



B-1 Tender No. ....

For 2024 -2025

## **MAHARASHTRA KRISHNA VALLEY DEVELOPMENT CORPORATION, PUNE**

**(A Govt.of Maharashtra Undertaking)**

**CHIEF ENGINEER (SP)  
WATER RESOURCES DEPARTMENT, PUNE**

**SUPERINTENDINGENGINEER  
KUKADI IRRIGATION CIRCLE, PUNE**

**EXECUTIVE ENGINEER  
KUKADI IRRIGATION DIVISION NO-1, NARAYANGAON**

**TENDER PAPERS  
TENDER DOCUMENTS, SPECIFICATIONS AND DRAWINGS**

**Name of Work:-**

**Kukadi Irrigation Project, Dist Pune, Ahilyanagar  
Special Repairs to Kukadi Left Bank Canal k.m. 1 to 60 under  
Maharashtra Irrigation Improvement Programme (MIIP).**

**COST PUT TO TENDER: - Rs.8283.00 Lakhs**

**MAHARASHTRA KRISHNA VALLEY DEVELOPMENT CORPORATION, PUNE.****Chief Engineer (SP), Water Resources Department, Pune-11****Superintending Engineer, Kukadi Irrigation Circle, Pune-11****Kukadi Irrigation Division No.1, Narayangaon**

**Name of work:** - Kukadi Irrigation Project, Dist Pune, Ahilyanagar  
 Special Repairs to Kukadi Left Bank Canal k.m.1 to 60 under Maharashtra Irrigation Improvement Programme (MIIP).

**Cost put to Tender Rs.: - 8283.00 Lakhs.**

**Tender Paper submitted for  
Approval please**

**Draft Tender Paper for Approval**

**(B.P. Chawane)**  
 Sub Divisional Engineer  
 Kukadi Irrigation Division No.4,  
 Wadegavhan

**(Rajlaxmi Yedav)**  
 Divisional Accountant,  
 Kukadi Irrigation Division No.1,  
 Narayangaon

**(Prashant P. Kaduskar)**  
 Executive Engineer  
 Kukadi Irrigation Division No.1,  
 Narayangaon

**“Recommended for Approval”**

**(Er.Santosh M. Sangle)**  
**Superintending Engineer**  
 Kukadi Irrigation Circle,  
 Pune-11

**“Approved ”**

**(Dr. H.T. Dhumal)**  
**Chief Engineer (S.P.)**  
 Water Resources Department,  
 Pune.

**Name of work:** - Kukadi Irrigation Project, Dist Pune, Ahilyanagar  
Special Repairs to Kukadi Left Bank Canal k.m.1 to 60 under Maharashtra Irrigation Improvement Programme (MIIP).

Contractor's Name :-

Registered in class :-

Valid up to :-

D. R. No. and Date :- .....  
of initial deposit

**Divisional Account Officer**

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दुर्धनी क्र.०२१३२-२४२०१६

जा.क्र./कुपावि१/लेशा/३५००/सन-२०२४



महाराष्ट्र शासन

जलसंपद विभाग

कार्यकारी अभियंता,  
कुकडी पाटबंधारे विभाग क्र.१ नारायणगाव,  
ता.जुन्नर, जि.पुणे

[ई-मेल-eekid1narayangaon@gmail.com](mailto:eekid1narayangaon@gmail.com)

दिनांक ०३/१०/२०२४

प्रति,

मा. सहाय्यक संचालक (जहिरात),  
माहिती व जनसंपर्क महासंचालनालय,  
तळमजला, मंत्रालय, मुंबई-४०००३२.

विषय :- ई निविदा सूचना प्रसिद्ध करणे बाबत.....

महोदय,

सोबत या कार्यालयाची ई निविदा सूचना क्रमांक ५ सन २०२४-२५ च्या दोन प्रती जोडलेल्या आहेत. तरी खालीलप्रमाणे जास्तीत जास्ती खप असलेल्या वर्तमानपत्रात एक वेळ प्रसिद्धीसाठी पाठविणेबाबत विनंती आहे.

- |                                 |  |
|---------------------------------|--|
| १) कार्यालयाचे नांव             | : - कार्यकारी अभियंता, कुकडी पाटबंधारे विभाग क्र.१, नारायणगाव, ता.जुन्नर, जि.पुणे  |
| २) प्रसिद्धी पातळी              | : - १. पुणे, अहिल्यानगर जिल्हातील “मोठे” संवर्गातील एक दैनिक व एक साप्ताहिक आणि<br>२. पुणे, अहिल्यानगर जिल्हातील / विभागातील “मध्यम” संवर्गातील एक दैनिक आणि<br>३. पुणे, अहिल्यानगर जिल्हातील “लघु” संवर्गातील एक दैनिक. |
| ३) प्रसिद्धीची तारीख            | : - तात्काळ किंवा दिनांक ०७/१०/२०२४ तत्पुर्वी  |
| ४) जाहिरात बील कोणास पाठवावयाचे | : - कार्यकारी अभियंता, कुकडी पाटबंधारे विभाग क्र.१, नारायणगाव, ता.जुन्नर, जि.पुणे  |

सोबत :- ई-निविदा सूचना क्रमांक ५

सन २०२४-२५

संक्षिप्त निविदा सूचनांच्या दोन प्रती (मराठी व इंग्रजी)

(प्रशांत पां. कडुसकर)

कार्यकारी अभियंता,  
कुकडी पाटबंधारे विभाग क्र. १  
नारायणगाव.

प्रत:- मा.मुख्य अभियंता (विप्र) जलसंपदा विभाग, पुणे-११ यांना माहितीसाठी सविनय सादर  
सोबत:- निविदा सूचना प्रत

प्रत:- मा.अधीक्षक अभियंता, कुकडी सिचंन मडंळ पुणे-११ यांना माहितीसाठी सविनय सादर  
सोबत:- निविदा सूचना प्रत

प्रत:- उपविभागीय अभियंता/अधिकारी (विभांगातर्गत सर्व) यांना माहितीसाठी व प्रसिद्धीसाठी रवाना  
सोबत:- निविदा सूचना प्रत

प्रत:- सचनाफलक (विभागीय कार्यालय)

महाराष्ट्र शासन  
कार्यकारी अभियंता,  
कुकडी पाटबंधारे विभाग क्र.१, नारायणगाव,  
ता.जुन्नर, जि.पुणे, पिन-४१०५०४  
यांचे कार्यालय

ई-मेल :- eekid1narayangaon@gmail.com

दुर्घटनीक्रमांक :- ०२१३२-२४२०१६

### ई-निविदा सूचना क्र.५ सन २०२४-२०२५

महाराष्ट्र राज्याच्या राज्यपालांच्या वतीने कार्यकारी अभियंता कुकडी पाटबंधारे विभाग क्र.१, नारायणगाव, जलसंपदा विभाग, महाराष्ट्र शासन हे सक्षम निविदाकारांकडून खालील कामाकरीता ई-निविदाप्रणालीद्वारे (ऑनलाइन) निविदा मागवित आहेत. निविदा कागदपत्रे शासनाचे संकेत स्थळ <https://mahatenders.gov.in> येथुन डाऊनलोड करण्यात यावीत. सविस्तर निविदा सूचना व ई-निविदे बाबत सर्व माहिती शासनाच्या संकेत स्थळावर व विभागीय कार्यालयाच्या सूचना फलकावर उपलब्ध आहे.

निविदा स्वीकारण्याचा अथवा नाकारण्याचा अधिकार कार्यकारी अभियंता, कुकडी पाटबंधारे विभाग क्र.१, नारायणगाव यांनी राखून ठेवला आहे. अट असलेली निविदा स्वीकारली जाणार नाही. सदर निविदा सूचनेमध्ये काही बदल होत असल्यास <https://mahatenders.gov.in> या संकेतस्थळावर कळविण्यात येईल.

अ.क्र.	कामाचे नांव	निविदेची किंमत रुपये
१	कुकडी पाटबंधारे प्रकल्प, जि.पुणे, अहिल्यानगर महाराष्ट्र सिंचन सुधारणा कार्यक्रमांतर्गत कुकडी डावा कालवा कि.मी. १ ते ६० ची विशेष दुरुस्ती करणे.	रु. ८२८३.०० लक्ष
२	कुकडी पाटबंधारे प्रकल्प, जि.पुणे, अहिल्यानगर महाराष्ट्र सिंचन सुधारणा कार्यक्रमांतर्गत कुकडी डावा कालवा कि.मी. ६१ ते ९० ची विशेष दुरुस्ती करणे.	रु. २३६६.०० लक्ष
३	कुकडी पाटबंधारे प्रकल्प, जि.पुणे, अहिल्यानगर महाराष्ट्र सिंचन सुधारणा कार्यक्रमांतर्गत कुकडी डावा कालवा कि.मी. ९१ ते ११० ची विशेष दुरुस्ती करणे.	रु. १४६३.०० लक्ष

**जिल्हा :**

पुणे/ अहिल्यानगर

**ई-निविदा उपलब्ध कालावधी :**

दिनांक : ०७/१०/२०२४ ते २१/१०/२०२४

**ई-निविदा उघडण्याचा दिनांक :**

दिनांक : २३/१०/२०२४

जा.क्र.कुपावि-१/लेशा/निविदा/ ३५०० /२०२४  
कार्यकारी अभियंता, कुकडी पाटबंधारे विभाग क्र.१,  
नारायणगाव, ता.जुन्नर, जि.पुणे दि.०३/१०/२०२४

(प्रशांत पां. कडुसकर)  
कार्यकारी अभियंता,  
कुकडी पाटबंधारे विभाग क्र.१,  
नारायणगाव, जि.पुणे

**Government of Maharashtra  
Office of the Executive Engineer,  
Kukadi Irrigation Division No.1, Narayangaon  
At. post-Narayangaon, Taluka-Junnar, Dist-Pune.**

Email: - eekid1narayangaon@gmail.com

Office Phone No-02132242016

**E-Tender Notice No.5 for 2024-2025**

On behalf of the Governor of the State of Maharashtra, the Executive Engineer, Kukadi Irrigation Division No.1, Narayangaon the Water Resources Department, Government of Maharashtra is inviting tenders from competent bidders for the following work through the e-tendering system (online). Tender documents should be downloaded from the official website <https://mahatenders.gov.in>. Detailed tender instructions and all information regarding the tender are available on the government website and the notice board of the division office.

Executive Engineer, Kukadi Irrigation Division No.1, Narayangaon reserves the power to accept or reject tenders. Conditional tender will not be accepted. If there is any change in the said tender notification, it will be informed on the website <https://mahatenders.gov.in> and the notice board of the Division Office.

<b>Sr. No.</b>	<b>Name of Work</b>	<b>Cost Put to Tender</b>
1	Kukadi Irrigation Project, Dist Pune, Ahilyanagar Special Repairs to Kukadi Left Bank Canal k.m. 1 to 60 under Maharashtra Irrigation Improvement Programme (MIIP).	Rs. 8283.00 lakhs
2	Kukadi Irrigation Project, Dist Pune, Ahilyanagar Special Repairs to Kukadi Left Bank Canal k.m. 61 to 90 under Maharashtra Irrigation Improvement Programme (MIIP).	Rs. 2366.00 lakhs
3	Kukadi Irrigation Project, Dist Pune, Ahilyanagar Special Repairs to Kukadi Left Bank Canal k.m. 91 to 110 under Maharashtra Irrigation Improvement Programme (MIIP).	Rs. 1463.00 lakhs

**District:** Pune/ Ahilyanagar

**E-tender available period:** Dt. 07/10/2024 to Dt. 21/10/2024

**E-tender Opening Date:** Date 23/10/2024.

No. KID-1/AB/Tender/3500/2024  
Office of the Executive Engineer  
Kukadi Irrigation Division No.1, Narayangaon  
Dt. 03/10/2024

**(Prashant P.Kaduskar)  
Executive Engineer,  
Kukadi Irrigation Division No.1,  
Narayangaon.**

**MAHARASHTRA KRISHNA VALLEY DEVELOPMENT CORPORATION, PUNE-11**  
**(Govt. of Maharashtra Undertaking)**

**CIRCLE: Superintending Engineer, Kukadi Irrigation Circle, Pune-11**

**DIVISION: Kukadi Irrigation Division No.1, Narayangaon**

**DETAILED TENDER NOTICE NO.05 FOR 2024-2025**

On behalf of the Governor of the State of Maharashtra, the Executive Engineer, Kukadi Irrigation Division No.1, Narayangaon Water Resources Department, Government of Maharashtra is inviting tenders from competent bidders for the following work through the e-Tendring system (online). Tender documents should be downloaded from the official website <https://mahatenders.gov.in>. Detailed tender instructions and all information regarding the tender are available on the government website and the notice board of the division office.

The power to accept or reject tenders is reserved by the Executive Engineer, Kukadi Irrigation Division No.1, Narayangaon Conditional tender will not be accepted. If there is any change in the said tender notification, it will be informed on the website <https://mahatenders.gov.in> and the notice board of the Division Office.

Sr. No.	Name of Work	Cost Put to Tender Rs.Lakhs	Tender Fee + GST	EMD Rs. Lakhs	Class of Contractor	Period in months
1	Kukadi Irrigation Project, Dist Pune, Ahilyanagar Special Repairs to Kukadi Left Bank Canal k.m.1 to 60 under Maharashtra Irrigation Improvement Programme (MIIP).	8283.00	5900/-	41.42	All Eligible Contractors	24 Months (Including Monsoon)

1. The tender documents and related information will be available on the website <https://mahatenders.gov.in>. Hereinafter called the website
2. The Post-Qualification (PQP) Process applies to this tender.
3. The Self-Evaluation Process (SLP) applies to this tender.
4. The aspiring bidders may download the Tender form, from the website free of cost. But to participate in a bid he/she must purchase tender documents online.
5. The bidder must fill in the information in the online format given in tender documents and upload them to the website. Also, he must upload the scanned copy of duly filled-in formats and copies of required documents.
6. Only scanned copies of the original document will be accepted. A scanned copy from other than the original will not be accepted.

7. While submitting the duly filled Tender Documents the bidder must deposit the Tender process fee amount and EMD through the e-payment gateway as per the procedure described on the website.
8. The Tender Process fee and EMD should be paid from the bidder's account only.
9. The bidder must prepare and submit Tender Documents Online on or before as per schedule.
10. The bidding is single stage Two Envelope system (1S2E)
11. The bidder shall submit online two separate Envelopes- 1 (Techno-Commercial) and Envelope-2 (Financial Bid)
12. The bidder should upload a 'Techno-commercial Bid' (Envelope-1) along with Qualification, information, prescribed forms, formats, other documents, and proof of EMD paid.
13. 'Financial Bid' i.e. (Envelope-2) is to be filled online with the offer of the bidder in the form of a percentage above or below the cost put to tender at the appropriate places on the website.
14. The bidder should upload the documents in readable form, He should take a trial of uploads by taking printouts. The unreadable documents will be treated as null and void. In such a case, the remaining documents will be evaluated. The decision of the opening authority regarding this will be binding to all the bidders.
15. Both the Envelopes are to be submitted simultaneously.
16. The bidder is not exempted from payment of EMD in any case.
17. Bidders can use seek clarification option on the website There will be no Pre-bid meeting for this purpose.
18. Bidders are not required to upload DD/BG/FDR of Additional Performance Security Deposit. The Lowest bidder (L1) needs to submit it to the Division within 8 (Eight) days of opening of financial bid.
19. If any assistance is required regarding e-tendering (upload and download) refer to the helpdesk contact details on the website.
20. Joint Venture is allowed as mentioned in an appropriate clause for tenders costing more than Rs. 25 crores.
21. Tender documents in hard copy will not be accepted.
22. The bidders should have appropriate registration with PWD, Government of Maharashtra, for works costing less than Rs. 1.5 crores. However, it is not essential to have such registration for works costing more than Rs. 1.5 crores.
23. All subsequent corrigendum, amendments shall be available only on the website. Hence bidders are advised to visit the website until the last date and time of completion of the bidding process. The participating bidders will be intimated by the notification through the website.
24. The first and last date of submission of tender will not be on holiday. The tender period includes all Government Holidays.

25. All the correspondence related to the tender will be mailed through email during the tender process.
26. If it is found that the bidder has submitted any false bill, fraudulent paper, false information, false supporting proof, and any information that leads to the miscalculation of bonafide bid capacity, and bidders, such acts may be found during submission, during evaluation or even after awarding the tender. In all such cases, the bidder is liable for action under any or all the actions as under:
  1. Action under Bhartiya Nyaya Sanhita (BNS)
  2. Action under the Information Technology Act. 2000,
  3. Disqualification
  4. Termination of contract.
  5. His EMD/ APSD/ SD will be forfeited,
  6. He will be blacklisted for 2 years for competing in WRD.
  7. If the bidder is a JV, all JV partners are liable for the above actions.
  8. The bidder must give information about any new work allotted to him after submission and before acceptance of this tender. If he fails to do so, he is liable for action as above.
27. The bidder is liable to forfeit the EMD when the bidder is L1 and fails to submit the APSD before the stipulated time. If the L1 is JV, all JV partners are liable for such punishments together as well as individually.
28. No officer of WRD and DAO will be held responsible in the court of law or anywhere in respect of the 26 mentioned above.
29. The bidder should combine various PDF files in a single PDF file as mentioned hereafter in ITB.
30. All rights are reserved to reject any or all tenders without assigning any reason by the competent authority.
31. At the time of opening of the tender as per the schedule prescribed on the website the bidder or his representative should be present. No complaint after that will be considered.
32. Bidders are not allowed to quote his offer in more than 1 bid independently and or in a Joint Venture at a time in this tender One bidder, one bid should be followed. This will apply to each partner too. A partner cannot be associated with another bidder in partnership, director, or partner in JV, otherwise bid of all such bidders will be cancelled and action will be taken against them.

33. The schedule for various activities for bidding processes is as follows:

<b>TIME SCHEDULE</b>				
<b>Sr. No.</b>	<b>WRD Stage</b>	<b>Contractor Stage</b>	<b>Start Date and time</b>	<b>Expiry Date and time</b>
1	Publication of Tender	--	07/10/2024 11.00	21/10/2024 18.00
2	--	Main Tender Document Purchase	07/10/2024 11.00	21/10/2024 18.00
3	--	Online Preparation of Techno-commercial Bid Submission	07/10/2024 11.00	21/10/2024 18.00
4	--	Seek Clarification	07/10/2024 11.00	14/10/2024 18.00
5	Last date of the common set of deviations (CSD) if applicable	--	15/10/2024 11.00	18/10/2024 18.00
6	Last date for bid submission	--	07/10/2024 11.00	21/10/2024 18.00
7	Bid Opening	--	23/10/2024 11.00	-----

## **2 DEFINITIONS AND ABBREVIATIONS**

### **2.1 DEFINITIONS**

#### **APPLICANT / BIDDER**

Applicant/ bidder / bidder mean individual proprietary firm, Limited Company, or Joint Venture of any of these applying for this tender.

#### **BID CAPACITY:**

The bid capacity shall mean the financial ability of the bidder to execute the work without any financial hindrance. This shall be calculated as shown in 5.4

#### **CHIEF ENGINEER**

Chief Engineer shall mean Chief Engineer, Water Resources Department.

#### **COMPETENT AUTHORITY**

Competent Authority shall mean the authority described by the Government for sanction, acceptance, approvals of various activities, may be from Executive Engineer to Government as per the case may be.

#### **CONTRACT**

The contract shall mean and include the following documents.

Volume I - Tender Documents signed by the Engineer In charge and successful bidder

Volume II - Drawings.

Information/data submitted by the contractor.

Common set of conditions / Common set of Deviations

#### **CONTRACTOR**

Contractor shall mean the person, firm company, Joint venture of any of these, who enters a contract, with the Corporation and shall include their executors, administrators, successors, and submitted assignees.

#### **CORPORATION**

The functions and powers of the Corporation have been listed in the Maharashtra Act XV of 1996. In general, it has been entrusted with the work of investigation,

planning, designing of projects, maintenance of completed projects, construction on projects, and irrigation management of the Major, Medium, and Minor projects (command area more than 600 Ha) in the Krishna River Basin.

#### **DEFECT(S) LIABILITY PERIOD (DLP)**

The period up to which the contractor is responsible for correcting/rectifying manufacturing/construction defects of the work at his own cost after the date of issue of the completion certificate by the Engineer in charge.

#### **DRAWING**

The drawing shall mean prints of the maps, drawings, and plans in Volume-II of the contract and shall include any modifications of such drawings and any further detailed drawings as may be issued by the Engineer-in-charge from time to time.

#### **ENGINEER / ENGINEER-IN-CHARGE**

Engineer / Engineer-in-charge shall mean the Executive Engineer in charge of the works and shall also include the superior officers of the Engineering Departments of the Corporation, i.e. the Superintending Engineer, Chief Engineer. Also, include Concerned Mechanical and Electrical Executive Engineer and their superior officers.

#### **ENGINEER'S REPRESENTATIVE**

Engineer's representative shall mean the Sub-Divisional Engineer / Assistant Executive Engineer / Sub-Divisional Officer / Assistant Engineer (Grade I), who is in direct charge of the works and shall include any AE II, JE, Sectional Engineer, etc. of the Corporation.

#### **EXECUTIVE ENGINEER**

Executive Engineer means in charge Executive Engineer of the concerned division specified in Detailed Tender Notice.

#### **HEADINGS AND MARGINAL HEADINGS**

The headings and the marginal headings in the contract are solely to facilitate references and shall not be deemed to be part thereof or taken into consideration in the interpretation of construction thereof or of the contract.

**L1 BIDDER**

L1 bidder shall mean the bidder who after qualifying the eligibility criteria and after opening the financial envelope, found that the bid quoted by him is the lowest amongst all the bidders.

**L2 BIDDER**

L2 bidder shall mean the bidder who after qualifying the eligibility criteria and after opening the financial envelope, found that the bid quoted by him is the second lowest.

**SINGULAR AND PLURAL**

Works imparting the singular number shall also include the plural and vice versa where the context requires.

**SITE**

Site shall mean the land and the other places on, under, in, or through which the works are carried out and any other lands or places provided by the Corporation.

**SPECIFICATIONS**

Specifications shall mean the specifications for material and work as specified in the contract.

**SUPERINTENDING ENGINEER**

Superintending Engineer shall mean in charge Superintending Engineer of concerned Circle specified in Detailed Tender Notice.

**THE WEBSITE**

The Website means official website for e-tendering having the following web address  
- <https://mahatenders.gov.in>

**WORK**

Work shall mean all the works mentioned in the tender notice to be executed by contract.

## 2.2 ABBREVIATIONS

1S2E	Single Stage Two Envelope System
AE1	Assistant Engineer Grade 1
AE2	Assistant Engineer Grade 2
APSD	Additional Performance Security Deposit
BG	Bank Guarantee
BC	Bid Capacity
BOQ	Bill of Quantities
CA	Chartered Accountant
CBL	Canal Bed Level
CE	Chief Engineer
CSD	Common Set of Deviations
CSR	Common Schedule Rates
CV	Curriculum vitae
DAO	Divisional Accounts Officer
DD	Demand Draft
DLP	Defect(S) Liability Period
DSR	District Schedule Rates
ED	Executive Director
EE	Executive Engineer
DEPT	Department
DSC	Digital Signature Certificate
EMD	Earnest Money Deposit
EPF	Employees Provident Fund
FDR	Fixed Deposit Receipt
FRL	Full Reservoir Level
FSL	Full Supply Level
GL	Ground Level
GoM	Government of Maharashtra
GPS	Global Positioning System
GR	(Maharashtra) Government resolutions
GST	Goods and Services Tax
HT	High Tension transmission line
ICA	Irrigable Command Area
ID	Identification Card
IMPS	Immediate Payment Service
BNS	Bhartiya Nyaya Sanhita (BNS)
IS	Indian Standards
IT	Income Tax
ITB	Instructions to bidder
JE	Junior Engineer
JV	Joint Venture
K <sub>1</sub>	Labour component for Price variation
K <sub>2</sub>	Material component for Price variation
K <sub>3</sub>	POL component for Price variation
L1	1st lowest bidder where off financial offer is lowest among all

L2	2nd lowest bidder where off financial offer is 2nd lowest among all
LIS	Lift Irrigation Scheme
LOI	Letter of Intent
LT	Low Tension transmission line
MDDL	Minimum Draw-Down Level
MI	Minor Irrigation
MKVDC	Maharashtra Krishna Valley Development Corporation, (Pune)
MM3	Million Cubic Meter
MOU	Memorandum of Understanding
MP	Medium Projects
MPW	Maharashtra Public Works (Manual)
MSEDCL	Maharashtra State Electricity Distribution Company Limited
MSETCL	Maharashtra State Electricity Transmission Company Limited
MWL	Maximum Water level
NEFT	National Electronic Funds Transfer
NIC	National Informatics Centre
O&M	Operation and Maintenance
PAN	Permanent Account Number
PH	Pump House
POL	Petroleum, Oil, and Lubricants
PSD	Performance Security Deposit
PSU	Public Sector Undertaking
PWD	Public Works Department
PQB	Post Qualification Bid
RMC	Ready Mixed Concrete
RPAD	Registered Post with Acknowledge Due
RTGS	Real Time Gross Settlement.
SBL	Sump Bottom Level settlement
SCADA	Supervisory control and data acquisition
SD	Security Deposit
SDE	Sub Divisional Engineer
SDO	Sub Divisional Officer
SE	Superintending Engineer
SSR	State Schedule Rates
SLP	Self-Evaluation Process
ST	Storage Tank
TBL	Top of Bund Level
TDS	Tax Deducted at Source
TCM	Thousand Cubic Meter
VSI	Vertical Shaft Impact
VT	Vertical Turbine Pump
UDIN	Unique Document Identification Number
WEBSITE	<a href="https://mahatenders.gov.in">https://mahatenders.gov.in</a>
WRD	Water Resources Department
WUA	Water User Association

### **3 WORK SPECIFIC INFORMATION**

#### **3.1 Description of the project:**

Kukadi irrigation project envisages construction of five major dams across river Kukadi and its tributaries in North Pune district and irrigating 1,55,056 hectares of land from three districts and seven tahasils. Five dams in Kukadi project are Yedgaon and Manikdoh dam across Kukadi River, Dimbhe dam across Ghod River, Wadaj dam across Meena River and Pimpalgaon Joge dam across Aar River. Presently all five dams of Kukadi project are completed. Also main canals and canal network in this project is almost completed and 1,42,449 hectares of irrigation potential has been created.

#### **3.2 Status of the project:**

The head works under this Major irrigation project is completed. Dam, Spillway, Irrigation outlet works of all five dams are completed. Canal lining work and distribution system work in some reaches of Dimbhe right bank canal and Pimpalgaon Joge left bank canal is yet to be completed. However irrigation potential is nearly created.

#### **3.3 Name of Work:**

Kukadi Irrigation Project, Dist Pune, Ahilyanagar

Special Repairs to Kukadi Left Bank Canal k.m.1 to 60 under Maharashtra Irrigation Improvement Programme (MIIP).

#### **3.4 Climatic conditions:**

The Average rainfall in this area is 400mm to 600mm of erratic nature. The rainy season normally commences in June & lasts up to October. A few periodic pre-monsoon showers & post monsoon showers with high velocity winds however cannot be ruled out and some of these can be quite heavy. Atmosphere in other seasons normally remains dry. The temperature varies from minimum 22<sup>0</sup> C in winter to maximum 42<sup>0</sup> C in summer.

#### **3.5 Scope of work:**

The work lies entirely in Tal-Junnar, Dist-Pune & Tal-Parner & Shrigonda, Dist-Ahilyanagar. The work under this tender includes repairs of canal structures & R.C.C. Lining, PCC Lining in selective length.

### **3.6 Information about work site:-**

1) Location of work: -	Kukadi Left Bank Canal Km.1 to 60, Tal-Junnar, Dist-Pune & Tal-Parner & Shrigonda
2) Nearest Airport: -	Pune
3) Nearest Railway Station: -	Ahilyanagar
4) Roads: -	Kalyan – Ahilyanagar Highway & Pune – Ahilyanagar Highway,
5) Position of land acquisition:	The earth work of the canal is completed. Land is in possession of MKVDC.

### **3.7 Period of completion and construction programme of work:**

1. Period of completion - **24 Months** including monsoon.
2. Construction Programme - The construction program is enclosed at the end of Schedule 'B' of tender Documents.

### **3.8 Price variation information**

(Vide Para of Special conditions of contract as per clause 41)

Component	Center/Place	Percentage
<b>Labour Component (K1)</b>		<b>12 %</b>
<b>Other Materials (K2)</b>	<b>All India Average</b>	<b>82 %</b>
<b>POL Component (K3)</b>		<b>6 %</b>

### **3.9 Basic star rate for materials**

For WRD Items			
1	Cement	-	Rs. 5720.00 / MT
2	TMT Steel	-	Rs. 51653.00 / MT
3	Mild Steel Plate	-	Rs...../ MT

### **3.10 Royalty charges**

Rates of Royalties of various construction materials to be recovered from RA Bills as per clause 36 are as under.

Sr. No.	Material	Rate of Royalty Charges Rs./Cum
1	A) Metal	216.18
2	B) Crushed Sand	216.18
3	C) Rubble	216.18
4	D) Murum	216.18
5	E) Soil	216.18

### **3.11 Cost put to tender**

**Rs. 8283.00 Lakhs**

#### **4 WORK FINANCIAL INFORMATION (EMD, SD, APSD)**

4.1	Name of Work	Kukadi Irrigation Project, Dist Pune, Ahilyanagar Special Repairs to Kukadi Left Bank Canal k.m.1 to 60 under Maharashtra Irrigation Improvement Programme (MIIP).
4.2	Cost Put to Tender	<b>Rs.8283.00 Lakhs</b>
4.3	Tender Fee	<b>Rs.5,900/-</b> (Non-Refundable) (Including GST) (Rs. Five thousand nine hundred Only) Only from bidder's own account by NEFT/ RTGS
4.4	Earnest Money Deposit (EMD)	<b>Rs.41.42 Lakhs</b> (Rs.Forty One lakh Forty Two thousand only) Only from bidders' own account by NEFT/ RTGS
4.5	Security Deposit	Total <b>Rs.165.66 Lakhs</b> (2% of the Tender Cost) <ul style="list-style-type: none"> <li>a) Initial <b>Rs.82.83 Lakhs</b>, i.e. 1% (In the form of D.D./B.G./FDR) drawn from Nationalized / Scheduled Bank in favour of the Executive Engineer deposited before the work order.</li> <li>b) <b>Rs.82.83 Lakhs</b>, i.e. the remaining 1% from each R.A. bill at the rate of 2% of the bill amount till the whole S.D. is recovered.</li> </ul>
4.6	Additional Performance Security Deposit (APSD).	In case of the bidder's offer is lower than 1 % of the cost put to tender, he must pay an Additional Performance Security Deposit in the form of Demand Draft/BG /FDR drawn from Nationalised/ Scheduled Bank in favor of the Executive Engineer. The lowest bidder L1 should submit the original APSD in a sealed Envelope to the Executive Engineer, strictly within eight working days after opening of Envelope-2. If L1 bidder fails to do so, his EMD will be forfeited and he will be banned in participating in WRD tender for 2 years. (If the L1 is JV, all JV partners are liable for such punishments in together as well as individually). Further, in such case, the second lowest bidder L2 will be requested to execute the work at the rate quoted by the L1 bidder. If the L2 bidder is ready to work with the same rate and tender condition, stipulated time then the process of accepting the tender for bidder L-2 will be started without recalling the tender. The contract agreement will be executed with L2 bidder.

	<p>The amount of APSD will be as following:</p> <p>If the tender offer is as 1 to 10% below the cost put to tender</p> <p><math>\text{APSD} = 1\% \text{ of the cost put to tender with a minimum of Rs. } 1000/-</math></p> <p>If the tender offer is 10 to 15 % below.</p> <p><math>\text{APSD} = 1\% \text{ plus the percentage by which the tender offer is below the } 10\% \text{ of with a minimum Rs. } 1000/-</math></p> <p>e.g. if the rate quoted is 14% below then the APSD shall be</p> <p><math>[1+ (14-10) \text{ i.e. } 1+4 = 5\%]</math> of the cost put to the tender.</p> <p>If the tender offer is more than 15 % below.</p> <p><math>\text{APSD} = 6\% \text{ plus twice the percentage by which the tender offer is below than } 15\% \text{ of with a minimum Rs. } 1000/-</math></p> <p>e.g. if the rate quoted is 19 % below then the APSD shall be</p> <p><math>[6 + 2(19-15) \text{ i.e. } 6+2(4) = 14\%]</math> of the cost put to the tender.</p> <p>50% of the APSD will be refunded within one month after successfully completion of the work as certified by the Executive Engineer and remaining 50 % of the APSD will be refunded after defect liability period (DLP).</p> <p><b>Notes</b></p> <ol style="list-style-type: none"> <li>Additional Performance Security Deposit should be rounded over up to two decimal points.</li> <li>The demand draft should be in favor of the <b>Executive Engineer Kukadi Irrigation Division No.1, Narayangaon</b> and Fixed Deposit Receipt (FDR) in favor of <b>Executive Engineer Kukadi Irrigation Division No.1, Narayangaon</b> and bidder.</li> <li>Bank Guarantee, Demand Draft, or FDR having branches in the State of Maharashtra Should be of Public Sector Bank (Nationalized or Scheduled Bank).</li> <li>The earnest money of bidders who submit false Demand Draft/ Bank Guarantee/FDR against SD/APSD shall be confiscated and action should be taken against the said bidder as per point no mentioned in the detailed tender notice.</li> </ol>
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4.7	Last date of Pre clarifications / Seek Clarification	<b>As per the schedule</b>
4.8	Tender Validity Period	The rates quoted by the bidder will be valid till <b>120</b> days from the submission of the bid.
4.9	Class of contractor	<b>All Eligible Contractors</b>
4.10	Contact Details of Executive Engineer Address	<b>Executive Engineer, Kukadi Irrigation Division No. 1, Narayangaon</b> Email: eekid1narayangaon@gmail.com Phone:02132-242016
4.11	Contact Details of Superintending Engineer and Address	<b>Superintending Engineer,</b> Kukadi Irrigation Circle, Pune-11 Email: sekpcp@gmail.com Phone: (020) 26128076
4.12	Contact Details of Chief Engineer and Address	<b>The Chief Engineer (Sp),</b> Water Resource Department, Pune-11 Email : cesppune@gmail.com Phone: (020) 26120130/26126335
4.13	Tender Accepting Authority	<b>Government Level Committee</b>
4.14	Date and time of opening of tender	<b>As per schedule.</b>
4.15	Place of Opening	<b>Office of The Executive Engineer, Kukadi Irrigation Division No. 1, Narayangaon</b>
4.16	Any addendum/ corrigendum/ cancellation	Any addendum/corrigendum/cancellation of the above tender will be published on the website and the notice board of the Office of the Executive Engineer, the website will generate a mail to those bidders who have already participated in this tender.
4.17	Documents to be uploaded	The scanned copies of the Original Documents should be uploaded on the website as per the instructions to bidders and may be asked to produce for verification on demand after the opening of the Techno-commercial bid if required.
4.18	Authority of Right to Reject	All rights are reserved to reject any or all Main Tender documents without assigning any reason by the competent authority at any stage.

4.19	Defects Liability Period	60 Months after issuance of Completion Certificate.
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## 5 ELIGIBILITY CRITERIA

The bidder shall qualify following eligibility criteria

1. Annual Turnover
2. Experience of similar type of work
3. General experience (Executed quantities of major items)
4. Bid capacity.
5. Personnel and machinery requirement.

Note:

1. Bidder should have completed similar type work mentioned in 5.2 below. It is not necessary for the work to be completed in just last 5 years.
2. Sublet work approved by competent authority of governmental / semi-governmental body will be considered for the similar type work and general experience criteria as mentioned in 5.2 and 5.3 below.
3. In the case of JV, share of each bidder in the JV will be considered for the annual turnover and bid capacity criteria as mentioned in 5.1 and 5.4 below.
4. Annual turnover of the bidder shall be certified by chartered accountant.
5. It will be mandatory for the bidder to submit correct amount of ongoing works.

### **5.1 Annual turnover**

The bidder should have attained an annual turnover of not less than **Rs.3106.13 Lakhs** in any financial year during the last five financial years and current year i.e. **2019-20 to 2023-24** An increment of 10 % annually shall be given for equating the turnover of the previous year to year **2019-20** The certificate of “Annual Turnover” must have been issued by the practicing Chartered Accountant having UDIN (Unique Document Identification Number). The bidder should fill “Annual Turnover Form” sheet (given in sheet 2) online carefully to declare his annual turnover.

### **5.2 Experience of similar types of work**

The bidder should have successfully completed at least one similar type of work of canal repairs having main items of work , lining, shotcreting and canal structure repairs and costing not less than **Rs.2484.90 Lakh.**

- a . Definition of similar type of work : Repairs to canal earthwork and structures having main items of work – Earthwork, lining, Shotcreting and structure repairs.

- b. An increment of 10 % annually shall be given to previous years for equating the cost of work to year 2023-24. The work in year 2024-25 will have multiplying factor 1 only.
- c. The bidder should fill out the “Completed Similar Type of Work” sheet (given in sheet 3) online for these criteria. He should confirm the correctness of the figures and confirm the same with certificates as prescribed. This work done certificate should be issued by an officer, of the rank of Executive Engineer and above.

### **5.3 General experience (Quantities of major items executed within last five years)**

The bidder should have executed a minimum quantity of items as given below in any year, during the last five years or in the current year, the year may be separate for separate items.

Sr. No.	Item	Unit	Minimum quantity executed in any Year
1.	Concrete lining	Cum	16910
2.	Steel Reinforcement	MT	431
3.	Earthwork	Cum	60490

The quantities should be filled in the "Item wise Quantity" sheets given in Sheet 4 online. The figures quoted in these sheets must be supported by certificates duly signed and issued by the officer, of the rank of Executive Engineer and above. The bidder should quote the reference of the certificate correctly, in the forms. Any wrong reference or misleading information may result in the non-evaluation of the bid for further process.

(Note: - Officially subleted work with approval from government/ semi-government authority will be considered for the above point.)

### **5.4 Bid Capacity**

For this work the applicant bidder should have the minimum bid capacity of **Rs.8283.00 Lakhs** (which shall be calculated as below)

The formula for evaluation of Bid Capacity is-

$$\text{BID CAPACITY} = (A \times N \times 2) - B$$

Where,

- A** = Maximum value of Annual turnover in any one financial year during the period of the last five years (updated to the price level of year 2024-25 ).
- B** = Value of existing commitments and work, ongoing work tendered (updated to the price level of the current year) to be completed in the period stipulated for completion of work of the present tender.
- N** = No of years prescribed for completion of this work = **2 years**

All certificates should be issued by the rank of Executive Engineer and above. An increment of 10 % annually shall be given for equating the amount of the previous year **2023-24**. The works in the year **2024-2025** will have a multiplying factor of 1.0.

The bidder shall submit an accurate and complete list and value of balance work in hand. Also, after submission of this present tender, he is required to inform about any new work allotted to him after submission of this tender and before acceptance of this tender. Otherwise, bidder will be liable for action as mentioned in the detailed tender notice. The Value of B shall be ascertained from the certificate as prescribed.

The value of B shall be as certified from the certificate as information furnished in Self Evaluation Sheet mentioned in Sheet 5.

### 5.5 List of machinery

Bidder shall give an undertaking that he will deploy the below machinery (Undertaking in format 3) if the work is awarded to him.

Sr. No.	Description of Machinery	Minimum Required No.
1	Excavator	8
2	Tipper	24
3	Roller	8
4	Transit mixer	18
5	Batching plant	4
6	Paver	8
7	Wet Shotcrete Machine	4

## 5.6 Technical Personnel Capabilities

Bidder shall give an undertaking that he will deploy below manpower (Undertaking in format 3) if the work is awarded to him.

Sr. No.	Description of Personnel	Minimum Required No.
1.	Project Manager	2
2.	Site Engineer -	8
	a) Engineer with Degree (B.E. Civil)	4
	b) Engineer with Diploma (D.E. Civil)	4

## 6 INSTRUCTIONS TO BIDDERS

### 6.1 General

1. The bid submission process is online through the website only.
2. To upload a single PDF file, the bidder must merge multiple PDF files for uploading
3. Bidders are not allowed to bid independently and or in a Joint Venture at a time. One bidder, one bid should be followed. This will apply to each partner too. A partner cannot be associated with another bidder, in Partnership, Director, or Partner in JV, otherwise, the bids of all such bidders will be cancelled and action will be taken against them.
4. An alteration in the bid will lead the bid to cancellation and EMD will be forfeited.
5. If it is found that the bidder has submitted any false bill, fraudulent paper, false information, false supporting proof, and any information that leads to the miscalculation of bonafide bid capacity and bidders such act may be found during submission, during evaluation, or even after awarding the tender. In all such cases, the bidder is liable for action under any or all the actions as under:
  - a. Action under The Bhartiya Nyaya Sanhita (BNS).
  - b. Action under the Information Technology Act. 2000,
  - c. Disqualification
  - d. Termination of contract.
  - e. His EMD/ APSD/ SD will be forfeited,
  - f. He will be blacklisted for 2 years for competing in WRD.
  - g. In the case of JV, all the partners of JV will be punishable as above individually and as well as JV.
  - h. If the bidder has not given information about any new work allotted to him after submission and before acceptance of this tender, he is liable for punishment as above.
6. The bidder is liable to forfeit the EMD when the bidder is L1 and fails to submit the APSD before the stipulated time. If the L1 is JV, all JV partners are liable for such punishments together as well as individually.
7. No officer of WRD and DAO will be held responsible in the court of law or anywhere in respect of the 6.1 (e) mentioned above.
8. The bidder shall be deemed to have fully acquainted himself with,

1. The work and site conditions.
2. Conditions in B-1 form, special conditions, specifications, schedules and drawings, common set of deviations issued
3. Various leads and lifts involved in the works and materials of construction.

## **6.2 Participation in bid**

1. **Portal registration:** The bidder intending to participate in the bid is required to register on the website using his/her active personal/official e-mail ID as his/her Login ID and attach his/her valid Digital signature certificate (DSC) to his/her unique Login Id. He / She will enter relevant information as asked for about the firm/contractor. This is a one-time activity for registering in Portal.
2. **Logging to the portal:** The 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 the 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 the respective CA stored in the system database. The system checks the unique login ID password and DSC combination and authenticates the login process for use of the portal.
3. **Downloading of bid:** The bidder can download the tender of his choice and save it in his system to undertake necessary preparatory work offline and upload the completed tender at his convenience before the closing date and time of submission.
4. **Clarification on bid:**
  1. Related to website: For any queries regarding the online bid procedure, and other help regarding the website, or difficulties of uploading/ downloading bidders are advised to get help from the helpline number/email and toll-free number mentioned on the website.
  2. Regarding tender: The bidder may ask questions online in the website portal using his/her DSC; provided the questions are raised within the period of seeking clarification as mentioned in the schedule. The Tender accepting authority will clarify queries related to the tender and The Executive Engineer in charge will upload the clarification on the portal at the appropriate time mentioned in the schedule. This clarification uploaded is common set of deviation (CSD). A common set of deviations issued by the Executive Engineer shall be part of the tender. If an Explanation/ Clarification of doubts raised by the contractor is not

replied and uploaded till the last date of submission of tender by the Executive Engineer, it indicates no changes in terms and conditions of the tender documents i.e. bidder shall consider it as it is, and submit their bids accordingly, The CSD will be an integral part of the tender.

3. Pre-bid Conference: There will be no Pre-bid conference for this tender work.

### **6.3 Preparation of bid**

The intending bidder shall log in to the website, and download the Techno-Commercial bid (Envelope-1) and financial bid (Envelope-2) The bidder must scan and upload original documents wherever required.

### **6.4 Submission of bid**

1. The bid consists of detailed tender notice, instructions to bidders, qualification criteria, B1 form, Conditions of Contract, Special Conditions of Contract, Specifications, Schedule A, B, B -1 form, drawings etc. The bidder may download these documents and take out the print for detailed study and preparation of his bid. Any other drawings and documents about the work will be available in the office of the Executive Engineer.
2. The bidder shall go through the bid carefully and list the documents that are asked for submission. He shall prepare all documents including the cost of bid document, EMD, Declaration form, price bid, etc., and store them in the system.
3. For all purposes, the server time displayed on the website shall be the time to be followed by all the users.
4. The bidder shall log on to the website with his / her DSC and move to the desired tender for uploading the documents in the appropriate place one by one simultaneously checking the documents.
5. Bids cannot be submitted after the expiry of the due date and time. The bids once submitted cannot be viewed, retrieved, or corrected after the deadline. The bidder should ensure the correctness of the bid before uploading and take a printout of the system-generated summary of the submission to confirm the successful uploading of the bid. The bids cannot be opened even by the tender-accepting officer/ Executive Engineer in charge, before the due date and time of opening.
6. Each process in the e-tender is time stamped and the system can detect the time of log-in of each user including the bidder.
7. The bidder should ensure the clarity/ legibility of the document uploaded by him to the

portal.

8. The system requires all the mandatory forms and fields filled up online by the bidder during the process of submission of the bid/tender.
9. The bidder should check the system-generated confirmation statement on the status of the submission.
10. The bidder should upload sufficiently ahead of the bid closure time to avoid traffic rush and failure in the network.
11. The Tender accepting authority / Executive Engineer in charge is not responsible for any failure, malfunction, or breakdown of the electronic system used during the e-tender process.
12. It is not necessary for the part of the bidder to up-load the drawing while up-loading his bid. It is assumed that the bidder has referred all the drawings and documents uploaded.
13. 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 Tender accepting authority / Executive Engineer in charge will be deemed as a plea to disrupt the bidding process and in such cases the EMD shall be forfeited.
14. The bidder is required to check the documents uploaded with the requirements asked for in the bid. Only after he is satisfied that all the documents have been uploaded, he should activate the submit button. Before activating the submit button clarification of the document may be ensured by taking out a sample copy. The "bidder" shall digitally sign on all statements, documents, and clarifications uploaded by him owning responsibility for their corrections/authenticity. No need to upload a copy of the Tender Form.
15. It has been observed that while uploading documents for tender, bidders tend to upload unnecessary, irrelevant, and sometimes multiple copies of the same documents, which leads to an unnecessary burden on time and resources of the department. Hence it is informed that only relevant documents to this tender should be uploaded and bidders are advised to the checklist of documents. Non-compliance with the above-mentioned condition may lead to outright rejection from the tendering process.
16. The bidder has to submit the Affidavit (Format 3) on Rs. 100/- Stamp Paper in Envelope-1 regarding the authenticity of the documents submitted by him.
17. The bidder shall digitally sign all statements, documents, and certificates, uploaded by

him, owning responsibility for their correctness/authenticity If the intending bidder is an individual, the documents shall be digitally signed by the individual while uploading the tender through the e-tender portal if the intending bidder is a proprietary firm, it shall be digitally signed by the proprietor while uploading the through the website.

18. If the intending bidder is a limited company or Corporation or JV, it shall be digitally signed by a duly authorized person holding the power of attorney in which case a certified copy of power of attorney shall accompany.
19. If the application is made by a firm in partnership, it shall be digitally signed by all the partners of the firm above their full type written names and current addresses or by a Partner holding valid power of attorney on behalf of the firm by signing the application, in which case a certified copy of the power of attorney shall accompany the application. A certified copy of the partnership deed and current address of all the partners of the firm shall also accompany the application. All details should be in the appropriate place as mentioned in the Form/Appendix.

#### **6.5 Submission of bid in case of Joint Venture:**

1. Joint venture is allowed for tenders having cost put to tender more than Rs. 25 crores. Joint venture or JV may be of individual or Partnership firms or Private Limited Companies or LLPs etc. These joint ventures are to be registered at appropriate places.
  - a) JV of two Partnership Firms: This is allowed but it cannot be registered anywhere, so the Partnership Deed in notarized form may be accepted.
  - b) Association of Partners (AOP): In such case notarized copy of Joint Venture Deed will be accepted.
  - c) Partnership JV: In such case notarized partnership Deed and Acknowledgement of submission of this with Registrars of Firms is acceptable.
  - d) LLP (Limited Liability Partnerships): In such case, the Joint Venture should be registered with the Registrar of Companies and its certificate should be obtained and attached in all above cases all the partners of Joint Venture are responsible for execution of the work and defect liability and all other liabilities. The undertaking of such responsibilities should be taken from each individual partners of Joint Venture. In case the Joint Venture is L1 they should apply immediately for PAN and GST. The PAN and GST registration should be submitted before the acceptance of the Tender without which the tender of JV will not be accepted. JV registration as mentioned above shall be submitted to the division office before 1<sup>st</sup> RA bill of the work.

2. Complete information about each partner in the respective forms duly signed by each such partner shall be submitted with the application.
3. The Joint Venture must submit complete information and identify the lead firm. It would be necessary for the Joint Venture to establish to the satisfaction of the department that the Venture has made practical, workable, and legally enforceable arrangements amongst the parties, that responsibilities regarding the execution and financial arrangements have been laid down and assigned that the individual parties to whom such responsibilities etc. assigned are capable in their capacity to discharge them completely and satisfactorily and also that the lead firm has necessary skill and capacity to lead responsibility and involvement for the entire period of execution as well as leading role in control and direction of the resources of the entire Joint Venture.
4. One of the partners with a major percentage of share, shall be nominated as being in charge (lead partner of J.V.) and this authorization shall be evidenced by submitting a power of attorney signed by all the JV partners.
5. All partners of the Joint Venture shall be liable jointly and severally for the execution of the contract-by-contract terms, and a relevant statement to this effect shall be included in the authorization mentioned.
6. In case of any dispute or any breach of contract, all the JV partners shall be held solely responsible for any recoveries due or any fulfillment of works mentioned in the tender.
7. The J.V. partners are not allowed to bid independently or in another Joint Venture at a time in this tender. Such bids will not be considered for the evaluation purpose and the bids will be rejected. Such bidders will not be allowed to take part in WRD tenders for next 2 years.
8. The Joint Venture shall not be dissolved till the completion of the defect liability period as stipulated in tender conditions and till all the liabilities thereof are liquidated.
9. The details of JV should be submitted in Format 2A.
10. The details of all partners should be submitted in Format 2.
11. An Affidavit of all JV partners in Format 7 regarding Firms responsibility.

