed by the Engineer-in-charge.	Cum	1395.97	745.8	1041114.43
4	**Cement concrete Grade M15 with 20mm** down graded hard granite crusher broken chips of approved quality free from skin materials mixing by concrete mixer including hoisting lowering and laying the concrete in position to proper slope, level and compacting by vibrators in layers and finishing the exposed surface smooth including watering with cost, conveyance, hire and running charges of all machineries, royalty and other taxes of all T & P materials labour etc complete & as directed by the Engineer in Charge.	Cum	1247.25	5588	6969633.00
5	Providing, strengthening, cutting, bending, binding, fitting & placing uncoated **HYSD bar reinforcement** & laying in position including cost of binding wire 18mm to 20mm gauge & fixing of reinforcement ilcluding lapping (As per steel code) where necessary spot including cost, conveyance, royalty, T & P & all taxes of reinforcement, etc. complete as directed by the Engineer-in-charge.	Qntl	2626.57	9354.5	24570249.07
6	**R.C.C. work of M-20 grade with 20mm** and down grade black hard granite (crusher broken) stone chips including hoisting and laying the concrete in position to proper slope, level and compacting by vibrators in layers and finishing the exposed surface smooth including watering with cost, conveyance, hire and running charges of all machineries, royalty and other taxes of all T & P materials labour etc complete & as directed by the Engineer in Charge.	Cum	2044.3	6009.3	12284811.99
7	Providing **form work for concrete with F1 finishing** using steel shutter plates of aproved specification for surfaces not porminently or permanently exposed to public view including supply of all materials. T & P	Sqm	14778	817.6	12082492.80

CONTRACTOR **SUPERINTENDING ENGINEER**

	labour and transportation of all materials ect. complete as directed by the Engineer-in-charge.				
8	**Filling the foundation & plinth with excavated materials** including watering and ramming, etc. complete as directed by the Engineer-in-charge.	Cum	1279.64	157.2	201159.41
9	**Earth work in ordinary** soil within the initial lead of 50m and initial lift of 1.5m including rough dressing and breaking the clouds to maximum 5cm to 7cm & laying in layers not exceeding 0.30m in depth & as per the direction of the Engineer-in-charge.	Cum	9403.33	175.4	1649344.08
10	Providing, **laying and fixing of RCC spun pipe** including collar joint with CM (1:3) cost of spun pipe and collars with cost of transportation etc. complete as per the direction of the Engineer-in-charge.	Rmt	135	743.1	100318.50
11	Inserting premoulded **expansion joints** including cleaning & including labour with cost of expansion joint materials.	Sqm	72.83	859.9	62626.52
12	Providing **weep holes** in Brick masonary/Plan/Rainforced Concrete abutment, wing wall/ Return wall with 50mm dia P.V.C. Pipe, extending through the full width of the strutures with slope of 1v:20H to-wards drawing face etc. complete as per drawing & technical spacification.	Rmt	685.5	90.6	62106.30
13	**16mm thick cement plaster (1 : 6)** for brick/stone work with all cost, carriage, Royalty, T & P etc complete as per direc-tion of Engineer-in-Charge.	Sqm	244.8	280.9	68764.32
	(**Thirteen items only**)		**TOTAL Rs.**		**6,02,24,702.89**

CONTRACTOR **SUPERINTENDING ENGINEER**