## **6.6 Security of bid submission**

1. Online B1 Forms (Envelopes 1 and 2), all Proforma and all scanned documents uploaded by the bidder to the website will be encrypted.

2. The encrypted bid can only be decrypted/opened by the authorized openers on or after the due date and time

## **6.7 Submission of Techno-Commercial Bid (Envelope- 1)**

### **6.7.1 General:**

The bidder should upload an online scanned copy of the original documents as below in Envelope-1.

All documents should be scanned from original documents and preferably clubbed in a single PDF file. These PDF files should be uploaded at the appropriate place on the website.

### **6.7.2 Essential Documents:**

The following are the essential documents to be uploaded first, without which the tender will be treated as unresponsive and will be ignored. It will not be evaluated further

1. Letter of Transmittal (Format 1)
2. Basic information of bidder in Format 2 and 2A
3. Proof that EMD & Tender fee paid through bidders account only. (Bank statement with account details & particular transaction)
4. Power of Attorney if applicable. (Registered with Sub Registrar)
5. Firm registration certificate, individual proprietary partnership, Private Limited, LLP, Public limited company, etc.
6. Affidavit in Format 7 on Rs.500 stamp paper
7. Undertakings in Format-3
8. In the case of JV-
  - a) Registration certificate/JV deed as mentioned in section 6.5 Format-6
  - b) Affidavit in Format 7 signed by all partners.
  - c) The JV registration document mentioned in 6.5.1

### **6.7.3 Other Techno-Commercial Documents**

1. Annual turnover certificate by practicing CA with UDIN
2. Work done certificate in Format-4 for each work.
3. Work in hand (ongoing commitments) Certificate for calculations value of B in Bid Capacity.
4. Similar type of work certificate in Format -4

5. Various work done certificate for general experience (quantities executed in a single year as mentioned in section 5.3)
6. Submission of self-evaluation sheet

#### **6.7.4 Various Certificates/ Deeds/ Affidavits:**

The required certificates should be from the following sources-

1. Annual turnover certificate: From practicing Chartered Account with UDIN.
2. EMD paid proof- Bank statement of the bidder bank.
3. Power of Attorney- Registered with Sub Registrar.
4. Partnership Deed, Company, JV, Other Deed a Registrar of Companies, Registrar of Firms, revenue/Notary Authorities (As the case maybe) for Deeds & JV.
5. Affidavit in Format-7: Registration with Sub Registrar/Notary as the case maybe.
6. Undertakings in Format-3: - Registration with Sub Registrar/Notary as the case maybe.
7. Work Done: Work under progress certificate officer of the rank Executive Engineer and above.
8. Similar type of work: Work under progress certificate officer of the rank Executive Engineer and above.
9. Various work certificates for general experiences: Quantities of important items officer of the rank Executive Engineer and above.

#### **6.7.5 Submission of Qualifying Documents in Envelope 1**

- 1) The self-evaluation process of qualification criteria applies to this Tender. The bidder must download the Excel File named "Self-Evaluation of bidder" from the website. The Excel file contains six sheets named
  - a) Sheet:1: The Qualification Criteria
  - b) Sheet:2: Annual Turnover Form
  - c) Sheet:3: Completed Similar Type of Work
  - d) Sheet:4a: Item-wise Quantity 1
  - e) Sheet:4b: Item-wise Quantity 2
  - f) Sheet:4c: Item-wise Quantity 3

- g) Sheet:5: Work in hand B
- h) Sheet:6: Result sheet

The bidder must fill in his information in the white background cells only. He should not try to interfere with other sheets /cells. The required documents are to be uploaded at the appropriate place in the sequence only.

The sheet-wise instructions for bidders to fill the **qualification** sheets are as follows:

**2) "The Qualification Criteria Sheet 1**

1. This is just a repetition of the qualification criteria which is necessary for this tender.
2. The bidder can only see this sheet/cannot change or edit it.

**3) Annual Turnover Form Sheet 2**

1. In this sheet the bidder must fill in his name on a white background cell.
2. He must enter his name only once; this name will repeat in other places automatically.
3. He must fill in five values of the last five years annual turnover at appropriate cells.
4. The average turnover and maximum annual turnover will be automatically generated and used at later stages for evaluation.

**4) Completed Similar Type of Work Sheet 3**

1. Information of completed similar type work is to be filled here.
2. The updated value of work will be automatically generated and used in the evaluation process.
3. Certificate of only one work is allowed here. The bidder should upload only the certificate which fits the definition mentioned in 5.2

**5) Item wise Quantity 1 Sheet 4a**

1. In this sheet, the bidder must find out the year in which he has executed the maximum quantity of the item mentioned in this sheet.
2. Enter this year at the appropriate white background cell.

3. Enter certificate references and other relevant data.
4. There are three maximum different sheets for three different important items.
5. The year for execution of the maximum quantity of these three items may be the same or different for 3 items.

**6) Item wise Quantity 2,3 Sheet 4b, 4c**

- a. Repeat the procedure as Item quantity 1 above.

**7) Work in hand Sheet 5**

1. In this sheet balance amount of work in hand of the bidder is to be mentioned in white background sheets.
2. In the last column bidder must mention the amount of balance work to be executed in the period of this work.
3. The bidder should not hide any ongoing work in hand. If it is found that the bidder has not shown any ongoing work, he will be penalized as per detailed tender notice and clause.

**8) Result Sheet 6**

1. In the result sheet the bidder himself can see his eligibility for the tender before uploading.
2. The bidder may or may not participate further in the bid process if he does not qualify.
3. This sheet is protected and will be stored on the server forever, after uploading it with the other tender documents.
4. This sheet can be seen at the time of opening of the tender.
5. The tender opening/ evaluation authority will check only the supporting documents of the qualified bidders.

**6.7.6 Documents to be uploaded related to Self-Evaluation:**

1. Annual turnover document: only one pdf file

The bidder has to upload one single PDF file of the last five years' annual turnover. This must be a certificate from CA with UDIN.

2. Completed Similar Type of Work

The bidder must upload only one PDF file of this subject of the certificate given in the Proforma attached herewith.

The certificate of only one work should be uploaded.

This certificate should be issued by an officer, of the rank of the Executive Engineer and above.

**3. Maximum Quantity of Important Item 1: Only one pdf file**

The bidder must identify the year in which he has executed the maximum quantity of the given item. The year should be entered in the appropriate place. The information on various available certificates is to be filled at appropriate places. The original certificates should be scanned and clubbed in a single PDF file. The sequence of these certificates should be as per the filled information. The certificate should be in Sheet 4.

**4. Maximum Quantity of Important Item 2: Only one pdf file as above for item 2**

**5. Maximum Quantity of Important Item 3: Only one pdf file as above for item 3**

**6. Work in hand, value of B: only one pdf file**

In this sheet bidder must upload information of all the works in his hand. He should prepare a single PDF file of all the certificates of all work in hand. And upload it at the appropriate place. The bidder should not hide any ongoing work in hand. If it is found that the bidder has not shown any ongoing work, he will be penalized as per detailed tender notice and clause 6.1

Thus, for this post-qualification evaluation, the bidder is allowed to upload only six PDF files in the support of information he has filled in the “Self-Evaluation of Qualification”

**7. Other Documents needed for technical qualification.**

Details of the works tendered for and works in hand with the contractor in Format 4 along with the value of work unfinished on the last date of submission of the tender.

#### **6.7.7 Submission of financial bid (Envelope-2)**

The bidder should quote his offer in the form of a percentage below or above the cost put to tender given in Schedule 'B' at the appropriate place both in figure and words. The contractor shall quote for the work as per details given in the main tender viz.

conditions in B-1-form, special conditions of contract, specifications, and common set of conditions issued/ additional stipulations made by the Corporation which will be available on the website from time to time.

#### **6.8 Resubmission and withdrawal of bids**

- 1) Resubmission of the bid by the bidder for any number of times before the expiry of the final date and time of submission is allowed.
- 2) 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.
- 3) The bidder can withdraw his bid before the closure date and time of receipt of the bid by uploading a scanned copy of a letter addressed to the Procurement officer/Publisher (Tender accepting officer/Executive Engineer in charge) citing reasons for withdrawal. The system does not allow any withdrawal after the expiry of the closure time of the bid.

#### **6.9 Opening of the techno-commercial bid (Envelope 1)**

##### **A. General**

- 1) Bid opening date and time are specified (detailed tender notice) or can be extended through corrigendum if required. Bids cannot be opened before the specified date and time.
- 2) At the time of opening of the tender as per the schedule prescribed on the website the bidder or his representative should be present. No complaint after that will be considered.
- 3) The specified bid openers will log in to the website to decrypt the bid submitted by the bidders.
- 4) The bidders and guest users can view the summary of the opening of bids from any system.
- 5) In the event of the specified date of bid opening being declared a holiday by the officer opening the bid, the bid may be opened at the appointed time on the next working day.

##### **B. Evaluation of the techno-commercial bid (Envelope-1)**

- 1) The Tender accepting officer/Evaluators shall take up the evaluation of bids concerning the qualifying information and other information furnished.
- 2) The basic information form will be downloaded first. The supporting documents

for this basic information in PDF will be downloaded and checked. If information is found wrong/misled further evaluation will not be done and EMD will be forfeited.

- 3) The result sheet (excel sheet) of the self-evaluation of the bidders will be opened. If the bidder is qualified for all criteria, the sheet-wise verification of documents will be done. Each supporting document will be checked information filled in by the bidder and certificates will be verified, all the sheets will be verified.
- 4) The Executive Engineer may ask for clarification on any document if required.
- 5) The bidders will respond within not more than seven days of the issue of the clarification letter, failing which the bid of the bidder will be evaluated on its merit.
- 6) Technical evaluation of all bids shall be carried out as per information furnished by bidders. However, the evaluation of bids does not exonerate bidders from checking their original documents later. If the bidder is found to have misled the evaluation through wrong information, he will be penalized as per the detailed tender notice and clause 6.1
- 7) In the result sheet of the post-qualification form, the evaluator will see the result of the qualification of each bidder. The evaluator only verifies the supported documents uploaded in connection with the data filled in respective forms.
- 8) The Divisional Accountant and Executive Engineer will send the evaluation report with qualification results and document verification report to the competent authority through the proper channel for approval.
- 9) The competent authority will finalize the list of the qualifying bidders and communicate to the Executive Engineer.
- 10) The Executive Engineer will publish the list of qualifying bidders on the website.
- 11) The concerned Executive Engineer will also declare the date, time, and venue of the opening of the financial bid.
- 12) The tender accepting authority reserves the right to relax any one or all criteria.
- 13) Bidder can witness principal activities and view the documents/summary reports for that work by logging on to the portal with his DSC from

anywhere.

### C. Evaluation in case of Joint Venture JV

In the case of JV, the evaluation will be done in following way

- 1) Criteria of maximum annual turnover : - these criteria jointly and in proportion to their share in JV.
- 2) Criteria of experience of similar type of work: - Any partner in JV or experience of J.V. Partners together shall satisfy these criteria.
- 3) General experience criteria mentioned: Any firm in JV or JV partners together may satisfy these criteria.
- 4) Criteria of bid capacity: - JV shall satisfy these criteria jointly in proportion to their share in JV.

#### **6.10 Opening of the financial bid (Envelope-2)**

1. After the declaration of the result of the technical bid, the Executive Engineer will declare the date and time of the opening of the financial bid.
2. Bid opening date and time as specified in or can be extended through corrigendum if required. Bids cannot be opened before the specified date and time.
3. At the time of opening of the tender as per the schedule prescribed on the website the bidder or his representative should be present. No complaint after that will be considered.
4. The specified bid openers will log in to the portal to decrypt the bid submitted by the bidders.
5. The bidders and guest users can view the summary of the opening of bids from any system.
6. In the event of the specified date of bid opening being declared a holiday for the officer opening the bid, the bid may be opened at the appointed time on the next working day.
7. The financial bid of all qualified bidder will be opened on the declared date and time. The bidder may remain present for this. The website will automatically generate the comparative statement. The lowest bidder's tender will be sent for acceptance to the competent authority.

8. The lowest financial bid will be submitted for acceptance to the competent authority. The tender acceptance depends on the cost put tender (Executive Engineer, Superintending Engineer, Chief Engineer, or various committees.) The competent authority may request/ negotiate with the lowest bidder L1 to reduce his offer. Depending upon the revised offer the financial bid may or may not be accepted by the Competent Authority. If the offer is rejected the Executive Engineer may be asked to recall the tender.
9. If the revised offer of the lowest bidder L1 is decided to be accepted, then it will be communicated to the Executive Engineer. The Executive Engineer will notify acceptance of the work before the expiry of the validity period. The Letter of Acceptance will state the sum that the Engineer-in-Charge will pay the bidder in consideration of the execution and completion of the works by the bidder as prescribed by the contract, the amount of Security deposit, and the Additional Performance Security Deposit 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.

#### **6.11 Notification of award and signing of agreement**

- 1) The bidders whose bid is accepted will be called to sign a contract agreement. He has to sign physically the contract agreement with the Executive Engineer.
- 2) The successful bidder will have to sign the contract with the Executive Engineer in the form of the tender document released on the website. The documents / information submitted by the contractor during the Tender Evaluation and seek clearance document.
- 3) After signing the contract, the bidder will be called a contractor.
- 4) The Contractor after furnishing the required acceptable security deposit and Additional Performance Security deposit, shall be issued a "Work Order" by the Engineer-in-Charge with a copy thereof to the Tender Accepting officer. The Executive Engineer shall upload the summary and declare the process as complete.
- 5) The contractor must submit a "program of work" at the time of execution of the agreement in the prescribed format for approval of the Engineer-in-charge.
- 6) The contractor shall sign as a token of final acceptance of the plans, sections, and agreements for the work before taking up the work for execution.
- 7) The date of commencement of work shall be as notified in the work order.
- 8) On signing the agreement, the site will be handed over to the contractor for execution, he

will start the work and complete it in all respects.

## **6.12 Other general instructions**

- 1) All rates should be for finished items of work unless otherwise mentioned in the tender schedule.
- 2) All taxes, and fees, under the local rule including, Income taxes and Cess and Surcharges as applicable will be borne by the contractor as admissible. It is implied that the quoted rates are inclusive of such elements.
- 3) The Water Resources Department reserves the right of authority to reject any or all tenders received without assigning any reason whatsoever.
- 4) The earnest money and Additional Performance Security Deposit (if applicable) of the successful lowest bidder will be retained and will be dealt with as per the terms and conditions. The earnest money and Additional Performance Security deposit of the unsuccessful bidders, except the L1, L2 shall be refunded on application. The EMD given by the second lowest shall also be refunded within 15 days (after the work order) of acceptance of the tender and agreement with L1.
- 5) The EMD and APSD (if submitted) will be forfeited in any of the following cases.
  - b) If the bidder withdraws the bid after bid opening during the period of bid validity.
  - c) In the case of a successful bidder fails within the specified time limit to
    - (i) Sign the agreement or
    - (ii) Furnish the required security deposit.
- 6) Over and above these conditions including the technical specifications the terms, conditions, rules regulations, and specifications laid down in the I.S. code are also binding on the part of the bidder.
- 7) 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 the Income Tax Act and as amended from time to time.
- 8) The contractor must supply necessary labour and materials for alignment lying recording of levels whenever required at his own cost.

- 9) THE CONTRACTOR SHOULD ARRANGE NECESSARY TOOLS AND PLANTS SUCH AS PUMPS, EXCAVATORS, TRUCKS, COMPRESSORS, TIPPERS, BATCHING PLANTS, CONCRETE MIXERS, STEEL SHUTTER PLATES, ETC. REQUIRED FOR THE EFFICIENT EXECUTION OF WORK AT HIS OWN COST. THE RUNNING CHARGES OF SUCH PLANT AND THE COST OF CONSUMABLES AND CONVEYANCE ARE TO BE BORNE BY THE CONTRACTOR. ANY DEVIATION FROM THIS MAY LEAD RECESSION OF THE CONTRACT.
- 10) For section measurement, levels will be taken in the presence of the contractor at suitable intervals and will be recorded in the level book before the commencement of the work. The level should be accepted by the contractor and the initial section be signed by him as a token of acceptance. The final levels will be taken after the completion of the work in the presence of the bidder in the same position, as in the case of the initial level. The measurement of earthwork for filling sections will be recorded on the finished compact section and payment will be made on level sections only as mentioned in the Schedule B quantities.
- 11) The measurement of fine dressing and turfing will be taken after the satisfactory full growth of the turf.
- 12) Borrowing earth is the entire responsibility of the contractor. No extra cost will be considered for whatsoever reason.
- 13) The language of all bidding documents and bidding process shall be in English for all purposes. The bid submitted in any other language except English shall not be accepted.
- 14) The information required as per bid documents may be provided in the specified format annexed to the bid document.

#### **6.13 Goods and service tax (GST)**

The Goods and Service Tax Act 2017 applies to this work contract. The tender rates are exclusive of GST. The bidder shall study the prevailing structure of GST. The bidders must register under GST and upload GST registration in Envelope- -1. The bidder must give an undertaking regarding the refund of GST as mentioned in clause 53.

#### **6.14 Conditional tender**

Conditional tenders will be summarily rejected. The tenders which do not fulfill any of the conditions of the notified requirements laid down in this detailed tender notice, the general rules, and directions for the guidance of the bidders as mentioned in the B- 1 form or are incomplete in any respect are likely to be rejected without assigning reasons therefor.

### **6.15 Tender units**

The tender has been invited under the Metric System of measurements. The bidder should particularly note the units mentioned in Schedule 'B' on which rates are to be based.

### **6.16 Process to be confidential**

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 Employer's processing of bids or award decisions may result in the rejection of his bid.

### **6.17 Clarification of bids**

- 1) To assist in the examination, evaluation, and comparison of bids, the Competent Authority may, at his discretion, ask any bidder for clarification of his bid, including breakdowns of the unit rates. The request for clarification and the response shall be in writing or by e-mail, but no change in the price or substance of the bid shall be sought, offered, or permitted.
- 2) No bidder shall contact the Employer on any matter relating to its bid from the time of the bid opening to the time the contract is awarded. If the bidder wishes to bring additional information to the notice, it should do so in writing.
- 3) Any effort by the bidder to influence the Competent Authority in the Competent Authority's bid evaluation, bid comparison, or contract award decisions may result in the rejection of the bidder's bid.
- 4) The successful bidder should produce to the satisfaction of the competent authority accepting the tender a valid and current license issued in his favour under the provisions of the Contract Labour (Regulation and Abolition) Act,1970, and the Maharashtra Contract Labour (R &A) Rules, 1971, before signing the contract.
- 5) The successful bidder should produce to the satisfaction of the competent authority accepting the tender a valid GST Certificate as required.
- 6) No percentage above or below is given over Royalty, Insurance, and testing charges.

- 7) Royalty and Insurance are deducted while calculating price variation.

#### **6.18 Tender Validity Period for 120 Days**

The offer shall remain valid for a period of **120 days** from the submission of the bid and thereafter it may be withdrawn by notice in writing by the bidder to the Executive Engineer. Such notice shall be sent by registered post acknowledgement (RPAD). If acceptance of tender is not communicated within ...days and if the offer is withdrawn by the bidder earnest money shall be refunded in full.

## 7 SITE VISIT

### 7.1 General

- 1) It is assumed that the bidder is well known for the site condition so the contractor is not entitled to claim for non-availability of construction materials in sufficient quantity and quality, extra lead of material, availability of labour, etc.
- 2) Every bidder is expected before quoting his rates to inspect the site of the proposed work. He should also inspect the quarries and approach roads to the quarries and the locality of the work and satisfy himself about the quality and availability of materials including medical aids, labour foodstuff, etc. In every case, the materials must comply with the relevant specifications.
- 3) 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 and that he has taken into account all conditions, and 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-charge of the work and his authorized subordinates.

## **8.0 SAMPLE FORMS, SHEETS**

### **PROFORMAS AND FORMATS**

## **Index of Forms and Formats**

- 1) Format 1: Letter of Transmittal
- 2) Format 2: Basic Information of bidder
- 3) Format 2A: JV Details
- 4) Format 3: Undertakings on Rs. 100 stamp paper.
- 5) Format 4: Certificate of Work Under Progress/ Work Completed
- 6) Format 5: Bank Guarantee Bond
- 7) Format 6: Memorandum of Understanding for Joint Venture Agreement
- 8) Format 7: Agreement and Affidavit
- 9) Sheets of Technical Qualification
  1. Sheet1: The Qualification Criteria
  2. Sheet 2: Annual Turnover
  3. Sheet 3: Completed similar type of work
  4. Sheet 4: General Experience, maximum quantities executed in a single year: Separate form for separate items
  5. Sheet 5: Cost of works in hand: For value of B in the bid Capacity.
  6. Sheet 6: Result Sheet.
  7. Sheet 7: Professional Tax Clearance Certificate

**FORMAT-1**  
**LETTER OF TRANSMITTAL**

To,

**The Executive Engineer,**  
Kukadi Irrigation Division NO.1,  
Narayangaon

**Subject: Submission of Tender Application for the work of –**

Kukadi Irrigation Project, Dist Pune, Ahilyanagar  
Special Repairs to Kukadi Left Bank Canal k.m.1 to 60 under Maharashtra Irrigation Improvement Programme (MIIP).

Having examined the details given in the information and instructions to bidder for the work.

I/We hereby submit the tender, information and relevant documents. I/We hereby certify the truth and correctness of all statements made and information supplied.

I/We have furnished all information and details necessary for the Tender as a bidder(s) and no further information remains to be supplied.

I/We authorize the project authorities to verify the correctness therefore as well as to approach any Government department individuals, employees, firms, and/or corporation to verify the correctness of information submitted by me/us to prove my/our competence and general reputation.

I/We submit all the certificate(s) in support of our eligibility; technical know-how, capability, and having completed the works from the clients/owners of respective works.

Date of submission:

Signature of bidder/Contractor.

Seal

**FORMAT- 2**

<b><u>Basic Information of Bidder</u></b>		
1	Name of Bidder/Company/Proprietary Firm	
2	Nationality	
3	Office Address	
3.1	Telephone No.	STD Code: -
3.2	Office: -	
3.3	Residence: -	
3.4	Mobile	
3.5	E-mail I.D.	
3.6	Fax No	
4	Year of Establishment	
5	If the Company/Proprietary firm/ Corporation gives the names and addresses of partners	
5.1	i)	
5.2	ii)	
5.3	iii)	
5.4	iv)	
5.5	v)	
6	Maharashtra P.W.D. Registration (Compulsory only for Tender cost up to Rs.1.50 Cr.)	
6.1	Class	
6.2	Valid up to	
7	Income Tax PAN	
8	GST Registration Details	
9	Power of Attorney Holder	
10	Name of Digital Signature Holder Used for this Tender	

11	Have you ever failed to complete any work awarded to you?	
12	In how many projects have you asked for arbitration after ratification and how many cases settled in your favour?	
13	In how many projects you have imposed penalties for delay?	
14	Has any key personnel or partner of your organisation ever failed to complete a contract awarded in his name?	
15	Do you have a Quality Control Laboratory and Mobile Laboratory?	

**Format 2A: JV Details****Joint Venture Details (If applicable)**

1.	Name of Joint Venture	
2.	Address of Joint Venture	
	Email	
	Phone no.	
3.	Type of JV (Options: Partnership, AOP, JV of Partnership Firms, LLP)	
4.	Name and addresses of all Partners with Percentage (%) of partnership A ____ % B ____ % C ____ %	
5.	Name of leading Firm	
6.	Name of POA holder (POA should be given by all Partners of JV)	
7.	Registration Certificate, Deed etc as mentioned in Paragraph 6.5	

**Note:**

1. All JV Partners need to submit information in format 2 separately
2. PAN, GST registration certificate and JV should be submitted at the time of acceptance of tender. If JV is L1.

**FORMAT-3****UNDERTAKING**

(To be typed on Rs. 100 Stamp Paper)

I ..... age ..... address ..... (Authorized signatory to sign the contract), hereby submit, vide this affidavit in truth, that I am the owner of the contracting firm ..... / authorized signatory and I am submitting the documents in Envelope no.1 for the purpose of scrutiny of the contract. I hereby agree to the conditions mentioned below: -

1. I/we am/are liable for action under Bhartiya Nyaya Sanhita (BNS) & Information Technology Act 2000 for submission of any false/fraudulent paper/information submitted in the tender.
2. I am liable for action under Bhartiya Nyaya Sanhita (BNS) & Information Technology Act 2000 if any false information, false bill of purchases, false supporting proof of purchase, or proof of testing submitted by my staff, subletting agency or by myself is found during the contract period and defect liability period.
3. I am liable for action under Bhartiya Nyaya Sanhita (BNS) and Information Technology Act 2000 if any information is concealed which will affect the calculation of bid capacity.
4. As a contractor, I / We have never been penalized for any work carried out by me, nor I / We have been blacklisted by any Government Department previously.
5. I / We have not abandoned any work for reasons attributed to me.
6. I / We have not delayed the completion of any work for any reason attributed to me/us.
7. I / We have not been blacklisted / Banned / Suspended by any Government / Semi-Government Department or Public Works Department / Water Resources Department.
8. I / We undertake that all information submitted by me/us is true to the best of my knowledge and belief. I / We fully aware that my tender will be treated as non-responsive and will be summarily rejected at any time, if the above information is found to be false and misleading.
9. I/WE have not omitted any work in hand i.e. information provided in the form includes all the work in hand.

10. I/WE know that if at any time, it is noticed that I/WE have not submitted, information regarding all the work in hand (works in hand means, the works for which the final bill is not passed and work is physically incomplete), that I will be disqualified from the tender process at any stage of the bidding.
11. I/WE shall give accurate information about work that will be awarded during the tender process is going on for this tender.
12. I undertake that I will deploy the machinery required for the work, as per section 5.5 if the work is awarded to me.I undertake that I will make available suitably, qualified personnel as per section 5.6 of the tender if the work is awarded to me.
13. I/We accept all terms and conditions, special conditions, specifications and drawings in the tender.
14. If I get any refund of GST from the GST department and if the same has been reimbursed to me earlier by the Executive Engineer, then I shall deposit this excess to the Division office immediately.

Date:

Place:

Signature of bidder with Seal

**FORMAT-4****PROFORMA FOR WORK DONE CERTIFICATES****Certificate For the work completed / Under progress**

(Separate Certificate for each work)

Certificate for the work completed / under progress As on .....

Sr. No.	Particular	Details
1	Name of work	
2	Estimate cost	
3	Agreement No	
4	Name of Contractor	
5	Tendered Cost	
6	Date of work order	
7	Stipulated period of completion	
8	Scheduled date of completion	
9	Extension granted	
	1	
	2	
	3	
10	Final date of completion	
11	The revised cost of work	
12	Cost of work executed (P.E. should be shown separately)	
13. a)	Balance cost of work-	
	i) from original Tender-	
	ii) from sanctioned Additional Work- (DSR Year- ) (Excess Note- 1)	
	iii) from sanctioned Additional Work- (DSR Year- ) (Excess Note- 2)	
13. b)	Expected month/year of completion-	
14	Reasons for non-completion of work in a scheduled period of completion	
15	Whether any penalties/fine / stop notice/compensation / liquidate damage imposed	
16	Details of Work Done	

A	Item	Concrete Lining	Steel Reinforcement	Earthwork		Other	Cost of Work
i.	Unit						
ii.	Tendered Quantity						
iii.	Revised Quantity						
iv.	<b>Total Executed Quantity</b>						
<b>Year-wise break up of an executed quantity</b>							
	5 <sup>th</sup> financial Year						-
	4 <sup>th</sup> financial Year						-
	3 <sup>rd</sup> financial Year						-
	2 <sup>nd</sup> financial Year						-
	1 <sup>st</sup> financial Year						-
	Current financial Year						-
v.	Balance Quantity						
B	<b>Cost of work executed-</b>						
17	Details of quality control arrangements made by the contractor or his own on these works						
18	Remarks about the performance of the contractor about physical progress and quality of work:						

**Outward No.:****Date:****Seal****(Stamp with name)****(E.E. Stamp with name)**

**FORMAT-5****BANK GUARANTEE FORMAT****(TO BE STAMPED AS AN AGREEMENT)**

1. THIS BANK GUARANTEE AGREEMENT executed at .....this.....day of .....202.... by.....(Name of the Bank) ..... having its Registered Office at..... and its Branch at ..... (hereinafter referred to as "the Guarantor", which expression shall, unless it be repugnant to the subject, meaning or context thereof, be deemed to mean and include its successors and permitted assigns) IN FAVOUR OF .....bank having its Corporate Centre at .....and one of its offices at.....(procuring office address) hereinafter referred to as "..... bank" which expression shall, unless repugnant to the subject, context, or meaning thereof, be deemed to mean and include its successors and assigns).
2. WHEREAS, M/s ..... incorporated under.....Act having its registered office at..... and principal place of business at..... (hereinafter referred to as "Service Provider/ Vendor" which expression shall unless repugnant to the context or meaning thereof shall include its successor, executor & assigns) has agreed to develop, implement and support..... (name of Service) (hereinafter referred to as "Services") to ..... bank in accordance with the Request for Proposal (RFP) No. ..... bank :xx:xx dated dd/mm/yyyy.
3. WHEREAS, ..... bank has agreed to avail the Services from Service Provider for a period of .....year(s) subject to the terms and conditions mentioned in the RFP.
4. WHEREAS, by terms and conditions of the RFP/Purchase order/Agreement dated....., the Service Provider is required to furnish a Bank Guarantee for a sum of Rs...../- (Rupees..... only) for due performance of the obligations of Service Provider in providing the Services, in accordance with the RFP/Purchase order/Agreement guaranteeing payment of the said amount of Rs..... (Rupees.....only) to ..... bank, if Service Provider fails to fulfil its obligations as agreed in RFP/Agreement.,
5. WHEREAS the Bank Guarantee is required to be valid for a total period

of.....months and in the event of failure, on the part of the Service Provider, to fulfil any of its commitments/obligations under the RFP/Agreement, ..... bank shall be entitled to invoke the Guarantee. AND WHEREAS, the Guarantor, at the request of the Service Provider, agreed to issue, on behalf of the Service Provider, Guarantee as above, for an amount of Rs.....(Rupees..... only).

**NOW THIS GUARANTEE WITNESSETH THAT**

1. In consideration of ..... bank having agreed to entrust the Service Provider for rendering Services as mentioned in the RFP, we, the Guarantors, hereby unconditionally and irrevocably guarantee that Service Provider shall fulfil its commitments and obligations in respect of providing the Services as mentioned in the RFP/Agreement and in the event of Service Provider failing to perform / fulfil its commitments/ obligations in respect of providing Services as mentioned in the RFP/Agreement, we (the Guarantor) shall on demand(s), from time to time from ..... bank, without protest or demur or without reference to Service Provider and notwithstanding any contestation or existence of any dispute whatsoever between Service Provider and ..... bank, pay ..... bank forthwith the sums so demanded by ..... bank not exceeding Rs. ...../- (Rupees \_\_\_\_\_ only).
2. Any notice/communication/demand from ..... bank to the effect that Service Provider has failed to fulfil its commitments/obligations in respect of rendering the Services as mentioned in the Agreement, shall be conclusive, final & binding on the Guarantor and shall not be questioned by the Guarantor in or outside the court, tribunal, authority or arbitration as the case may be and all such demands shall be honoured by the Guarantor without any delay.
3. We (the Guarantor) confirm that our obligation to the ..... bank, under this Guarantee shall be independent of the agreement or other understandings, whatsoever, between the ..... bank and Service Provider.
4. This Guarantee shall not be revoked by us (the Guarantor) without prior consent in writing of the ..... bank.

**WE (THE GUARANTOR) HEREBY FURTHER AGREE & DECLARE THAT**

1. Any neglect or forbearance on the part of ..... bank to Service Provider or any indulgence of any kind shown by ..... bank to Service Provider or any change in the terms and conditions of the Agreement or the Services shall not, in any way,

release or discharge the Bank from its liabilities under this Guarantee.

2. This Guarantee herein contained shall be distinct and independent and shall be enforceable against the Guarantor, notwithstanding any Guarantee or Security now or hereinafter held by ..... bank at its discretion.
3. This Guarantee shall not be affected by any infirmity or absence or irregularity in the execution of this Guarantee by and/or on behalf of the Guarantor or by merger or amalgamation or any change in the Constitution or name of the Guarantor.
4. The Guarantee shall not be affected by any change in the constitution of ..... bank or Service Provider or winding up/liquidation of Service Provider, whether voluntary or otherwise
5. This Guarantee shall be a continuing guarantee during its validity period.
6. This Guarantee shall remain in full force and effect for a period of... ..... year(s)..... month(s) from the date of the issuance i.e. up to..... Unless a claim under this Guarantee is made against us on or before ....., all your rights under this Guarantee shall be forfeited and we shall be relieved and discharged from all liabilities there under.
7. This Guarantee shall be governed by Indian Laws and the Courts in Mumbai, India alone shall have the jurisdiction to try & entertain any dispute arising out of this Guarantee.

**Notwithstanding anything contained herein above:**

1. Our liability under this Bank Guarantee shall not exceed...../-Rs (Rs..... only)
2. This Bank Guarantee shall be valid up to.....
3. We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only and only if ..... bank serve upon us a written claim or demand on or before.....

**Yours faithfully,**  
**For and on behalf of bank.**  
**Authorised official**

**FORMAT - 6**  
**JOINT VENTURE AGREEMENT/ DEED**  
**(ON APPROPRIATE STAMP PAPER AND REGISTERED WITH COMPETENT AUTHORITY)**

**NAME OF WORK** :- Kukadi Irrigation Project, Dist Pune, Ahilyanagar  
 Special Repairs to Kukadi Left Bank Canal k.m.1 to 60 under Maharashtra Irrigation Improvement Programme (MIIP).

..... DEED OF  
 PARTNERSHIP (JOINT VENTURE OF .....  
 .....

This Memorandum of Understanding for Joint Venture Agreement made and entered into at "....." this ..... day of ..... year ..... by and between

1..... with its registered office at  
 .....

Party No.1 hereinafter referred to as .....

AND

2. .... with its registered office at .....

Party No. 2 hereinafter referred to as .....

**DEFINITIONS**

In this deed, the following words and expressions shall have the meanings set out Below: -

"The Joint Venture ("JV" for short) shall mean .....  
 ..... Joint Venture collectively acting in collaboration for this agreement.

"Apex Co-ordination Body (ACB") shall mean the body comprising Managing Directors of the parties to Joint Venture."

"The owner" shall mean - Chief Engineer, Water Resources Department

“Executive Engineer” shall mean – Engineer in charge of the work working under Maharashtra Krishna Valley Development Corporation (MKVDC) (A Govt. of Maharashtra Undertaking)

"The Works" shall mean the – As mentioned above and for which J.V. is to be formed

"The contract" shall mean - The Contract entered into or to be entered into between the Joint Venture and the owner for the works.

## **AGREEMENT**

Whereas the Parties hereto declare that they agree and undertake to form a Joint Venture for execution of the works, as an integrated Joint Venture. Provided that the Parties are not, under this agreement, entering into any permanent partnership or Joint Venture to Tender or undertake any contract other than the subject works. Nothing herein contained shall be considered to construe the Parties or Partners to constitute either Party the agent of the other. Whereas the Executive Engineer .....  
....., when agree to award the work of  
Construction of .....  
....., in case the offer of J.V. is accepted. Whereas ..... and ..... wish to execute the Contract if awarded as per the terms of this indenture.

Now therefore this Deed of Partnership Witnesses is as follows:

1. That these recitals are and shall be deemed to have been part and parcel of the present MOU for JV
2. That the operation of this MOU for J.V. firm concerns and is confined to the work only, shall come into force from the date of this MOU i.e. .... 20 .....
3. That the name of the Joint Venture firm shall be ..... JOINT VENTURE (J.V.) in short.
4. That..... and..... shall jointly execute the works according to all terms and conditions as stated in the relevant instructions contained in the bid documents/ Contract as an integrated JV styled as “.....JOINT VENTURE” in short
5. That this agreement for Joint Venture firm shall regulate the relations between the parties and shall include, without being limited to them, the following conditions.
  - a) ..... shall be lead partner and in charge of the Joint Venture for all intents and purposes.
  - b) The parties hereto shall be jointly and severally liable to MKVDC for all acts, deeds, and things about the contract. The contract for the works shall be signed by Shri ..... to whom necessary General Power of Attorney signed by all signatories/ies, suitably as described above shall be issued by the JV and delivered to the owner.
  - c) That the Director of one of the parties to the J.V. M/S ..... shall be the lead Manager of the JV firm and shall have the power to control and manage

- the affairs of the J.V.
- d) That on behalf of the Joint Venture Shri (.....) shall have the authority to incur liabilities, receive instructions and payments, and sign and execute the contract for and on behalf of the joint Venture. All payments made under the contract shall be made into Joint Venture's Bank Account.
  - e) One or Two Bank accounts shall be opened in the name of J.V. to be operated by the individual signatories as mutually decided by representatives of the Joint Venture Partners.
  - f) That each of the parties to the JV agrees and undertakes to place at the disposal of the JV benefits of its individual experience, technical knowledge, and skill and shall in all respects bear its share of the responsibility including the provision of information, advice and other assistance required in connection with the works. The share and the participation of the partners in the JV shall broadly be as follows.
- Name of the Contractor ..... Share percentage .....
- Name of the Contractor ..... Share percentage .....
- g) All the rights, interests, liabilities, obligations, work experienced, and risks (and all net profits or net losses) arising out of the Contract shall be shared or borne by the Parties in proportion to these shares. Each of the parties shall furnish its proportionate share in any bonds, guarantees, securities required for the works as well as its proportionate share in working capital and other financial requirements, all by the decisions of the Apex Coordinating Body. "ACB"
  - h) Any loan/ advances shall be shared by the ..... and ..... at the ratio of ..... & ..... respectively.
  - i) All funds, finance or working capital required for carrying out and executing the works or contract shall be utilised by the parties as mutually agreed by the then and they shall be liable and responsible for the same.
  - j) In case of any dispute, breach of contract, or liability (Physical or financial) on the part of any partner of the Joint Venture firm, the lead firm of the joint venture shall be liable and responsible to fulfill all the terms and conditions of the tendered contract and for all the liabilities including recoveries if any of financial liabilities including recoveries if any or financial liabilities arising out of the contract or physical completion of work, till the expiration of the defect liability period under the contract.

- k) Site Management: The execution of the work on the site will be managed by a Project Manager reporting to the ACB. The Project Manager shall be authorized to represent the JV on the site in respect of matters arising out of or under the contract
- l) That “.....” and “.....” shall be jointly and severally liable to the owner for the execution of the contract commitment by contract conditions.
- m) This Joint Venture Agreement shall not be dissolved till the completion of the defects liability period as stipulated in the Tender Document conditions of the works and till all the liabilities thereof are liquidated.
- n) That question relating to the validity and interpretation of this Deed shall be governed by the Laws of India.
- o) That No Party to the JV has the right to assign any benefit, obligation, or liability under the agreement to any third party without first obtaining the written consent of the other partner and the Irrigation Development Corporation.
- p) Bank account(s) in the name of the Joint Venture firm may be opened with any Scheduled or Nationalized Bank and the representative of JV partners is authorized to operate upon such accounts individually.
- q) That both the parties to the JV shall be responsible to maintain or cause to maintain proper books of Accounts in respect of the business of the JV firm and the same shall be closed at the end of every financial year.
- r) That the financial year of the firm shall be the year ended on the 31st day of March every year.
- s) That upon closure of the books of account, balance sheet, and profit and Loss Account as to the state of affairs of the firm at the end of the financial year and as to the profit or loss made or incurred by the firm for the year ended on that date, respectively shall be prepared and the same shall be subject to audit by a Chartered Accountant.
- t) The firm holding the power of attorney shall be responsible for fulfilling the condition during the defect liability period after the completion of work. **LEGAL JURISDICTION:** All matters about or emanating from this JV agreement involving the owner shall be subject to or jurisdiction High Court of Judicature in Mumbai.

#### **NOTICES AND CORRESPONDANCE.:**

- u) All correspondence and notices to the J.V. shall be sent to any one of the following addresses. (1) ..... (2) ..... Will be intimated in due course

within a week from the date of "Work Order"

IN WITNESS WHEREOF the parties have caused their duly authorized representatives to sign below:

Signed on behalf of ..... Signed on behalf  
of ..... of .....

WITNESS

1)

2)

Contractor

No. of Corrections

Executive Engineer

**FORMAT - 7****AFFIDAVIT REGARDING RESPONSIBILITY OF CONTRACTOR AND ALL JV PARTNERS****(To be made on Rs. 500/- Stamp Paper)****(To be done by the tenderer and all JV partners in case of contractor is JV)**

**Name of work:** - Kukadi Irrigation Project, Dist Pune, Ahilyanagar  
 Special Repairs to Kukadi Left Bank Canal k.m.1 to 60 under Maharashtra Irrigation Improvement Programme (MIIP).

Articles of agreement executed on this the ..... Two

Thousand and ..... between the Executive Engineer, .....

..... Corporation (hereinafter referred to as ..... ) of the one part  
 and Shri.....

(Name and address of the bidder) (hereinafter referred to as 'the bounden') of the other part.

Whereas in response to the notification No..... Dated..... the bounden has submitted to the CORPORATION a tender for the work .....

..... specified therein subject to the terms and conditions contained in the said tender.

Whereas the bounden has also deposited with ..... CORPORATION a the sum of Rs. ..... as earnest money for the execution of an agreement undertaking the due fulfillment of the contract in case his tender is accepted by the CORPORATION.

Now these present witnesses and it is mutually agreed as follows:

1. In case the tender submitted by the bounden is accepted by the ..... CORPORATION and the contract is awarded to the bounden, the bounden shall within ..... days of acceptance of his tender execute an agreement with the CORPORATION incorporating all the terms and conditions under which the ..... CORPORATION accepts his tender.
2. In case the bounden fails to execute the agreement as aforesaid incorporating terms and conditions, governing the contract, the CORPORATION shall have power and authority to recover from the bounden any loss or any damage caused to the ..... CORPORATION by such breach, as may be determined by the ..... CORPORATION by appropriating the earnest money deposited by the bounden and if the

Contractor

No. of Corrections

Executive Engineer

earnest money is found to be inadequate the deficit amount may be recovered from the bounden and his properties, movable and immovable, in the manner hereafter contained.

3. Signed by Shri ..... date .....

In the presence of witness.

1. .....

2. .....

Signed by Shri ..... in the presence of a witness.

1. .....

2. .....

All sums found due to the CORPORATION under or by virtue of this agreement shall be recoverable from the bounden and his properties, movable and immovable, under the provisions of the Maharashtra Land Revenue Code for the time being in force as though such sums are arrears of land revenue and in such other manner as the CORPORATION may deem fit.

In witness whereof Shri .....

(Name and designation) for and on behalf of the DC and Shri..... the bounden have hereunto set them hands the days and years shown against them respective signature.

## SHEET 1: Qualifying Criteria

**Name of work:-** (To be declared by officer inviting Tender)  
 Kukadi Irrigation Project, Dist Pune, Ahilyanagar  
 Special Repairs to Kukadi Left Bank Canal k.m.1 to 60 under Maharashtra Irrigation Improvement Programme (MIIP).

<b>1</b>	<b>Current Year</b>		2024-25
<b>2</b>	<b>Annual Turnover (updated to current year)</b>	<b>Rs lakhs</b>	3106.13
<b>3</b>	<b>Completed Similar Type of Work</b>	<b>Rs lakhs</b>	2484.90
<b>4</b>	<b>Bid Capacity = (AxNx2) – B</b>	<b>Rs lakhs</b>	8283.00
<b>5</b>	<b>Time Limit for completion of work</b>	<b>Years</b>	2
<b>6</b>	<b>Quantities of Major Items Executed in any single year</b>		
	<b>1)</b> Concrete lining	Cum	16910
	<b>2)</b> Steel Reinforcement	MT	431
	<b>3)</b> Earthwork	Cum	60490

**Note:** - This is a sample form for display only. Actual information should be filled in a separate Excel Sheet of Self Evaluation.

## **SHEET 2: Annual Turnover Form**

Name of Bidder				
<b>Annual Turnover of the Contractor based on Certificates submitted to the Income Tax Department / CA</b>				
No. of year	Financial Year Ending March	Annual turnover (In Rs. Lakhs)	Multiplying factors for updating	Updated value (Rs. Lakhs)
V	2020		1.50	
IV	2021		1.40	
III	2022		1.30	
II	2023		1.20	
I	2024		1.10	
<b>Maximum Annual Turnover Value of A (Rs Lakhs)</b>				

**Note:-**

1. This is a Sample form for display only. Actual information should be filled in a separate Excel sheet of self-evaluation.
2. To be given separately by each partner in case of joint venture.

**SHEET 3: Completed similar type of work**  
**(only one Allowed)**

Name of Bidder:								
Sr. No.	Name of work	Agreement No	Ref. of work done certificate issued by Ex. Engr.		Value of Civil Engineering work done during the financial year. (Excluding the value of mobilization and mech. Adv.) (Rs. Lakhs)			
			Name of Division	Outward No. and Date	Completion Year (Ending March)	Value of Completed similar work	Multiplying factor	Updated value of completed work

**Note: - This is a sample form for display only. Actual information should be filled in a separate Excel Sheet of Self Evaluation**

**SHEET 4: General Experience, Maximum Quantities executed in a single year:****Separate form for separate Items**

(It will be repeat for various items)

Form Showing Maximum Quantities Executed in any single year of Item					
Name of Bidder:					
Item:				Unit:-	
Year of maximum Quantity					
Sr.No.	Name of work	Agreement No.	Ref. of work done certificate issued by Ex. Engr.		Quantity
			Name of Division	Outward No. and Date	
1					
2					
3					
4					
5					
6					
<b>Total</b>					

**Note:- This is a sample form for display only. Actual information should be filled in a separate Excel Sheet of Self Evaluation.**

**SHEET 5: Cost of works in hand: For value of B in the Bid capacity**

<b>Value of B in Bid Capacity</b>								
<b>Name of Bidder:</b>								
<b>Declaration of Contractor regarding the value of Existing Commitments and Work tendered (B) in the period stipulated for completion of work</b>								
Sr. No.	Name of work in hand	Agreement No.	Work Order Year ending March	Name of Division issuing Certificate		Balance cost of work (Rs. Lakhs)	Updated Value (B) work (Rs. Lakhs)	Updated Value (B) in this tender period (Rs. Lakhs)
				Name of Division	Ref. and Date of Certificate			
1								
2								
3								
4								
5								
6								
7								
<b>Total Value of B (Rs.in Lakhs) =</b>								

- Note: -**
- 1) This is a Sample form for display only. Actual information should be filled in a separate Excel sheet of self-evaluation
  - 2) To be given separately for each partner in case of joint venture
  - 3) The factor for updating the value of work in hand for Year 2024-25 should be 1.0

**SHEET 6: Result Sheet**

Name of work:- .....

.....

Sr. No.	Criteria	Unit	Requirement
1	<b>Annual Turnover (updated to current year)</b>	<b>Rs. Lakhs</b>	
2	<b>Bid Capacity = (AxNx2) -B</b>	<b>Rs. Lakhs</b>	
3	<b>Completed Similar Type of Work</b>	<b>Rs. Lakhs</b>	
4	<b>Quantities of Main Items Executed in any single year</b>		
	<b>Item No. 1</b>		
	<b>Item No. 2</b>		
	<b>Item No. 3</b>		

Note - This is a sample form for display only.

- (1) B-1 TENDER FORM**
- (2) SCHEDULE-A**
- (3) SCHEDULE-B**
- (4) WORK PROGRAMME**

## **B-1 TENDER FORM**

### **PERCENTAGE RATE TENDER & CONTRACT FOR WORKS**

**MAHARASHTRA KRISHNA VALLEY DEVELOPMENT CORPORATION, PUNE**

**REGION : Chief Engineer (SP), Water Resources Department, Pune-11.**

**CIRCLE : Superintending Engineer, Kukadi Irrigation Project Circle, Pune.**

**DIVISION : Executive Engineer, Kukadi Irrigation Division No.1, Narayangaon.**

#### **General Rules and Directions for the Guidance of Contractors**

1. All works proposed to be executed by contract shall be notified in the form of an invitation to tender pasted on a board hung up in the office of the Executive Engineer and signed by the Executive Engineer.

This form will state the work to be carried out as well as the date for submitting and opening tenders and the time allowed for carrying out the work, as the amount of the earnest money deposit (EMD) and additional performance security deposit (APSD) if required to be deposited with the tender, and the amount of the security deposit (SD) and Additional Performance Security Deposit APSD if required to be deposited by the successful bidder and the percentage if any, to be deducted from bills. Copies of the specifications, designs, and drawings, estimated rates, scheduled rates, and any other documents required in connection with the work shall be signed by the Executive Engineer for the purpose of identification and shall also be open for inspection by contractors at the office of the Executive Engineer, during office hours.

Where the works are proposed to be executed according to the specifications recommended by a contractor and approved by a competent authority on behalf of the corporation such specifications with designs and drawings shall form part of the accepted tender.

2. In the event of the tender being submitted by a firm, it must be signed by each partner thereof, and in the event of the absence of any partner, it shall be signed on his behalf by a person holding a power of attorney authorizing him to do so as mentioned in detailed tender notice.
  - i. The contractor shall pay along with the tender the sum as stipulated in Details of Tender as and by way of earnest money deposit.
  - ii. If, after submitting the tender, the contractor withdraws his offer or modifies the same or, if after the acceptance of his tender the contractor fails or neglects to furnish the APSD and balance of security deposit without prejudice to any other rights and powers of the Corporation hereunder or in law, Corporation shall be entitled to forfeit the full amount of the earnest money deposit and the additional performance security deposit deposited by him.

- iii. In the event of his tender not being accepted the amount of earnest money deposited by the contractor shall unless it is prior thereto forfeited under the provision of sub-clause (ii) above, be refunded to him on his passing receipt thereto.
- 3. Receipts for payments made on account of any work, when executed by a firm should also be signed by all the partners except where the contractors are described in their tender as firm, in which case the receipt shall be signed in the name of the firm by one of the partners or by some other person having authority to give effectual receipts of the firm.
- 4. Any person who submits a tender shall fill up an online form stating at what percentage above or below the rates specified in Schedule B (memorandum showing items of work to be carried out) he is willing to undertake the work. Only one percentage of all the items in Schedule B shall be named.
- 5. The officers indicated in the Detailed Tender Notice or his duly authorized assistant shall open tender online. The system will generate a comparative statement in a suitable form. In the event of tender being accepted, the contractor shall for the purpose of identification, sign copies of the tender Documents mentioned in Rule 1. In the event of tender being rejected the competent officer shall refund the amount of the earnest money deposited by the contractor, on his giving a receipt for the return of the EMD.
- 6. The officer competent to dispose of the tenders shall have the right to reject all or any of the tenders.
- 7. No receipt for any payment alleged to have been made by a contractor regarding any matter relating to this tender or the contract shall be valid and binding on the Corporation unless it is signed by the Executive Engineer.
- 8. No materials of any type required for the work shall be supplied by the Corporation. All the work shall be executed by the contractor with his own material(s). The memorandum of work to be tendered for shall be filled in and completed by the office of the Executive Engineer before the tender form is issued.
- 9. All work shall be measured net by standard measure and according to the rules and customs of the Corporation in units mentioned in schedule B and without reference to any local custom.
- 10. Under no circumstances shall any contractor be entitled to claim enhanced rates for items in this contract.
- 11. The measurements of work shall be recorded by Engineer of the Corporation as per the provisions in the MPW manual & MPW accounts code.
- 12. Any payment to the contractor will be done only in Indian Rupees (INR).
- 13. The contractor will have to construct shed for storing controlled and valuable materials at

work site, having double locking arrangement. The materials will be taken for use in the presence of the Corporation person. No materials will be allowed to be removed from the site of works without prior permission of Engineer-in-charge.

14. Successful bidder will have to produce to the satisfaction of the accepting authority a valid and current license issued in his favor under the provision of Contract Labour (Regulation and Abolition) Act, 1970 before starting work, failing which acceptance of the tender will be liable for withdrawal and earnest money will be forfeited to corporation.

**B-1 TENDER FORM****PERCENTAGE RATE TENDER & CONTRACT FOR WORKS**

1. I/We hereby tender for the execution for the -----  
----- Corporation (here-in-before and  
here-in-after referred to as Corporation) of the work  
specified in memorandum as enclosed within the time  
specified in such memorandum at \*.....%  
..... percent below/above the  
estimated rates entered in Schedule B (memorandum  
showing items of work to be carried out) and in  
accordance in all respects with the specifications, designs,  
drawings, and instructions in writing referred in Rule 1  
hereof.

\* In figure as well as in  
words.

2. I / We agree that the offer shall remain open for acceptance  
for a minimum period of \_\_\_\_ days from the date of  
submission of the Bid, the same shall remain valid  
thereafter until it is withdrawn by me/us by notice in  
writing duly addressed to the authority opening the tenders  
and sent by email and / or registered post AD or otherwise  
delivered at the office of such authority. Additional  
Performance Security Deposit in the form mentioned  
earlier as required in view of offer being lower than 1 %  
below the cost put to tender as stated will be delivered  
within 8 days of opening of Financial Bid (Envelope-2).  
The amount of earnest money shall not bear interest and

\* Amount to be specified  
in words and in  
figures.

shall be liable to be forfeited to the Corporation should I/We fail to (I) abide by the stipulation to keep the offer open for the period mentioned above or (2) sign and complete the contract Documents as required by the Engineer and furnish the security deposit and additional performance security deposit if any as specified in item (e) and (f) of the memorandum enclosed within the time limit laid down in clause (1) of conditions of Contract. The amount of earnest money may be adjusted towards the security deposit or refunded to me/us if so desired by me/us in writing, unless the same or any part thereof has been forfeited as aforesaid.

**MEMORANDUM**

1.	Name of the Work	Kukadi Irrigation Project, Dist Pune, Ahilyanagar Special Repairs to Kukadi Left Bank Canal k.m.1 to 60 under Maharashtra Irrigation Improvement Programme (MIIP).
2.	Cost put to tender	<b>Rs.8283.00 Lakhs.</b> (Tender fees are to be paid through E- payment gate way Net-Banking/NEFT)
3.	i) Earnest money (EMD)	<b>Rs.11.83 Lakhs</b> (Rs.Eleven Lakh Eighty Three Thousand only) E.M.D. amount to be paid through E- payment gate way Net-Banking/NEFT through tenders account only
	ii) Additional Performance Security Deposit APSD	As calculated in Section 4
3.	Total Security Deposit 2 %	<b>Rs.41.42 Lakhs</b>
	i) Initial 1 %	<b>Rs.82.83 Lakhs</b> In the form of DD/BG/FDR
	ii) Balance 1 % .	<b>Rs.82.83 Lakhs</b> Through R.A. bills (at the rate of 2 % of bill amount till the whole S.D. is recovered) (Total S.D. i+ii = <b>Rs.165.66 Lakhs</b> )
4.	Time of completion (from date of written work order)	<b>24 Calendar months</b> ( including monsoon )
5.	Defect liability period.	<b>60 months</b> From the date of issue of completion certificate by the Engineer in charge.

Signature of Contractor

Signature of Witness

Address \_\_\_\_\_

Address \_\_\_\_\_

Dated the \_\_\_\_\_ day of \_\_\_\_\_ 20 \_\_\_\_\_

The above tender is hereby accepted by me for and on behalf of the Corporation.

Dated the \_\_\_\_\_ day of \_\_\_\_\_ 20 \_\_\_\_\_

**Signature of the officer by whom accepted.**

Contractor

No. of Corrections

Executive Engineer

## **SCHEDULE-'A'**

**Name of work: -**

# Kukadi Irrigation Project, Dist Pune, Ahilyanagar

## Special Repairs to Kukadi Left Bank Canal k.m.1 to 60 under Maharashtra Irrigation Improvement Programme (MIIP).

Schedule showing (approximately) the material to be supplied from the departmental stores for work contracted to be executed and preliminary and ancillary works and the rates at which they are to be charged for

Sr.No.	Particulars	Quantity	Unit	Rates at which the materials will be charged to the contractor		Place of Delivery	Remarks
				In Words	In Figure		
				<b>NIL</b>			

**(B.P. Chawane)** Sub Divisional Engineer Kukadi Irrigation Division No.4, Wadegavhan  
**(Rajlaxmi Yeday)** Divisional Accountant, Kukadi Irrigation Division No.1, Narayangaon  
**(Prashant P. Kaduskar)** Executive Engineer Kukadi Irrigation Division No.1, Narayangaon

**(Er.Santosh M. Sangle)**  
**Superintending Engineer**  
Kukadi Irrigation Circle,  
Pune-11

**(Dr. H.T. Dhumal)**  
**Chief Engineer (S.P.)**  
Water Resources Department,  
Pune.

**SCHEDULE - 'B'****NAME OF WORK: -**

Kukadi Irrigation Project, Dist Pune, Ahilyanagar

Special Repairs to Kukadi Left Bank Canal k.m.1 to 60 under Maharashtra Irrigation Improvement Programme (MIIP).

**SCHEDULE OF QUANTITIES AND BID RATES FOR ITEMS AS ESTIMATED BY CORPORATION**

<b>Item of works</b>	<b>Estimated Quantity</b>	<b>Rate</b>		<b>Unit</b>	<b>Amount</b>
		<b>In fig.</b>	<b>In word</b>		
<b>Item No-1</b> Cleaning grass and removal of rubbish outside the periphery of the area including all leads and lifts as directed	97731.360	5.45	Rs. Five & Forty Five Paise Only	Sqm	532635.91
<b>Item No-2</b> Dismantling the old lime concrete / Stone masonry or cement concrete including stacking the material with all lead and lifts etc.complete as directed.	43585.000	307.25	Rs. Three Hundred Seven & Twenty Five Paise Only	Cum	13391491.25
<b>Item No-3</b> Excavation in soft strata for canal, seating of embankment, filter drains / catch water drains etc., and placing the excavated stuff neatly in dump area or for formation of service road / embankment including cost of all materials, machinery, labour, dressing bed and sides to required level and profile etc. Complete with all lead and lifts as directed.	84493.040	118.85	Rs. One Hundred Eighteen & Eighty Five Paise Only	Cum	10041997.80
<b>Item No-4</b> Providing casing embankment using selected pervious material from approved borrow areas (Government acquired land) in layers including cost of all materials, machinery,labour, all other operations such as collection of soil, spreading soil in layer of specified thickness, sorting out, breaking clods, levelling, sectioning edges / sides, watering, compacting each layer to density control of not less than 95 % of Proctor density using vibratory compactor including cost of water etc., complete with all lead and lifts as directed.	117139.960	229.20	Rs. Two Hundred Twenty Nine & Twenty Paise Only	Cum	26848478.83
<b>Item No-5</b> Providing and laying polythene film of 031 properly manufactured from 100% virgin granules confirming to I.S. 2508-1984 with 1.5 to 2.5 m. package in rolls etc. complete as directed.B) 200 microns with All lead and lifts	364760.200	69.50	Rs.Sixty Nine & Fifty Paise Only	Sqm	25350833.90

<b>Item No-6</b> Providing and fixing in position TMT - FE - 500 bar reinforcement of various diameters for R.C.C. pile caps, footings, foundations, slabs, beams columns, canopies, staircase, newels, chajjas, lintels pardis, copings, fins, arches etc. as per detailed designs, drawings and schedules. including cutting, bending, hooking the bars, binding with wires or tack welding and supporting as required complete with All lead and lifts as directed.	1433.892	88386.05	Rs. Eighty Eight Thousand Three Hundred Eighty Six & Five Paise Only	M.T.	126736050.01
<b>Item No-7</b> Providing and laying in situ cement concrete of grade M-15 of trap / granite / gneiss / quartzite / graded metal for foundation and bedding with Batching Plant and Transit Mixer including placing, compacting, curing etc. complete with All lead and lifts as directed.(b) M-15 (40 MSA) (Cement 5.20 bags/Cum) including Dewatering	934.975	6502.60	Rs. Six Thousand Five Hundred Two and Sixty Paise Only	Cum	6079768.44
<b>Item No- 8 (A)</b> Providing and laying in situ M-15 (20 MSA)(28 days cube compressive strength not less than 15N/sqmm) grade cement concrete with clean, hard, graded aggregates for canal lining for side and bed including cost of all materials, machinery, labour, cleaning with batching plant and transit mixer placing in position, finishing with all slope of canal including centering, scaffolding, formwork, compaction, curing, by cutting grooves, filling with sealing compound and providing porous plugs preparation of sub grade etc. complete with all lead and lifts etc. complete as directed. For Bed Lining (Cement 5.64 bags/Cum)	25054.345	7359.85	Rs. Seven Thousand Three Hundred Fifty Nine & Eighty Five Paise Only	Cum	184396221.05
<b>Item No:8 (B)</b> Providing and laying in situ M-15 (20 MSA)(28 days cube compressive strength not less than 15N/sqmm) grade cement concrete with clean, hard, graded aggregates for canal lining for side and bed including cost of all materials, machinery, labour, cleaning with batching plant and transit mixer placing in position, finishing with all slope of canal including centering, scaffolding, formwork, compaction, curing, by cutting grooves, filling with sealing compound and providing porous plugs preparation of sub grade etc. complete with all lead and lifts etc. complete as directed. For Side Lining (Cement 5.64 bags/Cum)	31313.704	7641.25	Rs. Seven Thousand Six Hundred Forty One & Twenty Five Paise Only	Cum	239275840.69

<b>Item No-9</b> Providing and laying in situ cement concrete of grade M 20 of trap / granite / gneiss / quartzite /graded metal for RCC works of gallery, sluice, spillway crest, spillway down stream face, energy dissipating structures, intake structures, training walls, piers, abutments, slab etc. with Batching Plant and Transit mixer including centering, shuttering ,scaffolding, compacting, curing etc. complete with all lifts etc. complete as directed. (A) For Side Lining (Cement 5.64 bags/Cum) with All lead and lifts as Directed	5240.677	7761.25	Rs. Seven Thousand Seven Hundred Sixty One & Twenty Five Paise Only	Cum	40674204.37
<b>Item No-10</b> Providing and applying wet shotcrete (M-25 : 10MSA) 50 mm thick in two layers including admixtures, neccessary machinery , labours ,scaffolding, lighting, drainage, ventilation with providing and all other ancillary operations etc. complete with All lead and lifts as directed	42341.850	610.15	Rs. Six Hundred Ten & Fifteen Paise Only	Sqm	25834879.78
<b>Item No-11</b> Providing and laying in situ cement concrete of grade M-20 of trap / granite / gneiss / quartzite / graded metal for RCC works of abutment, wing walls, returns, transition walls, piers, columns, beams and slabs, diaphragm walls, road slabs trough (Box Culvert) trough for aqueduct, wearing coat, etc. . with Batching Plant and Transit mixer including centering, shuttering, scaffolding, placing, compacting, curing etc. complete with all lifts as directed.(a) M-20 (20 MSA) (Cement 6.60 bags/Cum.viii) Wearing Coat and other required concrete with All lead and lifts as directed	184.810	6767.25	Rs. Six Thousand Seven Hundred Sixty Seven & Twenty Five Paise Only	Cum	1250655.47
<b>Item No-12</b> Sliding Type : Manufacturing with QAP & fabrication of sliding Type . Gate with hoisting arrangement including Manufacturing with QAP, fabrication, erection, commisioning & testing as per standard drawing / aooroved drawings & specifications with relevant IS codes mentioned in drawing. All materials used shall confirmed to related IS Codes, It includes all materials, labour charges, machining and machinery charges, with all leads & lifts etc. complete as per drawings and instructions of Engineer - in -charge.					
A) Sliding Type 0.6 x 0.6 Gate	20.00	68247.15	Rs. Sixty Eight Thousand Two Hundred Forty Seven & Fifteen Paise Only	No	1364943.00

B) Sliding Type 0.45 x 0.45 Gate	13.00	55533.30	Rs. Five Lakh Fifty Five Thousand Five Hundred Thirty Three & Thirty Paise only	No	721932.90
C) Sliding Type 0.3 x 0.3 Gate	8.00	51118.55	Rs. Fifty One Thousand One Hundred Eighteen & Fifty Five Paise Only	No	408948.40
D) Sliding Type 1.2 x 1.8 Gate	4.00	401424.50	Rs. Four Lakh One Thousand Four Hundred Twenty Four & Fifty Only	No	1605698.00
<b>Item No-13</b> Providing railing of mild steel angle post 2.0m center to center of section 75mm x 75mm x 10mm or equivalent I/C section of height 1.05 above bridge surface with minimum anchor length of 30cm including hold fast of 25mm diameter MS bar welded at the bottom and concreting of 1:3:6 of size 30cm x 30cm x 30cm with three rows of 40mm B class GI pipe provided at 30cm on center to center including scaffolding and one coat of anticorrosive paint with two coats of oil painting, curing of concrete etc. complete. with All lead and lifts as directed	2610.270	3678.50	Rs. Three Thousand Six Hundred Seventy Eight & Fifty Paise Only	Rmt	9601878.20
<b>Item No-14</b> Providing, erecting and laying steel shuttering formwork and making surface suitable for concreting including dismantling etc. complete as directed.(a) for abutments, piers, wings, returns etc.complete with All lead and lifts as directed	4095.080	540.55	Rs. Five Hundred Forty & Fifty Five Paise Only	Sqm	2213595.49
<b>Item No-15</b> Providing and laying 40 and 45 cm. thick UCR masonry in C.M. 1:5 for side lining of the canal including raking joints, centering, scaffolding and curing etc. complete excluding pointing with all lifts as directed (35% mortar) (Cement 2.00 bags/Cum with All lead and lifts as directed	954.350	4068.05	Rs. Four Thousand Sixty Eight & Five Paise Only	Cum	3882343.52

<b>Item No.16</b> Supplying, laying and joining Bituminous Geomembrane as hydraulic line over canal having average thickness of 4mm (minimum thickness 3.6mm), minimum width of 5m, minimum tensile strength of 18kN/m and minimum permissible elongation of 30% including 200mm overlap, excavating trench of size 500mm x 500mm, steel anchorage of 12mm dia MS bar 1.5m long of approved shape at 0.75mc/c. Bituminous Geomembrane Lining which shall be laid on the properly prepared subgrade including wastage, import duties & custom clearance charges, transportation, supplyatsite, Loading/unloading, labour charges and testing which shall confirm to ASTM/I.S. standard sand excluding dismantling of concrete, earthwork preparation, dewatering, GST etc complete with All lead and lifts as directed.	38491.011	1496.45	Rs. One Thousand Four Hundred Ninety Six and Forty Five Paise Only	Sqm	57599873.41
<b>Work Portion Total Rs.</b>					<b>777812270.42</b>
<b>Item No.17</b> Royalty charges of construction materials.	197569.248	216.18	Rs. Two Hundred Sixteen & Ps. Eighteen Only	Cum.	42710520.03
<b>Item No.18</b> Carrying out necessary Insurance policy for entire work for entire period.		.	---		7778122.70
					<b>Total Rs. = 828300913.16</b>
					<b>Say Rs. = 828300913.00</b>
<b>Rs. Eighty Two Crore Eighty Three Lakhs Nine Hundred &amp; Thirteen Only.</b>					

**(B.P. Chawane)**  
Sub Divisional Engineer  
Kukadi Irrigation Division No.4,  
Wadegavhan

**(Rajlaxmi Yedav)**  
Divisional Accountant,  
Kukadi Irrigation Division No.1,  
Narayangaon

**(Prashant P. Kaduskar)**  
Executive Engineer  
Kukadi Irrigation Division No.1,  
Narayangaon

**(Er.Santosh M. Sangle)**  
Superintending Engineer  
Kukadi Irrigation Circle,  
Pune-11

**(Dr. H.T. Dhumal)**  
Chief Engineer (S.P.)  
Water Resources Department,  
Pune.

# **WORK PROGRAMME**

## MONTHWISE WORK PROGRAMME

Sr. No.	Item	Unit	Total	M-1	M-2	M-3	M-4	M-5	M-6
			Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity
1	Item 1	Sqm	97731.360	16288.56	16288.56	16288.56	16288.56	16288.56	16288.56
2	Item 2	Cum	43585.000	3632.08	3632.08	3632.08	3632.08	3632.08	3632.08
3	Item 3	Cum	84493.040	7041.09	7041.09	7041.09	7041.09	7041.09	7041.09
4	Item 4	Cum	117139.960		6890.59	6890.59	6890.59	6890.59	6890.59
5	Item 5	Sqm	364760.200		15859.14	15859.14	15859.14	15859.14	15859.14
6	Item No.6	M.T.	1433.892		62.34	62.34	62.34	62.34	62.34
7	Item No.7	Cum	934.975		155.83	155.83	155.83	155.83	155.83
8	Item No.8 A)Bed	Cum	25054.345		1089.32	1089.32	1089.32	1089.32	1089.32
	B)Side	Cum	31313.704		1361.47	1361.47	1361.47	1361.47	1361.47
9	Item No.9	Cum	5240.677		227.86	227.86	227.86	227.86	227.86
10	Item No.10	Sqm	42341.850		1840.95	1840.95	1840.95	1840.95	1840.95
11	Item No.11	Cum	184.810						61.60
12	Item No.12								
	A)	No	20.00	1.00	1.00	1.00	1.00	1.00	1.00
	B)	No	13.00	1.00	1.00	1.00	1.00	1.00	1.00
	C)	No	8.00	1.00	1.00	1.00	1.00	1.00	1.00
	D	No	4.00				1.00	1.00	1.00
13	Item No.13	Rmt	2610.270		113.49	113.49	113.49	113.49	113.49
14	Item No.14	Sqm	4095.080		455.01	455.01	455.01	455.01	455.01
15	Item No. 15	Cum	954.350		106.04	106.04	106.04	106.04	106.04
16	Item No. 16	Sqm	38491.011		1673.52	1673.52	1673.52	1673.52	1673.52

Sr. No.	Item	Unit	Total	M-7	M-8	M-9	M-10	M-11	M-12
			Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity
1	Item 1	Sqm	97731.360						
2	Item 2	Cum	43585.000	3632.08	3632.08	3632.08	3632.08	3632.08	3632.08
3	Item 3	Cum	84493.040	7041.09	7041.09	7041.09	7041.09	7041.09	7041.09
4	Item 4	Cum	117139.960	6890.59	6890.59	6890.59	6890.59	6890.59	6890.59
5	Item 5	Sqm	364760.200	15859.14	15859.14	15859.14	15859.14	15859.14	15859.14
6	Item No.6	M.T.	1433.892	62.34	62.34	62.34	62.34	62.34	62.34
7	Item No.7	Cum	934.975	155.83					
8	Item No.8 A)Bed	Cum	25054.345	1089.32	1089.32	1089.32	1089.32	1089.32	1089.32
	B)Side	Cum	31313.704	1361.47	1361.47	1361.47	1361.47	1361.47	1361.47
9	Item No.9	Cum	5240.677	227.86	227.86	227.86	227.86	227.86	227.86
10	Item No.10	Sqm	42341.850	1840.95	1840.95	1840.95	1840.95	1840.95	1840.95
11	Item No.11	Cum	184.810	61.60	61.60				
12	Item No.12								
	A)	No	20.00	1.00	1.00	1.00	1.00	1.00	1.00
	B)	No	13.00	1.00	1.00	1.00	1.00	1.00	1.00
	C)	No	8.00	1.00	1.00				
	D	No	4.00	1.00					
13	Item No.13	Rmt	2610.270	113.49	113.49	113.49	113.49	113.49	113.49
14	Item No.14	Sqm	4095.080	455.01	455.01	455.01	455.01		
15	Item No. 15	Cum	954.350	106.04	106.04	106.04	106.04		
16	Item No. 16	Sqm	38491.011	1673.52	1673.52	1673.52	1673.52	1673.52	1673.52

Sr. No.	Item	Unit	Total	M-13	M-14	M-15	M-16	M-17	M-18
			Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity
1	Item 1	Sqm	97731.360						
2	Item 2	Cum	43585.000						
3	Item 3	Cum	84493.040						
4	Item 4	Cum	117139.960	6890.59	6890.59	6890.59	6890.59	6890.59	6890.59
5	Item 5	Sqm	364760.200	15859.14	15859.14	15859.14	15859.14	15859.14	15859.14
6	Item No.6	M.T.	1433.892	62.34	62.34	62.34	62.34	62.34	62.34
7	Item No.7	Cum	934.975						
8	Item No.8 A)Bed	Cum	25054.345	1089.32	1089.32	1089.32	1089.32	1089.32	1089.32
	B)Side	Cum	31313.704	1361.47	1361.47	1361.47	1361.47	1361.47	1361.47
9	Item No.9	Cum	5240.677	227.86	227.86	227.86	227.86	227.86	227.86
10	Item No.10	Sqm	42341.850	1840.95	1840.95	1840.95	1840.95	1840.95	1840.95
11	Item No.11	Cum	184.810						
12	Item No.12								
	A)	No	20.00	1.00	1.00	1.00	1.00	1.00	1.00
	B)	No	13.00	1.00					
	C)	No	8.00						
	D	No	4.00						
13	Item No.13	Rmt	2610.270	113.49	113.49	113.49	113.49	113.49	113.49
14	Item No.14	Sqm	4095.080						
15	Item No. 15	Cum	954.350						
16	Item No. 16	Sqm	38491.011	1673.52	1673.52	1673.52	1673.52	1673.52	1673.52

Sr. No.	Item	Unit	Total	M-19	M-20	M-21	M-22	M-23	M-24
			Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity
1	Item 1	Sqm	97731.360						
2	Item 2	Cum	43585.000						
3	Item 3	Cum	84493.040						
4	Item 4	Cum	117139.960						
5	Item 5	Sqm	364760.200	15859.14	15859.14	15859.14	15859.14	15859.14	15859.14
6	Item No.6	M.T.	1433.892	62.34	62.34	62.34	62.34	62.34	62.34
7	Item No.7	Cum	934.975						
8	Item No.8 A)Bed	Cum	25054.345	1089.32	1089.32	1089.32	1089.32	1089.32	1089.32
	B)Side	Cum	31313.704	1361.47	1361.47	1361.47	1361.47	1361.47	1361.47
9	Item No.9	Cum	5240.677	227.86	227.86	227.86	227.86	227.86	227.86
10	Item No.10	Sqm	42341.850	1840.95	1840.95	1840.95	1840.95	1840.95	1840.95
11	Item No.11	Cum	184.810						
12	Item No.12								
	A)	No	20.00	1.00	1.00				
	B)	No	13.00						
	C)	No	8.00						
	D	No	4.00						
13	Item No.13	Rmt	2610.270	113.49	113.49	113.49	113.49	113.49	113.49
14	Item No.14	Sqm	4095.080						
15	Item No. 15	Cum	954.350						
16	Item No. 16	Sqm	38491.011	1673.52	1673.52	1673.52	1673.52	1673.52	1673.52

1. Quantity wise physical and financial monthly programme for the principal items costing 80% of the work cost shall be given and for the balance items costing 20% of the work cost financial work programme be given.
2. For financial programme amount may be shown in Rs. lakhs up to two decimals only.
3. The contractor shall submit his work requirement of funds within 15 days of signing of contract.
4. The contractor shall submit his requirement of detailed construction drawings along with the dates on which these are required by him within 15 days of signing of contract.
5. Work Programme attached separately.

**SCHEDULE SHOWING ITEMS OF WORK AND APPLICABLE  
SPECIFICATIONS**

Item of Brief	Applicable Specification
<b>Item No-1</b> Cleaning grass and removal of rubbish outside the periphery of the area including all leads and lifts as directed	As directed by Engineer in charge, Section 1
<b>Item No-2</b> Dismantling the old lime concrete / Stone masonry or cement concrete including stacking the material with all lead and lifts etc. complete as directed.	As directed by Engineer in charge, Section 1, 7
<b>Item No-3</b> Excavation in soft strata for canal, seating of embankment, filter drains / catch water drains etc., and placing the excavated stuff neatly in dump area or for formation of service road / embankment including cost of all materials, machinery, labour, dressing bed and sides to required level and profile etc. Complete with all lead and lifts as directed.	As directed by Engineer in charge, Section 1, 2
<b>Item No-4</b> Providing casing embankment using selected pervious material from approved borrow areas (Government acquired land) in layers including cost of all materials, machinery, labour, all other operations such as collection of soil, spreading soil in layer of specified thickness, sorting out, breaking clods, levelling, sectioning edges / sides, watering, compacting each layer to density control of not less than 95 % of Proctor density using vibratory compactor including cost of water etc., complete with all lead and lifts as directed.	As directed by Engineer in charge, Section 1, 3
<b>Item No-5</b> Providing and laying polythene film of 031 properly manufactured from 100% virgin granules confirming to I.S. 2508-1984 with 1.5 to 2.5 m. package in rolls etc. complete as directed.B) 200 microns with All lead and lifts	As directed by Engineer in charge, Section 1, 6
<b>Item No-6</b> Providing and fixing in position TMT - FE - 500 bar reinforcement of various diameters for R.C.C. pile caps, footings, foundations, slabs, beams columns, canopies, staircase, newels, chajjas, lintels pardis, copings, fins, arches etc. as per detailed designs, drawings and schedules. including cutting, bending, hooking the bars, binding with wires or tack welding and supporting as required complete with All lead and lifts as directed.	As directed by Engineer in charge, Section 1, 5
<b>Item No-7</b> Providing and laying in situ cement concrete of grade M-15 of trap / granite / gneiss / quartzite / graded metal for foundation and bedding with Batching Plant and Transit Mixer including placing, compacting, curing etc. complete with with All lead and lifts as directed.(b) M-15 (40 MSA) (Cement 5.20 bags/Cum) including Dewatering	As directed by Engineer in charge, Section 1, 4
<b>Item No- 8 (A)</b> Providing and laying in situ M-15 (20 MSA)(28 days cube compressive strength not less than 15N/sqmm) grade cement concrete with clean, hard, graded aggregates for canal lining for side and bed including cost of all materials, machinery, labour, cleaning with batching plant and transit mixer placing in position, finishing with all slope of canal including centering, scaffolding, formwork, compaction, curing, by cutting grooves, filling with sealing compound and providing porous plugs preparation of sub grade etc. complete with all lead and lifts etc. complete as directed. For Bed Lining (Cement 5.64 bags/Cum)	As directed by Engineer in charge, Section 1, 8
<b>Item No:8 (B)</b> Providing and laying in situ M-15 (20 MSA)(28 days cube compressive strength not less than 15N/sqmm) grade cement concrete with clean, hard, graded aggregates for canal lining for side and bed including cost of all materials, machinery, labour, cleaning with batching plant and transit mixer placing in position, finishing with all slope of canal including centering, scaffolding, formwork, compaction, curing, by cutting grooves, filling with sealing compound and providing porous plugs preparation of sub grade etc. complete with all lead and lifts etc. complete as directed. For Side Lining (Cement 5.64 bags/Cum)	As directed by Engineer in charge, Section 1, 9

<b>Item No-9</b> Providing and laying in situ cement concrete of grade M 20 of trap / granite / gneiss / quartzite /graded metal for RCC works of gallery, sluice, spillway crest, spillway down stream face, energy dissipating structures, intake structures, training walls, piers, abutments, slab etc. with Batching Plant and Transit mixer including centering, shuttering ,scaffolding, compacting, curing etc. complete with all lifts etc. complete as directed. (A) For Side Lining (Cement 5.64 bags/Cum) with All lead and lifts as Directed	As directed by Engineer in charge, Section 1, 4
<b>Item No-10</b> Providing and applying wet shotcrete (M-25 : 10MSA) 50 mm thick in two layers including admixtures, necessary machinery , labours ,scaffolding, lighting, drainage, ventilation with providing and all other ancillary operations etc. complete with All lead and lifts as directed	As directed by Engineer in charge, Section 1, 10
<b>Item No-11</b> Providing and laying in situ cement concrete of grade M-20 of trap / granite / gneiss / quartzite / graded metal for RCC works of abutment, wing walls, returns, transition walls, piers, columns, beams and slabs, diaphragm walls, road slabs trough (Box Culvert) trough for aqueduct, wearing coat, etc. . with Batching Plant and Transit mixer including centering, shuttering, scaffolding, placing, compacting, curing etc. complete with all lifts as directed.(a) M-20 (20 MSA) (Cement 6.60 bags/Cum.viii) Wearing Coat and other required concrete with All lead and lifts as directed	As directed by Engineer in charge, Section 1, 4
<b>Item No-12</b> Sliding Type : Manufacturing with QAP & fabrication of sliding Type . Gate with hoisting arrangement including Manufacturing with QAP, fabrication, erection, commissioning & testing as per standard drawing / aooroved drawings & specifications with relevant IS codes mentioned in drawing. All materials used shall confirmed to related IS Codes, It includes all materials, labour charges, machining and machinery charges, with all leads & lifts etc. complete as per drawings and instructions of Engineer - in -charge.	As directed by Engineer in charge, Section 1,
A) Sliding Type 0.6 x 0.6 Gate	As directed by Engineer in charge, Section 1
B) Sliding Type 0.45 x 0.45 Gate	As directed by Engineer in charge, Section 1
C) Sliding Type 0.3 x 0.3 Gate	As directed by Engineer in charge, Section 1
D) Sliding Type 1.2 x 1.8 Gate	As directed by Engineer in charge, Section 1
<b>Item No-13</b> Providing railing of mild steel angle post 2.0m center to center of section 75mm x 75mm x 10mm or equivalent I/C section of height 1.05 above bridge surface with minimum anchor length of 30cm including hold fast of 25mm diameter MS bar welded at the bottom and concreting of 1:3:6 of size 30cm x 30cm x 30cm with three rows of 40mm B class GI pipe provided at 30cm on center to center including scaffolding and one coat of anticorrosive paint with two coats of oil painting, curing of concrete etc. complete. with All lead and lifts as directed	As directed by Engineer in charge, Section 1, 5
<b>Item No-14</b> Providing, erecting and laying steel shuttering formwork and making surface suitable for concreting including dismantling etc. complete as directed.(a) for abutments, piers, wings, returns etc.complete with All lead and lifts as directed	As directed by Engineer in charge, Section 1, 4, 5
<b>Item No-15</b> Providing and laying 40 and 45 cm. thick UCR masonry in C.M. 1:5 for side lining of the canal including raking joints, centering, scaffolding and curing etc. complete excluding pointing with all lifts as directed (35% mortar) (Cement 2.00 bags/Cum with All lead and lifts as directed	As directed by Engineer in charge, Section 1, 11
<b>Item No.16</b> Supplying, laying and joining Bituminous Geomembrane as hydraulic line over canal having average thickness of 4mm (minimum thickness 3.6mm), minimum width of 5m, minimum tensile strength of 18kN/m and minimum permissible elongation of 30% including 200mm overlap, excavating trench of size 500mm x 500mm, steel anchorage of 12mm dia MS bar 1.5m long of approved shape at 0.75mc/c. Bituminous Geomembrane Lining which shall be laid on the properly prepared subgrade	As directed by Engineer in charge, Section 1, 12

including wastage, import duties & custom clearance charges, transportation, supplyatsite, Loading/unloading, labour charges and testing which shall confirm to ASTM/I.S. standard sand excluding dismantling of concrete, earthwork preparation, dewatering, GST etc complete with All lead and lifts as directed.	
<b>Item No.15</b> Royalty charges of construction materials.	As directed by Engineer in charge, Section 1
<b>Item No.16</b> Carrying out necessary Insurance policy for entire work for entire period.	As directed by Engineer in charge, Section 1

**SECTION- 14**  
**CONDITIONS OF**  
**CONTRACT**

## CONDITIONS OF CONTRACT

### **CLAUSE 1 –**

#### **(A) Security Deposit: -**

*(A) Security  
Deposit*

The person/persons whose Tender may be accepted (hereinafter called the contractor, which expression shall unless excluded by or repugnant to the context include his heirs, executors, administrators, and assigns) shall (A) within 10 days (which may be extended by the Superintending Engineer concerned up to 15 days if the Superintending Engineer thinks fit to do so) of the receipt by him of the Notification of the acceptance of his tender, deposit with the Executive Engineer in the form of Demand Draft or Irrevocable Bank Guarantee or FDR only of Nationalized / Scheduled Bank of the branch in the State of Maharashtra endorsed in favour of the Executive Engineer a sum sufficient which will make up the initial security deposit at 1 % of the cost put to tender. The remaining 1% will be recovered while making any payment to the contractor for work done under contract to make up the full amount of Security Deposit at the rate of 2 % from every such payment as last aforesaid until the full amount of Security Deposit is made up. All compensation or other sums of money payable by the contractor to the Corporation under the terms of his contract may be deducted from or paid by the sale of sufficient part of his security deposit or from the interest arising therefrom, or from any sums which may be due or may become due by Corporation to the contractor under any other contract or transaction of any nature on any account whatsoever, and in the event of his security deposit being reduced because of any such deduction or sale as aforesaid, the contractor shall, within ten days thereafter, make good in Demand Draft or FDR or BG as aforesaid any sum or sums which may have been deducted from or raised by sale of his security deposit or any part thereof.

The 50 % amount of the security deposit of the contractor shall be refunded within one month from the date of completion of work and 50 % will be refunded after D.L.P.

#### **(B) Additional Performance Security Deposit:**

*(B)  
Additional  
Performance  
Security  
Deposit*

In case contractor's offer is less than 99% of the cost put to tender and he is Lowest (L1) then the Additional Performance Security Deposit in the form of DD/BG/FDR for a period equal to the period of the contract, the amount mentioned in Section 4 shall be submitted to the Engineer-in-charge within 8 days

after opening of Financial Bid. Non-submission of the above APSD will result in forfeiture of the E.M.D. and his tender will be rejected.

The 50 % amount of the additional performance security deposit of the contractor shall be refunded within one month from the date of completion of work and 50 % will be refunded after DLP.

DD/BG should be in the name of the Executive Engineer.

FDR should be in the joint name of the Executive Engineer and Contractor.

DD/BG/FDR should be of a Nationalized or Scheduled Bank and from a Branch in Maharashtra State only.

**(C) Security deposit on account of additional work as per provision of clause 14 and extra items: -**

During execution of work if the amount of work is increased then an additional security deposit will be deducted from the bills as provided in the memorandum at 4 (ii) on this additional work

**CLAUSE 2 –**

*Compensation  
for delay*

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 order to commence work is given to the contractor. The work shall throughout the stipulated period of the contract be proceeded with, with all due diligence (time being deemed to be the essence of the contract on the part of the contractor) and the contractor shall pay as compensation an amount equal to one per cent or such smaller amount as the Superintending Engineer (whose decision in writing shall be final) may decide of the amount of the cost put to tender of the whole work as shown by the contractor for every day that the work remains uncommenced or unfinished after the proper dates. Further to ensure good progress during the execution of the work, the contractor shall be bound, in all cases in which the time allowed for any work exceeds one month to complete.

The programme for the completion of work is attached herewith. The contractor is supposed to carry out the work and keep the progress as per programme attached herewith. The contractor should complete the work as per the phase period given in Month month-wise programme.

Full work to be completed in the period mentioned in section 4 including monsoon.

In the event of the contractor failing to comply with these conditions he shall be liable to pay as compensation an amount equal to one percent or such smaller

amount as the Superintending Engineer (whose decision in writing shall be final) may decide of the said estimated cost of the whole work for every day that the due quantity of work remains incomplete provided always that the total amount of compensation to be paid under the provisions of this clause shall not exceed 10 percent of the estimated cost of the work as shown in the tender. The Superintending Engineer should be the final authority in this respect, irrespective of the fact that the tender is accepted by the Chief Engineer / Superintending Engineer / Executive Engineer or Assistant Executive Engineer / Deputy Engineer.

### **CLAUSE 3 –**

*Action when  
whole of  
security  
deposit is  
forfeited*

In any case in which under any clause of this contract the contractor shall have rendered himself liable to pay compensation amounting to the whole of the security deposit whether paid in one sum or deducted by installments or in the case of abandonment of the work owing to serious illness or death of the contractor or any other cause the Executive Engineer, on behalf of the Governor of Maharashtra, shall have power to adopt any of the following courses, as he may deem best suited to the interest of Government.

To rescind the contract (for which rescission notice in writing to the contractor under the head of Executive Engineer shall be conclusive evidence) and in that case, the security deposit of the contractor shall stand forfeited and be absolutely at the disposal of the Government.

A) To rescind the contract (for which rescission notice in writing to the contractor under the letter head of Executive Engineer shall be conclusive evidence) and in that case all the Security Deposit/Additional Performance Security Deposit of the contractor shall stand forfeited and be absolutely at the disposal of Corporation

B) To carry out the work or any part of the work departmentally debiting the contractor with the cost of the work, expenditure incurred on tools and plant, and charges on additional supervisory staff including the cost of work charged establishment employed for getting the un-executed part of the work completed and crediting him with the value of the work done departmentally in all respects in the same manner and at the same rates as if it had been carried out by the contractor under the terms of his Contract. The Certificate of the Executive Engineer as to the costs and other allied expenses so incurred and as to the value of the work so done departmentally shall be final and conclusive against the contractor.

C) To order that the work of the contractor be measured up and to take such part

thereof as shall be unexecuted out of his hands, and to give it to another contractor to complete, in which case all expenses incurred on advertisement for fixing a new contracting agency, additional supervisory staff including the cost of work charged establishment and the cost of the work executed by the new contract agency will be debited to the contractor and the value of the work done or executed through the new contractor shall be credited to the contractor in all respects and in the same manner and at the same rates as if it had been carried out by the contractor under the terms of his contract. The certificate of the Executive Engineer as to all the cost of the work and other expenses incurred as aforesaid for or in getting the unexecuted work done by the new contractor and as to the value of the work so done shall be final and conclusive against the contractor.

In case the contract shall be rescinded under clause (a) above, the\ contractor shall not be entitled to recover or be paid, any sum for any work therefore actually performed by him under this contract unless and until the Executive Engineer shall have certified in writing the performance of the such work and the amount payable to him in respect thereof and he shall only be entitled to be paid the amount so certified. In the event of either of the courses referred to in clause (b) or (c) being adopted and the cost of the work executed departmentally or through a new contractor and other allied expenses exceeding the. value of such work credited to the contractors the amount of excess shall be deducted from any money due to the contractor, by Government under the contract or otherwise howsoever or from his security deposit or the sale proceeds thereof provided, however, that contractor shall have no claim against Government even if the certified value of the work done departmentally or through a new contractor exceeds the certified cost of such work and allied expenses, provided always that whichever of the three courses mentioned in clause (a), (b) or (c) being adopted and the cost of the work executed exceeding the value of such work credited to the contractors the amount by Government under the. contract or otherwise howsoever or from his security deposit or the sale proceeds thereof provided, however, that contractor shall have no claim against Government even if the certified value of the work done departmentally or through a new contractor exceeds the certified cost of such work and allied expenses, provided always that whichever of the three courses mentioned in clause (a), (b) or (c) is 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 advance on account of or with a view to the execution of the work or the performance of the contract.

**CLAUSE 4-**

*Action when  
the progress  
of any  
particular  
portion of the  
work is  
unsatisfactory*

If the progress of any particular portion of the work is unsatisfactory, the Executive Engineer shall Notwithstanding that the general progress of the work is per the conditions mentioned in clause 2, be entitled to take action after giving the contractor 10 days' Notice in writing.

The Engineer-in-charge will have to order that the work of the contractor be measured up and to take such part thereof as shall be unexecuted out of his hands, and to give it to another contractor to complete, in that case, all expenses incurred to advertisements for fixing a new contracting agency, additional supervisory staff including the cost of work charged establishment and the cost of the work executed by the new contract agency will be debited to the contractor and the value of the work done or executed through the new contractor (including escalation due) shall be credited to the contractor in all respects and the same manner and at the same rates as if it had been carried out by the contractor under the terms of his contract. The certificate of the Executive Engineer as to all the cost of the work and other expenses incurred as aforesaid for or in getting the unexecuted work done by the new contractor and as to the value of the work so done shall be final and conclusive against the contractor.

In case the cost of the work executed through a new contractor and other allied expenses exceed the value of such work credited to the contractors, the amount of excess shall be deducted from any money due to the contractor by Government or Corporation under the contract or otherwise howsoever or from his security deposit and Additional performance security deposit or the sale proceeds thereof provided, however, that the contractor shall have no claim against Corporation even if the certified value of the work done through a new contractor exceeds the certified cost of such work and allied expenses. The contractor shall have no claims to compensation for any loss sustained by him because of his having purchased or procured any materials, 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 because 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 The contractor of the whole work shall Not be

considered eligible to tender for the execution of work so withdrawn from this contract. The contractor will have no claim for compensation, for any loss sustained by him owing to such action.

### **CLAUSE 5 –**

*Contractor remains liable to pay compensation if action Not taken under clauses 3 and 4.*  
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*Power to take possession of or require removal of or sale contractor's plant*

In any case in which any of the powers conferred upon the Executive Engineer by clauses 3 and 4 hereof shall have become exercisable and the same shall not have been exercised the non-exercise thereof shall not constitute a waiving of any of the conditions hereof and such powers shall notwithstanding be exercisable in the event of any future case of default by the contractor for which under any clauses hereof he is declared liable to pay compensation amounting to the whole of his security deposit and additional performance security deposit and the liability of the contractor for past and future compensation shall remain unaffected.

In the event of the Executive Engineer taking action under clause - 3, he may, if he so desires, take possession of all / any tools, plant, materials, and stores in or upon the work or the site thereof or belonging to the contractor or procured by him and intended to be used for the execution of the work or any part thereof paying or allowing for the same in account at the contract rates or in the case of contract, rates not being applicable at current market rates to be certified by the Executive Engineer whose certificate thereof shall be final. In the alternative the Executive Engineer may, after giving Notice in writing to the contractor or his clerk of the work foreman or other authorized agent require him to remove such tools, plant, materials, or stores from the premises within a time to be specified in such notice and in the event of the contractor failing to comply with any such requisition, the Executive Engineer may remove them at the contractor's expense or sale 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 any such removal and the amount of the proceeds and expense of any such sale shall be final and conclusive against the contractor.

**CLAUSE 6 –**

*Extension of  
time*

If the Contractor shall desire an extension of the time for completion of the work on the ground of his having been unavoidably hindered in its execution or on any other ground he shall apply in writing to the Executive Engineer before the expiration of the period stipulated in tender or before the expiration of 30 days from the date on which he was hindered as aforesaid or on which the cause for asking for extension occurred, whichever is earlier and the Executive Engineer may, with prior approval of the officer accepting the tender, if in his opinion, there are reasonable grounds for granting an extension, grant such extension as he thinks necessary or proper. The decision of the Authority accepting the tender in this matter shall be final.

**CLAUSE 7 –**

*Completion  
Certificate*

On completion of work contractor will write a letter to Executive Engineer, Executive Engineer will issue a letter of completion within 30 days after receiving a letter from the contractor; but no such certificate shall be given nor shall the work be considered to be complete until the contractor shall have removed from the premises on which the work shall have been executed all scaffolding, surplus materials, and rubbish, and shall have cleaned off the dirt from all woodwork, doors, windows, walls, floor or other parts of any building in or upon which the work, has been executed or of which he may have had possession for executing the work or until the work have been measured by the Engineer-in-charge or where the measurement have been taken by his subordinates until they have received approval of the Engineer-in-charge, the said measurements being binding and conclusive against the contractor. If the contractor shall fail to comply with the requirements of this clause as to the removal of scaffolding, surplus material, 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 expense of the contractor, remove such scaffolding surplus material and rubbish and dispose of the same as he thinks fit and clean off such dirt as aforesaid and the contractor shall forthwith pay such amount of all expenses so incurred but shall have no claim in respect of any such scaffolding or surplus materials as aforesaid except for any sum realized by the sale thereof.

**CLAUSE 8-**

*Payment on  
intermediate  
be regarded  
as advances.*

No payment shall be made for any work estimated to cost less than five percent of the estimated cost, till after the whole of the work shall have been completed and a certificate of completion is given. But in the case of works estimated to cost more than five percent of the estimated cost the contractor shall on submitting a monthly bill therefore be entitled to receive payment proportionate to the part of the work then approved and passed by the Engineer-in-charge, whose certificate of such approval and passing of the sum so payable shall be final and conclusive against the contractor. All such intermediate payments shall be regarded as payments by way of advance against the final payments only and not as payments for work done and completed and shall not preclude the Engineer- in-charge from requiring any bad, unsound, imperfect, or unskillful work to be removed or taken away and reconstructed or re-erected nor shall any such payment be considered as an admission of the due performance of the contract or any part thereof in any respect or the occurring of any claim nor shall it conclude, determine or effect in any other way the powers of the Engineer-in-charge as to the final settlement and adjustment of the accounts or otherwise or in any other way vary or affect the contract. The final bill shall be submitted by the contractor within one month of the date fixed for the completion of the work, otherwise, the Engineer in-charge's certificate of the measurements and the total amount payable for the work shall be final and binding on all parties.

**CLAUSE 9 –**

*Payment at  
reduced rates*

The rates for several items of work estimated to cost more than Rs.1,000/- agreed to within, shall be valid only when the item concerned is accepted as having been completed fully by the sanctioned specifications. In the case where the items of work are not accepted as so completed, the Engineer-in-charge may make payment on account of such items at such reduced rates as he may consider reasonable in the preparation of the final or on Running Account bill.

**CLAUSE 10 –**

*Bill to be  
submitted  
monthly*

- 1) Before starting work all the initial ground levels/ foundation levels shall be taken by the authorized Engineer of the Corporation in the presence of the contractor or his authorized engineer and same shall be signed by the

Contractor

No. of Corrections

Executive Engineer

contractor in token of his acceptance. A computerized L-Section, Cross Sections, and Plan showing levels should be prepared by the contractor and submitted to the Executive Engineer based on the above measurements without which work will not be started. The contractor shall employ a qualified Engineer as his authorized representative to be present while taking measurements by the authorized Engineer of the Corporation. Bill is to be submitted monthly. Running Account bill shall be submitted by the contractor in each month on or before the 10<sup>th</sup> day for all work executed in the previous month based on measurements taken by him or his authorized engineer. The measurements for payments of Running Account Bills shall be taken by the authorized Engineer of the Corporation in the presence of the contractor or his authorized engineer and shall be recorded in the Measurement Book of the Corporation within 10 days after submission of the bill by the contractor. Based on the above measurements the contractor shall have to submit his Running Account Bills in the bill format given by the Corporation If the contractor does not submit the bill within the time fixed as aforesaid, the Engineer-in-charge with prior notice of 7 days to the contractor may depute a subordinate to measure the said work in presence of the contractor or his duly authorized agent whose counter signature to/on the measurements shall be a sufficient warrant and Engineer-in-charge may prepare a bill from such measurements which shall be binding on the contractor in all respects.

If the Contractor or his representative doesn't remain present on the date specified for taking measurements as specified above, then the Engineer-in-charge shall order that the measurements be taken in the absence on any day after 10 days and in this eventuality, the bill prepared by the Executive Engineer shall be binding on the contractor in all respects. As far as possible the payment of the bills will be made monthly to the extent of availability of funds for the work under this contract.

- 2) The Running and final bill shall be submitted by the contractor within one month of the issue of the completion certificate under Clause 7 of this contract. The Final bill shall be paid within 6 months of initial submission subject to the extent of availability of funds for the work under this contract. The procedure enumerated above for the Running account bills shall apply to the Running and final bill also.

**CLAUSE 11–**

*Bill to be on  
printed forms.*

The contractor shall submit all bills on the printed forms in the format approved by the Engineer-in-charge. The charges to be made in the bills shall always be entered at the rates specified in the tender. In the case of any extra work ordered in pursuance of these conditions, and not mentioned or provided for in the tender at the rates hereinafter provided for such work.

**CLAUSE 12–**

*Works to be  
executed by  
specifications,  
drawings,  
orders, etc.*

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 every other respect strictly per specifications. The contractor shall also confirm exactly fully and faithfully the designs, drawings, and instructions in writing relating to the work signed by the Engineer-in-charge and lodged in his office and to which the contractor shall be entitled to have access for inspection at such office, or on the site of the work during office hours.

The contractor will be entitled to receive three sets of contract drawings and working drawings as well as one certified copy of the accepted tender along with the work order free of cost. Further copies of the contract drawings and working drawings if required by him shall be supplied at the rate of Rs.5,000/- per set of contract drawings and Rs.300/- per working drawing except where otherwise specified.

**CLAUSE 13–**

*Alterations  
in  
specification  
s and designs  
Not to  
invalidate  
contracts.*

*Rates for  
works Not  
entered in  
tender or not  
in CSR*

The Engineer-in-charge shall have the power to make any alteration in or additions to the original specifications, drawings, designs, and instructions that may appear to him to be necessary or advisable during the progress of the work and the contractor shall be bound to carry out the work per any instructions in this connection which may be given to him in writing signed by Engineer-in-charge and such alteration shall not invalidate the contract, and any additional work which the contractor may be directed to do in the manner above specified as part of the work shall be carried out by the contractor on the same conditions in all respects on which he agreed to do the main work, and at the same rates as are specified in the tender for the main work. And if the additional and altered work includes any class of work for which no rate is specified in this contract, then such class of work shall be carried out at the rates decided as per the procedure mentioned in Clause 38(3). Where, however, the work is to be executed according to the designs, drawings, and specifications recommended by the contractor and

*Extensions  
of time  
consequence  
of additions  
or  
alterations.*

accepted by the competent authority the alterations above referred to shall be within the scope of such designs, drawings, and specifications appended to the tender.

The time limit for the completion of the work shall be extended in the proportion that an increase in its cost occasioned by alterations or additions bears to the cost of the original contract work, and the certificate of the Engineer-in-charge as to such proportion shall be conclusive. However, such an extension will be governed by provisions of Clause 6.

#### **CLAUSE 14—**

*No claim to  
any payment  
or  
compensation  
for alteration  
in or  
restriction of  
work.*

- a. If at any time after the execution of the contract Documents the Engineer shall for any reason what-so-ever (other than default on the part of the contractor for which the Corporation is entitled to rescind the contract) desires that the whole or any part of the work specified in the tender should be suspended for any period or that the whole or part of the work should not be carried out at all, he shall give to the contractor a notice in writing of such desire and upon the receipt of such notice the contractor shall forthwith suspend or stop the work wholly or in part as required, after having due regard to the appropriate stage at which the work should be stopped or suspended so as not to cause any damage or injury to the work already done or endanger the safety thereof provided that the decision' of the Engineer as to the stage at which the work or any part of it, could be or could have been safety stopped or suspended shall be final and conclusive against the contractor. The contractor shall have no claim to any payment or compensation whatsoever because of or in pursuance of any notice as aforesaid, on account of any suspension, stoppage, or curtailment except to the extent specified hereinafter.
- b. Where the total suspension of work ordered as aforesaid continued for a continuous period exceeding 90 days the contractor shall be at liberty to withdraw from the contractual obligations under the contract so far as it pertains to the unexecuted part of the work by giving a 10 days prior notice in writing to the Engineer, within 30 days of the expiry of the said period of 90 days, of such intention and requiring the Engineer to record the final measurement of the work already done and to pay final bill. Upon giving such notice the contractor shall be deemed to have discharged from his obligations to complete the remaining unexecuted work under the contract.

On receipt of such notice, the Engineer shall proceed to complete the measurements and make such payment as may be finally due to the contractor within 90 days from the receipt of such notice in respect of the work ~~already~~ done by the contractor. Such payment shall not in any manner prejudice the right of the contractor to any further compensation under the remaining provisions of this clause.

- c. Where the Engineer-in-charge is required to suspend the work for a period in excess of 30 days at any time or 60 days in the aggregate, the contractor shall be entitled to apply to the Engineer within 30 days of the resumption of work after such suspension for payment of compensation to the extent of pecuniary loss suffered by him in respect of working machinery remained idle on the site or on the account of his having and to pay the salary or wages of labor engaged by him during the said period of suspension provided always that the contractor shall not be entitled to any claim in respect of any such working machinery, salary or wages for the first 30 days whether consecutive or in the aggregate or such suspension or respect or any suspension whatsoever occasioned by unsatisfactory work or any other default on his part. The contractor shall maintain the record of idle staff, labor & machinery in the prescribed format of Appendix L. The decision of the Engineer in this regard shall be final and conclusive against the contractor.
  
- d. In the event of -
  - ii. Any total stoppage of work on notice from the Engineer under sub-clause (1) on that behalf.
  
  - iii. Withdrawal by the contractor from the contractual obligations to complete the remaining unexecuted work under sub-clause (2) on account of continued suspension of work for a period exceeding 90 days. **OR**
  
  - iv. Curtailment in the quantity of item or items originally tendered on account of any alteration, omission substitution in the specifications, drawings, designs, or instructions under clause 14(1) where such curtailment exceeds 25% in quantity and the value of the quantity curtailed beyond 25% of the rates for the item specified in the tender is more than Rs. 5000/-.

v. It shall be open to the contractor, within 90 days from the service of (i) the notice of stoppage of work (ii) the Notice of withdrawal from the contractual obligations under the contract on account of the continued suspension of work, or (iii) notice under clause 14 (1) resulting in such curtailment to produce to the Engineer satisfactory Documents any evidence that he had purchased or agreed to purchase material for use in the contracted work, before receipt by him of the notice of stoppage, suspension or curtailment and require the Government to take over on payment such material at the rate determined by the Engineer, provided, however, such rates shall in no case exceed the rates at which the same was acquired by the contractor. The Government shall thereafter take over the material so offered, provided the quantities offered are not more than the requirements of the unexecuted work as specified in the accepted tender and are of quality and specifications approved by the Engineer.

### **CLAUSE 15-**

*No claim to compensation on account of loss due to delay in supply of materials by the Corporation*

The contractor shall not be entitled to claim any compensation from the Corporation for the loss suffered by him on account of delay by the Corporation in the supply of materials where such delay is caused by

- i. Difficulties relating to the supply of railway wagons.
- ii. Force - majeure.
- iii. Act of God Act of enemies of the State or any other reasonable cause beyond the control of the Corporation.

In the case of such delay in the supply of materials, the Corporation shall grant such extension of time for the completion of the work as shall appear to the Executive Engineer to be reasonable by the circumstances of the case. The decision of the Executive Engineer as to the extension of time shall be accepted as final by the contractor and will be governed by the provision of Clause 6.

### **CLAUSE 16 -**

*Time limit for unforeseen claims.*

Under no circumstances whatsoever shall the contractor be entitled to any compensation from the Corporation on any account unless the contractor shall have submitted a claim in writing to the Engineer-in-charge within one month of the case of such claim occurring subject to provision in Clauses 30 and 40 with all authentic Documents any evidences in support of the claim

**CLAUSE 17-**

*Action and compensation payable in case of bad work.*

If at any time before the security deposit or any part thereof is refunded to the contractor it shall appear to the Engineer-in-charge or his subordinates in charge of the work, that any work has been executed with unsound, imperfect or unskillful workmanship or with materials of inferior quality, or that any materials or articles provided by him for the execution of the work are unsound, or of any quality inferior to that contracted for or are otherwise not in accordance with the contract, it shall be lawful for the Engineer-in-charge to intimate this fact in writing to the contractor and notwithstanding the fact that the work, materials or articles complained of may have been inadvertently passed, certified and paid for, the contractor shall be bound forthwith to rectify, or remove or reconstruct the work so specified in whole or in part, as the case may require or if so required, shall remove the materials or articles so specified and provide other proper and suitable materials or articles at his own 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 the written intimation aforesaid, the contractor shall be liable to pay compensation at the rate of one percent on the amount of the tender for every day not exceeding 10 days, during which the failure so continues 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 the materials or articles complained of as the case may be at the risk and expense in all respects of the contractor Should the Engineer-in-charge consider that any such inferior work or materials as described above may be accepted or made use of it shall be within his discretion to accept the same at such reduced rates as he may fix therefore, subject to Clause -9.

**CLAUSE 18 -**

*Work to be open for inspection.*

*The contractor or responsible*

All works under or in course of execution or executed in pursuance of the contract shall at all times be open to the inspection and supervision of the Engineer-in-charge and his subordinates and the contractor shall at all times during the usual working hours and at all other times at which reasonable notice of the intention of the Engineer-in-charge and his subordinate to visit the work shall have been given to the contractor either himself be present to receive orders and instructions or have responsible agent duly accredited in writing present for that purpose. Orders given to the contractor's duly authorized agent shall be considered to have the same force and effect as if they

*agent to be present.*

had been given to the contractor himself. The contractor should provide for safe arrangements for the inspection of work at his cost.

#### **CLAUSE 19 -**

*Notice to be given before work is covered up.*

The contractor shall give not less than five days' 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 any work so that the same may be measured and correct dimensions thereof taken before the same is so covered up or place beyond the reach or measurements and shall not cover up any work without the consent in writing of the Engineer-in-charge or his subordinate in charge of the work, and if any work shall be covered up or placed beyond the reach of measurement, without such notice having been given or consent obtained the same shall be uncovered at the contractor's expense and in default thereof, no payment or allowance shall be made for such work or for the materials with which the same was executed.

#### **CLAUSE 20 -**

*Contractor liable for damage done and for imperfections.*

If during the period specified at (i) *in a memorandum from the date of completion as certified by the Engineer-in-charge pursuant to Clause-7 of the contract* after commissioning the work, whichever is earlier in the opinion of the Engineer-in-charge, the said work is defective in any manner whatsoever, the contractor shall forthwith on receipt of notice in that behalf from the Executive Engineer, duly commence execution and completely carry out at his cost in every respect all the work that may be necessary for rectifying & setting right the defects specified therein including dismantling and reconstruction of unsafe portions strictly in accordance with and in the manner prescribed and under the supervision of the Executive Engineer. In the event of the contractor failing or neglecting to commence execution of the said rectification work within the period prescribed therefore in the said notice and / or to complete the same as aforesaid as required by the said Notice, the Executive Engineer get the same executed and carried out departmentally or by any other agency at the risk on account and at the cost of the contractor. The contractor shall forthwith on demand pay to the Govt./Corporation the amount of such costs, charges and expenses sustained or incurred by the Government / Corporation of which the certificate of the Executive Engineer shall be final and binding on the

contractor. Such costs, charges and expenses shall be deemed to be arrears of land revenue and on the event of the contractor failing or neglecting to pay the same on demand as aforesaid without prejudice to any other rights and remedies of the Government/Corporation, the same may be recovered from the contractor as arrears of land revenue. The Government / Corporation shall also be entitled to deduct the same from any amount which may then be payable or which may thereafter become payable by the Government/Corporation to the contractor either in respect of the said work or any other work whatsoever or from the amount of security deposit retained by Government/Corporation.

### **CLAUSE – 21**

*Contractor to supply plant, ladders, scaffolding etc.*

*And is liable for damages arising from Non provisions of light, fencing, etc.*

The contractor shall supply at his own cost all material (except such special materials, if any as may, per the contract be supplied from the Corporation stores) plant, tools, appliances, implements, ladders, carriage, tackle, scaffolding and temporary work requisite for the proper execution of the work, whether in the original, altered or substituted form, and whether included in the specification or other Documents forming part of the contract or referred to in these conditions or not and which may be necessary for satisfying or complying with the requirements of the Engineer-in-charge as to any matter as to which under these conditions he is entitled to be satisfied, or which he is entitled to require together with the carriage therefore to and from the work. The contractor shall also supply without charge the requisite No of persons with the means and materials necessary for setting out works and counting, weighing, and assisting in the measurement or examination at any time and from time to time of the work or the materials, failing which the same may be provided by the Engineer-in-charge at the expense of the contractor and the expenses may 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 provide all necessary fencing and lights required to protect the public from accident and shall also be bound to bear the expenses of defense of every suit, action or other legal proceeding that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and cost which may be awarded in any such suit, action or proceedings to any such person or which may with the consent of the contractor be paid for compromising any claim by any such person. List of Machinery in contractor's possession and which they

propose to use on the work should be submitted along with the tender. The contractor shall indemnify the Government / Corporation against all such claims.

**CLAUSE 21 (A) –**

The contractor shall provide suitable scaffolds and working platforms, gangways and stairways and shall comply with the following regulations in connections therewith.

- a) Suitable scaffolds shall be provided for workmen for all works that cannot be safely done from a ladder or by other means.
- b) A scaffold shall not be constructed, taken down or substantially altered except -
  - i. under the supervision of a competent and responsible person and
  - ii. as far as possible by competent workers possessing adequate experience in this kind of work.
- c) All scaffolds and appliances connected therewith and ladders shall
  - i. be of sound material,
  - ii. be of adequate strength having regard to the loads and strains to which they will be subjected, and
  - iii. be maintained in proper condition.
- a) Scaffolds shall be so constructed that no part thereof can be displaced in consequence of Normal use.
- b) Scaffolds shall not be overloaded and so far, as practicable the load shall be evenly distributed.
- c) Before installing lifting gear on scaffolds special precautions shall be taken to ensure the strength and stability of the scaffold.
- d) The scaffold shall be periodically inspected by a competent person.
- e) Before allowing a scaffold to be used by his workmen the contractor shall, whether the scaffold has been erected by his workmen or not, take steps to ensure that it complies fully with the regulations herein specified.
- f) Working platform, gangways, and stairways shall be so constructed that no part thereof can sag unduly or unequally, be so constructed and maintained having regard to the prevailing conditions as to reduce as far as practicable risks of persons tripping or slipping, and be kept free from any unnecessary obstruction.
- g) In the case of working platform, gangways, working places and stairways at the height exceeding 3 meters.

- i. Every working platform and every gangway shall be closely boarded unless other adequate measures are taken to ensure safety.
- ii. every working platform and gangway shall have adequate width and
- iii. Every working platform, gangway, working places and stairways shall be suitably fenced.
- h) Every opening in the floor of a building or in a working platform shall except for the time and to the extent required to allow the access of persons or the transport or shifting of materials be provided with suitable means to prevent the fall of persons or materials.
- i) When persons are employed on roof where there is a danger of falling from a height exceeding 3 meters suitable precautions shall be taken to prevent the fall of persons or materials.
- j) Suitable precautions shall be taken to prevent persons being struck by articles which might fall from scaffold or other working places.
- k) Safe means of access shall be provided to all working platforms and other working places.
- l) The contractor(s) will have to make payments to the laborers as per Minimum Wages Act.

**CLAUSE 21 B –**

- a) The contractor shall comply with the following regulations as regards the Hoisting Appliances to be used by him:
- b) Hoisting machine and tackle, including their attachments, anchorages, and support shall
- c) Be of good mechanical construction, sound material and adequate strength and free from patent defect, and
- d) Be kept in good repair and good working order.
- e) Every rope used in hoisting or lowering materials or as a means of suspension shall be of suitable quality and adequate strength and free from patent defect.
- f) Hoisting machine and tackle shall be examined and adequately tested after erection on a site and before use and be reexamined in position at intervals to be prescribed by the Corporation.
- g) Every chain, ring, hook, shackle swivel and pulley block used in hoisting or lowering materials or as a means of suspensions shall be periodically examined.
- h) Every crane driver or hoisting appliance operator shall be properly qualified.

- i) No person who is below the age of 18 years shall be in control of any hoisting machine, including any scaffold winch or give signals to the operator.
- j) In the case of every hoisting machine and of every chain, ring, hook, shackle, swivel pulley block used in hoisting or lowering or as a means of suspension, the safe working load shall be ascertained by adequate means.
- k) Every hoisting machine and all gear referred to in preceding regulation shall be plainly marked with the safe working load.
- l) In case of hoisting machine having a variable safe working load, each safe working load and the conditions under which it is applicable shall be clearly indicated.
- m) No part of any hoisting machine or of any gear referred to in regulation (g) above shall be loaded beyond the safe working load except for testing.
- n) Motors, gearing transmissions, electric wiring, and other dangerous part of hoisting appliances shall be provided with efficient safeguards.
- o) Hoisting appliances shall be provided with such means as will reduce to a minimum risk of the accidental descent of the load.
- p) Adequate precaution shall be taken to reduce to a minimum risk of any part of a suspended load becoming accidentally displaced.

### **CLAUSE 22 –**

*Measure for prevention of fire*

The contractor shall not set fire to any standing jungle, trees, brushwood or grass without a written permit from the competent authority under the law. When such permit is given, and also in all cases when destroying out or dug up trees, brushwood, grass etc. by fire, the contractor shall take the necessary measure to prevent such fire spreading to or otherwise damaging surrounding property. The contractor shall make his own arrangements for drinking water for the labour employed by him and provide sanitary and other arrangements.

### **CLAUSE 23 –**

*Liability of contractor for any damage done in or outside work area.*

Compensation for all damages done intentionally or unintentionally by contractor's labour whether in or beyond the limits of Corporation property including any damage caused by the spreading of fire mentioned in Clause 22 shall be estimated by the Engineer-in-charge or such other officer as he may appoint and the estimate of the Engineer- in-charge subject to the decision of the Superintending Engineer on appeal shall

be final and the contractor shall be bound to pay the amount of the assessed compensation on demand, failing which the same will be recovered from the contractor as damages or deducted by the Engineer-in-charge from any sums that may be due or become due from Corporation to contractor under this contract or otherwise.

The contractor shall bear the expenses of defending any action or other legal proceeding that may be brought by any persons for injury sustained by him owing to neglect of precautions to prevent the spread of fire and he shall pay any damages and cost that may be awarded by the court in consequence. The contractor shall indemnify the Corporation against all such legal actions and consequences thereof.

#### **CLAUSE 24 –**

*Lump sum in estimates*

When the estimate on which a tender is made includes lump sums in respect of parts of the work contractor shall be entitled to payment in respect of the item of work involved or the part of the work in question at the same rates as are payable under this contract for each item, or if the part of work in question is not in the opinion of the Engineer-in-charge capable of measurement, the Engineer-in-charge may at his discretion pay the lump sum amount entered in the estimate and the certificate in writing of the Engineer-in-charge shall be final and conclusive against the contractor concerning any sum or sums payable to him under the provision of this clause.

#### **CLAUSE 25**

If the contractor become insolvent or commence any proceeding to get himself adjudicated and insolvent or make any composition with his creditors; or attempt so to do or if bribe, gratuity, gift, loan, perquisite reward of advantage, pecuniary or otherwise, shall either directly or indirectly be given, promised or offered by the contractor or any of his servants or agents to any public officer or person in the employ of Corporation In any way relating to his office or employment or if any such officer or person shall become in any way directly or indirectly interested in the contract, the Engineer-in-charge may thereupon by notice in writing rescind the contract, and the security deposit of the contractor shall thereupon stand forfeited and be absolutely at the

disposal of Corporation 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.

### **CLAUSE 26 –**

*Work Not to  
sublet*

The contract shall not be assigned or sublet without the written approval of the competent authority. And if the contractor shall assign or sublet his contract, or attempt so to do, by notice in writing rescind the contract, and the security deposit of the contractor shall thereupon stand forfeited and be absolutely at the disposal of the Corporation 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.

### **CLAUSE 27-**

All sums payable by a contractor by way of compensation under any of these conditions shall be considered as a reasonable compensation to be applied to the use of Corporation without reference to the actual loss or damage sustained and whether any damage has or has Not been sustained.

### **CLAUSE 28-**

*Changes in  
the  
constitution  
of firm to be  
Notified*

In the case of tender by partners, any change in the constitution of a firm shall be forthwith Notified by the contractor to the Engineer-in-charge for his information.

### **CLAUSE 29-**

*Direction  
and control  
of the  
Executive  
Engineer*

All works to be executed under the contract shall be executed under the direction and subject to the approval in all respects of the 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 30 (1) -**

*Direction  
and control  
of the  
Superintendi-  
ng Engineer*

Except where otherwise specified in the contract and subject to the powers delegated to him by the Corporation under the code, rules then in force, the decision of the Superintending Engineer of the Circle for the time being shall be final, conclusive, and binding on all parties of the contract upon all question relating to the meaning of the specifications, designs, drawings, and instructions herein before mentioned and as to the quality or workmanship or materials used on the work or as to any other question, claim, right, matter or thing whatsoever, if any way arising out of or relating to the contract, designs, drawings, specifications, estimates, instructions, orders or these conditions or otherwise concerning the works or the execution or failure to execute the same, whether arising during the progress of the work or after the completion or abandonment thereof.

**CLAUSE 30 (2) -**

*Direction and  
control of the  
Chief  
Engineer*

The contractor may within thirty days of receipt by him of any order passed by the Superintending Engineer of the Circle as aforesaid appeal against it to the Chief Engineer concerned with the contract work or project provided that

- a)The accepted value of the contract exceeds Rs.10 Lakhs (Rs. Ten Lakhs).
- (b) Amount of claim is not less than Rs.1 lakh (Rupees one Lakh).

**CLAUSE-30 (3)**

*Direction and  
control of the  
Executive  
Committee /  
Claims  
Committee*

If the contractor is not satisfied with the order passed by the Chief Engineer as aforesaid, the contractor may, within thirty days of receipt by him of any such order, appeal against it to the Executive Director of the Corporation who if convinced that prima-facia the contractor's claim rejected by Superintending Engineer / Chief Engineer is not frivolous and that there is some substance in the claim of the contractor as would merit a detailed examination and decision by the Executive Committee at Corporation level shall put up to such committee for a decision in respect of claims up to Rs. 50 lakhs and to the claims committee at the Government level in respect of claims.

**CLAUSE-31**

*Actions where  
No  
specifications*

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 Divisional specifications and in the event of there being no Divisional specification, then in such case the work shall be carried out in all respects in accordance with all instructions and requirements of the Engineer-in-charge.

**CLAUSE-32**

*No claim for  
compensation  
for delay in  
starting work.*

No compensation shall be allowed for any delay caused in the starting of the work on account of acquisition of land or in the case of clearance work on any account of any delay in accordance to sanction of estimates.

**CLAUSE-33**

*No claim for  
compensation  
for delay in  
execution of  
work.*

No compensation shall be allowed for any delay in the execution of the work on account of water standing in borrow pits or compartments. The rates are inclusive for hard or cracked soil, excavation in mud, sub-soil, water standing in borrow pits and No claim for an extra rate shall be entertained unless otherwise expressly specified.

**CLAUSE-34**

*Definition of  
work.*

The expression ‘Work’ or ‘Works’ where used in these condition shall unless there be something in the subject or context repugnant to such construction, be construed to mean the work or works contracted to be executed under or in by virtue of the contract, whether temporary or permanent and whether original, altered, substituted or additional.

**CLAUSE-35**

*contractors'  
percentage  
whether  
applied to the  
net or gross  
amount of the  
bill*

The percentage referred to in the tender shall be deducted from/added to the gross amount of the bill excluding royalty, GST, Insurance, etc.

**CLAUSE – 36**

*Payment of  
quarry fees  
and Royalties*

All quarry fees, royalties, octroi dues and ground rent, all taxes for stacking materials if any, shall be paid by the contractor, at applicable rates.

**CLAUSE 37 –**

*Compensation under the workman's compensation act.*

The contractor shall be responsible for and shall pay any compensation to his workmen payable under the Workman's Compensation Act, 1923 (VIII of 1923) (hereinafter called the said Act) for injuries caused to the workmen. If such compensation is payable and/or paid by the Corporation as principle under sub-section (1) of section 12 of the said Act on behalf of the contractor, it shall be recoverable by the Corporation from the contractor under sub-section (2) of the said section. Such compensation shall be recovered in the manner laid down in Clause 1 above. The contractor shall indemnify the Government / Corporation against such compensation

**CLAUSE-37 (A)**

The contractor shall be responsible for and shall pay the expenses of providing medical aid to any workmen who may suffer a bodily injury as a result of an accident. If such expenses are incurred by Corporation the same shall be recoverable from the contractor forthwith and be deducted without prejudice to any other remedy of the Corporation from any amount due or that may become due to the contractor.

**CLAUSE 37 (B)**

The contractor shall provide all necessary personal safety equipment and first aid apparatus available for the use of the persons employed on the site and shall maintain the same in condition suitable for immediate use at any time and shall comply with the following regulations in connection therewith.

- i. The workers shall be required to use the equipment so provided by the contractor and the contractor shall take adequate steps to ensure proper use of the equipment by those concerned.
- ii. When work is carried on in proximity to any place where there is a risk of drowning all necessary equipment shall be provided and kept ready for use and all necessary steps shall be taken for the prompt rescue of any person in danger.
- iii. Adequate provision shall be made for prompt first-aid treatment of all injuries to be sustained during the work.

**CLAUSE 37 (C) -**

The contractor shall duly comply with the provisions of the Apprentices Act, 1961 (III of 1961), the rules made there under and the orders that may be issued from time to time under the said Act and the said rules and on his failure or neglect to do so, he shall be subject to all the liabilities and penalties provided by the said Act and said Rules.

**CLAUSE 38 –**

*Claim for quantities entered in the tender or estimates*

1. Quantities shown in the tender are approximate and no revision of rate shall be entertained for quantities of work executed being either more or less than those entered in the tender.
2. Quantities in respect of the several items shown in the Schedule-'B', of the tender are approximate and no revision in the tendered rate shall be permitted in respect of any of items so long as subject to any special provision contained in the specifications prescribing a different percentage of permissible variation the quantity of items does not exceed the tender quantity by more than 25% and so long as the value of the excess quantity beyond this limit at the rate of the item specified in the tender is not more than Rs.50000/- **DELETED**
3. The contractor shall if ordered in writing by the Engineer in charge to do so also carry out any quantities in excess of the limit mentioned in sub- clause. (2) here of on the same conditions as and in accordance with the specifications in the tender and at the rates derived from the rates entered in the current schedule of rates. In the absence of such rates, it will be mutual agreed rate. If the contractor's quoted rates are above cost put to tender , this above % shall not be applicable for quantities exceeding 125%.
4. If the contractor's quoted rates are below cost put to tender, this below % is be applicable for quantities exceeding 125%.
5. In case the quantity of any item reduces by more than 25% the rate of such item shall be revised as per provisions of sub-clause (3) of Clause 38. However, total payment of such item shall be limited to 75% of estimated cost of that item put to tender.
6. This clause is not applicable to extra items.
7. Also read special condition of contract clause 56 along with this clause.

**CLAUSE 39 -**

*Entering  
upon or  
commencing  
any portion  
of work*

The contractor shall not enter upon or commence any portion of the work except with the written authority and instructions of the Engineer-in-charge or of his subordinate in charge of the work. Failing such authority, the contractor shall have no claim to ask for measurements of or payment of work.

**CLAUSE 40 -**

*Minimum age  
of persons  
employed,  
The  
employment  
of donkeys  
and other  
animals*

- a. No contractor shall employ any person who is under the age of 14 years.
- b. The Engineer-in-charge or his Agent is authorized to remove from the work, any person found working which does not satisfy these conditions and no responsibility shall be accepted by the Corporation for any delay, caused in the completion of the work by such removal.
- c. The contractor shall pay fair and reasonable wages which will Not be below the minimum wages to the workmen employed by him in the contract undertaken by him. In the event of any dispute arising between the contractor and his workmen on the grounds that the wages paid are not fair and reasonable, the dispute shall be referred without delay to the appropriate Government Authority concerned with labour who shall decide the same. The decision of the said Authority shall be conclusive and binding on the contractor but such decision shall not in any way affect the conditions in the contract regarding the payment to be made by the Corporation at the sanctioned tender rates.
- d. All facilities **mentioned** in the contract labour (Regulation & Abolition Act, 1970), the Maharashtra Contract Labour Regulation and Abolition Rule, 1971, should be provided.

**CLAUSE 41**

*Method of  
payment*

Payment to contractors shall be made by cheque, RTGS or NEFT.

**CLAUSE 42 –**

*Employment  
of scarcity  
labour.*

If Government declares a state of scarcity or famine to exist in any village situated within 16 Kilometers of the work, the contractor shall employ upon

such parts of the work, as are suitable for unskilled labour, any person certified to him by the Executive Engineer, or by any person to whom the Executive Engineer may have delegated this duty in writing to be in need of relief and shall be bound to pay to such person wages Not below the minimum which the Government may have fixed in this behalf. Any disputes which may arise in connection with the implementation of this clause shall be decided by the Executive Engineer whose decision shall be final and binding on the contractor.

The contractor shall employ the unskilled labour to be employed by him on the said work only from locally available labour and shall give preference to those persons enrolled under MNREGS. Provided, however, that if the required unskilled labours are not available locally, the contractor shall in the first instance employ such no of persons as is available and thereafter may with previous permission. in writing of the Executive Engineer in charge of the said work, obtain the rest of the requirement of unskilled labour from outside the above Scheme.

#### **CLAUSE 43 -**

The rates to be quoted by the contractor must be inclusive of all taxes. No extra payment on this account will be made to the contractor.

#### **CLAUSE-44 –**

*Wages to be paid.*

The contractor shall pay the labourers skilled and unskilled, according to the wages prescribed by the Minimum Wages Act of 1948 applicable to the area in which the work is located.

Contractor shall comply with the provisions of apprentices act 1961 and the rules and orders issued there under from time to time if he fails to do so his failure will be a breach of the contract and the Suprintending Engineer may in his discretion cancel the contract. The contractor shall also be liable for any pecuniary liability arising out on account of any violation by him of the provisions of act.

The Contractor shall make payments of salaries and wages to all the employees and Labouers through bank account linked to Unique Identification Number (AADHAR CARD) and shall submit a certificate accordingly to the Engineer -in - charge. The certificate shall be submitted by the contractor within 60 days from the commencement of contract. If the time period of contract is less than 60 days, the such certificate shall be submitted within 15 days from the date of commencement of contract.

**CLAUSE 45**

*Recovery of Advances if any*

All amounts whatsoever which the contractor is liable to pay to the Corporation in connection with the execution of the work including the amount payable in respect of (i) materials and / or stores supplied / issued hereunder by the Corporation to the contractor (ii) hire charges in respect of heavy plant, machinery and equipment given on hire by the Corporation to the contractor for execution by him of the work and / or on which advances have been given by the Corporation to the contractor shall be deemed to be arrears of the Land Revenue and the Corporation may without prejudice to any other rights and remedies of the Corporation recover the same from the contractor as arrears of Land Revenue.

**CLAUSE 46 -**

*Labour laws*

The contractor shall duly comply with all the provisions of the Contract Labour (Regulation and Abolition) Act, 1970 (37 of 1970) and the Maharashtra Contract Labour (Regulation and Abolition) Rules, 1971 as amended from time to time and all other relevant statutes and statutory provisions concerning payment of wages particularly to workmen employed by the contractor and working on the site of the work. In particular the contractor shall pay wages to each worker employed by him on the site of the work at the rates prescribed under the Maharashtra Contract Labour (Regulation and Abolition) Rules, 1971. If the contractor fails or neglects to pay wages at the said rates or makes short payment and the Corporation makes such payment of wages in full or part thereof less paid by the contractor, as the case may be, the amount so paid by the Corporation to such workers shall be deemed to be arrears of Land Revenue and the Corporation shall be entitled to recover the same as such from the contractor or deduct the same from the amount payable by the Corporation to the contractor hereunder or from any other amounts payable to him by the Corporation.

**CLAUSE 47 -**

The contractor shall duly comply with all the provision of the Maharashtra State Tax on profession and Traders, calling and Employment Act, 1975 (See Rule 3 (2)). The contractor shall obtain certificate of registration under this Act and shall produce to Corporation clearance certificate as and when demanded.

**CLAUSE 48 -**

The contractor shall comply with all the provisions of GST Act, 2017, transfer of goods involved in the execution of work contracts.

**CLAUSE 49 -**

*Insurance of  
contract  
work*

The Contractor shall take out necessary Insurance Policy /Policies (viz. Contractor's All risks Insurance Policy, Erection all risks insurance policy etc. as decided by the Directorate of Insurance) so as to provide adequate insurance cover for execution of the awarded contract work for total contract value and complete contract period COMPULSORILY from the "Directorate of Insurance, Maharashtra State, Mumbai" only. Its postal address for correspondence is "264, MHADA, First floor, Opp. Kalanagar, Bandra (East), Mumbai - 400051." (Telephone No.022- 26590403 / 26590690 and Fax No.022-26592461 / 26590403) Similarly, all workmen appointed to complete the contract work are required to insure under workmen's compensation Act. Executive Engineer shall recover Insurance policy/ premium @ the rate of 1 % cost put to tender if insurance policy from Directorate of Insurance Maharashtra State Mumbai is Not taken. Insurance Policy / Policies taken out from any other company will Not be accepted. If contractor has not taken out the insurance policy from the "**Directorate of Insurance, Maharashtra State, Mumbai**" or has effected insurance with any other Insurance Company, the same will not be accepted and 1% of the tender amount or such amount of premium calculated by the Government Insurance Fund will be recovered directly from the amount payable to the Contractor for the executed contract work and paid to the Directorate of Insurance Fund, Maharashtra State, Mumbai. The Director of Insurance reserves the right to distribute the risks of insurance among the other insurers. The contactor shall renew the insurance policy for the extended period of the contract. The contractor shall also takeout additional insurance policy for the increased contract cost if any.

**CLAUSE 50 -**

*Condition for  
Malaria  
Eradication,  
Anti-Malaria  
and Other  
Health  
Measures*

**CONDITIONS FOR MALARIA ERADICATION, ANTI-MALARIA AND OTHER HEALTH MEASURES**

- a) The anti-malaria and other health measures shall be as directed by the Joint Director (Malaria and Filaria) of Health Services, Pune.
- b) Contractor shall see that mosquito genic conditions are not created to keep

vector population to minimum level.

- c) Contractor shall carry out anti-malaria measures in the area as per guidelines prescribed under the National Malaria Eradication Programme and as directed by the Joint Director (Malaria and Filaria) of Health Services, Pune.
- d) In case of default in carrying out prescribed anti-malaria measures increasing Malaria incidence, the Contractor shall be liable to pay to the Government the amount spent by the Government on anti-malaria measures to control the situation in addition to the fine.
- e) RELATION WITH PUBLIC AUTHORITIES- The contractor shall make sufficient arrangements for draining away the sewerage water as well as water coming from the bathing and washing places and shall dispose of this water in such a way as not to cause any nuisance. He shall also keep the premises clean by employing sufficient no of sweepers. The Contractor shall comply with all rules regulations bye-laws and directions given from time to time by any local or public authorities in connection with this work and shall pay fees or charges which are leviable on him without any extra cost to Government.

#### **CLAUSE 51 --**

The contractor shall comply with all rules, regulations byelaws and directions given from time to time by any local or public authority in connection with this work and shall pay fees or charges which are leviable on him without any extra cost to the Government.

*Labour  
welfare Cess*

#### **CLAUSE 52--**

The contractor will be entitled for an additional payment of 1 % over and above the gross payment <sup>in</sup> each bill towards labour welfare and the same will be deducted from each R. A. Bill and shall be credited to the Labour welfare account

*Goods and  
service tax  
(GST)*

#### **Clause 53:**

The rates in Schedule B are excluding GST. The contractor has to pay the applicable GST. The deduction of GST at source will be made from each running account bill for the work at the rate mentioned in the GST Act or as amended from time to time. The net GST paid (after adjusting

the input tax credit) will be reimbursed to the contractor. For that, the contractor has to produce proof of the GST amount/purchase invoice in which the contractor pays the GST amount mentioned. After verification of the amount of GST paid by the contractor and after approval from the competent authority, GST will be reimbursed to the contractor. This will be treated as advance.

After such reimbursement, if the contractor gets any refund of GST, the same will be deducted from the next RA bill, final bill, or Security Deposit (SD), as the case may be. The bidder has to submit an undertaking that he will communicate such a refund in this regard.

**Clause 54:**

*Maharashtra Stamp Act  
(Lx 1958)*

After allotment of tender the contractor shall have to register the work contract by paying Stamp Duty as per Mumbai Stamp Duty Act 1958 Rule 34.

Stamp duty @ Rs. 500 + 0.1% of the cost above Rs. 10 lakhs on accepted tender needs to be paid by the contractor in form of stamp paper or online like e-SBTR, GRAS as applicable.

As per Bombay stamp act. 1958 amounted via Maharashtra Act. No XX of 2015 as Maharashtra stamp amendment Act 2015 and provision contained in article 63, the contractor will have to pay stamp duty on value of accepted tender cost as per prevailing rate declared by Govt. of Maharashtra before work order. No separate claim will be entertained on this account by the department.

**SECTION- 15**  
**SPECIAL CONDITIONS  
OF CONTRACT**

## 15 SPECIAL CONDITIONS OF THE CONTRACT

### **1. General**

- 1) The Engineer-in-Charge has the right to reject the faulty/defective materials supplied by the contractor without giving any reasons there on.
- 2) The Engineer-in-Charge has the right to conduct any tests for ascertaining the quality of materials and materials after satisfying the test requirements shall only be used.
- 3) The Contractor shall produce all relevant manufacturer test certificates for all the materials and components supplied by him.
- 4) The charges for testing shall be borne by the contractor. The Contractor shall provide free of charge all labour, materials, electricity, fuel, water, apparatus and instruments as may reasonably be required to carry out tests.
- 5) The contractor shall use shuttering of 20 mm thick and 250mm wide for attending repairs to concrete and construction lift joints.
- 6) The contractor has to submit the record/statements on a daily basis, counter-signed by the Engineer in charge of supervision details showing the details of Inventory, Opening Balance of Repair Materials, and consumption.
- 7) Closing Balance of the Grouting and repair materials.

### **2. Contractor to inform himself fully:**

- 1) The contractor shall be deemed to have carefully examined the work and site conditions, conditions of contract in B-1 form, the special conditions, the specifications, schedules and drawings and shall be deemed to have visited the work site, investigated his quarries for rubble and sand and to have fully informed himself regarding the availability of construction materials, and leads involved local conditions, ancillary works required to be done etc. before quoting the offer. The lead and lift charges of construction materials are incorporated in the agreement and no additional claims will be made on this account by the contractor.
- 2) If he shall have any doubts as to the meaning of any portion of the special conditions the scope of work or the specifications or any other matter concerning the contract, he shall in good time, set forth the particulars thereof and submit them to the Engineer-in-charge.
- 3) The Engineer-in-charge generally means the Executive Engineer directly in charge of the work, but also means the Superintending Engineer, Chief Engineer of Corporation, for exercising powers under this contract.

**3. Contract Drawings and Specifications:**

- 1) On acceptance of the tender, three sets of contract drawings and working drawings as well as one certified copy of the accepted tender will be supplied to the contractor free of charge within one week. On request by the contractor, the contractor may be supplied additional copies of contract Documents to be charged at the rate of Rs.5000/- per set.
- 2) The drawings which form part of this contract show the works to be done in such details as possible to do for the present. They will be supplemented for superseded by such additional detailed drawings as may be necessary as the work progresses. The contractor shall carry out the work in accordance with these additional and / or revised drawings as the case may be at the applicable rates as per the contract. The contractor shall be supplied a maximum no of three copies of each of such working drawings free of charge. Should the contractor require any additional copy for his use, the same may be supplied and the contractor will be charged Rs.5000/- per set of contract drawings and Rs.3000/- for an additional copy of each working drawing.
- 3) The contractor shall check all drawings carefully and inform the Engineer-in-charge immediately of any errors or omissions discovered. The contractor shall not take advantage of any kind of errors or omissions in the drawings supplied.

**4. Data and Drawings to be furnished by the Contractor:**

- 1) Before the commencement of the work, within one month from the date of his receiving the Notice to start work, the contractor shall submit to the Engineer-in- charge for approval, computerized drawings or prints of size 1020 mm X 690 mm or 510 mm X 345 mm as may be suitable in triplicate showing the location of major plant workshop, if any, a layout plan of construction plant and equipment for the execution of the work which the contractor proposes to adopt at site, roadways, temporary bridges, unloading facilities and storage yards, etc. which he proposes to put up at the site.
- 2) Any changes in the approved layout will be subject to further approval by the Engineer - in – charge.
- 3) The approval of the drawings, however, will not relieve the contractor of his responsibility for any errors or omissions.

**5. Errors, Omissions, Discrepancies:**

- 1) In case of errors, omissions and / or disagreement between written and scaled dimensions on the drawings or between the drawings and specifications, the following orders of preference shall apply.
- 2) Between actual scaled and written dimensions or description on drawing and corresponding one in the specification, the latter shall be adopted.
- 3) Between the quantities in the schedule of quantities, and those arrived at from the drawings, the former shall apply.
- 4) Between the written description of the item in the schedule of quantities and the detailed specifications of the same item, the latter shall be adopted.
- 5) The information in connection with the works and work site as well as specifications are contained in this book of contract in general and in particular in two parts viz. special conditions and specifications for items of work. In case of any discrepancy or repugnancy in the clauses in these sections, the specifications will prevail over special conditions.
- 6) The special conditions of the contract and the specifications shall prevail over various clauses of the B-1 tender form.
- 7) In all cases of omissions and/or doubts or discrepancies in the dimensions or description of any item, a reference shall be made to the Engineer-in-charge whose elucidation, elaboration or decision shall be considered as authentic and final subject of Clause 30 of B-1 form. The contractor shall be held responsible for any errors that may occur in the work through lack of reference and precaution.

**6. Programme of Construction: Work and Progress Schedules:**

- 1) The construction programme is given at section 14 based on which the physical programme is prepared. If the bidder does not agree with this programme, he shall submit his own programme without changing the total period of tender.
- 2) In case it is subsequently found necessary to alter this programme agreed in contract Documents, including the changes in the sequence of the items, the contractor shall submit in good time a revised programme incorporating the necessary modifications proposed and get the same approved from the Engineer-in-Charge. An additional detailed programme for each

working season, beginning from October, showing the progress to be achieved month by month for controlling items shall also be submitted to the Engineer-in-charge not later than the 31<sup>st</sup> August preceding the working season and got approved. The Engineer-in- Charge is further empowered to ask for the more detailed programme, say week by week, for any items of special importance, and contractor shall supply the same as and when asked for without delay.

- 3) The submission of the works programme and approval to it by the Engineer-in- Charge shall not relieve the contractor of any of his duties or responsibilities under the contract, like timely completion, the damages due to flood or other natural calamities etc. The contractor shall not be entitled to any claims for any damages caused, due to a particular works programme. It is the entire responsibility of the contractor to frame the programme after anticipating the rains, floods etc. Actual work turned out shall be mainly taken into account and not just the sum of the various payments made to the contractor. The advance on material brought to the site of work will be accounted for while arriving at the progress achieved by the contractor in terms of proportion of the total work tendered for.

#### **7. Period and hours of work:**

The work shall be done usually during the day time. In the interest of progress, if it is felt necessary to work during the night, the contractor shall obtain specific permission from the Engineer-in-Charge and adequate lighting arrangements shall be made as directed by the Engineer-in-Charge.

#### **8. Contract Documents and matters to be treated as confidential:**

All Documents correspondence, decisions and other matters concerning the contract shall be considered of a confidential and restricted nature by the contractor and he shall not divulge or allow access thereto to any unauthorized person.

#### **9. Local Laws**

All local laws in force at the time of entering into the contract and those enacted thereafter shall be binding on the Contractor and he shall abide by the same.

#### **10. Taxes etc.**

All duties and taxes shall be borne by the Contractor and they shall be deemed to have been covered by his quoted tender rates. The contractor shall also be liable to all relevant provisions of the Indian Income Tax Act which may apply to him from time to time. The contractor shall protect and indemnify the Corporation against all claims or liabilities arising from or based on the violation of such laws, ordinances, regulations, or bylaws by him or his employee

#### **11. Death, Bankruptcy etc.:**

If the contractor shall die or commit any act of bankruptcy or being a corporation, commences winding up except for reconstruction purposes or carry on its business under a receiver, the executors, successors or other representatives in law of the estate of the contractor or any such receiver, liquidator or any person whom the contract may become vested shall forthwith give notice thereof in writing to the Corporation and shall for one month, during which he shall take all reasonable steps to prevent a stoppage of work, have the option of carrying out this contract subject to his or their providing such guarantee as may be required by the Corporation, but not exceeding the value of the work for the time being remaining unexecuted. In the event of a stoppage of work, the period of the option under this clause shall be fourteen days only. Should the above option be not exercised, the contract may be terminated by the Corporation, by a notice in writing to the Contractor or his successor. The power and provisions reserved to the Corporation in this contract of taking of the work out of the Contractor's hand shall immediately become operative. Copy of such notice shall be pasted on the work site and advertised in the newspaper.

## **12. Notices, how to be given:**

Where any legal or other Notice or any other Documents or any other direction is to be given to or served upon the Contractor, it shall be deemed to be duly given or served, if it shall have been either delivered to him through email, personally or to his recognized agent or Works Manager (including in the case of Company, the Secretary of Such Company) or delivered at or sent through the post, addressed to the last known place of business, or abode of the Contractor, a notice or other Documents which shall be so given to or so served on any one of the partners in such firms, shall be deemed to have been given or served on all of them.

### **13. Communication and Notices by Contractors:**

All communications and/or notices pertaining to works and concerning matters, such as passing and approving of foundations, reinforcement and formwork, measurements, mark outs etc. shall be addressed by the Contractor to the Engineer-in-charge. All such notices communications, etc. shall be addressed in good time so as not to hold up the work.

#### **14. Non-Compliance of Contract Conditions:**

If the contractor shall neglect or fail to proceed with the works, with due diligence or he violates any of the provisions of the contracts the Engineer-in-charge may give notice to

the contractor, identifying deficiencies in performance and demanding corrective action. The Engineer-in-charge, shall also clearly state in the notice the nature of action that shall be taken if the contractor fails to fulfil by necessary corrective action.

Depending on the nature of the default the Engineer-in-charge at his discretion shall have two options, regarding action to be taken in case of default by the contractor. He shall withhold any of the payments due to the contractor or shall terminate the contract in whole or in part. But Engineer-in-charge shall mention in his notice, the action that shall be taken if the contractor fails to take the corrective action. A period of 14 days shall be given to the contractor to take such corrective action after the issue of such notice.

No claims, for compensation of any sort, from the contractor will be entertained for withholding the bills indefinitely till specified requirements are complied with by the contractor. After the issue of the notice about default by the contractor the contractor shall not remove, from the site any plant, equipment and materials. The Corporation shall have a lien on all such plants, equipment and materials, from the date of such notice, till deficiencies have been corrected.

**15. Digital Photographic and Video Record:**

The contractor shall maintain a digital photographic record and video recording of all components of the work showing the monthly progress of work. The digital photographic and video record C.D. / Pen Drive) shall be submitted in five sets to the Engineer-in-charge. The photographic and video record should include date and time. The expenses on this account shall be deemed to be included in the contract price.

**16. Photographs of the Works not to be exhibited:**

The contractor will not be allowed to exhibit photographs showing fieldwork or the general location of the work.

**17. Use of Site:**

- 1) All land required for contractor's own use shall be arranged by the contractor from private land owner/ Revenue Department at his own cost and no claim on this account shall be entertained. If, however, spare land is available with Corporation / Government it may be handed over to contractor at the rates to be decided by the Corporation for such contract work.
- 2) All areas of operation, including those of his staff and labour colonies, in case handed over to the Contractor shall be cleared and handed over back in good condition to the Engineer-

in-charge, except the areas under works constructed by the Engineer-in-charge, any damage or alterations made to areas which he has to hand over back or to other property or land handed over to him for the purpose of this work.

- 3) The lands shall as hereinbefore mentioned, be handed over back to the Engineer-in-charge within three months after the completion of the work under this contract or the termination of the contract whichever is earlier. Also, no land shall be held by the Contractor longer than the Engineer-in-charge shall deem necessary and the contractor shall on due Notice by the engineer-in- charge vacate and return the land which the Engineer-in-charge may certify as No longer required by the contractor for the works. In case the lands are not handed over back to the Corporation within the time limit; specified above, penal rent as may be decided by the Engineer-in-charge will be recoverable and further legal action to vacate the land will be taken by the Engineer-in-Charge.
  
- 4) If the vegetation and forest are Noticeable in the project area, the contractor should take utmost care for the preservation of vegetation and forest. Any damage to this vegetation will have to be compensated by the contractor and the decision from the Engineer-in-charge will be final and binding on the contractor. The contractor shall note that any damage to the forest will attract the provision of the Forest Conservation Act, 1980.

#### **18. Contractor Not to Dispose of Soil, Trees Etc.:**

The contractor shall not sell or otherwise dispose of or remove except for this contract, sand, stone, clay, ballast, earth, rock, or other substance or materials that may be obtained from the excavation made for this contract or any produce from the site. All such substances materials and produce shall be the property of the Corporation and shall be disposed of in a manner and at the place shown in the drawings or as and where the Engineer-in-charge may direct.

#### **19. Excavated Material:**

All the materials available from excavation will be the property of the Corporation and shall be disposed off only as directed by the Engineer-in-charge. The materials of approved quality available from the excavation including that carried out by the Corporation may be used by the contractor in the items of works included in Schedule ‘B’ or for ancillary or preparatory work free of cost. However, the contractor has to pay Royalty charges to the Revenue Department. As per prevailing Government orders. Prior approval of the Engineer-in-charge for such use shall, however, be taken. The contractor shall make proper arrangements for sorting out and stacking material of approved quality that he proposes to use as aforesaid. The corporation will be free to make use of other materials not required or not likely to be required for use by

the contractor as will be determined by the Engineer-in-charge.

The excavated material not to be used by the contractor as above or stacked for his use, but remaining unused at the site after completion of works, shall be disposed of by the contractor at his own cost in a manner and at the place shown in the drawing or as and where the Engineer-in-charge may direct. The contractor should utilize material available from excavated stuff for backfilling.

**20. Cleaning up:**

- 1) The contractor shall at all times keep the construction areas and his colony and storage free from accumulation of waste or rejected materials.
- 2) Before the completion of the work, the contractor shall remove all rubbish from and around the premises and all tools, scaffolding equipment, and materials that are not part of permanent structures except otherwise asked for or as provided under any other clauses of this contract, the premises will be left in a manner fully satisfactory to the Engineer-in-Charge.

**21. Gold / Silver, Minerals, Oils, Relics, etc. found on the site:**

All gold, silver, Oil, or other minerals of any description and all precious stones, coins treasure, relics, antiquities, and other similar things which shall be found in or upon the site, shall be the property of the Government and the contractor shall duly preserve the same to the satisfaction of the Engineer-in-charge and shall from time to time, deliver the same to such person or persons as the Engineer- in-charge may appoint.

**22. Access to site and work and co-operation with other contractors:**

The Engineer-in-charge may, if he considers fit, from time to time, enter on any lands which may be in the possession of the contractor under the contract to execute any works Not included in the contract and may execute such works Not included in this contract by agents or by other contractors at his option and the contractor shall in accordance with the requirements of Engineer-in-charge, including occupation of lands by structures or otherwise to any other contractor employed by the Corporation and his workmen or for the workmen of the corporation who may be employed in the execution on or near the site of work not included in the contract, or of any contract in connection with or specially to the works and in default, the contractor shall be liable to the Corporation for any delay or expenses incurred because of such default. The contractor shall not, however, on account of any such modified, new, or extra work executed by or for the sake of the Corporation be entitled to claim relief from the

obligation to execute the works. The contractor shall also cooperate with other contractors with all fairness and mutual understanding and use the common facilities like access roads to quarries, water supply arrangements, etc. The contractor shall also not cause advertently or inadvertently any obstruction or impediments in the progress of the other works being executed by the Corporation or through other agencies. In the event of a dispute regarding the claim, the responsibility, liabilities, etc. in respect of such facilities, the decision of the Engineer-in-charge shall be final.

**23. Layout of construction roads:**

The contractor shall have to submit a detailed plan to the Engineer-in-Charge, showing the layout of the work site, roads, and approach roads he proposed, before he starts the actual work. Such road layout plan will be scrutinized by the Engineer-in-Charge and any modifications he suggests will be binding on the contractor. If the Engineer-in-Charge decides to have some of the roads proposed by the contractor as common roads for the common use of the Corporation and other contractors or convenient and for a compact and planned layout of the work site, the contractor will be bound to construct them and allow them to be used simultaneously by other contractors and departments. In case of disputes, the decision of the Engineer-in-Charge shall be final and binding on the contractor.

**24. Signing Field Books, Longitudinal Sections, Cross Sections, and Measurement Books:**

Before starting the work, and at the end before the work is covered, levels for plotting the longitudinal section (along the axis as decided by the Engineer-in-Charge or his authorized representative) and cross-section of the portion of the work shall be taken by the authorized Engineer of the Corporation in the presence of the contractor or his duly authorized representative and the same shall be recorded in the measurement books and field books by the authorized Engineer of the Corporation only. If the contractor fails to sign the levels and measurements recorded by the Engineer-in-Charge or his representative in the authorized books, the same shall be final and binding on the contractor. For this purpose, suitable date or dates shall be fixed by the Engineer-in-Charge and intimated to the contractor at least three days in advance. If the contractor or his duly authorized agent fails to attend on the appointed date or dates, the levels shall be taken in his absence and such levels and longitudinal sections and cross sections based thereon shall be final and binding on the contractor. The levels will be taken on such alignment and cross sections as will be useful for reference permanently and described under specifications for 'Excavation'. The point of locations for the level will depend upon the roughness of the area and will also be at least in conformity with the requirements of specifications for 'Excavation' as far as possible. Based on the above measurements and levels

recorded by the Engineer of the Corporation, the contractor shall prepare computerized drawings of the plan, L-Sections, Cross Sections etc. and submit the same to the Engineer-in-Charge. Thereafter the contractor can prepare, print and submit the Running Bills along with the quality control test result in the standard format for the payment.

**25. Procurement, storage, and maintaining cement store account:**

- 1) The cement used for this work shall conform to various BIS codes unless otherwise specified by the Engineer-in-charge.
- 2) The cement required for the work under this contract shall be procured, well in advance by the contractor in polythene bags as received from the cement factories. In case, where the batching plant is used, the procurement of cement through silo will be permitted if requested by the contractor to Engineer-in-charge.
- 3) The contractor shall produce proof of purchase of cement from the factories/authorized dealer. The purchase bill supported by Delivery Challan and Excise Gate Pass and Quality test reports which shall constitute adequate purchase bill/invoice and shall be enclosed with the Running Account bills of work in which said cement is consumed.
- 4) Cement shall be stored in such a way as to allow the removal and use of cement in chronological order of receipt i.e. first received being first used.
- 5) Cement shall be kept in a store under double locking arrangement (one key be operated by contractor and second key be operated by the authorized person of Corporation) so that it can be taken out or fresh stock admitted with the knowledge of supervising staff of the Corporation. The watch and ward of the cement stores shall be the responsibility of the contractor.

**26. Daily cement consumption report:**

- 1) Contractor shall maintain daily cement consumption account for each item in format as directed by Engineer-in-charge. The daily quantity executed for all the items executed and cement consumed shall tally with the daily cement issued from store. The report of daily cement consumed, quantity executed shall be maintained by contractor on site and copy signed by the site engineer of the Corporation shall be submitted to Engineer-in-charge. The abstract of item wise daily cement consumption and quantity executed

shall be enclosed with bills by the contractor, which will form basis of payment of bills.

- 2) In the event of cement in branded bags remaining surplus due to authorized reduction in the quantity of work certified by the Engineer-in-Charge and as Noticed after the issue of completion certificate, the contractor may choose any of the following three alternatives:
  - a) To transfer the cement in branded bags, with prior written permission from the Engineer-in-Charge to any of the contract work with the Corporation and account for the same therein.
  - b) To sell the cement with prior written permission from the Engineer-in-Charge to any of the contractors carrying out the works on contract with the Corporation at a price to be negotiated by both the contractors and account for the same.

**27. No interest on money due to the contractor:**

No omission by the Engineer to pay the amount due upon measurements or otherwise shall vitiate or make void the contract nor shall the contractor be entitled to interest on any guarantee bond or payment in arrears nor on any balance which may on the final settlement of his account be found due to him.

The payments for the work done will be made as and when the funds are made available by Maharashtra Krishna Valley Development Corporation, Pune.

**28. Other Contractor for the work:**

Corporation has the right to split up the project work detailed in the Work and Site Conditions, into distinct items and this contract shall apply only to those items which shall have been specified in this contract.

Should the Corporation enter into an agreement with other contractors for specified items of the project work, each contractor shall co-operate with others to the fullest extent and shall allow others every facility and co-operation for the execution of their works simultaneously and satisfactorily as intended in the designs, specifications, and drawings. Should there be a dispute or disagreement between the contractors for any cause whatsoever, the same shall be referred to the Engineer-in-charge whose decision regarding the co-ordination, cooperation, and facilities to be provided by any of the contractors to others shall be final and binding on all parties and such a decision or decisions shall not vitiate any contract nor absolve the contractor of his responsibilities under the contract nor form the grounds for any claim of compensation.

**29. Co-ordination with other contractors:**

The contractor should note that there will be other agencies including Corporations, working in the same area for works other than that included in this contract. The contractor shall co-operate with these agencies to the fullest extent and shall allow them reasonable facility and co-ordination for the execution of work, simultaneously and satisfactorily as intended in the contract conditions, specifications, and drawings.

Should there be a dispute or disagreement between the contractor and other agencies for any cause whatsoever, the same shall be referred to the Engineer-in-charge whose decision regarding Co-ordination and facilities to be provided by all the contractors to others shall be final and binding on all parties and such decision shall not vitiate any contract or absolve the contractor of his responsibility under the contract and shall not form the ground for any claim or compensation.

**30. Access to the Contractor's Books**

Whenever it is considered necessary by the Engineer-in-charge to ascertain the actual cost of execution of any particular item of work or supply of plant or material he shall direct the Contractor to produce the relevant Documents such as pay-rolls, records of personnel, invoices off materials and all other data and Documents relevant to the item or necessary to determine its cost, etc. and the contractor shall when so required furnish information, pertaining to the aforesaid items in the mode and manner that may specified.

**31. Breach on part of Corporation Not to Annul Contract**

No breach or non-observance on the part of Corporation of any of the conditions contained herein shall annul this contract or discharge the Contractor from the observance and performance thereof, but on application to the Engineer-in-charge, an extension of time may be given to the Contractor in respect of such breach or Non- observance by the Corporation, which shall be governed by Clause 6 of conditions of contract.

The Contractor shall not, however, be entitled to consideration or any extension of time for any item of the work unless the contractor shall have made an application in writing to the Engineer-in-charge within one month of the arising of the cause needing such extension.

**32. Personnel of the Contractor:**

The Contractor shall, at all times, maintain on the work, Managers, and other staff of duly qualified as mentioned in section 5.6 of sufficient experience of similar other jobs, to assure that the quality of work turned out shall be as intended in the specifications. The Contractor shall also maintain at the work a Works Manager of sufficient status, experience and office, and duly authorize him to deal with all aspects of the day-to-day work. All communications to and commitments by this Works Manager shall be absolutely binding on the Contractor.

The Contractor shall supply to the Engineer-in-charge details of names, qualifications and experience in regards to all supervisory staff employed by the Contractor and Notify changes when made, and satisfy the Engineer-in- charge regarding the quality and sufficiency of staff thus employed.

The Engineer-in-charge will have the unquestionable right to ask for changes in the quality and no of contractor's staff. The contractor shall on the written directives of the Engineer-in-charge, remove from the works any person employed thereon who may in the opinion of the Engineer-in-charge be incompetent or has misconducted himself. Such person shall not be employed again, on the work, without the written permission of the Engineer-in-charge. The contractor shall have to submit information regarding proof of payment of Professional Tax and the clearance certificates.

**33. The contractor to supply and be responsible for the sufficiency of the means employed:**

The Contractor shall supply & take upon himself the entire responsibility of the sufficiency of the scaffolding, timbering, machinery, tools, implements, and generally of all the means irrespective of whether such means may or may not have been approved of or recommended by the Engineer-in-charge and the Contractor must accept all risks of accidents or damages from whatever cause they may arise, until the completion of this contract.

**34. Accuracy of lines, levels, and Grades Setting Out:**

- 1) The contractor shall be responsible for the true and proper setting out of the work and for the correctness of the positions, levels, dimensions, and alignment of all parts of the work and for the provisions of all necessary instruments, appliances, and labor in connection with this.
- 2) To set out, one temporary / permanent bench mark shall be established by the Corporation near the site, the value of which shall be given to the contractor, by the Engineer-in-charge. All the setting out shall be with reference to this benchmark and reference line.
- 3) If at any time during the progress of works, the error appears or arises in the position, level, dimension, or alignment of any part of the work, the contractor shall rectify such error to the satisfaction of the Engineer-in-charge without any extra cost to the Corporation.
- 4) The periodical checking of these by Corporation staff shall not absolve the contractor of his responsibility regarding accuracy as contractor is also responsible to see that the things proceed in such a manner so as to give desired ends product. In case of deviation, the contractor shall make good on the discrepancy at his own cost and without any compensation

for the additional work involved. Wherever such discrepancies, if any, are found to arise between the works of different contractors at the junction of their works the relative liability to set right their respective discrepancies shall be fixed by the Engineer-in-charge, whose decision shall be final and binding on the contractors concerned. The Engineer -in-charge shall further have the unquestioned right to rectify the discrepancies and recover the costs from the contractor or contractors according to proportions as he may consider reasonable.

- 5) It is the responsibility of contractor to preserve the benchmark and the reference points established for setting out.

**35. Passing of Foundation etc.:**

After the completion of the work of excavation, the same will be checked and passed by the Engineer-in-charge as per the powers vested in them. No masonry or concrete or backfilling shall be laid unless the foundation is so passed. No concreting shall commence unless the centering and the reinforcement are checked and passed by the Engineer-in-charge.

**36. Inspection of Works:**

The Engineer or his duly authorized representative shall have at all times full power to inspect the work whenever in progress either on the site, in the contractor's premises or the work site. Further, the contractor shall not without written authorization, permit entry on site of work of any person except the authorized representative of the Corporation or the Engineer or the contractor's staff and labour directly engaged on and in connection with the work.

The contractor shall, at his cost, provide all necessary facilities for proper inspection and supervision of the work, gangways, platforms, scaffolding, ladders, etc., of suitable dimensions and sufficiently strong at appropriate locations, and all accesses to passages, etc. shall be well lighted and maintained in good order. The Engineer's decision about the sufficiency and adequacy thereof shall be final.

The contractor shall, during working hours, maintain a supervisor of sufficient training and experience to supervise various items and operations of the work and the said supervisors shall remain present during inspections of the Engineer. All orders and directions given to such supervisors or other staff of the contractor shall be deemed to have been given to the contractor directly. Further, the Engineer may, by due notice to the contractor, be present on any specified inspection and the contractor shall comply with such directions.

**37. Opening out works for Inspection:**

Should the Engineer-in-charge consider, if necessary, to satisfy himself as to the quality of work the contractor shall at any time during the continuance of the contract pull down or cut into any part of the work and make such openings into and such an extent through the same as the Engineer-in- charge may direct and the contractor shall make good the same at his cost and to the satisfaction of the Engineer-in-charge.

**38. Work Order Book:**

The contractor shall maintain a bound work order book at the work site as the Engineer-in-charge may direct. This work order book shall have machine-numbered pages in triplicate. The contractor shall make them available to the Engineer-in-charge or his representative, whenever called for.

Executive Engineer or his representative may record the order of works, in this book leaving the original copy in the book and removing the second and third copies with him. The contractor or his authorized representative shall also sign this work order, in token of its acceptance. All orders recorded in this work order book shall be deemed to have been served on the contractor. On completion of the work, all the work order books may be handed over to the Executive Engineer. In the event of refusal of the Contractor's representative on the spot to sign the work order book, the Engineer-in-charge shall take the necessary further steps in respect of further communication and control, modification, or stoppage of work as deemed fit at the entire

responsibility of the contractor.

**39. Reference to Standard Specifications:**

The specifications of the work as enclosed with this contract Documents are drawn with a specific reference to site conditions and do not everywhere include the details of the standard tests and procedures which are already laid down and available in the current Indian Standard Specifications. Wherever such details are not specified in this contract, the provision under current Indian Standard Specifications and/or the Standard Specifications of the Government of Maharashtra shall be deemed to be applicable.

**40. Extra Items:**

Extra items of work shall not vitiate the contract. The Contractor shall be bound to execute extra items of work as directed by the Engineer-in-charge. The rates for extra items will be governed by the provisions of clauses 13 and 30 of the conditions of the contract.

**41. Price Variation:**

1) If during the operative period of the Contract as defined in condition (i) below, there is any variation in the Consumer Price Index (New Series) for industrial workers for Solapur center as per the Labour Gazette published by the Commissioner of Labour Government of Maharashtra and/or in the Wholesale Price Index for all commodities, prepared by the office of Economic Adviser, Ministry of Industry, Government of India, or in the price of petrol/oil and lubricants and major construction materials like bitumen, cement, steel, various types of metal pipes, etc., then subject to the other conditions mentioned below, price adjustment on account of

- |   |          |
|---|----------|
| 1. Labour Component                             | -K1 12 % |
| 2. Material Component                           | -K2 82 % |
| 3. Petrol, Oil, and Lubricants (POL) components | -K3 6 %  |

**Star Rate**

4. H.Y.S.D.	Rs. 51653.00/MT
5. Mild Steel Component	Rs.-----/ MT
6. Cement Component.	Rs. 5720.00/MT

Calculated as per formula hereinafter appearing, shall be made. Apart from these, No other adjustments shall be made to the contract price for any reasons whatsoever component percentages as given below are as of the total cost of work put to tender excluding star rate items. The total of Labour, Material & POL components shall be 100 and other components shall be as per actual.

**1. Formula for Labour Component-**

$$V_1 = 0.85 \times P \times [K_1 / 100] \times [L_1 - L_0 / L_0]$$

Where,

$V_1$  = Amount of price variation in Rupees to be allowed for Labour Component.

P = Cost of work done during the quarter under consideration (Excluding royalty of materials) minus the cost of Cement, HYSD and Mild Steel, bitumen, Cl. & Dl. Pipes calculated at the basic star rates as applicable for the tender, consumed during the quarter under consideration.

$K_1$  = Percentage of Labour Component as indicated above.

$L_0$  = Basic consumer price index for **Pune** center shall be the average consumer price index for the quarter preceding the month in which the last date prescribed for receipt of tender falls.

$L_1$  = The average consumer price index for **pune** Center for the quarter under consideration.

## 2. Formula for Material Component-

$$V_2 = 0.85 \times P_x [K_2 / 100] \times [M_1 - M_0 / M_0]$$

Where,

$V_2$  = Amount of price variation in Rupees to be allowed for materials component.

P = Same as worked out for labour component.

$K_2$  = Percentage of Materials Component as indicated above.

$M_0$  = The basic wholesale price index shall be the average wholesale price index for the quarter preceding the month in which the last date prescribed for receipt of tender, falls.

$M_1$  = Average wholesale price index during the quarter under consideration.

## 3. Formula for Petrol, Oil and Lubricant Component

$$V_3 = 0.85 \times P [K_3 / 100] \times [P_1 - P_0 / P_0]$$

Where,

$V_3$  = Amount of price variation in Rupees to be allowed for P.O.L. Component.

P = Same as worked out for labor component.

$K_3$  = Percentage of Petrol, Oil, and Lubricant Component.

$P_0$  = Average price of H.S.D. at **Mumbai** during quarter preceding the month in which the last date prescribed for receipt of tender, falls.

$P_1$  = Average price of H.S.D. at the at **Mumbai** during the quarter under consideration.

## 4 Formula for H.Y.S.D. and mild Steel Component: --

$$V_4 = S_0 [S_1 - S_0] / S_0 \times T$$

Where,

$V_4$  = Amount of price variation in Rupees to be allowed for HYSD / Mild Steel component.

$S_0$  = Basic rate of HYSD / Mild Steel in Rupees per metric ton as considered for working out the value of P.

$S_{l1}$  = Average steel index as steel - long as per Economic Advisors Web Site during the under consideration.

$S_{l0}$  = Average steel index as steel - long as per Economic Advisors Web Site for the quarter preceding the month in which the last date prescribed for receipt of tender, falls.

T = Tonnage of steel used in the permanent works for the quarter under consideration.

##### **5. Formula for cement component:**

$$V_5 = C_0 [C_{l1} - C_{l0}] / C_{l0} \times T$$

Where,

$V_5$  =Amount of price escalation in Rupees to be allowed for cement component.

$C_0$  =Basic rate of cement in Rupees per metric ton as considered for working out the value of P.

$C_{l1}$  = Average cement index for gray cement published on the Economic Advisors website for the quarter under consideration.

$C_{l0}$  = Average of cement index for gray cement published in the Economic Advisors Web Site for quarter preceding the month in which the last date prescribed for receipt of tender, falls.

T = Tonnage of cement used in the permanent works for the quarter under consideration.

##### **The following conditions shall prevail:**

Contractor

No. of Corrections

Executive Engineer

- i. The Operative Period of the contract shall mean the period mentioned in the schedule and the extension of time, if any. The decision of the Engineer-in-charge as regards the Operative Period of the contract shall be final and binding on the contractor.
- ii. Where any compensation for liquidated damages is levied on the contractor on account of delay in completion or inadequate progress under the relevant contract provisions, the price adjustment amount for the balance of work from the date of levy of such compensation shall be worked out by pegging the indices L1, M1, C1, P1, B1, S/1, and C/1 to the levels corresponding to the date from which such compensation is levied.
- iii. Price Variation under this Clause shall not be payable for the extra items required to be executed during the completion of work and also on the excess quantities of items payable under the provisions of Clause 38 of the Contract. The rates payable for extra items or the extra quantities under Clause 38 are to be fixed as per current CSR or as mutually agreed subject to yearly revision till completion of such work. In other words, when the completion/execution of extra items as well as extra quantities under Clause 38 of the Contract, extends beyond the operative period, then rates payable for the same beyond the period shall be revised with reference to the current CSR on year-to-year basis or revised in accordance with mutual agreement thereon, as provided for in the Contract, whichever is less.
- iv. This clause i.e. operative both ways, i.e. if the price variation as calculated above is on the plus side, payment on account of the price variation shall be allowed to the Contractor and if it is on the negative side the Government shall be entitled to recover the same from the contractor and the amount shall be deductible from any amounts due and payable under the contract.
- v. To the extent that full compensation for any rise or fall in costs to the Contractor is not entirely covered by the provision of this or other Clauses in the Contract, the unit rate and prices included in the Contract shall be deemed to include amounts to cover the contingency of such other actual rise or fall in costs.
- vi. Quarter under consideration means a period of three calendar months starting from January i.e January to March, April to June, July to September and October to December.

**42. Fencing, Lighting and Ventilation:**

1. The Contractor shall be responsible for the proper lighting, fencing, guarding, and necessary health and safety measures while executing all works under this contract and for the proper provision of temporary roadways, guards, footways, fences, caution notices, etc., as far as the same may be rendered necessary by reasons of the work, for the accommodation of workmen, foot passengers or other traffic and of owners and occupiers of adjacent property and of the public and shall remain responsible for any accidents that may occur on account of his failure to take proper and timely precaution.
2. Maintenance of Services- After all the work under this contract is completed and accepted as such, in case the Engineer-in-charge so directs, the contractor shall maintain the lighting, ventilation, communication facilities, etc. up to a date determined by the Engineer-in-charge.

**43. Safety Measures:**

The contractor shall arrange for utmost safety in his operations. In case the contractor fails to make requisite arrangements the Engineer-in-charge shall be entitled to cause them to be provided and to recover the cost thereof from the contractor. The following are some of the measures listed, but the same are not exhaustive and the contractor shall add to and suggest these precautions on his own where necessary and should comply with the directions issued by the Engineer-in-charge on this behalf from time to time and at all times.

Providing protective head guards to workers in works like deep excavation, underground works, etc. to protect them against fall of overburdened materials.

Getting the workers in such jobs periodically examined for chest trouble due to too much breathing in fine dust.

Taking such normal precautions like fencing and lighting to excavations or trenches, not allowing, nails or metal parts or useless timber to spread around, marking dangerous areas for blasting, whistles, etc.

Providing sufficient suitable and safe access to all work spots including ladders, gangways, platforms, etc. avoiding naked wires, etc. would electrocute the workers. Taking necessary steps towards training the workers concerned on the use of machinery before they are allowed to handle them independently and taking all necessary precautions in and around areas where machines, hoists, and similar units are working.

#### **44. Liability for accidents to persons:**

It shall be the contractor's responsibility to protect against accidents on the work site. He shall indemnify the Corporation against any claims for damage to the property, injury to workers or any other persons including Corporation staff working at the site of work, deaths, etc.

On the occurrence of an accident resulting in death or which is so serious as to be likely to result in death, the contractor shall within 24 hours, report in writing to the Engineer-in-charge, the facts stating clearly the circumstances in which the accident has occurred and the subsequent action taken. Other minor accidents causing minor injuries and loss to property should be communicated in writing, promptly to the Engineer-in- charge. In all cases, the contractor shall indemnify the corporation against all losses or damage resulting directly or indirectly from the contractor's failure to report in the manner aforesaid. This includes penalties or fines if any, payable by the Government as a consequence of failure to give notice under the Workmen's Compensation Act or failure to confirm to the provisions of the said Act regarding such accidents.

In the event of an accident in respect of which compensation may become payable under the Workmen's Compensation Act VIII, of 1923 including all subsequent modifications thereof, the Engineer-in-charge may retain the sums of money as may in the opinion of the Engineer-in-charge be sufficient to meet such liability out of the amounts payable to the contractor. These sums shall be recovered from the immediate payment due to the contractor in one installment or more than one installment. The decision of the Engineer-in-charge regarding this shall be final and binding on the contractor. On receipt of an award from the Labour Commissioner, the balance amount shall be reimbursed to or recovered from the contractor.

It should be noted that though the Corporation is a Principal employer, the complete responsibility of compensation shall be on the contractor.

**45. Covering of work:**

The Contractor shall give not less than five days Notice in writing to the Engineer-in-charge of the work which is proposed to be covered up or placed beyond the reach of measurements so that the measurements may be taken before the work is covered up or placed beyond the reach of measurements. No work shall be covered up or placed beyond the reach of measurements, before ensuring that the measurements of work to be covered up are recorded. Any work covered up or placed beyond the reach of measurements without such notice having been given or consent obtained the same shall be uncovered at the Contractor's expense and in default thereof, no payment or allowances shall be made for such work or for materials with which the same was executed.

**46. Maintenance during the defect liability period:**

After the works are completed in all respects in accordance with the contract conditions a completion certificate will be issued by the Engineer-in-charge.

From the date of issue of the completion certificate, till the expiry of the period specified in section 4.19, the Contractor shall be liable for the replacement of any part of work found to be defective from the causes arising from faulty materials or workmanship or other causes, for which in the judgment of the Engineer-in-charge, the Contractor is responsible and for making good any damage arising therefrom.

**47. Bank Guarantee, Renewal & Encashment:**

A bank guarantee shall be given on the stamp paper of Rs.100/- in the form prescribed by the Corporation. The bank guarantee shall be valid for the entire period of the contract plus an extension of the work period. In case the contract period is extended it will be the responsibility of the

contractor to get the validity of the Bank Guarantee extended in view of the extension proposed, without which extension will not be granted. The Engineer-in-charge of the Corporation reserves the right to encash the bank guarantee in the event of a breach of any of the terms and conditions of the contract and failure to perform as per contract.

The Executive Engineer is empowered to approach the Bank for encashment and may take recourse to approach the Reserve Bank of India's Vigilance Branch and 'Ombudsman' as found necessary.

**48. Instrumentation:**

In case, it is proposed to have any instrumentation in work, the instruments, and their accessories will be procured and installed by the Corporation as per programme framed by the Engineer-in-charge. Care should be taken by the Contractor to protect these instruments as well as their connections during various construction operations. The contractor shall also extend all facilities for the installation and observation of these instruments. All the operations required for facilitating the installation of the instruments shall be included in the relevant items of tender. No claim, however, shall be entertained due to any delay or obstruction that might be created due to installation or observation.

**49. Removal of imperfect work and/or payment at reduced rates:**

If it shall appear that the work has been executed with unsound, imperfect, or of an inferior quality or otherwise Not in accordance with the contract Documents the contractor shall at his own cost rectify, reform, remove or reconstruct the same, wherein whole or in part as may be, directed by the Engineer-in-charge, whether or not, the value of any such work or material shall have been included in any payment made to the contractor. The decision of the engineer-in-charge shall be final and binding on the contractor. The Executive Engineer may, if he thinks fit, allow such work to be paid at reduced rates approved by the Superintending Engineer whose decision will be final and binding, provided further that the rates fixed by the Superintending Engineer, be Not acceptable to the contractor, he shall have the option to replace the defective work or materials with ones in accordance with the specified standards.

**50. Jurisdiction of court for disputes:**

Disputes, if any, arising out of this contract shall be subject to the jurisdiction of the High Court of Bombay.

**51. GST TAX:**

TDS in Respect of GST Will be deducted as per the G.R and circulars issued by Central or state government from time to time.

**52.** Deduction of Income Tax at 2% plus applicable surcharge thereon of the value of the work done will be made from the Contractor's every R.A. bill will be done. The contractor shall make arrangements to supply fuel for domestic use to all the laborers engaged on site and prevent the labors from cutting trees for fuel. If the contractor's labour is found to cut the trees the contractor shall be held responsible for the same and shall be punished as per the provision in Forest Conservation Act, 1980.

**53.** The royalty charges are to be paid by the Contractor to the Revenue authorities as mentioned in clause 36. The amount of the royalty charges will be withheld initially by Corporation / Government for the purpose of payment towards royalty charges. This amount shall be released to the contractor after fulfilling the following conditions.

- i. The contractor shall submit proof of the payment of the royalty charges to the concerned Revenue Authorities.
- ii. The total amount that can be released shall be limited to the actual payment made as mentioned above.
- iii. If the actual royalty charges are less than the amount withheld, the remaining amount shall be released by the Corporation / Government.

- iv. If the actual royalty charges are more than the amount withheld, the contractor shall pay the excess amount to the concerned Revenue Authority without any burden on the Corporation / Government.
- v. The contractor shall indemnify the Corporation / Government towards payment of the royalty charges.

**54. Shifting of electric line:**

In case shifting of an electric line is necessary, Engineer-in-charge will initiate the proposals to the concerned authorities. It will be the responsibility of the contractor to make good for early clearance of the proposal so that there should not be any delay in the completion of the work. The contractor should pay the required cost of shifting these lines to the concerned authorities. The same will be reimbursed to the contractor by the Corporation as per the availability of funds.

**55. Insurance Charges:**

- 1) The contractor has to take insurance of the whole work in the contract including personnel and machinery deployed to the work.
- 2) Insurance premium charges are to be paid by the contractor to the “Director of Insurance Maharashtra State, Mumbai”.
- 3) The insurance amount will be released to the contractor as per the conditions mentioned below.
  - a) The contractor shall submit proof of Insurance Policies to the Engineer-In- Charge.
  - b) After verification of the record submitted by the Contractor, the total amount that can be released shall be limited to the actual payment made as mentioned in condition (a).
  - c) If the actual insurance charges claimed are less than the provision made in the tender, the amount shall be paid as per actual.

**56. Mode of payment of the quantities of excavation, masonry, and concrete items executed in excess of 125%**

Clause. No. 38 of B-1 Tender form pertains to payment of quantities of different items of schedule "in excess of 125% of the tendered quantities It is to be clarified that in the case of items of excavation in soft strata and hard strata in excavation (ie. quantity given in schedule 'B' Part-I, Excavation in soft strata quantity given for excavation in hard strata) exceeds by 125% during execution for payment of quantity executed in excess of 125% of total quantity of excavation following procedure will apply. **DELETED**

**Case 1:** Where the quantity of excavation executed, exceeds 125% of the total tendered quantity of items of excavation in soft strata and in hard strata but the quantity executed of any one of the individual items is less than or equal to the tendered quantity for that item All the excess quantity beyond 125% of total tendered quantity in items of excavation in soft strata and hard strata will be paid by revising the rate of only that item where excess has occurred.

**Case 2:** Where the total quantity of excavation executed for both items (excavation in soft strata and hard strata) exceeds 125% of the total tendered quantity of items of excavation quantity in excess of 125% of the total tendered quantity will be distributed in the Ratio of

Executed quantity of individual item of excavation to

Total executed quantity of items of excavation in soft strata and hard strata.

Total executed quantity of items of excavation in soft strata and hard strata. And will be revising the rate of individual item as per clause 38 (2) subject of the provision that the revision of rate will be applicable only for the quantity of individual item executed beyond the tendered quantity.

In case of executed quantity is less than 75% of the total quantity of excavation in soft strata these will be treated on similar lines as in case (1) and (2) above

**Case 3:**

Where the total quantity of all masonry items taken together exceeds 125% of the total tendered

quantities of all masonry items, quantity in excess of 125% of the total tendered quantity will be distributed in the Ratio of

Executed quantity of individual items of masonry to the

Total executed quantity of all masonry items taken together.

And will be paid by revising the rate of individual item as per clause 38 (2) subject to the provision that the revision of rate will be applicable only for the quantity of individual items executed beyond the tendered quantity.

In case of executed is less than 75% of the quantity of all masonry items taken together these will be treated on similar lines as in case (1) and (2) above. **DELETED**

#### **Case 4:**

Where the total quantity of all concrete items taken together exceeds 125% of the total tendered quantities of all concrete items, quantity in excess of 125% of the total tendered quantity will be distributed in the Ratio of

Executed quantity of all individual items of concrete to the

Total executed quantity of all concrete items taken together.

and will be paid by revising the rate of individual item as per clause 38 (2) subject to the provision that the revision of rate will be applicable only for the quantity of individual items executed beyond the tendered quantity

In case of executed quantity is less than 75% of the total quantity of all concrete items taken together these will be treated on similar lines as in cases (1) and (2) above

Full payment of quantities in excess of 125% of tendered quantity for items other than excavation masonry and concrete items, provision of clause 38 (2) of B-1 Tender form will be applicable.

#### **57. Labour welfare cess**

The amount of labour welfare cess at the rate of 1% will be recovered from the contractor through every Running / final bill

**58. Web-Based SCADA and ERP for monitoring**

The monitoring software along with ERP and Web-based SCADA system must also be provided to the work.

Separate panel for the SCADA system along with independent sensors other than sensors required for operation and controlling of the plant should be installed at the plant site to facilitate the independent supervision by WRD

The activities of drilling and grouting must be logged and digitally recorded permanently on server which should be in non-editable form.

The activities/progress can be seen online on the site.

Data should be directly accessible to the WRD server.

All the sensors should be calibrated properly and the necessary calibration certificate along with the validity period should be produced by the concerned authority as and when required.

A facility to display the location of the Hot Mix plant on a GIS map should be provided.

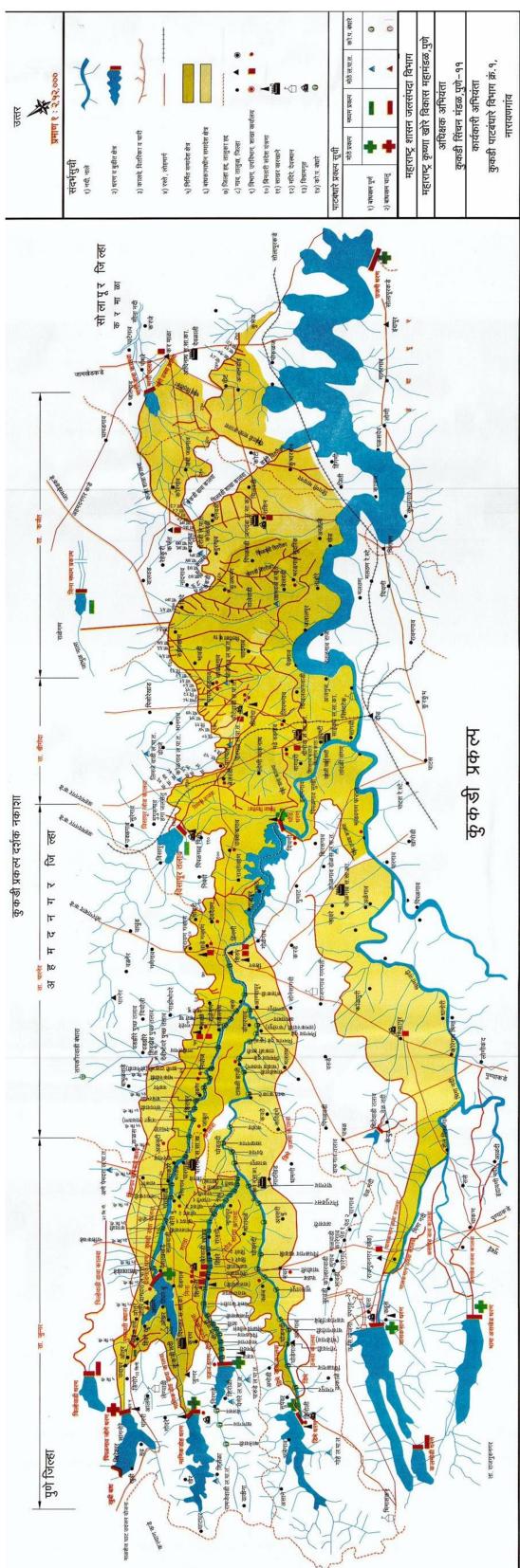
**59. Handing over of work:**

All the work and materials, before finally being taken over by the corporation will be the entire liability of the contractor for guarding, maintaining, and making good any damages of any magnitude. Interim payments made for such work will not alter this position.

The handing over by the contractor and taking over by the Executive Engineer or his authorized representative will be always in writing and copies will go to the Executive Engineer or his authorized representative and the contractor. It is, however, understood that before taking over such work, the Corporation will not put it into regular use as distinct from casual or incidental one, except as specifically mentioned elsewhere or as mutually agreed to.

**60. The Contractor shall provide setup of site office.**

**SECTION- 16**  
**DRAWINGS**



## **VOLUME-II**

## **SPECIFICATIONS**

**SCHEDULE SHOWING ITEMS OF WORK  
AND APPLICABLE SPECIFICATIONS**

Sr. No.	Section No.	Particulars	Page No.
1)	Section 1	General Specifications	
2)	Section 2	Excavation	
3)	Section 3	Embankment	
4)	Section 4	Cement concrete	
5)	Section 5	Steel Reinforcement	
6)	Section 6	Polythene Film	
7)	Section 7	Dismantling Stone Masonry/ Concrete / R.C.C.	
8)	Section 8	C.C. Bed Lining	
9)	Section 9	Providing C.C. Side Lining	
10)	Section 10	SC – Shotcreting	
11)	Section 11	M- Stone Masonry Structure	
12)	Section 12	Bituminous Geomembrane Lining	
13)	Section 13	Quality Control Test	

## SECTION - 1

### GENERAL SPECIFICATION

**1.0.0 MATERIALS:**

**1.1.1 PETROLOILANDLUBRICANT:**

The Contractor shall have to install his own supply for petrol and diesel at the site. The location of pumps shall have to be got approved from the Engineer-in charge and usual precautions which are necessary, for such installation will have to be taken.

**1.1.2 STONE FOR RUBBLE MASONRY AND FOR METAL:**

The Contractor shall make his own investigation regarding locations of quarries, quality of stone and adequacy of the various sources of stone in quarry areas known to him. Excavated material of hard rock excavation has been dumped on the canal site. Contractor can make use of this material. Material has to be sorted out by Contractor at his cost and should be got approved from the Engineer-in charge before its use in the work. However it is for Contractor to investigate the quarries which will yield stone in sufficient quantities and of required quality. Over burden on quarry shall have to be removed by the Contractor at his own cost.

The locations of quarries have to be such that they do not affect permanent structures and should not be near the existing or proposed habitations. The locations and size of the quarries shall be subject to the approval of the Engineer in-charge. However, if a quarry location, approved by the Engineer-in-charge, on its opening does not yield adequate or suitable stone, no claims can be raised against the Corporation. In that case other quarries will have to be established by the Contractor at his own cost and risk and the stone got approved from the Corporation for its quality before using it in the work.

If the quarries located- are in private properties, the Contractor shall negotiate with the respective owners and shall attend to legal rights and attend to payments etc. to the concerned parties for operation of these quarries at his own cost. Similarly, he shall make arrangements for roads leading to and from the stone quarries to the work site at his own cost.

**1.1.3 SAND:**

The Contractor is advised to make his own enquiries regarding adequacy, proper quality and cost of sand, approaches to quarries etc. The sand quarry to be used and any change in location shall have prior approval of the Engineer-in-charge.

The Contractor shall, however, obtain permission from Revenue and other authorities before removing the material and shall pay royalty and other taxes. Octroi duty, escort fee, if any, for sand which shall not be reimbursed. The Contractor shall have to make his own enquiries regarding legal rights and attend to the aspect of payments due etc. for the operation of the quarries.

The extent of annual replenishment of the sand sources is unknown. The Contractor may, therefore choose to collect the sand in advance of its use for the work.

The Contractor shall make his own arrangements for quarrying and transport of sand from the quarries to the work site. Approach roads to the quarries shall also be constructed and maintained by the Contractor at his own cost.

All the cost of transport of sand shall be borne by the Contractor and no claims on this account will be entertained,

Use of crushed sand conforming to the required gradation and specifications can be permitted with specific approval of the Engineer-in-charge.

#### **1.2.0 CEMENT AND STEEL SUPPLIED BY CORPORATION:**

No material will be issued by the Corporation on Schedule 'A'. The Contractor is responsible for arrangements of all materials including cement, steel, explosives, hume pipes etc. However, for the works for which the estimated cost put to tender is less than Rs. 100 lakhs, cement and steel will be supplied by the Corporation as shown in Schedule 'A'.

#### **1.2.1 CEMENT PROCURED BY CONTRACTOR:**

- A) The Contractor shall procure Cement 43 grade conforming to IS 269 of 1976 from recognised manufacturers such as L & T, A.C.C., Narmada, CCI, Rajashree, Manikgarh etc. as per para 14 of Special Conditions of Contract in standard packing of 50 kg. per bag from the authorized manufacturers. The Contractor shall make necessary arrangement at his own cost to the satisfaction of Engineer in-charge for actual weight or random sample from the available stock and shall conform with the specifications laid down by the Bureau of Indian Standards (vide their specifications No. IS 43 grade) or higher in quality as per para 17.0.2. Cement shall be got tested in the laboratory under Quality Control Circle, Pune. In case of any dispute about the results, the cement shall be tested in M.E.R.I., Nashik where decision will be final. The cement bags brought and kept at site godown shall be tested for all the tests as directed by the Engineer-in-charge at least one month in advance before actual use of cement.

Cement brought on site shall be as fresh as possible to the satisfaction of the Engineer-in-charge. The old stock, if rejected, shall be immediately removed from the site at the Contractor's cost.

Cement bags required for testing shall be supplied by the Contractor free of cost. However, the testing charges for cement will be borne by the employer. If the tests prove unsatisfactory then the charges will be borne by the Contractor.

- B) The use of admixtures and agents shall be made as per instructions of the Engineer-in-charge. The cost of cartage / storing / handling / batching / mixing shall be borne by the Contractor and shall be included by them in unit prices tendered for concrete.
- C) The Contractor should maintain throughout the tenure of the work adequate stock of the cement (min 30 days requirement) so as to ensure that, at no time, work is stopped for want of cement. At the same time, no cement of age older than 60 days from the date

of despatch from the manufacturing unit shall be used on the work. No cement shall be removed from the site without the permission of the Engineer-in-charge.

The Contractor shall forthwith remove from the works area any cement that the Engineer-in-charge may disallow for use on account of failure to meet with the required quality and standard.

Cement stock of ONE month's requirement shall be kept on site at least one month in advance. Samples for testing of the cement brought to the site shall be given free of cost by the contractor, as and when required.

- D) The Contractor will have to construct sheds for storing cement having capacity not less than the cement required for 90 days use at approved locations along the canal. The Engineer-in-charge or his representative shall have free access to such stores at all times.
- E) The Contractor shall further, at all times satisfy the Engineer-in-charge on demand, by production of records and books or by submission of returns and other proofs as directed, that the cement is being used as tested and approved by the Engineer-in-charge for the purpose and the Contractor shall at all times keep his records up-to-date to enable the Engineer-in-charge to apply such checks as he may desire.

### **1.3.0    STEEL (Procured by Contractor)**

- A) The Contractor shall procure steel from the market. The Contractor shall make necessary arrangement at his own cost for sample from the available stock and shall conform with the specifications laid down by the Bureau of Indian Standards (vide their Specifications NOS. I.S. 432 (Part 1) of 1966, 1139-1966, 1786-1979).
- B) The Contractor should store the steel of 60 days requirement at least one month in advance.
- C) The Contractor will have to construct sheds for storing steel having capacity not less than the steel required for 90 days use at approved locations along the canal. The Engineer-in-charge or his representative shall have free access to such stores at all times.
- D) The Contractor shall further, at all times satisfy the Engineer-in-charge on demand, by production of records and books or by submission of returns and other proofs as directed that the steel is being used as tested and approved by the Engineer in-charge for the purpose and the Contractor shall at all times keep his records up-to-date to enable the Engineer-in-charge to apply such checks as he may desire.
- E) Local Contractors shall procure the steel from main producer such as SAILS, TISCO, ISCO. Rerolled steel will not be acceptable. They should bring the test certificate of steel procured by them from the manufacturers.

- F) The steel procured should conform to standard specification of Bureau Indian Standards I. S. No. 1786 of 1979 for Tor Steel and I. S. 432 of 1966 for mild steel.
- G) Steel samples required for testing shall be supplied by Contractor free of cost. However the testing charge for steel will be borne by the employer. If the test proves unsatisfactory then the charges will be borne by the Contractor.

However the testing charges for steel for items (Structures) of Schedule-B, will be borne by the Contractor.

#### **1.4.0 HANDING OVER OF COMPLETED REACHES AND LETTING OUT WATER FOR IRRIGATION:**

- 1.4.1 On the request of the Contractor the continuous completed reaches of Distributary and Minors including Sub-Minors would be taken over by the Corporation provided if it fulfils the conditions specified below:
- 1.4.2 The term "completed" under 1.17.1 above should be deemed to be inclusive of structures and selective lining and ready to receive flow of water for irrigation.
  - i) If the lining works are in continuous length of 10 km and is in continuation with already lined section or such section of canal through which water is already passing.
  - ii) In case of main canal with earthwork and structures with length of 1 km and it is in continuation with the previous length of canal through which water is already passing.
- 1.4.3 Water is likely to be let out in Distributary and Minors including Sub-Minors in the completed reaches handed over to the Corporation for Irrigation purpose. However in reaches not handed over to the Corporation maintenance liability of the Contractor would continue to be for the entire period of contract with maintenance period of Six months after completion, while for reaches handed over the maintenance period of Six months would commence from the date of taking over by the Corporation irrespective of whether water is let out for Irrigation or not.
- 1.4.4 Water is available free of cost for use on works when water is let out in the Distributary/ Minor for irrigation purpose. However, during closure periods the Contractor has to make his own arrangements for storage of water for use in works. In case Distributary / Minors are closed for intervals the Contractor has to make his own arrangement of water at his cost. No claim of any kind will be entertained on this account.
- 1.5.0 The measurements for the work shall be taken by authorized representative of Engineer-in-charge in presence of the contractor or his authorized representative the contractor shall sign such recorded measurements in token of acceptance. This para is applicable to all items

**SECTION - 2**  
**EXCAVATION**

**2.0.0 EXCAVATION :**

**2.1.0 SCOPE :**

The item shall include clearing site, excavation to the designed section, removal of the material, their sorting out as specified and their depositing either in spoil banks or on canal banks in layers as specified including all leads and lifts.

**2.2.0 CLEARING SITE :**

The site of excavation and canal banks shall be cleared of all grass vegetation, fencing, bushes, trees as directed by the Engineer-in-charge. The materials, obtained from such clearance shall be the property of the Corporation and shall be stacked as directed by the Engineer-in-charge so as not to cause obstruction to the work. Burn Jungle @ contractors own cost and not damage to other farmers Digging properly up to roots of Jungle trees, cut, stack properly as per direction of Engineer in-charge

**2.3.1 LINE OUT :**

All materials such as pegs, bamboos and strings and templates for marking out slopes, and labour required for line out shall be provided by the Contractor at his own cost. The center line of excavation shall be clearly marked by pegs or by stones at each chain or change of direction or at shorter intervals on curves, in the beginning. The final line out will be done by fixing reference stone at suitable distances on either side of the center line, beyond the canal edges so that they are not disturbed during the construction period. The position of these stones will be marked on the cross section.

- 2.3.2** No change in the sanctioned plans and designs is permissible without the written permission of Engineer-in-charge.
- 2.3.3** Before starting the work, the Contractor shall have to sign the field books and plans showing the working longitudinal sections and cross sections of the portions of the alignment, that he has to tackle. If the Contractor fails to sign them within three days of being called upon to do so, the levels and sections as recorded by Engineer-in charge or his Assistant will be final and binding on the Contractor.
- 2.3.4** Contractor shall provide and maintain the quarry roads and temporary roads required for conveying and transport of materials at his cost.

- 2.3.5** For the points which are not covered by these specifications, the instructions given by the Engineer-in-charge shall be final and binding on the Contractor.
- 2.3.6** The material available from all excavation and remaining surplus after use on the work adjacent reaches / canal works etc. can be used by the Contractor free of cost provided these materials are used solely for the specific contract work and prior approval of the Engineer-in-charge is taken.

**2.4.0 EXCAVATION:**

**2.4.1 SCOPE OF WORK:**

Along the excavation and removal of excavated material and its disposal in a manner hereinafter specified, the rate for the item of excavation will also include.

- (i) Clearing of site.
  - (ii) Setting out works, profiles etc. according to sanctioned plan, or as directed by the Engineer-in-charge and setting up bench marks and other reference marks.
  - (iii) Providing and subsequently removing shoring and strutting if and when necessary.
  - (iv) Necessary protection including labour, materials and equipments to ensure safety and protection against risk or accident.
  - (v) Supply of facilities for inspection and measurements at any time to the concerned Corporation officials.
  - (vi) Compensation for injury to life and damage to property if any, caused by Contractor's operations connected with this item.
- 2.4.2** Canal section shall be excavated as shown on the drawings or as directed by the Engineer-in-charge. Both edges of the banks, specially the inner one shall be neatly aligned symmetrically to the center line of canal. They shall be absolutely straight reaches and smoothly curved at bends.
- 2.4.3** Suitable arrangements for drainage shall be provided to take surface water clear of excavation during the progress of work.
- 2.4.4** Excavation may be carried out by manual labour or by excavating machine.

**2.4.5 EXCAVATION IN ROCK :**

Excavation in rock shall be such that all sharp points of rock are chipped off so as not to extend into the canal profile. Blasting in a manner which is likely to produce over breakage which in the opinion of Engineer-in-charge is excessive, shall not be

permitted. Special care shall be taken to prevent over-breakage, or loosening of materials on bottom and side slopes against which lining is to be placed. Excavation in excess of the prescribed canal section shall not be permitted beyond pay – line and no payment will be made for such excess excavation.

- 2.4.6** The material excavated in a chain of 20/30 meters shall be stacked on either side of the chain as specified on the drawing or as directed by the Engineer-in-charge.
- 2.4.7** The excavation shall be carried out according to the design with accurately graded bed fall and side property sloped as shown in the drawings and as directed by the Engineer-in-charge. The cross section adopted in cutting is likely to change in side slopes according to the depth of different strata during actual excavation. The Contractor therefore, should get clear instructions from Engineer-in-charge, before commencing any cutting work. No claims for any variations in quantity of excavation resulting from the deviation from the instructions of the Engineer-in-charge, would be accepted. To account for this, the central box cutting with the canal bed width as its width have to be taken to canal bed level first, before the side slopes are determined and attacked (except for deep cutting of more than 6 m. depth). In portions where deep cutting of more than m. is to be done, the mode of excavation to be followed must be got approved from the Engineer-in-charge, before starting the work in such reaches and in any case, width of excavation to be tackled initially shall not be more than bed width + depth. The excavation should initially be carried out in steps. The steps should have such width and depth that after they are cut. the required final side slopes is attained. Cutting of steps should be done after bed level is reached and after one monsoon. If cutting is in soft strata, cutting of steps should be done just prior or preparing the side slopes for laying lining.

#### **2.4.8 REMOVAL OF LOOSE ROCK ETC :**

Before any work of excavation is taken up, all loose rock, semi-detached rock in/or close to the areas to be excavated, that is liable to fall or otherwise endanger the workmen on the project shall be stripped. The methods employed shall be will not shatter or render unstable and therefore unsafe any rock that was originally sound or safe. Any material not repairing removal as contemplated herein, but which may later become loosened or unstable shall be promptly and satisfactorily removed. The cost of such clearing shall be deemed to have been included in the unit rates accepted under the different items under excavation.

### **2.5.0 CLASSIFICATIONS :**

#### **2.5.1 The classification of strata shall be as under.**

##### **i) SOFT STRATA :**

This shall include all kinds of rock or shale, indurate clay, soil, silt sand and gravel, soft average and hard murum and any other materials which can best be removed with a shovel after loosening with a pick and / or bar. It shall also include isolated boulders up to 0.1 cubic meter each, which does not need blasting and could be removed with a pick / bar and shovel.

##### **ii) HARD STRATA :**

This shall include all rock occurring in masses in all types of geological formations which could best be removed by blasting, where such blasting is permissible. It shall also include rock which owing to the proximity of buildings/ structures / electric lines public roads or for any other reasons has to be cut by means of chisels or wedges. It shall also include boulders in mass and isolated boulders over 0.1 cubic meter each which requires blasting or wedging and breaking for easy removal. Merely the use of explosives in excavation shall not be considered a reason for classification in hard strata unless regular blasting is clearly necessary in the opinion of the Engineer in-charge. The hardness of strata or material to be excavated, presence of different type of geological constituents requiring increased drilling efforts, consumption of explosives, labour and use of machinery shall not be considered as reason for claim/increase in contract rates.

**2.5.2** In case of the disputes over the classification of strata met during execution, the decision of the Engineer-in-charge will be final.

#### **2.5.3 PAYMENT LINE (PAY LINES):**

The minimum excavation line is the line within which no unexcavated portion of any kind shall be allowed to remain i.e. a neat profile line for unlined and underside of the lining proposed if any for works of canal and disnet. Payment shall be made for the work done as per the pay lines prescribed in various strata and side slopes as below :

##### **2.5.3.1 FOR SIDES:**

- a) In case of hard strata where up to side slopes up to 0.5:1 are provided minimum thickness of 20 cm. chip masonry in C.M. (1:8) shall be provided. Pay line for Payment for excavation and back fill shall be limited to 30 cm average. If any overcuts are more than this limit, no payment for additional overcuts and backfill will be paid for. In case, excavation beyond minimum line of excavation (i.e. underside of lining) is in between 0 to 10 c.m. payment for backfill with C.C. (1 : 3 : 6) proportion shall be limited to

average 5 c.m. for payment, and will be executed monolithically with C.C. (1 : 3 : 6) side lining.

- b) In case of canal excavation with side slopes 1:1 in hard strata, pay line of 15cms. shall be permitted for payment of excavation and backfill with C.C. (1:6:12)
- c) In case of canal excavation with side slopes 1:5:1 in hard strata pay line up to 15 cm. shall be permitted for payment of excavation and backfill with chip masonry in cm (1:8/1:10) : In case the average excavation beyond minimum line of excavation is up to 5 c.m., backfill shall be done with C.C. (1:6:12). Apart from the standards given above for the pay lines, the Contractor shall take care to see that the slopes are stable and no accidents or slips would occur. Tolerance for over cut beyond pay lines arising out of peculiar nature of rock at the site and other site conditions shall be decided by the Superintending Engineer in-charge of the work. Payment for excavation beyond pay lines up to tolerance lines in such specific cases shall be made @ 60% tender rate of the particular item of the work. No tolerance shall however be permitted in soft strata.

#### **2.5.3.2 FOR BED:**

Pay line in case of bed shall be 15 c.m. Extra excavation in bed beyond designed section shall be backfilled with murum. (only for control & ordinary Blasting excavation method.)In case of soft strata no pay line is admissible. Extra excavation beyond designed section for sides in soft strata shall be backfilled with murum.

#### **2.5.4.1 EXTRA EXCAVATION FOR BLACK COTTEN SOIL:**

Wherever the canal bed and sides up to T.B.L. are in B.C. soil, extra excavation to 100 cm. depth is to be done for having murum back filling and this will be measured under respective items. Murum filling will be paid under item of casing. Contractor No. of

**2.5.4.2** While excavating in hard strata, if soft seams are struck, they will be considered as part of hard strata if the depth of individual seams is up to 15 cm. When depth of soft seams is more than 15cm. it will be paid under item of soft strata.

#### **2.6.0 MAINTENANCE OF SLOPES IN EXCAVATION:**

**2.6.1** Any shoring and strutting required during excavation and afterwards shall be deemed to be covered by the rates quoted for the items.

### **2.6.2 SLIPS-CORPORATION NOT RESPONSIBLE:**

Slips shall be avoided, but if any slips occur on account of any reason, the excavation shall be promptly restored to stability. No extra claims shall be entertained for suchslips. The Contractor shall have to make good the work at his cost.

### **2.7.0 USE OF EXCAVATED STUFF:**

**2.7.1** Excavation shall be done systematically so that only those excavated stuff which will be permitted for use will be used on the banks without double handling.

### **2.7.2 DEPOSITION OF EXCAVATED STUFF CLEAR OFF TRAFFIC LINES ETC.**

Disposal of all material from excavation shall be as per approved disposal plan or instructions of Engineer-in-charge, regarding the location and deposition of the stockpiles, spoil banks or embankment. Before any excavation is started the deposition of spoil shall be carefully planned so as not to obstruct normal traffic and traffic lines required for the construction materials, and shall be dumped sufficiently clear off the edges of the excavation so as not to endanger stability of the slopes of the excavation and also to permit ample space for lorry paths, installation and lifting of pumping devices, stacking construction materials etc.

### **2.8.0 SORTING AND STACKING OF MATERIALS:**

Excavated materials shall be sorted out stacked as under.

#### **a) SOFT STRATA:**

All the excavated materials from the soft strata shall be sorted out. The materials not useful for bank work shall be deposited as directed by the Engineer-in charge. Material useful in bank work shall be sorted out to be used in hearting or casing. Each stock pile of unrequited material shall be of regular size and not less than 5 m. in height.

#### **b) HARD STRATA :**

Rubble and boulders from hard strata be stacked in separate areas as directed by the Engineer-in-charge. Stock Piles shall be of regular shapes, allowing for easy measurement. No stock piles shall measure more than 200 sq.m. in plan and more than 1.5 m. in height, unless specifically permitted by the Engineer in-charge in writing.

## **2.9.0 SURPLUS MATERIALS:**

The excavated materials, if not required for embankment, should be stacked in spoil banks with neatly made stable slopes at top and a suitable berm being left between the toe of bank, and edge of excavation, as directed. In partial banks, where a side embankment is required to retain water, it's limit should be lined out before starting the excavation so that the soil may be disposed of properly.

### **2.9.1 STACKING IN STOCK AND WASTE PILES :**

After sorting is done, useful materials of various types shall be stacked in stock piles and rest may be disposed off as directed by the Engineer-in-charge. Useful material shall be stacked in separate areas as directed with reference to the nature of the material. Stock piles shall be of regular shapes allowing for easy measurement. No stock pile shall measure less than 60 m. length and 5 m. height unless specially permitted by the Engineer-in-charge.

**2.9.2** The excavated material shall be stacked within the area approved by the Engineer in-charge. If the excavated material is deposited in unauthorized land, such work will not be measured for payment unless suitable action as may be directed by the Engineer-in-charge is taken by the Contractor. In addition to non-payment of such work suitable amounts as directed by the Engineer-in-charge, will be recovered from the Contractor as deposited towards any extra cost which Corporation may have to bear on account of the Contractor's unauthorized action.

**2.9.2.1** All the materials available from excavation will be the property of Corporation and shall be deposited as directed by the Engineer-in-charge. The material of approved quality may be used by the Contractor in the item of work included in Schedule 'B' of the tender or on ancillary for preparatory work free of charge even from the surplus laying in the adjoining reaches. Prior approval of the Engineer-in-charge for such free use shall however be taken.

## **2.10.0 MODE OF MEASURMENTS :**

**2.10.1** Classification of the excavation will be made from the cross sections visible at the sides of excavation and from measurements of ridges which shall be left at 20 m.or less as directed by the Engineer-in-charge, which must be removed immediately after the final measurements have been taken except when orders are specially given to retain these ridges. No dead man would be allowed. The areas shall be worked out generally by ordinate method using prismoidal formula.

**2.10.2** As a rule, measurement of the excavated material on stacks shall not be permitted. However, when it is not possible to get a record of the excavated material in cross section, measurement of the excavated material on stacks may be permitted on writing. In such a case the stacks shall be on level ground rectangular in shape and shall not be more than 1 meter in height. The deduction for voids at the following percentage shall be made from the gross quantities of stack measurements to arrive at the net quantity.

	When measurements are taken before passing of a monsoon after laying the stacks	After passing of at least one monsoon after laying the stacks
i) Soft Strata	25%	25%
ii) Hard Strata	40%	40%

#### **2.11.0. SILTING OF EXCAVATION:**

##### **2.11.1 SILTING OF CANAL DUE TO FLOODS-CORPORATION NOT RESPONSIBLE:**

If excavated pits get silted due to intervening floods, slips or any other cause, till completion of the work, the Contractor shall excavate and restore the pits and section to the required shape and dimensions without any extra cost.

**2.12.0** Initially box excavation shall be carried out up to top of hard stratum. Thereafter table slopes may be cut in soft strata as stated hereafter. On striking hard rock in foundation trench the surface of this rock should be exposed on all area of the trench and it should be brought to the notice of the Engineer-in-charge by the contractor and contractor's authorized engineer shall immediately take levels of the top of hard stratum along predetermined sanctions in the presence of Engineer-in-charge or his authorized representative. If the Contractor fails to take levels as above, then such levels will be recorded by the Engineer-in-charge or his authorized representative and the same shall be binding on the contractor. Thereafter further excavation in hard strata can be continued up to foundation level to be fixed by the Engineer-in-charge. Failure to do so by the Contractor will not entitle him to get payment for the work that may have been done under item of hard stratum.

#### **2.13.0 PREPARING AND TESTING OF FOUNDATION:**

##### **2.13.1 SCALING AND TRIMMING OF FOUNDATION:**

After rough excavation to the required depth is completed scaling and trimming operations for the removal of all pieces loosened during excavation or partly separated from main rock mass by seams or cracks shall be carried out to the satisfaction of the Engineer-in-charge.

#### **2.13.2 TREATMENT OF WEAK LOCAL SPOTS:**

All weathered or partly or decomposed pieces of rock shall be removed so as not leave on the foundation any rock other than that which is an integral part of the rock mass. Areas of low bearing capacity, steep inclined seams, faults, and crushed zone in an otherwise good foundation, if permitted to be kept shall be cleared out to a sufficient depth and refilled and plugged with masonry or concrete as directed by the Engineer-in-charge.

#### **2.13.3 FINAL FINISHED SURFACE OF FOUNDATION:**

The finally prepared foundation shall present a rough surface in cross section to give added resistance to sliding. All smooth surface shall be roughened artificially to give good bond. The surface shall be free from steep angles and the edges of benches shall be chamfered approximately to 45°. Pinnacles of sharp projection shall be knocked off and prominent knobs flattened.

#### **2.13.4 TESTING FOR SOUNDNESS :**

The finally finished foundation rock shall be tested by striking with a heavy hammer and if loose portion of foundation rock is revealed by a hollow sound, it shall be excavated further (without blasting) till a clear ringing sound is obtained.

#### **2.13.5 EACAVATION OUTLINES AND PAY LINES:**

**2.13.5** All excavation shall be performed in accordance with the lines, grades, levels and dimensions shown in the drawing or established by the Engineer-in-charge. The dimensions shown in the drawing are tentative. During the progress of work it may be necessary or desirable to vary the slopes or the dimensions of excavation from those specified in the drawing. The side slopes of the excavation shall be as steep as would stand with safety as decided by the Engineer-in-charge. If the slopes established are found to be steeper and likely to slip, they shall be made flatter by removing the additional material and introducing suitable berms if possible and stable faces established. The additional excavation will be paid at the rate accepted for excavation for particular class of material.

**Excess Excavation:**

No payment shall be made for the work done beyond specified pay lines. Normally pay lines for different strata for excavation are defined as the lines starting from the outer dimension of the masonry or concrete at foundation level and sloping up as specified below :

- a) Soft strata : 1.5 : 1
- b) Hard strata : 1/4 : 1
- c) Berms with prior approval.

If in the opinion of Superintending Engineer the sides are unstable and prone to slip, modified pay lines will be laid down with flatter slopes and berms etc. as decided by him.

Any or all excess excavation carried out by the Contractor beyond approved pay lines for any purpose or reason, shall unless ordered in writing be at the expense of the Contractor, and if the unauthorized excavation has to be filled with concrete or masonry or with materials approved as filling so needed shall be carried by the Contractor as per specifications of the respective items of work at his own expense. Tolerance for over cut beyond pay lines arising out of peculiar nature of rock at the site and other site conditions shall be decided by the Superintending Engineer-in charge of the work. Payment for excavation beyond pay lines up to tolerance lines in such specific cases shall be made @ 60% tender rate of the particular item of the work. No tolerance shall however be permitted in soft strata.

**2.13.6 OVER CUT:**

Over cut is defined as the quantity of excavation beyond payment lines and the unit rate for the volume payable within pay lines covers the cost of overcut unless otherwise specified. Over cut in soft strata shall be filled (with the materials specified for the backfill) back to the same standard of placement as stipulated for the backfill and is covered by the payment under backfill item up to pay lines unless otherwise specified.

**2.13.7 MODE OF MEASUREMENTS AND PAYMENT:**

The measurements shall be based on areas of cross-sections taken normal to the axis of the structure or its part of the original ground surface and the surface of the finally completed excavation within the pay lines, taken at every 10 meters along the axis of structure or item part. Where there is abrupt change in depth, additional cross-sections

may be taken at the discretion of the Engineer-in-charge. Levels along the cross sections shall be taken at every 15 to 20 meters or 5 meters as per exigency of work.

Payment of work done under item of excavation will be made at 70% of contract rate in R.A. Bills for cumulative quantity of excavation till the 100% completion of all structures including installation of gates. 90% of payment at contract rate in R.A. Bills shall be released only after the work of all structures in the tender are completed in continuous reach from head to canal / Distributary / Minor.

During the excavation of the work running payment for the items of excavation will be made to Contractor at 90 percent of his tendered rate for the items. The remaining payments for these items will be progressively released depending upon the progress of completion of the item of excavation. This part rate will be reviewed by the Engineer in-charge when he feels necessary and decision of the Engineer-in-charge shall be final and binding on the Contractor. During the execution of the work running payment for the items of excavation will be made to the Contractor on the basis of cross-sectional measurements.

Quantities shall be computed from the cross sectional area by the trapezoidal formula.

#### **2.14.0 BLASTING :**

##### **2.14.1 OBSERVING RULES REGARDING BLASTING :**

In conducting blasting operations proper precautions shall be taken for the protection of persons, the work and property. All Government laws relating to the design and location of magazine, transport and handling of explosives and other measures for the prevention of accident shall be strictly observed. Warning signs shall be prominently displayed on the magazines, and warning signals given for each blast. Specifications for blasting given under the separate section shall be carefully and rigidly observed.

##### **2.14.2 STORING OF EXPLOSIVES:**

Explosives shall be stored in a safe place at sufficient distances from the work and under the special care of watchman so that in case of accidents no damage occurs to the other part of work. Explosives, detonators and fuses shall be each separately stored. No Objection Certificate from District Magistrate or Inspector of Explosives shall be obtained as required by the Contractor.

### **2.14.3 RESTRICTIONS ON BLASTING:**

- a) Blasting which may disturb or endanger the stability, safety or the quality of the foundation will not be permitted.
- b) Blasting within 30 meter of masonry work in progress or of a permanent structure shall not be permitted.
- c) Progressive blasting shall be limited to two third of the total remaining depth of excavation.
- d) No large scale blasting operation will be resorted to when the foundation excavation reaches the last half meter. Only small charge preferably black powder may be allowed so as not to shatter the foundation.
- e) Rules of blasting are as appended.

### **2.15.0 EXCAVATION IN HARD STRATA WITH CHISELLING AND / OR CONTROLLED BLASTING:**

**2.15.1** Here the canal excavation in hard strata is involved, since usual blasting operations are likely to damage the adjoining houses, transmission lines or hinder the traffic on important roads. The excavation for a good length is required to be done under controlled blasting conditions and / or chiseling. The item will include excavation in hard strata to the correct sections as shown in the drawings with chiseling and / or controlled blasting and depositing the excavated stuff as and where directed.

The Contractor shall obtain written permission of the Engineer-in-charge before undertaking the work under this item for specific reaches.

In addition to the specifications under paras 2.1.0 to 2.12.0 of section 2. the following specifications will apply to this item.

The holes as for blasting will be drilled for a depth of only 40 cm. thus increasing the number of holes and correspondingly decreasing the charge required for each holes. The holes as far as possible will be slant. All the holes after charging will be covered by grill of steel rods which will be suitably loaded by gunny bags filled with sand or murum.

The steel grill will be so lowered over the holes as not to cause any damage to the fuse wire or charges and care will be taken to see that the fuse wires remain free. The loading will be sufficient to prevent the overthrow of rock after blasting. In addition to the

above loading, the steel grill will be securely anchored to the adjoining rock by chains. The steel grill shall extend at least 3 metres beyond the area to be blasted.

- 2.15.2** Chiseling manually or excavation by pneumatic rock breakers will be resorted to as directed by Engineer-in-charge where blasting cannot be permitted.
- 2.15.3** Any alternate technique approved by the Engineer-in-charge may be used, but approval to execute the work by the above mentioned method or alternate technique will not relieve the Contractor of the responsibility of damage to the power line and properties.

## **RULES FOR BLASTING OPERATION**

### **GENERAL :**

1. The Contractor shall acquaint himself with all applicable laws & regulations concerning storing, handling and the use of explosives. All such laws, regulations and rules etc. and current from time to time, shall be binding on the Contractor.
2. The provisions detailed in these rules are supplementary to above laws, rules and regulations etc. and are applicable except where they conflict with the aforementioned laws etc. from time to time. Further, the Engineer-in-charge may issue modification, alterations or new instructions from time to time. The Contractor shall comply with the same without these being made a cause for any claims.

### **MATERIALS :**

3. All materials such as explosives, detonators, fuses, tamping materials etc. those are proposed to be used in the blasting operations shall have the prior approval of the Engineer-in-charge.
4. Black powder and safe explosives shall be used wherever possible. Explosive with nitroglycerine shall only be used under exceptional circumstances and where the above explosives are not effective.
5. The use of fuse with only one protective coat is prohibited. The fuse shall be sufficiently water resistant as to be unaffected when immersed in water for thirty minutes. The rate of burning of the fuse shall be uniform and less than 4 seconds per 25 cms. Of length with 10 percent tolerance on either side. Before use, the fuses shall be inspected, and the moist, damaged or broken ones discarded. The rate of burning of all new types of fuses, or when they have been in stock for long shall be tested before use.
6. The detonators used shall be capable of giving effective blasting of the explosives. Moist or damaged detonators shall be discarded.

### **PERSONNEL :**

7. Excavation by blasting will be permitted only under personal supervision of competent and licensed persons and trained workmen.
8. All supervisors and workmen in charge of making up, handling storage and blasting work, shall be adequately insured by the Contractor.
9. The storage shall be in charge of very reliable person approved by the Engineer-in-charge, who may, if necessary, cause police enquiries being made as to his reliability,

antecedents etc. The Contractor shall have to produce a security for the person incharge of explosives if and as required by the Engineer-in-charge of the Civil Authorities of the District.

10. The Contractor shall make sure that his supervisors and workmen are fully conversant with all the rules to be observed in storing, handling, and use of the explosives. It shall be assured that the supervisor in-charge, is thoroughly acquainted with all the details of the handling of the blasting operations.
11. No tools or implements, other than those of copper, brass gunmetal or wood shall be allowed inside the magazine. All tools shall be used with extreme gentleness and care.
12. Boxes of explosives shall not be thrown or dragged along the floor and shall be stacked on wooden trestles. Where there are white ants, the legs of the trestles should rest in shallow copper, lead or brass bowls containing water. Open boxes of dynamite shall never be exposed to the direct rays of the sun.
13. Empty boxes or loose packing material shall not be kept inside the magazine.
14. The magazine shall have a lightening conductor which shall be got tested at least once a year by any officer authorized by the Engineer-in-charge. The testing fees shall be a charge on the Contractor. The Contractor shall, within 15 days comply with all the recommendations made by the officer testing the lightening conductor, failing which Engineer-in-charge shall be entitled to comply with the same at the Contractor's expenses which shall not be open to question or may take any action that he may consider fit.
15. A notice shall be hung near the store prohibiting entrance of unauthorized persons.
16. The following shall be hung in the lobby of magazine.
  - a) A copy of the rules both in English and in the language with which the workers concerned are familiar with.
  - b) A statement showing the up-to-date stock in the magazine.
  - c) A certificate showing the last date of testing lightening conductor.
  - d) A notice that smoking is strictly prohibited.
17. The magazine will be inspected at least twice a year by the officer representing the Engineer-in-charge, who will see that all the rules are strictly complied with. He will notify all omissions etc. to the Contractor, who shall rectify the defect within a period of

15 days from the date of receipt of the notice failing which the Engineer-in-charge may take whatever action he considers suitable.

**USE OF EXPLOSIVES :**

18. For the transport of the explosives and detonators between the stores and the site, closed and strong container made of a soft material as timber, zinc, copper, leather and the like shall be used.
19. Explosive and detonators shall be carried in separate boxes and transported separately. For the conveyance of primer, special containers shall be used.

**STORAGE OF EXPLOSIVES :**

20. The Contractor shall build a magazine for storing the explosive. The site of the magazine, its capacity and design shall be subject to approval by the Engineer-in charge and the inspection of the Controller of Explosive before the construction is taken up. As a rule, the explosives should be stored in a clean, dry well ventilated bullet proof and fire proof building on the isolated site.
21. The explosives, detonator and fuses shall be separately stored.
22. A careful and day to day account of the use of explosives shall be kept by the Contractor in an approved register and in approved manner. The register shall be produced by the Contractor for inspection of the Engineer-in-charge when so requires by the later. The Engineer-in-charge may also pay surprise visits to the storage magazine. In case of any unaccountable shortage of the explosive or if the accounts not found to have been maintained in the manner prescribed by the Engineer-in charge, the Contractor shall be liable to be penalized with forfeiture of the security deposit lodged by him with the Corporation or his tender shall be liable to be cancelled in which case he shall not be entitled to any compensation for the losses etc. The action taken under this clause shall be in addition to that which be taken by the Competent Civil Authorities in court of Law.
23. The magazine shall at all times be kept clean.
24. No unauthorized person shall at any time be admitted inside the magazine.
25. The magazine shall, when not in use of authorized person, be kept well and securely locked.
26. The magazine shall on no account be opened during or in the approach of thunderstorm and no person shall remain in the vicinity of the magazine during such period.

27. Magazine shoes without nail shall at all time be kept in the magazine and wooden tub or cement through 30 cms. high and 45 cm. in diameter filled with water shall be fixed near the door of the magazine. Persons entering the magazine must put on the magazine shoes which shall be provided by the Contractor for the purpose and be careful.
- i) Not to put their feet on the clean floor unless they have the magazine shoes on.
  - ii) Not to allow the magazine shoes to touch the ground outside the clean floor.
  - iii) Not to allow any dirt or grit to fall on the clean floor.
28. Person with bare feet, shall before entering the magazine, dip their feet in water and then step directly from the tub over the barrier (if there be one) on to the clean floor.
29. A brush or broom shall be kept in the lobby of the magazine for cleaning out the magazine on each occasion it is opened for the receipt, delivery or inspection of explosives.
30. No matches or inflammable material shall be allowed in the magazine. Light shall be obtained from an electric storage battery lantern.
31. No person having article of steel or iron on him shall be allowed to enter the magazine.
32. Workmen shall be examined before they enter the magazine to see that they have none of the prohibited articles on their person.
33. Cotton rags waste and articles liable to spontaneous ignition shall not be allowed inside the magazine.
34. The boxes and containers used shall be kept well closed.
35. Explosives shall be stored and used chronologically to ensure the one received earlier being used first.
36. A make up house shall be provided at each working place in which cartridge will be made up by a experienced man as required. The makeup house shall be separated from other building. Only electric storage battery lamps shall be used in this house.
37. No smoking shall be allowed in the makeup house.

#### **DISPOSAL OF DETERIORATED EXPLOSIVES :**

38. All deteriorated explosives shall be disposed off in an approved manner. The quantity of the deteriorated explosives to be disposed off shall be intimated to the Engineer in-charge prior to its disposal.

**PREPARATION OF PRIMERS :**

39. The primers shall not be prepared near open flames or fires. The work of preparation of primers shall always be entrusted to same personnel. Primers shall be used as soon as possible after they are ready.

**CHARGING OF HOLES :**

40. The work of charging shall not commence before all the drilling work at the site is completed and the supervisor has satisfied himself to that effect by actual inspection.
41. While charging, open lamps shall be kept away. For charging with powdered explosives, naked flames shall not be allowed.
42. Only wooden tamping rods without any kind of metal on them shall be allowed to be used.
43. Bore holes must be of such a size that the cartridges can easily pass down them.
44. Only one cartridge shall be inserted at a time and gently pressed then with the tamping rod. The sand, clay or other tamping material used for filling the hole completely shall not be tamped too hard.

**BLASTING :**

45. Blasting shall be carried out during fixed hours of the day which shall have the approval of the Engineer-in-charge. The blasting hours once fixed shall not be altered without prior written approval of the Engineer-in-charge.
46. The site of blasting operations shall be prominently demarcated by red danger flags. The order to fire shall be given only by the Supervisor-in-charge of the work and his order shall be given only after giving the warning signal three times to reach to safe shelter and after having ascertained that nobody is within the danger zone.
47. A bugle with a distinctive note shall be used to give the warning signals. The bugle shall not be used for any other purpose. All the labourers shall be made acquainted with the sound of the bugle and shall be strictly warned to leave the work immediately at the first warning signal and to make for safe shelter until the clear signal has been given.
48. All the roads and footpath leading to the blasting area shall be watched.
49. In special cases suitable extra precautions shall be taken.
50. For lighting the fuses, a lamp with a strong flame such as carbide lamp shall be used.

51. The supervisor shall watch the time required for firing the fuses and shall see that all the workmen are under safe shelters in good time.

**ELECTRICAL FIRING :**

52. Only the supervisor in charge shall keep key of the firing apparatus and shall keep it always with himself.
53. Special apparatus shall be used as a source of current for the blasting operations, power lines shall not be tapped for the purpose.
54. All the detonators shall be checked before use.
55. For blasts in one series, only detonators of the same manufacture and of the same group of electrical resistance shall be used
56. Such of the electrical lines as could constitute danger for work of charging shall be removed from the site.
57. The firing cable shall have proper insulating cover so as to avoid short circuiting due to contact with metallic part of rock.
58. The use of the earth as a return line shall not be permitted.
59. The firing cable shall be connected to the source of current only after ascertaining that nobody is in the area of blasting.
60. Before firing the circuit shall be checked by a suitable apparatus.
61. After firing, with or without an actual blast the contact between firing cable and the source of current, shall be cut off before any persons are allowed to leave the shelters.
62. During storms charging with electrical detonators shall be suspended. The charges already placed into the holes shall be blasted as quickly as possible after taking all safety precautions and giving necessary warning and signals, if this is not possible, the site shall be abandoned till the storm has passed.

**RECAUTIONS AFTER BLAST AND MISFIRE :**

63. If it is suspected that part of the blast has failed to fire or is delayed, sufficient time shall be allowed to elapse before entering the danger zone. When fuses and blasting caps are used, safe time should be allowed and then the supervisor alone shall have the shelter to see the misfire.
64. Drilling near the hole that has misfired shall not be permitted until one of the two following operations have been carried out by the supervisor.

- i) The Supervisor should very carefully (when the tamping is of damp clay) extract the tamping with a wooden scraper or jet of water or compressed air (using a pipe of soft material) and withdraw the fuse with the primer and detonator attached. A fresh primer and detonator with fuse shall then be placed in this hole and fired.
  - ii) The Supervisor shall get one foot of the tamping cleared off and indicate the direction by placing a stick in the hole. Another hole may then be drilled at nine inches away and parallel to it. This hole should then be charged and fired. The balance of the cartridge and detonators found in the rock shall be removed.
65. Before leaving his work, the Supervisor should inform the Supervisor of the relieving shift of any case of misfire and shall point out the position with a red cross denoting the same and also state what action, if any, he has taken in the matter.
66. The Supervisor shall at once report to the office all cases of misfire, the cause of the misfire, and the steps taken in connection therewith
67. The names of Supervisor-in-charge of day or night shift may be noted daily in Contractor's office.
68. If misfire has been found to be due to defective detonator or dynamite the whole quantity of box from which the defective article was taken must be returned to the authority as may be directed by the Engineer-in-charge for inspection to ascertain whether the whole box contains defective material.
69. Redrilling the holes that have misfired either wholly or partly, shall not be permitted.
- PRECAUTIONS AFTER BLASTING:**
70. After the blast, the Supervisor shall carefully inspect the work and satisfy himself that all the charges have been exploded.

**SECTION - 3**  
**EMBANKMENT**

**3.0.0 EMBANKMENT**

**3.1.0 SCOPE OF WORK:**

The item shall include contractors own material brought up to site of work, deposition spreading in final position and consolidations as hereinafter specified. Wherever the embankment is formed by utilising excavated stuff from the excavation. The item also includes rehandling and picking up of the excavated stuff and its sorting wherever necessary.

**3.1.1 CLEARANCE OF SITE :**

Before commencing the embankment, the site should be cleared of stones, sand, shrub, vegetation etc. without any charges. If the soil on which the bank is to be placed is not suitable for laying banks, the whole or the portion of the same should be stripped off as directed in writing by the Engineer-in-charge and materials so stripped if suitable shall be utilised for bank work or filling of the stripped up portion, as directed by Engineer-in-charge.

**3.1.2 MATERIALS :**

The embankment shall be constructed of contractors' own soil, hard murum of approved quality as approved by the Engineer-in-charge and also laid as directed in the appropriate zones of the section, approved by the Engineer-in-charge. Materials harder than soft rock shall not be used for casing except with the written permission of the Engineer-in-charge who may allow hard rock partly to be used on outer slopes of the bank.

**3.1.3 ZONING OF EMBANKMENT :**

The embankment shall consist of :

- 1) Soil core
- 2) Murum casing as shown in the drawing.

### **SOIL CORE/HEARTING MATERIALS :**

The zone shall be formed with selected impervious soil as approved by the Engineer in-charge available from excavation specified in para. No. 2.7.1, 2.8.0 (a) and 2.9.0 or available from borrow pits as the case may be. Earth for hearting zone shall be free from roots and vegetate or other organic matter. All clods and lumps up to 5 cm. cubes shall be broken up as the work proceeds. The earth to be used for hearting shall be from the contractors' own quarry approved by the Engineer-in charge.

### **MURUM CASING :**

Casing shall be of pervious soils consisting of murum of approved quality to the desired section.

Materials for casing shall be free from roots and vegetable mounds or other organic matter. All clods and lumps up to 10 cm. cubes shall be broken up as the work proceeds. The material to be incorporated in the casing zone shall be got classified from the Engineer-in-charge with regard to its suitability before being used in bank work.

### **3.1.4 STRETCHES OF EMBANKMENT :**

The embankment shall be made of 150 to 250 metre in lengths and not in small bits.

### **3.2.0 ALLOWANCE FOR SETTLEMENTS :**

#### **3.2.1 IN HEIGHT :**

The banks will be made to extra height at a rate of 5 cm. per metre of designed height to allow for probable settlement of banks. The widths at base and top in this case remain unchanged. The extra work so done will be measured and paid for under the respective items of banking after deductions of specified shrinkage allowance.

### **3.3.0 USE OF EXCAVATED MATERIALS :**

3.3.1 All the materials required for the construction of the appropriate zones of the canal embankment shall come from following sources in order of priority.

- 1) The materials obtained from the excavation of canal and approved for use in the embankment by the Engineer-in-charge.
- 2) After utilising the materials obtained as above the remaining materials required for construction of embankment shall be taken from the approved borrow areas of the contract. The materials so obtained from the borrow area should also be got approved prior to its use.

The material already excavated and stacked alongside the cuts in the reaches will be permitted to be used free of cost in the respective zones of the embankment In respect of suitability of use of such materials, decision of Engineer-in-charge shall be final. The rate of this item includes cost of sorting out of material for casing from the spoil bank.

- 3.3.2** The quantity of earth work from borrow area mentioned above will be worked out by deducting the total usable soils of excavation In the appropriate zones whether actually used or not. 10 percent wastage for utilisation will be allowed in excavation quantities.

The utilisation of the excavated materials should be so planned that these materials shall be used directly in the embankment with the minimum lead. No charges will be paid for rehandling or if material is used with a longer lead when it can be used within a shorter lead. The quantities to be deducted for the utilisation in embankment in appropriate zones as detailed above will be arrived on the basis of the following conversion table.

Sr. No.	Type of material	Excavation measured in place i.e. direct measurements of cut	Converted compacted banks measurements for the purpose of reduction
1.	All soft material for hearting	1 cubic metre	0.9 cubic metre
2.	Hard material for casing	1 cubic metre	1.0 cubic metre
3.	soft rock	1 cubic metre	1.2 cubic metre
4	Hard rock	1 cubic metre	1.4 cubic metre

#### **3.4.0 BORROW PITS :**

No borrow pits shall be allowed in the Corporation land acquired for the canal, branches, minors and sub-minors.

#### **3.5.0 DEPOSITION OF MATERIAL :**

All materials obtained from excavation or contractor's own material shall be laid in regular layers not exceeding 23 cm. thickness loose. The layers of earth shall have a slight slope towards to centre of bund which shall be formed by dumping earth from the sides towards the centre. During monsoon, a small crown shall be maintained at the middle of the bank work to facilitate easy drainage of rain water. The material shall be laid to the section inclusive of pride. The profiles shall show the total heights and slopes including allowances for settlement. The bank is to be constructed evenly to the full section of the set out. The finished bank work shall be dressed neatly to the sections and slopes shown by the profile.

### **3.6.0 WATERING AND COMPACTION :**

- 3.6.1 Compaction of bank shall be done by 8 to 10 tonnes rollers. Before consolidation, the layer will be moistened with adequate quantity of water to bring the percentage of O.M.C. with variation of 2 percent of O.M.C. The rate of the item includes charges for rolling and for providing sprinkling water with all leads and lifts required for the purpose. Before laying the next layer the previous layer shall be scrapped and picking done if required so as ensuring good bond with the new layer. Subsequent layer shall only be allowed after the first layer is satisfactorily consolidated. If Contractor fails to give required compaction, the Corporation shall employ additional rollers at Contractors' cost. The hearting and casing shall be raised simultaneously in order that the whole embankment may be raised evenly.
- 3.6.2 The compaction will have to be uniform over the full width of the bank. The roller should be made to travel over the entire design section of each layer so that the earth is fully consolidated and leaves no visible marks on the surface or as directed by the Engineer-in-charge. Where, smooth rollers are used, the surface of each layer of compacted material shall be roughened with a borrow and thoroughly borrowed or raked before depositing the succeeding layer of material and care shall be exercised to avoid the occurrence of horizontal seams. Earth work should be continuous from day to day. In case of break in consolidation exceeding four days, the dried surface shall be well watered and borrowed before a fresh layer of earth is laid on it.

The spreading of the next layer shall be carried out only after the whole underplaying layer has been properly consolidated. -

The Contractor shall arrange for the water required for the work and no extra charges will be allowed on this account. Water required to bring up the moisture content to its optimum figure shall be sprinkled uniformly over the entire area and not poured in ditches. The Contractor should give all facilities for the Corporation staff to conduct the optimum moisture content and dry density tests at site.

### **3.6.3 TAMPING COMPATIION :**

In those parts of the embankment inaccessible to the specified rolling equipment around and in proximity with structures and in proximity of structures where the rolling equipment shall not be permitted to operate, compaction shall be accomplished either with manual or mechanical tampers of approved type. Roller shall not be permitted to operate within one metre of concrete or masonry structures and all fill within this distance shall be tamped by manual or mechanical tampers. All materials to be tamped shall be spread in layers not over 8 cm. thick when loose. The moisture

content of the material may be + 2 percent water than O.M.C. and amount of tamping shall be such as to produce a degree of compaction equal to the specified for rolled fill. Special care shall be exercised to obtain a good contact and bond with surface of concrete and masonry structures.

- 3.6.4** In order to achieve compaction up to the edges of the embankment, the embankment section shall be widened on inner side by minimum 30 cm or more to get width required for rolling as directed by Engineer-in-charge. The pride so provided shall not be payable under the item of excavation, initially. However the payment shall be made for removal of material from pride under the item of excavation of soft strata under canal earthwork and lining. The Contractor may use this material for raising of embankment in the zone above free board, for which payment shall be made under the relevant item of embankment.

Inner section of distributaries or minors (capacity less than 0.15 m<sup>3</sup> /sec) and approaches of structure on canal as directed by Engineer-in-charge shall be completely filled and compacted with murum casing in layers. The quantity of this extra filling shall be paid under the relevant item of embankment. The removal of quantity of extra filled material in the inner side of the section of canal, distributary or minor shall be paid under the item of excavation for soft strata and the material so excavated shall be reused in the embankment and shall be paid under the relevant item of embankment to be constructed. This removal shall be done as per the instructions of Engineer-in-charge.

#### **3.6.5 DRESSING:**

##### **DRESSING OF BANK :**

After completion of work, the bank including spoil shall be dressed evenly to the required section as directed with no extra cost to Corporation.

- 3.6.6** The side slope shall be accurately dressed to required slope and section by stretching string between the template faces. Dressing should be accompanied by watering and ramming, including replacing or refilling the murum material. Dressing and removal of inner side pride should be done just before commencing the lining as per direction of the Engineer-in-charge.

#### **3.7.0 LAYING AND TESTING :**

- 3.7.1** The material placed in the embankment shall be laid in 15 cm layers if plain roller is used and 22 cm layers if sheep foot roller is used and shall be properly watered and compacted to attain dry density of not less than 95% of the proctor density for the material under consideration. The soil shall be brought to + 2 percent of O.M.C. as determined in the laboratories by adding the required amount of water either at the borrow pits or on the embankment.

In case of canal embankment a dry density up to 90% of optimum dry density (Standard proctor density) will be accepted but shall be paid at reduced rate to be approved by the Superintending Engineer.

### **3.7.2 FIELD DENSITY:**

The field density tests shall be conducted to ascertain that a density of 95 percent of the proctor density is attained. The number of such tests shall not be less than one for every 500 cubic metres of the rolled or compacted earth work per layer or two per day whichever is more.

### **3.8.0 MODE OF MEASUREMENTS AND DEDUCTION IN SECTIONAL MEASURE-MENTS :**

All measurements shall be taken on cross section of bank. For this purpose detailed cross section of the ground shall be taken at the interval of 20m. or less as directed before a embankment of a particular reach starts. The quantities of bank work shall be worked out on the basis of areas and distances of these cross sections by prismoidal formula. Deduction in quantities of bank work and C.N. S. bank shall be made for shrinkage at the rate of 10 percent of intermediate measurements, 7 percent after one monsoon and 5 percent for final measurements of earthwork if the final measurements are taken after two or more monsoons.

### **3.9.0 PROVIDING PERVERIOUS MATERIAL HAVING C. N.S. PROPERTIES FOR SUB-GRADE BEHIND LINING :**

**3.9.1** Most of the proposed embankment quantity under banking item is required for preparing sub-grade behind lining in B. C. zone. As sub-grade in B.C. zone requires a good foundation for good lining, special care will have to be taken for it.

**3.9.2** The thickness of bed and side sub-grade shall be as per design and drawing or as directed by the Engineer-in-charge in writing.

**3.9.3** Only approved quality of murum should be used Murum shall be laid in horizontal layers of 15 to 23 cm. and the same shall be laid for bed first and latter for sides. Murum shall be laid in long reaches at a stretch and in any case the reach shall not be less than 100 metre.

**3.9.4** Each layer will be watered adequately and compacted as specified in this section. Mechanical slope compactors shall be used for compaction, in small section where mechanical device cannot be used. manual tamping is allowed provided that compaction is done to the requirement.

**3.9.5** Sub-grade will be inspected by the Engineer-in-charge or his field officer before the lining work is started and certificate regarding the stipulated thickness and quality of sub-grade will be recorded and kept on records. Testing shall be done as per Para 3.7.1 to 3.7.2 and test results shall conform to be standard requirement as stipulated in above paras.

- 3.9.6** Payment will be for one cum. of work done quantity which will be computed by taking actual measurement.
- 3.9.7** Construction of service road along Canal / Distributary / Minor.
- i) This work consists of levelling the ground after removing grass etc.
  - ii) Filling the ruts and depressions.
  - iii) Spreading available spoils for sub-grade and compaction.
  - iv) Spreading murum in layers and compaction.
- 3.9.8** After removing bushes and grass the ground will be levelled. Ruts and depressions if any shall be filled with available soil and the entire width of service road will be levelled. Available excavated material from cutting for accommodation backfill, should directly placed to act as sub grade for murum road. this should be watered and compacted.
- 3.9.9** Murum shall be placed in layers uniformly. After sectioning according to plan the surface will be watered and compacted as specified in this section. After thorough compaction, the surface of road will be finally levelled and dressed according to plans or as directed by Engineer-in-charge.
- 3.9.10** No payment for this work will be made to the Contractor unless and until trimming to the canal section in that reach and service road is compacted in all respect.

**SECTION – 4**  
**CEMENT CONCRETE**

**4.0.0 CEMENT CONCRETE:**

**4.1.0 SCOPE OF WORK:**

The work covered by this item shall consist of :

- I) Furnishing all materials, equipment and labour for the manufacture, transport, placing and curing of concrete and performing all the functions necessary and ancillary thereto including the concrete to the required shape as per drawing.
  - ii) Installation of all embedded parts stands included in the rates. No extra payment will be made for the installation of this embedded metal work or for delays or for interruptions arising there from.
  - iii) Providing and removal of all form work comprising of furnishing all materials equipment and labour for the manufacture, transport, erection, keeping in place with necessary fixtures and supports oiling etc. complete.
  - iv) Necessary sampling and tests for materials and concrete.
  - v) Compensation for injury to persons and damages to work or property.
- 4.2.0** The following specifications will apply in general of all types of concrete work Including R. C. C. work.

**4.3.0 CEMENT :**

Cement shall be obtained by the Contractor and conform to the Bureau of Indian Standards for Portland cement.

**4.4.0 SAND :**

**4.4.1 SOURCE AND SIZE :**

The contractors own sand as per specification shall be used. The sand used for mortar shall be natural river sand. The maximum size shall be limited to 5 mm.

**4.4.2 QUALITY :**

The sand shall consist of hard, dense, durable uncoated, gritty material obtained from rock fragment, it shall be free from injurious amounts of dust lumps, soft and flaky particles, shale, alkali organic matter, loam, mica and other deleterious substances. The maximum percentage of deleterious matter in sand as delivered for use in mortar shall not exceed the following values.

### PERCENTAGE BY WEIGHT

Materials passing 75 micron I. S. Sieve (00029")	3 Percent
Shale	1 Percent
Coal	1 Percent
Clay Lumps	1 Percent
Total of other deleterious substances such as Alkali, mica coated grains, soft and flaky particles	2 Percent

The sum of percentages of all deleterious substances shall not exceed 5 % by weight. The sand shall be free from injurious amounts of organic impurities. Sand producing a colour darker than the standard in the colorimetric tests for organic impurities shall be rejected. If the impurities are beyond the acceptable limits stated above, the sand shall be washed with power or diesel driven sand washing machine to the entire satisfaction of the Engineer-in-charge at the cost of the Contractor.

#### 4.4.3 MECHANICAL ANALYSIS:

The natural sand shall be well graded and the sieve analysis of the sand shall conform to the following limits of gradations.

ASTM sieve No.	Equivalent I.S.S. No.	Cumulative percentage by weight retained on Sieve
3/8" mesh	10 mm.	Nil
4 mesh	4.75 mm.	1 to 8
8 mesh	2.36 mm.	10 to 25
16 mesh	1.18 mm.	25 to 45
30 mesh	600 micron	50 to 70
50 mesh	300 micron	75 to 90
100 mesh	150 micron	90 to 97

The gradation curve of the natural sand shall lie within the enveloping curve of gradation specified as above.

#### **4.4.4 a) FINENESSMODULUS:**

The fineness modulus shall be computed by adding cumulative percentages of sand retained on the 6 standard screens from No. 4 to No. 100 inclusive A.S.T.M. standard (or as above of the I.S.I.) and dividing the sum by 100. Any deviation from the specified range of gradation and fineness modulus shall not be permitted without the written permission of the Engineer-in-charge. Corrective measures if any required for Improving the fineness modulus shall be arranged by the Contractor at his own cost as directed by the Engineer-in-charge.

#### **b) NATURALSAND :**

Natural sand shall have fineness modulus ranging from 2.00 to 3.85 without any admixtures

#### **c) ALLOWANCEFORBULKAGE:**

If the contractor's own sand required to be washed or obtained after its washing is found to be moist, bulkage will be measured and allowed provided sand is stacked at site at least for 48 hours before use. Bulkage of such a stack will be measured regularly as directed by the Engineer-in-charge and allowed, according to these, observations. Observations for bulkage will be made as per Indian Standard Procedure and allowance will be made as under.

BULKAGE OBSERVED	ALLOWNACE TO BE MADE
Below 5%	Nil
5 to 10	5 percent
10 to 15	10 percent
15 t0 20	15 percent
20 to 25	20 percent
25 to 30	25 percent
30 to 35	30 percent

#### **4.5.0 COARSE AGGREGATE :**

4.5.1 Coarse aggregate for concrete shall consist of hard, dense, durable uncoated crushed rock and shall be free from injurious amount of soft, feeble thin, elongated or laminated pieces, alkali, organic matter or other deleterious substances. Flaky and weathered stones shall not be used.

#### **4.5.2 IMPURITIES :**

The broken stone shall be free from dust and dirt and shall be washed if necessary to ensure that all faces of the stones are perfectly clean. The maximum individual percentages by

weight of deleterious substances of any size of coarse aggregate shall not exceed the following values.

Materials passing through No. 150 microns I.S. sieve one percent by weight.

Shale	1 percent by weight
Coal	1 percent by weight
Soft fragments	1 percent by weight
Clay lumps	1/4 percent by weight
Other deleterious substance	1 percent by weight

The sum of the percentages by weight of all the deleterious substances in any size shall not exceed five percent by weight.

The aggregate containing impurities above the specified permissible limits shall be screened / washed / or treated as directed before use in producing concrete.

#### 4.5.3 GRADING:

The approximate range in grading of coarse aggregate shall be as under. Coarse aggregate shall be of such size as shall be retained on a mesh 5 mm. Sq.

Maximum size of aggregate	Normal range mm.	Percentage of coarse aggregate fraction (mm)				
		40 to 80	20 to 40	5 to 20	10 to 20	5 to 10
20 mm.	10 to 20	--	--	100	50 to 67	33 to 45
40 mm.	20 to 40	--	40 to 50	50 to 60	28 to 40	18 to 30
80 mm.	40 to 80	20 to 36	16 to 36	35 to 44	10 to 30	13 to 29

The grading between the limits specified above shall be such as shall produce a dense concrete of the specified proportions and consistency that will work readily into position without segregation and without the use of excessive water content.

The use of gravel fraction left behind after sieving river sand for winning fine aggregates shall be permitted in the blending of coarse aggregate if asked for after suitable experiments and without rate variations.

#### 4.5.4 SIZE:

The maximum size of coarse aggregate for a particular grade of concrete shall be as large as possible but normally not greater than 1/4th of minimum thickness of the concrete member provided that in the case of R. C. C. this size presents no difficulty to surround the reinforcement thoroughly and fill up the comers of the form work fully and is less than the minimum cover by 6 mm.

For heavily reinforced concrete members such as ribs of beams, etc. the maximum size of aggregate shall be restricted to 6 mm less than the minimum clear lateral distances between the reinforcement bars or 6 mm. less than the cover whichever is smaller.

Generally, a maximum size of 20 mm. should be found satisfactory for reinforced concrete work.

The grading between the maximum size and minimum size of 5 mm shall be such as to produce a dense concrete of the specified proportion and consistency that will work readily into position without segregation and without the use of excessive water content.

**4.5.5** The Contractor shall at all times maintain a minimum storage of all grades of the aggregate for the days requirements, at work site failing which the work may not be commenced. The Contractor shall furnish representative samples of aggregate proposed for use in the work at least two months before aggregates are required for use.

#### **4.6.0 WATER :**

Water used in concrete shall be clean and free from objectionable quantities of silt, organic matter, alkali, salt and other impurities which are likely to be injurious. The turbidity of water for mixing shall not be more than 200 parts per million and shall preferably be lower.

#### **4.7.0 GRADING AND RELATIVE PROPORTION :**

Grading of the aggregates (fine and coarse) brought on the site shall be done by the contractor and shall be got approved from the Engineer-in-charge. The grading of sand and coarse aggregate is liable to be modified beyond the limits specified above to suit local condition in order to obtain required strength and workability. The grading as well as relative proportion of sand and coarse aggregate are liable to be changed at the discretion of the Engineer-in-charge, in order to produce dense concrete of required strength which can be worked readily into position without segregation in a given ratio of cement and total aggregate (sum of volume of sand and coarse aggregate). No compensation is payable for adjustment in relative proportion and grading of aggregates.

#### **4.8.0 MIX VARIATION :**

Cement variation in the concrete mix shall not constitute an extra item.

In case the ratio of cement to total aggregate is modified by changing the cement content under specific orders of the Engineer-in-charge, the Contractor shall be paid at increased or reduced rate according to the variation in the cost of cement alone resulting from change in mix proportion, calculated as per table given below, at the rate as given in Annex 'A' of Detailed Tender Notice.

Sr.	Nominal mix proportion of the concrete by volume	Equivalent I.S.S. mixes (ISS 456-2000)	Assumed cement consumption per one cubic metre of concrete
1.	1:2:4	M : 30	9.20 Bag/ M3 460 Kg/M3

Fine and coarse aggregate shall be measured by dry volumes in suitable wooden boxes.

Overall cement consumption for Individual Items during working season shall be within (+) or (-) 2%. In case the cement consumption is less than 2% than that specified, the work shall be paid at reduced rates.

#### **4.9.0 DESIGN MIX : (applicable for work more than Rs. 1 crore)**

The ratio of the volumes of the fine and coarse aggregate may be varied within limits of 1 : 1.5 to 1 : 2.5 as directed by the Engineer-in-charge to surt the maximum size of coarse aggregate, the grading, density, workability and strength without extra cost.

The quantity of water shall be just sufficient, but not more than sufficient to produce a dense concrete of required workability for its purpose. An accurate control shall be kept on the quantity of mixing water. An allowance shall be made for surface moisture present in the aggregates when computing water content as indicated in I. S. 456-2000.

Nominal mix proportions of concrete are given In para 4.8.0. However, the exact proportions in which the materials are to be used tor different parts of the work shall be determined by caring out mix design to obtain the specified strength of the concrete. The design of mix, shall be submitted by the contractor and got a approved from the Engineer-in-charge at least one month before the commencement of the work. The design may be changed at any given time at the discretion of the Engineer-in-charge during progress of the work. The samples of aggregates and cement and the resoling concrete, as well as the concrete mix design shall be tested as per relevant I. S. applicable. The tests shall be made by the Corporation at frequent intervals as decided by the Engineer-in-charge. So as to secure the required workability, density, impermeability, strength and economy.

All the materials going in each batch of concrete shall be weighed before use. The amount of each individual size of aggregate entering each batch of concrete shall be determined by direct weighing. The amount of water shall be added after weighing or volumetric measure. All measuring equipment shall be calibrated correctly and certificate from the competent authority shall be obtained as and when demanded by the Engineer-in-charge. All measuring equipments shall be so designed and operated that the combined inaccuracies In feeding and measuring the materials will not exceed, one and half percent for water or cement and two and half percent for each size of aggregate. Any batch of concrete not satisfying this requirement is liable to be rejected. No cement older than 60 days from the date of despatch from the manufacturer shall be used on the work. The cement to be used shall be in the Oder of its receipt so that no stock remains unused for duration longer than 60 days. Cement older than 60 days shall be removed from site as per the directives of Engineer-in-charge.

The ingredients of concrete shall be properly mixed in mixers, designed so as to positively ensure uniform distribution of all the component materials through the mass, at the end of the mixing period. The mixing of each batch shall continue about one and half to two minutes depending upon the revolutions per minute of the mixer and experience after all materials except for the full amount of water are added in the mixer. The minimum mixing period specified above assumes proper control of the rotation of the mixer and of

introduction of the materials, including water. The mixing time shall be increased at the discretion of the Engineer-in charge when the charging operation fails to produce concrete of the required uniformity of composition and consistency within the batch and from the batch to batch Contractor shall not be entitled for any extra payment for such increase in mixing time. Excessive mixing requiring the addition of the water to preserve the required concrete consistency shall be avoided. If the mixing and charging operations are such that the required uniformity of the concrete is obtained in shorter mixing time than the minimum specified without sacrifice of needed workability, the mixing time may be shortened under orders of the Engineer-in charge. Mixing shall be done by Mechanical means only.

Materials corresponding to one bag mix or half bag mix (depending upon the mixer capacity) shall be placed in the skip in sequence of metal cement and sand. The skip shall then be emptied into the drum and specified quantity of water added to material in drum.

The following general principles shall be followed in operation of mixing.

- a) The ingredient shall be fed into the mixer simultaneously.
- b) A portion of water (between 5 and 10 percent) shall precede and an equal quantity shall follow introduction of the other materials. The remainder of the water shall be added uniformly and simultaneously with the other materials.
- c) Care shall be taken that mixing of concrete in the mixer shall be uniform.

#### **4.9.1 CEMENT :**

The cement shall be procured as per para 14 of Special Conditions of Contract in standard bags as received from the manufacturers and is to conform with the specifications, laid down by the Bureau of Indian Standards (Vide their specification No. I. S. 269 of 1976) for Portlandcement and I.S.I. (Vide their specification No. I. S. 1489 - 1976 and subsequent revision) for pozollana cement.

#### **4.10.0 TEST FOR CEMENT CONCRETE :**

##### **4.10.1 STIPULATED CRUSHING STRENGTH :**

The crushing strength in Newton per square millimetre on works cubes, at 28 day for each nominal mix shall be as under.

Nominal Mix	Equivalent ISS mixes	Preliminary test at 28 days (N/mm <sup>2</sup> )	Stipulated crushing strength	
			in works tests At days (N/mm <sup>2</sup> )	At 28 days (N/mm <sup>2</sup> )
	M-30	38	19	30
1 : 1 : 2	M - 25	32	17	25
1 : 1.5 : 3	M - 20	26	13.5	20
1 : 2 : 4	M - 15	20	10	15
1 : 3 : 6	M - 10	13.5	7.5	10
1 : 4 : 8	M - 7.5	10	5	7.5

#### 4.10.2 PRELIMINARY LABORATORY TEST :

Preliminary tests of cubes shall be carried out in the laboratory well in advance of commencement of work. These tests should indicate in adequate margin over the stipulated strength specified in para 4.10.1

#### 4.10.3 WORKS TESTS ON CONCRETE :

Tests for crushing strength shall be made on standard cubes as per the relevant Indian Standard Specifications. For works tests, samples shall be taken on the job as and when directed. For works tests, samples shall be taken once for every 30 cubic metre of each type of concrete laid and at least three times a day, if output is more than 75 cubic metre. The samples for work test is defined as a set of three cubes. The materials required for the samples (concrete, cement, sand and coarse aggregate) shall be supplied by the Contractor free of cost and collection of samples, casting of cubes and tastings shall be carried out at the Corporations' cost.

#### 4.10.4 STANDARD OF ACCEPTANCE :

Not a single sample of work test cubes shall have at the age of 28 days, a crushing strength less than the stipulated crushing strength of concrete. The Engineer-in charge may at his discretion occasionally accept the crushing strength of a sample which is less than the stipulated strength but which is equal to or more than 85% of the stipulated strength. Each sample of work test cubes shall assume to represent 30 M3 concrete and corresponding quantity of concrete showing crushing strength less than stipulated strength shall be paid at reduced rates as under.

- 1) Equal to or more than 95% At full rates in occasional cases
  - 2) Equal to or more than 90% but less than 95% 5% reduced rates
  - Equal to or more than 85% but less than 90% 10% reduced rates
- The reduced rate shall be approved by the Superintending Engineer.

If the crushing strength falls below 85% of the stipulated crushing strength, then the quantity of concrete represented by these samples will not be paid for defective parts. If noticed shall be removed and redone by the contractor at his cost. Unit for acceptance or these tests will be one working season.

In addition to the 28 days strength tests, the Engineer-in-charge may at his discretion take 7 days strength tests and/or 3 days (accelerated curing) strength tests and fix up the relation between such strength and 28 days strength after studying the actual values realised. If at any time the tests i.e. 7 days or 3 days (accelerated curing) strength indicate that the strength may not be achieved as specified by the Engineer-in-charge, he shall have authority to suspend the work of laying concrete until the reasons for low strength have been investigated and corrected. The Contractors shall comply there with without such suspension of work being made a reason for any claim. The Engineer-in-charge may at his discretion also order suspension of the work when the variation in the strength of the individual work test cubes from average of the set is in his opinion excessive. The Contractor shall comply with such suspension until the reasons for the variations are investigated and corrected and such suspension shall not be accepted as reason for any claim.

The average crushing strength shall not be less than stipulated crushing strength for each nominal mix as given below.

Grade	Nominal mix	Preliminary test crushing strength at 28 days kg/sq.cm	Crushing strength at 7 days kg/sq.cm in work test	Crushing strength at 28 days Kg/sq. cm in work test
M - 30	1 : 1 : 2	380	190	300
M - 25	1 : 1 : 2	320	170	250
M - 20	1 : 1.5 : 3	260	135	200
M - 15	1 : 2 : 4	200	100	150
M - 10	1 : 3 : 6	135	75	100
M - 7.5	1 : 4 : 8	100	50	75

#### 4.10.5 SLUMP TESTS :

In order to test the consistency of the mixed concrete, Slump test shall have to be made by the Contractor when and where required by the Engineer-in-charge, as per Indian Standard Specification. The allowable slump shall be decided by the Engineer-in-charge, depending upon the location of the concrete.

- 4.10.6** In the case of reinforced concrete work, the workability shall be such as the concrete will surround and properly grip all the reinforcement. Water cement ratio will be such as will give concrete just sufficiently wet to be placed and compacted without difficulty.
- 4.10.7** Concrete shall have a consistency such that it will be workable in the required position and in the case of R. C. C. flow around reinforcing steel also.
- 4.10.8** For vibrated concrete slump shall range between 2.5 cm. to 5 cm. The slump shall be the less permitted by workability. The slump shall be determined as detailed in Appendix 'G' of I. S. 456-1978 and maintained throughout the concreting operation of a member.

**4.11.0 FORMS.:**

**4.11.1 GENERAL:**

Forms to confine the concrete and shape it to the required line shall be used wherever necessary. The form shall have sufficient strength and rigidity to hold concrete and to withstand the pressure of ramming and vibration without excessive deflection from the prescribed lines the more so when the concrete is in vibration. The Contractor shall have to get the design and drawing of the centring approved from the Engineer-in-charge before erection. Form work shall be of any of the following types.

- (a) Wooden shuttering with steel plates lining or plywood shuttering.
- (b) Steel shuttering.

For works costing more than Rs. one crore, only steel shuttering to be used. However as per need of site, wooden shuttering would be allowed only if it is free from warping and is fabricated true to line and shape. The decision of the Engineer in-charge as to the suitability of wooden shuttering as per (a) above to be used by the Contractor will be final and binding on the Contractor. The surface of all forms in contact with concrete shall be clean, rigid, watertight and smooth. Suitable devices shall be used to hold comers, adjacent ends and edges of pannel of other forms together in accurate alignment.

**4.11.2 DESIGN :**

The detailed designs of the form work and false work shall be prepared by the Contractor and got approved by the Engineer-in-charge well in time. Such an approval however, will not relieve the Contractor of his responsibility for the adequacy and strength of the form work and false work.

Forms shall be as designed and constructed as to be removable in sections without damaging the surface of the concrete and with facilities of removal in ascending order without disturbing the remaining forms required to be removed later.

**4.11.3 MATERIAL :**

The forms and false work shall be made of wood or metal. The timber from which the forms are prepared should preferably be partially seasoned. It shall be free from sap, shakes, loose knots, wormholes or other defects. The planks and scantlings shall be sawn straight and all edges and planes shall be straight and free from warps. Partially seasoned soft wood is generally preferable for form work as it is difficult to drive nails in hard wood. The dimensions of scantlings should conform to the design. The strength of the wood shall not be less than that assumed in a design.

In metal forms, steel sheets of the designed gauge strengthened with framing of angle or other sections shall be used.

Wooden forms may also be lined within thin steel sheet or plywood to give the required surface or finish.

#### **4.11.4 FABRICATION**

The timber planks and scantlings of the designed dimensions shall be used in the form work with appropriate spacing of studs, yokes, joists, girders etc. as provided in the designs. All timbers in contact with concrete shall be brought on one face and two edges, the unbrought face being on the outside. The joints should be made mortar tight. This may be done either by providing tongued and grooved or reveted joint or by caulking or nailing to the construction operations. The nuts and bolt heads inside the form work adjoining the concrete should be countersunk. The form work should allow finished concrete to have a smooth surface and conform to the shapes, lines and dimensions shown on the plans and true to line and grade. The effect of vibration shall be taken into account in the design and fabrication of the form and false work.

#### **4.11.5 TREATMENT OF THE INNER SIDES OF FORMS :**

Before placing concrete, the inner side of the forms which come in contact with the concrete shall be coated with mineral oil or any other suitable materials approved by the Engineer-in-charge which will prevent adhesion of concrete to the forms but will not discolour the concrete. When oil is used, it shall be applied before reinforcement is placed. Care shall be taken to see that reinforcement does not come in contact with coating. All chippings, saw dust and other rubbish shall be removed from the interior of the forms before concreting.

#### **4.11.6 FALSE WORK :**

False work shall be built on foundation or base of sufficient strength to carry the loads without settlement. False work which cannot be found on solid footing must be supported by piles or other similar devices. False work shall be designed to carry the full loads including that due to construction operation coming upon it.

#### **4.11.7 ERRECTION AND REMOVAL OF FORMS :**

The false work and form work shall be erected with an eye for absolute safety of the form work and concrete work before and after pouring concrete. Watch should be kept to see that the behaviour of centring and form is satisfactory during concreting. Erection should also be such that it would allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed later.

If there is failure of false work and/or form the Contractor shall be responsible for all the consequent damages to work, injury to life and damage to property and make good the damage at his cost.

- i) Before placing concrete the surface of forms shall be oiled with a suitable nonstaining oil such as raw linseed oil so as to prevent sticking of concrete and facilitate the removal of form.
- ii) The oil shall cover the forms fully and evenly without excess over drip. Care shall be taken to prevent oil from getting on the surface of the construction joints and on reinforcement bars. Special care shall be taken to oil thoroughly the form strips for narrow grooves so as to prevent swelling of the forms and the consequent damage to concrete prior to or during removal of forms. Immediately before concrete is placed, care shall be taken to see that all

forms are in proper alignment and the supports and fixtures are thoroughly secured and tightened.

- iii) Where forms for continuous surface are placed in successive units, the form shall fit tightly over the completed surface so as to prevent leakage of mortar from the concrete and to maintain accurate alignment of the surface.
- iv) Forms shall be left in place until their removal is authorized and shall then be removed with care so as to avoid injury to concrete.
- v) Removal of forms shall never be started until the concrete is thoroughly set and hardened adequately to carry its own weight, beside the live load which is likely to come on the work during constructions. The length of time for which the forms shall remain in place shall be decided by the Engineer-in-charge, with reference to weather conditions, shape position of the structure or structural member and the nature and amount of dead and live loads.

In normal circumstances forms shall be struck after the expiry of the following period.

- a) Walls, columns and vertical faces of all 24 to 28 hours as may be structural members decided by the Engineer-in-charge
- b) Slabs (Props left under) 3 days
- c) Beam soffits (Props left under) 7 days
- d) Removal of Props under slabs
  - 1 ) Spanning up to 4.5m 7 days
  - 2) Spanning over 4.5m 14 days
- e) Removing of props under beams and arches
  - 1 ) Spanning up to 6m 14 days
  - 2) Spanning over 6m 21 days

**Note :** The number of props left under their size and disposition shall be such as to be able to carry the full dead load of the slab, beam or arch as the case may be together with any live load likely to occur during curing or further construction.

In no case shall forms be removed until there is assurance that removal can be accomplished without damaging the concrete surface. No loads will be allowed to damage the concrete surface. Heavy load shall not be permitted until the concrete has reached its designed strength. The forms shall be removed with great caution and without harming the structure or throwing heavy forms upon the floor.

#### 4.11.8 RE-USE OF FORMS ETC :

Forms required to be used more than once shall be maintained in serviceable conditions and shall be thoroughly cleaned and smoothened before reuse. Where metal sheets are used for lining forms, the sheets shall be placed and maintained on the forms with minimum amount of wrinkles, humps or other imperfections. All forms shall be checked for shape and strength before reuse.

#### **4.11.9 INSPECTION :**

The forms and false work will be inspected, checked and approved by the Engineer in-charge before concreting commences. But this will not relieve the Contractor of his responsibility for strength, adequacy and safety of the form and false work.

#### **4.12.1 PLACING CONCRETE :**

**4.12.2** Concrete shall be placed only in locations where authorized and no concrete or mortar shall be placed until formwork, Installations of embedded parts, preparation of surface or necessary clean-up has been approved.

#### **4.12.3 ROCK SURFACE :**

Rock surface upon or against which concrete is to be placed, shall be prepared as specified in section of excavation for foundation.

#### **4.12.4 MASONRY SURFACE :**

- i) Masonry surfaces on which or against which concrete is to be placed, shall be prepared as described in para 9.2.1 and 9.2.2 of section 9. The unit rate for masonry shall cover the cost of such preparation.
- ii) If the old layer of masonry which has been paid for is required to be removed as mentioned in para 9.2.2 it shall be back filled with concrete along with upper concrete layer at no extra cost.

#### **4.12.4 CONCRETE SURFACES :**

Before laying of concrete the surface of the concrete in day to day work, shall be cleaned by a wire brush and jets of water, so that the surface is thoroughly cleaned and wetted but pools of water are avoided. If the old concrete surface has remained exposed for more than two week, it shall be prepared not roughened by chipping to a depth of two centimetres and the surface coated or covered with a layer of cement mortar (1:2) for a depth of 5 to 8 cm. The unit rate of concrete shall cover the cost of such preparation and also the cost of cement mortar. The concrete removed for roughening shall not be paid for.

#### **4.12.5 ALL SURFACES :**

- i) The cleaned rock, masonry or concrete surface shall be applied with cement slurry and then cement mortar coat as described in para 9.2.2 .
- ii) The first few batches of concrete may, if as required contain half the regular size of coarse aggregate without any extra claims.
- iii) The cost of such preparation work stands included in the unit rate of cement concrete.

#### **4.12.6 TIME FOR USE :**

All concrete shall be placed directly in its final position within thirty minutes of mixing. Any concrete which has become so stiff that proper placing cannot be assured without retempering shall be wasted and shall not be paid for. All surface of forms and metal work including reinforcement bars that have become encrusted with dried mortar or grout concrete previously placed shall be cleaned of all such mortar or grout before surrounding or adjacent concrete is placed.

#### **4.12.7 METHOD OF PLACEMENT:**

Before starting placing of concrete, it should be made certain that the transporting and placing equipment is clean in proper order and that equipment along with the operating staff is arranged to deliver the concrete in the final positions without undue delays and objectionable segregation. The methods and the equipment used for transport and placing of concrete shall be such as will permit the delivery of concrete of the required consistency into the work without objectionable segregation porosity or excessive loss of workability. Excessive segregation from whatever cause shall be prevented in handling and placing operation by avoiding or controlling lateral movement of the concrete as in dumping at an angle depositing continuously at one point and allowing the concrete to flow. Concrete shall not be dropped from excessive heights and free fall should be kept to a minimum. Concrete shall be deposited in continuous horizontal layers in a thickness of approximately 30cm. in normal work to 45 cm for mass concrete except that nothing herein shall be constructed to permit placement of the additional horizontal layers of mass concrete before the entire area to be concreted is covered by previous layers. On flat, horizontal surfaces, where congestion of steel near the forms makes placing of concrete difficult, a mortar of the same cement sand ratio as used in the concrete shall be first deposited to cover the forms and shall stand included in the unit rate of concrete before the entire area to be concreted is covered by previous layers.

#### **4.12.8 RATE OF PLACING :**

Concreting should be continued without interruption until the structure or section is completed or until satisfactory construction joints can be made. Location of construction joints shall be as directed by the Engineer-in-charge. Concrete shall not be placed, faster than the placing crew can compact it properly. In placing thin members and columns precautions shall be taken against too rapid placement which may result in movements or failure of the forms due to excessive lateral pressure. An interval of at least 12 hours and preferably 24 hours should elapse between the completion of columns and walls and the placing of slabs beams or girders supplied by them in order to avoid cracking due to settlement. All concrete shall be placed in approximately horizontal lifts not exceeding 1.25 metre in thickness per day. Concrete in arches shall be done in strips extending from one pier to another. No through joints shall be kept in the span.

#### **4.12.9 CONCRETING AT NIGHT TIME :**

If concrete is to be placed at night adequate lighting arrangements shall be made, as directed by the Engineer-in-charge.

#### **4.12.10 CONCRETING DURING RAINS :**

When concreting is required to be done or continued while it shall be seen that the concrete is not damaged due to rain while it is being transported and placed. After placing the green

concrete, it shall be adequately covered for a period of 24 hours when it will be capable for being cured by splash of water. The surface of fresh concrete should be maintained on a slope sufficient for result in the self-drainage of the rain water. The work shall however be discontinued when the rain is so severe that water collects in pools or washes the surface of the fresh concrete and it is not possible to provide adequate shelter.

#### **4.13.0 COMPACTION :**

##### **4.13.1 GENERAL :**

In all concrete works, required nos. of vibrators, with standby in working condition will be kept ready at site as per the instructions of the Engineer-in-charge.

- 4.13.2** All concrete shall be vibrated by mechanical vibrator of approved type so as to ensure dense concrete. Hand tamping and rolling shall not be used for compaction of concrete except in special circumstances with the express permission of the Engineer-in-charge. When immersion type vibrators are used they shall be used vertically at about 45 cm. apart. The vibrators shall be inserted to the full depth of the newly laid concrete layer. The concrete shall be thoroughly compacted during depositing to get a dense concrete and thoroughly worked in to the edges and corners of the form work and also along its faces and around reinforcement in the case of R.C.C. by means of suitable tools such as trowel and rods to get a good finish without honeycombing. The vibrator shall however, not reverberate concrete which has commenced its final set. Special care shall be taken to see the vibrator touching the reinforcement of embedded part does not disturb the concrete below which has commenced its final set. The concrete shall not be vibrated excessively so as to cause segregation.
- 4.13.3** Each layer of concrete, for surfaces which is required to be smooth and for all surfaces which will be permanently exposed to the weather, and for all surfaces next to embedded metal work shall be worked and vibrated by mechanical vibrator of approved type only so as to obtain a concrete of maximum density and Imperviousness and to assure close contact of the concrete with forms, reinforcement bars and other embedded parts. If the methods of transporting and placement have been conductive to air entrainment segregation of stiffening, the work of compaction should receive special attention.
- 4.13.4** For concrete surfaces exposed to flow of water special precaution shall be taken to minimise and to prevent surface pitting and protrusions without resorting to over manipulation of the concrete mix to the forms. No plastering for getting a smooth finish shall be permitted at these locations. Any protrusion shall be ground smooth.

#### **4.14.0 CURING AND PROTECTION :**

All concrete shall be protected against injury until final acceptance. Exposed finished surface of concrete shall be protected from the direct rays of sun of atleast 72 hours after placement. Concrete shall be kept continuously moist for not less than 21 days. Construction joints shall be cured in the same ways as other concrete and shall also be kept moist for at least 72 hours prior to the placing of additional concrete upon the joints. Approximately horizontal surfaces shall be cured by sprinkling, ponding, or by covering, or by damp sand or may be cured by the use of wet quilts or mats. Vertical surfaces shall be cured by covering with wet jute bags. If damp sand or quilting is used for curing, it shall be removed completely later. Should the concrete that has become dry or powdery through neglect of curing the Contractor shall rectify the work at his own extra cost. If curing

arrangements by the Contractor are not satisfactory the Engineer-in-charge may in his discretion engage labour and provide material and equipment for curing and recover expenditure thus involved from Contractor.

#### **4.15.0 FINISHING :**

##### **4.15.1 GENERAL :**

Finishing of formed and unformed surface shall be performed only by skilled workmen. All exposed concrete surface shall be cleaned of all incrustations of cement mortar or grout. Unsightly stains shall be removed.

##### **4.15.2 FORMED SURFACES :**

Surface of concrete finished against form shall be smooth, free from projections and filled thoroughly with mortar. Immediately upon removal forms, all unsightly ridges or fines shall be removed and any local bulging on exposed surfaces shall be remedied by tooling and rubbing. All holes left by the removal of fasteners shall, after being reamed with toothed reamer, neatly filled with dry patching mortar. All porous and fractured concrete and surface concrete to which additions are required to bring it to the prescribed lines shall be sharp edged and keyed and shall be filled to required line with fresh concrete used for filling the chipped openings and these shall not be less than 8 cm. in depth and the concrete filling shall be reinforced and dowelled to the surface of the openings. Honey combed surfaces and surfaces which give a hollow sound shall be rectified by guniting at the Contractors' cost within the unit rate accepted for concrete.

##### **4.15.3 DRY PATCHING:**

Dry patching mortar shall consist of one part of cement to 2 parts of sand by volume and just enough water so that the mortar so used, will stick together on being moulded into a ball by a slight pressure of hands and will not exclude water when pressed but will leave the hands damp. The mortar shall be placed in layers of not more than 2 cm. thickness. After being compacted each layer shall be roughened by being scratched to provide an effective bond with the succeeding layers. The last or finishing layer shall be smooth to form a surface continuous with the surrounding concrete. All patches shall be bonded thoroughly to the surface of the chipped opening and shall be sound and free from shrinkage cracks.

##### **4.15.4 FINISHING PERMANENTLY EXPOSED SURFACE :**

Except as otherwise specified or directed all permanently exposed concrete surface and other waterway surface requiring durability under water (except the outlet) shall be finished in the following manner, immediately upon the removal of the form the surface shall be wetted and all surface pits and air bubbles filled by rubbing mortar composed of cement and fine sand in proportion (1:2) in to the pits with burlap so as to secure a uniformly dense and smooth face.

The rubbing shall be performed in such a manner as to leave the surface free from mortar not used for filling the pits. Should the filling operation be unduly delayed and the surfaces of the pits become coated with dirt or other contaminating materials, they shall be thoroughly cleaned and washed and shall be maintained in a moist condition, until the mortar filling is placed. Such cleanings shall be done by means of air and water jets and chipping or brushing or other satisfactory means without damaging the surrounding concrete. All operations in connection with the filling of surface pits shall be handled as quickly as practicable to minimise the period during which the concrete and mortar filling

are exposed to the drying. When the treatment of a surface has been completed the surfaces shall be neat and of the same colour and texture as the adjoining concrete.

#### **4.15.5 FINISHING CONCEALED SURFACE :**

For exterior concealed surfaces below ground or back fill level or like surfaces not otherwise specified, no finish is necessary except that sand streaks metal pockets, honey combing or other imperfections which are of consequence affecting strength, water tightness or protection of reinforcing steel from corrosion, shall be corrected and repaired as prescribed for formed surface.

#### **4.15.6 FINISHING UNFORMED SURFACE :**

Unformed surface shall be finished by one or more of the operation of screeding floating and towelling of the surface should be done at proper time employing experienced men and should be just sufficient to produce the desired finish. Screeding which gives the surface its approximate shape by striking off surplus concrete immediately after compaction shall be accomplished, by moving a straight edge or template with a sawing motion across wood or metal strips that have been established as guides. Where the surface is curved special screed should be brought true to form and grade by working it with a wooden float. If a coarse textured finish is desired or if the surface is to be steel towelled a section or final floating should be performed after some stiffening has occurred and the surface moisture film or shine has disappeared. Where smooth dense finish is desired floating shall be followed by steel towelling some time after moisture film or shine has disappeared from the floated surface and where the concrete has hardened sufficiently to prevent fine material and water from being worked out the surface. Excessive towelling particularly at early time shall be avoided.

#### **4.15.7 CHIPPING AND ROUGHENING CONCRETE SURFACE :**

Surface upon or against which additional concrete is to be placed shall be chipped and roughened to a depth not greater than 25 mm. Roughening shall be performed by chipping or other satisfactory methods and in such manner as not to loosen, crack or shatter any part of the concrete beyond the roughened surface. After being roughened the surface of the concrete shall be cleaned thoroughly of all loose fragments, dirt and other objectionable substances and shall be sound and hard in such conditions as to assure good mechanical bond between old and new concrete. All concrete which is not hard, dense and durable shall be removed to the depth required to secure a satisfactory surface.

#### **4.15.8 DAMAGE DUE TO FLOODS - CORPORATION NOT RESPONSIBLE :**

In case of damage of any of the concrete works due to floods, Corporation will not be responsible and whatever corrective measures are required to be adopted shall be done by the Contractor at his cost.

#### **4.16.0 NOMINAL MIX :**

The locations indicated in Column No. 6 of the statement below are only suggestive. The nominal mix used for different components shall be directed by the Engineer-in charge according to requirements of detailed design. The Contractor shall not be entitled for any extra claim on account of the changes in location.

Sr. No.	Nominal mix	Cement content in kg/cum.	Maximum size of aggregate in mm	Stipulated strength at 28 days on 15 x15 x 15 cm cubes (works tests) N/mm <sup>2</sup>	Indicated probate locations for use
1	2	3	4	5	6
1)	1 : 2 : 4 M-15	282 5.64 Bag/M3	20	15	Slabs, Kerbs, Beams C.C. Lining, Concrete Steps, Cattle Ramps etc.
2)	1 : 1 : 2 M-30	460 Kg/M3	20	30	Trough of Aqueduct.

#### 4.17.0 PAYMENT :

4.17.1 Payments shall be on the net quantity of concrete after deducting quantities for openings and other class of work. No deductions shall be made for anchor bars, reinforcement grout holes, and bore or weep holes or any opening not exceeding 100 square centimetres in cross section. Rate shall be subject to paragraph 4.10.4 above. Measurements of concrete shall be taken within the specified pay lines for the structure or as indicated on the drawings. Any concrete placed in the excavation beyond the line of structures to avoid use forms shall not be paid for.

Payment at the rate of 1 % shall be withheld in running payment. Engineer-in charge shall inspect the work in relation to finishing, level and line of concrete laid, and release such withheld payment suitably, if he is satisfied with the work of finishing of the item.

## SECTION - 5

### STEEL REINFORCEMENT

#### **5.1.0 SCOPE OF WORK :**

This item shall include supplying bending and erecting In position steel reinforcement conforming to relevant Indian Standard Specifications.

#### **5.2.0 REINFORCEMENT BARS :**

- 5.2.1 Steel reinforcement bars and fabrics shall be placed In the concrete as shown in the Drawing or as directed. Before steel reinforcement is placed in position the surface of the reinforcement shall be cleaned of rust, scale, dirt and grease and other objectionable foreign substances (heavy flaky rust and Mill scale that cannot be removed by firm rubbing with burlap, or equivalent treatment is considered objectionable). The fact that light or early stage rust has no detrimental effect on bond and hence could be discharged shall not be used as excuse of careless handling and storage of steel. In storing bars of the same size, length shapes and grade shall be assembled in racks and marked distinctly. Before the reinforcement bars are fixed in position it shall be verified that they are of specific size end bent In accordance with the plans and specifications. They shall be accurately placed and secured in position by means of built In concrete block, metallic chairs, hangers, spacers and other suitable devices, at sufficiently close Intervals, so that they will not sag between supports, not be displacing of the concrete or by any operation of the work.
- 5.2.2 Special care shall be exercised to prevent any disturbance of the reinforcement In concrete that has already been placed. The reinforcement after being placed in position shall be maintained in a clean condition until it is completely embedded in concrete to prevent further damage to the concrete or unsightly rust stains on exposed concrete surface.
- 5.2.3 Reinforcement shall not be straightened or bend in a manner that will injure or weaken the materials. Bars with kinks or bends not shown on the plans shall not be used. Bars shall be bent to the shape and dimensions shown on the drawing or as directed, using a bar bender, operated by hand or power, to attain the proper bending radious. The radius of bend shall not less than 4 times the nominal size of the bar. Heating of reinforcement bars to facilitate bending will not normally be permitted when, however, such heating is permitted in the case of large diametre bars, the temperature of the steel shall not exceed the corresponding to a cherry red colour.

#### **5.3.0 BINDING :**

Wire for tying reinforcement shall be of soft and annealed steel. The wire may be of 1.22 mm. to 1.63 mm and shall have to confirm to IS 280-1962. Metal support and spacers shall be fabricated from non-corrodible metal. Dissimilar metals shall not be placed In concrete In intimate proximity with each other or be joined by a connector especially in the continued presence of moisture unless it is known that galvanic action will not result.

#### **5.4.0 DISTANCE BETWEEN REINFORCEMENT BARS :**

- 5.4.1 The distance between two parallel reinforcement bars shall be except as provided below in 14.4.2 not less than the greatest of the following distances.
  - a) The diameter of either bar, if their diameters be equal, b) The diameter of the

larger bar, if their diameters be unequal.

- c) 6 mm. more than the nominal maximum size of the coarse aggregate comprised in such concrete.

Note : A greater distance should be provided when convenient.

- 5.4.2 The vertical distance between two horizontal main steel reinforcements or the corresponding distance at right angles to two inclined main steel reinforcements shall be not less than 12mm. except at a splice or tap and except where one of such reinforcement is transverse to the other.
- 5.4.3 The pitch of the main bars in a reinforced concrete solid slab shall be not more than three times the effective depth of such slab, or 60 cm whichever is less.

#### **5.5.0 SPLICING :**

Bar splices as indicated in the drawing or as specified by the Engineer-in-charge shall only be allowed. The lapped ends shall be placed to ensure full bond on each bar. Splicing shall not be done in the region of maximum bending moment, and splicing of adjacent bars shall be avoided as far as possible.

Welding of bars for splicing may be allowed in place of lapping at the discretion of the Engineer-in-charge at approved locations. When welding is resorted, instead of lapping, the bar to be spliced shall be lap welded or butt welded by electric arc welding. Ends of bars to be spliced shall be cleaned of all dirt, scales, rust paint and foreign matter before welding. All welding shall conform to the relevant Indian Standard Specification. Any weld will be considered unsatisfactory if it fails to sustain a tensile stress of at least 90% of the tensile stress of the bar in which the weld has been made. The Contractor shall make necessary arrangements, for carrying out the tests as directed by the Engineer-in-charge and with the accepted unit rate for reinforcement.

#### **5.6.0 COVER :**

- 5.6.1 Sufficient concrete cover shall be provided to protect reinforcement from corrosion or as indicated in the drawings. All protruding bars from concrete or masonry to which other bars are to be spliced and which will be exposed to action of weather for an indefinite period shall be protected from rusting by a thin coat of neat cement grout.
- 5.6.2 The thickness of concrete cover (exclusive of plaster or other decorative finish) shall be as follow.
  - a) At each end of reinforcing bar a cover not less than 25 mm. nor less than twice the diameter of such rod or bar.
  - b) For a longitudinal reinforcing bar in a column cover not less than 40 mm. nor less than the diameter of such rod or bar in the case of column of minimum dimensions of 18 mm. or under those bars which do not exceed 12 mm. diameter, 25 mm. cover may be used.
  - c) For a longitudinal reinforcing bar in a beam a cover not less than 25 mm nor less than the diameter of such rod or bar.
  - d) For tensile, compressive shear or other reinforcement in a slab a cover, not less than 12 mm. nor less than the diameter of such reinforcement.

- e) For all external work for work against earth faces and also for internal work where there exist particularly corrosive conditions, the cover, of the concrete shall be Increased by 12 mm. beyond the figures given above (a to d).
- 5.6.3 Where because of splicing, the thickness of concrete in between reduces to less than the maximum size of the aggregate a concrete with reduced maximum size of aggregate shall be used so as to allow development of bond in the splice. The extra cost of such special concrete shall be deemed to have been included in the unit rate for the main concrete and shall be paid at the same rate.
- 5.7.0 INSPECTION BEFORE CONCRETING :**
- No concreting shall be started unless the reinforcement as laid is finally checked and certified by the Engineer-in-charge or his authorized representative. Before starting the concreting the Contractor shall make certain that the measurements of the reinforcement placed in have been recorded and that the Engineer-in-charge certifies the correctness of reinforcement used. Failure to do so may mean no payment or payment at the discretion of the Engineer-in-charge for the reinforcement concrete.
- 5.8.0 ANCHOR BARS :**
- The cost of anchor bars proper shall be paid under the item of reinforcement.
- 5.9.0 MODE OF MEASUREMENTS :**
- Accurate records shall be kept at all times of numbers, size, length and weight of bars placed in position for different parts of the work. The reinforcement shall be paid as the weight of actual quantity of steel reinforcement placed in the structure arrived at the time of measuring the actual length of the bars used and placed as shown in the bar bending schedules including hooks, bends and laps. The length of the bar shall be measured to the next nearest 10 cm. a fraction less than 5 cm. being neglected and fraction of 5 cm. more taken as 10 cm. Weight shall be computed from the standard table of weights.
- 5.9.1 The unit rate accepted for the reinforcement shall include the cost of supplying, cutting, bending, cleaning, straightening, fixing and maintaining In position the reinforcement. Supplying and attaching binding wire, supports separators, hangers etc, shall be deemed to be included in the unit rate for reinforcement and shall not be measured nor paid where welding is permitted, for splicing, shall not be paid for separately. Chairs if any provided as per instruction of. Engineer-in-charge will be paid separately.

**5.9.2 TABLE OF WEIGHT FOR REINFORCEMENT:**

Sr. No.	Diameter of bar in mm.	Weight in kg. per metre	
		M.S. round bars	Ribbed Tor Steel bars
1	6	0.222	0.222
2	7	0.300	---
3	8	0.395	0.395
4	9	0.500	---
5	10	0.617	0.617
6	11	0.750	---
7	12	0.888	0.888
8	14	1.210	1.208
9	16	1.580	1.578
10	18	2.000	2.000
11	20	2.470	2.466
12	22	2.980	2.980
13	25	3.850	3.854
14	28	4.830	4.830
15	32	6.310	6.313
16	36	7.990	7.990
17	40	9.850	9.864
18	45	12.500	----
19	50	15.400	15.410

**SECTION- 6**  
**POLYTHENE FILM**

**6.1 DESCRIPTION**

The work shall consist of providing, and laying polythene film of 031 property manufacture from 100% virgin granules confirming to IS 2508.-1984 with 1.5x 2.5 mtr package in rolls 200 micron as per specifications or as directed by the Engineer in charge.

**6.2 GENERAL**

1.4.5 Providing polythene film of 031 property manufacture from 100% virgin granules confirming to IS 2508.-1984 shall be duly got approved by the Engineer in charge. It shall be also be inspection, maintenance and replacement.

1.4.6 Any acceptance of alternative types will be at the sole discretion of the Engineer-in-charge.

**6.3 REQUIREMENTS.**

For arresting seepage of water from bank work of coffer dam. So working surface area foundation of structure remains minimum water for dewatering.

**6.4 MATERIALS**

Polythene film of 031 property manufacture from 100% virgin granules confirming to IS 2508.-1984 with 1.5x 2.5 mtr package in rolls of 200 micron

**6.5 MODE OF MEASUREMENT AND PAYMENT.**

The polythene film shall be measured in square meters. The contract unit rate shall include the cost of all material, labour equipment and other incidental, the cost of laying handing and fixing shall be borne by the contractor.

**SECTION- 7**  
**DISMANTLING STONE MASONARY/ CONCRETE/R.C.C**

**TERMINOLOGY**

**7. 1.(i) Deconstruction-**

Means a selective demolition in which salvaging new and recycling of demolished structure is maximized. The term Dismantling implies careful, separating the parts without damage and removing. This may consist of dismantling one or more parts of the structure as specified or shown on the drawings

**7.1.(II) Demolition-**

The term Demolition implies breaking up. This shall consist of demolishing whole or part of work either manually or using mechanical (or various equipment) or by implosion using explosion, including all relevant items as specified or shown on the drawings

**7.2 GENERAL**

The Chapter relates to dismantling and Demolishing. 1.1 Precautions All material obtained from dismantling and demolishing shall be the property of the Government unless otherwise specified and shall be kept in safe custody until they are handed over to the Engineer in Charge/ authorized representative. 1.1.2 The demolition shall always be well planned before hand and shall generally be done in reverse order of the one in which the structure was constructed. The operations shall be got approved from the Engineer-in- Charge before starting the work. Due care shall be taken to maintain the safety measures prescribed in IS 4130 and

7.2.1 Construction and demolition best management rules 2016 shall be followed. Necessary propping, shoring and/or under pinning shall be provided to ensure the safety of the adjoining work or property before dismantling and demolishing is taken up and work shall be carried out in such way that no damage caused to adjoining work or property. Wherever specified, temporary enclosures or partitions and necessary scaffolding with suitable double scaffolding and proper clothes covering shall also be provided, as directed by the Engineer-in-Charge it shall be ensured that no dust is generated while demolishing. Demolishing Rules- 2016 shall be followed

7.2.2 Necessary steps shall be taken to keep noise and dust nuisance to minimum. All work needs to be done under the direction of Engineer-in-Charge. Helmets, goggles, safety belts etc should be used whenever required and as directed by the Engineer in Charge. The demolishing work shall be proceeded within such a way that it causes the least damage and nuisance to the adjoining building and the public. Barricading shall be provided as per NGT guidelines. 1.1.5 Dismantling shall be done in a systematic manner. All materials which are likely to be damaged by dropping from a height or by demolishing roofs, masonry etc shall be carefully removed first. Chisels and cutters may be used carefully as directed. The dismantled articles shall be removed manually or otherwise, lowered to the ground (and not thrown) and then properly sacked as directed by the Engineer-in-Charge. 1.1.6 Where existing fixing is done by nalla, screws, bolts, rivets, etc, dismantling shall be done by taking out the fixing with proper tools and not by tearing or ripping off. 1.1.7 Any serviceable material, obtained during dismantling or demolition, shall be separate out and stacked properly as directed by the Engineer-in-Charge within a lead of meters. All unserviceable materials, rubbish etc. shall be disposed off at authorized locations by urban local bodies as directed by the Engineer-in-Charge. 1.1.8 The contractor shall maintain / disconnect existing services, whether temporary or permanent wherever required by the Engineer-in-Charge.

7.2.3 A single span arch can be damaged by hand by cutting horizontal progressive from each springing parallel to the span of the arch until the width of the arch has been reduced to a minimum. 2.5.6 When it is impossible to allow debris to fall to the ground below, centering desired in carrying the load should be erected and the arch demolished progressively. The design of the centering should make appropriate

allowance for impact.

7.2.3 Where deliberate collapse is feasible the crown may be broken working progressively from edges to the centre by the demolition ball method

7.2.4 Collapse of the structure can be effected in one action by the use of explosives. Charges should be inserted into boreholes drilled in both arch and abutments. This method is the most direct for demolition of tall viaducts. 2.5.9 In multi-span arches before individual spans are removed, lateral restraint should be provided at the springing level. Demolition may then proceed as for a single span, care being taken to demolish the spandrels down to the springing line as the work proceeds (see Fig. 15.20). Where explosives are used it's preferable to ensure the collapse of the whole structure in one operation to obviate the chance of leaving unstable portions standing.

7.2.4 Cantilevers (Not part of a Framed Structure) A cantilever type of construction depends for its stability on the superimposed structure. Canopies, cornices, staircases and balconies should be demolished or supported before the failing download is removed.

#### 7.2.5 in-situ Reinforced Concrete

7.2.6 Before commencing demolition, the nature and condition of the concrete, the condition and position of reinforcement, and the possibility of lack of continuity of reinforcement should be ascertained.

7.2.7 Before commencing demolition, the nature and condition of the concrete, the condition and position of reinforcement, and the possibility of lack of continuity of reinforcement should be ascertained.

7.2.8 Attention should be paid to the principles of the structural design to determine which parts of the structure depend on each other to maintain overall stability. F27.3 Demolition should be commenced by removing partitions and external non load bearing cladding. It should be noted that in some buildings the frame may rely on the panel walls for stability.

7.2.9 Where hard demolition methods are to be used the following procedures should be used (a) Reinforced Concrete Beams For beams a supporting rope should be attached of preferably at two or three locations to the beam. Then the concrete should be removed from both ends by pneumatic drill and the reinforcement exposed. The reinforcement should then be cut in such a way as to allow the beam to be lowered under control to the floor.

(b) Reinforced Concrete Columns For columns, the reinforcement should be exposed at the base after restraining wire guy ropes have been placed round the member at the top. The reinforcement should then be cut in such a way as to allow the column to be pulled down to the floor under control (see Fig. 15.38 for sequence of operations).

c) Reinforced Concrete Walls Reinforced concrete walls should be cut into strips and demolished as for columns.

### **7.3 MEASUREMENTS**

7.3.1 All work shall be measured net the following limit, unless otherwise stated herein a) Dimensions shall be measured correct to a cm as listed in the price. (b) Areas shall be worked out in qm correct to two places of decimal in the decimal system. Cubical contents shall be worked out to the nearest MOL cum.

7.3.2 Parts of work required to be dismantled and those required to be demands measured separately

7.3.3 Measurements of all work except hidden work shall be taken before demolition or dismantling and no allowance for increase in bulk shall be allowed

7.3.4 Specifications for deduction for voids, openings etc shall be on the same as that adopted for new construction of the work. 3.5 Work executed in the all condition shall be measured 3.6 Roofs

(i) Rools covering generally including battens boarding, mats, bamboo jafari or other subsidiary supports shall be measured in square meters except lead sheet roof covering which shall be measured in quintals (1523) and stone slab roof covering which shall be measured in cubic meters Ridges, hips and valley shall be girthed and included with the root area Corrugated or semi corrugated surfaces shall be measured in cubic meters (mi) Mud phuska on roofs shall be measured in cubic meter.

(ii) Lead sheets in roofs shall be measured in quintals, and hips, valley, lashings, lining to gutter etc shall be included in this weight (v) RB or R.CC roofs shall be measured as specified in 15.311. (vi) Supporting members, such as rates, pirlins, beams joists trusses etc. of wood shall be measured in cubic meters and steel or ton sections, in quintals 3.7 Ceiling

(1) The stripping of ceiling shall be measured insquare meters (11) Dismantling of supporting joists, beams etc. shall be measured in cubic meters or in quintals as specified in 15.3.6 (v) (H) Height above floor level if it exceeds 3.5 m shall paid for separately

**SECTION- 8**  
**C.C. BED LINING**

**8.1.0 GENERAL**

The lining for canal bed shall consist of cement concrete of nominal mix by volume in the proportion as directed by Engineer-in-charge. The specifications for cement, sand, coarse aggregated and water as per relevant paras of section 4 shall apply here also. The size of the coarse aggregate shall be 20 mm. maximum of the gradation shown in para 4.5.3 and with any modification therein to get a design mix as approved by the Engineer-In-charge.

All relevant paras of Specifications in Section 4 of cement concrete relating to materials, mixing, laying, ramming, curing and finishing, tests and from work for concrete shall also apply for this Item.

**8.2.0 PREPARATION OR BED FOR LAYING CONCRETE**

**8.2.1 EXCAVATION FOR LINING**

Unless specified no over excavation in soft strata for the seating of the lining below the underside of the lining shall be permitted. If any such over excavation is done, then immediately prior to the lining, the Contractor shall make good such over excavation is done, then immediately prior to the lining, the Contractor shall make good such over excavation by refilling with selected materials obtained from the spoil bank or contractor's own borrow area and finish to the grade and selection up to the underside of the lining including watering and compaction to the satisfaction of the Engineer-in-charge so as to provide a firm base for the lining. These operations have to be done by the Contractor at his own expenses.

**8.2.2** For excavation required for seating of lining in hard strata, a maximum over break to the extent of 15 cm, below the underside of the lining shall be permitted and paid for under the item of excavation in hard strata. No rock projection which protrude into the thickness of lining shall be permitted, Thus the minimum depth of excavation shall be strictly limited to the underside of the lining and all rock projections into the lining shall be removed at the Contractor's expense.

**8.2.3.** a) The sub-grade shall be prepared and trimmed and tapped true to level and grade according to the required cross section of the canal to form a firm compacted base to receive the lining. The preparation of sub-grade shall be done just ahead of the lining work, so as to ensure a firm base for the lining and to avoid delay in lining operations,

b) The Contractor shall prepare the earth base for concrete lining in a manner to result in a firm sub-grade for the concrete lining. The bottom; including the surface of compacted embankments, shall be finished accurately to the dimensions shown on the drawings or prescribed by the Engineer-in-charge, and surface so prepared shall be moistened with water and tamped with suitable tools for the purpose of thoroughly compacting them and forming firm base upon which the concrete lining is to be placed.

If at any point, the sub-grade has been excavated beyond the neat line required to receive the lining. the over excavation shall be refilled and finished to the satisfaction of the Engineer-in-charge,

c) Any over break in hard stratum below the underside of the lining shall be refilled completely up to underside of the lining with murum and properly watered and consolidated. Payment for this murum filling to 15 em, depth will be made under item of embankment for casing at the tender rate of that item.

#### **8.2.4 ACCURATE FINISHING OF SUB GRADE**

After the templates are laid and curved, finishing of the sub-grade along the slope etc. shall be accurately done bringing the surface to the required line and slope by fine cutting or by laying needed quantity of murum tamping and watering In case of cutting in soft stratum and banking.

#### **8.3.1 LAYING CAST IN SITU SPECIFIED GRADE CONCRETE FOR LINING IN PANELS**

The bed for lining shall be profusely watered and tamped by a wooden rammer of size 10 cm. x 15 cm. x 1.5 M with handles at the both the edges.

**8.3.2** Para No. 4.1.0 to 4.15.4 and 4.16.0 of the specification of cement concrete shall apply to this item. The mix of the concrete shall be designed in the laboratory before starting the work for which purpose. the Contractor shall supply the required quantity of materials he proposes to use free of cost The mix as designed shall be adopted by him as there is no Change in materials.

**8.3.3** The concreting shall be done panel wise along the slope and in alternate bays, the size of the panels being according to the drawing or as directed. Concrete shall be laid in one depth of specified thickness. The top finished surface of the concrete shall be in the line with hydraulic section of the canal. After concrete is laid to full depth, it shall be compacted thoroughly by tampers and/or wooden sleepers to the satisfaction of the Engineer-in-charge, or the concrete shall be compacted by mechanical plate or screed vibrators.

**8.3.4** If the part on which the concrete is to be placed is under water, it shall be pumped dry and kept so throughout the period of laying concrete and 12 hours thereafter, without any damage to the concrete. The rate of the lining items shall include the cost of any dewatering so required.

#### **8.3.5 EXPANSION JOINTS**

Expansion joints of 12 mm. shall be provided at every 20 m. interval c/c or as directed by the Engineer-in-charge and shall be filled in by 12 mm. thick asphaltic pads. In case of structures 12 mm thick asphalt pads shall be provided for each joint of R.C.C. slab as directed.

#### **ASPHALTIC COMPOUND**

On the exposed face of the cast-in-situ templates compound of approved manufacturer and grade shall be applied. It shall be applied in two coats as directed by the Engineer-in-charge.

#### **8.3.6. FINISHING**

Concrete shall be finished to even and smooth surface free from pockets of exposed aggregates. This shall be obtained by careful use long handled steel trowel. Any remaining roughness shall be rendered smooth with cement mortar 1:3 proportion without any time interval, after laying of concrete and removal of shuttering if used.

#### **8.3.7 DRAINAGE PIPES**

Drainage pipes shall be provided only in hard rock cutting portions where the side slopes are 1/2: 1 proportion and also where the sub soil water table is high at the rate of one per panel at a height of 0,30 meter from bottom and at centre of the panel. An inverse filter of sand gravel and metal of approved gradation and size of 10 x 10 x 10 cm. shall be provided below each pipe as shown in the drawing. This item shall be paid separately.

#### **8.4.0 CURING**

The panels in which concreting is done the previous day shall be covered with burlap or empty cement bags or gunny bags stitched end to end for full slope width or lining in the morning at 7.00 hours of the next day. All exposed area of concrete will be covered with gunny bags etc. and the surface so covered shall be kept continuously watered.

For the purpose of curing steel water tanks of 5,000 liters capacity shall be placed on platform at edge of service road at the rate of one for 500 m. length of lining, which shall be kept tilted with water with arrangement of outlet and flexible hose of at least 300 m. length. water will

be continuously sprinkled on the gunny bags keeping them wet for 14 days. Sprinkling will be done during night time also.

#### **8.5.0 MINIMUM PERIOD BEFORE LINING**

- 8.5.1** In position of banking, lining will be carried out after one monsoon is allowed to pass, after the banking work is completed.

#### **8.6.0 MODE OF MEASUREMENTS AND PAYMENTS**

The rate for this item shall be for a unit/Cum. completed and accepted canal concrete lining of specified proportion, strength and thickness on the basis of surface area including the expansion joint. This rate shall be in full compensation for furnishing hauling and placing all materials including jointing materials and conditioning the base as directed and specified and for furnishing all labours, equipment, tools and incidentals necessary to complete the item including breakages or damages if any.

**SECTION- 9**  
**PROVIDING C.C. SIDE LINING**

**9.1.0. GENERAL**

This lining Is provided on the sides of the canal section every where and consist of.

- i) Preparation of bed for laying the concrete.
- ii) Providing and laying of specified thickness cast-in-situ of specified grade concrete for side lining laid in pal etc as shown in the drawings.
- iii) Providing construction and expansion joints as shown in the drawing,

**9.2.0 PREPARATION OF CANAL,SLOPES FOR LAYING LINING:**

**9.2.1 PREPARATION OF SUB-GRADE IN CUTTING IN SOFT STRATUM AND BANKING:**

No over excavation in soft strata for the seating on the lining below the underside of the lining shall be permitted, If any such over excavation is done then immediately prior to the lining. the Contractor shall make good such over excavation by refilling within selected material obtained from the spoil bank of contractor's own borrow are and finish it to the grade section upto the underside of the lining, including watering and compaction to the satisfaction of the Engineer-in-charge so as to provide a firm

base of the lining, These operations have to be done by the Contractor at his own expense, In the depth of the banking portion lip cutting shall be done to exact slope and section.

**9.2.1. 110 order to utilize the inner side pride material fully, initially the embankment on IP and SR side stall be raised to such a height below TBL that the full pride material from inner side is consumed. The initially laid pride material! should be removed lust before lining is .aid but after passing of at least one monsoon season. For this removed and lain pride material, the condition of passing one monsoon will Removed and laid pride material, the condition of passing one monsoon will be relaxed. However, adequate compaction will be assumed.**

**9.2.2 PREPARATION OF SUB-GRAD IN HARD STRATUM 2:1 AND 1.5:1 SIDE SLOPES**

For excavation in hard stratum over breaks of 15 em depth perpendicular to the slope from underside of the lining are permitted. No rock projections which protrude into the thickness of lining shall tie permitted No rock projections it the over breaks are limited to 15 cm. depth, the space between the underside of the lining and the rock face shall be filled with chip masonry in C.M. 1 :8/1:10 or with 1:6:12 C.C., if overcuts are less than 5 cm.lfthe over-breaks e e more than 15 em. The extra depth beyond 15 cm. shall be filled with masonry 1 : 8/1 :10 C.M, at the cost of the Contractor.

**9.2.3 PREPARATION OF SUB-GRADE IN CUTTING IN HARD STRATUM UP TO 1/2:1 SIDE SLOPE**

For excavation in hard stratum over breaks of 30 cm. depth perpendicular to the slope from. underside of the lining. are permitted. All the over breaks between underside of the lining and excavated face of rock shall be filled with chip masonry in C.M. 1 :8/1:10 proportion or in C.C. 1 :3:6 proportion if overcuts are less than 5 cm. Payment (restricted to 30 cms.) for filling over breaks will be made under separate items,

**9.2.3. PREPARATION OF SUB-GRADE IN CUTTING IN HARD STRATA WHERE SIDE SLOPES ARE 1:1**

For excavation in hard strata, where side slopes of 1: 1 are recommended the over breaks at 15 cm. depth perpendicular to the slope from underside of the lining are permitted. This is to be back filled with C.C. 1 :6:12.

**9.2.4 ACCURATE FINISHING OF SUB GRADE**

After the templates are laid and curved, finishing of the sub-grade along the slope etc. shall be accurately done bringing the surface to the required line and slope by fine cutting or by laying needed quantity of murum tamping and watering In case of cutting in soft stratum and banking.

**9.3.1 LAYING CAST ·IN SITU SPECIFIED GRADE CONCRETE FOR LINING IN PANELS**

The bed for lining shall be profusely watered and tamped by a wooden rammer of size 10 cm. x 15 cm. x 1.5 M with handles at the both the edges.

**9.3.2** Para No. 4.1.0 to 4.15.4 and 4.16.0 of the specification of cement concrete shall apply to this item. The mix of the concrete shall be designed in the laboratory before starting the work for which purpose. the Contractor shall supply the required quantity of materials he proposes to use free of cost The mix as designed shall be adopted by him as there is no Change in materials.

**9.3.3** The concreting shall be done panel wise along the slope and in alternate bays, the size of the panels being according to the drawing or as directed. Concrete shall be laid in one depth of specified thickness. The top finished surface of the concrete shall be in the line with hydraulic section of the canal. After concrete is laid to full depth, it shall be compacted thoroughly by tampers and/or wooden sleepers to the satisfaction of the Engineer-in-charge, or the concrete shall be compacted by mechanical plate or screed vibrators.

**9.3.4** If the part on which the concrete is to be placed is under water, it shall be pumped dry and kept so throughout the period of laying concrete and 12 hours thereafter, without any damage to the concrete. The rate of the lining items shall include the cost of any dewatering so required.

**9.3.5 EXPANSION JOINTS**

Expansion joints of 12 mm. shall be provided at every 20 m. interval c/c or as directed by the Engineer-in-charge and shall be filled in by 12 mm. thick asphalt pads. In case of structures 12 mm thick asphalt pads shall be provided for each joint of R.C.C. slab as directed.

**ASPHALTIC COMPOUND**

On the exposed face of the cast-in-situ templates compound of approved manufacturer and grade shall be applied. It shall be applied in two coats as directed by the Engineer-in-charge.

**9.3.6. FINISHING**

Concrete shall be finished to even and smooth surface free from pockets of exposed aggregates. This shall be obtained by careful use long handled steel trowel Any remaining roughness shall be rendered smooth with cement mortar 1:3 proportion without any time interval, after laying of concrete and removal of shuttering if used.

### **9.3.7 DRAINAGE PIPES**

Drainage pipes shall be provided only in hard rock cutting portions where the side slopes are 1/2: 1 proportion and also where the sub soil water table is high at the rate of one per panel at a height of 0,30 meter from bottom and at centre of the panel. An inverse filter of sand gravel and metal of approved gradation and size of 10 x 10 x 10 cm. shall be provided below each pipe as shown in the drawing. This item shall be paid separately.

### **9.4.0 CURING**

The panels in which concreting is done the previous day shall be covered with burlap or empty cement bags or gunny bags stitched end to end for full slope width or lining in the morning at 7.00 hours of the next day. All exposed area of concrete will be covered with gunny bags etc. and the surface so covered shall be kept continuously watered.

For the purpose of curing steel water tanks of 5,000 L capacity shall be placed on platform at edge of service road at the rate of one for 500 m. length of lining. which shall be kept tilled with water with arrangement of outlet and flexible hose of at least 300 m. length. water will be continuously sprinkled on the gunny bags keeping them wet for 14 days. Sprinkling will be done during night time also.

### **9.5.0 MINIMUM PERIOD BEFORE LINING**

- 9.5.1** In position of banking, lining will be carried out after one monsoon is allowed to pass, after the banking work is completed.

### **9.6.0 MODE OF MEASUREMENTS AND PAYMENTS**

The rate for this item shall be for a unit/Cum completed and accepted canal concrete lining of specified proportion, strength and thickness on the basis of surface area including the expansion joint. This rate shall be in full compensation for furnishing hauling and placing all materials including jointing materials and conditioning the base as directed and specified and for furnishing all labours, equipment, tools and incidentals necessary to complete the item including breakages or damages if any.

Payment at the rate of 5% shall be withheld in running payment. Engineer-in-charge shall inspect the work in relation to finishing, level and line of concrete laid, and release such withheld payment suitably if he is satisfied with the work of finishing of the item.

**SECTION- 10**  
**SC - SHOTCRETING**

**10.1 Scope**

The work shall consist of –

- i) Furnishing all materials, equipment and labour for the manufacture, transport, placing of shotcrete additives and chicken mesh and curing the concrete and performing all the functions necessary and ancillary thereto, including finishing the concrete to the required shape as per drawing.
- ii) Providing and removal of all staging, furnishing all materials, equipment and labour for shotcrete with necessary fixture and supports complete.
- iii) This shall also include the cost of additives.

**10.2 Ingredients**

The ingredients i.e. cement, sand and metal should satisfy all the specifications mentioned in section IC sub-section A, B, C & D.

**10.3 Design Mix**

Shotcrete mix be designed to give 28-days characteristic compressive strength of at least 200 kg/sq cm viz M20 grade concrete. The following mix proportion by weight may be adopted for trial mix.

Cement = 1 part

Sand = 1 part (having fineness modulus of 2.5 or more)

Coarse aggregate = 2 parts (having maximum size of 10 mm to 12 mm)

The cement level may be about 425 kg/m<sup>3</sup>.

Water cement ratio = 0.40 by weight

**14.3.1** Following additives shall be used in the shotcrete mix for quick setting.

Calcium carbonate = 1 kg per bag of cement of 50 kg

Sodium Carbonate = 1/2 kg per bag of cement of 50 kg

Sodium alluminate = 1/2 kg per bag of cement of 50 kg

Total : 2 kg per bag of cement of 50 kg.

viz 4% by weight of cement

**10.4 Procedure**

(i) All loose concrete, cracked concrete/plaster should be removed underneath and around the steel reinforcement. The surface, which apparently appears to be in order, should be hammered to check the soundness of existing cover concrete. All unsound concrete/plaster would come down and be thoroughly scrapped till hard and dense concrete is encountered. Apply air-water jet for final clean-up. Prior to air-water jetting the concrete surface and steel reinforcement should be sand blasted.

(ii) First layer of shotcrete of + 38 mm thickness should, then be sprayed. Air pressure for pneumatic spray should not be less than 5.5 to 6.0 kg/cm<sup>2</sup> and the pressure of water introduced at the shotcrete nozzle be kept at 6kg/cm<sup>2</sup> to 7kg/cm<sup>2</sup>. It should be ensured that the shotcrete layer covers the steel reinforcement complete, with a minimum cover of 25 mm over it.

(iii) Thereafter, wire mesh of size 100 mm x 100 mm x 5 mm be nailed butting with the binding wire of 20 or 24 gauge.

(iv) The second layer of + 38 mm thick shotcrete be then pneumatically sprayed over the first layer.

**10.5 Curing**

Curing of the finished shotcrete surface be done with membrane curing compound for at least 10 days. The membrane curing compound shall satisfy all the requirements.

**10.6 Mode of measurement & Payment**

All linear measurements shall be in metre correct to 0.01 metre. Area shall be computed in square metres. Payment for shotcrete shall be made on square metre basis at the unit rate accepted for the same. The unit rate for shotcrete shall include cost of all additives, staging and membrane curing and no separate payment for the same shall be made.

## SECTION- 11

### M- STONE MASONRY STRUCTURE

#### **11.1 SCOPE**

This item shall include providing all material, labour and equipment required to construct the stone masonry including transporting material, preparation of mortar and placing and curing of masonry. It also includes the form work and scaffolding if required.

#### **11.2 MATERIAL**

##### **11.2.1 STONE**

The stones used for masonry shall be clean, hard, dense, durable, tough and sound and shall be free from decayed and weathered portions, veins flaws, cracks, soft seams, sharp corners and other defects. Stains on two out of six faces may however be allowed if such stains can not be removed even after rubbing with hard wire brush. The rubble shall have, as far as possible, uniform colour and texture and shall be quarried from approved quarries. The size of rubble stones shall be such that 75% stones are not less 15cm in size in any direction and weighing not less than 23kg.

Rejected stone shall be removed from the site within 3 days failing which department will remove the same at the cost of the contractor. Following IS codes shall generally apply to the stone masonry work.

IS 1597 (part-I) 1992 : Code of practice for construction of stonemasonry : Rubble stone masonry.

IS 1127 1970 : Recommendation for dimension & Workmanship of natural building stones for masonry work.

IS 5218 1969 : Method of test for toughness of natural building stone.

IS 1124 1974 : Method of test for determination of water absorption, apparent specific gravity and porosity of natural building stones.

IS 2250 1981 : Code of practice for preparation and use of masonry mortars.

IS 1122 1974 : Method of test for determination of true specific gravity of natural building stones.

IS 1121 1974 : Method of test for determination of strength IS 2116 198  
: Specifications of sand for masonry mortar.

The stone shall be tested for water absorption, specific gravity, soundness, and compressive strength. The physical properties of stone shall meet the following requirements

Test	IS code	Acceptance Criteria
(i) Water absorption (when immersed in water for 24 hours).	IS 1124 : 1974	Shall be less than 5%
(ii) Specific gravity.	IS 1122 : 1974	Greater than 2.5
(iii) Soundness.	IS 1126 : 1974	Less than 10% (after 5 cycles)

##### **11.2.2 SAND**

###### **a) GENERAL**

The sand shall be natural river sand washed and screened and the maximum size of particles being limited to 4.75mm for mortar. The second screening shall be done at site of work before use and no extra claim shall be entertained on this account.

The sand shall consist of hard, dense, durable uncoated rock fragments and shall be free from injurious amount of dust, lumps of soft or flaky particles, shale, alkali, loam, mica and other deleterious substances. The total percentage of all the deleterious substances shall not exceed 5%. The sand shall also be sound and free from deleterious amounts of organic impurities.

### **b) GRADING**

The sand shall be well graded and the grading shall be controlled in such a way that its fineness modulus ranges between 2.60 to 3.20. It shall not have silt more than 3% by weight.

The grading of the sand shall be controlled by mixing of sand from different sources, if necessary, so that the fineness modulus of at least 9 out of 10 consecutive test samples of finished sand, when samples are taken, will not vary more than 0.20 from the average fineness modulus of the 10 test samples. The contractor shall stack sand from different sources separately to facilitate sampling & testing. At least 3days stock shall be kept at site of the work to enable the department to take samples and test the material, in advance of its actual use.

The contractor shall take the approval of the sand stacks in advance. If unapproved sand is used the work shall be rejected and redone at the cost of the contractor. Sand shall conform to provisions of IS 2116 : 1980.

#### **Grading of sand for masonry work**

<b>IS sieve size</b>	<b>% passing by weight</b>
4.75mm	100
2.36mm	90-100
1.18mm	70-100
600micron	40-100
300micron	5-70
150micron	0-15

#### **CEMENT**

Ref. Item no.3 – Concrete mix INGREDIENTS

#### **11.3 WATER**

Ref. Item no.3 – Concrete mix INGREDIENTS

#### **11.4 CEMENT MORTAR**

The cement mortar shall consist of cement and sand each complying with its respective specification and shall be mixed in specified proportions given in drawings and bill of quantities. The code of practice for preparation and use of mortar, IS 2250-1981, shall be followed.

Mortar shall consist of Portland cement and sand in the specified proportion, by volume. Sand shall be natural sand and of grading as may be directed by the Engineer. The mortar shall be mixed in suitable sized mixers. The quantity of sand & cement in each mix shall be determined by weight or by conversion, into volume on the basis of bulk density as per directions of the Engineer-in-charge after making due allowance for bulking of sand.

Only such quantity of mortar shall be prepared at a time as could be completely used up in masonry within thirty minutes of mixing. Mortar that has remained longer, than this period or that has become stiff or set otherwise shall be rejected at the contractor's cost.

The mortar shall be mixed intimately in suitable mechanical mixers (of tilting type). The first batch of mortar at the commencement of work with any mix shall be made richer by mixing 10% more cement over and above that required for the particular mix. The mortar prepared in the mechanical mixer shall be mixed for at least 3 minutes or as directed by Engineer-in -charge. The contractor shall not be entitled for any extra payment for such increase in mixing time.

Hand mixing of mortar shall not be allowed: Only in exceptional circumstances, such as mechanical break down of mixer, or when the quantity of work is very small, hand mixing may be permitted by the Engineer-in-charge for that restricted period and the restricted quantity. This shall be done on a smooth water tight platform large enough to allow efficient turning over of the ingredients before and after adding water. Mixing platform shall be so arranged that no foreign material gets mixed with water nor does the mixing water flow out. Dry sand and cement shall be mixed thoroughly by turning over to get a mixture of uniform colour. Enough water shall then be added gradually and mixing continued until mortar of required consistency of 90 to 100mm, as required in clause 9.1.1 of IS: 2250-1981 is obtained.

All ingredients shall be fed to the mixer simultaneously. The required quantity of water to achieve the required consistency shall be pre determined by trial mixes, and portion of water from 5 to 10 percent shall precede and the like quantity shall follow the introduction of other materials. The remainder of water quantity shall be added during mixing operation.

### **11.5 MORTAR CONTENT**

As specified herein the average mortar content in 1 cum of the masonry is expected to vary between 0.37 to 0.43cum. The actual consumption of mortar shall be recorded from day to day as equivalent to the volume of the sand fraction of the mortar before the sand enters the mixer. The mix shall be as per proportions specified / approved by Engineer-in-charge from time to time. Following general principles shall be followed

(i) The ingredients shall be fed into the mixer simultaneously and in such a manner that the period of flow of each ingredient into the mixer is about the same.

(ii) A portion of water 5% to 10% shall be fed in the mixer initially and like quantity shall follow the introduction of other ingredients. The remaining of the water would be added uniformly and simultaneously with other ingredients.

(iii) The thoroughness of mixing and adequacy of mixing time so as to give a uniform mortar, shall be tested at the start of the job and at such intervals as may be considered necessary. The variation in air free unit weights (range between max. and min.) shall not be more than the limits given below for three samples, one each taken from the front, centre and back of the batch.

For one batch	-	36.6kg/cum.
Average for three batches	-	25.5kg/cum.
Average of 20 batches	-	19.1kg/cum.
Average of 90 batches	-	14.3kg/cum.

### **11.6 MASONRY GENERAL**

Generally, the masonry shall consist of sound, tough, durable and as far as possible, fine or medium grained stone rubble of approved quality embedded in cement mortar. The mix proportion of mortar in the masonry shall be as shown in the drawings, or of proportion as required by design consideration the later being subject to approval of the Engineer-in-charge from time to time with due allowance for the season of the year and the time of the day when the mortar is used and based on experiments and experience gained. The mortar proportion may be varied if desired by the Engineer, which shall not be considered extra items. All stones shall be absolutely free from dirt and scale and well cleaned and washed before being laid. On no account shall masonry be allowed to present a dry surface during the curing period. At the end of the

day's work the top shall be kept well flooded. The masonry shall be raised in courses and unless otherwise directed the next course shall not be laid earlier than 24 hours after the laying of the previous course. The rates given in the various items are based on standard consumption for purpose of computation of cement consumption. However, this shall be assumed as an average of 40% of finished masonry. A variation up-to  $\pm 3\%$  may be allowed in actual consumption on reasonable grounds without any change in rates. Variation of more than 3% on lower side will not be permitted and it will be considered as below specification of work. Variation of more than 3% on higher side will be at the risk and cost of contractor

To keep a check on the quantity of mortar used, record shall be maintained of the mortar turned out from the mixers and corresponding quantity of masonry laid.

The joints shall be well filled with mortar and suitable spauls shall be wedged to avoid excessive use of mortar. The stones shall be pressed and tamped.

### 11.7 TESTS ON MORTAR

Necessary tests to determine compressive strength of the mortar and for its consistency shall be carried out in accordance with IS: 2250-1981 (Appendix-A). A minimum of 3 test specimens shall be made for each 120 cubic meters of each class of mortar. There shall be at least 3 test specimens of mortar for each day of masonry work even if only a few cubic meter of particular mortar is manufactured and used in a day.

#### TESTS AND FREQUENCY OF TESTING

S.N o	Material	Test	Frequency of test	Test designation (Indian standard)
1.	Stone for masonry	a) Compressive strength. b) Water absorption. c) Soundness	One test in each working season of individual quarry.	IS : 1121-1974 IS : 1124-1974 IS : 1126-1974
2.	Cement mortar cubes	Compressive strength after 28-day curing of mortar cubes.	Up-to $120m^3$ of masonry work per day = one sample per shift per mixer. For every additional $100m^3$ of masonry work per day = one sample per shift per mixer.	IS : 2250-1981

The strength of one sample shall be taken as average of at least 3 test specimens taken from single batch of mortar. The average strength of any 3 consecutive samples shall be equal to or greater than the specified strength. The overall co-efficient of variation for any 10 consecutive samples shall not be more than 15 percent. Not more than 10% of the specimens tested shall have a compressive strength less than 80% of the required and the average strength of all tests shall equal or exceed the required specified strength. The minimum compressive strengths for 1:5, 1:4 and 1:3 cement mortar mixes shall be 56 Kg/Sq. cm. and 93 Kg/Sq.cm., 127 Kg/Sq.cm. respectively.

## **11.8 RANDOM RUBBLE MASONRY CONSTRUCTION**

### **(a) DRESSING**

The stone shall be set in the work as received from the quarry, after merely knocking off weak corners and edges with the mason's hammer and after clearing scales of foreign matter, coating if any on the stone. Cleaning and washing of stones as specified earlier shall, however, be done in each case.

### **(b) WASHING OF RUBBLE**

All rubble to be used in masonry shall be thoroughly washed with good clean water. All stones shall be wetted and surface dry while being laid. There must be a good collection of stones, and spauls within easy reach of each mason to enable proper selection of stones to suit the individual locations while laying and these shall be kept continuously replenished.

### **(c) BOND AND LAYING**

The stones shall be carefully laid so as to break joints as much as possible and shall be solidly bedded in mortar with close joints. No joint shall exceed 37 mm nor shall be less than 12mm in thickness. Chips of stone and spauls shall be wedged into the work, wherever necessary to avoid thick beds or joints of mortar and to give maximum density. No dry work or hollow space shall be allowed. Every stone, whether large or small, shall be set flush in mortar, shaken and hammered down by a mallet to sink into it. The smaller stone used in the filling shall be carefully selected to fit smugly into the interstices between the larger ones.

Additional mortar to be added to fill the intervening space shall be well worked by trowel and a light hand bar, 12.5mm diameter, and 0.60m long to ensure proper mixing and bonding with the bottom mortar. Disturbing the mortar during the process of setting shall be avoided. After the stone is laid, underpinning shall be avoided as this tends to lift the stone and leave air pockets. Putting chips in the intervening space, between stones shall not be done before filling it with mortar and shaking it down to the full depth. Flat chips shall not be laid at top. They shall be driven on the ends vertically. The masonry surface shall be kept as rough as possible to secure good bond between successive layers.

### **(d) HEADERS AND THROUGH STONES**

Vertical headers shall be inserted every 1.5m to 2metres apart both along and across the masonry monolith. They shall run through the height of at least two courses. Their positions shall be staggered in the successive courses, so that any two courses shall be bonded with such vertical headers. Through stones shall be laid horizontally from the front face to the rear face every 1.5 to 2metres apart. The consecutive stones shall overlap each other at least 15cm. and shall be at least 60cm. long each.

The overlaps shall be staggered as stated herein above, wire brush the masonry to clean between 24 and 36hrs. after it is laid. In case of long stoppage of work, leave construction joints 2 meter wide by 0.5 meters deep to serve as cut-off.

Important Requirements of Masonry Construction:

- No masonry works shall be allowed except in day light.
- Clean the old masonry surface prior to starting of new masonry work.
- Desired consistency of mortar shall be maintained.
- Do not place mortar which bleeds excessively.
- Surface of masonry shall be as rough as possible to secure good bond between successive layers.
- Wire brush the masonry surface after the mortar has set finally i.e. after 8hr. to 12hr. to remove excessive mortar.

- Only such quantity of mortar shall be prepared at a time as could be completely used within 30 minutes.

(e) CURING

Adequate mechanical arrangements shall be made by the contractor to protect the fresh masonry against rapid drying and to cure the masonry as detailed below. Curing of the masonry shall commence after about 4 to 12 hours of construction (depending upon weather, atmospheric temperature etc.) and water shall be gently sprayed to avoid damage.

All exposed surface of masonry shall be continuously kept moist for a minimum period of 28 days. All methods used for curing shall leave the surface free from any dislocation or damage. The surface should be cleaned of all the materials after completion of work. Should the masonry in any part deteriorate for want of curing, it shall be pulled down and rebuilt with fresh materials at the cost of the contractor.

**15.9 MODE OF MEASUREMENT OF MASONRY AND PAYMENT**

Except as otherwise specifically provided in these specifications, measurement of masonry for payment will be made only to the neat lines of the structure as shown on the drawings or as established by the Engineer-in-charge and on the basis of the thickness shown in the drawing. Where more than one thickness is shown the average thickness shown on the drawings will be used as the basis of measurement for payment. The rate for thid item shallbe for unit/Cum.

## SECTION – 12

### **3.31. SPECIFICATIONS FOR BITUMINOUS GEOMEMBRANE LINING**

#### **3.31.1 Description of Item**

A Bituminous Geomembrane (BGM) is an excellent waterproofing material which is practically impervious. It is manufactured by impregnating a non-woven polyester geotextile with an elastomeric bitumen compound. The BGM composites contain internal non-woven polyester reinforcement from 200 g/m<sup>2</sup> up to 400 g/m<sup>2</sup> and overall thickness of the composites are from 3.5 mm up to 5.6 mm which allows this to be used without any protective cover such as earth/concrete.

This durable composite is an effective waterproof and gas-impermeable separation layer with significant properties like UV resistance, workability at temperatures -40 to 55 °C, mechanical / puncture resistance, flexible, stable against alkali and acidic medium, suitable for potable water, dimensional stability and mechanical workability, easy installation, welded and repaired by local crews or maintenance people of any client.

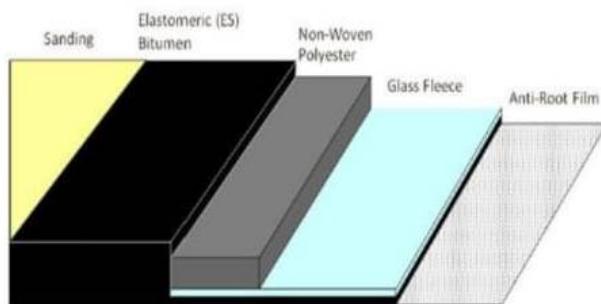
#### **3.31.2. Scope of work**

This specification covers the requirements for providing and supplying of Bituminous Geomembrane as hydraulic liner including all statutory duties, insurance, transportation and third party inspection charges of agency approved by WRD, excluding taxes levied by Government of India and Government of Maharashtra in all respect.

#### **3.31.3. Material Specifications**

##### **3.1 Introduction:**

The term geomembrane refers to all geomembranes intended for civil engineering structures. Geomembranes are thin, flexible, seamless, and impermeable in all circumstances, according to Darcy's Law (coefficient of permeability below  $10^{-13}$  m/s) and retain their properties even when in service. BGM is based on the combination of a non-woven polyester geotextile for mechanical resistance, and a specifically designed bituminous binder that guarantees waterproofing, chemical resistance and ageing behavior.



*Bituminous Geomembrane Structure*

**3.2 Applications:** Bituminous Geomembrane is widely used as waterproofing barrier in the below listed areas.

#### **Hydraulic uses**

- Dams
- Channels
- Irrigation canals
- Navigation canals
- Reservoirs and basins
- Banks protection

#### **Environment uses.**

- Solid waste storage
- Domestic waste containment
- Industrial or mining waste covering
- Polluted snow storage area
- Compost area, clinkers containment pad and other wastes
- Liquid waste storage
- Decantation Dam for polluted water
- Decantation Pond for polluted water
- Protection against agricultural pollution

#### **3.3 Applicable ASTM codes:**

The manufacturing, supplying, and testing at work sites of Bituminous geomembrane shall comply within range of following physical and mechanical properties of Type-A BGM as per with below listed ASTM standards and codes.

S.no.	Physical Properties	Unit	Standard	Type- A
1	Thickness	mm	ASTM D 5199	3.5-4.0
2	Width (average)	m		5.0
3	Length	m		80
4	Unit weight	kg/m <sup>2</sup>	ASTM D 3776	4.3-4.85
5	Friction angle	degree		34°
6	Thermal expansion coeff.	mm/m/°C	ASTM 1204	2 x 10 <sup>-3</sup>
7	Water Permeability	m/s	ASTM E 96	4x10 <sup>-14</sup>
8	Gas Permeability	m <sup>3</sup> /(m <sup>2</sup> .d.atm)		2 x10 <sup>-4</sup>

S.no.	Mechanical Properties	Unit	Standards	Type-A
1.	Max. tensile strength			
1.1	Longitudinal	kN/m	ASTM D 7275	18-27
1.2	Cross direction	kN/m	ASTM D 7275	15-24
2.	Elongation			
2.1	Longitudinal	%	ASTM D 7275	30% - 60%
2.2	Cross direction	%	ASTM D 7275	
3.	Static puncture resistance	N	ASTM D 4833	477-530
4.	Resistance to tearing			
4.1	Longitudinal	N	ASTM D 4073	619-825
4.2	Cross direction	N	ASTM D 4073	525-700

### 3.31.4 Unloading.

#### 4.1 Access

Before unloading, access conditions to the site must be studied carefully to bring in the rolls correctly to avoid wasting time. The main concern is room! Delivery trucks and machinery (loader, forklift, crane or excavator) need to be able to turn; bear in mind that they could have special additional equipment (such as an unloading pin or Unloading beam).

#### 4.2 Delivery of rolls

Usually, the delivery will be carried out by regular 20' sea-containers each containing 9 rolls maximum.

##### a. Usual characteristics of a 20' sea-container

<b>Weight</b>	2,300	
<b>Internal dimensions</b>	<i>Length</i>	5,90 m
	<i>Width</i>	2,35 m
	<i>Height</i>	2,40 m
<b>External dimensions</b>	<i>Length</i>	6,10 m
	<i>Width</i>	2,45 m
	<i>Height</i>	2,60 m

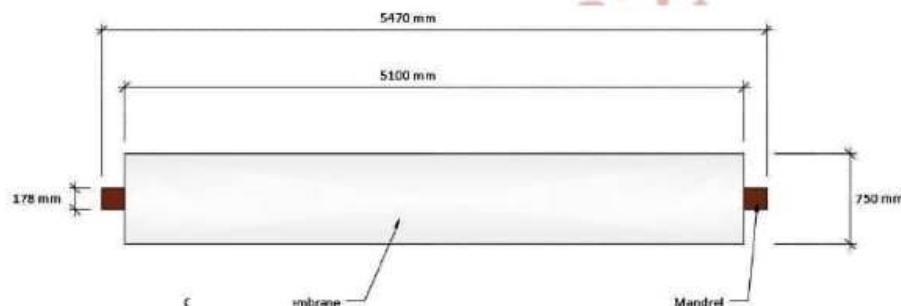


BGM rolls in container

Rolls of BGM each having 5.1m width and of required length, thickness manufactured, wrapped over a steel mandrel of 5.47m long (refer fig below) and transported from factory location to site. For the unloading of BGM rolls from containers, fabrication of special unloading Pin or unloading beam is must keeping in view the load and dimension of each roll.

### 3.31.5 Storage of BGM rolls

On the ground, each roll occupies a surface of 5 m<sup>2</sup>, thus sufficient area should be available at site as per the number of BGM rolls. Additional space is also required for handling depending on the vehicle used (shovel, crane, loader or crane truck etc).

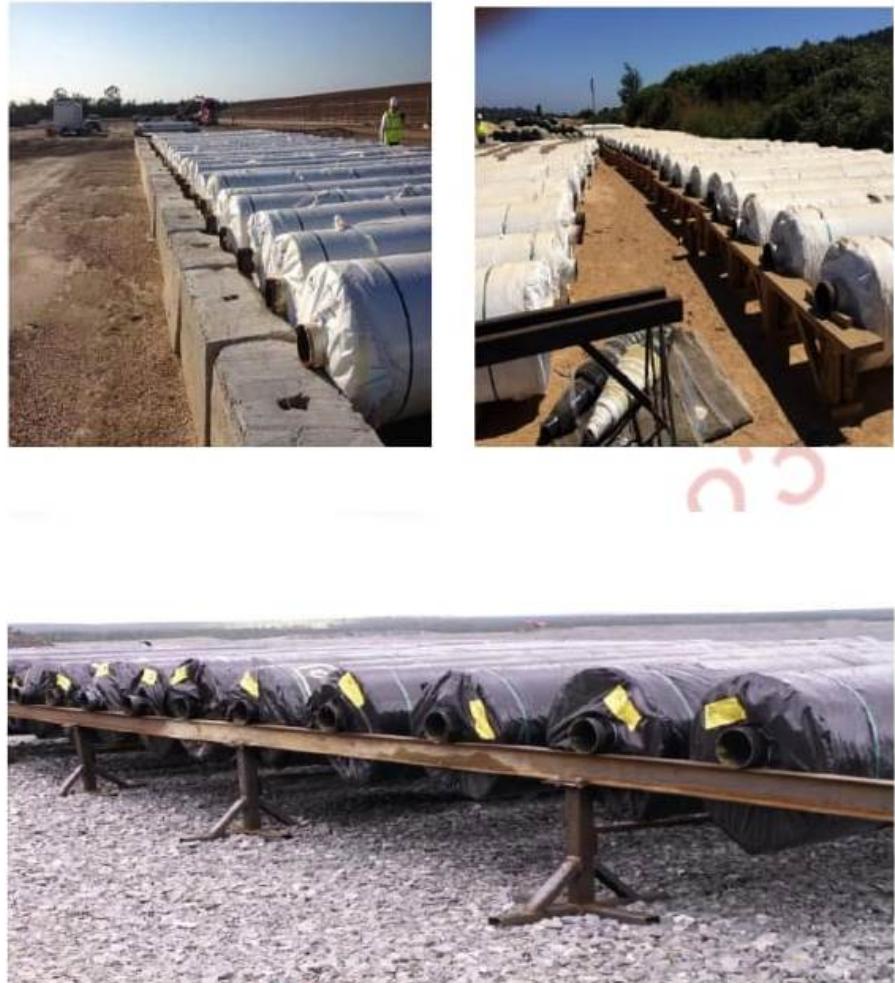


*Dimensions of BGM roll with mandrel.*

On the ground, each roll occupies a surface of 5 m<sup>2</sup>, thus sufficient area should be available at site as per the number of BGM rolls. Additional space is also required for handling depending on the vehicle used (shovel, crane, loader or crane truck etc).

The rolls should not be stored directly on the ground due to risk of punching on several layers of the roll. When storing rolls, the distance between the bottom of the roll and that of the mandrel, which is approximately 35 cm, must be taken into consideration. They should lay on adapted rigid supports such as:

- Concrete blocks
- Wooden beams
- Metal trestles or I-beams



*Different types of supports for the storage of BGM rolls*

### **3.31.6 Methodology of execution.**

#### **6.1 Subgrade Preparation**

Before installation of BGM, it must be ensured that the slope and base of canal bed (subgrade) is properly compacted, and the subgrade must be inspected to ensure there are no sharp edged aggregates. After compaction, the ground is sterilized where plant growth could cause problems, especially near anchorages. The subgrade preparation is done by filling the base and slope with morrum or locally available material at appropriate moisture content and compacting it uniformly using a plate compactor as shown in figure below.



*Subgrade Preparation before BGM installation*

### **6.2 Trench Excavation**

The anchorage trench with depth and width as shown in figure below should be excavated at the top edge of both the banks of canal to immediately anchor the membrane with anchor bar 12mm diameter and spacing @ 0.75m c/c along the canal length.



*Trench Excavation for BGM at canal banks*

### **6.3 BGM Laying**

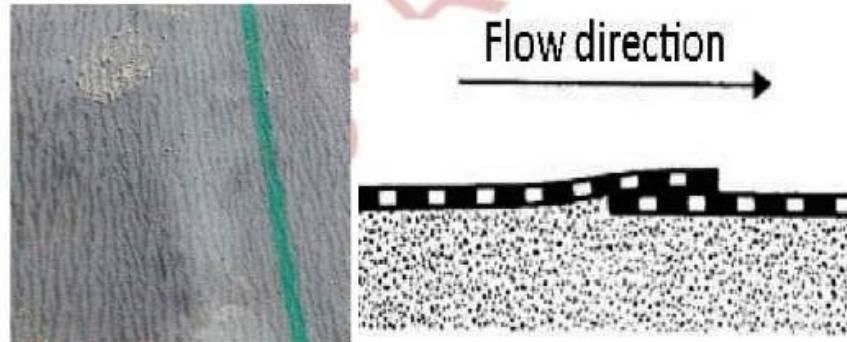
For the purpose of installation of BGM at the canal, a manual installation beam need to be fabricated of the required capacity and dimension. There is a green marking indicator at the BGM roll as to where to place the overlap for full uncut rolls and to easily guide the workers when laying the strips. For cut rolls, it is necessary to mark the position of the membrane with builder's line or painted marks, to define a minimum 20cm overlap.



*Laying of BGM sheet by installation beam*

Also during installation, it is always ensured that the overlapping of BGM over the other is done in canal flow direction as shown in below figure.

The laying of BGM should be carried out with the terphane (clear plastic film) downwards and the sanded face upward. The sanded face helps in stable movement of construction personnel and the terphane film is anti-rooting film, which protects the penetration of vegetation from subgrade to BGM.

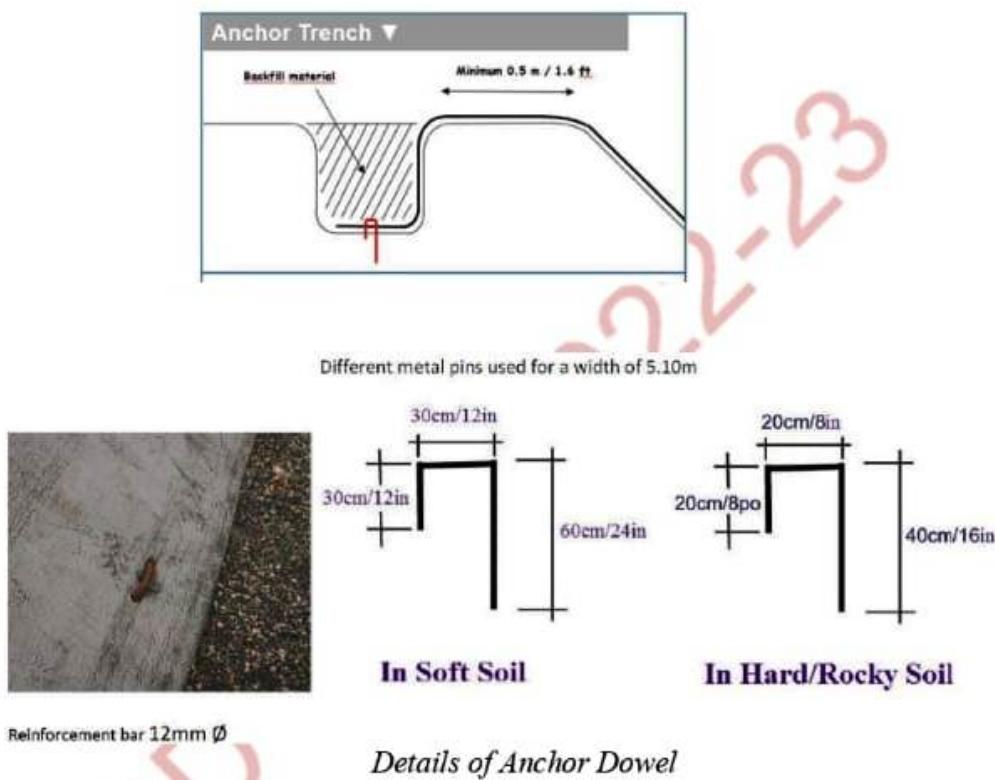


*Overlapping of BGM layer*

A gang of about 20-25 persons is required to pull the BGM from the installation beam upto the other bank top of canal. The installation beam is supported by a crane staying at one bank top of canal. Another gang of four persons would install the anchors by hammering into the trench and then immediately backfilling with compacted earth along the trench except at the location of overlapping. This location would later be torch welded and then anchored and backfilled.

#### 6.4 Trench Anchorage

The proper execution of anchoring at the crest is essential to the behaviour of the geomembrane and to prevent creases along the slope. The trench prepared at both the banks in advance to avoid unnecessary and potentially damaging movements of the membrane as explained earlier for anchorage of BGM at both banks.



#### 6.5 Welding/Torching

After laying of BGM with proper overlapping in the flow direction, torching of overlapped part is done in order to ensure the monolithic behavior of two separate roles. A typical manual welding crew includes:

- a welder, a helper for rolling
- An additional worker is needed for seam preparation (clear dirty membranes exposed to mud or wind, etc.). The welder leads the whole operation, setting the pace and directing the helper.

### 6.5.1. Welding Equipment

The equipment required for manual welding includes:

- Propane/LPG gas torch with a 4-hole flat burner, attached with a lance and a trigger handle with adjustable flow.
- LPG gas cylinders, with a hand truck and an adjustable pressure valve between 0 and 3 bars.
- Flexible gas feed pipe that is long enough to allow welding of a whole strip without having to move the propane gas bottle. Heatproof gloves in accordance with regulations.
- Small trowel and Fire extinguisher with powder or carbon dioxide.



*Installation kit*

### 6.5.2. Cleanliness of Weld

- The surface to be welded must be clean to ensure no defects and a proper mechanical resistance in accordance with specifications.
- Visible mud traces must be cleaned with a sponge.
- Any sharp stones that may still lie under the lower geomembrane must be removed, as their presence would hinder the proper rolling of the seam.

### 6.5.3. Detailed Procedure of Welding

The procedure for welding is as follows:

- Remove any sharp stones that may still lie under the membrane, as their presence would hinder the proper rolling of the seam.
- Carefully brush the seam area to remove loose sand.
- Clean mud traces with a sponge.
- Remove the PE silicone film after the seam area has been cleaned.
- Carefully burn in advance the terphane film where present, after turning the membrane upside down.
- First, weld a 50cm long area, and roll the roller on it carefully to join the two strips together.
- While moving at a continuous steady pace with one hand or a hook, lift the upper membrane about 10cm and insert the torch between the two strips, while keeping the flame aligned with the edge in order to heat the 20cm width in one single run.
- Carry out the rolling 1.5 or 2.0 meters behind the burner, about 1.0 meter behind the flame.
- The torch must be tilted so as to simultaneously melt the bitumen on both surfaces.
- The welder heats the overlapping surfaces until the bitumen begins to melt (stop before the bitumen melts completely or begins smoking).
- The entire width of the overlap must be welded.
- The welder lowers the top geomembrane onto the bottom geomembrane, which may leave a few wrinkles in the overlap.

### 6.6 Rolling

Few minutes after the welding operation, the assistant welder presses down on the overlap with a roller, making sure the wrinkles are removed. Rolling is then carried out about 1 m behind the flame.



*Torching and rolling of overlap joints*

A bitumen edge must ooze when rolling, on a width up to 3 cm – visual proof of good quality weld. The welder then adjusts his forward speed and the torch power to control the amount of heat applied to the seam.

#### **Finishing of welds joints**

Once the strip is finished, cooled down and visually inspected, the welder proceeds to the finishing works, through reheating the edge and shaping it as a fillet, with a small trowel.



*Finishing of welded joint*

### **3.31.7. Testing**

Third party inspection for physical and mechanical properties of BGM rolls are mandatory. Third party inspection agencies will be decided by the Hon. Chief Engineer after the work is awarded. Contractor may suggest three names of reputed third-party inspection agencies.

The testing of BGM rolls shall include the following tests.

- Thickness (mm)
- Width (m)
- Mass per unit area (kg/m<sup>2</sup>) in accordance with ASTM D 3776.
- Tensile strength (N/mm) in accordance with ASTM D 7275.
- Elongation (%) in accordance with ASTM D 7275.
- Static puncture (N) in accordance with ASTM D 4833.

### **3.31.8 Mode of measurement**

All measurements shall be taken on cross section of canal. For this purpose, detailed cross section of the canal bed shall be taken at the interval of 30 m. or less as directed before a particular reach starts. The Contract rate shall be in sq.m of the BGM used. The measurements should be inclusive of overlap and minimum overlap between joints should not be less than 200mm. The final area should include the cross section of canal and overlaps complete.

The unit of measurements shall be per square meter. The unit rate includes,

- Manufacturing & supply cost.
- Transportation up to site
- Third party inspection & testing charges.
- All taxes

## SECTION - 13

### QUALITY ASSURANCE AND TESTING

**13.0      Quality Assurance and Testing**

**13.1      Specification**

It is the responsibility of the contractor to assure the desired quality of work. Whenever the testing of construction materials are required as per the detailed specifications or otherwise required by the Engineer-in-charge, the same shall be carried out at the laboratory, selected by the Engineer-in-charge at Contractor's cost.

The other tests of mortar, concrete, colgrout etc. shall be carried out in field laboratory set up by the contractor in presence of quality control representative. Contractor shall through this procedure assure the quality of work.

The materials, mixes and any other arrangements, including labourers, shall be supplied by the contractor to the Corporation at contractor's cost. The samples for testing shall be taken in the presence of Engineer-in-Charge or his representative present on site.

The contractor or his authorized representative shall have a free access in these laboratories, to get himself satisfied about procedures of testing etc. Even if the contractor or his representative fails to remain present while collecting samples or testing the results will be considered as authentic and binding on the contractor.

**13.2      Mode of Payment**

The rates of quality control charges are included in the tendered items hence separate payment will not be done for quality control tests.

**13.3**      Contractor has to carry out quality control test as per specifications and as directed by Engineer-in-Charge & quality control and vigilance organization of Govt.